

Community Integrated Management Plan

Vaimauga 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.

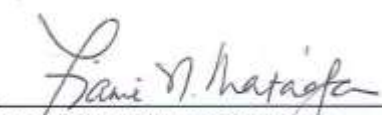
We wish to acknowledge the significant contributions of our District and Village communities and our key government partner stakeholders and implementing agencies, in particular:

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 Vaimauga West (Mulinu'u/Sogi/Savalalo/Fugalei/Saleufi, Vaimea/Aai o Fiti, Alamagoto, Apia, Togafuafua/Matafele/Tufuiopa, Taufusi, Lalovaea/Lalovaea Sasae/Palisi, Malifa/Motootua/Leufisa, Tanugamanono, Nafanua/Setema Fou, Papaloloa/Tanumaleko, Papauta/Loimata o Apaula, Vailima, Avele/Vaoala/Tiapapata, Matautu-tai/Matautu-uta, Vaiala, Vaipuna/Levili, Faatoia/Vini/Maagao, Magiagi, Moata'a, Vaivase, Toomatagi).

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

Date of Signing: 22 June 2018

Representatives

Signatures

Mulinu'u/Sogi/Savalalo/Fugalei/Saleufi Villages

- Suluape Ponifasio
- Faletausaga Ioane
- Akenese Tauia
- Roseta Ioane

Four handwritten signatures in blue ink, each written over a horizontal line. The signatures correspond to the names listed in the adjacent list: Suluape Ponifasio, Faletausaga Ioane, Akenese Tauia, and Roseta Ioane.

Vaimea/Aai o Fiti Villages

- Sula Senia Sheck
- Pupumai Nicky Nielsen
- Betty Nosese
- Seala Hili
- P Peresitene

Five handwritten signatures in blue ink, each written over a horizontal line. The signatures correspond to the names listed in the adjacent list: Sula Senia Sheck, Pupumai Nicky Nielsen, Betty Nosese, Seala Hili, and P Peresitene.

Alamagoto Village

- Lefau Soonalole
- Ava Etuale
- Toa Etuale
- Seuitusi Tala
- Maua Lui

[Handwritten signature]

 Ana So

 Toa

 Segi Tuitala

 UE

Apia Village

- Hinemoa Matagi
- Tuiletufuga Siaso Tuiletufuga
- Juliana Tuiletufuga
- Salauimatagi Tuiletufuga
- Saveatama Jonathan

[Handwritten signature]

 S. Tuiletufuga

 JT

[Handwritten signature]

 Jonathan

Togafu'afu'a, Matafele, Tufuiopa Villages

- Leuluama V Faee
- Mele Mamea
- Vavao Misi
- Fuamoli Misi
- Ulugia Tevita

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[Handwritten signature]

[Handwritten signature]

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 Ulugia

Taufusi Village

- Lilomaiava Schuster
- Tuifea Sapa
- Tui Schuster
- Seulu Loimata
- Aufagatene Ene

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[Handwritten signature]

[Handwritten signature]

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Lalovaea Sisifo, Lalovaea Sasa'e, Palisi Villages

- Tevaga Sasulu
- Laine Obrien
- Talaitaua Kovio
- Ausage Faaoso Misimoa
- Ausage Poua Misimoa







Malifa, Moto'otua, Leufisa Villages

- Lloyd Siaso
- Kelly Faletose
- Mosololo Fuimaono
- Moemoeolemalotumua Oilau
- Makerita Maninatu









Tanugamanono Village

- Tumau Tafuvai Atoa
- Tuuamalii Iose

Nafanua (Setema Fou) Village

- Aumua Kaisalika
- Suafoa Muliaga
- Matagi Ugafe
- Nuualuga Aumua
- Lepule Misiuepa Matagi







Papaloloa, Tanumaleko Village

- Papalii Tuisimona Tinai
- Vonnie Papalii Tinai
- Pati Tuamalii
- Mataui Polataivao
- Vai N Matagi



Handwritten signatures on lined paper for Papaloloa, Tanumaleko Village. The signatures are: Papalii Tuisimona Tinai, Vonnie Papalii Tinai, Pati Tuamalii, Mataui Polataivao, and Vai N Matagi.

Papauta (Loimata o Apaula) Village

- Taliulu Lupo Fruean
- Vainalepa Peseta
- Solotama Tuia
- Tafaomauga Siaosi
- Peter Sasi



Handwritten signatures on lined paper for Papauta (Loimata o Apaula) Village. The signatures are: Taliulu Lupo Fruean, Vainalepa Peseta, Solotama Tuia, Tafaomauga Siaosi, and Peter Sasi.

Vailima Village

- Puaae fu Jordan
- Puaasina Tamafiti
- Leniu Tomevaa
- Eseta Faleniko
- Vailima Lefale Makesi



Handwritten signatures on lined paper for Vailima Village. The signatures are: Puaae fu Jordan, Puaasina Tamafiti, Leniu Tomevaa, Eseta Faleniko, and Vailima Lefale Makesi.

Avele, Vaoala, Tiapapata Village

- Tavui Anne Laumea
- Sooale Koroseta
- Loli Filimana
- Samoa Iakopo
- Matau Faletolu
- Vaatilua Tufa
- Savea Petelo



Handwritten signatures on lined paper for Avele, Vaoala, Tiapapata Village. The signatures are: Tavui Anne Laumea, Sooale Koroseta, Loli Filimana, Samoa Iakopo, Matau Faletolu, Vaatilua Tufa, and Savea Petelo. The names 'Vaoala' and 'Makolololei' are written next to some signatures.

Matautu-tai/Matautu-uta Village

- Pupuaalii Senio Pupualii
- Solapo Avau
- Vaigalepa Niko
- Avamua Pio
- Kuliatu Enesi
- Taiupu Toomalatai

Pupuaalii Senio Pupualii
Solapo Avau
Vaigalepa Niko
Avamua Pio
Kuliatu Enesi

Vaiala Village

- Sasa Patu
- Falepauga Loau Tavita
- Puipuialii Ausage
- Terissa Asi
- Natasha Patu

Sasa Patu
Falepauga Loau Tavita
Puipuialii Ausage
Terissa Asi
Natasha Patu

Vaipuna, Levili Village

- Tuasa Ronnie
- Elenoa Salanoa
- Togisia Vena
- Serenita Papalii Afatia
- Papalii Afatia

Tuasa Ronnie
Elenoa Salanoa
Togisia Vena
Serenita Papalii Afatia
Papalii Afatia

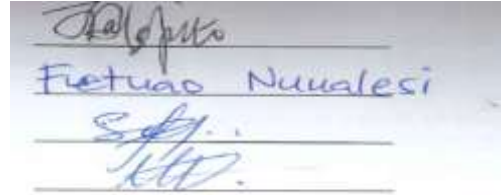
Fa'atoia, Vini, Ma'agao Village

- Papalii Pene
- Puao Saveaalii
- Taupau Ioane
- Aeau P Leavai
- Vaimoana Jane

Papalii Pene
Puao Saveaalii
Taupau Ioane
Aeau P Leavai
Vaimoana Jane

Magiagi Village

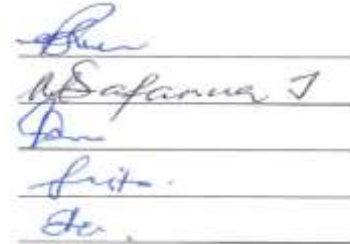
- Punoalii Fetulima Kopelani
- Fetuao Nuualesi
- Segi Melegi
- Tafilipou



Handwritten signatures on a lined background. The first line contains a signature, the second line contains the text "Fetuao Nuualesi", the third line contains a signature, and the fourth line contains a signature.

Moata'a Village

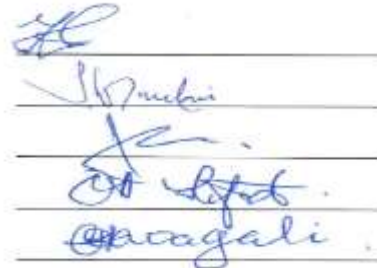
- Peresia Tamapua
- Mereane Safanua
- Fogafua Filipino
- Fenika Vaani
- Eteuati Aifili



Handwritten signatures on a lined background. The first line contains a signature, the second line contains the text "Mereane Safanua", the third line contains a signature, the fourth line contains a signature, and the fifth line contains a signature.

Vaivase Village

- Faasoutele Savalio
- Savea Uili Sinclair
- Tumanuvao Sione
- Otto Lafaele
- Onopene Faoagalii



Handwritten signatures on a lined background. The first line contains a signature, the second line contains the text "Tumanuvao Sione", the third line contains a signature, the fourth line contains a signature, and the fifth line contains the text "Faoagalii".

To'omatagi Village


- Lauano Perese



Handwritten signature on a lined background. The first line contains a signature.

The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Vaimauga 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.



Handwritten signature in blue ink.

Ulu Bismarck Crawley
CHIEF EXECUTIVE OFFICER, MNRE

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Acronyms:

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

Glossary

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

the Samoan phrase for both susceptibility and vulnerability is the same.

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

Introduction to the CIM Plan

The Strategic Vision

The District Community Integrated Management (CIM) Plan for Vaimauga 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).***

The Aim of the CIM Plan

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

The CIM Plan will:

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

Structure of the Plan

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

- ***Plan Development***, which describes the process undertaken in preparing the CIM Plan in conjunction with representatives of the Communities involved, the Government and other stakeholders with interests in the Plan area.
- ***Implementation Guidelines***, which describes the Plans and Actions recommended as outcomes of the process, together with the partner responsible for implementing these outcomes. The participants of the CIM Plan preparation process are acknowledged in the Implementation Guidelines.

Implementation Guidelines

Purpose of the Implementation Guidelines

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

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

Duration of the Plan

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

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

Financing of the Plan

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

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

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

- **Community Engagement Plan (CEP)**-the guidelines provided in the CEP is an excellent capacity building tool that can be used by CSO's and village communities themselves to aid development of small

grant proposals to existing small grant funding mechanisms like CSSP and the UNDP-GEFSGP

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

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

1. Description of Vaimauga West District

Physical and Natural Resource Setting

The Faipule District of Vaimauga West is a low lying coastal plain that covers part of the northern shore of Upolu Island and extends inland reaching Mt Vaea and highlands bordering the district from east to west. Apia, the largest city and home port for the pelagic fishing fleet and site for the major fish markets of the country is situated within this district.

On both the eastern¹ and western² coast of Vaimauga West, mangrove areas take up much of the location. The eastern part of the district's coastline also contains reef breaks of various distances ranging from 1 m to 1 km, with the most important being the channel which provides access to the Apia Port. The port facilitates for the country's many stevedoring, chandlery and further port related businesses located within the district. A dominant sea wall erected in the early 1990s after cyclone Ofa and Val protects the harbor and runs through most of the city's shoreline. These seawalls were later upgraded to the state in which it currently is. A smaller sea wall located east of the Apia Port and approximately 1m in height extends along Palolo Deep to Vaiala.

Coastal and alluvial soils with generally high levels of fertility dominate the coastal regions of Vaimauga West. These soil types were formed by a sandy beach, silty estuaries or coastal inundations. Inland, the hilly landscape is dominated by broad sloping ridges separated by deep gorges and much of the area is subject to erosion.

Since the introduction of the sea wall which safeguards the coast of Central Apia, the creation of a manmade beach at the mouth of the Vaisigano Bridge near the Aggie Grey's Hotel, building developments of the Apia Waterfront Project and a new discharge point for the Moata'a mangroves at Taumeasina Island, there has been an alteration in sand/sediment deposit patterns around the coast as well as the unnatural flow of wave travel patterns.

Vaimauga West is an urbanized area in contrast to other districts under CIMP review. It includes the Central Business Area, most of Samoa's Government offices including the Parliament Buildings at Mulifanua and many head offices for local and international companies. The main government institutions in the district include Police, Fire and Emergency management headquarters, the central bank offices and other commercial banks, and all government ministries including the key central agency; the Ministry of Finance. Next to the Internal Affairs offices is the main Pulenu'u fale where village representatives meet. In addition to these establishments, a number of historic sites, Aggie Grey's Hotel and Bungalows, Tanoa Tusitala Hotel, the clock tower, flea market and churches are located along the area, particularly along the main Beach Road.

Beside the main river (Vaisigano River) that flows through Vaimauga West, three other rivulets Gasegase, Fuluasou and Loimata o Apaula flow through Vaimauga West's catchment area. These rivers flood the more densely populated coastal areas of the district during heavy rain.

Vaimauga West consists of villages and village groups located along the coast, inland and in valley flats. Their descriptions are as follows.

Mulinu'u, Savalalo, Fugalei, Saleufi and Sogi are coastal villages located on the western side of the Apia harbor. Fugalei is a reclaimed mangrove region and is farther away from the sea compared to the other four villages. The old Parliament building, currently under renovation is located at Mulinu'u. Mulinu'u also houses a number of tourist accommodations³ and restaurants⁴ as well as an NUS Ocean Campus and the Samoa Meteorology Office at the peninsula. In Saleufi, several drains have been built over and are blocked causing water to pond due to the inadequate drainage structures. The reclaimed area off of Savalalo and Fugalei has exacerbated the drainage of the region. A particularly flood prone zone is the drain beside the Apollo's Cinema which outlets onto the main road. The area also experiences flooding from up stream Vaimoso.

Vaimea and A'ai o Fiti are inland villages east of Vaimoso and west of Lalovaea/Palisi. The Vaimoso School and cemetery behind the school have blocked drains and are swampy. Most issues with these villages include flooding during heavy rain from upland overland flows, flooding from the blocked Vaimoso ford, or ponding and inundation from blocked drains.

¹Moata'a area

²Mulinu'u/Fugalei area

³Amanaki Hotel Restaurant and Bar; Hotel Elisa and Hotel Millenia

⁴Sails Restaurant and Apia Yacht Club

Alamagoto is an inland village located south of A'ai o Fiti and north of Sinamoga. It experiences similar flooding issues as A'ai o Fiti and Vaimea in relation to flooding from blocked drains and flooding from the low bridge. The drains in Alamagoto stop at the northern edges of the village along the Moamoa Road. Overland flows from inland mountains are also a problem. Palisi Street has no drains hence flood water run off the mountains and collect on Palisi Street before overflowing into Alamagoto.

Apia is located in Central Apia and includes part of the coast along Beach Road and areas of land between the Vaisigano River and the Vailima Stream next to the Marist Brother's School. The village includes commercial areas along Beach Road and side roads, Government agencies such as the Police Station, and residential areas behind the commercial areas. There are drainage issues (blocked culverts or drains) near the Marist School which floods down the coast. Two springs are located within the village, one situated near the Apia Cemetery and another inland behind Lalovaea School. The spring near the cemetery acts as a supplementary water supply for a number of surrounding homes when the water supply is cut. The coast has a dominant, high, sea wall and coastal walkway. There are a number of churches located along the Beach Road and also on roads back from the coast. Sand mining is being undertaken at the mouth of the Vaisigano River. The area has a metered water supply, and stable electricity and telephone networks.

Togafu'afu'a, Matafele and Tufuiopa are located along south and west of Apia. The villages have two main waterways running along through them; the stream that discharges near Chan Mow and the spring that flows around the Marist Brother's School. The main road runs north/south. It has a number of blocked drains and stagnant water. Rubbish is an issue along the stream banks and land has been reclaimed at Chan Mow's narrowing the river channel. One spring is located in Tufui'opa. Metered water supplies are available for the villages as well as good electricity and telephone connections.

Taufusi is located at the intersection of Vaitele and Vaea Streets. The area has a large number of drains that run along the roads and east/west between houses on both sides of Vaea Street and north/south on the south side of the Vaitele Street. Two large culverts/bridges are located on Vaitele Street. The western most one is cleared by people walking through it. On the other side of Vaitele Street a commercial operator uses the drainage area to store containers. Some ponding areas have been poorly filled in, creating flood areas around dwellings. The majority of the village is flooded during heavy rains. There is a popular local market selling local produce in this village.

Lalovaea and Palisi are villages located inland south of Taufusi and Tufuiopa. Lalovaea includes a linear strip of land on the northern side of Vaitele Street extending west from Ifiifi Street, and most of the block between Ifiifi Street and Convent Street. Palisi is located east of Vaimea and west of Lalovaea. The majority of Lalovaea is located south of Vaitele Street to the east of Palisi over the mountain down into the Mulivai River valley behind the Moto'otua hospital. The river is generally Lalovaea's eastern boundary. Lalovaea is subject to flooding from the Mulivai River and runoff from Mount Vaea. The ford floods often and the river valley are eroding through landslips. There is concern over the hospital's overflow from septic tanks and Ligaliga Funeral Home dumping rubbish into the Vailima Valley.

