# **Community Integrated Management Plan**

# Palauli le Falefa District - Savaii



# **Implementation Guidelines 2018**

## Foreword

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

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

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

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

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

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

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

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

Thank you

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

## Participants in the Plan

The 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 Palauli le Falefa (Sili, Gataivai, Gautavai, Papa and Puleia villages).

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

#### Date of Signing: <u>15th June 2018</u>

Representatives

Signatures

#### Sili Village

- F'aolatane Fa'aiu
- Pepe F'aolatane
- Venise Fiu
- Fa'aolatane Lautasi

#### Gataivai Village

- Faitele Kolia
- Laupua Sale
- Maiava Siologa
- Laupua Tafale
- Fago Feleti



#### Gautavai Village

- Taulagi Pule
- Sefao Samuelu
- Vaitau Pule

#### Papa Village

- Faumuina Aviata
- Mele Sua
- Mauisisi'i Lavenia
- Tino Leato
- Afa Faumuina





#### Puleia Village

- Talifala Manihuko
- Tulouna Anesone
- Lilasa Lotoa
- Mataigaga Simona
- Lotoa Akelipa

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

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

Ulu Bismarck Crawley CHIEF EXECUTIVE OFFICER, MNRE

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## Acronyms

| ACCU         | Among Compitions to Constal Hand all   |
|--------------|--|
| ASCH         | Areas Sensitive to Coastal Hazards   |
| BCA          | Benefit Cost Analysis  |
| CBFMP        | Community Based Fisheries Management Plan  |
| CCCS         | Congregation Christian Church Samoa  |
| CC           | Climate Change   |
| ССА          | 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   |
| СОЕР         | 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   |
| IG           | Implementation Guideline   |
| IAS          | Invasive Alien Species   |
| KBA          | Key Biodiversity Area  |
| КРІ          | Key Performance Indicator  |
| LTA          | Land Transport Authority   |
| LTO          | Long Term Output   |
| MAF          | Ministry of Agriculture and Fisheries  |
| MET Office   | Meteorological Office  |
| МоН          | 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   |
| NGO          | Non-Government Organization  |
| NISP         | National Infrastructure Strategic Plan   |
| NRW          | Non-Revenue Water  |
| PA - KO      | Priority Area - Key Outcome  |
| PUMA         |  |
|              | Planning Urban Management Agency   |
| PPCR         | Pilot Programme Climate Resilience   |
| R2R          | Ridge to Reef  |
| SIAM         | Samoa Infrastructure Asset Management  |
| SOE          | State of Environment   |
| SWA          | Samoa Water Authority  |
| UNDP-GEF SGP | United Nations Development Programme Global Environment Facility Small Grants<br>Programme |
| VCDMP        | Village Climate Disaster Management Plan   |

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

| Glossary                 |   |
|--------------------------|---|
| "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.  |
| Food Security            | Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life <i>Food access:</i> Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as these to fall 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) <i>Food availability:</i> The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid) <i>Stability:</i> 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 in security). The concept of stability can therefore refer to both the availability and access dimensions of food security <i>Utilization:</i> Utilization of food through adequate diet, clean water, sanitation and healthcare 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 |
| Hazard                   | A source of potential harm or a situation with a potential to cause loss.   |
| Hazard Zones             | Defined areas 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 six hazard zones:  |
|                          | ASCHs(areas sensitive to coastal hazards);  |
|                          | CEHZs(coastal erosion hazard zones);  |
|                          | CFHZs(coastal flood hazard zones)and  |
|                          | <ul> <li><i>CLHZs</i> (coastal landslip hazard zones)</li> <li><i>CIHZ</i> (coastal inundation hazard zones)</li> <li>Coastal Inundation 0 to 15mASL – immediate coastal inundation hazard zone</li> <li>Coastal Inundation 15 to 20mASL – 5-metre uncertainty buffer on the immediate coastal inundation hazard zone (due to potential LiDAR inaccuracies)</li> <li>Coastal Inundation 20 to 50mASL – additional hazard zone for the purpose of assessing/planning the location of tsunami protection infrastructure beyond the 0-20mAmSL contour. Please note tsunami risk includes 0-20mASL, so tsunami hazard zones need to include the 0-15mASL and 15-20mASL polygons as well as the 20-50mASL polygon</li> <li>Coastal Inundation 50 to 55mASL – 5-metre uncertainty buffer on the tsunami infrastructure hazard zone (due to potential LiDAR inaccuracies)</li> <li><i>IFHZ</i> (immediate fluvial hazard zone) within the steep banks of the river gorges</li> <li>River bank encroachment control – 5m buffer on either side of river banks</li> <li>Watershed management riparian zone – 20m buffer on either side of the river banks</li> </ul>   |
| 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 Guidelin | e A document to guide land use and resource practices to achieve specified goals,<br>objectives and policies and provide a framework for the implementation of defenses and<br>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<br>(e.g. landuse includes areas used for villages or crops, resource use includes activities such<br>as sand mining, gravel extraction or fishing).  |
| Livelihood              | Livelihood refers to a person or group's "means of securing the necessities -food, water, shelter and clothing- of life".   |
| 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.  |
|                         | <i>Community Resilience:</i> The ability for the community to be adaptive, responsive and quick to recover from the adverse effects of hazard.<br><i>Natural Resilience:</i> 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<br>measured in terms of consequence and likelihood. In the Community Integrated<br>Management Plan context it is the likelihood that infrastructure, environment and<br>biological resources and agricultural and marine resources (food security) will be<br>subject to inland and coastal hazards and the potential for loss of property, life or land<br>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.  |

### 1. Introduction to the CIM Plan

#### **1.1 The Strategic Vision**

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

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

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

#### **1.2 The Aim of the CIM Plan**

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

The CIM Plan will:

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

#### **1.3 Structure of the Plan**

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

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

## 2. Implementation Guidelines

#### 2.1 Purpose of the Implementation Guidelines

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

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

#### 2.2 Duration of the Plan

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

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

#### 2.3 Financing of the Plan

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

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

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

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

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

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

## 3. Description of Palauli le Falefa District

#### 3.1 Physical and Natural Resource Setting

The District of Palauli le Falefa is located on the south western end of the island of Savaii between Palauli Sisifo and Satupaitea districts. It is characterised by steep basalt cliffs, lava rock flats and coast gradually ascending into inland mountains. Pocket beaches mainly consist of stones and rubble with underlying white sand. The coast line is naturally buffered by volcanic rocks and vegetation.

The villages of Palauli le Falefa include Gataivai, Gautavai, Puleia, Papa Puleia and Sili. These villages are clustered on the eastern side of the Palauli le Falefa District and all except Sili, are located on the coast. There is also some scattered development along a 10km stretch of this road away from the coast. Gautavai village extends along 5km of the main road with houses located in pockets on both sides of the road. The landscape is generally flat and enclosed by coastal vegetation and weeds where there are no houses. Gataivaivillage relocated after the 1990 cyclones to the north of the main South Central Coast Road when originally it had been located to the south of the Gataivai River mouth. Puleia and Papa Puleia have fewer houses located on coastal flats along the main road with most running ribbon like inland towards the village of Sili. Most churches and schools are located inland away from the coastal hazard zones.

The district is positioned on the south coast where seasonal rains influence the local climate. Seasonal rains generate intermittent flooding and a river system that is fed by a short catchment area and steep upland areas. The catchment generates rapid surface water flows as a result of the steep sided mountain range at the top of the catchment. The flat coastal plateau is where the majority of houses are positioned. This coastal area has mangroves and swamped tree species towards the western edge of the district. Low-lying areas are subject of flooding and ponding water.

There are several rivers<sup>1</sup>running through this district, which supply two local water systems. The district also has a large catchment area with many rivers flowing along valleys to discharge at two points to the sea. The first one is the Sili River, which ends in a waterfall directly into the sea. Sili River is fed from a number of streams which combine in Sili. During cyclones and heavy rains, Sili River floods over its river banks and into Sili, Gautavai and Puleia villages and plantations. A 300m long retaining wall was constructed in 2004 by the Ministry of Works<sup>2</sup> along the eastern bank of the Sili River to prevent flooding of Puleia village. This wall isolated a pocket of water, which during heavy rain, floods the field behind Puleia village.

The second discharge point is the Gataivai River mouth. The river channel is blocked in a number of locations from inland sediment and sand deposits/runoff. These deposits are so significant that the river has changed its course and is dry. The Nofoa Stream is also blocked by sediment deposits and has a sharp 90° bend. During heavy rain, the river floods adjoining properties. There is a bridge over Sili River and the remains of the previous ford exists seaward of the bridge. There have previously been three vehicle crossings at Sili, one bridge and 2 fords, all were washed away in floods.

There are a number of small channels or reef breaks in the district mainly near Puleia and Papa Puleia villages. The reef system hugs the coastline approximately 100 – 150m off shore protecting the villages from wave surges. The sea is most accessible by boat from Gautavai. Gataivai River mouth (in Gautavai village) had an established port before being destroyed by cyclones Ofa and Val in the early 1990s. The wharf was used for copra export and ferry but even before the Cyclones, had become less important after the Salelologa Wharf opened. Today there are segments of sea walls there, approximately 70m along the coast of Gautavai and 50m long in the cove of Gataivai River adjoining the main road. These offer some protection for houses and the road.

Adjacent to the coast, settlements and plantations, dominate the area. These are located generally on the northern side of the main road. Further inland land-use practices on the steeper plantation land, such as deforestation, and agriculture are increasing both the rate of erosion and the supply of sediment to the coast. This is particularly evident in the number of blocked and diverted rivers in the district.

Village plantations and cattle grazing dominate the upland areas of the district. The forests that once provided shelter for the districts fauna and flora have been severely damaged by land clearing and strong winds that only small "pockets" of native forest species are evident but even these are under threat from encroaching invasive species such as the merremia vine (*Merremiapeltata*), pulumamoe (*Castillaelastica*), and puluvao (*Funtumiaelastica*).

<sup>&</sup>lt;sup>1</sup>Sili River, Gataivai River, Nofoa Stream

<sup>&</sup>lt;sup>2</sup>Now Ministry of Works, Transport and Infrastructure

The main South Central Coast Road running through the district is also the main road around the south of Savaii, connecting it to the western tip of Savaii and around to the northern parts of the island. Therefore its maintenance is critical for its lifeline and connectivity functions. The roads have been sealed with good crossing bridges protecting it from the flowing rivers. The bridge at Puleia is located outside the coastal hazard zones and is of sound construction. One of the two bridges in this district is located in the village of Gautavai. The main issues concerning the safety of the road is the absence of drainage along the road especially where it links up with access roads from inland. The access roads flood during rainfall spilling onto the main road and damaging the road as well as flooding the village houses in this area.

This district has 7 other roads<sup>3</sup> within the national network. All villages in the district have at least one sealed access road apart from Sili and Gautavai villages where the access road crosses the Sili River. This access road is not sealed and cannot be crossed by cars when the river floods. Access roads are considered part of each village's infrastructure.

#### 3.2 Social and Economic Setting

The most recent census (2016) shows the district population at 3,581 with males 1,900 and females 1,681. Village specific populations show Puleia (265), Papa Puleia (357), Sili (1071), Gautavai(144) and Gataivai (399).

The Main South Central Coast Road provides easy access to local schools and shops and is the only through-road for the district. It is a sealed two-lane road 8m wide, made locally from sand from the mouth of the Gautavai River. Several unsealed work roads lead away from the main road north/inland and are used for access to plantations. A number of unsealed roads going south, generally lead to forestry plantations.

Primary services such as piped water from inland rivers, power, and telephone services generally follow the main road. The area also has cell phone coverage through Digicel towers located through the district. There are 12 churches<sup>4</sup> and 6 schools<sup>5</sup> located within this district, 2 pre-school and 4 primaries. Sili and Puleia have good quality water supply and pressure from their inland water source. Gautavai has water supply and pressure problems and Gataivai has poor water quality contaminated with sand. Gataivai sources its water from Sili.

The electricity supply in the district is one of the best in the country with street lights throughout the whole district and along the main road. All families have access to electricity. Cell phone communications are now available throughout the district with the introduction of the new GSM cellphone companies. Land line telephone communications has not reached the whole district but is not considered critical by the residents due to the convenience of mobile telephones. There is one SWA water intake in Gataivai which services neighbouring districts as Palauli le Falefa district's water supply is an Independent Water Scheme system sourced from one of the many freshwater springs and rivers found within the district. The main pipeline supplies water for Papa Puleia, Puleia, Gautavai, and Sili villages while Gataivai has its own water reservoir from a different spring. The old pipes are wearing out and in need of replacements to maintain the regular flow and minimise the leakage that is becoming a regular occurrence.

Power and telephone are sometime provided along inland work though village infrastructure to service a local church or school. Electricity lines at Sili and a water pipe across the river in several locations. Negotiations between the government and Sili over the construction of a hydroelectric power station further inland, sourced from Sili rivers, has been ongoing for some time. It is not known when this will eventuate.

Both villages on opposite sides of the Sili River in the districts of Palauli raised the need for a new bridge crossing in order to avoid the lengthy commute between the villages by travelling south to connect via the Main Road. Residents have to wade through the river to get to the other side but this crossing is impassable during heavy rains and extreme weather events.

Dominant livelihoods include cattle, plantations of coconuts and taro. Plantations extend from the coastal areas to the upper slopes leading into the mountain slope areas. Household vegetable plots are common. From the flat coastal plain the topography rise slightly until it meets the base of the upper slopes that leads into the forest uplands. The cash

<sup>&</sup>lt;sup>3</sup>Gautavai Access Rd, Sili Rd, Sili Access Rd, Puleia Rd, Gataivai School Rd, Vaiala-Uta Rd, Masalaolao Rd.

<sup>&</sup>lt;sup>4</sup>**Papa Puleia** (CCCS, LDS, Church of Nazarene, Bahai Faith, SDA), **Sili**(CCCS, Roman Catholic, Methodist, LDS), **Gautavai** (CCCS, Roman Catholic), **Gataivai** (Methodist)

<sup>&</sup>lt;sup>5</sup>Puleia Primary School, Sili Pre-School, Sili Primary School, Gataivai Primary School, Gautavai Pre-School, Gautavai Priary School.

economy of the District is dominated by traditional work. Fishing and plantations provide the main source of income for village residents although there is some employment in local schools, and shops.

#### 3.3 Climate Risk and Resilience

The use of LiDar mapping data, hydrologist and geomorphologist data and findings for this district has helped determine inland and coastal hazard zones and high risk areas for Palauli le Falefa. The immediate risks for some areas of the district are coastal landslips and fluvial hazards.

Palauli le Falefa has a total area of 22,110 hectares. There are approximately542 buildings in the district; 56 of those buildings are located within the CFHZ. About 70 buildings are in the Watershed Management Riparian Zone which is 5.615 hectare in total area. The area covered by the CFHZ, Tsunami evacuation zone and fluvial hazard zones is 5,757.18 hectares, leaving about 74% of the district area safe from these hazards.

As this district is prone to flooding certain mitigation measures should be established. River protection has been raised as a district issue as all villages are affected by rivers. There is an urgent need for river protection walls inland to minimize the effects of flooding. However, a proper catchment management, drainage analysis and geotechnical engineering survey of embankments and watercourses in this district needs to be done first. The resulting Catchment and Flood Management Plan for Palauli le Falefa will build resilience of the district and its residents to potential extreme weather events. Families residing within flood prone areas need to relocate or ensure their houses are resilient by raising their foundations and retrofitting to suit weather conditions. Improvements to drainages along the access roads will also reduce the potential for flooding in the villages. Re-vegetation in a low energy environment is also a solution for areas that has been flooded overtime.

Agriculture livelihoods are limited to areas of fertile soil on the lower slopes. This agriculture area is above the influence of any sea level rise impacts. Water surface flows will be altered by climate change and local adaption through the maintenance of the upper level forests will be important. There are only small areas that have suitable soil fertility which will have to managed in line with best practices that limits top soil erosion, and reduces the extend of invasive species. Storm surges and sea level rise may influence the productive capacity of the coastal households. Loss and or major alteration of upland forest areas will impact on the water flows and forest fires may become more common as temperatures increase and rain periods are less frequent and more intense.

