Community Integrated Management Plan

Palauli East, Savaii

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 Plan is envisaged as the blueprint for climate change interventions across all development sectors – reflecting the programmatic approach to climate change 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 and the UNDP Adaptation Fund, 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 will further enhance the adaptive capacity of Samoa to respond to the impacts of climate change.

Thank you

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

Participants in the Plan

The Community Integrated Management (CIM) Plan is a Partnership between the Government of Samoa and the villages within the plan. The Plan area starts from the ridge extending to the reef broadly covering four thematic areas; Infrastructure; Environment and Biological Resources; Livelihood and Food security; and 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 Constituency of Palauli East and Tafua Tai, (Tafua, Vailoa, Vaitoomuli and Faala) Savaii.

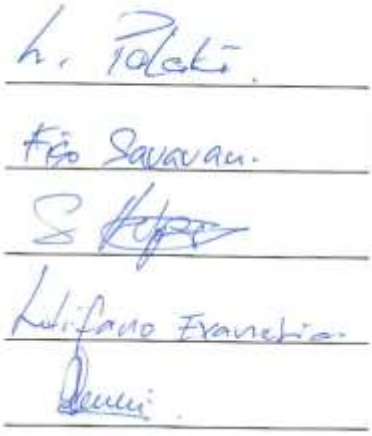
The village representatives participated in the preparation of this CIM Plan in partnership with the Government of Samoa.

Date of Signing 15 June 2018

Representatives	Signature
Tafua Tai Village	
• Tia'alii Matauaina	
• Lemaota Ailoi	
• Poulava Foaimauga	
• Fagomanu Toaalii	
• Faalele Poulava	
Vailoa Village	
• Tulipe Matafa	
• Tagavai Aso	
• Tuifelea Faatoina	
• Logo Penehuro	

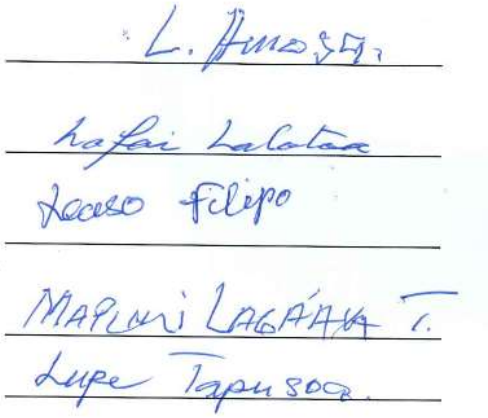
Vaitoomuli Village

- Leituala Palalu
- Fiso Savavau
- Seumanufegai Ailepata
- Lealiifano Evagalia
- Logokava Posui



Faala Village Date of Signing

- Lagaia Amosa
- Lafai Lalotoa
- Leaso Filipo
- Mapuni Lagaia
- Lupe Tapusoa



The Government of Samoa adopts the Community Integrated Management Plan for the Alii and Faipule of Palauli East & Tafua (Vailoa, Vaitoomuli, Tafua and Faala) 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 Ministries 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.

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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
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
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
SOE	State of Environment
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.

1. Introduction to the CIM Plan

1.1 The Strategic Vision

The District CIM Plan for Palauli East & Tafua -Tai has been prepared under the Government of Samoa's Pilot Programme for Climate Resilience (PPCR)- Enhancing Climate Resilience for Coastal Resources and Communities Project. The CIM Plans is the primary means of implementing the CIM Strategy, which was formally approved by the Government of Samoa in February, 2001, and revised in August 2015, to provide Strategic direction for the management of government and community resources within the districts and villages.

The Strategy has as its central vision "Resilience – Communities and their resources are Resilient to Natural Hazards". 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, August 2015)

1.2 The Aim of the CIM Plan

The aim of the CIM Plan is to help communities and government improve climate resilience by identifying actions and solutions for sustainable development.

The CIM Plan will enable communities and government service providers to:

1. Enhance awareness of hazard risks from the ridge to reef;

2. Improve climate resilience planning and development

3. Better adapt, respond and recover from natural disasters and other extreme events

1.3 The 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 to prepare 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.

2. Implementation Guidelines

2.1 Purpose of the Implementation Guidelines *(IG)*

The Implementation Guidelines describe the solutions proposed to increase the resilience of communities as identified in the CIM Plan consultation and site assessments. The solutions are presented under four broad themes; Infrastructure; Environment and Biological Resources; Livelihood and Food Security; and Governance Institution in the District/village. Implementation of solutions is considered to be the joint responsibility for both the villages and the government in partnership as follows.

The CIM Plan Solution Matrix, shows five columns each correlates to the solution identified:

- Column 1: Indicates the issues or problem identified during the CIM Plan consultation and site assessments
- Column 2: Solutions – these are the interventions/ solutions identified by the CIM Plan team and village community representatives. The government agency or village as indicated in Column-2 under each action will be the lead agency or village responsible for implementing the said solution;
- Column 3: "Other benefits", where one solution indicated in Column 2, will provide benefits to other items;
- Column 4: Provides guidance on how the solution is to be implemented and noting the relevant government action plan, policy, code of ethics, regulation or act to follow by the responsible government agency or district/village during implementation of the solution;
- Column 5: Provides an overall summary of how the solution being implemented supports or achieve the objectives or goals set-forth in the relevant government sector plans and linking them up to the Strategy for the Development of Samoa.

It is therefore worth noting that climate change adaptation and mitigation actions or interventions identified in the CIM Plan solution demonstrates the national commitment to enhancing Samoa's climate resilience portfolio.

2.2 Funding options to support CIM Plan Implementation *:*

Implementation of solutions that were identified from the CIM Plan consultations with each district communities will not be possible without the availability of funds. Like the previous CIM Plans infrastructural related solutions to protect government assets located in the coastal area are executed by the government through bi-lateral or multi-lateral donor funded projects. For example the NAPA (National Adaptation Programme of Action) project that supported the implementation of rock revetment or seawalls in most of the coastal villages, which is an outcome from the generation-1 CIM Plans were funded under multi-lateral donor. At the village level some villages were successful in sourcing small grants from existing mechanisms in country.

Similarly it is expected that funding support for the implementation of the updated revised CIM Plans during its 10 year lifespan, will be sourced from different development partners including the government of Samoa. All solutions and activities in the CIM Plans that have identified a government agency as the responsible agency for that particular action as outlined in the "CIM Plan Solution Matrix" will take up the responsibility for these activities as part of their on-going workplan and priorities for each districts/villages. Funding of these activities will be sourced either from their local budget or multi-lateral donors such as UNDP, FAO, World Bank, ADB, and GEF to name a few, as well as bi-lateral donors like New Zealand, Australia, Japan, USA and China. Implementation of activities that are under the responsibilities of village communities will source support from small grants opportunities available from the following programs and agencies: CSSP, the UNDP-GEF SGP, Global Green Grant and Discretionary Funds from different Diplomatic Mission in country like New Zealand High Commission, Australia, Japan and China.

2.3 Duration of the Plan

The CIM Plan is reviewed every ten years. During the Plan period, the solutions implemented are monitored to ensure that they are effective in improving resilience. Some solutions are likely to take longer than the original five years for implementation.

The review of the Implementation Guidelines and the solutions proposed the following:

1. The CIM Plan full review will be undertaken every 10 years or decade;

2. Once implemented, the solutions will be monitored on a bi-annual basis for progress and updated every five years in accordance with the Strategy for the Development of Samoa;

3. Detailed implementation of the solution will determine the monitoring requirements and Key Performance Indicators (KPI).

3. Description of Palauli East & Tafua District Environment

3.1 Physical and Natural Resource Setting

Palauli East and Tafua district is located on south east Savaii and includes villages of Vailoa, Vaitoomuli and Faala from the Palauli East constituency and Tafua of Palauli le Falefa constituency.

The Palauli landscape has a lower coastal plateau that has scattered elevated coastal cliffs, sandy beaches and areas of low lying areas – gradually rising to high mountains via an elevation in gradient at about the 350m ASL (above sea level). Steps of rocky outcrops and fractured substrate were evident in the elevation profile of the landscapes. These were across the contour with flatter areas of more fertile soil behind. So at places the landscape is like a series of terraced steps of deeper soils then rocky skeletal soils. There is incidence of recent clearing and plantations on the steeper lands around the 350-400m level, as farmers have just the more fertile lands previously covered by primary and healthy secondary and sometimes montane forests.

The Palauli East district is categorized as amongst the wettest areas in Savaii thus vegetation is lush with fertile soils and fast and rivers that flow all year round. The district is surrounded by the Palauli reef embayment extending from Satuipaitea on the west to the Fa'ala village on the east which is the largest in Savaii. Several marine habitats exist such as the fringing reef on the outer reef edge, a shallow lagoon and wider reef flat, the inner reef flat consist of volcanic sand and mud flats which mostly populated by sea grass beds. The outer reef consists of volcanic and coral sand although coral coverage is low most likely due to the impacts of the recent tsunami, coral bleaching and the human stresses of land-based pollution and use of dynamites in the past.