There are two main roads which extend inland (south) from Vaitele Street. Local roads branch off from one of these roads. Although most roads have been sealed, rain and storm water runoff have damaged them. An inland spring resides within this island group. There are a number of commercial businesses operating inland in Lalovaea including the Roko bar/restaurant. Lalovaea is also home to the Government Prayer House.

Malifa, Moto'otua and Leufisa are located in three main blocks north of Maluafou and west of Tanugamanono between the Vaisigano River and the Vailima Stream. There is a large scale subdivision of land approved on the western side of the Vailima Stream extending from the Moto'otua hospital to Papauta Girl's College. The National Hospital and associated infrastructure is located in Leufisa/Moto'otua. The area has a number of schools including Apia Primary School, Maluafou School and Leififi College. The area has metered water supply, although this is not consistent, and all homes have electricity. The Vailima Stream is undermining the banks of the EFKS Leufisa Church.

Tanugamanono is located on the Cross Island Road east of Leufisa. Its eastern boundary is the Vaisigano River. Three local roads reside within the village. Some drains on the Cross Island Road are blocked and intersection with local roads often flooded. Tanugamanono has its own Primary School. An unstable power pole is located just behind the school. An underground telephone box on the corner of Leufisa Road and the main road floods and is impassable during heavy rain. The area is not metered and water pressure and quality are an issue. Electricity is supplied to all homes in this village. A diesel power station situated in Tanugamanono causes

vibrations, noise associated with its operation, and nearby villages sometimes complain of diesel smoke and smells emanating from the station.

Nafanua is located off the Cross Island Road. It has a nursery on the western side of the road and two local roads. The SROS Headquarters is located in this area. Water supply is metered but not reliable. Some properties also have water tanks. The local roads are narrow with either overgrown, blocked drains or no drains, and the Main Cross Island Road also has poor drainage.

Papaloloa and Tanumaleko are small villages located on either side of the Cross Island Road south of Nafanua and Tanugamanono. Papaloloa consists of one of the main local sealed road with poor drainage, particularly at the eastern end of the road. Tanumaleko is located south of the Nafanua nursery. Water supply to Papaloloa east of the Cross Island Road is metered, however to the west of the road water supply is not metered. Electricity lines cross properties rather than being located along the road side and telephone service is affected during storms.

Papauta is another inland village north of Leufisa. All of the village houses are located on the south-eastern side of a Vailima Stream tributary which overflows during heavy rain. Papauta has one main road, which extends behind Papauta Girl's College and south west inland. The road is not sealed, narrow and steep in parts. There is a two culvert ford on the Vailima Stream which floods during heavy rain. On one side of the main road is the tributary; along the other is an open channel. During heavy rain the Vailima tributary floods in flat low lying developed areas and storm water runs down the main road and in the open drain. Land has been cleared along Papauta Road for plantations. Village plantations are also located further inland (south west). Soil erosion from hill slopes is also an issue. Water is metered and quantity is fine. Water pressure however is an issue. There are a number of springs located inland, which are used for bathing.

Vailima is located inland on the Cross Island Road. It consists of a number of local roads with blocked drains. The village can now access clean water through the SWA water supply system and is supplied with electricity. The village has a number of areas that pond after heavy rain, particularly near the taxi stand at the back of Avele College's playing ground and inland behind Vailima Primary School. Vailima's main local road extends southeast down into the Vaisigano River valley and eventually joins Magiagi's 'Ueligitone' area. The road is steep, narrow and not sealed. Electricity and telephone lines run along the first part of this road. Halfway along the local road is an area where people have illegally dumped rubbish over the side of a steep cliff. At the bottom of the valley are EPC's water reservoirs (both old and new) and further south a power station.

Avele, Vaoala and Tiapapata are villages located on the Cross Island Road south of Vailima. These villages have a number of local roads and work roads. The local road on the east of the Cross Island Road has flood prone areas and is also the start of a tourist walkway currently being developed. The walkway will extend down the valley to a waterfall and sliding rocks. It is under construction and parts of the earth exposed to create the track have been replanted. The land slopes northwards and as such during heavy rain water flows across roads into hillside properties and homes. The local roads are narrow, and generally have either have no drains or are blocked. A reservoir that provides the National Hospital's water supply is located at the base of a Bank Street cliff. Water is metered; however the flow and pressure are limited at times.

Matautuuta and Matautu Tai are located on the eastern corner of Apia harbour. The area includes the port and the coastal village Matautu Tai (north of Matafagatele Rd) and inland Matautuuta (south of Matafagatele Rd). Matafagatele Rd is a busy main road with limited drainage system in this area. The main local road in Matautuuta is off Matafagatele Road. The road is not sealed. Electricity lines at the end of this road cross over houses. The area floods from the Vaisigano River and ponds in some areas. It was heavily flooded when the supply pipes burst open during heavy rains of the 2012 cyclone Evans. Soil erosion was quite obvious from the muddy nature of ponding areas after the flooding. Matautu Tai includes a number of commercial businesses such as restaurants, stores, the port and government offices. Heavy traffic is generated from port activities. Along the coast are Palolo Deep and a seawall, which is eroding. Runoff from Matautu Tai and Matafagatele Road often discharges into Matautu Tai and Vaipuna. Water in the area is metered, there is a stable electricity supply and telecommunications are good. Matautu Primary School is located close to the Vaisigano River. There are a number of churches in these villages including CCS and Latter Day Saints (LDS).

Vaiala is a coastal village located north of Vaipuna and between Matautu Tai and Moata'a. The coast has a sea wall, which extends to Matautu Tai. A recently constructed sea wall is in very good condition and has improved the scenery in this popular part of the Vaiala Coast. There is yet no visible change to the wetland/mangrove areas as a result of the new seawall. The village has one spring on the boundary with Vaipuna village, which floods houses in the vicinity. The road is used as an alternative connection to Matafagatele Road and sometimes

by heavy trucks, which are trying to access the port at Matautu Tai. The road is narrow in places and does not have a footpath.

Vaipuna is located between the villages of Matautu Tai and Moata'a close to the coast and is bound on its southern side by Matafagatele Road; Vaipuna straddles both sides of Vaipuna Road. Like Moata'a, Vaipuna also has a large wetland area on the eastern side of Vaipuna Road.

Levili is located immediately to the south of Vaipuna on the southern side of Matafagatele Road and Fa'ato'ia Road. Houses have built up to the edge of the wetland area, often with no septic tanks and rubbish is often dumped in the wetland. There are two drains, which cross Matafagatele Road from Levili and Apia Park. There is also a spring on the western side of Vaipuna Road, on the boundary of Vaiala village, which floods during heavy rain and high tide. Some houses in the area are at lower elevations and surface water ponds in this area.

Fa'ato'ia, Vini and Ma'agao villages are located inland south of Apia Park and Fa'ato'ia Road. The villages incorporate a network of roads running north/south and east/west. The Vaisigano River forms the western boundary of the villages. The river diverts from its path during heavy rainfalls and floods northwards through homes and roads. Some drains are blocked causing further flooding or ponding areas. A number of local roads were unsealed in 2006 but have recently been sealed (e.g. Lelata Road, a road in Fa'ato'ia, Ma'agao and the north/south road). Vini is located at the western most corner of the Moata'a mangrove system. During heavy rain the mangrove floods north into Apia Park and south towards Fa'ato'ia but there was no significant effect on the mangrove per se. There is a spring located at the corner of Vini Road. Another feature of Ma'agao and Lelata village is the hydroelectric pipeline which runs along the Vaisigano River to the Power Station. Water is metered and electricity and telephone connections and supply are sufficient and stable.

Magiagi is an inland village made up of two parts; the settlement along the main road is informally known as Aukilani and the settlement along the valley is known as Ueligitone. Being located in the Vaisigano River valley makes Ueligitone (and its residents) prone to flooding.

Aukilani has metered water while the lower area, Ueligitone, sources its water from the Vaisigano River through the old/decaying German laid pipes (90-100 years old). Ueligitone experiences problems with both water supply and water quality. Most of the higher area, Aukilani, has a steady and stable electricity supply, however further inland and in the Ueligitone area the supply is limited. There is also limited access to the Ueligitone area, access either being gained from a footpath beside the LDS church or a road from Vailima to the north. A prominent feature of Ueligitone is the pipeline, which supplies the Vaisigano hydro power station. The pipe runs the length of the Vaisigano River valley and divides Ueligitone in two. The pipeline was damaged during the 2012 cyclone causing an extensive flooding in the lower area; causing significant damage to properties in Magiagi, Lelata, Fa'ato'ia, Levili, Vaipuna and Matautu. A vehicle maintenance track runs along the pipeline route, which is used as Ueligitone's main thoroughfare. There are no roadside drains in the lower area and limited or blocked drains in the upper Aukilani area. Fallen trees caused by heavy rain and cultivation on steep lands are evident in the upland areas and is washed down through the river during extreme events, causing the river to burst its banks and overflow into villages downstream.

Moata'a village is located on the eastern corner of Vaimauga West along the coast. Matafagatele Road runs along the village before turning south to follow the coast. The main feature of the village is an extensive wetland area located behind homes on Matafagatele Road. The wetland extends west to the village of Vini. The wetland area used to cover the entire village and discharge through the reserve area near Taumeasina. Today the wetland discharges through a narrow channel near Moata'a Primary School and some of the wetland has been filled and reclaimed for buildings and other developments. A pedestrian footpath crosses the southern corner of the wetland area and acts as a barrier for out-flows to the coast even though there are culverts through this area. Water in the wetland on both sides of the footpath is generally stagnant and is not suitable for swimming. Regular flooding occurs during heavy rainfall and high tide and often floods homes located on the edges of the wetland areas. Moata'a village has one spring and two pools which are both located on the corner of the wetland. Part of the village's coast has a seawall. The northern part of Moata'a's coast has changed significantly as a result of a number of reclamations including: Taumeasina Reserve; Taumeasina island off the coast of Vaipuna and Moata'a; the reclamation of the Vaipuna coastline and the reclamation of a jetty at Taumeasina.

Vaivase is made up of two villages Vaivase Tai and Vaivase Uta. Vaivase Tai is located closer to the coast while Vaivase Uta is located inland, east of To'omatagi. The eastern side of Vaivase Tai includes a steep valley and stream. The Vaivase Stream is eroding the land that the EFKS church is situated on. Sediment laden storm water run-off from Samoa College and the Polytechnic, drain across the road into houses. Water supply is reticulated and power supply is erratic at times. The power supply often gets turned off, is of low voltage and subject to

surges. Since the main telephone box has been placed underground connections are often not clear. During heavy rain the area where the telephone control box is located gets flooded and telephones don't work. Schools in the area include Samoa College, Vaivase Primary School, Falefitu Primary School and Vaimauga College.

To'omatagi is a small village located north of the National University of Samoa, west of Vaivase Uta and east of Magiagi. The village consists of one street of residences. The street has electricity supply and telephone connections on both sides of the road. The electricity lines hang low. Water supply has recently been upgraded by SWA replacing the old unmetered dirty water supply. There is limited water pressure at the southern end of To'omatagi road. The main street is steep and sediment laden storm water channels down it and ponds at the northern most corner of the road. This is exacerbated by run off from the To'omatagi Road from the other direction too. The road is narrow, and does not have a footpath; plantations are located in the river valley which floods. Le Papaigalala (NUS Campus) is situated along the road towards To'omatagi.

In total, 25 roads are located within the Vaimauga West district (Market Rd, Palisi Rd, Atina'e Rd, Apa'ula Heights Rd, Apa'ula St, Moto'otua Rd, Fa'ato'ia Lane, Faipule Rd, Vini Rd, Fogavai Rd, Matautu St, Matautu Drive, Kolisi Rd, Taliilagi Place, Gloria Rd, Tanugamanono Rd, Skippers Lane, Tana Rd, Lamosa St, Tanu,aleko Rd, Eugene Rd, States Rd, Alaoa Rd, Vaiala/Vini Rd and LeviliUta Rd) where only 3⁵ are in very poor condition and the remaining in less but still poor states.

Majority of the issues with these roads are; pot holes, failed patching, chipped and rough edges, narrowness, poor and rough surface structure, dangerous open drainage structure, overgrown and encroaching vegetation, installation of speed limit road signs and the need of proper road markings. Six major bridge crossings in Samoa are vulnerable to climate change and the Vaisigano Bridge is one of the susceptible bridges. The Vaisigano River is one of the two major catchment areas situated in Upolu.

Invasive species common to the district include *pulumamoe*, which appears to take up any opening in the original vegetation whether through cultivation or by wind damage; tamaligiuliuli or silk tree (*Albizziachinesis*) which is widespread in the district and could become the major threat to village vegetation in the future; tamaligipaepae(*Albizziacalcataria*) which is present in the hills and gullies of Vaimauga West and could cause landslips if blown over by strong winds as they do not have well-formed penetrating root systems; the large leaf merremia vine (*Merremiapeltata*), a big concern as it tends to invade open space and smother larger trees that remain in cultivated or wind damaged forest areas; faopasi(*Spathodiacampanulata*) or the African Tulip; vaomigi(*Hiptiscapitata*) a recently introduced weed that is fast spreading in pastures and cultivated lands; vaolapiti(*Solannomammomsum*) an introduced sub-shrub with spiny leaves and stems, usually uncommon in cultivated areas, was accidentally introduced through cattle movement; vaopinati(*Sennatoria*) occasional as a weed; lusina(*Leucaenaleucocephala*) wild tamarind; vaopovi(*Pennisetumpurpureum*) elephant grass, a tall reed-like grass common on road sides; losa Honolulu also sometimes referred to a *losafiti*, is a fast growing introduced shrub with showy white flowers; vilitaliga(*Clerodendrumquadriloculare*) dominate areas where it grows, sprouting readily from the roots forming dense mono-specific thickets and puluvao(*Funtumia elastic*) or African Rubber Tree is a serious threat as it dominates secondary growth, preventing the return of native forests and species (Reti, 2016).

Social and Economic Setting

The Vaimauga West district currently has a population of 19,029⁶; Malifa/Moto'otua/Leufisa 798, Tanugamanono 805, Nafanua/Setema Fou 370, Papauta 383, Vailima 769, Avele/Vaoala/Tiapapata 1,256, Vaiala 972, Fa'ato'ia/Vini/Ma'agao 915, Magiagi 1999, Vaivase 1897, To'omatagi 225, Mulinu'u/Sogi/Fugalei/Savalalo/Saleufi 617, Alamagoto 904, Apia 200, Lalovaea/Lalovaea East/Palisi 1,861, Matautu tai/uta 935, Moata'a 1,595, Papaloloa/Tanumalolo 302, Taufusi 364, Togafu'afu'a/Matafele/Tufuiopa 841, Vaimea/A'ai o Fiti 599 and Vaipuna/Levili 422⁷.

This area is the most significant employment area in Samoa with many workers coming into the area each day from around the country to work at offices and businesses located in the CBD and Greater Apia Urban Area. The maintenance, protection and enhancement of this district is important for the national development of Samoa.

The road network is a critical element of the district's infrastructure because of its economic and social significance of Urban Apia. However, roads are often severely affected by floods resulting in disruption to traffic

⁵Apaula St, Faipule Rd and Alaoa Rd

⁶Female 9,500; Male 9,529

⁷SBS Village Directory 2016 – Census 2016 Preliminary Count

and damage to the roads and buildings that often require ongoing maintenance. Improvements are proposed to Vaitele Street between Lepa and the Cross Island Road, which will include widening to four lanes and placing main electricity and telephone lines underground.

The main coast road (Beach Road) and Atina'e, Tufui'opa, Logan, Fa'ato'ia and Vaiala – Vini roads provide the east/west links through the district, while Cross Island Road provides the main connection south to the south coast of Upolu. Other inland roads extend development and provide access to plantations. Access to the Moto'otua National Hospital is through Ififi Street and a number of intersecting roads e.g. Moto'otua, Sinave, Salenesa and Leufisa Streets. These main roads in the network are sealed. The main public hospital is located in an elevated location outside of coastal hazard and flooding zones.

Majority of the agricultural activities in Vaimauga West consists mainly of small garden plots adjacent to houses. These plots produce a wide variety of fruits and vegetables that are used both on a subsistence and commercial scale. Plantations are found in the upland areas away from the coast which is outside the urban parts. Selected interviews and site observations indicate livelihood and food security are linked to the small micro-agricultural household vegetable and fruit production. Several households have cattle and small livestock in areas outside the urban areas and fishing is for sustenance and profitable purposes. In the Apia Urban Area, 30% of crop activities are deemed to be minor (Dews, 2016).

The most common varieties used for household subsistence are taro 11.7%; fish 5.6%; banana 4.5%; coconuts 2.9%; giant taro 1.9%; cooked local pork 1.9%; cocoa 1.1%; breadfruit 0.7% and pumpkin at 0.7%. These values total up to 31% with the remaining 69% belonging to products not produced locally⁸.

