

Community Integrated Management Plan

Anoama'a West 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 (MWCSO)
 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 Anoama'a West (Saoluafata, Fusi, Salelesi, Eva, Solosolo, Luatuanu'u and Leusoali'i villages).

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

Date of Signing: 22 June 2018

Representative:

Signature:

Saoluafata Village

- Mao Peter Rasch
- Lesila Vili
- Pati Vili
- Vaivao Viliamu



Four handwritten signatures in blue ink, each on a horizontal line. The signatures are: 1. Mao Peter Rasch, 2. Lesila Vili, 3. Pati Vili, and 4. Vaivao Viliamu.

Fusi Village


- Faifai Lemo
- Kalala Lauie
- Fuatavai Euta
- Talaifaga Vise
- Savea Lene Solofa





Five handwritten signatures in blue ink, each on a horizontal line. The signatures are: 1. Faifai Lemo, 2. Kalala Lauie, 3. Fuatavai Euta, 4. Talaifaga Vise, and 5. Savea Lene Solofa.

Salelesi Village

- Asa Michael Leausa
- Togi Savea
- Peka Sogialofa
- Sikione Tamate
- Faaga Paulo Teniteni Vui


(Asa Michael Leausa)


(Togi Savea)


(Peka Sogialofa)


(Sikione Tamate)


(Faaga Paulo Teniteni Vui)

Eva Village

- Leusu Seumanutafa
- Sina Leota
- Matamea Faafetai
- Seumanututusa Tavita
- Gafataumalo Ike


(Leusu Seumanutafa)


(Sina Leota)


(Matamea Faafetai)


(Seumanututusa Tavita)


(Gafataumalo Ike)

Solosolo Village

- Ilaoa Tuua
- Vainiu Seinafo
- Savea Sio
- Peni Too


(Ilaoa Tuua)


(Vainiu Seinafo)


(Savea Sio)


(Peni Too)

Luatuanuu Village

- Autu Lolesio
- Tuafasa Alofae
- Malaga Simone
- Malaga Aukusitino
- Valentine Junior M.






Leusoalii Village

- Malauia Afa
- Auloto Anosi
- Faleafa Amuula
- Peni Too
- Ana Mulitalo







The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Anoama'a West 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.

1. Introduction to the CIM Plan

1.1 The Strategic Vision

The District Community Integrated Management (CIM) Plan for Anoama'a West District 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).***

1.2 The Aim of the CIM Plan

The aim of the CIM Plan is to help communities and government improve 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.

1.3 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.

2. Implementation Guidelines

2.1 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.

2.2 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.

2.3 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).

3. Description of Anoama'a West District

3.1 Physical and Natural Resource Setting

The Faipule District of Anoama'a West is located on the north-eastern coast of the island of Upolu, to the east of Apia. It includes the villages of Saoluafata, Fusi, Salelesi, Eva, Solosolo, Luatuanu'u and Leusoali'i. The average annual rainfall varies with the district receiving above the national average for rainfall. Land use is open forest, secondary forest and plantation. The narrow flat coastal plateau has small areas of houses positioned close to the coast main road and short set back from the coastline. Inland from the coast the landscape is described as hills, steep-lands and intervening valleys. The district has mainly wet climate including small areas with moderate dry season near the coast (Dews, 2017).

The Anoama'a east and west districts are characterised by a series of steep headlands with bays in between. The bays vary in length with the larger bays providing the setting for the villages of the Districts. The hilly and steep nature of the topography provides some protection for the natural vegetation although this also makes the villages highly vulnerable to flooding from upland rivers and streams. Short, fast flowing rivers and streams flow through most of the villages draining the steep catchments behind. The main river running through this district is the Namo River. The coast of Anoama'a West is exposed to the north and east and the steep land behind the villages restricts relocation options for the main infrastructure. There is no significant area of sheltered lagoon. Beaches in the bay areas are made up of a mixture of fine coral sand, unbroken, dead coral and fine, black, river sand near the mouths of the main rivers.

The reef systems are mostly broken opposite the rivers and streams and from past volcanic activity that have left rocky outcrops offshore. Where there is a coral reef it is generally less than 500 m offshore. There is evidence of beach erosion mostly towards the eastern ends of the bays with erosion occurring at the western end of the bays. The exception to this is at Solosolo where there is accretion at the western end of the bay. Most of the beaches are "protected" by existing seawalls but these are not always located in the best place to protect against erosion and are structurally weak (Reti, 2017).

The construction of seawalls in many places in the Anoama'a districts has resulted in the complete removal of some littoral vegetation which had originally provided better protection from soil erosion as opposed to the newly constructed seawalls. In some places of the Anoama'a west district, the seawalls have created more erosion problems for other places that had not experienced such problem before. Furthermore, because the seawalls were built without solid foundations, many of them are already collapsing and creating more problems for the district (Reti, 2017). In Eva for instance, the tidal stream and the main East Coast Road crossing with the effect of a seawall has created problems for the drainage system and stream alignment for Eva and a sand spit has extended due to longitudinal drift (Townsend, 2017).

The main East Coast Road runs through the Anoama'a West district. This road is considered to be **highly** susceptible because there is no alternative access along the East Coast. The main road acts as a barrier to flood waters prolonging recovery. Drainage under the road is not adequate for the volume of flood waters. There are 5¹ access roads² and several tracks within this district.

At the Anoama'a west district, village activities are dominated by plantation work on the tops of the headlands and inland hills. Fishing is restricted because the coast is generally exposed and reef and lagoon fishing opportunities are limited. Wetland areas along the Anoama'a west coast at Saoluafata and Fusi are **moderately** susceptible to a variety of hazards including flooding and erosion from the sea, encroachment from new development and contamination from adjacent land-use activities. Risk of flooding at Solosolo is considered to be **moderate to high**. Wetland areas have formed at Saoluafata and Fusi but these have generally been cleared of natural vegetation and village houses have developed around them. Some erosion has occurred along the coast at the outlet of the wetland (Reti, 2017).

Inland development is limited by steep land immediately behind the villages. Plantation and agricultural areas are generally located on the tops of the headlands and hills that run down to the coast at some distance from the villages. The lowland and upland forest areas of Anoama'a east and Anoama'a west are comprised mainly of disturbed secondary forests dominated by village plantations (mainly coconuts) and cattle grazing. The existence of

¹ Eva Access Road, Fusi Road, Solosolo-uta Road, Leusoalii Access Road and Luatuanuu Access Road

² LTA Samoa Infrastructure Asset Management Database

inland settlements with their own agricultural development needs exacerbate the land clearing problem. Wind damage by cyclones Ofa and Val in 1990 and 1991 respectively are still evident in high areas and the merremia vine has taken over most of the open areas. The tamaligi paepae (*Paraserianthes falcataria*) is common on exposed inland slopes and roads of Anoama'a west making them extremely vulnerable to strong winds. The species have lateral root systems and can be easily blown over by strong winds which sometimes result in land slips and soil erosion (Reti, 2017).

Most of the beaches are protected by existing seawalls but these are not always located in the best place to protect against erosion. The villages are located on flat areas of alluvial deposits in the larger bays. These deposits vary in height above sea level with drainage and flooding being a problem in the eastern villages of Saoluafata, Fusi, Salelesi and Eva but less of an issue for Solosolo, Luatuanu'u and Leusoali'i. These villages are affected more by landslips which cut off the East Coast Road during extreme weather events.

