# Initial Environmental Examination

February 2022

# Vanuatu: Greater Port Vila Urban Resilience Project – Additional Financing

Prepared by the Ministry of Internal Affairs for the Asian Development Bank.

# Initial Environmental Examination

Project Number:
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# Vanuatu: Greater Port Vila Urban Resilience Project - Additional Financing

## Multipurpose Emergency Shelter at Korman Market

## Nature-Based Coastal Protection

Prepared by the Ministry of Internal Affairs
Prepared for the Asian Development Bank

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## ABBREVIATIONS

| | | |
|---|---|---|
| ADB | - | Asian Development Bank |
| CBD | - | central business district |
| CCP | - | Communications and consultation plan (for the Project) |
| CDCCC | - | community disaster and climate change committee |
| CEMP | - | Construction environmental management plan (of the contractor) |
| CME | - | Commonwealth Marine Economies Program |
| CSO | - | civil society organization |
| CSS | - | country safeguards system |
| DEPC | - | Department of Environmental Protection and Conservation |
| DLA | - | Department of Local Authorities (within MOIA) |
| DSC | - | Design and supervision consultants |
| EARF | - | environmental assessment and review framework |
| EHSG | - | Environmental Health and Safety Guidelines (of the World Bank Group) |
| EIA | - | environmental impact assessment |
| EIS | - | environmental impact statement |
| EMP | - | environmental management plan |
| EPCA | - | Environment Protection and Conservation Act 2010 |
| GPV | - | Greater Port Vila |
| GRM | - | grievance redress mechanism |
| IEE | - | initial environmental examination |
| IMMT | - | Ifira Marine Management Team |
| ITF | - | Irish Trust Fund (additional financing grant administered by ADB, for coastal protection) |
| MCC | - | Ministry of Climate Change Adaptation, Meteorology & Geohazards, Environment, Energy and Disaster Management |
| MFEM | - | Ministry of Finance and Economic Management |
| MOIA | - | Ministry of Internal Affairs |
| MLNR | - | Ministry of Lands and Natural Resources |
| NDMO | - | National Disaster Management Office |
| NEPIP | | Vanuatu National Environment Policy and Implementation Plan 2016–2030 |
| O&M | - | operation and maintenance |
| PCU | - | Project Coordination Unit |
| PEA | - | preliminary environmental assessment (conducted by DEPC) |
| PVCC | - | Port Vila City Council |
| RUDSAP | - | Resilient Urban Development Strategy and Action Plan |
| SPGC | - | Shefa Provincial Government Council |
| SPS | - | Safeguards Policy Statement 2009 (of ADB) |
| SUMA | - | Special Unique Marine Areas |
| TOR | - | Terms of reference |

## NOTE

In this report, "$" refers to US dollars.

# EXECUTIVE SUMMARY

1. **Background**. The Government of Vanuatu (the government) is being supported by the Asian Development Bank (ADB) to implement the Greater Port Vila Urban Resilience Project (the project). The project will increase urban resilience and livability in Greater Port Vila area through resilient infrastructure development, sector strengthening support and coordinated policy dialogue and will address issues of effectiveness and sustainability based on lessons emerging from previous projects in Vanuatu. The project also responds to the dual threat and crisis caused by the novel coronavirus (COVID-19) and Tropical Cyclone Harold in the recovery stage through (i) preventive measures, (ii) a focus on the vulnerable and 'new poor'; and (iii) partnerships and labor-intensive investments that would help generate jobs and stimulate the local economy.

2. **Institutional arrangements**. The executing agency is the Ministry of Finance and Economic Management (MFEM), and the implementing agency is the Ministry of Internal Affairs (MOIA), through a Project Coordinating Unit (PCU). A project Implementation Assistance Consultant (PIAC) and/or design and supervision consultants (DSC) will be recruited to support the MOIA and PCU.

3. **The project**. Port Vila, Vanuatu's capital city and economic hub, located on the island of Efate is a growing city that faces not only expansion but high vulnerability to natural hazards such as cyclones, earthquakes and associated tsunamis, prolonged inundation and drought. A recent example is Tropical Cyclone Pam which caused more than 32,600 households to seek post-disaster support. Port Vila has a population of just over 50,000 and is projected to double in size by 2028. The municipality has already outgrown its original urban boundaries due to the substantial population growth, along with urban migration, rapid development of squatter and informal settlements. At the same time, commercial installations are expanding. The efficiency of existing infrastructure reflects not only rapid growth but also deficiencies in urban planning over the city's history as well as ineffective implementation of urban development. The ongoing inefficiencies are attributed to a lack of clearly defined institutional responsibilities among the government agencies concerned. There is a need for both institutional reform and improved land use planning and development processes that take account of against risks from potential hazards to prevent or reduce the destruction of public and private infrastructure, economic assets and threats to lives and livelihoods.

4. **Additional financing**. The government is now seeking additional financing to construct a third emergency multi-purpose shelter and install nature-based coastal protection along selected sections of Fatumaru Bay.

5. **Impact, outcome and outputs**. The additional financing will further contribute to impact of the project which is Greater Port Vila is a safe, inclusive, resilient, and vibrant economic hub based on sustainable development. The project is a sector project, comprising a series of subprojects for which an investment framework has been developed. Project outputs will result in the following outcome: Improved resilience and livability in Greater Port Vila. Like the original project, the additional financing is aligned with Vanuatu 2030 with the following impact: Port Vila is a safe, inclusive, resilient and vibrant economic hub based on sustainable development. The outputs are as follows:

- Output 1: Resilience in urban planning and management is strengthened.

- Output 2: Urban resilience is enhanced through local partnerships.
- Output 3: Resilient urban infrastructure is constructed in Greater Port Vila.
- Output 4: Asset management and institutional capacity strengthened.

6. **Safeguards**. The project is designed and implemented in compliance with the country safeguards system (CSS) of Vanuatu and Safeguard Policy Statement 2009 (SPS) of the ADB. An environmental assessment and review framework and an initial environmental examination (IEE) were prepared for the original project, in accordance an IEE has been prepared for the construction of a third multipurpose emergency shelter in Port Vila, located at Korman Market in the municipal wards of Freshwater-Tessariki, and installation of demonstration sites for nature-based coastal protection for Fatumaru Bay. All statutory clearances will be obtained prior to commencement of civil works. The cleared IEE and clearance under the country system (along with any permit conditions) will be included as part of the contract package for civil works Monitoring of EMP implementation by the executing and implementing agencies will be reported to ADB.

7. **Anticipated impacts and mitigation measures**. Potential impacts and mitigation measures were identified through review of the feasibility studies prepared for the multipurpose emergency shelter facilities and the proposal for the coastal protection works, discussion with the team involved in design and stakeholder consultation. The feasibility study presents the preliminary design, detailed engineering design will be completed by the PCU with the assistance of the design and supervision consultants, to be recruited in 2020/2021. The IEE will be updated on the basis of detailed design.

8. Most impacts will be minor, temporary in that they will be created during the construction stage only, and these are expected, largely site specific and can be managed and mitigated readily. Impacts include biosecurity impacts from imported material and plant, dust, noise, waste generation, localized water quality impact, small-scale (building platform) earthworks, minor vegetation removal and clearance, water use, and use of hazardous substances. As the contractors will be either local or locally based, with a significant skilled, semiskilled workforce there will not be introduction of a large foreign workforce. The workforce may include islanders from other provinces in Vanuatu who will be temporarily resident. To minimize risks of social disruption and spread of disease, the contractor will be required to ensure that workers either come from within and around Port Vila as far as possible, or are from groups that are customarily resident in Port Vila for short periods for purposes such as work and study. Therefore, risks associated with labor influx and spread of communicable diseases will be minor. The increased opportunities for employment will be a positive, temporary impact.

9. **Environmental management plan**. An environmental management plan (EMP) has been prepared for each of the two subprojects and sets out the needs for environmental management of subproject construction and operation in terms of institutional responsibilities to ensure mitigation and monitoring takes place during the pre-construction, construction and operation phases, meeting the requirements of the government and the SPS. The EMP will be updated on detailed design and, along with the environmental permit (and any conditions), will be included in the bid documents and will be further reviewed and updated during implementation. The outline EMPs are included in this IEE.

10. As part of developing their construction environmental management plan (CEMP) based on the EMP in this assessment, the contractors will establish a health and safety plan to be adopted at each site following international best practices and the World Bank Environmental Health and Safety Guidelines (EHSG) on construction and decommissioning activities. The plan will cover communication and training; avoidance and mitigation of physical hazards and work-safe practices and measures to prevent the spread of communicable disease including COVID-19. Contractors' personnel are expected to be Ni-Vanuatu, or international staff resident in Vanuatu. Should international staff be required, such personnel must obtain clearances and undergo isolation for fourteen days, or longer if so, required by local regulations. On condition that the required measures are enacted by the contractor, the risk, or impact, is considered minor.

11. **Consultation and disclosure**. During implementation, communications about the project will be in accordance with government requirements and ADB's Access to Information Policy 2018. A communications and consultation plan (CCP) has been prepared for the Project. This will be updated early in implementation by MOIA, supported by the PIAC. Consultations have taken place in the form semi-structured interviews, surveys and group discussions, to gather facts and gain an understanding of issues facing stakeholders, and the views and needs of the city's inhabitants. In connection with the core subprojects, ward secretaries and groups of ward members were consulted on priorities. All ward representatives stated a need for multi-purpose halls able to provide accommodation in emergencies, clinics, sanitation, an office for the ward secretaries and key community representatives, and storage facilities. The benefits of coastal protection were clear to the participants.

12. Matters discussed included issues that have arisen with the use of schools and churches for shelter during times of emergency, which have led to resentment and shelter being denied, and the role of multi-purpose facilities to provide the longer duration shelter needed while affected homes are made habitable again. The importance of community centers to stimulate and encourage social activities among youths was also stressed.

13. Guided by the CCP, consultations for the overall project were conducted with government agencies and civil society and communities, including women's groups, stakeholders and businesses operators. Initial consultations with communities and stakeholders were undertaken during preparation of the additional financing in 2021. Between 02 and 06 October 2021 community meetings were held and participated by 108 people of the community.

14. **Grievance redress**. A grievance redress mechanism (GRM) has been established by the PCU for the project. The GRM is based on procedures used successfully in other ADB funded projects in Vanuatu. The GRM provides for complaints to be heard at the community level in the first instance, and then through project level, a customary land tribunal and finally legal procedures should resolution not be forthcoming. The GRM will equally apply to the additional financing.

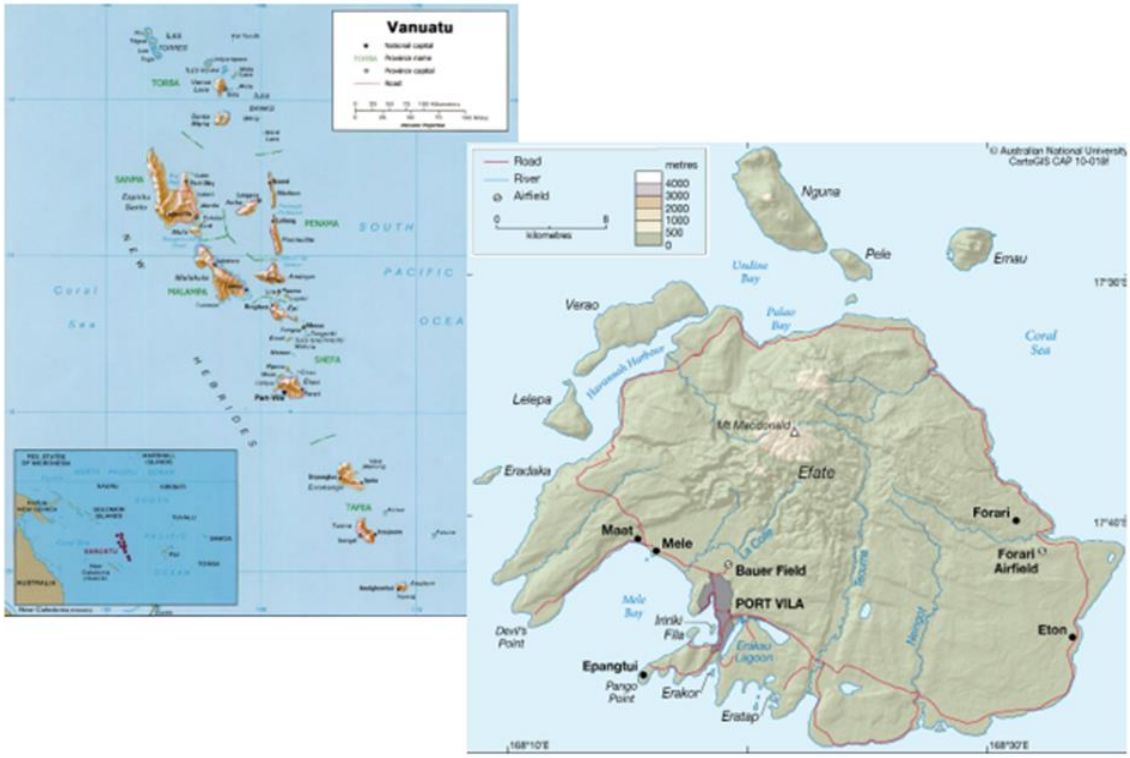
15. **Conclusion**. The overall finding of the IEE is that the additional financing will not result in significant adverse environmental impacts and that potential adverse impacts are manageable through the effective implementation of the EMP. Improved conditions for emergency sheltering, market operation, coastal protection, ward administration and community events will bring positive environmental impacts. The classification of category B for environment, according to the SPS, is confirmed.

# 1. INTRODUCTION

## A. Background to the Project

1. **Project rationale.** The Government of Vanuatu (the government) is being supported by the Asian Development Bank (ADB) to prepare and implement the Greater Port Vila Urban Resilience Project (the project). The project will improve urban resilience in Greater Port Vila through capacity building and institutional strengthening, as well as construction of three multipurpose emergency shelters. It brings together national priorities and local community needs by building the capacity of the Port Vila City Council (PVCC) to plan and manage urban assets and deliver quality and reliable services. It aligns investments to a common vision guided by the *Greater Port Vila Resilient Urban Resilient Development Strategy and Action Plan* (RUDSAP)—by 2030, Greater Port Vila is safe, inclusive, resilient and a vibrant economic hub based on sustainable development. The project is the first step in addressing issues of effectiveness and sustainability based on lessons emerging from previous projects in Vanuatu. About 58% of the total project financing comes from climate change and disaster risk reduction fund sources. About 30,000 people in the Port Vila municipality (refer to Figure 1.1) will benefit from the project, of which about half are women.[1]

**Figure 1.1: Vanuatu, Efate island and Port Vila**




[1] ADB. 2017. *Regional: Pacific Urban Development Investment Planning and Capacity Development Facility*. Manila.

2. The project also responds to the dual threat and crisis caused by the novel coronavirus (COVID-19) and Tropical Cyclone Harold in the recovery stage through (i) preventive measures, (ii) a focus on the vulnerable and 'new poor'; and (iii) partnerships and labor-intensive investments that would help generate jobs and stimulate the local economy. The project is aligned with the government's *Vanuatu Recovery Strategy 2020–2023: TC Harold & COVID-19* and is listed in the ADB's country operations business plan, 2020–2022 for 11 small Pacific Island countries (PICs).[2]

3. **Additional financing**. The government is now seeking additional financing to construct a third multi-purpose emergency shelter and install nature-based coastal protection along selected sections of Fatumaru Bay. Consistent with the project's outcome of improved resilience in Greater Port Vila, investment in nature based coastal protection at Fatumaru Bay for funding from the Ireland Trust Fund (ITF).

4. **Institutional arrangements**. The additional financing is subject to the institutional arrangements established for the original project; the executing agency is the Ministry of Finance and Economic Management (MFEM), and the implementing agency is the Ministry of Internal Affairs (MOIA), through a Project Coordinating Unit (PCU) which is supported by the project implementation and administration consultants (PIAC). Additional implementation support for specific matters will be provided by the Port Vila City Council(PVCC).

5. **Impact and outcome**. The additional financing will contribute to the impact of the project which is: Greater Port Vila is a safe, inclusive, resilient, and vibrant economic hub based on sustainable development. Additional financing outputs will also contribute to the project's outcome: Urban resilience in Greater Port Vila improved. The additional financing is aligned with Vanuatu 2030. During the design and development of the original project, a set of root problems were identified, these root problems will be addressed through the project outputs, which are aligned with specific goals and policy objectives listed in the Vanuatu 2030:

- Output 1: Resilience in urban planning and management is strengthened. The output will have a focus on key organization reforms and reforms of sector regulations and will comprise risk-informed urban planning and management.

- Output 2: Urban resilience is enhanced through local partnerships. This output will focus on multi-dimensional partnerships through activities including training ward secretaries in disaster risk management and climate change adaptation; financing public campaigns on climate change adaptation and disaster risk management with a particular emphasis on the poor, women, and vulnerable households; and preparing inclusive and gender responsive emergency preparedness plans for each shelter constructed. .

- Output 3: The output will finance three multipurpose and gender-responsive emergency shelters that include sanitation facilities, office space, and market area improvements. The shelters are one of the seven areas of investment prioritized in the GPV RUDSAP. They will be located at Seaside Showground in Center ward and at Freshwota in Freshwota-Tasariki ward. Geographic information system hazard risk and exposure maps were used as an initial screening tool to determine the location

[2] ADB. 2019. Country Operations Business Plan: 11 Small Pacific Island Countries, 2020–2022. Manila.

- Output 4: Asset management and institutional capacity strengthened. The output will improve the MOIA's capacity to develop, implement, and monitor projects; and will strengthen PVCC's capacity to operate and maintain shelters constructed under the project. Sustainable O&M will be ensured through the implementation of the Asset Management Strategy that was developed during project preparation, which includes support to PVCC in establishing and managing a dedicated major maintenance reserve account to finance future repairs and rehabilitation of the shelters. This will benefit both agencies' future investment activities.

## B. Overview of the Document

6. This initial environmental examination (IEE) relates to the construction of one multipurpose emergency shelter in Port Vila, located in Freshwater Tessariki Ward and a section of coastal protection in Fatumaru Bay.

7. **Structure of the document**. This is the initial environmental examination (IEE) for NNUP. The IEE document is structured around eight reporting chapters and seven supporting appendices. The eight reporting chapters / sections of the IEE are:

- Section 1 – introduces the project providing an overview of the project and the key areas of concern that will be addressed in the document and defines the project area.
- Section 2 –sets out the legal, administrative and policy framework that has defined the need and approach to the IEE. It discusses both the requirements of Tongan legislation and policy and those of the Asian Development Bank (ADB) supporting the government for the preparation and implementation of the project.
- Section 3 –describes the physical details of the project, the delivery mechanism timeframe and outline costs.
- Section 4 – sets out the existing environmental baseline conditions of the project area including physical features, ecological resources and socio-economic factors.
- Section 5 – is the assessment of impacts and where impact is identified the approach to mitigation.
- Section 6 – discusses the consultations carried out to disseminate information to the stakeholders and interested parties.
- Section 7 – is the environmental management plan (EMP) that will guide the detailed design; construction and operation phases of the additional financing to the project. It sets out specific requirements and issues that the contractors must address during construction, and ongoing management issues that the implementing agency must address during in the operational life.
- Section 8 is a summary and conclusion of the findings of the assessment process.

# 2. POLICY AND LEGAL ADMINISTRATIVE FRAMEWORK

## A. Country Safeguards System

### 1. Laws and regulations

8. The country safeguards system (CSS) for environment comprises the Constitution and various laws and regulations covering environmental protection, health and safety.

9. **The Constitution**. This document (1980) is the supreme law, vests the natural resources of Vanuatu in the people and government, and affords protection to national wealth, resources and environment in the interest of present and of future generations. Specific legislation on environmental protection and management, as the basis of the CSS, is largely provided for in the Environmental Protection and Conservation Act - CAP 283 2010 (EPCA), is an amendment of the Environmental Management and Conservation Act N°12 2002, and established the Department of Environment and Conservation (DEPC), under the Ministry of Lands and Natural Resources.

10. The EPCA provides for conservation, sustainable development and management of the environment and requires (in Part 3) environmental assessment of projects. The Act is supported by the environmental impact assessment (EIA) process which is detailed in the Environmental Impact Assessment (EIA) Regulations Order (No. 175, 2011) and the EIA Regulations (Amendment) Order (No. 105, 2012), which set out the decision making process for assessment and review of environmental impacts of projects.

11. **Environmental Protection and Conservation Act**. The EPCA has four main parts, covering (i) administration, (ii) EIA, (iii) biodiversity and protected areas and (iv) enforcement. It provides the founding legislation for: (i) the Department of Environmental Protection and Conservation (DEPC); and (ii) the Biodiversity Advisory Council.

12. The Act requires the publication of a National State of Environment Report, at least once every ten years and the maintenance of a publicly accessible environmental registry. It provides for bio-prospecting and community conservation areas. For projects that impact or are likely to impact the environment, the EPCA provides an approval process, which is set out under the EIA regulations.

13. The EIA Regulations require the developer of a project to prepare and submit an environmental permit application to the DEPC. The DEPC will review the screening forms and conduct the PEA and determine if further assessment is required. Based on this and an initial assessment, the DEPC undertakes a preliminary environment assessment (PEA), which provides a decision as to the level of further assessment, if any, required for a project. The decision may include: no further assessment; preparation of an environmental management and monitoring plan for the project or, whether an environmental impact statement (EIS) is required for approval of the project. The proponent, if required, undertakes and submits the management plan or assessment to DEPC for review, following which the DEPC may issue the environmental permit (with or without conditions).

14. Should an EIS be required, the DEPC prepares the Terms of Reference for EIS preparation, covering technical, economic, social and environmental aspects. Public consultation is required, and a steering committee is established.

15. No development can be embarked upon without DEPC approval through issue of an environmental permit.

16. There are other relevant legislation comprising the CSS.

17. **Physical Planning Act**. This act provides urban development and planning control for Vanuatu. Under the Act, a municipality or local government body may declare any area under its jurisdiction to be a Physical Planning Area. The majority of the Port Vila Area is administered by the Port Vila Municipal Council and this applies to the area being proposed for reclamation. Any areas which have not been declared Physical Planning Areas are not subject to planning and building controls.

18. **Land**. Legislation governing land allocations are, variously the Land Reform Act (1980), the Land Leases Act (1983), and the Custom Land Management Act (2013).

19. **Pollution control**. The Pollution Control Act 2013 obliges owners and/or users of premises to apply pollution control measures and provides for the issuance of permits. It also requires any person or agency to apply the precautionary principle, and for any decision making in relation to the Act is to be guided by consideration of climate change adaptation and mitigation. The Pollution Control Act is administered by the DEPC.

20. **Waste management**. The Waste Management Act (2014) and Waste Management Regulations 2018 set out requirements for waste services and operations and includes specific responsibilities relating to waste identification, collection, disposal and for planning and reporting on waste management including hazardous waste management. The Waste Management Regulations ban single use plastic bags, plastic straws and polystyrene takeaway boxes, and provide for licensing of private waste operators.

21. **Foreshore Development**. Development and use of the foreshore is covered under the Foreshore Development Act 1975 and Amendment Act 2013. The Act requires written consent of the Minister of Planning and consultation with and consent of custom owners for any development by any person on the foreshore of any island in the country. For the coastal protection, the project must make an application under the Act to ensure that the development does not contribute to the pollution of the marine environment of Fatumaru Bay.

22. **Biosecurity**. The Plant Protection Act 1998) and the Regulation 2014, as well as the Animal Importation and Quarantine Act 1997 and the Animal Importation and Quarantine Regulation 2007 are the primary items of legislation covering biosecurity, implemented by Biosecurity Vanuatu, a department under the Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity.

23. **Other matters related to civil construction**. The Quarry Act 2013, the Health and Safety at Work Act 1987 and the Labor Act 2009 are also relevant to planning and implementing construction work.

24. **Environmental standards**. National environmental standards are under preparation in Vanuatu including, for example, proposed drinking water quality standards (UN Water Global Analysis of Sanitation and Drinking Water, 2015). It is assumed that World Health Organization standards apply.

25. **National Environment Policy**. The Vanuatu National Environment Policy and Implementation Plan 2016–2030 (NEPIP) is an overarching policy for the sustainable conservation, development and management of the environment of Vanuatu. It is the first of its kind since Vanuatu gained independence in 1980. The NEPIP aims to:

- Provide for the co-ordination of related activities;
- Promote the environmentally sound and safe management and conservation of the natural resources and environment of Vanuatu; and
- Outline the operational matters necessary to implement the above.

26. The policy is implemented in pursuit of the National Sustainable Development Plan, which is an overarching government policy document. The environment is one of the three pillars under the National Sustainable Development Plan, and links it and the various sectors under the environment pillar.

27. The NEPIP is a framework that links existing environment related policies and provides a roadmap for Vanuatu's long-term environmental actions. In doing so, the NEPIP examines the core businesses of the DEPC under multilateral environmental agreements; legislation; corporate planning instruments such as the Corporate Plan 2016–2018 and Strategic Plan 2014–2024; and existing policies and programs such as the National Biodiversity Strategy and Action Plan, the National Invasive Species Strategy and Action Plan 2014–2020 and the National Waste Management Strategy and Action Plans.

28. The project and additional financing will contribute to the one of the key goals of the NEPIP: a strong and resilient nation in the face of climate change and disaster risks posed by natural and human-made hazards.

## 2. International agreements

29. Vanuatu has taken membership actions to 296 multilateral environmental agreements including 29 signatures, 73 ratifications, 85 entry into forces and 179 entry into force tacit acceptance. Appendix 1 lists the multilateral environmental agreements ratifies by Vanuatu.

## B. ADB Safeguard Policy

30. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments.

31. **Screening and categorization**. The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

- **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
- **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

32. For category A and B projects, environmental assessment is required, an environmental impact assessment for category A, and an IEE for category B. Requirements are summarized in Appendix 2.

33. Screening of project impacts takes place to determine the potential level of negative impacts and the required level of assessment. The emergency shelter and coastal protection subprojects are considered category B for environment, as they incur some adverse environmental impacts but these are expected to be largely site-specific, mitigation measures can be readily designed, and impacts are less significant than those of a category A project.

34. 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 Vanuatu 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.

35. ADB's safeguard due diligence emphasizes screening and scoping, planning, environmental and social impact assessments and safeguard documentation. Through such due diligence and review, ADB will confirm (i) that all key potential social and environmental impacts and risks of a project are identified; (ii) that effective measures to avoid, minimize, mitigate, or compensate for the adverse impacts are incorporated into the safeguard plans and project design; (iii) that the borrower/client understands ADB's safeguard policy principles and requirements and has the necessary commitment and capacity to manage the risks adequately; (iv) that, as required, the role of third parties is appropriately defined in the safeguard plans; and (v) that consultations with affected people are conducted in accordance with ADB's requirements. The procedures for such a process, ensuring compliance with the CSS and SPS, are set out in the EARF prepared for the overall project.

36. ADB will also assess the borrower's/client's capacity to manage environmental and social impacts and risks and to implement national laws and ADB's requirements. If gaps exist between ADB's requirements and the countries' laws, or where gaps in borrowers' capacity are apparent, the safeguard frameworks should include the details of the specific gap-filling requirements to ensure that policy principles and safeguard requirements are achieved.

37. **Environmental management plan**. The SPS further requires the development of an EMP specifying the required mitigation and monitoring and who is responsible for implementation.

38. **Public disclosure**. ADB will post the safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

(i) for environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) final or updated EIA and/or IEE upon receipt; and
(iii) environmental monitoring reports submitted by the PCU during project implementation upon receipt.

39. **Requirements for the project**. An EARF was prepared as part of the due diligence conducted for the original project. The EARF has been followed in the design, due diligence, and review of the additional financing. All statutory clearances will be obtained prior to commencement of civil works. This IEE (including EMPs), updated as required, will be included in package involving civil works as part of the bid and contract documents. Monitoring of EMP implementation including contractor compliance with the approved CEMP, by the implementation agency is reported to ADB.

# 3. DESCRIPTION OF THE ADDITIONAL FINANCING SUBPROJECTS

## A. Greater Port Vila Urban Resilience Project

40. **The original project**. Port Vila, Vanuatu's capital city and economic hub, located on the island of Efate is a growing city that faces not only expansion but high vulnerability to natural hazards such as cyclones, earthquakes and associated tsunamis, prolonged inundation, and drought. Largely attributable to Vanuatu's location on the earthquake prone Pacific rim and the Pacific cyclone belt, this vulnerability is borne out most recently by Tropical Cyclone Harold, which struck the island of Santo in April 2020, causing the loss of a reported two lives and extensive damage to homes and assets, affecting a total of 159,474 people.[3] Port Vila itself experienced severe damage five years earlier in 2015, when Tropical Cyclone Pam struck Efate Island with the loss of around fifteen lives and damage equating to around 64% of Vanuatu's gross domestic product. Tropical Cyclone Pam caused more than 32,600 households to seek post-disaster support. In Tafea and Shefa provinces, there were 11 fatalities, 65,000 people were displaced, and 17,000 buildings were damaged or destroyed.