The livelihood in the district is influenced by local employment generated from the large urban and peri-urban zones along with the associated infrastructures including government employment. Income generation is mainly reliant on local employment and households are not fully dependent on agriculture, fisheries or traditional crafts sectors as other rural communities of Samoa.

Although the household farm plots are small, the agricultural foot print in the district is accumulated and the impacts can be widespread across the coastal plateau. Impacts to the marine environment are from increased sediment loads and elevated nutrients combined with urban run-off. The marine environment is important as it supports a range of livelihood activities not just within the Vaimauga West District but adjacent areas as well.

Area proximity to the coastline creates the situation for opportunistic fishing for a large part of the population. Fishing pressure can be correlated to seasons, local weather conditions and family commitments. Families being made aware of employing traditional fishing rules may reduce the local impact of overfishing (Dews, 2016).

Primary services such as water, power and telephone generally follow all main roads and extend inland.

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 Vaimauga West. The immediate risks for some areas of Vaimauga West are from inland inundation, coastal landslip, fluvial hazards and coastal erosion

The major issue that the district experiences particularly during extreme events is inland flooding. This matter is exacerbated due to inadequate road structures and drainage systems. Storm water runoff from further upland is noticed to pond on streets and main road as culverts are either blocked or are not established within the area. Due to the variation in landscape and topography, soil types, aspect to prevailing winds and the extent of development that has altered the land formation within the district, it is difficult to predict with any precision the impacts from climate change within any given livelihood activity at the district level.

The Vaimauga West District includes the central part of Apia on the northern side of the island of Upolu. It is characterized by a narrow, low lying, coastal plain with Mount Vaea and highlands bordering the city in the south from east to west. The lowland is relatively flat and its elevation is not more than ten metres above the mean sea level. Across the whole of Apia's urban area lie the catchments of the six streams from Fagalii in the east to Fuluasou in the west. The Fagalii catchment is the smallest, occupying a narrow valley adjacent to the Vaivase catchment. It has a total area of approximately 500 ha. The two largest catchments are the Vaisigano and Fuluasou catchments, each with a total area of 3,200 ha with the Gasegase catchment the third largest at 2,500

⁸ Livelihood Specialist Village Report

ha. The Mulivai and the Vaivase catchments are each approximately 700 ha in area. The district has a total area of 5,946 hectares. The area covering Tsunami shore exclusive zone is 59 hectares, which is 0.62% of the total area of the district. The district has about 5288 buildings; about 291 buildings are located within the Tsunami shore exclusive zone (Tokalauvere, 2018).

Element at risk includes all human-made infrastructure and natural features, which consist of physical and non-physical infrastructures that face risks from natural disasters. Human-made physical infrastructures include houses, road networks, utilities networks, bridges, drainage networks and railways. Human-made non-physical elements consist of economic, cultural and political environments. Natural features that may be affected by natural disasters include beaches, river systems, swamps, vegetation and all fauna in these environments (Tokalauvere, 2018).

Vaimauga West District Interventions

Coastal area (“Reef”)

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Part of Main roads (junction of Beach Road and Tofilau St., junction of Matafagatele Road and Togoasa Crescent, Matafagatele Road and Sagauga Street and Mulinu’u Road, exposure to extremely high risk ⁹ hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations Responsibility: LTA/ MWTI/	<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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Parts of Levili Road, junction of Levili Uta Rd and Faatoia Rd, Faipule Road ¹⁰ , part of Faatoia Lane Rd, part of Apia Park Loop Rd, Taumeasina Drive, Togoasa Crescent, part of Logan Road, Togafuafua Road, part of Convent Street	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations	<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</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

⁹Extremely 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

¹⁰Not in national road network so not included in LTA normal road maintenance programme for Upolu Zone 1

<p>and Atinae Road - exposure to high risk¹¹ hazard zones (IFHZ, CFHZ)</p>	<p>Responsibility:LTA/MWTI/ \Village</p>	<p>natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets</p>	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with access roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>Responsibility:LTA/MWTI/MNRE/MWCSD /Village / Families</p>	<p>Improves climate resilience of infrastructure and rate of response and recovery to natural hazards and disasters.</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p> <p>Encourages coastal families to relocate inland.</p> <p>Maintains lifeline access for all of Savaii</p> <p>Use as escape routes when necessary</p> <p>Provides access for utility providers to extend their services inland</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>Use updated Hazard Maps to inform designs</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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
<p>Central Business Area (CBD), Government buildings, tourist facilities, Churches, Schools and private residences located in extremely high risk hazard</p>	<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</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</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>

¹¹Extremely 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>zones (IFHZ, CFHZ, CEHZ and tsunami shore exclusive zone)</p>	<p>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>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>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream</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>Safer villages, houses and roads</p>	<p>Conduct and utilize recommendation of geotechnical, catchment management and drainage analysis in the planning phase</p> <p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey of embankment and watercourses in district</p> <p>Utilise Hazard maps and Geomorphologist Drainage Infrastructure Database to identify specific location and condition of current drainage / infrastructure requiring maintenance and upgrade works</p> <p>Encourage and utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>Include in budget programming CBA, design and construction. Bridge 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</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p>

			with appropriate landuse planning controls and restrictions	
Upgrade roads used as escape routes	<p>Assess and upgrade approved escape/access roads to include adequate sized culverts to facilitate the overland flow of storm water and reduce flooding onto main roads and neighbouring villages</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility:LTA/MWTI/</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</p> <p>Include in budget programming CBA, design and construction. Road design standard to take account of forecast changes in sea level rise and increased rainfall intensity</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</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 evacuationshelterassessment 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 CDCRMprogram</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>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>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>			
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>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	EPC Strategic Plan
Effluent and wastewater management systems	<p>Conduct a thorough assessment of effects of discharge from Tanugamanono Power Station</p> <p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Extend effluent and wastewater management systems outside of the Greater Apia Urban Area</p> <p>Conduct campaign for public awareness of district ban and establish a “neighbourhood watch” agreement with district to monitor and manage introduced policies</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</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>Develop an integrated land management plan for Vaimauga West district</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the ‘polluter pays’ principle</p> <p>Review waste water strategy/ legislation to include role of Village/District bylaws</p> <p>Develop/Update and register District/Village bylaws to include regulating developments and latrines around catchment areas and areas susceptible to flooding</p> <p>Include in budget programming design, andinstallment of sewage and treatment systems</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p>

	Responsibility: <i>MNRE/MWCSD/ District/ Village</i>		Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Fugalei, Moata'a, Vaiala, Mulinuu/Sogi Mangrove area conservation	<p>Government to implement boundary demarcation of wetland reserves at Moata'a, Vaipuna and Fugalei with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas</p> <p>District and village councils to regulate clearing of lands around wetlands and initiate replanting programmes for coastal areas</p> <p>Promote and support village and district tree planting on coastal areas around existing seawalls to strengthen seawalls and reduce erosion using native species such as talie, fetau, toa etc that are known to have greater resilience to natural disasters and changing climate conditions</p> <p>Depth and density of planting to be increased and a minimum vegetative distance of 200mm as an effective wave barrier distance</p> <p>Village and Government management of clearing inland catchment areas close to rivers and streams to reduce sedimentation of estuaries, wetlands and the lagoon</p> <p>Responsibility: MNRE /MAF/Village/Village CSSP/NGO/</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 Mangrove Management Plan for Vaimauga 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>Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decision-making, promote the use of existing legal mechanisms to benefit mangroves, and underpin integrated management of coastal natural resources, including mangroves, at the village level</p>	<p>NESP 2017 - 2021</p> <p>Community Engagement Plan</p>
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest	<p>Protects and enhance local species diversity</p> <p>Reduced risk of</p>	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants	<p>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy</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>Responsibility: MNRE-WRD & Forestry/District /Village/CSSP</p>	<p>slips and erosion</p> <p>Reduce impact from inland flooding</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>2015-2020</p> <p>Restoration Operational Plan 2016-2020</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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</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</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 Vaimauga 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>

	to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/ Villages			
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Responsibility: MNRE/ MAF/Villages	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Vaimauga 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 MAF to collaborate on supply of climate resilient crops	NESP 2017-2021 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Sand mining	Identify alternative sustainable sources of sand for domestic use Research the impacts of sand mining Village consultation on sand mining policy and regulation Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and support of sustainable land use practices Responsibility: MNRE/ Village/Families	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion Economic benefit for village from sustainable sandmining activities	MNRE to continue to identify specific sites for inshore/ inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities	Draft Soil Resource Management Bill
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of root crops(i.e.yams,sweet potato)which are more resilient to cyclones, droughts and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases	Improve health through access to clean water and waste management Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	<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>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>	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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>

Inland area (“Ridge”)**CIM Plan Solutions**

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Part of Main road ¹² network : exposure to Immediate Fluvial Hazard Zone (IFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/ MNRE/ Village</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with access roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts</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</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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

¹²Vaialele Street, Vaivaseuta Road, Palisi Road, Saleufi Street, Atinae Road, Vaitele Street, Vaea Road, Leufisa Street, Apaula Street, Papauta Road, Cross Island Road, Avele Road, Palisi Road and Moamoa Road

	<p>and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Village/ Families</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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 D</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>
<p>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the</p>

	<p>upstream of Lelata, Vailima, Alamagoto, Vaivaseuta, Magiagi and Palisi</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</p>	<p>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>Implement Vaimauga 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>Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
<p>Upgrade roads used as escape routes</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 Vaimauga West district</p>	<p>National Disaster Management Plan 2017-2021</p> <p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</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 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>	<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>Electricity supply</p>	<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>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>

	Responsibility: EPC /MWTI/ Villages			
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/ MWCS/ 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 waste water 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
Solid waste management and collection	<p>Conduct campaign for public awareness of district ban on rubbish dumping and establish a "neighbourhood watch" agreement with district to monitor and manage introduced policies</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</p> <p>Government to monitor waste collection contractors and apply penalties according to relevant legislation</p> <p>Responsibility: MNRE/ 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>Develop an integrated land management plan for Vaimauga West District</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the 'polluter pays' principle</p> <p>Review Waste Management strategy/ legislation to include role of Village/District bylaws</p> <p>Develop/Update and register District/Village bylaws to include regulating illegal rubbish dumping especially around catchment areas and areas susceptible to flooding</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>Integrated Apia Master Plan for Water Supply, Sanitation and Drainage</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>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce</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</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>District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas</p> <p>Responsibility:SWA/ MWCS D/ MNRE / District/ Village/ CSSP</p>	<p>contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>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>	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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</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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>

	tava, and poumuli Responsibility: MNRE/ /SWA/District/Village/ CSSP/GEF-SGP			
Sand/rock mining (commercial) and sand/rock extraction (domestic): rivers and riverbanks	Identify alternative sustainable sources of sand for domestic use Research the impacts of sand mining Village consultation on sand mining policy and regulation Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and support of sustainable land use practices Responsibility: MNRE/ Village/Families	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion Economic benefit for village from sustainable sand mining activities	MNRE to continue to identify specific sites for inshore/ inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities	Draft Soil Resource Management Bill
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 in flood prone areas Responsibility: MNRE/ Villages	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Vaimauga 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
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of root crops (i.e. yams, sweet potato) which are more resilient to cyclones, drought and floods Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop	Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters	Utilise Hazard Maps and Geomorphologist findings to inform location and design Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	<p>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>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>	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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>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>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>

	<p>Facilitate continuous awareness raising programs with the villages</p> <p><i>Responsibility: MWCSO /Village</i></p>	<p>Improve accountability and enabling environment of communities</p>		
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Vaimauga West District Map



VAIMAUGA WEST DISTRICT



ADAPTATION FUND



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. *Mulinu'u, Sogi, Savalalo, Fugalei, Saleufi Village Interventions*

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to extremely high risk ¹³ hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/ MNRE/ Community</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, community homes and other assets	<p>Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts</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</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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

¹³Extremely 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>and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D/ Communities / Families</p>	<p>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 Vaimauga West District</p>	
<p>Government buildings, tourist facilities, Churches, Schools and private residences located in extremely high risk hazard zones (IFHZ, CFHZ, CEHZ and tsunami shore exclusive zone)</p>	<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: Community / Families / MWTI/ MNRE/ MWCS D</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>
<p>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Vaimoso, Alamagoto and Palisi based on recommendations of geotechnical, catchment management and</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>Conduct and utilize recommendation of geotechnical, catchment management and drainage analysis in the planning phase</p> <p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey of embankment and watercourses in district</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

	<p>drainage analysis</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/ Community</p>	<p>Safer villages, houses and roads</p>	<p>Utilise Hazard maps and Geomorphologist Drainage Infrastructure Database to identify specific location and condition of current drainage / infrastructure requiring maintenance and upgrade works</p> <p>Encourage and utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>Include in budget programming CBA, design and construction. Bridge 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>	
<p>Upgrade roads used as escape routes</p>	<p>Assess and upgrade approved escape/access roads to include adequate sized culverts to facilitate the overland flow of storm water and reduce flooding onto main roads and neighbouring villages</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility:LTA/MW TI/Communities</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</p> <p>Include in budget programming CBA, design and construction. Road design standard to take account of forecast changes in sea level rise and increased rainfall intensity</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p> <p>Develop/Update and register District/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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

<p>Parts of Main roads: exposure to extremely high risk¹⁴ hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)</p>	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
<p>Natural Resources and Environment</p>	<p>Best Solutions</p>	<p>Benefits</p>	<p>Guideline to assist with the implementation</p>	<p>Relevant Sector Plans, National Strategies & Policies</p>
<p>Fugalei, Mulinuu/Sogi Mangrove area conservation</p>	<p>Government to implement boundary demarcation of wetland reserves at Fugalei, Mulinuu/Sogi with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas</p> <p>Responsibility: MNRE /MAF/Communities/ CSSP/NGO/</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 Mangrove Management Plan for Vaimauga 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>Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decision-making, promote the use of existing legal mechanisms to benefit mangroves, and underpin integrated management of coastal</p>	<p>NESP 2017 - 2021</p> <p>Community Engagement Plan</p>

¹⁴Extremely 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

			natural resources, including mangroves, at the village level	
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/Communities</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 Vaimauga 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>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/Communities</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 Vaimauga 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 mining (commercial) and sand extraction (domestic)	<p>Identify alternative sustainable sources of sand for domestic use</p> <p>Research the impacts of sand mining</p> <p>Community 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/Community/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 sandmining 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>

Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting</p>	<p>Promote and facilitate planting of root crops(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 varieties</p> <p>Responsibility: MAF/ MNRE/Community</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, 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>AgricultureSectorPlan2016-2021</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</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</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