Palauli East district due to its fertile soils has had long association with development in Samoa extending back to pre-European contact where archaeological sites are present of major settlements along the Faleata river. In the 1800's much of the lowland areas was cleared for coconut plantations along the western end in Vailoa and Vaitoomuli, while in the Fa'ala village area of the Tafua Peninsula, indigenous lowland forest species still dominate the vegetation. This is evident now with most of the western end lowland area extending close to 500m covered by old coconut plantations serviced by old access roads. Within this western part of the district, much of the lowlands predominantly consists of mixed vegetation different pockets are dominated by secondary forest as Tavai, or invasive species such as faapasi (African tulip), while in small pockets along the river edges, some large tava trees still tower over the cleared lands.

The eastern end along the Tafua Peninsula is still intact lowland rainforest dominated by Tava and Dysoxyllum species of Maota and Tufaso while many of the typical lowland rainforest trees are also present. A higher rainfall than the national average along this district renders it to having fertile soils and running rivers, which is evident with the extensive Vailoa wetlands along the coast. As the sea level continues to rise, strong wave surges lead to most of old Vailoa village now relocated inland. Despite this, some developments such as the district secondary school are still located in the wetland, while the previously used spring-pools are drying up. The Faleata River, which drains into the Palauli bay continues to bring high volumes of black sand that has major influence on the coastal processes operating on the coastal areas of the district.

The invasive trees and shrubs are present along the access roads throughout the district. *Cordia spp, Spathodea campanulate* (African tulip) are the main invasive species found along the access roads and plantation area while the *Merremia peltata* is common both in cleared and forested areas. Stands of pulu vao *Funtumia elastica*; pulu mamoe *Castilla elastica* are present but not as dominant as in other areas of the country.

Myna birds and red-vented bulbuls were found in abundance along the whole northern Savaii especially closer to settlements.

3.2 Social and Economic Setting

Palauli East has a total population of 2,399 people (Census, 2016) and the village of Fa'ala has the highest number of people 932, next is Vailoa with 784 and Vaitoomuli at 683. Tafua village is part of Palauli Falefa constituency with a population 406 people.

Approximately 70% of Fa'ala and Tafua houses and buildings are located within the Coastal Flood Hazard Zone (CFHZ) compared to 85% of Vailoa.

The road is considered an important part of the district's infrastructure. The main road is sealed and is approximately 7 - 8m wide, it is in good repair and doesn't contain pot holes. Most of the districts infrastructure including water, power and telephone runs along the main road. The road provides easy access to primary services such as local schools and shops as well as adjacent districts. It is the lifeline to Salelologa town and wharf as well as to the Tuasivi National Hospital.

Most households within the district depend on subsistence agriculture for their consumption, every family has a plantation. There are cattle farms, piggery and poultry farms own by some families. Everyone has access to cash power for electricity and only a few families depend on fishing for income. There a few schools located in the district, the Palauli College is in Vailoa, whilst the Primary School is in Fa'ala as well as the pre-school. There are also a few business operations in the district, the Aganoa Resort and a number of small shops. The current location of the secondary school within the coastal hazard zone, deems it necessary to consider relocation in the future if the secondary school is upgraded.

3.3 Climate Risk and Resilience *:*

There is an urgent need for communities to understand the changes in Samoa's climate and future projection. A study has been completed in 2011 which summarizes changes in Samoa's climate at present and in the future, from 1990 -2030 up to 2090. The assessment showed that: Samoa's temperature will increase with very hot days; more extreme rainfall days expected; there would be a decrease in number of tropical cyclone but increase in intensity; sea level rise will continue and ocean acidification is increasing in Samoa's water threatening coral reef ecosystems and marine biodiversity.

The 2001 CIM Plan for Palauli East and Tafua, mapped out all vulnerable areas along the coast and the lowland coastal areas identifying them as hazard zones given the exposure to natural disasters, climate change and extreme events causing flooding and erosion. The basal boulder and gravel/sand barrier coastal area has a High Coastal Sensitivity Index, and has receded by approximately 45m over the last three decades. Inland there is much changes in the catchment areas and land use hence the severe flooding downstream is caused by the concentrated flows from up-catchment areas. As such the update of the CIM Plan considers a broader landscape hazards, climate risks and likely responses.

Coastal Hazards and Risks: The Tafua peninsula and the other three villages of Palauli East are located within the coastal hazard zone prone to erosion and flooding. Coastal erosion is a major issue for Vailoa and Vaitoomuli. Broad and thick terrestrial deposit between Vailoa and Satupaitea headland indicates a rapid erosion and sedimentation rate in the area. This could contribute to the degradation of coral reef ecosystem between Vailoa and Vaitoomulli according to Fepuleai (2017), as thick sediment can cover most coral and other marine habitats. The Tafua area it shows high erosion on the coastline and proposed area that could associate with landslide and rockfall hazard in the near future.

[1] Pacific-Australia Climate Change and Adaptation Planning Program Partners (2015) Current and Future Climate of Samoa, Government Australia and Government Samoa.

Inland Hazards and Risks: According to Fepuleai (2017), unstable crater walls of the Tafu-a-savaii double-crater volcano to the north of the village could generate landslides and rock falls in the near future (Fig.1). The crater walls are deeply dissected with series of jointed networks strongly elongated north to south direction. These jointed networks could extend their sizes and abundance due to surface water activity and high temperature. Current extractive mining activities on the side of the Tafua crater, are contributing factors to the high risk of a landslide in the future.

Further inland of Vailoa village a road access across the river has been established which has created a major river diversion towards the east to join with other major rivers. There is concern with this development given a lack of Environmental Impact Assessment conducted. This was done to stem downstream flooding but it has also stopped the natural flows to the coastal wetland areas. There is a need for close monitoring of this area due to a possibility of flooding.

Livelihoods and Food Security: Food security risks are also compounded from climatic changes to rainfall and temperature. Information from the MET Office was instrumental in determining the levels of risk about the landscape, especially in likely drought prone areas. The incidence of alien invasive species (IAS) is also a determinant of soil nutrient deficiencies (from natural causes or poor sustainable land management practices), changes to the micro-conditions of soils (e.g. drying out of topsoils after clearing), prospect instability and potential erosion risk (e.g. on steep slopes).

Unstable crater wall of the Tafu-a-savaii Volcano, this has high risk of triggering a landslide and rockfall (blue arrows) in the area.
Photo credit: Aleni Fepuleai, 2017

4. Palauli East & Tafua Tai District Interventions

Infrastructure	Best Solutions	Benefits	Guidelines to assist with implementation	Relevant Sector Plans
Main Road and side drainages require maintenance and upgrade as it exacerbates flooding	Implement routine maintenance of the road and side drains and clear any debris blocking the free flow of surface water runoff Install larger sized culverts where needed Construct roadside drainage ditches where needed Implement a road safety program ***Responsibility: LTA /MWTI / District-villages***	Improved rate of recovery Improved coastal protection Reduced potential for flooding in coastal areas Improved lifeline	Design for culverts and roadside drainage on the main road should apply the following guidelines: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) Vulnerability Assessment of the Samoa Road Network (2017) Programme drainage in budget and work programme Prepare assessment of road drainage systems National Infrastructure Strategic Plan 2011	Community Integrated Management Strategy 2015 Transport Sector Plan 2014-2019
Access Roads to be upgraded in 2 villages; Vailoa, & Tafua-tai.	Seal existing access roads to inland areas to provide safe access to village developments supporting livelihoods in Tafua-tai and Vailoa. Tafua-Tai Access road Length Road: 1.5km Estimated Cost: SAT$545,200.00 (LTA) Widen existing access road leading to the ocean to either 1 or 2 meters on each side, for road safety. Request to upgrade and tar sealed two access roads leading to the beach Vailoa access roads Length: 1 km	Improves resilience of infrastructure to natural hazards and disasters. Improves accessibility between coastline and plantations for food security Will encourage coastal families to relocate inland. Use as escape routes when necessary Will provide access to utility providers to extend their services		