3.2 Social and Economic Setting

The Anoama'a West District currently has a population of 4,996. Total male 2,571, female 2,425³. The villages vary in size. The largest are Saoluafata⁴ and Solosolo⁵ while the most spread out are Luatuanu'u and Leusoali'i. There are four primary schools⁶ in the district with the main district school, Anoama'a College, servicing both Anoama'a West and Anoama'a East, located at Saoluafata.

The main East Coast Road is considered an important part of the district's infrastructure and is in good condition. This road is sealed along its entire length and has numerous bridges and fords crossing the rivers and streams in the District. It is the lifeline access for districts located at the most eastern tip of Upolu commuting to Apia. It is also the same road used by the Anoama'a West residents to access the hospital at Lufilufi. This same East Coast Road runs all the way to the west, connecting to the Apia CBD where the majority of residents travel to sell their local produce. At Saoluafata, Fusi and Eva the East Coast Road has been relocated outside the CEHZ and as far to the back of the CFHZ as topography and existing coastal development will allow. At Salelesi, Luatuanu'u and Leusoali'i the road passes along the shoreline in both the CEHZ and CFHZ, while at Solosolo it cuts across the CEHZ behind most of the village. Between the villages it follows the coast at the base of the headlands and cliffs that separate them. In these areas the road is in the CLHZ at the base of the headland cliffs.

Primary services such as power and telephone generally follow the main road and are at **moderate** risk and susceptibility to flood and erosion damage. Consistent and clean water supply is a concern for a number of villages, especially communities that live away from existing pipelines. A recent survey⁷ of 25 districts from Upolu and Savaii recorded Anoama'a West as the highest district with poor water supply⁸. Anoama'a West is serviced through an independent water scheme reservoir.

The main economic activities for the District are those in Apia, which provides significant employment opportunities for people in the District. The CDCRM survey recorded Anoama'a West with 35.5% of its total population earning income from salaries. This is the highest for all districts surveyed. A number of small stores are located throughout the District in each of the villages. Village activities are dominated by plantation work on the tops of the headlands and inland hills. Fishing is restricted because the coast is generally exposed and reef and lagoon fishing opportunities are limited. The three livelihood zones that occur in Anoama'a West are: coral reef and lagoon system that supports fisheries including mangroves; small household farming plots close to the houses along the narrow coastal areas; and Upland forest area used for plantations and selective timber products mainly for carving or artifacts (Dews, 2017).

³ SBS 2016 Village profile: census preliminary count 2016

⁴ Population = 825

⁵ Population = 1,851

⁶ Luatuanuu Primary School, Salelesi Primary School, Saoluafata Primary School and Solosolo Primary School

⁷ GEF-UNDP EWACC/DMO. 2017. Community Disaster and Climate Risk Management (CDCRM) Household Survey - Final Report

⁸ 166 families had either no access or non consistent access to clean water

3.3 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 Anoama'a West.

For the entire district there is about 9,097 hectares of land. There are approximately 1,036 buildings in the district. About 14.39 hectare is in the Tsunami shore exclusion zone (Red zone) and **22** buildings are in this zone. There are **352 buildings** within the CFHZ and CEHZ. These buildings need to be relocated or have their floors reinforced and raised above flooding level. Part of the district is also covered by the Coastal Landslip Hazard Zone and about **22** buildings of the district are in this hazard zone. There are **394** buildings within the district that is in the Watershed Management Riparian Zone. The Watershed Management Riparian Zone is a 20m buffer on either side of the river banks. Healthy riparian areas are vital to the health of stream ecosystems and the entire watershed as well. Many of the threats to rivers and streams are directly related to physical changes to these areas and loss of vegetation. This district is prone to landslips and it is therefore recommended that a topographic and geomorphological assessment be carried out first if construction of any infrastructure is proposed within this buffer zone. To mitigate inland flooding, the culverts and drainage need to be improved. There are approximately 12 rivers running through this district which is exacerbating landslips.

4. Anoama'a West District Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Slope stabilization and road armouring to avoid landslips and erosions in most high risk hazard zones	<p>Implement slope stabilization or 'forced collapse' under controlled conditions at most vulnerable landslide areas of Anoama'a West as identified in the <i>Vulnerability Assessment of the Samoa Road Network</i> report</p> <p>Reduce sediment loads and loss of top soil by discouraging farming on steep slopes and keeping livestock in areas away from wetlands and watershed sites</p> <p>Government, Village and landowners to liaise and collaborate on processes needed to protect upland catchment area, riverbanks from land clearing and developments</p> <p>Responsibility: LTA/MWTI/ MNRE/ Villages</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Climate proof national road network</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and landslides</p> <p>Maintain lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>Implement Anoama'a West District Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>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</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district</p> <p>Include in budget programming CBA, design and construction</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>Transport Sector Plan 2014-2019 Goal 2</p> <p>NISP 2011 (KESO 5 D&E)</p>
Parts of main East Coast Road exposed to extremely high risk ⁹ hazard zones	<p>Continue to upgrade roads, upsize ocean outfalls and improve drainage systems at junctions of main road and Solosolo uta Rd, Eva Access Road, Fusi Saoluafata and Manunu Roads to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district</p> <p>Designation of the IFHZ, CEHZ</p>	<p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p>

⁹ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	<p>accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Assess and upgrade approved access roads to include adequate sized culverts</p> <p>Implement regular drainage inspection and maintenance</p> <p>Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ District/ Village /Families</p>	<p>from coastal erosion and natural disasters</p> <p>Maintains lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	
Flood protection measures for fords and bridges	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Leusoali'i, Luatuanu'u, Eva, Solosolo and Fusi</p> <p>Ensure river channel upstream is cleared and maintained regularly</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings</p> <p>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p> <p>Responsibility: MWTI/ LTA/MNRE/ District/ Village</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Maintains lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>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</p> <p>Include in budget programming CBA, design and construction.</p> <p>Designation of the IFHZ as an “at risk” zone with appropriate landuse planning controls and</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

			restrictions	
Drainage systems require maintenance and upgrade in high risk areas of main East Coast Road	<p>Assess and upgrade culverts and cross drainage on main East Coast Road especially at junctions with access roads sitting within combined hazard zones– in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Introduce new and widen existing culverts in wetland areas to improve tidal flow and fish passage in the wetland area</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>District to regulate developments near and around waterways and drainage connecting to main East Coast Road</p> <p>Responsibility: LTA /MWTI/MWCSD/ District/Village/ Families</p>	<p>Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Use existing information for guidance but not limited to: <i>“Vulnerability Assessment of the Samoa Road Network (2017)”</i>; <i>“Review of National Road Standards in Samoa (2016)”</i>; <i>“Samoa Code of Environmental Practice (2007)”</i></p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Anoama’a West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Village houses, schools, churches and government assets in extremely high risk hazard zones	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>

