Environmental & Social Impact Assessment

Tonga Climate Resilient Transport Project (TCRP)

Road Infrastructure

FINAL

August 2018

EXECUTIVE SUMMARY

The Government of Tonga is seeking funding from the World Bank for the Climate Resilient Transport Project to facilitate the safe, efficient and sustainable movement of goods and people in the Kingdom of Tonga whilst strengthening climate resilience of the transport sector. The overall Project addresses rehabilitation of key road, maritime and airport infrastructure. The focus of this Report however, is the proposed road infrastructural Project.

An Environmental and Social Impact Assessment (ESIA) for the Project has been prepared which assesses the environmental and socio-economic impacts arising from the Project and outlines measures to mitigate these impacts in accordance with Tongan legislation and World Bank safeguard policies.

Key stakeholders and Villages in Tongatapu, Ha'apai, Vava'u and 'Eua potentially impacted by the proposed Project were consulted and feedback has been incorporated into mitigation measures.

The socio- economic information and outcome of the consultation exercise indicates:

- The Villages across all of the islands are dependent on functioning roads for their survival.
- The high levels of subsistence agriculture mean that continued access to and from agricultural areas and to markets is essential.
- Well maintained roads that are resilient to the effects of climate are critical for safety reasons.

Potential impacts arising from road upgrade activities depend on a number of factors including the existing condition or type of road and the location of nearby sensitive environmental and social receptors and the scale and nature of the works proposed, which are different for each Island.

In summary, key potential construction impacts include:

- Temporary closure of roads and road shoulder to pedestrians in Villages.
- Temporary loss of access to adjacent land during works.
- Stockpiled material in road reserve due to clearance activities restricting access to agricultural plots.
- Loss of personal assets (such as crops, informal fences etc) as a result of clearance activities which encroach into the road reserve.
- Dust, noise and vibration impacts where works are located in Villages.
- Impacts on adjacent ecological communities as a result of stormwater runoff.

In summary, key potential positive and negative operational impacts common to all islands include:

- Reduced wear and tear requiring less frequent vehicle maintenance with upgraded roads provide additional travel routes and reduced travel times.
- Farmers have reduced travel times to access agricultural areas and taking produce to market.
- Improved connectivity of the road system and greater resilience of the new roads to climatic events.
- Stormwater ponding on upgraded or newly constructed carriageways creating traffic safety issues.
- If erosion potential of stormwater is not addressed in road design there is potential to compromise the integrity on some roads.
- Better road conditions may encourage excessive speeds leading to more accidents which is common to all roads particularly around Villages.

Potentially significant adverse impacts can be mitigated through adopting a range of measures including:

- Design of roads to minimize ponding water and provision of drainage to discharge stormwater.
- Traffic Management Plans developed by the Contractor that outline measures to minimize potential impacts on pedestrians and other road users, identify alternative traffic routes, etc, and these are communicated with key stakeholders/Villagers.
- In Villages strict adherence to work hours and regular maintenance of all machinery to minimise disturbance due to noise and vibration and use of water cart to suppress dust.

- Generally, the areas adjacent to the roads are dominated by built environments and farmland so impacts are likely to be limited due to the lack of sensitive receiving environments. Where these are identified (such as adjacent to some roads in Vava'u and 'Eua) measures to control runoff should be adopted.

In many cases, such as in all Villages, works are to be undertaken on the existing carriageway only minimising impacts due to stockpiled material and loss of personal assets. Where clearance outside the carriageway is required (on more rural roads) the Contractor is to have documented work procedures that ensure impacts are minimised such as removing cropped areas following harvest, assisting with relocation of informal fences, leaving accessways clear of stockpiled material at all times.

World Bank Operating Policy OP4.12 addressing Involuntary Resettlement states that *direct economic and social impacts that result from Bank-assisted investment projects, and are caused by (a) … (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood,* is not triggered on the basis that:

(i) Land to be used for the Project is either Government (including the Road Reserve and other Project sites) or Contractor owned or leased with no activities proposed on private land; and

(ii) The Road Contractor will adopt measures during road works to ensure all potential impacts relating to loss of assets, access to assets, the loss of income sources or means of livelihood are mitigated through the adoption of works procedures that avoid these impacts.

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1 Introduction

1.1 Background

The Government of Tonga is seeking funding from the World Bank for the Climate Resilient Transport Project (the Project), to facilitate the safe, efficient and sustainable movement of goods and people in the Kingdom of Tonga, whilst strengthening climate resilience of the transport sector.

The overall Project addresses rehabilitation of key roads, maritime and aviation sector infrastructure. This Report focusses on the assessment of impacts and identification of mitigation measures in relation to the road sector infrastructure Project.

Argo Environmental Ltd in association with Landcare Solutions Limited have been commissioned to assess the potential environmental and spcio-economic impacts of the Project (see TOR Appendix 1).

1.2 Project Rationale

The Tonga Climate Resilient Transport (TCRT) Project aims to support the transport sector in Tonga by:

- Addressing the infrastructure maintenance backlog in the road, aviation and maritime sectors;
- Increasing the resilience of transport infrastructure to climate change and extreme weather events; and
- Ensuring safer and more reliable transport services.

In accordance with the TOR for the TCRT Project, an Environmental and Social Impact Assessment (ESIA) protocol has been adopted and an Environmental & Social Management Plan (ESMP) has been prepared to facilitate the various transport Projects proposed.

1.3 Project Categorisation

The World Bank requires the categorisation of Project under OP 4.01. Based on Project activities, the Project is considered to be Category B on the basis that the impacts will not be irreversible or unprecedented, and mitigation measures can be readily identified. The applicable safeguards policies which are triggered by the Project are OP 4.01 Environmental Assessment, OP 4.04 Natural Habitats.

OP4.12 Involuntary Resettlementis not triggered. There will be no land acquisition required for any project works. If any additional land is required, it will be subject to a negotiated lease arrangement with the land owner.

2 Project Description

2.1 Background

A total of 93 roads covering approximately 155.2 km across four islands have been identified by MOI for a range of rehabilitation works. These roads serve a variety of purposes including general travel, access, agricultural productivity, tourism and general community participation. The current condition of the roads and surfacing condition varies and is described in further detail in Section 4.3.

Table 2.1 in Appendix 2 provides a list of the roads identified by MOI. Figures 2A-2D in Appendix 2 present road locations and photographs of all roads. Nine roads (on Tongatapu and Vava'u) have been identified as priority for works as part of the Project.

MOI have technical specifications[1] for undertaking road sealing. While these are in general delivering acceptable outcomes, MOI considers there is a need to focus on pre-seal repairs not just of the paved area, but the road shoulders and adjacent road drainage areas. MOI also have concerns that newly paved roads often lead to water ponding on the road as a result of the shoulder being too high.

On Vava'u and 'Eua a number of roads are located in rolling to steep terrain where erosion is a significant issue – either of the road pavement, or the adjacent drainage infrastructure on both paved and unpaved roads. Energy dissipation from the diverted water and determination of the conditions for sediment retention mechanisms to protect sensitive environments needs to be addressed (see Section 6 for more detail).

The Contractor who is engaged to undertake the required works will need to address these issues with the works for the new roads and will be appointed using either traditional or performance based contracts (PBC) which may affect the potential impacts as described in Section 6.

2.2 Road Rehabilitation & Resurfacing Methodology

MOI is currently proposing a range of works on the identified roads. In summary, the works involve rehabilitation and resurfacing of sections of the road including:

- Improving coastal protection, drainage and slope stability on a small number of roads to address climate resilience on coastal and hilly roads.
- Resurfacing / rehabilitation / patching (see Appendix 3 for definitions) of a number of roads as identified by the Tonga National Roads Improvement Three (3) Year Plan (2015)[2].

Appendix 3 describes the road works methodology and Table 2.1 presents the length of road based on types of road works proposed. In summary:

- Chip or Otta Sealing involves resurfacing of the existing paved surface resulting in no material change in the height, width or other characteristics of the road. Just over 1/3rd of all roads (36.9%) will undergo this type of works including all roads in Tongatapu and over 1/3rd (38.9%) of roads in Vava'u.
- Sealing unpaved Road or the first time with Chipseal or Otta Seal (similar to Chipseal but uses a lower quality aggregate on low volume roads) which may result in small changes in road elevation or width. Over half of all roads (52.4%) will undergo this type of works in Vava'u, Ha'apai and 'Eua. In Ha'apai and 'Eua this treatment will occur for the majority of roads.
- 'Agricultural Road' Upgrade where unformed (or very overgrown) agricultural road is upgraded to a 'good' quality gravel (unpaved) surface. A total of to 6% of the total length of roads will undergo this type of works and only in Ha'api.
- Paved Road Rehabilitation / Upgrade involves rebuild of a section of road (new surface and substantial pavement works), with the option of widening the road to achieve

[1] Ministry of Infrastructure. General Technical Specifications.
[2] MOI 2015. Tonga National Roads Improvement Three Year Plan.

design standards which may result in an increase road elevation. A total of to 4.5% of the total length of roads will undergo this type of works and only in Vava'u.

All works will take place within the existing road reservation. If works are outside of this area there will be negotiated arrangements with land owner.

The potential environmental and socio-economic risks and potential impacts associated with the different types of works are addressed in Section 6 of this Report. In summary, the risks associated with 'Sealing unpaved Road or the first time with Chipseal or Otta Seal', which will be undertaken on over 50% of all roads, are considered to be less than the 'Agricultural Road' Upgrade works which occur on 6% of roads only.

Table 2.1: Length of road (km) based on types of road treatment proposed.

Type	Location				TOTAL
	Tongatapu	Vava'u	Ha'api	'Eua	
'Agricultural Road' Upgrade			9.56		9.56
Paved Road Rehabilitation / Upgrade		7.0			7
Sealing unpaved Road for the first time		33.20	25.76	22.36	81.32
Resurfacing with Chip or Otta Sealing	31.72	25.57			57.29
TOTAL	**31.72**	**65.77**	**35.33**	**22.36**	**155.18**

There are a number of road contractors located across key islands that have their own storage yards with the exception of Ha'apai. Based on past experience, MOI allow Contractors access to their quarry or yard for the appointed contractor.

On all roads to be resurfaced, bitumen will be laid on roads using a spreader and imported emulsion material. There are a number of these machines located in Tonga owned by various contractors.

Based on past experience it is unlikely that Contractors will not require laydown areas given the proximity of the quarries and yards (where materials and equipment are stored) to the various work sites preferring to travel to and from their yards with all the required materials on a daily basis.

In the past, where road rehabilitation activities required removal of the existing road surface this material was taken back to the MOI or Contractor's yard either to be reused as a base aggregate or made available to public. Where a new road is to be installed or widened to accommodate a wider carriageway, the material that is generated through excavation by bulldozer is typically piled up within the road reserve adjacent to the carriageway.

Contractors from Tongatapu undertaking works in the outer islands would rent houses or apartments to house key staff such as a foreman who is likely to be a Tongan National. Typically local labourers are employed with 'gangs' ranging in size from 5–10 people depending on the nature of the activities. As the workers are likely to be locally-based with no requirement for contractor camps, there is no potential for interactions that may lead to culturally insensitive behaviour and relationships, including some that are disrespectful of local customs and village bylaws, and others fostering and or directly resulting in gender-based violence (GBV), violence against children (VAC), sexual harassment etc.

Solid waste generated in Tongatapu is disposed of at the Tapuhia Landfill located by Vaini Village which is managed by Tonga Waste Authority Limited and is the only approved operating landfill on Tongatapu. In Vava'u the recently opened managed landfill is located at Kalaka close to Neiafu. No managed landfills are present on 'Eua or Ha'apai and informal dump sites are used for waste disposal. In any event, minimal solid waste material is expected to be generated as typically old road material is reused as road aggregate, and excavated materials such as topsoil are typically taken back to the MOI or Contractors yard or quarry site for reuse.

2.3 Roads

The following roads have been identified for rehabilitation and resurfacing activities:

Tongatapu

On Tongatapu, rehabilitation / upgrade and chip-sealing of the existing 5m wide paved road on a total of five Roads for a total distance of 31.7 km is proposed. MOI have indicated there will be no widening of the existing road. The assessment of impact of road activities on Tongatapu has been made on this basis.

Vava'u

In Vava'u, 17 Roads totalling 65.7 km are proposed for works. A total of 10 Roads with existing carriageways ranging from 5-6m that are currently paved require chip - sealing. Seven 'Agricultural' Roads are proposed to have 4m wide paved carriageways installed.

Ha'apai

In Ha'apai, 54 Roads totalling 35.3 km are proposed for works including the following:

- 30 roads with 4-4.5m carriageways for Rehabilitation and Sealing / Resealing.
- 2 roads with 4m carriageways for Rehabilitation only.
- 7 roads with carriageways ranging from 4-5m for Sealing/Resealing.
- 6 roads with carriageways ranging from 4-5m for Upgrading.
- 8 roads with 4m carriageways for Upgrading and Sealing.

'Eua

In 'Eua, 25 Roads totalling 22.4 km have been identified for works including the following:

- 19 Roads with carriageways ranging from 3.6-5m for Rehabilitation and Sealing.
- 5 Roads with carriageways ranging from 3.6-6m for Patching and Sealing.
- 1 Road with a carriageways of 3.6-m for Resealing.

Further detail on the likely range of works to be undertaken on each road is provided in Section 6.

2.4 Aggregate Supply

MOI have indicated that only 'Ahononou Quarry in Tongatapu and the Quarry in 'Eua meet the minimum standards for chip seal roadworks. Quarries located on 'Eua, Ha'apai and Vava'u have aggregate available for undertaking otta-sealing works. MOI have indicated chip-sealing works will be undertaken on Vava'u for some high traffic volume roads which would require suitable material to be transported from Tongatapu by barge as it cannot be soured locally.

Tongatapu

Tongatapu has several quarries which are either currently active or have previously been used as a source of aggregate. Ahononou Quarry (Figure 2.5), located 6 km south west of Fua'amotu Airport, is the main source of material for recent project on Tongatapu and was used in the Fua'amotu runway construction, extension and resurfacing Projects. According to MOI the material from 'Ahononou Quarry meets the minimum standards for chip seal roadworks. 'Ahononou Quarry has the necessary environmental permits to operate having recently prepared an EIA for their activities.

A discussion with the Quarry owner indicates there are considerable reserves of material available. The processing yard is located in close proximity to the Quarry and has the necessary crushing and screening equipment.

'Eua

The quarry on 'Eua (Figure 2.5), located 400 m west of the Airport, is run by the same operator as the 'Ahononou Quarry. Crushing and screening equipment located at

'Ahononou Quarry would be transported back to 'Eua for use if required.

Figure 2.5: Ahononou (top) & 'Eua (bottom) quarries

Vava'u & Ha'apai

In Vava'u there are a minimum of three quarries: the existing MOI quarry located close to Neiafu; the Guttenbeil quarry located at Vaihoi; and the Veisiale Quarry located in Kameli, the last two are privately owned and operated (see Figure 2.6) and it is our understanding that they haven't undertaken an EIA for the necessary permits to operate.

There is one quarry on Ha'apai that is operated by MOI which is located in Foa.

Figure 2.6: MOI (left), Guttenbeil (middle) & Veisiale (right) quarries

2.5 Timing / Expected Duration of Works

Timing and expected duration of works are unknown at this stage and are dependent on the requirements of MOIs contract with the Contractor.

Normal working hours are Monday to Friday, 7am to 6pm. Works outside of these hours will require permission from MOI and notice to affected parties and the public at least one week prior to work commencing. It is possible that the road works will be required after hours in addition to the normal working hours when traffic volumes are lighter.

Work on a Sunday (Sabbath Day) is not permitted (as protected in the Constitution of Tonga) and any requirements to work on a Sunday (e.g. emergency works) will require special approvals.

2.6 Alternative Methodologies

The identified roads are existing infrastructure which requires improvements to ensure continued operation. Alternatives regarding design approach and methodology have been explored however budgetary constraints have limited the selection of roads, their design and construction methodology.

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.

Note the exact designs and construction methodology have not been finalised.

3 Environmental Policy, Legal & Administrative Framework

3.1 Environmental Regulatory Framework

Tonga has a well-established regulatory framework that provides measures to protect and preserve the environment from abuse, pollution and degradation, to manage the environment for sustainable development and to promote environmental awareness.

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 focus. Amongst these are the following key legislations:

- Environmental Impact Assessment Act 2003 and Environmental Impact Assessment Regulations 2010
- Environmental Management Act 2010
- Marine Pollution Prevention Act 2002
- Parks and Reserves Act 1988
- Fisheries Management Act 2002
- Aquaculture Management Act 2003
- Birds and Fish Preservation Act 1988
- Public Health Act 1992

The Ministry of Lands, Environment and Climate Change and Natural Resources (MEIDECC) is the principal agency responsible for the management of the environment, and in administering environmental-related legislation in Tonga. It provides environmental assessments, reports and recommendations to the responsible Ministry, as well as being mandated under the Environmental Impact Assessment Act 2003 and the EIA Regulations 2010 to require environmental impact assessments and impose conditions for development projects within Tonga.

Accordingly, activities funded under the TSCP will follow the GOT's established procedures and associated guidelines established under the Environmental Assessment Act 2003, and environmental legislation of the relevant Ministry.

3.2 Environmental Approvals Framework

In broad terms, the environmental approval framework in Tonga involves:

- Land acquisition and lease approval (Ministry of Lands and Natural Resources "MLNR")
- Building Permit approval (Ministry of Infrastructure "MOI")
- Environmental approval (Ministry of Environment, Information, Disaster Management, Energy and Climate Change "MEIDECC").

The application process is summarised Figure 3.1.

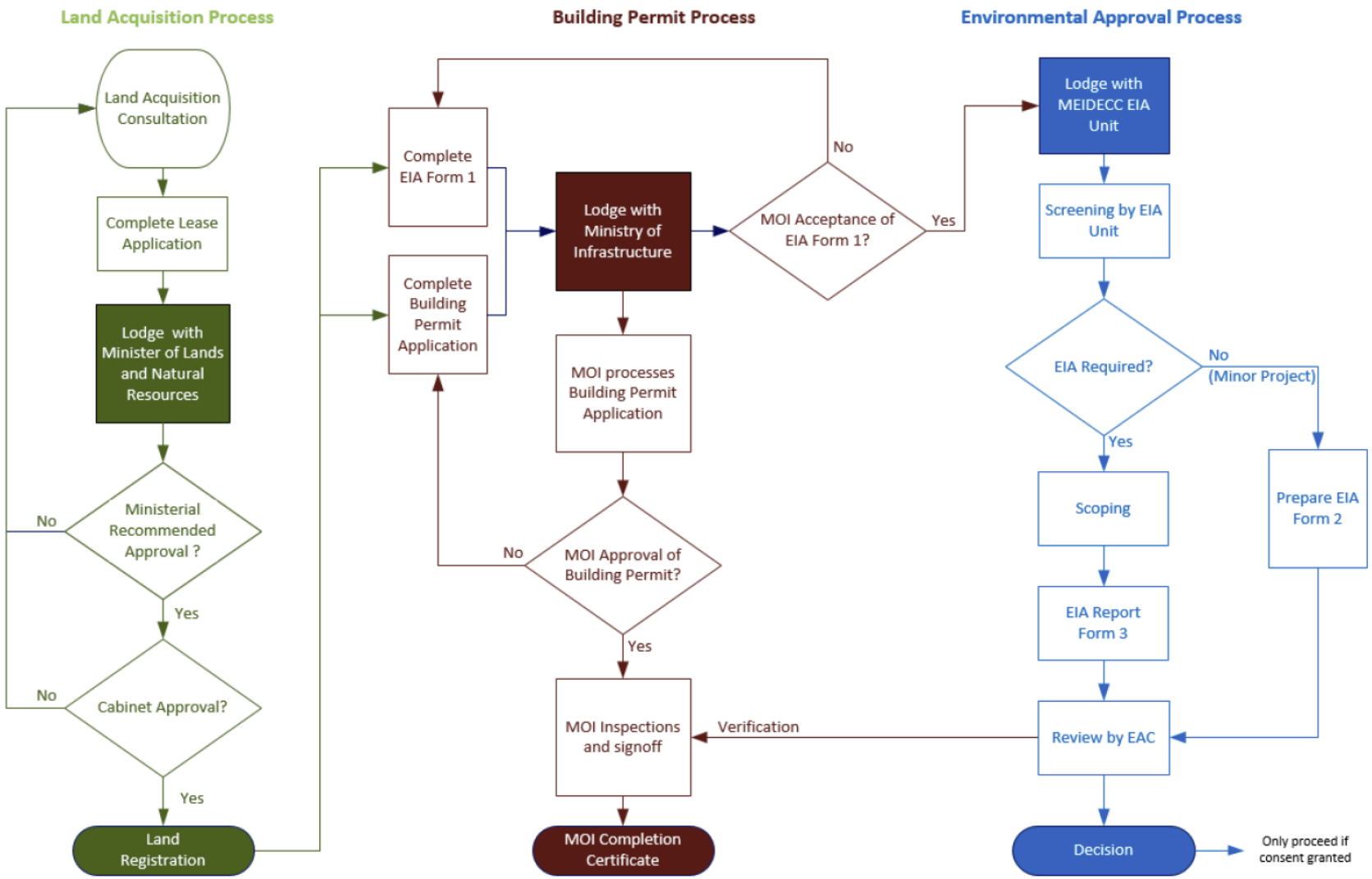

Figure 3.1: High level linkages between the three main environmental approval elements

3.3 Land Acquisition

3.3.1 Tenure and Leases

Project site selection involves identifying the best site, and identifying people affected by the Project. In securing project land, proponents must appreciate the fact that Tonga's land tenure system has unique features relative to other Pacific countries. Key aspects are:

- All land in Tonga belongs to the Crown
- Sale of land is prohibited.
- The rights or interests are individualised and life interest only
- The Land Act forbids land holders (registered allotments) from entering into any agreement for profit or benefit from the use of his holding other than that prescribed by the Act
- Non-Tongans can only obtain land under leasehold tenure, subject to the approval of the Cabinet. This would apply to offshore [non-Tongan] RE investors.
- Estate-holders and individual landholders are allowed to lease out all or part of their estates or allotment respectively
- If there is no male heir, then the unmarried daughter(s) may inherit or jointly inherit their father's land until they all get married. If there is no heir at all, then the land reverts to the estate holder for re-granting.

Land ownership is multifaceted within the Tongan societal context. Consequently, land may be a sensitivity subject for certain people. It is paramount for developers and investors to appreciate these sensitivities when seeking and/or acquiring land.

Estate-holders or registered land-holders must either be informed/consulted, either directly or through a legitimate representative, on land requirements of any proposed new electricity generation and electricity infrastructure project in Tonga.

Land allotments for development projects will be obtained through leasing. Lease terms are summarised as follows:

Crown land	Generally, the Minister, with consent of Cabinet may grant a lease of a crown land to a person or entity for a period not exceeding 99 years or a renewal of a lease provided the period not exceeding 99 years from the original lease.
Noble's estates	Generally, a Noble may grant leases provided it does not exceed 5% of his total area of that estate. However, it may exceed if such lease is for religious bodies, charitable institutions, and the Tonga Electric Power Board/Tonga Power Limited).
Tax and Town allotments	The landholder of the allotment may grant a lease of his registered allotment or part of it, with consent of Cabinet.
Leaseholders	The Lessee may grant a sublease of his or her leased property, either in whole or part of it, for sublease. Otherwise, he or she may elect to sell the lease outright for the purpose of the development project.

Any request in writing for a new lease must be served on the Landholder not less than six months before the expiration of the lease.

The Minister at the direction of Cabinet after a request in writing so to do by the holder of the expiring lease to grant to such holder of such expiring lease a further lease for a period not exceeding that granted in the expiring lease provided the rent is all settled, and all other conditions and terms have been observed and performed.

If the Landholder (Lessor) fails to agree to the grant of a new lease for a period equal to that of the expiring lease at a rent not greater than that reserved in such expiring lease within 3 months after a request in writing so to do by the holder (Lessee) of such expiring lease, the Minister may, with the Cabinet direction, grant the Lessee a further lease for a

period not exceeding that granted in the expiring lease.

The common practice is that both parties meet and negotiate the rental, purpose, and duration of the lease. Lease costs vary, however the market value is usually utilised as a guide. All the lease rentals must be paid to the Ministry of Lands, then the lessor (estate holder or landholders) will collect the rentals from them. The administration fees and taxes are deducted before the lessor received his or her share.

The fee for the registration of a lease is $21.00. The fee for surveying depends on the size of the area, $60 for an area less than 1.5 hectare, $70 for an area less than 3 hectares, $180 for an area less than 6 hectares, and $200 for 8 hectares.

Any action or claims in respect with any land matters must be brought before a Court within 10 years.

There is no legislation in Tonga that specifically address matters related to involuntary resettlement. Land acquisition is governed by the Constitution of Tonga, Government Act, and the Land Act, all of which provide the fundamental basis for acquiring land for public purposes, and compensation. In general, the King or the Minister of Lands can compel a landholder to relinquish his allotment or part of his allotment for public use. In fact, the Minister of Lands, with consent of Cabinet, has the power to acquire Crown Land for public purposes.

Although not specifically expressed in the Tongan legal framework, high priority is assigned in practice to the principle of avoiding or minimising involuntary resettlement. In the context of resettlement, it is the first preference to avoid involuntary resettlement if possible, through alternative project location or design. Secondly, focus is given to restoring or enhancing affected people's livelihoods. In effect, individualised land rights in Tonga means that resettlement also means loss of land ownership so that suitable compensation arrangement must be considered for all parties subject to a need for relocation or disruption. If Projects are using development partner funding, consideration will need to be given to the explicit requirements of development partners in each case.

No activities under this Project will require the use of any land laws as all activities occur or are undertaken on Government owned land or contractor-owned yards.

3.3.2 Land Acquisition Transfer Process

The land acquisition process (lease agreement process) is overseen by the Ministry of Land and Natural Resources (MLNR). The land acquisition process and parties involved are set out in Figure 3.2. The formal Land Transfer process is set out in detail in Figure 3.3 which highlights the key role of the MLNR in the decision making process

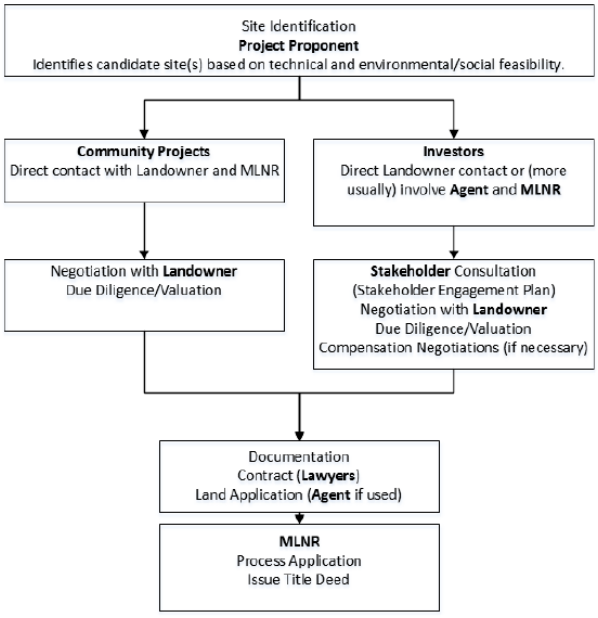

Figure 3.2: Parties involved in the land acquisition process

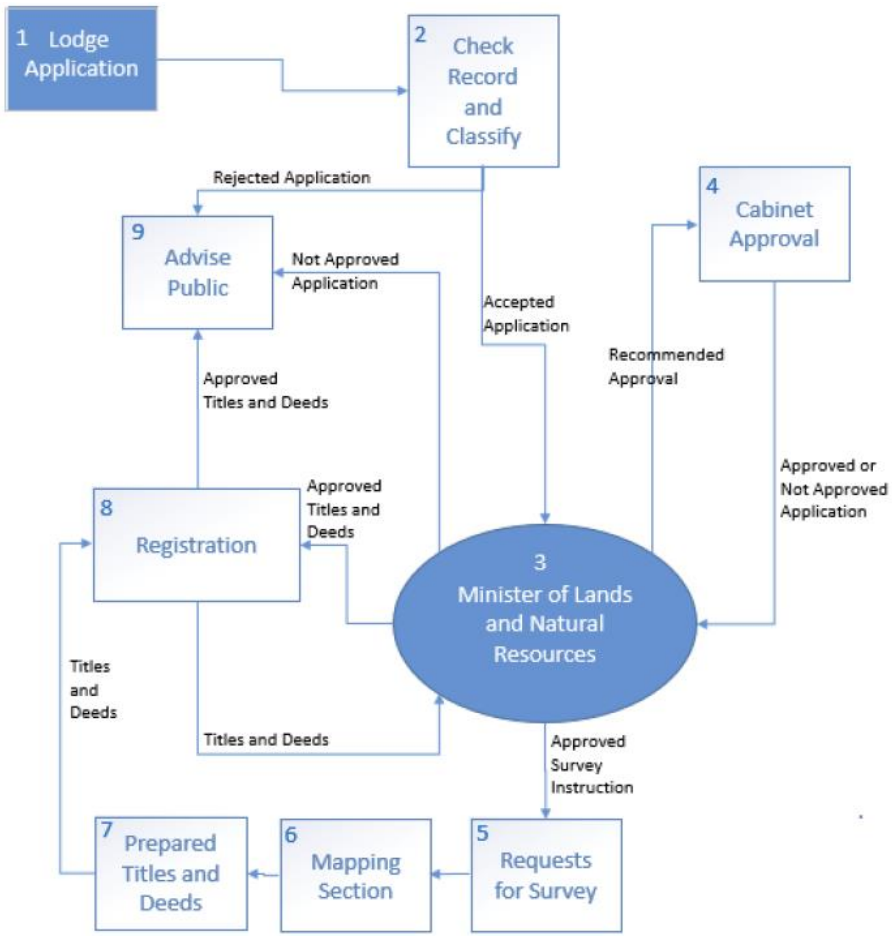

Figure 3.3: Details of Land Transfer process

3.3.3 Building Permit Application – Ministry of Infrastructure

The "Building Control and Standards Act No.39 of 2002" Section 10 requires every person intending to erect a building to obtain a building permit, which in this context, means applying to the Ministry of Infrastructure (MOI). Figure summarises the Building Permit and associated MOI construction approval pathway[3].

All RE projects would generally be caught under the definition of a Building under the Act, other than minor solar panel installations and wind installations involving masts lower than 6 m height. Replacement of existing lines, or installation of new distribution lines would not be expected to trigger the need for a building permit application.

3.4 Environmental Approvals Process

3.4.1 Introduction

Proposals for **all** development activities must be notified to the Minister of Environment, Information, Disaster Management, Energy and Climate Change for approval under the Environmental Impact Assessment Act 2003 and Environmental Impact Assessment Regulations 2010.

The Secretariat and the Minister determine whether the proposed development is a "minor" or a "major" project, and this determination is to be advised to the proponent within 30 days. Proponents of major projects are required to submit a full Environmental Impact Assessment for review by the Secretariat. If the Project is deemed to be a minor project, approval is granted with or without conditions and the Project may proceed.

The broad environmental approval process is summarised in Table 3.1 and Figure 3.5.

[3] From http://www.doingbusiness.org/data/exploreeconomies/tonga/dealing-with-construction-permits/

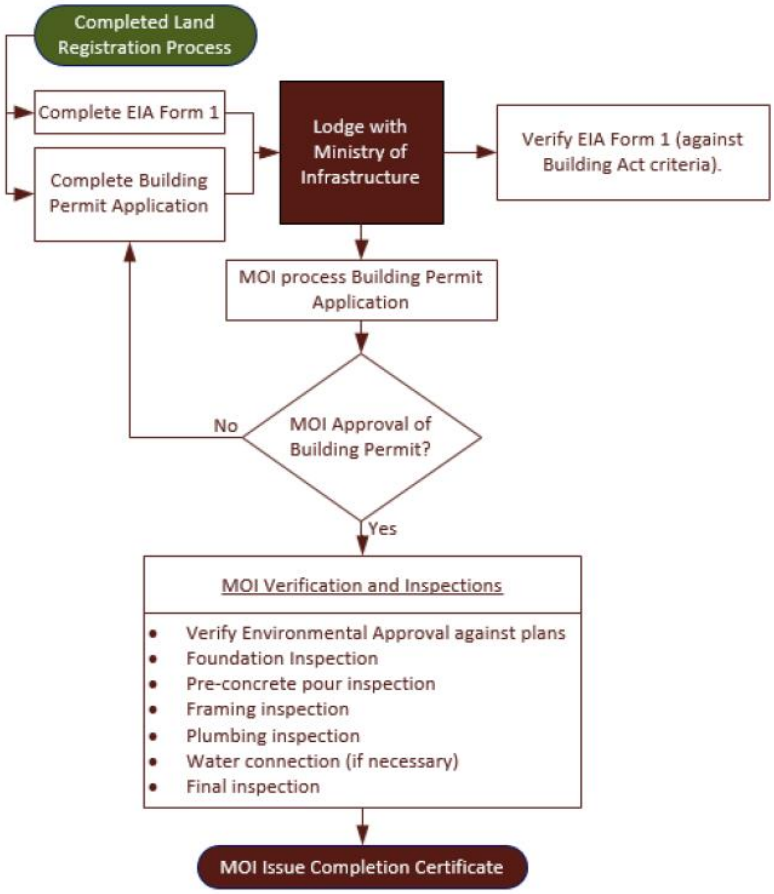

Figure 3.4: Ministry of Infrastructure overview of approval pathway

3.4.2 Application and Initial Evaluation Phase

Submission of Application to EIA Unit

Proposals for **all** development activities when notified to MEIDECC must include a completed "**Form 1**" as set out in Schedule 1 of the Regulations. The Secretariat and the Minister use Form 1 to determine whether the proposed development is a "minor" or a "major" project, and they are required to advise the proponent of this determination within 30 days.

If Proponents don't need any other permits the completed Form 1 may be delivered directly to the EIA Unit at the Environment Office of MEIDECC[4]. The EIA Unit will check that the correct form has been used.

However, most RE development activities would require a building permit from the Ministry of Infrastructure (MOI) in which case the Form 1 would also be lodged with MOI,

Delivering the application to the EIA Unit involves two steps.

1. Delivering the application to the EIA Unit at the Environment Office. The EIA Unit will check that a Form 1 is attached to the building permit application.
2. Paying the $10 registration fee to the EIA Unit at the Environment Office. They will issue a receipt, and keep a photocopy of the receipt for their records. MEIDECC will not process the application until the fee has been paid.

Initial Screening Phase – MEIDECC EIA Unit

An initial screening evaluation is undertaken during consideration of the completed Form 1 provided pursuant to Schedule 1 of the EIA Regulations 2010. The main purpose of Form 1 is to help the Minister determine whether a project should be dealt with as a Minor or

[4] Vuna Rd, Nuku'alofa, Tonga

Major Project.