	Estimated Cost: SAT$ 1,007700.00 BCA: 1.5 ***Responsibility: LTA / MWTI / Villages***		Implementation of low key seawall follow existing guidelines: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) Vulnerability Assessment of the Samoa Road Network (2017) National Infrastructure Strategic Plan 2011	
Hard coastal protection measure is needed to re-inforce the seawall at Vailoa.	Assess and design reinforcement measures to strengthen and complete the existing seawall as it is contributing to the rapid erosion of the coastal protection. Vailoa coastal protection Length: 300 m Height: 3m Estimated Cost: SAT$181,440.00 BCA: 1.9 ***Responsibility: LTA / MWTI / Villages***	Reduce impact of coastal erosion Strengthen armour shield protects the coast		
Electricity Supply	Install and connect power supply for inland residents Install streetlights along the roads where needed for community safety. Relocate overhead lines to a more resilient location when being replaced ***Responsibility: EPC / MWTI / Villages***	Maintain electricity supply at all times including during natural disasters. Avoid accidents from fallen electricity posts.	Monitor distribution networks to avoid overloading poles and contributing to line failures EPC to installed electricity lines to reach families residing inland and streetlights Consider energy efficiency developments for communities using renewable energy guided by existing framework – Development of a Renewable Energy and Energy Efficiency Framework, 2016	Samoa Energy Sector Plan 2017-2022
Environment and Natural Resources	**Best Solution**	**Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plans**
Upland forest and watershed areas need protection and management	Implement forest restoration programs to protect Upland forest and watershed areas Restrict plantation to lowland areas	Minimize forest loss and land clearance Improve ecological functions and resilience of forest	Provide technical guidance using existing strategies and plans already put in place. NBSAP 2015-2020	National Environment Sector Plan 2017-2021

	below 500m elevation Develop and implement invasive species eradication programs Develop a Management Plan for the Upland Forest and Watershed Area of the District ***Responsibility: MNRE / villages / MWCSD***	Increases water volumes in catchments Minimize soil erosion	National Water Resource Management Strategy 2007-2017 National Invasive Species Plan 2008-2011 Forestry Restoration Operational Plan 2016-2020 Environmental Management Bill 2013 National Parks and Reserves Act 1974 Protection of Wildlife Regulation 2004 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020 Forest Management Act 2011	Water and Sanitation Sector Plan 2016-2020
Wetland and Coastal Areas need protection and management	Implement coastal restoration programs including natural regrowth or regeneration of coastal vegetation plants Develop a Management Plan for the Wetland Ecosystem and declare it as a RAMSAR site ***Responsibility: MNRE / District / Villages***	Reduces rate of coastal erosion Reduces impact from storm surges Discourages sand mining Improves resilience of coastal ecosystems - wetland	Declare the wetland as a conservation site Develop a management plan for the wetland Establishment of the wetland conservation site should be guided by legal and institutional framework on biodiversity NBSAP 2015-2020 Environmental Management Bill 2013 National Parks and Reserves Act 1974 Waste Management Act 2011 Protection of Wildlife Regulation 2004	National Environment Sector Plan 2017-2021
Marine Environment needs protection and management	Establish a Marine Protected Area for the district Develop a	Improve resilience of coral reef ecosystem to combat climate change	Maintenance of marine reserve and protected area requires community consent and government approval along with	National Environment Sector Plan 2017 - 2021

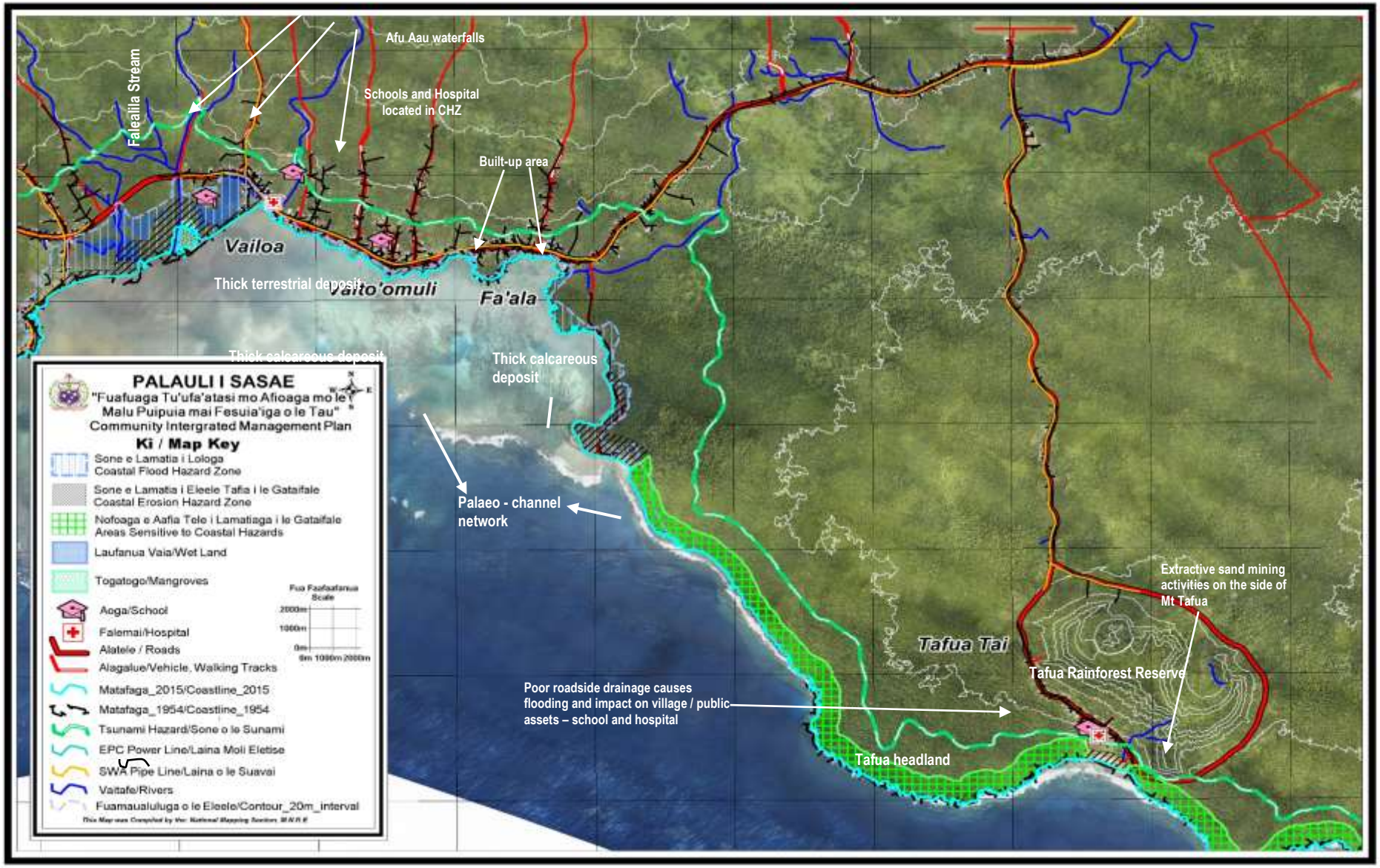
	Management Plan for the Marine Protected Area Expand existing fishery reserves and establish new ones Implement coral gardening Conduct training on village based monitoring programs for marine areas ***Responsibility: MAF / MNRE / District / Villages***	Reduce loss of marine habitats Reduce impact of coral bleaching Increase fish reserve stock for food security Reduce impact of land-based pollution	biological surveys. Fisheries Division to advice villages on the Community-based Fisheries Management Program (CBFMP) – Develop Village Fisheries Management Plans NBSAP 2015-2020	Agriculture Sector Plan 2016-2020
Sand mining for commercial and domestic use affecting the marine and coastal environment as well as terrestrial resources	Assess and identify sustainable sources of sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for sand mining Extractive industries (mining) monitored and corrected in the riverbank and coastal fringe Strengthen sand mining monitoring and enforcement Mass media awareness on sustainable sand mining practices Develop sand mining regulation ***Responsibility: MNRE / District & Village***	Village gains benefit from sand mining activities Reduce impact to natural coastal protection mechanism via control of scale and site of extraction Improve village resource management and sustainable development Minimize impacts of coastal inundation and erosion Improve the sustainable management of sand as a natural resource	Follow existing MNRE guidelines for sand mining or extracting such as: MNRE monitoring of sand extraction operations Secure relevant permits before any sand mining occurs Incorporate environmental and social safeguards concerns including consultations with any affected community Village environmental management plans established including annual monitoring systems For access to sites, obtain written consents from Alii Faipule and landowners. Lands and Survey Environment Act 1989 Consideration of EIA assessment of impact prior to any extraction PUMA Act 2004	National Environment Sector Plan 2017 - 2021

			NAP – Sustainable Land Management Plan 2015-2019 (draft) |Sand Mining Policy 2001 Draft Soil Resource Management Bill 2018	
Livelihood & Food Security	**Best Solution**	**Other Benefits**	**Guideline to assist Implementation**	**Relevant Sector Plan**
Disturbed forests and plantation areas	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests : Promote and facilitate planting of root-crops (i.e yams, sweet potato which are more resilient to cyclones, droughts and floods. Promote agro-forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases. Diversify into other climate resilient species cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement Sustainable Land management practices Implement integrated pest management programmes ***Responsibility:***	Improve food security and healthy living and increase community resilience and adaptive response to climate change	MAF CROP Division to support farmers through guidance and trainings from Agricultural experts and awareness programs on crop diversification to suit the prolonged periods of drought or rainy season Provide tools and planting materials to improve crop diversification and resilience – address pest issues etc. This will lead to improve food security Strengthen partnership with farming NGO's such as the: Samoa Farmers Association; Samoa Federated Farmers Incorporated ; Women in Business Inc. and private sector to support rural farmers through training opportunities and marketing productivity Implementation of solutions are guided by the following: Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020	Agriculture Sector Plan 2016-2020