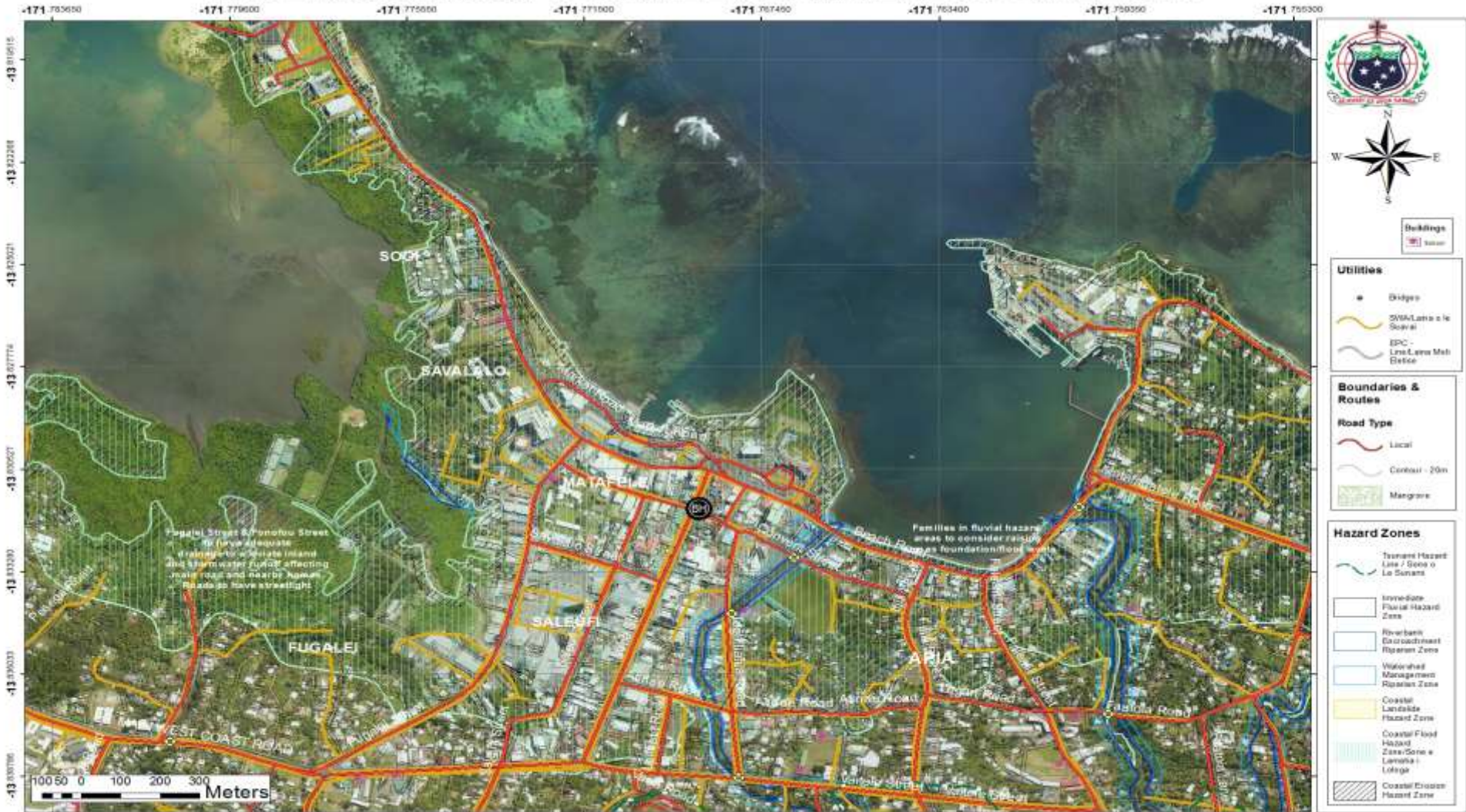
	<p>boreholes.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Obtain necessary permits required by law before developments take place</p> <p>Responsibility: MWCSO /MNRE /Community</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>meetings to monitor progress of district/village bylaws</p>	
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Non-CR issues raised during consultations	Proposed Solution	Comments
<p>Lands</p> <p>Responsibility: Community/ Government</p>	<p>Villagers requested land from government for relocation purposes</p>	<p>Related to CR as relocation is one of the recommended solutions to impacts of climate change included in the Vaimauga West CIM Plan</p>



Mulinu'u, Sogi, Savalalo, Fugalei and Saleufi Village Map

MULINUU/SOGI/ FUGALEI/SAVALALO/ SALEUFI



4. Vaimea, Aai o Fiti Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ¹⁵ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/ MNRE /Community</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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</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</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

¹⁵Extremely 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>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>Responsibility: LTA/ MWTI/MNRE/MWCSD /Community / Families</p>	<p>disaster recovery expenditure on damaged properties, public and private assets</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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: Community / Families /MWTI/ MNRE/ MWCSD</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>

<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 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/ Community /Families</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>Effluent and wastewater management systems</p>	<p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Conduct campaign for public awareness of village ban and establish a “neighbourhood watch” agreement with village councils to monitor and manage introduced policies</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</p> <p>Responsibility: MNRE/ MWCS D/District/ Community</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>Develop an integrated land management plan for Vaimauga West district</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the ‘polluter pays’ principle</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 around catchment areas and areas susceptible to flooding</p> <p>Include in budget programming design, and installation of sewage and treatment systems</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p> <p>Integrated Apia Master Plan for Water Supply, Sanitation and Drainage</p> <p>NESP 2017 - 2021</p> <p>Village Fono Act (Amendment Bill 2016)</p>
<p>Natural Resources and Environment</p>	<p>Best Solutions</p>	<p>Benefits</p>	<p>Guideline to assist with the implementation</p>	<p>Relevant Sector Plans, National Strategies & Policies</p>
<p>District Upland Forest</p>	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</p> <p>Promote agroforestry and mixed planting including</p>	<p>Protects and enhance local species diversity</p> <p>Reduced risk of slips and erosion</p>	<p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</p> <p>Develop an integrated land management plan with the</p>	<p>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p>

	<p>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>Responsibility: MNRE- WRD & Forestry/ District /Community /CSSP</p>	<p>Reduce impact from inland flooding</p>	<p>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>Restoration Operational Plan 2016-2020</p>
<p>Protection of catchment areas</p>	<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/Community /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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>
<p>Sand/rock mining (commercial) and sand/rock extraction (domestic): rivers and riverbanks</p>	<p>Identify alternative sustainable sources of sand for domestic use</p> <p>Research the impacts of sand mining</p> <p>Community consultation on sand mining policy and regulation</p> <p>Community and government to collaborate closely on designated areas for sand/rock mining</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</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</p>	<p>Draft Soil Resource Management Bill</p>

	<p>Raise awareness and support of sustainable land use practices</p> <p>Responsibility: MNRE/Community/Families</p>	<p>sandmining activities</p>	<p>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>	
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting</p>	<p>Promote and facilitate planting of root crops (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 varieties</p> <p>Responsibility: MAF/MNRE/Community</p>	<p>Improve recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p>	<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 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 advise 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>Agriculture Sector Plan 2016-2021</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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 Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the community</p> <p>Responsibility: MWCSD /Community</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
Foraging pigs from neighbouring villages damaging lands and assets Responsibility: Village/ Government	Aai of Fiti and neighbouring villages to develop village bylaws governing fencing of domestic animals	Not a CR issue but indirectly related to water supply contamination and health issues especially during and after extreme events



access road to families located inland



properly installed streetlights

Vaimea, Aai o Fiti Village Map

VAIMEA, AAI O FITI VILLAGES



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. Alamagoto Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ¹⁶ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure,	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

¹⁶Extremely 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>village homes and other assets</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>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Village / Families</p>	<p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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 D</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>

<p>Landslips</p>	<p>Implement slope stabilization or ‘forced collapse’ under controlled conditions at most vulnerable landslide areas of Vaimauga 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/M WT/ 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 Vaimauga 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 Vaimauga 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>
<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 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>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>

	Responsibility: EPC/ MWTI/ Village/Families			
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/ MWCS D/ 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>
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/ MWCS D/ 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 waste water 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
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</p> <p>Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection</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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the</p>	<p>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	<p>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>Responsibility: MNRE-WRD & Forestry/District /Village/CSSP</p>		<p>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>	
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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>
Sand/rock mining (commercial) and sand/rock extraction (domestic): rivers and riverbanks	<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</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 sandmining</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</p>	<p>Draft Soil Resource Management Bill</p>

	<p>support of sustainable land use practices</p> <p>Responsibility: MNRE/Village/Families</p>	<p>activities</p>	<p>sand/rock mining of rivers</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities</p>	
<p>Flood protection measures (soft solution to support flood protection measures for infrastructure)</p>	<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 Vaimauga 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>
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting</p>	<p>Promote and facilitate planting of root crops (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 varieties</p> <p>Responsibility: MAF/MNRE/village</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, seedlings and planting material for village/families as a trial</p> <p>Develop an integrated land</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

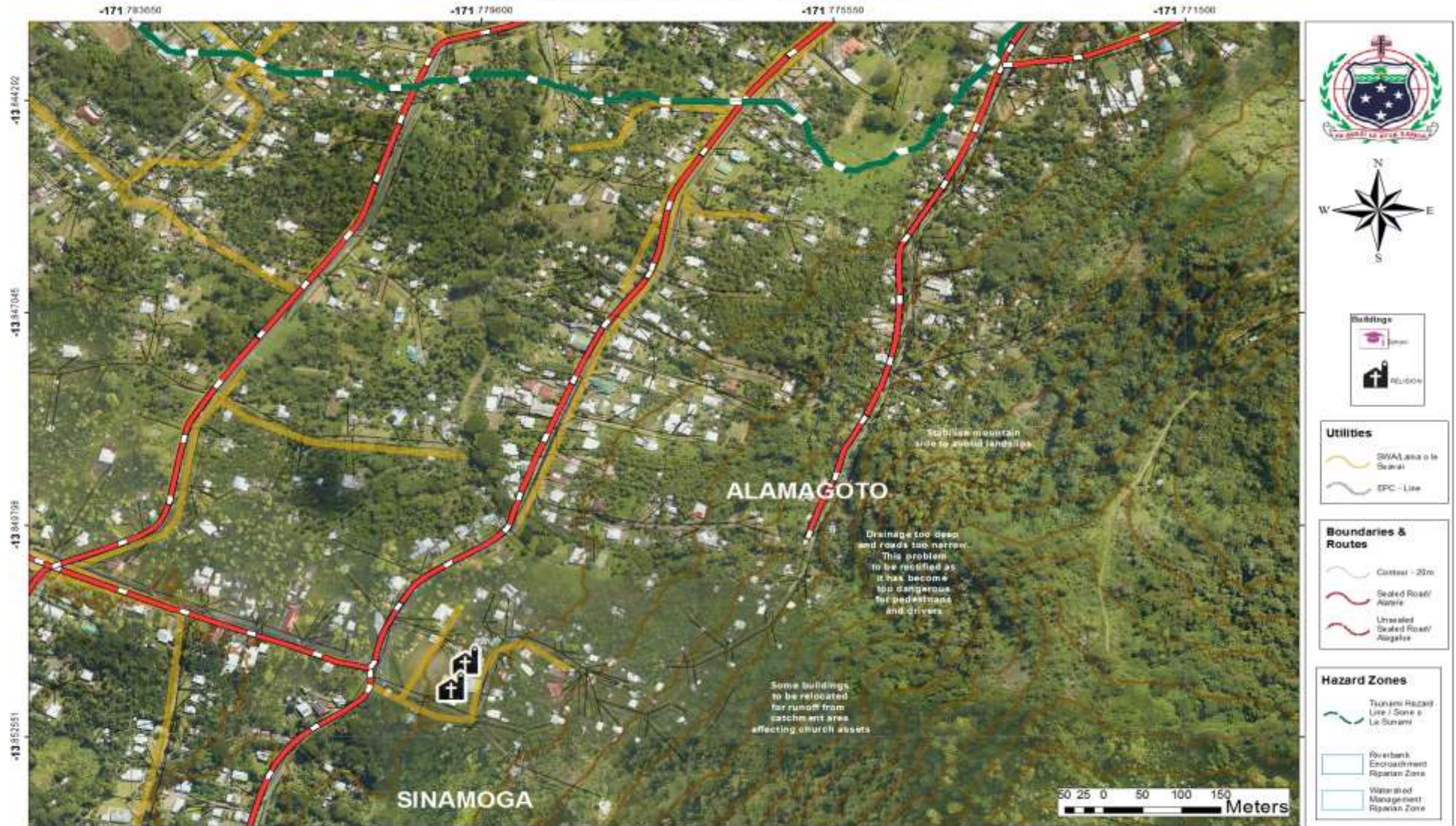
			<p>management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village</p>	
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: MWCS D /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
Exposed drainage on national road network Responsibility: Village/ Government	LTA to provide footpath over open drains for safety of travelling public and village community	Indirectly related to CR (safe havens and emergency response) as it could hamper work of response and recovery teams during and after extreme events



Alamagoto Tai Village Map

ALAMAGOTO 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

6. Apia Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ¹⁷ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Climateproof national road network</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts</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</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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

¹⁷Extremely 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>and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCSD /Village / Families</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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/ MWCSD</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>
<p>Electricity supply</p>	<p>Provide underground lines in the long term</p> <p>Install and connect power supply for inland residents</p>	<p>Maintain electricity supply at all times including natural disasters</p>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	<p>EPC Strategic Plan</p>

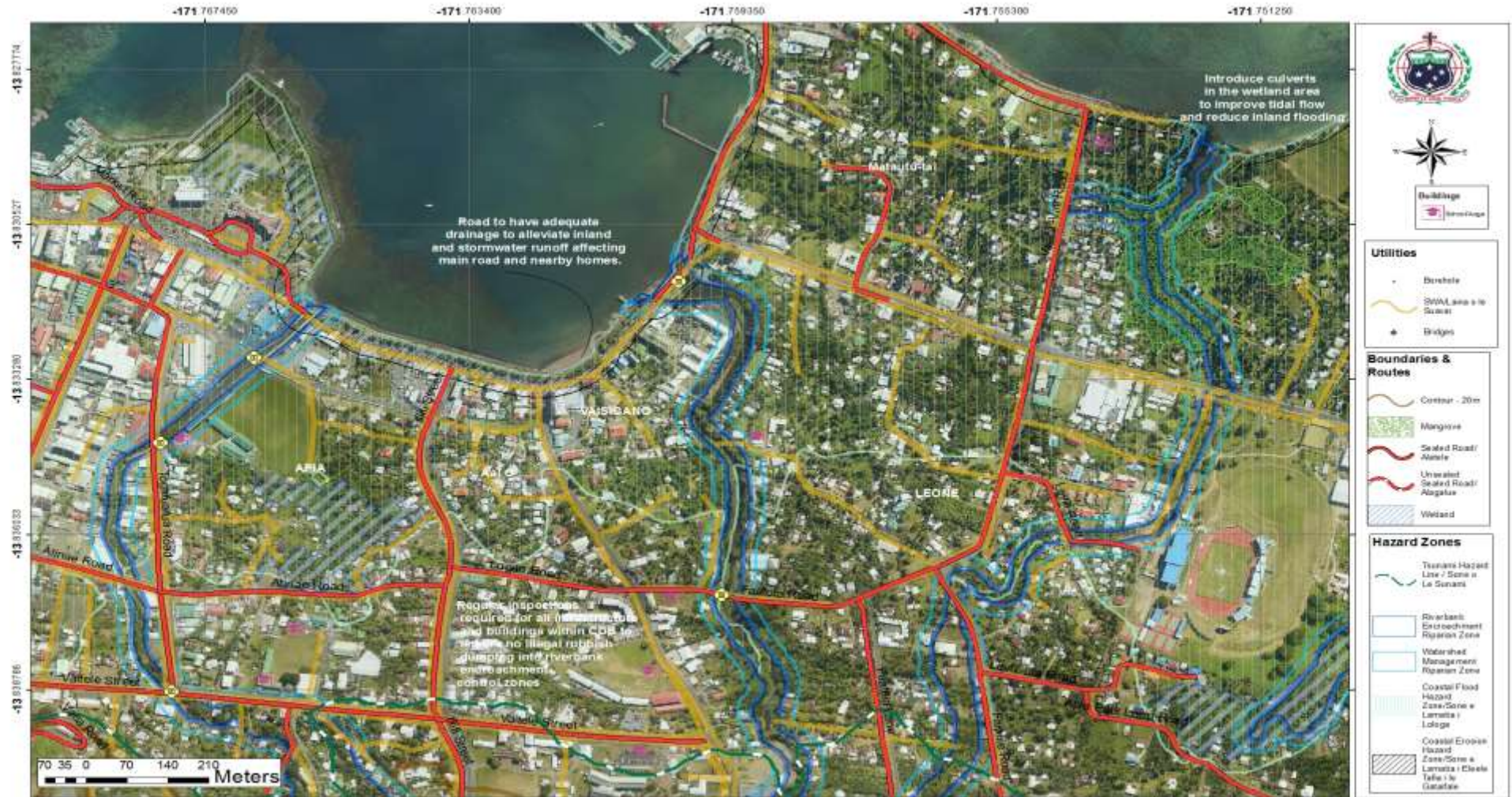
	<p>Relocate overhead lines to a more resilient location when being replaced</p> <p>Install streetlights along the roads where needed for community safety</p> <p>Install and connect to solar power supply if made available</p> <p>Families to limit building and developments near electricity posts</p> <p>Responsibility: EPC/ MWTI/ Village/Families</p>	<p>Avoid accidents from fallen electricity posts</p>		
<p>Effluent and wastewater management systems</p>	<p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Conduct campaign for public awareness of village ban and establish a “neighbourhood watch” agreement with village councils to monitor and manage introduced policies</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</p> <p>Responsibility: MNRE/MWCSD/ 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>Develop an integrated land management plan for Vaimauga West district</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the ‘polluter pays’ principle</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 around catchment areas and areas susceptible to flooding</p> <p>Include in budget programming design, and installment of sewage and treatment systems</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p> <p>Integrated Apia Master Plan for Water Supply, Sanitation and Drainage</p>
<p>Village pool (near Apia Cemetery) located in high risk hazard zones</p>	<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>
<p>Livelihood and Food Security</p>	<p>Best Solutions</p>	<p>Benefits</p>	<p>Guideline to assist with the implementation</p>	<p>Relevant Sector Plans, National Strategies & Policies</p>
<p>Plantations, crops and plants threatened by changes in climate, inland</p>	<p>Promote and facilitate planting of root crops (i.e. yams, sweet potato) which are more resilient to cyclones,</p>	<p>Improve recovery to create more resilient villages</p> <p>Improve</p>	<p>Utilise Hazard Maps and Geomorphologist findings to inform location and design</p> <p>Agriculture sector to provide</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Two Million Tree Strategy 2015-2020</p>