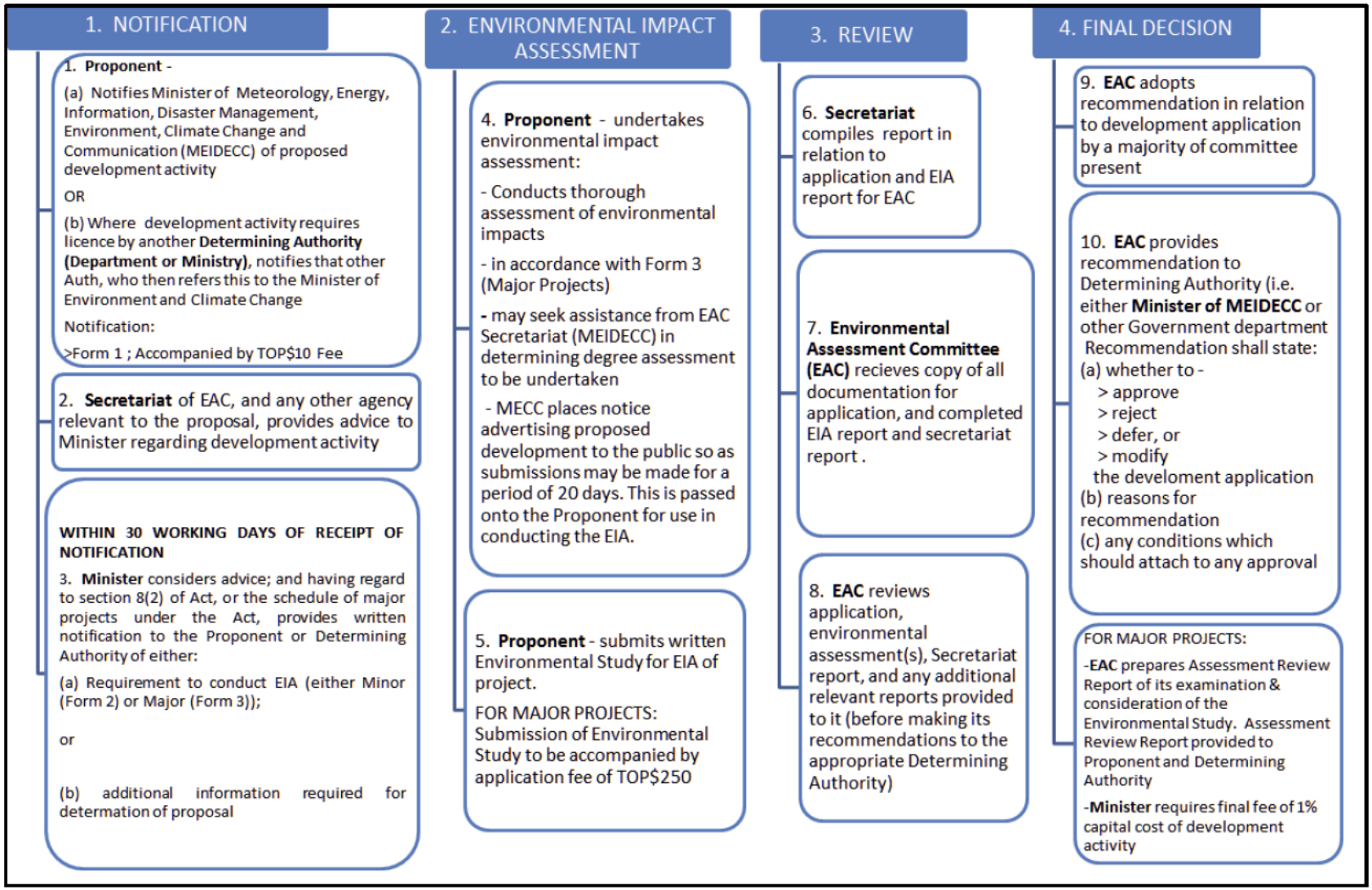

Table 3.1: Environmental Approval Process Detailed Overview

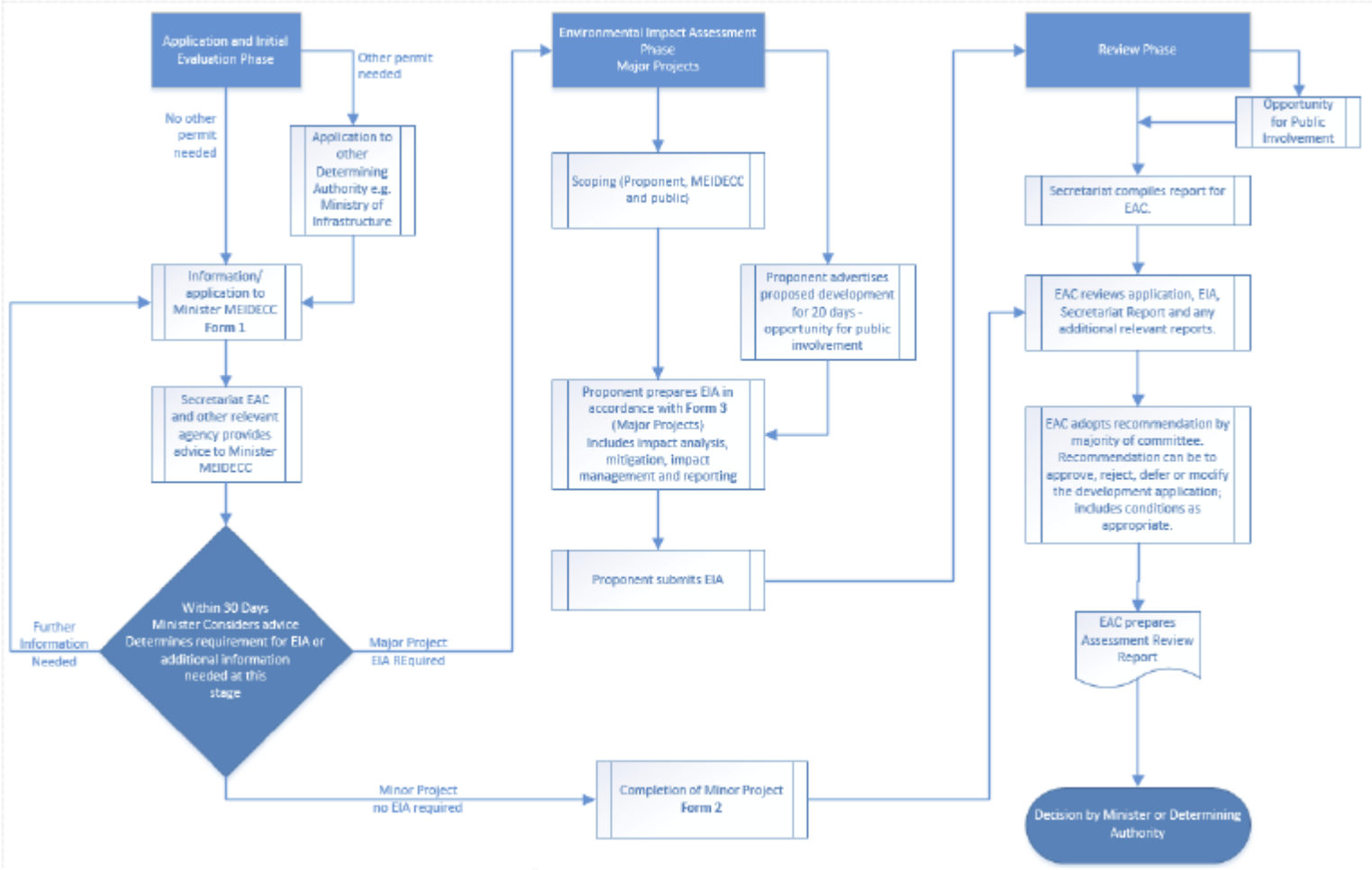

Figure 3.5: Environmental Approval Process Detailed Flowchart

3.4.3 Determination of Major or Minor Project Status

Once the EIA Unit has received the completed Form 1 it is assessed against the criteria in the EIA Act and EIA Regulations to determine whether the development activity is a minor or major project.

The Schedule in the EIA Act classifies a range of transport-related activities as Major Projects including:

(c) buildings, works, or land associated with the landing, take-off, parking or servicing of aircraft or helicopters;

(l) sand or gravel extraction from any beach within 50 metres of the high tide mark;

(r) construction of roads, wharfs, barrages, embankments or levees which affect the flow of tidal waters;

If the project is a Major Project, MEIDECC will issue a Form 3 and explain the next steps of the EIA process to the Proponent. If it is a minor project, the Minister will issue a Form 2.

For a major project, the proponent is required to submit a full Environmental Impact Assessment for review. The Minister subsequently issues an approval (with or without conditions), a request for further information, or a rejection.

For a minor project, approval is granted with or without conditions and the Project may proceed, usually under the provisions of an Environmental Management Plan ("**EMP**") which is binding on the Proponent. The EMP will address environmental management and protection measures and will be specific to the development under consideration.

3.4.4 EIA Preparation Phase - Major Projects

If the Project is defined as a Major Project or if the Minister otherwise so directs based on a risk assessment, the proponent will need to conduct an EIA in accordance with Form 3 (Major Projects) of the Regulations. The purpose of the EIA is to assess potential significant environmental issues associated with a project, and to develop appropriate methods to resolve those issues.

Preparation of the EIA is the responsibility of the Project Proponent.

The EIA element of the process involves a Scoping Phase and a Preparation phase both undertaken by the proponent in collaboration with regulators and other parties as necessary. The comprehensive initial screening undertaken during preparation of the Form 1 appraisal will inform this Scoping exercise and will greatly streamline this stage of the process.

Scoping identifies existing sources of data, key individual contacts and important areas of field study. It increases local, regional and national awareness of the project, its environmental concerns and facilitates rapid data collection and analysis.

The findings of the scoping exercise (i.e. information recorded in the scoping checklist) provide a list of potential environmental issues, which should be considered and assessed in detail in the subsequent EIA.

EIA Regulation 12 sets out factors to be taken into account by the Minister and the Secretariat when considering the likely impact of an activity upon the environment, including provision of an environmental management plan.

Minor Projects – Environmental Management Plan

Minor projects are not required to provide an EIA, and are approved with or without conditions.

Major Projects – Environmental Management Plan

This ESIA incorporates an Environmental and Social Management Plan (ESMP) for each component in partial fulfilment of the requirements of the Act.

3.5 Other Applicable Legislation

3.5.1 Aquaculture Management Act 2003

This Act allows for the designation of areas for aquaculture management and may also declare any associated development buffer zones.

The PIA for this Project is not proximal to any areas designation for aquaculture management.

3.5.2 Bird and Fish Preservation Act 1988

This Act defines species of birds and fish (including turtles) that are protected from being killed, shot, captured, taken or destroyed within their defined protected time period. The Act also defines protected areas within which it is prohibited to:

- Discharge or cause to be discharged into the protected area any effluent or noxious or toxic liquid or substance.
- Erect any harbour, wharf, pier, jetty or other building works, temporary or permanent.
- Cut, damage, remove or destroy any mangrove.
- Erect any fish-fence, or set any fish trap; or trawl for fish (including shellfish) or engage in fishing for commercial purposes.
- Carry out any boring, drilling or dredging operations.

The Tongatapu Lagoon is the only defined protect area within the Act which does not fall within the PIA for this assessment. The listed protected species are not recorded as occurring within the PIA and therefore compliance is assured.

3.5.3 Fisheries Management Act 2008

This Act provides for the sustainable management and extraction of fisheries resources and governs all aspects of the fishery industry within Tonga. It recognizes the importance of protecting marine ecosystems as a whole. This Act also governs the creation and management of Special Managed Areas (SMAs) within the Kingdom.

Regulations for the provision of this Act include those for local fisheries, for processing and export of fisheries resources, for the conservation of fisheries resources and the designation of SMAs. The Project is anticipated to be in compliance with this Act.

3.5.4 Parks and Reserves Acts 1988 (CAP 89)

This Act provides for the establishment of a Parks and Reserves Authority and for the establishment, preservation and administration of parks and reserves. It enables the Parks and Reserves Authority to seek permission to declare any area or land or sea to be a protected area. The attached schedules to this Act define five marine reserves: Hakaumama'o Reef, Pangaimotu Reef, Monuafe Island Park and Reef, Ha'atafu Beach and Malinoa Island. The Parks and Reserves Declaration Amendment (1992) established the 'Eua National Park on 'Eua Island.

None of the marine reserves or parks are within the PIA of the Project (see Section 4.2.3 for further detail).

3.5.5 Applicable International and Regional Policies

Convention on Biological Diversity (CBD) (1998)

The CBD is a multilateral treaty with three goals:

- Conservation of biodiversity
- Sustainable use of its components, and
- Fair and equitable sharing of benefits arising from genetic resources.

The convention was opened for signature at the Earth Summit in Rio de Janeiro in 1994 and was ratified by Tonga in 1998. As part of its obligations to the CBD, Tonga has developed a National Biodiversity Strategies and Action Plan (NBSAP) in which Tonga

identifies several actions under the CBD in respect to the protection of marine ecosystems. When considered in relation to this project, actions include:

- Reducing the impact of land-based activities by prohibiting dumping and chemical discharges, prohibiting sand mining, conducting environmental assessments on development and reducing erosion.
- Increase the number of marine conservation areas (which is currently underway in Vava'u, but in an area not associated with this project).
- Promoting sustainable management of marine ecosystem.

Convention for the Protection of the World Cultural and Natural Heritage (2004)

This convention founded the UNESCO World Heritage Site List (the List). To be a site on this List, it must be a place of special cultural or physical significance. The programme catalogues names and conserves sites of outstanding cultural or natural importance to the common heritage of humanity.

Tonga became a signatory to this convention in 2004. It does not have any approved sites on the List but does have two tentative items for consideration for the List, neither of which are in the geographic range impacted by this project.

The Convention for the Protection of Natural Resources and Environment of the South Pacific (SPREP or Noumea Convention) (1990).

This convention finds force of law in Tonga through the Marine Pollution Prevention Act 2004. This convention, along with its two protocols, entered into force in 1990. The convention is a comprehensive umbrella agreement for the protection, management and development of the marine and coastal environment of the South Pacific Region. As a signatory of the SPREP convention, Tonga has agreed to take all appropriate measures in conforming to international law to prevent, reduce and control pollution in the Convention Area from any source, and to ensure sound environmental management and development of natural resources.

3.6 World Bank Safeguards Policies

3.6.1 Introduction

This ESIA is based on the following World Bank ["WB"] Operational Policies ["OPs"][5]. The WB Environmental and Social Framework 2017[6] has not been applied as it is not yet in force.

Environmental and Social Policies

OP 4.01 Environmental Assessment

OP 4.04 Natural Habitats

OP 4.10 Indigenous Peoples does not apply to this Project – indigenous peoples are broadly defined as "*distinct, vulnerable, social and cultural group attached to geographically distinct habitats or historical territories, with separate culture than the project area, and usually different language*". This definition does not apply to the Tongan situation.

OP 4.11 Physical Cultural Resources (PCR)* does not apply as the Project involves works to existing infrastructure

OP4.12 Involuntary Resettlement does not apply. See Section 3.6.4 below for further analysis.

The relevant WB Policies OP 4.01 and OP 4.04. These policies are addressed further below.

3.6.2 Operational Policy 4.01 – *Environmental Assessment*

The WB requires an Environmental Assessment (EA) of Projects proposed for WB financing

[5] https://policies.worldbank.org/sites/ppf3/Pages/Manuals/Operational%20Manual.aspx
[6] http://documents.worldbank.org/curated/en/383011492423734099/pdf/114278-WP-REVISED-PUBLIC-Environmental-and-Social-Framework.pdf

to ensure they are environmentally sound and sustainable, thereby improving decision-making.

OP 4.01 classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts:

Category	Status
A	Likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented.
B	Potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects.
C	Likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.
FI	Involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

The Project, assessed as a Category B Project, with this ESIA presenting information on the following matters identified in OP 4.01:

- measures to prevent, minimise, mitigate or compensate adverse impacts (Section 7),
- public consultation and disclosure as part of the EA process (Section 6.4.7) and
- an Environmental and Social Management Plan (ESMP) (Section 7).

3.6.3 Operational Policy 4.04 – *Natural Habitats*

OP 4.04 Natural Habitats requires the conservation of natural habitats and specifically prohibits the support of projects that involve significant conversion or degradation of critical habitats, as defined by the policy. No such significant habitat effects are identified in relation to the Project, but there remains the possibility of low to medium level adverse impacts on the marine environment and therefore consideration is given to the requirements of OP 4.04.

The policy requires the EA to identify impacts on biodiversity and species; to determine project impacts on these species; and to propose acceptable mitigation and monitoring measures. These matters are addressed in Section 6.2 of this ESIA.

3.6.4 Operational Policy 4.12 – *Involuntary Resettlement*

OP4.12 addresses direct economic and social impacts from the projects activities that will cause:

a) involuntary taking of land resulting in loss of income sources or of livelihoods; and

b) involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

This policy requires siting of project infrastructure to be chosen as to avoid these impacts altogether or to minimise them to the extent possible. Where these cannot be avoided, the policy requires the preparation of either or both of these instruments:

(i) resettlement policy framework,

(ii) Resettlement Action Plan,

and for meaningful consultations with potentially affected people. The policy prohibits community donations of lands for location specific infrastructure.

The policy covers direct economic and social impacts that result from Bank-assisted

investment projects, and are caused by (a) the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) **loss of assets or access to assets; or (iii) loss of income sources or means of livelihood,** whether or not the affected persons must move to another location; or (b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

OP4.12 Involuntary Resettlement is not triggered on the basis that:

(iii) Land to be used for the Project is either Government (including the Road Reserve and other Project sites) or Contractor owned or leased with no activities proposed on private land; and

(iv) The Road Contractor will adopt measures during road works activities to ensure all potential impacts relating to loss of assets, access to assets, the loss of income sources or means of livelihood are mitigated through the adoption of works procedures as described in Sections 6 & 7.

4 Description of the Environment

4.1 Introduction

This section provides information on the physical, biological and socio-economic elements of the environment, which forms the baseline dataset that can be used as benchmarks for any potential future monitoring requirements.

The area considered for assessment of baseline conditions (the "Project Influence area" or "PIA") consists of:

- The road corridor and immediate adjacent environment.
- Quarry locations and immediate surrounds.

Although other Project locations such as contractors yards, lay down or stockpile areas are unknown at this stage, potential impacts arising and mitigation measures have been described.

The PIA is defined through consideration of the project footprint including all ancillary project components and potential impacts on environmental, economic and social resources.

Table 4.1 outlines the guidelines that have been followed to determine the PIA for the Project which is based around a precautionary approach. All data was obtained by desktop study and a field survey conducted in May and June 2018.

Table 4.1: Project influence areas delineations and conditions

Environment	PIA
Local villages/communities	Adjacent to road alignment
Important Species Habitat	Sensitive ecological areas in close proximity to roads potentially receiving road runoff during construction / operation
Inshore Waters (adjacent to coastline)	Assuming a precautionary approach, an area directly adjacent to road corridor potentially receiving road runoff during construction / operation

4.2 General Environmental Description

Tonga is an archipelago located directly south of Samoa and about two-thirds of the way from Hawaii to New Zealand. Consisting of 169 islands, 36 of them inhabited, Tonga is divided into three main groups Tongatapu, Vava'u and Ha'apai which lie approximately 800 km north to south (see Figure 4.1).

The largest island, Tongatapu, on which the capital city of Nuku'alofa is located, covers 257 km^2. Geologically the Tongan islands are of two types: most have a limestone base formed from uplifted coral formations; others consist of limestone overlaying a volcanic base.

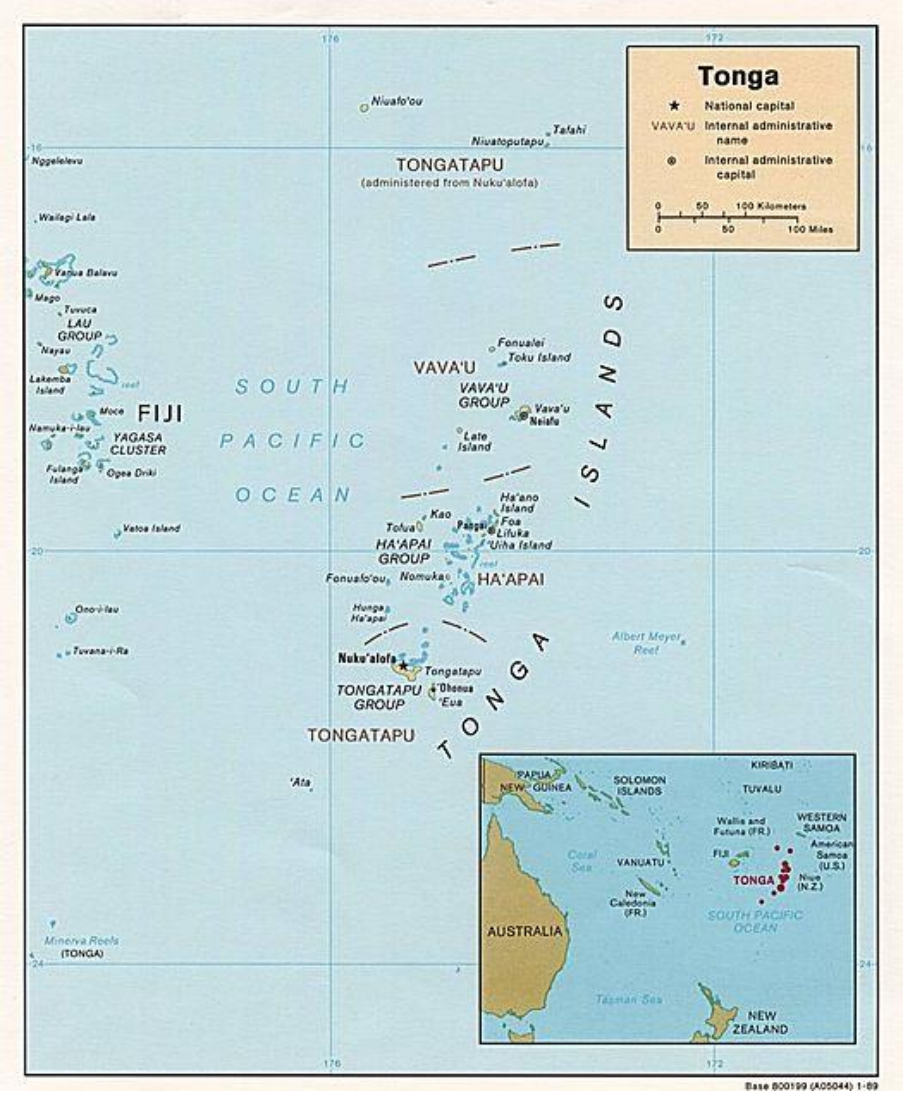

Figure 4.1: Location of Tonga and island groups in the Kingdom of Tonga.

4.3 Physical Environment

4.3.1 Climate

The climate is tropical with a distinct warm period (December–April), during which the temperatures rise above 32°C and a cooler period (May–November), with temperatures rarely rising above 27 C. Between Tongatapu in the south and the more northerly islands closer to the Equator, temperatures increase from 23 to 27 C and the annual rainfall from 1,700 to 2,970 millimetres. The average wettest period is around March with on average 263 mm. Average daily humidity is 80%.

Wind

Winds in Tonga are dominated by the south east trades which generally blow between 12-15 knots although wind speeds tends to be stronger from May to October. Figure 4.4 presents the annual wind rose showing predominant wind direction in Tonga.

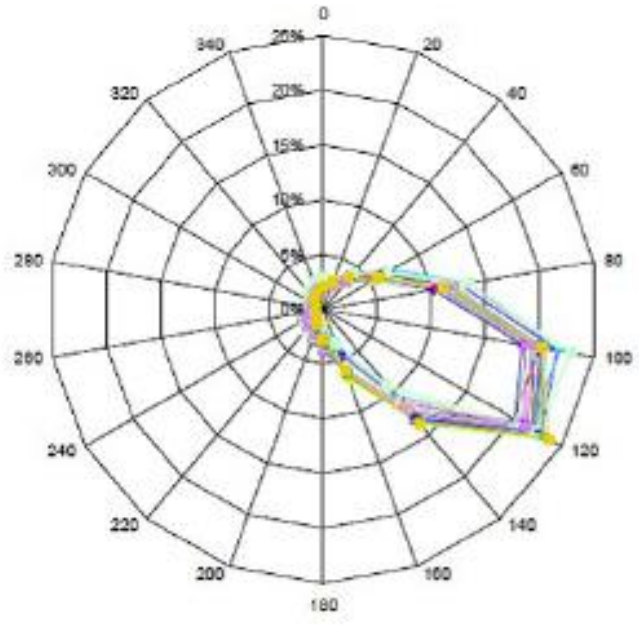

Figure 4.4: Annual wind rose showing predominant wind direction in Tonga.

Cyclones

Cyclone season is from November to April. In the 25 year period between 1989 and 2014, 19 cyclones tracked through the Tonga group of islands with 13 of those making landfall: 10 in Ha'apai, two in Vava'u and one in Tongatapu. Typically, the paths of cyclones are from the northwest, moving in a south-easterly direction (Figure 4.5).

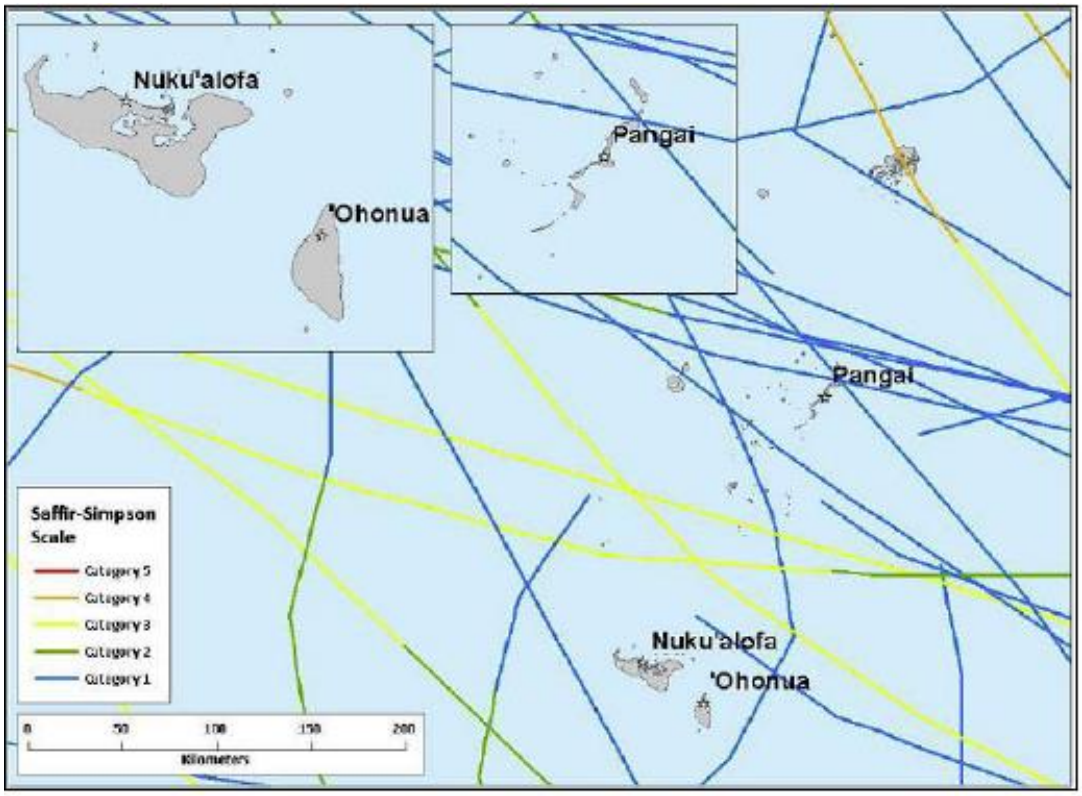

Figure 4.5: Category 3 and higher cyclone activity in Tonga 1945 – 2008[7]

[7]World Bank 2008. Pacific Catastrophe Risk Financing Initiative, Country Risk Profile: Tonga . Boston, MA: Air Worldwide on behalf of World Bank, SOPAC and GFDRR.

4.3.2 Climate Change

The IPCC Fifth Assessment Report[8] provides broad scale climate change projections for the Pacific region. A more detailed assessment of past and potential future climate change was carried out for the region[9]. The key points are as follows:

- Surface air temperature and sea surface temperature are projected to continue to increase (very high confidence). Annual mean surface temperatures are expected to be between 0.5° to 1°C higher by 2030 relative to 1990 and by 1°C to 2°C depending on emission scenario by 2055.
- The intensity and frequency of days of extreme heat are projected to increase (very high confidence).
- Annual and seasonal mean rainfall is projected to increase (high confidence). Increases in annual mean rainfall are projected to be most prominent near the SPCZ, with widespread increases in the number of heavy rain days (20-50 mm).

A number of projections however, suggest that islands located near the eastern edge of the SPCZ, such as Tonga, may become drier in the wet season as the trade winds in the south-east Pacific become stronger. There is also some suggestion of a shift towards the equator of the SPCZ in the dry season (May to October), which could increase mean rainfall during these months. In addition:

- The intensity and frequency of days of extreme rainfall are projected to increase (high confidence), for example rainfall events that occur on average once every 20 years are generally simulated to occur four times per year by 2055 (high emission scenario).
- Tropical cyclone numbers are projected to decline in the south Pacific sub-basin but with an increase in the proportion of more intense storms by the late 21st century. The occurrence of tropical cyclones affecting Niue will still be closely linked to the occurrence of periods of El Niño which will have a much more dominant influence on the cyclone occurrence than potential gradual changes in long-term average cyclone activity due to climate change.

Sea-level Rise

The rate of rise of sea levels across the globe is far from uniform. In some places, notably the western Pacific, sea levels have been rising rapidly (> 10 mm a year in some places), in others it has fallen. Since 1993 these regional differences have been measured by satellite (Figure 4.8). Tonga is on the edge of the area in the western Pacific that has experienced large rates of sea-level rise over the period of satellite recording period.

Over the longer term it is expected that sea-level rise over this last century around Tonga will have been close to the global average of about 0.19 m between 1901 and 2010.

Sea levels will continue to rise primarily because of thermal expansion within the oceans and loss of ice sheets and glaciers on land. Even if greenhouse gas emissions were stabilised today, sea levels would continue to rise. Sea levels to about 2050 are relatively insensitive to changes in emissions over this timeframe because of the time it takes the oceans to respond to changes in carbon dioxide and atmospheric temperatures, but future changes and trends in emissions become increasingly important in determining the magnitude of sea level rise beyond 2050.

The rate of global mean sea level rise during the 21st century is expected to exceed the rate observed during 1971–2010 due to increased ocean warming and loss of mass from glaciers and ice sheets[10]. For the period 2081–2100, compared to 1986–2005, global mean sea level is likely to be between 0.26–0.54 m for the lowest emission scenario considered (Representative Concentration Pathway scenario, RCP2.6) to between 0.45–0.81 m for the

[8] IPCC, 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.
[9] Australian Bureau of Meteorology & CSIRO, 2011. Climate change in the Pacific. Scientific assessment and new research. Volume 1: Regional overview.

highest emission scenario (RCP8.5) (Figure 4.9).

High tides and extreme sea levels are likely to increase close to the same rate as mean sea-level rise in Niue. There is nothing obvious to suggest that storm surge has increased in magnitude or frequency or will do so within the next one to two generations (30 - 50 years).

Long-term sea-level rise will continue to push sea levels higher resulting in high tide levels increasingly exceeding what may be presently considered extreme or king- tide level.

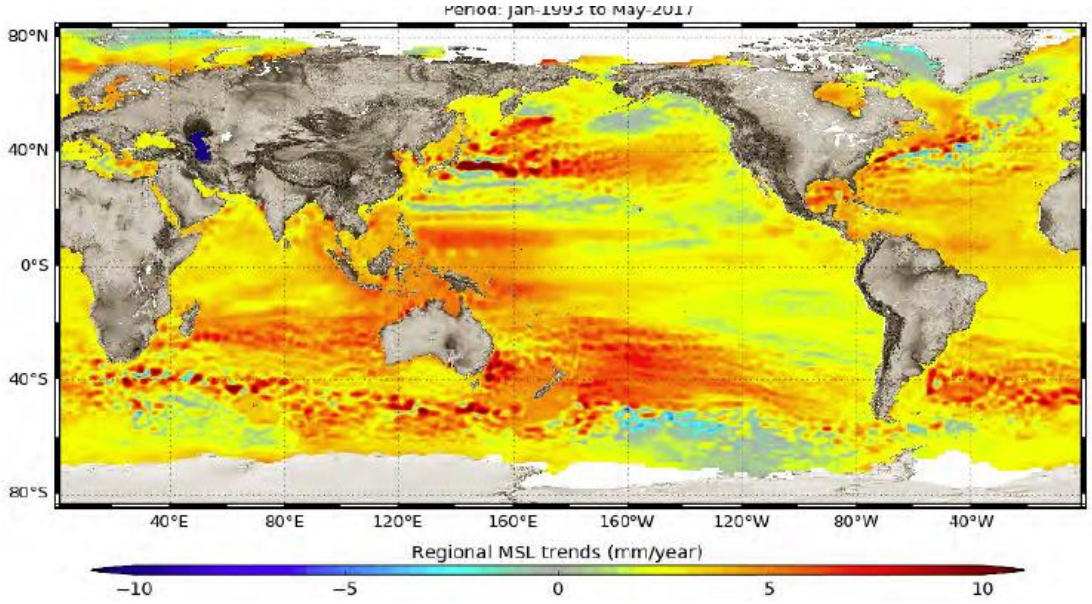

Figure 4.8: Global distribution of the rate of absolute sea-level rise between January 1993 and May2017 from satellite altimeter data. Source: https://www.aviso.altimetry.fr/en/data/products/ocean-indicators-products/mean-sea-level.html

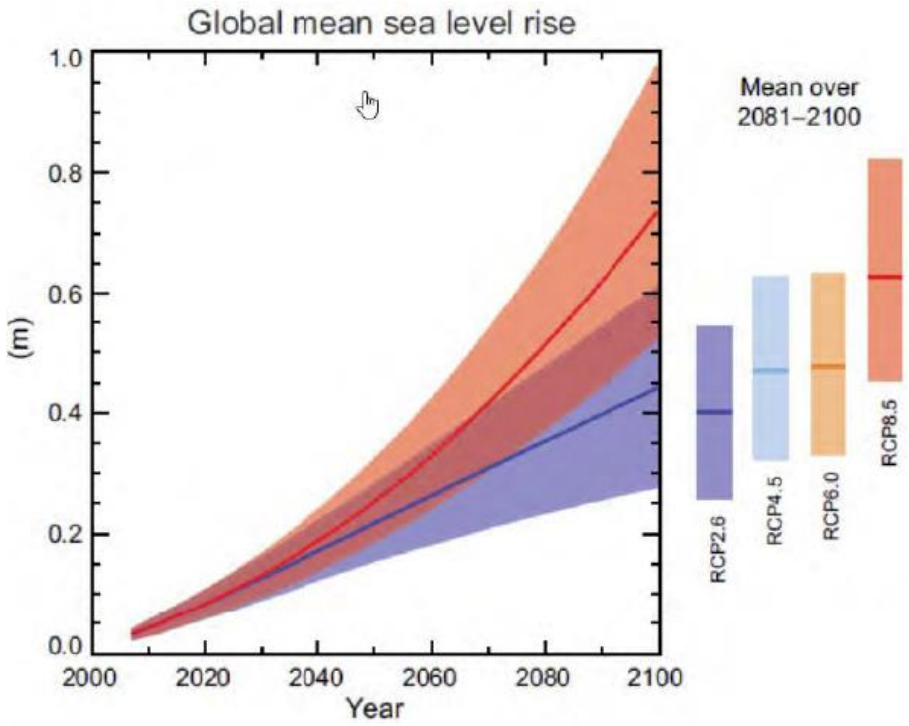

Figure 4.9: Projected global mean sea-level rise to 2100 relative to the average mean sea level between 1986 to 2005 for the four future scenarios presented in the Intergovernmental Panel for Climate Change Fifth Assessment Report (IPCC, 2013).

Modelling has been undertaken to determine the extent of coastal inundation in Lifuka,

Ha'apai, taking into climate change predictions[10]. An intermediate–high scenario based on projected global warming for 2100 is shown in Figure 4.10. This does not include intermediate flooding and associated risks due to higher-frequency events such as storm surge and wave setup during tropical cyclones (see Section 4.3.3).

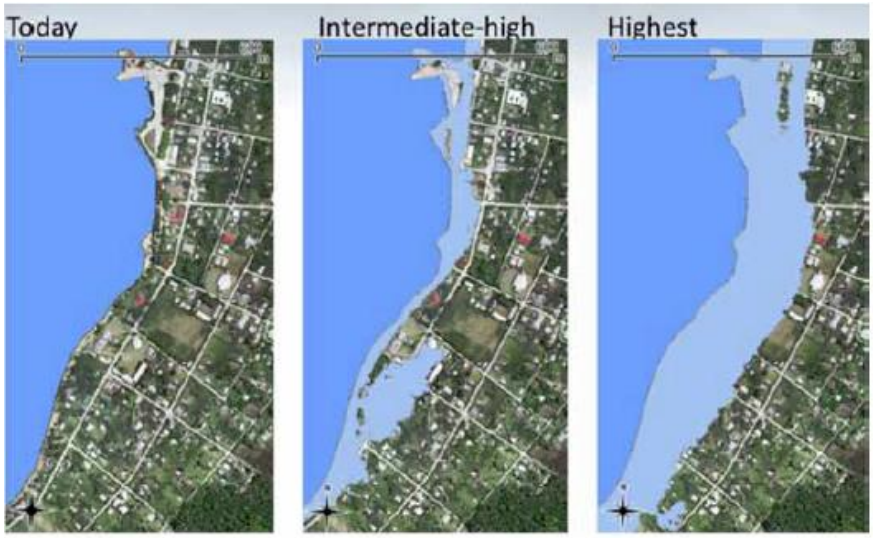

Figure 4.10: Water level scenario in Pangai in 2100.

4.3.3 Coastal Hazards

Tides

The astronomical tide is a mixed, dominant semi-diurnal type with high water levels alternately higher and lower than the average (high water level). Mean spring tide range is around 1.1 m, maximum spring tide range approximately 1.5 m, and mean neap range around 0.6 m.

Tide ranges and high tide levels vary over different timeframes (e.g. daily, two weekly Spring- Neap tide, 7 month perigean-spring cycle). Longer-term cycles also influence tide range and magnitude of the highest tide. Of particular relevance is the 8.85 year complete cycle of the lunar perigee which influences high tides on a 4.4 year cycle.