41. Port Vila has a population of just over 50,000 and is projected to double in size by 2028. Port Vila municipality has already outgrown its original urban boundaries due to the substantial population growth, along with urban migration, rapid development of squatter and informal settlements. At the same time, commercial installations are expanding. This growth places increasing burdens on the infrastructure of the city and Shefa Province.

42. The efficiency of existing infrastructure reflects not only rapid growth but also deficiencies in urban planning over the city's history as well as ineffective implementation of urban development. The ongoing inefficiencies are attributed to a lack of clearly defined institutional responsibilities among the government agencies concerned. There is a need for both institutional reform and improved land use planning and development processes that take account of against risks from potential hazards to prevent or reduce the destruction of public and private infrastructure, economic assets and threats to lives and livelihoods.

43. The selection of the multipurpose emergency shelters for construction under the project followed the development of an investment framework for Port Vila, included in the RUDSAP. This involved development of a long list as part of an urban sector assessment undertaken at an early stage of project preparation, followed by refinement of the long list and then shortlisting of priority investments. The long list of investments was identified from sources including subprojects carried forward from the Port Vila Urban Development Project, other sub projects proposed by the MOIA, and subprojects identified in the strategies, corporate plans and business plans of other ministries and under development partner programs. A key factor in the selection of investments is the extent to which they contribute to three pillars of resilience as set out in the government's National Sustainable Development Plan 2030 or society, environment and economy.[4]

[3] World Meteorological Organization post of 14 April 2020 on website public.wmo.int.
[4] Department of Strategic Policy, Planning and Aid Coordination (2016), Vanuatu 2030 the People's Plan: National Sustainable Development Plan 2016 to 2030. Port Vila

44. The environment pillar seeks to ensure a pristine natural environment on land and at sea that continues to serve Vanuatu's food, cultural, economic and ecological needs, and enhance resilience and adaptive capacity to climate change and natural disasters.

45. The consideration of alternative investments included detailed examination of the scope and feasibility of installing a sewerage system and wastewater treatment plant in Port Vila, with key choices such as siting and design of treatment facilities and sizing of the collection network in such a way as to allow for the expansion of improved sewerage and treatment in and around the city. The examination of the feasibility of such improvements brought into relief the complexity of the steps that are needed to establish a suitable system, including cost recovery, obtaining easements and consents for pipes and pumping stations, construction management in the CBD, the need for avoidance of prolific underground services, a suitable site for a wastewater plant, issues associated with available receiving waters, the level of technology required to achieve adequate nutrient removal, and operational risks associated with high technology treatment processes. Sewerage and wastewater treatment options remain high priority and a feasibility study for the system together with a sanitation roadmap and strategy for the city (updating previous master plans) has been prepared to guide investment in this area.

46. **Emergency shelter component**. The project provides for the construction of two multipurpose emergency shelters, and the additional financing will finance construction of one further shelter. The selection of these followed the development of an investment framework for Port Vila, included in the RUDSAP. This involved development of a long list as part of an urban sector assessment undertaken at an early stage of project preparation. Based on discussions with key stakeholders' key initiatives are proposed by the RUDSAP to help prioritize improvement measures for Port Vila. The key initiatives and sub-projects including the evacuation centers are set out in the Outline Investment Framework (OIF) that is aligned with the timeframe of 'Vanuatu 2030'. The OIF covers all key sectors for transport, water supply and wastewater, roads and drains, solid waste management, education, health and energy as well as buildings, ITC, planning and disaster risk reduction. The intention is to establish multipurpose evacuation centers with facilities such as sanitation blocks, a ward office and adjoining markets to create a communal focus for strengthening community interaction, socializing and recovery post disasters. Many social issues will be able to be addressed through these centers and the community activities around the centers.

47. The National Disaster Management Office (NDMO) has an Evacuation Centre checklist for the planning, assessment and classification of centers, and the new multipurpose evacuation centers have been developed to comply with these national requirements. With regard to access, entrances allow for wheelchair access, including to kitchen and toilet facilities with appropriately graded ramps and support rails. The buildings will conform to the National Building and will have the ability to withstand windspeeds associated with cyclone events. The shelters also provide for triage facilities, ward offices, uses as markets and for community events and occasions.

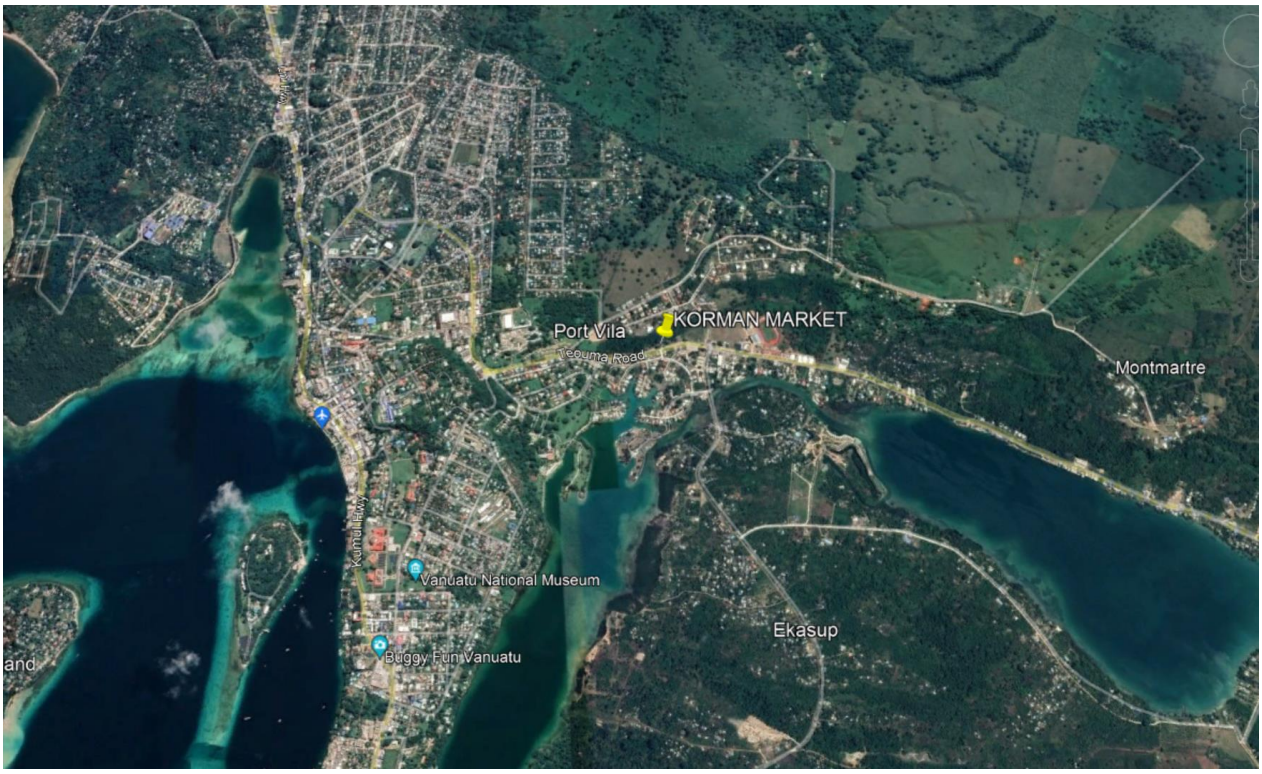
48. For the project and additional financing, three emergency shelter facilities have been identified and preliminary designs and cost estimates have been prepared for them. These are located within the Port Vila municipality at: (i) Showground (Centre ward) (ii) Freshwater Market (Freshwota Tessariki ward) and (iii) Korman Market (also in Freshwota Tessariki ward). Works at each site are expected to be carried out over a 6-9 month timeframe and will involve both civil and structural construction activities.

## B. Korman Multipurpose Emergency Shelter

49. The intention is to establish multipurpose evacuation centers with facilities such as sanitation blocks, a ward office within, or close by the center and adjacent markets to create a communal focus for strengthening community interaction, socializing and recovery post disasters. Many social issues will be able to be addressed through these centers and the community activities around the centers.

50. Feasibility studies have been prepared for the three multipurpose emergency shelter investments, with two undertaken in 2020 for including multipurpose emergency shelters at selected sites: (i) Showground, and (ii) Freshwater Market. Te additional financing proposes the design, construction and operation of a third multipurpose emergency shelter, at Korman Market. The location of this site is shown in **Error! Reference source not found.**below.

**Figure 3.1: Location of the Korman Market multi-purpose emergency shelter**




### 1. Guidelines and specifications

51. **Evacuation center checklist**. The NDMO has an evacuation centre checklist for the planning, assessment and classification of centers. This provides for consideration of the following main requirements and is attached as Appendix 3. The requirements are:

- Location and accessibility.
- Structural and architectural minimum requirements.

- Occupancy capacity.
- Cooking facilities (long-term).
- Water, sanitation and hygiene.
- Electrical installations and emergency power supplies.
- Safety and protection.

52. To the degree practical the designs for the new multipurpose evacuation centers have been developed to comply with these national requirements.

53. **Location and accessibility**. The buildings are located above likely impact from high tide storm surge and above identified flood levels. The main entrance doors will allow for ambulant access and a secondary emergency access is provided.

54. **Ability to withstand cyclones**. As new buildings, the emergency shelter will have the structural resilience required for extreme storm conditions and earthquake loads. The buildings will conform to the National Building Code and PVCC requirements pertaining to a multipurpose community center and have the ability to withstand windspeeds associated with cyclone events. To ensure compliance and wind-firmness in cyclone events, detailed designs will be guided by a suitably qualified structural engineer and will require certification that the final design can withstand earthquake and extreme wind loads.

55. For Cyclone Pam wind strengths of 160 miles per hour (257 km/hr) or 71.4 m/sec were recorded. Elsewhere in the Pacific (Cook Islands wind speeds of up to 280 kph (78 m/sec) were reported to have occurred for cyclones in 2005. The current standard applied to structural design for wind actions in Australia and New Zealand is AS/NZS1170.2. Wind Loads requirements are applied through zoning by risk category over the region. The code defines the ultimate gust wind speed in terms of a return period of 2000 years as 77 m/sec in region C, the tropical cyclone region of Queensland, the Northern Territory and Western Australia, and 99 m/sec in region D, the severe tropical cyclone region of Western Australia. Data from Cyclone Pam in Vanuatu suggests that the risk scenario is at least comparable to region C, meriting use of the standards in AS/NZS 1170.2.

56. In reality, total peak loads on a building are influenced by site characteristics and the aerodynamic shape factors for different buildings and structures. Successive refinements of AS/NZS 1170.2 reflect growing understanding of the wind loading mechanisms based on these factors, allowing for greater preservation of the building envelope and structure, so that heavy losses can be minimized. This has strong significance as even a modest breach of the building envelope will increase internal pressure, increasing the risk of break-up and allowing subsequent water infiltration, greatly increasing the extent of damage.

57. The degree of exposure of a site will vary according to factors such as topography, height and the surrounding terrain, and thus buildings situated close to the foreshore, or in elevated locations further inland, or on atolls, will be subject to different wind loads during extreme events. The current version of AS/NZS1170.2 provides for the incorporation of these factors in the design of buildings. The standard also considers categories of buildings and structures in terms of their overall shape and the effect of wind pressure and suction. These include enclosed rectangular buildings, storage tanks, and exposed structural members and frames.

58. Besides the ability of buildings themselves to resist wind damage, much of the damage in strong wind events occurs as a result of windborne debris. A major potential source of damaging debris includes attachments to buildings, such as pieces of roof sheeting, windows, doors and wall coverings, or supplementary features of buildings outside the main building envelope such as porch roofs and car ports which can experience higher than expected wind forces. This issue is also addressed in AS/NZS1170.2.

59. Issues associated with applying standards such as AS/NZS1170.2 to Vanuatu involve an effective and appropriate means of translating technical specifications into actual building methods and practice using guideline manuals which present options that are deemed to comply with the code. Such manuals can cover, for example, guidelines for roof designs that offer greater resistance to wind damage, methods of attaching and fixing building components and roof sheathing, and viable options for retro-fitting of existing buildings that do not currently comply with standards.

60. **Technical standards**. Building better is a key concept and aim for preparation in the disaster risk management cycle and building resilience. In 2013, the government passed the Building Act. This provided for the development of a national building code This has been progressed by revision of the 1990 code to ensure its currency and relevance. The two primary areas of revision have been to bring the code into line with: (i) international Standards have been reviewed to ensure only current standards are referenced; and (ii) incorporating recommendations arising from the Sanitation Master Plan for Port Vila.

61. NDMO does not have a standard building code for evacuation centers, although the Shelter Cluster is working with the Ministry of Infrastructure and Public Utilities for a standard building code. NDMO has produced a National Guideline for the Selection and Assessment of Evacuation Centers (2016), and an Evacuation Centre check list for planning, assessment and classification which highlights recommended requirements for evacuation centers in terms of siting, space and occupancy, cooking facilities, water and sanitation, and safety. The Guideline has gender sensitive recommendations to protect the privacy and safety of women and children as well as people with disabilities. The Guidelines and checklist are used in the assessment of potential evacuation centers (led by NDMO and coordinated with Public Works Department and other line agencies). The Guidelines recognize that there is no 'one size fits all' for evacuation centers and the assessment classifies centers across a range from a fully conforming evacuation center to a simpler evacuation center.

62. Over the last four years since Cyclone Pam there has been an increase in cyclone resistant buildings and more familiarity with the requirements, with several buildings built to compliant standard designs e.g., new classrooms, Vanuatu Christian Council cyclone shelter. Similar buildings have been constructed in other Area Councils for disaster risk including under the World Bank Increasing Resilience to Climate Change and Natural Hazards project, which were approved by the National Advisory Board and authorized by the Public Works Department. There is potential to adopt the parameters from these designs in developing relevant standards for the detailed design of the centers.

63. **Universal access**. Wheel chair access will be provided to the ground floor level and kitchen and toilet facilities with appropriately graded ramps, with doors and openings of sufficient width to allow easy movement within the buildings and providing for the requirements of disabled persons, including a toilet with wheel chair access and hand and support rails/bars.

64. **Kitchen facilities**. The kitchen will be designed and equipped for hygienic food preparation. With water tap(s), sinks and benches. Cooking facilities will be provided and kitchens will have adequate ventilation to exhaust fumes. Where bottled gas is to be used the gas cylinders will be positioned outside in secured weather protected cages away from the building.

65. **Water, sanitation and amenities**. Water storage will provide adequate supply for drinking water, cooking, hygiene and toilet flushing for the number of occupants accommodated in the shelter. Gender segregated toilets, again sufficient for the occupants will be provided for in the design of the shelter or covered by existing community toilet blocks.

66. **Emergency lighting**. A suitable alternate emergency back-up system (generator) will be incorporated into the design.

67. **Health clinic and triage**. The emergency shelter is located with 2km of the Port Vila Hospital. Triage facilities will be incorporated into the particular design.

68. **Ward office**. The emergency shelter/community centers will be located close to the ward office, or provision will be made for a suitable area for the ward secretary to operate out of the building under normal conditions.

69. **Multipurpose use**. The design allows for the multipurpose use envisaged as a community center, market building, meeting place and under emergencies as a shelter providing refuge for the community. The center could also provide quarantine facilities during community endemics.

70. **Shuttering and protection**. Buildings will be fitted with or have mountable storm shutters to prevent damage to windows and/or protect occupants from the element and shattered glass. Safety glass will be used for windows.

### 2. Site characteristics

71. The Korman Market emergency evacuation center is situated in Freswota-Tassiriki Ward and will be a new building, built mainly on open space. The building will be around 20m long and 15m to 20.4m wide and with a floor area of around 452m$^2$ will accommodate 130 people short-term during an emergency. The building will have a reinforced concrete slab floor, reinforced concrete block walls and a roof cladding of long-run steel sheets.

72. There is adequate open space within government (PVCC) owned land to accommodate the proposed multipurpose evacuation center. Segregated toilet, shower and hand washing facilities are provided in the design for women and men. Laundry areas are also incorporated into the design.

73. Provision is made with the concept design for a ward office, ward secretary's office. There is sufficient space to also provide an area that can be partitioned off for triage activities during a civil emergency. The design provides for toilet and amenity area within the building partitioned off from the main area, with separate amenities for women and men.

74. There is also adequate space to accommodate a kitchen for food preparation and cooking. A stage is incorporated in the design and the provision of demountable and moveable partitioning will support multi-use of the building.

75. Wastewater will be disposed of through a septic tank and effluent field designed in accordance with the national building code. The septic tank will be accessible for easy desludging.

76. Polyethylene water tanks will be installed on site adjacent to the building on raised and solid platforms of sufficient height to allow low pressure supply to the kitchen and amenity areas. The feed to the tanks will be from the public supply through a float valve at the top level of the tanks and with a permanent air gap to prevent back syphoning. The tanks will be sized to have sufficient water stored on site for three to four days to cover close down of the main supply during extreme circumstances. The tanks will be tied down with stainless steel cables and fixings to ensure their stability under earthquakes and high cyclonic winds.

77. The design concept (site and floor plans) is illustrated in Figures 3.2 and 3.3 and b below.

**Figure 3.2: Korman Market site multipurpose shelter site plan**

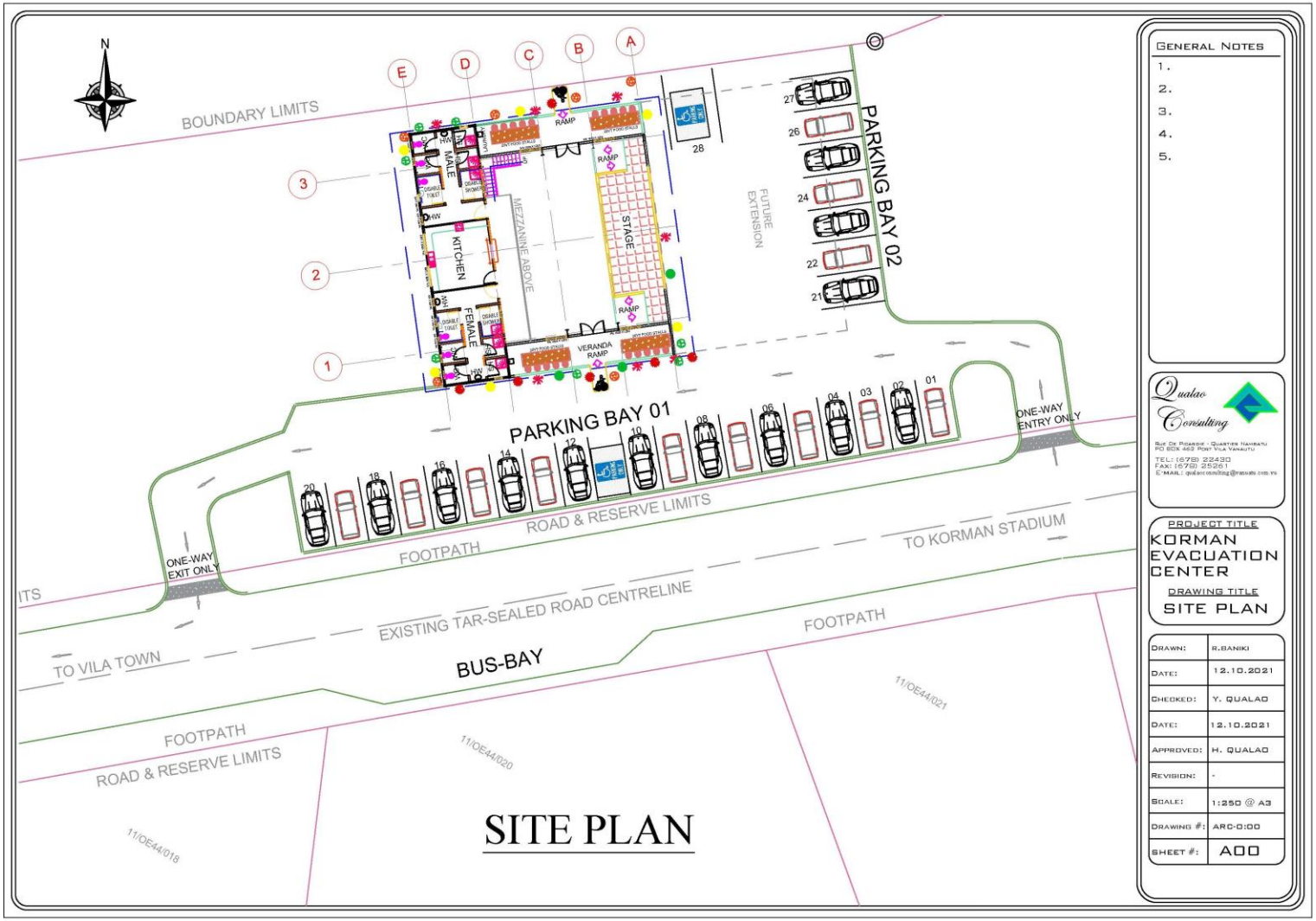


**Figure 3.3a: Korman Market multipurpose shelter - floor plans**

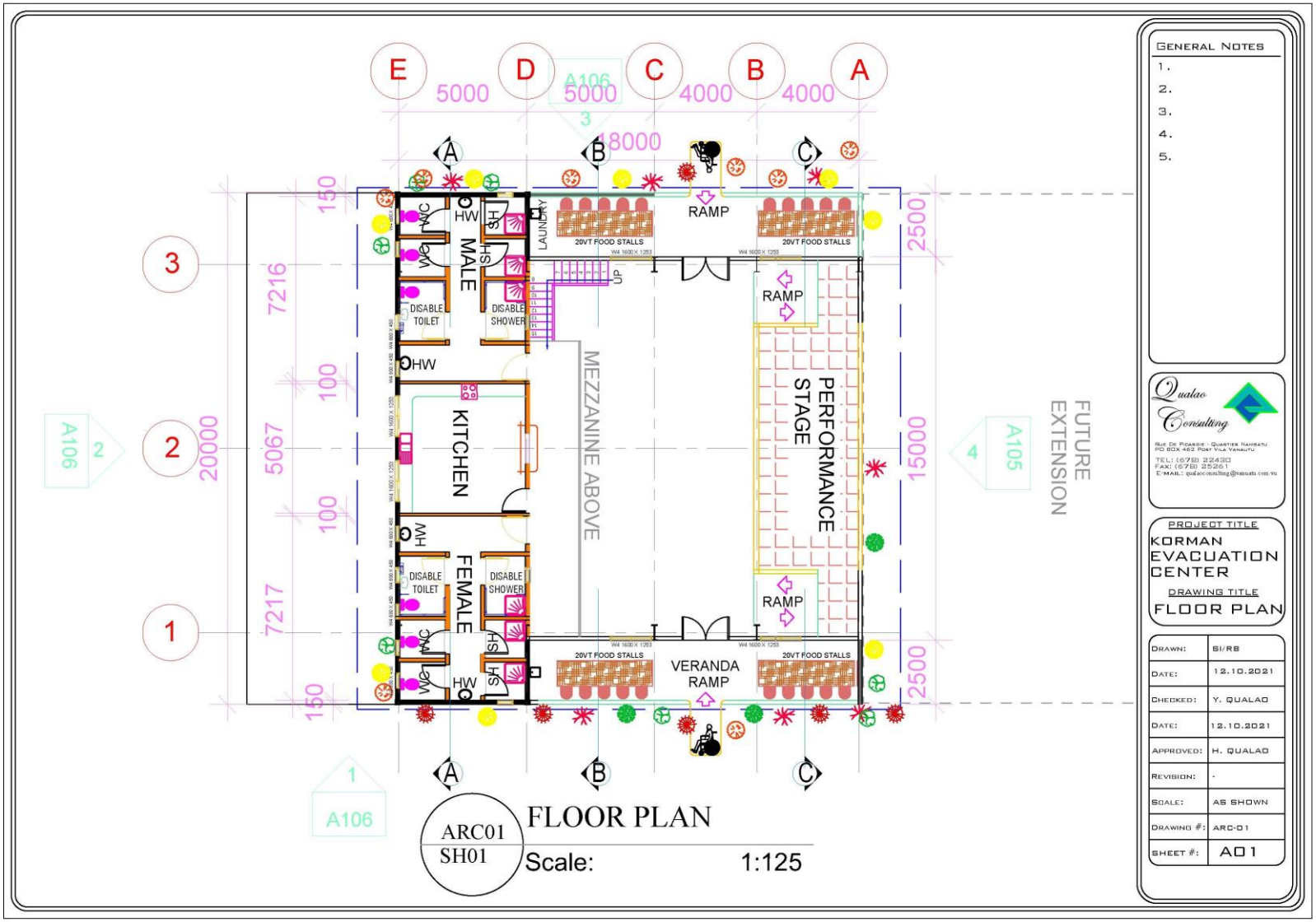
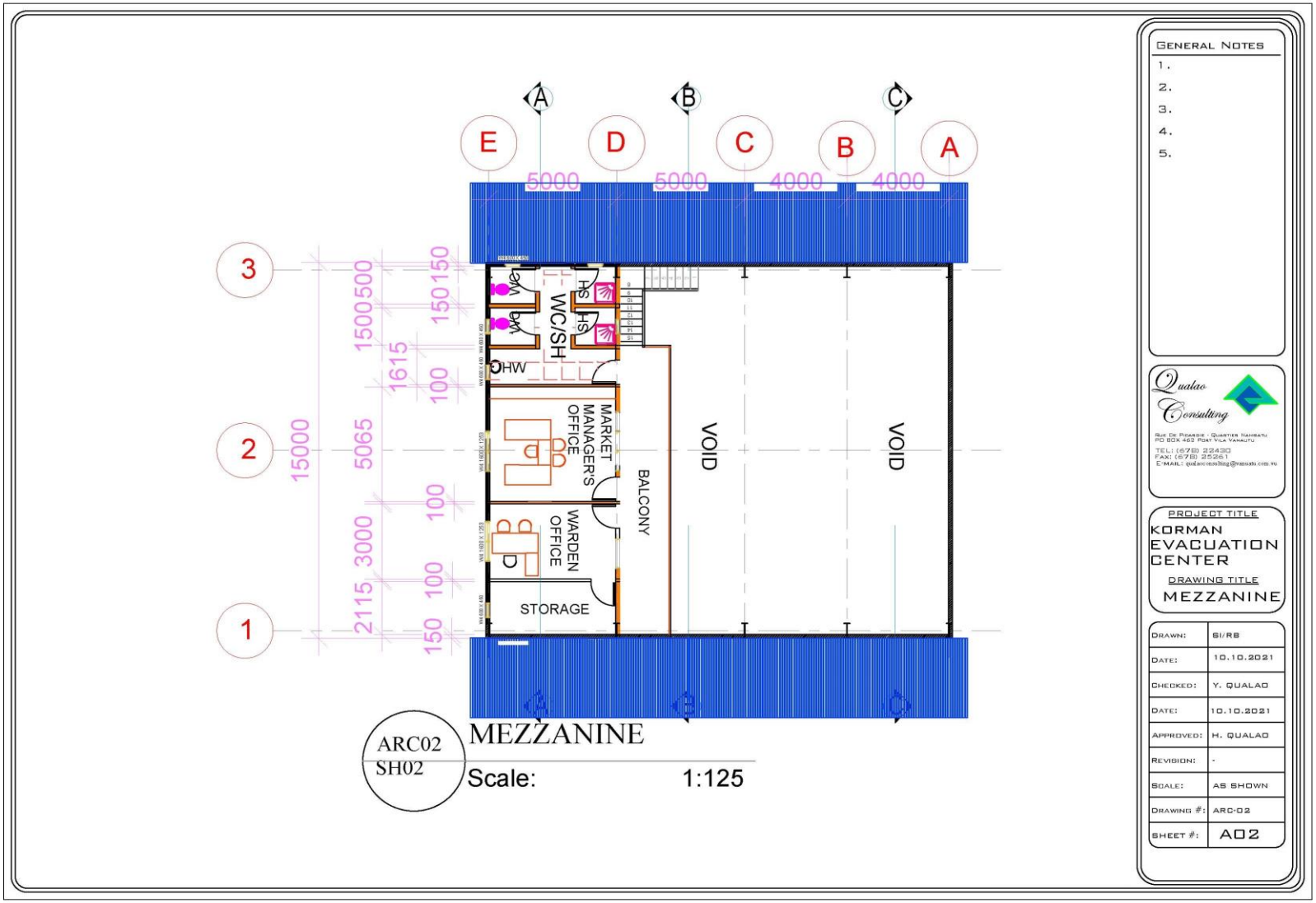


**Figure 3.3b: Korman Market multipurpose shelter - floor plans**



### 3. Construction activities, workforce and equipment

78. Work at the site is expected to be carried out over a 6-9 month timeframe and will involve both civil and structural construction activities. It is envisaged that there will be three key stages of construction.

