Samoa – City Development Strategy

'PLANNING FOR RESILIENCE'

Planning and Urban Management Agency
Ministry of Natural Resources andEnvironment,
Government of Samoa
Final (for Review)

October, 2015

First Edition 2015

United Nations Human Settlements Programme
ROAP, Fukuoka, Japan
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www.unhabitat.org

ACKNOWLEDGEMENT:

The Samoa – City Development Strategy (CDS) was funded by the United Nations Human Settlements Programme (UN-Habitat).

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Executive Summary

Samoa is witnessing significant urbanization which has placed burgeoning pressures on the physical, environmental, social, cultural, legal and institutional systems and financial resources of the Government. Corresponding with this, the capital city of Apia has experienced extreme and extensive impacts from climate change and natural disaster events.

The rapid change in the urban fabric and catchment conditions has reduced the city's natural resilience to climate change, natural and human induced disasters. Continued unstructured and ad-hoc urban development has severely affected the ability to reduce the cumulative impacts of land cover and catchment change. Without coordinated and orderly physical development, Government has been unable to secure the investment required for capital improvements, urban revitalization and theefficient provision of essential infrastructure and services. This situation has entrenched urban poverty and led to conflicts over land use and nuisance activities. There has been a lack of awareness of the implications of unfettered development and this has affected general community support to address the situation.

In October, 2013 the Government of Samoa released the Samoa National Urban Policy, to provide a high level commitment to strategically address urban land use and development management. This has set in train the pursuit of a "*Sustainable, Resilient and Inclusive City*" through a long term strategic framework to guide urban development, growth and change. To support this very high level policy the City Spatial Plan was released in December, 2014 to provide a clear long term strategic direction for the physical development of Apia. This provided conceptual picturing of the future development of the city over the next 50 plus years based on present patterns, pressures and needs of the community. Those needs were captured in the key values expressed through community engagement and turned into strategic goals:

- Goal 1: to Create a Unique City
- Goal 2: to Create and Enhance Employment Opportunities
- Goal 3: to Improve Accessibility and Travel Connection
- Goal 4: to Respect and Protect the Natural Environment and Heritage

The City Spatial Plan reflects on the community's aspirations for the future of the city and surrounds, defining key development principles, objectives to meet the goals and a series of key initiatives to assist with the long term planning and coordination of the city and its infrastructure. The spatial focus was far broader than the current city bounds.

The generation of this City Development Strategy (CDS) is accommodated under the Planning and Urban Management Authority's Land Use Planning and Management Programme. The intent is to take the high level commitment of the National Urban Policy and the long term visions for the city under the City Spatial Plan to provide a framework which enables implementation over the coming 20 years. Its coverage is the greater urban area of the City as defined by the inclusion of four Districts: Vaimauga East, Vaimauga West, Faleata East and Faleata West.

The role of the City Development Strategy is to provide the strategic framework for land use planning, development and environmental management decision-making for the City of Apia (as currently defined). It is accommodated by the PUM Act, 2004 and will particularly rely on the subsequent generation of Sustainable Management Plans (SMPs) under Part IV of the Act. These SMPs will provide the interface between national advocated forms and location of development and the communities' needs. The CDS will guide the SMPs for them to successfully manage and direct future land use and development, and guide decision-making within the City area.

The Planning and Urban Management Act, 2004 provides the legal mechanisms for strategic urban planning (Part IV Sustainable Management Plans). The lack of an overall spatial plan for the development and management of the City was identified as a key

shortcoming to using the strategic land use provisions of the Act. As such the City Development Strategy is spatially focussed both in the comprehensive analysis of key urban, social, cultural and environmental issues, as well as in the forwarding of an overall City Structure Plan and provisions to guide future planning and infrastructure provision. The CDS will guide the generation of SMPs scheduled over a three to five year programme. There will be fundamental supporting technological and human resource capacity building that will correspond with this programme – some delivered through commensurate Government programmes.

The CDS supports a number of the aims of The Samoa National Urban Policy:-

(a) It supports the introduction of the strategic planning processes of Part VI of the PUM Act, 2004 through the implementation of Sustainable Management Plans (SMPs);
(b) It provides a spatial plan and implementation initiatives to support SMP implementation to improve planning and coordination of the urban land use, infrastructure and services;
(c) It accommodates the Waterfront development - central / civic revitalization initiative;
(d) It provides the pathway for developing zoning/precinct plans and regulations through the subsequent SMPs; and,
(e) It progresses institutional capacity and new governance arrangements.

Use of a 'ridge to reef' approach afforded the opportunity to incorporate aspects of climate change adaptation and disaster risk reduction with land use planning considerations. The anticipated benefits of this approach are as follows:

(a) An agreed Structure Plan that reduces the risk of future key infrastructure by provision of a primary Infrastructure Corridor;
(b) Improved efficiencies in urban infrastructure and services by characterizing hazard risks about the City based on present and foreseeable land use;
(b) Improved productivity within urban centres through nomination of key centres around which better allocation of land uses, activities and infrastructure can be planned;
(c) Improved sustainability of Samoa's natural and built environment through better resource allocation and risk reduction measures;
(d) Enhanced appreciation of the prospect of community wellbeing through better land use allocation, introduction of urban design, planning and access to amenity facilities.
(f) Avenues for enhanced cultural identity within the Apia city.

Apia is a unique City with traditional villages located within the urban area. Maintaining this cultural identity is a fundamental goal of Apia's urban planning activities. Further stratification of decision-making tools and processes through the implementation of the CDS with the collaboration of the village fono in the generation of the subsequent SMPs will assist with recognizing customary values and ownership.

The CDS delivers the following:

a) A Structure Plan representing the spatial guide to future City development based on multi thematic and sectoral planning analysis and risk assessments;
b) The first full Land Use Plan and database for the City, as now defined;
c) A Combined Risks and Hazards database, using GIS with multiple layers and fields to enable multi query retrieval and analysis for future strategic planning as well as ongoing Development Consent processes;
d) A table of land use and development controls for hazard areas related to various land use categories. Table 3 supports the Structure Plan, and is designed as an intervening tool until SMPs are completed and further modelling and hazard classifications are completed across the City;
e) A programme for the roll-out of SMPs to cover the City over a 4-5 year period;
f) Nomination of some key strategic technical inputs that are required either prior to or co-jointly with the roll-out of SMPs;
g) Nomination of some key governance and institutional development matters that need follow-up;
h) A capacity development and investment strategy to progress the land use planning programme of MNRE-PUMA.

PART 1: Background

1. Introduction

The City Development Strategy (CDS) has been developed by the Ministry of Natural Resources and Environment's (MNRE), Planning and Urban Management Agency (PUMA) to further the work of the National Urban Policy (NUP) and the City Spatial Plan (CSP), released in December, 2014.

The intent is to provide PUMA and the community with a planning framework to address the future urban development of the City in a manner that is sustainable, provides for a low-carbon future and incorporates both climate change and disaster risk reduction measures.

The CDS sets a long term vision for the city's growth over a 20 year timeframe. It has built on community engagement over the last 2 years with a participative approach involving key stakeholders since December, 2014.

This report has been generated to inform of the process followed and the inputs provided for the CDS. It incorporates both the rationale and the reasoning for choices and options for future development structure of the city.

This report is structured as follows:

a) Part 1 – provides background to strategic land use planning in Samoa with particular reference to the City of Apia;

b) Part 2 – provides a summary of the detailed multi-sectoral and thematic analyses that have taken place with information provided by multiple agencies and/or generated through the development of the CDS;

c) Part 3 – incorporates the Implementation strategies.

The generation of the CDS is funded by the United Nations Human Settlements Programme (UN-Habitat) under a Grant from the Cities Alliance and executed by the Ministry of Finance and implemented by Ministry of Natural Resources and Environment (MNRE). The CDS work is currently managed by the MNRE PUMA Strategic Planning Section.

1.1 Strategic Land Use Planning in Samoa

The Government of Samoa (GoS) notes the importance of aligning the implementation of the City Development Strategy with associated plans and strategies primarily as guided by the National Strategy for the Development Samoa 2012-2016 (NSDS). This project supports the NSDS Priority Area 4 - the Environment and Key Outcome 13; ensuring Environmental Sustainability. It particularly relates to Strategic Area 7: Development of an urban agenda and policy. The secondary alignment is with Key Outcome 14: Climate and Disaster Resilience.

It is anticipated that the CDS will be the roadmap document that augments investments, infrastructure and environmental service delivery for the City of Apia, advancing discussions on governance, land management, development, investment needs, and strategies for urban improvements to stimulate investment. This City Development Strategy will then inform more detailed area and thematic based Sustainable Management Plans under the Planning and Urban Management, Act, 2004 (PUM Act, 2004).

Outcomes, outputs and suggested actions of the CDS will facilitate the ongoing land use planning and development management programme, and consequentially inform MNRE's future corporate plans and the National Strategy for the Development of Samoa 2017-2021.

1.2 Aim and Objective of the City Development Strategy

The aim of the CDS is to provide the Government of Samoa (GoS) with an improved institutional and technical capacity to plan and manage land use, coordinate development and ensure sustainable management of existing resources for the City of Apia. The aim is to

work toward generating an integrated Sustainable Management Plan (SMP) for the greater Apia urban area under the Planning and Urban Management Act, 2004 (PUM Act, 2004) to facilitate "climate and disaster proofed" sustainable urban development. The CDS will provide the pathway for this integrated SMPthrough the scheduled generation of the more detailed Sustainable Management Plans (SMPs).

To climate and disaster proof a city is a complex task requiring long term visions and actions based on clear pathways that amalgamate multi-thematic, sector and cross-sector analysis. Climate and disaster risk compatible development is development that minimizes the harm caused by climate change impacts and natural and human induced disasters, while maximizing the human development opportunities (CDKN)[1]. Transitioning to a resilient future is a major challenge for all countries and this challenge is exacerbated with urban development issues. Planning for resilience building needs to involve poverty reduction through securing human development in a manner which helps societies adapt to inevitable change. Charting of various pathways toward climate and disaster resilient development does require a master plan approach to bring together complex threads of human development. Medium to longer term actions will require ongoing research, urban and environmental information enhancement, institutional changes, ongoing community engagement and collaboration as well as the development of tailored decision support tools and mechanisms.

The objective of the CDS is to:

"Provide a spatially orientated strategic framework for land use planning, development and environmental management for the City of Apia to transition to a more resilient climate and disaster proofed city".

The CDS shall set the scene for the future development and management of the City at a strategic level. It shall help inform future decisions about the role and function of the land, its use and will provide the means for achieving Apia's development potential while pursuing resilience and sustainability outcomes.
Consistent with this objective the CDS offers the Government of Samoa the ability to:

1. Strengthen institutional arrangements, promote partnerships and share lessons that support growth of Apia City;
2. Encourage and engage stakeholder contribution, participation and support of CDS activities and identify their inputs into addressing issues;
3. Enhance urban development, growth and change for the greater Apia area through a climate proof CDS approach to ensure that the benefits are not limited to the Apia Central Area but flow to neighbouring districts;
4. Promote streamlined decision making based on technical knowledge, forward planning and co-ordination of government activities through the Strategy.

1.3 Vision and Goals for the development of Apia

The Vision for the development of Apia has been set by the National Urban Policy, 2013:

A "Sustainable, Inclusive and Resilient City"

The National Urban Policy articulates the overall objectives and directions for building a more resilient city and reinforces the need for urban planning to act as the conduit to coordinate land management with infrastructure, natural resources, and hazard risk reduction.

To support this very high level policy the City Spatial Plan was released in December, 2014. It provides a clear long term strategic direction for the physical development of Apia beyond its current bounds. This conceptual picturing of the future development of the city targets a 50 plus year period based on present patterns, pressures and long terms needs of the community. Those needs were captured in the key values expressed through community engagement and turned into strategic goals:

- Goal 1: to Create a Unique City

[1] Climate and Development Knowledge Network. http://cdkn.org/project/carbon-and-water-footprint-assessments-andean-cities-phase-2/

- Goal 2: to Create and Enhance Employment Opportunities
- Goal 3: to Improve Accessibility and Travel Connection
- Goal 4: to Respect and Protect the Natural Environment and Heritage

The City Spatial Plan reflects on the community's aspirations and visions for the future city and surrounds. It defines key development principles, objectives to meet the goals and a series of key initiatives to assist with the long term planning and coordination of the city and its infrastructure.

1.4 The CDS and Sustainable Management Plans

The role of the City Development Strategy (CDS) is to provide a more detailed and city wide spatial base for the strategic frameworks and principles set by the National Land Use Policy and City Spatial Plan. It is accommodated by the PUM Act, 2004 and will particularly rely on the subsequent generation of Sustainable Management Plans (SMPs) under Part IV of the Act for its fuller implementation. The amalgam of SMPs covering various areas of the city will form the basis of the future Integrated City wide SMP.

The Planning and Urban Management Act, 2004 provides the legal mechanisms for strategic urban planning including through zoning provisions (Part IV Sustainable Management Plans).

The lack of an overall spatial plan for the development and management of the City was identified as a key shortcoming to using the strategic land use provisions of the Act. As such the City Development Strategy is spatially focussed both in the comprehensive analysis of key urban, social, cultural and environmental issues, as well as in the forwarding of an overall City Structure Plan and provisions to guide future planning and infrastructure provision.

More specificity may be required for each unique part of the City, or where local complexities dictate and this shall be the role of the Sustainable Management Plans (SMPs) [2] .The CDS will guide the generation of these more detailed SMPs scheduled over a three to five year programme. These will provide the interface between nationally advocated types, forms and location of development and the communities' needs. There will also be fundamental supporting technological and human resource capacity building that will correspond with this programme – some delivered through commensurate Government programmes.

A Sustainable Management Plan is a land use policy document that can provide an overarching guide to future physical, social and resource use developments. Under the PUM Act, 2004 the plan can be generated through participatory methods to support traditional forms of local governance. It can make provisions for any use, development, protection or conservation of any land, as well as provide guidance for public uses and utility services.

Land use planning systems and approaches are recognized internationally as providing systems of urban governance that can address poverty, reduce land based conflict and induce sound environmental management. A SMP is a product of the strategic assessment and forward planning aspects of the land use planning system in Samoa. They can therefore have far-reaching influence on urban governance and compliment traditional systems if approached sensibly. By being able to affect future development - matters of security, equity, confidence and certainty can be addressed. These are important elements in the pursuit of good urban governance and poverty reduction.

[2] Section 15. Of the Planning and Urban Management Act, 2004 indicates the contents of sustainable management plans (SMPs) as the strategic plan making part of the decision-making process. SMPs can make provision relating to the use, development, protection or conservation of any land in a specific area. By virtue of Section 12, in terms of scale, SMPs may range to cover a national, regional, district, village or site specific matter. They can include specific strategic plans, policy statements, codes or guidelines relating to the use or development of land and the provision of public utility services.

1.5 Other Planning Frameworks and Tools

There are existing land use planning frameworks and tools generated and used under the PUM Act, 2004. This includes a SMP for Vaitele with accompanying 'how to' manuals that provides a useful model for additional SMPs over the coming years. PUMA has a number of policies, including a Noise Control Code, Draft Planning and Development Guidelines for Housing (2003), Environmental Impact Assessment guidelines and the Samoa Codes of Environmental Practice (2007), the latter generated to assist with road building.

In addition to these planning frameworks and tools used by PUMA are sector plans for the various agencies of Government (Trade, Commerce & Manufacturing Sector, Agriculture Sector, Health Sector, Water Sector Plan; Energy Sector Plan; Transport Sector Plan; Communications Sector Plan; Tourism Development Plan and the National Environment Sector Plan). Many of these have a component which impacts land use and the urban development of Apia. The CDS and its chief spatial output, the City Structure Plan now provides a consistent framework for the Sector Plans and the collaborative decision-making that will be needed in the future.

The CDS therefore provides the strategic pathway for development and urban environmental management on the ground. In the first instance it provides a strategic Structure Plan for the city which presents the 'big picture' and enables relevant provisions of sector plans to be actioned. Through this collaborative framework itdirects the way forward for integrated decision-making.

Figure 1below depicts the general relationship of the CDS with respect to the present frameworks and tools for land use decision-making and urban development.

Land use planning tools (sometimes referred to as instruments) primarily aim to direct the location and intensity of development about urban and rural areas. People often recognize planning instruments as being the platforms for determining 'zoning' of an area. But they can and do have other functional advantages in how they influence the form, function and quality of development. For instance land use plans may direct where within the City, the scale of development may vary depending, for instance on whether they are within the central business district (CBD) or within a quiet residential area. Planning instruments (or tools) can also incorporate guidelines for different location, intensity or forms of development. For instance offices in the CBD may need to contribute to city parking (either on-site or in public areas) at a rate of one (1) space for every 20 sqm of office space, whereas industrial development within a general industry park may need to provide parking at one (1) space per 100 sqm of building area.

With respect to climate and disaster risk reduction, planning instruments can identify areas of hazard within a City, classify the risk in terms of human response or investment and informmeasures which would: a) avoid the risk; b) decrease the risk; c) defend against the risk; d) protect people and/or investments from the risk, or e) increase the coping capacity (or resilience) of 'assets' - people, places and ecosystems.

