Community Integrated Management Plan

Aiga i le Tai District– Upolu

Implementation Guidelines 2018

Foreword

It is with great pleasure that I present the new Community Integrated Management (CIM) Plans, formerly known as Coastal Infrastructure Management (CIM) Plans. The revised CIM Plans recognizes the change in approach since the first set of fifteen CIM Plans were developed from 2002-2003 under the World Bank funded Infrastructure Asset Management Project (IAMP) , and from 2004-2007 for the remaining 26 districts, under the Samoa Infrastructure Asset Management (SIAM) Project.

With a broader geographic scope well beyond the coastal environment, the revised CIM Plans now cover all areas from the ridge-to-reef, and includes the thematic areas of not only infrastructure, but also the environment and biological resources, as well as livelihood sources and governance.

The CIM Strategy, from which the CIM Plans were derived from, was revised in August 2015 to reflect the new expanded approach and it emphasizes the whole of government approach for planning and implementation, taking into consideration an integrated ecosystem based adaptation approach and the ridge to reef concept. The timeframe for implementation and review has also expanded from five years to ten years as most of the solutions proposed in the CIM Plan may take several years to realize.

The CIM Plans is envisaged as the blueprint for climate change interventions across all development sectors – reflecting the programmatic approach to climate resilience adaptation taken by the Government of Samoa. The proposed interventions outlined in the CIM Plans are also linked to the Strategy for the Development of Samoa 2016/17 – 2019/20 and the relevant ministry sector plans.

We wish to acknowledge the significant contributions of our District and Village communities and our key government partner stakeholders and implementing agencies, in particular:

Ministry of Women Community and Social Development (MWCSD)
Ministry of Works Transportation and Infrastructure (MWTI)
Ministry of Natural Resources and Environment (MNRE)
Ministry of Agriculture and Fisheries (MAF)
Electric Power Corporation (EPC)
Land Transport Authority (LTA)
Samoa Water Authority (SWA)
Ministry of Health (MOH)
Ministry of Finance (MOF)

We acknowledge also our key international donor partners: the World Bank, the Pilot Program for Climate Resilience and Adaptation Fund, Adaptation Fund Project, through the UNDP, for the financial support that enabled the review and update of the CIM Plans.

Finally, I commend these CIM Plans to all relevant stakeholders from government ministries to districts and village communities and development partners to implement with the utmost urgency. It is assured that the implementation of the CIM Plans further enhance the resilience of Samoa to the impacts of climate change.

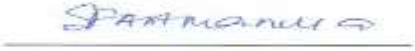
Thank you

Hon. Fiame Naomi Mata'afa
Minister of Natural Resources and Environment

Participants in the Plan

The CIM Plan is a Partnership between the Government of Samoa and the villages within the Plan area. The Plan area starts from the ridge extending to the reef broadly covering 4 sectors; Infrastructure; Natural Environment and Resources; Livelihood and Food security; and Village Governance. Both partners have responsibilities for issues and solutions and the Plan gives an integrated approach to the provision of services and improvement of resilience now and in the future.
This Plan incorporates the Faipule District of Aiga I le Tai and Satuimalufilufi Village (Apai Tai, ApolimaUta, Apolima Tai, Faleu Tai, Lalovi, Lepuia'i Tai, Manono Uta, Mulifanua, Paepaealā, Salua Tai and Satuimalufilufi villages).
The village representatives participated in the preparation of this CIM Plan in partnership with the Government of Samoa.

Date of Signing: 22 June 2015

Representative:	**Signature:**
Apai Tai Village, Manono Tai	
• Feauina Tolovae	
• Finau – Apai Tavita	
• Faimafili Finau	
• Alo Tile	
• Kaisu Faimalo	
Apolima Tai Village	
• Sa'u Filimaua	
• Sa'u Shute	
• Sa'u Faamanuia	
• Tautaiole Vao Tautala	
• Taumaiasi Atapana	

Apolima Uta Village

- Sa'u Polafaasili Puavase Sa'u
- Tina Sa'u
- Tolusefulutasi Siliva
- Sa'u Iosefa
- Anaimalo Sa'u

Faleu Tai Village, Manono Tai

- Lesā Tominiko
- Solomona Lesā
- Losi Leiataua
- Eseta Futi
- Terisa Leiataua

Lalovi Village

- Seulu Iloa
- Seuklu Pelela
- Togia Tuavela
- Gale Togia
- Falute Tafia

Lepuia'i Tai Village, Manono Tai

- Litia Vaipae
- Leiataua Ueli
- Sulu Tavita
- Leiataua Laki

Manono Uta Village

- Mulipola Liki
- Leiataua Punitai
- Mulipola Pemerika
- Taupau Joe Faatupu
- Auapaau Lailoa Manoa

Mulifanua Village

- Ma'uu Lopeti Ifopo
- Aiga Tau Maloto
- Talaleomalie Pritchard
- Vaatiuola L Misi
- MAuinatu Kofe Mafua

Paepaealā Village

- Malaga Teofilo Vaatiuola
- Tuifaasisna Tofaimaa
- Letelemaana Fuga
- Kaloto Tomasi
- Tiumalu Samuelu

Salua Tai Village, Manono Tai

- Aupaau Talilalo
- Mulipola Tausala
- Eseta Elisala
- Talia Auapaau
- Malo Taupau

Satuimalufilufi Village

- Tiumalu Taua
- Malumaauga Pisa
- Fuga Manuele
- Mavaega Tamati

The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Aiga I le Tai as a Management Plan for the Implementation of the Community Integrated Management Strategy (CIMS).

The Ministry of Natural Resources and Environment, as lead organization of Government, on behalf of the participating Government Departments and Corporations, confirms the participation of the Government of Samoa in the preparation of this Community Integrated Management Plan and its adoption as a Management Plan for the implementation of the Community Integrated Management Strategy.

Ulu Bismarck Crawley
CHIEF EXECUTIVE OFFICER, MNRE

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Acronyms

ASCH	Areas Sensitive to Coastal Hazards
BCA	Benefit Cost Analysis
CBFMP	Community Based Fisheries Management Plan
CC	Climate Change
CCA	Climate Change Adaptation
CDCRM	Community Disaster & Climate Risk Management
CEP	Community Engagement Plan
CHZ	Coastal Hazard Zone
CEHZ	Coastal Erosion Hazard Zone
CFHZ	Coastal Flooding Hazard Zone
CIM	Community Integrated Management (Plan) or (Strategy)
CLHZ	Coastal Landslip Hazard Zone
COEP	Code of Environmental Practice
CSO	Civil Society Organization
CSSP	Civil Society Support Programme
DSP	District Sub Project
EbA	Ecosystem based Adaptation
ECCCR	Enhancing Coastal Community Climate Resilience
ECR	Enhancing Climate Resilience
EMP	Environmental Management Plan
EPC	Electric Power Corporation
ERN	Emergency Radio Network
HCSI	High Coastal Sensitive Index
IAS	Invasive Alien Species
IG	Implementation Guideline
KBA	Key Biodiversity Area
KPI	Key Performance Indicator
LTA	Land Transport Authority
LTO	Long Term Output
MAF	Ministry of Agriculture and Fisheries
MET Office	Meteorological Office
MoH	Ministry of Health
MNRE	Ministry of Natural Resources and Environment
MWCSD	Ministry of Women Community and Social Development
MWTI	Ministry of Work Transport and Infrastructure
NAP	National Action Programme
NBSAP	National Biodiversity Action Plan
NDMP	National Disaster Management Plan
NESP	National Environment Sector Plan
NISP	National Infrastructure Strategic Plan
NRW	Non Revenue Water
PA - KO	Priority Area - Key Outcome
PUMA	Planning Urban Management Agency
PPCR	Pilot Programme Climate Resilience
R2R	Ridge to Reef
SIAM	Samoa Infrastructure Asset Management
SOER	State of Environment Report
SWA	Samoa Water Authority
UNDP-GEF SGP	United Nations Development Programme Global Environment Facility Small Grants Programme

WB	World Bank
WCR	West Coast Road
WMP	Watershed Management Plan
WSSP	Water Sanitation Sector Plan

Glossary

Coastal Hazard Zones	Defined areas landward of the coast which are or are considered likely to be subject to the effects of hazards over a defined assessment period. In this study, reference is made to four coastal hazard zones: ASCHs (areas sensitive to coastal hazards); CEHZs (coastal erosion hazard zones); CFHZs (coastal flood hazard zones) and CLHZs (coastal landslip hazard zones).
"Do Minimum"option	A Management option that involves continuing with the present maintenance and upgrading programme on and when required basis.
Emergency Management	To provide communities with skills, facilities and materials so that they may adapt, respond and recover more quickly in the event of emergencies.
Hazard	A source of potential harm or a situation with a potential to cause loss.
Infrastructure	Built structures and networks which support the national, regional or local community.
Lifeline infrastructure	Infrastructure that contributes directly to the survival of the community and its ability to respond and recover at the time of extreme events.
Secondary infrastructure	Infrastructure that contributes to the every-day development of the community.
Implementation Guidelines	A document to guide land use and resource practices to achieve specified goals, objectives and policies and provide a framework for the implementation of defenses and works.
Issue	A specific concern regarding both cause and effect.
Land and Resource Use	The use of land and resources by the community for social, economic or other benefit (e.g. land use includes areas used for villages or crops, resource use includes activities such as sand mining, gravel extraction or fishing).
Monitoring	Process of measuring the effectiveness or impacts of projects and works against predicted standards, levels or outcomes.
Resilience	The ability to be adaptive, responsive and quick to recover.
Community Resilience	The ability for the community to be adaptive, responsive and quick to recover from the adverse effects of hazard.
Natural Resilience–	The ability of natural systems to be adaptive, responsive and quick to recover from natural processes or hazards.
Risk	The chance of something happening that will have an impact on objectives. It is measured in terms of consequence and likelihood. In the Community Integrated Management Plan context it is the likelihood that infrastructure, environment and biological resources and agricultural and marine resources (food security) will be subject to inland and coastal hazards and the potential for loss of property, life or land due to natural processes.
Stakeholders	Those people and organizations who may affect, be affected by, or perceive themselves to be affected by, a decision or activity. The term stakeholder may also include interested parties.
Strategy	Direction or course of action to achieve a define division.
Susceptibility	The degree to which infrastructure at risk is likely to be damaged by coastal hazards and how easy/difficult, expensive/cheap it is to replace. In the context of the CIM Plan the term susceptibility is equivalent to the term vulnerability as the Samoan phrase for both susceptibility and vulnerability is the same.

Vision	A desired destiny.
Livelihood	A livelihood is a means of making a living. It encompasses people's capabilities, assets, income and activities required to secure the necessities of life Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).
Food access	Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources).
Utilization	Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.
Stability	To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.

Introduction to the CIM Plan

The Strategic Vision

The District Community Integrated Management (CIM) Plan for Aiga I le Tai District and Satuimalufilufi Village has been prepared as part of the Government of Samoa's Adaptation Fund - *Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project*. The CIM Plan is one of the primary means of implementing the CIM Strategy, which was formally approved by the Government of Samoa in February, 2001 and updated in 2015 as providing the Strategic direction for enhancing the resilience of community livelihoods, infrastructure, environment and natural resources using a holistic and integrated ridge-to-reef approach. The Strategy has as its central vision:

> Resilience – Community Livelihoods, Infrastructure, Environment and Natural Resources to Climate Change and Natural Disasters

The CIM Plan takes this vision and provides the practical tools with which the communities and the government, in partnership, can implement the Strategy. ***To be resilient is to be adaptive, responsive and quick to recover so that communities are environmentally, socially and economically sustainable (CIM Strategy, 2015).***

The Aim of the CIM Plan

The aim of the CIM Plan is to help communities and government improves resilience by identifying actions and solutions considered as best approach to issues identified. Not all the solutions may be actioned immediately but the plan will ensure that issues and options are identified for the long-term improvement in resilience of community livelihoods, infrastructure, and environment and resource systems.