79. **Stage 1**. Civil works that will involve site preparation activities that is expected to include:

- formation of site access and establishment (office, stores etc)
- general clearance and removal of vegetation,
- removal, stockpiling and reuse of any topsoil, and
- demolition and removal of existing structures (where required)
- excavation and backfill of trenches for foundations and utility service connections
- installation of utility services and connections, and
- minor cut/fill earthworks activities to create road and pedestrian access, parking space and a level building platform.

80. Resources at each site will include construction equipment (small to medium size), labor (some part time only) & materials and the following requirements can be expected: (i) equipment; excavator/loader, dump trucks, rollers/compactors, utility vehicles and hand tools; (ii) labor; supervisor/foreman (x1), operator/driver (~5), tradespeople (plumber/electrician) & general labor (<10); and (iii) materials; pipes/cables/fittings (service utilities), fill (for areas within any building footprint)

81. **Stage 2**. Structural works will involve building work activities that are expected to include:

- concreting foundations
- constructing concrete/block walls (including beams and lintels)
- preparation and placing floor slabs (concrete and reinforcement)
- installation of roofing (timber truss and framing)
- fixing of roof sheeting
- installation of doors and windows
- installation of utility services (pipes, cables, fixtures and fittings), and
- finishing works (plastering, painting etc).

82. Resources at each site will include construction equipment (small to medium size), labor (some part time only) and materials and the following requirements can be expected: (i) equipment; excavator, trucks/hi-ab, utility vehicles and hand tools; (ii) labor; supervisor/foreman (x1), operator/driver (~5), tradesmen (plumber/electrician/bricklayers x2/carpenters x2) and general labor (<10); and (iii) materials; concrete (including aggregate, sand etc), timber (doors, windows, roof framing), pipes/cables/fittings (service utilities), fixtures & fittings (toilets, showers, kitchen cabinets etc).

83. **Stage 3**. Civil works are expected to include removal of site establishment and site restoration, and landscaping and tidy up of the site. Resources at each site will include construction equipment (small to medium size), labor (some part time only) and materials and the following requirements can be expected: (i) equipment; excavator/loader, dump trucks, utility vehicles and hand tools; and (ii) labor; supervisor/fore-person (x1), operator/driver (~5) and general labor (<10).

## C. Coastal Protection Subproject

### 1. Background

84. With support from the DEPC, coastal habitat restoration work in has taken place in Eratap, to the west of the Port Vila (as well as Crab Bay on Malekula Island in Malampa Province). The activities have included mapping vegetation and has established demonstration sites for habitat restoration. The proposed approach is to elicit community based habitat restoration work, specifically planting suitable coastal species, in conjunction with small, low crested rock revetment, similar to the structure depicted in Plate 3.1 to provide wave protection and enable the establishment of the plans as well as form a highly resilient combined structure as the plants develop.

**Plate 3.1: Example of riprap boulder placement and planting work**

85. During stakeholder consultations, the consulting team met with the Ifira Marine Management Team (IMMT) to discuss approaches taken to date. The IMMT has, since establishment in 2016, undertaken work with coastal communities, tasks including awareness raising and workshops on the management of coastal resources, and have worked with the Forestry Department to produce and plant mangrove seedlings. The proposed approach is to work with the IMMT, building on relevant gained, particularly with regard to work with the communities and prior planting work.

86. To enhance the integrity of the littoral zone and seaside slopes, the key requirements of the plants are formation of a dense, low cover to armour the soil or sand surface, and development of extensive root systems to reinforce soils and supports slopes.

87. Utilization of locally available plants helps ensure suitability of the plants to the sites, reduce costs in the long term, and avoid biosecurity risks. Biosecurity risks can arise where imported plants become invasive in the new environment (whereas their proliferation may be controlled by the ecosystem where they originate), or when imported plant propagules carry insects or micro-organisms that may proliferate and cause damage on release. In other cases, imported plants may prove unable to thrive and develop in the local soils or microclimates. However, methods of obtaining and propagating planting stock are not always established for local plants. Whether this is done by collecting and planting seeds or using vegetative cuttings, the most efficient means need to be established by a trial process. In some cases, plants can be established from seeds or cuttings collected locally and planted directly on site, as is done in the region with seeds some species of mangrove, or where slip cuttings can be taken from clumps of grasses and planted directly on site. Often however, plants will need to be cultivated in a nursery to grow them to a level of development where they are resilient and better able to survive conditions at the planting site.

### 2. Specifications, inputs and schedule

88. The additional financing will develop and construct nature-based measures to provide coastal protection and resilience during extreme climatic and weather-related events. It is a specific initiative to strengthen coastal resilience through nature-based solutions, focusing on a specific area for intervention (e.g., Fatumaru Bay). The application is to include: (i) capacity development activities, (ii) infrastructure investments, and (iii) project implementation and management.

89. The objective of the Fatumaru Bay foreshore improvements is to increase resilience to the impacts of natural hazards and climate variability and change. [5] The target community is coastal residents in the area along the northern side of Fatumaru Bay, in particular vulnerable communities[6], as indicated in Figure 3.4. This feasibility study will provide an approach and methodology for the planning, design and implementation of resilient coastal and foreshore protection in selected priority locations within the indicated area.

[5] The Rockefeller Foundation's 100 Resilient Cities defines urban resilience as "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience."

[6] Vulnerable people are those who are particularly susceptible to shocks such as climate hazards, natural disasters, food insecurity and economic events as they have the lowest capacity to cope or are disproportionately affected by impacts

**Figure 3.4: Fatumaru Bay area proposed for foreshore and coastal protection**


90. The Fatumaru Bay coastal projection component/subproject will comprise:

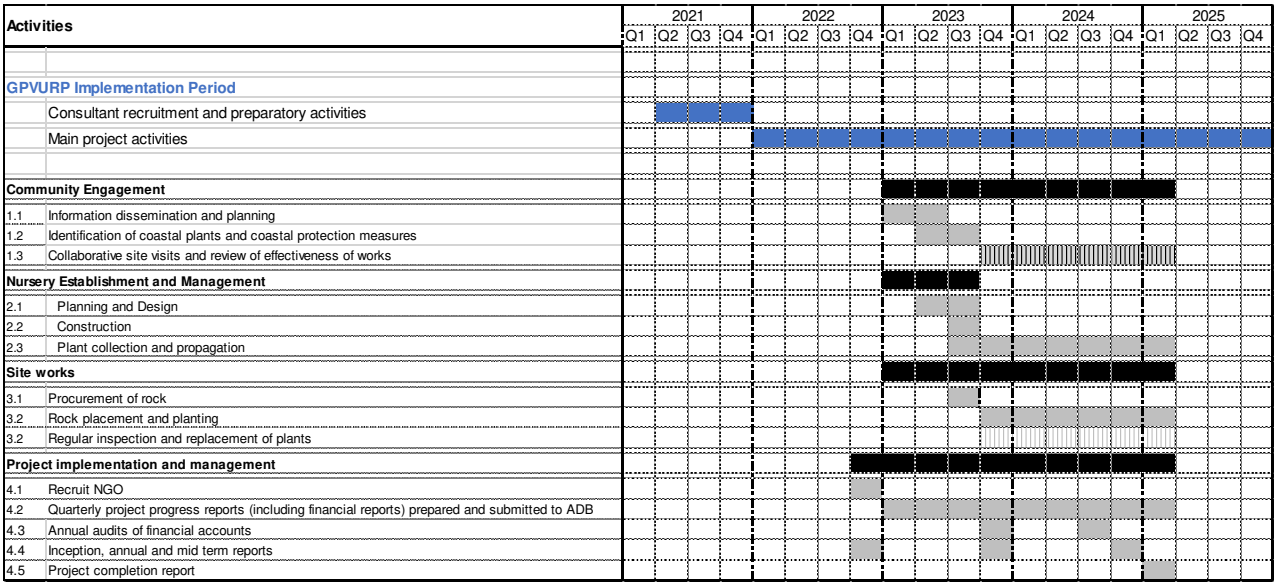
- Community engagement activities, to elicit participation in selection of plants to use for shore protection and in planting and upkeep of shore protection works. This will involve holding meetings with community groups in the vicinity of the proposed site, briefing participants on the nature based approach to coastal protection, obtaining information on suitable and preferred species and feedback. The work will be carried out with and guided by the IMMT.
- Planting and propagation trials of mangrove, coastal tree, shrub and tall stature grass species suitable for planting in the littoral zone or on seaside slopes
- Establishment and management of a plant nursery, at a location to be determined in discussion with the IMMT, including the IMMT Forestry Liaison Officer.
- Demonstration sites, involving the rock placement and planting similar to that shown in Plate 3.1, incorporating:
    - Supply and placement of geotextile matting on sites for rock armouring

- Hand placing of rock boulders at sample sites (up to 400 linear metres). Suitable boulders, sourced from the RDF quarry near Eratap (also known as the Jean-Paul Virelala quarry) was used for the coastal protection works near the CBD under the Vanuatu Tourism Infrastructure Project;
- Planting works in the littoral zone between the placed rock and the shoreline, and immediately adjoining land; and
- Maintenance of the plants to ensure development of permanent, functional vegetative cover.

- In order to facilitate learning from the work and applying the approaches at further vulnerable locations, the work will include the preparation of guidelines describing the design rationale and tasks, species selected, costs, and information on plant survival and performance of the structures during and after storm events.

The subproject will be implemented over a 24 month period, with an implementation schedule shown in Figure 3.5.

**Figure 3.5: Coastal protection subproject implementation**




91. The subproject will be managed by a national community engagement specialist, who will be responsible for design of community engagement activities, involving communities in plant selection, propagation, planting and maintenance activities as well as overall management and administration of the component. Technical support will be provided by an international community based coastal protection specialist and a national forester / plant propagation specialist who will guide plant identification, collection of seeds and cuttings, nursery management and site planting and upkeep. A nursery foreperson will maintain the nursery on a day to day basis.

## D. Analysis of Alternatives

92. Key alternatives considered are alternative sites for the subprojects, and the "no project" alternative.

93. **The 'no project' alternative**. The subprojects address, in addition to the need for safe shelter during and immediately after emergency events, the need for community centers that foster community cohesion and co-operative activity and ward administration facilities, and coastal protection of a sensitive area of Fatumaru Bay. In the absence of improvements, there will be full reliance on buildings not designed for the purpose of emergency shelter, and on the use of community buildings that are not firmly constructed, and no coastal protection of Fatumaru Bay in the immediate future. Hazards associated with practices such as poorly fitted roofing iron have proven to be a common cause of damage, injury and even fatality during high wind speed events.

94. **Alternative sites**. To identify the site for the Korman shelter (as well as for Freshwota and Seaside Showground), a long list of potential sites was compiled for further investigation. The study team members involved in these investigations then held initial consultations with ward members, MOIA, PVCC and the Police Commissioner and identified 25 sites within the Port Vila Municipal boundary. These were sites that were recommended by stakeholders and/or known to be in use, or to have been in use as shelters in the past. Screening was then undertaken to narrow down and rank the long list. Discussion on criteria took place in parallel with preparation of the long list. Criteria were applied via an iterative process as discussions took place to arrive at selection. The criteria finally adopted were:

- Schools and churches - were excluded due to: (i) reports of past experience with schools and churches, where costs of clean-up and restoration of facilities after use as evacuation shelters were high; and (ii) the need for schools in particular to revert to their normal purpose once the emergency phase as passed.
- Sites in hazardous areas - the vulnerability of sites coastal inundation, seismic, tsunami or wind hazard was assessed by ADB's hazard mapping team, who plotted each site identified on base maps showing vulnerable site for each of these hazard types. Sites in high-risk zones for the hazard categories were excluded.
- Location - sites must be within the Port Vila Municipal Boundary.
- Accessibility to poor communities - sites that readily serve poorer communities were given priority, such as the showground site in the southern ward.
- Spatial distribution - to the extent possible, sites should be distributed around the city, with the aim of at least one in each ward.
- Potential to combine with other functions - sites which have the potential to further functions, such as housing a ward office, market, clinic, Information Centre provision for wide community use and toilet block were favoured.

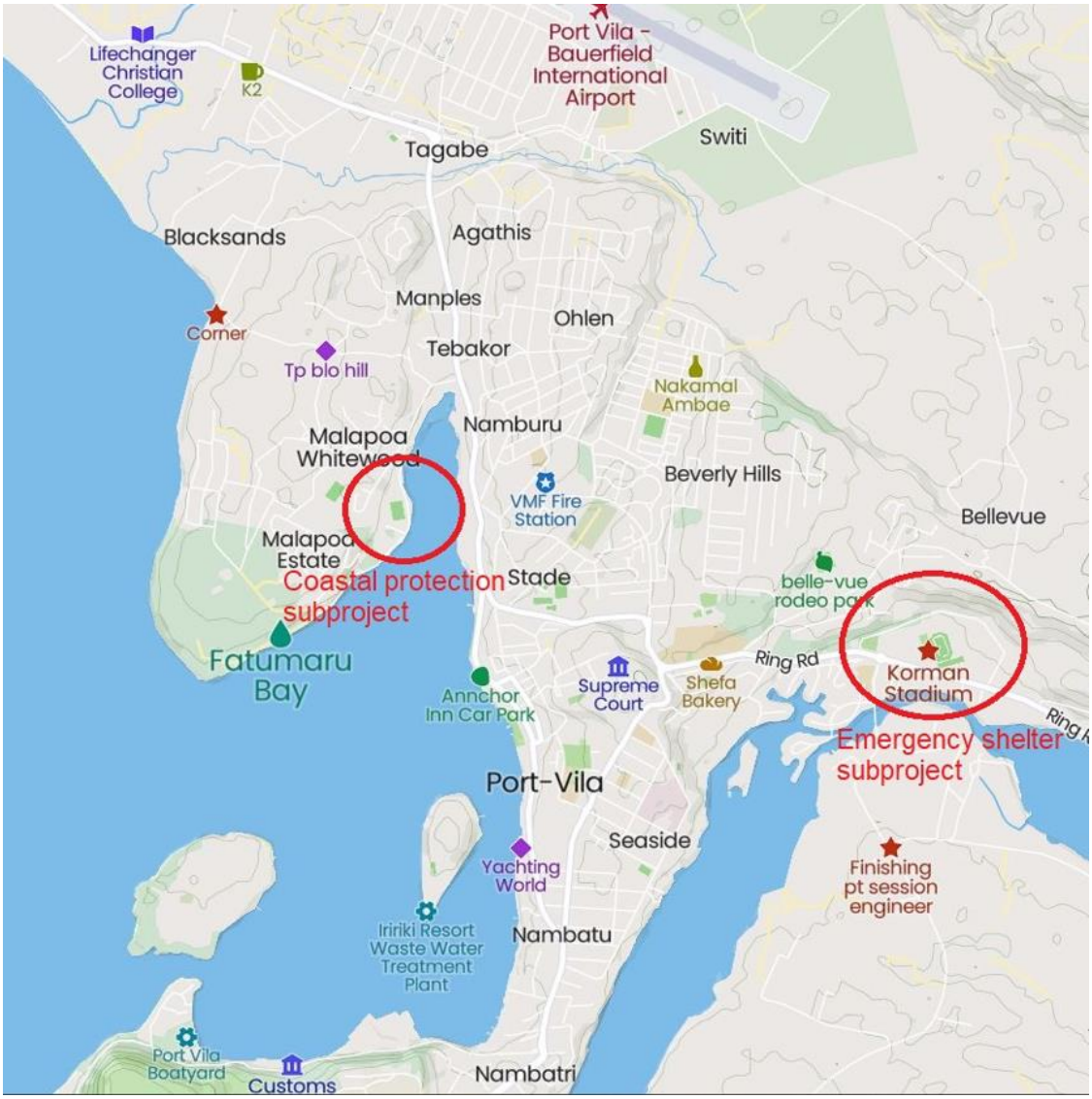
95. To confirm site availability, the team made initial and follow up visits to the Department of Lands, and the sites themselves to ascertain the current state of ownership, use and existence of any future plans for development of the sites. Consultations also took place with PVCC to confirm responsibilities for operation and maintenance of the facilities.

# 4. DESCRIPTION OF THE ENVIRONMENT (BASELINE)

## A. Definition of the Project Area

96. Greater Port Vila is the wider project area and its residents will be the beneficiaries of the project outputs (subprojects) which have the objective to improve safety and wellbeing and enhance resilience. The additional financing will focus on two areas within Port Vila, a section of Fatumaru Bay where coastal protection is proposed and the Korman market and stadium area where an emergency shelter is proposed (Figure 4.1).

**Figure 4.1: Additional financing subproject influence areas**



## B. Physical Resources

### 1. Geology, topography, and soils

97. **Geology**. Efate island was built up in two major phases of volcanic activity followed later by extensive reef limestone development. The oldest rocks belong to the Pumice formation of central Efate, a Plio-Pleistocene series of submarine pumice tuffs and breccias. These are overlain by the north Efate Basalt Volcano formation comprising submarine brecciate lava flows of olivine-basalt composition. Overlaying these two older formations is an extensive series of widely preserved recent reef limestone formations from the recent Pleistocene, rising from sea level to over 600m elevation. Around Port Vila the topography is dominated by old reef limestone terraces, which have been uplifted, faulted and tilted. Holocene deposits encompass loosely consolidated reef limestone, alluvium and beach sand which are mainly found as beach deposits.

98. Structurally, Efate is transacted by a fault complex with a dominant northwest – southeast to east-west trend. Many faults were active during and after reef limestone accumulation in the late Pleistocene to recent time and is believed to be a response to uplift of the island, which was most intense around Mt. MacDonald (646m). Port Vila harbor and the adjacent lagoons have been formed from a down dropped structural block which has arisen from a mega landslide.

99. Port Vila is situated on the limestone periphery of the island of Efate, an island of volcanic origin with a mainly basalt core with deposits of eruptive rock and ash, and a limestone periphery formed by coral growth over time originating from the late Pleistocene epoch (11,000 to 2.5 million years ago) and is heavily fractured as a result of faults, and tilting caused by earthquakes. Solubility of the underlying rock in the Port Vila area was extensively tested in 2015. Testing found the material to be highly insoluble, thus not susceptible to subsidence or the formation of sinkholes.[7] The volcanic substratum is generally at some depth beneath the limestone though there are some outcrops of volcanic rock in the Port Vila area.[8]

100. **Topography**. Situated on the periphery of Efate Island, much of Port Vila comprises a low lying coastal strip where the CBD is located, which at its lowest point is 1.6m above mean sea level (MSL). The higher land to the east of the CBD is formed by terraces, with elevations of up to 29m MSL. Beyond the ridge formed by terrace area, the land falls toward the Ekasuvat lagoon.

101. **Soils**. In and around the Port Vila, the ground is underlain by dense, in situ, corraline material which comprises rock fragments interspersed with sand and some silty clay deposits and is very permeable. In most areas, the in situ corraline material is relatively easy to excavate but, in some places, it can be very hard, making excavation very difficult, even with mechanical plant. Soil thicknesses are very variable within Port Vila, but are on average quite thin (a few meters. Only in a few places, significant thickness of soil can be observed. Borehole data show, below the thin soil layer, a 20m – 30m thick layer of variably weathered limestone bank mixed with sand and gravel deposit.

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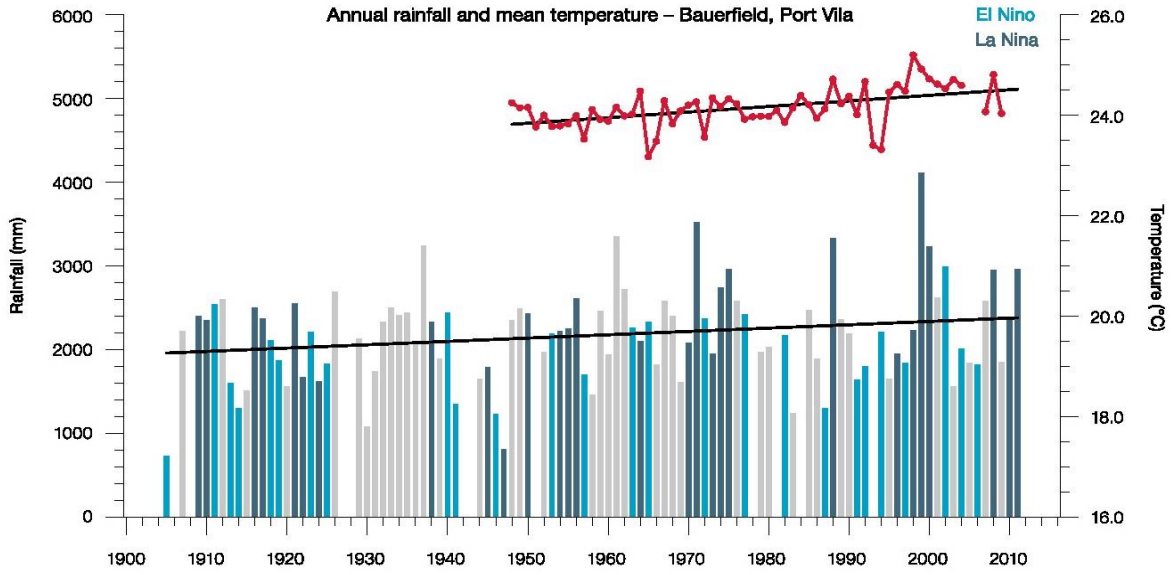
7 Buss, S. (2015) Port Vila Urban Development Project: groundwater appraisal report.
8 Shorten, G., Shapira, A., Regnier, M., Teakle, G., Biukoto, L., Swamy, M. and Vuetibau, L (2001). Site-specific earthquake hazard determinations in the capital cities of the South Pacific. SOPAC technical report 300.

## 2. Climate, climate change, and disasters

102. **Climate**. Efate climate is equatorial and humid according to the Köppen-Geiger climate classification.[9] Monthly average temperatures generally vary between 23°C and 28°C. Rainfall is typically around 2,100mm annually, two-thirds of which falls during the wet season (November to April). [10] The average number of rain days is approximately 161, with monthly occurrences ranging from 6 in August to 21 in March. The weather pattern is influenced by the southward migration of the Southern Pacific Convergence Zone where prevailing easterly and southeasterly trade winds converge, influencing levels of precipitation. Figure 4.2 illustrates fluctuations and changes in rainfall, over a period in excess of 60 years.

**Figure 4.2: Annual average air temperature and total rainfall at Bauerfield Airport, Port Vila**




Note: air temperature (red dots and line) and total rainfall (bars). Light blue, dark blue and grey bars indicate El Niño, La Niña and neutral years respectively. No bars indicate that data is not available. The solid black lines show the trends.

Source: Pacific-Australia Climate Change Science and Adaptation Planning Program (2014)

103. During cyclones, life and property are threatened by strong winds (speeds of up to 250kph were recorded during Tropical Cyclone Pam (2015), extreme rainfall, and sea surges. Strong winds can cause buildings to collapse, but much damage results from windborne objects such as loose sections or roofing material, picked up by the wind or forced off their fixings. Sea surges directly threaten buildings and property close to the coastline.

[9] Peel, M. C., Finlayson, B. L., and McMahon, T. A, (2007), Updated world map of the Köppen-Geiger climate classification. Hydrology and Earth System Sciences, University of Melbourne

[10] Vanuatu Meteorology and Geo-Hazard Department (2019) Vanuatu Climate Change Update issues 55, May 2019 (https://www.vmgd.gov.vu)

104. Flooding occurs regularly in the peak wet season, during and after storm events, and is exacerbated by the presence of roads and buildings, and inadequate drainage measures. The problem is exacerbated by infrequent clearance and poor upkeep of drains. Given the varied topography, effective drainage throughout the city is a challenge, and there are numerous hotspots identified by the Port Vila Urban Development Project.[11]

105. **Climate change**. Observations made on the basis of measurements taken over the past seventy years or so have shown temperature, precipitation, and sea level changes. These are summarized in the 2015 publication by the Pacific-Australia Climate Change Science and Adaptation Planning Program and include annual and seasonal temperature increases and increases in sea level. Rainfall levels, overall, have not shown a significant upward or downward trend but have shown substantial annual variation. With regard to the future climate, the Pacific-Australia Climate Change Science and Adaptation Planning Program[12] predicts:

- Continuing El Niño and La Niña events, though there is no strong evidential basis to predict any change in intensity of these
- Continuing rises in mean and peak temperatures
- Possible increase in drought frequency (under high emissions scenarios)
- Increased rainfall variability
- Continued sea level rise and related wave height increases, particularly in the wet season
- Less frequent, but more intense tropical cyclones

106. The projected increase in the intensity of tropical cyclones is of particular concern, particularly in the light of recent experience with cyclones Pam (2015, largely striking Efate) and Harold (2020, which caused more damage on Santo including the town of Luganville).The increased intensity is highly significant for coastal homes, subject to extreme high winds and wave heights. While improvements to building standards, including support to revisions to the national building code and its application or enforcement will encourage more resilient housing, this will occur gradually and access to shelter in carefully built structures will mitigate risks to lives.

107. **Disasters**. According to the World Bank Pacific Island countries are some of the most vulnerable in the world to the effects of climate change and disasters. The World Risk Index 2020 ranks five Pacific Island countries (in addition to PNG) among the top 20 most at-risk countries, including Vanuatu and Tonga, which are ranked first and second respectively.

108. A 2015 global risk analysis study found that Port Vila is the world's most exposed city to natural disasters. The Natural Hazards Risk Atlas[13] identified the threats posed to more than 1,300 cities. The analysis considered the combined risk posed by cyclones, floods, tsunamis, earthquakes, landslides, and fires. Port Vila received the top ranking because it faces a combination of multiple hazards.

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[11] ADB. 2011. Port Vila Urban Development Project: Initial Environmental Examination.

[12] Pacific-Australia Climate Change Science and Adaptation Planning Program 2014. Climate Change in the Pacific: Scientific Assessment and New Research | Volume 2: Country Reports

[13] Verisk Maplecroft. 2015. Natural Hazards Risk Atlas. UK

109. Port Vila is highly exposed to earthquakes, tsunamis, flooding and tropical cyclones and the levels of risk in terms of exposure to these hazards is high; the combination of the multiple hazards which drives its position at number one

110. **Seismicity and earthquakes**. Vanuatu is located about 100-200 km east of New Hebrides trench which runs parallel to, and has formed the archipelago where, the Australia-India plate collides with the Pacific Plate. The location of the archipelago relevant to this feature means that Vanuatu is located in an area of active seismic and volcanic activity. Earthquakes are frequent in Vanuatu and the United States Geological Survey recorded about 4,000 earthquakes with a magnitude greater than 4 between 1961 and 1982. Earthquakes often originate at considerable depth and are therefore not particularly destructive being of large magnitude but low intensity. Efate and Port Vila is still geologically active and continues to be deformed by faulting and tilting associated with earthquakes.

111. Port Vila is located in one of the most active seismic regions on earth. Earthquakes are felt frequently and, due to very rapid plate convergence rates, return period of large earthquakes (M>6) in the New Hebrides Benioff zone can be less than 10 years. Even though Port Vila does not lie on an identified seismic fault zone, strong motions by nearby earthquakes have to be expected due to the city's geographical location close to the plate boundary of New Hebrides convergence zone. Seismically[14], Port Vila is dominated by shallow events. The last major earthquake which recorded 7.3 on the Richter scale occurred in January 2002 and was located 35 km west of Port Vila. This earthquake caused widespread damage to buildings and infrastructure. While Port Vila does not lie in an identified major seismic zone, strong earthquakes must be expected due to its location to the plate boundary. A plot of seismic frequency for Port Vila shows that a magnitude 7 earthquake has a return frequency of 10 years, a magnitude 7.5 has a frequency of 30 years while a magnitude 7.8 has a frequency of 100 years. Based on the analysis of the terraces around Port Vila these are estimated to be rising at around 1.5mm/yr.

112. **Cyclones**. Efate and neighboring islands are subject to relatively frequent cyclones, sometimes to devastating effect. Cyclones occur almost exclusively during the wet season. The occurrence of cyclones varies considerably from year to year but are more frequent in El Niño/Southern Oscillation (ENSO) La Niña and neutral years and average some 24 cyclones per decade.[15] The ENSO also affects rainfall intensity and distribution and air temperature. Data collected over 62 years or more shows correlations with ENSO and related climate patterns, showing a later onset of the wet season, lower rainfall year round and cooler dry seasons associated with El Niño events, and the reverse for La Niña events.[16]

113. Tsunamis can also be triggered by earthquakes. The last major tsunami that affected Vanuatu was recorded in November 1999 following a magnitude 7.3 earthquake off South Pentecost Island. No major tsunamis have been recorded in Port Vila.

