Environmental Management Plan – Summary Version for Disclosure
Lelata Bridge Replacement Project

Prepared for the Planning and Urban Management Agency, Minister of Natural Resources and Environment
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Revision History

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Document Acceptance
1 Introduction

1.1 Background

This Environmental Management Plan (EMP) has been prepared to manage the assessed environmental and social impacts of the demolition of the existing Lelata Bridge and construction of its replacement.

The EMP forms part of the Land Transport Authority’s (LTA) application for Development Consent and shall be implemented in accordance with that consent. The EMP is an Annex to the Preliminary Environmental Assessment Report (PEAR) prepared to provide the Planning and Urban Management Agency (PUMA) with sufficient information to approve consent, as well as ensuring the project will comply with UNDP’s Social and Environmental Standards (SES). Through the GCF Accreditation Process, the SES was acknowledged to be in line with the GCF’s Environment and Social Standards.

This EMP incorporates best practice environmental management in accordance with the Government of Samoa Codes of Environmental Practice (COEPs) and UNDP SES. These are intended to be included by the contractor in the physical works contract for Lelata Bridge. The awarded contractor will incorporate the goals and objectives as outlined in this EMP in the development of their Construction Environmental Management Plan (CEMP) which they will implement for the duration of the construction works.

This EMP is divided into the following sections:

   Section 1: Introduction, the PEAR, the COEPs and EMP implementation
   Section 2: General Environmental Management
   Section 3: Construction Site Management
   Section 4: Water Quality
   Section 5: Air Quality
   Section 6: Noise and Vibration
   Section 7: Traffic Management
   Section 8: Environmental Management Plan

1.2 Preliminary Environmental Assessment Report (PEAR)

A PEAR has been prepared in accordance with the Environmental Impact Assessment (EIA) Regulations 2007 and UNDP SES to determine the likely impacts and their significance arising from the proposed reconstruction of Lelata Bridge. The following areas were identified as requiring mitigation to avoid or minimise adverse impacts during the construction stage:

- General construction site management.
- Noise and vibration.
- Dust generation and air quality.
- Erosion and sediment control.
- Impacts on water quality; and
- Traffic management and maintenance of community access.

1.3 Codes of Environmental Practice and UNDP SES

The current Samoa Codes of Environmental Practice (COEP’s) were prepared in 2007 to define methods and procedures to be followed by consultants, designers, and contractors to avoid or mitigate adverse environmental impacts.
associated with infrastructure development or maintenance projects.

There are 14 COEP’s, including COEP 1 – Administrative Procedures which sets out the authority for the codes, definitions and the process for implementation and monitoring of the COEP’s. The relevant COEPs for the Lelata Bridge project are:

- COEP 1 – Administrative Procedures
- COEP 2 – Road Planning, Design and Construction
- COEP 4 – Land Acquisition and Compensation
- COEP 5 – Construction Camps
- COEP 6 – Road Construction Erosion Control
- COEP 11 – Drainage
- COEP 12 – Traffic Control During Construction
- COEP 13 – Earthworks

All works shall be required to be undertaken in accordance with the relevant COEPs. In addition, all works for this project will comply with UNDP’s Social and Environmental Standards (SES), which came into effect 1 January 2015. The SES underpin UNDP’s commitment to mainstream social and environmental sustainability in its Programmes and Projects to support sustainable development. Both Samoa national laws and regulations, and UNDP SES, and their compliance requirements for the Lelata bridge are described in Section 3 of the PEAR.

The management measures in sections 2-8 of this EMP refer to the most relevant UNDP SES Standards – however those references are not intended to be exhaustive. The contractor is expected to maintain full compliance with the UNDP SES throughout all stages of its works.

1.4 Preparation of Environmental Management Plans

As per COEP 2 - Road Design and Construction, and in line with the assessment and management requirements of the UNDP SES, the consultant shall prepare an EMP which is to be completed by the appointed contractor. The EMP shall set out the management, mitigation measures, and monitoring requirements that will be put into place during the project. The final CEMP produced from the EMP will be prepared by the contractor and shall:

- Identify the personnel who will have clearly defined roles and responsibilities in the implementation of the CEMP.
- Establish the chain of responsibility for managing the environmental aspects of the demolition and construction works.
- Identify the records to be maintained which demonstrate compliance with the CEMP.
- Establish the mitigation and contingency measures for at least the following:
  - Spills (i.e., fuel, oil).
  - Erosion control.
  - Litter control.
  - Dust control.
  - Water quality management (of the Vaisigano River).
  - Noise control.
  - Health and safety; and
1. Traffic management and access.

- Maintain and monitor all treatment devices.
- Undertake any training programmes for personnel to ensure the CEMP is implemented.

No equipment shall be moved onto a site, or works undertaken, prior to the approval of the CEMP by the Project Engineer.

### 1.5 Implementation of Environmental Management Practices

This EMP should be implemented using the following procedures:

1. The awarded contractor will produce a CEMP based on this EMP and their construction methodology. This will require approval from the LTA and Project Engineer, as well as UNDP.

2. Compliance with the CEMP is the responsibility of the Construction Site Manager who is the authorised representative of the Contractor under the conditions of their contract. In their absence from the site, a suitably trained deputy will take responsibility as Site Manager and therefore responsibility for compliance with this CEMP. The Site Manager will be responsible for:

   a. daily site inspections.
   b. weekly reporting to the LTA and PUMA.
   c. incident reporting.
   d. following up on complaints.
   e. identification of where corrective action is required and ensuring these are undertaken.
   f. maintaining written records of the above; and
   g. 24 hours contact details for the Contractor and Construction Site Manager shall be always available on site.

3. Training of Contractors' staff will be undertaken in respect to environmental management expectations and a training record will be kept. All construction staff will be briefed on the CEMP and its requirements.