Figure 2 pictures the functional means by which planning tools can control or enhance development for the mutual benefit of all citizens. The CDS primarily addresses the locational functions of land use planning through provision of the Structure Plan at the city wide level, while the SMPs will include locational, scale and intensity matters at the district, village or neighbourhood scale. Development standards and the urban design manual can inform the specific scale and intensity requirements as well as 'quality of inputs' – and the 'quality of outputs' expected at the site development level.

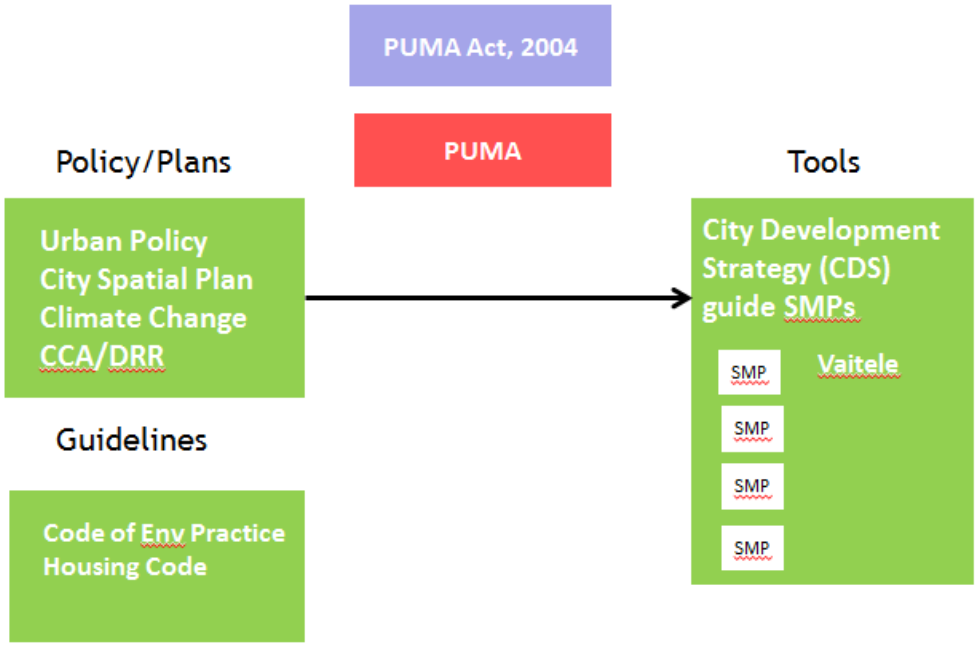


Figure 1: Context of the CDS

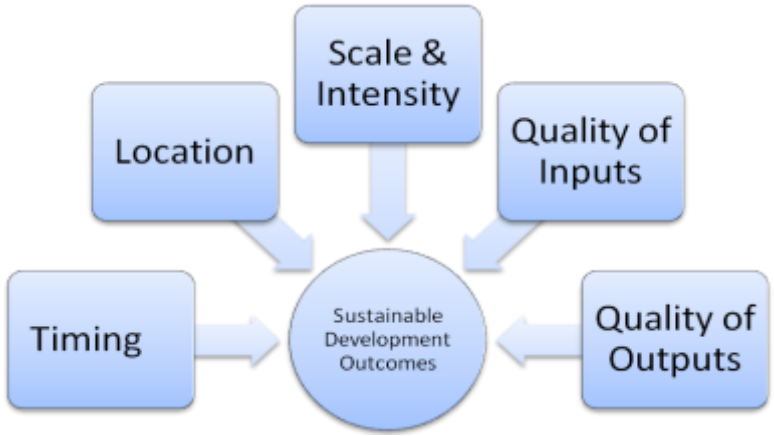


Figure 2: Function of land use tools and instruments

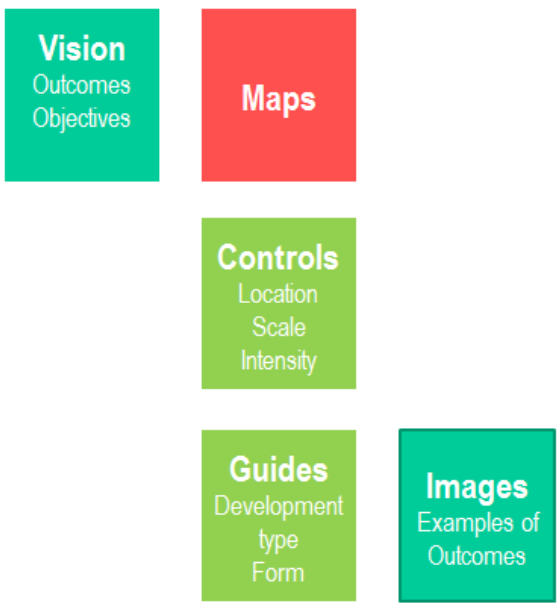
1.6 The Form of SMPs

The practical end of land use planning tools, in terms of directing or assisting the location, form, intensity, scale and quality of development, comes about in Samoa through the generation of the SMPs. SMPs can be generated to deal specifically with the functional matters shown in **Figure 2**, either individually or in a combined manner. They can address single or multiple thematic matters and can be at any spatial scale (i.e. City wide or sub-sets of the City).

In terms of what a SMP at this level would look like, key components incorporated to address the range of functions are shown in **Figure 3**. The primary parts are the plans and maps which determine the key location and form of development and can characterize the area or theme to be covered by the SMP. Guidelines correspond with the maps in terms of setting out controls andguidance on the types of uses, the scale, intensity, inputs and outputs. Graphic based guidelines and images of desired outcomes are preferred in contemporary planning instruments.

Part IV of the Planning and Urban Management Act, 2004 provides for the making (Section 12-14) and the contents (Section 15) of Sustainable Management Plans (SMPs). Providing the right procedures have been followed under the PUM Act, 2004 strategic plans, policies, codes and guidelines as are contained in the CDS can be approved under Section 15 (e)[3].

[3] The CDS could also be approved by the Planning Board under Section 46 (e) of the PUM Act, 2004 for use in determining development consents as a 'strategic plan, policy, development standard or guideline'.



To understand current & future Patterns
To characterize issues
To evaluate options

Maps give the functional allocation picture

Controls & Guides give the locational, scale intensity controls

Incentive based Guides can consist of qualitative & quantitative criteria
Images based specific guides are preferred

Figure 3: Usual Generic Components of a SMP

2. Approach

2.1 General

Given the relationship of land, customary tenure, resources and land use – information generation and provision will be key to enabling practical actions in a flexible community orientated planning system. The method employed for the CDS is centred on a two way process, based around a framework of an objective based decision system, reliant on input from prior engagement of the community by PUMA and a number of engagement and participation events during its development.

Enhanced information layers were used to representcommunity based, physical, environmental and economic data. Combining layers enabled the 'characterization' of social data and information with the bio-physical - to provide suitable bases for analysis and evaluation (see **Figure 4** below).

Initially the multiple sector and thematic data and information were aggregated then subject to cross-disciplinary review, enhancement and correlation. Composite bases were used in the generation of general constraints and risk mapping. Multiple data-sets were used to present to the stakeholders a picture of 'where things are up to' - the intent being for their input to outline 'where we wish to go' through a series of engagement events and follow-up one-on-one meetings.

Stakeholders were able to discuss scenarios of present problems and possible solution ideas. Further refinement of data and information through cross-analysis was guided by planning 'criteria' geared initially toward confirming overall constraints, hazards and to outline 'opportunity areas'. The results were then used to canvass and delineate strategic land use planning options. Engagement forums were used to validate options to address crucial issues or elements by the key stakeholders including a number of village pulenu'u.

The approach was designed to provide a means to reconcile land and development conflict issues, to characterize the extent of various hazards, to assist with consideration of equitable access and the efficient use of land resources.

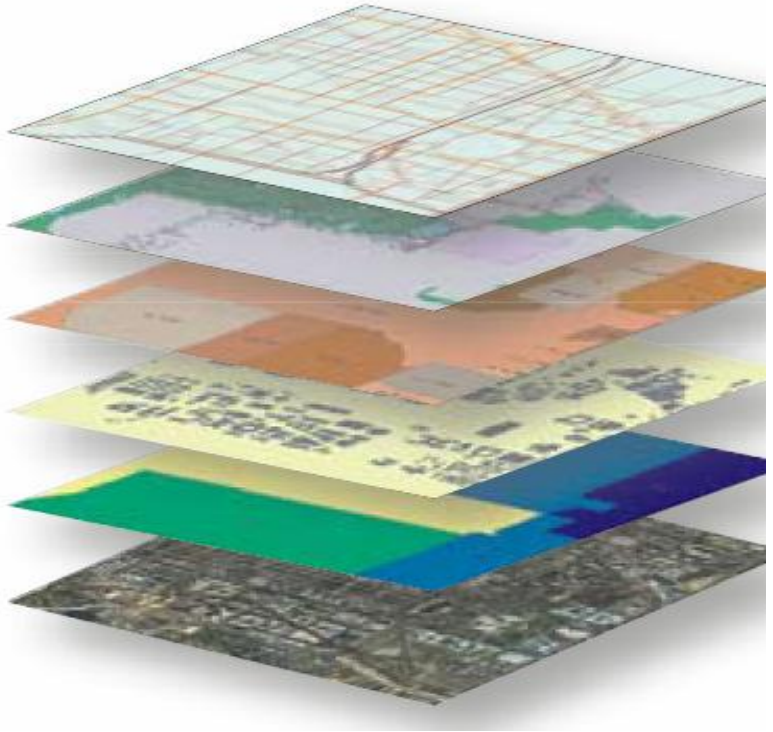


Figure 4: GIS used to aggregate and correlate data

The engagement process progressed work with community representatives commenced by PUMA as part of itsLand Use Planning and Management Programme. The aim is to establish a prominent role of village elders and village councils in day to day land use decision-making, so gaining their support and understanding was essential.

Given time and data constraints, the outlining of 'opportunity areas' for city development is best completed at two scales – at the city wide scale and at local village levels. The latter may entail the aggregation of like village areas based on practical 'city management units'. The outlining of these 'units' will assist with the delivery of SMPs over the

ensuing years. As this CDS was developed over a 3 month period the consideration of constraints, hazards, risks and opportunities was completed at the strategic city wide level. Shortcomings faced due to limited data availability were circumvented through use of surrogate information. Data collection, aggregation, creation, enhancement and modelling was organized within an interactive GIS framework. Synthesis of data will enable query based mapping at the city wide, district, village and site levels. This accommodates subsequent use in SMPs or as a reference base in ongoing decision-making.

The approach shall assist villages in generating rational and effective Sustainable Management Plans (SMPs) that suit local circumstances.

2.2 Methods

A rational planning approach was employed using a combination of the landscape analysis method (McHarg 1962); and 'concentric ring' and threshold analysis approach to land use planning. This integrated approach is assisted by GIS and derivations have been widely used globally. It can be easily adapted to assist with pursuing low-carbon and disaster risk reduction approaches to urban development. Features of the integrated approach are as follows:

- Employs graphical mapping techniques to assist community engagement;
- Enables evaluation of multi-layers of information from various sources;
- Allows interactive 'what if' scenarios in developing solution options.

2.3 Key Elements to the approach

Fed by the established goals and sub-objectives outlined in the City Spatial Plan the progress of the work was cognizant of some key messages derived frompast community and stakeholder engagement:

a) The CDS is to be driven by the unique physical and cultural systems of Samoa and in particular those of Apia. Present village boundaries, form and characteristics need to be considered in assessments and evaluations and incorporated in the forwarded options for longer term planning;

b) Spacious residential settlements incorporating traditional use areas and urban agriculture shall be maintained. The nature of semi-traditional village settings where gardens are a key part of the urban landscape and small scale agrarian systems are maintained, has many benefits for social cohesion, sustainable food supply and maintenance of cultural norms. The plots of land within the flat urban systems where localized flooding and poor drainage continues to be a problem can be opportunitiesfor instituting water sensitive urban design (WSUD) measures. That is, the larger open areas used for urban vegetable and crop gardens can double up as water retention and quality control areas to improve water management. Conversely there needs to be controls in the keeping and husbandry of livestock within the city bounds. While some livestock such as cattle can be ideal for weed management on large land parcels, excessive numbers or types of livestock can cause amenity, environmental and health issues;

c) The best means to ensure that the CDS contends with climate change and the need for disaster risk reduction is to approach all assessments from a 'ridge-to-reef' or 'whole of landscape' scale. This can ensure urban structure and form addresses prospect creeping climate change implications as well as the more dramatic and short term disaster hazards and risks;

d) Urban systems need to be energy efficient. Pursuit of development which is efficient in terms of satisfying demand for various land uses in a manner which enables effective and sustainable essential services – invariably will see efficiencies in terms of sustainable energy supply and use. For instance a planned road transport network that uses a road network hierarchy should see the right type of road construction for the relevant threshold of dwellings or other land uses.

Ridge to Reef and Landscape scale assessment: Essentially these approaches consider matters from the largest spatial scale as possible or relevant - rather than from a locality or site stand point. For instance when considering water management and flooding, water increases in volume and velocity from the top 'ridges' with variables changing at various places down the catchment. To consider only the local conditions at site levels would be inefficient, be subject to too many assumptions, rely on insufficient data and result in poor responses and decisions.

This will result in efficient energy use for construction and maintenance. Energy use per capita can be reduced over time as good road and connectivity systems are introduced. Good road hierarchies canreduce traffic congestion – which in itself will limit superfluous energy use.

Urban development types, location and form canalso promote good design and siting to accommodate better use of renewable sources, such as wind and sunlight.

e) More efficient urban systems, with coinciding infrastructure and essential service provision will rely on effective relationship building and collaboration between government and traditional village governance. Stakeholders agreed for the need to improve coordination in development planning and service management. PUMA has a strategic land use planning and development consent (administrative) role however other Government agencies alsohave a critical role in land planning, service provision and development management. The Ministry of Works, Transport and Infrastructure, the Land Transport Authority and Samoa Bureau of Statistics, among others – have a critical role in land use planning and development management.

f) Communities need to be provided with quality places to live and work. Coordinated land use planning and development management can lead to healthy and pleasing places to live with a range of work opportunities close by.

For instance grouping non-residential uses in local or district commercial centres can lead to more variety in land use types, which stimulates cross-use economic activity – leading to additional work opportunities in that centre. Some uses need a threshold of convenience 'shoppers' to survive. Grouping a number of retail shops can provide a threshold of people to attract, for instance, barber shops or small commercial offices in small urban centres, thereby increasing the incidence of local employment close to where people live. Continued scattered small shops about residential areaswill not aggregate sufficient people in a locality to provide the thresholds needed to broaden the employment base.

Additionally coordinated land use planning and development management will reduce the incidence of nuisance uses, such as car repair places or heavy noisy industry in close proximity to dwellings.

2.4 Climate Change and Disaster Risks

Some of the benefits of good land use planning for climate change and disaster risk reduction have been introduced in section 2.3. There are many more opportunities that will be realized through coordinating development, freeing up network systems and implementing more efficient delivery of infrastructure and essential services. Better coordination of data, strategic land use allocation and integrated decision-makingwill lead to a more resilient City. For the CDS the primary focus is on climate change adaptation and disaster risk reduction. This underpins all sector and cross-sector data aggregation and analysis documented within this strategy.

The Australia Bureau of Meteorology & CSIRO *Samoa Country Reports* (ABM & CSIRO, 2011) identifies the latest projected key changes to conditions from climate change over the next, 20, 50 and 100years. UN-Habitat produced the Apia, Samoa Climate Change Vulnerability Assessment in 2014. This set the context of the general implications of

the impacts from climate change on various sectors of the City. The vulnerability assessment is limited to general appraisal and observations with reference to past assessments. The lack of geo-physical and landscape data, especially the limitations to landscape, elevation and fluvial geomorphological information limited the characterization and quantification of impacts. However within these two sources there were pertinent messages to guide further assessments for land use planning:-

a) The medium protection forecasts that Samoa will experience a 2 °C increase in warmer weather with a corresponding increase in the number of days of extreme heat. The CDS needs to ensure the urban form, layout and design elements of the City accommodates more cooling environs, especially through provision of more open space and landscaping (shading & general softening of hard surfaces) close to peoples living areas and in the city centres;

b) While the statistics show a probable decline in the number of tropical cyclones, there is expected to be an increase in their intensity. While 'planned retreat' options are preferred for built up central areas including the CBD, more resilient coastlines through defence and protection mechanisms will be required. These measures should be a mix of 'hard' and 'soft' engineering and non-engineering options that suit the circumstances of the geomorphology of the coast. Development and building designs need to adapt to the new threats and be consistent with international best practice.

c) Samoa will be >5% wetter, with most rainfall increases expected in the wet season and with little change in the dry season rainfall. Combined with this will be increases in the number of days of extreme rainfall. There will be dramatic impacts for Apia, where the waterways are already unable to handle much of the quantity and velocity of flood waters. Exacerbating the situation is the tendency for urban extension to progress up into the steeper catchments. A change of land cover in these steep and higher environs combine with the expected climate change parameters will see increases in the incidence of flash flooding, with the inability of the natural/modified channels of waterways to accommodate the depth of flooding.

   For existing urban areas residential development over much of Apia is of very low density. The tendency over the next 20 years will be the intensification of development within these areas, which will also add to the generation of run-off and uncontrolled flood waters.