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[14] SOPAC. 2001. S*eismic Microzonation of Port Vila, Efate, Vanuatu.* South Pacific Geosciences Commission (Feb 2001)

[15] Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) Program (2014), Current and Future Climate of Vanuatu. www.pacificclimatechangescience.org

[16] PACCSAP. 2011. Climate Change in the Pacific: Scientific Assessment and New Research | Volume 2: Country Reports

114. Volcanoes are represented on nearly all of the islands of the archipelago of which nine volcanoes are still active. The most dangerous is Mount Garet (797 m) located on Guaua (Banks Island), and also on the islands of Lopevi and Tanna where Mt. Yasur is one of the world's most accessible volcanoes for tourists. There are no active volcanoes on Efate.

### 3. Water resources and water quality

115. **Freshwater resources**. There are no rivers flowing through Port Vila central area or into the adjoining Ekasuvat / Emten lagoon system. Surrounding catchments feed rivers to the north and south of the city. Drainage is reliant on road drains and their maintenance, although subsurface flows are significant.

116. Underlying soil and rock is largely porous, the corraline and associated soil deposits have high primary porosity, enhanced by secondary porosity in the form of sinkholes and voids in some locations. The porous corraline material creates the principal aquifer for the island of Efate[17] and is currently the primary source for the city's water supply.[18]

117. **Bathymetry of Port Vila Harbor**. The latest bathymetry data that is available for Port Vila is from British Admiralty (BA) Chart No. 1494 published in 2009, but based on surveys conducted much earlier (between 1961 and 1987). The general bathymetry of Port Vila can be summarized (Raaymakers 2010) as follows:

- Harbor entrance - 33m deep at its deepest point, but quite narrow with steep walls rising to reef shelf on either side of the entrance
- Port Vila Bay - immediately to the east of the Harbor entrance, between 30 and 40m deep throughout Fatumaru Bay: Shallow and sandy, extending to the north, generally less than 3m deep (with 6 distinct deeper holes within the Bay)
- Malapoa Reef - shallow coral ridge generally less than 2m deep, separating Port Vila Bay and Fatumaru Bay
- Three deep holes: (up to 30m deep) between the Central Market and Iririki Island
- Paray Bay - up to 40m deep in the southeast corner of the Harbor
- Iririki Ridge - shallow coral shelf generally less than 2m deep, separating Paray Bay and Pontoon Bay, and extending from the area of Star Wharf to Iririki Island; and
- Pontoon Bay - up to 50m deep in the south of the Harbor.

118. **Marine water quality**. There is a shortage of consistently collected, modern data, constraining the management of Vanuatu's marine resources, including coastal protection.[19] However, a series of water quality tests conducted by the Department of Water Resources since the 1980s has revealed a substantial increase in pollution levels in the harbor and more widely in Mele Bay. In 2016, a water quality monitoring assessment of Port Vila Harbor was undertaken by the Commonwealth Marine Economies Program (CME).

[17] Buss, S (2015) Port Vila Urban Development Project: groundwater appraisal report.

[18] Nath, D. Mudaliar, M. and Loan, C., 2006. Water Safety Plan Vanuatu. Water Safety Plans Programme, 2006.

[19] Commonwealth Marine Economies (CME) Programme (2018) Vanuatu: Country Review

119. The program found that "the areas directly affected by water quality are typically the sites closest to the storm water outlets and would be receiving water contaminated by sewage and urban runoff."20. This contributes to poor water quality in the Port Vila Harbor, where fecal coliform levels have been found to be well in excess of levels acceptable for recreational use. In June-September 2018, newspaper articles alerted the public to harbor contamination and unsafe conditions.

120. Water quality in Port Vila harbor and Mele Bay decreases at near-shore sites close to stormwater outlets, indicating high nutrient and micro-organism contents of stormwater, consistent with contamination of the stormwater by raw sewage and urban runoff (Cefas, 2016).

121. **Fatumaru Bay**. Fatumaru Bay is a sheltered bay within the Port Vila harbor and the wider Mele Bay, situated in Melcofé, at latitude: 17°43'59.99 and longitude: 168°18'0.01 and about 1.7km from the center of the city. Sediment comprises a very shallow (5-11cm) layer of fine, soft, muddy sediment overlain on hard coral and rock.

122. Sampling undertaken in Fatumaru Bay for the CME program[21] identified elevated concentrations of DIN (exceeding 350ug/L) together with relatively high concentrations of inorganic phosphorous (FRP or DIP). Nitrates are usually high in coastal waters that receive drainage from industrial and/or urban sources (Devlin et al, 2015). A small industrial estate as well as housing developments surround the shores of Fatumaru Bay, which could partly explain the nutrient enrichment, however the nitrate concentrations appear exceedingly high compared with other concentration ranges measured in Efate as well as other comparable regions of South Pacific (Devlin et al, 2020). The values of FRP or DIP in Fatumaru Bay appear similar to literature DIP concentration ranges attributed to ln runoff or riverine inputs f suspended matter, particularly fine particles that are conduit of phosphorous (Devlin et al, 2015). Salinity values were lower in Fatumaru Bay compared with the other locations, a sign of freshwater input to the bay.

123. The New Zealand government supported PVCC to implement the NZ$19 million Vanuatu Tourism Infrastructure Project which included rehabilitation and development of two public waterfront spaces: the Seafront Precinct (Fatumaru Bay area) and the Portside Precinct – the main wharf eastern entrance. Its aim was to improve the safety, attractiveness, and value of Port Vila as a tourist and cruise ship gateway. At Fatumaru Bay the work included concreting a section of the foreshore area between Telecom Vanuatu Limited and the Anchor Inn Beer Garden.

[20] Centre for Environment, Fisheries and Aquaculture Science (Cefas), (2016) Preliminary Outcomes of an Integrated Water Quality Assessment for Port Vila, Efate (Vanuatu).

[21] S. Lincoln et al. 2021. Assessing intertidal seagrass beds relative to water quality in Vanuatu, South Pacific. Marine Pollution Bulletin 163

## C. Ecological Resources

### 1. Marine habitats and resources

124. **Marine ecosystems**. The marine ecosystem is the largest ecosystem in the archipelago and includes mangrove forests, lagoons (both closed and open), seagrass beds, fringing coral reefs and deep water systems. None of the corals and shallow water reef fish are unique to Vanuatu and are similar to those found in similar latitudes. Coral reef habitats have been damaged by cyclones while outbreaks of the crown of thorns starfish (*Acanthaster planci)* that unlike the rest of the world are plentiful and not under threat. Mangroves are commonly found in estuary areas and quiet waters behind reefs where they form an important part of the marine system in providing shelter for a wide range of marine life including 13 species of molluscs, 20 species of crustaceans and 42 species of fish.

125. **Marine fauna**. Marine reptiles found in Vanuatu include four species of sea turtles which are all endangered worldwide. These include the Green Turtle *Chelonia mydas*, Hawkesbill Turtle *Eretmochelys imbricate*, Loggerhead Turtle *Caretta caretta*, and the Leatherback Turtle *Dermochelys coriacea*. Turtles are plentiful within Vanuatu waters and may also be hunted. Two species of sea snake *Pelamis platurus* and *Laticauda sp.* occur while the salt water crocodile *crocodylis porosus* is found in the northern islands.

126. **Mangroves**. Mangrove forests constitute the most extensive wetland vegetation in Vanuatu: estimates lie between 2,500ha (FAO 2005) and 3,000ha. Of this total, almost 2,000ha of mangrove occurs on Malekula, mainly in two large areas along the east coast; elsewhere, mangroves occur as small stands or narrow belts along lagoon perimeters, sea shores and estuaries. Typically, there are four recognizable zones: a landward fringe, now generally cleared by human activity; thickets of *Ceriops tagal* with the mangrove fern *Acrostichum aureum*; a *Rhizophora spp*. forest zone; and a seaward forest zone of *Avicennia marina*, occasionally with scattered *Sonneratia caeseolaris* and *Bruguiera sp*. In some localities, the stands of Sonneratia and Bruguiera spp. comprise an additional recognizable zone (Chambers 1988).

127. Sizeable stands of mangrove occur on only nine of the 80 islands in the archipelago: Malekula (1,915 ha), Hiu (210 ha), Efate (100 ha), Emae (70 ha), Epi (60 ha), Vanua Lava (35 ha), Ureparapara (30 ha), Mota Lava (25 ha) and Aniwa (15 ha) (Lal and Esrom, 1990). 24 species of mangrove tree ('natongtong') have been recorded (Vanuatu MESCAL project, 2013). On Efate, mangroves only cover 100ha (1%) of the island. Mangroves have been previously cleared for various developments as well as being felled for firewood and building materials. Three areas including mangroves were identified on Efate in 2014 (Figure 4.3).[22]

[22] SPREP & DEPC. 2014. Directory of Wetlands of Vanuatu.

**Figure 4.3: Mangroves areas on Efate**


Source: Directory of Wetlands of Vanuatu (2014)

128. Duck Lake (Emaotul), 10km east-north-east of Port Vila, is a lake 1.3km long and 0.6km wide and in an associated area of 73.6ha. It a small freshwater lake with associated swamp vegetation and some fringing swamp forest, surrounded by degraded lowland tropical rain forest.

129. Emaotfer Swamp (192 ha) is a freshwater swamp in the southern lowlands of Efate (10.5km south-east of Port Vila), consisting of tall emergent sedges surrounded by dense low swamp forest. Initial investigations suggest that the swamp may include peat deposits.

130. Ai Creek is located on north-west coast of Efate, 15km north of Port Vila. It originates 8.7km inland on a limestone plateau and emerges at the sea near Manga'asi Village. Ai Creek comprises a 50ha area surrounding a permanent stream emerging from forested limestone catchment on the north-west coast of Efate; the type locality is suitable for *Sicyopterus aiensis* a freshwater fish species that is endemic to Vanuatu. The boundary of the site is defined as the channel of Ai Creek form its sea mouth upstream for about 2.4km, with a 50m buffer zone on both sides of the channel.

131. **Use of resources**. While extensive marine resources exist in Vanuatu and are important both culturally and economically, the people of Vanuatu, unlike other Pacific island countries do not make heavy use of the resources. Marine exploitation is mainly in the form of subsistence fishing and resources are still plentiful though they can be overfished in some areas including the sea shells, *Trochus niloticus* and *Turbo marmoratus* which have been sought for pearl buttons and inlay materials. Pelagic fish (*Katsuwomus pelamis, Thunnus albacores, Thunnus alalunga, Thunnus obesus and Thunnus thymus*) pass through Vanuatu exclusive economic zone waters and are now being exploited as a fish resource by both a small national fishing fleet and internationally.

132. **Project area conditions**. Coastal and lagoon waters surrounding Port Vila have coral and mangrove habitats, both of which have suffered from clearance and are threatened by ongoing pollution. The emergency shelter is set back approximately 260m from lagoon waters. The Ekasuvat and adjoining Erakor lagoon is fringed by mangroves and also contains seagrass beds.[23] Fatumaru Bay also has mangroves along parts of the shoreline. The Malapoa reef, which separates Fatumaru Bay from adjoining Port Vila Bay supports coral communities.[24]

133. **Seagrass of Fatumaru Bay**. In 2017 CME undertook a seagrass survey[25] of sites on Efate (including Fatumaru Bay) and Tanna identified a total of five species of seagrass, all of which are already documented in Vanuatu: *Thalassia hemprichii*, *Cymodocea rotundata*, *Enhalus acoroides*, *Halodule uninervis* and *Halophila ovalis*.

134. In Fatumaru Bay, the seagrass appeared covered by epiphytes. Epiphytes are bacteria and microalgae that attach to the surface of the leaves proliferate in conditions of high nutrient concentrations in the water, smothering the seagrass and reducing the amount of light and nutrients that reaches the leaves, potentially slowing their growth. The seagrass in Fatumaru was also found to be sparser than in the other survey locations, and the plants generally shorter in height. The condition of the seagrass improved towards the north, with Paonagisu showing the highest diversity and better healthy appearance, followed by Moso Island and Erakor Lagoon. In general, the seagrasses measured in August 2018 were shorter than in 2017. The denser seagrass was found in Eratap followed by Pele and Pango, while Fatumaru Bay was sparser and with shorter plants than the previous year. The poor health of the seagrass in Fatumaru Bay found in both surveys could be due to high nutrient concentrations.

135. Seagrasses typically grow on nutrient-poor sediments so under high-nutrient conditions plants will initially increase their growth rate. However prolonged excess nutrients also stimulate epiphytes to grow on the seagrass smothering the plants. Other causes for poor seagrass health in Fatumaru Bay can be light limitation and fluctuations in salinity from freshwater flows.

136. The 2017-2018 survey results are validated by a further study.[26] In Fatumaru Bay, seagrass leaves appeared generally paler and brownish in color, almost completely covered by epiphytes. The seagrass in other sites showed some brown, burnt leaves (especially at Pango and Pele sites which were almost completely exposed at low tide). In general, at other sites, seagrass leaves appeared greener compared with Fatumaru where most of the seagrass patches exhibited brown fragmented or decaying leaves, more densely covered with epiphytes compared with other sites, nutrient over-enrichment could be an underlying factor, inducing a decline in seagrass condition. Epiphyte and macroalgae growth was more widespread across the seagrass beds surveyed in Fatumaru Bay and although macroalgae abundance, not strictly quantified, macroalgae were observed to cover large patches of Fatumaru seagrass, while much more sporadic at the other sites.

137. The carbon content in the seagrass plants and roots and the sediment underneath, to estimate the “blue carbon” potential of these seagrass meadows. We found the higher values of carbon storage in the seagrass growing on deeper soft sediment, like Erakor and Paonagisu. The lowest values of carbon storage were measured in Fatumaru Bay.

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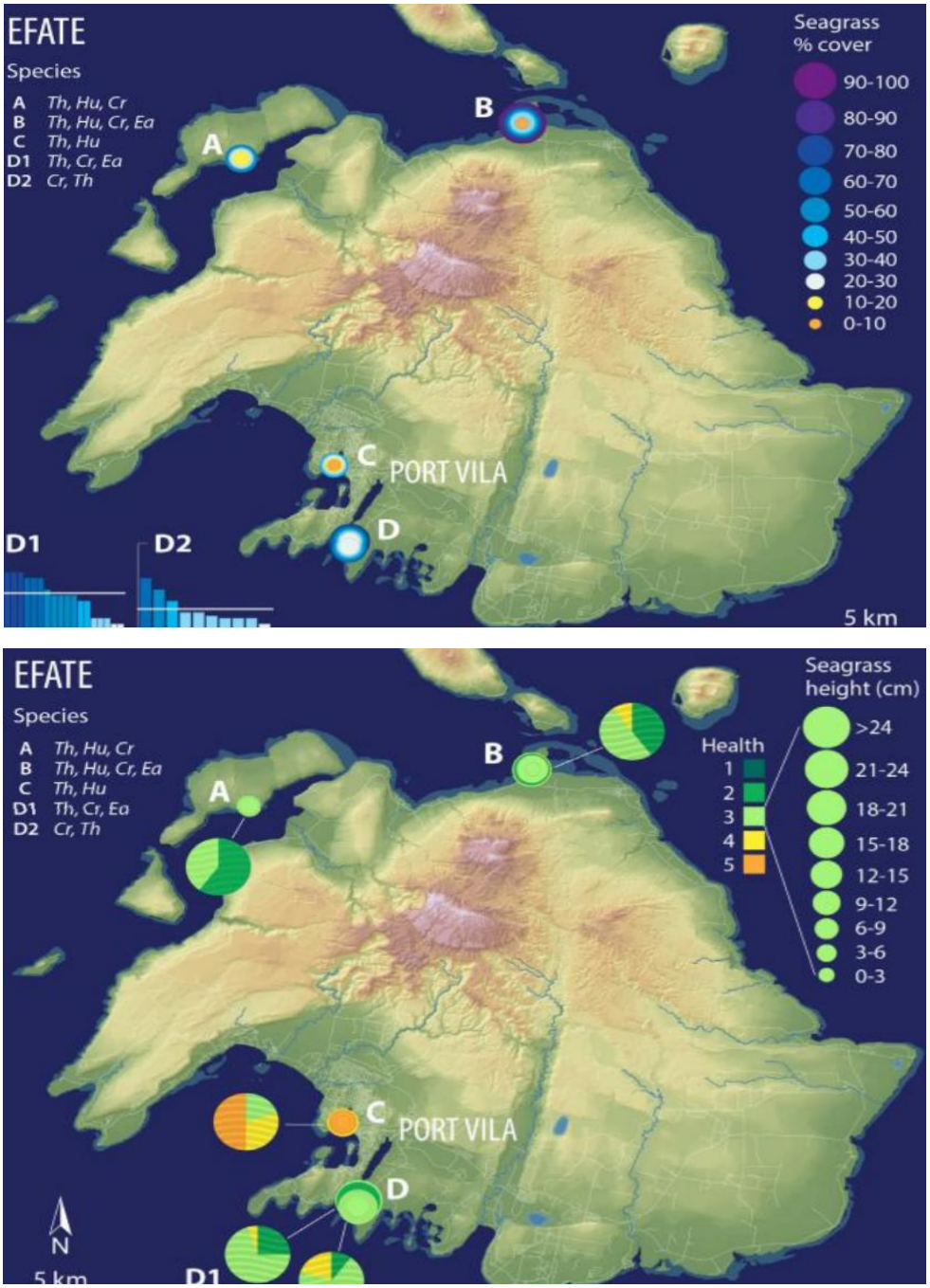
[23] Ceccarelli D.M et al. 2018. Biophysically special, unique marine areas of Vanuatu. MACBIO (GIZ, IUCN, SPREP)
[24] Government of Vanuatu. 2010. Star Terminal Development: Supplementary Environmental Impact Assessment.
[25] Commonwealth Marine Economies Programme. 2019. 2017-2018 Seagrass Surveys, Efate, Vanuatu
[26] S. Lincoln et al. 2021. Assessing intertidal seagrass beds relative to water quality in Vanuatu, South Pacific. Marine Pollution Bulletin 163

138. Figure 4.4 a and b shows survey results for seagrass cover (%) and seagrass health and height (cm). Fatumaru Bay is shown as survey site c.

**Figure 4.4: Survey results for (a) seagrass cover and (b) seagrass health and height**




Source: 2017-2018 Seagrass Surveys, Efate, Vanuatu (Commonwealth Marine Economies Programme, 2019)

139. **Other marine life in Fatumaru Bay**. On average over half the bottom is covered in fine silty sediment 1-3mm thick. In deeper places it is silty mud. The current amount is beyond the ability of most of the marine life documented on this survey to survive. Recruitment of new coral is unsuccessful because the substrate that newly spawned coral settles on is not clean. Fertilized egg packs cannot attach to loose material and subsequently they die. Coral and non-coral invertebrates are largely absent. There is between 15% and 20% cyanobacteria, and 5% and 15% funnel-weed algae on the substrate which is a significant amount. It can quickly deteriorate further if algae eaters are not allowed to re-populate the reef.

### 2. Terrestrial habitat and resources

140. **Terrestrial ecosystem**. Vanuatu is located at the eastern limit of the distribution of Indo-Malaysian species and at the western limit of many Pacific species. Compared to other neighboring bio-geographic regions such as Papua New Guinea, New Caledonia or the Solomon Islands, Vanuatu has low levels of diversity and endemicity of terrestrial species. There are about 1,000 vascular plants of which 150 are endemic and include 700 species of bryophytes which makes this the most common group of plants in the archipelago. Other plants include 158 species of orchids (7 endemic); 21 species of of palms including the endemic monospecific genus *Carpoxylon macrospernum* and 14 other endemic species of which 11 are rare or vulnerable.

141. **Fauna and avifauna**. Mammals include 12 species of *Chiropterae* including four species of flying foxes all of which are endemic and eight other bat species of which two are endemic. Flying foxes are important for pollination and seed dispersal of forest trees. All other mammals have been introduced and now include rats, mice, cattle, feral goats, pigs, and cats. Vanuatu has 121 species of birds of which 74 are land and freshwater birds. There are 32 species of sea-birds of which only a few are resident and 15 species of shore birds of which seven are endemic. There are several introduced birds the most recent being the common Myna (*Acridotheres trisis)* which was introduced in the 1960s and is now out-competing many of the indigenous birds. Reptiles and amphibians include 19 species of lizards and two snakes.

142. **Project area conditions.** Port Vila has many mature trees, within and around the CBD, several parks, gardens around government buildings and private homes in the residential areas, and some areas where thick ground story vegetation has developed beneath tree cover. These provide habitats for fauna and further flora such as epiphytes and shrubs and for fauna, although limited in extent in comparison to the slopes and coastal areas surrounding Port Vila offer which offer extensive natural habitat, including intact high forest.

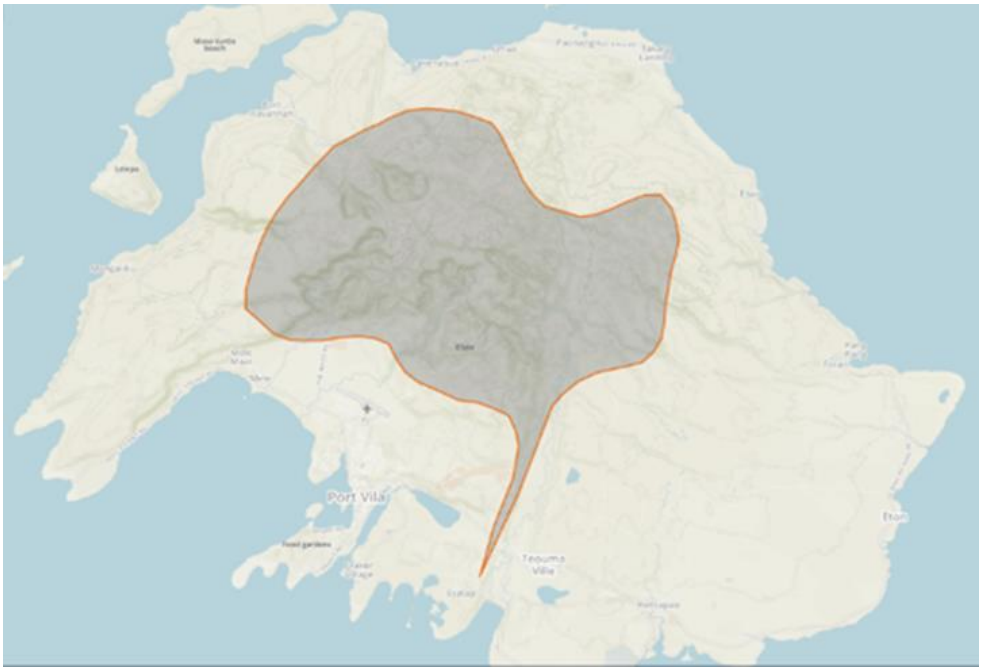
143. The Korman Market site is on bare ground, bounded by a patch of thick vegetation comprising of mature trees, fruit trees, shrubs and vines to the north, and Teouma Road (linking to the main eastbound route) to the south. Plate 4.1 shows the proposed site, with the existing market to the south-west.

**Plate 4.1: Aerial view of the Korman shelter site**

## 3. Protected areas

144. There are 34 protected areas in Vanuatu, covering 538 km$^2$ (4% of total land area). Only one is located on Efate–Central Efate forest conservation area (Teouma)–in the centre of the island (Figure 4.5). Approximately half of this area is in the western area of Efate. The two subproject sites are far from the area and its buffer zone (as shown in Figure 4.5)

**Figure 4.5: Central Efate forest conservation area**



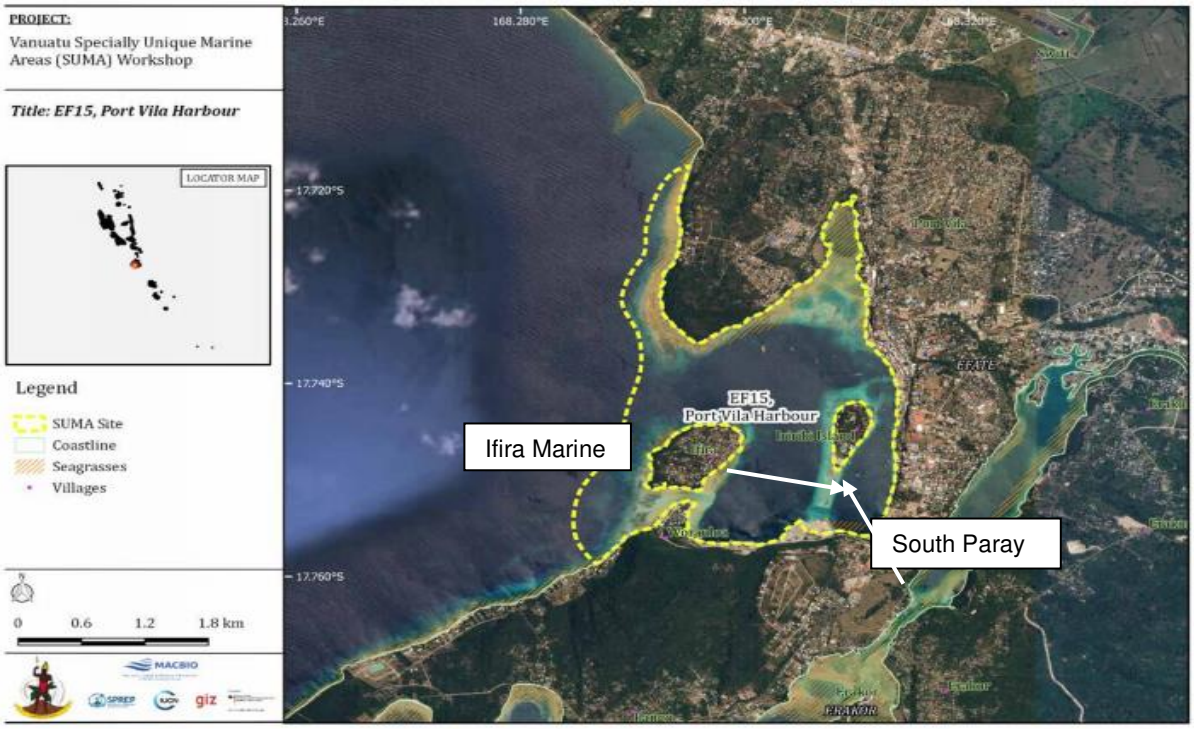

Source: Protected Planet (2016)

145. There are no protected areas or areas of high biodiversity value or significance (including key biodiversity areas or important bird areas) within proximity of the two subproject sites.

146. There are obligations to protect and sustainably manage species associated with coral reefs, seagrass beds and mangrove ecosystems within the EPCA, Fisheries Management Act 2014 and Forestry Act 2001. Turtles, dugongs and a large number of fishes and invertebrates associated with coral reefs, seagrass beds, and mangroves are listed under CITES and on the IUCN Red List of Threatened Species.

147. Special Unique Marine Areas (SUMA) have been identified and mapped in Vanuatu (Ceccarelli et al 2018) as part of the development of a National Ocean Policy and Marine Spatial Plan. There is a SUMA that encompasses the Port Vila Harbor area (identified as Site EF15: Port Vila Harbor – Ifira Marine Area) situated around Ifira island, containing coral reef, mangrove, seagrass, sand, estuary, and lagoon habitats (Figure 4.6). These habitats have been recorded to host important fish assemblages, green snail and trochus, turtles, and sharks. The SUMA includes the Ifira Marine Area which is not legally registered but is included in the NBSAP 2018–2030 as a proposed marine conservation site as a national priority for formal protection by 2030. It also includes community managed marine areas that are not priority for legal protection.

**Figure 4.6 Port Vila Harbor SUMA and Ifira Marine Area**




Source: Ceccarelli et al (2018)

### 4. Invasive species

148. There are nine known invasive species occurring in Efate Island, as listed in the Global Invasive Species Database (ISSG 2016); three flora species and six fauna species. Common. Invasive species found in Vanuatu include the following:

- Two vines which include: mile a minute vine (*Mikania sp*) and American rope vine (*Merremia spp.*)
- Wild Sage (*Lantana camara*)
- Perennial, climbing liana (*Macfadyena unguis-cati*)
- Water hyacinth (*Eichhornia sp.*) which has been introduced to fresh water lakes
- Water lettuce (*Pistia stratiotes)* is a free-floating aquatic weed from Asia that spreads into waterways and chokes drains
- The fire ant (*Wasmania auropunctata*) which is now established in Banks Islands (Vanua Lava and Mota). This is a tiny aggressive ant from tropical America whose sting is particularly harmful to fauna and humans.
- Giant African snail (*Euglandina fulica*) has been responsible for the destruction of endemic snails but is now being controlled following the introduction of its natural predator.
- Common Myna (*Acridothere trisis)* introduced from India is very successful in competing with native birds taking over their habitat by destroying eggs and nests.
- Broom week (*Side acuta*) is a woody weed that spreads through pasture. It is spread by overgrazing but is easily controlled by herbicides.

## D. Socio-Economic Resources

### 1. Population and demography

149. **Population**. Port Vila's population is 39,000, approximately 19% of the nation's population of 272,000, and accounts for 75% of the total urban population. Population data from 2016 (the most recent available) showed the growth in the urban population at 2.2%. The Korman shelter is located in Freshwater–Tessiriki ward and the Fatumaru Bay coastal protection is located in Anabrou-Melcofé ward. Table 4.1 below shows the population of the five wards that make up the PVCC area.