<p>flooding and inadequate soil for planting</p>	<p>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 varieties</p> <p>Responsibility: MAF/MNRE/village</p>	<p>preparedness and readiness response to natural disasters</p>	<p>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, 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>Restoration Operational Plan 2016-2020</p>
<p>Governance</p>	<p>Best Solutions</p>	<p>Benefits</p>	<p>Guideline to assist with the implementation</p>	<p>Relevant Sector Plans, National Strategies & Policies</p>
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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</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</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>

	<p>and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO /Village</p>	<p>recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>		
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Apia Village Map

APIA



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

7. Togafu'afu'a, Matafele, Tufuiopa Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ¹⁸ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ) – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce</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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

¹⁸Extremely 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>flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA / MWTI / MNRE / MWCS D / Community / Families</p>		<p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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 community to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Community / Families / MWTI / MNRE / MWCS D</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>
<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</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>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/ Community /Families</p>			
Effluent and wastewater management systems	<p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Conduct campaign for public awareness of village ban and establish a “neighbourhood watch” agreement with village councils to monitor and manage introduced policies</p> <p>Government, district and community to monitor, report and apply penalty on offenders</p> <p>Responsibility: MNRE/MWCSD/ District/ Community</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>Develop an integrated land management plan for Vaimauga West district</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the ‘polluter pays’ principle</p> <p>Review waste water strategy/legislation to include role of Village/District bylaws</p> <p>Develop/Update and register District/Village bylaws to include regulating developments and latrines around catchment areas and areas susceptible to flooding</p> <p>Include in budget programming design, and installment of sewage and treatment systems</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p> <p>Integrated Apia Master Plan for Water Supply, Sanitation and Drainage</p>
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village pool located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	<p>Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs</p> <p>Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: MoF-CSSP/ MNRE/Communities</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>Utilise Sui o Nu’u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Community Engagement Plan</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 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 /Community</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>Street lights for areas near Mulivai bridge and Marist Boys school</p> <p>Responsibility: Families/ Government</p>	<p>Community and families to liaise with EPC directly</p>	<p>Not a CR issue but contributes to safety of travelling public</p>



Togafu'afu'a, Matafele, Tufuiopa Village Map

TOGAFUAFUA, MATAFELE, TUFUIOPA VILLAGES



Utilities

- Borehole
- DWA/Lana o le Suva

Boundaries & Routes

- Contour - 20m
- Mangrove

Road Type

- Sealed Road/Alatale
- Unsealed Sealed Road/Algalua
- Lauibus/Mua/Waifanua

Hazard Zones

- Tsunami Hazard Line / Sone o Le Sunams
- Immediate Fluvial Hazard Zone
- Riverbank Encroachment Riparian Zone
- Watershed Management Riparian Zone
- Coastal Flood Hazard Zone/Sone o Lamatia / Lologa
- Coastal Erosion Hazard Zone

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. Taufusi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ¹⁹ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility:LTA/ MWTI/</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, community homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts</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</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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

¹⁹Extremely 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>and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Community / Families</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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: Community / Families / MWTI/ MNRE/ MWCS D</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>
<p>Electricity supply</p>	<p>Install streetlights along the roads where needed for community safety</p> <p>Relocate overhead lines to a more resilient</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents</p>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	<p>EPC Corporate Plan</p>

	<p>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/ Communities</p>	<p>from fallen electricity posts</p>		
<p>Effluent and wastewater management systems</p>	<p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Conduct campaign for public awareness of village ban and establish a “neighbourhood watch” agreement with village councils to monitor and manage introduced policies</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</p> <p>Responsibility: MNRE/MWCSD/ District/ Community</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>Develop an integrated land management plan for Vaimauga West district</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the ‘polluter pays’ principle</p> <p>Review waste water strategy/legislation to include role of Village/District bylaws</p> <p>Develop/Update and register District/Village bylaws to include regulating developments and latrines around catchment areas and areas susceptible to flooding</p> <p>Include in budget programming design, and installment of sewage and treatment systems</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p> <p>Integrated Apia Master Plan for Water Supply, Sanitation and Drainage</p>
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<p>Update and/or develop by laws 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</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>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>

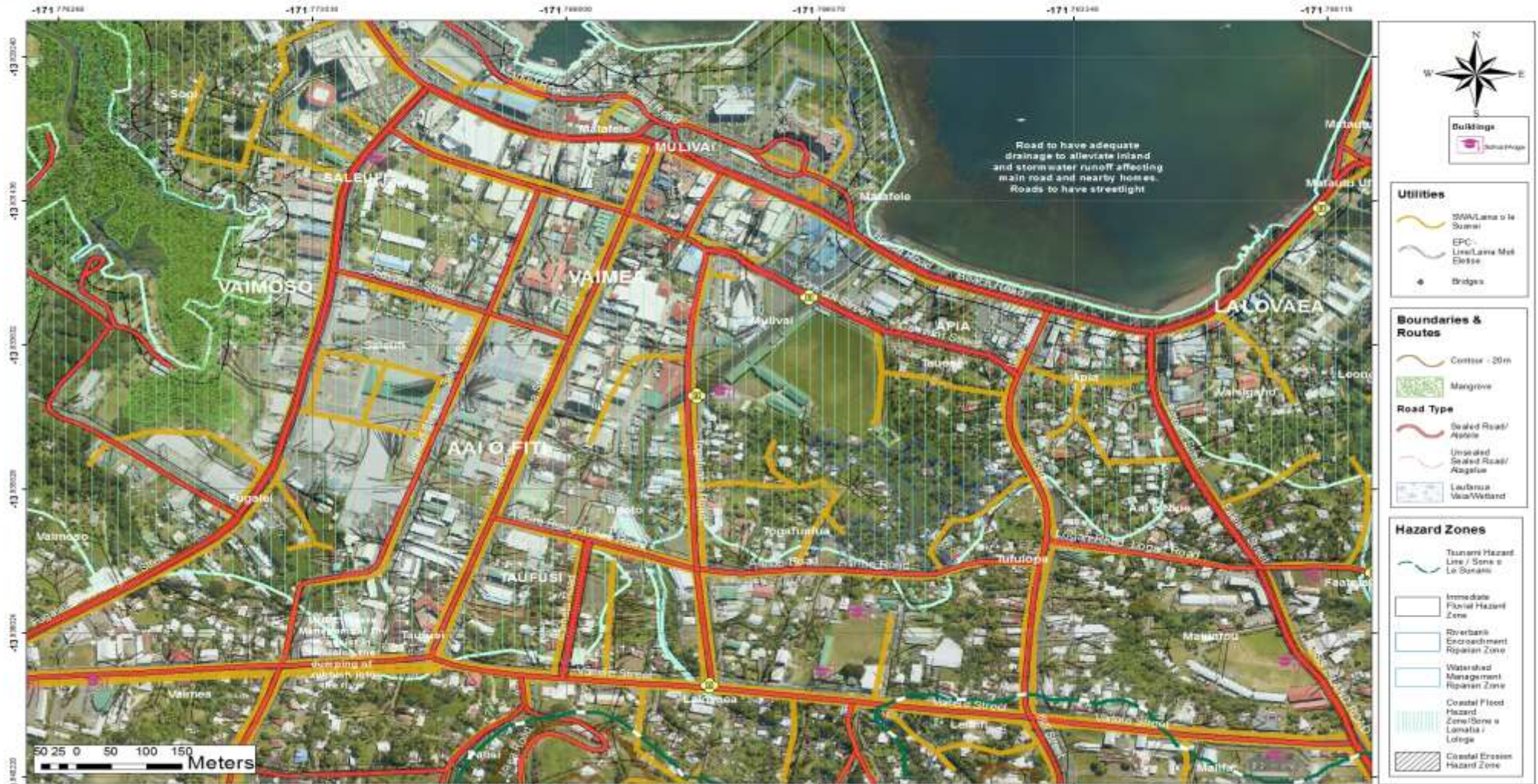
	<p>programs with the villages</p> <p><i>Responsibility: MWCSO /Community</i></p>	<p>Improve accountability and enabling environment of communities</p>		
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Taufusi Village Map



TAUFUSI



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. Lalovaea, Lalovaea Sasa'e, Palisi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ²⁰ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/ MNRE/Village</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts</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</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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

²⁰Extremely 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>and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Village / Families</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Lalovaea (Loimata o Apaula area) and Palisi)</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>Safer villages, houses and roads</p>	<p>Conduct and utilize recommendation of geotechnical, catchment management and drainage analysis in the planning phase</p> <p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey of embankment and watercourses in district</p> <p>Utilise Hazard maps and Geomorphologist Drainage Infrastructure Database to identify specific location and condition of current drainage / infrastructure requiring maintenance and upgrade works</p> <p>Encourage and utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>Include in budget programming CBA, design and construction. Bridge 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 land use planning controls and restrictions</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

<p>Upgrade access/ local roads²¹ to national standards to alleviate inland flooding affecting Lalovaea, Palisi and lower Apia CBD area</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 Vaimauga 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>Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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>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>

²¹Vaea Road, Apaula Street, Apaula Heights Road, Palisi Road and Ieriko Road. Mt Vaea Rd not in national network so not covered under LTA normal road maintenance programme

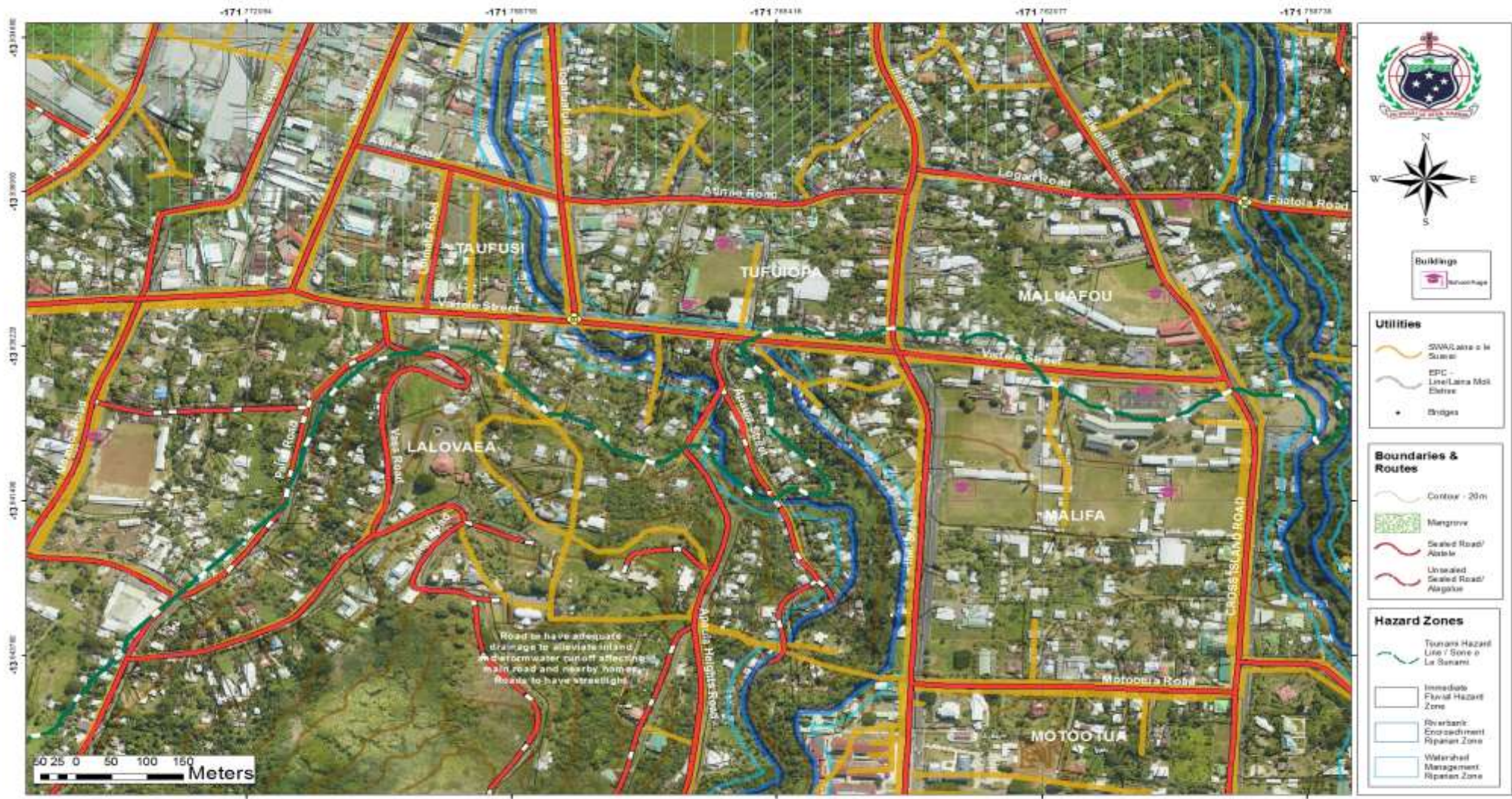
	Responsibility: Village / Families / MWTI / MNRE / MWCS D			
Landslips	<p>Implement slope stabilization at most vulnerable landslide areas of Vaimauga West as identified in the <i>Vulnerability Assessment of the Samoa Road Network</i> report</p> <p>Reduce sediment loads and loss of top soil by discouraging 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>Climateproof 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 Vaimauga 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 Vaimauga 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 land use 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>
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 / MWCS D / 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 waste water 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>	<p>National Waste Management Strategy</p>

Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</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</p>	<p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p>	<p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location</p>	<p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	<p>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>Safer villages, houses and roads</p>	<p>and designs</p> <p>MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation</p>	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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: MWCS D /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>



LALOVAEA & PALISI VILLAGES



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

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

10. Malifa, Moto'otua, Leufisa Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ²² hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</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</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</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

²²Extremely 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>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Community / Families</p>	<p>and private assets</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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: Community / Families / MWTI/ MNRE/ MWCS D</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>
<p>Effluent and wastewater management systems</p>	<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/</p>	<p>Increase adaptation during extreme weather events</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health</p>	<p>Review waste water 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>National Waste Management Strategy</p>

	<p>village drainage cleanup and awareness programme</p> <p>Produce posters and village signs for public awareness</p> <p>Responsibility: MNRE/ MWCS/ District/ Community</p>	<p>and sanitation</p> <p>Reduce contamination of water supply</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>	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>Responsibility: MNRE-WRD & Forestry/ District /Community /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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>

	Responsibility: MNRE/ /SWA/District/Community/ CSSP/GEF-SGP			
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: MWCS D /Community</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>



Malifa, Moto'otua, Leufisa Village Map

MALIFA, MOTOOTUA, LEUFISA VILLAGES



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

11. Tanugamanono 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 (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>Responsibility: LTA/ MWTI/MNRE/MWCSD /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)"; "Review of National Road Standards in Samoa (2016)"; "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 Vaimauga West District</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Access/work roads require maintenance and upgrade as it exacerbates flooding onto main Cross Island Road and exacerbate river /ford overruns	<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</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</p>	<p>National Disaster Management Plan 2017-2021</p> <p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

	<p>requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ Villages/Families</p>		Vaimauga West district	
<p>Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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 D</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>
<p>Effluent and wastewater management systems</p>	<p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Conduct campaign for public awareness of village ban and establish a “neighbourhood watch” agreement with village councils to monitor and manage introduced policies</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</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>Develop an integrated land management plan for Vaimauga West district</p> <p>Utilise Waste Management Act/Legislation to guide process of effecting the ‘polluter pays’ principle</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 around catchment areas and areas susceptible to flooding</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p> <p>Integrated Apia Master Plan for Water Supply, Sanitation and Drainage</p>

	Responsibility: MNRE/ MWCS/ District/ Village		<p>Include in budget programming design, and installation of sewage and treatment systems</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</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 Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising</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</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>

	<p>programs with the villages</p> <p>Responsibility: MWCSO /Village</p>	<p>enabling environment of communities</p>		
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Tanugamanono Village Map

TANUGAMANONO



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

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

12. Nafanua (Setema Fou) Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main roads: exposure to high risk ²³ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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 natural disasters</p> <p>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within combined hazard zones exacerbating inland flooding and storm water surges (IFHZ, CEHZ, CFHZ)– culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of</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</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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