# 4. Palauli le Falefa District Interventions

### **CIM Plan Solutions**

| Infrastructur<br>e   | Best Solutions   | Benefits   | Guideline to assist with the implementation   | Relevant<br>Sector Plans,<br>National<br>Strategies &<br>Policies                                     |
|--|--|--|---|---|
| Drainage<br>systems<br>require<br>maintenance<br>and upgrade in<br>high risk areas<br>of main South<br>Central Coast<br>Road | Assess and upgrade<br>culverts on main<br>South Central Coast<br>road especially at<br>junctions with access<br>roads (Papa Access<br>Road, Puleia Access<br>Road, Vaiala Uta<br>Access Road, Gataivai<br>School Road) sitting<br>within combined<br>hazard zones (IFHZ,<br>CEHZ, CFHZ)- in<br>accordance with<br>Vulnerability<br>Assessment of the<br>Samoa Road Network<br>recommendations<br>Implement national<br>standards for<br>culverts and drains<br>to facilitate the<br>overland flow of<br>storm water and<br>reduce flooding<br>Implement regular<br>drainage inspection<br>and maintenance<br>Responsibility: LTA<br>/MWTI/MWCSD<br>/Village/Families | Improves climate<br>resilience of<br>infrastructure<br>resilience and rate<br>of response and<br>recovery to<br>natural hazards<br>and disasters<br>Encourages coastal<br>families to relocate<br>inland<br>Maintains lifeline<br>access<br>Minimises national<br>disaster recovery<br>expenditure on<br>damaged<br>properties, public<br>and private assets | Use existing information for<br>guidance but not limited to:<br>"Vulnerability Assessment of<br>the Samoa Road Network<br>(2017)"; "Review of National<br>Road Standards in Samoa<br>(2016)"; "Samoa Code of<br>Environmental Practice<br>(2007)"<br>Undertake a Cost Benefit<br>Analysis to weigh options for<br>funding<br>Incorporate environmental<br>and social safeguards<br>concerns in the design and<br>undertake consultations with<br>affected communities<br>Apply for necessary permits<br>as required by law<br>Utilise hazard maps and<br>Geomorphologist<br>Infrastructure Drainage<br>Database to inform designs<br>Develop Integrated Catchment<br>Strategy and Flood<br>Management Plan for Anoama'a<br>East District<br>Develop and register<br>District/Village bylaws to<br>include maintenance of<br>drainages and illegal rubbish<br>dumping into waterways | CIM Strategy<br>2015<br>NISP2011<br>KESO 5<br>TSP2014-2019<br>Goal 2 KO 1<br>Community<br>Sector Plan |
| Access/ work<br>roads require<br>maintenance<br>and upgrade as<br>it exacerbates<br>flooding                                 | Implement regular<br>drainage inspection<br>and maintenance of<br>watercourse at Sili<br>Implement routine<br>maintenance of the<br>road and side<br>drains and clear<br>any debris<br>obstructing the free<br>flow of surface<br>water runoff   | Improves climate<br>resilience of<br>infrastructure and<br>rate of response<br>and recovery to<br>natural hazards<br>and disasters<br>Improves coastal<br>protection<br>Minimises the<br>impacts of flooding<br>on the community   | Use existing information for<br>guidance but not limited to:<br>"Vulnerability Assessment of<br>the Samoa Road Network<br>(2017)"; "Review of National<br>Road Standards in Samoa<br>(2016)"; "Samoa Code of<br>Environmental Practice<br>(2007)"   | CIM Strategy<br>2015<br>NISP2011<br>KESO 5<br>TSP2014-2019<br>Goal 2 KO 1<br>Community<br>Sector Plan |

|  | r   |   |   |   |
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|  | Construct roadside<br>drainage ditches<br>where needed.<br>Responsibility: LTA<br>/MWTI/ MNRE/<br>District/   | and businesses<br>Improves the rate<br>of surface water<br>discharge<br>Minimises the<br>impact of flooding<br>on utility serives   | Undertake a Cost Benefit<br>Analysis to weigh options for<br>funding<br>Incorporate environmental<br>and social safeguards<br>concerns in the design and<br>undertake consultations with<br>affected communities<br>Apply for necessary permits<br>as required by law<br>Utilise hazard maps and<br>Geomorphologist<br>Infrastructure Drainage<br>Database to inform designs<br>Develop and register<br>District/Village bylaws to<br>include maintenance of<br>drainages and illegal rubbish   |   |
|  |   |   | dumping into waterways  |   |
| Village houses,<br>school and<br>government<br>assets located<br>in IFHZ | Relocate outside of<br>high risk hazard<br>zones when<br>building/<br>infrastructure<br>requires<br>replacement<br>Investments within<br>the hazard zones to<br>adopt appropriate<br>mitigation measures<br>Conduct awareness<br>raising campaign on<br>flood resilient<br>building practices<br>and designs for at<br>risk communities<br>living in and near<br>high risk hazard<br>zones<br>Design<br>infrastructure to<br>take into account<br>the immediate<br>hazard zones; for<br>example, raise floor<br>levels of houses in<br>flood prone areas<br>Develop landuse<br>planning and<br>development controls<br>to restrict<br>developments within<br>high risk hazard<br>zones such as CEHZ | Minimise<br>expenditure on<br>damaged<br>properties &<br>personal assets<br>Mitigate potential<br>damage from<br>coastal erosion and<br>flooding<br>accommodating the<br>hazard<br>Improve recovery<br>to create more<br>resilient villages<br>Improve<br>preparedness and<br>readiness response<br>to natural disasters<br>Safer villages,<br>houses and roads | Develop an Integrated<br>Catchment and Flood<br>Management Strategy for<br>Palauli le Falefa District. MNRE<br>to develop zonation strategy<br>for safe areas<br>Utilise hazard maps and<br>Geomorphologist Drainage<br>Infrastructure Database to<br>inform designs<br>Enforcement of National<br>Building Code 2017<br>Encourage insurance of<br>significant investments and<br>assets within hazard zones<br>Designation of the IFHZ, CEHZ<br>and CFHZ as an "at risk" zone<br>with appropriate landuse<br>planning controls and<br>restrictions | National<br>Building Code<br>CIM Strategy<br>2015 |

|                                     | 1  |                                       | 1  |                                |
|-------------------------------------|--|---------------------------------------|--|--------------------------------|
| Flood<br>protection<br>measures for | Families and village<br>to limit building and<br>developing on<br>natural overland<br>flow paths<br>exacerbating inland<br>flooding and storm<br>water surges<br>Where reclamations<br>are proposed,<br>Government and<br>district to manage<br>processes by<br>requiring villagers to<br>get the appropriate<br>permits and consent<br><i>Responsibility:</i><br><i>Village / Families</i><br><i>/MWTI/ MNRE</i><br>Upgrade waterways | Minimise<br>expenditure on<br>damaged | Conduct a full catchment<br>management, drainage<br>analysis and geotechnical              | CIM Strategy<br>2015           |
| measures for<br>fords and           | Upgrade all  | damaged                               | analysis and geotechnical  | NISP 2011                      |
| bridges                             | crossings  | properties &<br>personal assets       | engineering survey and use<br>its recommendations to                                       | KESO 5                         |
|                                     | Upgrade or repair  | -                                     | inform location and designs  |                                |
|                                     | riverine<br>embankment   | Mitigate potential                    | Implement Delauli la Falafa  | TSP 2014-2019<br>Goal 2 KO 1   |
|                                     | protection work  | damage from<br>inland flooding        | Implement Palauli le Falefa<br>Integrated Catchment Strategy                               | GUAI 2 KU 1                    |
|                                     | upstream of Sili,  |                                       | and Flood Management Plan in   | Two Million                    |
|                                     | Gautavai, Gataivai<br>and Puleia rivers  | Reduce flooding of built up areas     | conjunction with hazard Maps<br>and Geomorphologist Drainage<br>Infrastructure Database to | Tree Strategy<br>2015-2020     |
|                                     | Ensure river   | Safer villages,                       | inform location and design   | Restoration                    |
|                                     | channel upstream is  | houses and roads                      |  | Operational                    |
|                                     | cleared and<br>maintained  |                                       | Utilise environmental and<br>social safeguards including                                   | Plan 2016-<br>2020             |
|                                     | regularly  |                                       | EIAs in screening and  | 2020                           |
|                                     | Construct levees to  |                                       | designing infrastructure facilities  | Vulnerability<br>Assessment of |
|                                     | reduce flooding along estuaries and  |                                       | Include in budget  | the Samoa<br>Road Network      |
|                                     | coastal streams  |                                       | programming CBA, design and construction. Bridge and road                                  | (2016) and<br>Road Network     |
|                                     | Conduct riparian   |                                       | designs to take account of   | Adaptation                     |
|                                     | replanting along<br>river channels and   |                                       | forecast changes in sea level rise and local flooding from                                 | Strategy, LTA                  |
|                                     | vatercourses   |                                       | increased rainfall intensity   |                                |
|                                     | Encourage planting of  |                                       | MNRE to zone hazard areas  |                                |
|                                     | indigenous species in  |                                       | along major watercourses<br>based on flood risk to provide                                 |                                |
|                                     | conjunction with engineered water  |                                       | suitable areas for riparian  |                                |
|                                     | land drainage action   |                                       | revegetation   |                                |
|                                     | plans  |                                       | Designation of the CEHZ and  |                                |
|                                     | Install advisory   |                                       | CFHZ as an "at risk" zone with   |                                |
|                                     | edge markers and   |                                       | appropriate landuse planning   |                                |
|                                     | depth markers to   |                                       | controls and restrictions  |                                |
|                                     | warn vehicle and pedestrians at all  |                                       |  |                                |
|                                     | peuesi ians at an  |                                       |  |                                |

|   | crossings  |   |  |   |
|---|--|---|--|---|
|   | ci ussings   |   |  |   |
|   | Government and<br>Villages to liaise and<br>collaborate on<br>processes needed to<br>protect riverbanks<br>from land clearing<br>and developments  |   |  |   |
|   | Responsibility:<br>MWTI/LTA/MNRE/<br>District/Village  |   |  |   |
| Vaitai<br>Hydroelectric<br>Power Station  | Monitor Power<br>Station in Vailoa,<br>Palauli <sup>6</sup> for any<br>environmental<br>effects on district<br>Monitor health of<br>rivers in district to<br>ensure no oil leaks<br>enter watercourses<br>and waterways in<br>district<br><b>Responsibility:</b><br><b>EPC/ MNRE</b>   | Minimize national<br>disaster recovery<br>expenditure on<br>damaged<br>properties, public<br>and private assets<br>Reduce<br>contamination of<br>water supply | Conduct a full catchment<br>management, drainage<br>analysis and geotechnical<br>engineering survey of<br>embankment and<br>watercourses in district<br>UtilizeHazard maps and<br>Geomorphologist Drainage<br>Infrastructure Database<br>Utilize environmental and<br>social safeguards including<br>EIAs in screening and<br>designing infrastructure | Energy Sector<br>Plan<br>NESP 2016-<br>2020   |
| Evacuation<br>Shelter and a<br>connected<br>escape route<br>needed for<br>emergency<br>preparedness<br>and response | Assess and/or select<br>location for either an<br>existing or new<br>evacuation shelter,<br>including safe access<br>routes to the shelter<br>Conduct evacuation<br>shelter assessment<br>and mark on CIM<br>Plan hazard maps<br>Develop a Village<br>Climate Disaster<br>Management Plan<br>(VCDMP)<br>Conduct trainings for<br>People With<br>Disabilities (PWDs)<br>on emergency and<br>disaster response<br>strategies<br>Implement CDCRM<br>program<br>Install relevant signs<br>to guide the<br>community on | Improve resilience of<br>public infrastructure<br>Improve<br>preparedness<br>and readiness<br>response to natural<br>disasters                                | facilities<br>Enforcement of National<br>Building Code 2017<br>Utilise hazard maps and<br>Geomorphologist findings to<br>inform location and designs   | National<br>Disaster<br>Management<br>Plan 2017-<br>2021<br>National<br>Building Code<br>National Policy<br>for People with<br>Disabilities |

| Natural<br>Resources and<br>Environment<br>Upland Forest | developments near<br>electricity posts<br><i>Responsibility: EPC/<br/>MWTI/ Village/<br/>Families</i><br>Best Solutions<br>Enforce Watershed  | <b>Benefits</b><br>Protects and  |   | Relevant<br>Sector Plans,<br>National<br>Strategies &<br>Policies<br>Forestry for |
|--|---|--|---|---|
|  | electricity posts<br>Responsibility: EPC/<br>MWTI/ Village/<br>Families   |  |   |   |
| supply   | underground lines in<br>the long term<br>Install and connect<br>power supply for<br>inland residents<br>Relocate overhead<br>lines to a more<br>resilient location<br>when being replaced<br>Install streetlights<br>along the roads<br>where needed for<br>community safety<br>Install and connect<br>to solar power<br>supply if made<br>available<br>Families to limit<br>building and                                       | electricity supply<br>at all times<br>including natural<br>disasters<br>Avoid accidents<br>from fallen<br>electricity posts. | networks to avoid<br>overloading poles and<br>contributing to line failures | Plan  |
| Electricity  | procedures and to<br>locations of<br>evacuation shelters<br>Where no suitable<br>houses exist, build<br>emergency shelter(s)<br>outside the hazard<br>zones<br>Retrofit identified<br>and approved<br>schools or churches<br>outside hazard<br>zones and designate<br>as evacuation<br>shelter<br><i>Responsibility:</i><br><i>MNRE / DMO/<br/>MWTI/ Village</i><br><i>/CSSP/Council of</i><br><i>Churches/MWCSD</i><br>Provide | Maintain   | Monitor distribution  | EPC Strategic   |

| · · · · · · · · · · · · · · · · · · · |                                       |                                 |  |                           |
|---------------------------------------|---------------------------------------|---------------------------------|--|---------------------------|
|                                       | ncroachment<br>ontrol and regulate    | Sustains ecosystem services and | develop zonation strategy for safe areas                     | Village Fono              |
|                                       | evelopments around                    | functions                       |  | Act                       |
| the                                   | e upland area                         |                                 | Develop an integrated land                                   | (Amendment                |
|                                       |                                       | Reduce                          | management plan with the                                     | Bill 2016)                |
|                                       | lopt agro-forestry                    | contamination of                | aim of reducing any  | CIM Strategy              |
|                                       | nd community tree<br>rming practices  | water supply                    | unnecessary actions that may<br>adversely affect the natural | 2015                      |
|                                       | stead of clear                        | Reduce impact from              | habitats and ecosystems of                                   | 2015                      |
|                                       | lling as is practiced                 | inland flooding                 | the area   | Water and                 |
|                                       | present                               | 8                               |  | Sanitation                |
|                                       | 1                                     | Improve                         | MNRE Forestry to advice on                                   | Sector Plan               |
|                                       | ncourage planting of                  | preparedness and                | appropriate species, depth                                   | CWA 10 V                  |
|                                       | digenous species in                   | readiness response              | and density of planting and                                  | SWA 10 Year<br>Investment |
|                                       | njunction with                        | to natural disasters            | provide seedlings for  | Plan (2016)               |
|                                       | ngineered water<br>nd drainage action | Safer villages, houses          | different vegetation types<br>suitable to the habitats and   | 1 Iuli (2010)             |
|                                       | ans                                   | and roads                       | planting materials for village                               | Community                 |
| pic                                   | ans                                   |                                 | planting materials for vinage                                | Engagement                |
| Re                                    | egulate                               |                                 | Develop and register   | Plan                      |
| de                                    | evelopments                           |                                 | District/Village bylaws to                                   |                           |
|                                       | ound catchment                        |                                 | include penalizing illegal                                   |                           |
|                                       | ea, SWA intake and                    |                                 | deforestation in district lands                              |                           |
| bo                                    | oreholes in district                  |                                 |  |                           |
| I in                                  | mit land clearance                    |                                 | Utilise Sui o Nu'u monthly<br>meetings to monitor progress   |                           |
|                                       | nd agricultural                       |                                 | of district/village forestry                                 |                           |
|                                       | evelopment around                     |                                 | programmes   |                           |
|                                       | VA intake and                         |                                 |  |                           |
| bo                                    | oreholes                              |                                 |  |                           |
|                                       | 1 . ·                                 |                                 |  |                           |
|                                       | onduct campaign                       |                                 |  |                           |
|                                       | r public awareness<br>id establish a  |                                 |  |                           |
|                                       | eighbourhood                          |                                 |  |                           |
|                                       | atch" agreement                       |                                 |  |                           |
|                                       | ith district to                       |                                 |  |                           |
|                                       | onitor and report                     |                                 |  |                           |
|                                       | n illegal                             |                                 |  |                           |
| de                                    | eforestation                          |                                 |  |                           |
| וח                                    | strict/village to                     |                                 |  |                           |
|                                       | elp promote the                       |                                 |  |                           |
|                                       | evelopment of the                     |                                 |  |                           |
| ag                                    | roforestry sector                     |                                 |  |                           |
|                                       | encouraging                           |                                 |  |                           |
|                                       | levant land use                       |                                 |  |                           |
| -                                     | actice and where                      |                                 |  |                           |
|                                       | ossible resolve any sociated land     |                                 |  |                           |
|                                       | sputes                                |                                 |  |                           |
|                                       | oputos                                |                                 |  |                           |
| Di                                    | strict and village                    |                                 |  |                           |
|                                       | support SWA                           |                                 |  |                           |
|                                       | ater rationing                        |                                 |  |                           |
|                                       | ogrammes during                       |                                 |  |                           |
| tin                                   | nes of drought                        |                                 |  |                           |
|                                       | strict to support                     |                                 |  |                           |
|                                       | VA efforts at                         |                                 |  |                           |
|                                       | ploratory intakes                     |                                 |  |                           |
| CA CA                                 | r j mouneo                            |                                 |  |                           |