Tide levels (and hence the level of the sea observed at any one time) can be also be elevated (or lowered) by other factors, the most significant in the Pacific is the ENSO cycle: During El Niño phases sea levels are pushed down (resulting in lower high tide levels), and conversely during La Niña phases sea levels are pushed up (resulting in higher high tide levels). However, the influence of ENSO on mean sea level variability is not as pronounced as in the Pacific Islands further west with variability in mean sea levels tending to be less than 0.15 m.

Any changes in tide levels as the results of changing climate could potentially affect the groundwater levels beneath the runway in Lifuka (see Section below) thus having a potential impact on the longevity of the new runway surface.

Tsunami

A tsunami is a series of water waves caused by the displacement of a large volume of water. Tsunamis have a small wave height offshore and a very long wavelength, which is why they generally pass unnoticed at sea. They grow in height when they reach shallower water in a wave shoaling process.

A tsunami in 2009, the most recent to affect the Tongan archipelago, was generated by an 8.1 magnitude earthquake located within the Samoan Islands which sent three 6m high waves towards Tonga (Figure 4.11). The majority of the damage in Tonga was to the northernmost islands of Niuatoputapu located 500km to the north of Nuku'alofa.

[10] SPC 2014. Assessing vulnerability and adaptation to sea-level rise: Lifuka Island. SOPAC Report

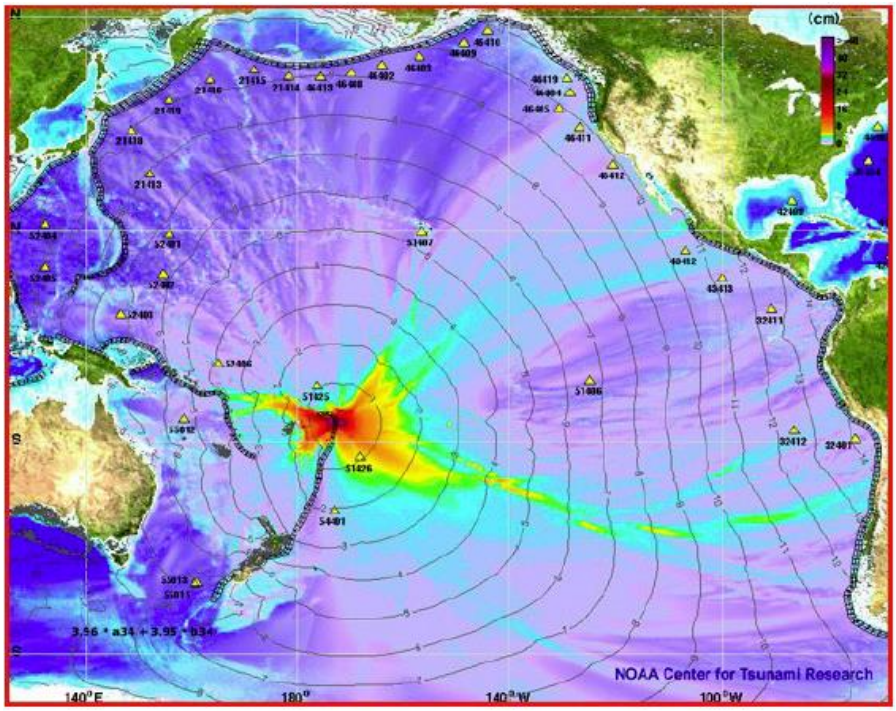

Figure 4.11: 2009 tsunami wave height and travel time[11].

Coastal Inundation

Potential storm surge associated with a tropical cyclone with a one-in-one-hundred years return frequency (1:100 year event) has been modelled for Lifuka Island in the Ha'api Group of Islands[10]. Such an event — equivalent to a tropical cyclone category 5 - could be highly damaging to the lives and livelihoods of the Lifuka community.

The extent of damage would depend on a number of factors, including location on stable or unstable (erosive) land, proximity to the foreshore, the speed of waves, the elevation of the houses, depth of flooding, etc

Based on the modelling conducted, several key zones have now been identified (Table 4.2). Figure 4.12 shows the hazard zones that take into account both slow-onset hazards such as sea-level rise and erosion, and rapid-onset hazards such as extreme storm tides and inundation.

Table 4.2: Key zones around Lifuka

Null zone	Areas around Lifuka island that would not be susceptible to inundation in a 1:100 year tropical cyclone event
Hazard zone	Areas that would be inundated during a 1:100 year event and that could be subject to wave action of waves <1 m in height
High hazard zone	Areas that would be inundated as a result of a 1:100 year event and that would be subject to damaging waves of =>1 m in height
Coastal setback zone	Area that is subject to long-term coastal erosion

[11] NOAA Centre for Tsunami Research.

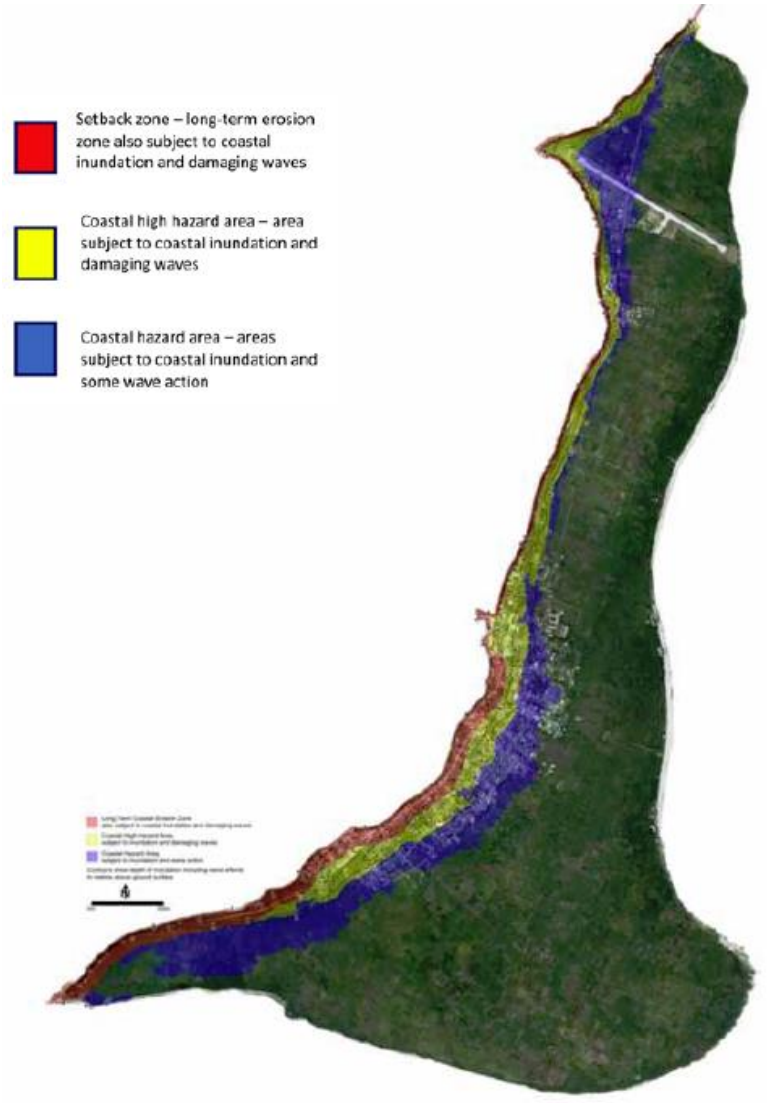

Figure 4.12: Hazardous zones in Likuka for a 1:100 year storm event

Figure 4.13 presents the modelling output which shows an intermediate–high sea-level rise (1.2 m by 2100), coupled with a cyclone in 2100, which would affect the western part of the runway. The dark red area depicts the coastal high hazard area subject to inundation and damaging waves. The light red area refers to coastal areas that are subject to inundation and some wave action. The contours show depth of inundation including wave effects in metres above ground level. By 2100 some of the coastal roads proposed for works could potentially be affected by a 1-3 m inundation.

Figure 4.13: Year 2100 flood depths (m) for Koulo and Holopeka (left), Pangai (middle) and Hihifo (right)

4.4 Ecological Resources

4.4.1 Coastal & Aquatic Ecology

Marine Protected Areas

Tonga has several national marine reserves as set out in Table 4.3. None of the reserves are located within the PIA.

Table 4.3: Marine Reserves in Tonga

Name of Reserve	Location and Size	Biodiversity Element
Hakaumama'o Reef Reserve, Tongatapu.	126 Ha area North of Tongatapu	Parrotfish on the coral reef.
Pangaimotu Reef Reserve, Tongatapu.	48 Ha area on the eastern edge of Nuku'alofa harbour	Mangrove forest and eelgrass, along with a wide range of shellfish and invertebrates, including sea cucumbers, marine snails and sea urchins, and with reef fish.
Malinoa Reef & Island Reserve, Tongatapu	73 Ha island located seven kilometres north of Nuku'alofa.	Range of fish species including octopus, grouper, clownfish and damselfish.
Ha'atafu Beach Reserve, Tongatapu .	Western tip of Tongatapu, 2km west of Nuku'alofa	Tropical fish and a variety of soft and hard corals.
Monuafe Island and Reef Reserve, Tongatapu	32 Ha island reserve, some 6.4km north-east of Nuku'alofa.	Beach vegetation, butterfly fish and marine snails.
Fanga'uta and Fangakakau Lagoons Marine Reserve, Tongatapu	2835 Ha reserve protecting a tidal, double lagoon complex on Tongatapu's northern coast.	Large stands of mangrove forest and saltmarsh, along with shellfish, invertebrates and wading birds such as the Pacific reef heron, the Pacific black duck, the great crested tern and Pacific golden plover.

Fisheries Special Management Areas (SMAs)

Since 2002 a total of 11 Fisheries Special Management Areas (SMAs) have been established by the Coastal Fisheries Section of the Ministry of Fisheries and located in Vava'u, Ha'apai, and Tongatapu[12]. These SMAs are areas where local communities are given responsibilities for fisheries management according to SMA Management Plans. None of the SMAs are located in the PIA.

4.4.2 Terrestrial Ecology

Tonga has 4 National Parks, 2 Parks, one Nature Reserve, one Faunal Reserve, one Sanctuary, one Multiple Use Conservation Area, and 4 other Protected Areas [13] as follows:

- **National Parks** - Eua National Park, 'Eua (450 ha) Mount Talau National Park, Vava'u,

[12] FAO Fisheries and Aquaculture Circular No. 1137

[13] https://www.unep-wcmc.org/wdpa/

Kao NP 1,250 ha**,** Tofua NP 4990 ha

- **Parks Ha'amonga** – Trilithon, Vava'u Coral Gardens Marine Park
- **Nature Reserves -** Vaomopa
- **Faunal Reserves -** Volcanic Island forest reserves
- **Sanctuaries -** Mounu Reef
- **Multi / Multiple Use Conservation Areas -** Ha'apai
- **Other Protected Areas -** Falevai, Neiafu Harbor Wreck, Nukuhetulu

None of these Park or Reserve areas are located in the PIA.

4.5 Socio-economic Environment

The following description and analysis of the socio-economic environment in each island is based on the information outlined in Appendix 4 of this report.

Population

Population data is provided in the 2016 census[14]. The following key points can be made:

- the Kingdom of Tonga has a total population of 100,651 (50,312 males and 50,433 females) compared with 103,252 in 2011.
- The largest Island, Tongatapu, has 74% of the population (74,611) and with a land area of 257 km^2, this equates to a population density of 290.6 persons per km^2.
- Vava'u, Ha'apai, 'Eua and Niuatoputapu have populations of 13,740, 6,144, 4,950 and 1,232 respectively and with land areas of 138, 109.3 87.4 and 71.7 km^2 respectively, equating to population densities of 99.5, 56.2 56.6 and 17.2 persons respectively per km^2.

Since the 2011 census there has been an overall population decline in Tonga of 2.5% with islands ranging from 1.1 % (Tongatapu) to 7.9% (Vava'u). The issues associated with population decline in outer islands are likely to be many and varied but it is possible that the ongoing investment in Road Project may in a small part assist with retaining population in these locations.

Employment

The key points relating to economic activity in the Islands identified in the 2016 census[14] are as follows:

- In Vava'u, 5,715 (41.5%) of the total population of 13,738 are economically active with 1,850 (13.5%) subsistence workers. 14% of the population are unemployed.
- In Vava'u, 5,715 (41.5%) of the total population of 13,738 are economically active with 1,850 (13.5%) subsistence workers. 14% of the population are unemployed.
- In Ha'apai, 2,828 (46%) of the total population of 6,125 are economically active with 918 (15%) subsistence workers. 9.7% of the population are unemployed.
- In 'Eua, 2,143 (43.4%) of the total population of 4,945 are economically active with 717 (14.4%) subsistence workers. 12.4% of the population are unemployed.

Possible short-term employment opportunities associated with the Project will assist with providing paid employment to local villagers in the islands.

Further analysis of the socio- economic information and the outcome of the consultation exercise set out in Appendix 4 indicates the following:

[14]Tonga 2016. Census of population and housing. Volume 1: basic tables and administration Report. Tonga Statistics Department.

- The Villages across all of the islands are dependent on functioning roads for their survival.
- The high levels of subsistence agriculture mean that access to and from agricultural areas and to markets is essential.
- Well maintained roads are important for safety reasons.
- Roads that are resilient to the effects of climate are important for continued road use.

4.6 Site Specific Environmental Characteristics

Tables 4.4-4.7 identify key baseline environmental characteristic and sensitive receptors adjacent to each road where road works have been identified for the four islands. The potential impact of road works activities on these communities is considered in Sections 6 & 7. Key points are summarised in the following sections.

Table 4.4: Key social, ecological and physical environment characteristics - Tongatapu

Roads	Proposed Work	Current Road Type	Existing Environment		
			Social	Ecological	Physical
Hoi - Kolonga (Taufa'ahau)	Upgrading/ Chip Seal	Paved	Hoi Village at southern end, Kolonga Village at northern end	Adjacent terrestrial environment dominated by farmland	Flat gradient
Liku Road 1 (Fuaamotu-Utulau)	Upgrading/ Chip Seal	Paved	Utulau Village at western end	Adjacent terrestrial environment dominated by farmland	Flat gradient
Liku Road 2 (Haveluliku - Hoi Int)	Upgrading/ Chip Seal	Paved	Haveluliku Village adjacent to southern end	Adjacent terrestrial environment dominated by farmland	Flat gradient
Loto Road 1 (Foui-Matahau)	Upgrading/ Chip Seal	Paved	Foui Village at western end and Matahau Village at eastern end	Adjacent terrestrial environment dominated by farmland	Flat gradient
Loto Road 2 (Makapaeo-Matahau)	Upgrading/ Chip Seal	Paved	No villages directly adjacent	Adjacent terrestrial environment dominated by farmland	Flat gradient

Table 4.5: Key social, ecological and physical environment characteristics - Vava'u

Roads	Proposed Work	Current Road Type	Existing Environment		
			Social	Ecological	Physical
Tefisi - Longomapu (Toafa)	Chip Seal	Paved (mainly)	Longamapu Village at western end, Tefisi Village at eastern end	Adjacent terrestrial environment dominated by farmland, Ano lagoon to the south	Steeper road gradients in places, existing drainage showing signs of wear
Vaipua - Tefisi	Chip Seal	Paved	Tefisi Village at northern end	Tidal inlet toward southern end	Steeper road gradients in places
Saineha - Int Pongi Petrol Stn	Chip Seal	Paved	Residential properties in Neiafu	No significant ecological resources	Flat gradient
Ta'anea - Tu'anekivale	Chip Seal	Paved	Ta'anea Village at northern end Tu'anekivale Village at southern end	Adjacent environment dominated by farmland, Inlet toward southern end	Steeper road gradients in places particularly to inlet, drainage in place
Tu'anuku - Longomapu	Chip Seal	Unpaved	Southern side of Longomapu Village, clearance to edge of road corridor required	Adjacent terrestrial environment dominated by farmland, Ano lagoon to the east and smaller lagoon to the west	Undetermined
Toula-Pangaimotu	Chip Seal	Paved	Toula Village at northern end Pangaimotu Village at southern end	Causeway across tidal inlet to Koko Bay located along road, adjacent terrestrial environment dominated by farmland.	Steeper road gradients in places particularly towards inlet, existing drainage in place
Mataika-Mangia	Chip Seal	Unpaved (presumed)	Mataika Village at north-eastern end and Mangia Village at south-eastern end, clearance to edge of road corridor required, used for access to lots, more direct route between villages	Adjacent terrestrial environment dominated by farmland, road corridor dominated by a range of common species	Undetermined
Tukulalo Road	Rehab & Chipseal	Paved	Mangia, Houma Ha'akio villages located along its length	Adjacent environment dominated by farmland	Flat gradient, existing drainage appears sufficient
Laifone Road	Rehab & Chipseal	Paved	Residential properties in Neiafu at south-western end	Adjacent environment dominated by farmland	Flat gradient, existing drainage appears sufficient
Vaihoi Road(Leimatua-Tefisi)	Upgrade and seal	Paved, compacted coral and unpaved	Leimatua Village at north eastern end and Tefisi Village at south- western end	Adjacent environment dominated by farmland and tidal inlet with mangroves	Mixed flat and steeper gradients, ponding in places indicating drainage issues
Vavau 1 (VVU14AGR01)	Upgrade and seal	Unpaved (presumed)	No villages in close proximity	Adjacent environment dominated by farmland and lagoon	Undetermined
Vavau 2 (VVU14AGR02)	Upgrade and seal	Paved	No villages in close proximity	Southern end close to tidal inlet	Mixed flat and steeper gradients.
Vavau 3 (VVU14AGR03)	Upgrade and seal	Compacted coral	No villages in close proximity, used for access to lots	Adjacent terrestrial environment dominated by farmland.	Mixed flat and steeper gradients
Vavau 4 (VVU14AGR04)	Upgrade and seal	Compacted coral?	No villages in close proximity, used for access to lots	Adjacent terrestrial environment dominated by farmland.	Mainly flat with occasional steeper gradients
Vavau 5 (VVU14AGR05)	Upgrade and seal	Compacted coral	No villages in close proximity, used for access to lots	Adjacent terrestrial environment dominated by farmland.	Mainly flat with occasional steeper gradients, existing drainage appears sufficient
Vavau 6 (VVU14AGR06)	Upgrade and seal	Paved	Leimatua Village at eastern end	Adjacent terrestrial environment dominated by farmland.	Mainly flat with occasional steeper gradients, existing drainage appears sufficient
Vavau 7 (VVU16AGR01)	Upgrade and seal	Existing compacted coral and no current road	No villages in close proximity	Adjacent terrestrial environment dominated by farmland.	Mainly flat with occasional steeper gradients.

Notes: Undetermined as access was not able to be made

Table 4.6: Key social, ecological and physical environment characteristics - Ha'apai

Roads	Proposed Work	Road Type	Existing Environment		
			Social	Ecological	Physical
Koulo 1 (HALCOM01)	Rehab & seal	Compacted coral, Paved	Koulo Village	No significant ecological resources	Flat gradient
Koulo 2 (HALCOM02)	Rehab & seal	Compacted coral	Koulo Village	No significant ecological resources	Flat gradient
Koulo 3 (HALCOM03)	Rehab & seal	Compacted coral, Paved	Koulo Village	No significant ecological resources	Flat gradient
Koulo 4 (HALCOM04)	Rehab & seal	Compacted coral	Koulo Village	No significant ecological resources	Flat gradient
Koulo 5 (HALCOM05)	Seal	Compacted coral	Koulo Village	No significant ecological resources	Flat gradient
Holopek 1 (HALCOM06)	Rehab & seal	Paved, Compacted coral	Holopeka Village	No significant ecological resources	Flat gradient
Holopeka 2 (HALCOM07)	Rehab & seal	Paved, compacted coral	Holopeka Village, northern end is farmland with no formed road	No significant ecological resources	Flat gradient
Pangai 1 (HALCOM08)	Rehab & reseal	Paved	Pangai Village	No significant ecological resources	Flat gradient
Pangai 2 (HALCOM09)	Rehab & reseal	Compacted coral, Paved	Pangai Village	No significant ecological resources	Flat gradient
Pangai 3 (HALCOM14)	Seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 4 (HALCOM15)	Upgrade	Compacted coral	Farmland adjacent to Pangai Village	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Pangai 5 (HALCOM16)	Upgrade	Compacted coral	Farmland adjacent to Pangai Village	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Pangai 6 (HALCOM17)	Rehab & seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 7 (HALCOM18)	Rehab & reseal	Compacted coral	Farmland adjacent to Pangai Village	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Pangai 8 (HALCOM19)	Rehab & reseal	Compacted coral	Pangai Village and farmland	No significant ecological resources	Flat gradient
Pangai 9 (HALCOM20)	Rehab & reseal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 10 (HALCOM21)	Rehab & reseal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 11 (HALCOM22)	Rehab & reseal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 12 (HALCOM23)	Rehab & reseal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 13 (HALCOM24)	Rehab & reseal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 14 (HALCOM25)	Rehab & reseal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 15 (HALCOM27)	Upgrade	Compacted coral	Farmland adjacent to Pangai Village	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Pangai 16 (HALCOM28)	Upgrade	Compacted coral	Farmland adjacent to Pangai Village	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Pangai 17 (HALCOM29)	Upgrade	Compacted coral	No village in close proximity, used for access to lots	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Pangai 18 (HALCOM30)	Upgrade	Compacted coral	Farmland adjacent to Pangai Village	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient

Haufolau Rd (HALCOM10)	Seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Faifekau Rd (HALCOM11)	Seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Mateialona Rd (HALCOM12)	Seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Paluto Rd (HALCOM13)	Seal	Compacted coral	Pangai Village, farmland and residential properties on eastern coast	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Faleloa 1 (HAFCOM01)	Upgrade & Seal	Compacted coral	Faleloa Village	No significant ecological resources	Flat gradient
Faleloa 2 (HAFCOM02)	Upgrade & Seal	Compacted coral	Faleloa Village	No significant ecological resources	Flat gradient
Faleloa 3 (HAFCOM03)	Upgrade & Seal	Compacted coral	Faleloa Village	No significant ecological resources	Steeper section but mainly flat gradient
Faleloa 4 (HAFCOM04)	Upgrade & Seal	Compacted coral	Faleloa Village and farmland	Adjacent environment dominated by village & farmland, no significant ecological resources	Flat gradient
Faleloa 5 (HAFCOM05)	Upgrade & Seal	Compacted coral	Faleloa Village	No significant ecological resources	Flat gradient
Faleloa 6 (HAFCOM06)	Upgrade & Seal	Compacted coral and track?	Farmland	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Faleloa 7 (HAFCOM07)	Upgrade & Seal	Compacted coral and farmtrack?	Farmland	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Faleloa 8 (HAFCOM08)	Upgrade & Seal	Compacted coral	Faleloa Village and farmland	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
LotoFoa 1 (HAFCOM08)	Rehab & seal	Compacted coral	Lotofoa Village	No significant ecological resources	Flat gradient
LotoFoa 2 (HAFCOM09)	Rehab & reseal	Compacted coral	Lotofoa Village	No significant ecological resources	Flat gradient
LotoFoa 3 (HAFCOM10)	Rehab & reseal	Compacted coral	Lotofoa Village	No significant ecological resources	Flat gradient
LotoFoa 4 (HAFCOM11)	Rehab & seal	Compacted coral	Lotofoa Village	No significant ecological resources	Flat gradient
LotoFoa 5 (HAFCOM12)	Rehab & seal	Compacted coral	Lotofoa Village	No significant ecological resources	Flat gradient
LotoFoa 6 (HAFCOM13)	Reseal	Compacted coral	Lotofoa Village	No significant ecological resources	Flat gradient
LotoFoa 7 (HAFCOM14)	Rehab & seal	Compacted coral, no current road	Lotofoa Village	Environment dominated by village, vegetation and adjacent swamp	Flat gradient
LotoFoa 8 (HAFCOM15)	Rehab	Compacted coral	Farmland and quarry access	Adjacent environment dominated by farmland,	Flat gradient
Loto Foa 9 (HAFCOM16)	Rehab & seal	Track	Vegetation and residential property	Adjacent environment dominated by regen vegetation	Flat gradient
Fotua 1 (HAFCOM18)	Rehab	Compacted coral	No village in close proximity	Adjacent environment dominated by regen vegetation and farmland	Flat gradient
Fotua 2 (HAFCOM19)	Rehab & seal	Compacted coral	Fotua Village	Adjacent environment dominated by regen vegetation and farmland	Flat gradient
Fotua 3 (HAFCOM20)	Rehab & seal	Compacted coral	Fotua Village	No significant ecological resources	Flat gradient
Fangaleounga 1 (HAFCOM21)	Rehab & seal	Compacted coral	Fangaleounga Village and farmland	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Fangaleounga 2 (HAFCOM22)	Rehab & seal	Compacted coral	Fangaleounga Village and farmland	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Fangaleounga 3 (HAFCOM23)	Rehab & seal	Compacted coral	Fangaleounga Village	No significant ecological resources	Flat gradient
Fangaleounga 4	Rehab & seal	Compacted coral	Fangaleounga Village	No significant ecological resources	Flat gradient

Table 4.7: Key social, ecological and physical environment characteristics - ‘Eua

Roads	Proposed Work	Road Type	Existing Environment		
			Social	Ecological	Physical
Mataaho 01 (EUACOM65)	Patch & Seal	Compacted coral	Mataaho Village and farmland	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Mataaho 02 (EUACOM66)	Patch & Seal	Paved	Mataaho Village	No significant ecological resources	Flat gradient
Mataaho 3 (EUACOM74)	Rehab & Reseal	Paved	Mataaho Village	No significant ecological resources	Flat gradient
Mataaho 4 (EUACOM67)	Patch & Seal	Paved	Mataaho Village	No significant ecological resources	Flat gradient
Mataaho 5 (EUACOM70)	Reseal	Paved	Mataaho Village	No significant ecological resources	Flat gradient
Mua 1 (EUACOM61)	Patch & Seal	Paved	Mua Village and farmland	Adjacent environment dominated by farmland, no significant ecological resources	Flat gradient
Mua 2 (EUACOM60)	Rehab & seal	Compacted coral	Mua Village	No significant ecological resources	Flat gradient
Angaha 1 (EUACOM106)	Rehab & seal	Compacted coral	Angaha & Petani Villages	No significant ecological resources	Flat gradient
Pangai 1 (EUACOM102)	Rehab & seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 2 (EUACOM101)	Rehab & seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 3 (EUACOM53)	Rehab & Seal	Compacted coral	Pangai Village and farmland	Adjacent environment dominated by village & farmland, no significant ecological resources	Flat gradient
Pangai 4 (EUACOM97)	Rehab & seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 5(EUACOM96)	Rehab & seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Pangai 6 (EUACOM57)	Rehab & seal	Compacted coral	Pangai Village	No significant ecological resources	Flat gradient
Petani 1 (EUACOM55)	Rehab & seal	Compacted coral	Petani Village and farmland	Adjacent environment dominated by village & farmland, no significant ecological resources	Flat gradient
Petani 2 (EUACOM44)	Rehab & Seal	Compacted coral	Petani Village	No significant ecological resources	Flat gradient
Haatua 1 (EUACOM35)	Rehab & Reseal	Compacted coral	Haatua Village	No significant ecological resources	Flat gradient
Haatua 2(EUACOM31)	Rehab & seal	Paved	Haatua Village	No significant ecological resources	Flat gradient
Haatua 3 (EUACOM32)	Rehab & seal	Compacted coral	Haatua Village	No significant ecological resources	Flat gradient
Haatua 4 (EUACOM36)	Rehab & seal	Compacted coral, Paved	Haatua Village and farmland	Adjacent environment dominated by village & farmland, no significant ecological resources	Flat gradient
Tufuvai 1 (EUACOM02)	Rehab & seal	Compacted coral	Tufuvai Village	No significant ecological resources	Flat gradient
Ohonua 1 (EUACOM13)	Rehab & seal	Paved	Ohonua Village	No significant ecological resources	Steep gradient, poor existing drainage
Ohonua 2 (EUACOM26)	Rehab & seal	Paved	Ohonua Village	Coastal marine environment in close proximity	Steep gradient, poor existing drainage
Ohonua 3 (EUACOM11)	Rehab & seal	Compacted coral	Ohonua Village	Coastal marine environment in close proximity	Steep gradient, no drainage
Houma 1 (EUACOM01)	Patch & Seal	Paved	Between Houma and Ohonua Villages	Coastal marine environment in close proximity	Steep gradient in parts, existing drainage sufficient

5 Consultation & Stakeholder Engagement

5.1 Background & Approach

As required by WB Safeguard Policies consultation and disclosure of Category B projects must be undertaken with project affected groups (stakeholders) and non-government organisations (NGO).

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.

The ESMP remains 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 MOI.

5.2 Consultation Details

A Land Due Diligence Report[15] has been prepared which details the outcome of the public consultation process. All meetings were held with local villages located in close proximity to the road Projects and who were considered to be potentially the most affected by construction and operational activities. These include the following:

Tongatapu

The following potentially impacted Villages on Tongatapu were identified:

- Hoi Village at southern end, Kolonga Village at northern end Hoi – Kolonga Road
- Utulau Village at western end of Liku Road 1 and Haveluliku Village adjacent to southern end of Liku Road 2.
- Foui Village at the western end and Matahau Village at the eastern end of Loto Road 1 (Foui-Matahau).

No villages are located directly adjacent to Loto Road 2. In addition, a range of agricultural lots are located adjacent to all 5 roads.

Vava'u

The following potentially impacted Villages on Vava'u were identified:

- Longamapu Village at western end, Tefisi Village at eastern end of Tefisi – Longomapu Road
- Tefisi Village at northern end of Vaipua – Tefisi Road.
- Residential properties in Neiafu adjacent to the Saineha - Int Pongi Petrol Stn road section and at the south western end of Laifone Road.
- Ta'anea Village at northern end Tu'anekivale Village at southern end of Ta'anea - Tu'anekivale Road
- Longomapu Village at the end of Tu'anuku – Longomapu Road.
- Toula Village at the northern end Pangaimotu Village at southern end of Toula-Pangaimotu Road.
- Mataika Village at north-eastern end and Mangia Village at south-eastern end of Mataika-Mangia Road.
- Mangia, Houma and Ha'akio Villages located along Tukulalo Road.

[15] Landcare Solutions Limited 2018. Land Due Diligence Report. Tonga Climate Resilient Transport Project. August 2018.

- Leimatua Village at north eastern end and Tefisi Village at south- western end of Vaihoi Road.
- Leimatua Village at eastern end of Vavau 6 Road.

Agricultural lots, frequented by farmers, are located along Vavau 1-7 Roads.

Ha'apai

The following potentially impacted Villages on Ha'apai were identified:

- Koulo Village where Koulo 1 -5 Roads are located.
- Holopeka Village where Holopeka 1 & 2 Roads are located.
- Pangai Village where Pangai 1-16 Haufolau Faifekau Mateialona and Paluto Roads are located.
- Faleloa Village where Faleloa 1 – 8 Roads are located.
- Lotofoa Village where LotoFoa 1-7, 9 Roads are located.
- Fotua Village where Fotua 1 - 3 Roads are located.
- Fangaleounga Village where Fangaleounga 1-4 Roads are located.

Agricultural lots, frequented by farmers, are located along Holopeka 2, Pangai 4, 5, 7, 8, 15-18 Roads.

'Eua

The following potentially impacted Villages on 'Eua were identified:

- Mataaho Village Mataaho 01-05
- Mua Village Mua 1, 2
- Angaha & Petani Villages where Angaha 1, Petani 1, 2 Roads are located.
- Pangai Village were Pangai 1-6 Roads are located.
- Haatua Village where Haatua 1-4 Roads are located.
- Tufuvai Village where Tufuvai 1 Road is located.
- Ohonua Village where Ohonua 1-3 Roads
- Houma Village where Houma 1 Road is located.

5.3 Outcome of Consultation

Appendix 4 details the outcome of the public consultation process. Table 5.1 summarise the public consultation undertaken. The key points to note are as follows:

- In Tongatapu, a total of 13 public consultation meetings were held in Fua'amotu, Kolonga, Hoi, Talafo'ou, Lapaha, Veitongo, Niutoua, Ha'ateiho, Ha'avakatolo, Kolovai, Ha'alalo, Matahau and Vaini Villages. A total of 99 people attended the meetings including both men (83) and women (16).
- In Vava'u, a total of 11 public consultation meetings were held in Pangaimotu, Leimatu'a, Mataika, Tu'anekivale, Tu'anuku, Longomapu, Tefisi and Houma Villages. A total of 136 people attended the meetings including both men (97) and women (39).
- In Ha'apai, a total of 7 public consultation meetings were held with villages located across the main Island of Lifuka including Ha'ateihosi'I, Faleloa, Faleloa, Koulo Pangai and Vahe Foa Villages. A total of 79 people attended the meetings including both men (46) and women (33).

- In ‘Eua, a total of 5 public consultation meetings were held in Houma, ‘Ohonua, Mu’a, Angaha and Kolomaile Villages. A total of 135 people attended the meetings including both men (74) and women (51).

Overall, a total of 280 people attended the public consultation meetings or were met with to discuss the Project and garner feedback.

Table 5.2 summarises the feedback received from each of the Villages where public consultation undertaken. In summary, the key points raised consistently during consultation across all Villages were as follows:

- Local people were very supportive of the project, and keen to see it implemented as soon as possible.
- Demarcation of the road reserves, where needed, will be beneficial for both the Project and local people.
- Road design needs to reflect the local conditions present on each island.
- Road safety is a priority for the local people.
- Clearing the road reserve provides a buffer between motor vehicles, pedestrians, and adjacent allotments.
- Road selection was questioned but it was not a priority for the local people.

Further detail on specific issues raised during meetings is provided in Appendix 4. Where possible, the issues raised have been addressed in the mitigation measures outlined in the Environmental and Social Management Plan (Section 7).

5.4 Disclosure

Disclosure is about transparency and accountability through release of information about the project and does not equate to consultation (and vice versa). This ESIA / ESMP document will be made available on the WB Infoshop website and in hard copy at Government offices and community centres on Tonga (most applicable and accessible).