²³Extremely 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>storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Community / Families</p>	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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: Community / Families / MWTI/ MNRE/ MWCS D</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>
<p>Effluent and wastewater management systems</p>	<p>Introduce ban on latrines established in and around fluvial hazard zones</p> <p>Conduct campaign for public awareness of</p>	<p>Increase adaptation during extreme weather events</p> <p>Improve infrastructure resilience and</p>	<p>Develop an integrated land management plan for Vaimauga West district</p> <p>Utilise Waste Management Act/Legislation to guide</p>	<p>National Waste Management Strategy</p> <p>National Waste Management Policy</p>

	<p>village ban and establish a “neighbourhood watch” agreement with village councils to monitor and manage introduced policies</p> <p>Government, district and villages to monitor, report and apply penalty on offenders</p> <p>Responsibility: MNRE/MWCSD/ District/ Community</p>	<p>rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>process of effecting the ‘polluter pays’ principle</p> <p>Review waste water strategy/legislation to include role of Village/District bylaws</p> <p>Develop/Update and register District/Village bylaws to include regulating developments and latrines around catchment areas and areas susceptible to flooding</p> <p>Include in budget programming design, and installment of sewage and treatment systems</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p>	<p>Integrated Apia Master Plan for Water Supply, Sanitation and Drainage</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/ Community/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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</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</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p>

	<p>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 /Community</p>	<p>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>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>Community Development Plan 2016-2021</p>
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Nafanua (Setema Fou) Village Map

NAFANUA



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

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

13. Papaloloa, Tanumaleko Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ²⁴ : exposure to high risk ²⁵ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ–culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

²⁴Hinoma Street and Dora Street

²⁵Extremely 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

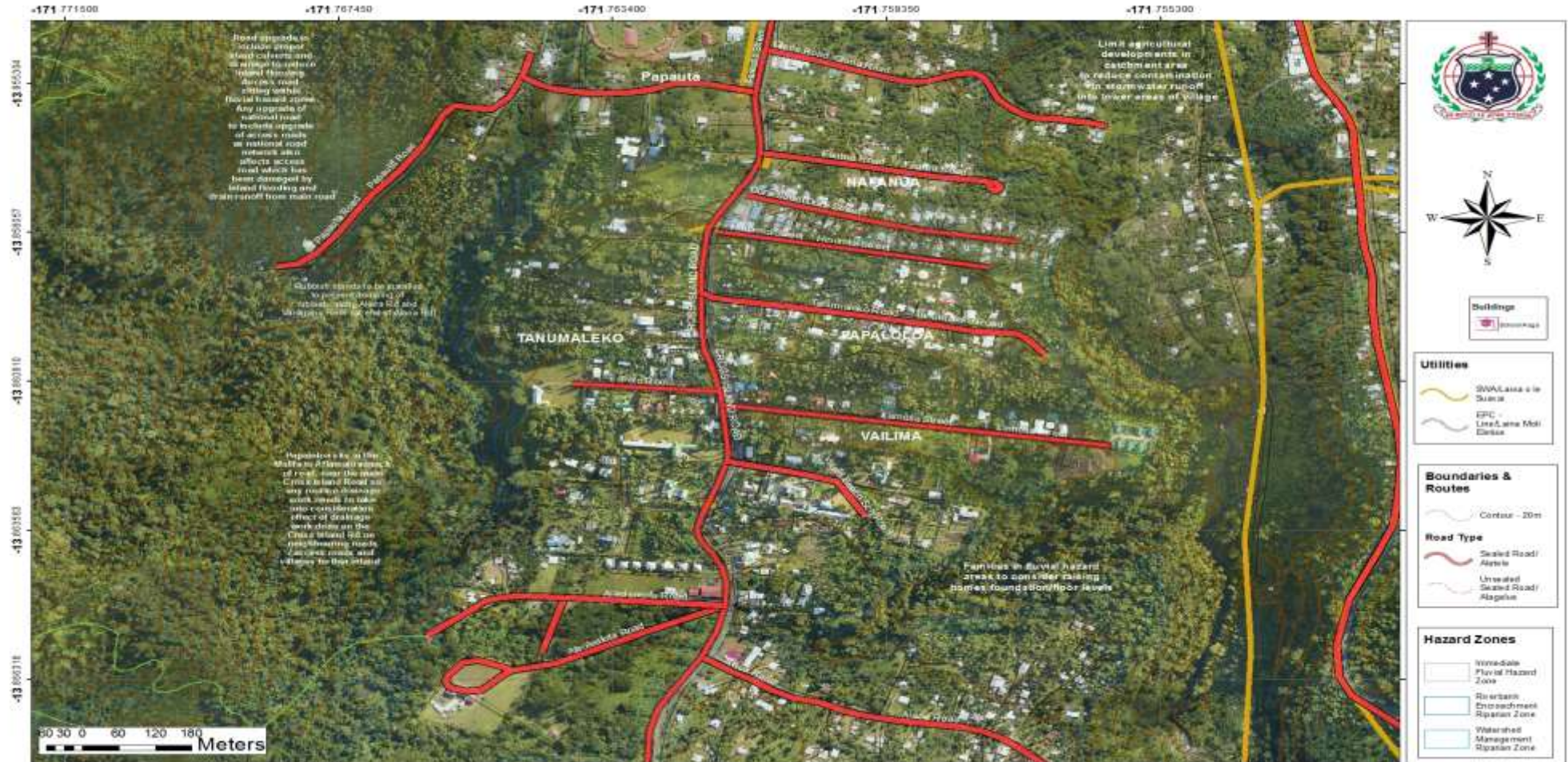
	Responsibility: LTA/ MWTI/MNRE/MWCSD /Community / Families		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Community / Families /MWTI/ MNRE/ MWCSD	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants 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	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	<p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Responsibility: MNRE-WRD & Forestry/District /Community /CSSP</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>	
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/Community /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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</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 Nuu to monitor the use of and impact on natural resources</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>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>

	<p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO /Community</p>	<p>Improve accountability and enabling environment of communities</p>		
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Papaloloa, Tanumaleko Village Map

PAPALOLOA, TANUMALEKO



14. Papauta (Loimata o Apaula) Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ²⁶ : exposure to high risk ²⁷ hazard zones (IFHZ, CEHZ, CFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

²⁶Papauta Road

²⁷Extremely 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

	Responsibility:LTA/ MWTI/MNRE/MWCSD /Village / Families		<p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	<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/ MWCSD</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>
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</p>	<p>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health</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</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan(2016)</p>

	<p>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/ MWCS D/ MNRE / District/ Village/ CSSP</p>	<p>and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>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>Community Engagement Plan</p>
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>

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

Non-CR issues raised during consultations	Proposed Solution	Comments
Sharp road curve/bend in Papauta Road (inland section) Responsibility: Village/ EPC	Village and private landowners to resolve land issues	Not a CR issue



Papauta (Loimata o Apaula) Village Map

PAPAUTA



15. Vailima Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ²⁸ : exposure to high risk ²⁹ hazard zones (IFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

²⁸Vaiala Beach School Road and Lamosa Street

²⁹Extremely 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

	Responsibility: LTA/ MWTI/MNRE/MWCSD /Village / Families		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District and village to support SWA water rationing programmes during times of drought District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA(2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	Continue programme by Forestry on replanting native forestry species of the upland forest Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	Responsibility: MNRE- WRD & Forestry/ District /Village/CSSP			
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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</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</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Vaimauga 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>

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

Non-CR issues raised during consultations	Proposed Solution	Comments
Signs (school crossing) in front of school Responsibility: School / LTA/ MESC	School/MESC to request LTA/MWTI assistance directly	Not a CR issue
Land for agricultural developments Responsibility: Families / Member of Parliament	Families/village to liaise with Member of Parliament	Not a CR issue



Vailima Village Map

VAILIMA



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

16. Avele, Vaoala, Tiapapata Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main Cross Island road and access roads ³⁰ ; exposure to high risk ³¹ hazard zones (IFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular</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</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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

³⁰Avele Road, Collins Street, Letava Street, Skippers Lane, Vaoala Heights Road, Island Style Road

³¹Extremely 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

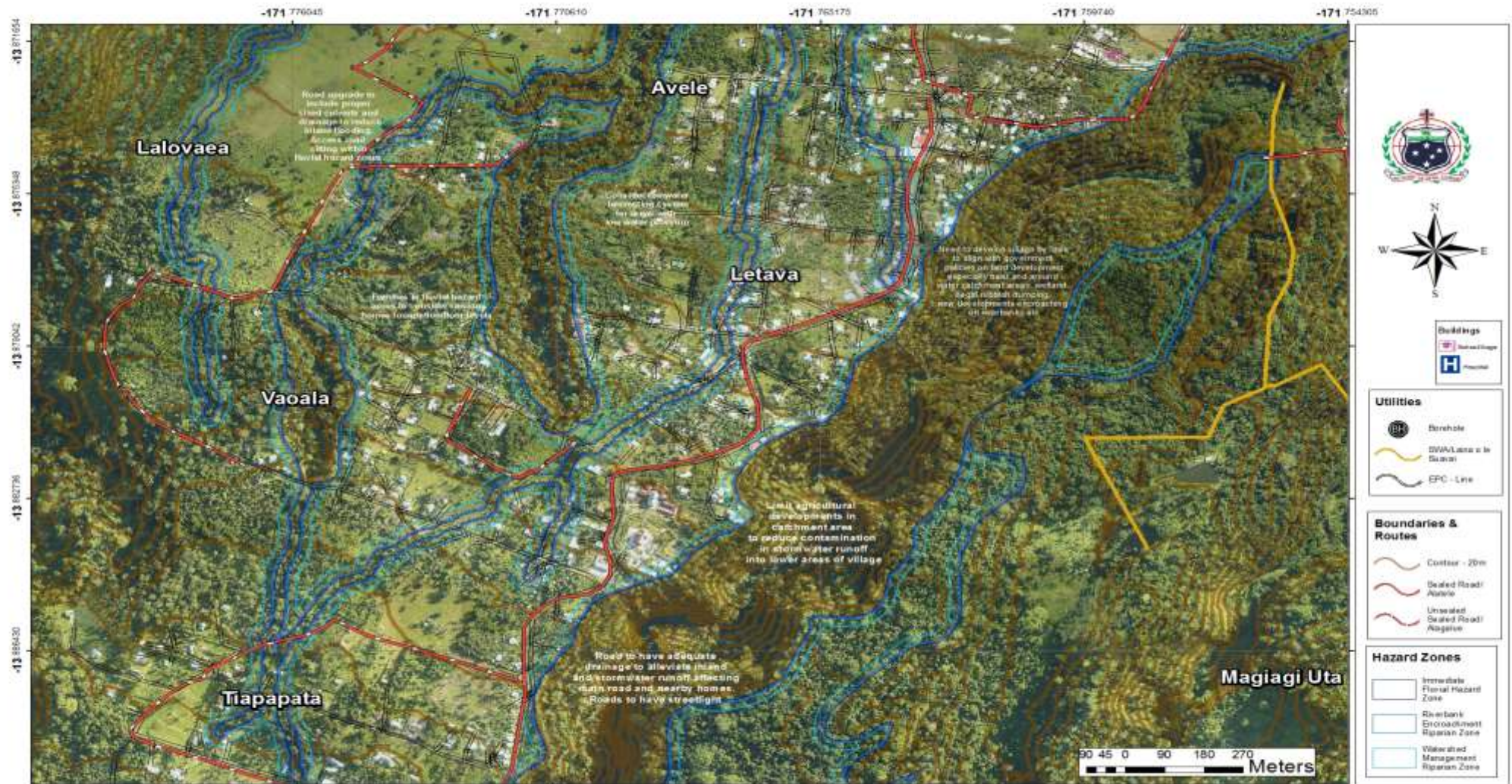
	<p>drainage inspection and maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Village / Families</p>	and private assets	<p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District</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/ MWCS D/ 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>
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

<p>Protection of catchment areas</p>	<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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>
<p>Governance</p>	<p>Best Solutions</p>	<p>Benefits</p>	<p>Guideline to assist with the implementation</p>	<p>Relevant Sector Plans, National Strategies & Policies</p>
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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: MWCS D /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
Upgrade road to Animal Protection Society Responsibility: APS / LTA/ MNRE	APS to request LTA directly	Not a CR issue as there is not enough population in this area to justify investment. Focus should be on upgrading drainage on Avele Road to alleviate inland flooding and storm water surges onto properties in this village as well as villages further downstream
Nurseries Responsibility: Families / MAF	Individuals to seek funding assistance from other sources	Related to livelihood section of CR but only a few individuals involved
Sewing machines for commercial purposes Responsibility: Families/ SBEC	Individuals to seek funding assistance from other sources	Related to livelihood section of CR but only a few individuals involved

Avele, Vaoala, Tiapapata Village Map

AVELE, VAOALA, TIAPAPATA VILLAGES



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

17. Matautu-Tai, Matautu-Uta Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ³² ; exposure to extremely high risk ³³ hazard zones (IFHZ, CFHZ, CEHZ and tsunami shore exclusive zone)	Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations Responsibility: LTA/ MWTI/	<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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

³²Sagauga Road, Matautu Drive sitting in CEHZ and CFHZ only

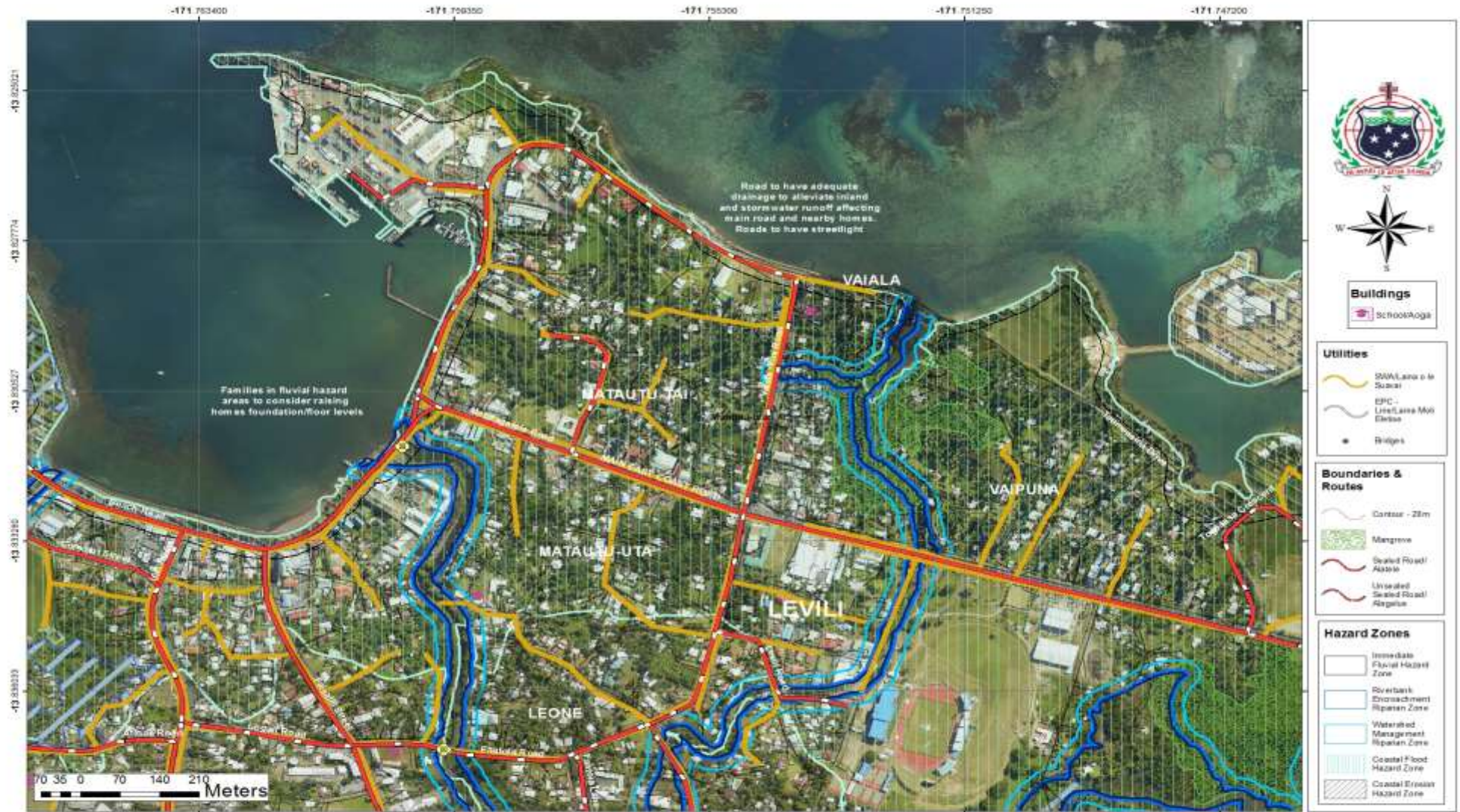
³³Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	Responsibility: LTA/ MWTI/MNRE/MWCSD /Village / Families		undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts Responsibility: EPC/ MWTI/ Village/Families	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages	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	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