The CIM Plan will:

1. Improve the community's awareness of all hazard risks from the ridge to the reef;
2. Enable the community as well as providers of services and physical, financial, and technical support in all climate prone sectors, to reduce inland and coastal hazard risks in villages;
3. Enable the community and government service providers of infrastructure services, livelihoods, environment and natural resources to better adapt, respond and recover from cyclones.

Structure of the Plan

The CIM Plan consists of two parts each serving a separate and distinct purpose.

- ***Plan Development,*** which describes the process undertaken in preparing the CIM Plan in conjunction with representatives of the Communities involved, the Government and other stakeholders with interests in the Plan area.

- ***Implementation Guidelines***, which describes the Plans and Actions recommended as outcomes of the process, together with the partner responsible for implementing these outcomes. The participants of the CIM Plan preparation process are acknowledged in the Implementation Guidelines.

Implementation Guidelines

Purpose of the Implementation Guidelines

The Implementation Guidelines describe the solutions proposed that will increase the resilience of the villages in the Plan area and the ways these solutions can be implemented. The solutions are presented for various livelihoods, infrastructure, environment and natural resources items that have moderate to low resilience. Where one solution will provide benefits to other items of livelihoods, infrastructure, environment and natural resources these "Other Benefits" are also noted. Implementation is considered to be the joint responsibility of both the villages and the government in partnership. The government is responsible for the provision of national and district "Public", infrastructure and public goods and benefits derive from environmental services and natural resources , while villages are responsible for local and community infrastructure and livelihoods related actions. The responsibility for implementing the proposed actions is also defined. Solutions for both District and Village level issues related to livelihoods, infrastructure, environment and natural resources respectively, and the responsibility of both partners, should be considered together as they combine to provide for the integrated management of all community development initiatives.

The solutions for village level interventions related to livelihoods, infrastructure, environment and natural resources will usually be the responsibility of the Village Council and Families in the village to implement. Advice and resources may be available from the Government to assist the village in implementing these solutions. In most situations these solutions will also provide benefits to both village and district infrastructure and resources and environmental goods that are shared between villages. These solutions should be considered an integral part of strengthening community resilience at both levels.

Duration of the Plan

The CIM Plan is ***reviewed*** every 10 years but during the Plan period, the solutions implemented will be ***monitored*** on a five (5) yearly basis to ensure the proposed solutions are effective and are actually improving resilience. The 5 yearly monitoring of the new CIM Plan is aligned with the 5 year review of **the key national planning and programming** strategy for Samoa: the *Strategy for the Development of Samoa* (SDS). The new CIM Plan recognizes some solutions are likely to take longer than 5 years, whilst others may take up to 10 years to implement due to the complexity of planning process, funding and budgeting programming required to implement these solutions.

Detailed implementation of the solution will determine the monitoring requirements and Key Performance Indicators.

Financing of the Plan

Implementation of best solutions is the collective effort of all identified responsible agencies, civil society organizations, donor partners **and** district and village communities themselves. Funding will be sourced through several mechanisms recognizing the Government of Samoa's programmatic approach to tackling climate change impacts on its development progress. While every effort has been made to identify priority actions needed to build the resilience of Samoa and its communities, the Government also recognizes that not all actions identified can be financed at once. Implementation of best solutions will be undertaken strategically and over time in line with available funding and, **if** determined a priority CCA activity that will actually build the resilience of communities and Samoa as a whole. Criteria of determining priority CCA best solutions for financing are:

- proposed development is in general accordance with the objectives of the CIM Strategy 2015;
- development is specifically recommended in the CIM Plan
- number of people that will benefit from the development, i.e. population benefit
- development will provide *life sustaining* support for communities
- minimum or neutral environmental effects
- development will improve resilience
- development will achieve speedy recovery
- development will reduce risk
- also identified as a priority in other Sector Plans or National Strategies

During the development of the new CIM Plans, the World Bank funded Pilot Programme for Climate Resilience Enhancing Climate Resilience for Coastal Resources and Communities (PPCR ECR) prepared two (2) key documents:

- ***Community Engagement Plan (CEP)***-the guidelines provided in the CEP is an excellent capacity building tool that can be used by CSO's and village communities themselves to aid development of small grant proposals to existing small grant funding mechanisms like CSSP and the UNDP-GEFSGP

- ***District Sub Project (DSP)*** – the guidelines provided in the DSP targets single districts or multi-district projects with a large number of beneficiaries.

Noting Samoa's programmatic approach to CC and CCA, these key documents are fundamental in guiding development partners, implementing agencies and other stakeholders on the most effective way of resourcing and supporting climate change adaptation projects at the village and district levels. These village and district level CCA projects actually achieve the majority of key indicators in various Sector Plans, subsequently achieving key national indicators contained in the *Strategy for the Development of Samoa* (SDS).

1. Description of Aiga I le Tai District

Physical and Natural Resource Setting

The Faipule District of Aiga I le Tai covers the islands of Manono and Apolima as well as part of Upolu at the western end of Upolu Island. Satuimalufilufi village which is part of the Faipule District of Aana Alofi 3, is covered under the Aiga i le Tai CIM Plan as it is located between the villages of Apolima Uta and Lalovi (refer map of district). The villages in the Aiga I le Tai district include Manono-Uta, Apolima-Uta, Lalovi, Mulifanua and Paepaealā from Upolu while Faleu Tai, Salua Tai, Lepuia'i Tai and Apai Tai are villages of Manono Tai. Apolima Tai covers the whole of Apolima Island which lies north-west of Manono Tai.

The physical and natural resource setting has been divided into distinct settings – Mulifanua to Manono Uta, Manono Island and Apolima Island – this setting provides three different environments to be considered in this CIM Plan.

Mulifanua Wharf to Manono Uta

The Mulifanua Wharf to Manono Uta sector of the Plan area is generally a flat or gently sloping plain characterized by a coastal berm with a wide low-lying area behind. The coast is, in most parts, a sandy shore with intermittent natural headlands including Cape Fatuosofia. The coastline is also highly modified with numerous reclamations jutting out into the lagoon creating smaller pocket beaches and interrupting sediment flow along the shore. There are also a number of poor quality seawalls along the coast in this area.

The low-lying area is mainly swamp, in some parts there is standing or tidal water (behind Apolima Uta) and in others it consists of mangroves (between the main road and the Samoan Village Resort) or reeds. Outside of the swamp areas, most vegetation is plantation or garden. Remnant lava flows dissect the low-lying areas at intervals mainly between Lalovi and Satuimalufilufi. The southern end of the District at Manono Uta changes from a typical soft coast to a harder rocky coastline.

Satuimalufilufi land is partly covered by the Apolima Uta coastal marshland, and through the years, coastal erosion and sea level rise has resulted in the loss of over 20m of previously coastal areas. A seawall now protects the coastal part of the village as well as the main west coast road that runs along the village. As sea level continue to rise, so will the wetlands behind the village, rendering it uninhabitable being so closely situated to the wetlands.

The main district infrastructure in the Mulifanua to Manono Uta area of the CIM Plan include the main road[1]which is considered a lifeline access as it connects the western side of Upolu to services such as the hospital[2], Faleolo International Airport, wharves, ports and other essential services. There are also seawalls with the most recent ones constructed in 2011 as part of the Tsunami Recovery Programme. The Aana West Coast Road is considered an important part of the district's infrastructure, however is listed as high severity for coastal hazard risk in the Vulnerability Assessment of the Samoa Road Network report[3]. Government managed seawalls include ones located at Satuimalufilufi, Apolima Uta and Manono Uta. These were constructed in 2004 and 2006 but later reconstructed in 2011 after being damaged by the tsunami of 2009.

The main road provides primary access to and from Apia, to the Faleolo International Airport, the Mulifanua wharf to Savai'i as well as district facilities and services including the district hospital, schools, churches and shops. The Aana West Coast Road connects the district to the southern side villages of Falelatai, Lefaga and Faleaseela but it is located within the flooding and erosion hazard zones and, in some parts, is only metres from the high water mark.

Where the road is close to the coast there is typically an un-designed seawall along the berm edge, which has not stopped erosion. In some places holes as much as a metre wide exist behind the rocks. Many of the drainage culverts under the road are blocked or damaged and are not effective in draining the low-lying area behind the road. This district sits within the LTA Samoa Infrastructure Asset Management Zone 6 and aside from the main Aana West Coast Road, has a total of 9 access roads[4] maintained by the government. There are approximately 6 unsealed roads/tracks in the district. Majority of these roads are in poor conditions and in need of maintenance.

[1]Aana West Coast Road. Source: LTA Samoa Infrastructure Asset Management Register

[2]Leulumoega and Motootua Hospitals

[3]LTA 2016

[4] Paepaeala Road 1 & 2, Fuailoloo Road 1 & 2, FaleuManono Rd, Salua Access Roads 1 & 2. Lepuiai andSatuimalufilufi Rd not

Overhead electricity lines are on the inland side of the main west coast road. The water network is currently being upgraded to follow the inland side of the road. Construction works are, in some places, affecting the carriageway and cutting off or blocking the drainage culverts. It is expected that this network will remain in place for 30 – 40 years unless damaged by cyclones. The telephone network to this area is provided by way of a micro-wave station at Apolima Uta and distributed by overhead lines from the central point.

The main land and resource use issue affecting the public or "lifeline" infrastructure along the Mulifanua Wharf to Manono Uta coast is the location of the road on the top of the sand berm. This combined with inadequate, blocked or damaged drainage culverts is seen as being the main cause of flooding in the areas behind the road. Rains of two days are reported to leave standing water for up to a week. This is common throughout the rainy season. This also affects the natural environment of the low-lying areas behind the coastal development, restricting flushing and creating unnatural conditions in these areas. The coast is highly modified with many reclamations interrupting sediment flow along the coast and un-designed seawalls ineffective against erosion. Sand mining has occurred on some parts of the coast both for domestic and commercial use. Most villages have management controls in place for domestic use and there is no commercial mining at present. Government is concerned at the on-going demand for sand for commercial use and seeks to identify specific sites for this.The Upolu based communities have limited access to area suitable for cultivation or livestock grazing area. Land available for crops is small in comparison to other districts. Much of the resettled land is logged and supports small household crops. This limits the varieties of crops that can be successfully cultivated. There is limited opportunity for raising livestock as well.

The agricultural ecosystem is mixed cropping on a small household scale. The soil type is influenced by ponding and swamp area. Fishery is a temporary operation with the brood stock being sourced from local reefs flats. The soil is rich and supports a number of plantations. The dominant varieties are banana, taro and coconut. Household income source is obtained through plantation and fishing.

Development is characteristically "ribbon-like", along the main west coast road, which provides easy access to the main services. The district now relies on mobile phones rather than landlines so underground cabling priority is based on commercial companies funding priorities.

Manono Island

Manono Island is a low, cone shaped island approximately 2.4km long and 1.5km wide, 290ha in area. At its highest point it is 95m above sea level. The island lies within the main Upolu reef/lagoon system as described, about 3.5km from Upolu. The reef to the south is about 1km off-shore while to the west and north it is about 800m off-shore. There are no breaks in the reef to the south and west while there is a narrow break to the north which is used for access to Apolima Island. Manono Island has a cluster of communities that are all close to the shoreline. The island is a surrounding fringing coral reef system that creates a lagoon system and natural protection from prevailing storms and trade winds. The coastline is generally rocky with small pocket beaches. The developed parts of the coast have been modified with the extension of private jetties, or rock walls, out from many properties. The only significant sand beach is in front of Apai Tai village. It was reported that this beach was moved inland about 30m by cyclones Ofa (1990) and Val (1991). Behind the beach is a low-lying area which remained flooded for 3 weeks following the cyclones.