|  | district<br>Continue ban of   |  |  |   |
|--|---|--|--|---|
|  | destructive fishing<br>practices including<br>sand mining and<br>introduce village ban<br>on rubbish dumping<br>in waterways and  |  |  |   |
|  | watercourses<br>(immediate fluvial<br>hazard zones)   |  |  |   |
|  | Fence domestic and<br>invasive animals to<br>protect young trees  |  |  |   |
|  | Responsibility:<br>MNRE/ SWA<br>MWCSD/ District<br>/Village /CSSP   |  |  |   |
| Soft coastal<br>protection<br>measures<br>needed for                               | Plant native species<br>along coastal areas to<br>strengthen existing<br>seawall and to reduce  |  | Develop an integrated land<br>management plan for Palauli<br>le Falefa district with the aim<br>of reducing any unnecessary  | Two Million<br>Tree Planting<br>Strategy 2015-<br>2020  |
| most<br>vulnerable<br>areas  | coastal erosion and<br>landslips; Talie, Fetau<br>Toa, Togatogo are<br>known to have  | strengthen existing<br>and new<br>infrastructure<br>along the coast  | actions that may adversely<br>affect the natural habitats and<br>ecosystems of the area  | Restoration<br>Operational<br>Plan 2016-  |
|  | greater resilience to<br>natural disasters and<br>changing climate<br>conditions  | Reduce impact from<br>coastal erosion and<br>natural disasters   | MAF to assist in establishment<br>of pilot sites to trial climate<br>ready plant varieties   | 2020<br>Forestry<br>Management  |
|  | To act as an effective wave barrier, a  | Implements an<br>Ecosystem Based   | MNRE Forestry, DEC and MAF<br>to collaborate on supply of  | Act 2011  |
|  | minimum distance of<br>200m of vegetation is<br>needed  | Approach   | climate resilient crops  |   |
|  | minimum distance of<br>200m of vegetation is<br>needed<br>Responsibility:<br>MNRE/<br>MAF/Villages  | Approach   |  |   |
| Governance   | minimum distance of<br>200m of vegetation is<br>needed<br><i>Responsibility:</i><br><i>MNRE/</i><br><i>MAF/Villages</i><br>Best Solutions   | Approach<br>Benefits   | Guideline to assist with<br>the implementation   | Relevant<br>Sector Plans,<br>National<br>Strategies &<br>Policies   |
| Strengthen the   | minimum distance of<br>200m of vegetation is<br>needed<br><i>Responsibility:</i><br><i>MNRE/</i><br><i>MAF/Villages</i><br>Best Solutions   | Approach<br>Benefits<br>Strengthen   | Guideline to assist with<br>the implementation   | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono   |
| Strengthen the governance of   | minimum distance of<br>200m of vegetation is<br>needed<br><i>Responsibility:</i><br><i>MNRE/</i><br><i>MAF/Villages</i><br>Best Solutions<br>Update and/or<br>develop bylaws to   | Approach Benefits Strengthen implementation of   | Guideline to assist with<br>the implementation   | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act  |
| Strengthen the   | <ul> <li>minimum distance of 200m of vegetation is needed</li> <li>Responsibility:<br/>MNRE/<br/>MAF/Villages</li> <li>Best Solutions</li> <li>Update and/or develop bylaws to manage the use of natural resources,</li> </ul>  | Approach<br>Benefits<br>Strengthen   | Guideline to assist with<br>the implementation   | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono   |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use            | <ul> <li>minimum distance of 200m of vegetation is needed</li> <li>Responsibility:<br/>MNRE/<br/>MAF/Villages</li> <li>Best Solutions</li> <li>Update and/or develop bylaws to manage the use of natural resources, and to control land</li> </ul>  | Approach Benefits Strengthen implementation of all national sector plans   | Guideline to assist with<br>the implementation<br>Develop and register<br>district/village bylaw to<br>protect all district/ village<br>and government assets,<br>environment, livelihood and  | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act<br>(Amendmen<br>t Bill 2016)   |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use<br>through | <ul> <li>minimum distance of 200m of vegetation is needed</li> <li>Responsibility:<br/>MNRE/<br/>MAF/Villages</li> <li>Best Solutions</li> <li>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as</li> </ul>   | Approach Benefits Strengthen implementation of all national sector plans Strengthen  | Guideline to assist with         the implementation         Develop and register         district/village bylaw to         protect all district/ village         and government assets,         environment, livelihood and         food security especially   | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act<br>(Amendmen<br>t Bill 2016)<br>Community  |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use            | <ul> <li>minimum distance of 200m of vegetation is needed</li> <li>Responsibility:<br/>MNRE/<br/>MAF/Villages</li> <li>Best Solutions</li> <li>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage</li> </ul>  | Approach<br>Benefits<br>Strengthen<br>implementation of<br>all national sector<br>plans<br>Strengthen<br>monitoring of all   | Guideline to assist with<br>the implementation<br>Develop and register<br>district/village bylaw to<br>protect all district/ village<br>and government assets,<br>environment, livelihood and<br>food security especially<br>activities affecting water  | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act<br>(Amendmen<br>t Bill 2016)   |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use<br>through | <ul> <li>minimum distance of 200m of vegetation is needed</li> <li>Responsibility:<br/>MNRE/<br/>MAF/Villages</li> <li>Best Solutions</li> <li>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as</li> </ul>   | Approach<br>Approach<br>Benefits<br>Strengthen<br>implementation of<br>all national sector<br>plans<br>Strengthen<br>monitoring of all<br>National Acts,<br>Regulation,                      | Guideline to assist with         the implementation         Develop and register         district/village bylaw to         protect all district/ village         and government assets,         environment, livelihood and         food security especially   | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act<br>(Amendmen<br>t Bill 2016)<br>Community<br>Sector Plan<br>Community                              |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use<br>through | minimum distance of<br>200m of vegetation is<br>needed<br>Responsibility:<br>MNRE/<br>MAF/Villages<br>Best Solutions<br>Update and/or<br>develop bylaws to<br>manage the use of<br>natural resources,<br>and to control land<br>use impacts; such as<br>drainage<br>maintenance,<br>rubbish dumping,<br>sand mining, stray                    | Approach<br>Benefits<br>Benefits<br>Strengthen<br>implementation of<br>all national sector<br>plans<br>Strengthen<br>monitoring of all<br>National Acts,<br>Regulation,<br>Strategies, Plans | Guideline to assist with<br>the implementation<br>Develop and register<br>district/village bylaw to<br>protect all district/ village<br>and government assets,<br>environment, livelihood and<br>food security especially<br>activities affecting water<br>catchment areas and coastline<br>Utilise Sui o Nu'u monthly                                 | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act<br>(Amendmen<br>t Bill 2016)<br>Community<br>Sector Plan<br>Community<br>Development               |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use<br>through | <ul> <li>minimum distance of 200m of vegetation is needed</li> <li>Responsibility:<br/>MNRE/<br/>MAF/Villages</li> <li>Best Solutions</li> <li>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</li> </ul> | Approach<br>Approach<br>Benefits<br>Strengthen<br>implementation of<br>all national sector<br>plans<br>Strengthen<br>monitoring of all<br>National Acts,<br>Regulation,                      | Guideline to assist with<br>the implementation<br>Develop and register<br>district/village bylaw to<br>protect all district/ village<br>and government assets,<br>environment, livelihood and<br>food security especially<br>activities affecting water<br>catchment areas and coastline<br>Utilise Sui o Nu'u monthly<br>meetings to monitor progress | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act<br>(Amendmen<br>t Bill 2016)<br>Community<br>Sector Plan<br>Community<br>Development<br>Plan 2016- |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use<br>through | minimum distance of<br>200m of vegetation is<br>needed<br>Responsibility:<br>MNRE/<br>MAF/Villages<br>Best Solutions<br>Update and/or<br>develop bylaws to<br>manage the use of<br>natural resources,<br>and to control land<br>use impacts; such as<br>drainage<br>maintenance,<br>rubbish dumping,<br>sand mining, stray                    | Approach<br>Benefits<br>Benefits<br>Strengthen<br>implementation of<br>all national sector<br>plans<br>Strengthen<br>monitoring of all<br>National Acts,<br>Regulation,<br>Strategies, Plans | Guideline to assist with<br>the implementation<br>Develop and register<br>district/village bylaw to<br>protect all district/ village<br>and government assets,<br>environment, livelihood and<br>food security especially<br>activities affecting water<br>catchment areas and coastline<br>Utilise Sui o Nu'u monthly                                 | Sector Plans,<br>National<br>Strategies &<br>Policies<br>Village Fono<br>Act<br>(Amendmen<br>t Bill 2016)<br>Community<br>Sector Plan<br>Community<br>Development               |

| r                     |                    |  |
|-----------------------|--------------------|--|
| areas and near        | adapt, respond and |  |
| boreholes.            | recover quickly in |  |
|                       | the long term      |  |
| Collaborate with Sui  | _                  |  |
| o Nuu to monitor the  | Improve            |  |
| use of and impact on  | accountability and |  |
| natural resources     | enabling           |  |
|                       | environment of     |  |
| Facilitate continuous | communities        |  |
| awareness raising     |                    |  |
| programs with the     |                    |  |
| villages              |                    |  |
|                       |                    |  |
| Responsibility:       |                    |  |
| MWCSD /Village        |                    |  |

#### Palauli le Falefa District 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

# 5. Sili Village Interventions

### **CIM Plan Solutions**

| Infrastructure    | Best Solutions            | Benefits           | Guideline to assist with                             | Relevant Sector                    |
|-------------------|---------------------------|--------------------|--|------------------------------------|
|                   |                           |                    | the implementation                                   | Plans, National                    |
|                   |                           |                    | -  | Strategies &                       |
|                   |                           |                    |  | Policies                           |
| Flood protection  | Upgrade                   | Minimise           | Conduct a full catchment                             | CIM Strategy 2015                  |
| measures for      | waterways                 | expenditure on     | management, drainage                                 |                                    |
| fords and bridges |                           | damaged            | analysis and geotechnical                            | NISP 2011 KESO 5                   |
|                   | Upgrade all               | properties &       | engineering survey and                               | TCD 2014 2010                      |
|                   | crossings                 | personal assets    | use its recommendations to inform location and       | TSP 2014-2019                      |
|                   | Upgrade or                | Mitigate potential | designs  | Goal 2 KO 1                        |
|                   | repair riverine           | damage from        | uesigns  | Two Million Tree                   |
|                   | embankment                | inland flooding    | Implement Palauli le Falefa                          | Strategy 2015-2020                 |
|                   | protection work           | 8                  | Integrated Catchment                                 |                                    |
|                   | upstream of Sili          | Reduce flooding of | Strategy and Flood                                   | Restoration                        |
|                   | catchment area            | built up areas     | Management Plan in                                   | <b>Operational Plan</b>            |
|                   |                           |                    | conjunction with hazard                              | 2016-2020                          |
|                   | Ensure river              | Safer villages,    | Maps and Geomorphologist                             |                                    |
|                   | channel                   | houses and roads   | Drainage Infrastructure                              | Vulnerability                      |
|                   | upstream is               |                    | Database to inform location                          | Assessment of the                  |
|                   | cleared and<br>maintained |                    | and design   | Samoa Road                         |
|                   | regularly                 |                    | Utilise environmental and                            | Network (2016)<br>and Road Network |
|                   | regularly                 |                    | social safeguards including                          | Adaptation                         |
|                   | Construct levees          |                    | EIAs in screening and                                | Strategy, LTA                      |
|                   | to reduce                 |                    | designing infrastructure                             | Strategy, Erri                     |
|                   | flooding along            |                    | facilities   |                                    |
|                   | estuaries and             |                    |  |                                    |
|                   | coastal streams           |                    | Include in budget                                    |                                    |
|                   |                           |                    | programming CBA, design                              |                                    |
|                   | Conduct riparian          |                    | and construction. Bridge                             |                                    |
|                   | replanting along          |                    | and road designs to take account of forecast changes |                                    |
|                   | river channels<br>and     |                    | in sea level rise and local                          |                                    |
|                   | watercourses              |                    | flooding from increased                              |                                    |
|                   | watercourses              |                    | rainfall intensity                                   |                                    |
|                   | Encourage                 |                    | -  |                                    |
|                   | planting of               |                    | MNRE to zone hazard areas                            |                                    |
|                   | indigenous                |                    | along major watercourses                             |                                    |
|                   | species in                |                    | based on flood risk to                               |                                    |
|                   | conjunction with          |                    | provide suitable areas for                           |                                    |
|                   | engineered water          |                    | riparian revegetation                                |                                    |
|                   | land drainage             |                    | Designation of the CEHZ                              |                                    |
|                   | action plans              |                    | and CFHZ as an "at risk"                             |                                    |
|                   | Install advisory          |                    | zone with appropriate                                |                                    |
|                   | edge markers              |                    | landuse planning controls                            |                                    |
|                   | and depth                 |                    | and restrictions                                     |                                    |
|                   | markers to warn           |                    |  |                                    |
|                   | vehicle and               |                    |  |                                    |
|                   | pedestrians at all        |                    |  |                                    |
|                   | crossings                 |                    |  |                                    |
|                   |                           |                    |  |                                    |
|                   | Government and            |                    |  |                                    |
|                   | Villages to liaise        |                    |  |                                    |

|                   | · · · · · · · · · · · · · · · · · · ·  |                             |   | I                 |
|-------------------|--|-----------------------------|---|-------------------|
|                   | and collaborate                        |                             |   |                   |
|                   | on processes                           |                             |   |                   |
|                   | needed to protect                      |                             |   |                   |
|                   | riverbanks from                        |                             |   |                   |
|                   | land clearing and                      |                             |   |                   |
|                   | developments                           |                             |   |                   |
|                   |  |                             |   |                   |
|                   | Responsibility:                        |                             |   |                   |
|                   | MWTI/                                  |                             |   |                   |
|                   | LTA/MNRE/                              |                             |   |                   |
|                   | District/ Village                      |                             |   |                   |
| Village houses,   | Relocate outside                       | Minimise                    | Develop an Integrated                                     | National Building |
| school and        | of high risk                           | expenditure on              | Catchment and Flood                                       | Code              |
| government        | hazard zones                           | damaged                     | Management Strategy for                                   |                   |
| assets located in | when building/                         | properties &                | Palauli le Falefa District.                               | CIM Strategy 2015 |
| IFHZ              | infrastructure                         | personal assets             | MNRE to develop zonation                                  |                   |
|                   | requires                               |                             | strategy for safe areas                                   |                   |
|                   | replacement                            | Mitigate potential          |   |                   |
|                   |  | damage from                 | Utilise hazard maps and                                   |                   |
|                   | Investments                            | coastal erosion             | Geomorphologist Drainage                                  |                   |
|                   | within the hazard                      | and flooding                | Infrastructure Database to                                |                   |
|                   | zones to adopt                         | accommodating               | inform designs  |                   |
|                   | appropriate                            | the hazard                  |   |                   |
|                   | mitigation                             | Imageneration               | Enforcement of National                                   |                   |
|                   | measures                               | Improve recovery            | Building Code 2017  |                   |
|                   |  | to create more              |   |                   |
|                   | Conduct                                | resilient villages          | Encourage insurance of                                    |                   |
|                   | awareness                              | Improvo                     | significant investments and<br>assets within hazard zones |                   |
|                   | raising campaign<br>on flood resilient | Improve<br>preparedness and | assets within hazard zones                                |                   |
|                   |  | readiness                   | Designation of the IFHZ,                                  |                   |
|                   | building<br>practices and              | response to                 | CEHZ and CFHZ as an "at                                   |                   |
|                   | designs for at                         | natural disasters           | risk" zone with appropriate                               |                   |
|                   | risk communities                       | liaturai uisasters          | landuse planning controls                                 |                   |
|                   | living in and near                     | Safer villages,             | and restrictions  |                   |
|                   | high risk hazard                       | houses and roads            |   |                   |
|                   | zones                                  | nouses and roads            |   |                   |
|                   | 201105                                 |                             |   |                   |
|                   | Design                                 |                             |   |                   |
|                   | infrastructure to                      |                             |   |                   |
|                   | take into account                      |                             |   |                   |
|                   | the immediate                          |                             |   |                   |
|                   | hazard zones; for                      |                             |   |                   |
|                   | example, raise                         |                             |   |                   |
|                   | floor levels of                        |                             |   |                   |
|                   | houses in flood                        |                             |   |                   |
|                   | prone areas                            |                             |   |                   |
|                   | *                                      |                             |   |                   |
|                   | Develop landuse                        |                             |   |                   |
|                   | planning and                           |                             |   |                   |
|                   | development                            |                             |   |                   |
|                   | controls to restrict                   |                             |   |                   |
|                   | developments                           |                             |   |                   |
|                   | within high risk                       |                             |   |                   |
|                   | hazard zones such                      |                             |   |                   |
|                   | as CEHZ and CFHZ                       |                             |   |                   |
|                   | Families and                           |                             |   |                   |
|                   |  |                             |   |                   |
|                   | village to limit                       |                             |   |                   |
|                   | building and                           |                             |   |                   |
|                   | developing on<br>natural overland      |                             |   |                   |
|                   | natural overland                       |                             |   |                   |

| and village landsMinimise national<br>disaster recovery<br>expenditure on<br>damaged<br>properties and<br>public assetsInclude in budget<br>programming CBA, design<br>and construction. Road<br>design standard to take<br>account of forecast<br>increased rainfall intensityVillage to restrict<br>rubbish dumping<br>into waterways<br>and conduct<br>regular clearance<br>of rubbish behind<br>homesDesignation of the IFHZ,<br>CEHZ and CFHZ as an "at<br>risk" zone with appropriate<br>landuse planning controls<br>and restrictionsVillage to regulate<br>developments<br>near and around<br>road shoulders of<br>all access roadsDevelop and register<br>Village to regulate<br>dumping into waterways<br>and conductVillage to regulate<br>developments<br>near and around<br>road shoulders of<br>all access roadsUtilise Sui o Nu'u monthly | Upgrade Sili<br>Access and Sili<br>Road:<br>connectivity line<br>roads to Puleia<br>and Gautavai | Implement<br>regular drainage<br>inspection and<br>maintenance<br>Village to restrict<br>rubbish dumping<br>into waterways<br>and conduct<br>regular clearance<br>of rubbish behind<br>homes<br>Village to regulate<br>developments<br>near and around<br>road shoulders of | rate of recovery<br>Improve<br>preparedness and<br>readiness<br>response to<br>natural disasters<br>Reduce impact<br>from coastal<br>erosion and<br>natural disasters<br>Safer villages,<br>houses and roads<br>Minimise national<br>disaster recovery<br>expenditure on<br>damaged<br>properties and | programming CBA, design<br>and construction. Road<br>design standard to take<br>account of forecast<br>increased rainfall intensity<br>Designation of the IFHZ,<br>CEHZ and CFHZ as an "at<br>risk" zone with appropriate<br>landuse planning controls<br>and restrictions<br>Develop and register<br>Village bylaws to include<br>maintenance of drainages<br>and illegal rubbish<br>dumping into waterways | CIM Strategy 2015<br>NISP2011 KES0 5<br>2 K0 1<br>Community Sector<br>Plan<br>Village Fono Act<br>(Amendment Bill<br>2016) |
|--|--|---|---|--|--|
|--|--|---|---|--|--|