4. All sub-contractors or suppliers who have the potential to undertake activities that may result in adverse impacts will be required to read the CEMP and sign a declaration that they have read and understood it and will abide by the requirements therein. No sub-contractor will be allowed to commence work until this form is completed.

5. Where necessary, sub-contractors must supply evidence that they have undertaken the necessary action to adhere to the requirements of the CEMP.

6. The CEMP will be reviewed on an ‘as required’ basis.

7. No access shall be given to the contractor to the site until such time as a complete Traffic Management Plan (TMP) has been developed by the Contractor and approved by PUMA and LTA. If, in the opinion of the Project Engineer, the Contractor is not in compliance with the approved plans at any time during the execution of the site work the Engineer shall notify the Contractor and may suspend the work if the Contractor fails to rectify the deficiencies within the period specified by the Engineer.

8. The contractor shall make sure a copy of this EMP, the CEMP and Development Consent are always located on site for ease of reference. The contractor shall ensure construction works always
comply with these documents, and report any actually or potential variations to LTA as soon as possible. The contractor will be responsible for obtaining any variations to the PUMA development consent if required.
2 General Environmental Management

2.1 General / Administrative Procedures

2.1.1 Community Relations
The Contractor will undertake the contracted activities in a manner which will ensure that the works do not cause any unnecessary adverse impacts on the surrounding community.

The public has the right to approach the Site Manager in the event of unexpected problems or issues of nuisance from any aspect of the construction works.

The contractor will erect notice board at either end of the works on Vailele Street provide contract details for contractor liaison person(s) should any person wish to engage with the contractor.

2.1.2 Complaints Procedure
Grievance Redress Mechanisms exist for the Vaisigano Catchment Project (VCP) project. The following compliance procedures are simplified procedures for contractor employees. All employees of the Contractor will immediately report any complaints from site visitors, neighbouring properties, or road users to the Site Manager.

A dedicated Stakeholder Relationship/Communications Manager will be appointed for the construction phase of the Project, who will manage all public consultation, engagement, enquiries, and complaints.

All complaints received in respect of the construction work will be recorded by the Site Manager in a Complaints Register, which will be maintained by the Site Manager throughout the duration of construction work.

The register will record:

- Date and time of complaint.
- Name and address of complainant.
- Nature of the complaint.
- Details of complaint.
- Weather conditions at the time of which the incident complained about occurred.
- Action undertaken to rectify the complaint.
- Date of verbal response provided to complainant; and
- Date of written response sent (if required).

The Site Manager will be required to respond to the complainant within 48 hours of the complaint being received. The response will confirm the details of the complaint and indicate what action is proposed or has been taken.

The Site Manager will provide a copy of all complaints and the response to the LTA and the GCF PMU at the Ministry of Finance (MoF) within two working days of the complaint(s) having been made.

2.1.3 General Construction Phase Operating Procedures
The Contractor shall undertake all reasonable steps to ensure works minimise nuisance to adjacent residents and road users during construction through the following:

- Normal hours of work are between 0700hrs and 1600hrs Monday to Friday. No work shall occur on public holidays or at weekends except for emergency work unless prior approval is given by the Engineer.
- Operations that cannot be reasonably undertaken or completed in normal working hours can be undertaken outside normal hours subject to the provision of notice to residents within 100 metres of the location of the intended operation and approval is given by the Engineer. The notice to undertake such work is to be given not less than five working days before the commencement and shall include reference to the location, nature, potential impacts, proposed timing, and duration of work.
- The Contractor shall ensure that reasonable and useable access is maintained to private land and villages. The provision of access needs to be balanced against health and safety implications and the contractor must ensure that health and safety is not compromised at any time.
- The Contractor shall ensure that plants, seedlings, and cuttings used for revegetation and landscaping are, wherever possible, taken from the immediate area, and from as close as possible to the restoration site without adversely affecting the site used for collection and with all approvals to do so in place.
- The Contractor shall be responsible for preparing management and mitigation plans for project activities, which are considered to create adverse impacts.

### 2.1.4 Climate Change Mitigation

The contractor shall outline within their CEMP measures they will adopt to lessen their climate change impact. This for example, could include climate change consideration in their procurement of goods and services, the planning and staging of activities to cut down emissions, reducing run and idling times of machinery to reduce the generation of emissions.

### 2.1.5 Site Tidy-up

As part of the completion of the construction work, the Contractor shall ensure that the following activities will be undertaken in accordance with COEP 5 and COEP 13 and UNDP SES Standards 1 and 3 (amongst others) where applicable:

- All construction materials shall be removed from the area.
- All silt traps / filters shall be removed.
- Non-invasive vegetation and grass shall be planted or allowed to grow in areas where earth is exposed.
- All disturbed surfaces shall be rehabilitated.
- All rubbish shall be removed from the area.
- The site shall be returned to a condition no worse than it was found prior to commencement of works.

### 2.1.6 Indigenous People (SES Standard 6)

As indicated in the PEAR, given that there is no required resettlement and displacement of affected people, only freehold land will be acquired, for which a Land Acquisition Action Plan (LAAP) has been prepared. Nevertheless, the contractor will be required to comply with the LAAP where FPIC has been undertaken with landowners in accordance with the SES standard.

### 2.2 Emergency Contracts and Response

In the event of a non-compliance with a development approval condition or other regulatory requirements, and if an incident occurs that
results in a significant adverse environmental effect, the following shall occur:

1. Immediate action will be taken to stabilise the situation (i.e., cease work, turn off or move machinery, deploy spill equipment). All spills shall be contained, recovered and disposed of appropriately.

2. The Contractor shall contact the MNRE as soon as practical, but within 24 hours, of the situation (for example, a significant oil spill).