Table 5.1: Summary of public consultations undertaken

Location	Date	Village/Ministry	Gender	
			Male	Female
Tongatapu	14.05.18	MOI – PPCSD	1	
		MIA		
	15.05.18	MOI – LTD		1
		MOI – MPD		1
		MOI – CAD	1	1
		TPL	1	1
	16.05.18	TWB	1	
		GroFed		1
	17.05.18	Town Officers	12	
	22.05.18	MLSNR		1
		TCC	1	
		MLSNR		1
		‘Ahononou Quarry	1	
	23.05.18	MEIDECC		1
		MIA		3
		Ports Authority Tonga	1	1
		Fua’amotu	20	8
	24.05.18	TAL	1	
		TSCP	1	1
		Navutoka (incl. Kolonga, Hoi, Talafo’ou)	10	
		Lapaha	15	
	25.05.18	Ministry of Fisheries	1	
		MOI CEO and HODs		3
	28.05.18	Veitongo	6	4
	30.05.18	Niutoua	7	
		Ha’ateiho	9	4
	31.05.18	Fo’ui (incl. Ha’avakatolo, Kolovai, Ha’alalo, Matahau)	7	
	08.06.18	Niua Development Committee		
	11.06.18	MOI – Transport	1	
		MOI - MPD	1	1
		BB Construction		1
	20.06.18	Vaini	9	
‘Eua	19.06.18	‘Eua Governor + Town Officers	1	
		Houma	26	15
		‘Ohonua	12	20
		Mu’a	18	
		Angaha	2	7
		Kolomaile	15	9
Ha’apai	06.06.18	Ha’apai Governor & Town Officers	6	-
		Weaving Women’s Group	-	3
		Ha’ateihosi’i	4	9
		Faleloa	6	9
		Koulo	9	4
		Pangai	8	3
	07.06.18	Vahe Foa	12	5
		TAL	1	
Vava’u	13.06.18	Neiafu	13	5
	14.06.18	Governor	1	-
		Weaving Women’s Group	-	2
		Pangaimotu	3	4
		Leimatu’a	11	6
		Mataika	16	
	15.06.18	Tu’anekivale (incl. Mangia)	13	7
		Tu’anuku	7	
		Longomapu	15	4
		Tefisi	7	4
	16.06.18	Houma	11	7

Table 5.2: Summary of feedback received during public consultation

Communities/Villages	Roads	Communities Comments
Tongatapu		
Niutoua, Afa, Kolonga, Navutoka, Hoi, Talafo'ou	Hoi - Kolonga (Taufa'ahau)	- Important road for accessing allotments - Important alternative route and part of evacuation road for coastal for communities - No encroachment in road reserve - Design of road to mitigate flooding
Veitongo, Vaini, Ha'ateiho	Liku Road 1 (Fuaamotu-Utulau)	- Important road for accessing allotments - Road treatment important (reseal) - Previous work on roads restricted access to allotments. - Safety measures such as signage required to assist with road safety
Lapaha	Liku Road 2 (Haveluliku - Hoi Int)	- Important road for accessing allotments, tourists to beaches, etc - Encroachment in road reserve
Fo'ui, Ha'avakatolo, Kolovai, Ha'alalo, Matahau	Loto Road 1 (Foui-Matahau)	- Important road for accessing allotments - No encroachment in road reserve
	Loto Road 2 (Makapaeo-Matahau)	- Important road for accessing allotments - Important access for western communities to schools
Vava'u		
Tefisi, Longomapu	Tefisi - Longomapu (Toafa)	- Road for accessing allotments - Previous road drainage work of poor quality leading to flooding of allotments and road damage. - Sealed roads required for steeper roads. - Runoff from agricultural areas causes damage. - Traffic safety issue with speeding vehicles through Tefisi Village. - Encroachment in road reserve
	Vaipua - Tefisi	- Roads need to be upgraded - Road for accessing allotments - Runoff creates issues
Neiafu	Saineha - Int Pongi Petrol Stn	- Roads need to be upgraded - High traffic area in Neiafu - Prefer other roads to be upgraded. - Allotment access needs to be considered.
Tu'anekivale, Mangia	Ta'anea - Tu'anekivale	- Road in good condition, drainage needs attention - Traffic safety issue with speeding vehicles in settlement. - Prefer other road to be upgraded. - No encroachment in road reserve - Wharf dredging welcomed.
Tu'anuku, Longomapu	Tu'anuku - Longomapu	- Old main road for travel between the two communities. - Upgrading will allow better connection between the two communities and allotment access
Pangaimotu	Toula-Pangaimotu	- Road for accessing allotments - Road is main connection for local communities - Good road design required - Concur for need for wharf dredging
Mangia, Houma, Mataika	Mataika-Mangia	- Traffic safety issue with speeding vehicles

	Tukulalo Road	- Prefer other road to be upgraded. - Road is main connection for local communities and allotments
Neiafu	Laifone Road	- Important access road - Road for accessing allotments - No encroachment in road reserve is likely - Road is still in good condition. - Other roads need upgrading.
Tefisi, Vaihoi, Leimatu'a	Vaihoi Road(Leimatua-Tefisi)	- Roads for accessing allotments, important agricultural areas. - Encroachment in road reserve is highly likely - Upgrade needed.
	Vavau 1 (VVU14AGR01)	
	Vavau 2 (VVU14AGR02)	
	Vavau 3 (VVU14AGR03)	
	Vavau 4 (VVU14AGR04)	
	Vavau 5 (VVU14AGR05)	
	Vavau 6 (VVU14AGR06)	
	Vavau 7 (VVU16AGR07)	
Ha'api		
Koula	Koulo 1 (HALCOM01)	- Agree with selected roads - Road reserve are known and there are no apparent encroachment
	Koulo 2 (HALCOM02)	
	Koulo 3 (HALCOM03)	
	Koulo 4 (HALCOM04)	
	Koulo 5 (HALCOM05)	
Pangai, Holopeka, Hihifo,	Holopek 1 (HALCOM06)	- Proposed upgrades welcomed - Previous works are now no good - Road reserves had recently been identified - Request sealed surface - Design should consider topography - Ongoing maintenance important - Rural roads need upgrading to facilitate access to allotments
	Holopeka 2 (HALCOM07)	
	Pangai 1 (HALCOM08)	
	Pangai 2 (HALCOM09)	
	Haufolau Rd (HALCOM10)	
	Faifekau Rd (HALCOM11)	
	Mateialona Rd (HALCOM12)	
	Paluto Rd (HALCOM13)	
	Pangai 3 (HALCOM14)	

	Pangai 4 (HALCOM15)	
	Pangai 5 (HALCOM16)	
	Pangai 6 (HALCOM17)	
	Pangai 7 (HALCOM18)	
	Pangai 8 (HALCOM19)	
	Pangai9 (HALCOM20)	
	Pangai 10 (HALCOM21)	
	Pangai 11 (HALCOM22)	
	Pangai 12 (HALCOM23)	
	Pangai 13 (HALCOM24)	
	Pangai 14 (HALCOM25)	
	Pangai 15 (HALCOM27)	
	Pangai 16 (HALCOM28)	
	Pangai 17 (HALCOM29)	
	Pangai 18 (HALCOM30)	
Loto Foa, Fotua, Fangale'ounga	Faleloa 1 (HAFCOM01)	- Consultation required for road selection - Support the project, - other roads should be considered - Contractor to ensure sure access to allotments is maintained - Seal thickness important - Monitoring of works required - Limited machinery at quarry to produce aggregate.
	Faleloa 21 (HAFCOM02)	
	Faleloa 32 (HAFCOM03)	
	Faleloa 43 (HAFCOM04)	
	Faleloa 54 (HAFCOM05)	
	Faleloa 65 (HAFCOM06)	
	Faleloa 76 (HAFCOM07)	
	Faleloa 87 (HAFCOM08)	
	LotoFoa 1 (HAFCOM08)	
	LotoFoa 2 (HAFCOM09)	
	LotoFoa 3 (HAFCOM10)	
	LotoFoa 4 (HAFCOM11)	

	LotoFoa 5 (HAFCOM12)	
	LotoFoa 6 (HAFCOM13)	
	LotoFoa 7 (HAFCOM14)	
	LotoFoa 8 (HAFCOM15)	
	Loto Foa 9 (HAFCOM16)	
	Fotua 1 (HAFCOM18)	
	Fotua 21 (HAFCOM19)	
	Fotua 32 (HAFCOM20)	
	Fangaleounga 1 (HAFCOM21)	
	Fangaleounga 2 (HAFCOM22)	
	Fangaleounga 3 (HAFCOM23)	
	Fangaleounga 4	
'Eua		
Mu'a, Angaha, Kolomaile*	Mua 1 (EUACOM61)	- Agree with proposed roads - Agricultural roads need work - Roads need to be tar seal - Speed is a safety issue for pedestrians - Traffic safety issue for pedestrians with speeding vehicles - A side-walk would ensure safety, especially for school kids - Judder bars on the road required - Road upgrade for accessing allotments welcomed
	Mataaho 1 (EUACOM65)	
	Mataaho 02 (EUACOM66)	
	Haatua 1 (EUACOM35)	
	Mataaho 3 (EUACOM74)	
	Mataaho 4 (EUACOM67)	
	Tufuvai 1 (EUACOM02)	
	Mataaho 5 (EUACOM70)	
	Ohonua 2 (EUACOM26)	
	Ohonua 3 (EUACOM11)	
	Angaha 1 (EUACOM106)	
	Petani 1 (EUACOM55)	
	Pangai 1 (EUACOM102)	
	Pangai 2 (EUACOM101)	

	Pangai 3(EUACOM53)	
	Petani 2 (EUACOM44)	
	Pangai 4 (EUACOM97)	
	Pangai 5(EUACOM96)	
	Mua 2 (EUACOM60)	
	Pangai 6 (EUACOM57)	
	Haatua 2(EUACOM31)	
	Haatua 3 (EUACOM32)	
	Haatua 4 (EUACOM36)	
Houma	Houma 1 (EUACOM01)	- Welcome proposed road work - Needed for access to Ohonua and allotments - Selected road are in good condition - Aware of the road reserve area
Ohonua	Ohonua 1 (EUACOM13)	- Support road Project - Locals needed to be involved in road selection process - Road reserve is clear and known to people - One of the roads selected has just been resealed - One road in particular in urgent needed rehab and seal - Water runoff is a major issue for 'Ohonua roads - Proper drainage system required

6 Assessment of Potential Impacts, Risk & Mitigation Measures

6.1 Introduction

The TCRT Project has the potential to create a variety of impacts. These potential impacts are either positive or negative depending on the receptors involved. The impact of this project on the social, ecological and physical environment has been assessed using methodology described in this chapter.

The impact assessment process initially involves identification of the project's activities and potential environmental and social impacts resulting from each activity during the project phases. A project activity could include site preparation, construction, reinstatement, operation and maintenance.

This ESIA document defines an impact as "*any change to the physical, biological or social environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services*".

This section provides an assessment of the potential construction and operational impacts of the proposed TCRT Project on the physical and ecological and socio-economic resources on and adjacent to the site. Potential impacts have been identified and evaluated as to whether they are adverse, positive, or have a negligible or neutral impact. These issues are discussed in the following sections in relation to the proposed Project activities.

6.2 Potential Construction Impacts

Potential impacts arising from road works activities depend on a number of factors including the existing condition or type of road and the location of nearby sensitive environmental and social receptors (see Table 4.3-4.6 and Appendix 2) and the scale and nature of the works proposed (see Appendix 3). On this basis the potential impacts that have been determined for each island are outlined in Tables 6.1-6.4 and summarised below.

6.2.1 Tongatapu

Social Impacts

- Temporary closure of shoulder to pedestrians during preparation works in Hoi, Utulau, Haveluliku, Foui and Matahau Villages.
- Temporary closure of all roads during works resulting in loss of access to residential properties in Villages and agricultural plots.
- Stockpiled material in road reserve due to clearance activities potentially restricts access to agricultural plots along all roads where there is agricultural activities.
- Potential loss of crops, fences etc encroaching in road reserve as a result of clearance activities.
- Noise and vibration during works when works are located in Hoi, Utulau, Haveluliku, Foui and Matahau Villages.
- Access to excess topsoil material for locals use.

Ecological Impacts

- No significant impact due to the lack of potentially impacted ecological communities which are dominated by farmland.

Physical Impacts

- No significant impact as topography is typical flat minimising potential for stormwater run-off of suspended materials.

Table 6.1: Key social, ecological and physical environment construction impacts identified in relation to proposed roads in Tongatapu

Proposed Work	Current Road Type	Roads	Potential Impacts		
			Social	Ecological	Physical
Upgrading/ Chip Seal	Paved	Hoi - Kolonga (Taufa'ahau) Liku Road 1 (Fuaamotu-Utulau) Liku Road 2 (Haveluliku - Hoi Int) Loto Road 1 (Foui-Matahau) Loto Road 2 (Makapaeo-Matahau)	• Temporary closure of shoulder to pedestrians during preparation works in villages • Temporary road closure during works resulting in loss of access to residential properties or agricultural plots. • Stockpiled material in road reserve due to clearance activities potentially restricts access to agricultural plots. • Loss of private assets private assets (crops, fences, etc) encroaching on road reserve as a result of clearance activities along • Temporary dust generation (if ottaseal), noise and vibration during works if located in Hoi, Utulau, Haveluliku, Foui and Matahau Villages	• No significant impact due to the lack of potentially impacted ecological communities.	• No significant impact as topography is typical flat minimising stormwater run-off of suspended materials

Table 6.2: Key social, ecological and physical environment construction impacts identified in relation to proposed roads in Vava'u

#	Proposed Work	Current Road Type	Roads	Potential Impacts		
				Social	Ecological	Physical
1.	Sealing (either chip seal or ottaseal)	Paved road	Tefisi - Longomapu (Toafa)	• Temporary closure of shoulder to pedestrians during preparation works • Temporary road closure during works resulting in loss of access to residential properties or agricultural plots. • Temporary dust generation (if ottaseal), noise and vibration during works if located in Neiafu or on fringes of Longamapu, Tefisi, Ta'anea, Tu'anekivale Toula, Pangaimotu Villages	• No significant impact due to the lack of potentially impacted ecological communities which are dominated by farmland and the type of works proposed (sealing only)	• Minimal impact as typically drainage in place (where required on steeper sections). • Rehabilitation of existing drainage on Vaipua – Tefisi Road is required. • Short section of Toula-Pangaimotu Road crosses coastal causeway
			Vaipua - Tefisi			
			Saineha - Int Pongi Petrol Stn			
			Ta'anea - Tu'anekivale			
			Toula-Pangaimotu			
			Vavau 2 (VVU14AGR02)			
			Vavau 6 (VVU14AGR06)			
		Unpaved road	Mataika-Mangia	• Temporary closure of shoulder to pedestrians during prep works • Temporary road closure during works resulting in loss of access to residential properties or agricultural plots. • Temporary dust generation (if ottaseal), noise and vibration during works if located on fringe of Longomapu Village	• Limited potential impacts in Mataika-Mangia Road due to limited nature of biological communities present. • Limited potential impact of Tu'anuku – Longomapu works affecting Ano Lagoon due to nature of works proposed (sealing only).	• Potential for new road to block overland flow paths creating erosion issues
			Tu'anuku - Longomapu			
2.	Rehab & Chipseal	Paved road	Tukulalo Road	• Closure of shoulder to pedestrians during preparation works • Temporary road closure during works resulting in loss of access to residential properties or agricultural plots. • Temporary dust generation (if ottaseal), noise and vibration during works for Mangia, Houma Ha'akio, Neiafu villages. • Stockpiled material in road reserve due to clearance activities blocks access to adjacent property.	• Minimal potential impacts along Laifone and Tukulalo Roads due to limited nature of adjacent biological communities present.	• Minimal impact as typically drainage in place (where required
			Laifone Road			
3.	Upgrade & seal	Unpaved road and compacted coral roads	Vavau 1 (VVU14AGR01)	• Temporary loss of access to agricultural plots during works. • Stockpiled material in road reserve due to clearance activities potentially blocks access to adjacent properties. • Loss of private assets (crops, fences, etc) encroaching on road reserve as a result of clearance activities particularly along extension to Vava'u 7 road. • Temporary dust generation, noise and vibration during works where located on fringes of Leimatua and Tefisi Villages. No impact on other roads.	• Potential runoff of disturbed sediments to tidal inlet adjacent to Vaihoi Road. • Minimal potential impacts in Laifone Road due to limited nature of adjacent biological communities present which is dominated by farmland.	• Potential for road to block overland flow paths creating erosion issues • Damage to roads as a result of runoff along steeper sections
			Vavau 3 (VVU14AGR03)			
			Vavau 4 (VVU14AGR04)			
			Vaihoi Road (Leimatua-Tefisi)			
			Vavau 5 (VVU14AGR05)			
			Vavau 7 (VVU16AGR01)			

Notes: Undetermined as access was not able to be made

Table 6.3: Key social, ecological and physical environment characteristics identified in relation to proposed roads in Ha'apai

#	Proposed Work	Road Type	Roads	Existing Environment		
				Social	Ecological	Physical
1.	Upgrade, Rehab	Compacted coral	Pangai 4 (HALCOM15)	• Temporary loss to access to agricultural plots during works. • Stockpiled material in road reserve due to clearance activities potentially restricts access to adjacent plots. • Potential loss of private assets (crops, fences) encroaching on road reserve as a result of clearance activities.	• No significant impact due to the lack of potentially impacted ecological communities which are dominated by farmland.	• Minimal potential drainage impacts due to flat gradient
			Pangai 5 (HALCOM16)			
			Pangai 15 (HALCOM27)			
			Pangai 16 (HALCOM28)			
			Pangai 17 (HALCOM29)			
			Pangai 18 (HALCOM30)			
			LotoFoa 8 (HAFCOM15)			
			Fotua 1 (HAFCOM18)			
2.	Upgrade & Seal, Rehab & seal	Compacted coral, farmtrack	Faleloa 4 (HAFCOM04)	• Temporary loss to access to agricultural plots during works. • Stockpiled material in road reserve due to clearance activities potentially restricts access to adjacent plots. • Potential loss of private assets (crops, fences, etc) encroaching on road reserve as a result of clearance activities. • Temporary dust generation (if ottaseal), noise and vibration during works where located on fringe of Faleloa, Pangai, Fotua, and Fangaleounga Villages	• Minimal potential impacts due to limited nature of adjacent biological communities present which is dominated by farmland.	• Minimal potential drainage impacts due to flat gradient • Minimal potential drainage impacts due to flat gradient
			Faleloa 6 (HAFCOM06)			
			Faleloa 7 (HAFCOM07)			
			Faleloa 8 (HAFCOM08)			
			Pangai 7 (HALCOM18)			
			Pangai 8 (HALCOM19)			
			Loto Foa 9 (HAFCOM16)			
			Fotua 2 (HAFCOM19)			
			Fangaleounga 1 (HAFCOM21)			
			Fangaleounga 2 (HAFCOM22)			
		no current road	LotoFoa 7 (HAFCOM14) **Eastern section**	• Potential loss of private assets (crops, fences, etc) encroaching on road reserve as a result of clearance activities.		
			Holopeka 2 (HALCOM07) **Northern section**			
3.	Seal, Reseal	Compacted coral	Koulo 5 (HALCOM05)	• Temporary closure of shoulder to pedestrians during prep works in Koulo, Pangai & Lotofoa Villages • Temporary road closure during works resulting in loss of access to residential properties. • Temporary dust generation (if	• Minimal potential impacts due to limited nature of adjacent biological communities present which is dominated by farmland.	• Minimal potential drainage impacts due to flat gradient
			Pangai 3 (HALCOM14)			
			Haufolau Rd (HALCOM10)			
			Faifekau Rd (HALCOM11)			

			Mateialona Rd (HALCOM12)	ottaseal), noise and vibration where works are located on fringe of Koulo, Pangai & Lotofoa Villages		
			LotoFoa 6 (HAFCOM13)			
			Paluto Rd (HALCOM13)	• Temporary loss to access to agricultural plots during works. • Stockpiled material in road reserve due to clearance activities potentially restricts access to adjacent plots. • Potential loss of private assets (crops, fences, etc) encroaching on road reserve as a result of clearance activities.	• Minimal potential impacts due to limited nature of adjacent biological communities present which is dominated by farmland.	• Minimal potential drainage impacts due to flat gradient
4.	Upgrade & Seal Rehab & seal / reseal	Compacted coral, Paved	Faleloa 1 (HAFCOM01)	• Temporary closure of shoulder to pedestrians during prep works in Faleloa, Koulo, Holopeka, Pangai, LotoFoa, Fotua, Fangaleounga Villages • Temporary road closure during works resulting in loss of access to residential properties • Temporary dust generation (if ottaseal), noise and vibration during works in Faleloa, Koulo, Holopeka, Pangai, Lotofoa, Fotua and Fangaleounga, Faleloa Villages	• Minimal potential impacts due to limited nature of adjacent biological communities present which is dominated by farmland.	• Minimal potential drainage impacts due to flat gradient
			Faleloa 2 (HAFCOM02)			
			Faleloa 5 (HAFCOM05)			
			Koulo 1 (HALCOM01)			
			Koulo 2 (HALCOM02)			
			Koulo 3 (HALCOM03)			
			Koulo 4 (HALCOM04)			
			Holopek 1 (HALCOM06)			
			Pangai 6 (HALCOM17)			
			LotoFoa 1 (HAFCOM08)			
			LotoFoa 4 (HAFCOM11)			
			LotoFoa 5 (HAFCOM12)			
			Fotua 3 (HAFCOM20)			
			Fangaleounga 3 (HAFCOM23)			
			Fangaleounga 4			
			Pangai 9 (HALCOM20)			
			Pangai 10 (HALCOM21)			
			Pangai 11 (HALCOM22)			
			Pangai 12 (HALCOM23)			
			Pangai 13 (HALCOM24)			
			Pangai 14 (HALCOM25)			

			Pangai 1 (HALCOM08)			
			Pangai 2 (HALCOM09)			
			LotoFoa 2 (HAFCOM09)			
			LotoFoa 3 (HAFCOM10)			
			LotoFoa 7 (HAFCOM14)			
			Holopeka 2 (HALCOM07)			
			Faleloa 3 (HAFCOM03)			• Damage to road as a result of runoff along steeper sections

Table 6.4: Key social, ecological and physical environment characteristics identified in relation to proposed roads in 'Eua

#	Proposed Work	Road Type	Roads	Existing Environment		
				Social	Ecological	Physical
1.	Reseal, Patch & Seal, Rehab & seal or reseal	Compacted coral, paved	Mataaho 5 (EUACOM70)	• Temporary closure of shoulder to pedestrians during preparation works here located in Mataaho, Houma, Ohonua, Mua, Pangai, Petani, ,Haatua and Mataaho Villages • Temporary road closure during works resulting in loss of access to residential properties • Temporary dust generation (if ottaseal), noise and vibration during works where located in Mataaho, Houma, Ohonua, Mua, Pangai, Petani, ,Haatua and Mataaho Villages	• Minimal impact on adjacent ecological communities due to nature and location of works	• Minimal impact as flat gradient or existing road shoulder & drainage sufficient
			Mataaho 02 (EUACOM66)			
			Houma 1 (EUACOM01)			
			Mataaho 4 (EUACOM67)			
			Mua 2 (EUACOM60)			
			Angaha 1 (EUACOM106)			
			Pangai 1 (EUACOM102)			
			Pangai 2 (EUACOM101)			
			Pangai 4 (EUACOM97)			
			Pangai 5(EUACOM96)			
			Pangai 6 (EUACOM57)			
			Petani 2 (EUACOM44)			
			Haatua 2(EUACOM31)			
			Haatua 3 (EUACOM32)			
			Tufuvai 1 (EUACOM02)			
			Mataaho 3 (EUACOM74)			
			Haatua 1 (EUACOM35)			
			Ohonua 1 (EUACOM13)		• Potential runoff of disturbed sediments to down gradient coastal area adjacent to Ohonua Village	• Potential for new road to block overland flow paths creating erosion issues • Damage to exposed road as a result of runoff along steeper sections
			Ohonua 2 (EUACOM26)			
			Ohonua 3 (EUACOM11)			
2.	Reseal, Patch & Seal, Rehab & seal or reseal	Compacted coral, paved	Mataaho 01 (EUACOM65)	• Temporary loss of access to agricultural plots (and houses where located in village) during works. • Stockpiled material in road reserve due to clearance activities potentially blocks access to adjacent properties. • Loss of crops, fences etc	• Minimal impact on adjacent ecological communities due to nature and location of works	• Minimal impact as flat gradient or existing road shoulder & drainage sufficient
			Mua 1 (EUACOM61)			
			Pangai 3 (EUACOM53)			
			Petani 1 (EUACOM55)			

			Haatua 4 (EUACOM36)	encroaching in road reserve as a result of clearance activities. • Temporary dust generation (if ottaseal), noise and vibration during works where located in Mataaho, Mua, Pangai, Petani, Haatua Villages		

6.2.2 Vava'u

Social Impacts

Where sealing (either chip seal or ottaseal) is proposed of paved (Tefisi - Longomapu, Vaipua – Tefisi Saineha - Int Pongi Petrol Stn, Ta'anea - Tu'anekivale, Toula-Pangaimotu, Vavau 2 (VVU14AGR02) Vavau 6 (VVU14AGR06)) and unpaved (Mataika-Mangia Tu'anuku - Longomapu Roads) in the Villages the following potential impacts may arise:

- Temporary closure of shoulder to pedestrians during preparation works in Neiafu Mangia, Houma and Ha'akio Villages on fringes of Longamapu, Tefisi, Ta'anea, Tu'anekivale Toula, Pangaimotu and Leimatua Villages.
- Temporary closure of roads during works resulting in loss of access to residential properties in Villages.
- Temporary dust generation (if ottaseal), noise and vibration during works if located in Neiafu and on fringes of Longamapu, Tefisi, Ta'anea, Tu'anekivale Toula, Pangaimotu and Longomapu Villages.

Where rehabilitation & chip sealing of the paved Tukulalo and Laifone Roads is proposed the following additional potential impacts may arise:

- Temporary dust generation (due to ottasealing), noise and vibration during works for Mangia, Houma, Ha'akio, and Neiafu villages.
- Stockpiled material in road reserve due to clearance activities restricts access to adjacent properties.

Where upgrade & sealing of unpaved road and compacted coral roads (Vaihoi Road (Leimatua-Tefisi) Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03) Vavau 4 (VVU14AGR04) Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01)) is proposed in the more rural areas the following additional impacts may arise:

- Temporary dust generation, noise and vibration during works where located on fringes of Leimatua and Tefisi Villages.
- Loss of crops, fences etc encroaching in road reserve as a result of clearance activities particularly along extension to Vava'u 7 Road.
- Access to excess topsoil material for locals use.

Ecological Impacts

Overall, no significant impact is expected due to the lack of significant ecological communities present which are typically dominated by built environments and farmland with the exception of the proposed upgrade & sealing of the unpaved Vaihoi Road which could potentially lead to runoff of disturbed sediments into the adjacent tidal inlet.

Physical Impacts

No significant impact is anticipated on existing paved roads as typically drainage in place (where required on steeper sections). Rehabilitation of existing drainage on Vaipua – Tefisi Road is required. Short section of Toula-Pangaimotu Road crosses coastal causeway with potential impacts relating to climate change due to rising sea levels, etc.

Upgrade & sealing of the unpaved and compacted coral rural roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01)) could create potential for the road to block overland flow paths creating erosion issues and damage to roads as a result of runoff along steeper sections.

Other Issues

Another potential issue that may arise relates to the importation of material from Tongatapu for chip-sealing works. The Contractor will require that all material is stored on Government land. This is addressed further in the ESMP (Section 7).

6.2.3 Ha'apai

Social Impacts

Where upgrading or rehabilitation and / or sealing / resealing works are proposed along the majority of roads in the Villages (including the Roads identified in Row 3. and 4. of Table 6.3) the following potential impacts may arise:

- Temporary closure of shoulder to pedestrians during preparation works in Faleloa, Koulo, Holopeka, Pangai, Lotofoa, Fotua and Fangaleounga, Faleloa Villages.
- Temporary closure of roads during works resulting in loss of access to residential properties in Villages.
- Temporary dust generation (if ottasealing), noise and vibration during works where they are located in Faleloa, Koulo, Holopeka, Pangai, Lotofoa, Fotua and Fangaleounga, Faleloa Villages.

Where works are proposed along more rural roads (including the Roads identified in 1. and 2. of Table 6.3) or where there is no road currently (LotoFoa 7 (HAFCOM14) - Eastern section, and Holopeka 2 (HALCOM07) - Northern section) the following additional impacts may arise:

- Temporary closure of roads during works (where there is currently a road) resulting in loss of access to agricultural plots.
- Stockpiled material in road reserve due to clearance activities blocks access to agricultural plots.
- Loss of crops, fences etc encroaching in road reserve as a result of clearance activities.
- Access to excess topsoil material for locals use.

Ecological Impacts

Overall, no significant impact is expected due to the lack of significant ecological communities present which are typically dominated by built environments and farmland.

Physical Impacts

No significant impact is anticipated on existing roads as the topography is typically flat with the exception of the steeper section of Faleloa 3 (HAFCOM03) Road in Faleloa Village where there is the potential creating erosion issues and damage as a result of runoff.

6.2.4 'Eua

Social Impacts

Where patching and sealing, rehabilitation and sealing / resealing works are proposed along the majority of roads in the villages (including the Roads identified in Row 1. of Table 6.4) the following potential impacts may arise:

- Temporary closure of shoulder to pedestrians during preparation works in Mataaho, Houma, Ohonua, Mua, Pangai, Petani, Haatua and Mataaho Villages.
- Temporary closure of roads during works resulting in loss of access to residential properties in Villages.
- Temporary dust generation (if ottasealing), noise and vibration during works where they are located in Mataaho, Houma, Ohonua, Mua, Pangai, Petani, Haatua and Mataaho Villages.

Where works are proposed along more 'rural' roads (including the Roads identified in Row 2. of Table 6.3) the following additional impacts may arise:

- Temporary closure of roads during works resulting in loss of access to agricultural plots.
- Stockpiled material in road reserve due to clearance activities blocks access to

adjacent properties.

- Loss of crops, fences etc encroaching in road reserve as a result of clearance activities.
- Temporary dust generation (if ottasealing), noise and vibration during works where located in Mataaho, Mua, Pangai, Haatua Villages.
- Access to excess topsoil material for locals use.

Ecological Impacts

Overall, no significant impact is expected in relation to the majority of roads due to the lack of significant ecological communities present which are typically dominated by built environments and farmland with the exception of Ohonua 1 (EUACOM13), Ohonua 2 (EUACOM26) and Ohonua 3 (EUACOM11) Roads in Ohonua Village where potential runoff of disturbed sediments to down gradient coastal areas adjacent to Ohonua Village could occur.

Physical Impacts

No significant impact is anticipated on existing roads as the topography is typically flat with the exception of Ohonua 1 (EUACOM13), Ohonua 2 (EUACOM26) and Ohonua 3 (EUACOM11) Roads in Ohonua Village where there is the potential of creating erosion issues and damage as a result of runoff.

6.3 Potential Operational Impacts

Overall, key positive and negative operational impacts common to all islands are as follows:

Positive

- Reduced wear and tear requiring less frequent vehicle maintenance.
- Upgraded roads provide additional travel routes and reduced travel times.
- Farmers have reduced travel times to access agricultural areas and taking produce to market.
- Improved connectivity of the road system.
- Construction of roads that are more resilient to climatic events by providing a more robust road surface, effective drainage,etc.

Negative

- Stormwater ponding on upgraded or newly constructed carriageways creating traffic safety issues.
- If erosion potential of stormwater is not addressed in road design there is possible impact on road integrity on some roads.
- Better road conditions may encourage excessive speeds leading to more accidents which is common to all roads particularly around Villages.

These potential positive and negative operational impacts are outlined below in further detail in relation to the proposed road works on each island.

6.3.1 Tongatapu

A range of positive and negative operational impacts social and physical impacts have been identified on Tongatapu as follows:

Positive

- Upgraded roads provide additional travel routes and reduced travel times. For example the upgrade to Liku Road 1 from Fua'amotu to Utulau will provide an alternative route for travel to and from the airport to Nuku'alofa.
- Farmers have reduced travel times to access agricultural areas and taking produce to market particularly along Hoi - Kolonga Road and Liku Road 1.

Negative

- Better road conditions may encourage excessive speeds leading to more accidents on all roads but particularly Liku Road 1.

6.3.2 Vava'u

A range of positive and negative operational impacts social and physical impacts have been identified on Vava'u as follows:

Positive

- Upgraded roads provide additional travel routes and reduced travel times. For example upgrades to Vavau 3 (VVU14AGR03) and Vavau 4 (VVU14AGR04) Roads will provide an alternative route for famers to travel to and from agricultural plots.
- Farmers have reduced travel times to access agricultural areas and taking produce to market particularly along Vavau 3 (VVU14AGR03) and Vavau 4 (VVU14AGR04).
- Improved connectivity of the road system. For example the Mataika – Mangaia and Tu'anuku – Longomapu Roads will provide better connectivity between Villages.

Negative

- Better road conditions may encourage excessive speeds leading to more accidents on all roads but particularly roads where poor conditions have restricted speeds to date such as Vaihoi Road.
- If erosion potential of stormwater is not addressed in road design there is possible impact on road integrity particularly on the more rural roads (such as Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))

6.3.3 Ha'apai

A range of positive and negative operational impacts social and physical impacts have been identified on Ha'apai as follows:

Positive

- Upgraded roads provide additional travel routes and reduced travel times. For example upgrades to rural roads in Pangai Village (such as Pangai 4, Pangai 5, Pangai 15, Pangai 17 and Pangai 18 Roads) will provide an alternative route for famers to travel to and from agricultural plots.
- Farmers have reduced travel times to access agricultural areas and taking produce to market particularly rural roads in Pangai Village (such as Pangai 4, Pangai 5, Pangai 15, Pangai 17 and Pangai 18 Roads).
- Improved connectivity of the road system. For example the extension to LotoFoa 7 Road in Lotofoa Village to the existing rural road will provide additional connectivity.

Negative

- If erosion potential of stormwater is not addressed in road design there is possible impact on road integrity particularly on the steeper section of Faleloa 3 Road.

6.3.4 'Eua

A range of positive and negative operational impacts social and physical impacts have been identified on 'Eua as follows:

Positive

- Upgraded roads provide additional travel routes and reduced travel times. For example upgrades to rural roads in Petani and Haatua Villages (such as Petani 1 and Haatua 1 Roads) will provide an alternative route for famers to travel to and from agricultural plots.

- Farmers have reduced travel times to access agricultural areas and taking produce to market particularly rural roads in Pangai and Mua Villages (such as Pangai 3 and Mua 1 Roads).
- Improved connectivity of the road system. For example the upgrades to roads in Petani and Haatua Villages will provide additional connectivity.

Negative

- If erosion potential of stormwater is not addressed in road design there is possible impact on road integrity particularly on the steeper Roads in Ohonua Village (Ohonua 1, 2 and 3 Roads).

6.4 Risk Assessment & Impact Identification Methodology

Risk Assessment is routinely undertaken as part of the ESIA process. In assessing a projects environmental risk, impacts are rated to determine the appropriate response or management actions that should be implemented to minimise potential impacts. The risk assessment methodology for the TCRT Project is described in this Section.

An EMP[16] has been prepared for the Transport Sector Consolidation Project which outlines an approach to assessment of risk that has been previously agreed with MEIDECC. To ensure consistency the same approach to risk management has been adopted for the assessment of risk for this Project whereby the level of risk posed by the activities associated with the Project is assessed and is based on the following: the likelihood or probability of an event; and the consequences of the impacts of that event occurring (see Table 6.5).

Table 6.5: Qualitative risk analysis matrix

	Consequence				
	1	2	3	4	5
Likelihood	Severe	Major	Moderate	Minor	Negligible
A - Almost Certain	E	E	H	M	M
B – Likely	E	H	H	M	L
C- Possible	H	H	M	M	L
D – Unlikely	H	M	M	L	L
E - Rare	M	M	L	L	L

Risk Map Colour Code
E = Extreme
H = High
M = Moderate
L = Low

This is a conventional risk management framework and is considered applicable in the context of this assessment which has a focus on high level identification of biodiversity and ecosystem services risks. The ESIA process will provide detail on these risk areas as appropriate.

There are four main levels of risk after combining the 'likelihood' and 'consequences' factors (see Tables 6.6 & 6.7).

[16]MOI 2018. Environmental Management Plan. Transport Sector Consolidation Project, Additional Financing. Revised Version. Ministry of Infrastructure, Kingdom of Tonga. 18 January 2018.

Table 6.6: Qualitative measures of likelihood

Level	Descriptor	Example	Frequency
A	Almost certain	Is expected to occur in most circumstances	> Once per year
B	Likely	Will probably occur in most circumstances	Once per year
C	Possible	Could occur	Once every 5 years
D	Unlikely	Could occur but not expected	May happen within Project life
E	Rare	Occurs in only exceptional circumstances	Not likely to happen within Project life

Source: Modified from *Environmental Risk Management – Principles and Process. HB 203:2006* (Standards Australia/Standards New Zealand, 2006).

Each level has a response or management control action. The four 'Risk Levels' are:

- Extreme (E) Risk - those impacts that require immediate action at the highest level of management.
- High (H) Risk - those impacts requiring action at senior management level.
- Moderate (M) Risk - those that require policies in place to address impacts and monitoring programs.
- Low (L) Risk - those impacts that do not require any specific management actions but may be part of routine management and monitoring plans.

In cases of "E", "H" and "M" Risks, mitigation measures are identified to reduce the level of residual Project risk as shown in Table 6.3.

6.5 Outcome of Risk Assessment & Impact Identification

Tables 6.8-6.11 present the results of the risks associated with the proposed Road Project. Key points in relation to any residual 'Extreme' and 'High' Risk Project activities following mitigation are addressed in Section 6.6.

Table 6.7: Qualitative measures of consequence

Rating	Project Objectives	Financial	Safety	Environment	Compliance	Reputation
Severe	Failure to meet all three objectives with termination of project.	Cost over-run by 25% or financial loss greater than TOP1M.	Fatality or permanent significant disability, long term impairment or illness significantly affecting the quality of life for an employee, contractor or member of the public.	Permanent impacts to populations of significant flora or fauna (e.g. threatened), highly significant heritage items, complete removal of habitat or significant impairment of ecosystem function.	Claim or action could be brought in the Courts; and	Court, regulator or Government/ Cabinet inquiry concludes improper, corrupt or grossly negligent conduct.
					Regulators could bring prosecution and penalties (and potential imprisonment for individuals); and	Other action by MOI results in termination of Minister or CEO.
Major	Project substantially fails to meet one objective of the project	Cost over-run between 15-25% or financial loss between TOP500 and TOP1M.	Long term or permanent disability, impairment or illness not significantly affecting the quality of life for an employee, contractor or member of the public.	Medium-long term (>10 years) physical impacts likely to cause impacts to flora/fauna populations, or direct impacts to flora / fauna populations. Adverse impacts to significant heritage items.	Claim or action could be brought in the Courts; and	Action by MOI results in one or more Executives or senior managers being terminated.
	Project requires restructuring to meet revised project objectives				Regulator could bring prosecution for which the penalty (and potential imprisonment for individuals).	Government or Cabinet inquiry into our actions or operations.
						Prolonged and negative national media attention.
Moderate	Project does not meet the target(s) of at least one indicator for the project objectives	Cost over-run between 5% - 15% or financial loss between TOP100,000 - TOP500,000.	Hospitalisation with medical intervention of an employee, contractor or member of the public.	Medium term (3-10 years) impacts on populations of native flora / fauna including loss of individuals of threatened species, Significant impacts on physical environment.	Claim or action could be brought in the Courts; &	Short term negative national media attention.
	Project requires time extension to meet project objectives				Regulator could bring prosecution for which a penalty or fine for an individual.	Regulator conducts formal inquiry.
						Prolonged and negative media attention.
Minor	Project fails to meet intermediate results, but could with intervention, meet the project objectives	Cost over-run less than 5% or financial loss between TOP10,000 and TOP100,000.	Injury or illness requiring medical treatment of an employee, contractor or member of the public.	Short term (1-3 years) direct impacts on physical environment (water, soil, air) that may impact on flora or fauna. Loss of individuals of common native flora or fauna. May extend outside of work area.	Claim or action could be brought in the Court; and	Formal complaint made to a Regulator.
					Regulator could issue an enforcement or penalty notice.	Short term negative media attention.
Negligible	Intervention required to meet targets and results to achieve project objectives	Financial loss less than TOP10,000K.	Nil to first aid injury, low level short term inconvenience or symptoms for an employee, contractor or	Low-level direct impacts on physical environment (water, soil, air) within work area.	Offence is merely reportable; and/or	Negative comment about MOI at Cabinet level.
				Impacts easily remedied.	Regulator could issue a warning notice.	Formal complaint made to MOI.