   Low lying and very flat urban areas close to the coast where defined channels have long been filled or overwhelmed with pooling of water even in smaller rainfall events, will face regular inundation. The climate changes will even affect the local drainage patterns with small rainfall events causing nuisance water run-off and pooling. This in turn affects people's quality of life and interrupts sustainable investments in the City.

d) While Samoa will face warmer weather with more intense and severe events, little change in drought patterns is expected. The current estimated return period of once to twice every 20 years for moderate to severe drought will be retained but given that rain is expected in more intense systems, water security is still a medium to longer term issue.

e) Ridge to reef approaches to firstly classifying the nature of urban and landscape forms and processes are needed in the CDS development to contend with the likely climate change implications. Evaluation of the current flooding and other associated hazards needs to consider options for Water Sensitive Urban Designs (WSUD) measures at the strategic assessment, subdivision design and final dwelling or building application stage

f) Water efficiency options and water harvesting capabilities need to be brought into development approval processes to ensure water security in future development areas. This is especially important in higher elevated areas where the satisfactory service from existing reticulated water supply systems cannot be efficiently achieved. Again it is important that these matters be addressed at environmental assessment

and preliminary design stages of subdivisions and new development areas.

2. 5 Pursuing Adaptation and Risk Reduction

In terms of pursuing sustainable outcomes, addressing climate change adaptation and disasters risk reduction across the whole City requires holistic approaches.This can be accommodated in 'Ridge to Reef' approaches. Land use planning requires a coordinated, plausible and integrated approach, with a synthesis of constraints, hazards and opportunities leading to suite of plausible options for urban management.

The community is in the unique position of being able to agree to a pathway that leads to a low-carbon city of the future. Good land use planning and urban management will lead to reduced emissions as well providing the basis for the effective and efficient implementation of adaptation measures that will work in unison.A coordinated land use planning system will enable 'planned retreat', protection and accommodation/defence response.

For the CDS the mapping, analysis and evaluation under various thematic, sectoral and technical areas has incorporated climate change and disaster risk variables and use of best practicecriteria. Many best practice risk characterization models already incorporate climate change and contemporary disaster risk factors (e.g. flood risk analysis following IPCC 5 outcomes). The shortcoming for the CDS was the limited data and modelling of terrestrial flooding and inundation in most catchments of the city. In these circumstances, surrogates were applied and/or limitations were nominated.

Some care needs to be taken in use of models and technical approaches (especially those that employ software). For instance in the case of surface water management, use of water engineering models adapted to take on the Intergovernmental Panel on Climate Change, Fifth Assessment Report (IPCC 5) outcomes, still have limitations where landscape and geo-physical data is not available. Even if the latest geo-physical data of the landscape is available (e.g. Digital Terrain Model, contours at 0.5-1metre level) the models cannot contemplate future land use changes. If there is unfettered land use and land cover change, massive changes will occur in the catchmentsinfluencing the water run-off quantity, velocity and depth. Without controls on the location, density and scale of development these significantwater balance process changes – cannot be predicted by the modelling. Even if modelling, which is expensive, is repeated bi-annually, unrestrained development will increase flooding over and above what is predicted in catchment models.The best water engineering modelling using very good datais still reliant on good land use planning systems to ensure that risk reduction occurs.

Land use planning for adaptation features highly in the United Nations Framework Convention on Climate Change(UNFCCC)advocacyand policy, as it is known to have a significant role to play in terms of both mitigation and adaptation responses.In terms of reducing green-house gas emissions noted methods can be employed at the strategic level: e.g. clusters of more denseurban development with efficient traffic and movement linkages between the clusters; a well-coordinated transport/road hierarchy over the city; 'place-making'[4]; subdivision designs that focus parcel orientation to the north to facilitate renewal energy installations, and increasing vegetatedgreen spaces about the city. Landscaped open spaces, including urban gardens, or retention ofrural development options between the urban clusters can be used to sequester carbon, mitigate against the expected rise in heat as well as being employed to reduce flooding.

Mapping, assessments and evaluation of thematic and specific technical sectors has incorporated climate change and disaster risk reduction considerations throughout the CDS.

[4]Place-making is a people-centred approach to planning, design and management of public spaces. It can be used to improve all of the spaces that comprise the gathering places within a community—its streets, parks, buildings, and other public spaces…so they invite greater interaction between people and foster healthier, more social, and economically viable communities. http://www.placemakingchicago.com/about/

2.6 Participatory Approach

For much of the work a participatory approach was used with the intent to impart as much knowledge on the process of planning as in the inputs and outputs of various assessments and outcomes. Activities includedcommunity visioning exercises and deliberations on governance choices through workshops and participatory forums. Stakeholders and community representatives were given the opportunity to convey their visions of their communities in 20 or 30 years time. The choices for land use zoning versus nomination of preferred use areas tied to incentivization of development control were debated. Participants were regularly informed of the mapping outputs of the various physical, social, environmental and landscape assessments. These were used to stimulate inputs on choices for future land use planning and controls. The outputs and outcomes of the participatory eventswere also used to drive the focus of the technical assessments, land use, lifestyle and livelihoods evaluations.

Land use planning of existing cities is by nature quite complex. There are many matters, disciplines, sectoral and multi-sector issues to consider. Participatory approaches were essential to ensure the eventual recipients were not confused by the inputs and outputs.

The intent of the integrated approach driven by participatory and learning forums is the advancement of a CDS which assists the subsequent SMP in forwarding optimal land use development scenarios that cement the pathways to sustainable community developmentwhere lifestyle choices and livelihood opportunities prevail.

2.7 Sequencing of Work

Annex 1 provides a step-wise depiction of the approach used in the work. This scheduling of work follows the 'rational' approach to land use planning and it is particularly useful in inter-related evaluation of social, cultural, environment and economic aspects of development planning. It also caters for the climate proofing and disaster risk reduction approach to modern city planning.

The work commenced with strategic assessments at the 'landscape scale' using available information or that which could be enhanced through existing layers. A 'ridge to reef' approach was followed consistent with the systems methods of contemporary land use planning. **Figure 5** below depicts the key considerationsin the CDS development process.

Figure 5: City planning – multiple facets to consider

Data, information and mapping were assembled using GIS. Bio-physical, human &culture, economic and hazards layers were created, enhanced and aggregated to enable correlation. This firstly assisted with gaining an understanding of what is currently happening about the city, knowledge which assisted later evaluations.

Data enhancement, synthesis and evaluation were undertaken by thematic assessments and cross-sector assessments. This enabled the demonstration of the pressures and impacts.

Criteria were established by theme to assist with risk and constraints analysis. These were used with standard best practice planning criteria to assist with opportunity analysis. Criteria assisted the socio-economic evaluations performed to document the ways forward. From the analytical work the City Structure Plan options were mappedfrom multiple layers and reviewed by Stakeholders. The preferred land use allocationswere guided by existing land use patterns and networks. These became the focus of documenting for the Structure Plan, a key outcome of the City Development Strategy.

Figure 6 shows the simple sequence of the CDS work whereas Annex 1 provides the detail of the approach.

Figure 6: Simple sequence of CDS work

3. Governance

3.1 Choices for development management

Land use planning system development invariably introduces the matter of governance. Land, its use and development that proceeds from it – can lead to conflict, nuisance, poor service delivery and poor accessibility – if not coordinated efficiently and effectively. Good governance is essential and the principle of subsidiarity should also be contemplated (enabling governance at the lowest practicable level in the society).

There are over 80 villages in the greater Apia urban area (AUA) with many roles and responsibilities still being addressed at the national level. Choices in governance to support effective land use and development management include:

- Centralised decision-making and the role of national agencies;
- Opportunities for a future City Council;
- Opportunities for a joint governance arrangement, with roles and responsibilities sharedbetween national agencies and village councils; and
- The continued role of the village councils.

At a number of meetings there was comment on the opportunity for PUMA to foster leadership, institute change and a new approach to planning for the urban area through the new framework (i.e. the City Development Strategy). Stakeholders noted that the new framework comes at an important juncture in the planning system, where change is occurring (e.g. significant urban drift to outer areas, major economic developments etc.). They suggested the new framework should set bold statements to address the decisive issues that are likely to determine Apia's future.

In some instances, representatives expressed a desire for village councils to have a role to play with central government; some saw specific roles only by village councils; and others still saw the need to relinquish the right to central government to provide the overarching guidance. Some suggested that the churches could also have a role to playwhilst others did not have strong opinions. Many times the discussions were linked to the fiscal responsibilities required to govern. Equity was also a common concern. Some expressed the desire for the Government to continue its role but to act fairly in identifying village initiatives for financial support.

The prospect of an overarching City Council comparable to other international capital cities was discussed – to assist with coordinating decisions among village fonos and to act as the conduit between national and local interests. However many were unclear on the role acity council could haveand how various village councils could have representation. Generally, in terms of coordination, comments noted the lack of planning and collaboration between the key agencies at the national level which led to the loss of resources, poorly coordinated development and lack of accountability. Remarks questioned whether another arm of government would exacerbate some of these matters, rather than improve the situation. The operation of another tier of government would also come at a significant cost.

Stakeholders acknowledged that PUMA has and should continue to have a central planning role. However many questioned its effectiveness in providing the strategic urban management functions (e.g. strategic land use planning and coordinating the delivery of urban services). In this respect, several stakeholders stressed the need to strengthen the Agency's coordination and regulatory role. Many felt that PUMA should be given sufficient authority and resources in government decision-making processes to cause better coordination between Government agencies responsible for land management, urban planning, infrastructure planning and essential service provision.

Some suggested that this should centre on strategic land use planning, linking implementation of pertinent parts of the Sector Plans and coordinating implementation mechanisms for infrastructure provision. Many suggested the status of the PUMA should be raised by either becoming an independent Authority or reporting directly to the Prime Minister's Office. This would help deliver key urban renewal projectsand

minimiseindividual agency interestsadversely affecting urban planning decisions. An alternate suggestion was for the role of the Agency to be primarily focussed on strategic planning and direction for the delivery of sustainable growth scenarios, with other control functions being shared among urban development management agencies. It was hoped that such an option would ensure agencies worked collaboratively to be more proactive in identifying infrastructure needs and delivering infrastructure prior to or concurrently with development.

The majority of the village consultations confirmed that the traditional governance systems should not be interfered with. The Village Councils should continue to regulate village and family activities on customary land. It was recognised that traditional authorities need to be consulted on government projects that affect their respective villages.

Community discussions did signal support for some type of zoning mechanisms that incorporate traditional practices (such as evening curfews). However it was confirmed that those village fonos interested in following this option up should progress it through the scheduled SMPs.

In terms of improving local governance, planners, urban managers and traditional village representatives were torn between the desire to maintain tradition and conventional practices, and the rational introduction of measures to address the mounting pressures that were beyond local village councils' means to manage. The challenge is to consider how traditional mechanisms can work and be utilized as planning tools in a modern planning system. It was agreed that the good resourcing and timely scheduling of more detailed SMPs could be used to broach choices at the local level, rather than being conceptual matters discussed at the national level.

It was accepted that by using environmental planning approaches that appreciated human rights and social justice principles, traditional based local governance could be accommodated through the SMPs. The bottom-up local decision-making and top down guidance through the broader operation of the PUM Act, 2004 provides the mechanisms to adequatelyrespond to the challenges of urbanization, climate change and the need for disaster risk reduction.

3.2 Options for Good Urban Governance

Annex 2 provides further information on current and prospective governance options.Sections 8 and 9 of Annex 2 discuss the existingand likely roles of village councils and PUMA (and thereby other national agencies). The Village Fono Act, 1990 and the Internal Affairs Act, 1995 both inform theroles of village fonosas well as the roles of national government institutions in servicing village fonos. While the PUM Act objectives may introduce new mechanisms, the flexible nature in which Sustainable Management Plans (SMPs) can be formed and implemented enables opportunities to support existing roles and responsibilities in a manner which strengthens local governance.

3.2.1 Structure

While there is no provision in the Constitution for a system of elected local government, the Village Fono Act, 1990 validates the authority of the village fono to have authority "in accordance with Samoan custom and tradition". The Internal Affairs Act 1995 establishes the [Ministry] Division of Internal Affairs, whose purpose among other things is to make provisions to recognize and organize village authority, and to advance local government through the development of village authority (s5(1)). "Local Government" is defined as including the Government of Samoa and the administration of a village by its fono. It advocates a partnership in governance.

So in effect there are mechanisms already that recognize a system of local government. There has been some question whether non-traditional areas like Vaitele fall under the provisions of both the Village Fono Act, 1990 and the Internal Affairs Act 1995.

Reference to a city council or council is in effect reference to a local government authority, usually charged with delegated authority to perform State functions (UK Westminster system) aligned with urban development and management. In Australia and New Zealand there is a question of the efficacy of multiple local government authorities in managing urban development, and over the last 20 years in both

countries there has been an effort to amalgamatelocal authorities (or "Councils") into larger authorities. Other than cost savings the argument has been that geographically larger local authorities would have a broader vision of development and environmental pressures and would be able to respond more strategically. However, Australia or New Zealand do not havethe defined and socio-cultural roleof the existing village fono structure, whichis a fundamental consideration to land use planning in Samoa.

Formation of a City Council, for Apia would entail gaining agreement among the 80+ village fonos. In addition to the administrative complexities, the process would effectively bring in a third tier of governmentwhich may require constitutional and national legislative amendments. The ongoing costs for this in a relatively small city would be extremely high, and there is insufficient evidence that any better coordination and form of urban development would result.

Supporting an improved urban governance structure will lead to better coordination of infrastructure and essential services; improved vertical links in governance and the coordination of 'bottom up' and 'top down' decision-makingconsistent with the principles of subsidiarity. .

3.2.2 Coordination

It is noted by many that PUMA has significant competing demands betweenApia city and national responsibilities. These frustrations may partly be linked to administrative (and possibly legislative shortcomings) in a quickly changing environment.

More so than ever before development and environmental pressures at the local community level are beyond the traditional governance role of village fonos and each call upon the national government for greater assistance. Annex 2 notes that there were challenges with the introduction of the PUM Act, 2004 in terms of cross government coordination and decision-making. Although significant advances have been made, many stakeholders in government noted there remained room for improvement.

Without the use of strategic spatial plans, generated under the Act (like the City Spatial Plan and this CDS), the PUMA has functioned more as a development control agency rather than a land use planning agency. .Administrative application processes have often relied on limited guidelines and criteria. These wereoften delivered through short-term foreign development assistance projects; were not very comprehensive or relevant – failing to assist with strategic land use planning.Despite the best efforts of PUMA, the system has become bureaucratic and costly in terms of the levels of input required by personnel and the delays to decision-making.

3.2.3 Roles

PUMA's role is stipulated in thePUM Act, 2004, and key areas are summarised as follows:

A. Strategic spatial planning

Under this core function, PUMA is responsible for land-use planning. This is to be achieved through guidingland use and decision-making through the production of strategic plans, including SMPs. Land use planning should examine the potential best location and mix of use that could be achieved to facilitate orderly use of land and to maximise economic returns of uses and activities while maintaining social equity and inclusiveness.

B. Development control

PUMA is also responsible for the regulation and control of theuse of land to ensure sustainability and assessing potential environmental impacts of development. To achieve this outcome PUMA is mandated to issue development consents for certain development forms and activities.

C. General environment pollution control

PUMA also has a function specific to amenity and nuisance control through ensuring environmental protection and in controlling pollution. As part of their monitoring and enforcement role, the Agencyis responsible for measuring and controlling many forms of pollution and nuisances,such asnoise, odour and waste.

While PUMA is responsible for urban development and management,as intimated in Annex 2 both the Internal Affairs Act, 1995 and the Village Fono Act, 1990 deal more specifically with local governance. The Ministry of Women Community Services and Development (MWCSD)is mandated to manage and assist villages through these legislative frameworks. One of the issues that needs clarification is the role of PUMA and the MWCSDwith respect to governance in local areas. The current institutional arrangement enablesMWCSD to engage ingovernance in traditional villages but not within non-traditional areas like Vaitele. There would be benefits for all if the institutional framework to implement all three legislative frameworks were integrated.

Other than local governance facilitation there may be other worthwhile benefits. The MWCSD has the mandate to implement the the Community-Centered Sustainable Development Programme (CCSDP). The project evolved from an Early Recovery Programme Strategyfollowing the tsunami in 2009 and Cyclone Evan in 2012. It continues to assist rural communities by encouraging communities to be self-reliant, both economically and socially, through improving and supporting livelihood and economic options. The programme supports villages that were severely affected by the tsunami and cyclone through the formulation of Village Sustainable Development Plans (VSDPs). It commenced with pilot projects in 3 villages in 2009, and was extended to assist 25 villages in 2010 – mostly those severely affected by the events of 2009 and 2012.

One of CCSDPs objectives is to build gender-sensitive community capacity to sustainably manage environmental and income generating initiatives that result from inclusive community-led planning processes. The project also supports communities in building an eco-friendly economy that incorporates adaptation and risk-reduction measures (MWCSD).

As the generation of Village Sustainable Development Plans has synergies with SMPs, there may be lessons learned that would assist PUMA in providing an effective village level governance framework to ensure the success of the SMPs' implementation.However, it is understood that the CCSDP did not target any Apia base villages.

Coastal Infrastructure Management Plans (CIMPs) were also generated by some districts/villages through the Coastal Infrastructure Management Strategy work of 2001 and 2005. These CIMPs are currently being reviewed under the large PPRC and Adaptation Fund climate change projects. Where this work coincides with Apia based villages there is an opportunity to ensure that SMPs benefit from the improved source of information on coastal processes and vulnerabilities. It is understood that Government is considering use of the PUM Act, 2004 and other legislative platforms to institute the revised CIM Plans. This will effectively givethe revised CIMPslegislative-based implementation capability, missing in 2001 and 2005 and which resulted in varied levels of implementation.