There are four villages on the island. Faleu Tai is the largest village and is closest to Upolu, located on the southern tip of the island. Faleu was one of those affected by the 2009 tsunami which damaged the jetty currently Utilized by Faleu and neighbouring villages to travel to Manono Uta and Apolima Tai. Salua Tai is located on the northern tip of the island about 2.4km from Faleu Tai. There is continuous residential and some tourism resort developments along the eastern coast (facing Upolu) between the two villages. Lepuia'i Tai and Apai Tai villages are located on the south-west facing the coast. Lepuia'i Tai is adjacent to Faleu Tai and Apai Tai is approximately 2km west of Faleu Tai. There is a distinct break in development between Lepuia'i Tai and Apai Tai. Apai Tai is located on a sandy beach while the other villages are located on rocky shorelines. There is almost no development along the north-west coast or more than 100m from the shore.

on LTA SIAM. Names may differ between LTA and MWTI records

Manono Island livelihood is quite similar to that of Apolima Island. There are a variety of crops farmed on the island. Most are small scale and associated with household subsistence. Fishing is the main economic activity on the island and there are small provision shops in the village. Development is focused along the eastern coast. There is one main tourist "resort" although other families also provide beach fales. The cash economy of the island is dominated by traditional work. The majority of the residents are largely sustained by plantation work and fishing. There are commercial oyster and giant clam farms on Manono Tai managed by Lepuiai, Apai and Faleu Tai residents and a private company.

The island is well planted with plantations and gardens with some open areas apparent from the aerial photograph (Flown 1999). It generally has a constant slope of about 10 degrees to the shore, although there are areas behind Apai Tai and Lepuia'i Tai that are flatter and flooded in extended periods of rain. A single sand track approximately 7.5km long circles the island. The track generally lies within the Coastal Hazard Erosion and Flooding zones. There are no permanent water courses on the island. Water is supplied by SWA through a submarine pipeline and is supplemented by wells and rain water by way of roof tanks. The piped water is intermittent and salination has been reported due to the water mains being located in the coastal erosion and flooding zones.

The coast of Manono Island has not only been impacted by the 2009 tsunami, domestic sand mining for construction and development purposes, but also the many private jetties along the coast interrupting the natural movement of sand. The local beaches are the only source of sand for construction on the island as the main wharf and jetties are not large enough to accommodate equipment and vehicles usually required for construction loads and purposes. Private jetties are formed from loose coast rocks often for each family along the shoreline. The effect is to remove some of the natural coast (used as raw material for the jetty), and potentially increasing the rate of localised erosion. Poor maintenance along the road contributes to some erosion from storm water runoff over soft road edges.

Over the years, island flooding occurs only during cyclones when waves run up the shore and recede once the storm passes. At Apai Tai and Lepuia'i Tai, flood waters lie for some time in low-lying areas behind a higher coastal area. Residents have responded to the problem by building their homes higher. The electricity supply is limited to the times that the generator is operated (7 – 8 hours per day). Piped water supply is intermittent resulting in reliance on rain water and wells.

Apolima Island

Apolima Island is a remnant volcanic cone located outside the main reef and lagoon system that surrounds much of Upolu. It is a small island of about 95 hectares, approximately 9.5km from Upolu. The highest part of the island (about 160m above mean sea level) is along the southern rim of the volcano from where it slopes steeply (approximately 45 degrees) to the southern coast and less steeply to the remnant crater and the northern side of the island.

Apolima Tai village is located close to the northern side of the island and is accessed by way of a breach in the crater wall. This has formed a "pocket" beach in a small bay which provides safe harbour for fishing craft. The entrance to the bay is through a narrow gap in the volcanic rocks which limits the size of craft that can be used for access. The entrance faces directly north, which is the direction from which a cyclone is most likely to approach from and the village facing the beach is very exposed to these events. The buildings are at least 60m from the present shoreline. The outer "face" of the island is generally steep cliffs, bare of vegetation and actively eroding into the sea. Inside, the crater is well vegetated with plantations and gardens. The Coastal Hazard Zone maps indicate that the outer face of the island is eroding (Landslip hazard) at an average rate of about 0.5m/yr.

The geographic isolation and difficulty of access make provision of services and infrastructure here a special case. Some residents have relocated to the Upolu part of the district but approximately 50 households remain on the island. On the island of Apolima, reef fishing is an important livelihood to the island community as well as supplementing fish to the community of Upolu. Water is provided through a central tank, supplemented by isolated rain catchment areas. Any significant alteration in rain patterns will have direct impact on the agriculture production. Families that have resettled on Upolu faces reduced areas for agricultural and cropping purposes as the soil there is not well drained and mainly swampy.

The beach formation consists of a steep coral/sand berm behind which is a wide low-lying area taking up the area eroded by cyclones Ofa and Val. The area is overgrown with plant material and is a good example of natural

revegetation. Native forest vegetation of these islands are completely altered by the years of human settlements with a small exception of remaining native ridge forests on Apolima which understandably, has not been affected by developments due to its difficult and inaccessible terrain. Several seabirds were observed nesting the seaward cliffs of Apolima mountain ridges. A small wetland area with an active stream exists in the middle of Apolima but its ecology has not been studied. The fringing coral reefs system around these islands are intact and rich with fish and shell fish species through swath of damaged reefs are recovering from recent cyclones, part destructive fishing and over-fishing practices

Social and Economic Setting

The most recent census (2016) shows the population of the following villages in the Aiga I le Tai District at Mulifanua (504), Paepaeala (162), ManonoUta (1394), Apolima Uta (500), Faleu Tai (250), Salua Tai (136), Apai (124), Lepuiai (183), Apolima Tai (96), and Satuimalufilufi (747). There are 6 schools within the district; 2 Pre-schools[5] and 4 Primaries[6]. A total of 22 churches are divided between the villages of Satuimalufilufi, Mulifanua, Apolima Tai, Manono Uta, Apai, Faleu Manono, Lepuiai Tai and Salua Tai. There are 4 tourist accommodations[7], 3 are based in the western part of Upolu and 1 is located on the island of Manono.

Aiga I le Tai is ranked as the 5th highest district that derive their income sources from remittances. The division of houses in the district showed 15 open Samoan fales, 21 open Samoan fales with extension, 1 closed Samoan fale, 146 open European house, 49 open European houses with extension, 144 closed European houses, 70 closed European houses with extension, 2 houses with 2 floors, 29 faleo'o and 31 *faleapalaiti*. This sums up to a total of 508 households in the Aiga I le Tai district. About 66 families in the district have no access to water supply; which has ranked the district with the most counted families with no water supply in a survey of 25 districts from Upolu and Savaii[8].

Climate Risk and Resilience

The use of LiDar mapping data, hydrologist and geomorphologist data and findings for this district has helped determine inland and coastal hazard zones and high risk areas for Aiga I le Tai. The immediate risks for some areas of Aiga I Le Tai District are coastal landslips, coastal erosion and fluvial hazards.

Part of the district in the western end of Upolu sits in a very high combined risk area with about 78 buildings in the Tsunami shore exclusive zone, Coastal Flood Hazard Zone (CFHZ), Coastal Erosion Hazard Zone (CEHZ) and Immediate Fluvial Hazard Zone (IFHZ). The island of Manono Tai has 101 buildings in the CFHZ and Tsunami shore exclusive zone. Apolima Tai Island has about 4 buildings in the CEHZ and 7 buildings in the CFHZ. It is of note that most buildings in this high risk coastal zone are schools, health centres and women's committee houses. Relocation options must be considered.

The main Aana West Coast Road is ranked high in severity of impacts from coastal erosion[9] but the AF Disaster Risk Management maps clearly show parts of the main road sitting in an area of combined hazard zones[10] which puts this crucial infrastructure at a very high risk. These specific high risk areas of the road will need to relocate as it is the only access connecting communities in the western coast[11] to essential services (hospital, wharf, and airport). Blocked culverts, damaged or non-existent drainage also increase the risk of the communities and essential infrastructure. Inland flooding from catchment areas and wetland areas are exacerbating storm surges during the rainy season or cyclone season. This district requires an integrated land management strategy that considers both engineering (hard) and soft options such as increasing the wetland coverage; riparian replanting and coastal replanting. When designing the size of culverts, a number of elements should be taken into account, i.e. size of drainage area, surrounding terrain type, rainfall intensity, etc.

[5]Saleiuatua Pre-School and Lepuiai Pre-school.
[6]Mulifanua Primary School, ApolimaUta Primary School, FaleuManono Tai Primary School and Salua Tai Primary School.
[7]Aggie Greys Hotel, Airport Lodge, Levasa Resort and The Sweet Escape
[8]MNRE. 2017. CDCRM Household survey: final report
[9]LTA. 2016. Vulnerability Assessment of the Samoa Road Network
[10]CEHZ, CFHZ, IFHZ and tsunami shore exclusive zones
[11]Includes Falelatai and Samatau as well as Lefaga and Faleaseela

Certain coastal areas of Aiga I le Tai is eroding at a much faster rate due to human influence. Sand mining is a major contributor to such cause. There is also evidence of recent reclamations in the coastal area which is affecting the natural flow of the wetland into the sea. The combination of floodplains, sand mining and reclamations puts this part of the district in a potential dangerous situation. Some villages in this district have no lands to relocate to, or have lands but are hemmed in by the coastal and wetland areas. These villages have requested land from the government to relocate to as a long term solution.

Rainwater harvesting is evidently a well-accepted, effectively universal practice for the scattered population of Aiga I le Tai District. Since the idea is already well accepted in the district, continuation with this practice would appear to be the most logical recommendation for any rural water supply scheme. Stored rainwater should be regarded as one of the primary resources in the district, which can effectively be Utilized in much of the area as the principal potable source, to be managed in conjunction with other potential sources of lesser reliability or (possibly mixed with) poorer quality. Clearly, the more rainwater harvesting that can be developed in the area, then the less demand needs to be placed on more conventional piped (SWA) water supplies sourced from the locally extremely “sensitive” aquifer (Tokalauvere, 2017).

2. Aiga I le Tai District Interventions

Mulifanua Wharf to Manono Uta

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Main Aana West Coast Rd: exposure to high risk hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	Upgrade main Aana West Coast Road to accommodate for hazard zones and in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Inspect, strengthen and undertake regular maintenance[12] of existing government managed seawalls in most vulnerable areas as short term solution for high risk area from Mulifanua to Manono Uta where road sits less than 5mtrs from the coast and is within fluvial and tsunami shore exclusive zones. Area also identified as high severity rating in *Assessment of the Samoa Road Network* and *Road Network Adaptation Strategy* Investigate relocating main road inland (length 1.6km) from the coast as **long term solution** for high risk hazard area from Mulifanua to Manono Uta where road sits less than 5mtrs from the coast and is within fluvial and tsunami shore exclusive zone. Area also identified in *Assessment of the Samoa Road Network* and *Road Network Adaptation Strategy* ***Responsibility: LTA/ MWTI***	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintains lifeline access for all of Upolu Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Aiga i le Tai district Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Drainage systems to be improved in high risk areas of main Aana West Coast Road	Assess and upgrade culverts on main Aana West Coast Road especially at junctions with access roads sitting within combined hazard	Improves infrastructure resilience and rate of response and recovery to	Use existing information for guidance but not limited to: *"Vulnerability*	CIM Strategy 2015 TSP2014-2019 Goal 2

[12]May involve routine, preventive or remedial maintenance process

especially at junctions of hazard zones (IFHZ, CEHZ, CFHZ and Tsunami shore exclusive zone) and access roads (Paepaeala Access Road, Fuailolo'o Access Roads 1&2, Faleu-uta Access Road and Salua-uta Access Road exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	zones exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets (IFHZ, CEHZ, CFHZ)– culverts in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance ***Responsibility: LTA/ MWTI/MNRE/MWCSD /Village / Families***	natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	*Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Aiga i le Tai District	KO 1
Village houses, schools, churches and government assets in extremely high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones;	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist	CIM Strategy 2015 National Building Code

	for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***		Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Upgrade access/ work roads to facilitate relocation of houses away from hazard zones and as potential escape routes	Assess and upgrade access/work roads as potential escape routes Construct roadside drainage ditches where needed Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff Village to regulate developments near and around road shoulders of all access roads Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: LTA/ MWTI/ MNRE/ Villages/Families***	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Aiga i le Tai district	National Disaster Management Plan 2017-2021 TSP 2014-2019 Goal 2 KO 1
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable	Increase adaptation during drought periods Improve infrastructure	Develop and register District/Village bylaws to include regulating developments around catchment	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year

	families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	Investment Plan (2016) Community Engagement Plan
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities

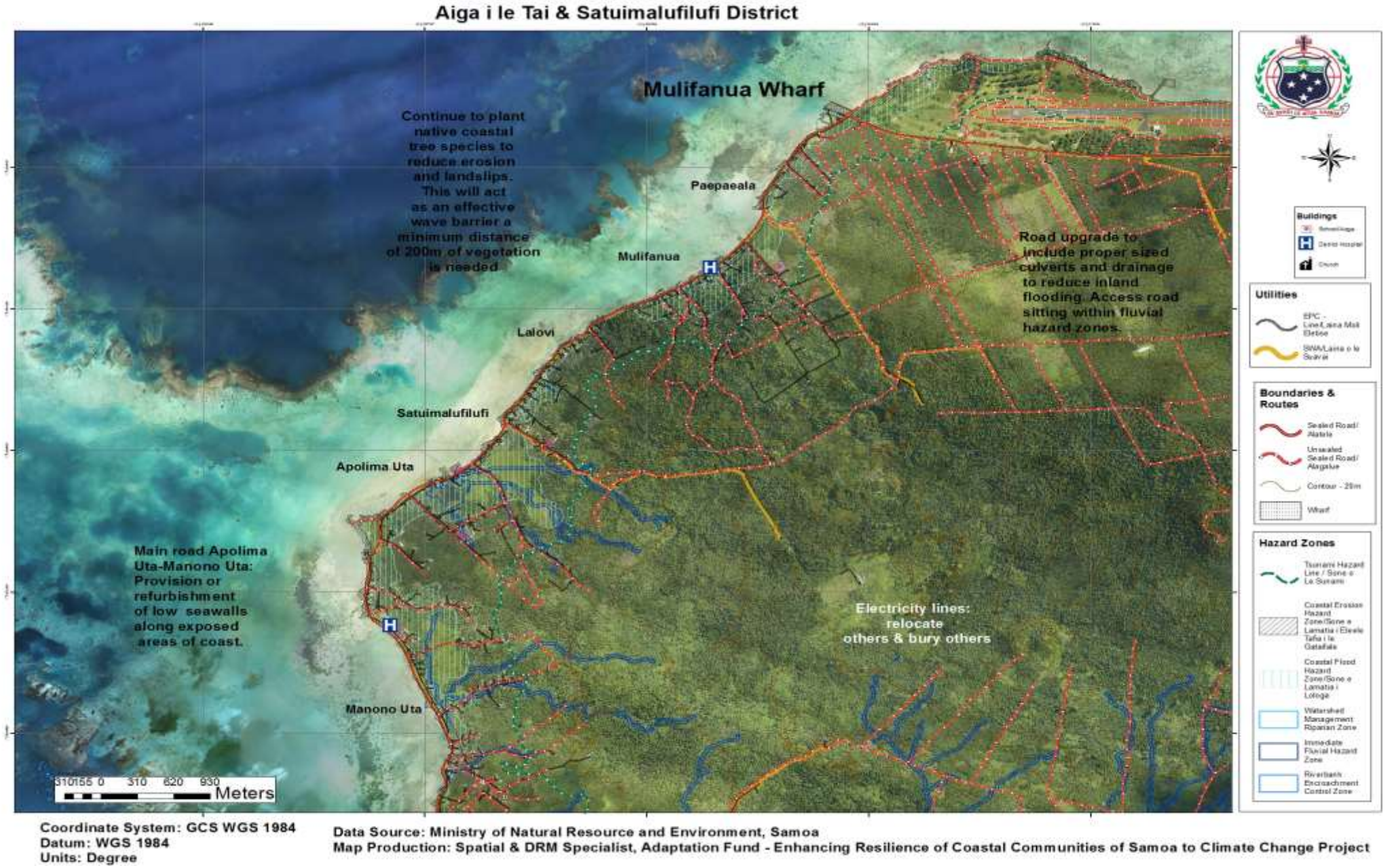
	churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts ***Responsibility: EPC/ MWTI/ Village/Families***	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Effluent and wastewater management systems	Provide a network sewage collection and treatment system for district Introduce ban on latrines established in and around fluvial hazard zones Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/ village drainage cleanup and awareness programme Produce posters and village signs for public awareness ***Responsibility: MNRE/ MWCSD/ District/ Village***	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	Review wastewater strategy/ legislation to include role of Village/District bylaws Develop/Update and register District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to flooding Utilise Hazard maps and Geomorphologist findings to inform location Utilise Sui o Nu'u	National Waste Management Strategy

			monthly meetings to monitor progress of village programmes on waste management	
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coasta erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Sand mining (commercial) and sand extraction (domestic)	Identify alternative sustainable sources of sand for domestic use Research the impacts of sand mining Village consultation on sand mining policy and regulation Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and support of sustainable land use practices ***Responsibility: MNRE/ Village/Families***	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion Economic benefit for village from sustainable sand mining activities	MNRE to continue to identify specific sites for inshore/ inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock	Draft Soil Resource Management Bill

			mining of rivers	
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources District to fence domestic animals ***Responsibility: Villages /District/ MNRE/MAF/ SROS***	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt,	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

	Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	respond and recover quickly in the long term Improve accountability and enabling environment of communities	monitor progress of district/village bylaws	

Non-CR issues raised during consultations	**Proposed Solution**	**Comments**
District lands ***Responsibility: Village/ Member of Parliament***	District requested land from government for relocation purposes	Related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Aiga I le Tai CIM Plan



Aiga I le Tai District Map (Mulifanua to ManonoUta)

3. Manono Tai

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Main wharves	Assess and upgrade main wharves to accommodate for response and recovery teams and equipments for both islands as only lifeline and connectivity infrastructure between Upolu, Manono-Tai and Apolima-Tai Inspect, strengthen and undertake regular maintenance of existing **government managed** seawalls in most vulnerable areas where there is no alternative route for relocation, as short term solution for high risk area ***Responsibility: SPA/MWTI/ MNRE/ Villages/CSSP/ NGO***	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Maintain lifeline access for all of Aiga i le Tai Safer villages, houses and roads	Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget programming CBA, design and construction. Designation of the IFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Main roads : exposure to high risk hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	Upgrade and maintain[13] main road to accommodate for hazard zones and in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations ***Responsibility: LTA/ MWTI/ MNRE/ Villages***	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintains lifeline access for all of Aiga i le Tai	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Aiga i le Tai district Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 NISP 2011 KESO 5 TSP 2014-2019 Goal 2 KO 1

[13]May involve routine, preventive or remedial maintenance process

		Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets		
Village houses, churches, and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District and village to	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016)

	support SWA water rationing programmes during times of drought District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	Community Engagement Plan
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts ***Responsibility: EPC/ MWTI/ Village/Families***	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Effluent and wastewater management systems	Introduce ban on latrines established in and around IFHZ, CEHZ and CFHZs Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/ village drainage cleanup and awareness programme Produce posters and	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	Develop an integrated land management plan for Apolima Tai and Manono Tai Review wastewater strategy/ legislation to include role of Village/District bylaws Develop/Update and register District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to	National Waste Management Strategy

	village signs for public awareness ***Responsibility: MNRE/ MWCSD/ District/ Village***		flooding Utilise Hazard maps and Geomorphologist findings to inform location	
Natural Resources and Environment	**BestSolutions**	**Benefits**	**Guideline to assist with the implementation**	**RelevantSector Plans, National Strategies & Policies**
Sand mining (commercial) and sand extraction (domestic)	Identify alternative sustainable sources of sand for domestic use Research the impacts of sand mining Village consultation on sand mining policy and regulation Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and support of sustainable land use practices ***Responsibility: MNRE/ Village/Families***	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion Economic benefit for village from sustainable sand mining activities	MNRE to continue to identify specific sites for inshore/ inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities	Draft Soil Resource Management Bill
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	Responsibility: MNRE/ MAF/Villages	Ecosystem Based Approach	crops	
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources ***Responsibility: Villages /District/ MNRE/MAF/ SROS***	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

	awareness raising programs with the villages ***Responsibility: MWCSD /Village***	in the long term Improve accountability and enabling environment of communities		

Non-CR issues raised during consultations	**Proposed Solution**	**Comments**
District lands ***Responsibility: Village/ Government/***	District requested land from government for relocation purposes	Indirectly related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Aiga I le Tai CIM Plan
Lighthouse maintenance ***Responsibility: SPA/DAC***	Conduct regular structural and damage surveys and maintenance of lighthouse	Although considered a safety issue, it is indirectly related to CR as it will be required for all travelling public (including government inspection/recovery teams) not just residents of Apolima Tai and Manono Tai

4. Apai Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation	Improve resilience of public infrastructure Improve preparedness and readiness response to	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with

	shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***	natural disasters		Disabilities NISP 2011 KESO 5
Coastal protection	Assess potential of a revetment for badly eroded coastal areas where relocation is not possible as **short term solution** **Encourage relocation** of families/houses in badly eroded coastal areas ***Responsibility: MNRE/ Village /MWTI***	Reduce impact from inland flooding on coastal areas Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NESP 2018 - 2022

Electricity supply	Install streetlights along the roads where needed for community safety Relocate overhead lines to a more resilient location when being replaced Provide underground lines in the long term Install and connect to solar power supply if made available ***Responsibility: EPC /MWTI/ Villages***	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District and village to support SWA water rationing programmes during times of drought District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Marine resources depletion	Assess feasibility of creating a marine reserve for village as backup, alternative food supply	Protects and enhance local species diversity Maintains natural	MAF and MNRE DEC to provide technical assistance and backstopping in the assessment and	NESP 2018 - 2022 Community Engagement Plan

	Village to restock marine reserve with suitable species Continue to ban the use of dynamites, herbal poisons (ava niukini), chemicals and other unsustainable fishing methods including sand mining and extraction Research improved inshore fishery resources that are resilient to climate change Village to provide fencing for domestic animals to prevent waste contaminating marine reserve ***Responsibility: MNRE /MAF/ Village /CSSP/ UNDP-GEF SGP***	ecosystem Builds resilience of community livelihood and food security	establishment of a marine reserve for village Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Village to seek funding to establish marine reserve MAF to raise awareness of farmers on impacts to water flows from poor livestock management	Agriculture Sector Plan 2016-2021
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