3. Any affected parties shall be contacted as soon as possible if an incident occurs that may affect any land outside of the Project area.

4. All steps necessary to mitigate the incident shall be taken. The UNDP Samoa Multi-country office and other external agencies shall be contacted where appropriate; and

5. An incident report shall be prepared that shall include, as a minimum:
   a. A Description and location of the incident/ non-compliance.
   b. The likely cause of the incident/ non-compliance.
   c. Potential or actual effects of the incident/ non-compliance.
   d. Mitigation and remedial action taken.
   e. Preventive action / changes to prevent a re-occurrence of the incident/ non-compliance; and
   f. Monitoring results.
3 Construction Site Management

3.1 Construction Traffic

To minimise the extent of heavy traffic and construction impacts on adjacent properties and other residential areas, the following shall apply, where applicable, to the use of public, private, and purpose-built roads by machinery and vehicles used in the completion of this contract. The use of vehicles and machinery on roads shall be in accordance with any road traffic regulations in effect at the time. The Contractor shall ensure the following:

- Vehicles and machinery using public and private roads shall be clean and loads secured to ensure accidental deposition of material on the road is kept to a minimum. Haul trucks shall use secure tailgates and truck and controlled machinery wash-down areas shall be provided where necessary. Where installed, any runoff from truck and machinery wash-down areas shall pass through stormwater treatment devices prior to discharge and be regularly inspected and maintained.
- The use of private roads shall minimise the extent of traffic and construction impacts on adjacent residential areas and community facilities.
- General noise control measures set out in the CEMP shall apply to access roads and the operation of vehicles and machinery.
- Access roads, wash-down areas and associated temporary construction site related structures shall be removed upon completion of the work and the area reinstated.
- The areas affected by access roads and wash-down areas shall be reinstated and re-vegetated as soon as it possible.

3.2 Construction Camps and Site Facilities

Site facilities shall be established as set out in COEP 5 and in compliance with UNDP SES Standard 1 – Biodiversity Conservation and Sustainable Natural Resource Management, SES Standard 3 – Community Health, Safety and Working Conditions and SES Standard 7 – Pollution Prevention and Resource Efficiency. Site facilities include offices, ablutions and areas designated for workers, and as such are activities which have the potential to generate litter and other waste material. As part of the design process, the GoS of Samoa acquired land to provide access to properties from Vailele Street on the north-eastern side of Lelata Bridge. These properties are ……… and will be available to the contractor to use as a laydown area for the purposes of the project. Should the contract require any additional land for temporary construction related purposes, they will be responsible for obtaining any approvals from PUMA. Any new or additional areas shall not be located within 30 metres of Vaisigano River. Site facilities include:

- Site offices, building and facilities as necessary.
- Covered rubbish bins and skips; and
- Regular disposal of rubbish off-site at an appropriate location.

Within 14 days of the commencement date of the contract the Contractor shall submit to the Project Engineer for approval a detailed layout plan for the development of their construction camp or site facilities showing the locations of all temporary buildings and facilities that are to be constructed, with the location of access roads, storage areas and drainage facilities. The Contractor shall also submit specifications for the materials to be used for the construction of all building and facilities and define the standard of construction for all work to be undertaken at the construction camp site.
In preparing such specifications the Contractor shall incorporate the following minimum requirements:

- The site shall be completely fenced with a security fence at least 2m high, the design of which shall be entirely suitable for its purpose. The fence shall be constructed from galvanised posts and wire.
- Areas for the storage of fuel or lubricants or where machinery or equipment is to be serviced shall be bunded to prevent the escape of spillages of fuel or lubricants from the site. Drainage of such bunded areas shall be through purpose-designed and constructed oil traps.
- A minimum of one water closet / toilet and one urinal shall be provided per 10 personnel employed either permanently or temporarily on the contract project. Separate toilet and wash facilities shall be provided for male and female employees.
- All discharge from toilets, washrooms, showers, kitchens, laundry facilities shall be collected by a licensed operator or appropriately treated before discharge.
- Any staff facilities shall be ventilated and illuminated to ensure the health and safety of the Contractor’s workforce.
- All stormwater drainage from the site shall be channelled or piped to a silt retention pond prior to discharge. The retention pond shall be sized to provide a minimum of 20 minutes retention for stormwater flow from the whole site that will be generated by a 20-year return period rainfall having a duration of at least 15 minutes. The run-off coefficient to be used in the calculation of retention pond volume shall be 0.9.
- All discharge from silt retention ponds shall be channelled to discharge to natural water via a grassed swale at least 20 metres in length with suitable longitudinal gradient where possible.

All camp facilities shall be maintained in a safe, clean, and appropriate condition throughout the construction period. The silt retention pond shall be maintained in efficient condition throughout the construction period. Trapped silt and soil shall be periodically removed and disposed of in appropriate waste material disposal areas.

The Contractor shall comply with the government medical or labour requirements and provide, equip, and maintain adequate first aid stations and erect notices directing where these are located. The Contractor shall also have experienced first aid personnel available throughout the construction period for attending injuries.

Throughout the period of the construction works, the Client / Employer, the Project Engineer, or their representatives, shall have uninterrupted access to the Contractor’s construction camp for the purpose of carrying out routine inspections of all buildings, facilities, or installations of whatever nature, to ensure compliance with these specifications.

### 3.3 Private Land

The Contractor, when planning with landowners to establish construction camps or work site facilities, must consult with the Site Engineer and the LTA to determine whether any Green Climate Fund (GCF) or United Nations Development Programme (UNDP) SES policies are triggered. Prior to developing such facilities, at a minimum, the Contractor shall submit to the Project Engineer a signed authority of the landowner for the Contractor to establish the facility on any land, after proceeding as per **COEP 4 – Land Acquisition and Compensation**; additional requirements under UNDP SES (e.g., Standard 5, Standard 6) might also be triggered.