**Table 4.1: Port Vila population data 2016 and 2020**

| Ward | Population 2016 | | | | Total population 2020 |
|---|---|---|---|---|---|
| | Male | Female | Total | No. households | |
| Malapoa-Tagabe | 7,003 | 6,764 | 13,767 | 2,918 | 15,019 |
| Anabrou- Melcofé | 3,138 | 3,121 | 6,259 | 1,429 | 6,828 |
| Freshwater-Tessariki | 4,701 | 4,566 | 9,267 | 1,976 | 10,110 |
| Centre | 2,873 | 2,662 | 5,535 | 1,090 | 6,038 |
| South | 2,034 | 1,852 | 3,886 | 905 | 4,239 |
| **PVCC area** | **19,749** | **18,965** | **38,714** | **8,318** | **42,235** |

Source: National Statistics Office based on enumeration areas within Port Vila urban wards (2016)

Notes: An annual growth rates of 2.2% for urban wards (as advised by VNSO) has been applied to obtain 2020 population estimates.

150. The population of Vanuatu is predominantly Melanesian Ni-Vanuatu (99.2%). According to the 2016 mini census, the figure in Port Vila is 97.5 Ni-Vanuatu, the balance being of overseas origin such as Chinese, Vietnamese, and European. The population in the Freshwota-Tessariki ward is almost entirely ni-Vanuatu. The ni-Vanuatu are considered to be the indigenous population in Vanuatu and are recognized in the legislation. There are people of other ethnicities living in Port Vila, including the three wards, but these people make up less than 2.5% of the population.

151. The indigenous population in Vanuatu, called ni-Vanuatu, is predominately Melanesian (99.2%)[27]. Other smaller ethnic groups include Wallisians, Futunans, i-Kiribati, Chinese, European, and Vietnamese. The legislation in Vanuatu recognizes all ni-Vanuatu as indigenous peoples.

152. **Livelihoods and poverty**. For most ni-Vanuatu, 'absolute poverty' such as hunger and destitution is not seen as existing. Poverty is defined as a state of "having nothing" (no gat samting), "being hopeless", and "struggling for survival".[28] Hardship, however, is widely perceived to exist, characterized primarily by lack of and/or limited access to basic services such as education, health, good roads, and safe water supply. Limited income sources and unemployment are the most cited hardships in the urban areas.

153. Average weekly household income for Port Vila in 2010 was Vt 24,023 (US$214.49) or Vt 4,000 (US$35.71) per capita, with most income from wages and salaries. Roughly half of the Port Vila's municipal population was actively involved in the workforce. Of those, one fifth are engaged in services and sales, followed by 15% engaged in craftwork and trades.

154. In 2010, 14.7% of Port Vila households were below the basic needs poverty line (BNPL) of Vt 2,866 and 2.2% of households were below the food poverty line. Poverty is higher in Port Vila than rural areas. Although poverty in Port Vila decreased between 2006 and 2010 from 20% basic needs poverty to 18%, and 5.4% food poverty to 2.8% in real terms, the average weekly expenditure on food and non-food items per household increased by 42.7%.

[27] VNSO 2017. Vanuatu 2016 Post TC Pam Mini-Census Report.
[28] ADB 2003. Priorities of the People, Hardship in Vanuatu. Asian Development Bank: Manila

155. The proportion of households with no primary income source is lower across Port Vila than the national average of 5.5%.[29] However in Port Vila's settlements, many members of the community are unemployed and struggle to live. Those in settlements with employment often hold lower paid low skilled jobs such as: for men: security guards, construction laborers, and for women: Chinese storekeepers, domestic workers, hotel housekeeping workers, and office cleaners.

156. **Gender issues**. Gender-based inequality is deeper in Port Vila and other urban areas, compared to rural areas. This is partly a reflection of wage inequality, where women's share of the benefits from economic growth has been less than men's. This is probably attributable to higher growth in male-dominated jobs such as construction, particularly in Port Vila and surrounding area. In urban areas there is a strong three-way relationship between gender, low or no education and poverty. Vulnerability and the incidence of basic needs poverty is higher among females than males with limited or no schooling.

### 2. Land ownership, use and tenure

157. **Land ownership**. Across Vanuatu, an estimated 98% of land is owned by indigenous ni-Vanuatu, in accordance with the rules of customs (kastoms) and as outlined in the Constitution. Only indigenous citizens who have acquired their land in accordance with the recognized system of land tenure can have perpetual ownership of their land. The land-owning unit is usually a family or a clan.[30] Vanuatu has a representative parliamentary system where the President is the head of the Republic and the Prime Minister is the head of government. The constitution also provides for a National Council of Chiefs (Malatumeuri), composed of 22 elected kastom chiefs, who advise the government on matters relating to custom and tradition. Provincial authorities are responsible for local government functions.

158. Historically, Vanuatu was colonized by both the British and the French in the 18th century. Vanuatu gained independence in 1980. During the colonial administration, systems for land registration were developed and a court established. At the time customary tenure was not recognized and land rights became a catalyst in the independence movement. Following independence, the new Constitution returned land to custom owners. Since this time, ni-Vanuatu gained the rights to land, territories, and other productive resources, and have not been restricted in their ability to participate and benefit from development.

159. **Project site**. The land at Korman Market is government owned, and managed by the PVCC. Ownership and access rights to the site are described fully in the Land Due Diligence Report. The construction of the multipurpose emergency shelter at Korman (Figure 4.7 and 4.8) will not require or result in involuntary land acquisition. The new shelter will be located on land owned by PVCC. There will be no permanent physical or economic displacement impacts as a result of the construction of the shelter (Table 4.2).

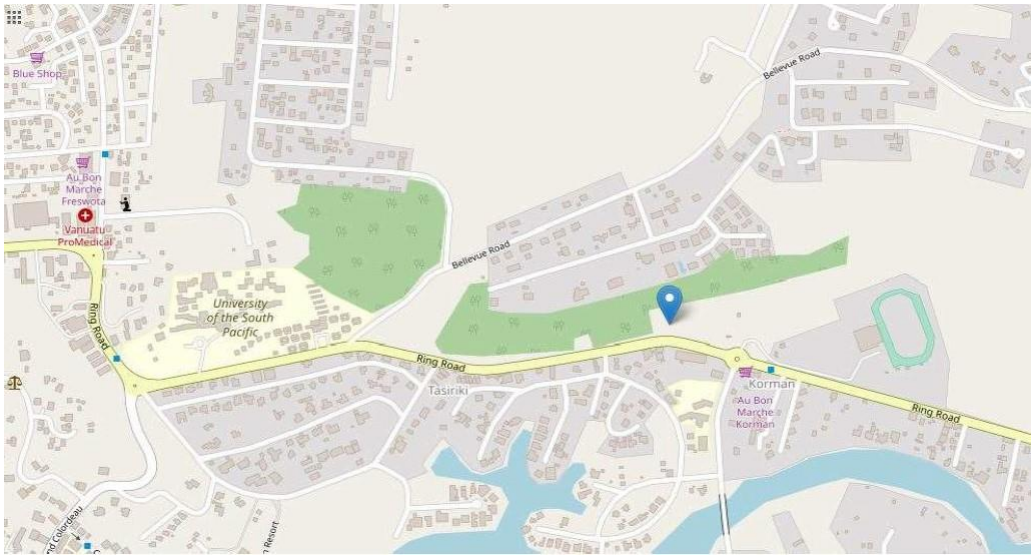
[29] Vanuatu National Statistics Office, 2012. *Vanuatu Household Income and Expenditure Survey (HIES) 2010*

[30] Despite the Constitution and land laws, it has been challenging to enact land rights due to the variety of customary systems and beliefs concerning land use and ownership, absence of records, varying inheritance practices and other issues.

**Figure 4.7: Property boundaries**

Source: LandLogic Property Report for PVM (June 2019)

**Figure 4.8: Street location**




Source: LandLogic Property Report for PVM (June 2019)

**Table 4.2: Summary of land ownership and resettlement impacts at Korman site**

| | |
|---|---|
| Amount of land required | 1,505m$^2$ |
| Ownership of the land | Government - PVCC (confirmed by Department of Land |
| Existing use of the land | Vacant |
| Land acquisition requirements | None<br><br>No acquisition required. PVCC will be responsible to operate and maintain the new shelter. |
| Permanent physical or economic impacts | None<br><br>There are no structures, trees or assets that will be impacted. There will be no permanent impacts on livelihoods. |
| Temporary physical Economic impacts | None<br><br>The construction activities will be within the site and there will be no temporary impacts on privately owned assets or livelihoods. |

160. There are no legacy issues, land disputes or cumulative impacts related to the shelter proposed under the additional financing, as confirmed in the letters and agreements within the appendices.

### 3. Education, health and access to water supply and sanitation

161. **Education**. Primary education in Vanuatu is fee-free and compulsory. Vanuatu's dual English and French education system has a unified curriculum at the primary level. The education system consists of early childhood care and education (ECCE), 6 years of primary school education (Years 1-6), 4 years of junior secondary education (years 7-10) and three years of senior secondary school (Years 11-13). Official entry starts at age 6.

162. In 2016 children in the 0-5 age range were the largest age cohort (equal with 20-24 years), representing 12.0% of the Port Vila population. This means that the number of age appropriate children entering or in primary school in the near future will be larger than current enrolments. In addition, statistics show there is considerable over-age enrolment in all primary schools. While primary school net enrolment (on-time students of official school age) was 97% for boys and 96% for girls nationally, gross enrolment (all students including over-age) was 122% for boys and 123% for girls.

163. As of 2017, there were 576 Early Child Care Education centers, 433 primary schools, 96 secondary schools and 35 technical and vocational education and training institutions in Vanuatu.[31] The government is the main education provider, with access to education further expanded by churches, private schools, and communities also present. Port Vila municipality is an education hub with 11 elementary, 13 primary (French and English), eight secondary schools, and several tertiary facilities including the University of South Pacific.

164. A study in 2018 on urban schools found that a significant number of students (68%) in Port Vila are travelling from outside of their catchment area (ward) to attend school. Most schools were operating at either full capacity or over capacity for student numbers.

[31] Ministry of Education and Training, 2017. *Interim Vanuatu Education and Training Sector Strategy (IVETSS) 2017-2019*.

165. **Health**. Up to date information on the incidence of disease and other health parameters is sparse in Vanuatu as a whole, an issue acknowledged by the Ministry of Health.[32] Illnesses common to urban areas in much of the Pacific where sanitation infrastructure is limited, such as diarrhea and skin diseases, are prevalent. Of particular concern is 2007 data that shows that infant mortality rose from 17 per 1,000 live births in 1997 to 27 per 1,00 live births in 2007. Heart disorders, high blood pressure, and diabetes, on the other hand, are "lifestyle" illnesses, more commonly associated with households in more affluent and developed situations.[33] Respiratory infections, diarrheal disease and neonatal conditions account for most childhood illnesses and under-five deaths. The prevalence of stunting in children under five-years is 28.5%. The maternal mortality ratio per 100,000 live births has fallen from 96 in 1998 to 86 in 2007.

166. Malaria is a further public health issue of importance in the country, with an incidence rate of 14.7/1,000 people. Other communicable disease concerns include tuberculosis, sexually transmitted infections, acute respiratory tract infections including pneumonia, diarrheal diseases, viral hepatitis, typhoid fever and measles. Major non communicable diseases include diabetes, heart disease and stroke.

167. Gender based violence is a recurrent problem, with 60% of women reporting experience of sexual and physical violence. This has consequent and serious short and long term physical, mental, sexual and reproductive health problems.

168. At the time of preparation of this report, Vanuatu is yet to record a case of COVID-19.[34] Vanuatu has put in place strong preventative measures to limit potential transmission of COVID-19. These include closing of borders with international and domestic travel bans, and awareness raising actions by the Ministry of Health on hand washing, sanitation, and physical distancing.

169. **Access to water supply and sanitation**. The majority of the city's population has access to clean water but less than half have access to improved sanitation. Data from 2013 shows that in urban areas (including both Port Vila and Luganville), 97.2% of households used an improved water source (predominantly piped water, followed by rainwater), compared to 87.5% in rural areas (refer Table 4.3). Nearly two thirds of the urban population accessed piped water, and in Port Vila the piped network is known to have a wide area of service. For sanitation, only 45.8% of urban households used improved sanitation (pour flush to septic tanks and pit latrines with slabs). According to the census handwashing facilities were present in 80% of urban households, of which 80% had soap and water available.[35]

[32] Ministry of Health, *Heath Sector Strategy 2017-2020*
[33] Partnership for Newborn, Child and Maternal Health/UNICEF, 2013. *Tracking Progress in Maternal and Child Survival, Case Study Report for Vanuatu*, UNICEF.
[34] WHO COVID Stats, 21/6/2020. https://covid19.who.int/region/wpro/country/vu
[35] Vanuatu National Statistics Office and SPC. 2014. Vanuatu Demographic and Health Survey 2013.

**Table 4.3: Access to water and sanitation (% of households)**

| Indicator | Vanuatu | Rural | Urban |
|---|---|---|---|
| **Source of drinking water** | | | |
| *Improved source* | *90.4* | *87.5* | *97.2* |
| Piped water into dwelling, yard or plot | 40.2 | 30.2 | 63.6 |
| Rainwater | 33.9 | 37.3 | 25.8 |
| Public tap/standpipe | 6.4 | 7.2 | 4.4 |
| Tubewell or borehole | 1.4 | 1.9 | 0.2 |
| Protected dug well | 5.9 | 7.3 | 2.8 |
| Protected spring | 2.6 | 3.5 | 0.5 |
| *Unimproved source* | *6.8* | *9.4* | *0.6* |
| Water on Premises | 85.0 | 79.8 | 97.4 |
| **Type of toilet/latrine facility** | | | |
| *Improved, not shared facility* | *50.7* | *51.7* | *45.8* |
| Flush/pour flush to piped sewer system | 3.0 | 1.4 | 6.6 |
| Flush/pour flush to septic tank | 10.9 | 2.8 | 29.8 |
| Flush/pour flush to pit latrine | 2.6 | 2.9 | 2.0 |
| Ventilated improved pit (VIP) latrine | 10.5 | 13.8 | 2.9 |
| Pit latrine with slab | 23.7 | 31.8 | 4.5 |
| *Unimproved facility* | *48.8* | *46.8* | *53.5* |
| Any shared toilet | 27.4 | 18.7 | 48.0 |
| Pit latrine without slab/open pit | 18.9 | 25.2 | 4.0 |
| No facility/bush/field | 3.1 | 2.5 | 1.2 |

Source: Vanuatu National Statistics Office & Secretariat of the Pacific Community: Vanuatu Demographic and Health Survey 2013 (2014)

Note: Urban area includes Port Vila and Luganville.

### 4. Air quality, noise, traffic and services

170. **Air quality and noise**. There are at present no air quality standards, or regular air quality monitoring in Vanuatu. However, sources of air pollution are relatively limited, as there is little heavy industry. Vehicle traffic, diesel power generation and to a lesser and more variable extent, construction are sources of noise and aerial pollutants.

171. **Traffic**. Vehicle traffic within Port Vila is intense in the CBD. Traffic flow within the CBD benefits from a one way system, though blockages can occur at peak traffic times. At the Korman site, traffic flows have benefited from recent improvements to Teouma Road in 2018 and 2019, however this remains a busy route. Traffic is prone to disruption from vehicles accessing an existing informal market area to the immediate east of the proposed site. Pollution from vehicles is higher in the low lying CBD where traffic levels are high, and high for periods of high traffic in the vicinity of the Korman shelter, particularly during periods of traffic build-up as traffic flows from residential areas at the start and end of each working day.

172. **Energy**. Port Vila is reliant on petroleum imports for power generation, although approximately 17% of the power on Efate island is generated from clean (wind and solar) sources, a proportion that is set to increase significantly with the implementation of the energy road map for Efate.[36] Generators at the main power station, located to the southeast of the CBD are being replaced with larger, more modern units which are hooded and sound-proofed and the electricity utility, UNELCO, states that these will enable power production capacity to be increased whilst significantly reducing noise pollution and gas emissions.[37] Construction activity takes place constantly around the city, including improvements and extensions to homes, businesses, and government offices.

173. **Economy**. Vanuatu is ranked No. 138 in the world on the Human Development Index, significantly higher than the immediate Melanesian neighbors (the Solomon Islands and Papua New Guinea are ranked 152 and 153 respectively, though lower than Fiji (92) and other large Pacific nations such as Samoa (104 and Tonga (98).[38] Per capita GDP is estimated at US$2,846 (318,752 Vt).[39]

[36] https://www.unelco.engie.com/images/doc/roadmap2030.pdf

[37] https://www.unelco.engie.com/en/unelco/location

[38] http://hdr.undp.org/en/countries No HDI ranking available for New Caledonia or Tuvalu.

[39] https://tradingeconomics.com/vanuatu/gdp-per-capita-ppp

# 5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

174. The potential impacts and mitigation measures have been identified through review of the feasibility studies prepared for the multipurpose emergency shelter facilities, discussion with the team involved in design and stakeholder consultation. The feasibility study presents the preliminary design. Detailed engineering design will be completed by the PCU with the assistance of the PIAC, to be recruited in 2022. The IEE will be updated on the basis of detailed design. The two subprojects have been reported separately, and separate EMP have been developed – refer to Section 7), to enable clear advice and guidance for the contractors.

## A. Korman Market Emergency Shelter

### 1. Design and pre-construction stage

175. **Site investigations**. Sites are level, and on bare ground. For detailed design, further site investigation is required to confirm geotechnical conditions, for the purpose of design of foundations and of the septic tank system, which is to follow the Vanuatu national building code. The geotechnical investigations will involve digging small pits or using a hand auger to ascertain underlying soil characteristics and thickness of the soil layer. As described in section IV, rock conditions are largely uniform over the city, comprising heavily fractured limestone, formed from coral deposits. There will be no residual impact.

176. **Climate change adaptation**. The shelter is needed as a refuge from storm events, the intensity of which is expected to increase with climate change. Seismic activity also represents significant hazard. Design therefore calls for measures to ensure wind firmness as well as earthquake resistance. This will be ensured by inclusion on the design team engaged by the PCU of a suitably qualified structural engineer. Above and beyond the Vanuatu National Building Code, the engineer will ensure compliance with appropriate Australia and New Zealand code AS/NZS1170.2 which defines the ultimate gust wind speed in terms of a return period of 2000 years, for different regions. The most severe is region D, used for the severe tropical cyclone region of Western Australia, where the design windspeeds is 99 m/sec. This speed is consistent with anecdotal evidence of those that can be attained in tropical cyclone events in Vanuatu. The standard considers key design parameters and also provision over the use of roofing materials, windows, doors and wall coverings, or supplementary features of buildings outside the main building envelope which can become dislodged and result in secondary hazards when blown at speed by storm winds.

177. The residual impact is expected to be positive, in reducing hazards associated with larger buildings when tropical cyclones occur.

178. **Environmentally responsible procurement**. The PIAC and DSC will include an international (intermittent) and national environmental specialists to support the PCU to undertake tasks associated with development consent application and inputs to the tender documentation and bid evaluation. Terms of Reference for the environmental specialists are included in the project administration manual.

179. The IEE and EMP will be formatted as required under the CSS, checked for compliance with requirements of the EPCA, and submitted to the DEPC for clearance and issue of the environmental permit. The reformatted assessment, along with any conditions of the environmental permit, will be incorporated into technical specifications and bid documents.

180. Following contract award, the contractor, with support as required from the PCU and PIAC/DSC, will prepare the CEMP responding to the EMP and provide the site-specific drawings, work method statements, sub-plans, details, and construction methodologies, including specifics around construction method, impact mitigations and spoil disposal. The residual risk is expected to be low.

181. **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 communities. Prior to contractor mobilization to the site, based on the project's communication and consultation plan (CCP), the PCU 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.

182. 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 PCU. 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 works site 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[40] and STIs/HIV/AIDS awareness and prevention program for contractor's workers and adjacent communities.

183. Given the workforce will be predominantly, if not exclusively, local, the residual impact is expected to be low.

[40] https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19

184. **Biosecurity and invasive species**. 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 Vanuatu legislation.

185. To avoid further introduction of invasive flora and fauna, all materials, food or equipment brought into Vanuatu for the project must be cleaned and provide with requisite certificates in compliance with the requirements of the CSS including Plant Protection Act (2006) and the Animal Importation and Quarantine Act [CAP 201]. Timber must be sourced either locally, from suppliers with valid timber licenses, or imported in which case the timber must be sawn, free of pests or infections and compliant with the Plant Protection Act of 2006.

186. By way of mitigation, as part of the development of their CEMP, the contractor will be required to conduct a risk assessment and prepare a plan demonstrating how they will follow the procedures and requirements identified in Vanuatu's National Invasive Species and Action Plan 2014-2020, IUCN Guidelines for Invasive Species Management on Islands 2018 and SPREP's Guidelines for Invasive Species Management in the Pacific.

187. The residual impact is considered to be low.

188. **Materials sourcing**. Materials required for the buildings will include aggregate, bricks, panel products, timber, and roofing materials. Materials will be both sourced locally and imported. Contractors will be required to source all sand, aggregate and other stone based material from quarries or suppliers with permits issued by the Department of Geology, Mines and Water Resources under the Quarry Act, 2013. Timber must be sourced either locally, from suppliers with valid timber licenses, or imported in which case the timber must be sawn, free of pests or infections and compliant with the Plant Protection Act of 2006.

189. To mitigate the impacts of aggregate extraction, the contractor will be required to identify materials sources and for any new sources apply for a quarry permit including preparation of an aggregate extraction plan (AEP) which will cover:

- Process for negotiation and consultation with custom resource and/or land-owners (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.

190. 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 best practice for aggregate extraction and/or gravel abstraction. The AEP is to be submitted to PCU for review prior to submission as part of the quarry permit application. The PCU and PIAC/DSC will monitor implementation of the extraction plan(s). The residual risk is expected to be low.

191. **Importation of hazardous materials**. Import and improper use of hazardous materials and substances beyond what is necessary for construction, and inadequate disposal of residues and packaging of such materials can lead to pollution and danger to workers to the public. Approval will be obtained by the PCU for any import of hazardous materials (including specialized lubricants and paints). The contractor will supply a list of materials rated as hazardous under the Globally Harmonized System of Classification and Labelling of Chemicals, including quantities and arrangements for storage and disposal.

192. The residual impacts is expected to be low.

193. **Land and property**. No private property or assets will be affected and no land acquisition will be required as each of the sites is under government or PVCC ownership or lease. Neighboring land is not expected to be required temporarily for purposes such as materials storage during construction. There will be no residual impact.

194. **Summary**. Table 5.1 provides a summary of design and pre-construction impacts and significance, if any of residual impacts.

**Table 5.1: Summary of impacts related to design and pre-construction**

| Project activity/potential impact | Residual impact and significance |
|---|---|
| Site investigation | Negligible |
| Climate change adaptation | Positive - reducing hazards associated with larger buildings when tropical cyclones occur |
| Bid documents and contracts | Negligible |
| Mobilization of contractor | Low |
| Materials sourcing | Low |
| Biosecurity | Low |
| Land and property | Negligible |

### 2. Construction impacts on the physical environment

195. **Air quality**. Vehicles and plant used for construction will release exhaust and cause dust. Site preparation, earthworks, and excavation for foundations, service installation and construction of drainage may cause dust generation during dry and windy weather.

196. Mitigation measures include:

- Ensuring that construction vehicles are maintained in good operable condition, with functional exhaust systems
- Wetting of bare sites during site preparation, earthworks, and excavation operations in dry and windy conditions.

197. Provided the mitigation measures are implemented, negligible residual impact is expected.

198. **Soils and erosion**. Excavations to form building platforms, foundations for structures will involve clearing the sites, making temporary stockpiles of material that will either be removed or re-used.

199. Mitigation measures to prevent the release of silt into drains, contractors will be required to ensure that:

- Excavated areas are rapidly refilled on completion of works;
- Place silt fences around temporary piles of excavated material; and
- Avoid excavation in wet weather to the extent practicable.

200. Provided the mitigation measures are implemented, negligible residual impact is expected.

201. **Water quality**. The use of vehicles and plant can cause risks of water pollution, in the event of leaks and spills of fuel, lubricants, hydraulic fluid or other fluids used for vehicle operation. The site is served by roadside drains, which drain to the city's stormwater drains, which stormwater system is known to be a source of contamination in harbor and lagoon waters surrounding the city.

202. Mitigation measures to be implemented by the contractor include:

- Ensuring that vehicles and plant are well maintained, free of leaks of oil and fuel, and regularly checked.
- Contractors will prepare and submit a plan to the PCU for spill management, including provision of spill kits.
- Training/briefing of workers on procedures for handling spills.
- Allocation of responsibility within the contractor's team for ensuring that spill kits are available and that workers know how to use them.
- Provision of arrangements for toilet facilities accessible during working hours that ensure that no raw sewage from workers' toilets is discharged on site or in the vicinity.

203. Provided the mitigation measures are implemented, negligible residual impact on water quality is expected.

204. **Waste**. Construction waste will include packaging of equipment, fuels, lubricants, materials, equipment and food and some rubble where existing structures need to be demolished. Some specialist lubricants and paint for marking may be hazardous.

205. Mitigation measures to be implemented by the contractor include:

- Disposal of hazardous substances in accordance with the Waste Management Act (2014) and Waste Management Regulations 2018
- Site, or facility used for final disposal of hazardous waste must be approved by the PCU
- Re-use of rubble, or supply of rubble for re-use at another construction site.

206. Provided that the mitigation measures are implemented, negligible residual impact from waste is expected.

207. **Storage, use and disposal of hazardous substances**. Hazardous materials used in construction may include fuels, lubricants, and paints. The contractor will include a section in their CEMP describing the measures to be implemented for correct storage, use and disposal according to the manufacturer specifications,

208. Mitigation measures to be implemented by the contractor include:

- Prior to importation, provision of list of any materials rated as hazardous under the globally harmonized system of classification and labelling of chemicals to submit for approval by PCU
- All hazardous materials, including fuels, lubricants and paints will be kept in secure, locked stores with access restricted to contractors' authorized personnel
- Allocation of responsibility to authorize personnel for the use of hazardous materials and ensuring no spillage or excess use.

209. Provided that the mitigation measures are implemented, the residual impact will be low-medium.

### 3. Construction impacts on the biological environment

210. **Clearance of vegetation and removal of trees**. The site is currently open land, with mature trees located at or near the periphery. Four trees, two coconut (*Cocos nucifera*) and two rain trees (*Samanea saman*) are expected to be removed. Both species are not endangered, introduced to Vanuatu, and are found in abundance in the area.

211. Mitigation measures to be implemented by the contractor include:

- Preparation of a site plan clearly showing trees or branches on to be removed. Each tree to be marked with hi-vis paint. Only trees and/or branches indicated will be removed.
- Removal of branches following consultation with owners in neighbouring properties, and in a manner that does not damage the trees unnecessarily.

212. Provided that the mitigation measures are implemented, the residual impact will be low.

213. **Effects on fauna**. The site offers sparse habitat to birds and animals, and no impact is expected. The removal of dangerous tree branches, should this be necessary, will not significantly reduce the habitat provided by tree canopies to wildlife. Negligible residual impact is expected.

214. **Impacts on natural and critical habitat.** As noted in the baseline section, the site does not contain natural or critical terrestrial, marine or freshwater habitat. There are no protected areas close to the subproject site. There will be no residual impact.

### 4. Construction impacts on the socio-economic environment

215. **Noise and vibration**. Construction operations such as excavation and earthworks will involve the use of machinery such as diggers and trucks which generate noise and vibration. Erection of the superstructure will also involve constant use of power tools, saws and drills.

216. Mitigation measures to be implemented by the contractor include:

- Contractors will be required to maintain plant in good operational condition, with noise abatement measures as appropriate (such as properly fitted exhaust systems).
- Construction activity will be confined to normal weekday business hours.

217. The occurrence of construction noise is a minor, temporary impact. Provided the contractor effectively implements the mitigation measures, the residual impact is expected to be low.

218. **Physical cultural resources**. Remnants of ancient occupation or other artefacts are not commonly found in Port Vila, and the occurrence of such items of cultural or historical significance is not expected, however chance finds of items of cultural or historical importance are possible.

219. Mitigation measures to be implemented by the contractor include:

- In the event items of cultural or historical significance be discovered during excavations, work will be stopped, and the Vanuatu Cultural Council of Archaeologists will be formed.
- Ensuing work will follow instructions given by the archaeologists.

220. The residual impact is expected to be negligible.

221. **Traffic and access**. Medium to large vehicles will access the site for the delivery of materials and for earthworks. Teouma road services an outlying residential area and carries commuter traffic, peaking in the morning and evening, with avoidance of peak traffic times, no significant impedance of regular traffic is expected. Negligible residual impact is expected.