	<p>immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families / MWTI / MNRE / MWCSD</p>		restrictions	
Reticulated water supply, quality and network to be improved	<p>Extend the water supply to families inland with no access to water</p> <p>Procure rainwater harvesting systems for vulnerable families as a short term solution</p> <p>District and village to support SWA water rationing programmes during times of drought</p> <p>District to support SWA efforts at exploratory boreholes in district</p> <p>District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas</p> <p>Responsibility: SWA / MWCSD / MNRE / District / Village / CSSP</p>	<p>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes</p> <p>Implement SWA (2016) 10 year investment plan to improve water supply network to support all inland families without access to drinking water</p> <p>Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan (2016)</p> <p>Community Engagement Plan</p>
Coastline protection: upgrade seawalls at most high risk hazard zones	<p>Assess and strengthen part of seawalls in most high risk areas to reduce vulnerability of road and other critical village assets in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Reduce impact from coastal erosion</p> <p>Safer villages,</p>	<p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Draft Soil Resource Management Bill</p>

	<p>Clear debris from existing culverts near seawalls to enable free outflow of storm water and streams</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Enforce environmental social safeguards where reclamations, sand mining, extraction or other major coastal works are proposed. Government and village to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/Village /MNRE/MWTI</p>	<p>houses and roads</p> <p>Minimise expenditure on damaged properties & personal assets</p>	<p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Access/work roads require maintenance and upgrade as it exacerbates flooding onto main East Coast Road</p>	<p>Assess and upgrade access/work roads as potential escape routes</p> <p>Construct roadside drainage ditches where needed</p> <p>Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/MWTI/ MNRE/Villages/Families</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>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</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama’a West district</p>	<p>National Disaster Management Plan 2017-2021</p> <p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

Electricity supply	<p>Provide underground lines in the long term</p> <p>Install and connect power supply for inland residents</p> <p>Relocate overhead lines to a more resilient location when being replaced</p> <p>Install streetlights along the roads where needed for community safety</p> <p>Install and connect to solar power supply if made available</p> <p>Families to limit building and developments near electricity posts</p> <p>Responsibility: EPC/ MWTI/ Village/Families</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents from fallen electricity posts</p>	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
Restoration and conservation of upland forest	<p>Protect ridge-top habitats and forests from indiscriminate cultivate and other developments</p> <p>Replant native forestry species of the upland forests to restore resilience and ecological function</p> <p>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area</p> <p>District/village to help promote the development of the agroforestry sector by encouraging relevant land use practice and where possible resolve any associated land disputes</p> <p>Responsibility: MNRE/ MWCSO/ District/ Village/CSSP</p>	<p>Protects and enhance local species diversity</p> <p>Sustains ecosystem services and functions</p> <p>Reduced risk of slips and erosion</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District</p> <p>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</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation in district lands</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village forestry programmes</p>	<p>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops,	<p>Reduced risk of slips and erosion</p> <p>Improve</p>	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for	<p>Water Sector Plan</p> <p>Community Engagement Plan</p>

	<p>especially in catchments, and erosion-prone and sensitive areas</p> <p>Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district</p> <p>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area</p> <p>Replant catchment areas with local species such as tava, and poumuli</p> <p>Responsibility: MNRE/ /SWA/District/Village/ CSSP/GEF-SGP</p>	<p>resilience of catchments</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce contamination of water supply</p>	<p>Anoama'a West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Restoration Operational Plan 2016-2020</p>
Soft coastal protection measures needed for most vulnerable areas	<p>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</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p>Responsibility: MNRE/ MAF/Villages</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Flood protection measures (soft solution to support flood protection measures for infrastructure)	<p>Conduct riparian replanting along river channels and watercourses</p> <p>Encourage planting of indigenous species in conjunction with engineered water land drainage action plans</p> <p>Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood</p>	<p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Safer villages, houses and roads</p>	<p>Implement Integrated Watershed/Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation</p>	<p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	prone areas Responsibility: MNRE/ Villages			
Wetland and mangrove area conservation	<p>Undertake an assessment of tidal flow necessary to maintain a healthy natural environment</p> <p>Limit land clearance and developments adjacent to wetland areas</p> <p>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</p> <p>Village to fence off domestic animals</p> <p>Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI</p>	<p>Protects and enhance local species diversity</p> <p>Sustains ecosystem services and functions</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Implement wetland and mangrove protection programme</p> <p>Identify funding /budget requirements and implementation programme for establishment of protected areas in district</p>	<p>Draft NESP 2017-2021</p> <p>Community Engagement Plan</p>
Illegal rubbish dumping in wetlands, coastal areas, riverbanks and roadsides within fluvial hazard zones	<p>Produce posters and village signs for public awareness</p> <p>Introduce ban on illegal rubbish dumping in district especially around fluvial hazard zones</p> <p>Conduct campaign for public awareness of district ban and establish a "neighbourhood watch" agreement with district to monitor and report on illegal dumping activities</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</p> <p>Responsibility: MNRE/ District/Village/CSSP</p>	<p>Improve health and sanitation</p> <p>Reduce leachate into environment and water supply</p> <p>Reduce contaminant from overland flooding entering sea</p>	<p>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</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the 'polluter pays' principle</p> <p>Develop and register District/Village bylaws to include penalizing illegal rubbish dumping in district lands</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p> <p>Draft NESP 2017-2021</p> <p>Community Engagement Plan</p>
Sand mining	<p>Identify alternative sustainable sources of sand for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p>	<p>MNRE to continue to identify specific sites for inshore/ inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p>	<p>Draft Soil Resource Management Bill</p>

	<p>regulation</p> <p>Village and government to collaborate closely on designated areas for sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p>Responsibility: MNRE/ Village/Families</p>	<p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</p>	<p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities</p>	
Effluent and wastewater management systems	<p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Families in fluvial hazard zones to install proper septic waste disposal systems</p> <p>Implement district/ village drainage cleanup and awareness programme</p> <p>Produce posters and village signs for public awareness</p> <p>Responsibility: MNRE/ MWCSO/ District/ Village</p>	<p>Increase adaptation during extreme weather events</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>Review wastewater strategy/ legislation to include role of Village/District bylaws</p> <p>Develop/Update and register District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to flooding</p> <p>Utilise Hazard maps and Geomorphologist findings to inform location</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management</p>	National Waste Management Strategy
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	<p>Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods</p> <p>Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Conduct pilot site trials for climate ready plant</p>	<p>Improve health through access to clean water and waste management</p> <p>Improve recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p>	<p>Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</p> <p>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</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice,</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	<p>varieties</p> <p>Responsibility: MAF/MNRE/village</p>		<p>seedlings and planting material for village/families as a trial</p> <p>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</p> <p>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</p>	
<p>Pest management; invasive plants and animals</p>	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>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</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>District to fence domestic animals</p> <p>Responsibility: Villages/District/MNRE/MAF/SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>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</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

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	<p>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.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Obtain necessary permits required by law before developments take place</p> <p>Responsibility: MWCSO /MNRE /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Anoama'a West District Map

ANOAMA'A WEST DISTRICT



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

3. Saoluafata Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Drainage systems to be improved in high risk areas especially at junctions of East Coast road and Fusi Saoluafata and Manunu Roads	<p>Continue to assess and upgrade culverts on main and access roads in district to facilitate the overland flow of storm water and reduce flooding - in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Introduce culverts in wetland areas to improve tidal flow and fish passage in the wetland area</p> <p>Implement regular drainage inspection and maintenance</p> <p>Village to conduct regular drainage and waterway clearance behind homes</p> <p>Government to regulate developments and illegal rubbish dumping near and around waterways and drainage connecting to East Coast Road</p> <p>Responsibility: LTA/MWTI/MNRE/MWCSD/Village/Families</p>	<p>Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform design</p> <p>Use existing information for guidance but not limited to: <i>"Vulnerability Assessment of the Samoa Road Network (2017)"</i>; <i>"Review of National Road Standards in Samoa (2016)"</i>; <i>"Samoa Code of Environmental Practice (2007)"</i></p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a West District</p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Village houses, church and government assets in extremely high risk hazard zones	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>