3.3 Prominence of PUMA

As a decision-making unit within the Ministry of Natural Resources and Environment (MNRE), PUMA is currently viewed as lacking the 'teeth' to ensure effective coordination among government development agencies and authorities. Additionally, there is a lack of human resource capacity to assist with strategic planning and ensure compliance with and enforcement under the PUM Act, 2004.

Stakeholders recognised that transfer of PUMA to an independent authority, under its own Ministry or under the Prime Minister's Office, could improve coordination of development and urban management.

Given the coordination role of PUMA, it was recognised asimperative that PUMA has adequate resources and the right institutional setting to ensure success in its role and responsibilities in rolling out and implementing the SMPs effectively and efficiently.

Part 2: Situation Analysis

4. Existing Situation

4.1 Existing Laws, Regulations, Plans & Policies

Annex 2 provides a summary of the status of the PUM Act, 2004, referring to laws and regulations, plans and policies related to land use planning in Samoa. It gives some further context to Sections 1 to 3 above.

4.2 The City Area

The CDS area covers four (4) districts including Vaimauga East, Vaimauga West, Faleata East, and Faleata West. There have been numerous metrics used previously to define the City, from offset measurements from certain intersections, to aligning with statistical return districts such as Vaimauga East and Faleata West.

The defined City area was recently extended to capture the prime urban land use changes that have occurred over the last 10 years. Within this new city area there are 84 villages and a total population of some 63,000 people. This is 35% of Samoa's total population of 180,000. In terms of numbers the Vaitele is the biggest village with a population at the last census of 7,180 people, the smallest being Matafele with 7 people.

The City area is some 139 km² (13,900 ha) which represents 5% of Samoa. Approximately 65% of this area is mid-slope to upper catchments of rural and forested areas, with much of the city occupying the coastal plains. The population density of this area is approximately 4.5 persons/ha, which is considered low. However this is skewed by the majority of the City area being rural and forested upper areas.

The population growth rate for the Apia is currently 0.4% per annum with the national average being 0.63% per annum. The average age is 21.9 years with the National average being 20.7 years. The explanation for these lower than national average statistics are not conclusive but have been linked to: the strong urban and rural-residential growth west of the City toward the airport; the high emigration rate of young students and qualified people from the City area.

The strong population growth in the north-west Upolu Island now sees this area account for over 55% of the population of Samoa. This urbanization of previously dominant villages along the coast was recognized in the Apia Spatial Plan, with the nomination of a potential future urban centre to the west of Vaitele.

Figure 7: The City Area for the CDS

4.3 Present Issues

Participants of forums from the National Urban Policy, the City Spatial Plan and this work contemplated whether there was indeed a need for better land use planning at this juncture of Apia's growth.

Overall there was consensus on the needs for better coordination and joint visions for the future. Identified issues with the present progress of urban development included:

- complexity in resolving conflicting traditional and urban aspirations;
- continuing land-use conflicts;
- infrastructure conflict and inefficiency in provision;
- Inappropriate use of land (ecologically sensitive; very steep; flood proneetc.);
- uncoordinated response to climate change impacts;
- limited control over energy efficiency;
- poor responses to population/demographic changes;
- urban economic inefficiencies;
- Little control over urban identity/character (built form, views/vistas, etc.)

It was recognized that some positives have come about since the introduction of the PUM Act, 2004. Reference was made to the Vaitele subdivision area (Samoa Land Corporation) which in 2006 featured spasmodic take up of land, poor servicing, limited sealed roads, poor drainage and lack of defined access ways to properties. There were few jobs in the vicinity and crime especially by youth was prevalent. Since then the residential areas have seen much progress in investment, roads are all sealed, water issues are not as profound and gardens and urban agriculture has been well established.

The Vaitele SMP has set a solid framework for investment and coordinated development in the Vaitele Industrial Area. There has also been the setting aside of land for a bus terminal and public open space and communal areas.

Plate 1: Old VaiteleSLC Subdivision – poor access and drainage

Plate 2: New Subdivision areas – improved table drains

Plate 3: Old VaiteleSLC Subdivision – unsealed roads prevalent

Plate 4: New Subdivisions – sealed roads

4.4. Resource Inventory & Assessment

To get a better understanding of the existing situation and to assist with the recognition of the key pressures and drivers, the work aggregated as much geographic and related data and information as was available.

Use of GIS has enabled the generation of a multi-layer database that will provide a decision-support tool for the planners at PUMA. The multiple layers of GIS data with tied relational databases have been incorporated into a grid system over the whole city. Simple and advanced queries by location or area will reveal the nature of all constraints, hazards and features within a defined area.**Figure 8** provides a representation of the broad approach in terms of mapping of constraints, risks and opportunities as well as the spatial analytical process used to date.

These assessments cover the bio-physical, social, cultural, economic elements of society and surroundings. They firstly identified the existing situation, characterizing the issues and location of hazard areas. Combining constraints and hazard mapping was used to identify opportunity areas. It also provided the pathway for more in-depth cross-sectoral analysis. These assessments formed additional layers of data that were used to inform the CDS. This part of the CDS outlines the technical assessments and associated outputs that were prepared.

As the range of information and data continues to be assembled, PUMA continues to use the Geographic Information Systems (GIS) with associated databases to assemble, aggregate and manage the data. This allowed consistent and linked data and information to be used in the generation of the CDS, but also it will assist in the later generation and implementation of SMPs.

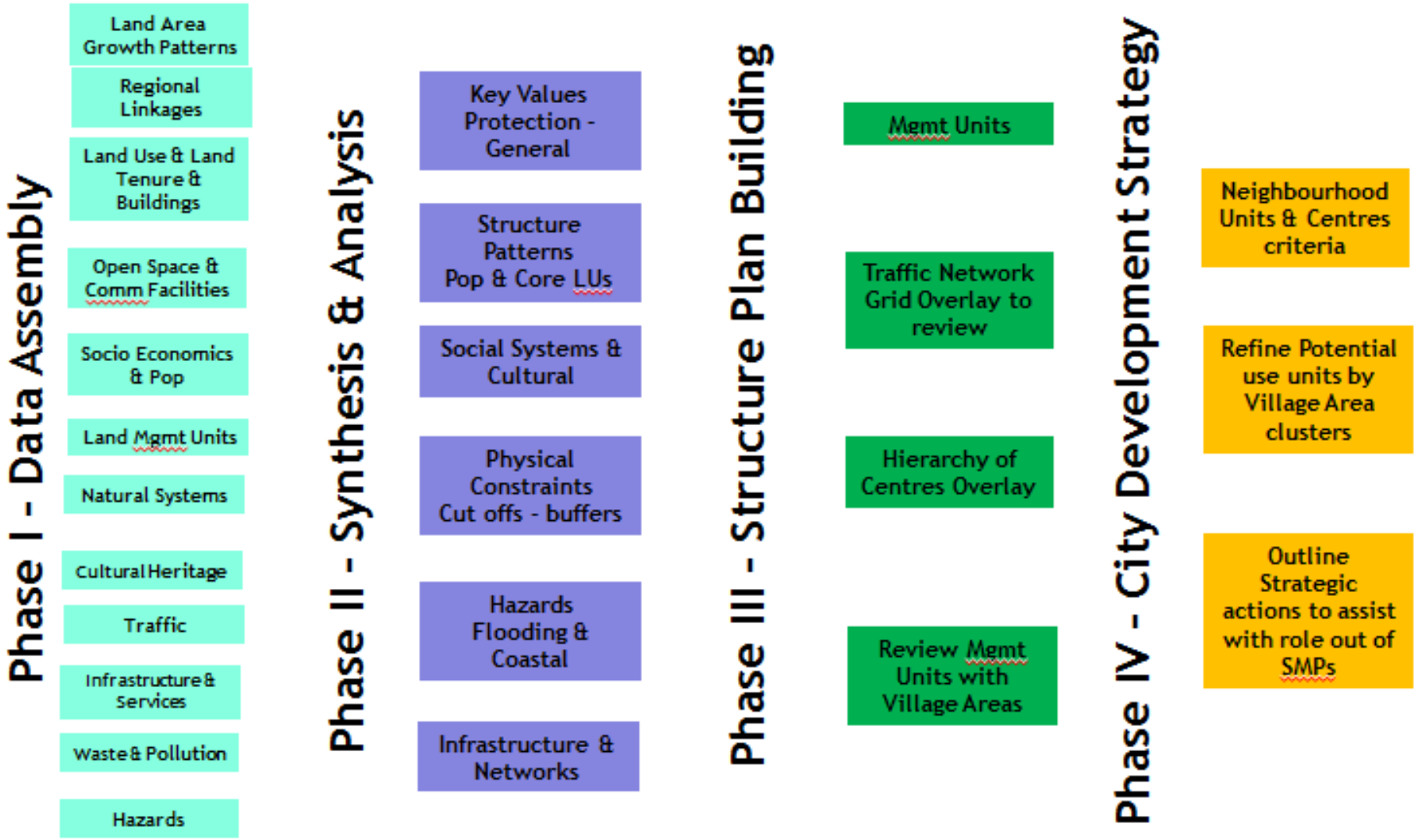


Figure 8: Managing data analysis to assist with the CDS

5. Settlement, Tenure and Land Use

5.1 Land Patterns

Review and analysis of land use and settlement patterns was the starting point for City Development Strategy, consistent with any land use planning strategy orMaster Plan. Key aspects considered were: land ownership, land use, land trends / changes in use over time, land supply and development activity (whether Development Consents (DC's)) have been applied or not). Each of these aspects providedthe insight into: how the surrounding land is currently being used; the nature of change in land use, the success of development, where the problems are, and how land can be better used in the future. People function in patterns. The natural systems function in patterns and economic development takes pattern form. Sustainable development pathways are created by bringing these realms together. Land use history and patterns enable some comprehension of how vulnerabilities and risks to natural and human induced hazards eventuated.

5.2 Settlement Patterns

The prevailing settlement patterns were reviewed using aerial/remotely sensed imagesover a period since 1954 **(see Plates 3-5).** From an early time development has been concentrated about the present CBD and harbour foreshores. Spines of commerce and western forms of housing sprung up along key main roads in the central area, along Vaitele Road and up toward Lotopa as residents sought the mix of urban opportunities and urban farming. Expat residents were seeking elevated views as far back as the early 1960s and this set the precedent for the clearing of steep forested areas.The settlement pattern pre-1980s was very much of a dispersed nature, at a very low density within the urban areas, concentrated along key routes and confined to the coastal plains. Up to the 1970s there was some retention of natural coastlines and wetlands. However from 1970, reclamation of the port area, the Government offices land, wetlands south of Mulinu'u and the coast around and to the east of Taumasena had begun.

Plate 5: Apia, 1954

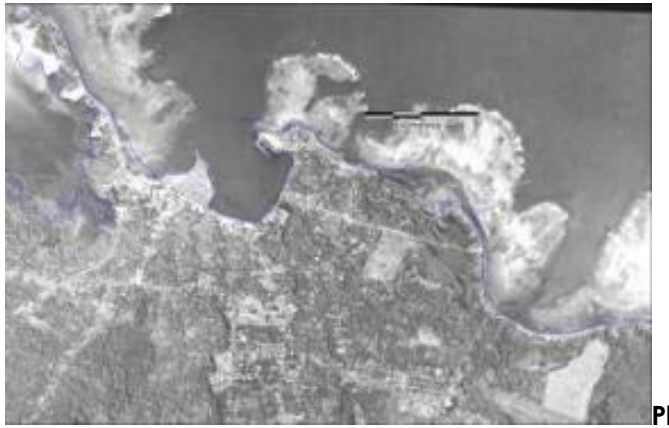


Plate 6: Apia, 1970

Plate 7: Apia, 2006

5.3 Land tenure

Land tenure within Apia continues to be a mix of customary land (traditional areas), customary with 'freehold' mix, government and freehold land. Tenure (i.e. whether traditional customary or 'freehold') will have a significant bearing on the level of influence that the CDS and its recommendations will have on much of the community as most land is still held in customary use-hold. The Constitution, the land laws, as well as many international conventions and agreements give protection to customary tenure, use and management. The CDS will therefore need to lead to incentivized change rather than change based on prescriptive decision-making systems.

Governance is a key matter in implementation of land use planning systems, and noting where traditional customary versus Government subdivided land is located is essential in understanding past patterns and the influence for future development scenarios. Relating the nature of different forms of customary use and historic development also informs where 'zoning' of land may be appropriate (or readily considered by villages) under the subsequent Sustainable Management Plans (SMPs). Moreover reviews, surveys and continued engagement will enable the recognition of village fonos or areas where members continue to be sensitive as regards loss of their customary rights. These areas will required more flexible policy approaches centred on incentivization and guidance.

As with many traditional societies in Pacific Island Countries, the customary rights of the indigenous are 'absolute' and any future decisions on introducing formal zoning regimes need to contend with this. Annex 2 provides additional information on land tenure, customary rights and other relevant human rights.

Many village fonos, matai and community members continue to be sensitive as regards loss of their customary rights - which they feel, may be promulgated through Westminster style prescriptive land use planning systems. Conversely many understand that the complexities of modern urban development and pressures are beyond the village capacity to manage. An equitable system of land use planning driven by community engagement and consensus is essential. A balance between community driven decision-making and national based guidance has been foreseen in the PUM Act, 2004, through the generation of the SMPs. Government is keen to see the continued involvement of village fono in urban development decision-making. Reduced effectiveness of village fono roles' can impact negatively on national government resources as public agencies are called upon to assist with local village based matters.

In traditional village settings the Government has been able to rely on systems that have been used for: consensus building; maintaining basic social justice; providing harmony with development; assisting with community services/support, and strong respect for the environment and basic lawfulness. However societal changes from subsistence to cash-crop and commercial enterprise; combined with population density increases, urbanisation and the dominance of 'individualism' over communal sharing – has placed pressures on existing villages and national level governance.

As communities'economic base and aspirations change, land use and development scenarios become more complex. Development types, scale and intensityare increasing and impacts are becoming more extensive with wider community implications. Changes in living preferences are placing pressure on the sharing and consensus based fa'asamoa. Natural and human induced hazards have villages facing new challenges. Population growth and pressures from a development economy have national government agencies under pressure to maintain basic human services especially in urban areas.

The pressures and driving forces have culminated in the appearance and growth of non-traditional village settings. The Government is increasingly required to provide additional services that weretraditionally covered by village councils. People are settling in peri-urban settings, often away from good transport, basic services and employment opportunities. The communities often comprise people originating from different villages, living on freehold land with less social obligations to their neighbours, as would be the case in traditional

village settings. In these circumstances where national government has been unable to keep pace with the greater demand for dispersed services and infrastructure, unemployment has increased, especially among the high percentage of youth. With low economic activity which stifles employment opportunities, as well as poor services and community activities (such assport, arts and cultural events) often crime has escalated.

Figure 9 shows the land tenure as best as can be determined at this stage as there are difficulties in confirming the status of freehold land in many areas including the CBD. Anomalies are known to exist in the plans included in the City Spatial Plan. The engagement required during the role out of the SMPs is seen an opportunity for villages and their communities to confirm forms of tenure. More importantly it is an opportunity for communities to identify areas where traditional use and therefore tenure is important to be maintained versus areas where they are happy to explore non-traditional development. In this Figure 9 the area shown as the central business area in blue is known to be mostly customary but with many uses agreed in 'freehold' form. It is therefore often referred to as freehold, whereas the underlying form of tenure remains as customary. In the central business area this sometimes becomes an impediment to Government trying to stimulate economic growth

Figure 10 shows the extensive number of villages within the City bounds. It also shows the location of the four (4) Political Districts which make up the Apia City Area: Vaimauga East, Vaimauga West, Faleata East and Faleata West. Given the status of customary land and the importance of governance in future implementation it was important that the evaluations and the recommendations that stemmed from them were cognizant of the various village boundaries. The sheer number of villages within the City provides some difficulty in reaching consensus in land use and governance choices. This was one of the drivers for the City Development Strategy to be information based.

5.4 Recommended Actions – Land Tenure

The community engagement preceding and during the roll out of the SMPs should strive to address the following in terms of land tenure:

1) Communities should be encouraged to confirm the nature of 'freehold' arrangements on customary land within key areas of the City;
2) Along with this the communities should strive to differentiate the various forms of tenure within their village fono areas;
3) Within customary tenure areas identify those particular areas where traditional use only should be pursued versus areas where villages are supportive of non-traditional forms of development;
4) Communities should debate how families within high to critically high hazard areas can be afforded traditional tenure flexibility to re-locate or re-build in less hazardous areas.