222. **Use of water**. Water will be used for mixing small quantities of concrete and mortar, on site catering, washing and toilet facilities. Water for these requirements can be supplied via the town piped system, supplemented by deliveries via tanker vehicles as necessary. Negligible residual impact is expected from the use of water.

223. **Presence of workers and influx of labor**. It is expected that the contractors will be either local or locally based, with a significant skilled, semi-skilled workforce. The workforce will comprise members who live in and on the periphery of Port Vila and may also include islanders from other provinces in Vanuatu who will be temporarily resident in Port Vila for the construction period. Employment in construction work can provide incomes, which can have a highly significant positive impact for poorer people and particularly, younger people seeking to acquire work experience and people taking steps to invest earnings in microenterprise opportunities. Where practicable, Contractors should ensure that opportunities are open to poorer people who stand to derive long term benefits from the income generation opportunities.

224. Potentially, such groups may cause social disruption and spread of disease. Mitigation measures to be implemented by the contractor to minimize such risks include:

- Ensuring that workers either come from within and around Port Vila as far as possible or are from groups that are customarily resident in Port Vila for short periods for purposes such as work and study.
- Recruitment of an approved service provider to deliver a communicable diseases awareness and prevention program.

225. The increased opportunities for employment will be a positive, temporary impact. Negligible adverse impact from the presence of workers brought to the site is expected.

226. **Risk of spread of communicable diseases**. Communicable diseases potentially spread through worker migration include sexually transmitted infections (STI) including HIV/AIDS and COVID-19. At the time of project preparation, a state of emergency is in force in Vanuatu to combat the threat of introduction of COVID-19, for which no cases have as yet been reported in Vanuatu. It is expected that the proposed facilities can be constructed by local contractors using materials that are either locally sourced or sourced internationally but available on the local market. Contractors' personnel are expected to be Ni Vanuatu, or international staff resident in Vanuatu. However, given the absolute need to ensure that the COVID-19 is not introduced to Vanuatu, the following measures will be implemented by the contractor(s):

- To the degree practicable; no international staff will be brought to Vanuatu to undertake the works.
- Should international staff be required, such personnel must obtain clearance from the MOIA prior to travelling to Vanuatu and proceed to a facility where they are isolated from other individuals on arrival, and stay at the facility for fourteen days, or longer of so required by local regulations.
- The contractor will engage an approved service provider to prepare a communicable diseases prevention plan and deliver a communicable diseases awareness and prevention campaign. The program will be delivered to the communities within the subproject area prior to the mobilization of workers to the site. The program will also be delivered to workers as new recruits join the workforce
- The approved service provider will, based on consultations, identify the most appropriate (socially and culturally acceptable) tools and methods for delivering the training;
- Work sites and yards, if required, will have a clean source of water, sanitation arrangements that ensure no raw sewage is discharged from the site, toilets and washing areas (if both male and female workers), and be established in areas with adequate drainage in order to prevent formation of breeding sites for mosquitoes; and

- 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, as prepared by the U.S. Department of Labor Occupational Safety and Health Administration Guidance on Preparing Workplaces for COVID-19 or the World Health Organization 2020 Considerations for public health and social measures in the workplace in the context of COVID-19.[41]

227. Provided that the above measures are effectively implemented, the residual risk, or impact, is considered low.

228. **Worker health and safety**. Construction activities include various hazards and risks including working with heavy equipment and machinery, working above water, 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) as discussed above.

229. The contractor shall establish its health and safety plan (HSP) to be implemented at each site. The HSP will follow international best practices and the World Bank EHSG on construction and decommissioning activities. Mitigation measures to be implemented by the contractor include:

- As part of their CEMP, the contractor will prepare and implement an HSP. The HSP will follow international best practices and the World Bank EHSG;[42]
- The contractor will appoint a full-time environment, health and safety officer (EHSO) responsible for implementation and monitoring of the CEMP and in conjunction with the community liaison officer (CLO) to communicate with the PCU and residences/villages/businesses in the subproject areas;
- 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 communicable diseases awareness and prevention 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;
- 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;

[41] Available at https://www.who.int/publications-detail/considerations-for-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19 and/or https://www.osha.gov/Publications/OSHA3990.pdf and https://www.who.int/publications-detail/considerationsfor-public-health-and-social-measures-in-the-workplace-in-the-context-of-covid-19

[42] http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES

- The contractor will recruit an approved services provider to deliver the communicable diseases awareness and prevention program;

- The HSP will cover:
  - Communication and training including: (i) training of all workers on occupational health and safety prior to construction works; (ii) conduct of orientation to visitors on health and safety procedures at work sites; (iii) signages strategically installed to identify all areas at work sites, including hazard or danger areas; (iv) proper labeling of equipment and containers at construction and storage sites; and (v) suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and communication with nearest fire brigade station.
  - Physical hazards including: (i) use of personal protective equipment (PPE) by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly; (ii) avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear; (iii) use of bracing or trench shoring on deep excavation works; (iv) adequate lighting in dark working areas and areas with night works; (v) rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only; (vi) specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and (vii) use of air pollution source equipment and vehicles that are well maintained and with valid permits.
  - General facility design and operation including: (i) regular checking of integrity of workplace structures to avoid collapse or failure;(ii) ensuring workplace can withstand severe weather conditions; (iii) provision of enough work spaces available for workers, including exit routes during emergencies; (iv) fire precautions and firefighting equipment installed; (v) first aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents; (vi) secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only; (vii) good working environment temperature maintained; (viii) worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and (ix) maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

230. Provided the above measures are implemented, the residual impact will be low.

231. **Community health and safety**. The use of plant and machinery, use of cables to supply machinery and excavations are potentially hazardous. Contractors must limit access to the work sites, particularly by children and provide notices to the public identifying hazards and erect safety barriers/covers for areas of open excavation.

232. Contractors will be required to identify in the HSP the risk and impacts on the community and how these will be avoided and/or mitigated. The contractor will implement the HSP and will:

- Implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites and activities during construction and demobilization;
- Restrict access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures, excavations or areas depending on site-specific situations, including allowing access to only authorized people, guard posted at entry, fencing, signage, and communication of risks to the local community;
- Remove hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small, confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and
- Implement measure to prevent proliferation of vectors of diseases at work sites.

233. On condition that the required measures are implemented fully by the contractor, the residual risk, or impact, is considered low.

234. **Site decommissioning and rehabilitation**. Beyond digging of foundations and site preparation within the building footprint, minimal disturbance will take place during construction. Contractors will be required to remove construction waste such as packaging. The concept designs include minor landscaping, including construction of planting boxes and planting with trees and shrubs. Landscaping is to be included in detailed design, informed by community consultation on preferred tree and shrub species to use. The building and landscaping improvements will result in an overall low positive impact.

235. **Summary.** The potential construction impacts and significance of residual impacts is summarized in Table 5.2.

**Table 5.2: Summary of impacts related to Construction**

| Potential Impact | Residual impact/significance |
|---|---|
| Negligible | Negligible |
| Negligible | Negligible |
| Water quality | Negligible |
| Solid and liquid waste | Negligible |
| Biodiversity | Low |
| Use of hazardous materials | Low-medium |
| Noise and vibration | Negligible |
| PCR and heritage | Negligible |
| Traffic impacts | Low |
| Site preparation / landscaping | Positive - low |
| Use of water | Low |
| Workforce and influx of labor | Low |
| Risk of spread of communicable diseases | Low |
| Workers' health and safety | Low |
| Community health and safety | Low |

## 5. Environmental impacts related to operation

236. The PVCC has confirmed that it will take responsibility for operation and maintenance of each facility. A copy of the letter confirming this is included as Appendix 4.

237. **Noise**. Operation of the emergency shelter, including their multi-purpose function, will create some noise. This will be within accepted and usual limits.

238. **Wastewater**. The improvements include a sanitation block, integral to the building, enabling greater cleanliness and reducing risks of inadequate collection and treatment of wastewater. Regular desludging and transfer of the sludge to the city's septage facility is necessary. The improvements to the sanitation facilities represent a significant positive impact.

239. **Solid waste**. General waste, as well as waste from use of the facilities as markets at the site, is collected by the PVCC trucks and brought to the city's landfill at Bouffa. This arrangement will continue, and the residual impact is expected to be low.

240. **Pests and hygiene**. The handling and storage of foods for sale in market facilities, including waste from unsold foods, husks, etc can encourage pests such as cockroaches and rodents. Site hygiene and regular cleaning of floors and surfaces needs to be done during market operation, minimizing time that putrescible waste is stored. The improved facilities will be easier to maintain in a clean and hygienic state, and the impact is therefore positive.

241. **Traffic**. An informal market currently operates in an area adjoining the site, to the east. Customers frequently park their vehicles at the side of Teouma road while visiting the market, leading to congestion. The inclusion of an access road and parking space at the Korman site will improve the existing situation. The impact will be positive.

242. **Occupational health and safety**. Day to day operation of the facilities involves meetings, market operation, and administration activities. During normal operation, these activities will benefit from ready access to improved sanitation and food preparation facilities. During emergency events however, operation involves intensive occupation by people who are temporarily unable to occupy their own homes. The provision of improved sanitation, as well as management to promote clean practices and collaborative behavior will greatly improve the situation for families that are able to use the facilities at such times. Improved site cleanliness and management will reduce health risks associated with the state of the existing buildings, including poor state of sanitation facilities, most significantly when the facilities are used for shelter purposes. The impact is significant and positive.

243. The summary of operational impacts and their significance is shown in Table 5.3.

**Table 5.3: Summary of operational impacts and significance**

| Potential Impact | Significance |
|---|---|
| Noise | Negligible |
| Wastewater | Positive |
| Solid waste | Low |
| Pests and hygiene | Positive |
| Traffic | Positive |
| Occupational health and safety | Positive |

## B. Fatumaru Bay Coastal Protection

244. A Rapid Environmental Assessment (REA) Checklist, has been completed (Appendix 5), using the ADB checklist for developments in coastal areas (ports and harbors). The responses in the checklist reflect the fact that the project will (i) directly address shore stability issues using nature based methods (ii) use mainly labor based methods, engaging local people, and (iii) use local vegetation in shore protection. Potential adverse environmental impacts are site-specific, none are irreversible, and mitigation measures can be readily designed, requiring an environmental management plan (EMP). The coastal protection subproject is therefore category B.

### 1. Design and pre-construction

245. **Site investigations**. Sites investigations will involve inspections of areas selected by communities. There will be no residual impact.

246. **Climate change adaptation**. Design of the coastal protection measures will take into account projected sea level rise and sea surges, in order to provide protection to the shoreline within normal storm conditions and a level of protection to minimize damage in the event of severe events. The residual impact is expected to be positive.

247. **Mobilization of the contractor**. No works contractor will be procured. Work will be carried out with local communities. No residual impact is expected.

248. **Biosecurity and invasive species**. All materials (rock and plants) will be procured locally, biosecurity risks is expressly avoided.

249. **Materials sourcing**. Rocks will be required for riprap bouldering, and are available from local quarries. The project will source them from quarries or suppliers with permits issued by the Department of Geology, Mines and Water Resources under the Quarry Act, 2013. Planting material will conform to the Plant Protection Act of 2006. No residual risk is expected.

250. **Importation of hazardous materials**. No hazardous materials will be imported, and no residual impacts are expected.

251. **Land and property**. No private property or assets will be affected and no land acquisition will be required. Confirmation will be sought from the Ifira Land Trust. There will be no residual impact.

252. **Summary**. Table 5.4 provides a summary of design and pre-construction impacts and significance, if any of residual impacts.

**Table 5.4: Summary of impacts related to design and pre-construction**

| Project activity/potential impact | Residual impact and significance |
|---|---|
| Site investigation | None |
| Climate change adaptation | Positive |
| Bid documents and contracts | N/A |
| Mobilization of contractor | N/A |
| Materials sourcing | None |
| Biosecurity | None |
| Land and property | None |

### 2. Construction impacts on the physical environment

253. **Air quality**. Vehicles will be used for site visits, carrying out works and for delivery of rocks and plants. Vehicles used in the project must be maintained in good operable condition, with functional exhaust systems. Negligible residual impact is expected.

254. **Soils and erosion**. The proposed measures will address coastal erosion, the residual impact is positive.

255. **Water quality**. The use of vehicles can cause risks of water pollution, in the event of leaks and spills of fuel, lubricants, hydraulic fluid or other fluids used for vehicle operation. The project vehicle and any delivery vehicles will be well maintained, free of leaks of oil and fuel. No residual impact on water quality is expected.

256. **Waste**. There will be minimal construction waste. Packaging used to deliver plants is expected to be hessian sacking or similar, which will be removed for re-use. Packaging of food for communities working on site will be removed. No residual impact from waste is expected.

### 3. Construction impacts on the biological environment

257. **Effects on flora**. The work will involve propagation and use of local coastal flora (such as mangroves), in order to ensure compatibility with the site and local ecosystem and to avoid plant invasiveness. The residual impact will be positive.

258. **Effects on fauna**. The use of local plants will protect and improve habitats for coastal organisms, for example mangrove forests which provide spawning grounds for some fish and crustacean species. The residual impact will be positive.

### 4. Construction impacts on the socio-economic environment

259. **Noise and vibration**. Apart from the delivery of rocks and plants for the work, no noise or vibration generating activities will be included. The residual impact is negligible.

260. **Physical cultural resources**. The work will not involve site excavation (beyond shaping of the shoreline prior to rock placement) or other works that may result in chance finds of items of cultural or historical importance. No residual impact is expected.

261. **Traffic and access**. Site access will be via a road that runs along the shore and pedestrian access to the work sites. Few vehicle movements are needed. Negligible residual impact is expected.

262. **Use of water**. No water will be required for the works, other than drinking water for community members working at the sites. No impact is expected.

263. **Presence of workers and influx of labor**. The work will involve community engagement in rock placement and planting activities. No impact is expected.

264. **Risk of spread of communicable diseases**. At the time of project preparation, a state of emergency is in force in Vanuatu to combat the threat of introduction of COVID-19, for which no cases have as yet been reported in Vanuatu. The involvement of one international specialist is required. There is an absolute need to ensure that the COVID-19 is not introduced to Vanuatu. The international specialist must obtain clearance from the Ministry of Internal Affairs prior to travelling to Vanuatu and proceed to a facility where they are isolated from other individuals on arrival, and stay at the facility for fourteen days, or longer of so required by local regulations. While at the time of writing the availability of vaccination for international specialists is not confirmed, should the Ministry of Internal Affairs require vaccination at a later date prior to mobilization, this must be complied with. The residual risk, or impact, is considered low.

265. **Worker health and safety**. Placement of rip rap boulders can potentially cause injury. The project will instruction is provided in methods of lifting and placing rocks, involving the use of slings and poles for carrying rocks by two or more people, and safe placement, avoiding muscular or skeletal injury. The residual risk will be low.

266. **Community health and safety**. The use of boulders for the construction of riprap protection can pose some risk during transport, offloading and carrying of boulders to the work sites. The project will restrict access to the site during delivery and placement of riprap rock protection. The residual risk, or impact, is considered low.

267. **Site decommissioning and rehabilitation**. The project will ensure that on completion of the work, tools, food packaging and any other waste will be removed. There will be no residual impact.

268. **Summary.** The potential construction impacts and significance of residual impacts is summarized in Table 5.5.

**Table 5.5: Summary of impacts related to Construction**

| Potential Impact | Residual impact/significance |
|---|---|
| Air quality | Negligible |
| Soils and erosion | Positive |
| Water quality | None |
| Solid and liquid waste | None |
| Biodiversity | Positive |
| Use of hazardous materials | N/A |
| Noise and vibration | Negligible |
| Physical and cultural resources and heritage | None |
| Traffic impacts | None |
| Use of water | None |
| Workforce and influx of labor | None |
| Risk of spread of communicable diseases | Low |
| Workers' health and safety | Low |
| Community health and safety | Low |

### 5. Environmental impacts related to operation

269. **Health and Safety**. Periodical maintenance will involve replacement of some boulders in the riprap protection structure. Workers will be instructed in safety measures to avoid falling, or muscular or skeletal injuries associated with handling and placing the boulders. The impact is low.

270. **Biodiversity**. The use of native coastal vegetation will involve maintenance, replacing failed plants and trying new species from the local fauna. The work will progressively extend coverage of functional vegetation composed of native species. The impact is positive.

271. The summary of operational impacts and their significance is shown in Table 5.6.

**Table 5.6: Summary of operational impacts and significance**

| Potential Impact | Significance |
|---|---|
| Health and safety | Low |
| Biodiversity | Positive |

## C. Global, Transboundary and Cumulative Impacts

272. The proposed improvement will occur within Port Vila, benefiting the local community through use of the facilities as administrative centers and meeting places on a day to day basis, and refuge during emergency events. The design of the shelter and its access road and car park area draws on guidelines from the NDMO that have been prepared following prior experience with the provision of emergency shelters within Vanuatu and internationally. Use of the shelter may help contribute to the international body of knowledge on best practices for design, construction and management of such facilities.

Capacity building of PVCC will assist in the build-up of capabilities required to further improve and manage waste management facilities elsewhere in Vanuatu.

# 6. CONSULTATION AND INFORMATION DISCLOSURE

## A. Consultations and Information Disclosure during Design

273. In the preparation of the project, consultations have taken place in the form of including semi-structured interviews, surveys and group discussions, to gather facts and gain an understanding of issues facing stakeholders, and the views and needs of the city's inhabitants. Over 100 consultations have occurred including workshops, meetings and interviews with key informants from government, NGOs/CBOs, private sector, consultants including: ward secretaries, PVCC Town Planner, PVCC Finance and Administration manager, Ministries of Internal Affairs, Lands and Natural Resources, the Ministry of Climate Change, Adaptation, Meteorology, Geo-Hazards, Environment, Energy and Disaster Management, the Department of Environmental Protection and Conservation, Infrastructure and Public Utilities, Department of Women's Affairs, VPMU, Vanuatu Society for People with a Disability, NGOs, UN Habitat, World Bank, local and international consultants including those with experience in and knowledge of small scale infrastructure works and contractor capacity.

274. Seventeen community meetings were held in settlements in Port Vila municipality, to collect information needed to test the feasibility of the Community Action Plan project and to identify issues that should be included in the design. These community meetings were attended by 273 men, women, boys and girls, of which 74 (27%) were women and 23 (8%) girls. A survey of 38 businesses in the CBD was also conducted in connection with investigations undertaken to examine the feasibility of a sewerage scheme and wastewater treatment plant and to feed into the development of a sanitation roadmap and strategy for Port Vila.

275. A summary of the consultations is provided in Appendix 6. A summary of consultations undertaken specifically for the Korman Facility is presented as the consultation report in Appendix 7.

276. In connection with the subprojects, ward secretaries and groups of ward members were consulted on priorities. All ward representatives stated a need for multi-purpose halls able to provide accommodation in emergencies, clinics, sanitation, an office for the ward secretaries and key community representatives, and storage facilities. Situating such facilities close to low-income areas is desirable.

277. Issues arise with the use of schools and churches for shelter during times of emergency. The use of such facilities in the past has helped people meet immediate needs for shelter, but actions to keep the facilities safe and clean during occupation and to restore them to their original condition have not always been taken by the temporary occupants, with church groups and schools often facing the costs and workloads of cleanup and repairs. This has led to resentment and even people being turned away when refuge is needed.

278. Additional benefits from multi-purpose halls are the longer term shelter than be afforded, over schools and churches which need to return to their normal purposes as early as possible. People with heavily damaged homes then struggle to find temporary shelter while essential repairs can be undertaken.

279. The importance of community centres to stimulate and encourage social activities among youths was also stressed, nothing that problems among youth, including crime and suicide, are increasing and there is an increasing need to provide constructive activity for them.

280. In connection with the issue of sanitation in the CBD, a survey or 38 CBD businesses was conducted in February-March 2019. Businesses make up the majority of building occupancy in the CBD, while residential properties are found in the immediate periphery and beyond. The survey covered supermarkets, shops/stores, offices, hotel/motels, restaurants, cafes and bars, and police station and obtained information on existing sanitation facilities and practices and assessed business attitudes to and preferences for CBD sewerage options. The main findings of the survey were as follows:

- 35 businesses (92%) use septic tanks with absorption fields while three businesses (8%) use onsite waste water treatment plants. Several businesses had multiple septic tanks, up to six in some cases.
- 26 businesses (74%) had septic tanks located outside the building and nine businesses had septic tanks (26%) located inside. The average size of septic tanks is 21$m^3$, with a range of 2m3-64$m^3$;
- The average time for septic tank emptying is two years; 20% of tanks are never emptied;
- Average cost of tank emptying is 44,200 Vatu with a range 14,000-80,000 Vatu;
- 30 businesses (86%) are willing to connect to piped sewerage, 5 (14%) are not. The main reason for willingness to connect was related to making the harbor and environment cleaner, although some businesses thought there might be a cost advantage.
- 28 businesses (82%) are willing to contribute to the cost of connections, six (18%) are not;
- 25 businesses (71%) are willing to pay wastewater fees of 53,000 Vatu/year on average;
- 88% of businesses are unwilling to pay wastewater fees that are greater than the cost of septic tank emptying (average septic tank emptying cost is 82,000 Vatu/year); and
- Preferred methods for paying wastewater fees are: water bill volume basis (29%); fixed fee in business registration (15%); fixed fee in land tax (15%); fixed fee on water bill (9%); other or don't know (32%).

281. Specific to the Korman market site, consultations took place with vendors and the public in October 2021. The following paragraphs summarize the findings.

282. PVCC – Town Clerk. Mr. Peter Sakita, the town clerk, confirmed the strong interest of PVCC in receiving support for the Korman multipurpose emergency shelter. He confirmed that a previously held agreement for development of a market building at the site with funding via the sister city of Lifou in New Caledonia had been cancelled. Mr. Sakita confirmed that PVCC would take responsibility for the operation and management of the facility.

283. **Market stallholders.** All stallholders consulted were women, who at the existing open air market at Korman are mainly from settlements within and outside Port Vila. Vendors from areas distant to Port Vila on Efate Island sell produce from their communities while vendors from the nearby area sell on behalf of producers on other islands, for a small commission. Vendors from outside Port Vila strongly welcome the construction of the market facility both for improved operating conditions and better transport access. While there are market halls within Port Vila closer to the main commercial centers, the Korman site is close to a bus stop for long distance serving the rural area on Efate Island. Vendors from these areas need to transfer to a further bus if travelling onwards to a further location in Port Vila. This additional bus journey incurs extra cost and involves the time and labor to transfer goods at the Korman bus stop. A new facility would allow the vendors to operate their stalls in a secure, sheltered location, while at present they rely on open air stalls or makeshift shelters, with some loss of produce when damaged by heavy rain or exposure to direct sunlight.

284. **Men who use the market and/or support vendors.** Expressed concern that some women need to stay overnight at the open market site, which is not safe and also that women's points of view are seldom considered in decision making. They also mentioned that Port Vila's population is growing fast and more markets are needed for food distribution. One respondent emphasized the importance of markets in supplying fresh food, including greens and root crops when needed to allow Port Vila residents to have a healthy diet.

285. **Views on the use of the facility as an emergency evacuation center.** Respondents were asked to give their opinion and suggestions on the idea of using the same building as an evacuation center during disaster period. The men said that it is an excellent idea as it will stop people from going into school buildings and destroying the school's assets, which causes the parents to fundraise all the time to replace the damages caused. The men also agreed that showers and kitchens should be provided as most women come from areas where water is scarce and that having a kitchen will stop women spending money in the Chinese shops and take-aways, allowing them to have healthy meals if they contribute food to the kitchen and cook their own meals. The men welcomed the idea that toilets will be included in the facility. Chief Jean Pierre Kapalu said that in most existing buildings that have been used as evacuation centers before, the main problem had always been toilets being constructed away from the building making it difficult for the women and children to go out of the building to use them and sometimes the toilets are in very poor condition. He said that as an example, a the Epauto hall does not have toilets inside it and when used as a shelter, occupants had to leave the building during emergency times to use the toilets and as the hall is on top of the high hill, it is very dangerous.

286. Some respondents stated that the lack of toilet and washing facilities at buildings used as emergency shelters in the past causes some people to remain at their homes in vulnerable areas – to obvious danger.

287. In preparation of the Fatumaru Bay coastal protection project, meetings took place with key stakeholder groups, namely the community leaders of the Ifira group, who hold tribal rights to coastal areas around Port Vila including Fatumaru Bay, the Ifira Land Trust Board, and the IMMT who are engaged in coastal protection initiatives.

## B. Disclosure and Public Consultation During Implementation

288. **Communications and consultation**. Communications about the project will be in accordance with government requirements and ADB's Access to Information Policy 2018. A communications and consultation plan (CCP) has been prepared for the Project. This will be PIAC and DSC, certain elements will also be implemented by the contractors. The contractor's CEMP will set out how they will implement the relevant elements of the GRM.

289. Guided by the CCP, consultations with government agencies and civil society and communities, including women's groups, stakeholders and businesses operators were conducted. Initial consultations with communities and stakeholders were undertaken during project preparation and conducted during 2019. The purpose of community consultations at this stage 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;
- Develop and inform the options analyses, to help develop the recommendation of an overall Project scope;
- Provide information to the screening and assessment processes.

290. The communications and consultations with local communities and stakeholders have expressed support for the Project as they clearly seen the benefits associated with improved urban services, wastewater, drainage services and community sanitation facilities. Additional consultations are required to be held with project stakeholders and communities in respect to finalizing the project design and will incorporate community feedback as well as continued community awareness associated with the project's timing of activities and further refine, as required, the grievance redress mechanism (GRM) as described in the next section.

291. Public consultation shall include discussions with members of project beneficiary groups, affected persons and ward or village officials, as a part of IEE preparation, in order to ascertain any concerns that may need to be addressed. Consultation commences during subproject feasibility study and continues throughout the project cycle, including during monitoring. The consultation procedures shall be conducted as set out in the SPS and guided by the project's CCP and will include:

- Information about the project overall, including the strategic vision of a safe, inclusive, resilient and vibrant economic hub based on sustainable development, management arrangements, and rationale for the selection of each subproject;
- Information about the proposed communications and grievance redress approach;
- A summary of the proposed works under the subproject;

- A summary of subproject objectives and likely positive and negative environmental impacts, covering the impacts in design, construction and operation phases for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders;
- Invitation for feedback in respect of any areas of concern that the public may have, and suggested means of implementation. A summary will be prepared of comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures;
- Acceptability of the proposed works to the public; and
- Facilitating participation of affected people during project implementation.

292. Dates, participants, concerns discussed, and topics covered should be minuted/recorded and included with the due diligence reports.

293. **Disclosure**. Following the requirements of the Access to Information Policy, project documents will be disclosed locally and on the ADB website.

294. This IEE shall be made available to the public locally and through the ADB website.

## C. Grievance Redress Mechanism

295. Grievance and complaints procedures are set up to: (i) provide support to people on problems arising from land acquisition and associated impacts; and (ii) provide a means by which the various conflicting stakeholders may be consulted, and a negotiated agreement reached.

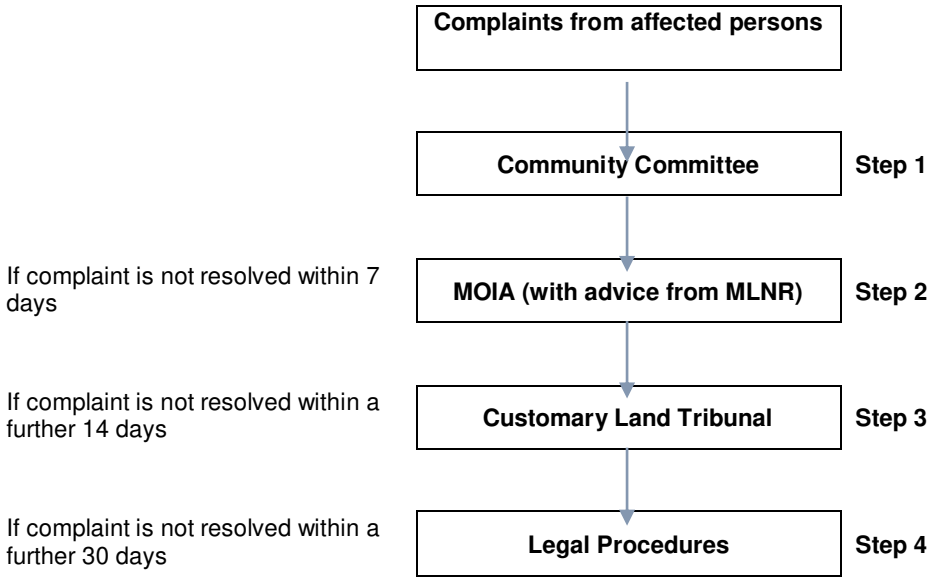
296. A grievance redress mechanism (GRM) has been set up for the project. It has the following levels for resolution. The GRM is based on procedures used successfully in other ADB funded projects in Vanuatu and will be established by the PCU prior to design and construction of the shelters The RP for relevant components/subprojects will specify further details on the GRM procedure for land matters:

- **Community level**. A community committee made up of AP representatives, community representatives, and representatives of the customary owners will be set up and will meet in the case a complaint is lodged. A decision should be made within 7 days of the complaint being lodged. The committee will be chaired by the village chief. In the event that the village chief is a customary owner, the chair of the committee may be represented by the community's religious leader.
- **Project level**. If not satisfied with the decision, the complainant has the option to appeal to the project level, represented by MIA with the advice of MLNR. A decision must be made within 14 days of receipt of the appeal.
- **Customary Land Tribunal**. If not satisfied with the project-level decision, the complainant may choose to appeal to the Customary Land Tribunal and MLNR, as per the current land acquisition law. Under the law and current procedures in Vanuatu, the complaints procedure can last up to 30 days. The decision of the tribunal is generally final, unless the tribunal procedures are challenged

- **Legal procedures**. Further appeal may be made through the Supreme Court of Vanuatu, only in cases when the Customary Land Tribunal procedures were faulty in a specific case.

