

# Pacific Aviation Investment Programme (PAIP)

Environmental and Social Management Plan - Bauerfield International Airport (VLI)



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Environmental and Social Management Plan - Bauerfield International Airport (VLI)

Client: Vanuatu Project Management Unit, Ministry of Finance and Economic Management, Government of Vanuatu

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**DRAFT****Glossary and Abbreviations**

°C	Degrees Celsius
ACM	Asbestos Containing Material
ADS-B	Auto Dependent Surveillance – Broadcast – a new, low-cost technology that allows for more efficient aircraft surveillance and consequent safer operations across the Pacific. ADS-B is being implemented by all PAIP participating countries.
AGL	Aeronautical Ground Lighting System
ATS	Air Traffic Services
APs	Affected Parties
ARAP	Abbreviated Resettlement Plan
ARFF	Airport Rescue and Fire Fighting
AVL	Airports Vanuatu Limited
AWS	Automatic Weather Station
CAAV	Civil Aviation Authority Vanuatu. This civil aviation authority sits under the Ministry of Infrastructure and Public Utilities. The CAAV discharges its duties and responsibilities in accordance with Civil Aviation laws of Vanuatu CAP 258 and the specific operating rules, satisfying the Vanuatu Government policy and International Civil Aviation Organization (ICAO) standards and requirement.
Category B	World Bank categorised projects with potential limited adverse social or environmental impacts that are few in number, site-specific, largely reversible, and readily addressed through mitigation measures.
CVOR	Conventional VHF Omnidirectional Range
DEPC	Department of Environmental Protection and Conservation
DGMRW	Department of Geology, Mines and Rural Water
DME	Distance Measuring Equipment – A transponder-based radio navigation technology that measures slant range distance by timing the propagation delay of VHF or UHF radio signals.
DVOR	Doppler VHF Omnidirectional Range – a type of short-range radio navigation system for aircraft, enabling aircraft with a receiving unit to determine their position and stay on course by receiving radio signals transmitted by a network of fixed ground radio beacons.
EEZ	Exclusive Economic Zone
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FOD	Foreign Object Debris
GDP	Gross Domestic Product

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GoV	Government of Vanuatu
HWD	Heavy Weight Deflectometer
IA	Implementing agency
ICAO	International Civil Aviation Organisation
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
km	kilometre
L	Litres
LED	Light Emitting Diode
Localizers	A ground-based navigation aid that give lateral guidance to landing aircraft.
m/ m <sup>2</sup> / m <sup>3</sup>	Metre/ square metres (area)/ cubic metres (volume)
MFEM	Ministry of Finance and Economic Management.
MIPU	Ministry of Infrastructure and Public Utilities. The Public Works Department and Civil Aviation Authority Vanuatu site under this ministry sector.
MLNR	Ministry of Land and Natural Resources
MOWP	Method of Works Plan
Nakamal	Traditional meeting place in Vanuatu
NBCS	National Biodiversity Conservation Strategy
NGO	Non-Governmental Organisation
PAIP	Pacific Aviation Investment Program
PIB	Public Information Bulletin
PID	Photoionization detector
PPE	Personal protection equipment
ppm	Parts per million
PVMC	Port Vila Municipal Council
PWD	Public Works Department
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SON	Santo-Pekoa International Airport located in Luganville, Espiritu Santo.
SPREP	South Pacific Regional Environmental Program
Stakeholder	Project stakeholders are all people directly or indirectly, negatively or positively impacted by the project; that are important to make the project successful, or that may oppose the project or that have a vested interest.
TAH	Whitegrass Airport on Tanna
TFSU	Technical and Fiduciary Services Unit
TPH	Total petroleum hydrocarbons
TMP	Traffic Management Plan
TOR	Terms of Reference

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UNELCO	The private water utilities company that serves a reticulated water supply to Port Vila.
VAIP	Vanuatu Aviation Investment Program
VHF	Very high frequency
VLI	Bauerfield International Airport located in Port Vila, Efate
VSAT	Very small aperture terminal
VOCs	Volatile organic compounds
VPMU	Vanuatu Project Management Unit
WB	World Bank



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## Executive Summary

The Pacific Aviation Investment Program (PAIP) is funded by the World Bank (WB) and has the development objective to (i) improve the safety, security, efficiency, management and environmental sustainability of airports, and (ii) improve regional harmonization of aviation safety standards. The Government of Vanuatu (GoV) and the WB are preparing a project to improve international airport infrastructure in Vanuatu. As part of the regional PAIP, aimed primarily at improving airport safety and security across the Pacific, the Vanuatu Aviation Investment Project (VAIP) has been established. The candidate airports in Vanuatu are:

- Bauerfield International Airport (VLI) located in Port Vila, Efate.
- Santo-Pekoa International Airport (SON) located in Luganville, Espiritu Santo.
- Whitegrass Airport (TAH) on Tanna.

The VAIP project objective is to enable air transport infrastructure and operations of VLI to meet International Civil Aviation Organisation (ICAO) standards, and to improve sustainability of the airport and civil aviation of Vanuatu.

The VAIP is a Category B project under WB environmental and social screening guidelines and requires the development of a site specific Environmental and Social Management Plan (ESMP). Due to the nature of the project it is expected that environmental impacts will be site specific, few if any are irreversible, and mitigation measures can be readily designed and implemented. The WB involuntary resettlement policy OP/BP4.12 is not triggered by the components of the VAIP. The ESMP is required to identify and assess environmental and social issues associated with the proposed activities, and develop mitigation and management measures consistent with World Bank requirements.

The VAIP program for each of the three candidate airports consists of the following primary tasks:

Bauerfield International Airport (VLI)	Santo-Pekoa International Airport (SON)	Whitegrass Airport (TAH)
a) Upgrade of runway lighting and cabling.	a) Installation of new air traffic control equipment.	a) Upgrade of runway lighting and cabling.
b) Relocation of Domestic Terminal Building.	b) Installation of new air navigation aids.	b) Installation of new air navigation aids.
c) Installation of new air traffic control equipment.	c) Installation of new secure communications.	c) Installation of new weather monitoring equipment.
d) Installation of new air navigation aids.	d) Evaluation of ARFF capacity.	d) Installation of new secure communications.
e) Installation of new weather monitoring equipment.	e) Installation of new security equipment.	e) Improved power supply.
f) Installation of new secure communications.		f) Evaluation of ARFF capacity.
g) Improved power supply.		
h) Evaluation of ARFF capacity.		
i) Installation of new security equipment.		

Furthermore, during project preparation Tropical Cyclone Pam devastated Vanuatu, including damaging all three abovementioned international airports. Damage assessments are currently underway. The VAIP program will also provide support to the GoV with emergency reconstruction activities in the form of goods and works. At present it is not possible to assess the impacts that this work may have on the environment and sensitive social receptors. Once a scope of works is outlined, an assessment will be completed and included in an update to this ESMP.

This ESMP includes information on mitigation, monitoring, capacity development and training, and implementation costs (in accordance with WB Operational Policy 4.01 Environmental Assessment). The majority of potential adverse impacts will occur during the construction phase of the VAIP. However given that this primarily involves the rehabilitation of existing infrastructure, mitigation measures should be able to alleviate or lessen any potential negative impacts. The key potential impacts that are being mitigated are:

- Solid waste generation.
- Soil erosion through vegetation clearing and excavation.

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- Hazardous materials handling and storage (potentially including hydrocarbon contaminated soils and asbestos containing materials [ACM]).
- Noise and vibration disturbances from machinery and construction activities.
- Air pollution from dust and equipment.
- Traffic disruption during construction activities.
- Transport of equipment and materials from the port and around Efate.
- Disposal of waste materials.
- Safety hazards for workers and users of the facilities where upgrades are occurring.
- Water demand management for freshwater resources.
- Wastewater discharges.
- Construction camp establishment and dis-establishment.

This ESMP is designed to address these issues through:

- Implementation of this ESMP through the Contractor's ESMP.
- Regular supervision and monitoring of the implementation of the ESMP (refer ESMP monitoring plan).

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## 1.0 Introduction

### 1.1 Background

The Pacific Aviation Investment Program (PAIP) is funded by the World Bank (WB) and has the development objective to (i) improve the safety, security, efficiency, management and environmental sustainability of airports, and (ii) improve regional harmonization of aviation safety standards. The Government of Vanuatu (GoV) and the WB are preparing a project to improve international airport infrastructure in Vanuatu. As part of the regional PAIP, the Vanuatu Aviation Investment Project (VAIP) has been established. The candidate airports in Vanuatu are:

- Bauerfield International Airport (VLI) located in Port Vila, Efate.
- Santo-Pekoa International Airport (SON) located in Luganville, Espiritu Santo.
- Whitegrass Airport (TAH) on Tanna.

In the aftermath of Tropical Cyclone Pam, the VAIP program will also provide support to the GoV with emergency reconstruction activities in the form of goods and works.

VAIP is part of a series of projects under the PAIP, which involves similar activities in Tonga, Tuvalu, Kiribati and Samoa.

The Republic of Vanuatu is a small Pacific archipelago island nation located in the South Pacific Ocean and is approximately a two to three hour flight from ports in Australia and New Zealand. There are approximately 80 islands which comprise of 12,336 km<sup>2</sup> spread over 1,300 km. Efate is one of the largest islands and hosts the country's capital Port Vila and is home to a quarter of the country's population.

VLI, located just outside of Port Vila, is the main international airport within Vanuatu and is the primary access point for tourists and expatriate ni-Vanuatu people. VAIP is being presented to the WB Board as an Emergency Operation under paragraph 12 of OP/BP10.00 on the premise that immediate risk of complete pavement failure on 600 m of VLI runway would result in the cessation of all jet operations, which would have a detrimental impact on the national economy which relies heavily on tourism. The VAIP project seeks to address emergency remedial works on the runway and apron pavements to ensure the continuation of international flights.

The primary beneficiaries if the VAIP are air travellers throughout the Pacific Islands, as well as the national and regional administrative bodies and personnel involved in air transport management, freight and passenger air service providers. Other indirect beneficiaries are tourism-related services and seasonal labour markets.

In order to support finalisation of the VAIP project preparation, and bidding of the proposed runway repair works, an Environmental and Social Management Plan (ESMP) is required to identify and assess environmental and social issues associated with the proposed activities, and develop mitigation and management measures consistent with WB requirements.

### 1.2 Environmental and Social Objectives and Scope

The VAIP project objective is to enable air transport infrastructure and operations of VLI to meet International Civil Aviation Organisation (ICAO) standards, and to improve sustainability of the airport and civil aviation of Vanuatu.

### 1.3 Environmental and Social Management Plan Objectives and Scope

The VAIP is a Category B project under WB environmental and social screening guidelines and requires the development of a site specific ESMP. Due to the nature of the project it is expected that environmental impacts will be site specific, few if any are irreversible, and mitigation measures can be readily designed and implemented.

The objective of the ESMP is to provide a framework for managing the airport upgrade works in a manner that incorporates the principles of environment sustainability while minimising potential adverse effects on the local community and the environment.

To achieve this objective the ESMP outlines the mitigation measures required for avoiding or minimising the potential impacts of the works and provides a monitoring program to confirm effectiveness of the required mitigation measures. Roles and responsibilities are clearly defined for all stages of the project works and

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execution of project works. The ESMP also provides the details of how the community and stakeholders are to be engaged and the mechanisms for ongoing consultation and communication.

This ESMP is limited to the scope of works as described in Section 2 of this document and addresses impacts and mitigation measures identified at each stage of the project's execution, namely detailed design, construction and operation. This ESMP will be included in the bidding documents for construction contractors and form the basis of the Contractor's ESMP. The mitigation measures identified in this ESMP form the minimum requirement for reducing impacts on the environment as a result of works associated with the project.

### 1.3.1 Environmental Safeguards Document Hierarchy and Development

The PAIP has an Environmental and Social Management Framework (ESMF) which outlines the key steps and procedures in screening and assessment of environmental and social issues related to the PAIP (generally). The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social impacts. It contains measures and plans to reduce, mitigate and/or offset adverse impacts and enhance positive impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project impacts. It defines roles and responsibilities, and provides guidance for the Implementing Agency (IA), Executing Agencies (EA) (respective country's ministries) and the respective countries Civil Aviation Authorities for developing the environmental and social safeguards documents in compliance with respective WB operational policies (namely OP/BP4.01, OP/BP4.12, OP/BP4.10) and respective country environmental requirements.

The ESMP is a dynamic document which is updated as and when project scope, detailed designs or further information becomes available (e.g. as a result of consultation with stakeholders and the general public), thus creating a hierarchy of documents as the project progresses. The diagram below shows the hierarchy and development of these documents culminating in the development of the contractor's ESMP which specifically details how the contractor will implement requirements of the ESMP. Issues, impacts and mitigation measures identified in superseded ESMPs are incorporated into subsequent versions unless they have been addressed through design or other means, in which case this is identified in the ESMP. Only those documents showing a date have been drafted, all others are either in progress or are yet to start. The Contractors are required to comply with this ESMP and use it to identify what mitigation measures need to be implemented. The Contractors ESMPs will document implementation and specific measures that will be used based on their construction methodology (if different from that identified in Section 2).

The finalised ESMP should be included with the pavement (runway, taxiway and apron) and runway lighting and air navigational aids Contractor procurement bid documents for the VAIP.

Figure 1 Environmental Safeguard Document Hierarchy



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## 1.4 ESMP Methodology

The methodology used to develop this ESMP is as follows:

- Review the ESMF.
- Prepare for field survey and organise site visits, include specific requirements as identified in the ESMF.
- Conduct field survey using the ESMF and an environmental screening checklist as a basis for assessment.
- Liaise with Design and Supervision team regarding any findings which may influence detailed design.
- Draft the VLI ESMP based on consultation outcomes and update with information obtained from the field survey and conceptual designs.
- Submit to Technical and Fiduciary Services Unit (TFSU), Vanuatu Project Management Unit (VPMU), GoV (Department of Environmental Protection and Conservation [DEPC]), Airports Vanuatu Limited (AVL) and the WB for review prior to consultation, update according to comments and feedback from all parties.
- Consultation in and around Port Vila with site specific Public Information Bulletin (PIB) available in hard copy conducted by a VPMU engaged consultant.
- Incorporate outcomes as required from consultation into final VLI ESMP to be included in bidding documents.
- Submit to TFSU, VPMU, GoV (DEPC), AVL and WB for final review.

This ESMP is a dynamic document that can inform the design and be modified accordingly as the design is finalised (and subsequently reissued). At this very early stage of the VAIP project, there is not any site specific concept design, detailed design and supporting assessment reports available to assist in the compilation of this ESMP. Information from the ESMF, field survey, public consultation and also other PAIP EMP examples (e.g. Tonga EMP for Fua'amotu International Airport) have been used to assist in identifying the impacts and mitigation measures for the VAIP project.

As the design work and supporting assessment reports is developed and a detailed scope is defined, this should prompt a review of this ESMP and it should be updated accordingly.

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## 2.0 VAIP Airport Infrastructure Description of Works

### 2.1 VLI Upgrade Description of Works

#### 2.1.1 Overview of Works

The VAIP VLI program consists of the following primary tasks:

- a) Rehabilitation and resurfacing of existing airport pavements.
- b) Extension of the apron.
- c) Additional taxiways and widening of existing taxiway.
- d) Upgrade of runway lighting and cabling.
- e) Relocation of Domestic Terminal Building.
- f) Installation of new air traffic control equipment.
- g) Installation of new air navigation aids.
- h) Installation of new weather monitoring equipment.
- i) Installation of new secure communications.
- j) Improved power supply.
- k) Evaluation of ARFF capacity.
- l) Installation of new security equipment.

At the time of the development of this ESMP version, the detailed design work for all of these components has yet to be completed.

##### 2.1.1.1 Runway Pavement Design

The land on which the airfield was positioned was part of a plantation owned by Henri Russet. The US Army established the airfield in 1942. The airfield was originally named Efate Field, Vila Field or McDonald Field but was later officially named Bauer Field after Lt-Col. Harold W. Bauer, an American World War II fighter pilot. The base was disestablished and abandoned in February 1946. Later the airfield was established as an international airport.

The VLI 11/29 Runway is 2.6 km in length and 45 m wide, the current surface is asphalt. Runway upgrade works were last completed in the late 1990's.

VLI's runway, apron and taxiway pavements are in poor condition and need to be repaired urgently. Damages are particularly critical at the Runway 11 end, which will likely require a full rehabilitation. Presently, 600 m of runway is at immediate risk of complete pavement failure and is in need of rehabilitation. Discussions with geotechnical engineers who have undertaken previous similar surveys suggest that the portion of the VLI runway to be upgraded is on alluvial materials which have saturated the pavement structure so full rehabilitation of some 600 m is the proposed treatment to the runway. The remaining 2 km of the runway appears structurally sound and therefore a structural overlay (minimum 65 mm) is all that is required.

The detailed design Consultant for the proposed runway pavement design is Tonkin and Taylor Limited (T&T). At the time of this ESMP version, the detailed design work for the runway pavement work has yet to be completed. T&T are mobilising to the site shortly to complete a preliminary coring and Heavy Weight Deflectometer (HWD) testing to inform pavement design of the runway in order to prepare a design brief for the runway and apron areas.

The proposed runway pavement scope includes the following activities:

- Pavement rehabilitation for the 11/29 Runway including the reconstruction of 600 m length at south-west end of the runway.
- Texturising and nominal 65 mm structural overlay to remaining runway and end turning areas.
- Texturising and structural overlay to existing taxiway and apron.

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- All pavements will receive new markings.

The design scope for VLI is the rehabilitation and resurfacing of the runway, taxiway and apron for a projected life of approximately 10 to 15 years. However, prior to the pavement rehabilitation works, emergency civil works are required for the main runway and apron areas.

The runway pavement rehabilitation and resurfacing works will require the use of local quarries for supply of basalt and coronous aggregate, the scope of work associated with this component includes:

- Confirmation of the aggregate supply (basalt and coronous aggregate) quarries, to be located on Efate.
- Maintenance of designated haul road routes between quarries and VLI.

### 2.1.1.2 Extension of the Apron

The current apron space limits the type and frequency of aircraft that can be accommodated at VLI. The apron space will be enlarged on eastern and western sides by an additional approximately 12,500 m<sup>2</sup>. The works will also include a turning bay expansion to cater for Code E aircraft at each threshold with holding bay at threshold 11 to enable a narrow-body jet to be able to hold clear of the runway without disrupting operations.

### 2.1.1.3 Additional Taxiways and Widening of Existing Taxiway

To accommodate Code E aircraft, the existing taxiway will be widened and two additional stub taxiways at the eastern and the western extremities of the runway will be constructed.

### 2.1.1.4 Upgrade of Runway Lighting and Cabling

Current incandescent airfield lighting will be replaced with high intensity, energy efficient LED lighting at VLI.

### 2.1.1.5 Relocation of Domestic Terminal Building

The current location of the domestic terminal at VLI represents a safety risk to aircraft, in particular the larger international flights, due to its proximity to the runway. Since it is non-compliant with international standards, it will be moved away from the runway.

The domestic terminal building structure may be constructed of asbestos containing material (ACM). During the design works and construction phase planning works, consideration should be made to the exposure risks, management and disposal of this hazardous material. Once the design and scope of works has been established, the ESMP will be updated subsequently to reflect this.

### 2.1.1.6 Installation of New Air traffic Control Equipment

This will include the provision of new Air Traffic Services (ATS) consoles for VLI to monitor airport operations.

### 2.1.1.7 Installation of New Air Navigation Aids

The VAIP project will finance critical navigation aids to ensure safe operations, including the installation of Doppler very high frequency (VHF) Omnidirectional Range (DVOR) and Distance Measuring Equipment (DME) for VLI. This will replace the current outdated Conventional VHF Omnidirectional Range (CVOR) and in addition, new localizers will also be financed. Furthermore the project will fund the installation of ADS-B, including ground stations and the necessary avionics equipment for aircraft. A detailed roll-out study has been conducted under PAIP identifying requirements, and an implementation coordinator is currently being recruited to supervise implementation.

The physical works associated with the new air navigation aids include concrete pads and trenching for power and communication cables.

### 2.1.1.8 Installation of New Weather Monitoring Equipment

An Automatic Weather Observation Station will be financed for VLI.

### 2.1.1.9 Installation of New Secure Communications

The project will upgrade of nationwide VHF communications and supply and installation of very small aperture terminal (VSAT) secure communications system for satellite-based ground-to-ground communications. The system will enable voice and data communications for airline operations via a full-mesh closed network connecting regional civil aviation authorities, airports and air services providers. The project will also finance a management contract, which will operate the network across the region.

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## 2.1.1.10 Improved Power Supply

The provision of improved power supply including backup generators is proposed for VLI.

## 2.1.1.11 Evaluation of ARFF Capacity

VLI currently operates three fire tenders. Due to equipment aging, the vehicles are encountering breakdowns making the airport non-compliant with international requirements. A detailed evaluation of Airport Rescue and Fire Fighting (ARFF) capacity will be undertaken financed by the design Consultant outlining requirements to comply with standards for Category 7 airport operations. Based on the evaluation, the project will provide funding for the required activities including, but not limited to, fire tender vehicles, training and fire safety equipment to enable compliance with Category 7 operations.