Figure 9: Indicative Apia Land Tenure Types

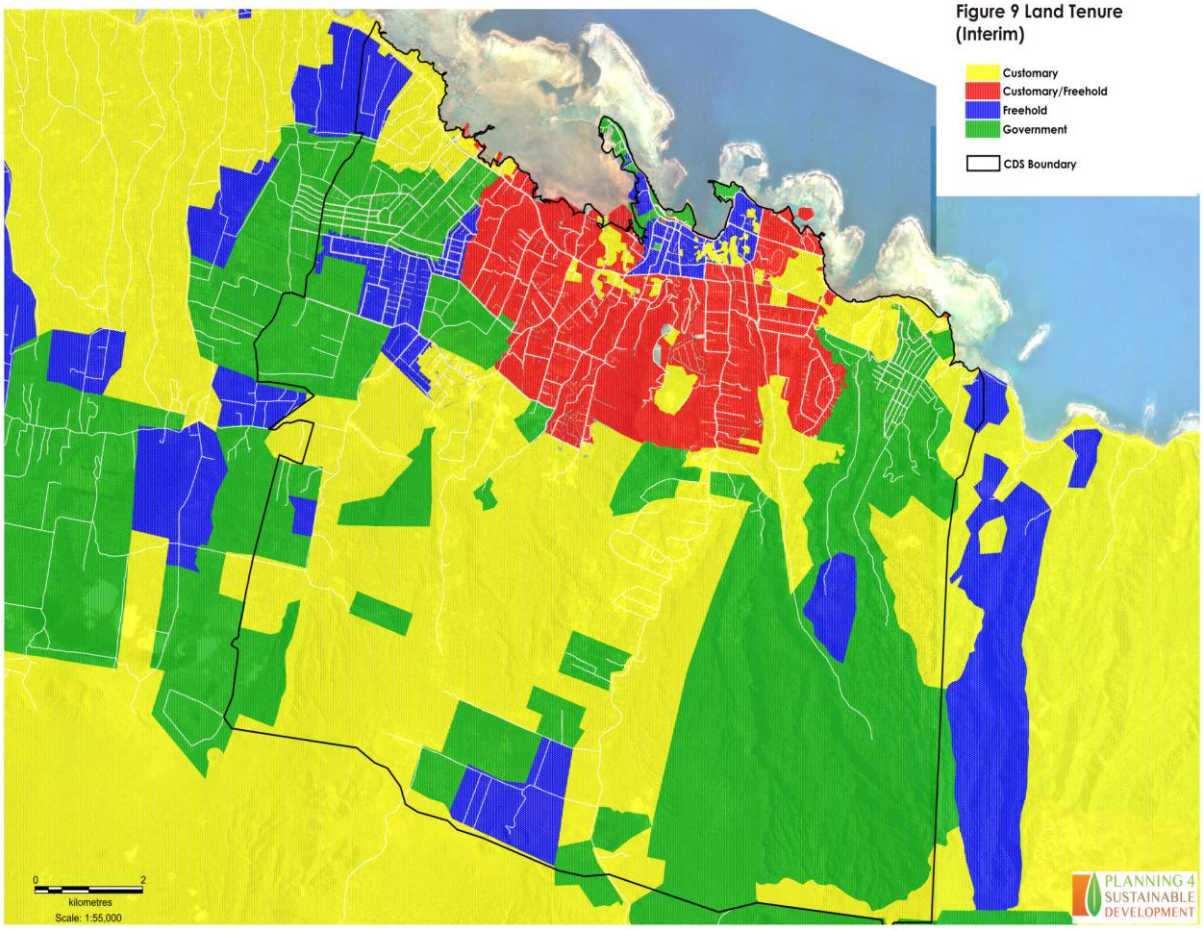
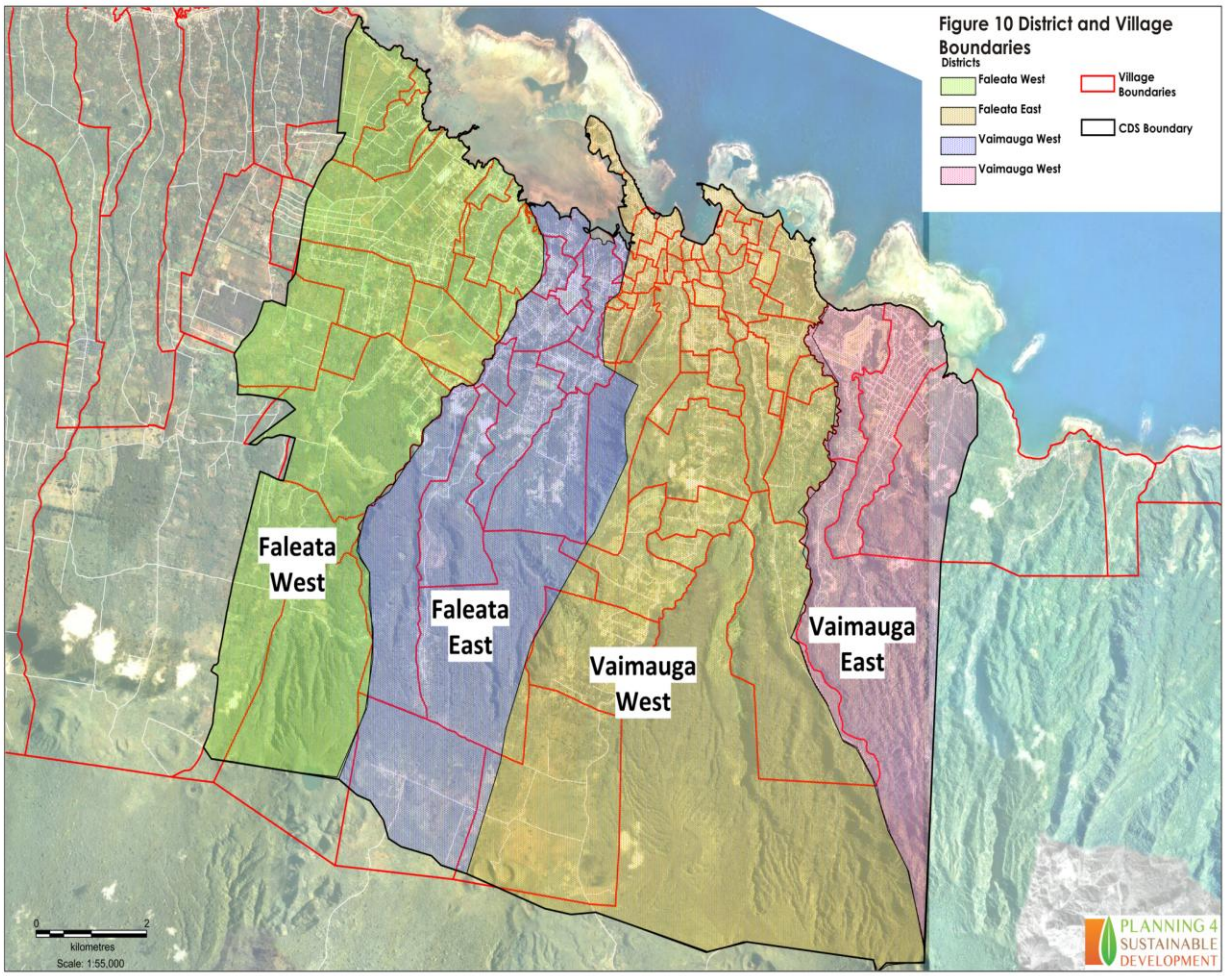


Figure 10: Village and District boundaries



5.5 Land Use

Aland use plan was generated for the City, using aerial photographs, PCRAFI[5] building layer files (SOPAC project) and the findings of an initial land use survey. Many of the data sources were dated and validation of land uses and activities at the city-wide level was limited by time. The City Spatial Plan had updated land use maps within the central business area of the City; however the building and dwelling GIS layers upon which this was based were also dated. The land use validation surveys undertaken in February, 2015 concentrated on identifying areas where collections of new commercial and new non-standard residential uses were appearing – to try and characterize the drivers for such change. The full validation of land uses and development activities about the City is important for the future land use planning programme, especially to support the roll out of the SMPs. This work will be undertaken by PUMAin the lead up to and during the generation of SMPs.

Considering the existing land use was critical in getting a full understanding of the type, location and form of current urban development, to characterize hazards and levels of risks and to identifyconstraints and opportunities for future urban development. Land uses were designated consistent with international practice with variation to suit the unique circumstances in Samoa:

- Agriculture
- Forestry
- Rural Residential
- Residential
- Office / Commercial.
- Industrial.
- Open Space / Recreation.
- Community.
- Institutional / education.
- Conservation / Environmental Areas.

Standardised international land use colours were used in final mapping.

Aerial photographs and brief records can only provide a certain level of information regarding land use. It is important the Land Use Plan (and database), now available to PUMA be fully validated and kept up to date for the MNRE and other Ministries involved in land use and planning and development management. Correlation with building information from MWTI would be invaluable for future auto-updates of the database. Land use assignation was based on building 'use' nomination through the PCRAFI project. There are many anomalies where there are multiple buildings and uses on one parcel of land. The buildings GIS layer upon which the work was originally based is over 10 years old, and will not include many new buildings including significant changes in the central business area and the hospital precinct.

For SMP production a land use survey (and updated Land Use Plan) is required to accurately document land uses. This can be a resource-intensive process butis the key to supporting the effective roll out of SMPs. The land use survey should identify the location, size of lot, type of uses, interface issues, building form/type and site cover. This information can be documented in a table or spreadsheet to be linked with the GIS system. This has occurred at a high level for the CDS and shouldbe improved during the production of subsequent SMPs. The receipt of the LiDAR base should enable updatesto the buildings layer within the GIS.

A validated land use plan canreveal currentconstraints to development and make 'risk' areas more immediately identifiable. For instance, with flood modelling (see below) known flood prone land and waterways can be mapped against known land use, buildings, infrastructure, easements, structures and known habitation.

[5] **Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI)** is a joint initiative of SOPAC/SPC, World Bank, and the Asian Development Bank with the financial support of the Government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR) and the ACP-EU Natural Disaster Risk Reduction Programme, and technical support from AIR Worldwide, New Zealand GNS Science, Geoscience Australia, Pacific Disaster Centre (PDC), OpenGeo and GFDRR Labs.

5.6 Recommended Actions – Land Use

Assisted by the active input of village communities preceding and during the SMP roll-out, PUMA shall address the following in terms of land use:

1) Complete a land use survey and update land use maps and databases to accurately document land uses about the City. The land use survey should enable differentiation of various uses on one parcel of land which often is the case in Apia;

2) The land use survey should identify the location, size of land parcel, type of uses, interface issues, building form/type, and condition and site coverage. This information can be documented in a table or spreadsheet to be linked to mapping within the GIS system;

3) The LiDARbase which has been commissioned by the Government shall be used to update of the buildings layer within the GIS. This in turn shall be used to assist with finalizing the land use survey and mapping updates. LiDAR shall assist with nominating the relative level (RL) of the ground in a gridded format, to enable future minimum floor levels to be applied (see Flooding, section 7.3);

4) The updated land use mapping and buildings layers shall be used with the latest population statistics to quantify the numbers of people and buildings in each hazard classification area applied to the City (low, medium, high and critical hazards). This shall become the baseline for future reviews of the CDS and Structure Plan. The work should reveal the extent of current encumbrances to development and make 'risk' areas more immediately identifiable – so will also entail updating the Combined Risks and Constraints GIS database.