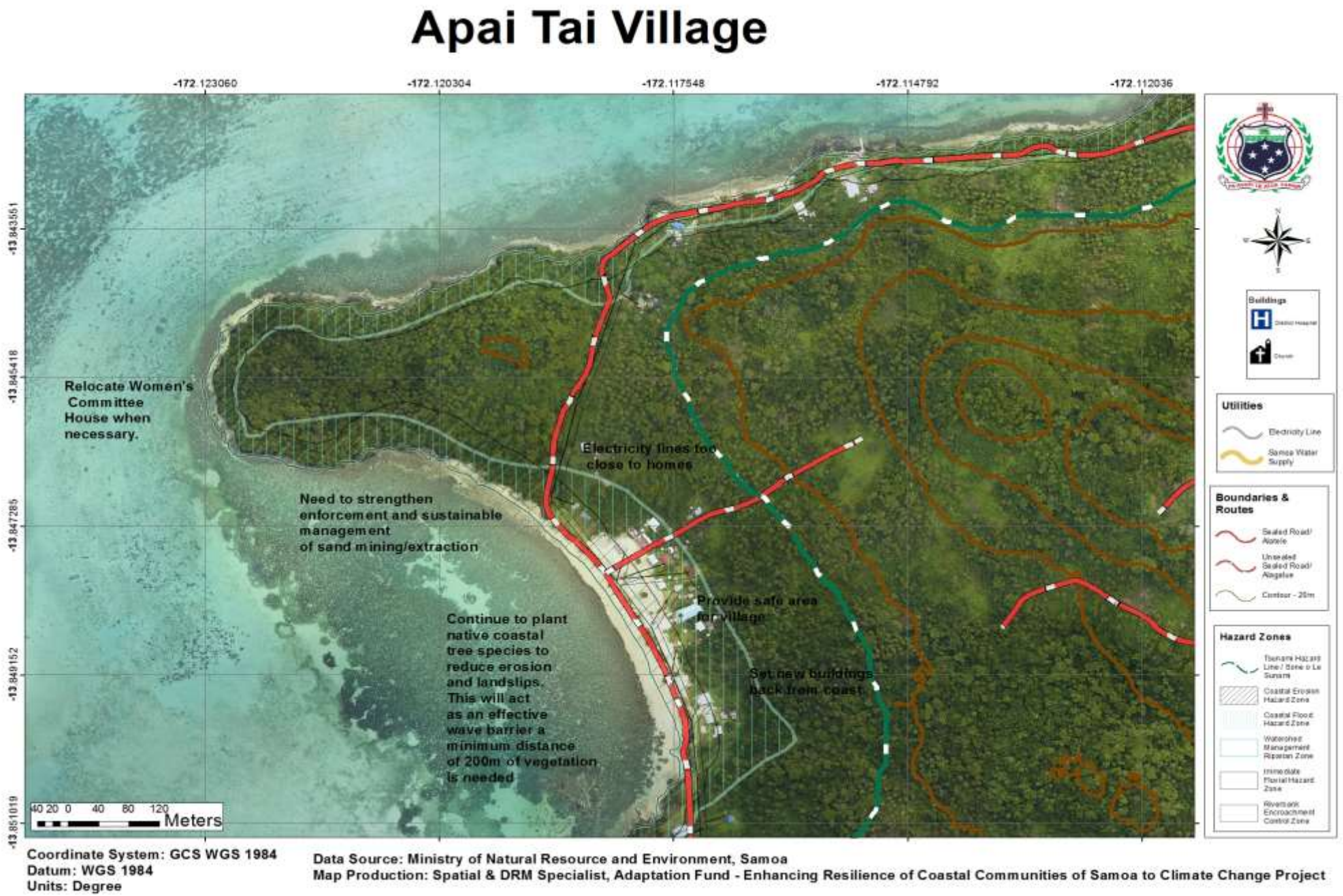
Non-CR issues raised during consultations	Proposed Solution	Comments
Village lands ***Responsibility: Village/ Government/***	Village requested land from government for relocation purposes	Related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Aiga I le Tai CIM Plan


Exposed waterlines


Climate resilient trees vs coastal erosion


New Pre-School within the coastal hazard zones

Apai tai Village Map



5. Apolima Uta Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
Village houses, Apolima Primary school, Pre-school, jetty, church and government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Village to seek lands to migrate to due to expanding CEFZ and CFHZ Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Coastal protection	Assess potential of a revetment for badly eroded coastal areas where relocation is not possible as **short term solution**	Reduce impact from inland flooding on coastal areas Mitigate potential damage from	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure	NESP 2018 - 2022

	Encourage relocation of families/houses in badly eroded coastal areas ***Responsibility: MNRE/ Village /MWTI***	coastal erosion and flooding accommodating the hazard Safer villages, houses and roads	Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Drainage systems require maintenance and upgrade in high risk areas on main Aana West Coast road especially at junctions where access roads and tracks[14] meet national road	Assess and upgrade culverts on main Aana West Coast road and junction of Faleu Access Road and upgrade to recommended –in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance ***Responsibility: LTA /MWTI/MWCSD /Village/ Families***	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan
Upgrade access[15]/ work roads to national standards to alleviate inland flooding and encourage relocation	Assess feasibility of upgrading existing tracks and work roads as potential relocation roads and as backup connectivity and lifeline for main Aana	Improve infrastructure resilience and rate of recovery Improve	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Utilise environmental and	CIM Strategy 2015 NISP 2011 KESO 5 TSP 2014-2019 Goal 2 KO 1

[14]Only Faleu Access Road and Salua no.2 Access Road under LTA RMIP Zone 6. Other tracks and unsealed access roads and are not covered under national road network maintenance programme

[15]Existing work/access roads and tracks not covered under LTA national network road maintenance programme

	West Coast Road Road upgrades to include adequate sized culverts to facilitate the overland flow of storm water exacerbating river overruns, and to reduce flooding onto main roads and neighbouring villages Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: LTA /MWTI/ MNRE/ District/ Village***	preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Maintains lifeline access for all of Upolu Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	social safeguards including EIAs in screening and designing built environment infrastructure projects for Aiga i le Tai district Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District and village to support SWA water rationing programmes during times of drought District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan

			responsibilities	
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/ village drainage cleanup and awareness programme Produce posters and village signs for public awareness ***Responsibility: MNRE/ MWCSD/ District/ Village***	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	Review wastewater strategy/ legislation to include role of Village/District bylaws Develop/Update and register District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to flooding Utilise Hazard maps and Geomorphologist findings to inform location Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	National Waste Management Strategy
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Marine reserve	Assess feasibility of creating a marine reserve for village as backup, alternative food supply Village to restock marine reserve with suitable species Village to collect and dispose of crown-of-thorns (alamea) on a regular basis to prevent major outbreaks Continue to ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods including sand mining and extraction Village to provide fencing for domestic	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of food supply Reduce impact from inland flooding	MAF and MNRE DEC to provide technical assistance and backstopping in the assessment and establishment of a marine reserve for village Develop Village Bylaws to include management of natural resources (spring pools, marine reserve, forest etc) Identify funding /budget requirements and implementation programme for establishment of protected areas in district	NESP 2018 - 2022 Community Engagement Plan Agriculture Sector Plan 2016-2021

	animals to prevent waste contaminating marine reserve ***Responsibility: MNRE/MAF/ Village Council/CSSP/ NGO/ UNDP-GEF SGP***			
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Mangrove area conservation	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals foraging in wetland areas ***Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI***	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Aiga i le Tai District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	Draft NESP 2017-2021 Community Engagement Plan

Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/village***	Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Utilise Hazard Maps and Geomorphologist findings to inform location and design Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources ***Responsibility: Villages /District/ MNRE/MAF/ SROS***	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

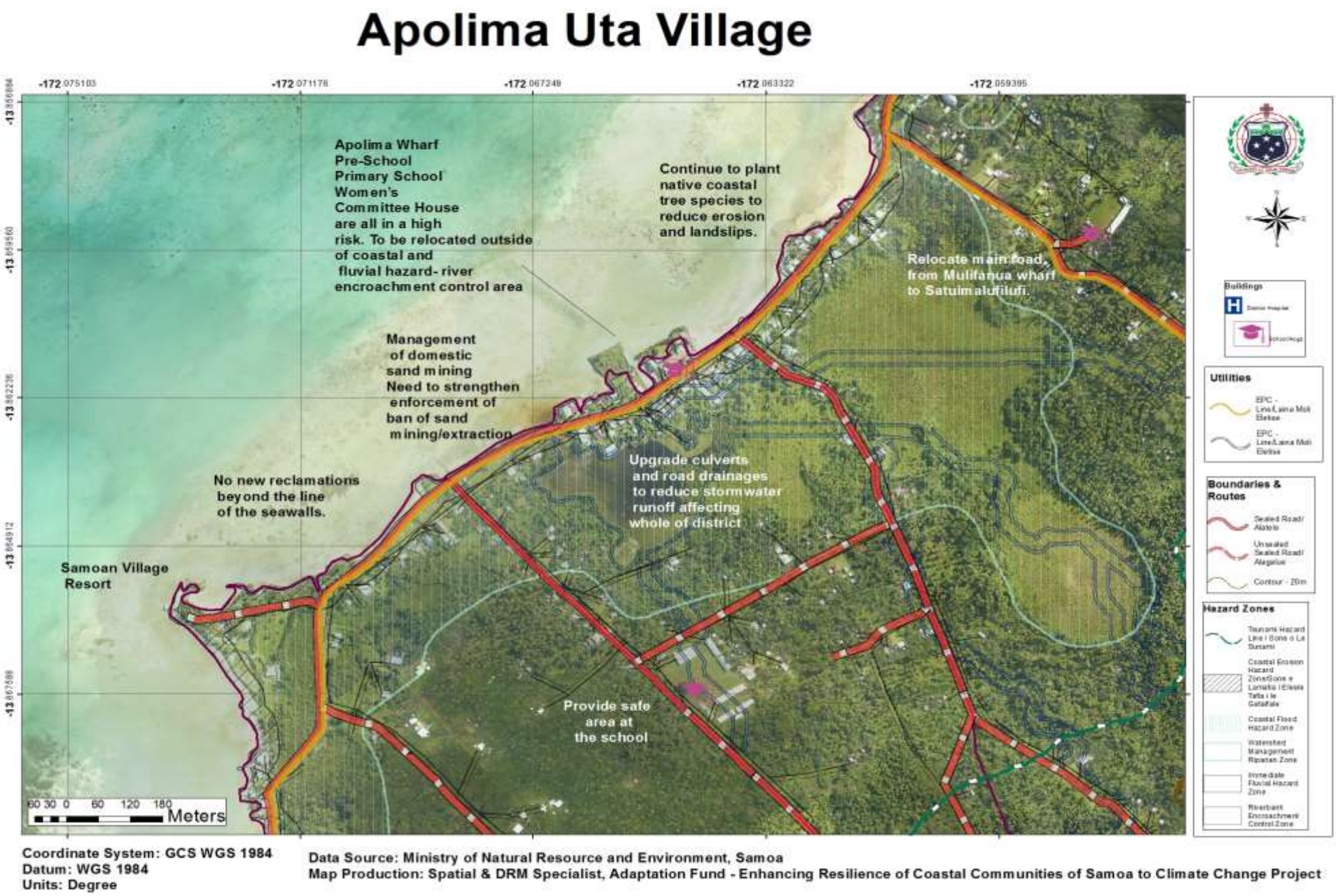
	Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	district/village bylaws	


Apolima Uta Wetland


Village development within marsh land


Inland access path

Apolima Uta Village Map



Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

6. Apolima Tai Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, church and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Village to seek lands to migrate to due to expanding CEFZ and CFHZ Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Marine landing ramp: main wharf	Repair and upgrade damaged marine landing ramp Enforce environmental safeguards under the PUMA Act when	Maintain lifeline access and connectivity Improve preparedness and readiness	Identify funding/ budget requirements and implementation programme Designation of the CEHZ, CFHZ and	CIM Strategy 2015 Community Sector Plan Apolima Village Hazard Zone

	upgrading wharves and jetties	response to natural disasters	tsunami shore exlusive zones as an "at risk" zone with appropriate landuse planning controls and restrictions	Resettlement Plan (VHZRP)
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5
Island water supply: tank	Relocate main water tank out of hazard zones Procure rainwater	Improve preparedness and readiness response to natural disasters	Develop and register District/Village bylaws to include regulating developments around	CIM Strategy 2015 Water and Sanitation Sector

	harvesting systems as backup for vulnerable families as a short term solution Regulate developments and remove latrines around water supply Village to fence domestic animals away from areas susceptible to flooding ***Responsibility: District/Village/ CSSP/ NGO***	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	identified hazard zones Include in budget programming relocation of tanks and procurement of rainfall catchment systems Utilize Hazard Map Hazard maps and Geomorphologist findings for planning purposes Utilize Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	Plan Community Engagement Plan
Solar power plant	Replace battery to maintain electricity supply to Apolima island ***Responsibility: District /Village/ CSSP/ NGO***	Maintain connectivity Improve preparedness and readiness response to natural disasters	Village to seek funding Utilize Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	CIM Strategy 2015 Community Engagement Plan Energy Sector Plan
Natural Resources & Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Village pool located in high risk hazard zones	Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) ***Responsibility: MoF-CSSP/ MNRE/Villages/ NGOs***	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	Utilise Hazard Maps and Geomorphologist findings to inform location and design MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention Update Village bylaws to include managing and maintaining village natural resources	CIM Strategy 2015 Community Engagement Plan
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