## 2.1.1.12 Installation of New Security Equipment

New x-ray machines for passenger baggage and cargo screening are proposed for VLI.

## 2.2 SON Upgrade Description of Works

### 2.2.1 Overview of Works

The VAIP SON program consists of the following primary tasks:

- a) Installation of new air traffic control equipment.
- b) Installation of new air navigation aids.
- c) Installation of new secure communications.
- d) Evaluation of ARFF capacity.
- e) Installation of new security equipment.

At the time of the development of this ESMP version, the detailed design work for all of these components had yet to be completed.

It is anticipated that these proposed SON tasks will require very little disturbance and will have no more than minor impacts on the environment and sensitive social receptors. Should these scope of works change and be assessed to likely have an increased impact on the environment and sensitive social receptors, the ESMP will be updated subsequently to reflect this.

### 2.2.1.1 Installation of New Air Traffic Control Equipment

This will include the provision of new ATS consoles SON to monitor airport operations.

### 2.2.1.2 Installation of New Air Navigation Aids

The VAIP project will finance critical navigation aids to ensure safe operations, including the installation of DVOR and DME for SON. Furthermore the project will fund the installation of ADS-B, including ground stations and the necessary avionics equipment for aircraft. A detailed roll-out study has been conducted under PAIP identifying requirements, and an implementation coordinator is currently being recruited to supervise implementation.

The physical works associated with the new air navigation aids include concrete pads and trenching for power and communication cables.

### 2.2.1.3 Installation of New Secure Communications

The project will upgrade of nationwide VHF communications and supply and installation of VSAT secure communications system for satellite-based ground-to-ground communications. The system will enable voice and data communications for airline operations via a full-mesh closed network connecting regional civil aviation authorities, airports and air services providers. The project will also finance a management contract, which will operate the network across the region.

### 2.2.1.4 Evaluation of ARFF Capacity

Fire safety equipment including personal protection equipment (PPE) will be provided to ARFF employees at SON.



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## 2.2.1.5 Installation of New Security Equipment

New x-ray machines for passenger baggage and cargo screening are proposed for SON.

## 2.3 TAH Upgrade Description of Works

### 2.3.1 Overview of Works

The VAIP TAH program consists of the following primary tasks:

- a) Upgrade of runway lighting and cabling.
- b) Installation of new air navigation aids.
- c) Installation of new weather monitoring equipment.
- d) Installation of new secure communications.
- e) Improved power supply.
- f) Evaluation of ARFF capacity.

At the time of the development of this version of the ESMP, the detailed design work for all of these components had yet to be completed.

It is anticipated that these proposed TAH tasks will require very little disturbance and will have no more than minor impacts on the environment and sensitive social receptors. Should these scope of works change and be assessed to likely have an increased impact on the environment and sensitive social receptors, the ESMP will be updated subsequently to reflect this.

#### 2.3.1.1 Upgrade of Runway Lighting and Cabling

Current incandescent airfield lighting will be replaced with high intensity, energy efficient LED lighting at TAH.

#### 2.3.1.2 Installation of New Air Navigation Aids

The VAIP project will finance critical navigation aids to ensure safe operations, including the installation of DVOR and DME for TAH. Furthermore the project will fund the installation of ADS-B, including ground stations and the necessary avionics equipment for aircraft. A detailed roll-out study has been conducted under PAIP identifying requirements, and an implementation coordinator is currently being recruited to supervise implementation.

The physical works associated with the new air navigation aids include concrete pads and trenching for power and communication cables.

#### 2.3.1.3 Installation of New Weather Monitoring Equipment

An Automatic Weather Observation Station will be financed for TAH.

#### 2.3.1.4 Installation of New Secure Communications

The project will upgrade of nationwide VHF communications and supply and installation of VSAT secure communications system for satellite-based ground-to-ground communications. The system will enable voice and data communications for airline operations via a full-mesh closed network connecting regional civil aviation authorities, airports and air services providers. The project will also finance a management contract, which will operate the network across the region.

#### 2.3.1.5 Improved Power Supply

The provision of improved power supply including backup generators is proposed for TAH.

#### 2.3.1.6 Evaluation of ARFF Capacity

Fire safety equipment including PPE will be provided to ARFF employees at TAH.

## 2.4 Emergency Reconstruction Following Tropical Cyclone PAM

During project preparation Tropical Cyclone Pam devastated Vanuatu, including damaging all three abovementioned international airports. Damage assessments are currently underway. The VAIP program will also provide support to the GoV with emergency reconstruction activities in the form of goods and works. At present it

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is not possible to assess the impacts that this work may have on the environment and sensitive social receptors. Once a scope of works is outlined, an assessment will be completed and included in an update to this ESMP.

## 2.5 Alternatives

The airport is existing infrastructure which requires maintenance work to ensure continued operation. Alternatives regarding design approach and methodology were explored however budgets and constraints around land and natural resource availability limited the selection of design and construction methodology. The designs and proposed construction methodology have been selected based on the most effective use of natural resources, labour, ease of ongoing maintenance, effects on the local environment and community.

## 2.6 Construction Methodology

The runway pavement will most likely be the first component of the VAIP to be started followed by the navigational aids. The contracts for the physical works for each component have yet to be awarded so the precise construction methodology is unknown. At the time of the development of this ESMP, the detailed design work for the pavement rehabilitation and resurfacing works and also the runway lighting and air navigational aids has yet to be completed. This ESMP is a dynamic document that can inform the design and be modified accordingly as the design is finalised (and subsequently reissued). The Contractor's implementation ESMP will be required to address specific methodological measures or impacts.

### 2.6.1 Method of Works Plan (MOWP)

The Method of Works Plan (MOWP) is a required document for any major construction works within the boundaries of an airport. The MOWP sets out the operational requirements for maintaining a functioning airport throughout the construction process. It includes the concessions and alternative arrangements that may need to be made (e.g. alternative aircraft parking apron) and staging of the construction process while ensuring the safety and security of all personnel, the community and aircraft and continued operation of the airport throughout construction works.

### 2.6.2 Materials and Equipment

All aggregate materials will be sourced locally on Efate.

Specialised equipment such as the asphalt plant (including dust scrubber), paver and milling machine will need to be imported for the VAIP project. It is likely that general construction equipment such as excavators and rollers can be sourced locally. All cargo whether air or ship will need to be processed in accordance with Vanuatu quarantine and customs laws which require fumigation (proof of) of materials and equipment and declarations by personnel (specifically regarding communicable diseases).

### 2.6.3 Aggregate Supply

#### 2.6.3.1 Runway Aggregate Requirements

Aggregate materials for the runway will be obtained from existing quarries locally on Efate. The estimated volumes of the different types of aggregate (basalt and coronous) and materials required for the pavement works and also the runway lighting and air navigational aids have yet to be confirmed by the design consultant, T&T.

##### 2.6.3.1.1 Basalt Aggregate Source

During the last runway upgrade works in the late 1990's, basalt aggregate used to reseal the runway was imported into the country; this would have incurred a higher cost to sourcing basalt locally on the island. Today, Efate has one established basalt quarry, Malarua Quarry which is currently not in operation. This quarry is located approximately 50 km from Port Vila on the northern side of Efate, refer Figure 2. The quarry was established by Downer in 2009 and was utilised to source and produce basalt aggregate chip to upgrade the main road around the island. Prior to the quarry becoming active, a quarry permit was obtained under the Mines and Minerals Act, Quarry Permit Regulation Order No. 8. The permit allowed up to 40,000 m<sup>3</sup> of rock to be blasted and removed from the site and this quantity was blasted during 2009 - 2010. The processing plant and stockpile areas were also located at this quarry site.

Following the road upgrade works, the quarry became inactive and is now recolonized with vegetation. Since this time, the New Lands Act has come into effect and the custom ownership of the site has been disputed. In March 2015, a Lands Tribunal is in process between the Emua community (believed custom owners), Jimmy Kalorib and Lauren Uma Bule (believed land occupiers) to determine the custom ownership of the site. The duration of the

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Lands Tribunal is not confirmed but likely to be a couple of months. Refer to Figure 3 for a site layout plan and the designated areas that the affected parties are currently occupying.

There is currently approximately 3,000 m<sup>3</sup> of blasted basalt currently stockpiled at Malarua Quarry and as the royalties have been paid to the then thought custom owners, this stockpile is deemed the property of the GoV. It is possible that, subject to their approval, this material could be utilised for the VAIP project.

If this quarry is re-established for the VAIP works, a new quarry permit will be required under the Mines and Minerals Act, Quarry Permit Regulation Order No. 8. The quarry property boundary will also be redefined to encompass the land beyond the existing quarry face. Permitting requirements will need Contractors to include provision for quarry specific plans including environmental management, health and safety and rehabilitation.

The quarry is approximately 700 m inland from the coast. The nearest settlement to the quarry is Emua (community contesting custom ownership), less than 1 km east of the site.

The preferred haul route for the material transport to VLI will be clockwise around the island (approximately 75 km) travelling through or near to Emua, Baofatu, Onesua, Epao, Forari, Eton villages and Port Vila urban area. Although this transport route is longer than the anticlockwise route around Efate, it is less undulating and a gentler route for trucks. There is no electricity supply to the site, power would need to be produced using a diesel powered generator. There is a concrete bunded area located on site for a 3-5,000 L capacity above ground diesel tank. There is no water supply at the site, water would need to be transported via tanker truck.

The Department of Geology, Mines and Rural Water (DGMRW) have advised that the Lands Tribunal process should be resolved before July 2015. However, if this is not the case, the DGMRW will assist in trying to establish another quarry in the area. One alternative site has been identified in Fatmalapa, however, it would require a 3 km access haul road to be constructed.

Prior to any quarries being selected for the VAIP project, public consultation will be completed with any affected parties relating to each quarry site, whether it is an operating, re-opening or new quarry site. Should it be identified that a new quarry site will be required for the VAIP project, the requirements of the Resettlement Policy Framework (RPF) presented in Appendix D will need to be implemented.

Refer to Plates 1 - 4 for photographs of the quarry site as observed in March 2015.

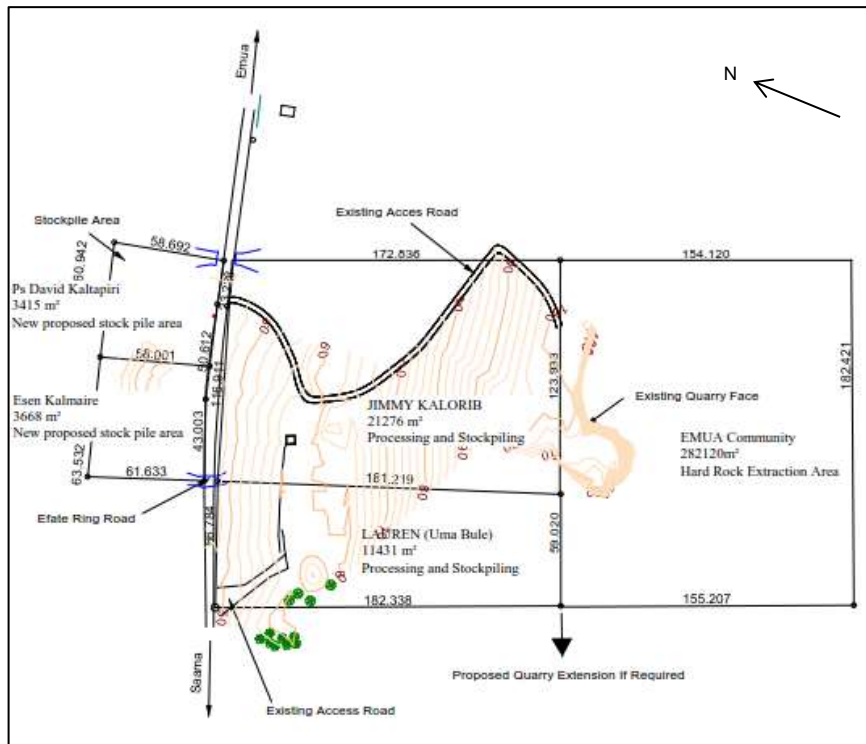
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**Figure 2 Malarua Quarry Site Location in North Efate**



Source: Google Earth 2015, Imagery date 7 December 2014.

**Figure 3 Malarua Site Layout plan**



Source: Downer, 5 December 2014. Malarua Quarry - Existing Quarry Development, scale: 1:2500, drawn by Bob Tatton.

**DRAFT****Plate 1 Existing quarry face****Plate 2 Blasted basalt stockpile from 2009 operations****Plate 3 Area for stockpiling across road from quarry****Plate 4 Public notice regarding Land Tribunal and Emua Tribe****2.6.3.1.2 Coronous Aggregate Source**

In the vicinity of Port Vila, there are currently 5 active, permitted coronous quarry operations. One quarry, Orangorango Quarry is less than 1 km north-east of VLI (refer Figure 4). The custom owner of this site is Henri Russet and the quarry site is split between 2 permit holders, Henri Russet and Aku Dehn (Dehn Enterprise Limited). Pierre Brunet contractors operate the processing plant located at the site and also pay royalties to Henri Russet for the aggregate for their contractor operations and concrete production plant (located just south-east of VLI).

This is the largest coronous quarry operation in the area. There is a diesel generator on site to power the processing operations. There is also an established permitted water supply network for aggregate washing processes. Plates 5 - 6 show the quarry and aggregate processing operations at Orangorango Quarry. The haul route from this quarry is less than 1 km and passes briefly through the eastern periphery of the settlement south of VLI. Due to the size of the operation, permit status and proximity to VLI, this quarry is the preferred coronous aggregate source.



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**Figure 4 Orangorango Quarry Location North-East of Bauerfield Airport**



Source: Google Earth 2015, Imagery date 7 September 2014.

**Plate 5 Existing quarry face and blasted material**



**Plate 6 Aggregate processing plant at the quarry site**



**2.6.3.2 Runway Lighting and Air Navigational Aids Aggregate Requirements**

Small amounts of material (sand and hard fill) will be required for the excavations associated with the runway lighting and air navigational aids upgrade work as detailed in Section 2.1.2. Material from the excavations themselves will be used in the first instance and supplemented as required either by the former pavement basecourse material that could not be re-used during the rehabilitation works, or coronous quarry derived material.

**2.6.4 Construction Camp and Lay Down Areas**

**2.6.4.1 Establishment**

The proposed construction camp and lay down area to be utilised by all project Contractors (pavement works and air navigational aids) at differing times should be located either on the VLI site or on land located close to the airport (subject to appropriate custom owner and leaseholder approval); at this stage, this location has yet to be confirmed.

During the late 1990’s runway resurfacing works, a construction camp (including asphalt plant) was located on the VLI site in the south-east corner and construction lay down areas for stockpiling were located to the north of the

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runway. AVL have highlighted that Air Vanuatu lease vacant land to the west of the AVL office on site (subject to appropriate negotiations and approvals) is also a potential location that could be utilised during the construction works. Alternatively farmland is located to the north and east of the site could possibly be utilised in the short-term, again subject to the appropriate approvals and likely implementation of the RPF.

The construction camp will be utilised by all project Contractors (pavement works and air navigational aids) at differing times so the scale of the camp will vary. The greatest land area required will be for the pavement works (runway) component of the VAIP as the equipment and aggregate requirements are the greatest. The estimated area required for the duration of the construction works has yet to be confirmed.

The exact details of the size and site management (health and safety, solid waste management, water management and wastewater management) will need to be decided by the Contractors in consultation with AVL. Final approval of these details will be required by AVL, custom owners and leaseholders before the construction camp and lay down areas can be set up and documented in the Contractors' ESMP.

Construction camp size should be kept to a minimum, be fenced and materials and equipment kept secure to prevent access and use by non-authorised personnel. Should the construction camp be located outside of the VLI security perimeter, hiring of a local security firm to provide security for the area is recommended.

At the potential construction camp and lay down areas, there are no existing hard stand areas available for stock piling or bunded areas (secondary containment) for hazardous substance storage. Vegetation clearance along with temporary hard stand and bunded areas will need to be constructed. The bunded area, also known as secondary containment is defined by the International Finance Corporation (IFC), environmental, health and safety guidelines as "appropriate secondary containment structures consist of berms, dikes, or walls capable of containing the larger of 110% of the largest tank or 25% percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 L and will be made of impervious, chemically resistant material"<sup>1</sup>.

Prior to the establishment of the asphalt plant, consideration should be made on where the asphalt plant is to be located. Although the use of this machinery will be short-term (2 to 3 months), it can produce nuisances such as noise and a mercaptan odour. If located away from communities, the social impacts should be minimal.

Noise, dust, wastewater production, vibration and increased traffic are impacts that can negatively affect communities and sensitive receptors (settlement to the south, river to the west of VLI and groundwater); these potential impacts will need to be considered when identifying the location of the construction camp and laydown areas. The construction camp is not a residential camp, and foreign contractors will be required to use local existing accommodation facilities throughout the project.

### 2.6.4.2 Haul Routes

Transport to and from the construction camp, particularly of materials and equipment, must occur on the existing road network and measures undertaken to prevent accidents, dust, spillages, noise and vibration nuisance (e.g. wheel wash, covering of loads, servicing of vehicles). If the transport of material or equipment is likely to impact on normal pedestrian and vehicle traffic or pose an increased safety hazard, consideration should be given to moving these items during off peak times. Measures such as prohibiting the use of engine braking and use of speed control in and close to settlements can be implemented to reduce noise, speed and vibration near sensitive receptors. Once quarries and haul routes have been identified, the Contractor's ESMP should assess these requirements.

Temporary lay down areas for stockpile of material or equipment may be suitable to reduce the need to transport items on the road. All temporary stockpiles must be kept small (no higher than 2 m) and bunded to prevent dust and sediment laden runoff being generated. If need be the stockpiles should be wetted or covered to prevent dust. Lay down areas should not be sited near sensitive receptors (refer Section 5.4). Any land required for a temporary lay down area will need to be negotiated with the custom owner and lease holder.

### 2.6.4.3 Hazardous Substances

Hard stand areas must be available for storage of hazardous substances and other equipment that poses a potential risk to the environment (e.g. leaking lubricant from machinery). Runoff from hard stand areas used to store machinery will need to be collected and treated (e.g. oil water separator) to prevent contamination of soil or

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<sup>1</sup> International Finance Corporation and World Bank (30 April 2007) Environmental, Health and Safety (EHS) Guidelines, Section 1.5 Hazardous Materials Management, Control Measures.  
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water bodies. Hazardous substances (e.g. fuel, lubricants, oil, paint or ACM) must be stored in a bunded area. Solid waste and wastewater must be managed in such a way to prevent the spread of vector-borne diseases and contamination of soil and water bodies.

### 2.6.4.4 Waste

There is one official landfill on Efate. Bouffa Landfill is located to the east of Port Vila which is managed by the Port Vila Municipal Council (PVMC). This landfill only accepts general waste and waste from septic tanks. Any inert aggregate waste (asphalt or basecourse material) should be either recycled on-site where possible or provided to the Public Works Department (PWD) to be used on GoV road projects e.g. road patch work. The Contractor's ESMP should confirm whether used (empty) asphalt drums may be returned to the supplier or crushed and disposed of to landfill. Any hazardous waste (e.g. contaminated soil / water, empty containers which contained hazardous substance [oil, lubricant, paint, diesel, ACM]) generated during the construction works would have to be exported from Vanuatu to a landfill in a country approved to accept such waste.

There is no reticulated sewer network on the island, septic tanks are utilised. Therefore temporary toilets and disposal or treatment of wastewater will need to be in accordance with the Ministry of Infrastructure and Public Utilities (MIPU) and AVL advice (for example construction and training in use of composting toilet facilities).

### 2.6.4.5 Health and Safety

All occupational health and safety requirements must be in place and workers trained in necessary procedures (e.g. spill response plan). Health and safety requirements must be applied to all aspects of the VAIP project (including airport operations, quarries and transport routes). PPE needs to be available to workers as required (e.g. high visibility vest, safety boots) and processes in place for obtaining relevant PPE.

### 2.6.5 Duration and Timing of Construction Activities

Two separate contracts will probably be awarded for the two types of work, namely pavement rehabilitation (runway) and installation of navigational aids. As the contractors have yet to be appointed the exact duration of each component is not yet known. However, the indicative time scale for the physical portion of the works is estimated to be 6 months between July and December 2015.

Normal working hours are Monday to Saturday, 7am to 6pm. Working on a Sunday or Public Holiday is not recommended and would likely only be approved if urgently required for safety purposes. It is likely the runway pavement works will need to be completed outside of normal working hours in order to work around flight schedules to ensure safe operations of the airstrip for incoming and outgoing aircraft. All flight and construction scheduling must be coordinated with air operators as documented in the MOWP.



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## 3.0 Policy, Legal and Administration Framework

### 3.1 National Requirements

Vanuatu has a well-established regulatory framework that provides measures to protect and preserve the environment. Legislation concerning the protection and preservation of the environment is found in a number of Acts and is the responsibility of a number of different ministries according to their focuses, they are detailed below:

#### 3.1.1 Environmental Management and Conservation Act (2006)

This is national legislation which provides for the protection and management of the environment including its lands, air and waters in Vanuatu. Key areas of this legislation which will impact the VAIP project are detailed below.