Figure11: Land Use for the CBD – showing Waterfront Precincts

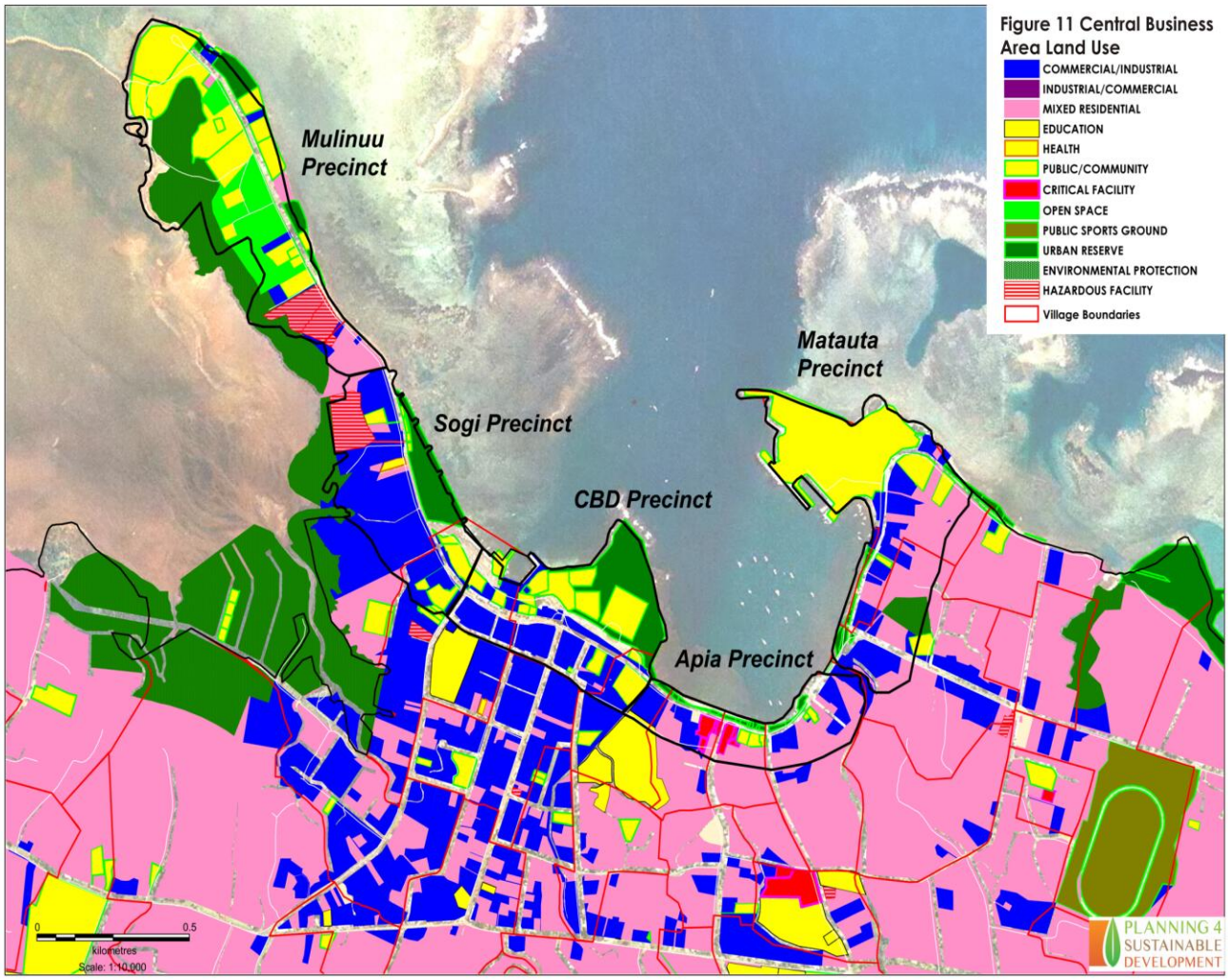


Figure 12: Land Use for the CDS Area

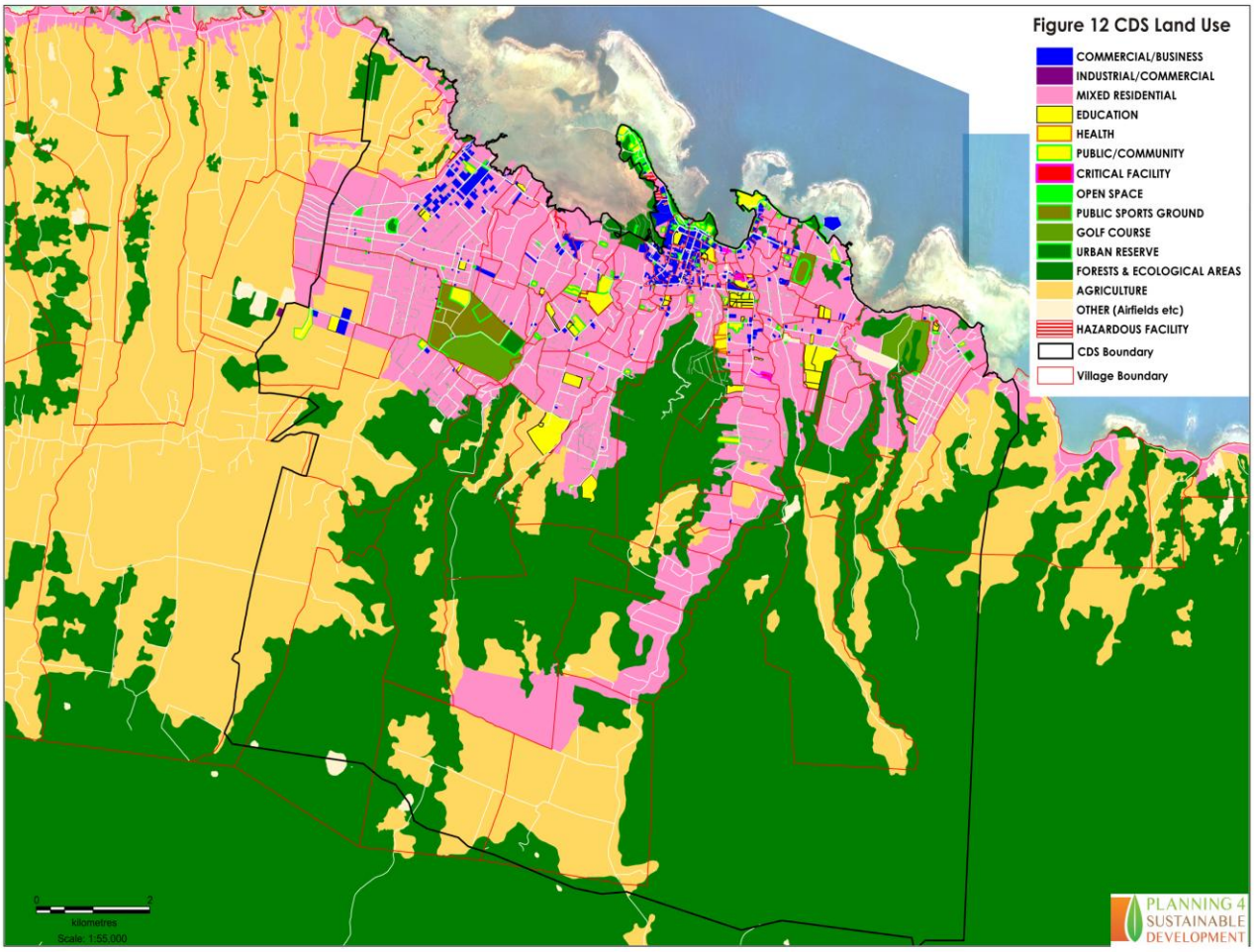
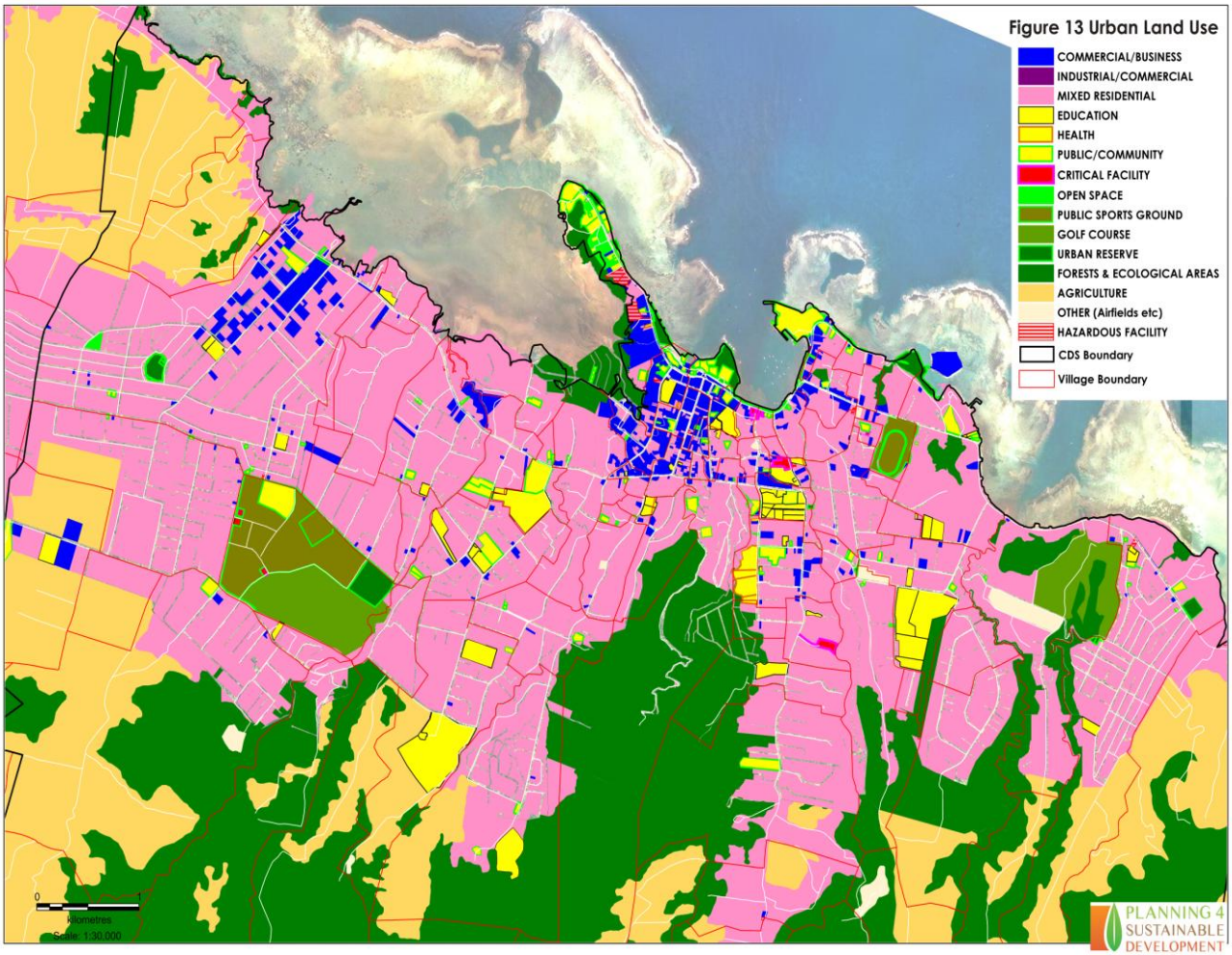


Figure 13: Land Use for the Urban Areas



6. Social and Cultural Assessments

6.1 Population and Social Analysis

It was important that population and social matters beincorporated in the land use planning assessments. Social needs drive the urban planning needs in terms of the location, type and form of development. Data and information was drawn from the Statistic Office to provide an overview of demographic changes and to characterize the potential future social impacts for village, urban and rural land use options.

Social assessment for the CDS was limited to population and demographic representation to determine city widepatterns distinguishable in terms of past development, social changes and likely future needs. Statistical data enumerated at the village level was coupled with GIS layers including the buildings database. The quality and availability of corresponding physical data limited the useability of the statistical information.

Addressing these physical data shortcomings assisted by the receipt of the LiDAR data should assist with the roll out of the SMPs with the correlation of physical built form with population and land use statistics:

- The buildings and structure GIS files can be updated, will see the detailed validation of multiple uses on land and enable reliable correlation with population statistics and demographics;
- The buildings database will be able to accurately differentiate between building types (i.e. dwelling, fale, commercial, vacant, other buildings) to determine accurately population densities and numbers of people within various risk categories etc.;
- Will assist with completion of a fully validated land use plan that will accommodate the correlation population dynamics with the level of service provision;
- With the engagement of communities during the generation of SMPs the correlation of statistics' enumeration boundaries with known village boundaries can be completed;
- The matching of village boundaries District boundaries can be completed.

Some of the urban fringe villages have small portions within the 'urban' area and larger portions that extend into the surrounding 'rural' areas. Statistics for these areas are therefore skewed in terms of determining key land use planning and statistical parameters. With improved bases these anomalies can be addressed.

While the focus for the CDS is on population 'living' dynamics, the enumeration of commercial, jobs and economic data at the Village and District levels will also provide the bases for improved socio-economic analyses for future land use planning.

6.2 Urban Population Trends

Population and demographic statistics from the Statistics Office were correlated with various GIS layers including the map of village fono areas to gain an understanding of past growthand location trends for the City. Population comparisons by village between the census of 2011 and 2001 were able to be performed, as was the determination of population densities by village (noting the anomalies in building data and differences in village sizes. From the strategic review of population statistics by Village the following was produced:

- Map of population numbers by Village in 2011 (**Figure 14**)
- Map of population change by Village, 2001-2011 (**Figure 15**)
- Map of population density by Village, 2011 (**Figure 16**)
- Map of predicted population by Village to 2035 (**Figure 17**)

The key population and demographic findings for the City were as follows:-

- Of a population of 186,340 (Census, 2011), a total of 63,360 people or 35% of the national population are living in or very close to Apia;

- The north-west Upolu area has only 311 sq. km (11%) of the total land area of Upolu (2827 sq. km) but accommodates over 50% of the population of the country. The growth of Apia City and the influence of the location of the International Airport drives much of this. There is major population growth along the coastal strip between Apia and the airport. This will drive land use change and physical development along the coast, and the demand for services from this vantage will also influence the location of land uses within Apia. As much of the pressure is along the coast care needs to be taken to ensure new development areas are outside of high coastal hazard areas;
- **Figure 14** shows the large population numbers to the immediate west of the City area. Options for future land use planning and infrastructure development will need to contend with the demands that will prevail from this population. The present City area has been determined on geo-politic grounds; however the City Spatial Plan incorporated this area. Further review of this area in a land use planning sense should be included in the roll-out of SMPdelivery;
- Within the City area **Figure 15** shows the population changes between 2001 and 2011. The biggest growth in population has been in the outer areas of Vaitele to the west and Vailele to the east. Focus in the recent past has been on Vaitele. The needs of the growing population of Vailele cannot be dismissed in future planning.
- There has been a decrease in population within the inner city areas. This is possibly due to the extension of non-residential uses within and outside the core central business area. Higher levels of available free-hold Government land to the west and east of the City has attracted many. The increase in flood liable land and degree of risk within established inner city areas has deflated interest in redevelopment. While there is a decrease in the population numbers within the core city centre, **Figure 16** shows that the population density in these areas is still high. A falling population in the high hazard areas of the inner city can be beneficial given the expected rise in risk due to climate change;
- A growing number of those living in the outer areas of Apia and beyond are now living outside traditional village and community governance settings. Where traditional Village fono is not in practice, there would seem to be a corresponding increase in demand on Government services;
- Significant emigration has slowed overall population growth rates but there continues to be significant internal migration from rural to urban and between urban settings.
- The growth patterns have been influenced by the availability of government property being subdivided to the City east and west.

There are significant economic and social implications of these patterns of development for Apia and the country as a whole in terms of infrastructure provision and supply of essential services. The need for an east-west infrastructure corridor was proposed under the City Spatial Plan, which will have broader impacts on commerce and employment nodes to the west and south-west of Apia. Premature expansion of the city will increase the costs of urban development, and could affect the functionality of the central business area. Conversely well planned expansion in a south-west direction with the use of a multi-nodal city structure can accommodate a'planned retreat'approach to adaptation and disaster risk reduction approach to development;

The city has a young population with the younger age groups dominated by males. The over 50s age group is dominated by females. These population trends are notable and will affect future planning of services. High youth numbers as a percentage of the total population is significant. Land use planning and development management should focus on facilitating employment opportunities. In the first instance this direction can be achieved through accepting a 'hierarchy of centres' within the city to concentrate commerce and increase market thresholds for employment opportunities. Urban development investments in district centre infrastructure and services would stimulate this economic move;

The average household size was 7.2 persons per dwelling in 2011. While the residential building density per hectare is low, the very high average occupancy rate should be noted in future planning.

Figure 14: Population by Village, 2011

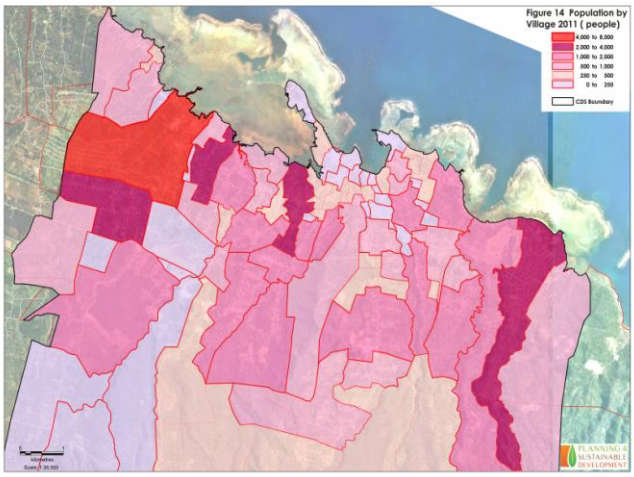


Figure 15: Population change – 2001 to 2011

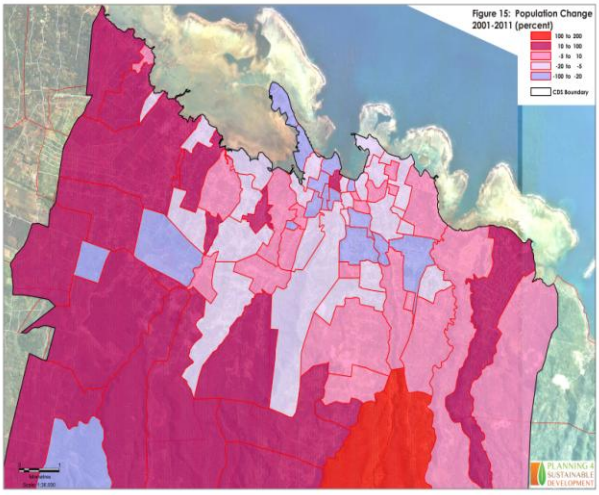


Figure 16: Population Density, 2011

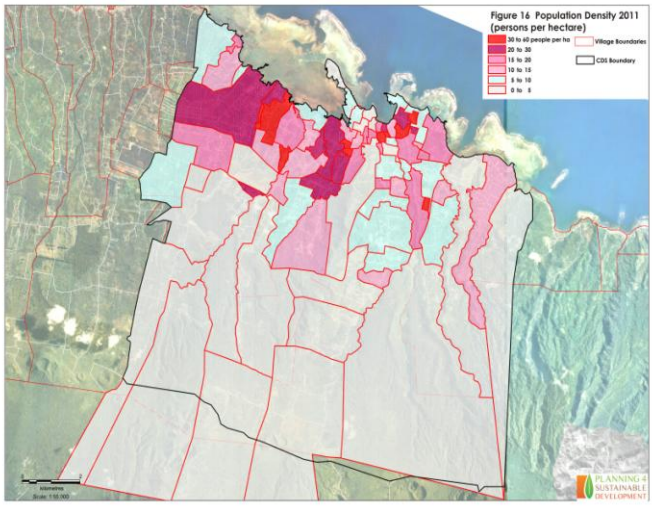
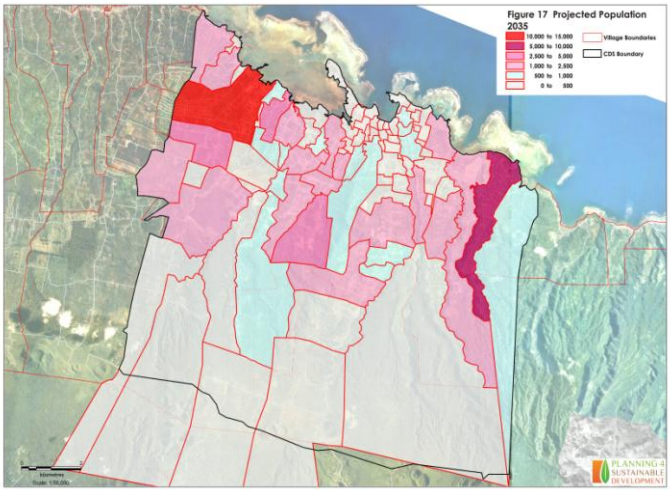


Figure 17: Predicted Population by Village, 2035



6.3 Demographic Profiles

Demographic profiles of areas (by village) will be targeted in the roll out of SMPs and will be built initially using the available statistics data as the baseline. This can be enhanced by using community profiling templates to add to these baselines. An analysis of key data is undertaken to understand who, where and what we are planning for in terms of providing services, providing economic opportunity and understanding the marketability of various land use options. It will also assist in determining the current community needs and that for the future population. Most importantly the demographic profiles, with improved land use and physical development data will provide more accurate information on the numbers of people in various hazard and risk areas. This is an essential baseline in pursuing a climate and disaster risk proof planning system.

The following characteristics of a population garnished through community profiling shall be useful for the more advanced land use planning for SMPs:

- Accessibility
- Serviceability
- Demographic change
- Community issues
- Community services & facilities
- Recreation, sport, park and open space needs
- Economic trends
- Housing affordability and diversity
- Land management (administrative) options

For the subsequent SMP delivery, improved databases and land use maps at the local level shall enable the following demographic trends to be reviewed and analysed:

- **Age and gender**: to gain an understanding of the population profile by determining how many people are in each age group or cohort (5 year intervals i.e. 0-5, 5-10 years etc.). This will assist with correlating population characteristics with future service and community facility needs e.g. school children, young adults, and older people.[6]
- **Education level** – the level of education obtained by the population will provide an insight into the social profile and job prospects of the local people.
- **Employment / Job Type** – This will provide knowledge on how and where people are employed, the types of jobs that are pursued and the level unemployment in each area. This work should incorporate gender differentiations, education levels and people's skills. If jobs in the area do not match the skill sets of the people it is likely a higher percentage of people are looking outside the area for jobs, or are taking on jobs that do not suit them. Characterizing the type of jobs available in a locality enables the characterizing of the types of business enterprises that exist. This can be compared to best practice land use allocation criteria – and responses can be made i.e. provision of more commercial areas within a neighbourhood area.
- **Household income** – This enables the social profiling of the economic status residents and their service needs (usually enumerated as household or individual income of residents). Household income ranges can be matched against basic health and well-being criteria to determine gaps and needs. The level of income will influence the type of services and activities that are required in the area.
- **Household Size & Type** – Analysis of data relating to the household size and type is analysed against the age profile. For instance if there are on average 10 people per house and the age profile shows that over 50% of the population are under 10 years old - it can be concluded that households in that area are

[6] Land use allocation criteria generated to suit the conditions in Samoa are needed. While work is proceeding in enhancing demographic profiles with physical data sets – to enable the correlation of population needs and provision rates, Annex 5 and 6 can be used as surrogate references. They have been generated based on land use provision rates used in multiple states of Australia, moderated in part to suit Pacific Island Countries through work in Niue, Cook Islands and regional level capacity building.

made up of young families. Community facilities and services in that area should respond with an adequate number of places in primary school, with sufficient local health services to cater for child health issues. The type of household relates to whether it is a family, a couple, or an extended family. This is important information to enable the forecasting of the needs of the population in terms of services, open space, education etc.