The Contractor shall submit to the Project Engineer the following information signed by the landowner and the Contractor:

- Details of compensation to be paid.
- Agreed period of tenure.
- Any specific requirements of the landowner.
- Photographs of the site in its original condition prior to the site being modified or any facilities being established; and
• Details of the proposed and agreed site restoration after completion of the contract work.

At the completion of the contract work, the Contractor shall submit to the Project Engineer a signed statement from the landowner confirming that the compensation has been paid, if relevant, and that the landowner is satisfied with the restoration of the site. If such a statement is not submitted, the Client / Employer may withhold money owing to the Contractor in a sum sufficient to pay for any compensation and the site restoration.

3.4 Construction Camp Site Restoration

At the completion of the construction work, in compliance with Samoa’s local legislations and UNDP SES Standard 1 – Biodiversity Conservation the Contractor shall dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates. The whole of the construction camp site shall be returned to its preconstruction state, and vegetation replaced with appropriate native species. At the completion of restoration, the site shall be in no way inferior to the condition that pertained prior to commencement of the construction work. However, if the camp is located on private land any site restoration after completion of the contract work shall be carried out in consultation and agreement of the landowner.

Any soil contaminated by hydrocarbons (i.e., oil or fuel) or any other hazardous substance shall be carefully removed from the site and disposed of in appropriate waste soil disposal areas as approved by the Ministry of Natural Resources and Environment (MNRE), and in a manner aligned with UNDP SES Standards 3 and 7 in particular.

3.5 Refuelling and Maintenance Areas

Procedures for refuelling and maintenance areas must comply with the relevant provisions in COEP 5 – Construction Camps and UNDP SES Standard 7 – Pollution Prevention and Resource Efficiency.

• Refuelling and maintenance facilities shall not be located, or refuelling and maintenance activities shall not take place, within 30m of Vaisigano River or in ecologically sensitive areas. If a 30m limit is impracticable then a lesser limit may be adopted provided approval from the Planning and Urban Management Agency (PUMA) is obtained. On no account shall the limit be less than 10 metres.
• Vehicles and plant shall not be stored within 30 metres of Vaisigano River or in ecologically sensitive areas, overnight or when not in use.

3.6 Waste Management

At all times the Contractor shall undertake their activities in accordance with the Waste Management Act 2010 and UNDP SES Standard 7 – Pollution Prevention and Resource Efficiency. The CEMP shall demonstrate the following:

• Waste is to be controlled on site, with appropriate bins supplied.
• Waste is to be collected regularly and disposed of to Tafaigata Landfill.
• Where possible, waste should be separated into waste stream for recycling and reuse.
• All waste that can be reused or recycled shall be done so.
• Incineration of waste on site is prohibited.
• Materials shall be ordered with a view to minimise waste generation.
• Bins shall be secured to stop material being blown about or accessed and scattered by birds and vermin.
• The site shall be cleaned at the end of each working day and all wastes collected and disposed of appropriately.
• Inspections prior and during demolition to identify presence of hazardous materials and waste. Where identified,
confirmation with MNRE and LTA on their appropriate handling and disposal.

Regarding bridge demolition, where possible, reusable, or recyclable items will be salvaged and kept for reuse by the LTA. This will include, but may not be limited to, bridge beams, deck and fence which will be removed off-site and stored at LTA’s Vaitele yard.

3.7 Consideration of Cumulative Impacts

It is possible that the construction of the river walls will overlap with the construction of Lelata Bridge. Overlapping construction activities around the location of Lelata Bridge could potentially combine to generate greater impacts on surrounding residents. The contractor’s construction methodology will need to take into consideration the timing of the river wall construction and associated activities and the potential for the generation of cumulative impacts. The contractor will need to discuss and agree the potential for cumulative impacts and any necessary mitigation with LTA and GCF-VCP.

3.8 Biodiversity at Bridge Location

In compliance with Samoa’s local legislations and UNDP SES Standard 1 – Biodiversity Conservation and Sustainable Natural Resource Management, it is unlikely that works at the bridge location will have impact on any significant flora and fauna, including aquatic migratory species that are located beneath or around the bridge location due to the highly level of modification of the banks and stream bed, as well as the riverbed drying out during the dry season. However, to ensure that no significant flora and fauna are adversely affected, the contractor will be required to undertake a flora and fauna survey beneath the bridge and 20m up and down stream prior to construction works commencing. The survey must be carried out by a suitably qualified ecologist who will identify any species or habitat that requires protection. If any species or habitat is identified, the ecologist will develop an appropriate mitigation and management plan to ensure their protection, relocation, or restoration. Mitigation measures must be implemented prior to implementation.

3.9 Cultural Heritage Assessment

No cultural sites or objects of significance were identified under the PEAR, but in compliance with Samoa’s local legislations and UNDP SES Standard 4 – Cultural Heritage, the Construction Contractor will be required to produce a chance find plan and for any additional land for their construction activities to undertake a site-specific assessment to ensure that any additional work areas are assessed for the presence of cultural heritage sites. If any sites are identified, the contractor must follow the plan and determine appropriate mitigation and apply for additional development consent approval from PUMA.
4 Water Quality

Management of water quality during construction shall be in accordance with UNDP SES Standards including Standard 1 – Biodiversity Conservation and Sustainable Natural Resource Management, Standard 3 – Community Health, Safety and Working Conditions and SES Standard 7 – Pollution Prevention and Resource Efficiency and Samoa’s PUMA COEP’s including: COEP 2 – Road Planning, Design and Construction; COEP 6 – Road Construction Erosion Control; COEP 11 – Drainage; and COEP 13 – Earthworks. The following provides a summary of the key procedures that shall apply to the Contractor.