#### Part 3 – Environmental Impact Assessment

Part 3 of this Act – Environmental Impact Assessment (EIA), states that all projects, proposals or developing activities that impact or are likely to impact the environment are subject to this Act and may require an EIA. Initially, all projects are required to be registered with the DEPC and a preliminary assessment of the project is required to assess whether a full EIA is required. However under Section 17 – EIA determination, at the Director of the DEPC's discretion, they have the authority to determine whether an EIA is required on a case by case basis. In the case of this VAIP project, this draft ESMP will be submitted to the Director of DECM for review, at this point they will determine whether a full EIA will be required or whether this document meets GoV EIA requirements. The DEPC EIA decision, once received, will be presented as an Appendix to subsequent revisions of this document.

#### Part 4 – Biodiversity and Protected Areas

With regard to the National Biodiversity Conservation Strategy (NBCS), the DEPC have indicated that there are no protected or community conservation areas in the vicinity of VLI. However, the NBCS identifies all rivers on Efate as important and vulnerable. La Colle River is located approximately 100 m to the west of VLI and unnamed watercourses are also located to the north and south of the site.

With regard to Section 32 – Biorespecting to require permit, no permits would be required for the VAIP project. However, it should be noted that any imported equipment would be required to go through quarantine processes and be deemed clean prior to entering Vanuatu.

#### 3.1.2 Water Resources Management Act (2002)

This national legislation provides for the protection, management and use of water resources in Vanuatu. This national legislation applies to all water in Vanuatu.

Under Part 2 – Use of Water, Section 6 – Application for right to use water, if the Contractor elects to obtain water supply from natural resources such as groundwater or surface water, they would be required to apply to the Director for the right to utilise it. Furthermore the Contractor must apply to the Director for the right to construct, operate or maintain works for any purpose including:

- Any work in or adjacent to any water or any bore – VLI is directly adjacent La Colle River and two potable bores are located within 100 m of the site. One bore is utilised by UNELCO for the private reticulated supply and one is used by a local residential property.
- Any work whose purpose is to supply water to any other person – this does not apply to the VAIP project.

Section 10 – Matters to be considered, the Director will make assessment on the application and the following factors would need to be considered with regard to an application for the VAIP project:

- It is not likely to create a water shortage – an assessment on water requirements will need to be made to ensure the resource used is not compromised.
- It is not likely to create a health nuisance – wastewater disposal and control of hazardous waste at the site needs to be controlled and monitored.
- It is not likely to adversely affect other lawful users of the water resources – an assessment of adverse effects will need to be made once the Contractors water supply methodology has been determined.

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- It is not likely to damage the water resource or its environment – an assessment of adverse effects will need to be made once the Contractors water supply methodology has been determined.
- It is compatible with other uses in and works in the immediate area – an assessment of adverse effects will need to be made once the Contractors water supply methodology has been determined.

Under Part 4 – Water Resource Management, the National Water Resources Management Policy and Plan aims to manage water resources in Vanuatu.

All water use (water usage and also wastewater / hazardous waste / sediment management) during the VAIP project will be required to meet the rules under this legislation and the permitting requirements will need to be met.

### 3.1.3 Mines and Minerals Act (1986)

This Act makes provision for the control of mining and related operations in Vanuatu. This Act provides for legalisation regarding licensing for mining and quarrying. Key areas that have implications to the VAIP project include:

- Part 14 – Quarry Permits: provides details on the permitting system.
- Part 16 – Restrictions and Surfacing Rights: this section defines a 'custom owner' as the person or persons who, in the absence of a dispute, the Minister responsible for land is satisfied are the custom owners of land. It also defines a 'lawful occupier' in relation to any land, means an alienator or the custom owners, or any person occupying the land with the lawful consent of the custom owners in relation to that land. Part 16 describes the rights and compensation rights of the lawful occupier.

#### 3.1.3.1 Mines and Minerals Act, Quarry Permit Regulation Order No. 8 (2005)

This is a Regulation to make provision for applications for the issue of Quarry Permits and for related matters. This Act supersedes the quarry permitting section in the Mines and Minerals Act (1986).

The Act states that a permit is not required for the extraction of building minerals on land by the custom owner of the land for customary purposes. A permit is required if the custom owner of land sells, or intend to sell, any extracted building minerals for use outside the land from which they were extracted.

#### Quarry Permit Application

Malarua Quarry (basalt) would require a new permit application to be sought prior to it being re-established (refer Section 2.3.3.1.1). There are 5 coronous quarry operations within the vicinity of Port Vila that are operating and have existing active permits (refer to Section 2.3.3.1.2).

The DGMRW have advised that as long as there is sufficient resource and approval from custom owners, a quarry permit holder may increase their permitted abstraction volume, they would just be required to pay an additional permit fee to GoV and royalties to the custom owner.

A quarry permit application must include the following information:

- 1) A person must apply to the Commissioner for the issue or renewal of a quarry permit.
- 2) A non-refundable fee of Vatu 2,500 must accompany any application for the issue or renewal of a quarry permit.
- 3) An applicant is a company, the full names, addresses and nationalities of the directors and details of where the company is registered.

The permit application requires the following site details:

- Details of the area to be covered by the permit which must not exceed 0.5 km<sup>2</sup> illustrated by a sketch plan, at a scale of not less than 1:2000, whose boundaries must be straight lines, and whose coordinates must be fully defined in a manner acceptable to the commissioner.
- An occupational and health safety management plan outlining the occupational health and safety risks that may occur, and the steps to be taken to manage those risks.
- Information on the number of persons to be employed, including citizens and non-citizens, and any employee training programs.
- An infrastructure plan, including expected requirements.

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- Information on the number of persons to be employed, including citizens and non-citizens, and any employee training programs.
  - An infrastructure plan, including expected requirements.
  - An environment management plan consistent with guidelines (if any) determined by the Minister setting out:
    - The environment risks which may occur and the steps to be taken to reduce or manage those risks.
    - The measures to deal with overburden, water runoff and topsoil management.
    - A proposed rehabilitation plan for ongoing rehabilitation and rehabilitation of the site after relinquishment.
  - Details of the building minerals to be extracted, including an estimate of the quantity in m<sup>3</sup> to be extracted, and the building materials to be made and the proposed program of work including information on blasting and drilling operations, transport, and the frequency, type and mode of spillage protection.
  - The term for which the permit is required.
  - Copy of the signed contract between the applicant and the custom owner of the land and the lawful occupier of the land (if different to the custom owners) approving the quarry.
- 4) The Commissioner may, by notice served on the applicant, require further information in respect of the application as the Commissioner considers relevant or necessary. The applicant must comply with the notice.
  - 5) The Commissioner must not issue or renew any permit unless a copy of the application has been exhibited for a period of not less than 30 days at the headquarters of the area council of the local government council responsible for the land which is the subject of the application.

The fee payable for a quarry permit is Vatu 50,000 per year payable annually in advance to the Commissioner.

As part of permitting requirements, Contractors will need to include provision for quarry specific plans including environmental management, health and safety and rehabilitation.

### Restoration of Land

Unless the Commissioner otherwise specifies, the quarry permit holder must remove, within 60 days after the expiry or relinquishment of the permit, any camp, temporary buildings or machinery erected or installed by the permit holder and make safe the area covered by the permit, to the satisfaction of the Commissioner.

The permit area is to be rehabilitated to the level specified in the permit or, if this is not specified, the level determined by the Commissioner in consultation with the custom owners of the land.

#### 3.1.4 Lands Acts (2009) and New Land Laws (2014)

The Vanuatu land system is administered through numerous Lands Acts and the newly amended / introduced New Land Acts, as of the end of 2013 and those recently Gazetted in June 2014, that govern land administration in Vanuatu. They comprise comprehensive laws and provide for custom land management, land reform, customary land tribunals and land leases.

Under the Customary Land Management (Amendment) Act, a land tribunal is presently being held over the custom ownership at Malarua Quarry, the only basalt quarry in Vanuatu. This is the first pilot tribunal and is being held in March 2015. Section 2.3.3.1.1 describes some detail regarding this dispute. Previously during the quarry's operation between 2009 and 2010, custom owner royalties for the natural resources at the site went to three land occupiers and not the Emua tribe who are alleged to be the custom owner. The pilot tribunal seeks to establish the custom owners prior to the quarry being re-established and designation of any further royalties for natural resources.

#### 3.1.5 Other Legislation

Other national legislation that may have implications on the project includes:

- **Civil Aviation Laws of Vanuatu** – The Civil Aviation Authority of Vanuatu (CAAV) discharges its duties and responsibilities in accordance with Civil Aviation laws of Vanuatu CAP 258 and the specific operating rules, satisfying the Vanuatu Government policy and ICAO standards and requirement. All VAIP works at VLI would be required to be in line with the CAAV safety requirements and this will be monitored by AVL.

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- **Public Health Act (1994)** – This Public Health Act prescribes rules relative, among other things, prevention of nuisance, prevention of poisoning by food, prevention of mosquitoes and vermin, water supply, waste disposal and waste water discharge and control of baby food.
- **International Trade (Fauna and Flora) Act (1991)** – This International Trade (Fauna and Flora) Act deals specifically with the importation and exportation of species that are found in Vanuatu and other countries for trading purposes.
- **The Wild Bird Protection Regulation (1962)** – This Wild Bird Protection Regulation protects a number of wild birds in Vanuatu by setting controls on their hunting and prohibiting their sale or export.
- **Forestry Act (2006)** – The Forestry Act makes provision for the protection, development and sustainable management of forests and the regulation of the forestry industry in Vanuatu, and for related purposes.
- **Fisheries Act (2006)** – This Fisheries Act makes provisions for the management, development and regulation of fisheries within Vanuatu waters, and for the regulation of Vanuatu fishing vessels outside of Vanuatu waters in a manner consistent with Vanuatu's international obligations, and for related matters.
- **National Parks Act (2006)** – The National Parks Act makes provisions for the declaration of national parks and nature reserves, for the protection and preservation of such areas.

### 3.2 Regional Requirements

The regional authority is PVMC, they do not have any regulations or by-laws regarding noise or operating hours and days.

PVMC operate the only landfill on Efate, Bouffa Landfill (refer to Section 2.3.4.4). This landfill accepts only general waste and septic tank waste; the landfill does not have capacity to accept hazardous waste (e.g. ACM, chemicals or hydrocarbons).

### 3.3 International Obligations

Vanuatu is also a signatory to a number of international agreements. Listed below are some of the more applicable agreements to the type of activities of the VAIP. This list is not exhaustive.

- Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Waste and to Control the Transboundary Movement and Management of Hazardous Waste within the South Pacific region. (Adopted at Waigani in 1995, but has yet to ratify).
- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (Adopted at Noumea, New Caledonia on 24 November 1986), this also includes:
  - Protocol concerning Cooperation in Combating Pollution Emergencies in the South Pacific Region.
  - Protocol for the Prevention of Pollution of the South Pacific Region by Dumping.
- Agreement Establishing the South Pacific Regional Environment Program (SPREP Convention).
- Stockholm Convention on Persistent Organic Pollutants (Adopted at Stockholm on 21 May 2002)

There are also a number of international standards and operating procedures that the airport operations must comply with (e.g. ICAO and CAANZ).

As no landfill sites in Vanuatu accept hazardous waste and any generated during the project will need to be exported, the Waigani Convention and Basel Convention are particularly relevant and will need to be adhered to in preparing hazardous substances (e.g. waste oil, lubricants, articles containing polychlorinated biphenyls or asbestos) for shipping and final disposal at acceptable and licensed waste facilities. The conventions outline the necessary information required for documents (notification and movement) and agreements that need to be in place with the receiving territory.

### 3.4 World Bank Policy

The PAIP VLI is a category B project under WB environmental and social screening guidelines and requires development of the project specific ESMP. Due to the nature of the project it is expected that environmental impacts will be site specific, few if any are irreversible, and mitigation measures can be readily designed and

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implemented. In accordance with the WB Operational Policy 4.01 Environmental Assessment this ESMP includes information on mitigation, monitoring, capacity development and training, and implementation costs. The ESMP outlines the potential environmental impacts and the measures needed to prevent, minimise, mitigate or compensate for adverse impacts and improve environmental performance of the project.

The ESMP is a dynamic document which must be updated as consultation and detailed designs of the project components are finalised to ensure currently unanticipated impacts and revised mitigation measures are addressed. Effective implementation of the ESMP is a requirement of the funding agencies and local legislation so monitoring is an integral component of implementation. A Monitoring Plan is included in Section 9 (and Appendix B) of this ESMP. This ESMP is to form part of the bidding documents for contract(s) awarded under the VAIP and will form the basis of the Contractor's ESMP.

All works completed for the VAIP project should be completed in compliance with the Environmental and Social Safeguard Instruments for Pacific Island Countries (World Bank, October, 2014) and the IFC Environmental, Health, and Safety Guidelines (2007)<sup>2</sup>.

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<sup>2</sup> International Finance Corporation, 30 April 2007. Environmental, Health, and Safety General Guidelines, <http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

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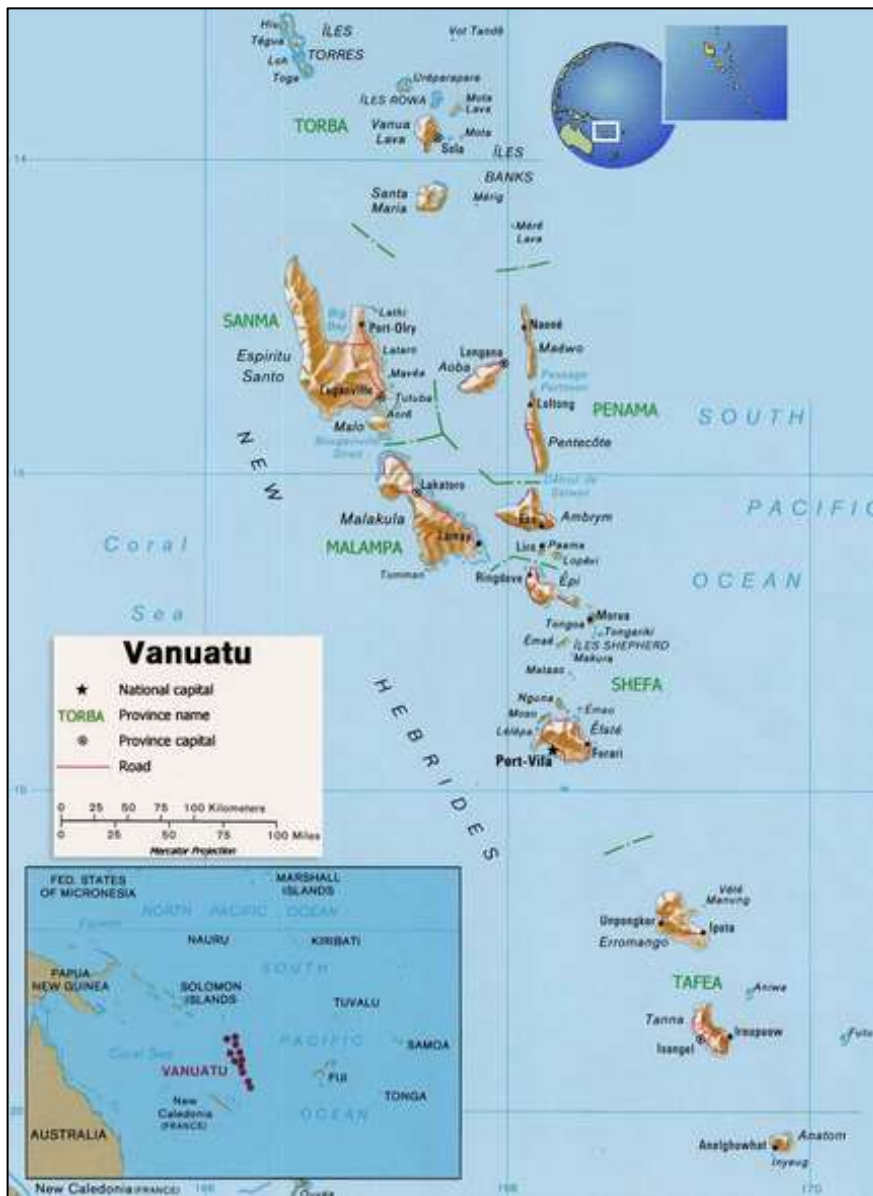
**4.0 Environmental and Social Environment**

**4.1 Physical Environment**

**4.1.1 Location and Geography**

Vanuatu, officially the Republic of Vanuatu is an archipelago island nation located in the South Pacific Ocean and consists of 83 islands dispersed over 1,300 km (refer Figure 5). The island group is of volcanic origin and lies 1,750 km east of northern Australia. Port Vila is situated on the south coast of the island Efate, Vanuatu’s third largest island. The land area is approximately 12,336 km<sup>2</sup>.

**Figure 5 Location Plan of Vanuatu showing Port Vila on Efate**



Source: Geographic Guide Oceania, <http://www.geographicguide.com/oceania-maps/vanuatu.htm>

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Vanuatu’s exclusive economic zone (EEZ) extends some 827,891 km<sup>2</sup> as illustrated on Figure 6 by the red circle. The EEZ is an area of coastal water and seabed, to which the country claims exclusive rights for fishing, drilling and other economic activities.

**Figure 6 Vanuatu's Exclusive Economic Zone**



Source: Australian National University, <http://asiapacific.anu.edu.au/maponline/base-maps/pacific-eez-zones>

VLI is located in a lowland area on the south side of Efate (refer to Figure 7), approximately 6 km north of Port Vila, Vanuatu’s capital and largest and most populated city. The centre of Efate consists largely of inhabited, forested, mountains; Mount Macdonald located to the north-west is the highest point on Efate and is 647 m above mean sea level. Approximately 73% of Vanuatu is forested. The majority of the population live in the lowland coastal areas.

**Figure 7 Location of Bauerfield International Airport on Efate**





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Source: Google Earth 2015, Imagery date 7 December 2014.

## 4.1.2 Climate

Being an equatorial country, Vanuatu has relatively uniform temperature throughout the year. The country has two distinct seasons – a warm wet season from November to April and a cooler dry season from May to October. Across Vanuatu the annual average temperatures are between 23.5–27.5°C. Port Vila has an average annual temperature of 25 °C with August averaging at 23 °C. Changes in the temperature from season to season are strongly tied to changes in the surrounding ocean temperature. Rainfall in Vanuatu is affected by the South Pacific Convergence Zone. On the windward side of Efate, annual rainfall is measured from 2400 and 3000 mm and is almost half that amount on the leeward side<sup>3</sup>.

Mountains also play a role in the variations in rainfall across some islands. During the wet season, rainfall is particularly high on the windward (south-east) side of the mountain ranges of the bigger islands, and scarce on the leeward (north-west) sides, especially during the dry season. Vanuatu's climate varies considerably from year to year due to the El Niño Southern Oscillation. This is a climate pattern that occurs across the tropical Pacific Ocean and affects weather around the world. There are two extreme phases of the El Niño-Southern Oscillation: El Niño and La Niña. There is also a neutral phase. In both Port Vila and Aneityum El Niño events tend to bring drier conditions as well as a late start to the wet season and cooler than normal dry seasons. The opposite occurs during La Niña events<sup>4</sup>.

## 4.1.3 Soil and Geology

The geology of Efate comprises of three rock formations that make up the island. The oldest geology is the Efate Pumice Formation, a Pliocene-Pleistocene series of submarine pumice tuff and breccias that generally occur in the central part of the island. The pumice formation is overlain in north Efate by Pleistocene Basalt Volcanic Formation. These two older formations have been overlain by limestone terraces, which make up the Late Pleistocene to Recent Reef Limestone Formation. It has extensive outcrop totalling nearly 500 m<sup>2</sup> on Efate and near shore islands<sup>5</sup>.

## 4.1.4 Water Resources

In Vanuatu, both ground and surface water is utilised for domestic potable purposes. In urban areas, the main water sources are shallow aquifers whereas in rural areas various sources are used such as bores, wells, springs, rivers and rainwater catchments. All rural supplies are donor-funded and designed and delivered by either the drilling section or rural water supply operated and managed by the local community. A reticulated urban water supply is provided by a private company (UNELCO) in Port Vila. UNELCO obtain their water supply from both river (Tagabe River, west of Port Vila) and groundwater sources, including a bore located less than 100 m south of VLI.

In Port Vila the groundwater aquifer is under increasing pressure from housing, agriculture and other developments. Groundwater quality in the urban centre of Port Vila is generally good with only calcium hardness to note. The UNELCO water supply currently does not require treatment other than chlorination; however the aquifer level is thought to be decreasing while pumping demands are increasing<sup>6</sup>.

VLI sources its water supply from the reticulated UNELCO network.

## 4.1.5 Land Use around VLI

The land to the north and east of VLI is dominated by cattle grazing farmland and a residential settlement with some commercial/industrial activity located to the south. To the west is La Colle River beyond which are sparse residential properties amongst scrubland and farmland. The airport is located approximately 22 m above mean sea level and the topography at VLI is relatively flat. To the north of VLI, the topography inclines to undulating hills approximately 1 km away.