	<i>Responsibility: MWCSD /Village</i>	communities		
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Matautu Tai/Uta Village Map

MATAUTU-TAI, MATAUTU-UTA VILLAGES



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

18. Vaiala Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ³⁴ : exposure to high risk ³⁵ hazard zones (IFHZ, CFHZ and CEHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Maintain seawall that was upgraded in 2015 Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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</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</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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

³⁴Matautu Street near Vaiala seawall and Vaiala-Vini Road

³⁵Extremely 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>maintenance</p> <p>Responsibility: LTA/ MWTI/</p>	and private assets	<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 Vaimauga West District</p>	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Vaiala/ Vaipuna Mangrove area conservation</p>	<p>Government to implement boundary demarcation of wetland reserves at Vaiala/ Vaipuna with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas</p> <p>Introduce culverts in wetland areas to improve tidal flow and fish passage in the wetland area</p> <p>District and village councils to regulate clearing of lands around wetlands and initiate replanting programmes for coastal areas</p> <p>Promote and support village and district tree planting on coastal areas around existing seawalls to strengthen seawalls and reduce erosion using native species such as talie, fetau, toa etc that are known to have greater resilience to natural disasters and changing climate conditions</p> <p>Depth and density of planting to be increased and a minimum vegetative distance of 200mm as an effective wave barrier distance</p> <p>Village and Government management of clearing inland catchment areas</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 Mangrove Management Plan for Vaimauga 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>Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decision-making, promote the use of existing legal mechanisms to benefit mangroves, and underpin integrated management of coastal natural resources, including mangroves, at the village level</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 district/Village</p> <p>Identify funding /budget requirements and implementation programme for establishment of protected areas in district</p>	<p>NESP 2017 - 2021</p> <p>Community Engagement Plan</p> <p>Agriculture Sector Plan 2016-2021</p> <p>PUMA Act</p> <p>PUMA Regulation</p> <p>Village Fono Act (Amendment Bill 2016)</p>

	close to rivers and streams to reduce sedimentation of estuaries, wetlands and the lagoon Responsibility: MNRE /MAF/Village/Village CSSP/NGO/			
Village pool (Vaiala uta- near Levili) located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) Responsibility: MoF-CSSP/ MNRE/Villages	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	Utilise Hazard Maps and Geomorphologist findings to inform location and design MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention Update Village bylaws to include managing and maintaining village natural resources Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	CIM Strategy 2015 Community Engagement Plan
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Responsibility: MWCS D /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



Vaiala Village Map



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

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

19. Vaipuna, Levili Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ³⁶ : exposure to hazard zones (IFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

³⁶Apia Park Loop Road, Levili-uta Road

	Responsibility: LTA/ MWTI/		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Village / Families / MWTI/ MNRE/ MWCS D	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Vaiala/ Vaipuna Mangrove area conservation	Government to implement boundary demarcation of wetland reserves at Vaiala/ Vaipuna with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas Introduce culverts in	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from	MNRE DEC to provide technical assistance and backstopping in the development of a Mangrove Management Plan for Vaimauga West district Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and	NESP 2017 - 2021 Community Engagement Plan

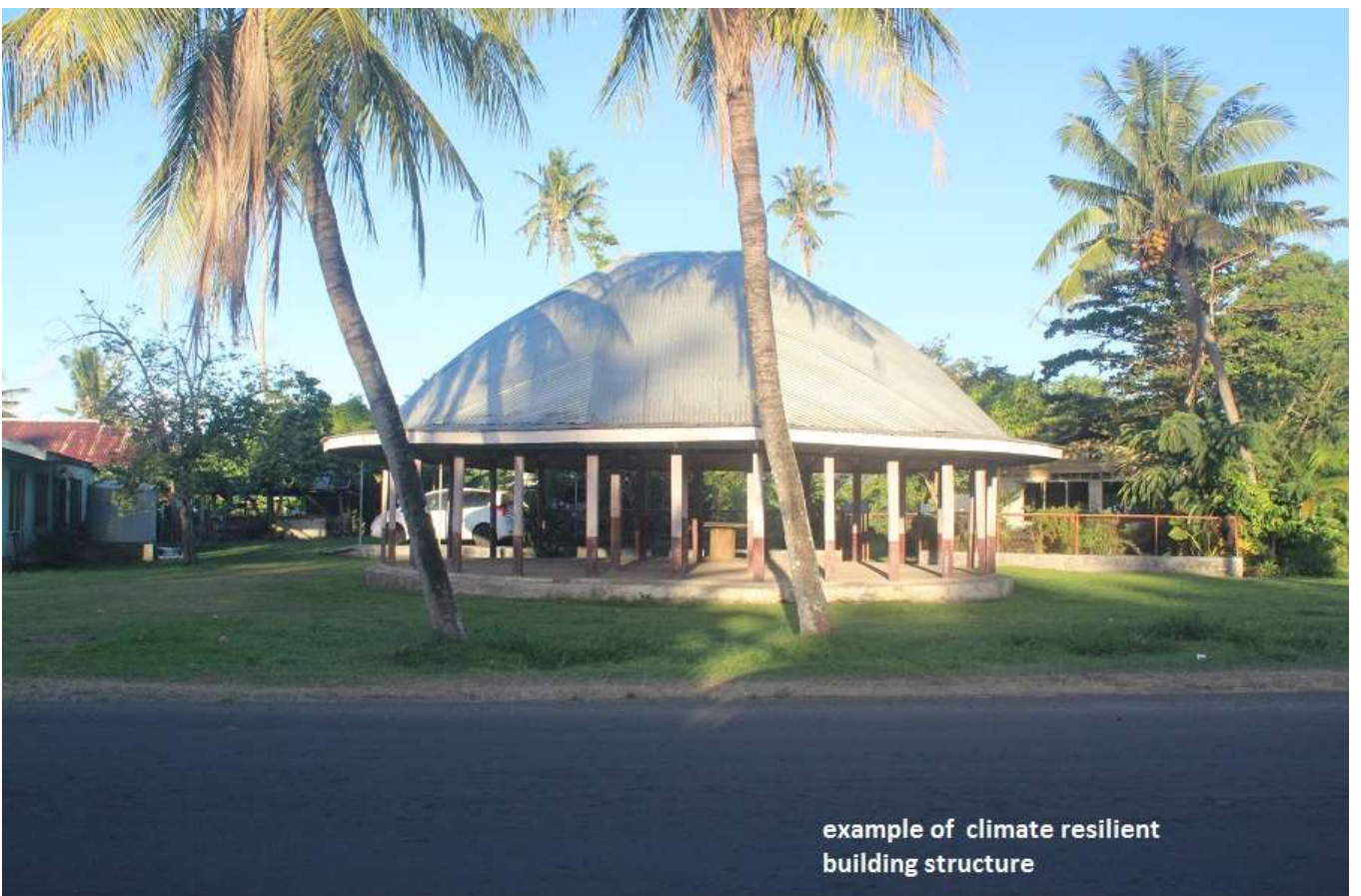
	<p>wetland areas to improve tidal flow and fish passage in the wetland area</p> <p>District and village councils to regulate clearing of lands around wetlands and initiate replanting programmes for coastal areas</p> <p>Promote and support village and district tree planting on coastal areas around existing seawalls to strengthen seawalls and reduce erosion using native species such as talie, fetau, toa etc that are known to have greater resilience to natural disasters and changing climate conditions</p> <p>Depth and density of planting to be increased and a minimum vegetative distance of 200mm as an effective wave barrier distance</p> <p>Village and Government management of clearing inland catchment areas close to rivers and streams to reduce sedimentation of estuaries, wetlands and the lagoon</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: MNRE /MAF/Village/Village CSSP/NGO/</p>	<p>inland flooding</p>	<p>ecosystems of the area</p> <p>Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decision-making, promote the use of existing legal mechanisms to benefit mangroves, and underpin integrated management of coastal natural resources, including mangroves, at the village level</p> <p>Identify funding /budget requirements and implementation programme for establishment of protected areas in district</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management</p>	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation,</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>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan</p>

	<p>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>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>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>2016-2021</p>
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Non-CR issues raised during consultations	Proposed Solution	Comments
<p>Traffic: install humps at Vaipuna/Levili roads</p> <p>Responsibility: LTA/ Village</p>	<p>Village to request LTA directly</p>	<p>Not a CR issue</p>



poor practice of taro planting in drainage



example of climate resilient building structure

Vaipuna, Levili Village Map

VAIPUNA, LEVILI VILLAGES



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

20. Fa'atoia, Vini, Ma'agao Village Interventions

CIM Plan Solutions

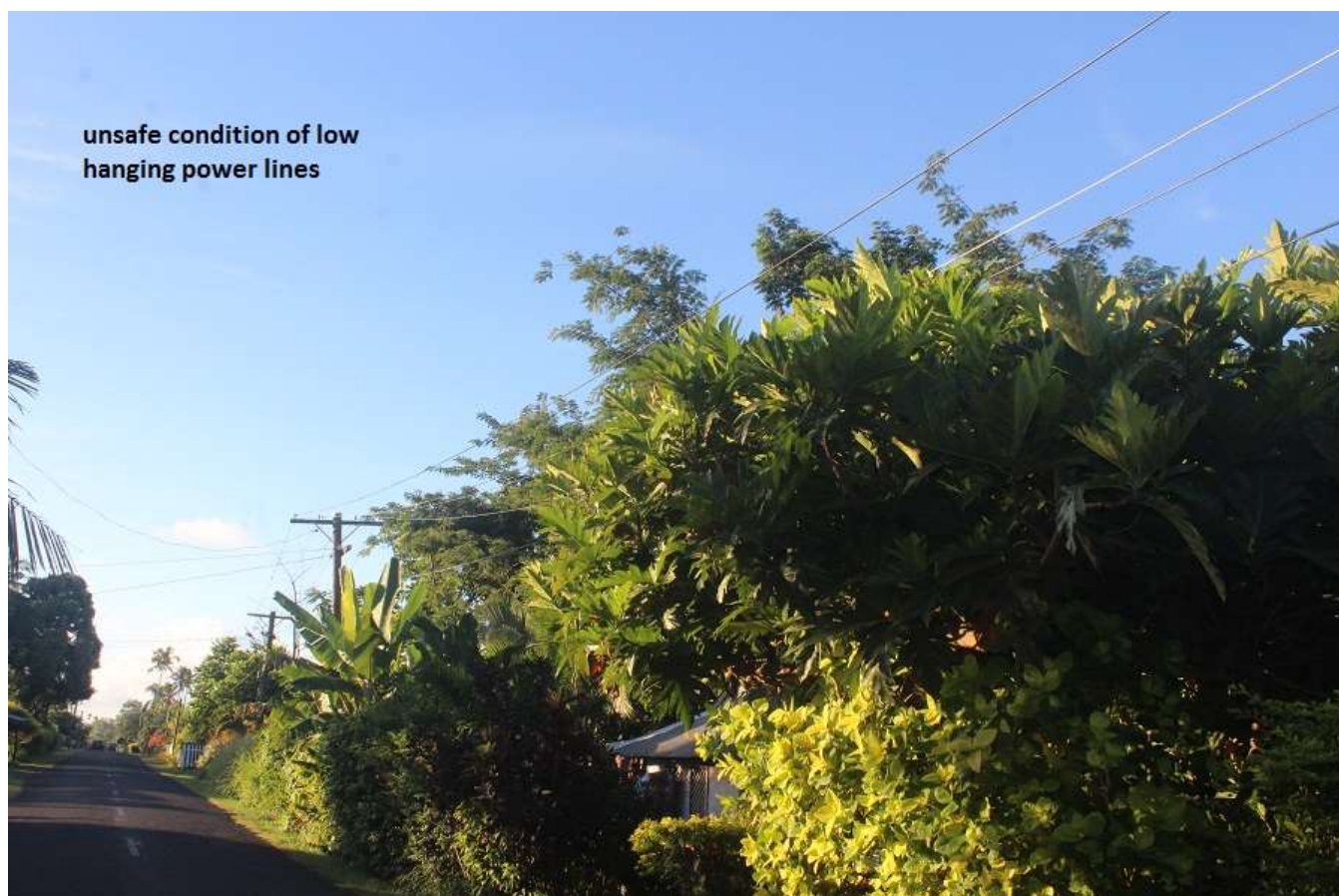
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ³⁷ ; exposure to hazard zones (IFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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)"; "Review of National Road Standards in Samoa (2016)"; "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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

³⁷Faipule Road not in LTA normal road maintenance programme

	Responsibility: LTA/ MWTI/		Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District	
Flood protection measures for fords and bridges	Upgrade waterways Upgrade all crossings Upgrade or repair riverine embankment protection work upstream of Magiagi Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Responsibility: MWTI/ LTA/MNRE/ District/ Village	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from inland flooding Reduce flooding of built up areas Maintains lifeline access for all of Upolu Safer villages, houses and roads	Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Include in budget programming CBA, design and construction. Designation of the IFHZ as an “at risk” zone with appropriate land use planning controls and restrictions	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	Relocate assets outside of high risk hazard zones when re-building Develop land use planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ,	CIM Strategy 2015 National Building Code

	<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 D</p>		<p>CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village pool (near Vini) located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	<p>Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs</p> <p>Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: MoF-CSSP/ MNRE/NGOs/ Villages</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>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Community Engagement Plan</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 Vaimauga 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>

Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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>



unsafe condition of low hanging power lines

Faatoia Maagao Village Map

FAATOIA, VINI, MA'AGAO VILLAGES



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

21. Magiagi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ³⁸ : exposure to hazard zones (IFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>NESP 2017 - 2021</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>PUMA Act</p> <p>Review of National Road Standards in Samoa (2016) MWTI</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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</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</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</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

³⁸Alaoa Road and several unnamed tracks

	<p>maintenance</p> <p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Village / Families</p>	and private assets	<p>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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Village infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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 D</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>
<p>Upgrade roads³⁹ used as escape routes</p>	<p>Assess and upgrade access/work roads as potential escape routes</p> <p>Construct roadside drainage ditches where needed</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness 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</p>	<p>National Disaster Management Plan 2017-2021</p> <p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p>

³⁹Ueligitone and Aukilani Roads, Alaoa Road (to Vailima/Vaoala)

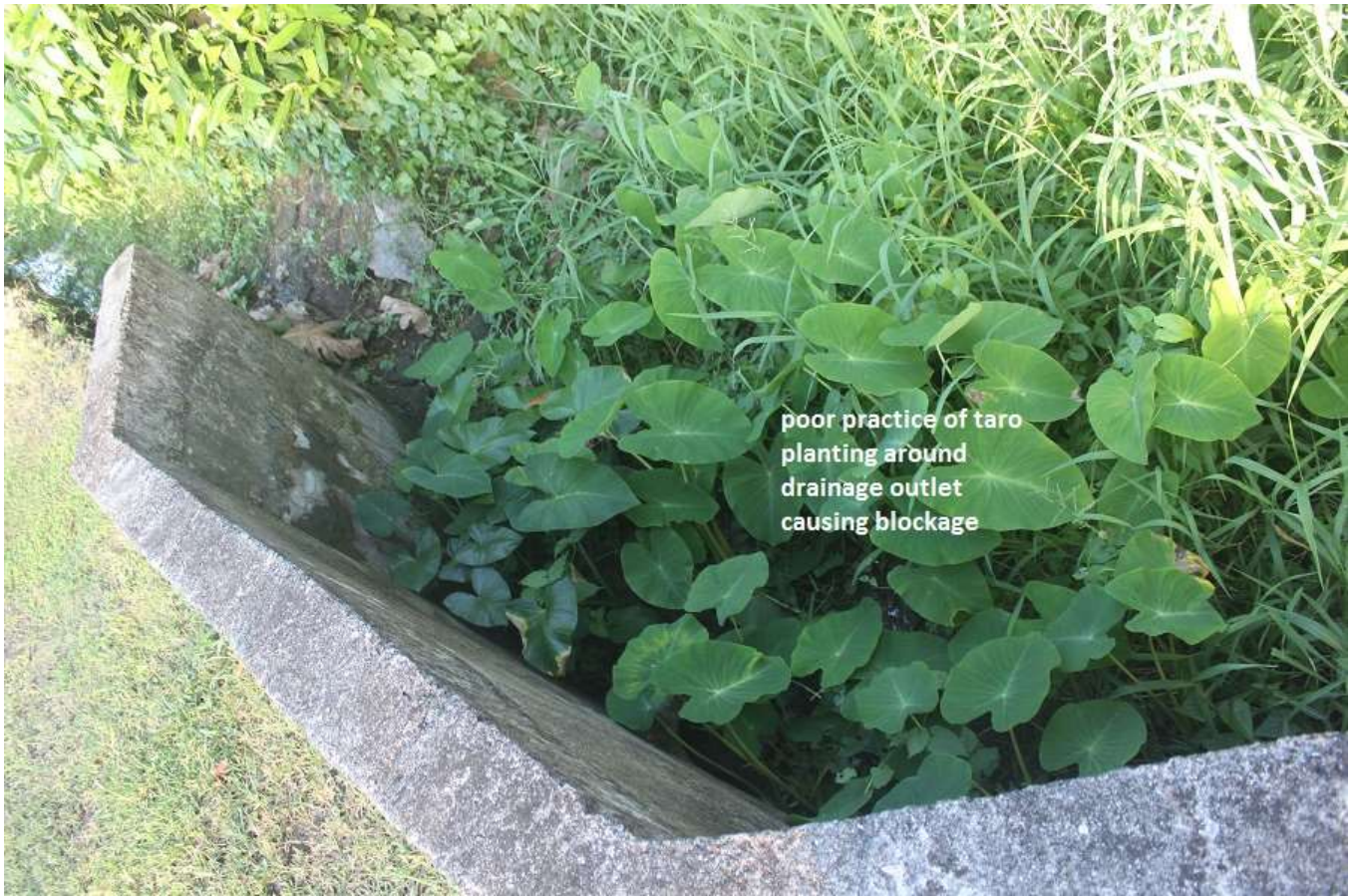
	<p>Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: LTA/ MWTI/ MNRE/ Villages /Families</p>	<p>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>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 Vaimauga West district</p>	<p>TSP2014-2019 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 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/ MWCS/ 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>
<p>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Lelata, Maagao, Vaisigano</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Install advisory edge</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>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilise environmental and</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