Rating	Project Objectives	Financial	Safety	Environment	Compliance	Reputation
			member of the public.	No identifiable impact on flora or fauna.		

Table 6.8: Issues & risk assessment - Tongatapu

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
1. Traffic Safety							
Movement of construction vehicles	Local community / contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to develop a Traffic Management Plan (TMP) that identifies measures to minimize potential impacts	M
Traffic disruption as a result of road closures	Local community	Alternative routes not defined	3	A	H	Contractor to identify alternative routes in TMP prior to commencement of construction	M
Excessive vehicle speeds on newly paved roads	Local community	Increased risk of accident	1	B	E	Design to include traffic calming measures in villages, barriers on corners, speed signs, etc	M
2. Flood Risk							
Stormwater ponding on carriageway following construction	Risk to road users	Water ponding in low-lying areas creating driving hazard and potential damage to roads	1	B	E	Design of roads to minimize ponding water and provision of drainage to discharge stormwater	M
3. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Asset owners	Loss of assets due to clearance activities within the road reserve	3	A	H	Contractor to identify where issue will arise and prepare site-specific plan to address including consultation with landowners, works to be conducted post-harvest, fence reinstatement, etc.	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
1. Traffic Safety							
Movement of construction vehicles	Local Community / Contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to implement TMP which will include pedestrian safety measures, traffic control supervisor to be used, and alternative routes to be identified,	M

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
Temporary closure of shoulder to pedestrians	Local Community / Contractors	Potential human hazards due to closure of road shoulder in Hoi, Utulau, Haveluliku, Foui and Matahau Villages	1	B	E	timing of works to ensure safe access for children, etc Contractor to communicate TMP to local community as described in the Stakeholder Engagement Plan (SEP).	M
Temporary Road closures	Local Community / Contractors	Restriction of access to property, agricultural lots, essential facilities such as hospitals etc	3	A	H		M
2. Restriction of Access to Property							
Stockpiled material in road reserve due to clearance activities	Agricultural land owners	Access restricted to allotments along all roads	3	A	H	Contractor to prepare EMP detailing procedures to ensure stockpiled material does not restrict access to properties	L
3. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Agricultural land owners	Loss of assets due to clearance activities within the road reserve	3	A	H	Contractor to identify where issue will arise and prepare site-specific plan to address including consultation with landowners, works to be conducted post-harvest, fence reinstatement, etc.	L
4. Noise & vibration							
Construction activity creating noise and / or vibration disturbance	Local community/	Noise and / or vibration disturbance to Hoi, Utulau, Haveluliku, Foui and Matahau Villages where road works occur in close proximity	3	A	H	Strict adherence to working hours (0800-2000) Regularly maintenance of machinery, equipment and vehicles	M
	Contractors	Noise impacts on workers	3	A	H	Contractor to ensure workers provided with PPE including ear protection.	L
5. Dust							
Generation of dust as a result of construction activities	Soil disturbance	Dust creating nuisance in Hoi, Utulau, Haveluliku, Foui and Matahau Villages where road works occur in close proximity	4	B	M	Contractor to implement dust suppression techniques during construction such as use of a water truck.	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
C. OPERATION							
1. Traffic Safety							
Excessive speeds on improved roads	Local community	Accidents relating to excessive speeds	1	B	E	Contractor to install traffic calming devices in Villages and barriers on corners, speed signs, etc	H
2. Road flooding							
Road flooding	Road users and property owners	Overflow of drainage systems due to poor maintenance	1	B	E	Periodic clearance of road shoulders to ensure continual flow of stormwater.	M

Table 6.9: Issues & risk assessment – Vava'u

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
1. Traffic Safety							
Movement of construction vehicles	Local community / contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to develop a Traffic Management Plan (TMP) that identifies measures to minimize potential impacts	M
Traffic disruption as a result of road closures	Local community	Alternative routes not defined	3	A	H	Contractor to identify alternative routes in TMP prior to commencement of construction	M
Excessive vehicle speeds on newly paved roads	Local community	Increased risk of accident	1	B	E	Design to include traffic calming measures in villages, barriers on corners, speed signs, etc	M
2. Flood Risk							
Stormwater ponding on carriageway following construction	Risk to road users	Water ponding in low-lying areas creating driving hazard and potential damage to roads	1	B	E	Design of roads to minimize ponding water and provision of drainage to discharge stormwater	M
3. Soil Erosion							
Loss of soils disturbed by road construction activities	Soil disturbance	Runoff of sediments affecting sensitive receiving environment as a result of activities on the unpaved Vaihoi Road	3	D	M	Design erosion protection measures to minimize erosion such as sediment pond to capture runoff, silt fences, etc	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
4. Road Integrity							
Water movement creating erosion issues to newly formed roads	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of upgrade & sealing of the unpaved and compacted coral roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))	3	A	H	Design road to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
5. Restriction of Access to Property							
Stockpiled material in road reserve due to clearance activities	Agricultural land owners	Access restricted to allotments along the unpaved and compacted coral roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))	3	A	H	Contractors to design procedures to ensure stockpiled material does not restrict access to properties	L
6. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Agricultural land owners	Loss of assets due to clearance activities within the road reserve along the unpaved and compacted coral roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))	3	A	H	Contractor to confirm works prior to being undertaken.	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
1. Traffic Safety							
Movement of construction vehicles	Local Community / Contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to implement TMP which will include pedestrian safety measures, traffic control supervisor to be used, and	M

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
Temporary closure of shoulder to pedestrians	Local Community / Contractors	Potential human hazards due to closure of road shoulder in Neiafu, Mangia, Houma and Ha'akio Villages on fringes of Longamapu, Tefisi, Ta'anea, Tu'anekivale Toula, Pangaimotu and Leimatua Villages.	1	B	E	alternative routes to be identified, timing of works to ensure safe access for children, etc Contractor to communicate TMP to local community as described in the SEP.	M
Temporary Road closures	Local Community / Contractors	Restriction of access to property, agricultural lots, on all roads to essential facilities such as hospitals etc	3	A	H		M
2. Restriction of Access to Property							
Stockpiled material in road reserve due to clearance activities	Agricultural land owners	Access restricted to allotments along the unpaved and compacted coral roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))	3	A	H	Contractor to prepare EMP detailing procedures to ensure stockpiled material does not restrict access to properties	L
3. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Agricultural land owners	Loss of assets due to clearance activities within the road reserve along the unpaved and compacted coral roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))	3	A	H	Contractor to prepare EMP detailing procedures to avoid or mitigate loss of assets. This may include timing of crop removal, providing assistance to reinstate fences, etc	L
4. Noise & vibration							
Construction activity creating noise and / or vibration disturbance	Local community	Noise and / or vibration disturbance in Neiafu, Mangia, Houma and Ha'akio Villages on fringes of Longamapu, Tefisi, Ta'anea, Tu'anekivale Toula, Pangaimotu and Leimatua Villages.	3	A	H	Strict adherence to working hours (0800-2000) Regularly check and maintenance of machinery, equipment and vehicles	M
	Contractors	Noise impacts on workers	3	A	H	Contractor to ensure workers provided with PPE including ear protection.	L
5. Dust							
Generation of dust as a result of construction activities	Soil disturbance	Dust creating nuisance in Neiafu, Mangia, Houma Ha'akio, Longamapu, Tefisi, Ta'anea, Tu'anekivale Toula, Pangaimotu and Leimatua Villages.	4	B	M	Contractor to implement dust suppression techniques during construction such as use of a water truck.	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
6. Soil Erosion							
Loss of soils disturbed by road construction activities	Soil disturbance	Runoff of sediments affecting sensitive receiving environment as a result of activities on the unpaved Vaihoi Road	3	D	M	Contractor to implement erosion protection measures during construction to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
7. Road Integrity							
Water movement creating erosion issues during road formation	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of Upgrade & sealing of the unpaved and compacted coral roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))	3	A	H	Contractor to implement design measures to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
8. Lack of locally available road material from approved quarries							
Local quarries do not have required environmental approvals to meet WB requirements	Local environment / community	Use of quarry material from quarry without necessary environmental permit	2	A	E	Contractor to ensure material is sourced from permitted quarry	L
Transport of coral aggregate for chip-sealing works from approved Tongatapu quarry to Vava'u	Local community	Loss of access to land as a result of stockpiling material	3	A	H	Contractor to ensure material is stored on Government property	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
C. OPERATION							
1. Traffic Safety							
Excessive speeds on improved roads	Local community	Accidents relating to excessive speeds on all roads	1	B	E	Consult with Police to enforce speed limits Installation of traffic calming devices in Villages and barriers on corners, speed signs, etc	H

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
C. OPERATION							
2. Road flooding							
Road flooding	Road users and property owners	Overflow of drainage systems due to poor maintenance	1	B	E	Contractor to undertake periodic clearance of road shoulders to ensure continual flow of stormwater	M
3. Road Integrity							
Water movement creating erosion issues to newly formed roads	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of Upgrade & sealing of the unpaved and compacted coral roads (Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01))	3	A	H	Contractor to implement design measures to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L

Table 6.10: Issues & risk assessment – Ha'apai

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
1. Traffic Safety							
Movement of construction vehicles	Local community / contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to develop a Traffic Management Plan (TMP) that identifies measures to minimize potential impacts	M
Traffic disruption as a result of road closures	Local community	Alternative routes not defined	3	A	H	Contractor to identify alternative routes in TMP prior to commencement of construction	M
Excessive vehicle speeds on newly paved roads	Local community	Increased risk of accident	1	B	E	Design to include traffic calming measures in villages, barriers on corners, speed signs, etc	M
2. Flood Risk							
Stormwater ponding on carriageway following construction	Risk to road users	Water ponding in low-lying areas creating driving hazard and potential damage to roads	1	B	E	Design of roads to minimize ponding water and provision of drainage to discharge stormwater	M
3. Soil Erosion							
Loss of soils disturbed by road construction activities	Soil disturbance	Runoff of sediments affecting sensitive receiving environment as a result of activities on Falaloa 3 Road	3	D	M	Design erosion protection measures to minimize erosion such as sediment pond to capture runoff, silt fences, etc	L
4. Road Integrity							
Water movement creating erosion issues to newly formed roads	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of upgrade & sealing of particularly the Faleloa 3 Road in Faleloa Village	3	A	H	Design road to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
5. Restriction of Access to Property							
Stockpiled material in road reserve due to clearance activities	Agricultural land owners	Access restricted to allotments along the the more rural roads in Pangai Fotua and Fangaleounga.	3	A	H	Contractors to design procedures to ensure stockpiled material does not restrict access to properties	L
6. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Agricultural land owners	Loss of assets due to clearance within the road reserve along the more rural roads in Pangai Fotua and Fangaleounga.	3	A	H	Contractor to confirm works prior to being undertaken.	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
Activity	**Source of Risk**	**Description of Potential Impact**	**Assessment of Risk**			**Mitigation**	**Post-Mitigation Residual Impact**
			C	**L**	**Rating**		
B. CONSTRUCTION							
1. Traffic Safety							
Movement of construction vehicles	Local Community / Contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to implement TMP which will include pedestrian safety measures, traffic control supervisor to be used, and alternative routes to be identified, timing of works to ensure safe access for children, etc Contractor to communicate TMP to local community as described in the SEP.	M
Temporary closure of shoulder to pedestrians	Local Community / Contractors	Potential human hazards due to closure of road shoulder in Faleloa, Koulo, Holopeka, Pangai, LotoFoa, Fotua, Fangaleounga Villages.	1	B	E		M
Temporary Road closures	Local Community / Contractors	Restriction of access to property, agricultural lots, on all roads to essential facilities such as hospitals etc	3	A	H		M
2. Restriction of Access to Property							
Stockpiled material in road reserve due to clearance activities	Agricultural land owners	Access restricted to allotments along the unpaved and compacted coral roads such as the more rural roads in Pangai Fotua and Fangaleounga.	3	A	H	Contractor to prepare EMP detailing procedures to ensure stockpiled material does not restrict access to properties	L
3. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Agricultural land owners	Loss of assets due to clearance activities within the road reserve along the unpaved and compacted coral roads such as in the more rural roads in Pangai Fotua and Fangaleounga.	3	A	H	Contractor to prepare EMP detailing procedures to avoid or mitigate loss of assets. This may include timing of crop removal, providing assistance to reinstate fences, etc	L
4. Noise & vibration							
Construction activity creating noise and/or vibration disturbance	Local community	Noise and / or vibration disturbance in Faleloa, Koulo, Holopeka, Pangai, Lotofoa, Fotua and Fangaleounga, Faleloa Villages	3	A	H	Strict adherence to working hours (0800-2000) Regularly check and maintenance of machinery, equipment and vehicles	M
	Contractors	Noise impacts on workers	3	A	H	Contractor to ensure workers provided with PPE including ear protection.	L
5. Dust / Air Pollution							

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
Generation of dust as a result of construction activities	Soil disturbance	Dust creating nuisance in Faleloa, Koulo, Holopeka, Pangai, Lotofoa, Fotua and Fangaleounga, Faleloa Villages	4	B	M	Contractor to implement dust suppression techniques during construction such as use of a water truck.	L
6. Soil Erosion							
Loss of soils disturbed by road construction activities	Soil disturbance	Runoff of sediments affecting sensitive receiving environment as a result of activities on the Falaloa 3 Road	3	D	M	Contractor to implement erosion protection measures during construction to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
7. Road Integrity							
Water movement creating erosion issues during road formation	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of Upgrade & sealing of particularly the Faleloa 3 Road in Faleloa Village	3	A	H	Contractor to implement design measures to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
8. Lack of locally available road material from approved quarries							
Local quarries do not have required environmental approvals to meet WB requirements	Local environment / community	Use of quarry material from quarry without necessary environmental permit	2	A	E	Contractor to ensure material is sourced from permitted quarry	L
Transport of coral aggregate for chip-sealing works from approved Tongatapu quarry	Local community	Loss of access to land as a result of stockpiling material	3	A	H	Contractor to ensure material is stored on Government property	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
C. OPERATION							
1. Traffic Safety							
Excessive speeds on improved roads	Local community	Accidents relating to excessive speeds on all roads	1	B	E	Consult with Police to enforce speed limits Installation of traffic calming devices in Villages and barriers on corners, speed signs, etc	H
2. Road flooding							

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
C. OPERATION							
Road flooding	Road users and property owners	Overflow of drainage systems due to poor maintenance such as the Faleloa 3 Road in Faleloa Village	1	B	E	Contractor to undertake periodic clearance of road shoulders to ensure continual flow of stormwater	M
3. Road Integrity							
Water movement creating erosion issues to newly formed roads	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of Upgrade & sealing of the Faleloa 3 Road in Faleloa Village	3	A	H	Contractor to implement design measures to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L

Table 6.11: Issues & risk assessment – 'Eua

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
1. Traffic							
Movement of construction vehicles	Local community / contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to develop a Traffic Management Plan (TMP) that identifies measures to minimize potential impacts	M
Traffic disruption as a result of road closures	Local community	Alternative routes not defined	3	A	H	Contractor to identify alternative routes in TMP prior to commencement of construction	M
Excessive vehicle speeds on newly paved roads	Local community	Increased risk of accident	1	B	E	Design to include traffic calming measures in villages, barriers on corners, speed signs, etc	M
2. Flood Risk							
Stormwater ponding on carriageway following construction	Risk to road users	Water ponding in low-lying areas creating driving hazard and potential damage to roads	1	B	E	Design of roads to minimize ponding water and provision of drainage to discharge stormwater	M
3. Soil Erosion							

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
A. Design							
Loss of soils disturbed by road construction activities	Soil disturbance	Runoff of sediments affecting sensitive receiving environment as a result of activities on Ohonua 1, 2 and 3 Roads in Ohonua Village.	3	D	M	Design erosion protection measures to minimize erosion such as sediment pond to capture runoff, silt fences, etc	L
4. Road Integrity							
Water movement creating erosion issues to newly formed roads	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of upgrade & sealing of particularly on Ohonua 1, 2 and 3 Roads in Ohonua Village.	3	A	H	Design road to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
5. Restriction of Access to Property							
Stockpiled material in road reserve due to clearance activities	Agricultural land owners	Access restricted to allotments along the the more rural roads in Mataaho, Mua, Pangai, Petani, and Haatua	3	A	H	Contractors to design procedures to ensure stockpiled material does not restrict access to properties	L
6. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Agricultural land owners	Loss of assets due to clearance activities within the road reserve along the more rural roads in Mataaho, Mua, Pangai, Petani, Tufuvai and Haatua	3	A	H	Contractor to confirm works prior to being undertaken.	L
7. Lack of locally available road material from approved quarries							
Local quarries do not have required environmental approvals to meet WB requirements	Local environment / community	Use of quarry material from quarry without necessary environmental permit	2	A	E	Contractor to ensure material is sourced from permitted quarry	L
Transport of coral aggregate for chip-sealing works from approved Tongatapu quarry	Local community	Loss of access to land as a result of stockpiling material	3	A	H	Contractor to ensure material is stored on Government property	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
1. Traffic Safety							

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
Movement of construction vehicles	Local Community / Contractors	Potential human hazards due to movement of vehicles and machinery on all roads	1	B	E	Contractor to implement TMP which will include pedestrian safety measures, traffic control supervisor to be used, and alternative routes to be identified, timing of works to ensure safe access for children, etc Contractor to communicate TMP to local community as described in the SEP.	M
Temporary closure of shoulder to pedestrians	Local Community / Contractors	Potential human hazards due to closure of road shoulder in Mataaho, Houma, Ohonua, Mua, Pangai, Petani, ,Haatua and Mataaho Villages	1	B	E		M
Temporary Road closures	Local Community / Contractors	Restriction of access to property, agricultural lots, on all roads to essential facilities such as hospitals etc	3	A	H		M
2. Restriction of Access to Property							
Stockpiled material in road reserve due to clearance activities	Agricultural land owners	Access restricted to allotments along the unpaved and compacted coral roads such as the more rural roads in Mataaho, Mua, Pangai, Petani, and Haatua	3	A	H	Contractor to prepare EMP detailing procedures to ensure stockpiled material does not restrict access to properties	L
3. Loss of assets (e.g., crops, fences, etc)							
Loss of assets such as crops, fences, etc	Agricultural land owners	Loss of assets due to clearance activities within the road reserve along the unpaved and compacted coral roads such as in the more rural roads in Mataaho, Mua, Pangai, Petani, and Haatua	3	A	H	Contractor to prepare EMP detailing procedures to avoid or mitigate loss of assets. This may include timing of crop removal, providing assistance to reinstate fences, etc	L
4. Noise & vibration							
Construction activity creating noise and/or vibration disturbance	Local community	Noise and / or vibration disturbance in Mataaho, Houma, Ohonua, Mua, Pangai, Petani, Haatua and Mataaho Villages	3	A	H	Strict adherence to working hours (0800-2000) Regularly check and maintenance of machinery, equipment and vehicles	M
	Contractors	Noise impacts on workers	3	A	H	Contractor to ensure workers provided with PPE including ear protection.	L
5. Dust / Air Pollution							

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
B. CONSTRUCTION							
Generation of dust as a result of construction activities	Soil disturbance	Dust creating nuisance in Mataaho, Mua, Pangai, Petani and Haatua Villages	4	B	M	Contractor to implement dust suppression techniques during construction such as use of a water truck.	L
6. Soil Erosion							
Loss of soils disturbed by road construction activities	Soil disturbance	Runoff of sediments affecting sensitive receiving environment as a result of activities on the	3	D	M	Contractor to implement erosion protection measures during construction to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L
7. Road Integrity							
Water movement creating erosion issues during road formation	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of upgrade & sealing on Ohonua 1, 2 and 3 Roads in Ohonua Village.	3	A	H	Contractor to implement design measures to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
C. OPERATION							
1. Traffic Safety							
Excessive speeds on improved roads	Local community	Accidents relating to excessive speeds on all roads	1	B	E	Consult with Police to enforce speed limits Installation of traffic calming devices in Villages and barriers on corners, speed signs, etc	H
2. Road flooding							
Road flooding	Road users and property owners	Overflow of drainage systems due to poor maintenance on Ohonua 1, 2 and 3 Roads in Ohonua Village.	1	B	E	Contractor to undertake periodic clearance of road shoulders to ensure continual flow of stormwater	M
3. Road Integrity							

Activity	Source of Risk	Description of Potential Impact	Assessment of Risk			Mitigation	Post-Mitigation Residual Impact
			C	L	Rating		
C. OPERATION							
Water movement creating erosion issues to newly formed roads	Stormwater runoff	Loss of road integrity due to water movement creating erosion issues as a result of Upgrade & sealing o on Ohonua 1, 2 and 3 Roads in Ohonua Village.	3	A	H	Contractor to implement design measures to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	L

6.6 Residual "High Risk" Matters

6.6.1 Introduction

Most of the "Extreme", "High" and "Medium" Risk matters identified in Section 6.6 of this ESIA are resolved to a "Low" Risk category by application of mitigation measures (which are outlined in the ESMP - Section 7).

However, there remain several items with a residual "High" Risk rating. These Operational Impacts are discussed in more detail in the following sections.

6.6.2 Road use by vehicles

Excessive speeds on improved roads leading to vehicle / pedestrian accidents	The residual risk remains "High" given the potentially high consequence of injury as a result of excessive speeds. Mitigation measures need to implemented such as traffic calming measures, barriers, speed signs, etc The Project would benefit from implementation of a Public awareness campaign and to work with local Police to ensure enforcement.

6.7 Cumulative & Induced Impacts

Cumulative impacts are those that result from the successive, incremental and/or combined effects of an action, project of activity. It is envisaged that the Road Project will not result in any long term adverse impacts to any identified environmental or social resources.

No adverse cumulative or induced impacts are expected for any phases of the various road upgrade Projects.

7 Environmental & Social Management Plan

7.1 Introduction

The ESMP is outlined in Table 7.1 which identifies the mitigation measures that the Executing Agency (MOI) has committed to implement for the design construction and operational period of the project. This ESMP will inform the Contractor's ESMP to be prepared following detailed design. Reporting templates that required to be completed by the Contractor are provided in Appendix 4.

7.2 Performance Indicators

Given that nearly all of the potential negative impacts would occur during the construction period, and that robust environmental contract clauses will be able to avoid all impacts, key performance indicators will be as follows:

i) Confirmation that the ESMP tasks are defined as specific individual or grouped environmental and social clauses in contract bid documents.

ii) Confirmation that environmental management criteria are included as part of the contractor selection process, including their experience preparing and implementing ESMPs, etc;

iii) Safeguards advisors retained by the Contractor and by the PMU to provide assistance with ESMP implementation, contractor briefing on habitat protection, contractor ESMP supervision (including observations during construction), and participation in community consultation;

iv) A written record of the briefing on safeguards according to tasks defined in the ESMP and contract specification as soon as contractors have been selected.

v) Compliance monitoring checklists prepared and being used by the contractor and safeguards consultant and due diligence notes, completed as defined in the ESMP, and making the notes available in an easily accessible file for the contractor, Technical Coordinator, PMU Project Manager and others to use.

vi) Preparation of a completion report, identifying mitigation measures defined in the ESMP, their implementation timing and any follow up actions; and,

vii) A written record of all interviews and consultations.

The safeguards advisor will be responsible for preparing a performance indicator report on behalf of the PMU, by listing the seven items above and provide a short text to indicate how these items were implemented and their success as of the start of the operating period of the project.

7.3 Implementation Arrangements

The Ministry of Finance and National Planning is the Executing Agency and the MOI is the Implementing Agency. The MOI is responsible for the management of all activities, including procurement, financial management, and reporting.

7.4 Institutional Capacity

The successful implementation of this project will depend on the management of the environmental and social impacts, in addition to the effective management of construction and operational processes. These roles and responsibilities will fall under MOI and MEIDECC.

MOI will require environmental awareness training for monitoring the Contractors' implementation of the ESMP. Project management staff will have overall responsibility to ensure safeguard compliance in the preparatory and construction phase and will work in collaboration with the Government staff with regard to safeguard requirements.

An Environmental Assessment Committee (EAC) has been established in 2013 with the

responsibility for enforcing the EIA Act. This committee has the responsibility of ensuring that all regulations are adhered to and is also responsible for managing the EIA application and reporting processes. The forming of the EAC shows a level of commitment from MEIDECC to ensuring that development in Tonga is done in consideration to the environment and while there are budgetary constraints to consider, the EAC team has already been active in enforcing regulations in the island groups.

The EAC is still very much dependent on self-regulation in adhering to the EIA regulations and processes. MOI has already committed itself to the correct EIA processes as outlined in Section 4 of this assessment and the EAC is aware of the project. The onus will be on MOI to ensure that they are following correct processes to obtain their environmental permit. The EAC will use this ESIA report to inform MOI of their conditions of permit and any monitoring requirements. It will then be the responsibility of MOI, as the proponent, to facilitate the EAC in their stipulated monitoring requirements which usually includes on-site inspections and monitoring parameters as per the EIA recommendations.

As MOI is committed to the EIA process, this will act as a capacity development tool for the new EAC and the MEIDECC. No direct involvement is required from the Ministry as the project develops, so no additional capacity building is required.

A safeguards consultant will fill the gap in institutional safeguards capacity. The safeguards specialists will also assist to build capacity for implementation of safeguards instruments during supervision missions.

7.5 Mitigation Costs

The cost of a part time safeguards advisor to implement the ESMP and monitor the Contractor's EMP is budgeted at $NZ100,000 per annum. This work would include all reporting and contractor briefing. Mitigation measures, where required to be implemented, are detailed in the ESMP.

Table 7.1: Environmental and Social Management Plan

ACTIVITY	POTENTIAL IMPACT	MITIGATION / MONITORING MEASURES	LOCATION	TIMING	IMPLEMENTATION	SUPERVISION
1.0 Pre-Construction Period (Planning and design actions to prevent future impacts)						
Construction traffic movements	Potential human hazards due to movement of vehicles and machinery on all roads Overall disruption to traffic.	Contractor to develop a Traffic Management Plan (TMP) that identifies measures to minimize potential site-specific impacts such as: • Pedestrian safety measures to be adopted during road shoulder closure • Identification of personnel dedicated to traffic control • Identification of alternative routes to be identified. • Adoption of Stakeholder Engagement Plan (SEP) identifies how information will be disseminated to the community.	Tongatapu, Vava'u, Ha'apai, 'Eua	Before works begin	Road Contractor	Safeguards Advisor
Road flood risk	Water ponding in low-lying areas creating driving hazard and potential damage to roads	Design of roads to minimise ponding water and provision of drainage to discharge stormwater	Tongatapu, Vava'u, Ha'apai, 'Eua	Before works begin	Design Contractor	MOI
Stockpiled material in road reserve due to clearance activities	Restriction of access to allotments along the unpaved and compacted coral roads including: • Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01) (Vava'u) • the more rural roads in Pangai Fotua and Fangaleounga (Ha'apai) • Mataaho, Mua, Pangai, Petani, and Haatua ('Eua)	Contractor to prepare site-specific plans outlining procedures to ensure stockpiled material does not restrict access to properties such as: • Identification of access points to properties • Process for removal of materials to approved Government land location • Process for making material available for use by public.	Vava'u, Ha'apai, 'Eua	Before works begin	Road Contractor	Safeguards Advisor
Loss of assets during clearance activities	Loss of assets (crops, fences etc) due to clearance activities within the road reserve in: • Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4	Inform all Governors and Town Officers of pending works; undertake stakeholder engagement to share information on potential impacts of road clearance; aim to reduce planting of crops in the road reserve after the next harvest.	Vava'u, Ha'apai, 'Eua	Immediate	MOI	Safeguards Advisor

ACTIVITY	POTENTIAL IMPACT	MITIGATION / MONITORING MEASURES	LOCATION	TIMING	IMPLEMENTATION	SUPERVISION
	(VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01) (Vava'u) • Rural roads in Pangai Fotua and Fangaleounga (Ha'apai) • Rural roads in Mataaho, Mua, Pangai, Petani, Tufuvai and Haatua ('Eua)	Contractors to implement Land Clearance Process in the Land Assessment in order to manage impacts associated with clearance activities. This include : • Consultation with landowners (outlined in SEP). • Undertake crop clearance following harvest • Undertaking initial consultation with landowner to discuss options. • Assisting with reinstatement of fences.		Before works begin	Road Contractor	
Loss of soils disturbed by road construction activities	Runoff of sediments affecting sensitive receiving environment as a result of construction activities along: • Vaihoi Road (Vava'u) • Falaloa 3 Road (Ha'apai) and • Ohonua 1, 2 and 3 Roads ('Eua)	Design erosion protection measures to minimize erosion such as sediment pond to capture runoff, silt fences, etc	Vava'u, Ha'apai, 'Eua	Before works begin	Design Contractor	MOI
Road Integrity	Water movement creating erosion issues to newly formed roads: • Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01)) (Vava'u), • Falaloa 3 Road (Ha'apai) and • Ohonua 1, 2 and 3 Roads ('Eua)	Design road to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	Vava'u, Ha'apai, 'Eua	Before works begin	Design Contractor	MOI
Stakeholder engagement (SEP)	Information sharing throughout the life of the project Prepare stakeholder engagement plan to ensure information on the project is shared with all stakeholders.	Implement stakeholder engagement plan to ensure information on the project is shared with all stakeholders.	All project locations	Throughout project life	MOI Construction Contractor	Safeguards Advisor
Community Grievances	Issues developing community resentment due to unaddressed project related concerns	Establishment of grievance redress mechanism prior to commencement of civil works and communicate to public/stakeholders (as outlined in SEP).	Tongatapu, Vava'u, Ha'apai, 'Eua	Before civil works begin	MOI	Safeguards Advisor
2.0 Construction Period (Impacts associated with the work)						

ACTIVITY	POTENTIAL IMPACT	MITIGATION / MONITORING MEASURES	LOCATION	TIMING	IMPLEMENTATION	SUPERVISION
Traffic Safety	Potential human hazards due to movement of construction vehicles around work site Temporary closure of shoulder to pedestrians in Villages creating pedestrian safety issue in • Tongatapu - Hoi, Utulau, Haveluliku, Foui and Matahau Villages • Vava'u - Neiafu, Mangia, Houma and Ha'akio Villages on fringes of Longamapu, Tefisi, Ta'anea, Tu'anekivale Toula, Pangaimotu and Leimatua Villages • Ha'apai - Faleloa, Koulo, Holopeka, Pangai, LotoFoa, Fotua, Fangaleounga Villages • 'Eua - Mataaho, Houma, Ohonua, Mua, Pangai, Petani, ,Haatua and Mataaho Villages Temporary Road closures restricting access to property, agricultural lots, on all roads to essential facilities such as hospitals etc	Contractor to implement Traffic Management Plan (TMP) that identifies measures to minimize potential site-specific impacts such as: • Pedestrian safety measures to be adopted during road shoulder closure • Identification of personnel dedicated to traffic control • Identification of alternative routes to be identified. • Consultation with community/stakeholders (as outlined in SEP.	Tongatapu, Vava'u, Ha'apai, 'Eua	During road works activities	Road Contractor	Safeguards Advisor
Stockpiled material in road reserve due to clearance activities	Restriction of access to allotments along the unpaved and compacted coral roads including: • Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01) (Vava'u) • the more rural roads in Pangai Fotua and Fangaleounga (Ha'apai) • Mataaho, Mua, Pangai, Petani, and Haatua ('Eua)	Contractors to implement site-specific plans including procedures to ensure stockpiled material does not restrict access to properties such as: • Identification of access points to properties • Removal of materials to approved Government land location • Material to be made available for use by public.	Vava'u, Ha'apai, 'Eua	During road works activities	Road Contractor	Safeguards Advisor
Loss of assets during clearance activities	Loss of assets (crops, fences etc) due to clearance activities within the road reserve in: • Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3	Contractors to implement land Clearance Process (see Appendix 1) relating to assets impacted as a result of clearance activities and measures to mitigate potential impacts including: • Consultation with landowners	Vava'u, Ha'apai, 'Eua	During road works activities	Road Contractor	Safeguards Advisor

ACTIVITY	POTENTIAL IMPACT	MITIGATION / MONITORING MEASURES	LOCATION	TIMING	IMPLEMENTATION	SUPERVISION
	(VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01) (Vava'u) • rural roads in Pangai Fotua and Fangaleounga (Ha'apai) • rural roads in Mataaho, Mua, Pangai, Petani, Tufuvai and Haatua ('Eua)	• Undertaking crop clearance following harvest • Undertaking initial consultation with landowner to discuss options. • Assisting with reinstatement of informal fences.				
Loss of soils disturbed by road construction activities	Runoff of sediments affecting sensitive receiving environment as a result of construction activities along: • Vaihoi Road (Vava'u) • Falaloa 3 Road (Ha'apai) and • Ohonua 1, 2 and 3 Roads ('Eua)	Implement erosion protection measures to minimise erosion potential such as side drains and culverts under roads to connect side drains (as required).	Vava'u, Ha'apai, 'Eua	During road works activities	Road Contractor	Safeguards Advisor
Road Integrity	Water movement creating erosion issues to newly formed roads: • Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road (Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01)) (Vava'u), • Falaloa 3 Road (Ha'apai) and • Ohonua 1, 2 and 3 Roads ('Eua)	Implement road design measures to minimize erosion potential such as side drains and culverts under roads to connect side drains (as required).	Vava'u, Ha'apai, 'Eua	During road works activities	Road Contractor	Safeguards Advisor
3.0 Operating Period						
Excessive speeds on improved roads	Accidents relating to excessive speeds on all roads	Consult with Police to enforce speed limits Identification of traffic hazard spots Installation of measures such as traffic calming devices in Villages, barriers on road corners, speed signs, etc	Tongatapu, Vava'u, Ha'apai, 'Eua	Road operation	MOI	MOI
Road flooding	Water ponding in low-lying areas creating driving hazard and potential damage to roads	Monitor roads to ensure ponding water is minimised and provision of drainage to discharge stormwater has been installed. Rectify issue if non-compliance.	Tongatapu, Vava'u, Ha'apai, 'Eua	Road operation	Road Contractor	MOI
Road Integrity	Water movement creating erosion issues to newly formed roads: • Vaihoi Road (Leimatua-Tefisi), Vavau 1 (VVU14AGR01), Vavau 3 (VVU14AGR03), Vavau 4 (VVU14AGR04), Vaihoi Road	Monitor roads to ensure erosion potential has been minimized. Rectify issue if non-compliance.	Vava'u, Ha'apai, 'Eua	Road operation	Road Contractor	MOI

ACTIVITY	POTENTIAL IMPACT	MITIGATION / MONITORING MEASURES	LOCATION	TIMING	IMPLEMENTATION	SUPERVISION
	(Leimatua-Tefisi), Vavau 5 (VVU14AGR05) and Vavau 7 (VVU16AGR01)) (Vava'u), • Falaloa 3 Road (Ha'apai) and • Ohonua 1, 2 and 3 Roads ('Eua)					

8 Grievance Redress Mechanism

8.1 Grievance Redress Process

A grievance redress mechanism (GRM) is presented below to ensure the Project's social and environmental safeguards performance. The purpose of the GRM is to record and address any complaints that may arise during the implementation phase of the project and/or any future operational issues that have the potential to be designed out during implementation. The GRM is designed to address concerns and complaints promptly and transparently with no impacts (cost, discrimination) to project affected people (APs). The GRM works within existing legal and cultural frameworks, providing an additional opportunity to resolve grievances at the local, project level.

The key objectives of the GRM are:

- Record, categorize and prioritize the grievances;
- Settle the grievances via consultation with all stakeholders (and inform those stakeholders of the solutions)
- Forward any unresolved cases to the relevant authority.