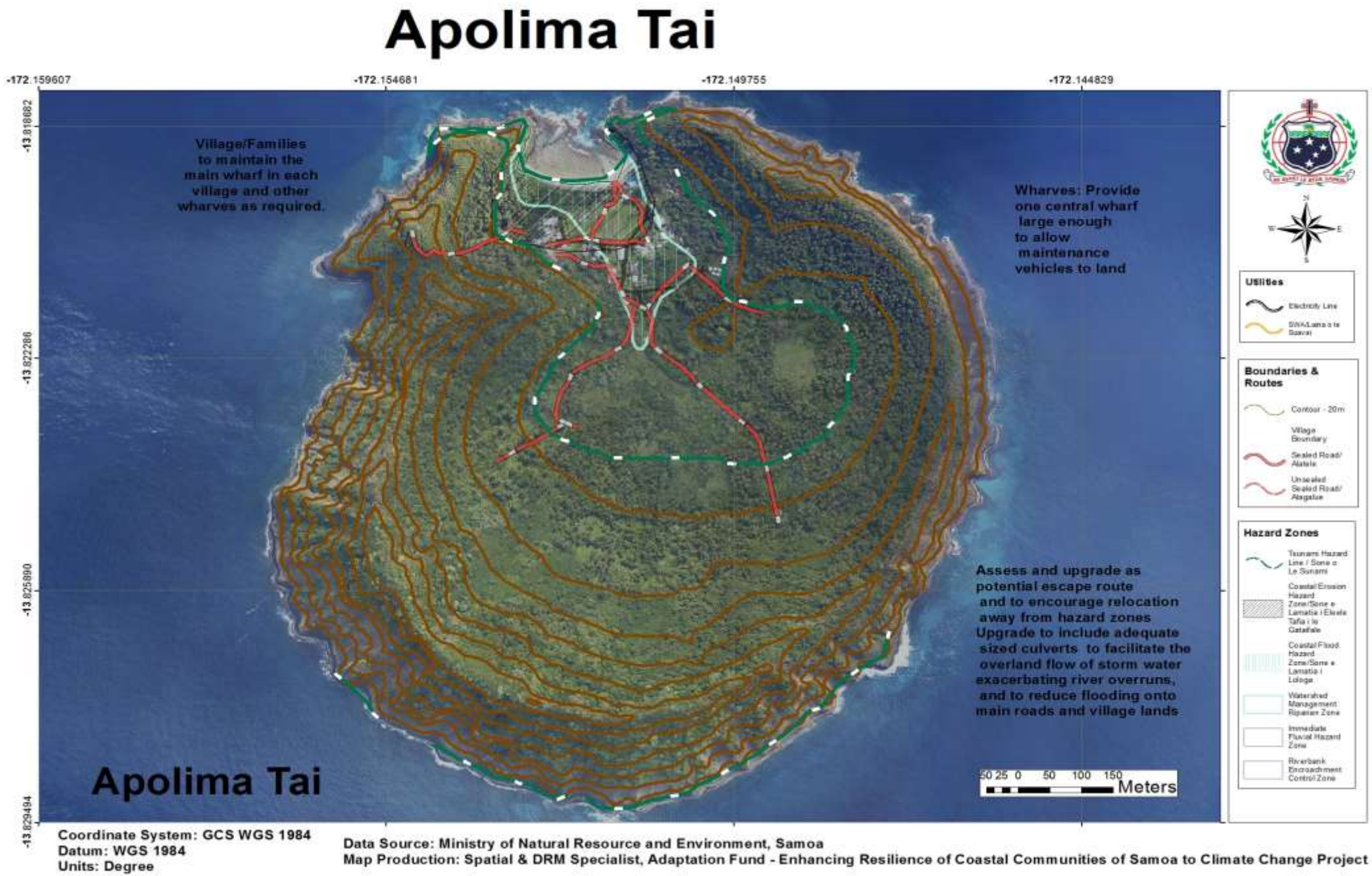
Non-CR issues raised during consultations	**Proposed Solution**	**Comments**
Village lands ***Responsibility: Village/ Government/***	Village requested land from government for relocation purposes	Related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Aiga I le Tai CIM Plan


Apolima Tai damaged jetty


designated part of the pool for drinking


Sea cucumber nursery plant

Apolima Tai Village Map



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Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

6. *Faleu tai Village Interventions*

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, church and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Coastline protection: combination of hard and soft solutions	Investigate potential for upgrading seawalls in areas where road sits less than 5mtr from coastline Encourage relocation of families/houses in badly eroded coastal areas	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and	Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities Utilize Sui o Nu'u monthly meetings to monitor progress of village replanting and cleanup programmes	CIM Strategy 2015 NESP 2018 - 2022 Community Sector Plan

	Responsibility: MWTI/ MNRE/ Village	natural disasters Safer villages, houses and roads		
Jetty	Repair and upgrade damaged posts Village to maintain and upgrade jetty Village to limit number of private jetties on island ***Responsibility: SPA/ MNRE/ Village /CSSP/ NGO***	Maintain lifeline access and connectivity Improve preparedness and readiness response to natural disasters	Identify funding/ budget requirements and implementation programme Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities Designation of the CEHZ, CFHZ and tsunami shore exlusive zones as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 Community Engagement Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance,	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts,	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially	Village Fono Act (Amendment Bill 2016) Community Sector Plan

Bylaws	rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Community Development Plan 2016-2021

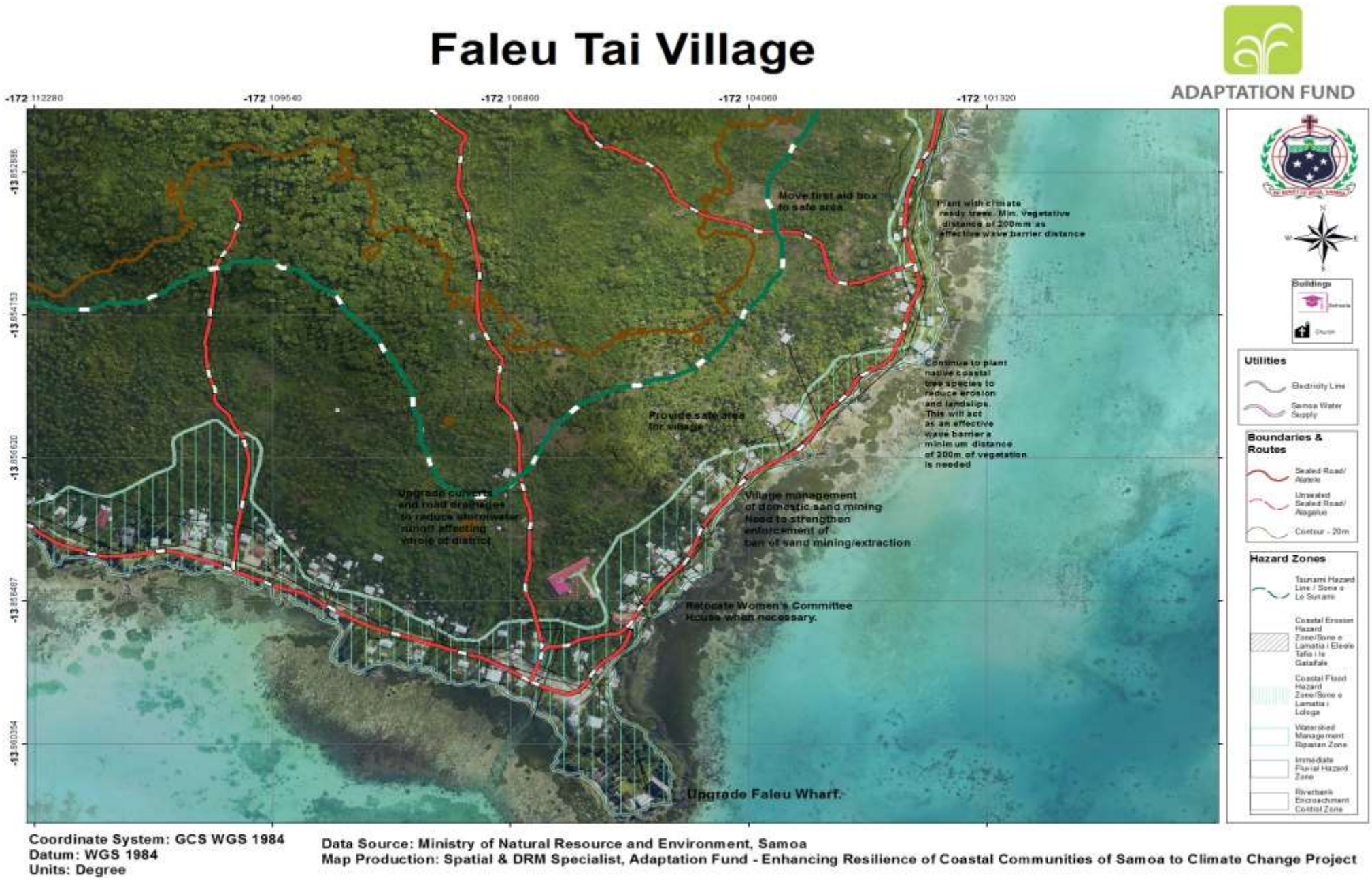
Non-CR issues raised during consultations	**Proposed Solution**	**Comments**
Village lands ***Responsibility: Village/ Government/***	Village requested land from government for relocation purposes	Related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Aiga I le Tai CIM Plan


Sources of livelihood


Waste management need improvement


Access used as an escape route to higher grounds in times of natural disasters

Faleu Tai Village Map



7. Lalovi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Coastline protection: combination of hard and soft solutions	Investigate potential for upgrading government managed seawalls in areas where road sits less than 5mtr from coastline as **short term solution** Where reclamations, sand mining, extraction or other major coastal works are proposed, Government and village	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and	Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities Develop and register Village bylaws to include banning of sand mining, reclamation works in high risk hazard	CIM Strategy 2015 PUMA Act Community Engagement Plan NESP 2018 - 2022 Village Fono Act (Amendment Bill 2016)

	to manage processes by requiring villagers to get the appropriate permits and consent Clear debris from existing culverts near seawalls to enable free outflow of storm water and streams Ban reclamations beyond seawalls ***Responsibility: MWTI/ MNRE/ Village***	natural disasters Safer villages, houses and roads	zones and illegal rubbish dumping in waterways and drains Utilize Sui o Nu'u monthly meetings to monitor progress of village replanting and cleanup programmes	
Main Aana West Coast Road and junctions of main west coast road and access roads/tracks[16]	Continue investigating relocating main road (2km arterial road) in areas where road sits less than 5mtr from coastline in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Assess and upgrade access roads/tracks to include adequate sized culverts to facilitate the overland flow of storm water and to reduce flooding onto main lifeline and connectivity road ***Responsibility:LTA/MWTI/ MNRE/ District/ Village***	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads Minimize national disaster recovery expenditure on damaged properties and public assets	Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities UtilizeHazard Map Hazard maps and Geomorphologist Drainage Infrastructure Database Include in budget programming CBA, design and construction Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5

[16]Access roads not in national network nor LTA road maintenance programme

	(VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan

			location and designs	
Natural Resources & Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Mangrove area conservation	Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals ***Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI***	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Implement wetland and mangrove protection programme Identify funding /budget requirements and implementation programme for establishment of protected areas in district	Draft NESP 2017-2021 Community Engagement Plan
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

			of climate resilient crops	
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/village***	Improve health through access to clean water and waste management Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

			for different vegetation types suitable to the habitats and planting materials for village	
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021