With improvements to coinciding data sets such as the buildings GIS layer and land use classification, key population planning parameters can be determined by each village and aggregated for the whole City. For instance during the production of SMPs it would be useful to be able to characterize village sizes (ha), with population densities (pop/ha), household numbers, household sizes and household densities (households/ha). This would provide a powerful planning tool to determine the level of adequate servicing for communities. It would also be useful for infrastructure and essential service providers in the planning of their asset augmentation. Most importantly it would enable more accurate characterization of the number of people and assets within medium to high hazard and risk areas.

6.4 Social Assessments for SMPs

The population and demographic profiling completed at the strategic level for the CDS has revealed some important patterns for spatial planning at the city-wide scale. It has also revealed some important gaps in base data layers that should be addressed prior to or coinciding with the role out of SMPs. The following outlines some important aspects that will need to be addressed through the SMP productions:

- The settlement pattern, demographics, existing community infrastructure, services, access and mobility elements of the local community need to be evaluated with stakeholders and addressed in the SMPs;
- Assessment of population and demographics need to consider the likely direct and indirect social and community impacts of land use change, including impacts on schools; nursing homes; medical facilities; emergency services and policing requirements; transport and transport infrastructure; and tourism, recreational and social amenities;
- Assessments need to cover the potential for landholders in the vicinity of the development to be indirectly affected through reduction of their amenity, in relation to visual amenity, noise and the character of the area –with any change to land use or development patterns.
- Assessments need to consider potential impacts on places with particular cultural, recreational or aesthetic values, particularly with regard to significant locations and including impacts on tourism.
- Assess potential impacts of the construction workforce on housing demand, community services and community cohesion and the capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the proposed development.
- Assess local community attitudes towards proposed development and concerns expressed during community consultation processes as part of the generation of the SMPs.
- Assess the residual short-and long-term beneficial and adverse social impacts that are likely to result from proposed land use change.

The potential social issues, both positive and negative, associated with population growth and city expansion includes the following:

- Expanded residential population in the community generally, and in specific localities – and the allocation of land use areas to accommodate this;
- Corresponding need to upgrade water, sewerage services, provide new public facilities and road improvements;
- Potential employment opportunities during planning, construction, and final development and implications for future schools and training centres and operation of those centres;

- Traffic impacts on the road network from increased demand, alternate access requirements, as well as increased through traffic to many areas;
- Noise and dust impacts on present residents during construction phases;
- Direct increase in economic activity due to building work, new commerce and increased demand for industrial and support services as well as health and other community services;
- How access and mobility for all within the community (especially people with disability) is to be accommodated in urban design – e.g. wheelchair access, ramps, wider footpaths etc.

6.5 Recommended Actions - Social

PUMA shall instigate the following prior to and during the production of SMPs:

1) Correlate population statistics and demographics at the SMP and villages levels with the update of the land use, buildings and structures GIS database as recommended in section 5.6 Land Use.
2) Use the updated land use and buildings database to determine accurately population densities and numbers of people within various risk categories by village;
3) Commence Population Profiles for nominated priority SMP areas and villages consistent with section 6.3 to assist with SMP generation.
4) With the engagement of communities during the generation of SMPs correlate statistics' enumeration boundaries with validated Village Council boundaries;
5) Using the input of the village communities' match confirmed Village Council boundaries with the District boundaries to assist with future governance options.
6) Correlate village boundaries, statistical data, land parcel areas, nominated urban preferred use areas, built up areas map layer, dwellings/buildings – to confirm populations, densities and percentages of built up areas versus vacant areas about the City. This work should note the very high average household size of 7.2 persons per dwelling (2011). The outcomes of this correlation work will be:
    - The confirmation of population dynamics by Village Council area;
    - The differentiation of 'built up' areas of villages versus vacant rural areas – so that land supply databases can be developed.
7) During the roll-out of SMPs undertake social assessments highlighting population and demographic patterns and needs consistent with section 6.4.

6.6 Cultural Heritage

Cultural history, folklore, assets and places are important matters for future planning. There is a need to understand the implications of cultural heritage assets on affecting future urban structure and land uses. Cultural heritage sites, areas, places and practices should be protected and celebrated via the SMPs(or subsequent planning tools) as an important feature of local identity and sense of place.

Figure 18provides a preliminary map of key known cultural heritage places, buildings and monuments within Apia. Further investigation of places and practices of cultural and historic heritage significance should be undertaken as part of the SMP process.

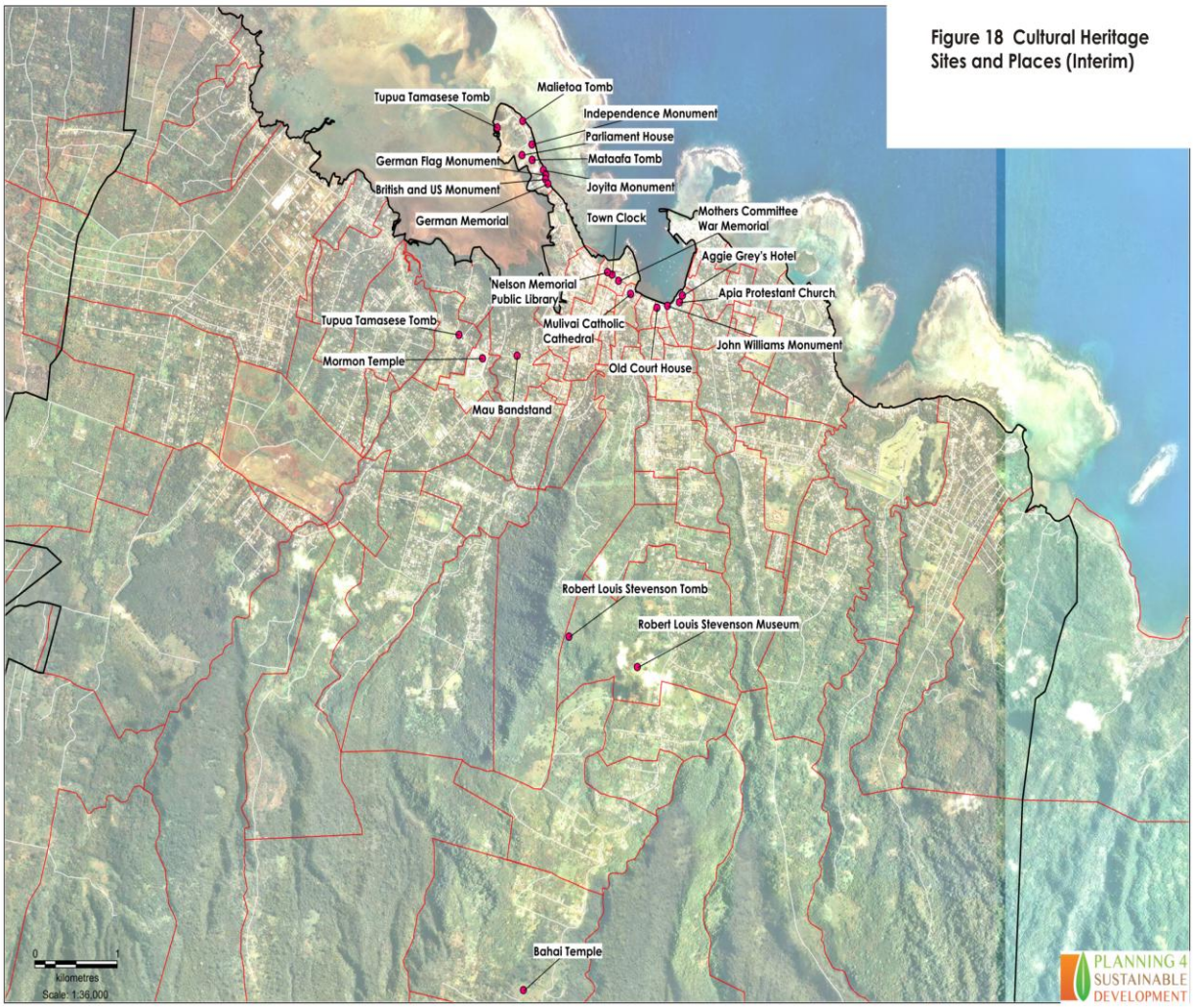
Additionally it is also important for PUMA to gain a better understanding from stakeholders of the location of traditional village areas within each of the village fono boundaries. For many of the urban villages there is a mix of modern development and traditional 'fale' areas within the one village. There is little mapping of these important areas at this time and it is unlikely that this information can be distilled at the City widescale. It should be targeted as part of subsequent and follow-on SMP generation. There is an important link to urban design matters covered in Section 11.

6.7 Recommended Actions - Culture

The community engagement preceding and during the roll out of the SMPs should strive to address the following in terms of cultural heritage management:

1) Work with the village communities to differentiate between traditional village areas of cultural significance (uses and physical form) within each of the Village fono boundary areas.
2) Where there is a mix of modern development and traditional 'fale' areas within villages use community engagement to confirm options of enabling future development as nominated by the participants and protecting culturally significant traditional areas.

Figure 18: Key Cultural and Historic Heritage Places



7. Environment and Natural Features

Apia is located within a unique setting on the island of Upolu. Approximately 40% of Upolu is comprised on steep slopes related to the volcanic geological formation of the country. The peaks rise to about 1000m in Upolu along a central island ridgeline. It is this ridgeline that provides the backdrop to Apia. The coastal plains of the City have historically accommodated urban development, however over the last 15 years there is a tendency to see urban drift through the mid-slopes and up into the elevated steep areas.

In terms of ecology and habitats there a 5 major common vegetation types present in Samoa's terrestrial ecosystem: littoral vegetation, swamp and herbaceous marsh, rainforest, volcanic vegetation and secondary or disturbed forest. The lowland and upland rainforests, with wetlands and mixed upland swamps – have slowly been reduced since the introduction of agriculture in the mid-1800s. Many forests were cleared for coconut and rubber plantations, and more lately for intensive farms and logging. Cyclones since the 1990s have been attributed to further decline in the native vegetation cover. The decline has been to the point where most of the forest cover in the mid to higher elevated steep slopes are degraded regrowth or are dominated by non-indigenous species.

Upolu is surrounded by coral reefs, sea grass beds, coastal marshlands and mangrove forests within the intertidal zones. While common to the Pacific the marine environment in terms of biodiversity is not rich or diverse. However isolation has led to high levels of species endemism, leaving an ecological fragile marine environment – with many species having limited defensive mechanisms to ward against invasive species. About Apia there has been much modification of the coastal environment over many years, from reclamation, to blowing channels through the coral reefs to filling mangroves and developing over coastal plain waterways.

Approximately 80% of the country's 403km coastline has been classed as either 'sensitive' or highly sensitive to coastal erosion, flooding or landslip. Much of this has been as a result of the degradation pressures that continue.

The mapping for the CDS of environmentally sensitive areas has relied on existing information. Much more work on ecological classification is needed especially as regards to urban ecology and aquatic ecology. Thefollowing key matters need to be addressed through the role out of SMPs, or as strategic separate City wide assessments:

- **Flora and Fauna**: Identify any existing and potential fauna & habitat areas/zones within the City. What are the flora and fauna features of the particular areas? Are there any areas where flora and fauna should be conserved / protected? What is the overall biodiversity quality of the areas? Are there any sites that should be rehabilitated to improvebiodiversity?
- **Waterways**: Identify any waterways (natural springs, pools, rivers, wetlands, waterholes etc.), as well as all drainage paths in the existing built up areas. In addition to locations the work needs to assess how they interact with or service the built environment and the capability for rehabilitation to assist with flood and water quality management. Are there any contamination or pollution issues for waterways from urban development? What quantity and quality controls can be used as part of the development layout and form?
- **Groundwater**: Groundwater systems are significant in terms of potential to supply additional water resources in times of need. It will also be important that development does not lead to longer term impacts on the groundwater resources. The location of present and future groundwater extraction points, hydro-geological features and implications from urban development need to be characterized.
- **Landscape Values**: What are the key landscape features and topographic features of the study area i.e. views to ranges / high points, key views through and about the village. Identify

any key view lines i.e. to landmarks, natural features etc. that can be advanced through layout and built form assisted by suitable landscaping.

From these analyses, PUMAwould be in a better position to determine how to protect natural features, or rehabilitate landscapes etc. Future land use planning via the SMPs needs to determine where and how developmentshould be restricted due to natural features: to enhance overall ecological systems; improve amenity and facilitate better stormwater and flood management – to reduce climate change as well as disaster risks.

7.1 Sensitive Ecological Areas

Existing literature and mapping data was used to depict the ecologically sensitive areas about the City of Apia. While this reflects biodiversity values in a regional context, there are extensive gaps with regard to urban ecology and aquatic systems within the urban areas. Such information would be invaluable to assist with the identification of viable local and regional corridors and possible habitat for threatened biodiversity.

The wetlands and mangroves of the MoataaBay area are significant assets that need to be protectedand enhanced. Wetlands and mangroves such as these and those about the Vaiusu Bay can assist with stripping pollutions from water run-off and can buffer against the thermal stresses upon reefs from ocean warming and acidification.

Agreed definition of urban waterways especially within the coastal plain urban areas is a major shortcoming for planning for the future. Ecologically healthy waterways provide the linkages between the ridges to the reefs. Re-defining urban waterways can provide sufficient areas for measures to improve run-off water quality; to reduce water quantity and velocity during floods and to provide the social linkages between urban villages (i.e. through pathways ana bike-paths co-located along waterway corridors.

The majority of comments received during consultations were focused on the ecosystem degradation, including: primarily in the upper catchments from uncontrolled subdivisions; degraded wetlands; and the reclamation of mangroves and pollution of the coastal interface area.

Other concerns identified were: the general encroachment of unregulated development on higher and steeper slopes of Mt. Vaea and associated hillslopes; the erosion and localised flooding this causes; declining water quality of the waterways, the receiving bay and harbour, and solid waste management. The feedback suggested that more needed to be done at the strategic level as well as during development consent processes to control development and protect natural urban assets.

In terms of increasing resilience to climate change, maintenance of the quality of catchments, waterways and land cover is essential. Healthy ecosystems increase coping capacity, and enable quick rebound after disasters. Major changes to land cover of catchments will exacerbate flooding of mid to lower slopes. Clearance of mangroves and wetlands reduces the resilience of the coastlines and inhibits species regeneration and survival after disasters. Waterways are the conduits of stormwater and runoff from urbanized and hardened surfaces. They are also the conduits of the pollution to the coastal environs. Healthy waterways can provide healthy landscaped features for social cohesion and accommodate open space spines which can include recreation facilities and bike paths and walk paths.