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<sup>3</sup> Ministry of Infrastructure and Public Utilities, Vanuatu Government Meteorological Services, <http://www.meteo.gov.vu/climate/VanuatuClimate/tabid/196/Default.aspx>

<sup>4</sup> Australian Government Pacific Climate Change Science, [http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/15\\_PCCSP\\_Vanuatu\\_8pp.pdf](http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/15_PCCSP_Vanuatu_8pp.pdf)

<sup>5</sup> South Pacific Applied Geoscience Commission, Technical Report on Geological and Geo-Technical Assessment of the Quoin Hill Volcanic Rocks, Efate, Vanuatu, as a Potential Aggregates Source, June 2005.

<sup>6</sup> SOPAC, Pacific Water. <http://www.pacificwater.org/pages.cfm/country-information/vanuatu.html>  
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## 4.2 Biological Environment

### 4.2.1 Marine Biodiversity

Vanuatu's 200 nautical mile EEZ is extensive and encompasses mangrove, sea grass, lagoon and coral habitats. Therefore, marine biodiversity is an important national consideration. Vanuatu's two towns and many villages are close to the coast. Fish, shellfish, crabs and other marine animals have become important components of subsistence diets and valuable economic commodities. There has been intensive subsistence and commercial land use in coastal areas of many islands and most national infrastructure (roads, ports, electricity supplies, airports, hospitals etc.) is located on the relatively flat coastal plains. These areas are vulnerable to cyclones and tidal waves. Mangroves, sea grass and other coastal ecosystems provide protective buffers that shelter land and human settlements from the full impacts of these storm events<sup>7</sup>.

Freshwater fish restricted to Vanuatu include the gobies. Endemic marine fish include the Sharpnosed Coralbrotula, a flounder, and a duckbill eel<sup>8</sup>. Many marine animals such as crabs, sea cucumbers and turtles are vulnerable due to over exploitation. The increasing human population and more advanced fishing methods causes negative impacts biodiversity.

VLI is approximately 2 km inland from the coast therefore it is not expected that the VAIP construction activities will have any effect on the marine or coastal environments.

### 4.2.2 Terrestrial Biodiversity

Vanuatu's islands are young in geological terms, small and highly disturbed as a result of natural cyclones, seismic and volcanic activity, and as a consequence Vanuatu's biodiversity is less rich than that of the two nearest countries (New Caledonia and the Solomon Islands). There are threats which impact Vanuatu's terrestrial biodiversity and these include over exploitation of many plant and animal resources, degradation of ecosystems due to development practices, and declining respect for traditional resource management systems and authority structures.

Vanuatu is included in the Vanuatu Rain Forests terrestrial ecoregion and the East Melanesian Islands biodiversity hotspot.

There are nine species of bird endemic to Vanuatu (Vanuatu Petrel, Vanuatu Imperial-pigeon, Tanna Fruit-dove, Vanuatu Kingfisher, Vanuatu Honeyeater, Yellow-fronted White-eye, Royal Parrotfinch, and Santo Mountain Starling, and Buff-bellied Monarch). There are two mammals unique to the country (Vanuatu Flying Fox and Banks Flying Fox) and nine reptiles (Toupeed Skink *Emoia sanfordi*, Vanuatu Coppery Vine Skink, Anatom Tree Skink, Erronan Tree Skink, Vanuatu Snake-eyed Skink, Vanuatu Saw-tailed Gecko, Vanuatu Forest Gecko, Vanuatu Ant-nest Gecko, and Vanuatu Yellow-lipped Sea Snake). A rich endemic land mollusc fauna includes a slug and several snails. Other endemic invertebrates include a freshwater snail, a new tree-climbing mangrove crab of the, a starfish, a bryozoan, and a crinoid. Invertebrates known solely from Vanuatu include two species of butterflies, a hawk moth, a damselfly, two species of bees, a parasitic wasp, two katydids, several cricket species, a termite, a lace bug, a checkered beetle, a mayfly, a scorpion and a millipede<sup>4</sup>.

There are a number of endemic plant species in Vanuatu which include several palms, orchids, kauri, and yams.

### 4.2.3 Conservation Areas on Efate

Parks and Sanctuaries on Efate include the Efate Land Management Area, an initiative established by the Efate Vaturisu Council of Chiefs to protect the natural, cultural and historical resources of Efate for future generations. Other areas include the Nguna-Pele Marine Protected Area Network on Nguna and Pele (islands on the north coast of Efate), and the Hideaway Marine Sanctuary at Hideaway Island, Mele (10 km north-west of Port Vila).

The Vanuatu National Biodiversity Strategy and Action Plan Project, NBCS identifies locations of places and habitats of conservation significance on Efate, they are as follows:

- Bat caves.
- Mangroves – identified as been vulnerable as they have been damaged / degraded by human impacts.

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<sup>7</sup> Ministry of Land and Natural Resources, Mine and Rural Water Supply, November 1999. Vanuatu National Biodiversity Strategy and Action Plan Project – National Biodiversity Conservation Strategy.

<sup>8</sup> Living National Treasures, <http://Intreasures.com/vanuatu.html>

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- Rivers – identified as been vulnerable as they have been damaged / degraded by human impacts.
- Creek Al (west coast)

The NBCS also identified places on Efate that are vulnerable because they have been damaged or degraded due to human impacts, they include mangroves, rivers, sea grass beds, low-land forest ecosystems and the coastline at Mele Bay and Samoa Point due to sand mining.

The area in which the airport is located is a farmland area on the periphery of a settlement, there are no specified conservation areas within the vicinity of VLI. However, the NBCS identifies all rivers on Efate as important and vulnerable. La Colle River is located approximately 100 m to the west of VLI and unnamed watercourses are also located to the north and south of the site.

### 4.2.4 Rare or Endangered Species

The 2008 International Union for Conservation of Nature (IUCN) Red List identified a total of nine species in Vanuatu which are threatened, of which seven are endemic to Vanuatu. The nine species and their red list categories are listed below:

- Akihito Vanuatu (fish species) – least concern.
- Vanuatu Starling – vulnerable.
- Vanuatu Imperial Pigeon – vulnerable.
- Vanuatu Silver Vine Skink – least concern.
- Vanuatu Thicket Bird – near threatened.
- Vanuatu Scrub Fowl – vulnerable.
- Vanuatu Saw Tailed Gecko – data deficient.
- Vanuatu Kingfisher – near threatened.
- Vanuatu White Eye (bird species) – least concern.

The IUCN regard the threatened status of animals and plants as one of the most useful signs for assessing the condition of an ecosystem and its biodiversity. The IUCN Red List of Threatened Species™ (IUCN Red List) is widely recognized as the most comprehensive, apolitical approach for assessing and monitoring the status of biodiversity.

Two species of giant clam appear to have become extinct in most of their range in Vanuatu. 'Namalau' (Megapodes) are rare in heavily populated areas but remain common in remote locations. The coconut crab is rare in many areas and populations of several over-exploited marine resources are locally at risk.

Populations of black flying fox have declined in many of the islands. Over collecting or hunting is a common cause for the decline of many of the species, but so too is the degradation of habitats. Without proper management these natural resources could further decline, or become extinct as has happened elsewhere in the Pacific region.

## 4.3 Socio-Economic Conditions

### 4.3.1 Population and Demographics

According to the results of the 2009 Census the population of Vanuatu was 234,023 and there were 7,373 households. The population of Efate is 66,000 with 44,040 living in Port Vila. The growth rate between 1999 and 2009 was 2.3% per annum. Approximately 80% of the population live in rural areas.

### 4.3.2 Education and Health

School attendance is compulsory up until the age of seven years. However, from the age of six, rates of attendance are low as school fees are often a barrier. School attendance in Vanuatu is the lowest in the Pacific. Port Vila is home to a campus of the University of the South Pacific, an educational institution co-owned by 12 Pacific countries. The campus in Port Vila, known as the Emalus Campus, houses the university's law school<sup>9</sup>.

<sup>9</sup> International Council for Open and Distance Education, [www.icde.org](http://www.icde.org)  
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The average life expectancy in Vanuatu is 71 years. The Ministry of Health is responsible for the four provincial hospitals. One of two major hospitals is located in Port Vila. In Vanuatu there are 30 health centres and 97 active dispensaries providing inpatient and outpatient care, preventative medicine and primary care around the islands<sup>10</sup>.

### 4.3.3 Livelihoods and Economic Activities

Vanuatu's economy is primarily agricultural, whereby 80% of the population is engaged in agricultural activities that range from subsistence farming to smallholder farming of coconuts and other crops. Copra (dried kernel or meat of the coconut from which coconut oil is expressed) is the most important cash crop, making up more than 35% of the country's exports, followed by timber, beef and cocoa. Copra, cocoa, kava and beef account for more than 60% of Vanuatu's total exports by value. Agriculture accounts for 20% of the gross domestic product (GDP).

Tourism is Vanuatu's fastest growing sector, tourism and travel makes a significant contribution to Vanuatu's economy representing about 23.2% of GDP in 2013. Tourist arrivals have been steadily increasing, recording around 330'000 visitors in 2013. A quarter of these tourists arrive by air<sup>11</sup>. In 2013, tourism and travel services directly engaged 12,500 workers representing around 18.2% of total employment. The direct contribution of travel and tourism to GDP is expected to grow by 4.3% per annum to 25% by 2024<sup>12</sup>.

The average household income in Vanuatu is approximately 60,700 vatu. The average income in Port Vila is 93,400 vatu.

### 4.3.4 Land Tenure and Rights

In 1980 the country declared its independence. The indigenous people are the custom owners of all land in Vanuatu and the government cannot take it away under any circumstance. By definition, custom owners are any lineage, family, clan, tribe or other group who are recognised by the rules of custom, following the custom of the area in which the land is situated, as the perpetual owners of that land and, in those custom areas where an individual person is regarded by custom as able to own custom land, such individual person. For the most part, the ni-Vanuatu people are agreeable in leasing their real estate to investors as it means they have an income on their land.

The Vanuatu land system is administered through numerous Lands Acts and the newly amended / introduced New Land Acts, as of the end of 2013 and those recently Gazetted in June 2014, that govern land administration in Vanuatu. They comprise comprehensive laws and provide for custom land management, land reform, customary land tribunals and land leases.

Land issues are sensitive and are governed by comprehensive legislative processes. Land in Vanuatu may not be sold, but may be leased or sub-leased. All land can be leased for up to 75 year periods and there are no restrictions of foreign ownership of property other than land. Leases are common in Vanuatu and may be made between the custom owners and individuals, organisations or companies.

AVL are the leaseholders of the VLI land. It is understood that the land on which VLI resides is owned by four custom owners. Any infrastructure changes or upgrade works proposed at VLI would require permission from the leaseholders only and not the custom owners.

It should be noted that under Vanuatu law, any quarrying of natural resources by leaseholders is subject to quarry royalty payments to custom owners.

The WB's policy on indigenous peoples (Operational Policy (OP) 4.10) is only triggered in the Pacific where all of the following four defining characteristics are present:

- a) Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others.
- b) Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources therein.
- c) Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture.
- d) An indigenous language, often different from the official language of the country or region

<sup>10</sup> Commonwealth Health Online, [www.commonwealthhealth.org/pacific/vanuatu](http://www.commonwealthhealth.org/pacific/vanuatu)

<sup>11</sup> Statistics from Vanuatu Hotels and Resorts Association.

<sup>12</sup> World Travel and Tourism Council. 2013. Travel and Tourism. Economic Impact 2014 Vanuatu, <http://www.wttc.org/focus/research-for-action/economic-impact-analysis/country-reports/>

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Projects situated in Vanuatu would not be expected to trigger OP 4.10 as only characteristic (b) is relevant.

## 4.4 Projected Climate Changes and Impacts

The Pacific Climate Change Science Program (PCCSP) (part of the International Climate Change Adaptation Initiative) conducts critical climate research and capacity building in Pacific Island countries. Information regarding climate change projections was obtained from the BoM and CSIRO (2011) Climate Change in the Pacific: Scientific Assessment and New Research (Vol. 2: Country Reports) produced by the Pacific Climate Change Science Program<sup>13</sup>.

Vanuatu, like many other Pacific nations are already experiencing the effects of increased temperatures and rising sea level. Sea level (measured by satellite altimeters and tide gauges) has risen in Vanuatu by 6 mm per year since 1993. This is larger than the global average of 2.8 to 3.6 mm per year. Sea level does fluctuate year to year and decade to decade due to El Niño-Southern Oscillation. Annual maximum and minimum temperatures have increased in Port Vila since 1950; at VLI, maximum temperatures have increased at a rate of 0.17°C per decade. Data since 1950 for Port Vila show a decreasing trend in wet season rainfall, however, there are no clear trends in annual and dry season rainfall here. Over this period, there has been substantial variation in rainfall from year to year<sup>14</sup>.

Climate change projections for 2030, 2055 and 2090 (relative to 1990) were reviewed. The PCCSP report (as identified above) reviewed a number of climate projection models to determine the most plausible representations of future climate in the Pacific under the three emission scenarios developed by the Intergovernmental Panel on Climate Change (IPCC). The three emission scenarios are: low, medium and high for time periods around 2030, 2055 and 2090.

Table 1 presents the projected changes in annual average air temperature and sea level for Vanuatu for the three emission scenarios and the three time horizons.

**Table 1 Air temperature and sea level rise projections for the three emission scenarios and three time periods**

Annual Average Air Temperature Projection				Sea Level Rise Projection			
Values represent 90% of the range of the models and changes are relative to the average of the period 1980-1999.							
	2030 (°C)	2055 (°C)	2090 (°C)		2030 (cm)	2055 (cm)	2090 (cm)
Low emissions scenario	0.2–1.0	0.5–1.5	0.7–2.1	Low emissions scenario	5–16	10–27	17–47
Medium emissions scenario	0.3–1.1	0.8–2.0	1.3–3.1	Medium emissions scenario	5–16	8–31	20–59
High emissions scenario	0.4–1.0	1.1–1.7	2.0–3.2	High emissions scenario	3–17	7–31	21–63

The PCCSP make the following climate change predictions for Vanuatu:

- Increases in temperatures.
- More very hot days – increases in average temperatures will also result in a rise in the number of hot days and warm nights and a decline in cooler weather.
- Changing rainfall patterns – projections generally suggest a decrease in dry season rainfall and an increase in wet season rainfall over the course of the 21st century.
- More extreme rainfall days.
- Less frequent but more intense tropical cyclones.

<sup>13</sup> Australian Government, Pacific Climate Change Science, <http://www.pacificclimatechangescience.org/>

<sup>14</sup> Australian Government Pacific Climate Change Science, [http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/15\\_PCCSP\\_Vanuatu\\_8pp.pdf](http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/15_PCCSP_Vanuatu_8pp.pdf)

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The projected design life is 10 to 15 years for the runway. Therefore, the climate change projections for 2030 reflect the VAIP project most adequately. At VLI the majority of runoff from rain events goes to natural soakage and this does not have implications for localised flooding depending on impermeable surfaces and the ability of the rainfall to percolate into the ground. VLI is approximately 22 m above mean sea level and approximately 2 km from the coast. Therefore, it is unlikely that the predicted rises in sea level will have an effect on the airport operations or design parameters.

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## 5.0 Consultation and Stakeholder Engagement

### 5.1 Background and Approach

As required by WB Safeguards Policies consultation and disclosure of Category B projects must be undertaken with project affected groups (stakeholders) and non-government organisations (NGOs). The potential environmental and social impacts of the project require the opportunity for discussion and review during the environmental assessment/ ESMP process to inform detailed design and mitigation measures. This ESMP will remain a draft until public disclosure and consultation has been completed. This will allow for the ESMP to be updated with details of consultation and disclosure as and when this is completed. Disclosure and consultation will be the responsibility of VPMU through their nominated Consultant, Henry Vira.

### 5.2 Outcomes of Consultation to Date

Institutional stakeholders in safeguards compliance are the implementing agency (MIPU), VPMU, AVL and the Department of Geology, Mines and Water (Mines and Minerals Section). Local stakeholders are the communities surrounding the Government owned buffer zones around the airports and airport concessionaires. Consultation with stakeholders commenced on 11 March and is ongoing.

Broader public consultation was originally scheduled at the National Council of Chief's Nakamal in Port Vila on Tuesday 17 March 2015. An announcement for the public consultation was sent out between 11 and 12 March 2015. Cyclone Pam impacted Vanuatu on 13 March creating widespread damage and disruption. Accordingly, the consultation was not able to proceed as planned. This consultation has been rescheduled between Sunday 5 April and Saturday 11 April 2015.

This ESMP will be revised subsequent to the rescheduled public consultations. The final ESMP will include more detailed provisions for public disclosure and consultations during project implementation, including for communities near the quarry sites and along the transport route for materials.

Initial in-country disclosure (considering the post-Cyclone Pam circumstances) will involve provision of documents at the AVL offices together with direct discussions with airport concessionaires where possible. Subsequent iterations of the ESMP (and the Contractors ESMP) will be disclosed prior to works commencing.

Stakeholders will continue to be consulted at other times during implementation (for example to announce the start of works or to advise of traffic management plans during the construction phase). Neighbouring communities will be made aware through these media of the procedure for registering any complaints or grievances in relation to the project. Where the airport Master Plan process has the potential to impact on communities outside the airports, these communities, with representatives of both men and women groups, will be engaged in a meaningful way in the master plan process.

Smaller scale consultation meeting (focus groups) will also be held with the following governmental and NGO stakeholders:

- Mele village community (closest community to the VLI)
- Bladinier Estate Members (including women)
- Department of Women's Affairs (focus group discussion)
- Airports Vanuatu Limited staff members
- Department of Environment staff members

This ESMP will be revised subsequent to the rescheduled public consultations. The final will include more detailed provisions for public disclosure and consultations during project implementation, including for communities near the quarry sites and along the transport route for materials.

### 5.3 Disclosure

Disclosure does not equate to consultation (and vice versa) as disclosure is about transparency and accountability through release of information about the project. A copy of this draft ESMP should be made available on the WB Infoshop and GoV websites and hard copies available at GoV offices (most applicable and accessible), VPMU office in Port Vila, AVL office at VLI, and community centres on Efate.

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## 5.4 Sensitive Receptors

Mele village and the settlement directly south of the airport are located just south and south-west of VLI. Homes, schools (including pre-schools), churches, and hospitals are categorised as sensitive receptors where people can be more susceptible to the adverse effects of exposure, like to traffic (safety) or noise. Sensitive receptors do not usually include places of business or public open space. Specific consultation should be undertaken with the Mele community and the settlement directly south of the airport before and during construction activities to ensure impacts are minimised and community safety is ensured. This is particularly important for the transport of materials and equipment from the port to the construction camp. Mitigation measures may include construction works or transport during specific hours which do not impact school hours or specific traffic (includes pedestrian) safety management like flag controls and route diversions.

## 5.5 Resettlement Policy Framework

Prior to any quarries or off-airport construction camp sites being selected for the VAIP project, public consultation will be completed with any affected parties relating to each quarry site, whether it is an operating, re-opening or new quarry site. Should it be identified that additional land, for example a new quarry site or short term use of farmland is required for the VAIP project, the requirements of the Resettlement Policy Framework (RPF) presented in Appendix D will need to be implemented.

No involuntary resettlement will take place until after the WB has approved the relevant Resettlement Action Plan (RAP) / Abbreviated Resettlement Action Plan (ARAP) and no construction related activities with involuntary resettlement impacts will take place until satisfactory implementation of the RAP/ARAP.



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## 6.0 Environmental and Social Impacts

### 6.1 Overview of Impacts

The VAIP VLI scope is to rehabilitate the existing runway and upgrade the existing navigation aids. At this stage, new land acquisition is not anticipated (pending satisfactory resolution of a quarry land ownership dispute (as discussed in Section 2.3.3) and identification of a suitable construction camp site within the airport boundary) and the project is unlikely to cause any major negative environmental or social impacts as the work is providing maintenance to and improving existing infrastructure. The social outcomes of the VAIP VLI are expected to be positive by improving safety, accessibility and mobility of island communities.

### 6.2 Environmental Impacts

#### 6.2.1 Solid Waste

Scarification, replacement of unsuitable pavement material, replacement of lighting and air navigation aids will lead to the generation of excess soil and demolition waste. Efate is getting to terms with their waste management and has an approved, licensed landfill, Bouffa Landfill, located to the east of Port Vila. PVMC manages the landfill which is licensed to receive general waste and septic tank waste only. Material will also be generated from the excavations associated with the runway pavement rehabilitation, concrete pads for air navigational aids and cable trenches. Most of the raw material can either be used to backfill areas where old equipment or infrastructure has been removed or as a resource (e.g. crushed asphalt and basecourse material) for general use by AVL or PWD and the community. The asphalt works will also generate asphalt drums for disposal. The Contractor's ESMP should confirm whether used (empty) asphalt drums may be returned to the supplier or crushed and disposed of to landfill.