	<p>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>Safer villages, houses and roads</p>	<p>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>	
Landslips	<p>Implement slope stabilization at most vulnerable landslide area⁴⁰ identified in study and Vaimauga West Integrated Catchment Strategy and Flood Management Plan</p> <p>Reduce sediment loads and loss of top soil by discouraging buildings and 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/Village</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 Vaimauga 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 Vaimauga 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>

⁴⁰Upper Magiagi region overlooking Ueligitone section

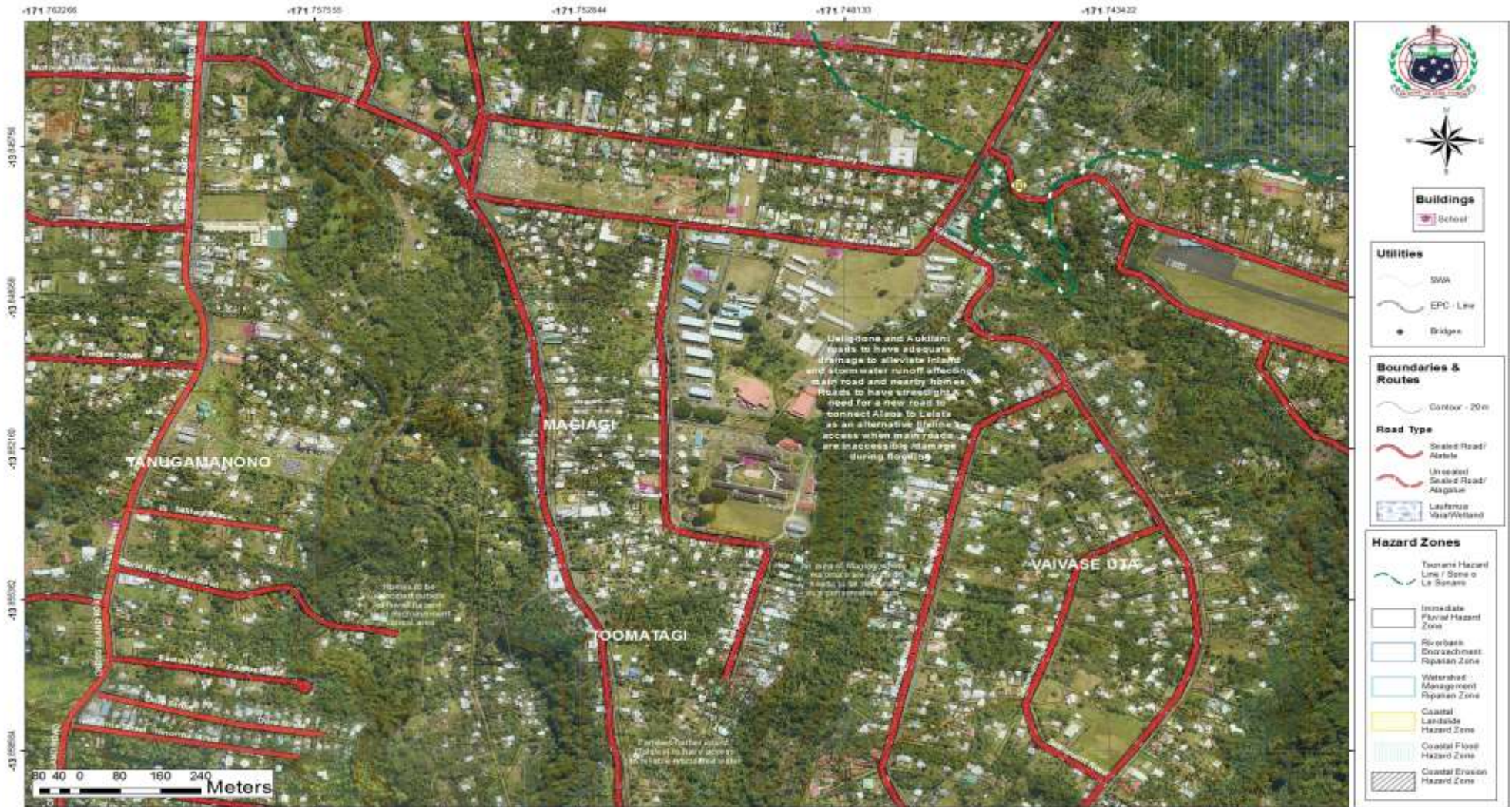
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</p> <p>Promote agroforestry and 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>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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</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</p>	<p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p>	<p>Implement Integrated Watershed/Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist</p>	<p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>

	<p>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>Safer villages, houses and roads</p>	<p>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>	
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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: MWCS D /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>



Magiagi Village Map

MAGIAGI 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

22. Moata'a Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road and access roads ⁴¹ ; exposure to extremely high risk hazard zones (IFHZ, CEHZ, CFHZ and tsunami shore exclusive zone)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/ MNRE /Village</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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 land use planning controls and restrictions</p>	<p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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)"; "Review of National Road Standards in Samoa (2016)"; "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>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

⁴¹Apia Park Loop Road, Togoasa Crescent, Taumeasina Drive

	<p>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Village / Families</p>		<p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Village houses, churches, shops, Moataa Primary School, Taumeasina Resort and other government assets located in high risk hazard zones</p>	<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 D</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>
<p>Upgrade roads used as escape routes</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</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>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</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>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>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>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 Vaimauga 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 Moata’a, Vini, Vaiala, Faatoia and Vaivase-uta</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 Vaimauga 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>TSP2014-2019 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
Coastal protection	Encourage relocation of families/houses in badly eroded coastal areas	Reduce impact from inland flooding on coastal areas	MNRE Forestry to continue to provide technical assistance to guide village planting programmes in coastal areas	<p>NESP 2017 - 2021</p> <p>Community Engagement Plan</p>

	<p>Conduct feasibility study of proposed seawall in most vulnerable eroded areas</p> <p>Responsibility: MNRE /Village/ CSSP/NGO/</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p>	<p>MNRE Forestry to provide suitable climate ready trees suitable for coastal conditions</p>	
<p>Moata'a Mangrove area conservation</p>	<p>Government to implement boundary demarcation of wetland reserves at Moata'a with application of planning controls and appropriate management guidelines to meet the needs as both drainage system components and conservation areas</p> <p>Introduce culverts in wetland areas to improve tidal flow and fish passage in the wetland area</p> <p>District and village councils to regulate clearing of lands around wetlands and initiate replanting programmes for coastal areas</p> <p>Promote and support village and district tree planting on coastal areas around existing seawalls to strengthen seawalls and reduce erosion using native species such as talie, fetau, toa etc that are known to have greater resilience to natural disasters and changing climate conditions</p> <p>Depth and density of planting to be increased and a minimum vegetative distance of 200mm as an effective wave barrier distance</p> <p>Village and Government management of clearing inland catchment areas close to rivers and streams to reduce sedimentation of estuaries, wetlands and the lagoon</p> <p>Where reclamations are proposed, Government</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 Mangrove Management Plan for Vaimauga 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>Develop a specific Mangrove Legislation providing systematic consideration of mangroves in decision-making, promote the use of existing legal mechanisms to benefit mangroves, and underpin integrated management of coastal natural resources, including mangroves, at the village level</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 district/Village</p> <p>Identify funding /budget requirements and implementation programme for establishment of protected areas in district</p> <p>Hazard map</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management</p>	<p>NESP 2017 - 2021</p> <p>Community Engagement Plan</p>

	<p>and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: MNRE /MAF/Village/CSSP/ NGO</p>			
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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 Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>

<p>Flood protection measures (soft solution to support flood protection measures for infrastructure)</p>	<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 Vaimauga 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>
<p>Soft coastal protection measures needed for most vulnerable areas</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 Vaimauga 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>
<p>Village pool in mangrove area</p>	<p>Village pool is currently in a poor location with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs</p> <p>Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: MoF-CSSP/ MNRE/Villages/ NGOs</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>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Community Engagement Plan</p>
<p>Governance</p>	<p>Best Solutions</p>	<p>Benefits</p>	<p>Guideline to assist with the implementation</p>	<p>Relevant Sector Plans, National Strategies & Policies</p>
<p>Strengthen the governance of natural resources and</p>	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use</p>	<p>Strengthen implementation of all national sector plans</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets,</p>	<p>Village Fono Act (Amendment Bill 2016)</p>

<p>land use through Bylaws</p>	<p>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 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>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>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>
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Moataa Village Map

MOATA'A 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

23. Vaivase Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Parts of Main road: exposure to hazard zone (IFHZ)	<p>Continue to upgrade, widen roads, upsize ocean outfalls and improve drainage systems at identified areas to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Responsibility: LTA/ MWTI/</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>Maintain lifeline access and connectivity for Central Business Area</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Develop a climate resilient Drainage Master Plan for Vaimauga West utilising Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Vaimauga 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>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Drainage systems to be improved in high risk areas (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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>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</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>Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Community / Families</p>		<p>Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Vaimauga West District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc</p>	<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: Community / Families / MWTI/ MNRE/ MWCS D</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>
<p>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream</p> <p>Ensure river channel upstream is cleared and maintained regularly</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>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Implement Vaimauga West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist</p>	<p>CIM Strategy 2015</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</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 community to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p> <p>Responsibility: MWTI/ LTA/MNRE/ District/ Community</p>	<p>Maintains lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p>	<p>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>	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>Responsibility: MNRE- WRD & Forestry/ District / Community/ 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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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</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>Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</p>

	<p>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/ Community/CSSP/GEF-SGP</p>	<p>Reduce contamination of water supply</p>	<p>developments in upper catchment areas</p>	
<p>Flood protection measures (soft solution to support flood protection measures for infrastructure)</p>	<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/ Communities</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 Vaimauga 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>
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<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</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</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>

	<p>programs with the villages</p> <p>Responsibility: MWCSO /Community</p>	<p>enabling environment of communities</p>		
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Vaivase Village Map

VAIVASE VILLAGE



24. To'omatagi 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 (lower catchment areas, near rivers and streams) exacerbating inland flooding and storm water surges affecting infrastructure, village homes and other assets	<p>Continue to assess and upgrade culverts on main and 'access' roads in district especially at junctions with local roads sitting within IFHZ – culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</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 Responsibility: LTA/ MWTI/ MNRE/ MWCS D /Community / 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 Vaimauga 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>
Community infrastructure located in high risk hazard zones; such as houses, schools, Churches, Businesses, Committee houses etc	<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</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>CIM Strategy 2015</p> <p>National Building Code</p>

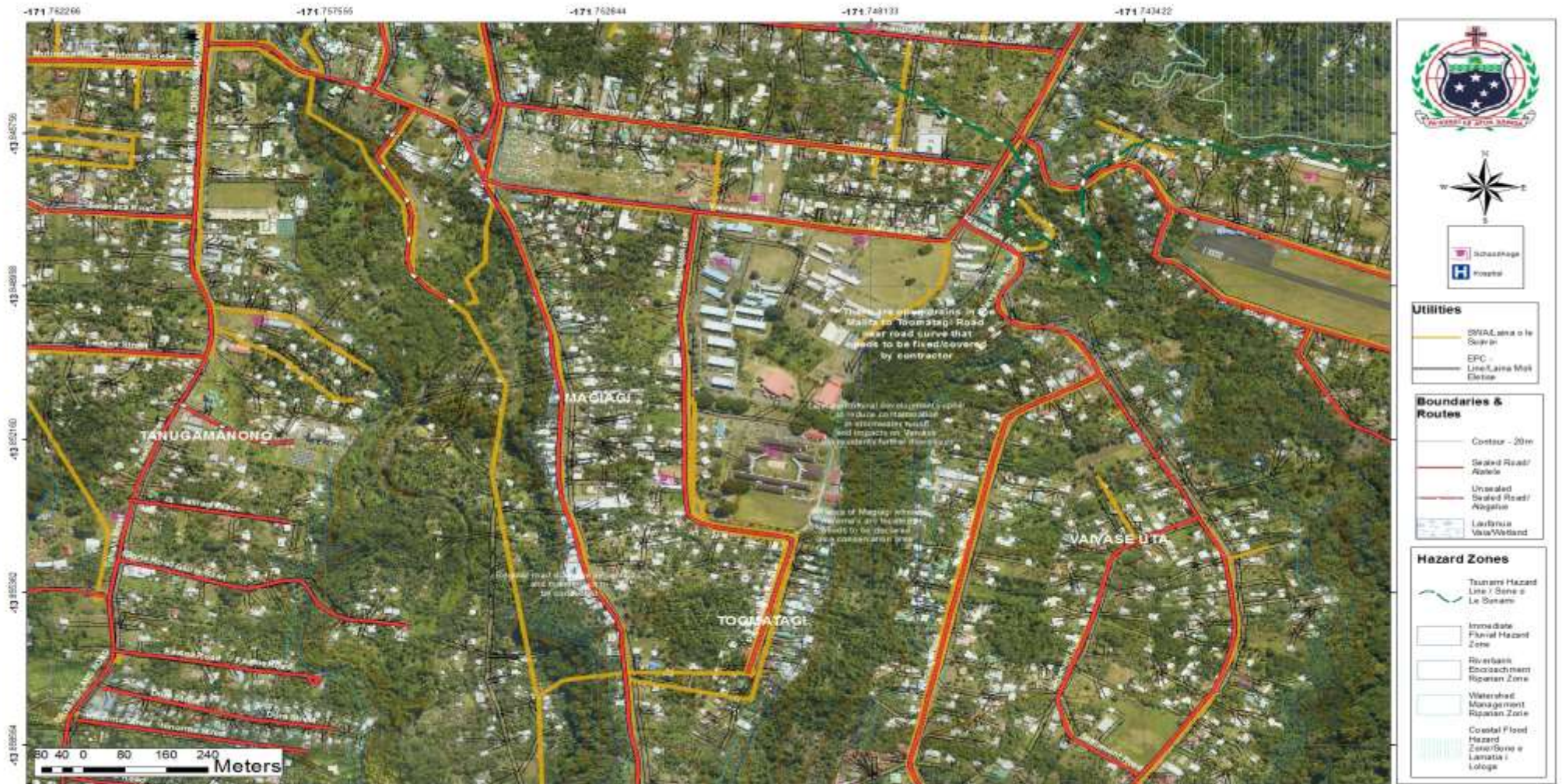
	<p>near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Responsibility: Community / Families /MWTI/ MNRE/ MWCS D</p>		<p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
District Upland Forest	<p>Continue programme by Forestry on replanting native forestry species of the upland forest</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>Responsibility: MNRE- WRD & Forestry/ District /Community /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>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants</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>Community Engagement Plan</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</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>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</p>	<p>Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Vaimauga West District</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas</p>	<p>Water Sector Plan</p> <p>Community Engagement Plan</p> <p>Restoration Operational Plan 2016-2020</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/ Community/CSSP/GEF-SGP</p>	water supply		
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: MWCS D /Community</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
Land in Toomatagi valley Responsibility: Village	Village requested use of land in valley for agricultural develop	Not a CR issue and should not be encouraged as agricultural developments upriver will impact Vaivase uta residents further downriver

Toomatagi Village Map

TOOMATAGII 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