	MAF /CSSP/WIBDI/Farmers Association/ METI/ SBEC / UNDP-GEF-SGP/MNRE / villages		National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	

Governance	**Best Solutions**	**Guideline to assist Implementation**	**Comment**
Village By-laws	Implement village by-laws for community to follow and include protection of natural resources both marine and terrestrial ***Responsibility: Village / MWCSD***	MWCSD to provide assistance to village in developing by-laws Community Development 2016-2021	Support the development of village by-laws that can guide governing structure of village and the implementation of government and non-government programs including CIM Plans.
Enforce law on illegal logging	Reinforce the no indigenous forest logging legislation or provide appropriate requirements for sustainable portable sawmills operating in the village. ***Responsibility: MNRE/village***	MNRE- Forestry to enforce logging regulation upon logging companies Monitor logging companies or individual portable sawmills Forestry Restoration Operational Plan 2016-2020 2 Million Tree Planting Strategy 2015-2020 Forest Management Act 2011	Community identified the continuous practice of illegal logging and need to look at options for re-enforcement to reduce the cutting down of native tree and stop logging from moving further inland.

Palauli East District Map



4.1 Vailoa Village Interventions

Infrastructure	Best Solutions	Other Benefits	Guideline to assist Implementation	Relevant Sector Plan
Upgrade 3 access roads to improve accessibility inland Mulivaitaele Access road to waterfall Access road to the old coastal village	Asess, reconstruct and seal village access roads to provide for safe access 1. Access road to re-establish the road across the river (Mulivaitaele), or consider alternative access road towards the west with a new cross-road higher in the catchment to provide access to family plantations 2. Access road to the Waterfall - to support livelihoods and provide safe access inland. 3. Access road towards the old coastal village – however impacts on the wetland needs to be considered. Length: 1.5km Estimated Cost: SAT$ 545,200.00 BCA: 1.5 ***Responsibility: LTA / MWTI***	Increases the number of families relocating to higher grounds Improves access to livelihoods	Construction of access roads and bridge should be guided by the following: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) Vulnerability Assessment of the Samoa Road Network (2017) Programme road safety activities into budget and work programme National Infrastructure Strategic Plan (NISP) 2011	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
Existing crossing / bridge / concrete slab	Assess the need to upgrade the existing bridge/concrete slab in the northern part of the village to connect families still residing in the old part of the village - due consideration is needed as the area is still highly exposed to coastal hazards. ***Responsibility: LTA / MWTI***	Provides safe access for existing families residing in this area of Vailoa.		

Hard coastal protection measure is needed to re-inforce the seawall at Vailoa.	Assess and design reinforcement measures to strengthen and complete the existing seawall as it is contributing to the rapid erosion of the coastal protection. Vailoa coastal protection Length: 300 m Height: 3m Estimated Cost: SAT$181,440.00 BCA: 1.9 ***Responsibility: LTA / MWTI / Villages***	Reduce impact of coastal erosion Strengthen armour shield protects the coast		
Village infrastructure located in high risk hazard zones such as: Houses, Schools Churches Businesses, Committee House	Relocate outside hazard zones when infrastructure requires replacement Investments within the hazard zones to adopt appropriate mitigation measures Design infrastructure appropriately to take into account the immediate hazard zones; for example, raise floor levels in flood prone areas. ***Responsibility: / MWTI/MNRE / Villages***	Mitigate potential damage caused by hazards such as coastal erosion, flooding and landslips Reduce costs and on-ongoing maintenance of infrastructure Safer villages, houses and roads	Implementation of adaptation options should follow existing guidelines: Use updated Hazard Maps to inform designs Application of the National Building Code (Draft Sept 2016) and permit compliance National Infrastructure Strategic Plan 2011	CIM Strategy (2015) Transport Sector Plan 2014-2019
Drainage maintenance	Maintenance of road side drains and regular inspection of drainage system; ***Responsibility: village/ MWTI***	Improved rate of recovery Reduce potential for flooding in village areas Safer village houses and roads Improved safety community and resilience	Implementation of activities to follow existing guidelines: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) National Infrastructure Strategic Plan (NISP) 2011	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019

			Programme road safety activities into budget and work programme Programme drainage in budget and work programme Prepare assessment of road drainage systems Prepare a local education programme on need for keeping drainage systems clean	
Electricity Supply	Install and connect power supply for inland residents Install streetlights along the roads where needed for community safety. Relocate overhead lines to a more resilient location when being replaced ***Responsibility: EPC / MWTI / Villages***	Maintain electricity supply at all times including during natural disasters. Avoid accidents from fallen electricity posts.	Monitor distribution networks to avoid overloading poles and contributing to line failures EPC to installed electricity lines to reach families residing inland and streetlights Consider energy efficiency developments for communities using renewable energy guided by existing framework – Development of a Renewable Energy and Energy Efficiency Framework, 2016	Samoa Energy Sector Plan 2017-2022
Footbridge or Crossing is needed	Develop a foot bridge or crossing across the river as an escape route Design the footbridge / crossing and implement ***Responsibility: LTA / MWTI /MNRE/ Village***	Increase rate of recovery Improve response to emergency	Design of footbridge should be guided by: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007)	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019

			Review of National Road Standards in Samoa (2016) National Infrastructure Strategic Plan (NISP) 2011	

Natural Resources and Environment	Best Solutions	Benefits	Guidelines to assist Implementation	Relevant Sector Plans
Sand mining for commercial and domestic use affecting the marine and coastal environment as well as terrestrial resources	Assess and identify sustainable sources of sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for sand mining Extractive industries (mining) monitored and corrected in the riverbank and coastal fringe Strengthen sand mining monitoring and enforcement Mass media awareness on sustainable sand mining practices Develop sand mining regulation ***Responsibility: MNRE / District & Village***	Village gains benefit from sand mining activities Reduce impact to natural coastal protection mechanism via control of scale and site of extraction Improve village resource management and sustainable development Minimize impacts of coastal inundation and erosion Improve the sustainable management of sand as a natural resource	Follow existing MNRE guidelines for sand mining or extracting such as: MNRE monitoring of sand extraction operations Secure relevant permits before any sand mining occurs Incorporate environmental and social safeguards concerns including consultations with any affected community Village environmental management plans established including annual monitoring systems For access to sites, obtain written consents from Alii Faipule and landowners. Lands and Survey Environment Act 1989 Consideration of EIA assessment of impact prior to any extraction PUMA Act 2004	National Environment Sector Plan 2017 - 2021

			NAP – Sustainable Land Management Plan 2015-2019 (draft) |Sand Mining Policy 2001 Draft Soil Resource Management Bill 2018	
Upland forest and watershed areas need protection and management	Implement forest restoration programs to protect Upland forest and watershed areas Restrict plantation to lowland areas below 500m elevation Develop and implement invasive species eradication programs Develop a Management Plan for the Upland Forest and Watershed Area of the District ***Responsibility: MNRE / villages / MWCSD***	Minimize forest loss and land clearance Improve ecological functions and resilience of forest Increases water volumes in catchments Minimize soil erosion	Provide technical guidance using existing strategies and plans already put in place. NBSAP 2015-2020 National Water Resource Management Strategy 2007-2017 National Invasive Species Plan 2008-2011 Forestry Restoration Operational Plan 2016-2020 Environmental Management Bill 2013 National Parks and Reserves Act 1974 Protection of Wildlife Regulation 2004 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020 Forest Management Act 2011	National Environment Sector Plan 2017-2021 Water and Sanitation Sector Plan 2016-2020
Marine Environment needs protection and management	Establish a Marine fisheries reserves for village Collect and dispose of crown-of-thorns (COTs) on a regular basis to prevent major outbreaks	Provides a sustainable source of food for the village Reduces coral bleaching and increases growth of new coral	Maintenance of marine reserve and protected area requires community consent and government approval along with biological surveys.	National Environment Sector Plan 2017 - 2021 Agriculture Sector Plan 2016-2020

	Ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods. Monitor the state of corals and implement coral gardening Conduct training on village based monitoring programs for marine areas ***Responsibility: MAF / MNRE / Villages***	Improve resilience of coral reef ecosystem to combat climate change Reduce loss of marine habitats Protects marine biodiveristy	Fisheries Division to advice villages on the Community-based Fisheries Management Program (CBFMP) – Develop Village Fisheries Management Plans NBSAP 2015-2020	
Wetland and Coastal Area	Replant coastal areas with coastal vegetation plants Establish a wetland conservation program to protect and sustainably manage the Vailoa wetlands and river estuary Implement clean-up campaigns to stop dumping rubbish into the wetland ***Responsibility: MNRE/ Villages***	Reduce rate of coastal erosion Reduce impact from storm surges Discourage sand mining Improve resilience of coastal ecosystems - wetland	Establishment of the wetland conservation site should be guided by legal and institutional framework on biodiversity Declare the wetland as a conservation site Develop a management plan for the wetland NBSAP 2015-2020 Environmental Management Bill 2013 National Parks and Reserves Act 1974 Waste Management Act 2011 Protection of Wildlife Regulation 2004	National Environment Sector Plan 2017-2021

Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plans**

Disturbed forests and plantation areas	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests : Promote and facilitate planting of root-crops (i.e yams, sweet potato which are more resilient to cyclones, droughts and floods. Promote agro-forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases. Diversify into other climate resilient species cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement Sustainable Land management practices Implement integrated pest management programmes ***Responsibility: MAF / CSSP/WIBDI/Farmers Association/ METI/ SBEC / UNDP-GEF-SGP/MNRE / villages***	Improve food security and healthy living and increase community resilience and adaptive response to climate change	MAF CROP Division to support farmers through guidance and trainings from Agricultural experts and awareness programs on crop diversification to suit the prolonged periods of drought or rainy season Provide tools and planting materials to improve crop diversification and resilience – address pest issues etc. This will lead to improve food security Strengthen partnership with farming NGO's such as the: Samoa Farmers Association; Samoa Federated Farmers Incorporated ; Women in Business Inc. and private sector to support rural farmers through training opportunities and marketing productivity Implementation of solutions are guided by the following: Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020	Agriculture Sector Plan 2016-2020

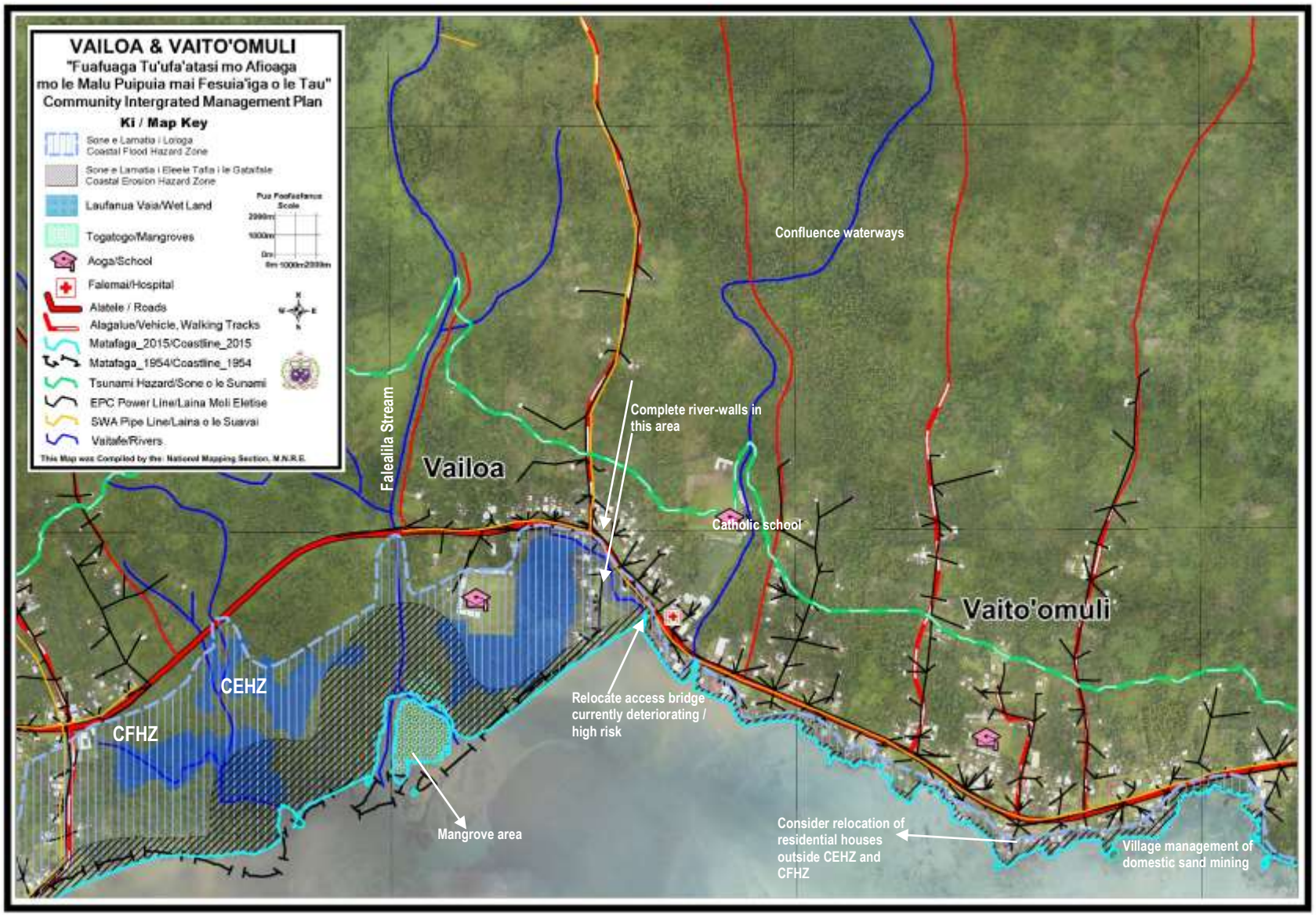
			National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	
Handicrafts derived from natural resources	Provide opportunities for villagers to sell their handicrafts Implement training programs on income generating activities ***Responsibility: MWCSD / NGOs / Villages***	Increase income benefits for vulnerable groups	SBEC to assist in developing business plan trainings for Women's Committee – WIBDI to provide guidance on sustainable financing and production	Community Development Plan 2016-2021

Village Governance	**Best Solutions**	**Guidelines to assist Implementation**	**Comments**
Implement clean-up programs in the village	Conduct routine inspections and remove debris and rubbish from river channels, road side drains and culverts to remove blockages and improve discharge ***Responsibility: Village***	Village Beautification Committee monitor clean-up program Community Development 2016-2021	Village Women's Committtee and Untitled men lead clean-up culverts, drainage and environment
Develop Village By-laws to support CIM Plan implementation	Review existing village bylaws and/or develop new village bylaws that will protect natural resources both marine and terrestrial ***Responsibility: Village / MWCSD***	MWCSD to provide assistance to village in developing by-laws Community Development 2016-2021	Support the development of village by-laws that can guide governing structure for the implementation of government and non-government programs including CIM Plans.

Old Cement Bridge Vailoa village access to the old village on the coast, potential high risk as the bottom is eroding and unstable. Located in the coastal hazard and flooding zone **Photo credit: MNRE-PUMA, 2017**

Waterfall Vailoa village one of the main tourist attraction in the village and a sign of abundant water supply. **Photo credit: MNRE-PUMA, 2017**

Vailoa Map Village



4.2 Vaitoomuli Village Interventions

Infrastructure	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plans
Village infrastructure in hazard zones include: Households Schools Churches Businesses, Women's Committee House	Relocate outside hazard zones Investments within the hazard zone adopt appropriate mitigation measures Raise building foundations at a level that takes into account the CFHZ in the vicinity ***Responsibility: Village/Families / MWTI/MWCSD***	Reduce cost in ongoing maintenance mitigate potential damage from coastal erosion and flooding accommodating the hazard.	PUMA Act 2004 Application of the National Building Code (Draft Sept 2016) and permit compliance	Community Integrated Management Strategy, August 2015
Village Access Road	Reconstruction and sealing of village access/plantation road: Length: 1.5km Estimated Cost: SAT$ 545,200.00 ***Responsibility: LTA / village***	Improve rate of recovery Increase number of families relocate to higher grounds	Construction of access roads should be guided by the following: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) Vulnerability Assessment of the Samoa Road Network (2017) National Infrastructure Strategic Plan (NISP) 2011	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
Maintenance of Drainage to reduce impact from flooding	Maintenance of road side drains and regular inspection of drainage system;	Improved coastal protection Reduced potential for flooding in coastal areas Improved lifeline	Programme drainage in budget and work programme Prepare assessment of road drainage systems	Community Integrated Management Strategy, August 2015

	Responsibility: MWTI and LTA	access Safer village houses and roads	Implementation of maintenance for national roadside drainage should be guided by the following: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) National Infrastructure Strategic Plan (NISP) 2011	Transport Sector Plan 2014-2019
Village pool	Upgrade village pool with improved wall structures Test water quality Estimated cost: SAT$20,000.00 Total Benefits: SAT$33,600.00 BCA: 1.7 ***Responsibility: MWTI / CSSP / NGO/ MOH/ Village***	Improve water quality and alternative source of water supply during time of drought period Reduce sanitation problems and improve hygiene and health living Reduce potential for contamination	MNRE to ensure that proper guidelines are followed by community for improving pool: Environmental and Social Safeguard Policy Samoa Code of Environmental Practice (2007) PUMA Act 2004	Water and Sanitation Sector Plan 2016-2020 Community Development Plan 2016-2021 National Environment Sector Plan 2017-2021

Other CIM Plan issues identified and solutions

Infrastructure	Solutions/ Issues	Comment
Primary School	Adding additional buildings for the school needs to be elevated above the flood zone height. ***Responsibility: MESC / Village***	The community requested for additional school buildings to accommodate for the growing number of students. The current location of the Primary School is within the hazard zone and ideally in the long term the school needs to be relocated further inland on higher grounds away from risk prone areas to extreme events or cyclones.