4.1 Working within a Watercourse (UNDP SES Standards 1, 3 7 and PUMA COEP11)

Works within a watercourse shall be undertaken in accordance with UNDP SES Standards 1, 3, 7 and PUMA COEP 11.

- Disturbance of the Vaisigano River shall be minimised wherever possible.
- Exposed surfaces near the Vaisigano River (within 10 metres) shall be minimised and revegetated or otherwise sealed as soon as practicable.
- Weather conditions should be considered in programming earthworks. Earthworks or works within the Vaisigano River shall be avoided during storm events or periods of heavy rain.

4.2 Erosion and Sediment Control Plan (UNDP SES Standards 1, 3, 7 and PUMA COEP 2, COEP 6, COEP 11 and COEP 13)

All earth disturbing activities shall be undertaken in accordance with COEP 13 – Earthworks which provides planning and work guidelines for earthworks activities associated with development projects. All activities within watercourses shall be undertaken in accordance with COEP11 – Drainage. Additionally, all earthworks and watercourse works shall be undertaken in accordance with UNDP SES UNDP SES Standards including Standard 1 – Biodiversity Conservation and Sustainable Natural Resource Management, Standard 3 – Community Health, Safety and Working Conditions and SES Standard 7 – Pollution Prevention and Resource Efficiency ensuring both UNDP SES and COEPs requirements are satisfied.

A sediment control plan shall be developed by the Contractor and included in their CEMP. In the event of any unforeseen discharge, the sediment control plan and the CEMP shall be reviewed and, where necessary, amended to improve the management of silt generating and control activities.

4.2.1 Earthworks

The Contractor shall employ such temporary measures as are necessary to prevent or mitigate impacts caused by erosion or siltation of any natural watercourse or receiving environment.

All works shall be undertaken with a conscious approach to the need for preventing or minimising erosion of any exposed earth surface. In addition to permanent drainage or erosion control systems that are required to be constructed, temporary measures to prevent erosion are to be implemented whenever these are clearly necessary to mitigate impacts of the erosion of exposed surfaces.

Should the replacement of Lelata Bridge require earthworks, erosion and sedimentation control measures referred to in the COEP and this EMP shall be described and set out within an Earthworks Plan. The Earthworks Plan shall be submitted to the PUMA by the contractor for their approval prior to works commencing. Once approved, a copy of the Earthworks Plan shall be always available at the site of the activity.
The Earthworks Plan shall be designed to prevent erosion or sedimentation and shall consider all factors that contribute to erosion and sedimentation, including, but not limited to, the following:

- The topographic or hydrographic features, or both, of the project area.
- The types, depth, slope, and area of the soils of the affected area.
- The original state of the area as to plant and animal life and ecosystem functioning.
- Whether any valuable ecosystem may be affected by the earthworks.
- The proposed alteration to the area.
- The amount of runoff from the project area.
- The staging of earthwork activities.
- Temporary control measures and facilities for use during earthwork activities.
- Permanent control measures and facilities for long-term protection.
- A maintenance programme for the control facilities including disposal of materials removed from the control facilities or project area.
- Whether archaeological sites or other cultural resources are in the vicinity.
- Whether designated tourism or fishery resources are in the vicinity (or may be affected by sediment discharge).

4.2.2 Stockpiles

Stockpiles shall be sited such that stormwater run-off can be collected, controlled and discharged through devices to remove suspended solids prior to discharge to natural watercourses.

- No stockpiles shall be established within 10 metres of Vaisigano River or in ecologically sensitive areas (though none have been currently identified at this site).
- No stockpiles shall be established on the road such that they will adversely impact the sightlines or safe movement of vehicles.
- Any stockpile shall be equipped with cut off drains or similar.
- Runoff from stockpiles to be directed through a stormwater treatment device.
- All stormwater treatment devices are adequately maintained.

4.2.3 Temporary Silt Control

Throughout construction works, the Contractor shall install silt traps in all temporary and permanent drains where work is occurring in, or within 30 metres, of such drains.

Silt traps shall be maintained in appropriate operating condition throughout the construction work. Material periodically cleaned from such silt traps and drains shall be transported and disposed of in waste disposal areas established as detailed and specified in accordance with UNDP SES Standard 7, PUMA COEPs 11 and 13.

The Contractor shall identify the need for silt traps and construct and maintain these in accordance with design documents, provided by the Project Engineer, and where necessary manage the impacts of silt run-off and discharge. The following forms the key approach to silt control during construction either within or immediately adjacent to watercourses:

- Temporary stormwater devices and associated cut off drains/bunds shall be installed prior to any earthworks commencing on site.
- Construction of temporary treatment devices shall minimise environmental disturbance.
- A sediment trap will be placed downstream of the site where construction work is due to take place, prior to the work commencing to intercept flow from disturbed surfaces, particularly the bed of the watercourse during silt excavation or rubbish removal.
- The Contractor shall install silt fences.
- The disposal of material that is periodically cleaned from silt traps shall be specified to ensure that it
does not re-enter Vaisigano River.
- Throughout the construction period and, if necessary, during maintenance activities, the discharge of silt laden water shall be avoided or where necessary minimised.
- At the completion of construction work, silt traps shall be cleaned out and removed.
- Where silt traps are required, details of these shall be provided by the Site Manager to the Project Engineer.
- Cofferdams or bunded areas shall be used for any works required within the wetted area of Vaisigano River. This will avoid the generation of silt within the river and provide a dry area for construction equipment. The work area shall be cleaned, and all sediment, material and rubbish removed before the cofferdam is removed.