|              | Enforce             |                    | progress of village cleanup |                     |
|--------------|---------------------|--------------------|-----------------------------|---------------------|
|              | environmental       |                    | and awareness               |                     |
|              | safeguards          |                    | programmes                  |                     |
|              |                     |                    |                             |                     |
|              | Where               |                    |                             |                     |
|              | reclamations are    |                    |                             |                     |
|              | proposed,           |                    |                             |                     |
|              | Government and      |                    |                             |                     |
|              | district to manage  |                    |                             |                     |
|              | processes by        |                    |                             |                     |
|              | requiring villagers |                    |                             |                     |
|              | to get the          |                    |                             |                     |
|              | appropriate         |                    |                             |                     |
|              | permits and         |                    |                             |                     |
|              | consent             |                    |                             |                     |
|              | consent             |                    |                             |                     |
|              | Responsibility:     |                    |                             |                     |
|              | LTA/ MWTI/          |                    |                             |                     |
|              | MNRE/ District/     |                    |                             |                     |
|              | Village             |                    |                             |                     |
|              | /Families/CSSP      |                    |                             |                     |
| Electricity  | Install             | Maintain           | Monitor distribution        | EPC Strategic Plan  |
| supply       | streetlights        | electricity supply | networks to avoid           | EFC Strategic Flair |
| Supply       | along the roads     | at all times       | overloading poles and       |                     |
|              | where needed        | including natural  | contributing to line        |                     |
|              | for community       | disasters          | failures                    |                     |
|              | safety              | uisasters          | lanures                     |                     |
|              | Salety              | Avoid accidents    |                             |                     |
|              | Relocate            | from fallen        |                             |                     |
|              | overhead lines      | electricity posts  |                             |                     |
|              | to a more           | ciccularly posts   |                             |                     |
|              | resilient           |                    |                             |                     |
|              | location when       |                    |                             |                     |
|              |                     |                    |                             |                     |
|              | being replaced      |                    |                             |                     |
|              | Provide             |                    |                             |                     |
|              |                     |                    |                             |                     |
|              | underground         |                    |                             |                     |
|              | lines in the long   |                    |                             |                     |
|              | term                |                    |                             |                     |
|              | Install and         |                    |                             |                     |
|              | connect to solar    |                    |                             |                     |
|              | power supply if     |                    |                             |                     |
|              | made available      |                    |                             |                     |
|              | made available      |                    |                             |                     |
|              | Responsibility:     |                    |                             |                     |
|              | EPC/MWTI/           |                    |                             |                     |
|              | Villages            |                    |                             |                     |
| Effluent and | Families in fluvial | Increase           | Develop an integrated land  | National Waste      |
| wastewater   | hazard zones to     | adaptation during  | management plan with the    |                     |
| management   | install proper      | extreme weather    | aim of reducing any         | 2 07                |
| systems      | septic waste        | events             | unnecessary actions that    | Village Fono        |
|              | disposal systems    |                    |                             | Act(Amendment Bill  |
|              | 1 - J               | Improve            | natural habitats and        | 2016)               |
|              | Introduce ban on    | infrastructure     | ecosystems of the area      | _                   |
|              | latrines            | resilience and     | J                           |                     |
|              | established in and  | rate of recovery   | Review wastewater           |                     |
|              | around fluvial      |                    | strategy/legislation to     |                     |
|              | hazard zones        | Improve health     | include role of             |                     |
|              |                     | and sanitation     | Village/District bylaws     |                     |
|              | Families to fence   | camadon            |                             |                     |
|              | domestic animals    | Reduce             | Develop/Update and          |                     |
| L            |                     |                    | = store opunte unu          | 1                   |

|                          | Implement village<br>awareness and<br>cleanup<br>programme to<br>reduce illegal<br>rubbish dumping<br>Implement<br>district/ village<br>drainage cleanup<br>and awareness<br>programme<br>Produce posters<br>and village signs<br>for public<br>awareness | contamination of<br>water supply | register District/Village<br>bylaws to include<br>regulating developments<br>and latrines around<br>catchment areas and areas<br>susceptible to flooding<br>Utilise Hazard maps and<br>Geomorphologist findings to<br>inform location<br>Utilise Sui o Nu'u monthly<br>meetings to monitor<br>progress of village<br>programmes on waste<br>management |                                    |
|--------------------------|---|----------------------------------|--|------------------------------------|
|                          | Responsibility:<br>MNRE/ MWCSD/   |                                  |  |                                    |
| Natural<br>Resources and | District/Village<br>Best Solutions  | Benefits                         | the implementation   | Relevant Sector<br>Plans, National |
| Environment              | F (   |                                  |  | Strategies & Policies              |
| Upland Forest and        | Enforce   | Protects and                     | Develop Integrated   | Forestry for                       |
| Catchment Areas          | Watershed   | enhance local                    | Catchment Strategy and   | Sustainable                        |
|                          | Management  | species diversity                | Flood Management Plan for  | Development Policy                 |
|                          | Riparian Zone and   | <b>a</b>                         | Palauli le Falefa District.  |                                    |
|                          | Riverbank   | Sustains ecosystem               | MNRE to develop zonation   | Village Fono Act                   |
|                          | Encroachment  | services and                     | strategy for safe areas  | (Amendment Bill                    |
|                          | Control and   | functions                        |  | 2016)                              |
|                          | regulate  | _                                | Develop an integrated land   |                                    |
|                          | developments  | Reduce                           | management plan with the   | CIM Strategy 2015                  |
|                          | around the upland   |                                  | aim of reducing any  | <b>TAT</b> . 1                     |
|                          | area  | water supply                     | unnecessary actions that   | Water and                          |
|                          |   |                                  | may adversely affect the   | Sanitation Sector                  |
|                          | Adopt agro-   | Reduce impact                    | natural habitats and   | Plan                               |
|                          | forestry and  | from inland                      | ecosystems of the area   | CIALA 10 M                         |
|                          | community tree  | flooding                         |  | SWA 10 Year                        |
|                          | farming practices   |                                  | MNRE Forestry to advice  | Investment Plan                    |
|                          | instead of clear  | Improve                          | on appropriate species,  | (2016)                             |
|                          | felling as is   | preparedness and                 | depth and density of   | Common it                          |
|                          | practiced at  | readiness response               | planting and provide   | Community                          |
|                          | present   | to natural disasters             | seedlings for different  | Engagement Plan                    |
|                          |   |                                  | vegetation types suitable  |                                    |
|                          | Encourage   | Safer villages,                  | to the habitats and  |                                    |
|                          | planting of   | houses and roads                 | planting materials for   |                                    |
|                          | indigenous  |                                  | village  |                                    |
|                          | species in  |                                  | 5  |                                    |
|                          | conjunction with  |                                  | Develop and register   |                                    |
|                          | engineered water  |                                  | District/Village bylaws to   |                                    |
|                          | land drainage   |                                  | include penalizing illegal   |                                    |
|                          | action plans  |                                  | deforestation in district  |                                    |
|                          | ···· F  |                                  | lands  |                                    |
|                          | Regulate  |                                  |  |                                    |
|                          | developments  |                                  | Utilise Sui o Nu'u monthly   |                                    |
|                          | around  |                                  | meetings to monitor  |                                    |
|                          |   |                                  |  |                                    |
|                          | catchment area,   |                                  | progress of district/village   |                                    |
|                          | SWA intake and  |                                  | forestry programmes  |                                    |
|                          | boreholes in  |                                  |  |                                    |
|                          | district  |                                  |  |                                    |

| Limit land<br>clearance and<br>agricultural<br>development<br>around SWA<br>intake and<br>boreholes  |  |  |
|--|--|--|
| Conduct campaign<br>for public<br>awareness and<br>establish a<br>"neighbourhood<br>watch"<br>agreement with<br>district to<br>monitor and<br>report on illegal<br>deforestation                               |  |  |
| District/village to<br>help promote the<br>development of<br>the agroforestry<br>sector by<br>encouraging<br>relevant land use<br>practice and<br>where possible<br>resolve any<br>associated land<br>disputes |  |  |
| District and<br>village to<br>support SWA<br>water rationing<br>programmes<br>during times of<br>drought   |  |  |
| District to<br>support SWA<br>efforts at<br>exploratory<br>intakes and<br>boreholes in<br>district   |  |  |
| Continue ban of<br>destructive fishing<br>practices including<br>sand mining and<br>introduce village<br>ban on rubbish<br>dumping in<br>waterways and<br>watercourses<br>(immediate fluvial<br>hazard zones)  |  |  |

| Food security:<br>threatened by<br>changes in<br>planting of<br>rootcrops (i.e<br>potato) which<br>are more resilient<br>to cyclones,<br>droughts and<br>floodsMaintains natural<br>ecosystemMAF to provide trainings,<br>awareness raising and<br>oupput in supply of<br>nursery trees, technology<br>and infrastructureAgriculture Sector<br>Plan 2016-2021Maintains natural<br>looding and<br>indequate soil<br>for plantingMaintains natural<br>ecosystemMAF to provide trainings,<br>awareness raising and<br>supput in supply of<br>nursery trees, technology<br>and infrastructureAgriculture Sector<br>Plan 2016-2021Maintains natural<br>indequate soil<br>for planting<br>including fruit<br>trees species to<br>reduce crop<br>vulnerability to<br>pests and<br>diseasesMaintains natural<br>ecosystemMAF to provide trainings,<br>awareness on crop<br>diversification to suit the<br>eradiness<br>response to<br>natural disastersMAF to provide trainings,<br>awareness on crop<br>diversification to suit the<br>eradiness<br>response to<br>natural disastersMAF to provide trainings,<br>awareness on crop<br>diversification to suit the<br>eradiness<br>response to<br>natural disastersMAF to provide trainings,<br>adawareness on crop<br>diversification to suit the<br>eradiness<br>response to<br>natural disastersMAF to provide trainings,<br>adawareness on crop<br>diversification to suit the<br>adright trainess<br>response to<br>natural disastersMAF to assist in<br>estatist in<br>estatist in<br>estatist in<br>estatist in<br>estatist in<br>ecosystems of the areaMarget<br>Plan 2016-2020Implement<br>Sustainable Land<br>Management<br>(SLM) practicesImplement<br>Sustainable Land<br>Management<br>(SLM) practicesMNRE Forestry to advice<br>on appropriate species,<br>depth and dens  |                |                    |                      |                            |                       |
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| Replanting of<br>native forestry<br>species of the<br>upland forests to<br>restore resilience<br>and ecological<br>functionvegetation types suitable<br>to the habitats and<br>planting materials for<br>villageConduct pilot<br>site trials for<br>climate ready<br>plant varietiesConduct pilot<br>site trials for<br>climate ready<br>plant varietiesImage: Image: Im |                | (- ) [             |                      |                            |                       |
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| species of the<br>upland forests to<br>restore resilience<br>and ecological<br>function<br>Conduct pilot<br>site trials for<br>climate ready<br>plant varieties<br>Responsibility:<br>MAF/   |                |                    |                      |                            |                       |
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| restore resilience<br>and ecological<br>function<br>Conduct pilot<br>site trials for<br>climate ready<br>plant varieties<br>Responsibility:<br>MAF/  |                |                    |                      | village                    |                       |
| and ecological         function         Conduct pilot         site trials for         climate ready         plant varieties         Responsibility:         MAF/   |                |                    |                      |                            |                       |
| function<br>Conduct pilot<br>site trials for<br>climate ready<br>plant varieties<br>Responsibility:<br>MAF/  |                |                    |                      |                            |                       |
| Conduct pilot<br>site trials for<br>climate ready<br>plant varieties<br>Responsibility:<br>MAF/  |                |                    |                      |                            |                       |
| site trials for<br>climate ready<br>plant varieties<br>Responsibility:<br>MAF/   |                | IUIICUOII          |                      |                            |                       |
| site trials for<br>climate ready<br>plant varieties<br>Responsibility:<br>MAF/   |                | Conduct nilot      |                      |                            |                       |
| climate ready<br>plant varieties<br>Responsibility:<br>MAF/  |                | -                  |                      |                            |                       |
| plant varieties       Responsibility:       MAF/   |                |                    |                      |                            |                       |
| Responsibility:<br>MAF/  |                |                    |                      |                            |                       |
| MAF/   |                | 1                  |                      |                            |                       |
|  |                | Responsibility:    |                      |                            |                       |
|  |                |                    |                      |                            |                       |
|  |                | MNRE/villages/C    |                      |                            |                       |
| SSP  |                | SSP                |                      |                            |                       |

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

#### Sili Village Map



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

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



# 6. Gataivai Village Interventions

| Infrastructur    | Best Solutions                         | Benefits                       | Guideline to assist with                                 | Relevant          |
|------------------|--|--------------------------------|--|-------------------|
| e                | Dest solutions                         | Dellents                       | the implementation                                       | National, Sector  |
| C                |  |                                |  | Plans and         |
|                  |  |                                |  | Strategies        |
| Village houses,  | Relocate outside of                    |                                | Develop an Integrated                                    | National Building |
| school and other | high risk hazard                       | expenditure on                 | Catchment and Flood                                      | Code              |
| village assets   | zones when                             | damaged                        | Management Strategy for                                  |                   |
| located in high  | building/infrastru                     | properties &                   | Palauli le Falefa District.                              | CIM Strategy 2015 |
| risk hazard      | cture requires                         | personal assets                | MNRE to develop zonation                                 |                   |
| zones            | replacement                            | Mitianto a chantial            | strategy for safe areas                                  |                   |
|                  | Investments                            | Mitigate potential             | Itilias barand mana and                                  |                   |
|                  | Investments within the hazard          | damage from<br>coastal erosion | Utilise hazard maps and<br>Geomorphologist Drainage      |                   |
|                  | zones to adopt                         | and flooding                   | Infrastructure Database to                               |                   |
|                  | appropriate                            | accommodating                  | inform designs   |                   |
|                  | mitigation                             | the hazard                     |  |                   |
|                  | measures                               |                                | Enforcement of National                                  |                   |
|                  |  | Improve recovery               | Building Code 2017                                       |                   |
|                  | Conduct                                | to create more                 |  |                   |
|                  | awareness raising                      | resilient villages             | Encourage insurance of                                   |                   |
|                  | campaign on flood                      |                                | significant investments and                              |                   |
|                  | resilient building                     | Improve                        | assets within hazard zones                               |                   |
|                  | practices and                          | preparedness and               |  |                   |
|                  | designs for at risk                    | readiness                      | Designation of the IFHZ,                                 |                   |
|                  | communities                            | response to                    | CEHZ and CFHZ as an "at                                  |                   |
|                  | living in and near<br>high risk hazard | natural disasters              | risk" zone with appropriate<br>landuse planning controls |                   |
|                  | zones                                  | Safer villages,                | and restrictions   |                   |
|                  | 201105                                 | houses and roads               |  |                   |
|                  | Design                                 | nouses und rouds               |  |                   |
|                  | infrastructure to                      |                                |  |                   |
|                  | take into account                      |                                |  |                   |
|                  | the immediate                          |                                |  |                   |
|                  | hazard zones; for                      |                                |  |                   |
|                  | example, raise                         |                                |  |                   |
|                  | floor levels of                        |                                |  |                   |
|                  | houses in flood                        |                                |  |                   |
|                  | prone areas                            |                                |  |                   |
|                  | Develop landuse                        |                                |  |                   |
|                  | planning and                           |                                |  |                   |
|                  | development                            |                                |  |                   |
|                  | controls to restrict                   |                                |  |                   |
|                  | developments                           |                                |  |                   |
|                  | within high risk                       |                                |  |                   |
|                  | hazard zones such                      |                                |  |                   |
|                  | as CEHZ and CFHZ                       |                                |  |                   |
|                  | Families and                           |                                |  |                   |
|                  | village to limit                       |                                |  |                   |
|                  | building and                           |                                |  |                   |
|                  | developing on                          |                                |  |                   |
|                  | natural overland                       |                                |  |                   |
|                  | flow paths                             |                                |  |                   |
|                  | exacerbating                           |                                |  |                   |
|                  | inland flooding                        |                                |  |                   |