		In the immediate term, the village can mitigate and accommodate the hazard by elevating the level of new buildings above the flood height.
Drainage	Undertake village inspection of culverts along inland / main roads; - Implement district/village drainage/ culvert clean-up and awareness program Prepare a local education programme on need for keeping drainage systems clean Women's committee monitor hygiene and clean-up program Village beautification committee to monitor clean-up program for drainage and culverts ***Responsibility: Village***	Prepare a local education programme on need for keeping drainage systems clean Women's committee monitor hygiene and clean-up program Village beautification committee to monitor clean-up program for drainage and culverts

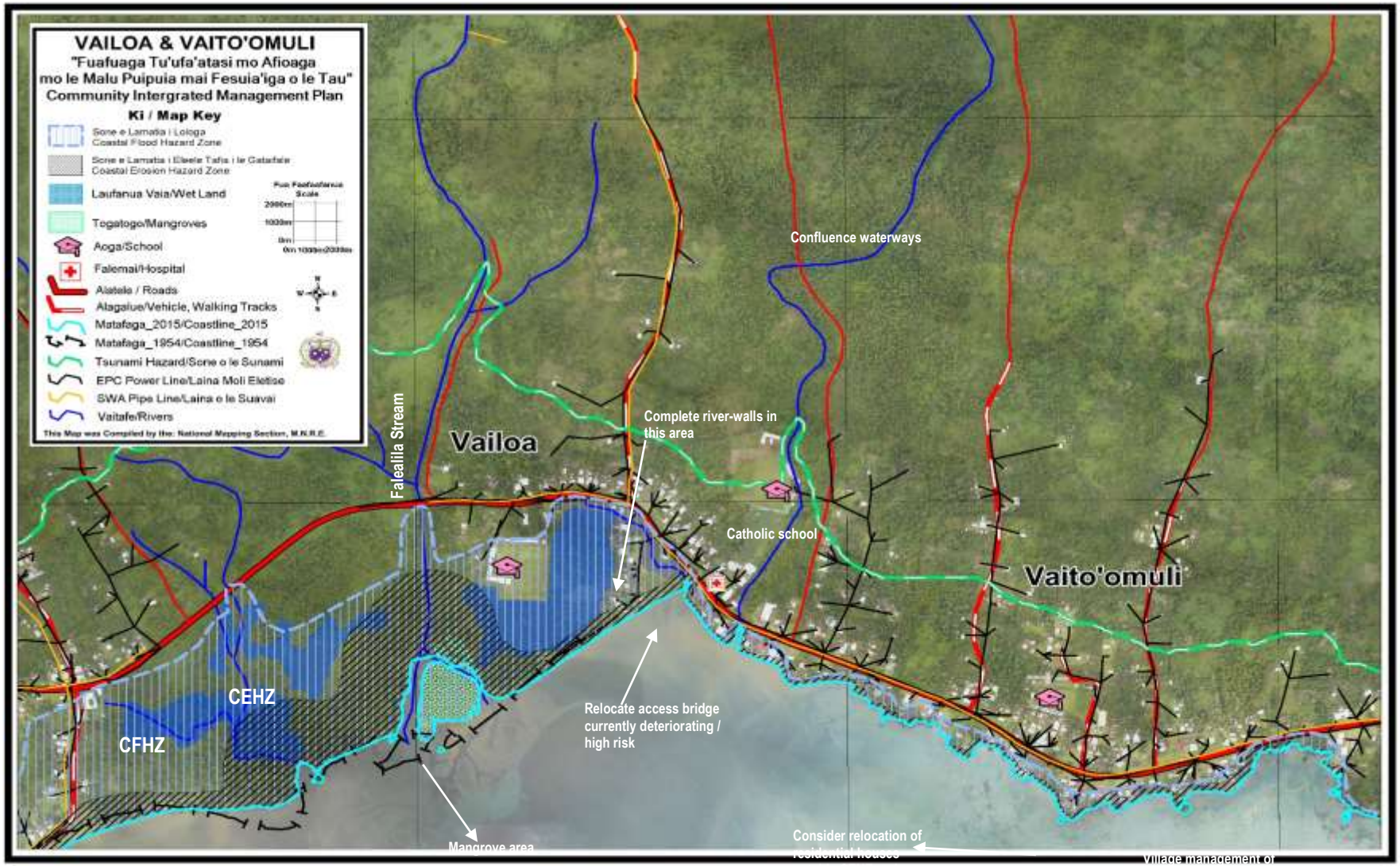
Environment & Biological Resources	**Best Solutions**	**Other Benefits**	**Guideline to assist Implementation**	**Relevant Sector Plans**
Upland forest and watershed areas need protection and management	Implement forest restoration programs to protect Upland forest and watershed areas Restrict plantation to lowland areas below 500m elevation Develop and implement invasive species eradication programs Develop a Management Plan for the Upland Forest and Watershed Area of the District ***Responsibility: MNRE / villages / MWCSD***	Minimize forest loss and land clearance Improve ecological functions and resilience of forest Increases water volumes in catchments Minimize soil erosion	Provide technical guidance using existing strategies and plans already put in place. NBSAP 2015-2020 National Water Resource Management Strategy 2007-2017 National Invasive Species Plan 2008-2011 Forestry Restoration Operational Plan 2016-2020 Environmental Management Bill 2013 National Parks and Reserves Act 1974 Protection of Wildlife Regulation 2004 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting	National Environment Sector Plan 2017-2021 Water and Sanitation Sector Plan 2016-2020

			Strategy 2015-2020 Forest Management Act 2011	
Conservation of Forest Area	Protect the remaining native upland forest – declaring it as part of the Tafua and Mauga o Salafai Upland forest conservation area Monitor logging activities and limit to lowland forest area Implement replanting of native forestry species Re-enforce the indigenous logging legislation or provide appropriate requirements for individual portable sawmills ***Responsibility: MNRE/village***	Restore resilience and ecological function of upland forest Increase resilience against climate change impacts by improved biodiversity Reducing risk of forest fire and providing land stabilization Reduce erosion, reduce landslips and maintaining water quality Contribute to Samoa 2million tree planting for carbon offset	MNRE-Forestry Division to provide advice and technical support to communities on upland forest restorations guided by: Development of Savaii Upland Forest Management Plan National Water Management Strategy 2007-2017 National Action Programme to combat land degradation and mitigate effects of drought 2015-2020 NBSAP 2015-2020 Forestry Restoration Operational Plan 2016-2020 Two Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011 National Water Resources Management Strategy 2007-2017	National Environment Sector Plan 2017-2021 Water and Sanitation Sector Plan 2016-2020

Marine Environment needs protection and management	Strengthen monitoring the fishery reserve and expand the protection of coastal and inshore marine area, Remove crown of thorns from inshore area and monitor coral bleaching Replicate Fishery reserve to nearby villages ***Responsibility: MNRE / MAF / Village***	Mitigate beach coastal erosion Reduce coral bleaching Managed marine areas creates awareness that will provide biological abundance with spill-over effect beyond the protected area boundaries. Benefits are sustainable livelihoods, improved food security.	Maintenance of marine reserve and protected area requires community consent and government approval along with biological surveys. Fisheries Division to advice villages on the Community-based Fisheries Management Program (CBFMP) – Develop Village Fisheries Management Plans NBSAP 2015-2020	National Environment Sector Plan 2017 - 2021 Agriculture Sector Plan 2016-2020

Vaitoomuli coastal spring pool use as back-up water supply for bathing. The rock-wall surrounding the pool is eroding. **Photo credit: MNRE-PUMA, 2017**