4.2.4 Use of Heavy Machinery in or close to Watercourses
- All earthworks shall be constructed in accordance with UNDP SES Standard 1, 3 and 7 and PUMA COEP 13 and in such a way as to prevent or minimise accelerated erosion, accelerated sedimentation and disturbance. This applies to all work carried out on land, or in the water, where natural sediment will be disturbed.
- Use of construction machinery in watercourses shall only occur in accordance with UNDP SES Standard 1, 3 and 7 and PUMA COEP 11 to minimise the clearance of vegetation, minimise the release of sediment to the downstream environment and ensure cofferdams/ bunded areas are in place prior to works in such areas commencing.
- The Contractor shall utilise equipment of an appropriate nature and scale relevant for the physical activity required and not utilise heavy machinery where a less intrusive approach is better suited.
- Where possible, the use of heavy machinery in the stream shall be avoided.

4.2.5 Clearing Vegetation
The Contractor shall only clear vegetation, in accordance with UNDP SES Standard 1, 3 and 7 and PUMA COEP 5 and COEP 13, from within the areas agreed with the Project Engineer, for the construction camp, construction camp access or other site works described in the contract. On no account is the Contractor to damage vegetation outside the above areas. Should such damage occur, the Contractor shall forthwith take such steps as are necessary to prevent erosion and to re-establish vegetation lost through any damage that may have occurred. On no account is cleared vegetation to be burned. Such vegetation shall be removed from the site to an appropriate disposal site.

4.3 Drainage (COEP 11)
All design, construction and maintenance of drainage structures are to comply with COEP 11 and UNDP SES Standard 1 (and others as applicable) to minimise short-term and long-term environmental impacts of these structures and drainage channels.

4.3.1 Design

Capacities
The following design directive, as provided in COEP 11, shall be applied:

“The Designer shall design all channels, culverts, bridge waterways and other drainage structures such that they are able to discharge their design flow without overtopping or surcharge. In the design of bridge waterways and major culverts care shall be taken to assess appropriate overland flow paths for the discharge of flood flows arising from extreme rainfall in excess of the specified design rainfall. Such overland flow paths shall be such as to avoid the overtopping of any bridge super structure.”
Overland flow paths shall be arranged wherever practicable to mitigate the adverse effects of flooding of land or buildings both upstream and downstream of any bridge or major structure. Flow paths across roads shall be protected against scour by appropriate methods.”

- Unless impracticable, the construction of Lelata Bridge shall be undertaken without river diversion beyond that required within the channel for removing and installing piers and abutments.
- Abutments located on riverbanks shall have erosion protection measures incorporated into the design.
- Banks shall be protected against scour by the use of erosion protection measures to protect riverbanks.

4.3.2 Construction

It is the Contractor’s responsibility to ensure that:

- Prior to commencing site clearance or earthworks all temporary or permanent drainage channels are installed as appropriate together with silt fences or silt retention ponds to minimise the discharge of surface water containing sediment particles to any natural watercourse or on the land adjacent to the construction site.
- Construction shall be undertaken utilising methods that limit to practical levels the amount of water contaminated with sediment.
- The clearance of existing vegetation from the invert or banks at the bridge site shall be limited to just that area required for the construction of the works.
- The programme for construction of the bridge shall demonstrate that detailed and specified erosion protection works are to be constructed at the earliest possible time. Any construction materials to be stored on site at any time, e.g., aggregates, cement, formwork, and the like shall be stored in a location above likely flood level. Any fuel storage, workshop or fabrication yards shall be contained within a bunded area in line with UNDP SES Standard 3 and 7 and PUMA COEP 5 – Construction Camps.
- The use of plant or equipment within the river or stream channel is to be avoided. If it is unavoidable only plant or equipment free from fuel or oil leaks shall be used.
- Construction debris shall not at any time be deposited in any stream or river. At completion of the works all surplus construction materials, debris of any sort and any temporary buildings shall be removed from the site of the works and the whole of the works area returned to a condition that is in no way inferior to that which existing prior to the commencement of the works.
5 Air Quality

Management of air quality during construction shall be in accordance with UNDP SES Standard 3 and 7 and PUMA COEP 2 – Road Planning, Design and Construction. The following provides a summary of the key procedures that shall apply to the Contractor.

5.1 Dust Control (UNDP SES Standard 3 and 7 and PUMA COEP 2)

- The Contractor shall undertake dust control measures following prolonged dry periods, where earth has been exposed, by spraying water onto the dry earth area or otherwise covering exposed areas. Water used for dust control shall be collected either from rain storage tanks or local watercourses. The Contractor shall always have a watering truck available for use. All care shall be taken to ensure excess runoff does not find its way into the Vaisigano River.
- Any stockpiles shall be grassed where practicable or otherwise covered. Stockpiles of materials shall not be permitted to generate dust.
- All surfaces shall be constructed to their final design requirements as quickly as practicable.
- Covers shall be used where practicable on small areas that may generate dust.
- Materials, such as gravel, that do not produce dust, can be used as cover where practicable.
- Hydrocarbons shall not be used as a method of dust control.
- Contractor will monitor dust generation and weather conditions. If concrete cutting is likely to generate dust at residential properties boundaries, the contractor is to stop work until mitigation measures can be installed or until wind direction changes. Mitigation measures include installing a partial enclosure of activity area.

5.2 Vehicle Emissions and Air Pollutants

- All vehicles and machinery shall be well maintained and operated in a safe manner including the use of effective exhaust systems.
- Waste materials are not to be burnt on site but must be disposed of at an appropriate facility.

5.3 Concrete Dust

- Workers involved in the cutting of concrete, or workers otherwise near concrete cutting activities are to be always issued with dust masks while concrete cutting is being undertaken. The use of dust masks is to be monitored by the Site Engineer to ensure they are correctly used when required.
6 Noise and Vibration

All works shall comply with UNDP SES Standard 3 and 7 and PUMA’s Noise Policy 2006 as follows.