#### **CIM Plan Solutions**

| Drainage<br>systems to be<br>improved in<br>high risk areas<br>of South Central<br>Coast Road<br>where it joins<br>access roads | junctions with<br>access roads<br>(Gataivai School<br>Road and other<br>village tracks)<br>sitting within<br>combined hazard<br>zones (IFHZ, CEHZ,<br>CFHZ)- in<br>accordance with<br>Vulnerability<br>Assessment of the<br>Samoa Road<br>Network<br>recommendations<br>Implement<br>national standards<br>for culverts and<br>drains to facilitate | Improves climate<br>resilience of<br>infrastructure<br>resilience and<br>rate of response<br>and recovery to<br>natural hazards<br>and disasters<br>Encourages<br>coastal families to<br>relocate inland<br>Maintains lifeline<br>access<br>Minimise<br>national disaster<br>recovery<br>expenditure on<br>damaged<br>properties, public<br>and private<br>assets | Use existing information for<br>guidance but not limited to:<br>"Vulnerability Assessment of<br>the Samoa Road Network<br>(2017)"; "Review of<br>National Road Standards in<br>Samoa (2016)"; "Samoa<br>Code of Environmental<br>Practice (2007)"<br>Undertake a Cost Benefit<br>Analysis to weigh options<br>for funding<br>Incorporate environmental<br>and social safeguards<br>concerns in the design and<br>undertake consultations<br>with affected communities<br>Apply for necessary<br>permits as required by law<br>Utilise hazard maps and<br>Geomorphologist | CIM Strategy 2015<br>NISP2011 KESO 5<br>TSP2014-2019 Goal<br>2 KO 1<br>Community Sector<br>Plan |
|---|---|---|--|---|
|   | Samoa Road<br>Network<br>recommendations<br>Implement<br>national standards<br>for culverts and   | expenditure on<br>damaged<br>properties, public<br>and private  | with affected communities<br>Apply for necessary<br>permits as required by law<br>Utilise hazard maps and  |   |
|   | of storm water<br>and reduce<br>flooding<br>Implement regular<br>drainage<br>inspection and   |   | Database to inform designs<br>Develop Integrated<br>Catchment Strategy and<br>Flood Management Plan for<br>Anoama'a East District  |   |
|   | maintenance<br>Responsibility:<br>LTA/<br>MWTI/MWCSD<br>/Village /<br>Families  |   | Develop and register<br>District/Village bylaws to<br>include maintenance of<br>drainages and illegal<br>rubbish dumping into<br>waterways   |   |
|                  |                    | _                 |                             |                         |
|------------------|--------------------|-------------------|-----------------------------|-------------------------|
| Flood protection | Upgrade            | Improve           | Conduct a full catchment    | CIM Strategy 2015       |
| measures for     | waterways          | infrastructure    | management, drainage        |                         |
| watercourses     |                    | resilience and    | analysis and geotechnical   | NISP 2011 KESO 5        |
| and riverbanks   | Upgrade bridge     | rate of recovery  | engineering survey and      |                         |
|                  |                    |                   | use its recommendations     | TSP 2014-2019           |
|                  | Upgrade or         | Improve           | during the planning phase   | Goal 2 KO 1             |
|                  | repair riverine    | preparedness and  |                             |                         |
|                  | embankment         | readiness         | Implement Palauli le Falefa | Two Million Tree        |
|                  | protection work    | response to       | Integrated Catchment        | Strategy 2015-          |
|                  | upstream           | natural disasters | Strategy and Flood          | 2020                    |
|                  |                    |                   | Management Plan in          |                         |
|                  | Construct levees   | Reduce impact     | conjunction with hazard     | Restoration             |
|                  | to reduce          | from coastal      | Maps and Geomorphologist    | <b>Operational Plan</b> |
|                  | flooding along     | erosion and       | Drainage Infrastructure     | 2016-2020               |
|                  | estuaries and      | natural disasters | Database to inform location |                         |
|                  | coastal streams    |                   | and designs                 | Forestry                |
|                  |                    | Safer villages,   |                             | Management Act          |
|                  | Conduct riparian   | houses and roads  | Utilise environmental and   | 2011                    |
|                  | replanting along   |                   | social safeguards including |                         |
|                  | river channels     | Minimise national | EIAs in screening and       | Vulnerability           |
|                  | and watercourses   | disaster recovery | designing infrastructure    | Assessment of the       |
|                  |                    | expenditure on    | facilities                  | Samoa Road              |
|                  | Install advisory   | damaged           |                             | Network (2016)          |
|                  | edge markers and   | properties and    | Include in budget           | and Road Network        |
|                  | depth markers to   | public assets     | programming CBA, design     | Adaptation              |
|                  | warn vehicle and   | •                 | and construction            | Strategy, LTA           |
|                  | pedestrians at all |                   |                             |                         |
|                  | crossings          |                   | MNRE to zone hazard areas   |                         |
|                  | 0                  |                   | along major watercourses    |                         |
|                  | Government and     |                   | based on flood risk to      |                         |
|                  | Villages to liaise |                   | provide suitable areas for  |                         |
|                  | and collaborate    |                   | riparian revegetation       |                         |
|                  | on processes       |                   |                             |                         |
|                  | needed to protect  |                   | Designation of the CEHZ and |                         |
|                  | riverbanks from    |                   | CFHZ as an "at risk" zone   |                         |
|                  | land clearing and  |                   | with appropriate landuse    |                         |
|                  | developments       |                   | planning controls and       |                         |
|                  | 1                  |                   | restrictions                |                         |
|                  | Responsibility:    |                   |                             |                         |
|                  | MWTI/              |                   |                             |                         |
|                  | LTA/MNRE/          |                   |                             |                         |
|                  | District/ Village  |                   |                             |                         |
| L I              | 2.50 ret, ringe    |                   |                             |                         |

| Install<br>streetlights along<br>the roads where<br>needed for<br>community<br>safety<br>Relocate<br>overhead lines to<br>a more resilient<br>location when   | Maintain<br>electricity<br>supply at all<br>times including<br>natural<br>disasters<br>Avoid accidents<br>from fallen<br>electricity posts   | Monitor distribution<br>networks to avoid<br>overloading poles and<br>contributing to line<br>failures  | EPC Strategic Plan  |
|---|--|---|---|
| being replaced<br>Provide<br>underground<br>lines in the long<br>term<br>Install and<br>connect to solar<br>power supply if<br>made available<br><b>Responsibility:</b><br><b>EPC / MWTI</b> /  |  |   |   |
|   | Donofito   | Cuidalina to agaist with  | Relevant Sector   |
| Dest Solutions  | Denents  | the implementation  | Plans, National<br>Strategies & Policies  |
| Enforce Watershed<br>Management<br>Riparian Zone and<br>Riverbank<br>Encroachment<br>Control and<br>regulate<br>developments<br>around the upland<br>area<br>Adopt agro-<br>forestry and<br>community tree<br>farming practices<br>instead of clear<br>felling as is<br>practiced at<br>present<br>Encourage planting<br>of indigenous<br>species in<br>conjunction with<br>engineered water<br>land drainage<br>action plans | Protects and<br>enhance local<br>species diversity<br>Sustains<br>ecosystem<br>services and<br>functions<br>Reduce<br>contamination of<br>water supply<br>Reduce impact<br>from inland<br>flooding<br>Improve<br>preparedness and<br>readiness<br>response to<br>natural disasters<br>Safer villages,<br>houses and roads  | Develop Integrated<br>Catchment Strategy and<br>Flood Management Plan for<br>Palauli le Falefa District.<br>MNRE to develop zonation<br>strategy for safe areas<br>Develop an integrated land<br>management plan with the<br>aim of reducing any<br>unnecessary actions that<br>may adversely affect the<br>natural habitats and<br>ecosystems of the area<br>MNRE Forestry to advice on<br>appropriate species, depth<br>and density of planting and<br>provide seedlings for<br>different vegetation types<br>suitable to the habitats and<br>planting materials for<br>village<br>Develop and register<br>District/Village bylaws to<br>include penalizing illegal<br>deforestation in district  | Forestry for<br>Sustainable<br>Development Policy<br>Village Fono Act<br>(Amendment Bill<br>2016)<br>CIM Strategy 2015<br>Water and<br>Sanitation Sector<br>Plan<br>SWA 10 Year<br>Investment Plan<br>(2016)<br>Community<br>Engagement Plan  |
|   | streetlights along<br>the roads where<br>needed for<br>community<br>safety<br>Relocate<br>overhead lines to<br>a more resilient<br>location when<br>being replaced<br>Provide<br>underground<br>lines in the long<br>term<br>Install and<br>connect to solar<br>power supply if<br>made available<br><b>Responsibility:</b><br><b>EPC / MWTI/</b><br><b>Villages</b><br><b>Best Solutions</b><br>Enforce Watershed<br>Management<br>Riparian Zone and<br>Riverbank<br>Encroachment<br>Control and<br>regulate<br>developments<br>around the upland<br>area<br>Adopt agro-<br>forestry and<br>community tree<br>farming practices<br>instead of clear<br>felling as is<br>practiced at<br>present<br>Encourage planting<br>of indigenous<br>species in<br>conjunction with<br>engineered water<br>land drainage | streetlights along<br>the roads where<br>needed for<br>community<br>safetyelectricity<br>supply at all<br>times including<br>natural<br>disastersRelocate<br>overhead lines to<br>a more resilient<br>location when<br>being replacedAvoid accidents<br>from fallen<br>electricity postsProvide<br>underground<br>lines in the long<br>termInstall and<br>connect to solar<br>power supply if<br>made availableImstall and<br>connect to solar<br>power supply if<br>made availableResponsibility:<br>EPC /MWTI/<br>VillagesProtects and<br>enhance local<br>species diversityEnforce Watershed<br>Riverbank<br>Encroachment<br>Control and<br>areaProtects and<br>enhance local<br>species diversityReduce<br>contamination of<br>vater supplySustains<br>ecosystem<br>services and<br>functionsAdopt agro-<br>forestry and<br>community tree<br>farming practices<br>instead of clear<br>felling as is<br>practiced at<br>presentImprove<br>preparedness and<br>readinessEncourage planting<br>of indigenous<br>species in<br>conjunction with<br>engineered water<br>land drainageImprove<br>safer villages,<br>houses and roads | streetlights along<br>the roads where<br>needed for<br>community<br>safetyelectricity<br>supply at all<br>times including<br>natural<br>disastersnetworks to avoid<br>overloading poles and<br>contributing to line<br>failuresRelocate<br>overhead lines to<br>a more resilient<br>location when<br>being replacedAvoid accidents<br>from fallen<br>electricity postsInstand<br>electricity postsProvide<br>underground<br>lines in the long<br>termInstall and<br>connect to solar<br>power supply if<br>made availableInstall and<br>connect to solar<br>power supply if<br>set SolutionsGuideline to assist with<br>the implementationEnforce Watershed<br>Management<br>Riparian Zone and<br>RiverbankProtects and<br>ensance local<br>species diversityDevelop Integrated<br>Catchment Strategy and<br>strategy for safe areasAdopt agro-<br>forestry and<br>community tree<br>farming practiced<br>instead of clear<br>feling as is<br>practiced at<br>preateded<br>farming practices<br>instead of clear<br>feling as is<br>practiced at<br>preateded<br>foodingPevelop an integrated land<br>management plan with the<br>amagement plan with the<br>amagement plan with the<br>and ensity of planting and<br>preparedness and<br>from inland<br>finctionsAdopt agro-<br>forestry and<br>contamination of<br>my adversely affect the<br>natural disastersMNRE Forestry to advice on<br>appropriate species, depth<br>and density of planting and<br>preparedness and<br>readiness<br>species in<br>conjunction with<br>Safer villages,<br>houses and roadsDevelop and register<br>planting materials for<br>village |

| and boreholes in progress         |                     |
|-----------------------------------|---------------------|
| 1 0                               | of district/village |
|                                   | programmes          |
| Limit land                        |                     |
| clearance and                     |                     |
| agricultural                      |                     |
| development                       |                     |
| around SWA                        |                     |
| intake and                        |                     |
| boreholes                         |                     |
|                                   |                     |
| Conduct campaign                  |                     |
| for public                        |                     |
| awareness and                     |                     |
| establish a                       |                     |
| "neighborhood<br>watch" agreement |                     |
| with district to                  |                     |
| monitor and                       |                     |
| report on illegal                 |                     |
| deforestation                     |                     |
|                                   |                     |
| District/village to               |                     |
| help promote the                  |                     |
| development of                    |                     |
| the agroforestry                  |                     |
| sector by                         |                     |
| encouraging<br>relevant land use  |                     |
| practice and                      |                     |
| where possible                    |                     |
| resolve any                       |                     |
| associated land                   |                     |
| disputes                          |                     |
|                                   |                     |
| District and                      |                     |
| village to support                |                     |
| SWA water                         |                     |
| rationing<br>programmes           |                     |
| during times of                   |                     |
| drought                           |                     |
|                                   |                     |
| District to support               |                     |
| SWA efforts at                    |                     |
| exploratory                       |                     |
| intakes and                       |                     |
| boreholes in<br>district          |                     |
|                                   |                     |
| Continue ban of                   |                     |
| destructive fishing               |                     |
| practices including               |                     |
| sand mining and                   |                     |
| introduce village                 |                     |
| ban on rubbish                    |                     |
| dumping in                        |                     |
| waterways and<br>watercourses     |                     |
| (immediate fluvial                |                     |
| hazard zones)                     |                     |

| Soft coastal<br>protection<br>measures<br>needed for most<br>vulnerable areas | 0  | Soft coastal<br>protection<br>measures will<br>support and<br>strengthen<br>existing and new<br>infrastructure<br>along the coast<br>Reduce impact | Develop an integrated land<br>management plan for<br>Palauli le Falefa district<br>with the aim of reducing<br>any unnecessary actions<br>that may adversely affect<br>the natural habitats and<br>ecosystems of the area<br>MAF to assist in<br>establishment of pilot sites<br>to trial climate ready plant<br>varieties<br>MNRE Forestry, DEC and<br>MAF to collaborate on<br>supply of climate resilient<br>crops | NESP 2017-2021<br>Two Million Tree<br>Planting Strategy<br>2015-2020<br>Restoration<br>Operational Plan<br>2016-2020<br>Forestry<br>Management Act<br>2011         |
|---|--|--|---|--|
|   | needed<br>Responsibility:<br>MNRE/<br>MAF/Villages   |  |   |  |
| Heritage and<br>tourism site  | Encourage planting<br>of indigenous<br>species in<br>conjunction with<br>engineered water<br>land drainage<br>action plans<br>Formally declare<br>site as reserve<br>Responsibility:<br>MNRE//MWCSD/<br>Villages/CSSP<br>/NGO/ | Protects and<br>enhance local<br>species diversity<br>Sustains<br>ecosystem<br>services and<br>functions   | Develop an integrated land<br>management plan with the<br>aim of reducing any<br>unnecessary actions that<br>may adversely affect the<br>natural habitats and<br>ecosystems of the area<br>MNRE Forestry to advice on<br>appropriate species, depth<br>and density of planting and<br>provide seedlings for<br>different vegetation types<br>suitable to the habitats and<br>planting materials for<br>village        | NESP 2017-2021<br>Village Fono Act<br>(Amendment Bill<br>2016)<br>CIM Strategy 2015<br>Community<br>Engagement Plan<br>Village Fono<br>Act(Amendment<br>Bill 2016) |
|   |  |  | Develop and register<br>District/Village bylaws to<br>include protection of<br>park/reserve<br>Utilize Sui o Nu'u monthly<br>meetings to monitor<br>progress of district/village<br>reserve/park programmes   |  |

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

Gataivai Village Map



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

Data Source: Ministry of Natural Resource and Environment, Samoa





## 7. Gautavai Village Interventions

### **CIM Plan Solutions**

|  | Solutions   |  |   | _   |
|--|---|--|---|---|
| Infrastructur<br>e   | Best Solutions  | Benefits   | Guideline to assist with the implementation   | Relevant National,<br>Sector Plans and<br>Strategies              |
| Village houses,<br>Churches,<br>School and<br>private<br>residences<br>located in high<br>risk hazard<br>zones | Relocate outside of high<br>risk hazard zones when<br>building/infrastructure<br>requires replacement<br>Investments within the<br>hazard zones to adopt<br>appropriate mitigation<br>measures<br>Conduct awareness<br>raising campaign on flood<br>resilient building<br>practices and designs for<br>at risk communities living<br>in and near high risk<br>hazard zones<br>Design infrastructure to<br>take into account the<br>immediate hazard zones;<br>for example, raise floor<br>levels of houses in flood<br>prone areas<br>Develop landuse planning<br>and development controls<br>to restrict developments<br>within high risk hazard<br>zones such as CEHZ and<br>CFHZ<br>Families and village to<br>limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm water<br>surges<br><b>Responsibility:</b><br><b>Village / Families</b><br><b>/MWTI/ MNRE/</b><br><b>MWCSD</b> | Minimise<br>expenditure on<br>damaged<br>properties and<br>personal assets<br>Safer villages,<br>houses and roads<br>Increases<br>awareness for<br>insurance | Planning provisions to<br>be guided by the<br>Planning and Urban<br>Management Act 2004<br>Enforcement of National<br>Building Code 2017<br>Encourage insurance of<br>significant investments<br>and assets within hazard<br>zones<br>Utilise hazard maps and<br>Geomorphologist<br>Drainage Infrastructure<br>Database to determine<br>safe areas for relocation<br>purposes<br>Designation of the IFHZ,<br>CEHZ and CFHZ as an "at<br>risk" zone with<br>appropriate landuse<br>planning controls and<br>restrictions | CIM Strategy 2015<br>[Draft] Samoa<br>Relocation Strategy<br>2016 |
| Drainage<br>systems to be<br>improved in<br>high risk areas<br>of South  | Assess and upgrade<br>culverts on main South<br>Central Coast road<br>especially at junctions<br>with access roads  | Improves climate<br>resilience of<br>infrastructure<br>resilience and rate<br>of response and  | Utilise hazard maps and<br>Geomorphologist<br>Drainage Infrastructure<br>Database to inform<br>design   | CIM Strategy 2015<br>NISP 2011 KESO 5<br>TSP 2014-2019            |
| Central Coast<br>Road  | (VaialaUta Access Road<br>and Gautavai Access<br>Road <sup>7</sup> ) sitting within<br>combined hazard zones  | recovery to<br>natural hazards<br>and disasters  | Use existing information<br>for guidance but not<br>limited to:   | Goal 2 KO 1<br>Community Sector<br>Plan                           |