#### 6.2.2 Water Resources

Freshwater will be required for workers and some construction activities (e.g. dust suppression and concrete and bitumen production). The impact on current water supply could be major if not properly mitigated through good resource planning. The source of water supply for the VAIP project has yet to be confirmed, however the following water resource options are to be considered:

- Rainwater harvesting – it rains throughout the year therefore this is the most sustainable and preferred option.
- Use of local river supply – this would require an assessment of suitability as a resource and a permit under the Water Resources Management Act.
- Use of shallow groundwater – local groundwater is utilised as a potable supply and this is a finite resource therefore this is not a preferred option. This would also require a permit under the Water Resources Management Act.
- UNELCO private reticulated supply – this option is likely the most costly option.

Water efficiency, conservation and reclamation practices will be adopted; another option is use of an osmosis plant for non-potable water purification or a mobile desalination plant.

#### 6.2.3 Biological Resources

The VAIP VLI will rehabilitate and upgrade the existing infrastructure. The airport land is defined by a secure perimeter fence designed to exclude animals and prevent access by people. Most of the airport land is mown grass however there are areas of scrub in areas outside of the runway strip, these are potential locations for the construction camp and lay down areas. It is not anticipated that there will be any further loss of habitat or disturbance that is not short term (e.g. related to the construction phase). There is the possibility that in the process of construction works fauna (e.g. nesting birds) could be impacted or the temporary removal of vegetation (e.g. for construction lay down area) could impact on potential habitats. The habitats surrounding the runway are primarily open pasture land to the north, east and west and a settlement to the south. Mitigation measures will include liaison with the DEPC should any fauna (reptile, avian, or mammal) be encountered that affect construction activities (e.g. nesting bird).



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## 6.2.4 Hazardous Substances and Materials

Potential soil and water pollution from construction run-off with fuel and lubricants are expected to be temporary and minor. Work practices and mitigation measures for spills will be implemented, including a spill response plan and bunded areas for storage (for all project locations during construction and operation phase).

Should any hazardous waste be produced during the works, it would be required to be exported to a landfill in a country which is approved to accept such waste.

Should an emergency event occur there is also potential for a discharge of hazardous substances to the environment or the use of fire retardants during firefighting. The spill response plan should include provisions for mitigating any adverse effects.

The domestic terminal building structure may be constructed of ACM. During the design works and construction phase planning works, consideration should be made to the exposure risks, management and disposal of this hazardous material. Once the design and scope of works has been established, the ESMP will be updated subsequently to reflect this.

## 6.2.5 Noise and Vibration

Noise and vibration disturbances are particularly likely during construction related to the transportation of construction materials from the quarries and operation of equipment (e.g. blasting and processing of aggregate in quarries, asphalt plant operation and milling of pavement surface). These impacts will be short-term and affect different people at different times. Impacts include noise during pavement resurfacing and possible effect of vibration caused by operation of heavy machinery, increased traffic in some sections of roads, etc. Noise and vibration is likely to be an ongoing issue throughout the construction stage and to a lesser degree the operational phase (e.g. aircraft landing and take-off). As the airport represents existing infrastructure any noise or vibration impacts are likely already being experienced by the local community.

## 6.2.6 Erosion and Sediment control

Some soil erosion may occur as a result of the removal of shrubs and earth cover during resurfacing, and restoration of pavement areas and drainage. The impacts on vegetative cover will be short-term and reversible through natural regeneration. There is only a thin topsoil layer in most parts and runoff is easily filtered into the underlying groundwater table. Where topsoil is required to be cleared this will be set aside for use in restoration of disturbed areas.

Sediment has the potential to be generated during any excavations. The confirmed areas of disturbance and volumes of material which is likely to be disturbed has yet to be confirmed by the design consultant, T&T. The main areas of disturbance will be the main runway, particularly 600 m of the south-west section where the rehabilitation works are proposed. Other areas include the remaining 2 km of runway where resurfacing is proposed, the apron areas and turning bays. Excavation will also be required for the navigational aids (concrete pads and cable trenches) and details of these excavations have yet to be defined as these components are also at the concept design stage.

## 6.2.7 Air Emissions and Odours

Air pollution can arise due to improper maintenance of equipment, dust generation and the bitumen smoke / fumes arising from application of the new pavement seal and maintenance work. Impacts are expected to be localised and short term with only minor negative impact on the ambient air quality in the vicinity of the construction areas. Consideration should be made as to where noisy and odorous equipment should be placed in relation to sensitive receptors, if located away from communities, the social impacts should be minimal.

No ongoing impact to air quality is expected as this is rehabilitation of existing infrastructure.

## 6.2.8 Traffic and Airport Operations

Traffic impacts will occur in transporting equipment and materials from the port and quarries. These impacts will mostly be short-term and through good mitigation and traffic management the impacts should be low. The Contractor is responsible for developing and implementing a Traffic Management Plan (TMP). The TMP will need to consider pedestrian traffic as well as vehicle traffic management, and particular attention will need to be given to management near sensitive receptors (schools, residential dwellings, markets, churches etc.). Upon completion of the construction phase of works, traffic and road safety impacts caused by the VAIP VLI should cease.

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The MOWP will specify safety measures required for the operation of the airport when construction work is underway. The MOWP includes instruction on airfield operational distances, foreign object debris (FOD) protection, airfield security, and responsibility hierarchy and communication methods.

### 6.2.9 Wastewater Discharges

Sanitary facilities for workers will be provided to prevent water bodies or other areas being used. Specification of sanitary facilities will be at the advice of AVL.

Uncontrolled wastewater (e.g. sewage, grey water, wash water, water containing fire retardants used during emergency activities) discharges have the potential to contaminate soil, water and spread disease. Wash water from equipment can be contaminated with hydrocarbons (e.g. oil and fuel) which have a detrimental effect on aquatic life, water quality and soil quality. There are also human health impacts regarding hydrocarbon exposure which vary in severity depending on type and length of exposure. Wash water from concrete processing and cutting is highly alkaline and can burn vegetation, result in fish kills and also cause burns to the skin. Sediment loads in wash water if allowed to discharge to either marine or freshwater systems can also adversely impact aquatic life and water quality. While the potential impacts of uncontrolled discharges of wastewater can adversely affect the receiving environment, they can be easily mitigated through planning and implementation of mitigation measures (as outlined in Section 7.8).

### 6.2.10 Quarry and Aggregate Supply

Potential adverse impacts from uncontrolled quarrying or mining are high and include all of the above listed impacts, namely:

- Air emissions – machinery and dust.
- Noise and vibration – machinery and blasting (if used).
- Water – consumption, hydrology (changes to site drainage patterns and groundwater), wastewater, and contamination.
- Waste – overburden, by-products and contaminated waste material.
- Land conversion – loss of habitat and agricultural land.

Only licensed quarry operations will be used to source suitable aggregate (Malarua (basalt) and Orangorango (coronous) quarries are recommended). The potential quarry sources identified in Sections 2.3.3.1.1 and 2.3.3.1.2 are either currently operating as a quarry or have been utilised as a quarry in the recent past so land conversion has already taken place. Impacts of quarrying are not limited to the location of the quarry but can extend along the delivery route. Noise, dust, and traffic (vehicle and pedestrian) safety are primary concerns for the transport of materials from the quarry site. Depending on the quarry sites selected to supply the required aggregate, a more detailed assessment of impacts will be completed by the Contractor in their ESMP along with mitigation measure suitable for the location and activities within the quarry. Malarua Quarry is located approximately 700 m from the coast and it is unlikely that it will impact the coastal and marine environment, but it should be managed in accordance with international standard practice. Consideration and planning should also be implemented on quarry rehabilitation following the completion of the works.

### 6.2.11 Biosecurity

Some equipment is most likely going to be required to be imported which can harbour plant and animal species which may pose a threat to Vanuatu's biodiversity and ecosystems.

### 6.2.12 Impacts on Cultural Property

The Vanuatu Cultural and Historical Sites Survey (now known as the Vanuatu National Heritage Registry) were established in 1990 and were initially funded by the European Union. Their main role is to identify and conduct surveys on sites of cultural, historical and archaeological importance in the country, especially those sites that were exposed to development projects that could have substantial detrimental effects to the sites. Should any areas of potential cultural importance or artefacts be identified during the VAIP project, works should stop and the Vanuatu National Heritage Registry and the Ministry of Land and Natural Resources (MLNR) should be contacted. No work should continue until approval has been sought from the above-mentioned agencies.

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## 6.2.13 Secondary and Cumulative Impacts

Secondary and cumulative impacts tend to be triggered by impacts to environmental resources that function as integral parts of a larger system over time and space, and can initially be 'invisible' to the normal present time impact assessment. Secondary impacts can include land use changes due to improved accessibility which in turn can impact habitats and pressure on existing resources and utilities (e.g. water supply). Secondary and cumulative impacts also often cannot be managed solely by the project executors (MIPU/VPMU). Town planning (e.g. restricting development and clearing of land) and conservation are two examples of external influences which can assist in reducing secondary and cumulative impacts.

Secondary and cumulative impacts are not always negative, positive impacts include increased business and supply chain opportunities due to improved infrastructure and accessibility, improved access to health and education facilities and employment (beyond the scope of the project).

The airport is existing infrastructure which has existing impacts (e.g. noise and dust generation). In most cases the VAIP will not be able to remedy these impacts however the designs can lessen and in some cases mitigate some of the impacts.

## 6.2.14 Coastal and Marine Environment Impacts

A number of activities may have the potential to have minor impacts on the aquatic environment in nearby waterways, including uncontrolled discharges (e.g. stormwater, wastewater, spills). Albeit unlikely, minor impacts may include reduced water quality and loss of aquatic life due to pollution.

## 6.3 Social Impacts

Social implications with the regard to safeguarding sensitive receptors such and the community to the south of VLI and communities on the haul routes will be addressed through the public consultation process throughout the life of the project. Furthermore, should the project require new land e.g. a new quarry site or temporary use of farmland, the requirements of the RPF, presented in Appendix D, will be triggered.

### 6.3.1 Health and Safety

During construction and operation health and safety is to be managed through a Site Specific Safety Management Plan (to be developed by the contractors for their respective works) and application of international environmental and health and safety (EHS) standards (WB/IFC EHS Guidelines). The Contractors health and safety documentation should incorporate all aspects of the project including the airport site, quarries and transport routes.

The primary hazards identified are construction works involving hot bituminous products (up to 165 °C), and working in extreme ambient temperatures.

Trenches for the air navigational aids are not expected to exceed 1.2 m however batter slopes or shoring may be required to stabilise the sides of the trenches. Exposed trenches pose a risk to the community and airport operations therefore trenches will be progressively filled as the cable ducts are laid. At any one time the maximum length of exposed trench shall be 30 m. Exposed trenches shall be secured at night to prevent access by non-authorised personnel.

### 6.3.2 Business Impacts

During the construction phase there is the potential for minor impacts on airport concessionaires and other small businesses in the airport vicinity. These impacts would be limited to noise, dust and traffic from construction activities and will be of limited duration. Standard good practice construction management will mitigate these potential impacts to an acceptable level. All potentially affected businesses will be included in the consultation process.

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### 7.0 Mitigation Measures

Due to the nature of the rehabilitation activities proposed there are some mitigation measures which are applicable to all aspects of the project, while others that are specific to particular components. Sensitive receptors and environmental values have been identified around the airport site which will require specific mitigation measures for safety and environmental protection. The mitigation measures are outlined in Appendix A. The mitigation tables detail the impact or issue, the mitigation required, where this is to occur, when this mitigation is to be applied, estimated costs, implementation responsibility and supervision responsibility.

This ESMP should be included in all bidding documents and form the basis of the Contractors' ESMP which will detail implementation of the mitigation measures identified in this ESMP. The ESMPs are dynamic documents which should be updated to include any variation from the current scope or addition of newly identified impacts and mitigation measures that may arise through the bidding and contracting process (if not addressed in the Contractor's ESMP) or consultation. The mitigation measures associated with the impacts identified above are detailed below.

#### 7.1 Aggregate, Materials and Equipment Importation

Aggregate will ideally be sourced from existing quarry sites on Efate (Malarua Quarry and Orangorango Quarry have been recommended as the most suitable). Once the suitable quarries are confirmed, the Contractor and MIPU is responsible for reviewing site operations to ensure that the operation is legal and approved for supply of aggregate (under Vanuatu law). The Contractor will have a choice as to which quarry source to use and how the quarry operation is to be set up (e.g. operated by the VAIP Contractor or a local quarry operator). If the contractor uses a local operator, they are responsible for reviewing operating license/permits and any conditions of operation which may have been imposed to ensure the operation is legal and that the contractor's work complies with any transport or purchase requirements. If the VAIP Contractor is to operate the quarry (or part of) themselves they are responsible for securing the necessary operating permits and completing environmental assessments. An EIA and quarry management plan may be required to support any permit application. As a minimum the contractor should adopt the IFC Environmental, Health and Safety Guidelines for Construction Materials Extraction. Key mitigation measures from this document are outlined below. Permitting requirements will need Contractors to include provision for quarry specific plans including environmental management, health and safety and rehabilitation.

Dust is a major issue at quarry sites and can travel some distance and affect a large number of people if not properly managed. As stated in Section 2.3.3.1.1 the nearest settlement to Malarua Quarry is Emua village located less than 1 km east of the quarry and the settlement to the south of VLI is the closest (over 1 km) to Orangorango Quarry. Dust should be managed using the same measures as identified in Appendix A along with use of linear layout for materials handling to reduce the need for loading and unloading and vehicle movements around the site. The Contractor's ESMP should include a provision for quarry dust and noise control; all equipment including crushers, aggregate processors, generators etc. should / if possible, be located in the quarry pit to minimize noise and dust emissions. Use closed/covered trucks for transportation of construction materials. When locating operations consideration should be given to prevailing wind conditions.

Water is significant resource in quarry activities and where possible closed circuit systems should be implemented for treatment and re-use in site activities and processes (e.g. washing plants). There is no water supply to Malarua Quarry; water would need to be brought to site via tanker. There is water supply to the Orangorango Quarry although its source is unconfirmed; the source would be declared and approved by the quarry permitting system. Orangorango Quarry has an established closed water circuit implemented at present. It is preferable that Malarua Quarry also implement a closed circuit water management cycle that will allow for treatment of wastewater contaminated with sediment (through settlement ponds) and collection of wastewater contaminated with hydrocarbons for treatment through an oil water separator.

In order to minimise site waste, careful planning and understanding of product quality is required. Overburden by-product should be stockpiled for use in rehabilitation of the quarry site at a later date.

Other mitigation measures that have been identified for the project as a whole (refer to Appendix A) are also applicable to the quarry site if managed by the VAIP pavement Contractor. For example chance find of archaeological artefacts or loss of biodiversity, damage to assets and infrastructure, erosion and sediment control measures (e.g. clean water diversion), wastewater treatment, noise and vibration mitigation etc.

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The transport of material from the quarry will need to be managed through a Traffic Management Plan which identifies the route, maximum load limits, required transport permits and required measures to reduce dust and spillages. Mitigation measures provided in Appendix A include covering of loads, refused delivery of overloaded trucks, transport during off peak times and route identification which uses existing less trafficked roads. The Contractor should also include provision for noise and speed control in their ESMP; this can include prohibiting the use of engine braking for noise reduction, speed control measures in and near settlements (e.g. introduction of speed bumps), and regulating working hours for the haul trucks.

## 7.2 Hazardous Substance Use, Storage and Disposal

Hazardous liquids (e.g. fuel and lubricants) must be managed within hardstand and bunded areas to prevent runoff to surrounding permeable ground. Bunded areas (secondary containment) must contain the larger of 110% of the largest tank or 25% of the combined volumes in areas with a total storage volume equal or greater than 1,000 L. Bunded areas are to be impervious (water tight), constructed from chemically resistant material, and be sheltered from the rain as rain water allowed to collect within the bund could be contaminated if there is any hazardous substance residue on storage containers or spilt product within the bund. A spill response plan must be in place and all workers trained in correct implementation of the spill response plan. Spill kits should be available in close proximity to where hazardous substances are used and stored e.g. on the work truck or beside the fuel store.

The bitumen and asphalt plant (including dust scrubber) should be located at the construction lay down area or quarry to contain potential environmental impacts. The location of the construction lay down area should be such that residential settlements are not impacted by dust, noise or runoff.

There is potential that hydrocarbon product or contamination may be encountered during construction work. A photoionization detector (PID) should be available to monitor the worker breathing zone. Parts per million (ppm) concentrations of volatile organic compounds (VOCs) should be used to quantify the potential risk to workers. If the breathing zone concentration exceeds 5 ppm, workers should move to an upwind location until vapours clear. If any soil staining is observed or odour experienced a sample of the affected soil material should be collected and measured using the PID. If the PID returns readings greater than 10 ppm the material should be treated as contaminated fill. Depending on the volume of material it may be appropriate to excavate the affected soils and prepare for transport to a facility licensed to accept hazardous waste. Material should be secured in airtight containers for transport (as per Waigani Convention requirements for the trans-boundary movement of hazardous waste material).

The domestic terminal building structure may be constructed of ACM. During the design works and construction phase planning works, consideration should be made to the exposure risks, management and disposal of this hazardous material. Once the design and scope of works has been established, the ESMP will be updated subsequently to reflect this.

## 7.3 Safety and Traffic Management

The airport is protected by a patrolled perimeter security fence. It is likely that all works, including the construction lay down area will occur within this fence. Security clearance will be required for all airside construction workers. Airside construction works will be managed through the MOWP and AVL will be responsible for ensuring the safe operation of the airport at all times. The MOWP will detail the specific safety and security requirements for the airport operations, including safe operating distances and responsibility of key project roles.

The transport of materials has the potential to impact communities through noise, dust and road safety. The Contractors are responsible for developing a TMP which will specify how traffic (vehicle and pedestrian) will be managed, including transport times (outside peak hours), maximum speed and loads of trucks, use of flag controls at site entrances (construction lay down area) and around specific work areas.

## 7.4 Stormwater and Water Management

### 7.4.1 Stormwater Management

AVL confirmed that at least annually, localised flooding occurs on the southern perimeter of the runway. A large open unsealed stormwater drain is located in this area but on these occasions, it is unable to cope with the volume of surface run-off which is generated by flash flooding. This is also a likely contributing factor to the current poor state of the south-western section of the runway pavement.

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Stormwater drains are located on the northern and southern perimeter of the runway and these converge with La Colle River to the west of the site. There are also two drains that travel southwards from the airfield to an unnamed watercourse south of VLI. During construction, clean water diversion bunds will be used to direct any runoff from undisturbed areas away from work areas, stockpiles and storage areas. The diversion bunds will direct this clean water to land for soakage or to the established open stormwater drains located on site. Soakage pits should not be installed directly into a shallow aquifer.

## 7.4.2 Water Management

Water required for construction activities such as dust suppression and concrete production will need to be managed carefully so as not to impact on the island's freshwater supply or the airport's needs for ARFF. Where possible rain water should be collected or non-potable water should be used, provided there will be no risk of contamination of groundwater.

There are no groundwater bores located at VLI, ARFF collect rainwater in an above ground tank and utilise the reticulated supply as do the terminal and administration buildings. Two potable bores are however located within 100 m of VLI (estimated down and across hydraulic gradient). Due to the proximity of these bores, it is recommended that the Contractor communicates with the bore owners and MLNR to ascertain whether groundwater monitoring is required to be completed prior to construction works commence, during construction works and at completion of all construction works; this would be to confirm that no there has been no contamination of groundwater as a result of the works. The parameters that should be monitored include pH, electrical conductivity, total petroleum hydrocarbons (for potential petroleum contamination), and total nitrogen (for potential sewage contamination), or as agreed with MLNR and MIPU.

## 7.5 Bitumen, Asphalt and Concrete Plant

Bitumen and asphalt production requires very high temperatures which pose a significant risk to workers and the general public. While a full scale bitumen and asphalt plant is not required all bitumen product should be located within a secure compound (the construction lay down area or quarry) to ensure security and reduce risk of unauthorised access. Prior to the establishment of the asphalt plant, consideration should be made on where the asphalt plant is to be located. Although the use of this machinery will be short-term (2-3 months), it can create nuisances such as noise and a mercaptan odour. The bitumen and asphalt plant should be located at least 300 to 500 m downwind of any settlements or inhabited areas and 150 m away from any water bodies, streams or rivers. The asphalt plant should be equipped with either bag house or wet scrubber particulate removing system to reduce dust and odour emissions. The Contractor should include a bitumen and asphalt plant rehabilitation plan in their ESMP documentation. Other hazardous materials may be used in preparing the seal coats for the pavement which must be stored on hard stand areas within bunded areas (both should be available at the construction lay down area or quarry).

The project may require concrete production for the air navigational aids and runway. There is a concrete production plant operated by Pierre Brunet Contractors located directly south-east of VLI, this would be the preferred source for concrete. However, if concrete is to be constructed in-situ, care needs to be taken with slurry and runoff from the concrete. Concrete production should only take place when there is no rain forecast. Concrete slurry is highly alkali and cannot be diluted. Sand bags or diversion drains must be used to divert runoff from concrete cutting or setting areas. Any concrete debris must be collected and disposed of as a hazardous substance and removed to an authorised landfill (abroad). Wastewater from concrete cutting or production must be collected and treated (settling and neutralisation through pH adjustment). All equipment used in concrete production must be cleaned in designated wash down areas in the construction camp, away from surface water and not be allowed to permeate to ground.