As the GRM works within existing legal and cultural frameworks, it is recognized that the GRM will comprise community level, project level and RMI judiciary level redress mechanisms. The details of each of those components are described as follows.

8.2 Community Level Grievance Redress Mechanism

Local communities have existing traditional and cultural grievance redress mechanisms. It is expected that some disputes at the community level may be resolved using these mechanism without the involvement of the contractor(s), and or Government representatives. Such disputes include differences between households over land, or boundaries, and even issues triggered indirectly by the Project such as employment, behaviour of imported workers etc.

Typically the mechanism to resolve these types of disputes \ involve the Town Officer, landowner(s) concerned and, if required, the representative from the Ministry of Lands and Natural Resources and Ministry of Infrastructure.

It is expected that for any land dispute issues relating to the Project would be resolved at this level given the nature of land ownership and the significant authority vested under the Minister of Lands.

Where issues caused by the Project are raised and resolved through these mechanisms, it is important that a process for reporting these grievances to MOI is established. Hence, MOI should record all complaints/outcomes, and if it is land disputes, then the MLNR will lead and record all complaints/outcomes.

8.3 Project Level Grievance Redress Mechanism

Many project related grievances are minor and site-specific and often relate to nuisances generated during construction such as noise, dust, vibration, workers disputes etc. Often they can be resolved easily on site. Other grievances are more difficult to resolve especially issues relating to land boundaries or misunderstandings between affected households and the Contractor regarding access arrangements. Most of these cannot be resolved immediately on site.

For the Project activities in Tongatapu, 'Eua, Ha'apai, Vava'u and Niuatoputapu, the Project Contact Person (PCP) within PMU MOI will receive, review, record and address project related complaints.

In practice not many complaints are expected. However, some complaints are likely to be associated with construction impacts. Most will be received directly on site by the Contractor's Site Supervisor (CSS) who will endeavour to resolve them satisfactorily on site. The CSS will inform the MOI Contact Person and eventually relay to the PCP at MOI/PMU of these

complaints and their outcomes, and of others not satisfactorily resolved that the Project Contact Person should take over. The PCP will log these in the Complaints Register.

The PCPs will, on receipt of each complaint, note date, time, name and contact details of the complainant, and the nature of the complaint in the Complaints Register. The PCP will inform the complainant of when to expect a response. They will then address the complaint to the best of their abilities, as quickly as possible. Should the PCP not be able to resolve the complaint to the satisfaction of the affected persons, they will then refer the complaint directly to the MOI Project Manager (PM).

Complaints referred to the MOI PM will require immediate action to reach a resolution. The aggrieved party will be informed of the course of action being taken, and when a result may be expected. Reporting back to the complainant will be undertaken within a period of two weeks from the date that the complaint was received. If it's a land related issue, the MOI PM will inform the MOI Secretary who will consult the CEO MLNR on how best to resolve it.

If the complaint is not resolved to the satisfaction of the aggrieved party, the complaint will then be referred by the MOI Secretary to the National Steering Committee (NSC). The NSC will be required to address the concern within 1 month.

Should measures taken by the National Steering Committee fail to satisfy the complainant, the aggrieved party is free to take his/her grievance to the Ombudsman's Office, and the Ombudsman's decision will be final. For land issues, the complainant to take his/her issue to the Minister of Lands for a final decision.

It is rare for a complaint to be unresolved after the Ombudsman's decision. However, the very last resort will be redress in the Courts, or Land Court for land disputes.

Appropriate signage will be erected at works sites providing the public with updated project information, summarising the GRM process and including contact details of the PCP. Anyone is able to lodge a complaint and the methods (forms, in person, telephone, forms written in Tongan) should not inhibit the lodgement of any complaint.

The Complaints Register will be maintained by the PCP, who will log:

i) details and nature of the complaint;

ii) the complainant name and their contact details;

iii) date;

iv) corrective actions taken in response to the complaint.

This information will be included in MOI's progress reports to the Bank. Appendix 4 presents a GRM reporting template.

The project level process can only act within its appropriate level of authority and where appropriate, complaints will be referred on to the relevant authority such as those indicated.

Table 8.1 and Figure 8.1 outline the Project level grievance redress process.

8.4 Judiciary Level Grievance Redress Mechanism

The project level process will not impede affected persons access to the legal system. At any time, the complainant may take the matter to the appropriate legal or judicial authority as per the laws of Tonga.

Table 8.1: Grievance Redress Process – Project level

Stage	Process	Duration
1	The Aggrieved Party (AP) will take his/her grievance to Construction Site Supervisor (CSS) who will endeavor to resolve it immediately. Where AP is not satisfied, the CSS will refer the AP to the Project's Contact Person (PCP). For complaints that were satisfactorily resolved by the CSS, he/she will inform the PCP and the PCP will log the grievance and the actions that were taken.	Any time.
2	On receipt of the complaint, the Project PCP will endeavor to resolve it immediately. If unsuccessful, he/she then notify PMU Project Manager	Immediately after logging of grievance.
3	The PMU Project Manager will endeavor to address and resolve the complaint and inform the aggrieved party. If it's a land issue, the Project Manager will advise the MOI CEO, to engage the MLNR. The Project Manager will also refer to the MOI Project Manager other unresolved grievances for his/her action.	2 weeks.
If the matter remains unresolved, or complainant is not satisfied with the outcome at the project level		
4	The MOI Project Manager will then refer to matter to the National Steering Committee (NSC) for a resolution.	1 month.
5	If it remains unresolved or the complainant is dissatisfied with the outcome proposed by the NSC, he/she is free to refer the matter to the Ombudsman's Office or MLNR if it is land matters.	Anytime.
6	Land related issue, MOI CEO may seek the assistance of the MLNR CEO.	Immediately after Stage 3.
7	If the issue remains unresolved through the Ombudsman's decision or the Minister of Lands decision, then the ultimate step will be for the Courts or Land Court respectively to deliberate. Any such decisions are final.	

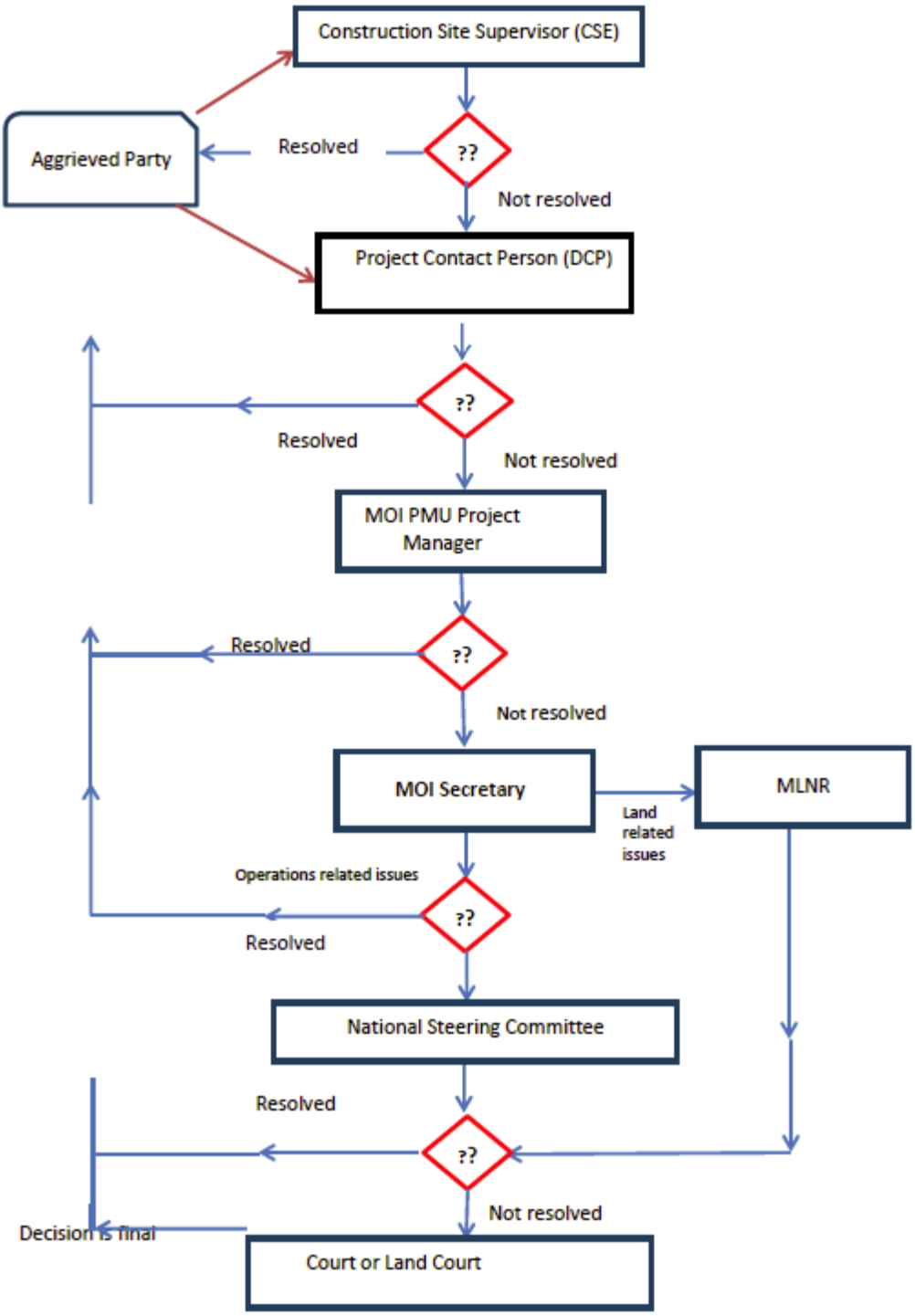

Figure 8.1: Flow Diagram showing Project level Grievance Redress Mechanism

Appendix 1: Land Assessment

LAND DUE DILIGENCE REPORT

Tonga Climate Resilient Transport Project (TCRP)

JUNE 2018

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1. Introduction

The Government of Tonga is seeking funding from the World Bank for the Climate Resilient Transport Project (the Project), to facilitate the safe, efficient and sustainable movement of goods and people in the Kingdom of Tonga, whilst strengthening climate resilience of the transport sector. The Ministry of Infrastructure and Tourism (MOIT) is implementing the Tonga Transport Sector Consolidation Project (TSCP) to consolidate the various transport-related functions and responsibilities of the sector. The project focuses on three key sectors of MOIT: civil aviation, maritime and land transport

The Project focuses on rehabilitation of key infrastructures like roads (Tongatapu Island; 'Eua Island; Foa and Lifuka Islands (Ha'apai Group; Vava'u Island), maritime (ports at the islands of 'Eua, Lifuka, Vava'u, and Niuatoputapu) and aviation (Lifuka Island, Ha'apai Group).

Tonga has a population of approximately 100,000; an estimated total of 20,000 vehicles; and a road network comprising around 1,800km across six islands, of which approximately half is on Tongatapu. The length of minor (feeder or access) roads is estimated at 750km on Tongatapu and 1,350km in total. It is noted that the condition of the road network is generally declining due mainly to under-funding of maintenance. In addition, the safety of outer island ports is also addressed, particularly depth of and width of ferry channels and wharf. Regarding the aviation sector, the focus will only be on resurfacing Salote Pilolevu Airport at Ha'apai.

The purpose of this land due diligence report is to assess and report on the impact of the project with regards to people's lands, and associated assets. More importantly, focused on whether OP4.12 is triggered, and if so, recommend additional documents or plans required. The primary objective is to make sure that there are mitigative measures to avoid or minimise such impacts on the local people. Further, this report also support the main ESIA document.

2. Background

It is advantageous to appreciate the land and tenure system in Tonga, given the complexity and uniqueness of land and tenure in Tonga. In effect, the project is primarily development on land. The proposed road works consist of; Tongatapu – 5 major Roads (28.1 km), Vava'u – 10 Major Roads, 7 minor Roads, Ha'apai – 53 minor Roads, Eau – 25 Minor Roads. The proposed port works will cover dredging of the ports in 'Eua, Ha'apai, Vava'u, and Niuatoputapu. Civil Aviation works will be on Ha'apai airport.

2.1. Concepts to note

The following concepts are paramount for understanding the significance of land, as a medium for development in Tonga, particularly in the transport sector.

2.1.1. The Land

In Tonga, **land** is multifaceted, and for the purpose of this project, land is a space for settlements (road reserves), it also a medium for various land usages (residential and livelihood); it is a material that people can use as resource or raw material; it is a habitat for flora and fauna; it is a base for social identity and ancestry significance; it provides some sense of freedom (ownership and inheritance).

It is necessary for all stakeholders to understand that land is multifaceted within the Tongan societal context. These are mentioned here briefly to provide a platform for understanding how land is perceived.

- Religious Values – Christian Belief (*Tui faka-kalisitiane*)

- Social and Cultural Values – identity of an individual and land practices within the intricate kinship (*Feveitokai'aki*)
- Political Values – sovereignty (*Pule faka-fonua*)
- Economical Values – property value, property administration (*Mahu'inga faka-'ekonomika*)
- Tongan Symmetrical Values – people perceive land as a mean to address various obligations under the intricate relationships among families, communities, and custom (*Mo'ui Faka-Tonga*)

These values are entrenched within the belief of most Tongans with regards to their land. In reality, people availed different weight to each of these values. It should be noted that monetarising of the value of land, adds another dimension on how people view land. Consequently, land can be a sensitive subject for certain people based on their own valued perception. It is paramount for developers and investors to appreciate these when seeking and/or acquiring land for their development project. Therefore, land compensation and consultation requires fiduciary and appropriate consideration. Generally, the relationship between people and land has two primary dimensions in Tonga namely, spiritual and material.

2.1.2. Land Use

People **use** land for various purposes mainly for food production and residential, and to lesser extent, commercial and services such as public utilities, recreation, etc. Categorisation of land use in Tonga is very loose. There is no zoning in Tonga partly due to the individual land rights in Tonga. However, these are characterised by arrangements with regards to ownership, access, and use, for a particular land allotment. The rights to use and/or access land allotments rests on the owner, either allowing other people to use and/or access his allotment, This is either through formal contractual arrangements, like a leasing agreement, or informal arrangements, such as customary agreement. Associated payment, if required, is by mutual agreement between the owner and the user.

2.1.3. Land Tenure

Land tenure refers to the terms and mode under which land and natural resources are held or occupied by individuals or groups. These are rules, usually formal, but informal arrangements are common, these define the nature and content of property rights in land or other resources and the conditions under which those rights are to be held and enjoyed. The land tenure system will discussed in detail below.

2.1.4. Public Roads.

The Roads Act stipulated that the Minister of Lands shall have power to cause new roads to be made. Such road proclamation must be first published in the Gazette and from the date of the publication of such proclamation the said road will be and become a public road. Essentially, all the laws and regulations will be applicable to such proclaimed road. On the other hand, this proclamation is not necessary for roads which are already known or reputed to be public roads and have been considered and treated as public roads.

2.1.5. Road Reserve

Once the public road is open, the road reserve will be the boundaries demarcating the area and the adjacent allotments on either side of the road reserve area. Normally, this area varies based on available land, and it is allocated by the Minister of Lands, as he has the authority to open roads. The width ranges from 7m to 14m, and in some cases 20m. Generally, most of the major

rural road reserves are 14m, and township roads are 7m. The 20m width are uncommon but mainly for major roads. In effect, the area is deemed public road reserve, and is under the authority of the Minister of Lands. The use of this area can only be permitted by the Minister of Lands, and any unauthorised encroachment is illegal.

2.1.6. Coastal Areas

2.1.6.1. Foreshore Area

The Foreshore is defined as the land adjacent to the sea alternately covered and left dry by the ordinary flow and ebb of the tides and all land adjoining thereunto lying within 15.24 metres of the high water mark of the ordinary tides. In other words, 15.24 meters inland above the high-water mark around the islands.

The foreshore in Tonga belongs to the Crown, and the Minister of Lands may, with the consent of the Cabinet, grant permits or a lease to erect "stores or wharves or jetties." Although the purposes are specified or restricted, there have been town allotment and commercial leases in Tonga allocated or granted on these areas.

3. Relevant Legal Framework

The following table is a list of legislations deemed relevant for the purpose of this project.

Legislations:	**Brief descriptions:**
Constitution	The Tongan Constitution states in its Declaration of Freedom (Section 1) that *"…all men may use their lives and persons and time to acquire and possess property and to dispose of their labour and fruit of their hands and to use their own property as they will."*
Land Act	Prescribes the nature and size of land tenure; permissible land use (for public purposes, utilities and services) such as roads, public ways, use by Government Departments or for other public purposes; permissible use on Crown land (timber cutting and sand and limestone quarrying with permit); prescribed use like the responsibility of a landholder to plant coconut trees on his tax allotment.
Environmental Management Act	The Act defines the Government's role in relation to all environmental management and decision-making processes. It also defines the functions and powers of the Ministry in relation to its obligations towards environmental management.
EIA Act	The EIA Act is administered by the Environment Department (MEIDECC). It empowers the ministry to form the EAC and defines the conditions under which an EIA is required.
Roads Act	Under the Roads Act 2007, road construction is the responsibility of the Ministry of Lands and Natural Resources. However, this function in practice has been undertaken by the Ministry of Infrastructure.
Traffics Act	The act administrates the motor vehicle licensing and registration, plus road codes and offences.
National Spatial	Tongan land tenure is complemented by the National Spatial

Management Act	Planning and Management Act, which establishes the National Planning Authority, which is the Minister for Lands. The Act is a landmark progression towards integrated land use in Tonga.
Park and Reserves Act	Provides for the establishment of parks and reserves both on land and marine reserve. The authority rests with the Minister of Lands, with consent of Privy Council.
Bird and Fish Preservation Act	The Act defines species of birds and fish (including turtles) that are protected from being killed, shot, captured, taken or destroyed within their protected time period. It also defines the protected areas.
Fishing Management Act	This Act provides for the sustainable management and extraction of fisheries resources and governs all aspects of the fishery industry within Tonga waters. Further, it recognises the protecting marine ecosystems as a whole.
Harbours Act	This Act provides for the declaration of harbour areas by the Minister.

4. World Bank Requirements

4.1. World Bank Operational Policy 4.04 – *Natural Habitats*

This policy requires the conservation of natural habitats and specifically prohibits the support of projects that involve significant conversion or degradation of critical habitats, as defined by the policy. The policy further requires the EA to identify impacts on biodiversity and species and to determine endemism, endangered species and to determine project impacts on these species and to propose acceptable mitigation and monitoring measures.

4.2. World Bank Operations Policy 4.10 – *Indigenous Peoples*

This policy requires the Government of Tonga to engage in a process of free, prior and informed consultation with Indigenous Peoples (IP's), as described by the policy in situations where IP's are present in, or have collective attachment to, the project area and for the preparation of an Indigenous Peoples Plan (IPP) and /or Indigenous Peoples Planning Framework (IPPF).

4.3. World Bank Operational Policy 4.11 – *Physical Cultural Resources (PCR)*

This policy seeks to avoid the disturbance and/or destruction of PCR as defined by this policy by the projects activities. PCR includes places of worship, buried artefacts, cemeteries, and archeological assets, etc. The policy further requires, (i) EA to undertake an exhaustive desk review and/or site investigation to pre- identify and locate PCR's in the PIA, (ii) EA/EMP to propose management measures and (iii) to include "chance find" clauses in civil works contracts during construction and maintenance stages.

4.4. World Bank Operational Policy 4.12 – *Involuntary Resettlement*

This policy covers direct economic and social impacts that both result from Bank-assisted investment projects , and are caused by (a) the involuntary taking of land resulting in (i)

relocation or loss of shelter; (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or (b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

This policy requires siting of project infrastructure to be so chosen as to avoid these impacts altogether or to minimise them to the extent possible. Where these cannot be avoided, the policy requires the preparation of either or both of these instruments (i) resettlement policy framework, (ii) Resettlement Action Plan, and for meaningful consultations with potentially affected people.

5. The Land Tenure System of tonga

It is well documented and understood that all land in Tonga belongs to the King (Crown). Such tradition has been entrenched in the Act of Constitution 1875, prescribing that all the lands are the property of the King. Further, it is prohibited to sell land in Tonga.
Under the Constitution, the King may grant land to nobles, and Tongan subjects. The nobles act as trustees for the King, looking after the lands. The nobles may grant land to a commoner to live on. However in the beginning of the 19th Century, the Land Act was enacted, allowing commoners to register the land that they occupied as their 'property'. Nowadays, there are six types of landholders or holders of land in Tonga. For example, Estate holder (Hereditary Estates), Landowner (Town and/or Tax Allotment), Widow/ Daughter entitled to life estate, Leasehold (Leaseholder and Sub-leaseholder), Trusteeship (land hold under trustee), Reserves for Public Purposes (Roads, Parks, Reserves).
In respect of any crown lands in Tonga, the authorized landholder is the Minister of Lands who may grant any portion of land to a person or entity by way of a lease or permit. Such Crown Land includes the Foreshore and Beach Frontage.
In respect of any registered land, the appropriate person would be the registered Tongan Subject (or the heir) who may grant any portion of land to a person or entity by way of lease or permit or surrender. Such registered land includes tax and town allotments.
In respect of a noble's estate, the Noble of that village would be the appropriate person to grant any portion of land to a person or entity by way of lease or permit. Such estate includes hereditary land, non-Crown Land and non-registered allotments
The above landholders or holders are likely to be involved in meetings and negotiations over the land for the location of any proposed marine generation project in Tonga. Later sections of this Chapter present information on lease legal requirements including the lease Term, and restrictions.

5.1. Land Tenure in Practice

It is critical for development partners and stakeholders to appreciate the fact that Tonga's land tenure system has unique features relative to other Pacific countries.
The land tenure is entrenched by the Constitution. Part III (Land) provides that all land is vested in the King under sovereign power; the sale of land is prohibited; every 16 year old male Tongan born subject is entitled to apply and be granted a town allotment and a tax allotment; title to land is effected and enforceable upon registration; land may be leased; and land is inherited by prescribed rules of inheritance.

The formalised tenure through a constitutional and statutory regime with different forms of interests as described below.
The intervening interests of the Sovereign as all land in the Kingdom belongs to the King; the nobles who hold hereditary estates and may consent to the allocation of allotments from those estates; and the Minister for Lands who grants all land interests and estates and acts as the Registrar General.
The overlapping interests in which several entities may be allocated different rights to the same parcel of land. The classic example is when a landowner (Lessor) lease his land to a Lesse for a fixed period. In some cases, the Lessee sub-lease the leased land again to a Sub-lessee.
The complementary interests in which different parties share the same interest in the same parcel of land (e.g. equal rights to commons areas such as cemeteries and recreation and sporting parks). Although under Tongan law, there is no customary or communal landholding.
The competing interests in which different parties contest the same interests in the same parcel. In cases where there is no direct heir, the succession provision allows for brothers of the landowner to state their claim.

5.2. Land ownership and succession

Land allotments are either registered as an inheritance (town or tax allotment) or registered as a property through a leasing arrangement. Noting that leaseholds, unlike registered allotments, are allowed to be traded as a commodity (buy and sell). Both leases and registered allotments may be used to secure bank loans.
It is both a legal and social requirement for every Tongan male over the age of 16 is entitled to an agricultural (tax) allotment of 3.3 hectares (ha), and a residential (town) allotment of between 758 m^2 and 1,618 m^2 for residential purposes. The holders of these allotments are registered at the Ministry of Lands and Natural Resources.
When the registered owner of an allotment dies, the allotment is inherited by the eldest son, or other male heir. Women can only lease land or hold land in trust for their male heirs. On the other hand, leaseholds can be inherited by next rightful owner (next of kin (male or female), entity) if the leaseholder passed away. This can be claimed via a letter of administrative or will of the deceased.

5.3. Granting Land Allotments as registered allotment or leasehold

In respect of any estates in Tonga, the lawful legitimate Estate-holder[17] may grant any portion of land to a Tongan subject an allotment to own as his inheritance (registered land allotment); or for a person or entity to lease (leasehold).
In respect of any registered land, the appropriate land holder would be the registered landholder who may grant any portion of the allotment to a person or entity by way of lease. There is a limit in terms of duration, 20 year with a 10 year renewal for tax allotments, and 30 year for town allotments.
In respect of a noble's estate (*tofi'a),* the Estate-holder (King or Noble) can grant any portion of the estate to a person or entity by way of lease. The leasing period may go up to 99 year.

[17] HM The King on Royal Estates & King's Estates, Noble on Noble Estates, Minister of Lands on Government Estates.

The above estate-holders or registered land-holders must either be informed/consulted, either directly or through a legitimate representative, on land requirements of any proposed new electricity generation and electricity infrastructure project in Tonga. Later sections of this Chapter present information on lease legal requirements including the lease terms, and restrictions.

5.4. Leases

Lease agreements between the lessor (private owner or estate-holder) and the lessee (tenant). Details of lease agreements are described below. This is one of the land ownership instrument that women own and access land. However, it is also allow foreigners and commercial organisations to .

8.4.1 Terms of Leases

5.4.1. Lease Areas

Government estates: Generally, the Minister, with consent of Cabinet may grant a lease of a crown land to a person or entity for a period not exceeding 99 years or a renewal of a lease provided the period not exceeding 99 years from the original lease.

Noble's estates**:** Generally, a Noble may grant leases provided it does not exceed 5% of his total area of that estate. However, it may exceed if such lease is for religious bodies, charitable institutions, and the Tonga Electric Power Board (now Tonga Power Limited[18]).

Tax and Town allotments**:** The landholder of the allotment may grant a lease of his registered allotment or part of it, with consent of Cabinet.

Lessee**:** The Lessee may grant a sublease of his or her leased property, either in whole or part of it, for sublease. Otherwise, he or she may elect to sell the lease outright for the purpose of the development project.

5.4.2. Renewal of Leases

A request in writing for a new lease must be served on the Landholder not less than six months before the expiration of the lease.

Government Land or estates**:** The Minister at the direction of Cabinet after a request in writing so to do by the holder of the expiring lease to grant to such holder of such expiring lease a further lease for a period not exceeding that granted in the expiring lease provided the rent is all settled, and all other conditions and terms have been observed and performed.

Noble's estates/Allotments: If the Landholder (Lessor) fails to agree to the grant of a new lease for a period equal to that of the expiring lease at a rent not greater than that reserved in such expiring lease within 3 months after a request in writing so to do by the holder (Lessee) of such expiring lease, the Minister may, with the Cabinet direction, grant the Lessee a further lease for a period not exceeding that granted in the expiring lease.

5.4.3. Administrative Matters

Rentals: The common practice is that both parties meet and negotiate the

[18] In 1998 the TEPB was privatised, when the Shoreline Power Company leased the utility. Shoreline invested in upgrading the grids and in new generation. In 2008 the government bought back the power assets owned by the Shoreline group and today the utility is run by Tonga Power Limited, which is a vertically-integrated, State Owned Enterprise.

rental, purpose, and duration of the lease. Lease costs vary, however the market value is usually utilised as a guide. All the lease rentals must be paid to the Ministry of Lands, then the lessor (estate holder or landholders) will collect the rentals from them. The administration fees and taxes are deducted before the lessor received his or her share.

Fees: The fee for the registration of a lease is $21.00. The fee for surveying depends on the size of the area, $60 for an area less than 1.5 hectare, $70 for an area less than 3 hectares, $180 for an area less than 6 hectares, and $200 for 8 hectares.

Limitation of action: Any action or claims in respect with any land matters must be brought before a Court within 10 years.

6. Tonga's Land Tenure and Development

There is a prevailing perception and opinion that the Tongan land tenure is one of the key constraints to sustainable land use or economic development. On the contrary, it is acknowledged that one of the most effective incentives to production and conservation is security of title to land and its resources.

As alluded to, security is the underpinning principle of the Tongan land tenure system. Security of tenure embodies that certainty that a person's rights to land will be recognised by others and protected against specific challenges. Further, such security is essential to a person's ability to access and utilise land for sustenance and well-being. On the other hand, insecurity of land tenure gravely weakens the effectiveness of land use. Insecure tenure also means limited access to land, hence encumbers the management and conservation of natural resources.

7. Contemporary Land Tenure System

Land tenure is the regulatory framework by which land ownership is defined, recognised and enforced by the society. It should be clear at this point that in practice, both the land tenure (as specified by the Land Act) and the customary land tenure are practiced in parallel. Interestingly, these systems compliments and seldom dispute each other. This is one of the primary reason that land practice has managed to mitigate the adverse impacts of Tonga's depleted land supply.

It is essential to note that Tonga's contemporary land tenure system[19] is a hybrid system, not just the tenure system as commonly known. In effect, land practice encompasses both the land tenure system and the customary tenure system. It allows people to utilise both sets of tenure as practical and appropriate to their needs or situation.

[19] "Tonga's Contemporary Land Tenure System: Reality and Rhetoric" (2002), PhD Thesis, School of Geoscience, Faculty of Science, University of Sydney, Sydney, Australia

8. TCRTP and Land Tenure

The following are land tenure attributes are very important to note in light of the TCRTP:

- All land in Tonga belongs to the Crown.
- Sale of land is prohibited.
- The rights or interests are individualised and life interest only.
- The Land Act forbids land holders (registered allotments) from entering into any agreement for profit or benefit from the use of his holding other than that prescribed by the Act.
- Designation (open) and authority over Road Reserves is the Minister of Lands
- Road designing, building, maintenance is the responsibility of the Minister of Infrastructure

It is well understood that the principal purpose of the set land tenure system is to protect the land or to secure the inheritance of land for all Tongans. However, the Tongan land tenure system, like any other human-structured systems, is vulnerable to exploitation unfortunately. More significantly, the tenure system allows for the customary tenure to be practiced.

9. TCRTP and Land Use

It is useful to present here a general land use leading to the next section. Townships is a built area, and are predominantly residential properties with other commercial and office buildings. Rural areas are primarily tax allotments, and primarily agricultural activities. Noting that a large proportion of the farm lands was lying fallow (25,445 acres); areas of annual crop (23,999 acres); perennial crop areas (3,207 acres); and pasture areas (4,858 acres)[20]. Obviously, Tongatapu has three-quarter of the total national annual crop cultivated area (76 percent). This followed by Vava'u (10 percent), Ha'apai (6 percent), 'Eua (5 percent) and the Niuas (3 percent).

The 2015 Agricultural Census also identified five most common annual crops as manioke[21] (cassava), talo futuna (yautia)[22], kumala[23] (sweet potato), and talo Tonga (swamp taro). Manioke and kumala have increased since the 2001 census but talo futuna, 'ufi, and Talo Tonga have declined. This was apparent during the site visits to the selected roads for this project. Further, the primary purpose for cultivating these crops is for subsistence, although there are fewer commercial purpose. These type of crops, characteristics and method of cultivating them, facilitate relocation if required, as will be discussed in the next section.

The agriculture active population reflects similar pattern to the national population distribution. However, the lifestyle in the rural areas, and outer islands, reflected a strong presence of extended family ties. This is supported by the fact that agriculture active workforce are classified

[20] Agricultural Census 2015, MAFFF

[21] Manioke is propagate by cutting, by planting pieces of stem.

[22] Talo is propagate using the tubers, small tubers, or suckers.

[23] Kumala is propagate by part of the plant stems.

as ‘self-employed’, and these are predominantly male.

10. Component Activities: Land Status and Requirements for Project Components and Potential Issues

10.1.1. Tongatapu

Tongatapu Island is the capital island of the Kingdom. It is a low, raised coral limestone island. It is about 35km from east to west and 15km from north to south. The island had been formed on the crest of a large submarine fold west of a deep trench (known as the Tonga trench) on the floor of the Pacific Ocean. The land is flattish and there are no permanent streams. Geological pressure on the fold has tilted the island so that the south-eastern end is about 80m above sea-level. The north-western part is generally low-lying areas.

The agricultural districts covered by the selected roads are Nukunuku (Loto Road – 2 parts), Vaini and Lapaha (Liku Road (2 parts) and Taufa’ahau Road). This covers 3 out of 7 agricultural districts in Tongatapu. Potentially, about 35 percent of the agricultural active households directly

benefit from the proposed improvements[24]. The communities directly impacted with population are as follow;

Townships	Population
Ha'ateiho	2,664
Vaini	3,294
Veitongo	1,199
Fua'amotu	1,639
Haveluliku	182
Hoi	427
Kolonga	1,135
Lapaha	1,995
Makaunga	389
Navutoka	717
Talafo'ou	362
Matahau	570
Fo'ui	657
Ha'alalo	605
Total	13,842

The estimated number of people (13,842) is almost a fifth of the total population of Tongatapu. Noting that two thirds of the national population resides in the capital area of Nuku'alofa.

10.1.1.1. Roads & Road Reserve

The 5 roads selected for this project are primarily rural roads and had been declared as public roads under the authority of the Minister of Lands. Most people are well within their boundary but from preliminary survey based on a 14m width reserve, there are encroachments on some areas of the road reserve. These include smaller part of some crops, such as taro, bananas or yams; and in fewer cases, livestock fences. In some other areas where the roads seemed narrow, are due to overgrowth of vegetation. These particular cases, there is no encroachment as these are just natural vegetation covering part of the road reserve. However, it would have been much clearer if the survey pegs were still in place but most are not identifiable. It is a common practice that people relied on their knowledge of where the boundaries are. These are near accurate in most cases but not all.

[24] Percentage calculated from Table 2 Total number of agricultural active households in cropping. 2015 Tonga National Agricultural Census Main Report, December 2015, MAFFF, Tonga

Road encroachment: Crops (Banana trees), Loto Road

Road encroachment: Livestock fence on Liku Road

Vegetation overgrowth onto road reserve, narrowing the actual road; Liku Road.

In order to calculate the extension of the encroachment there is a need for a boundary redefinition survey to demarcate the reserve boundaries in some areas of encroachments. People were aware of these potential encroachments, and willing to cooperate with the project team to facilitate the project implementation.

The types of encroachment are potentially, root crops (taro or yam), boundary fences (wood posts and barbed wires), and vegetation (overgrowth and some trees). Overall, these are non-permanent and removable if required. The impact of removing or relocating these are not significantly detrimental to the owners.

It was pointed out clearly at the consultations, that people need to work on clearing the road reserve if they feel that they are encroaching. Again, people understood that road reserves are not their land, and they respected that.

Proposed Road clearance and upgrade

The road improvements proposed for Tongatapu are well within the road reserves. The work will be primarily upgrading and chip seal of existing roads. All of the 5 roads selected are well within the road reserve areas. However, in some parts of the roads, some clearing of the road reserve are necessary, particularly to remove overgrowth near the carriage-way. In this case, a boundary redefinition survey to ascertain the proper allotment boundaries is recommended prior to any clearance work.

10.1.1.2. Land Ownership

The lands adjacent to the selected roads are registered town and tax allotments. This is clearly defined from the road reserve. No one has ownership or right to use that road reserve. However, the proposed improvements will be limited to the existing carriage-way (approx. 5m width), set within a 14m width road reserve, there will be no encroachment on private land allotments.

10.1.1.3. Right of Way

The proposed road works are not in any form hinder people's right of way. The proposed work focussed on the existing carriage-way (5m) from a road reserve of approximately 14m. Hence, the proposed road works will be within the road reserve therefor no impact on people's land allotment. However, all works must be within the road reserves. If there is a genuine need to use extra land areas adjacent to the road reserve, then a permission or an agreement with landowner(s) concerned must be secured in advance through consultation. If that particular landowner does not agree or consent, then an alternative land/landowner should be considered. There were concerns raised with regards to the access or turn off into peoples' allotments. People have had their access or turn-offs hindered by access materials in previous road works. Hence, the general consensus from the people was for the Project and the Contractor to make sure these access or turn-offs are not hindered during or after implementation.

10.1.1.4. Protected Areas

There are no special protected areas near the selected roads.

10.1.1.5. Terrestrial ecosystems

The selected roads are mostly rural roads, and all 5 provide access to tax allotments (agricultural areas). Vegetation are mostly secondary plant and grass cover. This is due to the fact that most lands are either lay in idol or being farrowed especially Taufa'ahau Road.

Idol farm allotments on both sides of the road, Taufa'ahau Road.

10.1.1.6. Socio-economic environment

Farming activities are traditionally root crops for mixed use (subsistence, semi-commercial, commercial). These are annual and not permanent crops. The impact of these 5 roads, covering with regards to peoples' socio-economic activities are beneficial, particularly for agriculture, transport, utilities, social networking, and commercial businesses. Noting that most of the roads selected for this project covers a huge area of the agricultural land (tax allotments), allowing

better access for the relevant communities to access their tax allotments. Most of the farming activities are for subsistence and there are some who farm purely for commercial purposes (supplying the local market and overseas Tongan communities).
The upgrade, especially Liku Road and Loto Road, will allow accessible to the airport from central and western districts. On the same note, provides alternative route to the airport for Nuku'alofa people.