Vailoa village and Vaito'omuli village Map



4.3 Fa'ala Village Interventions

Infrastructure	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plans
Seal Access Road	Reconstruction and sealing of village access/plantation road: Length: 1.5km Estimated Cost: SAT$ 545,200.00 ***Responsibility: LTA / village***	Improve rate of recovery Increase number of families relocate to higher grounds	Construction of access roads should be guided by the following: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) National Infrastructure Strategic Plan (NISP) 2011 Vulnerability Assessment of the Samoa Road Network (2017)	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
Village infrastructure in hazard zones include: Households Schools Churches Businesses, Women's Committee House	Relocate outside hazard zones Investments within the hazard zone adopt appropriate mitigation measures Raise building foundations at a level that takes into account the CFHZ in the vicinity ***Responsibility: Village/Families / MWTI/MWCSD***	Reduce cost in ongoing maintenance mitigate potential damage from coastal erosion and flooding accommodating the hazard.	PUMA Act 2004 Application of the National Building Code (Draft Sept 2016) and permit compliance	CIM Strategy (2015)
Maintenance of Drainage to reduce impact from flooding	Maintenance of road side drains and regular inspection of drainage system;	Improved coastal protection Reduced potential for flooding in coastal areas Improved lifeline	Programme drainage in budget and work programme Prepare assessment of road drainage systems	Community Integrated Management Strategy, August 2015

	Responsibility: MWTI and LTA	access Safer village houses and roads	Implementation of maintenance for national roadside drainage should be guided by the following: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) National Infrastructure Strategic Plan (NISP) 2011	Transport Sector Plan 2014-2019

Other CIM Plan issues and solutions

Infrastructure	Solutions/ Issues	Comment
SWA Water	Request for SWA to install another sub-main pipe for resident's inland, as the main piped is on the main road. ***Responsibility: SWA / village***	This has no climate resilience benefit, it is more an issue for SWA to address.

Environment & Biological Resources	Best Solutions	Other Benefits	Guideline to assist Implementation	Relevant Sector Plans
Sand mining for commercial and domestic use affecting the marine and coastal environment as well as terrestrial resources	Assess and identify sustainable sources of sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for sand mining Extractive industries (mining) monitored and corrected in the	Village gains benefit from sand mining activities Reduce impact to natural coastal protection mechanism via control of scale and site of extraction Improve village resource management and sustainable	Follow existing MNRE guidelines for sand mining or extracting such as: MNRE monitoring of sand extraction operations Secure relevant permits before any sand mining occurs Incorporate environmental and	National Environment Sector Plan 2017 - 2021

	riverbank and coastal fringe Strengthen sand mining monitoring and enforcement Mass media awareness on sustainable sand mining practices Develop sand mining regulation ***Responsibility: MNRE / District & Village***	development Minimize impacts of coastal inundation and erosion Improve the sustainable management of sand as a natural resource	social safeguards concerns including consultations with any affected community Village environmental management plans established including annual monitoring systems For access to sites, obtain written consents from Alii Faipule and landowners. Lands and Survey Environment Act 1989 Consideration of EIA assessment of impact prior to any extraction PUMA Act 2004 NAP – Sustainable Land Management Plan 2015-2019 (draft) |Sand Mining Policy 2001 Draft Soil Resource Management Bill 2018	
Marine Environment needs protection and management	Strengthen monitoring the fishery reserve and expand the protection of coastal and inshore marine area, Remove crown of thorns from inshore area and monitor coral bleaching Replicate Fishery reserve to nearby villages	Mitigate beach coastal erosion Reduce coral bleaching Managed marine areas creates awareness that will provide biological abundance with spill-over effect beyond the protected area boundaries. Benefits are sustainable livelihoods,	Maintenance of marine reserve and protected area requires community consent and government approval along with biological surveys. Fisheries Division to advice villages on the Community-based Fisheries Management Program (CBFMP) – Develop Village Fisheries Management Plans NBSAP 2015-2020	National Environment Sector Plan 2017 - 2021 Agriculture Sector Plan 2016-2020

	Responsibility: MNRE / MAF / Village	improved food security.		
Forest (Coastal lowland forest)	Monitor logging activities and limit to lowland forest area Implement replanting of native forestry species Re-enforce the indigenous logging legislation or provide appropriate requirements for individual portable sawmills Strengthen the management of the Tafua Peninsula Forest Reserve Allow for natural regeneration of coastal plant seedlings ***Responsibility: MNRE/village***	Restore resilience and ecological function of upland forest Increase resilience against climate change impacts by improved biodiversity Reducing risk of forest fire and providing land stabilization Reduce erosion, reduce landslips and maintaining water quality Contribute to Samoa 2million tree planting for carbon offset	MNRE-Forestry Division to provide advice and technical support to communities on upland forest restorations guided by: Development of Savaii Upland Forest Management Plan National Water Management Strategy 2007-2017 National Action Programme to combat land degradation and mitigate effects of drought 2015-2020 NBSAP 2015-2020 Forestry Restoration Operational Plan 2016-2020 2 Million Tree Planting Strategy 2015-2020	NESP 2017-2021 Water and Sanitation Sector Plan 2016-2020

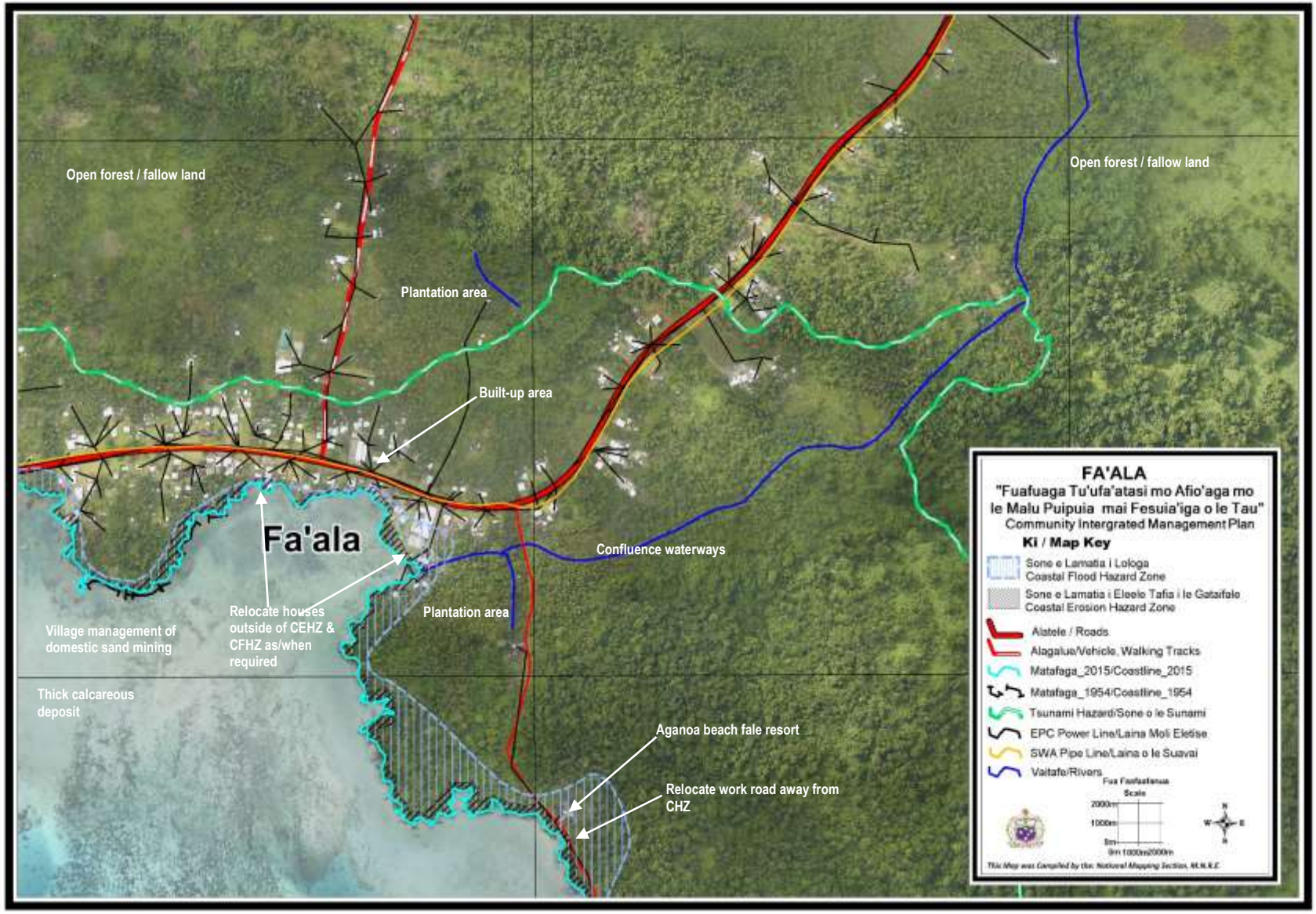
Livelihood and Food Security	**Best Solutions and Other Solutions Proposed**	**Other Benefits**	**Implementation Guidelines**	**Prioritization immediate actions**
Disturbed forests and plantation areas	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests : Promote and facilitate planting of root-crops (i.e yams, sweet potato which are more resilient to cyclones, droughts and floods. Promote agro-forestry and mixed planting	Improve food security and healthy living and increase community resilience and adaptive response to climate change	MAF CROP Division to support farmers through guidance and trainings from Agricultural experts and awareness programs on crop diversification to suit the prolonged periods of drought or rainy season	Agriculture Sector Plan 2016-2020

	including fruit trees species to reduce crop vulnerability to pests and diseases. Diversify into other climate resilient species cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement Sustainable Land management practices Implement integrated pest management programmes ***Responsibility: MAF / CSSP/WIBDI/Farmers Association/ METI/ SBEC / UNDP-GEF-SGP/MNRE / villages***		Provide tools and planting materials to improve crop diversification and resilience – address pest issues etc. This will lead to improve food security Strengthen partnership with farming NGO's such as the: Samoa Farmers Association; Samoa Federated Farmers Incorporated ; Women in Business Inc. and private sector to support rural farmers through training opportunities and marketing productivity Implementation of solutions are guided by the following: Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	