## 7.6 Construction Camp

The construction lay down area will be used to store equipment and materials for all components of the project, and as such there are a number of potential hazards associated with the equipment and materials. The construction lay down area will most likely be within the airport perimeter fence however additional fencing may be required around specific stores (e.g. hazardous substances) to prevent access by unauthorised personnel. Areas within the compound must be clearly marked for solid waste collection, machinery maintenance, hazardous substance storage, plant operations (concrete, bitumen, asphalt) and toilet facilities for workers. Each of these areas must be constructed in such a way to prevent any potential adverse impacts on the surrounding environment; ideally it should be located to the north or east side of VLI away from the surface water bodies and

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community. Including hard stand areas, protection from wind and rain, bunding (hazardous substances), clean water diversion drains, and collection and treatment of waste water from site operations (e.g. concrete production, machinery maintenance). The construction lay down area is not a residential camp. Foreign contract and project staff will utilise existing local accommodation. The ground of the construction lay down area will likely be compacted by the end of its use and so restoration will require scarification of the soil, application of topsoil and re-vegetation.

### 7.7 Erosion and Sediment Control

The land within the vicinity of VLI is relatively flat, low lying with permeable soils. Wet weather is usually experienced as short, heavy rainfall events, often in the morning or at night. Clean water diversion bunds should be constructed around any excavation to prevent ingress of runoff from surrounding areas. Any ponding which may occur within an excavated area shall either be allowed to percolate into the subsoil or pumped out to a settling area or used for dust suppression at a later date. Excavations should be kept to a manageable size to reduce the time of exposure. It is most likely that the largest stockpiles will be within the construction camp for the aggregate. These stockpiles will need to be on an impermeable geotextile or hardstand and runoff directed to permeable land. The aggregate material will be inert larger size pieces. Stockpiles of any fine grain materials (e.g. sand and topsoil) must be covered to prevent dust and sediment laden runoff during rain events.

These erosion and sediment control measures must also be applied to the quarry sites, especially Malarua Quarry. Discharges from any activity at these locations are prohibited from discharging directly to the marine and coastal environment. Clean runoff should be diverted inland for percolation to underlying groundwater, and potentially contaminated runoff should be collected and treated. Treatment will be dependent on type of potential contamination (e.g. oil water separator for runoff contaminated with hydrocarbons, or settling pond or tank for sediment laden runoff).

### 7.8 Waste Water Management

There are a number of activities during construction and operation phases of the project which will generate wastewater. During construction wastewater will be generated by the sanitation facilities provided for workers and as there is no reticulated wastewater treatment system on Efate, the contractor is responsible for the collection and treatment of the generated wastewater from sanitation facilities. There are a number of options regarding sewage treatment that the contractor can implement to mitigate the potential impacts on the land and or water (ocean or groundwater). These include using a waste removal contractor (e.g. Thompson Septic Contractors) to remove the waste to Bouffa Landfill, use of composting systems or a mobile proprietary treatment system (to be imported for the project). The Contractor is responsible for ensuring the treatment and disposal of wastewater is in accordance with MIPU, DEPC and AVL advice and approved by MIPU.

Wastewater from wash down areas is to be collected either in a settlement pond or tank to allow sediment and particulate matter to drop out (or processed through a filtration system) before the water can be reused as wash water, dust suppression or in other processes. A separate wash down area is required for machinery or material with oil or fuel residue as this wash water is required to be treated through a mobile oil water separator. Wash water from concrete production, cutting, washing of equipment used and areas where concrete is produced must be collected and treated to lower the pH (closer to neutral) and to allow settlement of suspended solids (see Section 7.5). All wash down areas and wastewater treatment areas, where practical should be located within the construction camp or lay down areas.

Treated wash water where possible should be reused for dust suppression or within other processes. Direct discharge to the river, marine or coastal environment or to the water reserve protection area is prohibited. Discharges of treated wash water are to occur to land only (outside the water reserve catchment area). For Malarua Quarry, sufficient measures to avoid direct discharges are required when working adjacent to the marine and coastal environment, particularly for the runway resurfacing component, which may include bunding (e.g. sand bags), demarcation of exclusion zones, and limited use of large machinery.

Precautions should be in place to prevent wastewater and hazardous substances or materials entering the environment (e.g. fuel spillage, wastewater containing fire retardant during firefighting), however should an incident occur, the Contractor must have a spill response plan must be in place. The response plan should include details on the use of spill kits and absorbent items to prevent spills entering the receiving sensitive environment (ground, surface water). This spill response plan should be applicable to all VAIP project works areas (airport,

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quarries, and transport routes). A spill response plan should be in place for both the construction phase and operational phase.

The VLI fuel farm is a hard stand area with bunding to contain all stored hazardous substances; any drainage from these areas is transported to a soak pit. Wastewater from this soak pit is removed by Thomson Septic Contractors. In the case of a contained spill at VLI, with AVL permission, wastewater could be disposed of in this soak pit.

### 7.9 Solid Waste Management

Bouffa Landfill is the only authorised landfill on Efate and is operated by PVMC. This landfill only accepts general waste and septic tank waste. The Contractor is responsible for coordinating with MIPU regarding the removal of hazardous waste abroad. Waste streams able to be re-used or recycled are to be done by licensed operators able to provide this service. Some waste can be re-used within the project however excess re-usable or recyclable waste will be provided to the PWD or nominated receiver. In summary, the type of waste expected to be generated is:

- Excess rubble (asphalt or base course) generated from milling of the runway surface and excavations – the PWD can recycle this on road patch works.
- Used asphalt drums from the asphalt production works – Contractor's ESMP should confirm whether these can be returned to the supplier or crushed and disposed of to landfill.
- Green waste from clearing the area for the construction camp – can potentially be composted.
- Packaging materials from imported supplies – can go to Bouffa Landfill.
- ACM, waste oil, lubricants etc. – have to be exported to countries that have facilities approved to accept such waste.
- Wastewater from sanitary facilities (dependent on system used) – can go to Bouffa Landfill.

Any waste that cannot be disposed of at the Bouffa Landfill, reused or recycled must be removed from the island at the completion of the project. International waste conventions (e.g. Waigani, Basel and Stockholm conventions) may apply depending on the type of waste that is to be transported across country boundaries.

### 7.10 Socio-Economic Measures

Any impacts or concerns from communities close to VLI, the quarries or haul routes will be addressed throughout the VAIP project life through the disclosure and public consultation process (refer Section 5). Furthermore should the project require the use of and new land e.g. a new quarry site or temporary use of farmland, the requirements of the RPF, presented in Appendix D, will be triggered.

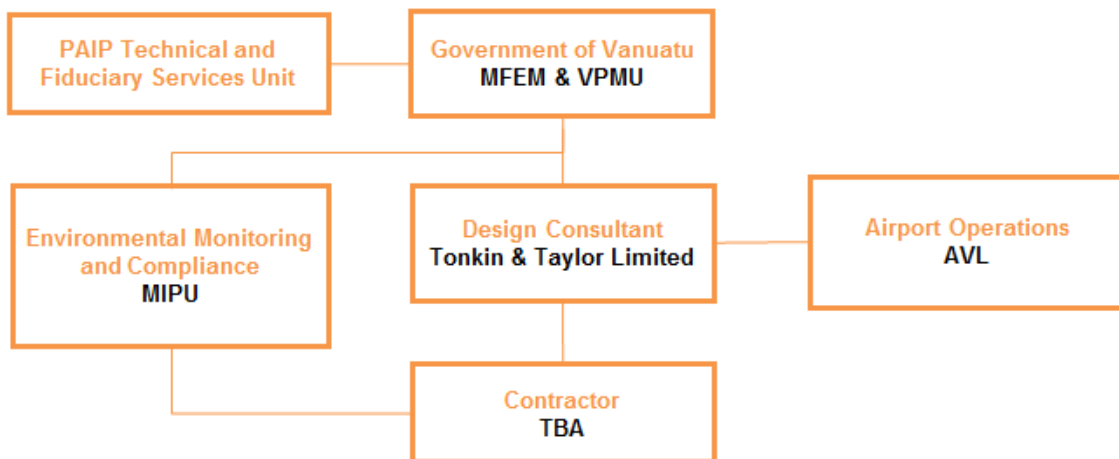


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## 8.0 Roles and Responsibilities

The VPMU under the Ministry of Finance and Economic Management (MFEM) are responsible for delivery of the VAIP project (including all components), funding received and contracts awarded under the VAIP. TFSU is the Implementing Agency in regards to funding received from donors including the WB. The VPMU will undertake the day to day management of the project. Aspects of the monitoring required by the ESMP will be undertaken by MIPU. The implementation of this ESMP is the responsibility of the Contractors awarded contracts under the VAIP. The Figure 8 below shows the reporting and responsibilities for this ESMP. The MIPU has a statutory responsibility to respond to pollution complaints, and ensuring impacts are managed as per the ESMP. There will also be ongoing airport operational monitoring requirements of AVL.

Figure 8 Reporting and Responsibilities for ESMP



### 8.1 Institutional Capacity

It is likely that the MIPU and AVL will require environmental awareness training for monitoring the Contractors. Personnel from the MIPU (PWD) and AVL will work alongside the Contractor and Supervision Consultant to capacity build and gain a better understanding of the airport upgrade and rehabilitation work and also the technical equipment being installed; they should also be informed on the ongoing maintenance requirements.

A training budget must be put aside to enable this capacity building with the GoV departments. There may also be an opportunity for an Officer from the MIPU to work with the Contractor and Supervision Consultant’s environmental officer.

It should be confirmed whether noise meters are required to be included within this budget. The cost of one meter has been included in the indicative training budget for the VAIP project as shown in Table 2. Furthermore, new x-ray machines for passenger baggage and cargo screening are proposed for VLI and SON, however confirmation is required as to whether these airports have equipment for monitoring of the x-ray machines. Costs for ongoing monitoring of x-ray equipment have been included in Table 2 but are provisional based on whether x-ray equipment is actually installed.

Table 2 Indicative Training Budget for VAIP Project

Training Budget Components	Cost
Training for Contractors, MIPU and AVL personnel (onsite training in Vanuatu)	US\$ 50,000
Procurement of one noise meter for monitoring (plus duty and delivery)	US\$ 1,000
Miscellaneous (e.g. other GoV department participation)	US\$ 4,000
Operational monitoring of x-ray equipment (annual cost)	US\$ 2,000
<b>TOTAL Budget</b>	<b>US\$ 57,000</b>

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## 8.2 Grievance Redress Mechanism

The availability of redress, and information about how to access it, will be publicly disclosed in Public Information Bulletins for the media, and during consultations with the public. The Grievance Mechanism will offer remedies appropriate to the scale of the grievance.

Minor project-related grievances will in the first instance be addressed to the contractor who will manage these in accordance with its complaints management system. As a second point, complainants will be able to submit their complaint to the implementing agency (VPMU through the MIPU). If these avenues are unsuccessful, or if the matter is substantive, the case may be referred to legal proceedings in accordance with Vanuatu laws and procedures.

Communities and individuals who believe that they are adversely affected by a WB supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns.

Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures.

Complaints may be submitted at any time after concerns have been brought directly to the WB's attention, and WB Management has been given an opportunity to respond.

For information on how to submit complaints to the World Bank's corporate GRS, please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).

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## 9.0 Compliance and Monitoring Plan

### 9.1 Monitoring Plan

The ESMP identifies the environmental and social monitoring requirements to ensure that all the mitigation measures identified in this ESMP are implemented effectively. Environmental and social monitoring methodology (refer Appendix B) for this project includes:

- Audit of detailed designs.
- Audit and approval of site environmental planning documents.
- Consultations with communities and other stakeholders as required.
- Routine site inspection of construction works to confirm or otherwise the implementation and effectiveness of required environmental mitigation measures (refer to inspection checklist in Appendix C).

Non-compliance to environmental mitigation measures identified in the ESMP will be advised to the Contractor(s) in writing by MIPU's nominated Environmental Officer as required. The non-compliance notification will identify the problem, including the actions the Contractor needs to take and a time frame for implementing the corrective action.

### 9.2 Monitoring Plan Reporting

Throughout the construction period, the Supervision Consultant will include results of the ESMP monitoring in a monthly report for submission to the MIPU who is responsible for submitting these monthly progress reports to the PAIP TFSU. The format of the monthly report shall be agreed with all agencies but is recommended to include the following aspects:

- Description and results of environmental monitoring activities undertaken during the month.
- Status of implementation of relevant environmental mitigation measures pertaining to the works.
- Key environmental problems encountered and actions taken to rectify problems.
- Summary of non-compliance notifications issued to the Contractor during the month.
- Summary of environmental complaints received and actions taken.
- Key environmental issues to be addressed in the coming month.

A day to day contract diary is to be maintained pertaining to administration of the contract, request forms and orders given to the Contractors, and any other information which may at a later date be of assistance in resolving queries which may arise concerning execution of works. This day to day contract diary is to include any environmental events that may arise in the course of the day, including incidents and response, complaints and inspections completed.

During airport operations the VLI Managers will include an environmental management section as part of their normal reporting to MIPU. The environmental management section shall include an analysis of the operation monitoring programme, any environmental issues arising and recommendations (including cost estimates as required) for further action.

MIPU / VPMU are also responsible for quarterly progress reports to the WB. This quarterly progress report will include a section on environmental compliance and issues. This section will cover (as a minimum) the overall compliance with implementation of the ESMP, any environmental issues arising as a result of project works and how these issues will be remedied or mitigated, and the schedule for completion of project works.

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### 10.0 Contingency Planning

It is recommended that the Contractors prepare a Contingency Plan encompassing tsunami, cyclone and storm events. The purpose of the Plan is to ensure all staff are fully aware of their responsibilities in respect to human safety and environmental risk reduction. Procedures should clearly delineate the roles and responsibilities of staff; define the functions to be performed by them, the process to be followed in the performance of these functions including tools and equipment to be kept in readiness, and an emergency medical plan. All of the Contractor's staff should undergo training/induction to the Plan.

The wet season in Vanuatu is usually November to April which coincides with the cyclone season. Construction activities should be limited to the dry season (May to October) however storm and rain events can still occur during this period causing flooding and bringing high winds.

The Contractors are responsible for monitoring weather forecasts, inspecting all erosion and sediment control measures and undertaking any remedial works required prior to the forecast rain or storm event.

In general the Contractors will:

- Inspect daily weather patterns to anticipate periods of risk and be prepared to undertake remedial works on erosion and sediment control measures to suit the climatic conditions.
- Monitor the effectiveness of such measures after storms and incorporate improvements where possible in accordance with best management practice.
- Ensure appropriate resources are available to deal with the installation of additional controls as and when needed.
- Inform MIPU if there are any concerns associated with the measures in place.

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Appendix A

# Mitigation Measures

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POTENTIAL NEGATIVE IMPACT	ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES	IMPLEMENTING LOCATION	ESTIMATED MITIGATION COSTS <sup>15</sup>	EXECUTING AGENCY	SUPERVISING AGENCY
<b>DETAILED DESIGN/ PRE-CONSTRUCTION MOBILISATION STAGE</b>					
Road traffic safety	<p>Provide for Traffic Management Plan (TMP) to be developed by Contractor, to include signage, flag operators, personnel protective equipment (e.g. high visibility vest), and specific actions (e.g. regulating working hours for haul trucks, installation of speed bumps and prohibition of engine braking) to be implemented around sensitive receptors (e.g. residential dwellings, schools, hospital). TMP to include vehicle and pedestrian traffic.</p> <p>Include transport of materials and equipment to construction lay down area (likely to be located at the airport) in the TMP e.g. covering of loads, maximum speed, designated travel times and notification of police and other required departments (e.g. hospital and schools).</p>	From port to airport (delivery of equipment) To and from the construction lay down area and the quarries	Minimal (requirement of bidding documents)	Design Consultant and Contractors	Ministry of Infrastructure & Public Utilities (MIPU)
Aviation traffic safety	Each investment within an operational airport is to have a Methods of Works Plan (MOWP) which is to be included in all bid and contract documents. The Contractor is to develop a Safety Management Plan as an addendum to the MOWP. The MOWP will include details of site works scheduling around known flight timetables and procedures for emergency response for all workers.	Operational airports	Minimal (requirement of bidding documents and standard construction practices)	Design Consultant	Airports Vanuatu Limited (AVL) / MIPU
Soil erosion	<p>Minimize erosion and design erosion protection measures according to international good practice standards, including incorporation of effective drainage systems (soakage pits) and consideration of surface flow paths.</p> <p>Preferred time to schedule earthworks and construction activities is during dry season (May to October).</p>	All locations	Minimal (part of standard design practices)	Design Consultant	MIPU

<sup>15</sup> Costs are estimates only and will be calculated during the detailed engineering design.

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Dust / Odours / Air Pollution	<p>Identify and locate waste disposal sites, stockpile sites and equipment (e.g. bitumen plant) at least 300 to 500 m downwind of any settlements or inhabited areas and 150 m away from any water bodies, streams or rivers, to minimize impacts on the environment and nearby population.</p> <p>The Contractor's ESMP should include a provision for quarry dust and noise control; all equipment including crushers, aggregate processors, generators etc. should / if possible, be located in the quarry pit to minimize noise and dust emissions.</p> <p>Ensure all equipment is serviced and issued with warrant of fitness (as required). Any machinery deemed to be polluting the air must be replaced (or fixed) on instruction by the MIPU.</p>	Construction lay down area	Minimal (part of standard design practices)	Design Consultant	MIPU

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Water and soil pollution	<p>Minimise risk to groundwater and surrounding soil by developing a spill response plan and provide training to all contract workers on how to implement the spill response plan. Precautions should be in place to prevent wastewater and hazardous substances or materials entering the environment (e.g. fuel spillage, wastewater containing fire retardant during firefighting), The spill response plan should include factors associated with both the construction and operational phases and should be available at all VAIP locations.</p> <p>Ensure bunded areas and hard stands are allocated at construction lay down area for the storage of fuel, lubricants and other potential substances required for the project. Water tight bunds to be able to contain 110% of volumes being stored or 25% if total volume greater than 1,000 L.</p> <p>Ensure wash down areas with respective collection and treatment systems are designated within the construction camp (e.g. settling pond or tank and concrete slurry treatment) prior to works commencing.</p> <p>Sanitation treatment system (e.g. removal of waste to landfill, compost or proprietary treatment system) is approved by the MIPU and AVL prior to implementation.</p> <p>If required by Ministry of Land and Natural Resources (MLNR) and bore owner, prior to any site establishment or construction activities sample groundwater at two specified potable bores within 100 m of VLI (to be coordinated with MLNR, owner and MIPU) to determine base line conditions. Measure depth to groundwater and analyse samples for concentrations of pH, electrical conductivity, total petroleum hydrocarbons (for potential petroleum contamination), and total nitrogen (for potential sewage contamination), or as agreed with MLNR and MIPU.</p>	All components	Minimal (part of standard design and construction practices)	Design Consultant	MIPU



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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Water and soil pollution	Soakage pits should not be installed directly into a shallow aquifer	All components	Minimal (part of standard design and construction practices)	Design Consultant	MIPU
Water supply	The Contractors will need to ensure adequate supply of water for construction and personnel which does not adversely affect local community's water supply (e.g. rainwater harvesting or reclamation, permitted use of river, or use of reticulated supply).	All components	Minimal (part of standard design practices)	Design Consultant and Contractors	MIPU
Sourcing aggregate material	<p>Ensure aggregate is sourced from approved/ permitted quarry sources and are operating in accordance with the Vanuatu law. Prior to any quarries being selected for the VAIP project, public consultation will be completed with any affected parties relating to each quarry site, whether it is an operating, re-opening or new quarry site. Should it be identified that a new quarry site will be required for the VAIP project, the requirements of the Resettlement Policy Framework (RPF) presented in Appendix D will need to be implemented.</p> <p>Permitting requirements will need Contractors to include provision for quarry specific plans including environmental management, health and safety and rehabilitation.</p>	All components	Minimal (part of standard design and construction practices)	Design Consultant	MIPU / Department of Geology, Mines & Rural Water (DGMRW)

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POTENTIAL NEGATIVE IMPACT	ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES	IMPLEMENTING LOCATION	ESTIMATED MITIGATION COSTS <sup>15</sup>	EXECUTING AGENCY	SUPERVISING AGENCY
Solid waste generation	<p>Allow for re-use of as much material as possible either within the VAIP, other projects, or for community use. Port Vila Municipality Council (PVMC) should be consulted for approval to receive material (at Bouffa Landfill) that cannot be recycled, reused or returned to the supplier.</p> <p>When planning the construction lay down area ensure temporary waste dump areas are allowed for and approved waste disposal sites / methodologies identified for removal of all solid waste.</p> <p>As early as possible in the pre-construction preparation phase suitable receiving waste facility(ies) should be identified (e.g. Bouffa Landfill or road patching material for MIPU) and agreements put in place to transport (trans-boundary) project hazardous waste from Vanuatu.</p>	All locations	Minimal (part of standard design and construction practices)	Design Consultant and Contractors	MIPU
Hazardous substances	<p>Where possible fuel shall be obtained from local commercially available sources. Prior arrangement regarding quantity and type will need to be organised (AVL / MIPU to provide details of providers).</p> <p>In all VAIP project locations, fuel should only be stored in designated areas that are designed to store and facilitate operations associated with it (e.g. re-fuelling).</p>	All locations	Minimal (part of mobilisation and construction planning)	Contractors	MIPU / AVL
Importation of equipment and materials	Obtain import permits and quarantine certification prior to export from country of origin. Certificate of fumigation required.	All components	Minimal (part of mobilisation and construction planning)	Contractor	MIPU