Narrow inland access for Lalovi village


Abandoned district hospital as no longer safe for use

Lalovi Village Map

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

8. *Lepuia'i-Tai Village Interventions*

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, churches and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5

	Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Coastal protection	Assess potential of a revetment for badly eroded coastal areas where relocation is not possible as **short term solution** Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: MNRE/ Village Council/CSSP/ NGO/ UNDP-GEF SGP***	Reduce impact from inland flooding on coastal areas Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NESP 2018 - 2022
Electricity supply	Install streetlights along the roads where needed for community safety Relocate overhead lines	Maintain electricity supply at all times including	Monitor distribution networks to avoid overloading poles and contributing to	EPC Strategic Plan

	to a more resilient location when being replaced Provide underground lines in the long term Install and connect to solar power supply if made available ***Responsibility: EPC /MWTI/ Villages***	natural disasters Avoid accidents from fallen electricity posts	line failures	
Natural Resources and Environment	**BestSolutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Marine reserve	Assess feasibility of creating a marine reserve for village as backup, alternative food supply Village to restock marine reserve with suitable species Continue to ban the use of dynamites, herbal poisons (ava niukini), chemicals and other unsustainable fishing methods including sand mining and extraction Research improved inshore fishery resources that are resilient to climate change Village to provide fencing for domestic animals to prevent waste contaminating marine reserve ***Responsibility: MNRE /MAF/ Village /CSSP/ UNDP-GEF SGP***	Protects and enhance local species diversity Maintains natural ecosystem Builds resilience of community livelihood and food security	MAF and MNRE DEC and CC to provide technical assistance and backstopping in the assessment and establishment of a marine reserve for village Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Village to seek funding to establish marine reserve MAF to raise awareness of farmers on impacts to water flows from poor livestock management	NESP 2018 - 2022 Community Engagement Plan Agriculture Sector Plan 2016-2021
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	natural disasters Implements an Ecosystem Based Approach	MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	
Governance	**Best Solutions**	**Benefits**	**Guideline toassist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Non-CR issues raised during consultations	**Proposed Solution**	**Comments**
Village lands ***Responsibility: Village/ Government/***	Village requested land from government for relocation purposes	Related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Aiga I le Tai CIM Plan

Community project (marine conservation)


Residential houses on stilts at the coast

Lepuiai village marine & environment conservation rules

Lepuia'i Tai Village Map

9. Manono-Uta Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, churches, Manono uta Primary School and government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Upgrade access/ work roads to facilitate relocation of houses away from hazard zones	Undertake engineering and feasibility study of existing seawalls, roads, drainage in line with reclamations within IFHZ and CFHZ Assess and upgrade local access roads especially in area sitting within fluvial hazard zone, to include adequate sized culverts to facilitate the overland	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Develop an Integrated Flood Management Plan for Aiga i le Tai District. MNRE to develop zonation strategy for safe areas Develop an integrated	CIM Strategy 2015 National Disaster Management Plan 2017-2021

	flow of storm water exacerbating river overruns, and to reduce flooding onto main roads and village lands Assess and upgrade culverts on most vulnerable parts of the local road especially at junction with main Aana West Coast Road (Salua Access Road, Faleu Access Roads and local tracks[17]) in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations District to regulate reclamations and developments near and around waterways and drainage connecting to main Aana West Coast Road ***Responsibility: LTA /MWTI/ MNRE/ District/ MWCSD/Village/ Families***	natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Develop and register Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes	
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5

[17]Not in national road network nor LTA normal road maintenance programme for Upolu Zone 6

	Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Coastal protection	Assess potential of a revetment for badly eroded coastal areas where relocation is not possible as **short term solution** Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: MNRE/ Village Council/CSSP/ NGO/ UNDP-GEF SGP***	Reduce impact from inland flooding on coastal areas Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NESP 2018 - 2022
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/ village drainage cleanup and awareness programme Produce posters and village signs for public awareness	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	Review wastewater strategy/ legislation to include role of Village/District bylaws Develop/Update and register District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to flooding Utilise Hazard maps and Geomorphologist findings to inform location	National Waste Management Strategy

	Responsibility: MNRE/ MWCSD/ District/ Village		Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts ***Responsibility: EPC/ MWTI/ Village/Families***	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Mangrove area conservation	Research new species found in mangrove area Undertake an	Protects and enhance local species diversity	MNRE DEC to provide technical assistance and backstopping in the development of a	Draft NESP 2017-2021 Community

	assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals foraging in wetland areas ***Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI***	Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	Wetland Management Plan for Aiga i le Tai District Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district	Engagement Plan
Livelihood & Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/village***	Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Utilise Hazard Maps and Geomorphologist findings to inform location and design Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

			MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme and Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

	animals (pigs, cattle) that are contaminating water sources ***Responsibility: Villages /District/ MNRE/MAF/ SROS***		fruit trees and crops	
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Non-CR issues raised during consultations	**Proposed Solution**	**Comments**
Village lands ***Responsibility: Village/ Government/***	Village requested land from government for relocation purposes	Related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Aiga I le Tai CIM Plan


Regular tree trimming required to avoid impact on electricity lines


Inland access loop road


Manono Uta marsh land

Manono Uta Village Map

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

10. Mulifanua Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, churches, hospital, Mulifanua Wharf and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Village to seek lands to migrate to due to expanding CEFZ and CFHZ Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Coastline protection: combination of hard and soft solutions	Investigate potential for upgrading government managed seawalls in areas where road sits less than 5mtr from coastline as **short term solution** Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits	Reduce impact from inland flooding on coastal areas Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ	NESP 2018 - 2022

	and consent Ban reclamations beyond seawalls ***Responsibility: LTA/ MWTI/ MNRE/ Village Council***		as an "at risk" zone with appropriate landuse planning controls and restrictions	
Main Aana West Coast Road and junctions of main road and access roads/tracks[18]	Continue investigating relocating main road (2km arterial road) in areas where road sits less than 5mtr from coastline in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Assess and upgrade access roads/tracks to include adequate sized culverts to facilitate the overland flow of storm water and to reduce flooding onto main lifeline and connectivity road ***Responsibility: LTA/MWTI/ MNRE/ District/ Village***	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads Minimize national disaster recovery expenditure on damaged properties and public assets	Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities UtilizeHazard Map Hazard maps and Geomorphologist Drainage Infrastructure Database Include in budget programming CBA, design and construction Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5

[18]Only Paepaeala Roads (2) and Fuailoloo Roads 1 & 2 in LTA Upolu Zone 6 RMIP

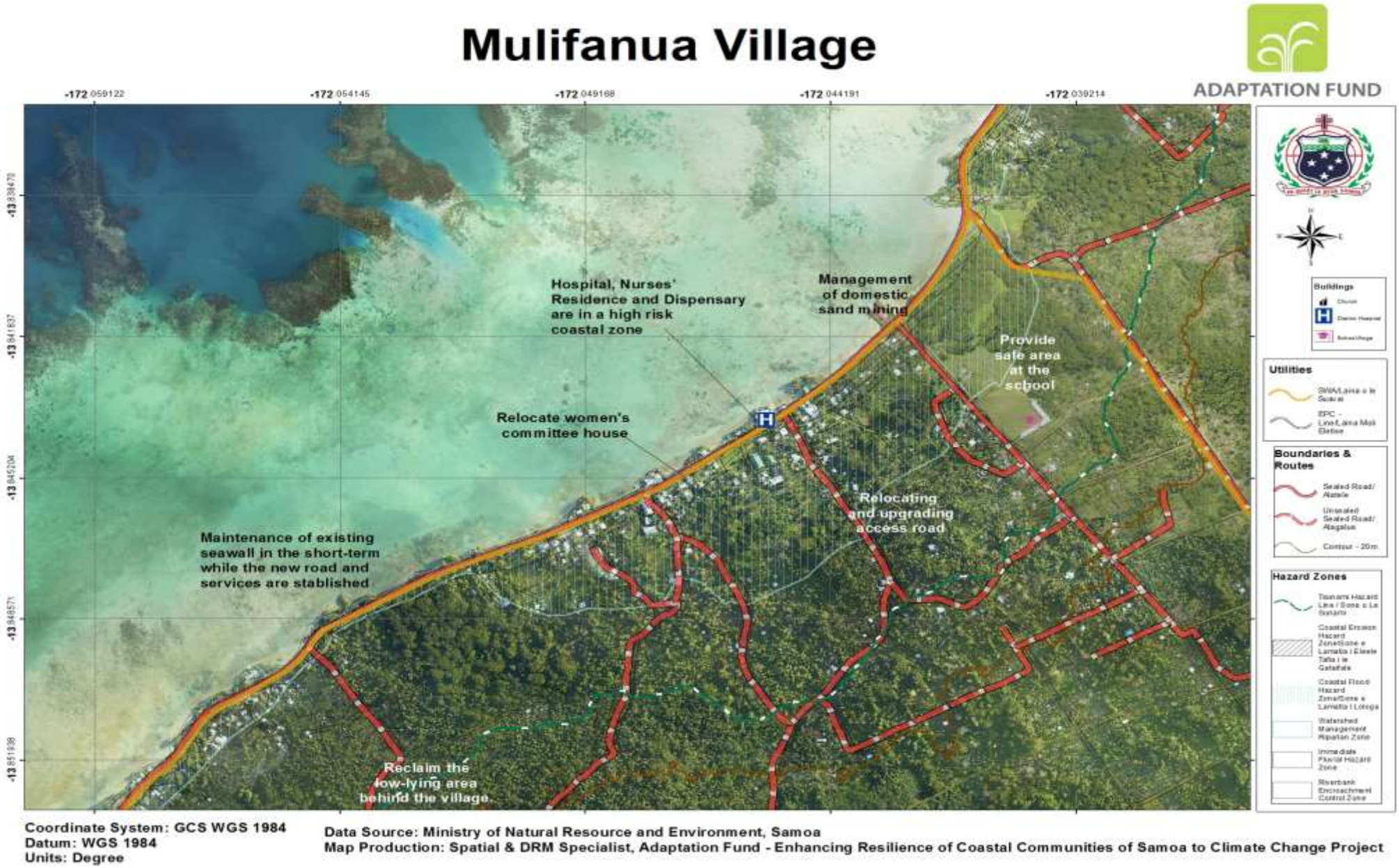
	Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan
Natural Resources & Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Mangrove area conservation	Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas	Protects and enhance local species diversity Sustains ecosystem services and functions	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural	Draft NESP 2017-2021 Community Engagement Plan

	Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals ***Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI***	Reduce contamination of water supply Reduce impact from inland flooding	habitats and ecosystems of the area Implement wetland and mangrove protection programme Identify funding /budget requirements and implementation programme for establishment of protected areas in district	
Coastal Restoration	Promote and support village and district tree planting on coastal areas around existing seawalls to strengthen seawalls and reduce erosion using native species such as talie, fetau, toa etc that are known to have greater resilience to natural disasters and changing climate conditions Depth and density of planting to be increased and a minimum vegetative distance of 200mm as an effective wave barrier distance	Maintains natural ecosystem Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads	Develop an Integrated Flood Management Plan for Manono-uta. Utilize Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes MNRE Forestry to provide technical assistance to guide village planting programmes in coastal areas MNRE Forestry to provide suitable climate ready trees suitable for coastal conditions	NESP 2017 – 2021 Two Million Tree Strategy 2015-2020 Forestry Management Act 2011
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme	Improve health through access to clean water and waste management Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/village***		climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

	programs with the villages ***Responsibility: MWCSD /Village***	accountability and enabling environment of communities		