<sup>7</sup>Track only. Not in LTA RRM. *Source*: LTA Samoa Infrastructure Asset Management Database

|                | (IFHZ, CEHZ, CFHZ)– in                        | Encourages coastal          | "Vulnerability Assessment         |                    |
|----------------|---|-----------------------------|-----------------------------------|--------------------|
|                | accordance with                               | families to relocate        | of the Samoa Road                 |                    |
|                | Vulnerability Assessment                      | inland                      | Network (2017)";                  |                    |
|                | of the Samoa Road                             |                             | "Review of National Road          |                    |
|                | Network                                       | Maintains lifeline          | Standards in Samoa                |                    |
|                | recommendations                               | access for all of           | (2016)"; "Samoa Code of           |                    |
|                |   | Upolu                       | Environmental Practice            |                    |
|                | Implement national                            | <b>N</b> (1) (1) (1)        | (2007)"                           |                    |
|                | standards for culverts                        | Minimises national          | (2007)                            |                    |
|                | and drains to facilitate                      | disaster recovery           | Develop Integrated                |                    |
|                | the overland flow of                          | expenditure on              | Catchment Strategy and            |                    |
|                | storm water and reduce                        | damaged                     | Flood Management Plan             |                    |
|                | flooding                                      | properties, public          | for Palauli le Falefa District    |                    |
|                | Introduce culverts in                         | and private assets          |                                   |                    |
|                | wetland areas to                              |                             | Undertake a Cost Benefit          |                    |
|                | improve tidal flow and                        |                             | Analysis to weigh options         |                    |
|                | fish passage in the                           |                             | for funding                       |                    |
|                | wetland area                                  |                             |                                   |                    |
|                |   |                             | Utilise environmental             |                    |
|                | Implement regular                             |                             | and social safeguards             |                    |
|                | drainage inspection and                       |                             | including EIAs in                 |                    |
|                | maintenance                                   |                             | screening and designing           |                    |
|                |   |                             | built environment                 |                    |
|                | Government to regulate                        |                             | infrastructure projects           |                    |
|                | developments and illegal                      |                             | for Palauli le Falefa<br>district |                    |
|                | rubbish dumping near                          |                             | uistrict                          |                    |
|                | and around waterways                          |                             | Include in budget                 |                    |
|                | and drainage                                  |                             | programming CBA,                  |                    |
|                |   |                             | design and construction           |                    |
|                | Responsibility: LTA/                          |                             | design and construction           |                    |
|                | <i>MWTI/MNRE/MWCSD<br/>/Village/ Families</i> |                             | Develop and register              |                    |
|                | /village/ rumilies                            |                             | District/Village bylaws to        |                    |
|                |   |                             | include maintenance of            |                    |
|                |   |                             | drainages and illegal             |                    |
|                |   |                             | rubbish dumping into              |                    |
|                |   |                             | waterways                         |                    |
| Flood          | Upgrade waterways                             | Improve                     | Conduct a full                    | CIM Strategy 2015  |
| protection     |   | infrastructure              | catchment management,             |                    |
| measures for   | Upgrade bridge                                | resilience and rate         | drainage analysis and             | NISP 2011 KESO 5   |
| fords,         |   | of recovery                 | geotechnical                      |                    |
| watercourses   | Upgrade or repair                             | T                           | engineering survey and            | Two Million Tree   |
| and riverbanks | riverine embankment<br>protection work        | Improve<br>preparedness and | use its<br>recommendations        | Strategy 2015-2020 |
|                | upstream                                      | readiness response          | during the planning               | Restoration        |
|                | up5ti cuili                                   | to natural disasters        | phase                             | Operational Plan   |
|                | Construct levees to                           |                             | r ·······                         | 2016-2020          |
|                | reduce flooding along                         | Reduce impact               | Implement Palauli le Falefa       |                    |
|                | estuaries and coastal                         | from coastal                | Integrated Catchment              | Vulnerability      |
|                | streams                                       | erosion and natural         | Strategy and Flood                | Assessment of the  |
|                |   | disasters                   | Management Plan in                | Samoa Road         |
|                | Conduct riparian                              |                             | conjunction with hazard           | Network (2016)     |
|                | replanting along river                        | Safer villages,             | Maps and                          | and Road Network   |
|                | channels and                                  | houses and roads            | Geomorphologist Drainage          | Adaptation         |
|                | watercourses                                  |                             | Infrastructure Database to        | Strategy, LTA      |
|                |   | Minimise national           | inform location and               |                    |
|                | Install advisory edge                         | disaster recovery           | designs                           |                    |
|                | markers and depth                             | expenditure on              |                                   |                    |
|                | markers to warn vehicle                       | damaged                     | Utilise environmental             |                    |
|                | and pedestrians at all                        | properties and              | and social safeguards             |                    |
|                | crossings                                     | public assets               | including EIAs in                 |                    |

|                |                            |                                    | screening and designing                    |                       |
|----------------|----------------------------|------------------------------------|--|-----------------------|
|                | Government and Villages    |                                    | infrastructure facilities                  |                       |
|                | to liaise and collaborate  |                                    |  |                       |
|                | on processes needed to     |                                    | Include in budget                          |                       |
|                | protect riverbanks from    |                                    | programming CBA, design                    |                       |
|                | land clearing and          |                                    | and construction                           |                       |
|                | developments               |                                    |  |                       |
|                | *                          |                                    | MNRE to zone hazard                        |                       |
|                | Responsibility: MWTI/      |                                    | areas along major                          |                       |
|                | LTA/MNRE/ District/        |                                    | watercourses based on                      |                       |
|                | Village                    |                                    | flood risk to provide                      |                       |
|                | J                          |                                    | suitable areas for riparian                |                       |
|                |                            |                                    | revegetation                               |                       |
|                |                            |                                    |  |                       |
|                |                            |                                    | Designation of the CEHZ                    |                       |
|                |                            |                                    | and CFHZ as an "at risk"                   |                       |
|                |                            |                                    | zone with appropriate                      |                       |
|                |                            |                                    | landuse planning controls                  |                       |
| El a statis it | Durani da cura da cura da  | Maintain                           | and restrictions                           | EDC Church i Dl       |
| Electricity    | Provide underground        | Maintain                           | Monitor distribution                       | EPC Strategic Plan    |
| supply         | lines in the long term     | electricity supply<br>at all times | networks to avoid<br>overloading poles and | NISP                  |
|                | Install and connect power  | including natural                  | contributing to line                       | 10101                 |
|                | supply for inland          | disasters                          | failures                                   |                       |
|                | residents                  | uisasters                          | lanures                                    |                       |
|                | residents                  | Avoid accidents                    |  |                       |
|                | Relocate overhead lines to | from fallen                        |  |                       |
|                | a more resilient location  | electricity posts.                 |  |                       |
|                | when being replaced        | ciccularly posts.                  |  |                       |
|                | C I                        |                                    |  |                       |
|                | 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/<br>Village/Families  |                                    |  |                       |
| Natural        | Best Solutions             | Benefits                           | Guideline to assist with                   | Relevant Sector       |
| Resources and  | Dest Solutions             | Denents                            |  | Plans, National       |
| Environment    |                            |                                    | -  | Strategies & Policies |
| Upland Forest  | Enforce Watershed          | Protects and                       | Develop Integrated                         | Forestry for          |
| and Catchment  | Management Riparian        | enhance local                      | Catchment Strategy and                     | Sustainable           |
| Areas          | Zone and Riverbank         | species diversity                  | Flood Management Plan                      | Development Policy    |
|                | Encroachment Control and   | · · ·                              | for Palauli le Falefa                      | ×                     |
|                | regulate developments      | Sustains ecosystem                 | District. MNRE to develop                  | Village Fono Act      |
|                | around the upland area     | services and                       | zonation strategy for safe                 | (Amendment Bill       |
|                |                            | functions                          | areas                                      | 2016)                 |
|                | Adopt agro-forestry and    |                                    |  |                       |
|                | community tree farming     | Reduce                             | Develop an integrated                      | CIM Strategy 2015     |
|                | practices instead of clear | contamination of                   | land management plan                       | 147 . 1               |
|                | felling as is practiced at | water supply                       | with the aim of reducing                   | Water and             |
|                | present                    |                                    | any unnecessary actions                    | Sanitation Sector     |
|                |                            | Reduce impact from                 | that may adversely affect                  | Plan                  |
|                | Encourage planting of      | inland flooding                    | the natural habitats and                   |                       |

| indigenous species in      |                      | ecosystems of the area     | SWA 10 Year     |
|----------------------------|----------------------|----------------------------|-----------------|
| conjunction with           | Improve              |                            | Investment Plan |
| engineered water land      | preparedness and     | MNRE Forestry to advice    | (2016)          |
| drainage action plans      | readiness response   | on appropriate species,    | (_0_0)          |
| dramage action plans       | to natural disasters | depth and density of       | Community       |
|                            | to natural disasters |                            |                 |
| Regulate developments      | <b>a</b> ( ) 11      | planting and provide       | Engagement Plan |
| around catchment area,     | Safer villages,      | seedlings for different    |                 |
| SWA intake and             | houses and roads     | vegetation types suitable  |                 |
| boreholes in district      |                      | to the habitats and        |                 |
|                            |                      | planting materials for     |                 |
| Limit land clearance and   |                      | village                    |                 |
| agricultural development   |                      |                            |                 |
| around SWA intake and      |                      | Develop and register       |                 |
|                            |                      |                            |                 |
| boreholes                  |                      | District/Village bylaws to |                 |
|                            |                      | include penalizing illegal |                 |
| Conduct campaign for       |                      | deforestation in district  |                 |
| public awareness and       |                      | lands                      |                 |
| establish a                |                      |                            |                 |
| "neighbourhood watch"      |                      | Utilise Sui o Nu'u monthly |                 |
| agreement with district    |                      | meetings to monitor        |                 |
| to monitor and report on   |                      | progress of                |                 |
|                            |                      |                            |                 |
| illegal deforestation      |                      | district/village forestry  |                 |
|                            |                      | programmes                 |                 |
| District/village to help   |                      |                            |                 |
| promote the development    |                      |                            |                 |
| of the agroforestry sector |                      |                            |                 |
| by encouraging relevant    |                      |                            |                 |
| land use practice and      |                      |                            |                 |
| where possible resolve     |                      |                            |                 |
| any associated land        |                      |                            |                 |
| disputes                   |                      |                            |                 |
| uisputes                   |                      |                            |                 |
| District and village to    |                      |                            |                 |
|                            |                      |                            |                 |
| support SWA water          |                      |                            |                 |
| rationing programmes       |                      |                            |                 |
| during times of drought    |                      |                            |                 |
|                            |                      |                            |                 |
| District to support SWA    |                      |                            |                 |
| efforts at exploratory     |                      |                            |                 |
| intakes and boreholes in   |                      |                            |                 |
| district                   |                      |                            |                 |
|                            |                      |                            |                 |
| Continue ban of            |                      |                            |                 |
| destructive fishing        |                      |                            |                 |
| practices including sand   |                      |                            |                 |
| mining and introduce       |                      |                            |                 |
|                            |                      |                            |                 |
| village ban on rubbish     |                      |                            |                 |
| dumping in waterways       |                      |                            |                 |
| and watercourses           |                      |                            |                 |
| (immediate fluvial hazard  |                      |                            |                 |
| zones)                     |                      |                            |                 |
|                            |                      |                            |                 |
| Fence domestic and         |                      |                            |                 |
| invasive animals to        |                      |                            |                 |
| protect young trees        |                      |                            |                 |
| r                          |                      |                            |                 |
| Responsibility: MNRE/      |                      |                            |                 |
| SWA MWCSD/ District        |                      |                            |                 |
| /Village /CSSP             |                      |                            |                 |
| / villuge / CSSF           |                      |                            |                 |

| Soft coastal<br>protection<br>measures<br>needed for<br>most<br>vulnerable<br>areas          | Plant native species along<br>coastal areas to strengthen<br>existing seawall and to<br>reduce coastal erosion and<br>landslips; Talie, Fetau, Toa,<br>Togatogo are known to<br>have greater resilience to<br>natural disasters and<br>changing climate<br>conditions<br>To act as an effective wave<br>barrier, a minimum<br>distance of 200m of<br>vegetation is needed<br><b>Responsibility: MNRE</b><br><b>Villages</b>   | Soft coastal<br>protection<br>measures will<br>support and<br>strengthen<br>existing and new<br>infrastructure<br>along the coast<br>Reduce impact from<br>coastal erosion and<br>natural disasters<br>Implements an<br>Ecosystem Based<br>Approach   | Develop an integrated<br>land management plan<br>for Palauli le Falefa<br>district with the aim of<br>reducing any<br>unnecessary actions that<br>may adversely affect the<br>natural habitats and<br>ecosystems of the area<br>MAF to assist in<br>establishment of pilot<br>sites to trial climate ready<br>plant varieties<br>MNRE Forestry, DEC and<br>MAF to collaborate on<br>supply of climate<br>resilient crops | Two Million Tree<br>Planting Strategy<br>2015-2020<br>Restoration<br>Operational Plan<br>2016-2020<br>Forestry<br>Management Act<br>2011 |
|--|---|---|--|--|
| Governance   | Best Solutions  | Benefits  | Guideline to assist<br>with the<br>implementation  | Relevant Sector<br>Plans, National<br>Strategies &<br>Policies   |
| Strengthen the<br>governance of<br>natural<br>resources and<br>land use<br>through<br>Bylaws | Update and/or develop<br>bylaws to manage the use<br>of natural resources, and<br>to control land use<br>impacts; such as drainage<br>maintenance, rubbish<br>dumping, sand mining,<br>stray animals and<br>unregulated<br>developments in water<br>catchment areas and near<br>boreholes.<br>Collaborate with Sui o<br>Nuu to monitor the use of<br>and impact on natural<br>resources<br>Facilitate continuous<br>awareness raising<br>programs with the villages<br><i>Responsibility: MWCSD</i><br>/Village | Strengthen<br>implementation of<br>all national sector<br>plans<br>Strengthen<br>monitoring of all<br>National Acts,<br>Regulation,<br>Strategies, Plans<br>and Policies<br>Improve ability of<br>communities to<br>adapt, respond and<br>recover quickly in<br>the long term<br>Improve<br>accountability and<br>enabling<br>environment of<br>communities | Develop and register<br>district/village bylaw to<br>protect all district/<br>village and government<br>assets, environment,<br>livelihood and food<br>security especially<br>activities affecting water<br>catchment areas and<br>coastline<br>Utilise Sui o Nu'u monthly<br>meetings to monitor<br>progress of district/village<br>bylaws  | Village Fono Act<br>(Amendment Bill<br>2016)<br>Community<br>Sector Plan<br>Community<br>Development Plan<br>2016-2021                   |

### Gautavai Village Map



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

Data Source: Ministry of Natural Resource and Environment, Samoa



# 8. Papa Puleia Village Interventions

### **CIM Plan Solutions**

| Vilage houses,<br>churches, school<br>and other village<br>assets located<br>high risk hazard<br>zonesRelocate outside of<br>hurches, school<br>assets located<br>high risk hazard<br>zones when<br>building/infrastructur<br>replacement<br>mitigation measures<br>Investments within<br>the hazard zones to<br>adopt apropriate<br>mitigation measuresMinimise expenditure<br>on damaged<br>assetsDevelop an Integrated<br>Cathement and Flood<br>Palauli le Falefa District;<br>MNE to develop zonation<br>strategy for safe areas<br>utilise hazardMational, Sector<br>Plans and<br>CodeUlige beau<br>conduct awareness<br>and designs for at<br>risk communities<br>and designs for at<br>risk communities<br>to ake into account<br>the immediate<br>hazard zones; for<br>example, raise floorMitigate potential<br>damage from coastal<br>accommodating the<br>hazardMitigate potential<br>damage from coastal<br>accommodating the<br>hazardDesign infrastructure<br>to take into account<br>the immediate<br>hazard zones; for<br>example, raise floorImprove recovery to<br>create more resilient<br>inform designsEnforcement of National<br>assets within hazard zones<br>and readiness<br>and roadsDevelop landuse<br>planning and<br>development controls<br>to restrict<br>development and<br>development and<br>development and<br>development and<br>development and<br>development and<br>development and<br>development and<br>flood gross<br>such as CEIVZ and<br>CHIZFindical and<br>assetsIntegrates<br>assetsDevelop landuse<br>planning and<br>development and<br>flooding and storm<br>water surgesPeneses<br>and readiness<br>and roadsIntegrates<br>assets within<br>appropriate<br>and roadsIntegrate<br>assets within<br>appropriate<br>and readiness<br>and roadsIntegrate<br>asset within<  | Infrastructure | Best Solutions         | Benefits             | Guideline to assist with   | Relevant          |
|--|----------------|------------------------|----------------------|----------------------------|-------------------|
| village houses<br>turches, school<br>and other village<br>assets located<br>high risk hazard<br>zones when<br>sasets located<br>high risk hazard<br>zones when<br>somesMinimise expenditure<br>on damaged<br>or damaged<br>or portries & personal<br>assets<br>replacementDevelop an Integrate<br>Conduct awareness<br>resilient<br>mitiggation measures<br>conduct awareness<br>raising campaign on<br>flood resilient<br>building practices<br>and designs for at<br>risk communities<br>living in and near<br>risk communities<br>living in and near<br>risk communities<br>living in firk structure<br>to take into account<br>the immediate<br>hazard zones; ioDevelop an Integrate<br>conduct awareness<br>conduct awareness<br>raising campaign on<br>flood resilient<br>building practices<br>and designs for at<br>risk communities<br>living in and near<br>risk communities<br>living in and near<br>ones setDevelop and the provide<br>mitiggation measures<br>ling row recovery to<br>to<br>to take into account<br>the immediate<br>hazard zones;<br>sonesDevelop infrastructure<br>to take into account<br>the immediate<br>hazard zones; io<br>pevelop landuse<br>planning and<br>development controls<br>to restrict<br>development suffing and<br>development controls<br>to restrict<br>development controls<br>to restrict<br>development controls<br>to restrict<br>development suffing and<br>development controls<br>to restrict<br>development suffing and<br>development suffing and<br>development suffing and<br>development suffing and<br>development suffing and<br>development suffing and<br>development controls<br>to restrict<br>development suffing and<br>development controls<br>to restrict<br>development suffing and<br>development s  |                |                        |                      | the implementation         |                   |
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| and other village<br>saxests located<br>high risk hazard<br>zones when<br>saxests or and<br>properties & personal<br>high risk hazard<br>zones when<br>saxests or and<br>relacement<br>high risk hazard<br>nore equires<br>relacement<br>high risk hazard zones to<br>coduct awareness<br>raising campaign on<br>hood resilient<br>high risk hazard<br>rok communities<br>raising campaign<br>hood resilient<br>high risk hazard<br>rok communities<br>response to natural<br>living in an near<br>high risk hazard<br>zones<br>Design infrastructure<br>to take into account<br>the immediate<br>hazard<br>high risk hazard<br>zones<br>Design infrastructure<br>to take into account<br>the immediate<br>such as CEHZ and<br>CHZ<br>High risk hazard<br>response to natural<br>disasters<br>and readiness<br>response to natural<br>disasters<br>and readiness<br>parporpate landuse<br>planning controls and<br>restrictions<br>building code 2017<br>Building Code 2017<br>Building Code 2017<br>Building Code Zo17<br>Building Code Zo17<br>B   |                |                        | -                    |                            | 0                 |
| assets located<br>high risk hazard<br>zones<br>high risk hazard zones<br>high risk hazard<br>zones<br>high risk hazard zones<br>high risk hazard zone<br>high risk hazard hig |                | _                      |                      |                            | Code              |
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| example, raise floor<br>levels of houses in<br>flood prone areasDevelop landuse<br>planning and<br>development controls<br>to restrict<br>developments within<br>high risk hazard zones<br>such as CEHZ and<br>CFHZFamilies and village<br>to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surgesWhere reclamations<br>are proposed,<br>Government and<br>district to manage   |                |                        |                      |                            |                   |
| levels of houses in<br>flood prone areasDevelop landuse<br>planning and<br>development controls<br>to restrict<br>developments within<br>high risk hazard zones<br>such as CEHZ and<br>CFHZFamilies and village<br>to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surgesWhere reclamations<br>are proposed,<br>Government and<br>district to manage   |                |                        |                      |                            |                   |
| flood prone areasDevelop landuse<br>planning and<br>development controls<br>to restrict<br>developments within<br>high risk hazard zones<br>such as CEHZ and<br>CFHZFamilies and village<br>to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surgesWhere reclamations<br>are proposed,<br>Government and<br>district to manage  |                |                        |                      |                            |                   |
| planning and<br>development controls<br>to restrict<br>developments within<br>high risk hazard zones<br>such as CEHZ and<br>CFHZFamilies and village<br>to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surgesWhere reclamations<br>are proposed,<br>Government and<br>district to manage  |                |                        |                      |                            |                   |
| development controls<br>to restrict<br>developments within<br>high risk hazard zones<br>such as CEHZ and<br>CFHZ<br>Families and village<br>to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surges<br>Where reclamations<br>are proposed,<br>Government and<br>district to manage  |                |                        |                      |                            |                   |
| to restrict<br>developments within<br>high risk hazard zones<br>such as CEHZ and<br>CFHZ<br>Families and village<br>to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surges<br>Where reclamations<br>are proposed,<br>Government and<br>district to manage  |                |                        |                      |                            |                   |
| developments within<br>high risk hazard zones<br>such as CEHZ and<br>CFHZFamilies and village<br>to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surgesWhere reclamations<br>are proposed,<br>Government and<br>district to manage   |                | -                      |                      |                            |                   |
| high risk hazard zones   such as CEHZ and   CFHZ   Families and village   to limit building and   developing on natural   overland flow paths   exacerbating inland   flooding and storm   water surges   Where reclamations   are proposed,   Government and   district to manage   |                |                        |                      |                            |                   |
| CFHZ   Families and village   to limit building and   developing on natural   overland flow paths   exacerbating inland   flooding and storm   water surges   Where reclamations   are proposed,   Government and   district to manage   |                | high risk hazard zones |                      |                            |                   |
| to limit building and<br>developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surges<br>Where reclamations<br>are proposed,<br>Government and<br>district to manage  |                |                        |                      |                            |                   |
| developing on natural<br>overland flow paths<br>exacerbating inland<br>flooding and storm<br>water surges<br>Where reclamations<br>are proposed,<br>Government and<br>district to manage   |                |                        |                      |                            |                   |
| overland flow paths   exacerbating inland   flooding and storm   water surges   Where reclamations   are proposed,   Government and   district to manage   |                |                        |                      |                            |                   |
| exacerbating inland<br>flooding and storm<br>water surges<br>Where reclamations<br>are proposed,<br>Government and<br>district to manage   |                |                        |                      |                            |                   |
| flooding and storm<br>water surges<br>Where reclamations<br>are proposed,<br>Government and<br>district to manage  |                |                        |                      |                            |                   |
| Where reclamations<br>are proposed,<br>Government and<br>district to manage  |                | flooding and storm     |                      |                            |                   |
| are proposed,<br>Government and<br>district to manage  |                | water surges           |                      |                            |                   |
| Government and<br>district to manage   |                |                        |                      |                            |                   |
| district to manage   |                |                        |                      |                            |                   |
|  |                |                        |                      |                            |                   |
|  |                | processes by requiring |                      |                            |                   |