10.1.1.7. Historical and Anthropological environment

There are no historical or anthropological sites affected by the proposed project activities.

10.1.1.8. Public Consultation Feedback

The public consultations were held at Fua'amotu, Veitongo, Vaini, Navutoka. Relevant communities were invited to these meetings primarily to be informed of the project and also to get their feedback.
There were a lot of dialogues and questions with regards to the proposed road improvement (Liku Road 1). However, there were a few matters that were repeatedly prominent matters from peoples' remarks.

- Support for the project was clear, as people expressed their appreciations.
- People were well informed and willing to collaborate in clearing the road reserves.
- People understood that with better roads, means easy access, and more traffic through their village. More so with the westerns districts accessing to the airport.
- Road safety was a key discussion topic. The existing road condition was believed to be unsafe, as there have been accidents. The proposed improvement should have appropriate safety measures to control the foreseeable increase in traffic.
- People also noted the fact that vehicles nowadays are heavier and faster. The example was the dump trucks using the roads, particularly the quarry at 'Ahononou (Fua'amotu). They alleged that without good road design, the heavy vehicles can damage the road.
- People seek to utilise the access materials from the road works, especially the soils. However, any soil material on the road reserve is under the jurisdiction of the Minister of Lands to dispose of. The general view is for the Project and MoI to seek permission from the Minister of Lands for people to use these materials.
- Access or turn-off to the individual allotments should not be hindered during or after the project.
- People were eager to know their rightful boundaries exactly, as suppose to the road reserve areas. Knowing their boundaries will assist them in stopping unintentional encroachments on the road reserves. At the moment, most survey pegs are lost and people based their land use on memories and on natural landmarks such as neighbours boundaries or existing roads. Noting that the existing roads do not mark the actual road reserves.
- People are happy to stay clear of the road reserve in order to allow the project to proceed. This include moving any crops that potentially on the road reserve. There is general understanding that the road reserve is Government area. More importantly, people were asked to reframe from encroaching on road reserves leading up to implementation next year.

10.1.1.9. Summation

Overall support was unquestionable, particularly with potential benefits of this project. Members of the communities were well informed and understood the positive impacts of this project in terms of better roads, improved transport network for commuting to employments, schools, and farming. The linking of communities was also highlighted based on kinship ties to other parts of Tongatapu.
The communities' concerns raised were for the road design and contractor to facilitate their

needs, particularly allotment access and road safety. For example, road works should not hinder their access or turn-off into their allotments. Road safety, such as road signs and speed management, are a priority for the communities in view of the improvements proposed for these 5 primary roads.

It is noted that with widening of the roads, particularly Liku Road, there will be no impact on the adjacent allotments. Liku Road is laid on a road reserve (approx. 14m) far wider than the existing carriage-way. People understood their limitation of use on road reserves. At the same point, the Ministry of Lands do not compensate encroachment on road reserves. Hence, the general understanding that road reserves are Government areas. It is recommended that a road reserve boundary redefinition survey be done to clearly demarcate the road reserves if there is any contentious boundaries.

It should be noted that in some areas, particularly Liku Road and Loto Road, there are areas of encroachment on the road reserves. Despite the fact that people will have to vacate the road reserve area. In areas with crop encroachment, these are small relative to the cropped area. For example, from the site visit, visual assessment, and consultations, the estimated encroaching crop areas are generally less than 10 percent of the total crop, commonly these are annual crops. Regarding the livestock fences, it is the frontage fence line that usually encroached on road reserve. The fence materials are re-usable, removable and can be relocated if required. The overall impact on the landowner concerned, is minor in view of the total area farmed on his tax allotment.

There is also a chance that with a wide road reserve area, road works can be implemented without the need to clear the encroaching assets (affected assets).

No historical or archaeological sites affected. Given the understanding by the local people, they see the potential benefits will be theirs.

10.1.2. Ha’apai (Lifuka Island and Foa Island)

The Ha’apai Group is an archipelago that lies 160 km north of Tongatapu island. These islands are mostly low-lying coral islands with a flat to gentle topography covered with a three meters thick mantle of volcanic ash. Some islands are made up of rocks other than coral limestone (volcanic tuffs, marl, organic sediments). However, the subject islands of interests are Lifuka and Foa, noting that Lifuka is the capital island of the group.

The project covers the two main islands in the group. These islands hold half of the number of agricultural active households of Ha'apai Group[25]. The two islands of Foa and Lifuka have a combined population of 3,598, which is about two third of the total population of Ha'apai.

10.1.2.1. Roads & Road Reserve

There are 54 minor roads identified for this project with proposed works ranging from rehabilitation, sealing/resealing, upgrading, and upgrading/sealing. All land allotments, residential and agricultural, are allocated and registered. The land program under the reconstruction after Cyclone Ian had improved land registration in the islands.
Road reserves in the settlement areas had recently been demarcated under the Outer Island Renewable Energy Project (OIREP). OIREP upgraded the electricity lines in Lifuka and Foa islands, and the road reserve redefinition survey was a precondition to the network upgrade work. Overall, the road reserves are well marked on the main roads and secondary roads within the settlement areas. In effect, proposed works should be on road reserves and no encroachment or removal of vegetation or otherwise in the settlement areas.
Although the road proposed road works will be within the road reserve. However, the rural roads have encroachments, primarily overgrowth vegetation. Noting that vegetation overgrowth hinders peoples right of way as well.

[25] 2015 Tonga National Agricultural Census Main Report, December 2015, MAFFF, Tonga

Rural road, Pangai, Lifuka, Ha'apai

10.1.2.2. Proposed Road clearance and upgrade

The roads in the islands of Foa and Lifuka townships had just been surveyed for a network upgrade under the Outer Island Renewable Energy Project, which has been completed. As such the road reservations have been marked but some roads, especially those leading out from the settlements to the farming area, still need redefinition survey boundary work.

The road improvements proposed varies between different roads namely, upgrade and seal, rehab and seal, seal, upgrade, rehab and reseal, upgrade then seal. Roads within the settlement areas, are well marked and road works should be within these road reserve areas. Unfortunately, the rural roads are not well maintained and not properly aligned in some parts (Pangai 4, 5, 15, 16, 17, 18). These roads need to be surveyed because in some parts the road reserve is indistinct. However, in Foa, the proposed rural roads have topographical issues. Lotofoa 8 and Lotofoa 9 cuts through depression area or swampy area. That will mean that the road will have to be filled and compacted to a higher level to avoid being flooded during wet season. The alternative according to local people, is the road to that traverse their water source, parallel to the proposed roads to the north.

Potential encroachments, in the form of crops and fence lines, especially on rural road reserves on both islands. These are not significant in view of total cropped area per tax allotment, from visual inspection, it is estimated to be less than 10 percent. The type of crops are mainly manioke (tapioca), hopa (plantain trees), talo (taro), or 'ufi (yams). These are not permanent and can be practically relocated form the road reserve. In similar manner, fence lines are typically of wood posts and barbed wire or mesh diamond wire or tin sheets, all are removable if required.

10.1.2.3. Marine Area & Wharf

The marine area identified for dredging (entrance channel and wharf) are coral reef. Noting that these are existing wharf and channel. People are still doing reef fishing in the general area.

10.1.2.4. Land Ownership

Land ownership of allotments on either side of the proposed roads had been allocated and in many instances, registered as either town allotment (residential) or tax allotment (farming). Road reserves are evidently public roads and under the authority of the Minister of Lands. The port area and the wharf are under the jurisdiction and operated by the Department of Marine (MoI). The wharf area on land are distinct, and the marine area are also known by the local people.

10.1.2.5. Right of Way

There no inhibition of right of ways for both the road and port proposed works. Given that the road reserves had recently been marked under OIREP, the only area of concern are the access or turn-offs into peoples' allotments. These should be cleared at all times during and after the implementation phase, to allow people freedom of access to their allotments.
However, the right of ways of people access reef areas for customary fishing will only be limited during the implementation phase. The impact of that will be minimal, as there are other alternatives for fishing along the coast.

10.1.2.6. Protected Areas

There are no protected areas in the PIAs in Lifuka and Foa Islands. However, two roads in Foa Island traverse a swampy area. Although not a protected area, it poses issues with flooding, especially during wet season.
The port proposed dredging will have no impact on any SMA zone.

10.1.2.7. Terrestrial & Marine ecosystems

The roads are well established, despite the poor conditions of some of them, but the terrestrial ecosystem is predominantly secondary vegetation.
The area concerned is a reef ecosystem and any impact must be minimised.
The only airport upgrade under this project, will be for Salote Pilolevu Airport runway at Koulo, Lifuka Island. The area is an established airport runway with grass cover on either side.

10.1.2.8. Socio-economic environment

The point of contact to the rest of Tonga and the world are the airport and port. Given that people welcome and for some people depend on remittances, the port and airport are indispensable. At the same instance, the port also important in connecting people within Foa and Lifuka and other islands. People in the outer islands depend on this for their commute and supply.
Improving the road network, especially the selected rural roads will allow better access to the farming areas (tax allotments). This is where people farm for subsistence, and some practice mixed farming (subsistence/commercial). The latter, consume part and sell part of their produce. Ha'apai is also well known for growing mulberry trees for women's handicraft, but these seemed to be unaffected. However, better roads allow women to participate and more active economically.
The roads, particularly through the townships, are critical for both social and economic benefits of the communities in Foa and Lifuka islands. Further, the connection between the townships and the rural areas where they do their farming.
These improvements also provides employment in the transport sector for local people. The ripple effect of that to other sectors, especially fishery and tourism, is significantly critical for Ha'apai as a whole.

10.1.2.9. Historical and Anthropological environment

In most areas, there is no historical or anthropological areas impacted both on land and at the port area. However, there are existing roads that either traverse or adjacent to some of the historical sites in Lifuka Island. That will be a benefit by allowing better access by people and foreign tourists to these sites.

10.1.2.10. Public Consultation Feedback

Overall, the response from all communities were generally appreciation and keenness to see this project implemented. On the same note, they were concern because based on their experiences, road work had been promised before and never came to fruition.
People understood that OIREP had done the road reserve markings which should help this project in terms of demarcating the road reserves as supposed to peoples' town allotment boundaries.
Road design was discussed in more depth than usual. People wanted to be sure that any road work laid will last, in counter of their experiences from past road works. It was also claimed that the road designs did not take the Lifuka topography into account. They identified that Lifuka Island is higher on the east and low on the west coasts. That dictates the runoffs and that is partly why roads are often washed away during wet weathers.
Road maintenance was also a serious topic of discussion. They know that any good road laid will only last if it is done and maintained properly.
People were concerned that most road rehabilitation and resurfacing done so far does not include tar sealing. These roads do not last very long and more vulnerable to runoffs.
In Foa Island, people identified two proposed roads linking the settlements to the higher parts of the island on the east, to be impractical. These traverse through known swampy areas (Ano) and will not be useful during wet season or extreme weather conditions.

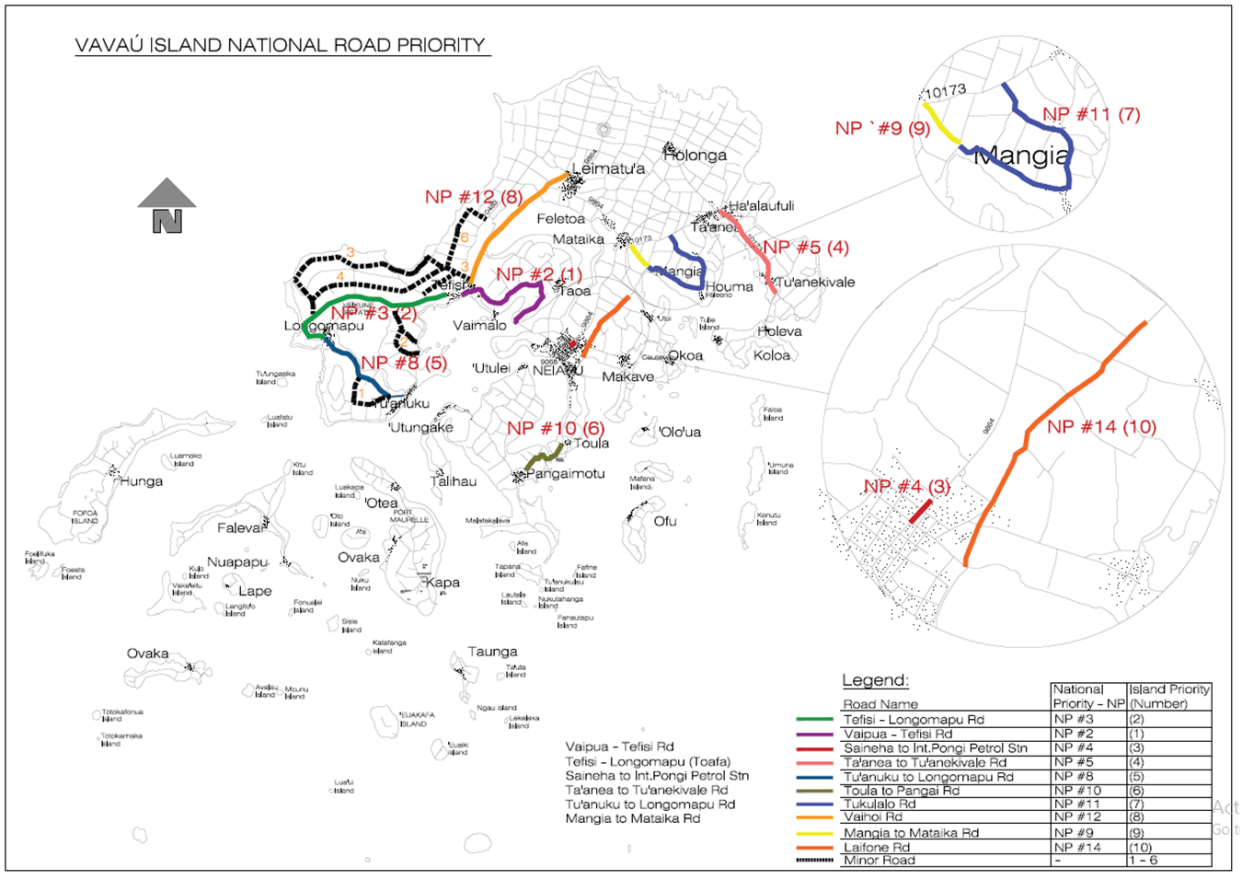
10.1.2.11. Summation

Overall, people were supportive of the proposed road works, especially the roads within the settlements. The fact that road reserves in the settlement areas are well marked, the impacts on peoples' right of way and land allotments should not be an issue. Similarly, both the port and airport areas are well distinct and understood by the people.
However, the impact of these improvements namely, road, port and airport, on the Ha'apai people social and economic is very significant. The movement of both people and goods will significantly improve allowing for more social and economic activities. Noting that Ha'apai is generally more of fishing communities than land based farming.
However, they raised some good points of concerns particularly with the road design and maintenance. Further, the rural roads on both islands although needed, the Foa roads are vulnerable to flooding, while the rural roads in Lifuka needed to be surveyed. In any case, there is some areas of encroachment on the rural road reserves, especially on Lifuka.
The farming activities are primarily traditional mixed farming (subsistence and semi-commercial, crops and livestock). Although the conventional tax allotment is 8 acres, most of the cropped areas are relatively smaller (1 acre – 4 acres), than say Tongatapu and Vava'u. However, there are areas with no farming activities, presumably lay in idol or being farrow. The existing rural roads are mostly gravel filled and compacted, but some areas, it is still dirt road. Any improvement on the rural roads will provide better access to the farming areas, and optimistically increase agricultural activities.
Affected assets on road reserves are primarily part of crops or fence lines in the rural area. In terms of the crops, from visual estimation, it is just part (<10%) of the total crop area per subjected tax allotment. The estimated percentage is similar to other islands because despite the difference in cropped areas, the method of cultivation is similar. Thus presenting similar number of crops per acre. Further, these crops can be either be harvested or relocate from the road reserve area. Fence lines, based on make-up and characteristics, are also removable and relocated back to the right boundary line. The impact will be limited to the landowner concerned, and relatively small compared to the rest of his farmed area or tax allotment. There is a chance that given the road reserve areas, there may be no need to clear affected assets.

Overall, there will be no impact on people's individual town allotments and tax allotments. The proposed work will be on road reserve areas. The primary encroachment on the road reserves are primarily on the rural roads. These are mostly vegetation overgrowth.

10.1.3. Vava'u

The Vava'u Group lies 110km north of the Ha'apai Group, and approximately 270km from Tongatapu . The main island of Vava'u is being surrounded by a number of smaller islands which are separated from the mainland by numerous narrow channels. Besides a number of low coral isles the group contains also larger raised coral islands with a characteristic three-tiered terraced silhouette. The largest island, Vava'u, has an elevation of 213m above the mean sea level at its south-western end. All islands in this group are covered by a mantle of clayey andesitic volcanic ash of several meters thick.



The project include roads in the agricultural districts of Neiafu, Hihifo, Leimatu'a, Pangaimotu, and Hahake[26]. This spread covers most communities and a large portion of the agricultural active households.

The communities directly impacted are Neiafu (3722), Toula (357), Pangaimotu (636), Houma (146), Koloa (142), Mangia (102), Ta'anea (644), Tu'anekivale (368), Leimatu'a (1173), Mataika (527), Longomapu (549), Tefisi (533), and Tu'anuku (283). In total, one fifth of the total population of the Vava'u Group.

[26] 2015 Tonga National Agricultural Census Main Report, December 2015, MAFFF, Tonga

10.1.3.1. Roads & Road Reserve

People generally welcomed the proposed project's road works. Prior to this project, there were roads that had been brought to the attention of Government but have not been upgraded. However, road reserved areas are generally known and respected by people in Vava'u.
All proposed road works, 4m and 5m in width, should be within the road reserves. This should be more practical for roads in residential areas than those in rural areas. Rural roads have encroachments in some parts and these are mostly crops and agricultural fences (wooden posts and barbed wires).

10.1.3.2. Proposed Road clearance and upgrade

Roads selected roads will be upgrade and chip seal, upgrade and seal, seal, rehab and chip seal. These are expected to be 4m or 5m wide but more importantly, well within the road reserve areas.
The communities were glad that this project will upgrade 10 major roads and 7 minor ones. They were well understood the benefits. Vava'u is the primary grower and producer of kava, and farming of kava has increased in recent years. Therefore the improvement of rural roads such as Vaihoi Road, Tefisi-Longomapu for example, will be a boost for farming in Vava'u, especially kava cropping.

10.1.3.3. Land Ownership

This is a matter that was clearly appreciated by the communities. People were certain on their allotments, town and tax allotments that they owned, as supposed to the road reserve. However,. land allotments on both sides of the selected roads are allocated and had been registered as either town allotments, tax allotments or leaseholds. The road reserve, where the proposed road works will occur, is under the jurisdiction of the Minster of Lands
The wharf area, including the ferry channels, is under the Marine Department of MoI. These areas are well demarcated and known by the Vava'u public.

10.1.3.4. Right of Way

The proposed road improvements ranges from 4m, 5m and 6m, all are within the road reserve area of 10m and 14m. Public right of ways will not be affected by the proposed road works. However, access or turn-offs to peoples' allotments should be acknowledged and not hindered during and after the project.
The proposed dredging of the ferry channel will be concentrated on specific areas. Hence there will be minimal impact on people's right of way.

10.1.3.5. Protected Areas

There were no protected areas identified by the communities.

10.1.3.6. Terrestrial ecosystems

The settlement areas or township areas are commonly grass and some trees.
The rural areas, which is mostly tax allotments, have mostly secondary vegetative cover and grass cover where land is lay in idol or farrowed. However, farming activities is commonly mixed (subsistence and semi-commercial crops, livestock), and commercial, specifically kava and vanilla plantations.

10.1.3.7. Socio-economic environment

The benefits to the communities were well voiced by the local people. The impact of road improvements (township and rural areas), and the wharf improvements, are beyond this project. In addition to the connectivity and improvements to the existing transport network, the impacts on other sectors such as tourism.

In the primary sector (agriculture and fishery), the road and wharf improvements certainly facilitate both the two primary pillars of Vava'u economy, namely farming and tourism activities.

10.1.3.8. Historical and Anthropological environment

Vava'u's geographical location and history meant that there are a lot of historical and anthropological sites spreading across the island. Fortunately, there are no historical or archaeological sites identified as potential impacted area.

10.1.3.9. Public Consultation Feedback

The communities welcomed being consulted on this proposed road project. There were overwhelming support of this project, as local people saw the need and the issues with the existing roads. However, there were some concerns about the selection of the roads.

There were two roads that were strongly emphasised and suggested to be part of this project namely, Kalauta Road at Neiafu and Mangia-Mataika road. The Kalauta Road is a seriously eroded road but it is one of the most used road in Neiafu. The Mataika-Mania road allows a more direct link between these communities, but it need upgrade.

People, based on their local knowledge and experiences with road works, were adamant that any road project in Vava'u must take into account drainage. Good roads have been known to be washed away, leaving gashing on the road surfaces. In some cases, debris are piled up at the end of the roads downhill or in someone's allotment.

Road safety attracted a lot of comments, particularly when the roads are upgraded, people will speed. There were suggestions for measures such as signage and judder bars to be installed.

The priority issues voiced ranges from poor conditions for both vehicles and pedestrians, road safety (pedestrians footpath, road signage, speeding), uneven spread of available road works (both donor funded and MoI).

People well understood that the primary enemy of their roads is water runoffs. This was clearly seen during the road visits, deep fissures on some areas, especially where water run down the roads. In some areas, deep holes and concentration of debris, are clear testament of peoples' concerns.

There were strong suggestions from the communities that roads has to be designed to suit their environment and also tar sealed; and also drainage must be part of any road upgrade design/work.

10.1.3.10. Summation

The support for the project was clearly aired by the local people. However, they are keen to see this project, road and port upgrade, implemented. Unfortunately, they have had experiences with consultations on projects that either did not materialised or badly implemented. However, there is general hope for this project to deliver.

The need for better roads is primary and fundamental for their socio-economic wellbeing of Vava'u. As the second largest island, with a hilly topography, road network is critical for the local people. Connectivity between communities and communities with their livelihood (farming lands, employment, and tourist businesses) is clear.

The matter of road safety consistently voiced as a priority throughout the meetings. People

genuinely concerned due to the number of accidents in recent times. Road improvements (upgrading) should include safety measures such as road signs and road markings, and also speed management system such as judder bars for example.
Road design attracted a lot of discussion, as people pointed out that road designs must befitting to the land (topography) and the climate (rainy). Further, the design should also consider drainage, even a simple system to manage the runoffs. Otherwise, the road upgrade will not last and potentially create erosion issues along the road reserve and adjacent allotments.
No historical or archaeological sites affected.
The proposed road improvements ranging from 4m – 6m, are well within the road reserves. However, encroachments on the road reserves are apparent in some areas along the rural roads. These are primarily annual crops and some agricultural fences. In terms of the crops, these include one of the following; talo (taro), manioke (tapioca), and kava. From visual inspection, the affected assets are estimated to be less than 10 percent of the total cropped area on a tax allotment. Noting that only a small portion of crops are potentially be on road reserve. Further, these crops can either be harvested, depending season, or relocated. These crops can be relocated by uprooting, using the same material as seedlings, and replant back behind the proper boundary line. In similar manner, fences can be removed, reused the same material, to re-fence along the proper boundary line.

10.1.4. Niua

Niuatoputapu Island lies 300km north of the Vava'u Group. The island is about 18 km^2 with a central ridge that reaches 150m above sea level. There is a plan that surrounds the central ridge and most of the island is covered by native forest. There three settlements, all located on the northern coasts namely, Hihifo (302), Falehau(223) and Vaipoa (183). The island of Tafahi (31), which is close to Niuatoputapu, is also linked to Niuatoputapu[27]. The total population is estimated at 739 people. The island has one airport and a port.

10.1.4.1. Port of interest: Pasivulangi Wharf

This is the only wharf for domestic ferries that serve Niuatoputapu Island.

10.1.4.2. Proposed works

The proposed dredging will basically widened and deepened the entrance channel and wharf area. Given the ferry's 4-6 weeks travel schedule to Niuatoputapu, the impact of the proposed dredging is minimal.

10.1.4.3. Land Ownership

The ownership of the land is the Government and the port is under the Department of Marine (MoI).

10.1.4.4. Right of Way

There will be no impact on the public right of way. However, there will be some restrictions during the implementation phase (dredging) of the project for safety reasons. This will depend on the method of dredging and amount of material to be removed. However, the impact will not be significant, as people can use alternative arras for their customary fishing or commuting.

[27] Census Preliminary Count Results, 2016, Statistics Department, Tonga

10.1.4.5. Protected Areas

There is no protected area within the project impact area.

10.1.4.6. Marine ecosystems

Coral marine ecosystem but the subject area is an established ferry channel and wharf.

10.1.4.7. Socio-economic environment

The benefit of upgrading the wharf well justified given that the main link or point of contact for the Niuatoputapu people is through the wharf. However, there is a flight once a week but that is limited in passenger numbers and cargo capacity.
The port is also a point of contact for the Niua Group, namely Tafahi Island and Niuafo'ou Island.
Improvements to the wharf facilitates a better service in terms of the frequency and capacity of the ferry to service the island. People can receive their supplies regularly and in bigger load capacity. Such impact also resonate on local handicrafts and cultural items transported to Tongatapu.

10.1.4.8. Historical and Anthropological environment

There is no historical or archaeological site impacted by the proposed dredging project.

10.1.4.9. Public Consultation Feedback

The special flight that took the team to Niuatoputapu, only allowed 3 hours on the ground. Anyway, the meeting had to be relocated to the wharf, as no one turned up at the church hall. The reason was that, that was the day the ferry arrives in Niuatoputapu. Rightfully, people were at the wharf to receive supplies and relatives, and also send off people and products.
It was agreed with the Government Representative to move the meeting to the market warehouse, adjacent to the wharf. That proved to be the right move, and most of the local already at the site. Interestingly, all three local communities were present at the meeting. Furthermore, the gender balance was high compared to other island group meetings.
At the time of the consultation, the ferry was unloading at the wharf. It was highlighted by the people that this was the first time that it berthed for over four months. Partly due to the status of the existing wharf and entrance channel.
The support for the proposed dredging was great and most people expressed their appreciation. There were general assumptions that the upgrading work will mean a more consistent ferry service and also easy berth for the ferries.
People highlighted the smallness of the wharf area, especially for loading and unloading. It was suggested that the dredged materials from the channel and the wharf area can be utilised to expand the wharf area. It was clarified that this was not part of the project, but a matter that MoI will have to consider.

10.1.4.10. Summation

Given the isolation of the island of Niuatoputapu, it was not surprising that local people were quite supportive and keen to see this project implemented.
The ripple effect of the project on the social and economic aspects of life in Niuatoputapu was apparent. Given its isolation and distance from the main island of Tongatapu, the main point of contact is the wharf. Apart from the local food products, almost everything is shipped into the island. Therefore, the proposed improvement will allow better service and supply for the local people.

No encroachment issue identified with the subject land. Further, people were well aware of the wharf area and the jurisdiction of the Government (Department of Marine).

10.1.5. ‘Eua

Lying 20kms south-east of Tongatapu, ‘Eua presents a complete contrast in terms of geomorphology, characterised by rolling hills, streams and high cliffs. Most of its surface is covered by a mantle of volcanic ash up to 3 meters thick.

‘Eua has two agricultural districts and the selected roads covers communities on both districts. In effect, the project covers almost every agricultural active households in ‘Eua[28].

10.1.5.1. Roads & Road Reserve

Most road reserves around the settlements had been demarcated by the OIREP. Thus presents a better understanding of the road reserves by the people. However, the road reserve along the rural roads needs boundary redefinition survey.

10.1.5.2. Proposed Road clearance and upgrade

The proposed road improvements (seal, rehab and seal, patch and seal) for 3.6m and 5m road width is within the road reserve areas. However, most of the road reserve in ‘Eua were demarcated by the recent OIREP for upgrading of their electricity network. This provided an

[28] 2015 Tonga National Agricultural Census Main Report, December 2015, MAFFF, Tonga

excellent platform for the project, particularly in the settlement areas.
Some of the rural roads, such as Mu'a 1 and Mata'aho 1, will have some encroachments on the road reserve areas. Again, the rural area are farming areas with some areas of farrowing or in idol. Cropping include conventional activities such as root crops primarily for subsistence. Most of the semi commercial and commercial crops like kava, are on the southern and upper plateau, quite a distance from the proposed project area. Clearing of the encroachments will be limited to the road reserve area and restricted impact. For example, only a small part of the crops should be removed with minor loss to the owner.

10.1.5.3. Proposed Wharf upgrade

The proposed work will be for dredging work within the wharf area and the entrance channel to the Nafanua Harbour.

10.1.5.4. Land Ownership

This is a matter that was clearly appreciated by the communities. However, it deemed to bear no impact on the road works proposed. Road reserves are known and understood to be Government land. Adjacent land allotments are individual owned through registration (town and tax allotment) or leased.
The proposed road improvements (3.6m and 5m) are within the road reserve area.

10.1.5.5. Right of Way

There are no hindrances identified. However, the access or turn-offs into people's allotment should not be hindered during and after the implementation of this project.
The dredging work at the wharf area will affect the daily routine of local fishermen, but this is not significantly detrimental. There are alternative areas for temporary use, especially during the dredging work.

10.1.5.6. Protected Areas

There are some protected areas in 'Eua, such as the watershed and forest reservation areas. Fortunately, there no protected areas impacted either by the proposed road improvement or the wharf dredging work.

10.1.5.7. Terrestrial and Marine ecosystems

The ecosystems are either on built areas (townships) or farming areas (rural). These are mostly secondary vegetation covered. However, the road works will be on road reserves with little impact on the surrounding vegetation.
As for the wharf dredging work, it will be on an established and functioning port, hence little impact on the marine ecosystem at large.

10.1.5.8. Socio-economic environment

The roads identified for this project are beneficial in terms of social and economy of the local communities. It improves the link between communities to their farming land. Given the close proximity of the most of the settlements of 'Eua Fo'ou district, improved roads facilitate easier commuting.
The wharf is significant for the local people, given that this is their primary link to the main island of Tongatapu. Therefore, any improvement will have ripple effect on the island's socio-economic

environment. It is also noted that the only commercial pine tree farm for timber production is on ‘Eua.

10.1.5.9. Historical and Anthropological environment

‘Eau Island is the oldest island in the Kingdom, and there are historical and anthropological sites on the island. However, there are no historical or archaeological sites impacted by the proposed project identified.

10.1.5.10. Public Consultation Feedback

The consultation in ‘Eua was interesting. Although there were overwhelming support for the project, there was debates during the ‘Ohonua meeting. The selection process of the roads was questioned and suggested that local communities should have been involved.
Communities had suggestions for roads to be included There was one road in ‘Ohonua put forward that was in serious condition and need upgrade. On the other hand, there was a portion of road selected but already resurfaced by MoI. This raised interest from the local ‘Ohonua people whether the allocation can be transferred to the badly damaged road. Overall. The general response from the communities in ‘Eua is that they welcome the project, and that their other needs can accommodated by Government or other donors. That generated some satisfaction and appreciation from the local people.
Road safety was also prominent throughout the consultations in ‘Eua. Road signage and speed bumps were suggested as part of this road improvement project. Further, ‘Amaile community put forward the need for sidewalk for pedestrians, especially school children. Speeding on the main road is an ongoing issue for them.
Road design was also a matter of discussion during the meetings. Understandably, from the people of ‘Ohonua and Tufuvai for example, given their steep landscape. Managing the runoffs through a drainage system was deemed important. Otherwise, the sustainability of the road improvements will not last long.
Potential encroachment, particularly rural roads, is from some individual activities and also natural vegetation. Crops and fence lines are common type of encroachments on these roads. However, these are removable and can be practically relocated. People are happy to cooperate, as long as their road is upgraded.
The proposed work for the wharf was also discussed but not in the same interest as the road network. However, the silt build up in the wharf pointed to the increase of erosion upstream according to the local people. The increase of deforestation and or lack of forestry management at the top are the reasons alleged.
The wharf is a key infrastructure to the ‘Eua economy as it is the link for sea freight for the local pine tree for timber, local crops for Tongatapu produce market, and recently, the tourist sector (diving and whale watching).

10.1.5.11. Summation

Local people were overwhelmingly supportive of the project. Further, the benefits of better road network allowing accessibility to other communities and town amenities such as school, work and church were well appreciated. Further, upgraded road access to the farming allotments is important but these roads had been overlooked for a number of years.
In parts of rural roads where there is encroachments, these are manageable, as these involved crops and fences that can be removed. Commonly cropping is either of talo (taro), ‘ufi (yam), kava, and in some allotments inter-cropping of these crops are done. The encroached crops are less than 10 percent of the total cropped areas on a typical tax allotment. These plants can be relocated, and more importantly, the same material uprooted can be used as seedlings for

replanting behind the proper boundary line. Likewise, fences made of wood posts, barbed wires and/or tic sheets or piggery wire, can also be removed and relocated from the road reserve.
The proposed improvements to the wharf benefits the people of ‘Eua, given that this is the primary point of contact for the island. In addition, both the tourism and the primary sector also need the port for services and supply.

In light of the proposed works for the wharf and the road network, these are within the Government owned foreshore and land respectively. However, there are encroachments on parts of the roads, more specifically the rural roads. These are removable assets such as fences and crops. The impact of these, with mitigation measures, will be limited.

‘Eua is an elevated coral island with a weather system that is different to Tongatapu for example. Understandably, the matter of designing of the roads to suit the landscape and weather was prominent. Hence, managing runoffs through drainages was strongly suggested by the people.

11. SUMMARY

11.1 Land Assessment

The whole exercise of consulting and visiting the sites on various islands was a success overall. More significantly, the Ministry of Infrastructure and World Bank to take note of subject matters of importance aired by the local people.

- Local people were very supportive of the proposed project, and keen to see the project implemented. The benefits for communities due to the proposed transport network upgrades were generally understood and welcomed.

- The proposed works are within Government areas namely road reserves, wharf areas, and the airport. People are well aware of Government areas, namely leases (airport and wharves) and road reserve. Noting that the project’s proposed works will be within these boundaries and not on individual allotments.

- In terms of vegetation overgrowth, these can be cleared as long as the clearing activity is within the road reserve, and does not encroach on individual land allotments. Given that the affected assets are primarily on the rural roads, it is only a small number of tax allotments and hence people impacted. Further, the affected assets, crops, and/or fences, can be relocated. Overall, people will not be significantly loose out or put in a perilous position because of the relocation of affected assets (see detailed summary below).

- Road design need to be fairly reflect the local conditions on each island. This was a sound point of view, as ‘Eua and Vava’u are high and rolling landscape compared to the low and flat topography of Tongatapu and Ha’apai (Foa and Lifuka Islands).

- Road safety, appropriately, is a priority for the local people across all four.

- Leading on from the above point, clearing the road reserve provides the buffer between motor vehicles, pedestrians, and adjacent allotments.

- Road selection was questioned but it was not a priority for the local people. It was more important for them for the project to be implemented anyway.

8.11 Summary of Impacts from Asset Clearance

The overall impact of crop and fence clearance is considered minor. This is based on a number of factors:

- Project design:
    - Clearance of private assets such as crops and fences only relates to the roads component. No impacts are expected for maritime or aviation components.
    - For roads, all works will take place within existing road reservations and there will be no need for any land acquisition. If access to lay for lay downs areas etc is required, government land will be prioritised. Where this is not possible, private land can be leased by negotiated agreement.
    - Roadside clearance will only be undertaken where necessary. There is no intention to clear the whole width of the road reserve and crops/fences/other assets will be avoided where possible. Crop clearance is uncommon on other road projects in Tonga (including those constructed under the TCSP).
- Impact of loss:
    - It is estimated that in most cases, only a small proportion of total crops are located in the road reservation (max. 10%, remaining 90% are within allotment boundary). There is no evidence to suggest that any crops owners are dependent on crops in the road reserve.
    - The majority of road side vegetation is natural; observation during the site visits indicates that crops are only grown on a small proportion of the reservation.
    - Issues associated with the loss of crops/fences were discussed during stakeholder consultation and no concerns were raised in any session.
    - Fences can be easily relocated. However, its very likely that impacts to fences can be avoided as while they may be located in the road reserve, they are unlikely to be located adjacent to the existing carriageway and therefore can be avoided in the vast majority of cases. Further, not every tax allotment has a fence, and not all fences encroach on the road reserve. Thus the impact to fencing is likely to be minimal.
    - The majority of affected crops are annual and thus with adequate notice, current crops can be harvested which will minimise impacts. (Construction works will likely commence at the end of 2019 at the earliest). Further, annual crops such as taro etc can be relocated mid season and so any remaining crops may be removed from the road reserve and relocated to the owners allotment.
    - Communication efforts prior to the commence of construction activities will strongly discourage re-planting.