Mulifanua Village Map



11. Paepaeala Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, churches hospital, and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Coastline protection: combination of hard and soft solutions	Investigate potential for upgrading government managed seawalls in areas where road sits less than 5mtr from coastline as **short term solution** Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring	Reduce impact from inland flooding on coastal areas Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages,	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes	NESP 2018 - 2022

	villagers to get the appropriate permits and consent ***Responsibility: LTA/ MWTI/ MNRE/ Village Council***	houses and roads	Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Main Aana West Coast Road and junctions of main road and access roads/tracks[19]	Continue investigating relocating main road (2km arterial road) in areas where road sits less than 5mtr from coastline in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Assess and upgrade access roads/tracks to include adequate sized culverts to facilitate the overland flow of storm water and to reduce flooding onto main lifeline and connectivity road ***Responsibility:LTA /MWTI/ MNRE/ District/ Village***	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads Minimize national disaster recovery expenditure on damaged properties and public assets	Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities Utilize Hazard Map Hazard maps and Geomorphologist Drainage Infrastructure Database Include in budget programming CBA, design and construction Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5

[19]Only Paepaeala Roads (2) and Fuailoloo Roads 1 & 2 in LTA Upolu Zone 6 RMIP

	Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan
Natural Resources & Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Mangrove area conservation	Undertake an assessment of tidal flow necessary to maintain a	Protects and enhance local species diversity	Develop an integrated land management plan for	Draft NESP 2017-2021

	healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals ***Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI***	Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Implement wetland and mangrove protection programme Identify funding /budget requirements and implementation programme for establishment of protected areas in district	Community Engagement Plan
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote	Improve health through access to clean water and waste management Improve recovery to create more resilient villages Improve	Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/village***	preparedness and readiness response to natural disasters	collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts,	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community

	mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Development Plan 2016-2021

Paepaeala Village Map

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

12. Salua tai Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, churches, pre-school and other government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Coastline protection: combination of hard and soft solutions	Investigate potential for upgrading seawalls[20] in areas where road sits less than 5mtr from coastline Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring	Reduce impact from inland flooding on coastal areas Mitigate potential damage from coastal erosion and flooding accommodating the hazard	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas	NESP 2018 - 2022

[20]Constructed in 2011 under Tsunami Recovery Programme

	villagers to get the appropriate permits and consent *Responsibility: LTA/ MWTI/ MNRE/ Village Council*	Safer villages, houses and roads	for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities

Jetty	Repair and upgrade damaged posts Village to maintain and upgrade jetty Village to limit number of private jetties on island ***Responsibility: SPA/ MNRE/ Village /CSSP/ NGO***	Maintain lifeline access and connectivity Improve preparedness and readiness response to natural disasters	Identify funding/ budget requirements and implementation programme Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities Designation of the CEHZ, CFHZ and tsunami shore exlusive zones as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 Community Engagement Plan
Electricity supply	Install streetlights along the roads where needed for community safety Relocate overhead lines to a more resilient location when being replaced Provide underground lines in the long term Install and connect to solar power supply if made available ***Responsibility: EPC /MWTI/ Villages***	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Island water supply: pipelines	Relocate main water pipelines away from CEHZ and CFHZ Procure rainwater harvesting systems as backup for vulnerable families as a short term solution Regulate developments and remove latrines around water supply Village to fence domestic animals away from areas susceptible to flooding ***Responsibility: District/Village/ CSSP/ NGO***	Improve preparedness and readiness response to natural disasters Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	Develop and register District/Village bylaws to include regulating developments around identified hazard zones Include in budget programming relocation of tanks and procurement of rainfall catchment systems Utilize Hazard Map Hazard maps and Geomorphologist findings for planning purposes Utilize Sui o Nu'u monthly meetings to	CIM Strategy 2015 Water and Sanitation Sector Plan Community Engagement Plan

			monitor progress of village programmes and responsibilities	
Natural Resources & Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Marine Protected Area and inshore fishery resources	Village to restock marine reserve with suitable species Collect and dispose of crown-of-thorns (alamea) on a regular basis to prevent major outbreaks Continue to ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods including sand mining and extraction Enforce village bylaws on ban on rubbish dumping in coastal areas ***Responsibility: Village fishing households, MAF/ CSSP/ NGO***	Protect coral reefs and inshore fisheries Protect marine biodiversity Protects and enhance local species diversity Sustains ecosystem services and functions	MAF Fisheries to support implementation and provide technical backstopping and monitoring Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Develop Village Bylaws to include management of natural resources (spring pools, marine reserve, forest etc)	Agriculture Sector Plan 2016-2021 Community Engagement Plan
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources ***Responsibility: Villages/District/ MNRE/MAF/ SROS***	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme	Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Utilise Hazard Maps and Geomorphologist findings to inform location and design Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/village***		trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

	near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	

Salua Tai Village Map

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

13. Satuimalufilufi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village houses, churches, Satuimalufilufi Primary School and government assets located in high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Upgrade access/ work roads to facilitate relocation of houses away from hazard zones and alleviate inland	Upgrade to include adequate sized culverts to facilitate the overland flow of storm water exacerbating river overruns, and to reduce flooding onto main roads and village	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Develop an	CIM Strategy 2015 National Disaster Management Plan 2017-2021

flooding from inadequate culverts/ drainage	lands Implement regular drainage inspection and maintenance Village to restrict rubbish dumping into waterways and conduct regular clearance of rubbish behind homes Village to regulate developments near and around road shoulders of all access roads Enforce environmental safeguards Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: LTA/ MWTI/ MNRE/ District/ Village /Families/CSSP***	natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Integrated Flood Management Plan for Aiga i le Tai District. MNRE to develop zonation strategy for safe areas Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Develop and register Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP)	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities NISP 2011 KESO 5

	Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Coastal protection: combination of hard and soft options	Assess potential of a revetment[21] for badly eroded coastal areas where relocation is not possible as **short term solution** Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: LTA/ MWTI/Village***	Reduce impact from inland flooding on coastal areas Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads	Planning provisions to be guided by the Planning and Urban Management Act 2004 Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	NESP 2018 - 2022

[21]Seawall constructed in 2011 under Tsunami Recovery Programme

Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Families in fluvial hazard zones to install proper septic waste disposal systems Implement district/ village drainage cleanup and awareness programme Produce posters and village signs for public awareness ***Responsibility: MNRE/ MWCSD/ District/ Village***	Increase adaptation during extreme weather events Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	Review wastewater strategy/ legislation to include role of Village/District bylaws Develop/Update and register District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to flooding Utilise Hazard maps and Geomorphologist findings to inform location Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	National Waste Management Strategy
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts ***Responsibility: EPC/ MWTI/ Village/Families***	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Reticulated water supply, quality and	Extend the water supply to families inland with no access	Increase adaptation during drought	Develop and register District/Village	CIM Strategy 2015 Water and

network to be improved	to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas ***Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP***	periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan
Natural Resources and Environment	**BestSolutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Coastal Restoration	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2018 - 2022 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

Livelihood & Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Marine reserve	Assess feasibility of creating a marine reserve for village as backup, alternative food supply Village to restock marine reserve with suitable species Continue to ban the use of dynamites, herbal poisons (ava niukini), chemicals and other unsustainable fishing methods including sand mining and extraction Research improved inshore fishery resources that are resilient to climate change Village to provide fencing for domestic animals to prevent waste contaminating marine reserve ***Responsibility: MNRE /MAF/ Village /CSSP/ UNDP-GEF SGP***	Protects and enhance local species diversity Maintains natural ecosystem Builds resilience of community livelihood and food security	MAF and MNRE DEC and CC to provide technical assistance and backstopping in the assessment and establishment of a marine reserve for village Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Village to seek funding to establish marine reserve MAF to raise awareness of farmers on impacts to water flows from poor livestock management	NESP 2018 - 2022 Community Engagement Plan Agriculture Sector Plan 2016-2021
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management	Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Utilise Hazard Maps and Geomorphologist findings to inform location and design Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/village***		resilient crops and plants MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	

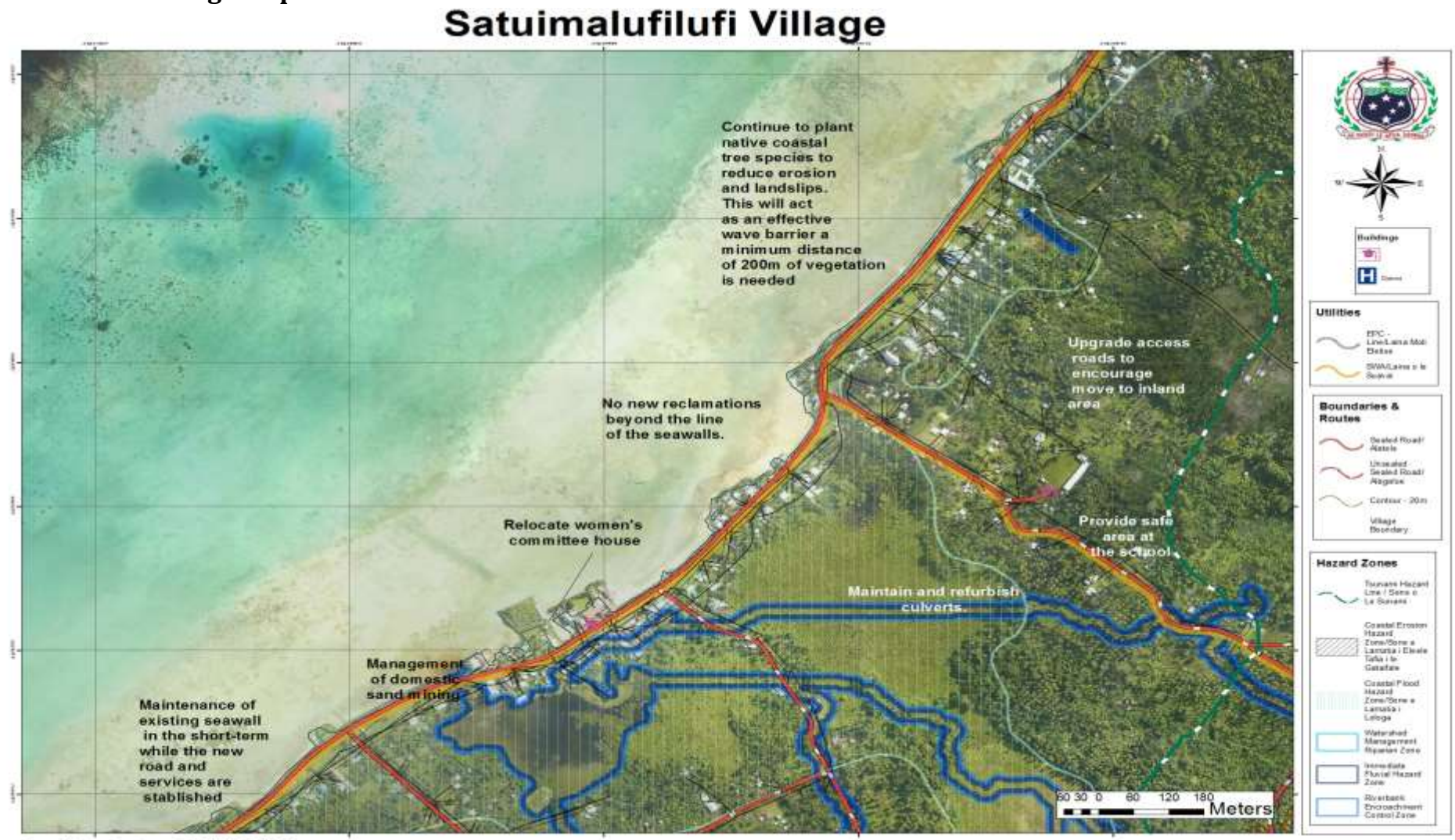
Pest management; invasive plants and animals	Research new type of vegetation found in rivers and seas of Solosolo Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources ***Responsibility: Villages /District/ MNRE/MAF/ SROS***	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Aiga i le Tai district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021


Require regular maintenance of rock wall


Need drainage network and improve domestic animal management

Satuimalufilufi Village Map



Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa
Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

Upolu AF Districts Overview Map of Coastal Inundation Zones