	<p>immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families /MWTI/ MNRE/ MWCS</p>		<p>planning controls and restrictions</p>	
<p>Access/work roads (Saoluafata - Solaua, Manunu, Sauniatu) require maintenance and upgrade as it exacerbates flooding onto main East Coast Road and exacerbate river /ford overruns</p>	<p>Assess and upgrade access/work roads as potential escape routes</p> <p>Construct roadside drainage ditches where needed</p> <p>Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ Villages/Families</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>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</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama’a West district</p>	<p>National Disaster Management Plan 2017-2021</p> <p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
<p>Electricity supply</p>	<p>Provide underground lines in the long term</p> <p>Install and connect power supply for inland residents</p> <p>Relocate overhead lines to a more resilient location when being replaced</p> <p>Install streetlights along the</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents from fallen electricity posts</p>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	<p>EPC Strategic Plan</p>

	<p>roads where needed for community safety</p> <p>Install and connect to solar power supply if made available</p> <p>Families to limit building and developments near electricity posts</p> <p>Responsibility: EPC/ MWTI/ Village/Families</p>			
Coastline protection: seawall upgrade and maintenance	<p>Assess and strengthen part of seawall in relevant area only to reduce vulnerability of road and other critical assets in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Clear debris from existing culverts near seawalls and waterways to enable free outflow of storm water and streams into sea</p> <p>Where reclamations, sand mining, extraction or other major coastal works are proposed, Government and village to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: MNRE/ Village /Families/ CSSP/ MWTI/LTA</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Reduce impact from coastal erosion</p> <p>Safer villages, houses and roads</p> <p>Minimise expenditure on damaged properties & personal assets</p>	<p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district</p> <p>Develop and register Village bylaws to include banning of sand mining and illegal rubbish dumping in waterways and drains</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village replanting and clean up programmes</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plan, National Strategies & Policies
Wetland area conservation	<p>Research new species found in mangrove area</p> <p>Undertake an assessment of tidal flow necessary to maintain a healthy natural environment</p> <p>Limit land clearance and developments adjacent to wetland areas</p> <p>Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a</p>	<p>Protects and enhance local species diversity</p> <p>Sustains ecosystem services and functions</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a West District</p> <p>Identify funding /budget requirements and implementation programme to continue protection of mangrove/wetland areas in district</p>	<p>Draft NESP 2017-2021</p> <p>Community Engagement Plan</p>

	<p>minimum distance of 200m of vegetation is needed</p> <p>Village to fence off domestic animals foraging in wetland areas</p> <p>Responsibility: MNRE / Village /CSSP/ UNDP-GEF SGP/ MWTI</p>			
Water supply from Independent Water Scheme (IWS)/ village reservoir dirty: affected by flooding and unsustainable land practices	<p>Village and relevant authorities to conduct water quality tests on a regular basis</p> <p>Introduce ban on illegal rubbish dumping in district especially around fluvial hazard zones</p> <p>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate agricultural developments around the upland forest area</p> <p>Limit land clearance and agricultural development around intake and boreholes</p> <p>District to support SWA efforts at exploratory intakes and boreholes in district</p> <p>Responsibility: IWS/ MNRE/ SWA/MWCSD/ District/ Village</p>	<p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Develop and register District/Village bylaws to include regulating developments around rivers, streams and water catchment</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a West district</p> <p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>Community Engagement Plan</p> <p>Community Sector Plan</p>
Soft coastal protection measures needed for most vulnerable areas	<p>Re-stock existing nursery</p> <p>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</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	Responsibility: MNRE/ MAF/Villages		Utilise PD3 to inform location for planting/replanting	
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 affecting taro plantations	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>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</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>Responsibility: Villages/District/ MNRE/MAF/ SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>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</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

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	<p>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.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Obtain necessary permits required by law before developments take place</p> <p>Responsibility: MWCSO /MNRE /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Non-CR issues raised during consultations	Proposed Solution	Comments
New diseases found in domestic animals Responsibility: Village /NGOs	Village to seek assistance of veterinarian	Not a CR issue



Saoluafata College compound and school building - safe haven

Saoluafata Village Map

SAOLUAFATA VILLAGE



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

4. Fusi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely high risk hazard zones	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families /MWTI/ MNRE/ MWCS</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>
Drainage systems require maintenance and upgrade in high risk areas of main East Coast Road	<p>Assess and upgrade culverts and cross drainage especially at junction with Fusi Saolufata access road sitting within combined hazard zones– in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Introduce new and widen existing culverts in wetland areas to improve tidal flow and fish passage in the wetland area</p> <p>Implement national</p>	<p>Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises</p>	<p>Use existing information for guidance but not limited to: “<i>Vulnerability Assessment of the Samoa Road Network (2017)</i>”; “<i>Review of National Road Standards in Samoa (2016)</i>”; “<i>Samoa Code of Environmental Practice (2007)</i>”</p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

	<p>standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>District to regulate developments near and around waterways and drainage connecting to main East Coast Road</p> <p>Responsibility: LTA /MWTI/MWCSD/ District/Village/ Families</p>	<p>national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
Flood protection measures for fords and bridges	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Fusi</p> <p>Ensure river channel upstream is cleared and maintained regularly</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings</p> <p>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p> <p>Responsibility: MWTI/ LTA/MNRE/ District/ Village</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Maintains lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>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</p> <p>Include in budget programming CBA, design and construction.</p> <p>Designation of the IFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Sand mining	<p>Identify alternative sustainable sources of sand for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Village and government to collaborate closely on designated areas for sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p>Responsibility: MNRE/Village/Families</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p> <p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</p>	<p>MNRE to continue to identify specific sites for inshore/ inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p> <p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities</p>	<p>Draft Soil Resource Management Bill</p>
Flood protection measures (soft solution to support flood protection measures for infrastructure)	<p>Conduct riparian replanting along river channels and watercourses</p> <p>Encourage planting of indigenous species in conjunction with engineered water land drainage action plans</p> <p>Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas</p> <p>Responsibility: MNRE/Villages</p>	<p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Safer villages, houses and roads</p>	<p>Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation</p>	<p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Soft coastal protection measures needed for most vulnerable areas	<p>Re-stock existing nursery</p> <p>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</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	Responsibility: MNRE/MAF/Villages	Ecosystem Based Approach	supply of climate resilient crops Utilise PD3 to inform location for planting/ re-planting	
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	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>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</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>District to fence domestic animals</p> <p>Responsibility: Villages/District/ MNRE/MAF/ SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>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</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

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	<p>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.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Obtain necessary permits required by law before developments take place</p> <p>Responsibility: MWCSO /MNRE /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Non-CR issues raised during consultations	Proposed Solution	Comments
<p>Funding to procure fencing for domestic animals</p> <p>Responsibility: Village/NGOs</p>	<p>Village to seek financial assistance from other sources</p>	<p>Not a CR issue. Potential for MAF financing if fencing is related to agricultural initiatives</p>