297. The process is depicted in Figure 6.1 below:

**Figure 6.1: Grievance Redress Mechanism**



# 7. ENVIRONMENTAL MANAGEMENT PLAN

## A. Objectives

298. This EMP sets out the needs for environmental management of subproject construction and operation within the project in terms of institutional responsibilities to ensure mitigation and monitoring takes place during the pre-construction, construction and operation phases, meeting the requirements of the government and the SPS. This EMP will be updated based on detailed design and included in the bid documents. As part of the contract, the EMP will be binding on all contractors and sub-contractors. Non-compliance with, or any deviation from, the conditions set out in the EMP constitutes a failure in compliance.

299. **Institutional arrangements**. The MFEM will be the executing agency. The MOIA will be the primary implementing agency with a PCU set up within the Department of Urban Affairs and Planning. The MFEM and MOIA will have sole responsibility for administering ADB financing, including procurement and disbursement responsibilities. The PVCC will also be an implementing agency with a project implementation unit to support implementation of day-to-day project activities.

300. The PCU will be supported by the PIAC for project management, implementation, reporting and capacity development functions and the DSC for detailed design and construction supervision, including the monitoring of compliance with environmental and social safeguards. Project progress, updates and issues will be shared with members of the Vanuatu Project Management Unit - Steering Committee, which comprises representatives of multiple agencies, while a Technical Advisory Roundtable will provide strategic direction to the project.[43]

301. An organization chart is shown in Figure 7.1. Implementation arrangements are outlined in Table 7.1 and roles and responsibilities are outlined in Table 7.2. The project is expected to be delivered over a seven-year period, commencing in December 2020 and completing in November 2027. The additional financing will be delivered in 2022 and 2023.

[43] The Vanuatu Project Management Unit, established in 2012 under the Prime Minister's Office, coordinates ADB, World Bank, and bilateral-funded projects and administers major infrastructure of contract values of more $10 million.

**Figure 7.1: Project organizational structure**

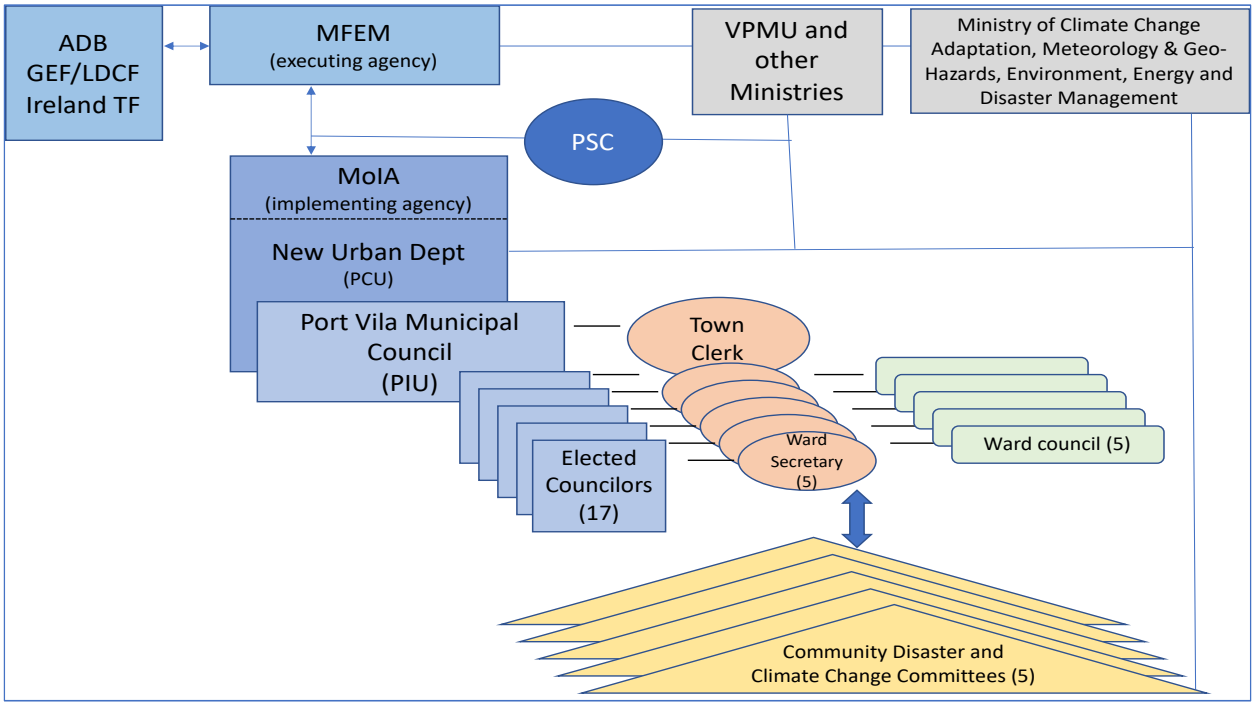



**Table 7.1: Project implementation arrangements**

| Body/party | Role |
|---|---|
| Oversight body | VPMU Steering Committee<br>Director General of the Office of the Prime Minister (chair); Director General, MFEM; Director General, MIPU; Director, PWD, MIPU; Director General, MOFA; Director, Finance Department; Director, Department of Strategic Policy and Planning; and Secretary General of Public Service Commission. Director General, MOIA will attend VPMU Steering Committee meetings to share project information and updates. |
| Technical Advisory Roundtable | Director, Department of Urban Affairs and Planning, MOIA (chair); Director, Finance Department, MFEM; Municipal Clerk, Port Vila Municipal Council; Director, PWD, MIPU; Director, DCC; and others based on topic of discussion. |
| Executing agency | MFEM |
| Key implementing agencies | MOIA; and PVCC |
| Project coordination unit | MOIA, |
| Project implementation unit | PVCC |
| Ward secretaries | Will facilitate ward level planning in output 3. Ward secretaries will coordinate with CDCCCs. |

Notes: CDCCC = community disaster and climate change committees, DCC = Department of Climate Change, MOFA = Ministry of Foreign Affairs, MOIA = Ministry of Internal Affairs, MFEM = Ministry of Finance and Economic Management, MIPU = Ministry of Infrastructure and Public Utilities, PWD = Public Works Department, PVCC = Port Vila Municipal Council, VPMU = Vanuatu Project Management Unit

Source: Asian Development Bank.

**Table 7.2: Responsibilities for environmental management**

| Project stage | Responsible agency | Responsibilities |
|---|---|---|
| Feasibility studies, detailed design review and subproject approval | MFEM, MOIA, PVCC | Review designs, feasibility study prepared and complete detailed design.<br>Update feasibility study including safeguards due diligence as required.<br>Update IEE and submit environmental permit/development consent applications to DEPC. |
| | ADB | Review and clear all feasibility study documentation (incl. subproject IEEs).<br>Assist government to recruit DSC. |
| Pre-construction | MOIA, PIU, PCU, DSC | Include environmental specialist as part of DSC team.<br>Ensure updated IEE and EMP and any conditions of development consent are included in the bid and contract documents.<br>Prior to works commencing ensure the baseline conditions are benchmarked and recorded—including marine ecology, noise—as required by the EMP for subsequent monitoring.<br>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.<br>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.<br>Review and approve the contractor's CEMP (including sharing CEMP with ADB for review and comment) and advise DSC Engineer of approval to trigger "no objection" to commencement of activities/works. |
| | ADB | Review and clear updated safeguards documents.<br>Provide comments on the CEMP and proposed monitoring checklists. |
| | Contractor | Recruit suitably qualified EHSO.<br>Prior to any works commencing, prepare CEMP including the site-specific plans, worker code of conduct, work method statements and construction methodologies, CCP and GRM.<br>Submit CEMP to PIU/PCU and DSC for review and approval (revising as necessary if required).<br>Identify materials and equipment sources and apply for materials permits for new sources and clearance consents and compliance certificates for imported materials and equipment.<br>Provide pre-mobilization induction on CEMP (incl. OHS) to employees.<br>Recruit approved service provider to provide communicable diseases (incl. STI/HIV/AIDS awareness and prevention training for workers and community. |
| Construction | Contractor | Inclusion of EHSO as part of core team.<br>Provide ongoing training, awareness and "tool box" sessions for workers.<br>Implementation and monitoring of CEMP.<br>Implementation of CCP and GRM as pertains to construction.<br>Reporting of CEMP, CCP and GRM implementation in monthly reports.<br>Implementation of corrective actions as requested by Engineer. |
| | MOIA, PCU, PIU, DSC | Supervise, monitor and report on contractor's implementation of CEMP and all other contractual obligations.<br>Enforce contractual requirements.<br>Audit construction phase through environmental inspections and review monitoring reports and data.<br>Submission of quarterly progress reports and semi-annual monitoring reports.<br>Work with contractor EHSO for provision of awareness/training to workers and information transfer to contractor as required. |

| Project stage | Responsible agency | Responsibilities |
|---|---|---|
| | ADB | Undertake regular review missions.<br>Review monitoring reports.<br>Disclose project information as required. |
| | DEPC | Ensure compliance with government requirements.<br>Review complicated issues, if any, arising from the project.<br>Participate in monitoring. |
| Operation | MFEM, MOIA, PVCC/SPGC | Provide budget to undertake maintenance activities and operation stage environmental monitoring as required by EMP. |
| | Maintenance contractors | Undertake environmental monitoring and prepare bi-annual reports.<br>Prepare maintenance reports to adaptively manage environmental risks related to operations (per EMP). |

## B. Institutional Capacity Development

302. The regulatory body responsible for approving environmental impact assessments and issuing of permits is the responsibility of the DEPC, within the Ministry of Climate Change Adaptation, Meteorology & Geohazards, Environment, Energy and Disaster Management.

303. The DEPC has one principal officer tasked with environmental assessment review, but no further staff, it therefore relies on inputs from registered principal or review consultants, consultants, of which there are reportedly 11 in the country at present. The DEPC is also responsible for the administration of the Pollution Control Act and has limited staff for this purpose.

304. The PIAC will provide assistance and capacity building support during the project for the implementation of safeguards in compliance with ADB SPS 2009 requirements and with the requirements of the DEPC. This provision responds to lessons learned for project design to include support to national structures in project implementation. The PIAC will provide assistance to the PCU for overseeing EMP implementation.

305. For civil works, the contractor, depending on their experience may need support from the PCU through PIAC/DSC to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

## C. Impacts and Mitigation

306. Table 7.3 and Table 7.4 summarizes the potential impacts and mitigation measures in relation to location, construction and operation of the two additional financing subprojects as identified in the IEE. The costs of mitigation measures are largely included in the contract (IIC) or the project implementation budget, where they are not the cost has been identified.

## D. Environmental Monitoring and Reporting

307. **Monitoring**. Monitoring will provide two key pieces of information: (i) confirm compliance with the approved EMP and implementation of required measures; and (ii) determine effectiveness of the measures and whether changes are required. The design of the environmental monitoring system is based on an analysis of the key environmental performance issues associated with each stage of the project, as set out in **Error! Reference source not found.** and Table 7.4.

308. Two areas of environmental monitoring are identified: compliance monitoring and community feedback, which are in addition to monitoring measures in the design and monitoring framework for the project. These provide a means of gauging whether the stations operate more efficiently and with less loss of waste into the sea.

309. Compliance monitoring is required during detailed design and construction of the improved facilities, to ensure that mitigation specified in the EMP is carried out to an adequate standard. Compliance monitoring is a function of the PCU and it's cost of this monitoring is part of the running cost of the PCU.

310. Community feedback provides for the monitoring of environmental indicators gauged by public perception. Appropriate indicators are: (i) improved interaction with ward administrations; and (ii) effectiveness of management of the multipurpose emergency shelters.

311. Costs of environmental assessment and monitoring during construction are project costs. Environmental monitoring during operation is to be borne by PVCC, and costs will be met from O&M budgets prepared and managed by PVCC.

312. **Reporting**. EMP compliance monitoring will be undertaken by the PCU, with support of the DSC. The contractor will be required to provide monthly reports to the PCU, detailing progress, compliance with the EMP, community feedback and laboratory testing, issues arising how these were addressed, and matters requiring attention from the PCU. Consistent with reporting requirements set out in the Project Administration Manual, the PCU will prepare reports to be sent to ADB on a semi-annual basis during and immediately after construction, containing the results of safeguards monitoring. Semi-annual reports during operation are to be prepared by PVCC. To facilitate monitoring and enable responses to emerging issues, monthly reports will be prepared by the PCU.

## Table 7.3: Environmental Management Plan – Korman Emergency Shelter

| Project activity | Potential impact | Mitigation | | | Monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mitigation Measures | Cost | Responsibility | Parameter | Frequency/ timeframe | Means of validation | Responsibility |
| **DESIGN AND PRE-CONSTRUCTION PHASE** | | | | | | | | |
| Adaptation for climate change | Risk of structural damage and danger to human life if buildings are not windfirm | Application of stringent international requirements inbuilding design to ensure wind firmness of the structures | $83,800[44] | DSC | Design addresses climate change projections and impacts | Once, during approval/ finalization of design | DSC firm's QA; Application of code AS/NZS 1170.2 | DSC |
| Award of civil works contract | Delays with approvals of if CSS and IEE/EMP are not compliant | IEE and EMP will be formatted as required under the CSS, checked for compliance with requirements of the EPCA, and submitted to the DEPC for clearance and issue of the environmental permit | Included in consul-tancy contracts | PCU | IEE/EMP format and quality | Prior to tender going to market | Environmental permit incl. in bid dox and contract | PCU |
| Mobilization of the contractor | Disturbance by construction workers to local communities | Development of a code of conduct agreed with community leaders and disseminated to workers<br>Designation by contractor of a staff member with responsibility for liaison with the communities and PCU; establishment of community advisory committees<br>Signage and security at the work sites and prevention of unauthorized people (including children) entering the work sites;<br>Protection to the public close to the work site, including notices, barriers and marking of the work areas;<br>Provision of safe access across the works sites<br>Recruitment of an approved service provider and delivery of the communicable diseases awareness programme, to include COVID-19 and STIs/HIV/AIDS awareness | IIC | Contractor | Inclusion of competent liaison officer in contractor's staff; dissemination of awareness plan; signage and protection to the public in place | At mobilization and throughout construction | Review of Contractor's staff deployment; inspection of training materials and of site arrangements for protection of the public | DSC |

[44] The DSC is to be led by a qualified building engineer. The cost estimate represents the costs of time and expenses for this specialist during the detailed design phase.

| Project activity | Potential impact | Mitigation | | | Monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mitigation Measures | Cost | Responsibility | Parameter | Frequency/ timeframe | Means of validation | Responsibility |
| Import of material and/or plant and equipment | Risk of spread or introduction of invasive an alien species | Contractor to conduct risk assessment and prepare a plan to meet requirements of Vanuatu's National Invasive Species and Action Plan 2014-2020; IUCN Guidelines for Invasive Species Management on Islands 2018 and SPREP's Guidelines for Invasive Species Management in the Pacific | IIC | Contractor | Risk assessment and plan for meeting biosecurity requirements | Once | Review by DSC | DSC |
| Materials sourcing | Introduction of pests and diseases | Contractors required to source stone based material locally, from suppliers with permits under the Quarry Act, 2013. Timber to be coursed locally or if imported, to be certified free of pests and infections compliant with the Plant Protection Act 2006. | IIC | Contractor | Source of materials and volume being extracted | Once | Quarry permit; AEP: Submission of certification to Engineer | DSC |
| Importation of hazardous materials | Leakage of hazardous materials / injury or health hazard | Contractors to supply a list of materials rated as hazardous under the Globally Harmonized System of Classification and Labelling of Chemicals for approval by PCU. Approval to be conditional on stating adequate arrangements for use and disposal. | IIC | Contractor | Need for proposed hazardous materials, adequacy of labelling, storage and control of access and use and arrangements for disposal | Once | Inspection by DSC | DSC |
| **CONSTRUCTION PHASE** | | | | | | | | |
| Air Quality | Release of exhaust, dust generation causing public nuisance / health hazard | Vehicles and plant to be kept in sound operational condition and fitted with suitable exhaust control. Excavation and other potentially dust generating operations not to take place during dry and windy weather. Bare sites to be wetted during dry weather. | IIC | Contractor | General air quality / complaints from neighboring communities or households | Routine and regular during construction | Regular inspection by DSC works inspectors | DSC |

| Project activity | Potential impact | Mitigation | | | Monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mitigation Measures | Cost | Responsibility | Parameter | Frequency/ timeframe | Means of validation | Responsibility |
| Soil Erosion | Release of silt into waterways / on to properties | Prompt refilling of excavated sites on completion of works/ use of silt fences around excavations and materials stockpiles , avoid excavation operations in wet weather | IIC | Contractor | Use of silt fences; no evidence of silt in runoff water | Routine and regular during construction | Regular inspection by DSC works inspectors | DSC |
| Water pollution | Impaired water quality in drains and waterways from use of vehicles and plant and from on-site toilets | Vehicles and plant are to be maintained in sound operable condition, free of leaks. Contractor to prepare and submit a plan for spill management, including provision of spill kits. Training of workers on procedures for handling spills. Allocation of responsibility within the Contractor's team. Arrangements to be made for workers' access to toilets such that no raw sewage is released from the sites. | IIC | Contractor | Condition of work sites | Routine and regular during construction | Regular inspection by DSC works inspectors | DSC |
| Waste generation from construction activities | Buildup of waste on sites; pest hazard; release of waste from the sites | All solid waste must be disposed of at a landfill or approved disposal site. Hazardous waste disposal in accordance with Waste Management Act and Waste Management Regulations, 2018. Re-use of materials (eg concrete rubble) to the extent practicable | IIC | Contractor | Condition of work sites | Routine and regular during construction | Regular inspection by DSC works inspectors | DSC |
| Use of hazardous materials | Contamination of soil, water and air / health hazard | Hazardous substances including fuel, lubricants and paint to be kept in locked storage, accessed by authorized personnel only, use to be undertaken or supervised by authorized personnel | IIC | Contractor | Condition of stores and work sites | Routine and regular during construction | Regular inspection by DSC works inspectors | DSC |
| Clearance of vegetation | Removal of trees and shrubs of conservation value (Four trees, two coconut (*Cocos nucifera*) and two rain trees (*Samanea saman*) need to be removed) | The tree, or any further branches or shrubs not to be removed unless cleared with PCU. Removal of branches in a manner that does not damage trees unnecessarily. | IIC | Contractor | As per performance standard | Routine and regular during construction | Regular inspection by DSC works inspectors | DSC |

| Project activity | Potential impact | Mitigation | | | Monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mitigation Measures | Cost | Responsibility | Parameter | Frequency/ timeframe | Means of validation | Responsibility |
| Use of vehicles and plant | Noise and vibration | Liaison with nearby residents and institutions, particularly the hospital in the case of Seaside Futuna.<br>Construction activity to be confined to normal weekday business hours.<br>Ensuring vehicles and plant are fitted with exhaust baffles and maintained in sound operable condition | IIC | Contractor | Vehicles and plant in sound operable condition with exhaust controls; no complaints from neighboring households | At least Weekly during construction | Site inspections | DSC |
| Traffic | Congestion if heavy vehicles deliver materials during peak traffic times on Teouma Road | Schedule materials deliveries at non peak hours | IIC | Contractor | No deliveries between 7 and 9 am or 4 and 6pm | All week days during construction | Site inspections | DSC |
| Chance finds of items of cultural or heritage significance | Loss of items of cultural or heritage significance to future generations | Should artefacts be found during excavations, work to stop, PCU to be contacted and guidance sought from Vanuatu Cultural Council of Archaeologists before resuming work | IIC | Contractor / PCU | Procedure adhered to | Routine and regular during construction | Regular inspection by DSC works inspectors | DSC |
| Site decommissioning and rehabilitation | Waste or unsafe conditions on site at completion of works | Removal of construction waste.<br>Inclusion of landscaping in detailed design | IIC | Contractor | Completed waste removal and landscaping | Once | Site inspection | DSC |
| Employment of workforce | Possible social disruption and spread of disease | Engagement of workers who live in or around Port Vila where possible.<br>Awareness raising to workers on infectious disease prevention including STIs and HIG/AIDS and on code of conduct to be observed on and off work sites.<br>Ensuring workers respect landowner boundaries and observe health and safety procedures. | IIC | Contractor | Preparation and delivery of awareness raising measures | To be determined | Inspection of training material and of training sessions | DSC |

| Project activity | Potential impact | Mitigation | | | Monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mitigation Measures | Cost | Responsibility | Parameter | Frequency/ timeframe | Means of validation | Responsibility |
| Engagement of workers | Occupational health and safety hazards | Contractors to appoint health and safety officers for each site and to ensure regular briefing of construction workforce on health and safety issues. Adequate personal protective equipment to be provided to the workforce.<br><br>Contractors to adopt the WB EHS Guidelines on OHS, particularly those that relate to construction works. | IIC | Contractor | Contractors appointed H&S staff available at all times; workers briefed; WB EHS guidelines being followed. | Regular – spot checking by works in-spectors | Inspection of training material and of training sessions | DSC |
| | Contracting and/or carrying COVID 19 infection or other communicable disease | Avoiding use of international staff; where staff do come to Vanuatu: strict adherence to Vanuatu's requirements for travelers; provision of stringent conditions for isolation; development and dissemination of a communicable disease prevention plan, training of workers in disease prevention, use of PPE | IIC | Contractor | Guidelines for communicable disease prevention being followed | Regular – spot checking by works inspectors | Inspection of training material and of training sessions | DSC |
| Community health and safety hazards | Hazards to the communities | Restriction of access to the construction sites. For work at the periphery of the sites, provide notices to the public identifying hazards and erect safety barriers / covers for areas of open excavation.<br><br>Contractors to adopt the WB EHS Guidelines on Community Health and Safety, particularly those that relate to construction works. | Construct ion Cost | Contractor | Guidelines being followed | Regular spot-checking by works inspectors | Inspecting application of guidelines | DSC |

| Project activity | Potential impact | Mitigation | | | Monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mitigation Measures | Cost | Responsibility | Parameter | Frequency/ timeframe | Means of validation | Responsibility |
| Occupational health and safety hazards | Hazards to workers | Contractors to appoint health and safety officers for each site and to ensure regular briefing of construction workforce on health and safety issues. Adequate personal protective equipment to be provided to the workforce.<br><br>Contractors to adopt the WB EHS Guidelines on OHS, particularly those that relate to construction works. | Construction Cost | Contractor | Guidelines being followed | Regular spot checks by works inspectors | Inspecting application of guidelines | DSC |
| OPERATION | | | | | | | | |
| Wastewater management | Wastewater treatment and removal | To ensure efficient wastewater treatment and removal, the facilities will have septic tanks, which need to be desludged regularly and the sludge taken to the septage facility at Bouffa. | VUV 30,000 ($262) for desludging (estimated to be required annually) | PVCC | Toilets and septic tanks clean and in good operable condition | To be determined | On site meetings between PVCC and MOIA | MOIA |
| Solid waste management | Removal of solid waste | Waste to be collected and moved by PVCC trucks to city landfill at Bouffa | VUV 20,000 per month approx. | PVCC | Waste regularly removed; no pests observed | To be determined | On site meetings between PVCC and MOIA | MOIA |
| Occupational health and safety | Hazards to users of the facilities | Establishment of safety plan including provision of first aid and safety equipment, assigning safety and first roles to personnel at the facilities. Training of staff and users | Included in administrative costs | PVCC | No safety incidents | To be determined | On site meetings between PVCC and MOIA | MOIA |

## Table 7.4: Environmental Monitoring Plan – Fatumaru Bay Coastal Protection

| Project activity | Potential impact | Mitigation | | | Monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mitigation Measures | Cost | Responsibility | Parameter | Frequency/ timeframe | Means of validation | Responsibility |
| **DESIGN AND PRE-CONSTRUCTION PHASE** | | | | | | | | |
| Materials sourcing | Induced slope instability; safety hazards; sustainability of supply at quarry | Use of rock only from suppliers with permits under the Quarry Act, 2013. Obtaining and use of seedlings to be compliant with Plant Protection Act 2006. | IIC | Project team | Source of materials | Once | Quarry permit; | PVMC |
| **CONSTRUCTION PHASE** | | | | | | | | |
| Air Quality | Release of exhaust by project vehicle and vehicles used for delivery of materials | Vehicles and plant to be kept in sound operational condition and fitted with suitable exhaust control. | IIC | Project team | Condition of vehicles/ complaints from neighboring communities or households | Routine during construction | Community observation | Project team / PVMC |
| Waste | Remnant waste from site work left onsite | Use of reusable packaging for materials (eg hessian for plants); removal from site of food wrappings and similar | IIC | Project team | Condition of work sites | Routine during construction | Confirmation sites are left clear | Project team / PVMC |
| Communicable diseases | Contracting and/or carrying COVID 19 infection or other communicable disease | The international expert required for the project will confirm to all vaccination, quarantine and any other restriction in force at the time of mobilization | TBD | Project team | n/a | Once | Valid entrance permit | Project team / PVMC |
| Community health and safety hazards | Injury from involvement in the site works | Instruction in proper techniques of lifting and carrying heavy boulders | IIC | Project team | Instructions being followed | During rock placement works and | Site supervision | Project team |
| **OPERATION** | | | | | | | | |
| Occupational health and safety | Injury while handling heavy boulders for upkeep of riprap protection measures | Instruction in proper techniques of lifting and carrying heavy boulders | IIC | PVMC | No injuries | To be determined | Confirmation by communities | PVMC |

# 8. CONCLUSION

313. The establishment of the multipurpose evacuation center at Korman with sanitation blocks, ward offices and market facilities will be undertaken on currently unused land, and the Fatumaru Bay coastal protection will be undertaken along the foreshore, both of which are owned by the government and under the purview of the PVCC. Works are expected to be carried primarily by local or locally based contractors, and will use mainly locally sourced materials, although some components will be imported. Design of the center will entail use of stringent international codes to ensure wind-firmness under maximum windspeeds expected in the event of a major tropical cyclone. Expected impacts are mainly those associated with construction, which can be substantially mitigated by the application of good practice. The IEE includes an EMP which will be included with bidding documents, obliging contractors to enact the required level of mitigation in construction and commissioning. The center will provide a refuge to communities and households in Port Vila whose homes are damaged when severe events such as tropical cyclones or tsunamis occur and, as a resource in the aftermath of such events when communities are recovering. When not used for this purpose, they will serve communities by providing a facility for community activities, market operation, strengthening community interaction, socializing and cohesion.

314. The overall finding of the IEE is that the Project will not result in significant adverse environmental impacts and that potential adverse impacts are manageable through the effective implementation of the EMPs. Improved conditions for emergency sheltering, market operation, ward administration, community events and costal protection will bring positive environmental impacts.

315. The classification of Category B for the additional financing is confirmed. No further environmental assessment is therefore required. However, this IEE will be finalized based on the final detailed design and this classification shall be reassessed or reconfirmed accordingly.