Village Governance	Best Solutions and Other Solutions Proposed	Implementation Guidelines	Comments
Develop Village By-laws to support CIM Plan implementation	Review existing village bylaws and/or develop new village bylaws that will protect natural resources both marine and terrestrial ***Responsibility: Village / MWCSD***	MWCSD to provide assistance to village in developing by-laws Community Development 2016-2021	Support the development of village by-laws that can guide governing structure for the implementation of government and non-government programs including CIM Plans.
Drainage	Undertake village inspection of culverts along inland / main roads; - Implement district/village drainage/ culvert clean-up and awareness program ***Responsibility: Village***	Community Development 2016-2021 MWCSD to provide assistance to district /village in developing by-laws	Prepare a local education programme on need for keeping drainage systems clean Women's committee monitor hygiene and clean-up program Village beautification committee to monitor clean-up program for drainage and culverts

Fa'ala has a number of fishermen in their community and fishing is part of the main livelihood
Photo credit: MNRE-PUMA, 2017

Fa'ala Village Map



4.4 Tafua Tai Village Interventions

Infrastructure	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plans
Drainage (coastal)blockage contributes to flooding in coastal area	Maintenance of road side drains and regular inspection of drainage system; - enlarge undersized road side drains to divert water away from the school grounds and hospital so it flows directly into the sea ***Responsibility: MWTI and LTA***	Improved rate of recovery Reduce potential for flooding in village areas Safer village houses and roads Improved safety community and resilience	Implementation of activities to following existing guidelines: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) National Infrastructure Strategic Plan (NISP) 2011 Programme road safety activities into budget and work programme Programme drainage in budget and work programme Prepare assessment of road drainage systems Prepare a local education programme on need for keeping drainage systems clean	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
Electricity Supply	Install and connect power supply for inland residents Install streetlights along the roads where needed for community safety. Relocate overhead	Maintain electricity supply at all times including during natural disasters. Avoid accidents from fallen electricity posts.	Monitor distribution networks to avoid overloading poles and contributing to line failures EPC to installed electricity lines to reach families residing inland and streetlights	Samoa Energy Sector Plan 2017-2022

	lines to a more resilient location when being replaced ***Responsibility: EPC / MWTI / Villages***		Consider energy efficiency developments for communities using renewable energy guided by existing framework – Development of a Renewable Energy and Energy Efficiency Framework, 2016	

Other CIM Plan issues identified and solutions

Infrastructure	Solutions/ Issues	Comment
Access Road	Widen existing access road leading to the ocean to either 1 or 2 meters on each side, for road safety. Request to upgrade and tar sealed two access roads leading to the beach ***Responsibility: LTA / village***	This request from village has no strong climate resilience outcome. However for community safety they are asking for road widening to safeguard pedestrians from increase road traffic. Similar to the above request, tar sealing two access road has no strong climate resilience outcome. Approximate length: 800m each (1.6km for 2 roads) Estimated Cost: SAT$ 1,613,320.00 Benefits: SAT$2,766,000.00 BCA: 1.7 The estimated costing provided by the Civil Engineer in the event the village has funding for road improvement.
Community Pool	Village requested if possible to rehabilitate existing pool within the coastal area. ***Responsibility: village***	Noted from site assessment the current status of the pool it is filled with silt. The water is brackish and it will be too costly to upgrade. There is no climate resilience strong justification for upgrading the pool given the current water from SWA runs all year round and most families also have water tanks.

Environment & Natural Resources	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Sand mining for commercial and domestic use affecting the marine and coastal environment as well as terrestrial resources (mining activity on the side of Tafua crater)	Enforce close monitoring of extractive activities around the Tafua crater to prevent risk of a landslide Assess and identify sustainable sources of sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for sand mining Extractive industries (mining) monitored and corrected in the riverbank and coastal fringe Strengthen sand mining monitoring and enforcement Mass media awareness on sustainable sand mining practices Develop sand mining regulation ***Responsibility: MNRE / District & Village***	Village gains benefit from sand mining activities Reduce impact to natural coastal protection mechanism via control of scale and site of extraction Improve village resource management and sustainable development Minimize impacts of coastal inundation and erosion Improve the sustainable management of sand as a natural resource	Follow existing MNRE guidelines for sand mining or extracting such as: MNRE monitoring of sand extraction operations Secure relevant permits before any sand mining occurs Incorporate environmental and social safeguards concerns including consultations with any affected community Village environmental management plans established including annual monitoring systems For access to sites, obtain written consents from Alii Faipule and landowners. Lands and Survey Environment Act 1989 Consideration of EIA assessment of impact prior to any extraction PUMA Act 2004 NAP – Sustainable Land Management Plan 2015-2019 (draft) |Sand Mining Policy 2001 Draft Soil Resource Management Bill 2018	National Environment Sector Plan 2017-2021

Marine Environment needs protection and management	Establish a Marine fisheries reserves for village Collect and dispose of crown-of-thorns (COTs) on a regular basis to prevent major outbreaks Ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods. Monitor the state of corals and implement coral gardening Conduct training on village based monitoring programs for marine areas ***Responsibility: MAF / MNRE / Villages***	Provides a sustainable source of food for the village Reduces coral bleaching and increases growth of new coral Improve resilience of coral reef ecosystem to combat climate change Reduce loss of marine habitats Protects marine biodiversity	Maintenance of marine reserve and protected area requires community consent and government approval along with biological surveys. Fisheries Division to advice villages on the Community-based Fisheries Management Program (CBFMP) – Develop Village Fisheries Management Plans NBSAP 2015-2020	National Environment Sector Plan 2017 - 2021 Agriculture Sector Plan 2016-2020
Forest (Coastal lowland forest)	Monitor logging activities and limit to lowland forest area Implement replanting of native forestry species Re-enforce the indigenous logging legislation or provide appropriate requirements for individual portable sawmills Strengthen the management of the Tafua Peninsula Forest Reserve Allow for natural regeneration of coastal plant seedlings ***Responsibility: MNRE/village***	Restore resilience and ecological function of upland forest Increase resilience against climate change impacts by improved biodiversity Reducing risk of forest fire and providing land stabilization Reduce erosion, reduce landslips and maintaining water quality Contribute to Samoa 2million tree planting for carbon offset	MNRE-Forestry Division to provide advice and technical support to communities on upland forest restorations guided by: Development of Savaii Upland Forest Management Plan National Water Management Strategy 2007-2017 National Action Programme to combat land degradation and mitigate effects of drought 2015-2020 NBSAP 2015-2020 Forestry Restoration Operational Plan 2016-2020 Environmental Management Bill 2013	National Environment Sector Plan 2017-2021 Water and Sanitation Sector Plan 2016-2020

			National Parks and Reserves Act 1974 Protection of Wildlife Regulation 2004 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	

Livelihood and Food Security	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Pest management	Implement fencing program to remove wild boars and domesticated pigs damaging plantations ***Responsibility: Village***	Reduce spread of invasive weeds Reduce damages to plantations and increase productivity	MAF CROPs / Livestock Division to provide support and advice to farmers on fencing and managing domesticated pigs	Agriculture Sector Plan 2016-2020

Village Governance	Best Solutions	Implementation Guidelines	Comments
Village By-laws	Implement village by-laws for community to follow and include protection of natural resources both marine and terrestrial Additional: Strengthen village governance ***Responsibility: Village / MWCSD***	MWCSD to provide assistance to village in developing by-laws Community Development 2016-2021	Support the development of district / village by-laws that can guide governing structure of village and the implementation of government and non-government programs including CIM Plans.

Extractive sand mining on the side of the Tafua crater causing soil erosion and the high risk of a landslide during extreme heavy rainfall.
Photo credit: MNRE-PUMA. 2017

Extractive sand mining on the side of the Tafua crater
Photo credit: MNRE-PUMA, 2017

High risk of a land collapse during heavy rainfall season – hole beneath the Tafua crater.
Photo credit: MNRE-PUMA, 2017

Tafua Village Map