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POTENTIAL NEGATIVE IMPACT	ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES	IMPLEMENTING LOCATION	ESTIMATED MITIGATION COSTS <sup>15</sup>	EXECUTING AGENCY	SUPERVISING AGENCY
Community grievances	Ensure that public consultation and disclosure communication is completed at regular intervals to ensure that the public are fully aware of the proposed VAIP project. Consultation should include all aspects of the project including the airport site, quarries and transport routes.	All components	Minimal (part of mobilisation and construction planning)	VPMU Consultant	VPMU
Airport concessionaires / local business grievances	Ensure that local businesses and airport commissionaires are included in the public consultation and disclosure communication process. Regular communication should be made with affected parties to ensure that they are fully aware of the proposed program of works.	Airport	Minimal (part of mobilisation and construction planning)	VPMU Consultant	VPMU
<b>CONSTRUCTION STAGE</b>					
Traffic (vehicle and pedestrian) and construction safety	Implement the traffic management plan (TMP) to ensure smooth traffic flow and safety for workers, passing vehicles and pedestrian traffic.  Where appropriate, employ flag operators on the road to prevent traffic accidents. The workers shall have relevant safety equipment. The TMP should prohibit the use of engine breaking close to and through communities and inhabited areas, it should also regulate the working hours for the haul trucks.	Route from quarries and port to airport	Safety equipment included in construction cost	Construction Contractors	MIPU
Soil erosion	Minimise time and size of ground disturbing activities to workable size at any one time. Vegetation to be removed manually, strictly no use of herbicides/ pesticides.  Keep construction vehicles on defined tracks.  Re-vegetate disturbed areas that are not being paved as soon as practicable (loosen ground; apply topsoil; seed or plant as necessary).	All locations	Minimal (part of standard construction practice)	Construction Contractors	MIPU

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Waste disposal	<p>Ensure all construction waste material is re-used, recycled, returned to supplier, or packed up for transport to Bouffa Landfill or out of country depending on accepted waste streams at each facility.</p> <p>Ensure areas for waste collection, recycling and off-site disposal are clearly marked/sign posted. Segregate waste to avoid cross contamination, such as with contaminated material (hazardous substance).</p> <p>Install waste collection facilities at construction lay down area to allow for collection and packing of waste. Strictly no dumping of rubbish. Include awareness training in general environmental training.</p> <p>Workers must be provided with a sanitary system to prevent fouling of surrounding soils.</p>	All locations	Minimal (part of standard construction practice)	Construction Contractors	MIPU

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Water and soil pollution	<p>Hydrocarbons (lubricants / fuel) shall be collected and recycled, or disposed of according to Vanuatu regulations (removed from country).</p> <p>The VLI fuel farm is a hard stand area with bunding to contain all stored hazardous substances; any drainage from these areas is transported to a soak pit. Wastewater from this soak pit is removed by Thomson Septic Contractors. In the case of a contained spill at VLI, with AVL permission, wastewater could be disposed of in this soak pit.</p> <p>Spill response plan training completed for all construction workers. Precautions should be in place to prevent wastewater and hazardous substances / materials entering the environment (e.g. fuel spillage, wastewater containing fire retardant during firefighting), however should an incident occur, the Contractor must have a spill response plan must be in place. The response plan should include details on the use of spill kits and absorbent items to prevent spills entering the receiving sensitive environment (ground, surface water). This spill response plan should be applicable to all VAIP project works areas (airport, quarries, and transport routes). A spill response plan should be in place for both the construction phase and operational phase.</p> <p>Zones for preliminary accumulation of wastes are designated in areas that will cause no damage to the vegetation cover or leach into groundwater or surface water (e.g. within construction lay down area on hard surface).</p> <p>Excavations are bunded to prevent ingress of water runoff and clean water diversion (e.g. sand bags, clay bund, or shallow trenches) are used to direct overland flow away from active work and storage areas. Soakage pits should not be installed directly into a shallow aquifer.</p>	All locations	Minimal (part of standard construction practice)	Construction Contractors	MIPU

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Water and soil pollution	<p>Hydrocarbon impacted soil may be identified. Any material excavated which has a PID reading of 10 ppm shall be treated as contaminated fill and must be disposed of internationally at an approved facility able to handle contaminated fill.</p> <p>Sediment laden runoff from excavations or stockpiles must be directed to a settling area or collected for dust suppression provided the runoff is not contaminated with any chemicals (e.g. fuel).</p> <p>If required by MLNR and bore owner, during construction activities, sample groundwater at two specified potable bores within 100 m of VLI (to be coordinated with MLNR, owner and MIPU) to indicate whether construction activities have adversely affected groundwater quality. Measure depth to groundwater and analyse samples for concentrations of pH, electrical conductivity, total petroleum hydrocarbons (for potential petroleum contamination), and total nitrogen (for potential sewage contamination), or as agreed with MLNR and MIPU.</p>	All locations	Minimal (part of standard construction practice)	Construction Contractors	MIPU

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Generation of dust	<p>Use closed/covered trucks for transportation of construction materials. Any vehicle which is overloaded (exceed designed load limit) or is not covered properly shall be refused entry to the construction lay down area or material shall be refused delivery (if not to the construction lay down area).</p> <p>Cover stockpiles containing fine material (e.g. sand and topsoil) when not actively being used.</p> <p>Keep work areas clean with regular sweeping. Due to freshwater supply constraints large scale water sprinkling should be kept to a minimum and only as required.</p> <p>Only small areas should be cleared of vegetation at any one time and re-vegetation should occur as soon as practicable.</p> <p>Dust masks and personnel protective equipment must be available for workers during dust generating activities (e.g. pavement milling).</p>	All locations	Minimal (part of standard construction practice)	Construction Contractors	MIPU

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Noise and vibration disturbances	<p>Minimise nuisance from noise, especially closer to residential areas, through establishment and communication to affected parties of standard working hours (07:00 to 18:00, Monday to Friday) and avoid increase of noise and number of work equipment at peak hours. Try to schedule any noisy construction activities during normal working hours and avoid noisy work from 18:00 to 06:00 and during weekends and public holidays. If possible, use noise barriers / screens or mounds to shield sensitive receptors.</p> <p>It's likely that work at VLI will be completed at night, this will require approval by the AVL / MIPU and notice to affected peoples provided at least one week prior to out of schedule works starting. Work on Sunday is restricted and is likely to only be approved in emergency situations.</p> <p>Regularly check and maintain machinery, equipment and vehicle conditions to ensure appropriate use of mufflers, etc.</p> <p>Workers in the vicinity of sources of high noise shall wear necessary protection gear rated for the situation they are being used.</p> <p>Signage to outline complaints procedure and contact details of recipient of complaints (e.g. phone number, physical address and email).</p> <p>The WB/IFC EHS Guidelines<sup>16</sup> Section 1.7 – Noise Management shall be applied (if no local limits are prescribed). Noise impacts should not exceed the levels for industrial commercial activities for one hour LAeq of 70 dB at any point of the day or night. Alternatively noise impacts should not result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site (e.g. residential house).</p>	All locations	Minimal (part of standard construction practice)	Construction Contractors	MIPU / VMPU

<sup>16</sup> International Finance Corporation, Environmental Health and Safety Guidelines, General Guidelines: Noise Management



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POTENTIAL NEGATIVE IMPACT	ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES	IMPLEMENTING LOCATION	ESTIMATED MITIGATION COSTS <sup>15</sup>	EXECUTING AGENCY	SUPERVISING AGENCY
Accident risks/Impacts on traffic safety	<p>Arrange necessary measures for pedestrian and passer-by safety and all means of transportation safety (e.g. establish protection zones, by-pass these areas during transportation of materials, etc.)</p> <p>Relevant safety elements such as guardrails, road signs and delineators, pavement markings, barricades and beams, warning lights shall be installed. In some cases a flag operator or traffic control supervisor could be engaged around the specific work site.</p>	All locations	<p>Safety equipment included in construction cost</p> <p>Minimal (part of standard construction practice)</p>	Construction Contractors	MIPU
Loss of archaeological artefacts or sites	Work to stop in specific location of unearthed artefacts or site. Fence the area to limit access and notify Vanuatu National Heritage Registry, AVL and MLNR immediately for instruction to proceed.	All locations	No marginal cost	Construction Contractors	Vanuatu National Heritage Registry / AVL / MLNR
Landscape degradation	<p>Contractor to include provision for construction camp and lay down area rehabilitation following the completion of the construction phase.</p> <p>Restoration of quarries to be completed in accordance with quarry permit.</p> <p>Restoration of landscape after completion of rehabilitation works; restore the vegetation cover in accordance with the surrounding landscape and any required design (e.g. grass land or shrubs).</p> <p>Use plant species characteristic for the landscape in the course of restoration of the vegetation cover.</p>	All locations	Minimal (part of standard construction practice)	Construction Contractors	AVL / MIPU / DGMRW

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Hazardous substances and safety and pollution	<p>Store and handle hazardous substances in bunded, hard stand or designated areas only. Bunded areas to drain to an oil water separator which will need to be constructed or a mobile proprietary unit imported specifically for use on the VAIP. Bunds to contain 110% of total volume required to be stored or 25% of total volume if total volume is over 1,000 L.</p> <p>Provide hazard specific personnel protective equipment to workers directly involved in handling hazardous substances (e.g. chemical or heat resistant clothing, gloves).</p> <p>Complete list, including safety data sheets (SDS) for each hazardous substances stored or used shall be accessible at all times. Signage to be posted in storage areas identifying all chemicals present.</p> <p>Precautions should be in place to prevent wastewater and hazardous substances / materials entering the environment (e.g. fuel spillage, wastewater containing fire retardant during firefighting), however should an incident occur, the Contractor should must spill response plan must be in place. The response plan should include details on the use of spill kits and absorbent items to prevent spills entering the receiving sensitive environment (ground, surface water). This spill response plan should be applicable to all VAIP project works areas (airport, quarries, and transport routes). A spill response plan should be in place for both the construction phase and operational phase.</p> <p>Spill kits and training of use to be provided to all workers during toolbox meetings. Spill kits to contain PPE for the spill clean-up (e.g. appropriate gloves [nitrile] and overalls), material to contain the spill and absorbent pads, and a heavy duty rubbish bag to collect absorbent pads or material.</p> <p>Waste oil to be collected and removed abroad to an approved facility (for disposal or cleaning) at completion of works.</p>	All locations	<p>Safety equipment included in construction cost</p> <p>Minimal (part of standard construction practice)</p>	Construction Contractors	MIPU

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Loss of biodiversity	If during course of construction work, particularly vegetation clearance and excavations any bird, reptile or mammal species is identified as being potentially impacted (e.g. nesting bird in area of proposed vegetation clearance) work is to stop in the specific location of the find and the Department of Environmental Protection and Conservation (DEPC), MIPU and AVL notified immediately for instruction to proceed.	All locations	No marginal cost	Contractors	AVL / MIPU / DEPC

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Health and safety	<p>Prepare site specific safety plans specifying responsibilities and authorities. Health and safety documentation to include all areas of the project (e.g. airport, quarries and transport routes). Ensure all occupational health and safety requirements are in place on construction sites and in work camps.</p> <p>Construction lay down area to be fenced to prevent access by unauthorised personnel.</p> <p>First aid training to be provided as required to site workers with basic first aid services to be provided by Contractor e.g. stretcher, vehicle transport to hospital.</p> <p>Provide education on basic hygiene practices to minimize spread of diseases.</p> <p>Increase workers' HIV/AIDS and sexually transmitted disease (STD) awareness, including information on methods of transmission and protection measures.</p> <p>Prohibit usage of drugs and alcohol on construction sites.</p> <p>Install lights and cautionary signs in hazardous areas.</p> <p>Establish footpaths and pull-off bays along roads through villages, near markets, schools and other community facilities.</p> <p>Limit construction activities from 07:00 hr to 19:00 hr to limit exposure to dust, noise etc.</p> <p>Enhance safety and inspection procedures.</p> <p>Ensure use of PPE.</p>	All locations	<p>Security included in construction cost</p> <p>Included in construction costs</p>	Contractor	MIPU / AVL

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Damage to assets and infrastructure	<p>Maintain high standard of site supervision and vehicle and plant operation to reduce risks of damage to water, power and telecommunication lines.</p> <p>Prepare procedures for rapid notification to the responsible authority (MIPU / AVL and service providers).</p> <p>As a result of VAIP construction activities any damage to assets or infrastructure must be reported to the MIPU / AVL and rectified at the expense of the Contractors.</p> <p>Provide assistance with reinstatement, in the event of any disruption.</p>	All locations	Dependent on asset/ infrastructure and level of damage	Contractors	MIPU / AVL
Community grievances	<p>Ensure that public consultation and disclosure communication is completed at regular intervals to ensure that the public are fully aware of the VAIP project program of activities. Consultation should include all aspects of the project including the airport site, quarries and transport routes.</p> <p>Signage should be used in public areas around the VAIP project sites advising the complaints procedure and contact details of key project individuals responsible for responding to issues raised.</p>	All components	Minimal (part of standard construction practice)	VPMU Consultant	VPMU / MIPU
Airport concessionaires / local business grievances	<p>Ensure that local businesses and airport concessionaires are included in the public consultation and disclosure communication process throughout the construction phase. Regular communication should be made with affected parties to ensure that they are fully aware of the proposed program of works.</p> <p>Signage should be used in public areas around the vicinity of VLI advising the complaints procedure and contact details of key project individuals responsible for responding to issues raised.</p>	Airport	Minimal (part of standard construction practice)	VPMU Consultant	VPMU / MIPU

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POTENTIAL NEGATIVE IMPACT	ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES	IMPLEMENTING LOCATION	ESTIMATED MITIGATION COSTS <sup>15</sup>	EXECUTING AGENCY	SUPERVISING AGENCY
<b>OPERATION STAGE</b>					
Hazardous substance management	<p>Strictly apply and enforce manufacturer's recommendations for handling and storage. These measures include sealing of drums, and avoiding extreme heat.</p> <p>Compliance with international good practice.</p> <p>Security of storage areas to facilitate transport, handling and placement to be maintained (e.g. fences and locks fixed immediately if broken or vandalised).</p> <p>Complete list, including MSDS for each chemical stored or used shall be accessible at all times. Signage to be posted in storage areas identifying all chemicals present.</p> <p>Staff to wear manufacturers recommended PPE (e.g. gloves and overalls) when handling or mixing hazardous substances.</p> <p>Emergency vehicles are to be serviced and maintained at existing workshop areas.</p>	All airport compounds	No marginal cost (standard operating procedure)	AVL Management	MIPU / AVL

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Fuel storage	<p>All refuelling activities to occur on designated areas at fuel tank farm and ARFF at VLI. The VLI fuel farm is a hard stand area with bunding to contain all stored hazardous substances; any drainage from these areas is transported to a soak pit. Wastewater from this soak pit is removed by Thomson Septic Contractors. In the case of a contained spill at VLI, with AVL permission, wastewater could be disposed of in this soak pit.</p> <p>Precautions should be in place to prevent wastewater and hazardous substances / materials entering the environment (e.g. fuel spillage), however should an incident occur, the Contractor should must spill response plan must be in place. The response plan should include details on the use of spill kits and absorbent items to prevent spills entering the receiving sensitive environment (ground, surface water). This spill response plan should be applicable to all VAIP project works areas (airport, quarries, and transport routes). A spill response plan should be in place for both the construction phase and operational phase.</p>	All airport compounds	No marginal cost (standard operating procedure)	AVL Management	MIPU / AVL
Airport waste management	Allow for re-use of as much waste as possible either within the VAIP, other projects, or for community use. PVMC should be consulted for approval to receive material (at Bouffa Landfill) that cannot be recycled, reused or returned to the supplier.	All airport compounds	No marginal cost (standard operating procedure)	AVL Management	MIPU / AVL
Use of fire retardant in ARFF	Spill response plan training to be completed for AVL workers. Precautions should be in place to prevent potentially hazardous substances entering the environment (e.g. wastewater containing fire retardant during firefighting), however should an incident occur, the Contractor / AVL must have a spill response plan must be in place.	All airport compounds	No marginal cost (standard operating procedure)	AVL Management	MIPU / AVL

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<b>POTENTIAL NEGATIVE IMPACT</b>	<b>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</b>	<b>IMPLEMENTING LOCATION</b>	<b>ESTIMATED MITIGATION COSTS<sup>15</sup></b>	<b>EXECUTING AGENCY</b>	<b>SUPERVISING AGENCY</b>
Water or soil pollution	<p>Workshops or maintenance areas to be fitted with bunded areas for storage of oil and fuel drums (and any other hazardous substances).</p> <p>Used oil drums should be returned to the suppliers or, after being cleaned, sold in secondary local market if there is demand for this.</p> <p>Used oils may be used for emergency drills/preparedness exercises as appropriate by ARFF.</p>	All locations	No marginal cost (standard operating procedure)	AVL Management	MIPU / AVL
Maintenance of drainage and soakage systems	<p>Drainage systems shall be periodically cleared of sediment and organic matter build up to ensure appropriate flows and soakage. Material to be disposed at approved site (e.g. landfill or used as cleanfill) or composted if organic.</p> <p>Vegetation to be cleared from drainage channels and soakage pits and composted (check with PVMC/MIPU regarding composting facilities on Efate).</p> <p>Grass in drainage swales to be maintained at a height slightly higher than the surrounding grass on the shoulders.</p>	All locations	No marginal cost (standard operating procedure)	AVL Management	MIPU / AVL



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Vanuatu Aviation Investment Project (VAIP)  
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Appendix B

# Monitoring Plan

**DRAFT****Appendix B Monitoring Plan**

PARAMETER TO MONITOR	LOCATION	MONITORING	FREQUENCY	RESPONSIBILITY
<b>DETAILED DESIGN/ PRE-CONSTRUCTION PHASE</b>				
Traffic safety	Design documents	Ensure TMP established for project.	Prior to sign off of final designs	Design Consultant
Aviation safety	Design documents	MOWP complete with details of flight schedules and emergency procedures.	Prior to sign off of final designs	Design Consultant
Soil erosion	Design documents	Proposed construction scheduled for between July and December 2015. Designs include erosion protection measures.	Prior to sign off of final designs	Design Consultant
Water supply	Design documents	Proposed water source and supply network to be included in designs	Prior to sign off of final designs	Design Consultant
Stormwater management	Design documents	Proposed stormwater management / drainage design (e.g. use of oil-water separator) to consider impacts on hydrology, receiving environments and also contamination risk	Prior to sign off of final designs	Design Consultant
Quarry operations	Quarry	Upon confirmation of which quarries are to supply aggregate verify quarry operations to ensure any required permits or approvals are in place.  Ensure TMP is included in procurement documentation for transport of materials from the quarries to the airport.	Prior to contract award	Design Consultant
Importation of equipment and materials	Importation permits	Ensure inclusion in design and material specifications that material and equipment to be fumigated and free of contamination. Approval to import material and equipment is given prior to material and equipment leaving country of origin.	Contractor to organize prior to export from country of origin.	Contractors

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<b>CONSTRUCTION</b>				
Agreement for waste disposal	Construction Contractor's records	Permits and/or agreements with local waste disposal providers (e.g. Bouffa Landfill) and licensed recycling operators. Inspection of disposal sites.	Documentation viewed prior to construction works starting Weekly as applicable to schedule of works.	MIPU
Soil erosion	Areas of exposed soil and earth moving	Inspections at sites to ensure silt fences, diversion drains etc. are constructed as needed. Inspection to ensure replanting and restoration work completed.	Weekly inspection as applicable to schedule of works and after site restoration.	MIPU
Waste disposal	At construction and quarry sites	Inspection to ensure waste is not accumulating and evidence waste has been stockpiled for removal to licensed landfill (Bouffa Landfill), removal from Vanuatu as hazardous, recycling or returning to supplier.  Inspections to ensure waste streams are sorted for re-use, recycling or waste to landfill.	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU
Water and soil pollution	At construction sites	Inspection of sites to ensure waste collection in defined area; spill response plan in place and workers trained at all VAIP locations. Complete spill kits available where hazardous substances sorted and handled.  Any results from groundwater sampling are submitted to MLNR, owner and MIPU with remedial action points if background/baseline conditions are exceeded.  Any encounters with potentially or confirmed contaminated soil (based on PID readings) are reported to MIPU / AVL.  Inspect soakage pits siting directly above any underlying aquifer (if present).	Weekly inspection as applicable to schedule of works and on receipt of any complaints	MIPU
Dust	At construction sites, quarries and adjacent sensitive areas.	Site inspections. Regular visual inspections to ensure stockpiles are covered when not in use and trucks transporting material are covered and not overloaded.	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU

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Noise	At work sites and sensitive locations	Site inspections to ensure workers wearing appropriate PPE when required. Measurement of noise level with hand-held noise meter not to exceed 70dB.  Public signage detailing complaints procedure and contact people/person on display.  Noisy machinery is replaced or fixed as soon as problem arises or on instruction by MIPU.	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU
Air pollution	At work sites	Site inspections to ensure equipment and machinery operating without excessive emissions. If an issue is reported the contractor is responsible for replacing or fixing the equipment to the satisfaction of MIPU.	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU
Storage of fuel, oil, bitumen, etc.	At work sites and construction camp. Contractors training log.	Regular site inspections to ensure material is stored within bunded area and spill response training for workers completed. Visual inspection of spill kit for completeness and accessibility.	Weekly as applicable to schedule of works and on receipt of any complaints.	MIPU
Vehicle and pedestrian safety	At and near work sites	Regular inspections to check that TMP is implemented correctly (e.g. flags and diversions in place) and workers wearing appropriate PPE.	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU
Construction workers and staff safety (personal protective equipment)	At work sites	Inspections to ensure workers have access to and are wearing (when required) appropriate personnel protective equipment (e.g. for handling hazardous materials). WB/IFC Guidelines have been implemented.	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU
Community / airport concessionaires / local business safety	At work sites	Inspections to ensure signs and fences restricting access are in place and pedestrian diversion routes clearly marked (whether for access to a building or home or particular route).	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU

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Community grievances	At work sites	Monitor public awareness campaigns and community engagement procedures.	Weekly as applicable to schedule of works and on receipt of any complaints.	MIPU / VPMU
Airport concessionaires / local business grievances	At and near VLI work sites	Monitor public awareness campaigns and airport concessionaires / local business engagement procedures.	Weekly as applicable to schedule of works and on receipt of any complaints.	MIPU / VPMU
Materials supply	Quarry and work sites	Inspections to ensure permits in place for transporting loads over 3 tonnes (if applicable).  Evidence that trucks are not overloaded and loads are covered e.g. complaints register, evidence of debris on the road.	Weekly visual inspection as applicable to schedule of works and on receipt of any complaints.	MIPU
<b>OPERATION</b>				
Accidents with hazardous materials or wastes	Airport sites	Accident report.	Immediately after accident	MIPU / AVL
Drainage system operational with reduced flooding incidences	Runway	Clean out of soakage pits documented and inspection of grass swales after mowing shows grass height in swale is higher than surrounds.	Soakage pit – after storm events to clear blockages and annually to remove sediment. After grass mowing.	MIPU / AVL
Waste disposal	Airport sites	Inspection to ensure waste is not accumulating and evidence waste has been stockpiled for removal to licensed landfill (Bouffa Landfill), removal from Vanuatu as hazardous, recycling or returning to supplier.  Inspections to ensure waste streams are sorted for re-use, recycling or waste to landfill.	Weekly inspection as applicable to schedule of works and on receipt of any complaints.	MIPU / AVL
Water and soil pollution	Airport sites	Inspection of sites to ensure waste collection in defined area; spill response plan in place and workers trained at all VAIP locations. Complete spill kits available where hazardous substances sorted and handled.  Inspection drains on site to ensure no blockages present or maintenance required.	Weekly inspection as applicable to schedule of works and on receipt of any complaints	MIPU / AVL

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Storage of fuel, oil, bitumen, etc.	Airport sites AVL training log.	Regular site inspections to ensure material is stored within bunded areas and spill response training for AVL workers up to date. Visual inspection of spill kit for completeness and accessibility.	Weekly as applicable to schedule of works and on receipt of any complaints.	MIPU / AVL
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Appendix C

# ESMP Monitoring Plan Inspection Checklist

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<b>Location:</b>	
<b>Auditor:</b>	
<b>Audit Date/Time (Start):</b>	
<b>Audit Date/Time (Finish):</b>	

<b>Environmental Issue:</b>	<b>Inspection areas:</b>	<b>Requirements met?</b>
<b>1.0 Construction Phase</b>		
1.1 Soil Erosion	<ul style="list-style-type: none"> <li>- Silt fences and diversion drains in place</li> <li>- Replanting and restoration work completed</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
1.2 Waste accumulation and Disposal Agreements	<ul style="list-style-type: none"> <li>- Good housekeeping around the work sites</li> <li>- Waste stockpiled in defined areas with signage ready for removal</li> <li>- Waste/recycling permits/agreements in place</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
1.3 Soil and Water Pollution	<ul style="list-style-type: none"> <li>- Waste collected in defined area on impermeable ground</li> <li>- Appropriate spill response plan/kit in place for waste area</li> <li>- Freshwater lens water quality results sighted</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
1.4 Dust	<ul style="list-style-type: none"> <li>- Stockpiles covered or kept wet when not in use</li> <li>- Visual inspection of ambient dust conditions</li> <li>- Truck transports are covered</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
1.5 Noise	<ul style="list-style-type: none"> <li>- Workers wearing ear protection as required</li> <li>- Noise level maximum of 70dB</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:



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Environmental Issue:	Inspection areas:	Requirements met?
<b>1.0 Construction Phase</b>		
1.6 Hazardous Substance Storage (fuel/oil/bitumen)	<ul style="list-style-type: none"> <li>- Hazardous substances within bund on impermeable surface</li> <li>- Spill kit complete and accessible</li> <li>- Spill training completed</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
1.7 Traffic Management Plan Implementation	<ul style="list-style-type: none"> <li>- Traffic Management Plan (TMP) implemented</li> <li>- PPE is being worn by workers</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
1.8 Personal Protective Equipment (PPE) Use	<ul style="list-style-type: none"> <li>- Workers have access to, and using appropriate, PPE for the task.</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
1.9 Community / Airport Concessionaires / Local Business Safety	<ul style="list-style-type: none"> <li>- Public signage of complaints procedure</li> <li>- Signs and fences restrict or direct pedestrians and public where appropriate.</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
<b>2.0 Operational Phase</b>		
2.1 Drainage Maintenance	<ul style="list-style-type: none"> <li>- Inspect to check for blockages and debris, particularly after storm events</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:
2.2 Hazardous substance management	<ul style="list-style-type: none"> <li>- Inspect hazardous substance storage containers and storage area.</li> <li>- Inspect to check that correct MSDS are present in storage areas.</li> <li>- Inspect emergency vehicles service / maintenance records in workshop areas.</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> If No, details:

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## Actions Required:

Issue No.	Action Required? By Whom?	Date Action Required?

## Signoff

Signature:

Date:

.....

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Appendix D

# Resettlement Policy Framework

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## Appendix D Resettlement Policy Framework

Should it be identified that additional land, for example a new quarry site or short term use of farmland is required for the VAIP project, the requirements of this Resettlement Policy Framework (RPF) will need to be implemented.

### A. Project Description

For project description, please refer to Sections 1 and 2.

### B. Justification for Preparing a Resettlement Policy Framework

The exact nature of the investments, detailed design of the engineering works and precise siting of infrastructure works for the projects has not been determined, and will be decided taking in to account feedback from initial consultations with stakeholders and affected parties (APs). A Resettlement Policy Framework (RPF) has therefore been selected as the appropriate social safeguard instrument. As a Category B project, it is not anticipated that there will be substantial resettlement requirements, and no physical displacement is envisaged in either project. The RPF describes the policies and procedures leading to development of the resettlement plan (RAP), which is to be completed in the detailed planning stages of the projects or sub-projects, prior to implementation of the civil works. The RAP will be developed in conformance with World Bank Operational Policy 4.12, Involuntary Resettlement, Annex A paragraphs 1 to 21. If resettlement affects fewer than 200 people, and impacts are minor, an Abbreviated Resettlement Plan (ARAP) will be developed as per Operational Policy 4.12, Annex A paragraph 22. The RAP or ARAP will form part of the agreement between the GoV and the World Bank. For brevity, the term 'RAP/ARAP' will be used in this document to refer to whichever resettlement instrument is selected.

### C. Objectives, Definitions and Key Principles

The guiding principles for the RAP are that involuntary resettlement is to be avoided or minimised. APs should be better off or at least as well off as before the project. All persons affected by the project are to be consulted throughout the project, have the opportunity to participate in planning, and to share in project benefits. The project should contribute to sustainable development.

These principles entrain a process of early identification of stakeholders, and in particular of APs; frank and effective public disclosure of any known impacts; consultation and participation to avoid or mitigate negative impacts identified, and to ensure that no person or impact is overlooked; fair, transparent and timely intervention to support APs during implementation, resettlement and restoration of livelihoods; and commitment where possible to improve upon the status quo, particularly for those who may be vulnerable by reason of poverty, ethnicity, gender, age, disability, or social status.

In the present projects, the policy objective to avoid, and where avoidance is not possible, to minimise impacts will inform the final technical design and implementation planning of the works. To ensure that the projects contribute to the objective of sustainable development, the implementing agency's (IA) plan comprehensive disclosure and consultation process that includes all stakeholders. The consultation process with APs will reveal all foreseeable impacts, and will elicit AP concepts of how mitigation options and resettlement planning can contribute to their aspirations for sustainable restoration or improvement of their livelihoods.

If there is loss of land, and land-based assets, the aim will be to replace like for like, and if this is not possible, to compensate for lost land, assets and income, and meet the costs of relocation and restoration of livelihoods. Restoration includes not only physical assets, but also social and cultural assets. If there is a risk of disruption of these values, which are often disproportionately encountered by women, the APs will contribute to selection of mitigation and resettlement options to ensure policy objectives are met.

### D. Legal and Regulatory Framework

A number of Vanuatu legal instruments are relevant for concepts or mechanisms that bear on resettlement planning.

#### National Legislation

For the full legal and regulatory framework, please refer to Section 3.

With regard to land laws in Vanuatu, the national land system is administered through numerous Lands Acts and the newly amended / introduced New Land Acts, as of the end of 2013 and those recently Gazetted in June 2014, that govern land administration in Vanuatu. The Land Acts comprise comprehensive laws including the following:

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- Alienated Land Act 12, 18 (1982).
- Customary Land Tribunal Act 7 (2001).
- Freehold Titles Act 13 (1994).
- Land Acquisition Act 5 (1992), 34 (Amendment) (2000).
- Land Leases Act 4 (1983), 32 (1985), 10 (1987), 30 (1988), 38 (1989), 24 (2003).
- Land Reform Act 31 (1980), 6 (1981), 10 (1983), 31 (1985), 6 (1992), 35 (2000).
- Land Survey Act (1984).
- Land Valuers Registration Act 23 (2002).
- Stata Titles Act 29 (2000).
- Valuation of Land Act 22 (2002).

The New Land Laws comprise the following:

- Customary Land Management (Amendment) Act (2014).
- Land Reform (Amendment) Act (2014).
- Customary Land Tribunal (Repeal) Act (2014).
- Custom Land Management Act (2013).
- Land Leases (Amendment) Act (2013).
- Land Reform (Amendment) Act (2013).
- Sixth Amendment of the Constitution (2013).

These laws impact the rights of custom owners, leaseholders and users of land. A full review of the legislative implications will be completed if additional land is required for the VAIP project and a RAP/ARAP is required to be implemented.

### World Bank Policy

WB resettlement policy starts from the principle of restoration or improvement of livelihoods at replacement cost, rather than current value, recognising not only financial and physical assets, but also the environmental, social, and cultural assets of an individual, irrespective of gender, ethnic or social status, in the resettlement context. Resettlement policy enjoins avoidance and minimisation of adverse impacts not only because it is less costly, but also because it avoids damage to the less tangible and hard-to-value aspects of livelihoods and cultures. WB resettlement policy has a positive objective of sustainable development, with particular regard for the vulnerable.

### Gap Analysis

Gap analysis between national laws covering involuntary resettlement and the Bank's OP/BP 4.12, will be included in any subsequent RAP/ARAP.

### E. Preparing and Approving RAP/ARAP

In the event that the RAP/ARP becomes necessary the following will preparation will be undertaken:

Responsibility for preparation, implementation and monitoring of RAPs/ARAPs (including responsibility for meeting all associated costs with their implementation), in accordance with this RPF, rests with the GoV (VPMU). The agency in the GoV (VPMU) with direct and overall responsibility for managing the land acquisition and involuntary resettlement process in this project is to be determined. As necessary, VPMU will exercise its authority to coordinate actions with any other agencies involved to ensure timely and effective RAP/ARAP implementation.

Preparation of the RAP/ARAP begins as soon as it is determined that involuntary resettlement is essential to complete any of the project activities and shall be finalized prior to the commencement of any works to carry out said project activities. The VPMU will carry out, or cause to be carried out, a census survey to identify and enumerate Displaced Persons and to identify and inventory land and other assets to be required. The census survey must cover 100% of the displaced persons. The census survey also establishes whether any displaced

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persons are significantly affected by loss of productive land, whether any commercial enterprises are affected, or whether any households will be required to physically relocate.

If involuntary resettlement impacts are minor (i.e., affected people are not physically displaced and less than 10% of their productive assets are lost) or fewer than 200 people are displaced, the VPMU prepares one or more abbreviated resettlement plans (ARAP). If the resettlement impacts of the project are not minor or lead to the displacement of more than 200 people, the VPMU prepares one or more resettlement action plans (RAP).

The RAP/ARAP will be prepared in accordance with the policy, principles and planning and implementation arrangements set forth in this RPF. The RAP/ARAP is based on accurate baseline census and socioeconomic survey information, and establishes appropriate mitigation measures (e.g., compensation at full replacement cost for loss assets, transitional assistance for relocation, and transitional assistance for livelihood restoration, and transitional assistance for commercial enterprises) for all relevant categories of adverse impacts. Depending on the categories of impacts, the RAP/ARAP specifically addresses the following:

- Description of the project activity causing involuntary resettlement and explanation of efforts to avoid or minimize involuntary resettlement associated with the project (alternative project designs considered).
- Range and scope of potential adverse resettlement impacts.
- Socioeconomic survey and baseline census survey information.
- Review of relevant laws and regulations relating to land acquisition and involuntary resettlement (see section above on legal and regulatory framework for more details).
- Description of asset valuation procedures and specific compensation rates (or alternative measures) for all categories of affected assets.
- Other assistance measures, if any, necessary to provide opportunities for livelihood restoration for displaced persons.
- Assistance to affected commercial enterprises.
- Eligibility criteria for compensation and all other forms of assistance.
- Relocation arrangements, if necessary, including transitional support.
- Resettlement site selection, site preparation, and measures to mitigate impacts on host communities, if necessary.
- Restoration or replacement of community infrastructure and other services.
- Land donation arrangements and documentation requirements, if relevant.
- Organizational arrangements for implementation.
- Consultation and disclosure requirements and arrangements.
- Resettlement implementation schedule.
- Costs and budget.
- Monitoring arrangements.
- Grievance procedures.
- Summary entitlements matrix.

## F. Eligibility Criteria

### Criteria Defining Displaced Persons

Eligibility of an individual for resettlement assistance will relate to their:

- Loss of land, whether an owner, lessee or informal occupant.
- Loss of trees or other plants, whether on owned, leased or informally accessed land.
- Loss of land-based improvements – houses, shelters, business buildings, also irrespective of the ownership status of the land.

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- Loss of access to commons and reserves, e.g. road reserves, whether or not legally encroached, and restricted areas.

Eligibility for loss of non-land assets, whether temporary or permanent, will be recognised for project-induced impacts on:

- An individual's business or income.
- Soil or water quality changes that impact the individual's livelihood activities in the direct or indirect impact area.
- Air, light or noise pollution, or restrictions on access to social or economic resources that impact property values and amenity.
- Access to resources due to quarrying operations.
- Any other assets or elements of livelihoods recognised in the Tuvalu law and in WB Operational Policy that may be discovered during disclosure and consultation.

Persons demonstrating that they will suffer losses from any of these causes as at the cut-off date for entitlements will be regarded as eligible for resettlement assistance. Losses from encroachments or activities commenced after the cut-off date for the respective projects will not be eligible.

### Nature of Impacts

The nature of foreseeable impacts cannot be identified at this early stage in the VAIP project; this will be included in any subsequent RAP/ARAP.

### H. Communal Land Acquisition – Guiding Principles

The following resettlement planning process will be reviewed and established:

- Alternatives to land acquisition are considered. Especially where replacement land is scarce or non-existent, or where customary land tenure is deemed inalienable, negotiated agreements for long-term lease, even for infrastructure siting, should be considered.
- Where communal land must be acquired, collective compensation may be appropriate. Under such conditions, compensation is used solely for appropriate community purposes, or is distributed equitably among community members. The RAP/ARAP describes arrangements for usage of collective compensation.
- Individual users and occupants of acquired communal land are identified in the census prepared for the RAP/ARAP and the RAP/ARAP describes mitigation measures or negotiated agreements providing for restoration of their livelihoods or living standards.
- Where replacement land does not exist, it will be impossible to establish a technical valuation for replacement cost. The RAP/ARAP describes alternative means used for valuation. This may include negotiated agreement with affected communities.
- Where negotiated agreements for land valuation, for long-term lease, or for provision of remedial assistance to users or occupants of acquired communal land, are to be established, the resettlement plan describes the methods by which affected communities are involved in the negotiations, and methods by which terms of negotiated agreements are fully disclosed to them, in a manner accessible to the affected community.
- If relevant, the RAP/ARAP describes any changes that may occur regarding land use and tenurial arrangements for remaining communal land in project-affected areas.
- The RAP/ARAP describes a process by which conflicting claims to ownership or use rights will be addressed.

### Implementation Arrangements

Implementation arrangements such as a time-bound implementation schedule of all activities relating to involuntary resettlement shall be included at the development of a RAP/ARAP. Payment of compensation should be completed at least one month prior to involuntary resettlement. If there is a delay of one year or more between land or asset valuation and payment of compensation, compensation rates will be adjusted for inflation purposes.

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## I. Budget and Costs

The VPMU bears responsibility for meeting all costs associated with involuntary resettlement. Any RAPs/ARAPs prepared in accordance with this RPF require a budget with estimated costs for all aspects of their implementation. All displaced persons are entitled to compensation or other appropriate assistance and mitigation measures, regardless of whether these persons have been identified at the time of resettlement planning, and regardless of whether sufficient mitigation funds have been allocated. For this reason, and to meet any other unanticipated costs that may arise, the RAP/ARAP budget shall include contingency funds, i.e., at least 10% of estimated total costs. Compensation must be paid promptly and in full to the displaced person. No deductions from compensation will occur for any reason. The RAP/ARAP should describe the procedures by which compensation funds will flow from VPMU to the displaced persons.

## J. Consultation and Disclosure Arrangements

### Disclosure and consultation on the RPF

Disclosure does not equate to consultation (and vice versa) as disclosure is about transparency and accountability through release of information about the project. A copy of this draft ESMP should be made available on the WB Infoshop and GoV websites, and hard copies available at GoV offices (most applicable and accessible), VPMU office in Port Vila, AVL office at VLI, and community centres on Efate.

### Disclosure and consultation on the RAP/ARAP

The RAP/ARAP must describe measures taken to consult with displaced persons regarding proposed land acquisition, transitional assistance, relocation arrangements, and other arrangements, and summarizes results of those consultations. The VPMU also discloses the RAP/ARAP- both the draft and final versions – to the displaced persons and the general public in the project area, in a language and location accessible to them. Disclosure of the draft RAP/ARAP should occur at least one month prior to Bank review. Disclosure of the final RAP/ARAP occurs following WB acceptance.

## K. Monitoring Arrangements

Monitoring arrangements will be established in the RAP/ARAP to assess the effectiveness of RAP/ARAP implementation in a timely manner. Monitoring includes review of progress in land acquisition, payment of compensation, provision of transitional assistance, and functioning of project grievance procedures. The RAP/ARAP should establish the frequency of monitoring activities. Monitoring should be conducted by an individual, firm, or community organization not directly affiliated with the VPMU. Any issues or problems associated with RAP/ARAP implementation that are observed in the monitoring process will be reported to the VPMU and the WB project team.

Prior to project completion, the monitoring process will assess whether livelihoods and living standards of displaced persons have been improved, or at least restored. If these objectives have not been achieved, the VPMU identifies plans and implements supplemental measures necessary to achieve satisfactory outcomes.

## L. Grievance Procedures

### Grievance Redress Mechanisms

The availability of redress, and information about how to access it, will be publicly disclosed in Public Information Bulletins for the media, and during consultations with the public. The Grievance Mechanism will offer remedies appropriate to the scale of the grievance.

Minor project-related grievances will in the first instance be notified to the project Safeguard Officers / Supervision Consultant's Environmental Officer for mediation within a specified short time, preferably not more than ten working days. The project's Safeguards Officers / Supervision Consultant's Environmental Officer will endeavour to arrange mediation hearings in open forum close to the place of residence of APs. APs will be entitled at no personal cost to independent representation by a mediator of their choice, and will be encouraged to be accompanied by supporters during the process. The IAs will ensure that such negotiations are transparent, and that the policies, principles and methods of value assessment in the RAP/ARAP are applied equitably to all APs.

If mediation is unsuccessful, or if the matter is substantive, the case may be referred to legal proceedings in accordance with Vanuatu laws and procedures.