12. Land Clearance process

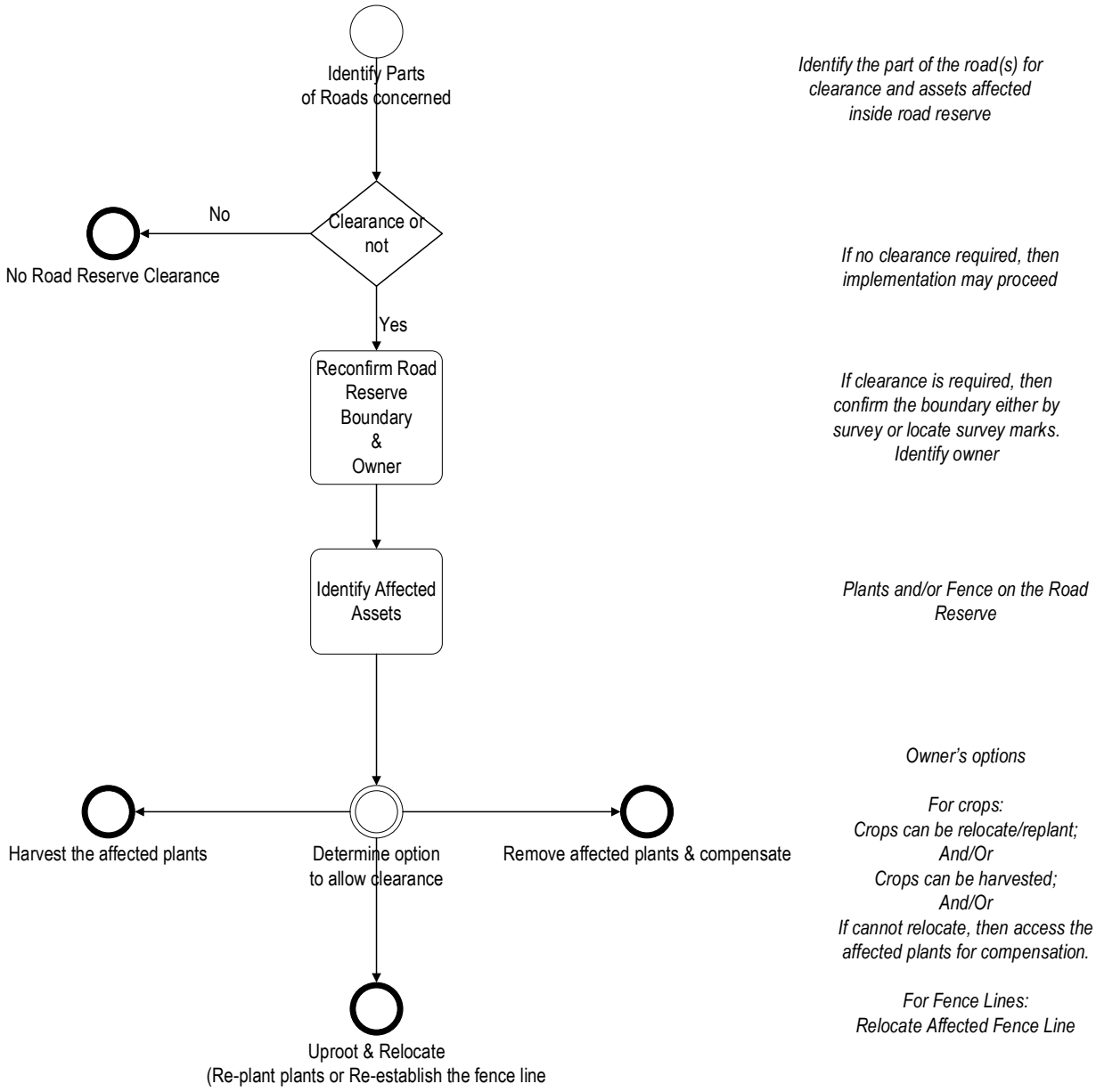
Despite limited impacts, it is acknowledged that clearance of assets within the road reservation may cause impacts for a small number or households. In order to manage this adequately, the following table (Table 1) outlines the process for identifying and mitigation impacts if they occur. The implementation of this process is ultimately the responsibility for the implementing agency (Ministry of Infrastructure) though many of the actions will be undertaken by the appointed roads contractors.

The table covers activities that need to commence immediately, such as encouraging people to harvest this season's crops and then plant replacement crops on their allotment/outside the road reservation; and activities that need to take once details works are planned. All applicable activities must be completed before any land clearance takes place or any private assets are affected.

Table 1: Land clearance process

Project Phase	Action	Description	Responsibility	Timeframe
Planning and design	Stakeholder engagement to communicate possible impacts to private assets	• Inform Governor of works and possible impacts of road reservation clearance • Provide information on impacts to all villages and remind all landowners that crops in the reservation could be affected. • Encourage landowners to only plant next year's harvest within their property boundary.	MOI	Immediately- until start of construction
	Design contractor to minimise use of private land.	Design consultants to be required to avoid using or affecting private land unless essential. This includes all work sites, laydown areas etc. Justification for use of private land must be documented.	MOI Design consultant	Include in contract.
Construction	Inform stakeholders of the commencement of works	Publicise date for the start of works; provide information to all Governors and relevant representatives.	Road contractor MOI	Minimum 2 weeks prior to the start works.
	Identify road section where clearance is necessary	• Identify where clearance is required and any affected private assets (by type). If no assets are identified, document findings. • Minimise the need to impact private assets by considering alternative locations or work methods.	Road contractor	Prior to construction
	Consult asset owners and agree how impacts will be managed	Where impacts to assets are unavoidable: • Identify and consult affected asset owners • For fences- agree timing for moving fence from the road reservation, and site of new location on allotment owner's property; reuse existing fence materials. • For crops- communicate options which include allowing asset owners to harvest crops before clearance or relocate crops to their allotment. • Agree and document approach, including reason why impacts cant be avoided. Where asset owners cant be identified, document	Road contractor	Minimum 2 weeks prior to the start works.

		effort to locate them including undertaking consultation with neighbours, Town Councils etc.		
	Implement agreed plans	Relocate crops or fences in conjunction with affected asset owner. Photograph and document activities.	Road contractor Asset owner	Prior to construction.



It is critical that the implementing agent (Contractor) must consult owners on any road clearance, especially if there are assets affected. In rare cases where the owner is identified but cannot be contacted, next of kin or in some cases, the caretaker, can be consulted. However, these people must be verified or confirmed by the Town Officer. Similarly, the Contractor should identify and avail additional support for owners who cannot carry out the relocation of assets themselves. For example, owners may be elderly or physically vulnerable.
In terms of laydown area or site, this should be identified by the Contractor and consult the rightful landowner. If the landowner say no, then the Contractor has to identify an alternative site. If the landowner agrees, then the negotiation to clarify conditions (period of use) and if need be, payments (rental, compensation of affected assets as explained above). Under no

circumstance that the Contractor access or use any land without the consent of the landowner. In conclusion, the people from all communities involved and impacted by this project expressed strong support. It is fortunate that no historical, anthropological, or protected sites affected. Moreover, the tenure system, through the provision of leasing agreements and foreshore provisions for the wharf and airport; road reserves and associated regulations for roads, paved the way for the project. The objectives of this project and associated benefits cannot be emphasised enough. The issue of affected assets on some areas of the road reserve, is small in view of the over-all farmed areas and total length of fences. The estimation is less than 10 percent in both cases and associated cost is minimal. Affected assets, are reusable in terms of plant materials for crops and fence materials for fences. Furthermore, there is always the chance that road reserve areas may be ample for the road works, without clearing the affected assets. Overall, the above recommended process can mitigate the impact of any road clearance on the people and their land. In effect, there is no need to trigger OP 4.12 on this project.

13. Conclusion

All land allotments, town and tax allotments, have been allocated and most has been registered. However, the ownership and succession meant that every allotment has an owner or an heir. In general terms, ownership and authority for road reserves is the Minister of Lands, road making is the responsibility of the Minister of Infrastructure, and traffic management is the responsibility of the Minister of Police. Tax and Town allotments belong to landowners and the land rights are individualised. As such the boundaries and separation of rights between these allotments and Government owned lands (road reserve, foreshore, Government leased areas) is a common knowledge.

Now that the communities had been consulted and informed of this project, it will be unfortunate if one of the communities met is omitted for one reason or another. It will be for the integrity of MoI and this project, to vary by reducing road lengths for example, but keep all these communities included for implementation. Similar consideration should be for the port and airport components.

The areas required for the project are within the Government prerogatives namely, the road reserves (Ministry of Lands), wharves (Marine Department, Ministry of Infrastructure), and airport (Tonga Airport Limited, Ministry of Public Enterprises). There are no resettlement initiative necessary, as all areas involved are Government lands, and no private (individual) lands loss to people. As a result, OP4.12 is not triggered.

Potential impacts, based on the existing conditions and tenure specifically, are not adverse. It should be noted again that, the proposed road works will be within the road reserve areas. Similarly with the wharf and airport works, all within the legal boundary. Moreover, the impact on individual owners in view of the affected assets (crops or fence) to be relocated is estimated at 10 percent or less relative to their total crop or fencing. Noting that relocated crops can be utilise as seedlings for replanting within individual tax allotments. Similarly, the fence materials removed can be reuse in relocating the fence line to the proper boundary line.

In areas with vegetation overgrowth, this is not an issue to clear, as long it is within the road reserve, and not encroach on adjacent allotment. Communication between the Contractor and the landowners, is key.

APPENDIX 1: List of Communities and People consulted
(Tongatapu, Ha'apai. Vava'u. Niua, 'Eua Islands)

Safeguards Program Summary

TONGATAPU

Date	Time	Meetings/Consultations		Name	Gender	
		Ministry/Comp.	Village(s)		Male	Female
14.05.18	9am – 11am	MOI – PPCSD		Kohitaha Palu		1
	11am – 12:30pm	MIA		'Eva Tu'uholoaki Sam Pohiva	1	1
15.05.18	10am	MOI – LTD		Hepisipa Oko		1
	11am	MOI – MPD		Meliame Kakala		1
	12noon	MOI – CAD		'Emeline Fifita, Saia Ma'ake	1	1
	1pm – 2pm	TPL		S. Chen, Andrea Tora	1	1
16.05.18	11am – 12noon	TWB		Quddus Fielea	1	
	2pm – 3pm	GroFed		Sinai Tu'itaha		1
17.05.18	10am – 12noon	Town Officers		Town Officers	12	
	1:30pm – 3pm	MLSNR				1
18.05.18	10am	TCC		Timote Katoanga	1	
22.05.18	10am – 12noon	MLSNR		Rosamond Bing		1
	1:30pm -2:30pm	'Ahononou Quarry		Sekitofa Malupo	1	
23.05.18	9am – 10am	MEIDECC		Lupe Matoto		1
	10am – 12noon	MIA		'Eva Tu'uholoaki, Lavinia Latu, Ms. Hola		3
	2pm – 3pm	Ports Authority Tonga		Mosese Lavemai, Mele Lavemaau	1	1
	7pm – 8pm		Fua'amotu	Community Members	20	8
24.05.18	9am – 10am	TAL		Viliami Ma'ake	1	
	10am – 11am	TSCP		Taniela Fusimalohi, Maile Fotu	1	1
	7pm – 8pm		Navutoka (incl. Kolonga, Hoi, Talafo'ou)	Community Members	10	
	8:30pm –9:30pm		Lapaha	Community Members	15	
25.05.18	8am –	World Bank		Rachelle Therese		1

	9am			Marbaugh		
	9am – 10am	Tongatapu Fisheries		Dr. Tu'ikolongahau Halafihi	1	
	10am – 11am	MOI CEO and HODs		Meliame Kakala, Salome 'Akau'ola, 'Emeline Fifita		3
28.05.18	7pm – 8pm		Veitongo	Community Members	6	4
30.05.18	7pm – 8pm		Niutoua	Community Members	7	
	8:30pm –9:30pm		Ha'ateiho	Community Members	9	4
31.05.18	7pm – 8pm		Fo'ui (incl. Ha'avakatolo, Kolovai, Ha'alalo, Matahau)	Community Members	7	
08.06.18	10am – 11:30am	Niua Development Committee		NDC + MIA reps		
11.06.18	2pm – 2:30pm	MOI – Transport Pool		Kioa Palasi	1	
	3pm – 3:30pm	MOI - MPD		Meliame Kakala, Patelesio Manukeu	1	1
	4pm - 4:30pm	BB Constructions		Noleen Blake		1
20.06.18	7pm – 8pm		Vaini	Community Members	9	
Total Number		**25 Meetings**	**8 Consultations**		**107**	**36**

HA'APAI

Date	Time	Meetings/Consultations		Name	Gender	
		Ministry/Comp.	Village(s)		Male	Female
06.06.18	10:30am– 11:30am	Ha'apai Governor & Town Officers		Rev. Mohenoa Puloka	6	
	1:30pm – 2pm		Weaving Women's Group	Community Members		3
	4pm – 5pm		Ha'ateihosi'I – Ha'apai	Community Members	4	9
	6pm – 7pm		Faleloa – Ha'apai	Community Members	6	9
	7pm – 8pm		Koulo – Ha'apai	Community Members	9	4
	8pm – 9pm		Pangai – Ha'apai	Community Members	8	3
07.06.18	9am – 10:30am		Vahe Foa – Ha'apai	Community Members	12	5
	11am- 11:30am	CAD		Saia Ma'ake	1	

Total Number	**2 Meetings**	**6 Consultations**		**46**	**33**

Note: Only one night spent in Ha'apai

NIUA TOPUTAPU

Date	Time	Meetings/Consultations		Name	Gender	
		Ministry/Comp.	Village(s)		Male	Female
13.06.18	11:00am –2pm		Niua Toputapu	Community Members	17	11
Total Number			**1 Consultation**		**17**	**11**

Note: Spent 3 hours on the ground ONLY. Also there was a ferry.

VAVA'U

Date	Time	Meetings/Consultations		Name	Gender	
		Ministry/Comp.	Village(s)		Male	Female
13.06.18	6pm – 8:30pm		Neiafu – Vava'u	Community Members	13	5
14.06.18	9am – 11am	Governor		Vava'u Governor	1	
	2pm		Weaving Women's Group	Fungamisi Women		2
	4pm – 5pm		Pangaimotu – Vava'u	Community Members	3	4
	6pm – 7pm		Leimatu'a – Vava'u	Community Members	11	6
	7pm – 8:30pm		Mataika – Vava'u	Community Members	16	
15.06.18	9am – 10:30am		Tu'anekivale – Vava'u (incl. Mangia)	Community Members	13	7
	4pm – 5pm		Tu'anuku – Vava'u	Community Members	7	
	6pm – 7:50pm		Longomapu – Vava'u	Community Members	15	4
	8pm – 9:30pm		Tefisi – Vava'u	Community Members	7	4
16.06.18	9am – 10am		Houma – Vava'u (incl. Mangia)	Community Members	11	7
Total Number		**1 Meeting**	**10 Consultations**		**97**	**39**

ʻEUA

Date	Time	Meetings/Consultations		Name	Gender	
		Ministry/Comp.	Village(s)		Male	Female
19.06.18	9am – 10am	ʻEua Governor + Town Officers		Governor + Town Officers	1+	

	5-6pm		Houma – ‘Eua	Community Members	26	15
	6-7:30pm		‘Ohonua – ‘Eua	Community Members	12	20
	7:45pm-8:30pm		Mu’a – ‘Eua	Community Members	18	
	8:45-9:30pm		Angaha – ‘Eua	Community Members	2	7
	9:45pm-10:30pm		Kolomaile – ‘Eua	Community Members	15	9
Total Number		**1 Meeting**	**5 Consultations**			

Note: Only one night spent in ‘Eua

NB: Site visits were conducted at relevant locations in all the islands. Survey of identified roads on all islands, ports (except on TBU), airport in Ha’apai was conducted as well as visits to quarries and machinery pools.

8.12 APPENDIX 2: Summary of Meetings

Roads	Communities	Proposed Works	Communities Comments
Tongatapu			
Proposed work: Roads Upgrade			
Hoi - Kolonga (Taufa'ahau)	Niutoua, Afa, Kolonga, Navutoka, Hoi, Talafo’ou	Upgrading/ Chip Seal	- Needed the road as people have allotments or crops on allotments along this road - Alternative routes for communities on the north-eastern districts (Afa, Kolonga, Makaunga, Navutoka, Manuka, Talafo’ou) - No apparent encroachments identified - There is a depression area, often flooded, and the road design need to allow for water runoff, otherwise one side will be flooded - Evacuation roads lead up to this road
Liku Road 1 (Fuaamotu-Utulau)	Veitongo, Vaini, Ha’ateiho	Upgrading/ Chip Seal	- Roads need to be fixed because most have allotments with crops (subsistence, semi-commercial, and a few commercial plantations). - Request is for roads to be sealed properly with appropriate material so iy will last longer - Issue with roads funded by China is that they do not properly remove the materials excavated so there are ensure the entrances to allotments are paved properly and that road works do not block access to their Requested signage for road safety as they can recall when road was better years ago, people would speed through this road from the western side to the airport

			- allotments huge piles blocking people's allotments - 2 other dirt roads that require urgent attention - Willing to cooperate and facilitate clearing the road reserves - Alternative access to the airport - Need safety measures (road signs etc.) and speed management
Liku Road 2 (Haveluliku - Hoi Int)	Lapaha	Upgrading/ Chip Seal	- Mostly tax allotments for people of Lapaha - Access to beaches for local people and tourists - Encroachment sighted
Loto Road 1 (Foui-Matahau)	Fo'ui, Ha'avakatolo, Kolovai, Ha'alalo, Matahau	Upgrading/ Chip Seal	- Farming area, and a lot of the landowners are from Nukunuku - No apparent encroachment sighted
Loto Road 2 (Makapaeo-Matahau)		Upgrading/ Chip Seal	- Tax allotments that belong to people from Houma mostly - Long due for upgrading - Road reserve belong to the Government - Access route for western communities to main secondary school, particularly boarding schools (Liahona High School, Tonga College, Tupou College)
Vava'u			
Proposed work: Roads Upgrade, and Wharf Dredging			
Tefisi - Longomapu (Toafa)	Tefisi, Longomapu	Upgrading/ Chip Seal	- There was some drainage and culvert installed but failed to connect to the ocean. So the drainage is now blocked and causes flooding to some allotments. - 'Incomplete' drainage resulted in water digging up holes beside the road, and also piled up debris - The sloped terrain need better design for the roads and needed to be sealed - Runoffs from the higher parts (farming area) along the roads down to the selected road, causes damage and silt pile ups - Speeding by through traffic is a safety issue for Tefisi - Encroachment sighted along the road but people were willing to cooperate to remove these - Most of the tax allotments along this road for Tefisi and Longomapu people - Support thr proposed wharf upgrade
Vaipua - Tefisi		Upgrading/ Chip Seal	- Needed upgrade - Runoffs especially on downhill parts needed to be considered - Farming area with a few residences
Saineha - Int	Neiafu	Upgrading/ Chip	- Need upgrade

Pongi Petrol Stn		Seal	- High traffic area in Neiafu - Preferred that Kalauta road be upgraded, as this is used a lot but neglected for a long time - Access to people's allotments should be levelled and not hindered
Ta'anea - Tu'anekivale	Tu'anekivale, Mangia	Upgrading/ Chip Seal	- Still in good condition but need drainage system - Runoffs during rainy season is a problem - Speeding, especially through the settlement area is an issue - Need to include the short street that link the main road to the primary school - Wharf dredging is welcomed - No encroachment
Tu'anuku - Longomapu	Tu'anuku, Longomapu	Upgrading/ Chip Seal	- This used to be the main road for travel between the two communities. - Upgrading this road will allow better connection between the two communities but also between access for people with tax allotments in the area
Toula-Pangaimotu	Pangaimotu	Upgrading/ Chip Seal	- Main route for Pangaimotu, Talihau, Utulei to Neiafu - Wharf dredging is fine - - It is still good but need upgrading, especially in parts that start to break up - The road is also an access to tax allotments
Mataika-Mangia	Mangia, Houma, Mataika	Upgrading/ Chip Seal	- Long due for an upgrade - This is a road that connects three communities namely Mangia, Houma, Ha'akio and adjacent farming area - Needed the agricultural road that cuts through the middle of their farming area to be upgraded as well - Speeding is an issue
Tukulalo Road		Rehab & Chipseal	
Laifone Road	Neiafu	Rehab & Chipseal	- Laifone and Tu'i roads are the primary routes into Neiafu - It traverses farming area and watershed area for Neiafu - No encroachment likely - Still in good condition - There are other roads in Neiafu that really needed upgrade as this is relatively still a good road
Vaihoi Road(Leimatua-Tefisi)	Tefisi, Vaihoi, Leimatu'a	Upgrade and seal	- This is farming area for people of Tefisi, Vaihoi, and Leimatu'a - Needed some upgrade
Vavau 1 (VVU14AGR01)		Upgrade and seal	- Rural roads or agricultural roads are important especially for vanilla and kava growers especially farming areas around Tefisi, Leimatu'a, Longomapu, Pangaimotu for example
Vavau 2 (VVU14AGR02)		Upgrade and seal	
Vavau 3 (VVU14AGR03)		Upgrade and seal	
Vavau 4 (VVU14AGR04)		Upgrade and seal	

Vavau 5 (VVU14AGR05)		Upgrade and seal	- Encroachments is highly likely as people rely on estimated guess of boundaries of road reserves
Vavau 6 (VVU14AGR06)		Upgrade and seal	
Vavau 7 (VVU16AGR07)		Upgrade and seal	
Ha'apai			
Proposed work: Roads Upgrade, Wharf dredging, and Airport Runway Resurface			
Koulo 1 (HALCOM01)	Koula	Rehab and seal	- Selected roads are fine to be upgraded - Airport upgrade is urgent because of the issue with the aircrafts - Wharf dredging is needed - Road reserve are known and there are no apparent encroachment
Koulo 2 (HALCOM02)		Rehab and seal	
Koulo 3 (HALCOM03)		Rehab and seal	
Koulo 4 (HALCOM04)		Rehab and seal	
Koulo 5 (HALCOM05)		Seal	
Holopek 1 (HALCOM06)	Pangai, Holopeka, Hihifo,	Rehab and seal	- Proposed upgrades are welcomed - Roads had been ploughed/levelled but left without resurface or reseal, and these are now no good - Road reserves had recently been marked under the OIREP - Hope that the upgrades proposed will mean tar sealed or chipseal - Design should take into consideration the landscape (topography), elevated to the east and lower on the west side of the island - Upgrading is fine but concerned with maintenance in the long run. This is a common issue with roads in Lifuka - Need rural roads to be upgraded, allow access to farm areas (tax allotments)
Holopeka 2 (HALCOM07)		Rehab and seal	
Pangai 1 (HALCOM08)		Rehab and Reseal.	
Pangai 2 (HALCOM09)		Rehab and Reseal.	
Haufolau Rd (HALCOM10)		Seal	
Faifekau Rd (HALCOM11)		Seal	
Mateialona Rd (HALCOM12)		Seal	
Paluto Rd (HALCOM13)		Seal	
Pangai 3 (HALCOM14)		Seal	
Pangai 4 (HALCOM15)		Upgrade	
Pangai 5 (HALCOM16)		Upgrade	
Pangai 6 (HALCOM17)		Rehab and seal	
Pangai 7 (HALCOM18)		Rehab and reseal	
Pangai 8 (HALCOM19)		Rehab and reseal	
Pangai9 (HALCOM20)		Rehab and reseal	
Pangai 10 (HALCOM21)		Rehab and reseal	
Pangai 11 (HALCOM22)		Rehab and reseal	

Pangai 12 (HALCOM23)		Rehab and reseal	
Pangai 13 (HALCOM24)		Rehab and reseal	
Pangai 14 (HALCOM25)		Rehab and reseal	
Pangai 15 (HALCOM27)		Upgrade	
Pangai 16 (HALCOM28)		Upgrade	
Pangai 17 (HALCOM29)		Upgrade	
Pangai 18 (HALCOM30)		Upgrade	
Faleloa 1 (HAFCOM01)	Loto Foa, Fotua, Fangale'ounga	Upgrade & Seal	- Local people know the local situation, and should be consulted on selecting the roads - Support the proposed project, but there are other roads that should be considered - The contractor should make sure that access to allotments is not hindered - Need the seal or reseal to be think enough, not just a thin cover, that washed off by heavy rains - Access to toan and tax allotments need to be cleared and levelled - Hope that the work is properly monitored - Welcomed the wharf dredging but the natural harbor for Ha'apai is here at Foa Island (Loto Foa) - From community experience, there is limited machinery to produce aggregates at the quarry - Improvement to the airport runway is needed given the issue with loosen rocks
Faleloa 2~~1~~ (HAFCOM02)		Upgrade then seal	
Faleloa 3~~2~~ (HAFCOM03)		Upgrade then seal	
Faleloa 4~~3~~ (HAFCOM04)		Upgrade then seal	
Faleloa 5~~4~~ (HAFCOM05)		Upgrade then seal	
Faleloa 6~~5~~ (HAFCOM06)		Upgrade then seal	
Faleloa 7~~6~~ (HAFCOM07)		Upgrade then seal	
Faleloa 8~~7~~ (HAFCOM08)		Upgrade then seal	
LotoFoa 1 (HAFCOM08)		Rehab and seal.	
LotoFoa 2 (HAFCOM09)		Reseal & Rehab	
LotoFoa 3 (HAFCOM10)		Reseal & Rehab	
LotoFoa 4 (HAFCOM11)		Rehab and seal.	
LotoFoa 5 (HAFCOM12)		Rehab and seal.	
LotoFoa 6 (HAFCOM13)		Reseal	
LotoFoa 7 (HAFCOM14)		Rehab and seal.	
LotoFoa 8 (HAFCOM15)		Rehab	
Loto Foa 9 (HAFCOM16)		Rehab and seal.	
Fotua 1 (HAFCOM18)		Rehab	
Fotua 2~~1~~ (HAFCOM19)		Rehab and seal.	
Fotua 3~~2~~ (HAFCOM20)		Rehab and seal.	
Fangaleounga 1 (HAFCOM21)		Rehab and seal.	

Fangaleounga 2 (HAFCOM22)		Rehab and seal.	
Fangaleounga 3 (HAFCOM23)		Rehab and seal.	
Fangaleounga 4		Rehab and seal.	
'Eua			
Proposed work: Roads upgrade, and Wharf Dredging			
Mua ~~0~~1 (EUACOM61)	Mu'a, Angaha, Kolomaile*	Patch and Seal	- Proposed roads are fine - There are some roads that need upgrade, especially back roads
Mataaho ~~0~~1 (EUACOM65)		Patch and Seal	
Mataaho 02 (EUACOM66)		Patch and Seal	
Houma 1 (EUACOM01)	Houma	Patch and Seal	- Welcomed the proposed road work - Needed for transport to Ohonua and tax allotments - Selected road is still good, why not upgrade the agricultural roads to the north - Wharf dredging is good - Aware of the road reserve area
Haatua 1 (EUACOM35)	Mu'a, Angaha, Kolomaile*	Rehab & Reseal	- These roads needed upgrades - Important to tar seal these roads
Mataaho 3 (EUACOM74)		Rehab & Reseal	
Mataaho 4 (EUACOM67)		Patch and Seal	
Tufuvai 1 (EUACOM02)		Rehab and seal	
Mataaho 5 (EUACOM70)		Reseal	
Ohonua 1 (EUACOM13)	Ohonua	Rehab then Seal	- Local people needed to be involved in selecting the roads, although fully support the proposed roads - Road reserve is well clear and known to people - Noted that one of the roads selected has just been resealed - One road in particular to the south, urgent needed rehab and seal - Water runoff is a major issue for roads in 'Ohonua - Need proper drainage system or at least culvert - Wharf dredging is good but need to relocate the boat ramp for small boats. It is dangerous when you mix big ferries and small boats within a small space - Silt from the stream is increasing in recent years. - Used to fish mullets at stream mouth but not anymore
Ohonua 2 (EUACOM26)		Rehab then Seal	
Ohonua 3 (EUACOM11)		Rehab then Seal	
Angaha 1 (EUACOM106)	Mu'a, Angaha, Kolomaile*	Rehab then Seal	- Roads are all useful for the people - It is not sensible to use the conventional method of gravel filled and compacted roads. Roads need to be tar seal - Speed is a safety issue for pedestrians
Petani 1 (EUACOM55)		Rehab then Seal	
Pangai 1		Rehab	

(EUACOM102)		then Seal	- Side-walk will ensure safety, especially for school kids - Judder bars on the road, like in Pelehake (Tongatapu) is needed - Roads selected that run through tax allotments are welcomed, especially for active farmers
Pangai 2 (EUACOM101)		Rehab then Seal	
Pangai 3(EUACOM53)		Rehab & Seal	
Petani 2 (EUACOM44)		Rehab & Seal	
Pangai 4 (EUACOM97)		Rehab then Seal	
Pangai 5(EUACOM96)		Rehab then Seal	
Mua 2 (EUACOM60)		Rehab then Seal	
Pangai 6 (EUACOM57)		Rehab and Seal	
Haatua 2(EUACOM31)		Rehab then Seal	
Haatua 3 (EUACOM32)		Rehab then Seal	
Haatua 4 (EUACOM36)		Rehab then Seal	
Niuatoputapu			
Proposed work: Wharf Dredging			
Wharf Dredging	Hihifo, Vaipoa, Falehau	Dredging Wharf	- Welcomed and support the proposed dredging - Rely on the shipping service for supplies and also sending cargo to Tongatapu - Help to improve wharf to make sure ferry will dock anytime - Deeper wharf may allow bigger ships to dock, which is a bonus for the island

Appendix 2: Roads

Appendix 3: Description of proposed Methodology based on type of road

Definition	Outline Methodology
Agricultural Road Upgrade (where unpaved)	Upgrading unformed (or very overgrown) agricultural road to a good quality gravel (unpaved) surface. Road elevation raised 200-300mm above surrounding land. i. Push through overgrown or unformed alignment with bulldozer to create basic formation. Some trees may require chainsaw removal. ii. Trim alignment further with grader / bulldozer. iii. Remove excess materials – combination of soil, vegetation and occasional bits of coral. iv. Install cross-drainage if required (in many cases no cross drainage is provided and water is permitted to run across the gravel surface) v. Place 200-300mm of crushed coral aggregate, grade and compact
Paved Road Rehabilitation / Upgrade	Involves rebuild of a section of road (new surface and substantial pavement works), with the option of widening the road to achieve design standards. May result in an increase in the elevation of the road by 100-200mm. i. If existing paved road is not of sufficient width, then trim shoulder down by 200-300mm and minimum of 1.5m wide. Ideally constrain widening to a single side to reduce costs. ii. Remove existing paved surface with a grader. Potentially using the removed material as subbase material to construct new shoulders. iii. Remove old road pavement in areas of localised failures. iv. Bring in 100-200mm of new material and form new road pavement, ensuring shoulders are shaped to direct water away from the road surface. v. Form any longitudinal drainage channels. For steeper slopes consider lining the channel or other devices to avoid erosion. vi. Complete resurfacing activities, spraying bitumen on the road and then applying loose chip. Rolling to ensure compaction. vii. Apply paint markings

Definition	Outline Methodology
Sealing Unpaved Road	Sealing of the road for the first time with Chipseal or Otta Seal (similar to Chipseal but uses a lower quality aggregate to be used on low volume roads). May result in small changes in road elevation or width as cross-section design shape is achieved prior to sealing. i. If existing unpaved road is not of sufficient width for sealing, then trim shoulder down by 200-300mm and minimum of 1.5m wide. Ideally constrain widening to a single side to reduce costs. ii. Build up pavement to required width with coral aggregate. iii. Form any longitudinal drainage channels. For steeper slopes consider lining the channel or other devices to avoid erosion. iv. Add additional material across full width to provide cross-slope, ensuring water can run away from edge of seal for at least 1m v. Complete resurfacing activities, spraying bitumen on the road and then applying loose chip. Rolling to ensure compaction. vi. Apply paint markings
Chip Seal or Otta Seal	Resurfacing of existing paved surface, with no material change in the height, width or other characteristics of the road. i. Trim shoulders of excessive vegetation for 1m from edge of seal with grader or by hand, to ensure water runs away from edge of road. ii. Repair edgebreak of old seal to provide a straight edge to the side of the road. iii. Undertake any localised pre-seal patching of potholes etc. iv. Complete resurfacing activities, spraying bitumen on the road and then applying loose chip. Rolling to ensure compaction. v. Apply paint markings

Note: The Contractor will develop a detailed methodology. This method reflect past practices in Tonga for such works and are provided to enable an assessment of potential impacts.

Appendix 4: Report Templates

Contractor Monthly Reporting Template

Contractors will work closely with the Project prior to the commencement of work to define the structure, content and format for their environmental and social monthly report. This report will contain key information around the contractors' implementation of the environmental and social requirements and mitigation measures and will cover, among others:

Month Covered in Report:
Date of Report:
Report Prepared by:

1. Incident notifications during period
2. Non-conformances/non-compliances and corrective actions
3. Key performance indicators
4. Details of any environmental or social surveys or studies
5. Environmental and social training conducted

Construction Daily Inspection Checklist

Date of Inspection:
Inspection undertaken by:

Environmental Issue	Inspection areas:	Status	Note
1 Soil Erosion	—Are silt fences for the bare ground in place (if required in ESMP) —Has replanting and restoration work been started or completed according to ESMP	YES ☐ NO ☐ If No note	
2 Soil and Water Pollution	—Is waste collected in defined area on impermeable ground —Is appropriate spill response plan/kit in place	YES ☐ NO ☐ If No note	
3 Dust	—Has a visual inspection of ambient dust conditions on site and at nearby sensitive locations been undertaken? —Are truck transports are covered?	YES ☐ NO ☐ If No note	
4 Noise	— Are workers wearing ear protection as required?	YES ☐ NO ☐ If No note	
5 Hazardous Substance Storage (fuel/oil/bitumen)	—Are hazardous substances stored within bund on impermeable surface —Is spill kit complete and accessible —Has spill training completed	YES ☐ NO ☐ If No note	
6 Traffic Management Plan Implementation	—Is a Traffic Management Plan [if required] implemented and evaluated to assess appropriate throughout course of construction phase —Is PPE is being worn be workers	YES ☐ NO ☐ If No note	
7 Personal Protective Equipment (PPE) Use	—Do workers have access to, and are they using appropriate, PPE for the task.	YES ☐ NO ☐ If No note	
8 Hazardous substance management	—Has inspection been undertaken of hazardous substance storage containers and storage area(s) if any.	YES ☐ NO ☐ If No note	

GRIEVANCE REPORT FORM

Grievance Information: Summarise Details		
Name of Complainant	**Employee ID (If Employee)**	**Telephone** **Email**
Date, time, and location of Event leading to Grievance:		
Detailed account of Grievance (Include names of persons involved) if known:		
Are there any policies, procedures, guidelines that may have been violated:		
Proposed solution or sought remedy:		
Outcome of Grievance:		
Date and Signature:		

Incident Report Form

DATE & TIME OF INCIDENT _____ **LOCATION** _____

NAME OF PERSON(S) INVOLVED: _____

_____

Contact Details of Person(s) Involved:

DESCRIPTION OF INCIDENT (Please include names of individuals involved, the nature of the incident, and a brief narrative of what occurred):

WAS ILLNESS OR INJURY INVOLVED? (If yes, provide details and ***attach copy of accident report***.)

OUTCOME (how you handled the incident, any next steps required, or likely outcomes):

PRINT NAME OF PERSON SUBMITTING REPORT _____

SIGNATURE OF PERSON SUBMITTING REPORT _____

MANAGER'S SIGNATURE: _____

DATE SUBMITTED TO MANAGER:

8.12.1Environmental Monitoring Template
8.12.2

Environmental Issue	Verification	Duration/ Frequency	Supervisor
Noise	• Field checks (hand held noise meters if required)	Continuous during construct. Monitored weekly.	Project Manager
Air Quality and Dust Control	• Visual field checks of dust emissions	Continuous during construction. Monitored weekly.	Project Manager
Water Quality	• Visual field checks for sediment load, water and drainage management and waste management procedures	Continuous during construction. Monitored weekly.	Project Manager
Hazardous Substance Storage	• Visual field checks of Hazardous Substance Storage, including oil, fuel, bitumen	Continuous during construction. Monitored weekly.	Project Manager
Traffic	• Visual field checks of traffic disruptions	Continuous during construction. Monitored weekly.	Project Manager
Waste Management	• Visual field checks for waste management procedures	Continuous during construction. Monitored weekly.	Project Manager
Safety and Health	•Visual field checks of work safety methods, use of PPE.	Continuous during construction. Monitored weekly.	Project Manager
Community Impacts	• Ongoing consultation and engagement with nearby villages, through communication with the village head.	Continuous during construction. Monitored weekly.	Project Manager