The following average noise levels measured at the stated times at the boundary of any land use shall not exceed the limits set below.

<table>
<thead>
<tr>
<th>Noise Source (Average dBA, L10min)</th>
<th>“Receiving Property” (LAeq, 10 minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential Use</td>
</tr>
<tr>
<td></td>
<td>Day</td>
</tr>
<tr>
<td>Construction Work</td>
<td>75</td>
</tr>
</tbody>
</table>

Note: Day period is defined as 0700 to 1800, evening period is defined as 1800 to 2200 and night period is defined as 2200 to 0700. Construction activities conducted at times not specified in the table above will require special approval from relevant authorities. These may include the Night period, Sundays, and all other times within Residential and Tertiary Educational compounds.

Construction works include building works, demolition, remediation, renewal, and maintenance. The PUMA may impose more or less stringent construction hours and noise limits depending on the location or the sensitivity of the area where construction is occurring:

- Noise generated from any Power Generator must not exceed an average of 75dB in the Day period, 60dB in the Evening periods.
- All vehicles and machinery shall be operated in a safe manner including the use of effective noise suppressors or silencing systems installed in accordance with the manufacturers recommendations.
- The Contractor shall ensure that all best practicable options are taken to avoid a public noise nuisance beyond the boundaries of the site.
- In areas where there is the potential for excess noise or vibration to be created the Contractor shall advise potentially affected parties 24 hours in advance of the activity causing the noise / vibration commencing.
- No works to be undertaken between 2200 and 0700 hrs.
- The contractor will be required to notify all residents within a 200m radius of Lelata Bridge of impending deconstruction or demolition activities and construction activities prior to their commencement and the complaints procedures as per the PEAR. Deconstruction/construction of the bridge shall be undertaken by the contractor to ensure the least-noisy removal methodology and options. The contractor shall maximize deconstruction and removal of components off site for demolition elsewhere (e.g., bridge beams), rather than demolition in situ.
- The Contractor will be required to install Temporary Construction Noise Barriers around jack hammers, concrete cutters and any other activities that are likely to exceed PUMA noise standards at adjacent residential boundaries.
- The Contractor shall develop a Noise Management Plan. This shall be submitted and approved by the LTA prior to any works commencing on site. This Plan will outline the Contractors approach to meeting the requirements of PUMA’s Noise Policy 2011 as well as any conditions attached to the Development Approval. Particular attention shall be paid to addressing noise impacts on residences near the worksite.
• The Noise Management Plan shall also include a community consultation plan. This will outline the Contractors strategy for communicating with residents over noise generating activities. Where the contractor cannot achieve the noise standards as set out in the PUMA Noise Policy 2011, they must work with those potentially affected to reduce the impacts of noise. This may include limiting the timing of activities, limited duration of activities etc.
• The Contractor should demonstrate in their Noise Management Plan that:
  o They have made every effort to reduce noise where practicable.
  o Affected persons can notify LTA/contractor which times are not suitable for activities that are likely to exceed the PUMA Noise Policy to occur; and
  o Communication with residents will be proactively managed on site and by the Contractor in association with the LTA.
7 Traffic Management

Traffic management during construction shall be in accordance with COEP 12 – Traffic Control During Construction and UNDP SES 3 – Community Health, Safety and Working Conditions. The following provides a summary of the key procedures that shall apply to the Contractor and be considered in the preparation of the Traffic Management Plan (TMP).

The Contractor will be responsible for developing the final TMP based on their construction methodology.

7.1 Pre-Construction Warning of Works

Warning of work to road users and adjacent land users using road signage, stating the date that work is due to start and the approximate length of time that work is expected to occur on or immediately adjacent to the road. Advance warning shall be a minimum of 5 working days before commencement.

7.2 Signage and Access

Unless otherwise included in the Approved TMP, the Contractor shall comply with the following:

- All traffic signs used for the warning or direction of traffic at road work sites shall comply with the requirements of the LTA and appropriate traffic regulations. Homemade signs shall not be used.
- Advance warning signs during construction are to be placed beside the road to warn approaching traffic about Contractor personnel when on or near the road. As a guide, signs should be placed in advance of the site in a position where they can be seen for at least 60m by oncoming traffic.
- Safe access for vehicles and pedestrians shall be always be provided by the Contractor during construction when work affects access ways. Safe access shall be provided using appropriate signage and traffic cones to clearly direct road users or traffic.
- Traffic cones shall be used to warn and slow down traffic approaching the work areas. They should be placed along the centreline or shoulder of the road as appropriate. Where this is insufficient the cones can also be placed on the other side of the carriageway to narrow the effective carriageway width and slow oncoming traffic. Cones are essential if the work site requires through traffic to deviate from the normal line of travel. In such cases the cones should be used to taper traffic to their desired position.
- The contractor shall confirm the planned transport route for the bridge beams from the port to the bridge site if practical and confirm to LTA and detail any measures in the TMP.
- The Contractor shall submit a TMP for the approval of LTA 1 week prior to the transportation of the beams.

7.3 Health, Safety and Efficiency

- The Contractor shall ensure that a safe work site is always provided for the public and site personnel and in all conditions. In the event of an occupational fatality or serious injury, the Contractor shall report to UNDP MCO, LTA, Lead Project Engineer and relevant Government Ministries on the nature of fatality or injury as soon as becoming aware of the incident and shall inform government authorities in accordance with national reporting requirements.
- All personnel engaged in construction related activities on or adjacent to any road shall wear reflective high visibility jackets.
- Appropriate traffic management shall be implemented to manage traffic flow past the site.
- Unless otherwise provided for, in the form of temporary deviations and the like, all roads shall have at least one lane open for the passage of traffic at all times. Where one-way traffic lines are required,
the Contractor shall ensure that personnel be positioned at each end of anyone-lane section of road equipped with stop / go paddles to provide instructions to passing vehicles. Where personnel directing the traffic are not inter-visible, they shall be equipped with radio telephones in good working order.