Fusi Village Map

FUSI VILLAGE



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

5. Salelesi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely high risk hazard zones	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families /MWTI/ MNRE/ MWCS</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>
Access/work roads require maintenance and upgrade as it exacerbates flooding onto main East Coast Road	<p>Assess and upgrade access/work roads as potential escape routes</p> <p>Construct roadside drainage ditches where needed</p> <p>Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff</p> <p>Village to regulate developments near and around road shoulders of all access roads</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>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</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>National Disaster Management Plan 2017-2021</p> <p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

	<p>Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ Villages /Families</p>	public assets	<p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district</p>	
Coastline protection: upgrade seawalls at most high risk hazard zones	<p>Assess and strengthen part of seawalls in relevant areas to reduce vulnerability of road and other critical village assets in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Clear debris from existing culverts near seawalls to enable free outflow of storm water and streams</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Enforce environmental social safeguards where reclamations, sand mining, extraction or other major coastal works are proposed. Government and village to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: MNRE/ Village /Families/MWTI</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Maintains natural ecosystem connectivity</p> <p>Reduce impact from coastal erosion</p> <p>Safer villages, houses and roads</p> <p>Minimise expenditure on damaged properties & personal assets</p>	<p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Draft Soil Resource Management Bill</p>
Upgrade village pool	<p>Upgrade pool fence</p> <p>Test the quality of the water source before any investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: CSSP/ NGOs/ MNRE/Village</p>	<p>Increase adaptation during drought periods</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>Utilise Hazard Maps and Geomorphologist findings to inform location and design</p> <p>MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>Community Engagement Plan</p>
Evacuation Shelter and a connected escape route needed for	<p>Assess and/or select location for either an existing or new evacuation shelter, including safe</p>	<p>Improve resilience of public infrastructure</p>	<p>Enforcement of National Building Code 2017</p> <p>Utilise hazard maps and</p>	<p>National Disaster Management Plan 2017-2021</p>

emergency preparedness and response	<p>access routes to the shelter</p> <p>Conduct evacuation shelter assessment and mark on CIM Plan hazard maps</p> <p>Develop a Village Climate Disaster Management Plan (VCDMP)</p> <p>Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies</p> <p>Implement CDCRM program</p> <p>Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters</p> <p>Where no suitable houses exist, build emergency shelter(s) outside the hazard zones</p> <p>Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter</p> <p>Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD</p>	Improve preparedness and readiness response to natural disasters	Geomorphologist findings to inform location and designs	<p>National Building Code</p> <p>National Policy for People with Disabilities</p> <p>NISP 2011 KESO 5</p>
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Restoration and conservation of upland forest	<p>Re-stock existing nursery with appropriate trees</p> <p>Protect ridge-top habitats and forests from indiscriminate cultivate and other developments</p> <p>Replant native forestry species of the upland forests to restore resilience and ecological function</p> <p>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area</p>	<p>Protects and enhance local species diversity</p> <p>Sustains ecosystem services and functions</p> <p>Reduced risk of slips and erosion</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p> <p>Improve</p>	<p>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</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation in district lands</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village forestry programmes</p>	<p>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	<p>District/village to help promote the development of the agroforestry sector by encouraging relevant land use practice and where possible resolve any associated land disputes</p> <p>Responsibility: MNRE/ /MWCSO/ District /Village/CSSP</p>	<p>preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Utilise PD3 to inform location for planting/ re-planting</p>	
Protection of catchment areas	<p>Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas</p> <p>Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district</p> <p>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area</p> <p>Replant catchment areas with local species such as tava, and poumuli</p> <p>Responsibility: MNRE/ /SWA/District/Village/ CSSP/GEF-SGP</p>	<p>Reduced risk of slips and erosion</p> <p>Improve resilience of catchments</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce contamination of water supply</p>	<p>Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p> <p>Utilise PD3 to inform location for planting/ re-planting</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>
Soft coastal protection measures needed for most vulnerable areas	<p>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</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p>Responsibility: MNRE/ MAF/Villages</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

Sand/rock extraction (domestic): coastline, rivers and riverbanks	<p>Identify alternative sustainable sources of sand/rocks for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Village and government to collaborate closely on designated areas for sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p>Responsibility: MNRE/Village/Families</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p> <p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</p>	<p>MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p> <p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities</p>	Draft Soil Resource Management Bill
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	<p>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.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO/Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>



Salelesi Village Map



6. Eva Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely high risk hazard zones	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families /MWTI/ MNRE/ MWCS</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>
Upgrade ‘Eva’ causeway on main East Coast Road	<p>Upgrade or repair riverine embankment protection work upstream of Eva and Luatuanu’u</p> <p>Ensure river channel upstream is cleared and maintained regularly</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Safer villages, houses and roads</p> <p>Maintain lifeline access for Upolu</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Implement Anoama’a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and design</p> <p>Utilise environmental and social safeguards including EIAs in screening and</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

	<p>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p> <p>Responsibility: MWTI/ LTA/MNRE/ District/ Village</p>		<p>designing infrastructure facilities</p> <p>Include in budget programming CBA, design and construction. Bridge/ causeway and road designs to take account of forecast changes in sea level rise and local flooding from increased rainfall intensity</p> <p>Designation of the CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	
Eva Access Road: extend into mountainside as potential escape route and to facilitate relocation inland	<p>Conduct feasibility study using hazard maps and geomorphologist database to inform location and design</p> <p>Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: MNRE /MWCS/ District/ Village /Families/MWTI</p>	<p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and design</p> <p>Include in budget programming CBA, design and construction</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>National Disaster Management Plan 2017-2021</p> <p>Community Sector Plan</p>
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	<p>Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter</p> <p>Conduct evacuation shelter assessment and mark on CIM Plan hazard maps</p> <p>Develop a Village Climate Disaster Management Plan (VCDMP)</p> <p>Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies</p> <p>Implement CDCRM program</p> <p>Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters</p>	<p>Improve resilience of public infrastructure</p> <p>Improve preparedness and readiness response to natural disasters</p>	<p>Enforcement of National Building Code 2017</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p>	<p>National Disaster Management Plan 2017-2021</p> <p>National Building Code</p> <p>National Policy for People with Disabilities</p>

	<p>Where no suitable houses exist, build emergency shelter(s) outside the hazard zones</p> <p>Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter</p> <p>Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD</p>			
Reticulated water supply, quality and network to be improved	<p>Extend the water supply to families inland with no access to water</p> <p>Procure rainwater harvesting systems for vulnerable families as a short term solution</p> <p>District to support SWA efforts at exploratory boreholes in district</p> <p>District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas</p> <p>Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP</p>	<p>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes</p> <p>Implement SWA (2016) 10 year investment plan to improve water supply network to support all inland families without access to drinking water</p> <p>Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan (2016)</p> <p>Community Engagement Plan</p>
Electricity supply	<p>Install streetlights along the roads where needed for community safety</p> <p>Relocate overhead lines to a more resilient location when being replaced</p> <p>Provide underground lines in the long term</p> <p>Install and connect to solar power supply if made available</p> <p>Responsibility: EPC /MWTI/ Villages</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents from fallen electricity posts</p>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	EPC Strategic Plan