|                 | · ·                                      |   |   | I                 |
|-----------------|--|---|---|-------------------|
|                 | villagers to get the                     |   |   |                   |
|                 | appropriate permits                      |   |   |                   |
|                 | and consent                              |   |   |                   |
|                 |  |   |   |                   |
|                 | Responsibility:                          |   |   |                   |
|                 | Village / Families                       |   |   |                   |
|                 | /MWTI/ MNRE                              |   |   |                   |
| Upgrade access/ | Assess and upgrade                       | Improve                                 | Utilise hazard maps and                               | CIM Strategy 2015 |
| work roads to   | Papa track roads as                      | infrastructure                          | Geomorphologist                                       |                   |
| facilitate      | potential escape                         | resilience and rate of                  | Drainage Infrastructure                               | NISP2011 KESO 5   |
| relocation of   | route and to                             | recovery                                | Database to inform                                    |                   |
| houses away     | encourage                                |   | location and designs                                  | TSP2014-2019      |
| from hazard     | relocation away                          | Improve preparedness                    |   | Goal 2 KO 1       |
| zones           | from hazard zones                        | and readiness                           | Develop an Integrated                                 |                   |
|                 |  | response to natural                     | Flood Management Plan                                 | Community Sector  |
|                 | Upgrade to include                       | disasters                               | for Palauli le Falefa                                 | Plan              |
|                 | adequate sized                           |   | District. MNRE to develop                             |                   |
|                 | culverts to facilitate                   | Reduce impact from                      | zonation strategy for safe                            | Village Fono Act  |
|                 | the overland flow of                     | coastal erosion and                     | areas   | (Amendment Bill   |
|                 | storm water                              | natural disasters                       |   | 2016)             |
|                 | exacerbating river                       |   | Develop an integrated                                 |                   |
|                 | overruns, and to                         | Safer villages, houses                  | land management plan                                  |                   |
|                 | reduce flooding onto<br>main roads and   | and roads                               | with the aim of reducing                              |                   |
|                 |  | Minimire netional                       | any unnecessary actions                               |                   |
|                 | village lands                            | Minimise national                       | that may adversely affect<br>the natural habitats and |                   |
|                 | Imploment regular                        | disaster recovery                       |   |                   |
|                 | Implement regular<br>drainage inspection | expenditure on                          | ecosystems of the area                                |                   |
|                 | and maintenance                          | damaged properties<br>and public assets | Include in budget                                     |                   |
|                 | and mannenance                           | and public assets                       | programming CBA, design                               |                   |
|                 | Village to restrict                      |   | and construction. Road                                |                   |
|                 | rubbish dumping into                     |   | design standard to take                               |                   |
|                 | waterways and                            |   | account of forecast                                   |                   |
|                 | conduct regular                          |   | increased rainfall                                    |                   |
|                 | clearance of rubbish                     |   | intensity   |                   |
|                 | behind homes                             |   |   |                   |
|                 |  |   | Designation of the IFHZ,                              |                   |
|                 | Village to regulate                      |   | CEHZ and CFHZ as an "at                               |                   |
|                 | developments near                        |   | risk" zone with                                       |                   |
|                 | and around road                          |   | appropriate landuse                                   |                   |
|                 | shoulders of all access                  |   | planning controls and                                 |                   |
|                 | roads                                    |   | restrictions  |                   |
|                 |  |   |   |                   |
|                 | Enforce                                  |   | Develop and register                                  |                   |
|                 | environmental                            |   | Village bylaws to include                             |                   |
|                 | safeguards                               |   | maintenance of drainages                              |                   |
|                 |  |   | and illegal rubbish                                   |                   |
|                 | Where reclamations                       |   | dumping into waterways                                |                   |
|                 | are proposed,                            |   | Heiling Cui a Mula an and I                           |                   |
|                 | Government and                           |   | Utilise Sui o Nu'u monthly                            |                   |
|                 | district to manage                       |   | meetings to monitor                                   |                   |
|                 | processes by requiring                   |   | progress of village                                   |                   |
|                 | villagers to get the                     |   | cleanup and awareness                                 |                   |
|                 | appropriate permits                      |   | programmes  |                   |
|                 | and consent                              |   |   |                   |
|                 | Responsibility: LTA/                     |   |   |                   |
|                 | MWTI/ MNRE/                              |   |   |                   |
|                 | District/ Village                        |   |   |                   |
|                 | /Families/CSSP                           |   |   |                   |
| L               | /14/111105/0551                          |   |   |                   |

|                                      | <u>т                                    </u>   |  |  | 1                                   |
|--------------------------------------|--|--|--|-------------------------------------|
| Electricity supply                   | lines in the long term<br>Install and connect<br>power supply for<br>inland residents<br>Relocate overhead<br>lines to a more<br>resilient location<br>when being replaced<br>Install streetlights<br>along the roads<br>where needed for<br>community safety<br>Install and connect to<br>solar power supply if<br>made available | Maintain electricity<br>supply at all times<br>including natural<br>disasters<br>Avoid accidents from<br>fallen electricity posts. | Monitor distribution<br>networks to avoid<br>overloading poles and<br>contributing to line<br>failures | EPC Strategic Plan                  |
|                                      | Families to limit  |  |  |                                     |
|                                      | building and developments near   |  |  |                                     |
|                                      | electricity posts  |  |  |                                     |
|                                      | Responsibility:  |  |  |                                     |
|                                      | EPC/ MWTI/<br>Village /Families  |  |  |                                     |
| Natural                              | Best Solutions   | Benefits   | Guideline to assist with   | Relevant Sector                     |
| Resources and                        |  |  |  | Plans, National                     |
| Environment                          |  | In many a dampatian  |  | Strategies & Policie                |
| Village pool<br>(Vailala) located in | Village pool is currently<br>in a poor state with an   | Increase adaptation<br>during drought  | Utilise Hazard Maps and<br>Geomorphologist findings  | CIM Strategy 2015                   |
| high risk hazard                     | assessment needed for  | periods  | for planning purposes  | Water and                           |
| zones (coastal                       | options to either  |  |  | Sanitation Sector                   |
| erosion and<br>flooding from         | rejuvenate or find a<br>new site depending on  | Improve health and<br>sanitation   | MNRE Water &<br>Sanitation to conduct  | Plan                                |
|                                      | the location of springs.   | Saliitatioli   | water testing and  | Community                           |
| wave impacts and                     | ine recurren er opringer   | Reduce contamination   | analysis of village pool   | Engagement Plan                     |
| storm surges)                        | Test the quality of the  | of water supply  | prior to any intervention  | Villago Fono Act                    |
|                                      | water source before<br>any further investment  |  | UpdateVillage bylaws to  | Village Fono Act<br>(Amendment Bill |
|                                      | on the pool is   |  | include managing and   | 2016)                               |
|                                      | undertaken (eg:  |  | maintaining village  |                                     |
|                                      | fence/repair works)  |  | natural resources  |                                     |
|                                      |  |  | Utilise Sui o Nu'u monthly   |                                     |
|                                      | Responsibility: CSSP/  |  | meetings to monitor  |                                     |
|                                      | NGOs/MNRE/Villages   |  | progress of village<br>programmes and  |                                     |
|                                      |  |  | responsibilities   |                                     |
| Upland Forest and                    |  | Protects and enhance   | Develop Integrated   | Forestry for                        |
| Catchment Areas                      | Management Riparian<br>Zone and Riverbank  | local species diversity  | Catchment Strategy and   | Sustainable                         |
|                                      | Encroachment Control   | Sustains ecosystem   | Flood Management Plan for<br>Palauli le Falefa District.   | Development Policy                  |
|                                      | and regulate   | services and functions   | MNRE to develop zonation   | Village Fono Act                    |
|                                      | developments around  |  | strategy for safe areas  | (Amendment Bill                     |
|                                      | the upland area  | Reduce contamination<br>of water supply  | Develop an integrated  | 2016)                               |
|                                      |  | or water suppry  |  | CIM Streets are 2015                |
|                                      | Adopt agro-forestry  |  | land management plan   | CIM Strategy 2015                   |

| farming practice                     |  | any unnecessary actions    | Water and         |
|--------------------------------------|--|----------------------------|-------------------|
| instead of clear f                   | -  | that may adversely affect  | Sanitation Sector |
| as is practiced at                   | t Improve preparedness<br>and readiness response | the natural habitats and   | Plan              |
| present                              | to natural disasters                             | ecosystems of the area     | SWA 10 Year       |
| Encourage plant                      |  | MNRE Forestry to advice    | Investment Plan   |
| indigenous speci                     |  | on appropriate species,    | (2016)            |
| conjunction with                     |  | depth and density of       |                   |
| engineered wate                      |  | planting and provide       | Community         |
| drainage action                      |  | seedlings for different    | Engagement        |
|                                      |  | vegetation types suitable  | Plan              |
| Regulate                             |  | to the habitats and        |                   |
| developments ar                      | round  | planting materials for     |                   |
| catchment area,                      | SWA  | village                    |                   |
| intake and boreh                     | noles  |                            |                   |
| in district                          |  | Develop and register       |                   |
|                                      |  | District/Village bylaws to |                   |
| Limit land cleara                    |  | include penalizing illegal |                   |
| and agricultural                     |  | deforestation in district  |                   |
| development are                      | ound   | lands                      |                   |
| SWA intake and                       |  |                            |                   |
| boreholes                            |  | Utilise Sui o Nu'u monthly |                   |
| Conductor                            | an for   | meetings to monitor        |                   |
| Conduct campaig                      |  | progress of                |                   |
| public awarenes<br>establish a       | s and  | district/village forestry  |                   |
| "neighbourhood                       | 4  | programmes                 |                   |
| watch" agreeme                       |  |                            |                   |
| with district to                     |  |                            |                   |
| monitor and rep                      | port   |                            |                   |
| on illegal                           |  |                            |                   |
| deforestation                        |  |                            |                   |
|                                      |  |                            |                   |
| District/village t                   |  |                            |                   |
| help promote th                      |  |                            |                   |
| development of                       |  |                            |                   |
| agroforestry sec                     | tor  |                            |                   |
| by encouraging                       |  |                            |                   |
| relevant land us<br>practice and who |  |                            |                   |
| practice and who<br>possible resolve |  |                            |                   |
| associated land                      | ally   |                            |                   |
| disputes                             |  |                            |                   |
| aisputes                             |  |                            |                   |
| District and villa                   | age to   |                            |                   |
| support SWA w                        | -  |                            |                   |
| rationing                            |  |                            |                   |
| programmes du                        | Iring  |                            |                   |
| times of drough                      |  |                            |                   |
|                                      |  |                            |                   |
| District to suppo                    | ort  |                            |                   |
| SWA efforts at                       | ,  |                            |                   |
| exploratory inta                     |  |                            |                   |
| and boreholes in<br>district         | 1  |                            |                   |
| aistrict                             |  |                            |                   |
| Continue ban of                      |  |                            |                   |
| destructive fishing                  | ng   |                            |                   |
| practices includi                    |  |                            |                   |
| sand mining and                      |  |                            |                   |
| introduce village                    |  |                            |                   |
| on rubbish dum                       | ping in  |                            |                   |

| Livelihood and<br>Food Security<br>Pest management; | waterways and<br>watercourses<br>(immediate fluvial<br>hazard zones)<br>Fence domestic and<br>invasive animals to<br>protect young trees<br><i>Responsibility:</i><br><i>MNRE/ SWA</i><br><i>MWCSD/ District</i><br><i>/Village /CSSP</i><br>Best Solutions  | Benefits<br>Maintains natural   | the implementation   | Relevant Sector<br>Plans, National<br>Strategies &<br>Policies<br>Agriculture Sector |
|---|--|---|--|--|
|   | eradicate, contain or<br>exclude invasive<br>species<br>Replant with climate<br>resilient native<br>species<br>Implement an<br>inventory of invasive<br>species and include<br>information on their<br>past, present and<br>potential future<br>distribution, as well as<br>impacts and possible<br>actions that can be<br>taken<br>Conduct education and<br>awareness<br>programmes on the<br>impacts of invasive<br>species<br>Implement the<br>Integrated Pest<br>Management<br>Programme | Builds resilience of<br>community livelihood<br>and food security<br>Reduce forest loss and<br>land clearance | any unnecessary actions<br>that may adversely affect<br>the natural habitats and<br>ecosystems of the area<br>MAF to raise awareness of<br>farmers on impacts to<br>water flows from poor<br>livestock management<br>MAF to assist in<br>establishment of pilot sites<br>to trial climate ready plant<br>varieties<br>MNRE Forestry, DEC and<br>MAF to collaborate on<br>supply of climate resilient<br>crops<br>MNRE, MAF and SROS to<br>implement aggressive,<br>nationwide invasive<br>species eradication<br>programme based on<br>inventory of invasive<br>species and conduct<br>campaign on public<br>awareness accordingly | (NISAP)  |
|   | Implement<br>Sustainable Land<br>Management (SLM)<br>practices<br>Build the capacity of<br>farmers to manage<br>stray animals (pigs,<br>cattle) that are<br>contaminating water<br>sources   |   | Village to manage<br>pig/cattle population<br>(compounds, in particular<br>around water supplies)<br>Training for farmers on<br>pests management<br>particularly affecting<br>fruit trees and crops  |  |

| governance of<br>naturaldeve<br>man<br>man<br>resources and  | late and/or<br>elop bylaws to<br>nage the use of   | Strengthen<br>implementation of all  | with the<br>implementation   | Plans, National<br>Strategies & |
|--|--|--|--|---------------------------------|
| governance of<br>naturaldeve<br>man<br>man<br>resources and  | elop bylaws to   |  | Develop and register   |                                 |
| through Bylaws use i<br>drain<br>mair<br>dum<br>mini<br>and u<br>deve<br>wate<br>area<br>bore<br>Colla<br>o Nu<br>use o<br>natu<br>Facil<br>awar<br>prog<br>villag | aral resources,<br>to control land<br>impacts; such as<br>inage<br>ntenance, rubbish<br>ping, sand<br>ing, stray animals<br>unregulated<br>elopments in<br>er catchment<br>as and near<br>eholes<br>aborate with Sui<br>u to monitor the<br>of and impact on<br>aral resources<br>litate continuous<br>reness raising<br>grams with the<br>ges | national sector plans<br>Strengthen monitoring<br>of all National Acts,<br>Regulation, Strategies,<br>Plans and Policies | Develop and register<br>district/village bylaw to<br>protect all district/ village<br>and government assets,<br>environment, livelihood<br>and food security<br>especially activities<br>affecting water catchment<br>areas and coastline<br>Utilise Sui o Nu'u monthly<br>meetings to monitor<br>progress of district/village<br>bylaws | Community<br>Sector Plan        |