- Should lane closures be required, they shall be organised by the Contractor in consultation with, and with the approval of, the LTA.
8 Environmental Monitoring Plan

The following Environmental Monitoring Plan is a guide for the monitoring of Construction works.
<table>
<thead>
<tr>
<th>Potential Environmental Issue</th>
<th>Verification</th>
<th>Implementing Responsibility</th>
<th>Duration/ Frequency/ Estimated Mitigation Cost</th>
<th>Locations</th>
<th>Standards/ Criteria</th>
<th>Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality and Dust Control</td>
<td>● Visual field checks of dust emissions &lt;br&gt;● Verbal or formal complaints received</td>
<td>Contractor</td>
<td>Continuous during construction. Minimal costs included in standard supervision</td>
<td>Cleared areas Material transport Bridge demolition</td>
<td>Samoa COEP and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
</tr>
<tr>
<td>Water Quality and Hydrology</td>
<td>● Visual field checks for sediment loads, water and drainage management and waste management procedures &lt;br&gt;● Verbal or formal complaints received</td>
<td>Contractor</td>
<td>Continuous during construction. Minimal costs included in standard supervision</td>
<td>All areas where clearing is required and construction sites</td>
<td>Samoa COEPs and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>● Flora and fauna survey required prior to construction &lt;br&gt;● Relocation or protection or restoration plan prepared for any site of values, approved prior to construction commencing</td>
<td>Contractor</td>
<td>Planning and development of construction methodology. Continuous during construction</td>
<td>Beneath the bridge and 20metres up and down stream</td>
<td>Samoa COEPs and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
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<td>Potential Environmental Issue</td>
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</tbody>
</table>
| Cultural Heritage             | • Cultural heritage chance finding Plan prior works  
• Cultural heritage assessment should be undertaken on any additional land required by the contractor | Contractor | Planning and development of construction methodology. Continuous during construction. | Any areas required by the contractor outside the area covered by the development consent | Samoa COEPs and UNDP SES | Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS) |
| Community Impacts             | • Ongoing consultation and engagement with Lelata Village and landowners  
• Verbal or formal complaints received | Contractor LTA | Continuous during construction. Minimal costs included in standard supervision | Along work areas at Lelata Village | Samoa COEPs and UNDP SES | Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS) |
| Noise and Vibration           | • Field checks (handheld noise meters if required)  
• Verbal or formal complaints received | Contractor | Continuous during construction. Minimal costs included in standard supervision | All construction areas, access routes | PUMA Planning Policy – Noise Standards and UNDP SES | Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS) |
| Traffic                       | • Visual field checks of traffic disruptions  
• Verbal or formal complaints received  
• Confirmation of planned transport of bridge beams from Port to Bridge site is practical | Contractor LTA | Continuous during construction. Minimal costs included in standard supervision | All construction areas, access routes | Samoa COEP/ PUMA Planning Policy – Noise Standards and UNDP SES | Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS) |
<table>
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<th>Verification</th>
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<th>Locations</th>
<th>Standards/ Criteria</th>
<th>Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater Ecosystems</td>
<td>Visual field checks for sediment load, water and drainage management and waste management procedures</td>
<td>Contractor</td>
<td>Continuous during construction. Minimal costs included in standard supervision</td>
<td>Downstream of works site in the river</td>
<td>Samoa COEP and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Visual field checks for waste management procedures</td>
<td>Contractor</td>
<td>Continuous during construction. Minimal costs included in standard supervision Inspection prior to and during demolition</td>
<td>All construction areas</td>
<td>Samoa COEPs and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
</tr>
<tr>
<td>Mitigating Climate Change</td>
<td>The CEMP should outline measures adopted by the contractor to lessen their climate change impacts.</td>
<td>Contractor</td>
<td>Continuous during construction. Minimal costs included in standard supervision</td>
<td>All construction areas</td>
<td>UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
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<td>Potential Environmental Issue</td>
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<tr>
<td>Safety and Health</td>
<td>Visual field checks of work safety methods, use of PPE, implementation of Job Safety Analysis. Verbal or formal complaints by communities and workers</td>
<td>Contractor</td>
<td>Continuous during construction. Minimal costs included in standard supervision</td>
<td>All construction areas</td>
<td>Samoa COEPs and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
</tr>
<tr>
<td>Cumulative Impacts</td>
<td>Reduce possibility of cumulative impacts increasing impacts on surround properties</td>
<td>Contractor LTA GCF-VCP</td>
<td>Planning and development of construction methodology. Continuous during construction</td>
<td>All construction locations</td>
<td>Samoa COEPs and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
</tr>
<tr>
<td>Compliance Monitoring</td>
<td>Compliance monitoring by Resident Engineer</td>
<td>Contractor</td>
<td>Daily</td>
<td>All construction locations</td>
<td>EMP, CEMP, PUMA Development Consent and UNDP SES</td>
<td>Resident Engineer LTA, and Safeguard and Gender Specialist (SGS)</td>
</tr>
<tr>
<td>Site-Tidy Up</td>
<td>Visual field checks Counting of new planting and revegetation Agreement with communities Verbal or formal complaints received</td>
<td>Contractor LTA</td>
<td>After completion of construction. Minimal costs included in standard supervision</td>
<td>All construction and camp sites</td>
<td>Samoa COEPs and UNDP SES</td>
<td>Resident Engineer LTA, MNRE, and GCF VCP Safeguard and Gender Specialist (SGS)</td>
</tr>
</tbody>
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