Upgrade village pool	<p>Extend wall of pool to cover exposed area from flooding</p> <p>Research installation of a facility to store water from village pool as backup supply for village</p> <p>Test the quality of the water source before any investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: CSSP/NGOs/ MNRE/Village</p>	<p>Increase adaptation during drought periods</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>Utilise Hazard Maps and Geomorphologist findings to inform location and design</p> <p>MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention</p> <p>Update Village bylaws to include managing and maintaining village natural resources</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>Community Engagement Plan</p>
Natural resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies and Policies
Sand/rock extraction (domestic): coastline, rivers and riverbanks	<p>Identify alternative sustainable sources of sand/rocks for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Village and government to collaborate closely on designated areas for sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p>Responsibility: MNRE/Village/Families</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p> <p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</p>	<p>MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p> <p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers</p>	<p>Draft Soil Resource Management Bill</p>
Soft coastal protection measures needed for most vulnerable areas	<p>Re-stock existing nursery</p> <p>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</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	needed Responsibility: MNRE/MAF/Villages	Implements an Ecosystem Based Approach	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient plants Utilise PD3 to inform location for planting/ re-planting	
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	<p>Research new type of vegetation found in river near bridge) and seas of Eva</p> <p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>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</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>Responsibility: Villages/District/MNRE/MAF/ SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>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</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>
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	Improve recovery to create more resilient villages	<p>Utilise Hazard Maps and Geomorphologist findings to inform location and design</p> <p>Agriculture sector to provide best practice management guidelines for the management of water that</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

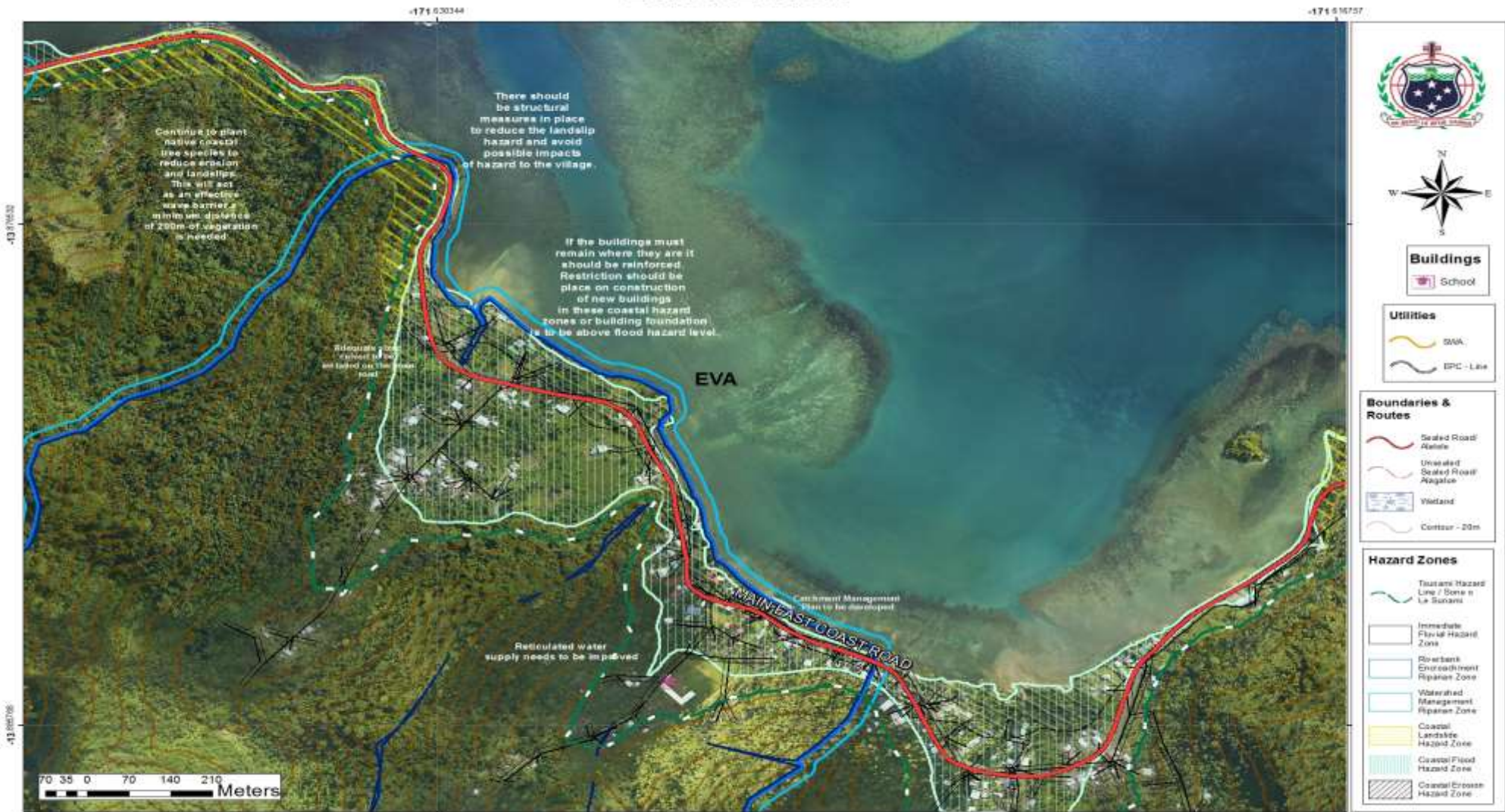
	<p>Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Conduct pilot site trials for climate ready plant varieties</p> <p>Responsibility: MAF/ MNRE/village</p>	<p>Improve preparedness and readiness response to natural disasters</p>	<p>allows for levels of contamination to be kept to minimum</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</p> <p>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</p> <p>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</p> <p>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</p> <p>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</p>	
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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	<p>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.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>



Eva Village Map

EVA VILLAGE



7. Solosolo Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Access/work roads require maintenance and upgrade as it exacerbates flooding and to be used as potential escape route	<p>Assess and upgrade access road as potential escape route and to encourage relocation away from hazard zones</p> <p>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 lands</p> <p>Implement regular drainage inspection and maintenance</p> <p>Village to restrict rubbish dumping into waterways and conduct regular clearance of rubbish behind homes</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ District/ Village /Families/CSSP</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>Develop an Integrated Flood Management Plan for Anoama'a West District. MNRE to develop zonation strategy for safe areas</p> <p>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</p> <p>Include in budget programming CBA, design and construction</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p> <p>Develop and register Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p> <p>Community Engagement Plan</p>
Village houses, church and government assets in extremely high risk hazard zones	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>

	<p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families /MWTI/ MNRE/ MWCSO</p>	insurance	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	
Coastline protection: seawall upgrade and maintenance	<p>Assess and strengthen part of seawall in relevant area only to reduce vulnerability of road and other critical assets in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Clear debris from existing culverts near seawalls and waterways to enable free outflow of storm water and streams into sea</p> <p>Where reclamations, sand mining, extraction or other major coastal works are proposed, Government and village to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: MNRE/ Village /Families/ CSSP/ MWTI/LTA</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Reduce impact from coastal erosion</p> <p>Safer villages, houses and roads</p> <p>Minimise expenditure on damaged properties & personal assets</p>	<p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama’a West district</p> <p>Develop and register Village bylaws to include banning of sand mining and illegal rubbish dumping in waterways and drains</p> <p>Utilise Sui o Nu’u monthly meetings to monitor progress of village replanting and clean up programmes</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