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

Data Source: Ministry of Natural Resource and Environment, Samoa



# 9. Puleia Village Interventions

### **CIM Plan Solutions**

| Infrastructure  | Best Solutions   | Benefits   | Guideline to assist with  | Relevant  |
|---|--|--|---|---|
|   |  |  | the implementation  | National,<br>Sector Plans<br>and Strategies   |
| to be improved in<br>high risk areas<br>especially at<br>junction of South<br>Central Coast<br>Road and Puleia<br>Access Road | upgrade culverts on<br>main and 'access' roads<br>in district and widen<br>culverts in accordance<br>with Vulnerability<br>Assessment of the<br>Samoa Road Network<br>recommendations<br>Implement national<br>standards for culverts<br>and drains to facilitate<br>the overland flow of<br>storm water and<br>reduce flooding<br>Introduce culverts in<br>wetland areas to<br>improve tidal flow and<br>fish passage in the<br>wetland area<br>Implement regular<br>drainage inspection<br>and maintenance<br>Government to<br>regulate developments<br>and illegal rubbish<br>dumping near and<br>around waterways and<br>drainage<br><b>Responsibility: LTA/</b><br><b>MWTI/MNRE/MWCS</b><br><b>D /Village/ Families</b> | resilience of<br>infrastructure<br>resilience and rate<br>of response and<br>recovery to natural<br>hazards and<br>disasters<br>Encourages coastal<br>families to relocate<br>inland<br>Maintains lifeline<br>access for all of<br>Upolu<br>Minimises national<br>disaster recovery<br>expenditure on<br>damaged<br>properties, public<br>and private assets | Use existing information for<br>guidance but not limited to:<br>"Vulnerability Assessment of<br>the Samoa Road Network<br>(2017)"; "Review of National<br>Road Standards in Samoa<br>(2016)"; "Samoa Code of<br>Environmental Practice<br>(2007)"<br>Develop Integrated<br>Catchment Strategy and<br>Flood Management Plan for<br>Palauli le Falefa District<br>Undertake a Cost Benefit<br>Analysis to weigh options<br>for funding<br>Utilise environmental and<br>social safeguards including<br>EIAs in screening and<br>designing built environment<br>infrastructure projects<br>Include in budget<br>programming CBA, design<br>and construction<br>Develop and register<br>District/Village bylaws to<br>include maintenance of<br>drainages and illegal<br>rubbish dumping into<br>waterways |   |
| Village houses,<br>Churches, School<br>and private<br>residences located<br>in high risk hazard<br>zones                      | Relocate outside of<br>high risk hazard<br>zones when<br>building/infrastructu<br>re requires<br>replacement<br>Investments within<br>the hazard zones to<br>adopt appropriate<br>mitigation measures  | Minimise<br>expenditure on<br>damaged<br>properties and<br>personal assets<br>Safer villages,<br>houses and roads<br>Increases<br>awareness for<br>insurance   | Planning provisions to be<br>guided by the Planning<br>and Urban Management<br>Act 2004<br>Enforcement of National<br>Building Code 2017<br>Encourage insurance of<br>significant investments<br>and assets within hazard<br>zones  | CIM Strategy<br>2015<br>Draft NESP 2017-<br>2021<br>NISP 2011 KESO<br>5<br>TSP 2014-2019<br>Goal 2 KO 1 |
|   | Conduct awareness raising campaign on  |  | Utilise hazard maps and   | [Draft] Samoa<br>Relocation   |

|                  | flood resilient                               |                                       | Geomorphologist                                     | Strategy 2016    |
|------------------|---|---------------------------------------|---|------------------|
|                  | building practices                            |                                       | Drainage Infrastructure                             | Strategy 2010    |
|                  | and designs for at                            |                                       | Database to determine                               |                  |
|                  | risk communities                              |                                       | safe areas for relocation                           |                  |
|                  | living in and near                            |                                       | purposes  |                  |
|                  | high risk hazard                              |                                       | purposes  |                  |
|                  | zones   |                                       | Designation of the IEU7                             |                  |
|                  | zones   |                                       | Designation of the IFHZ,<br>CEHZ and CFHZ as an "at |                  |
|                  | Design infus structure                        |                                       | risk" zone with                                     |                  |
|                  | Design infrastructure<br>to take into account |                                       |   |                  |
|                  |   |                                       | appropriate landuse                                 |                  |
|                  | the immediate                                 |                                       | planning controls and                               |                  |
|                  | hazard zones; for                             |                                       | restrictions  |                  |
|                  | example, raise floor                          |                                       |   |                  |
|                  | levels of houses in                           |                                       |   |                  |
|                  | flood prone areas                             |                                       |   |                  |
|                  | Develop landuse                               |                                       |   |                  |
|                  | planning and                                  |                                       |   |                  |
|                  | development controls                          |                                       |   |                  |
|                  | to restrict                                   |                                       |   |                  |
|                  | developments within                           |                                       |   |                  |
|                  | high risk hazard zones                        |                                       |   |                  |
|                  | such as CEHZ and                              |                                       |   |                  |
|                  | CFHZ  |                                       |   |                  |
|                  | Families and village                          |                                       |   |                  |
|                  | to limit building and                         |                                       |   |                  |
|                  | developing on natural                         |                                       |   |                  |
|                  | overland flow paths                           |                                       |   |                  |
|                  | exacerbating inland                           |                                       |   |                  |
|                  | flooding and storm                            |                                       |   |                  |
|                  | water surges                                  |                                       |   |                  |
|                  | Responsibility:                               |                                       |   |                  |
|                  | Village / Families                            |                                       |   |                  |
|                  | /MWTI/ MNRE/                                  |                                       |   |                  |
|                  | MWCSD   |                                       |   |                  |
| Upgrade access/  | Assess and upgrade                            | Improve                               | Utilise hazard maps and                             | CIM Strategy     |
| work roads to    | Puleia Access road                            | infrastructure                        | Geomorphologist                                     | 2015             |
| facilitate       | as potential escape                           | resilience and                        | Drainage Infrastructure                             |                  |
| relocation of    | route and to                                  | rate of recovery                      | Database to inform                                  | NISP2011 KESO    |
| houses away from | encourage                                     | , , , , , , , , , , , , , , , , , , , | location and designs                                | 5                |
| hazard zones     | relocation away                               | Improve                               | 0 -   |                  |
|                  | from hazard zones                             | preparedness and                      | Develop an Integrated                               | TSP2014-2019     |
|                  |   | readiness                             | Flood Management Plan                               | Goal 2 KO 1      |
|                  | Upgrade to include                            | response to                           | for Palauli le Falefa                               |                  |
|                  | adequate sized                                | natural disasters                     | District. MNRE to develop                           | Community        |
|                  | culverts to facilitate                        |                                       | zonation strategy for safe                          | Sector Plan      |
|                  | the overland flow of                          | Reduce impact                         | areas   |                  |
|                  | storm water                                   | from coastal                          |   | Village Fono Act |
|                  | exacerbating river                            | erosion and                           | Develop an integrated                               | (Amendment Bill  |
|                  | overruns, and to                              | natural disasters                     | land management plan                                | 2016)            |
|                  | reduce flooding onto                          |                                       | with the aim of reducing                            | = • = • ;        |
|                  | main roads and                                | Safer villages,                       | any unnecessary actions                             |                  |
|                  | village lands                                 | houses and roads                      | that may adversely affect                           |                  |
|                  |   |                                       | the natural habitats and                            |                  |
|                  | Implement regular                             | Minimise national                     | ecosystems of the area                              |                  |
|                  | drainage inspection                           | disaster recovery                     | -   |                  |
|                  | and maintenance                               | expenditure on                        | Include in budget                                   |                  |
|                  |   | damaged                               | programming CBA, design                             |                  |
|                  | Village to restrict                           | properties and                        | and construction. Road                              |                  |
|                  | rubbish dumping into                          | public assets                         | design standard to take                             |                  |
|                  | waterways and                                 |                                       | account of forecast                                 |                  |
|                  |   |                                       |   | I                |

|                    | conduct regular         |                                     | increased rainfall                                     |                                 |
|--------------------|-------------------------|-------------------------------------|--|---------------------------------|
|                    | clearance of rubbish    |                                     | intensity  |                                 |
|                    | behind homes            |                                     |  |                                 |
|                    |                         |                                     | Designation of the IFHZ,                               |                                 |
|                    | Village to regulate     |                                     | CEHZ and CFHZ as an "at                                |                                 |
|                    | developments near       |                                     | risk" zone with  |                                 |
|                    | and around road         |                                     | appropriate landuse                                    |                                 |
|                    | shoulders of all access |                                     | planning controls and                                  |                                 |
|                    | roads                   |                                     | restrictions   |                                 |
|                    | Touus                   |                                     |  |                                 |
|                    | Enforce                 |                                     | Develop and register                                   |                                 |
|                    | environmental           |                                     | Village bylaws to include                              |                                 |
|                    | safeguards              |                                     | maintenance of drainages                               |                                 |
|                    | salegualus              |                                     | and illegal rubbish                                    |                                 |
|                    | Whone realementions     |                                     | dumping into waterways                                 |                                 |
|                    | Where reclamations      |                                     | dumping into water ways                                |                                 |
|                    | are proposed,           |                                     | Utilico Sui o Nu'u monthly                             |                                 |
|                    | Government and          |                                     | Utilise Sui o Nu'u monthly                             |                                 |
|                    | district to manage      |                                     | meetings to monitor                                    |                                 |
|                    | processes by requiring  |                                     | progress of village                                    |                                 |
|                    | villagers to get the    |                                     | cleanup and awareness                                  |                                 |
|                    | appropriate permits     |                                     | programmes   |                                 |
|                    | and consent             |                                     |  |                                 |
|                    |                         |                                     |  |                                 |
|                    | Responsibility: LTA/    |                                     |  |                                 |
|                    | MWTI/MNRE/              |                                     |  |                                 |
|                    | District/ Village       |                                     |  |                                 |
|                    | /Families/CSSP          |                                     |  |                                 |
| Flood protection   | Upgrade waterways       | Minimise                            | Conduct a full catchment                               | CIM Strategy                    |
| measures for fords |                         | expenditure on                      | management, drainage                                   | 2015                            |
| and bridges        | Upgrade all crossings   | damaged                             | analysis and   |                                 |
| Ũ                  |                         | properties &                        | geotechnical   | NISP 2011 KESO                  |
|                    | Upgrade or repair       | personal assets                     | engineering survey and                                 | 5                               |
|                    | riverine                | 1                                   | use its  |                                 |
|                    | embankment              | Mitigate potential                  | recommendations to                                     | TSP 2014-2019                   |
|                    | protection work         | damage from                         | inform location and                                    | Goal 2 KO 1                     |
|                    | upstream of Puleia      | inland flooding                     | designs  | dour <b>-</b> 110 1             |
|                    | and other major         | initiana nootaning                  | ucorgino   | Two Million Tree                |
|                    | rivers in district      | Reduce flooding of                  | Implement Palauli le Falefa                            |                                 |
|                    |                         | built up areas                      | Integrated Catchment                                   | 2020                            |
|                    | Ensure river channel    | built up al cas                     | Strategy and Flood                                     | 2020                            |
|                    | upstream is cleared     | Safor villagos                      | Management Plan in                                     | Restoration                     |
|                    | and maintained          | Safer villages,<br>houses and roads | conjunction with hazard                                | Operational Plan                |
|                    |                         | nouses and roads                    | Maps and Geomorphologist                               |                                 |
|                    | regularly               |                                     | Drainage Infrastructure                                | 2010-2020                       |
|                    | Construct levees to     |                                     | Drainage infrastructure<br>Database to inform location | Vulnovabiliter                  |
|                    |                         |                                     |  | 2                               |
|                    | reduce flooding         |                                     | and design   | Assessment of<br>the Samoa Road |
|                    | along estuaries and     |                                     | Iltilian opering parts                                 |                                 |
|                    | coastal streams         |                                     | Utilise environmental                                  | Network (2016)                  |
|                    | C 1 . · · ·             |                                     | and social safeguards                                  | and Road                        |
|                    | Conduct riparian        |                                     | including EIAs in                                      | Network                         |
|                    | replanting along        |                                     | screening and designing                                | Adaptation                      |
|                    | river channels and      |                                     | infrastructure facilities                              | Strategy, LTA                   |
|                    | watercourses            |                                     |  |                                 |
|                    |                         |                                     | Include in budget                                      |                                 |
|                    | Encourage planting of   |                                     | programming CBA, design                                |                                 |
|                    | indigenous species in   |                                     | and construction                                       |                                 |
|                    | conjunction with        |                                     |  |                                 |
|                    |                         |                                     | MNRE to zone hazard                                    |                                 |
|                    | engineered water land   |                                     | 1 .  |                                 |
|                    |                         |                                     | areas along major                                      |                                 |
|                    | engineered water land   |                                     | watercourses based on                                  |                                 |
|                    | engineered water land   |                                     |  |                                 |

| r                  |  |                                  | I   | ,                         |
|--------------------|--|----------------------------------|---|---------------------------|
|                    | markers to warn                            |                                  | revegetation  |                           |
|                    | vehicle and                                |                                  |   |                           |
|                    | pedestrians at all<br>crossings            |                                  | Designation of the CEHZ<br>and CFHZ as an "at risk" |                           |
|                    | crossings                                  |                                  | zone with appropriate                               |                           |
|                    | Government and                             |                                  | landuse planning controls                           |                           |
|                    | Villages to liaise and                     |                                  | and restrictions                                    |                           |
|                    | collaborate on                             |                                  |   |                           |
|                    | processes needed to                        |                                  |   |                           |
|                    | protect riverbanks                         |                                  |   |                           |
|                    | from land clearing                         |                                  |   |                           |
|                    | and developments                           |                                  |   |                           |
|                    | -  |                                  |   |                           |
|                    | Responsibility:                            |                                  |   |                           |
|                    | MWTI/LTA/MNRE/                             |                                  |   |                           |
|                    | District/ Village                          |                                  |   |                           |
| Electricity supply | Provide underground                        | Maintain                         | Monitor distribution                                | EPC Strategic             |
|                    | lines in the long term                     | electricity supply               | networks to avoid                                   | Plan                      |
|                    | <b>T</b> , 11 1 .                          | at all times                     | overloading poles and                               |                           |
|                    | Install and connect                        | including natural<br>disasters   | contributing to line                                |                           |
|                    | power supply for<br>inland residents       | disasters                        | failures  |                           |
|                    | iniand residents                           | Avoid accidents                  |   |                           |
|                    | Relocate overhead                          | from fallen                      |   |                           |
|                    | lines to a more                            | electricity posts                |   |                           |
|                    | resilient location                         | ciccularly posts                 |   |                           |
|                    | when being replaced                        |                                  |   |                           |
|                    |  |                                  |   |                           |
|                    | Install streetlights                       |                                  |   |                           |
|                    | along the roads                            |                                  |   |                           |
|                    | where needed for                           |                                  |   |                           |
|                    | community safety                           |                                  |   |                           |
|                    | Install and connect to                     |                                  |   |                           |
|                    | solar power supply if                      |                                  |   |                           |
|                    | made available                             |                                  |   |                           |
|                    | made a anabre                              |                                  |   |                           |
|                    | Families to limit                          |                                  |   |                           |
|                    | building and                               |                                  |   |                           |
|                    | developments near                          |                                  |   |                           |
|                    | electricity posts                          |                                  |   |                           |
|                    | D (1.01)                                   |                                  |   |                           |
|                    | Responsibility:                            |                                  |   |                           |
|                    | EPC/ MWTI/<br>Village/ Families            |                                  |   |                           |
| Natural            | Best Solutions                             | Benefits                         | Guideline to assist with                            | Relevant Sector           |
| Resources and      |  |                                  | the implementation                                  | Plans, National           |
| Environment        |  |                                  | -   | Strategies &              |
|                    |  |                                  |   | Policies                  |
|                    | Village pool is currently                  | Increase                         | Utilise Hazard Maps and                             | CIM Strategy              |
|                    | in a poor state with an                    | adaptation during                | Geomorphologist findings                            | 2015                      |
| 0                  | assessment needed for                      | drought periods                  | for planning purposes                               | Watay ar                  |
|                    | options to either                          | Improvo hoolth                   | MNDE Wator 9  | Water and                 |
|                    | rejuvenate or find a new site depending on | Improve health<br>and sanitation | MNRE Water &<br>Sanitation to conduct               | Sanitation Sector<br>Plan |
|                    | the location of springs.                   | anu sannanon                     | water testing and                                   | 1 1011                    |
| wave impacts and   | the location of springs.                   | Reduce                           | analysis of village pool                            | Community                 |
|                    | Test the quality of the                    | contamination of                 | prior to any intervention                           | Engagement Plan           |
|                    |  |                                  | r my moor voncou                                    | ~ ~                       |
|                    | water source before                        | water supply                     |   |                           |
|                    |  | water supply                     | UpdateVillage bylaws to                             |                           |
|                    | water source before                        | water supply                     | UpdateVillage bylaws to include managing and        |                           |

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

#### **Puleia Village Map**



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

Data Source: Ministry of Natural Resource and Environment, Samoa



## Savaii AF Districts Overview Map of Coastal Inundation Zones