## Appendix 1: Multilateral Environmental Agreements Ratified by Vanuatu

| Treaty, Convention, Agreement | Ratified |
|---|---|
| South Pacific Fisheries Forum Agency Convention | 1981 |
| UN Convention on Law of the Sea (UNCLOS) | 1982 |
| International Convention on Civil Liability for Oil Pollution Damage | 1983 |
| Vienna Convention for Protection of the Ozone Layer | 1985 |
| Noumea Convention - Protection of Natural Resources and Environment of South Pacific | 1986 |
| Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) | 1989 |
| International Convention for the Prevention of Pollution from Ships (MARPOL) | 1989 |
| Convention for Prohibition of Fishing with Long Driftnets in South Pacific | 1990 |
| Niue Treaty - Cooperation in Fisheries Surveillance and Law Enforcement in South Pacific Region | 1992 |
| La Jolla Agreement on the Reduction of Dolphin Mortality in the Eastern Pacific Ocean | 1992 |
| Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter | 1992 |
| UN Framework Convention on Climate Change (UNFCC) | 1993 |
| UN Convention on Biological Diversity (UNCBD) | 1993 |
| Agreement Establishing the South Pacific Regional Environment Programme (SPREP) | 1993 |
| Montreal Protocol on Substances that Deplete the Ozone Layer | 1994 |
| Vienna Convention for Protection of the Ozone Layer | 1994 |
| Convention to Ban Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within South Pacific Region | 1995 |
| Rarotonga Treaty – South Pacific Nuclear Free Zone Treaty | 1995 |
| Comprehensive Nuclear Test Ban Treat | 1996 |
| UNCLOS Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish | 1996 |
| Agreement on the International Dolphin Conservation Program | 1998 |
| UN Convention to Combat Desertification | 1999 |
| International Convention on Oil Pollution Preparedness, Response and Cooperation | 1999 |
| Convention on Conservation and Management of Highly Migratory Fish Stocks | 2000 |
| Protocol to Amend the International Convention on Civil Liability for Oil Pollution Damage | 2000 |
| Cartagena Protocol (to UNCBD) on Biosafety | 2001 |
| Convention on the Conservation of Antarctic Marine Living Resources | 2001 |
| Convention on the Conservation and Management of Highly Migratory Fish Stocks of the Western and Central Pacific Ocean | 2001 |
| Protocol Amending the International Convention for Conservation of Atlantic Tunas | 2002 |
| Convention Concerning the Protection of World Cultural and Natural Heritage | 2002 |
| Agreement Establishing the Pacific Islands Forum | 2005 |
| Stockholm Convention on Persistent Organic Pollutants | 2005 |
| Convention on the Prohibition of Development, Production, Stockpiling and Use of Chemical Weapons and their Destruction | 2005 |
| Kyoto Protocol to UNFCC | 2005 |
| International Treaty on Plant Genetic Resources for Food and Agriculture | 2006 |
| Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region | 2006 |
| Waigani Convention – Ban on Importation into Forum Island Countries of Hazardous and | 2007 |

| Treaty, Convention, Agreement | Ratified |
|---|---|
| Radioactive Waste and Control Transboundary Movements of Hazardous Waste within South Pacific Region | |
| International Plant Protection Convention (1979 Revised Text) | 2007 |
| Agreement on the International Dolphin Conservation Program 1998 (AIDCP) | 2008 |
| Convention for the Safeguarding of the Intangible Cultural Heritage | 2009 |
| Memorandum of Understanding on the Conservation and Management of Dugongs and their Habitats throughout their Range | 2010 |
| International Tropical Timber Agreement | 2011 |
| Doha Amendment to Kyoto Protocol | 2012 |
| Memorandum of Understanding on the Conservation of Migratory Sharks | 2013 |
| Nagoya Protocol (to UNCBD) on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization | 2014 |
| Tokelau Arrangement - Management Of The South Pacific Albacore Fishery | 2014 |
| Samoa Pathway Framework for Action for the Next 10 Years | 2015 |
| Kigali Amendment to Montreal Protocol - reduce consumption and production of HFCs | 2016 |
| Paris Agreement on Climate Change | 2016 |
| Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing | 2016 |
| Treaty on the Prohibition of Nuclear Weapons | 2017 |
| Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean | 2017 |
| Treaty on the Non-Proliferation of Nuclear Weapons | 2018 |
| Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal | 2018 |
| Ramsar Convention on Wetlands 1971 | 2019 |

## Appendix 2: ADB Safeguards Policy Requirements for Category A and B Projects

**Environmental assessment**: to include the identification of impacts (direct, indirect, cumulative, induced, transboundary), rationale for project choices, assessment of impacts, consideration of alternatives, an accurate project description and collection of appropriate environmental and social baseline data.

**Environmental planning and management**. Preparation of an environmental management plan (EMP) that addresses potential impacts and risks, effective mitigation measures, institutional/ organizational Arrangements, a monitoring plan, capacity development and training, an implementation schedule, cost estimates and performance indicators, with targets.

**Information disclosure**. Provision of adequate, timely, accessible and understandable information for disclosure of social and environmental safeguard issues, allowing for meaningful dialogue with stakeholders.

**Consultation**. Meaningful consultation in a non-coercive situation, including with affected persons and NGOs.

**Grievance redress mechanism**. A Mechanism to receive and facilitate resolution of complaints etc scaled to the risks and adverse impacts of the project

**Arrangements for monitoring and reporting**, so that EMP implementation can be monitored and effects measured, commensurate with the project's risks and impacts. Roles and responsibilities for monitoring and reporting need to be defined.

**Provision for addressing unanticipated environmental impacts**.

**Biodiversity conservation and sustainable natural resource management**. No net loss, or a net gain in biodiversity/ for affected natural habitats, confirmation that no alternatives are available and that benefits outweigh costs; appropriate mitigation of converted or degraded habitats.

**Pollution prevention and abatement**. Pollution prevention to comply with internationally recognized standards.

**Health and safety**. Assessment of risks and appropriate provisions to be included in the EMP for both community health and safety, and for occupational health and safety. The SPS requires compliance with the World Bank Group's Environmental Health and Safety Guidelines.[45]

[45] World Bank Group (2007). *Environmental Health and Safety General Guidelines* and Waste Management Guidelines Washington, D.C.

## Appendix 3: NDMO Evacuation Centre Checklist

Government of the Republic of Vanuatu
National Disaster Management Office
**Phone:** +678 22699 / +678 23035 **Email:** ndmo@vanuatu.gov.vu
**Post:** NDMO, Private Mail Bag 9107, Port Vila, Vanuatu

# *Evacuation Centre Checklist for planning, assessment & classification*

### LOCATION AND ACCESSIBILITY

- ☐ Be elevated above likely impact from high tide storm surge level 10m
- ☐ Minimum 500mm above identified flood level
- ☐ Equally accessible for the disabled (ramp for wheel chairs)
- ☐ Provision of emergency door/exit
- ☐ Centrally located in the community
- ☐ No nearby large trees, structures use/store hazardous materials or high voltage power lines
- ☐ Building to be less than 9 meter height and designed in accordance with earthquake load standards
- ☐ Be close to a health facility (where possible)
- ☐ Perimeter fencing adequate main entrance/exit gate
- ☐ Be located on geotechnical stable land, not subject to potential landslides nor exposed to potential land slide of adjacent land

### STRUCTURAL & ARCHITECTURAL MINIMUM REQUIREMENTS

- ☐ Engineer's cyclone certificate
- ☐ Structure engineer's certification that the design can withstand earthquake loads (Vanuatu buildings code or equivalent international e.g. New Zealand or Australia ) New, but recommended for old also wherever possible
- ☐ Building is not more than 9 meter high
- ☐ Building is square or rectangular shape
- ☐ Fitted with cyclone shutters for windows and doors
- ☐ Fitted with provision for people with disabilities, including ramps where necessary and adequate design for unimpeded wheel chair access
- ☐ Provision of all services and facilities to cover the gender and protection aspects

### OCCUPANCY CAPACITY

- ☐ Minimum 1.5 Sq.m/person for the shelter 1 to 3 days (Short term)
- ☐ Minimum 3.5 Sq.m/person for the shelter 4 days & above (Long term)

### COOKING FACILITIES (LONG TERM)

- ☐ Kitchen should be equipped for the hygienic food preparation
- ☐ Provision of utensils
- ☐ Provision of water tap inside kitchen
- ☐ Sinks for washing utensils
- ☐ If using gas cylinders, must be installed outside
- ☐ Gas cylinders regulators must be positioned outside in secure cages away from building (Recommended in safety point of view)
- ☐ If wood will be used for fire, an adequate arrangement of wood storage must be made available (Preferred, this storage is for preparedness )
- ☐ Kitchen must be provided with adequate ventilation to exhaust the fume/ventilation

## WATER SANITATION AND HYGIENE

- ☐ Minimum 3-5 liter per person per day drinking water
- ☐ Minimum 2liter per person per day for basic hygiene
- ☐ Minimum 3 liters per day per person for cooking
- ☐ 10-20 liter water per person per day if the conventional flushing toilet is provided
- ☐ 1.5-3.0 liter per person per day if pour flushing is used
- ☐ Minimum one toilet per 30 female
- ☐ Minimum one toilet plus one urinal per 50 male or one toilet per 40 male
- ☐ Gender segregated toilets
- ☐ Conventional handwashing facilities one hand washbasin per 10 toilets
- ☐ Minimum one toilet for people with disabilities
- ☐ Gender segregated shower facility one shower/ 30 person
- ☐ Toilet should be at least 20m away from kitchen but no more than 30 meter away from main building and ideally be all weather accessible.
- ☐ Laundry block be provided where possible
- ☐ Protection and gender aspects should not be overlooked during the design and site planning facilities (for instance male & female toilets should not be face to face, water point should not be in dark areas etc. general guidance protection & gender principles)
- ☐ Toilets are internally lockable
- ☐ External lock key should remain with Evacuation Center manager.

## ELECTRICAL INSTALATIONS AND EMERGENCY POWER SUPPLIES

- ☐ Adequate electrical installation
- ☐ An alternate/emergency backup system (Alternate not necessarily generator or UPS, it can also be a Kerosene lamp)
- ☐ If alternate/emergency backup is a generator a manual changeover switch at the switch board to connect the generator should be provided
- ☐ If alternate/emergency backup is a solar panel, batteries/UPS are to be provided with an adequate inlet for the battery/UPS to connect with the switch board.
- ☐ Generator and fuel tank ideally be located outside and should be protected from rain, wind born debris. Access to fuel and generator should be all weather
- ☐ Inspection of electrical installation should be done upon completion by an electrical engineer to issue a certificate (despite new or old, an old installation could be vulnerable and inspection can help to know and mitigate the risk)
- ☐ All corridors, toilet areas, shower points, drinking water points and hand washbasin areas should be lit during the night
- ☐ Provide exhaust fan/ventilation in the evacuation center to avoid suffocation due to large number of people inside

## SAFETY AND PROTECTION

- ☐ Ensure building properly secured with night latches for doors
- ☐ Ensure burglar proof bars for windows
- ☐ Ideally an Evacuation Center should be small for an easy operations and management from activation to closure.
- ☐ Ensure all dark areas, toilets washrooms, showers ,water points are provided with appropriate lighting
- ☐ Where possible provide moveable partitions to give privacy for women and girls in the evacuation center.
- ☐ Ensure an adequate emergency exit

## Appendix 4: PVCC Letter of Confirmation re Operation and Maintenance Responsibility

**CITY OF PORT VILA**
Emile Mercet Street
P.O.BOX 99

**VILLE DE PORT VILA**
Rue Emile Mercet
B.P 99

Port Vila, Vanuatu
Phone : (678) 22 113 – Email : lamarie@pvmc.gov.vu

**Ref: PS 1/3/1**

To Whom it may Concern

**Subject: Confirmation Letter for a Proposed Emergency Shelter at Korman,Port Vila**

With ADB Assistance, a feasibility study is being carry out for the Purposed Construction of a Multipurpose Emergency Shelter.

This letter is to Inform you that, should the Facility be found feasible, its operate and maintenance will be under the responsibility of the Port Vila City Council.

Mr. Peter SAKITA
City Town Clerk
Port Vila City Council

Cc. File

Our Vision: "A cultural, traditional, safe, vibrant, and resilient city that enhances access and equal opportunities for all".

## Appendix 5: Fatumaru Bay Coastal Protection REA Checklist

| Screening Questions | yes | no | Remarks |
|---|---|---|---|
| **A. Project Siting**<br>Is the Project area adjacent to or within any of the following environmentally sensitive areas? | | | |
| ▪ Cultural heritage site | | x | |
| ▪ Protected Area | | x | |
| ▪ Wetland | | x | |
| ▪ Mangrove | x | | |
| ▪ Estuarine | x | | |
| ▪ Buffer zone of protected area | | x | |
| ▪ Special area for protecting biodiversity | | x | |
| **B. Potential Environmental Impacts**<br>Will the Project cause… | | | |
| ▪ encroachment on precious ecology resulting in loss or damage to fisheries and fragile coastal habitats such as coral reefs, mangroves, and seagrass beds? | | x | |
| ▪ short-term increase in turbidity and sunlight penetration as well as changes in sediment pattern and flows at dredging site? | | x | |
| ▪ removal and disturbance of aquatic flora and fauna at dredging site? | | x | |
| ▪ deterioration of water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction? | | x | |
| ▪ alteration of bottom surface and modifications to bathymetry, causing changes in tidal bore, river circulation, species diversity, and salinity? | | x | |
| ▪ changes in sediment pattern and littoral drift that may cause beach erosion of neighbouring areas? | | x | The project aims to directly address erosion in the littoral and backshore areas |
| ▪ modification of terrestrial habitat by upland disposal of dredged material or covering of potential archaeological sites with dredge spoil? | | x | |
| ▪ short-term air quality degradation due to dredging-related operations? | | x | |
| ▪ noise and vibration due to blasting and other civil works? | | x | |
| ▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation? | | x | |
| ▪ dislocation or involuntary resettlement of people? | | x | |
| ▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups? | | x | |
| ▪ other social concerns relating to inconveniences in living conditions in the project areas? | | x | |
| ▪ social conflicts if construction depletes local fishery resources on which communities depend for subsistence? | | x | |
| ▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations (such as STI's and HIV/AIDS)? | x | | Temporary sanitation arrangements will be required |
| ▪ social concerns relating to local inconveniences associated with port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission)? | | x | |

| Screening Questions | yes | no | Remarks |
|---|---|---|---|
| ▪ deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and waterfront industry discharges? | | x | |
| ▪ increased noise and air pollution resulting from airborne emissions (e.g. gas, smoke, fumes) from manoeuvring and berthing ships and the waterfront industry? | | x | |
| ▪ large population increase during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? | | x | |
| ▪ social conflicts especially when workers from other areas are hired? | | x | |
| ▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? | | x | |
| ▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning? | | x | |

## Appendix 6: Record of Consultations Relating to Environmental and Social Safeguards

| Date | Location | Venue | Name of person (or group) consulted | No. Participants (Male/Female)[i] | | | Key Outcomes of consultation |
|---|---|---|---|---|---|---|---|
| | | | | M | F | Total | |
| **2018** | | | | | | | |
| 25/9/2018 | Port Vila | MIA office | Christy Haruel, Social safeguards officer, VPMU | 0 | 1 | 1 | Initial contact, to be followed up by TA Team's social safeguards specialist |
| 3/10/2018 | Port Vila | DLA Meeting Room, MIA | Tony Sokomanu, Wesley Obed, Pita Sali, Edou Willie, Kaltaliu Kaltaliu. Port Vila Land Transport Association Executive Members, MIA | 5 | 1 | 6 | Identification of location of flooding hotspots, priority projects and issues |
| 4/10/2018 | Port Vila | Nambawan Cafe | Catherine Malosu, former Safeguards Officer, VPMU | 0 | 1 | 1 | Resettlement challenges, role of VPMU |
| 7/10/2018 | Port Vila | Nambawan Cafe | Christy Haruel, Social safeguards officer, VPMU | 0 | 1 | 1 | Land acquisition and resettlement experience |
| 16/10/2018 | Port Vila | MLNR | Paul Gambetta, Acting Director, Department of Land, Survey and Registry | 1 | 0 | 1 | Resettlement and compensation processes, customary land, framework, differences with ADB policy |
| 16/10/2018 | Port Vila | DWA | Celine Bareus, Gender Officer, Department of Women's Affairs | 0 | 1 | 1 | Role of DWA, ways to mainstream gender in project eg. Training, monitoring. |
| 14/11/18 | Port Vila | MOLWNR | Ericson Sammy | 1 | 0 | 1 | Water resources oversees the WASH cluster group with UNICEF. Sanitation is under Public Health Department (contact Director Len Tarivolta)<br>Major concern is with the contamination of a) the groundwater source at Tagabe, b) the groundwater and bay along the coast (Vila Bay). There is need to regulate the illegal connections (wastewater to stormwater drains) and poor maintenance of septic tanks.<br>Their "ridge to reef" water resources management approach has been supported by GEF and SPC (Pacific Community).<br>Important sub-projects that need funding support are: a) boreholes along the coast to monitor ground water quality, b) regulation of septic tanks and illegal connections (under Public Health Department) |
| 5/12/2018 | Port Vila | DEPC | Roenas Tavuae Baereleo | 0 | 1 | 1 | Overview of community based coastal restoration. Discussion of approaches for mangrove restoration – encouraging natural regeneration has had some success. Patterns of ownership of coastal areas. |
| **2019** | | | | | | | |
| 19/02/19 | Port Vila | MLNR | Arthur Faerua, Director General, | 1 | 0 | 1 | Project and subprojects outlined to DG. Process for and timing of declaration of state land for WWTP, foreshore consent. Potential land site opposite the Independence Park. |

| Date | Location | Venue | Name of person (or group) consulted | No. Participants (Male/Female)[i] | | | Key Outcomes of consultation |
|---|---|---|---|---|---|---|---|
| | | | | M | F | Total | |
| | | | | | | | Need to work out how much time is available for land process under project. Can land be procured now? If public land it requires the minister of lands to make a declarations that the land will be for the purpose stated. This is officially gazetted, then 30 days for public feedback. Allow 2 month window for this. |
| 26/2/2019 | Port Vila | VPMU | Christy Harel, Social Safeguards | 0 | 1 | 1 | Committed to supporting consultation with Paramount Chief of Ifira. Advised on water quality monitoring program. |
| 15/03/2019 | Port Vila | DEPC | Ron Texster Mogeror, Pollution Control Manager | 1 | 0 | 1 | Update on progress of water quality standards for Vanuatu – still not prepared and request that assistance be provided from the project in this area. Discussion on permit processes – currently being assessed. Existing practice is for DEPC to issue permits under both EPCA and Pollution Control Acts. DEPC aims to streamline the process. Update on water quality resources management taskforce. |
| 11/04/2019 | Port Vila | DEPC | Naomay ("Norma") Jibe Tor, EIA officer | 0 | 1 | 1 | Update on current legislation and status for revisions |
| 11/4/2019 | Port Vila | Jill's Cafe | Christy Harel, Social Safeguards | 0 | 1 | 1 | Update on sewerage scheme and likely resettlement impacts. Advised on liaison with Lands, need to obtain land records for WWTP site, check declared purpose, demarcate site. Offered support to MIA. |
| **2020** | | | | | | | |
| 13/05/20 | Port Vila | QCL office | National Disaster Management Office, Port Vila Municipal Council, Department of Local Authorities, Department of Health | 7 | 1 | 8 | Briefing on proposed screening of candidate sites for emergency shelters leading to feasibility study |
| 15/05/20 | Port Vila | Numerous | Visited Tokyo Paama & Buninga, Nagire church, AOG church, Seaside Paama, Show ground, Tongoa seaside, Futuna seaside, Epauto School Freshwater 1 market, Ex-FOL,Anambrou market, Selime church hall, ManPles market, & Anglican church | 12 | 4 | 16 | Visits to existing halls and churches; consultations with caretakers on potential use as emergency shelter and where people in the area normally go when there is disaster. |
| 18/05/20 | Port Vila | Numerous | Visited the Korman Market site & consulted care takers of churches and schools. Beverly Hills, Malasi tapu, Freshwater school, Pakaroa church and Vila North school. | 5 | 1 | 6 | Visits to existing halls and churches; consultations with caretakers on potential use as emergency shelter and where people in the area normally go when there is disaster. |
| 19/05/20 | Port Vila | MOIA | Department of Local Authorities (DLA), Ministry of Internal Affairs (MOIA): Director Leith Veremaito, Jeffrey Kaitip; secretary | 2 | 1 | 3 | Briefing on ward sub projects , evacuation centres and letter of Access. |
| 20/05/20 | Port Vila | PVCC Office | PVCC secretary; Town Clerk Peter Sakita, Jenny Toasu & Mandes Tangaras. | 2 | 2 | 4 | Consultations on purpose of Ward Sub projects, evacuation centres& letter of Access. |
| 22/05/20 | Port Vila | Seaside | School principals. | 2 | 1 | 3 | Consulted them on how their schools had been affected by |

| Date | Location | Venue | Name of person (or group) consulted | No. Participants (Male/Female)[i] | | | Key Outcomes of consultation |
|---|---|---|---|---|---|---|---|
| | | | | M | F | Total | |
| | | School, Central School, Vila North School | | | | | evacuees & whether the government covered the cost of damages incurred by evacuees and disasters. |
| 25/05/20 | Port Vila | PVCC office | Ward Secretaries & Town Clerk. | 3 | 3 | 6 | Consulted Ward Secretaries at 1:30pm on ward sub project, evacuation centres' 'Asked them to submit urgent priority needs in their wards |
| 26/05/20 | Port Vila | National Statistics Office | David Talo and colleagues | 3 | 3 | 6 | Consulted the staff on 2016 population Census in each ward. |
| 29/05/20 | Port Vila | Laken Community | Chiefs of Laken community near Septic Treatment facility. | 4 | 4 | 8 | Consultations on the status of land and the settlement. |
| 1/06/20 | Port Vila | Seaside Futuna | Chairman of Futuna Land Trust on Land matters- Also consulted lands dept. officers for land Title | 4 | 1 | 5 | Discussed matters concerning use of Futuna land, determined that the Futuna Land Trust is agreeable to the development of an emergency shelter facility. |
| 1/06/20 | Port Vila | Tokyo Paama community | Paama Chief Alex Mahit and his people | 5 | 3 | 8 | Consultations on land and evacuation centre. Chief Mahit said he and his people will not interfere with the government concerning State land. |
| 2/06/20 | Port Vila | Numerous | Labour Dept, Vanuatu Tourism Office and Vanuatu Chamber of Commerce and Industry on statistics of Laid off workers due to Covid 19. | 3 | 5 | 8 | Consultations on any statistics they could provide on Laid off workers or closed businesses. |
| 4/06/20 | Port Vila | Seaside community | Ward representatives at Seaside area. | 4 | 1 | 5 | Consultations on ward statistics for Pentecost & Paama communities. |
| 9/06/20 | Port Vila | Seaside Futuna | Futuna Chief on ground works to be done by engineers at Futuna seaside. | 3 | 1 | 4 | Understanding on scope of feasibility study and concept for the facility at Futuna Seaside. |
| 18/06/20 | Port Vila | Southern Ward | Southern Ward Secretary; Acting Commissioner of Police on Ward sub projects and evacuation centres. | 2 | 1 | 1 | Consultation on ward subprojects. Agreement on concept and to proceed with feasibility studies |
| 29/06/20 | Port Vila | Tokyo Paama | Tokyo Paama community | 12 | 1 | 10 | Consultations on scope and key features of the emergency shelter / community facility |
| 30/06/20 | Port Vila | Tokyo Paama | Tokyo Buninga Rep. | 1 | | 1 | Confirmation on hall improvement project. |
| 1/07/20 | Port Vila | Tokyo Paama | Tokyo Paama leaders. | 5 | 1 | 6 | No objection from community, confirmation of land availability to be confirmed by Lands Department. |
| 3/07/20 | Port Vila | Department of Lands office | Director of Lands Dept Mr. Paul Gambetta | 3 | 1 | 4 | The Director confirmed that land at Tokyo Paama, Showground and Freshwater Market is state land and that Ministry of Lands will sort out the land issue. |
| 10/07/20 | Port Vila | Seaside Futuna | Seaside Futuna Community representative Mary Navaika. | 0 | 1 | 1 | Mary Navaika organised signing of a letter from the community on behalf of Futuna Land Trust Assoc. |

| Date | Location | Venue | Name of person (or group) consulted | No. Participants (Male/Female)[i] | | | Key Outcomes of consultation |
|---|---|---|---|---|---|---|---|
| | | | | M | F | Total | |
| 14/07/20 | Port Vila | Department of Lands office | Director of Lands Dept Mr. Paul Gambetta | 2 | 2 | 4 | Confirmation on Access to Tokyo site. |
| 27/07/20 | Port Vila | Seaside Futuna | chairman of Futuna Land Trust Board Mr. Erick Natuoivi, Mr. Jack Nanubi | 5 | 0 | 5 | Clarification and confirmation of ownership of Seaside Futuna Site. Site was purchased by the islanders of Futuna island over a period, following an initiative by Mr. Jackson Nafi who made the initial deposit. The land title was transferred from Mr. Jackson Nafi 's name to the Futuna Land Trust Board in 1997. |
| 27/07/20 – 03/08/20 | Port Vila | Showground | Chief Alex Mahit, assistant chief Onis Robert and site attendants, Marinet Robert, Rebecca Tasso and Lishy Saul | 2 | 3 | 5 | PVUDP built sanitation facility currently in difficulty as communities are unable to make regular contributions due to unemployment in hotel sector, resulting from COIVID 19 state of emergency / tourist travel restrictions. Difficulty meeting septage removal charge of VUV 30,000 |
| 01/10/21 | Port Vila | Korman Market | Town Clerk, Mr. Peter Sakita | 1 | 0 | 1 | Confirmation of PVCC desire for the facility and responsibility to undertake operation and maintenance of it |
| 02/10/21 | Port Vila | Korman Market | Market vendors | 0 | 28 | 28 | Confirmation that the facility would be welcome and would address existing issues faced with access, security and market operating conditions |
| 04/10/21 | Port Vila | Korman Market | Market vendors and users | 1 | 19 | 20 | Perspectives on use of the facility for emergencies: strong need for the facility |
| 05/10/21 | Port Vila | Freshwater Market | Market vendors | 0 | 30 | 30 | Confirmation of need for the facility |
| 05/10/21 | Port 6Vila | Freshwater Market | Market vendors and users | 14 | 16 | 30 | Perspectives on use of the facility for emergencies: strong need for the facility |

**Appendix 7: Summary of Consultations**

## Proposed Korman Market Multipurpose Emergency Facility - Consultation Report

Ninety-three women and fifteen men were interviewed on the idea of having a market built at the Korman area. The men stressed their strong support for the facility saying that the women's needs are not seriously considered by the government and that they have even seen women sleep in the open spaces at night which is not safe at all. The men also mentioned that having a market facility built at Korman will save money for the women especially to exclude extra bus fares. The men also said that the population of Port Vila has grown very fast, and more markets are needed to meet food distribution needs. One of the men said that without this market and the efforts of the women vendors, many people would suffer because from the difficulty in obtaining greens and root crops that women bring to the market, which are needed to supplement the daily diet of the population of Port Vila.

The men were asked to give their opinion and suggestions on the idea of using the same building as an evacuation centre during disaster period. The men said that it is an excellent idea as it will stop people from going into school buildings and destroying the school's assets, which causes the parents to fundraise all the time to replace the damages caused. The men also agreed that showers and kitchens should be provided as most women come from areas where water is scarce and that having a kitchen will stop women spending money in the Chinese shops and take-aways, allowing them to have healthy meals if they contribute food to the kitchen and cook their own meals. The men welcomed the idea that toilets will be included in the facility. Chief Jean Pierre Kapalu said that in most existing buildings that have been used as evacuation canters before, the main problem had always been toilets being constructed away from the building making it difficult for the women and children to go out of the building to use them and sometimes the toilets are in very poor condition. He said that as an example, a the Epauto hall does not have toilets inside it and when used as a shelter, occupants had to leave the building during emergency times to use the toilets and as the hall is on top of the high hill, it is very dangerous.

The market vendors said that their main problem during disaster has always been toilets and showers because of that, many of them have always refused to evacuate their residence during emergencies. Overcrowding in buildings where there are no showers or places where the toilets are not operating well or may be less in number to service the large population within the building is a problem for them. They welcomed the idea of having toilets, kitchen and showers in the new facilities and added that the provision of these facilities should not only be allowed to be used during emergencies but should also be used during normal days for hygienic reasons.

The women were asked where they normally go to hide during emergencies some said that their pastors normally move them to the church buildings for safety. Asked what churches, some said the Presbyterian Church, the church of the Latter Saints, the Christadelphians, the Assemblies of God , the Seventh Day Adventist church and other ministries like the Living Water Ministry and schools.

The women also acknowledged the work of the Vanuatu Mobile Force who in the past have always been helpful in transporting them to schools and other buildings like the FOL, Korman Sports complex and to family homes at the request of family members.

In conclusion, I would like to say that the comments made during the consultations and individual interviews have shown that all the women and men contacted are in favour of the new facility at the Korman.

**Photographs**

Market vendors being interviewed at Korman

Torn tarpaulins at the Korman market

Vegetables lying on the tables under torn tarpaulins

Root crops lying in the rain due to lack of space

A market vendor using an umbrella under the torn tarpaulin

Water pouring out from a makeshift roof at Korman

Removal of two coconut, and two rain trees will be required

Space provided for the facility

Interviewing two young market vendors at Freshwater

Interviewing Chief Jean Pierre

Interviewing youth

Intervieiwng stall-holder