<p>Reticulated water supply, quality and network to be improved</p>	<p>Extend the water supply to families inland with no access to water</p> <p>Procure rainwater harvesting systems for vulnerable families as a short term solution</p> <p>District and village to support SWA water rationing programmes during times of drought</p> <p>District to support SWA efforts at exploratory boreholes in district</p> <p>District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas</p> <p>Responsibility: SWA/ MWCSO/ MNRE / District/ Village/ CSSP</p>	<p>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes</p> <p>Implement SWA (2016) 10 year investment plan to improve water supply network to support all inland families without access to drinking water</p> <p>Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan (2016)</p> <p>Community Engagement Plan</p>
<p>Evacuation Shelter and a connected escape route needed for emergency preparedness and response</p>	<p>Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter</p> <p>Conduct evacuation shelter assessment and mark on CIM Plan hazard maps</p> <p>Develop a Village Climate Disaster Management Plan (VCDMP)</p> <p>Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies</p> <p>Implement CDCRM program</p> <p>Install relevant signs to guide the community on emergency response procedures and to locations</p>	<p>Improve resilience of public infrastructure</p> <p>Improve preparedness and readiness response to natural disasters</p>	<p>Enforcement of National Building Code 2017</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p>	<p>National Disaster Management Plan 2017-2021</p> <p>National Building Code</p> <p>National Policy for People with Disabilities</p> <p>NISP 2011 KESO 5</p>

	<p>of evacuation shelters</p> <p>Where no suitable houses exist, build emergency shelter(s) outside the hazard zones</p> <p>Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter</p> <p>Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD</p>			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Protection of catchment areas	<p>Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas</p> <p>Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district</p> <p>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area</p> <p>Replant catchment areas with local species such as tava, and poumuli</p> <p>Responsibility: MNRE/ /SWA/District/Village/ CSSP/GEF-SGP</p>	<p>Reduced risk of slips and erosion</p> <p>Improve resilience of catchments</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce contamination of water supply</p>	<p>Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p> <p>Utilise PD3 to inform location for planting/ re-planting</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>
Restoration and conservation of upland forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</p> <p>Re-stock existing nursery with appropriate trees</p> <p>Responsibility: MNRE- WRD & Forestry/ District /Village/CSSP</p>	<p>Protects and enhance local species diversity</p> <p>Reduced risk of slips and erosion</p> <p>Reduce impact from inland flooding</p>	<p>Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District</p> <p>MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types</p>	<p>Community Engagement Plan</p> <p>Water Sector Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan</p>

			<p>suitable to the habitats and planting materials for village</p> <p>Utilise PD3 to inform location for planting/ re-planting</p>	2016-2020
Soft coastal protection measures needed for most vulnerable areas	<p>Re-stock existing nursery</p> <p>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</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p>Responsibility: MNRE/MAF/Villages</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient plants</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
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	<p>Research new type of vegetation found in rivers and seas of Solosolo</p> <p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>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</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>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</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

	are contaminating water sources Responsibility: Villages /District/ MNRE/MAF/ SROS			
Local and overseas markets for produce needed	Village to set up agreement with local and overseas markets for produce Responsibility: Villages /NGOs/WIBDI	Builds resilience of community livelihood and food security Improve preparedness and readiness response to natural disasters	MAF and relevant NGOs to Solosolo acquire agreements with local markets (e.g. restaurants etc) and overseas markets for exportation of local produce	Agriculture Sector Plan 2016-2021
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 Nu'u 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



Solosolo Village Map

SOLOSOLO VILLAGE



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. Luatuanu'u Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Access/work roads requires upgrade to facilitate relocation inland and to be used as potential escape route	<p>Upgrade and seal existing track</p> <p>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 lands</p> <p>Implement regular drainage inspection and maintenance</p> <p>Village to restrict rubbish dumping into waterways and conduct regular clearance of rubbish behind homes</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ District/ Village /Families/CSSP</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>Develop an Integrated Flood Management Plan for Anoama'a West District. MNRE to develop zonation strategy for safe areas</p> <p>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</p> <p>Include in budget programming CBA, design and construction</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p> <p>Develop and register Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes</p>	<p>CIM Strategy 2015</p> <p>National Disaster Management Plan 2017-2021</p>

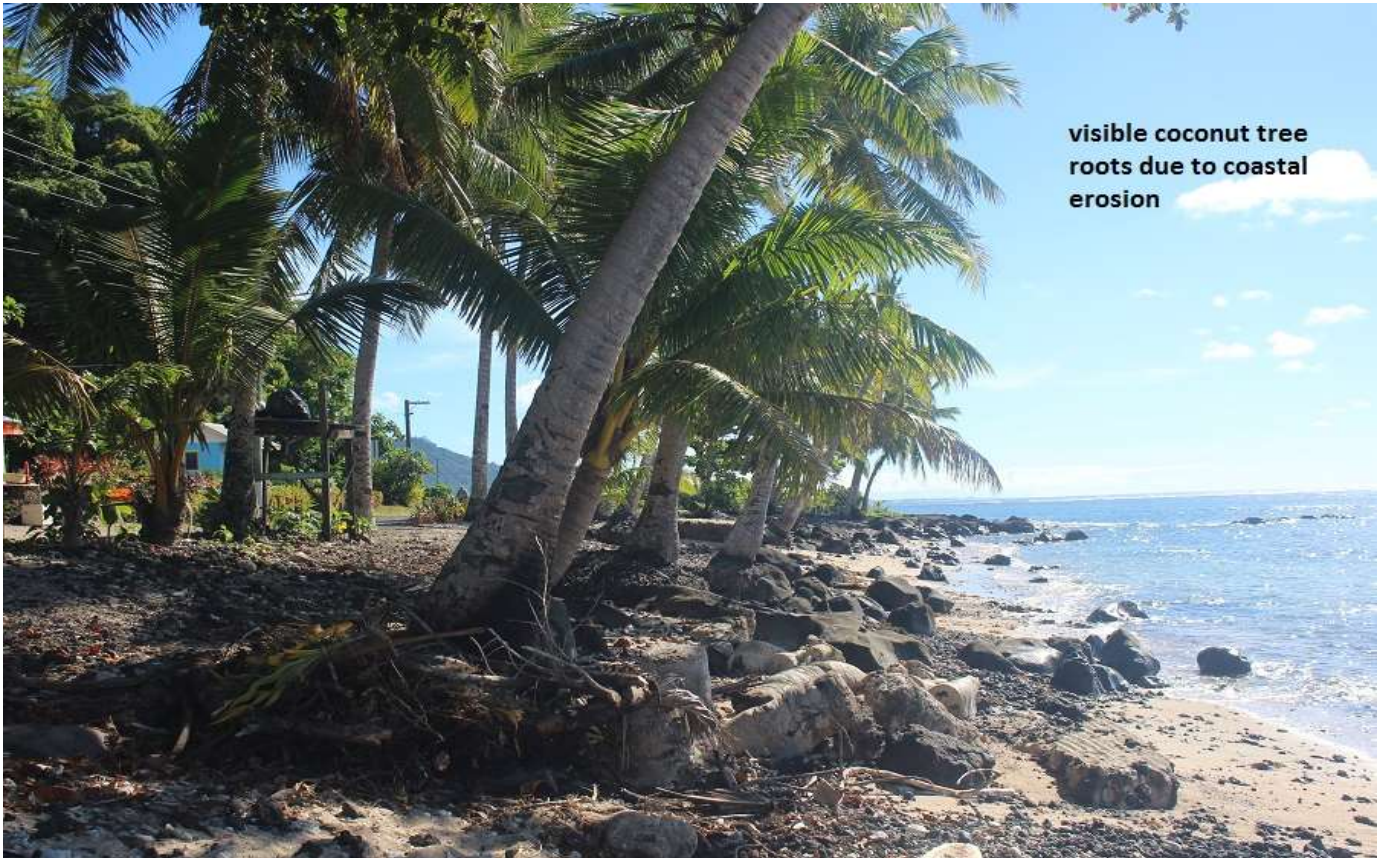
<p>Village houses, schools, churches and government assets in extremely high risk hazard zones</p>	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Village to seek lands to migrate to due to expanding CEFZ and CFHZ</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families /MWTI/ MNRE/ MWCS</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>
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Drainage systems require maintenance and upgrade in high risk areas of main East Coast Road	<p>Assess and upgrade culverts and cross drainage on main East Coast Road especially at junctions with access roads– in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Introduce new and widen existing culverts in wetland areas to reduce flooding onto nearby village houses</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>District to regulate developments near and around waterways and drainage connecting to main East Coast Road</p> <p>Responsibility: LTA /MWTI/MWCSD/ District/Village/ Families</p>	<p>Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Use existing information for guidance but not limited to: <i>“Vulnerability Assessment of the Samoa Road Network (2017)”</i>; <i>“Review of National Road Standards in Samoa (2016)”</i>; <i>“Samoa Code of Environmental Practice (2007)”</i></p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Anoama’a West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Coastline protection: upgrade seawalls at most high risk hazard zones	<p>Assess feasibility of extending seawall to protect and reduce vulnerability of road and other critical village assets in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Enforce environmental social safeguards where reclamations, sand mining, extraction or other major coastal works are proposed. Government and village to manage processes by requiring villagers to</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Maintains natural ecosystem connectivity</p> <p>Reduce impact from coastal erosion</p> <p>Safer villages, houses and roads</p> <p>Minimise expenditure on damaged properties &</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Draft NESP 2017-2021</p>

	get the appropriate permits and consent <i>Responsibility: LTA/Village /MNRE/MWTI</i>	personal assets		
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Sand mining	Continue ban on sand mining Research on the impacts of sand mining Government to honor village ban on sand mining for commercial purposes <i>Responsibility: MNRE/Village</i>	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion	MNRE to continue to identify and undertake assessments of specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks 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	Draft Soil Resource Management Bill
Restoration and conservation of upland forest	Continue programme by Forestry on replanting native forestry species of the upland forest Re-stock existing nursery with appropriate trees <i>Responsibility: MNRE-WRD & Forestry/District /Village/CSSP</i>	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District 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 Utilise PD3 to inform location for planting/ re-planting	Community Engagement Plan Water Sector Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Soft coastal protection measures needed for most vulnerable areas	Re-stock existing nursery 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	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters	Develop an integrated land management plan for Anoama'a West 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	NESP 2017-2021 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	<p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p>Responsibility: MNRE/MAF/Villages</p>	Implements an Ecosystem Based Approach	MAF to collaborate on supply of climate resilient plants	
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	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>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</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>District to fence domestic animals</p> <p>Responsibility: Villages/District/MNRE/MAF/ SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>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</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

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	<p>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.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSD /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>



Luatuanu'u Village Map

LUATUANU'U VILLAGE



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

9. Leusoali'i Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses and other assets in extremely high risk hazard zones	<p>Relocate assets outside of high risk hazard zones when re-building</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Village / Families /MWTI/ MNRE/ MWCS</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>
Access/work roads require maintenance and upgrade as it exacerbates flooding onto main East Coast Road	<p>Assess and upgrade access/work roads as potential escape routes</p> <p>Construct roadside drainage ditches where needed</p> <p>Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff</p> <p>Village to regulate developments near and around road shoulders of all access roads</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>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</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p>	<p>National Disaster Management Plan 2017-2021</p> <p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p>

	<p>Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ Villages/Families</p>	public assets	<p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district</p>	
Flood protection measures for fords and bridges	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Leusoali'i</p> <p>Ensure river channel upstream is cleared and maintained regularly</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings</p> <p>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p> <p>Responsibility: MWTI/ LTA/MNRE/ District/ Village</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Maintains lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>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</p> <p>Include in budget programming CBA, design and construction.</p> <p>Designation of the IFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

Drainage systems require maintenance and upgrade in high risk areas of main East Coast Road	<p>Assess and upgrade culverts and cross drainage on main East Coast Road especially at junctions with access roads sitting within combined hazard zones– in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Introduce new and widen existing culverts in wetland areas to reduce flooding onto main road and nearby village homes</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>District to regulate developments near and around waterways and drainage connecting to main East Coast Road</p> <p>Responsibility: LTA /MWTI/MWCSD/ District/Village/ Families</p>	<p>Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Use existing information for guidance but not limited to: <i>“Vulnerability Assessment of the Samoa Road Network (2017)”</i>; <i>“Review of National Road Standards in Samoa (2016)”</i>; <i>“Samoa Code of Environmental Practice (2007)”</i></p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Anoama’a West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p>
Coastline protection: upgrade seawalls at most high risk hazard zones	<p>Assess and strengthen part of seawalls in most high risk areas to reduce vulnerability of road and other critical village assets in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Clear debris from existing culverts near seawalls to enable free outflow of storm water and streams</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Enforce environmental</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Maintains natural ecosystem connectivity</p> <p>Reduce impact from coastal erosion</p> <p>Safer villages, houses and roads</p> <p>Minimise expenditure on damaged properties & personal assets</p>	<p>Planning provisions to be guided by the Planning and Urban Management Act 2004</p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop and register</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Draft Soil Resource Management Bill</p>

	social safeguards where reclamations, sand mining, extraction or other major coastal works are proposed. Government and village to manage processes by requiring villagers to get the appropriate permits and consent Responsibility: LTA/Village /MNRE/MWTI		District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
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 and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Flood protection measures (soft solution to support flood protection measures for infrastructure)	Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	in flood prone areas Responsibility: MNRE/ Village			
Soft coastal protection measures needed for most vulnerable areas	<p>Re-stock existing nursery</p> <p>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</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p>Responsibility: MNRE/ MAF/Villages</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient plants</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
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	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>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</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>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</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

	District to fence domestic animals Responsibility: Villages /District/ MNRE/MAF/ SROS			
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	<p>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.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>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</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Non-CR issues raised during consultations	Proposed Solution	Comments
Women's committee house upgrade Responsibility: Women's Committee/Village	Village to seek assistance from other sources	Not a direct CR issue
Remnants of old bridge at Leusoalii river Responsibility: Village	Remove remnants from river	Not a CR issue but could be a potential threat to the bridge downriver during extreme events



**widen access towards Primary School
(safe haven)**



**Punavai o le Ola Church building_example of an
elevated church building**

Leusoali'i Village Map

LEUSOALI'I VILLAGE



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