7.2 Recommended Actions - Environment

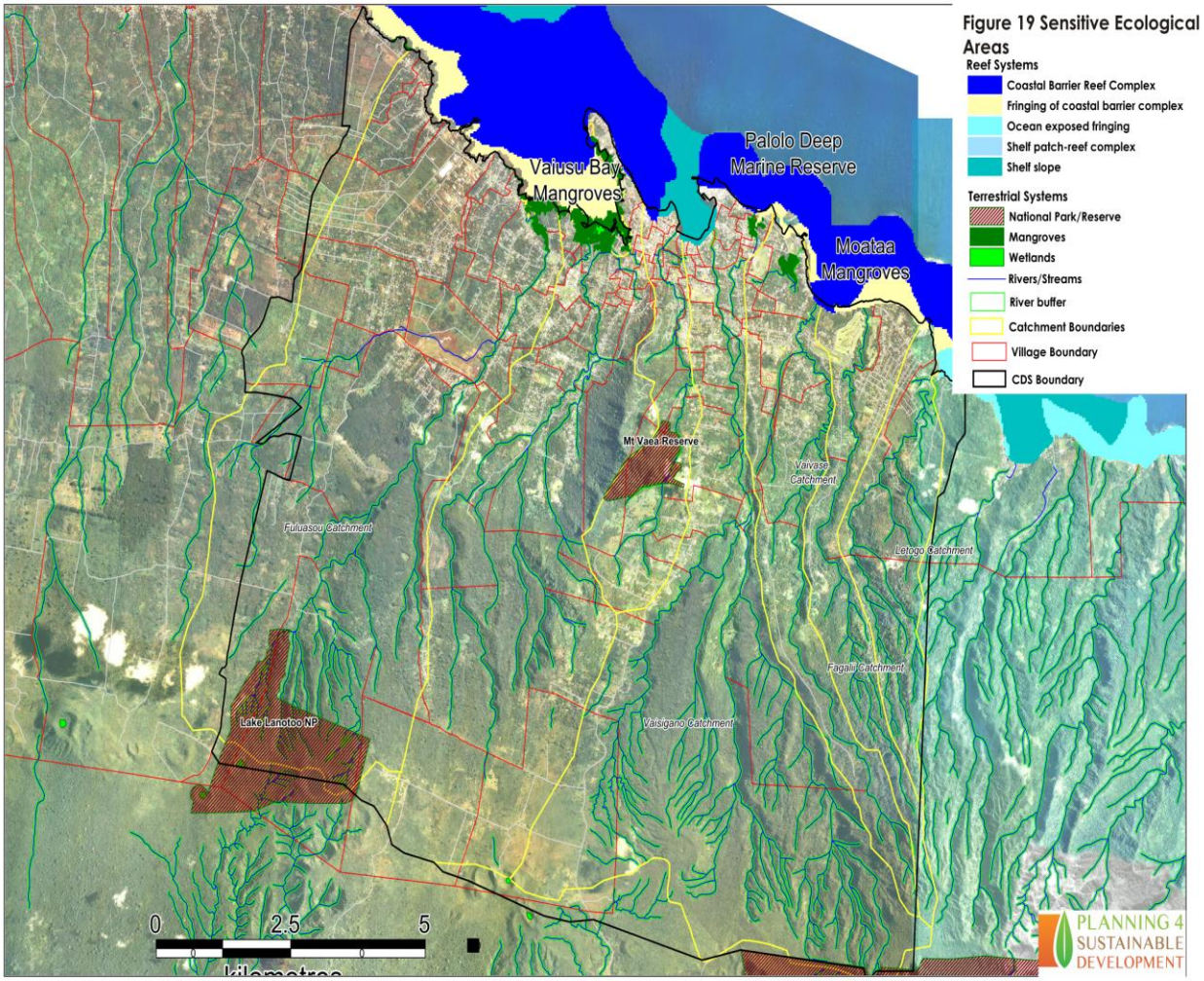
There are a number of priority needs for future planning to assist with ecosystem based adaptation and to buffer against disasters. The following actions need to be addressed either prior to or during the roll out of the SMPs:

1) Filling of mangroves, wetlands, waterways and drainage-ways continues over the coastal plains of the City. Community education is needed to address these issues and relate the implications to catchment and flood management. The wetlands and mangroves

of Moataa Bay and Vaiusu Bay are of significance and should be the priority for rehabilitation and protection;

2) Ecological assessments and classification of urban ecology and aquatic ecology within the City shall be prioritized. As an initial important step the engagement of village communities through the SMP production should:
   - Identify habitat areas/zones within the City;
   - Identify any waterways (natural springs, pools, rivers, wetlands, waterholes etc.), as well as all drainage paths in the existing built up areas;
   - Agree on which waterways and drainage-ways (urban waterways) need to be protected and free of development. This will entail communities identifying the setbacks of development from waterways/drainage-ways (flood assessments/modelling will dictate a required setback from the major waterways);
3) Once waterways and drainage-ways are identified by the community the Waterways mapping layer shall be updated in the GIS;
4) The Water Resources Division of MNRE with the Samoa Water Authority shall assist by reviewing the Structure Plan and identifying implications for groundwater protection. This should commence with the locating of all present and future groundwater extraction points, hydro-geological features and determination of needs as regards suitable setback buffers between urban development and groundwater priority areas.

Figure 19: Sensitive Ecological Areas



7.3 Water Resources

There is much synergy between the water resources and the land resources'considerations for the City, especially as regards 'ridge to reef' processes.

The review of work on waterways, local flooding, coastal inundation and drainage follows the landscape approach of integrated water resource management principles established by the Global Water Initiative (among others).

In terms of stormwater, hydrology, local flooding and drainage assessments the Coastal Infrastructure Management Strategy work of 2001 and 2005 remains the only reference work that covered flooding and inundation hazards for the whole City area. The CIMS nominated coastal flooding; coastal erosion and landslip hazards along the coasts of Upolu (see **Figure 20** below).

The recent modelling of the Vaisigano Catchment by Water Technology Pty Ltd (Watertech) represents the most advanced work for the City. It included the determination of the 1:20, 1:50 and 1:100 flooding and coastal inundation levels for the lower catchment. The work accounted for terrestrial run-off and coastal processes jointly incorporating climate change scenarios (e.g. 1 in 100 river + 1 in 20 coastal inundation; 1 in 20 river + 1 in 100 coastal inundation).

Figure 21shows the current flooding and inundation areas under the present climate scenario. **Figure 22**shows the inundation areas based on the climate scenarios for 2100. The red areasare the high volume, high velocity and high depth areas representing the extremely high hazard flood and inundation areas (critical hazard areas). The orange, yellow, green then blue represent the high, medium, low and very low hazard areas. **Figure 23** shows the 1 in 100 Annual Exceedance Probability (AEP) levels for the lower catchment with nominated floor levels (above sea levels - ASL) for future dwellings/buildings (floor levels related to flood depths). Such information is a powerful contribution to land use planning.

Figure 20: CIMS, 2005, showing Coastal Flood Hazards

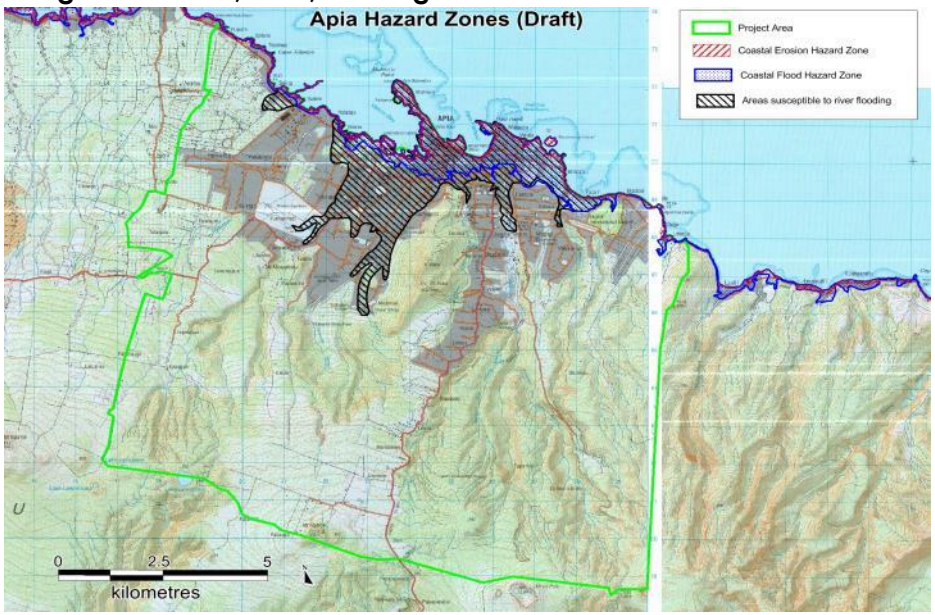


Figure 21: Water Technology Flooding & Inundation – present scenario

The work by Water Technology for the MNRE onlycovered the lower Vaisigano Catchment, as part of pilot work and training. It therefore has limited utility in determining flooding and inundation risks for climate change and disastersfor the rest of the City.

Kellogg Brown Root (Engineering Consulting firm) undertook flood modelling work for parts of the City in 2006, although the original modelling and reporting source is unknown. Another reference was work done for the EU and SOPAC, by HR Wallingford (UK) also in 2006. However these flood assessments were again only for part of the City. There was close association between the results of the CIMS and Water Technology's modelling for the lower Vaisiganocatchment which incorporated coastal inundation in extreme events.

The work also uncovered GIS layers of 1 in 100 year flood zones for the whole City dated about 2005. However the authorship could not be determined. Cross correlation between this mapping with that completed by Water Technology Pty Ltd again shows some synergy, to the point it was agreed that it represented the best available data on terrestrial flooding for the balance of the City. It has been combined with Watertech's outputs as the surrogate flooding and inundation layer in the Combined Risks and Constraints database in the GIS.

In terms of other disaster risk assessments there was separate work completed by the Australian Bureau of Meteorology and CSIRO on coastal inundation and wave run-up near the Mulinu'u Peninsula. Data was not made available on this work. GNS Science also completed tsunami modeling for the Disaster Management Office (DMO) to assist with evacuation planning (*'Inundation Modelling and Evacuation Mapping Report for Samoa'*, 2011). While reports were available, GIS based data is progressing.

All GIS layers and related databases on inundation hazards (i.e. terrestrial flooding, storm surge, wave run-up and tsunami modelling) are either not fully available or there are synergy issues with the data sources due to the various modelling tools used.

Figure 22: Water Technology Flooding & Inundation – 2100 Scenario

Figure 23: 1 in 100 AEP - Floor levels related to Flood Depths

The relatively low quality and low-resolution of topography data had limited integrated flooding and coastal inundation modelling and vulnerability assessments in the past.

Poor base data inhibits the required level of modelling to accurately demonstrate (in a consistent form) the levels of flooding and inundation hazard about the City. The current information available in GIS form is either patchy (covers only parts of the City), or nominates only broad areas of hazard (i.e. does not classify the levels of hazard based on universally accepted criteria). Where there are nominal classes, these do not enable merging of hazard classes (e.g. Q100 catchment mapping does not include sub-classes which would enable synergy with coastal inundation hazard mapping). As such there is no universally consistent and accepted classification of flooding and inundation hazards for the whole City.

The work on the CDS was able to be aligned with that of the NIWA team completing the project, '*Strengthening Disaster and Climate Resilience in Urban Development in the Pacific'* funded through the ADB with support by MNRE. This project aims to promote the use of available data, tools and information, including datadeveloped under the Pacific Catastrophic Risk Assessment and Financing Initiative(PCRAFI), to effectively address climate change and natural disaster risks in urban planning.

Apia, Samoa has been chosen as one of six (6) potential country case studies centred ondeveloping and demonstrating suitable risk reduction approaches for urban development planning. As one of the preliminary exercises the aim was to merge hazard classifications based on existing data sources (the nominated gap to land use planning mooted above). This would assist future land use planning by taking the general merging of hazard assessments completed for the CDS to a more finer grained level suitable for use in the generation of SMPs.

With the agreement to merge and use the terrestrial flood mapping data (2005) and outputs from Watertech'sVaisigano modelling sufficient characterization of hazards was achievable to suit the City wide land use planning for the CDS.

The barriers to integrated modelling and classification of hazards will be assisted by:

- the receipt of the high-definition LiDAR bases;
- the updating of the land use maps and databases
- the updating of the buildings and structures layers;
- the completion of population and demographic profiles based on improved land use and building layers; and,
- The extension by the Water Resources Division of the flood and inundation modelling carried out by Watertech – to the remaining catchments covering the City.

7.4 Recommended Actions – Water Resources

Flooding, inundation and the implications of sea level rise are critical matters in the determination of the levels of hazards for the future development of the City. The recommended actions below are therefore extensive.

For subsequent SMPs the following work shall be completed. In some parts of the City this is best undertaken on a catchment basis rather than individual SMP area basis.

<u>Hydrologic Investigations</u>

- The LiDAR bases shall be registered and used via GIS to improve the topographic and coastal bases for modelling;
- initial mapping shall define the extent of external catchments impacting on the urban development areas;
- Modelling and vulnerability assessments similar to that completed for the Vaisigano catchment will be undertaken for the remaining catchments covering the City. This work shall nominate the 200, 100, 50 and 20 year annual exceedance probability (AEP) levels for the catchments combined with the coastal inundation hazard levels. This shall be completed for the present scenario and IPCC 2100

projections. It will utilize the enhanced catchment information (i.e. LiDAR. Land use and landcover);

- Modelling outcomes are to assist in defining suitable waterways buffers, based on quantity, velocity and depth outcomes of the modelling;
- Quantity, velocity and depth outcomes of the modelling shall be used to nominate future floor levels of buildings to assist with reducing risk over time;

Water Sensitive Urban Design (WSUD)

(Integrated water quantity and quality control devices)

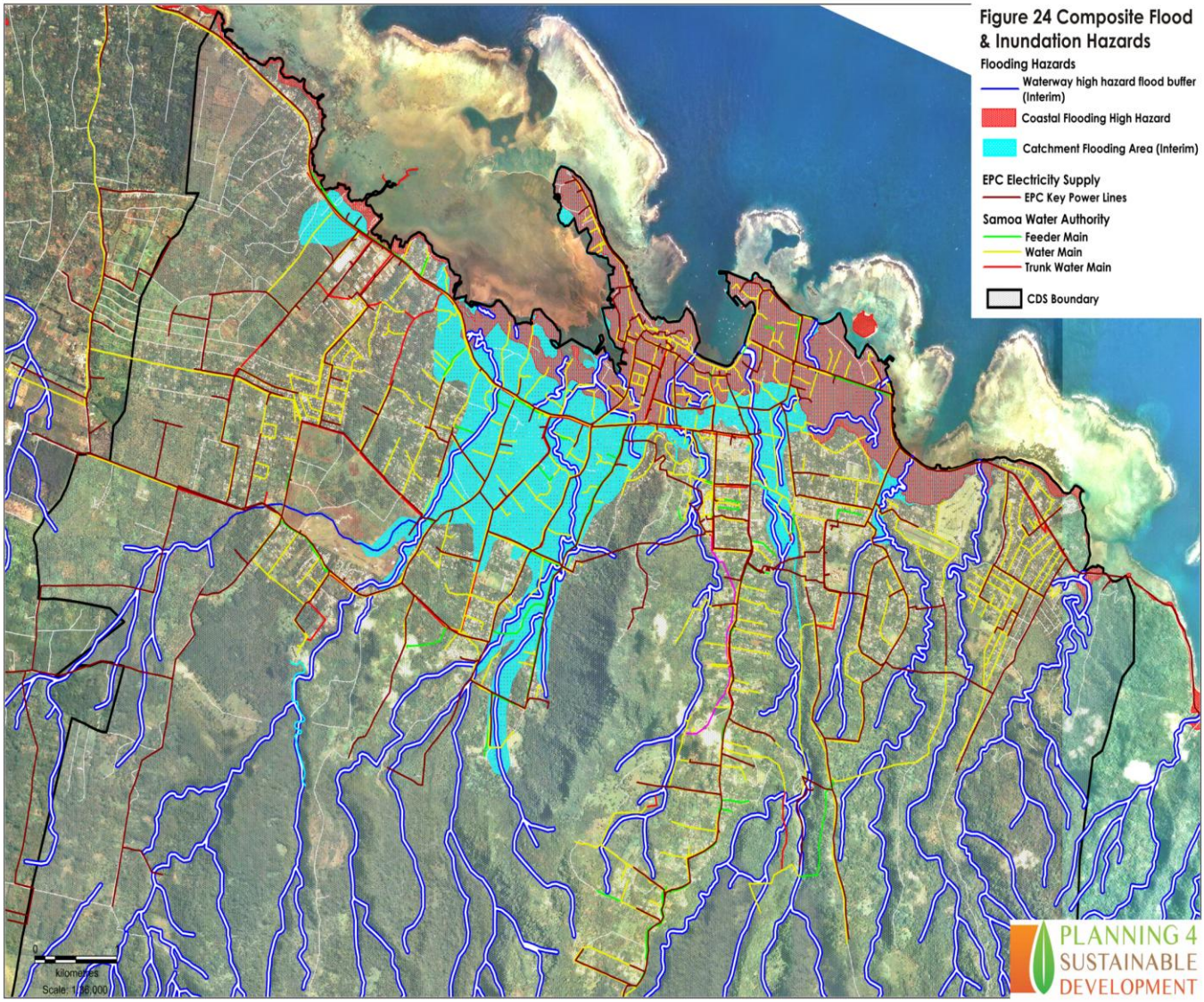
- The hydrologic modelling will be used to address integrated catchment management, and conceptualise the form and location of catchment based water quantity and quality measures for the upper catchments and mid-slopes of the City;
- These WSUD measures will aim to reduce present flooding conditions at the source, and lower mid-slopes to minimize velocities and depths before water flows to the lower flood prone areas of the coastal plains.
- The substantial catchment based WSUD measures shall be costed and incorporated into Government Sector Plans and programming for implementation.
- The outcomes of the WSUD modelling and assessments will assist the Division of Water Resources (MNRE) confirm catchment protection areas.
- Catchment strategies for the catchment protection areas should identify the best location for water retention and control facilities elsewhere in the catchments to address hydrological changes from changes to land use;
- The work shall also determine the best location, form and sizes of appropriate Water Sensitive Urban Design (WSUD) measures and devices along urban waterways and drainage ways to reduce hazards and risks in the lower flood prone areas of the City;

Groundwater

- Groundwater resource assessments should be undertaken for the western catchments of the City to determine their status in terms of quality, yield potential and potential threats based on prospect land use changes. This work should be guided by the NSW 'Guidelines for the Assessment and Management of Groundwater Contamination' (200)[7] or similar internationally accepted guidelines and generic requirements forEnvironmental Impact Statements under the PUM Act, 2004;
- The review of groundwater resources is to cover: estimates of aquifer capacity, numbers and location of bores, groundwater recharge points and rates, potential impacts of development, main water users and their uptake volumes;
- The work should highlight the specific land uses and activities which pose the most significant threats to groundwater resources and infrastructure. It shall confirm suitable buffers for a range of land use types and categories;
- The work shall identify the areas that should be protected from land use change to protect potential future groundwater resource extraction. These areas will be included in the catchment protection areas;
- In areas where existing groundwater resources exist a network of observation points to satisfactorily monitor groundwater resources shall be recommended;

[7] The NSW guidelines are the most comprehensive and used in a number of states across Australia. They cover for a range of geo-climes in NSW from dry desert through to tropical areas of northern NSW.

Figure 24: Composite Flooding and Inundation Hazard Map



7.5 Land Resources

Land resource capability analysis was completed at the reconnaissance level using available information. This mapping was originally completed for rural and agricultural development processes. In subsequent reviews of the CDS, when better information is availed, assessments should consider the following: the geomorphology of the region; the base geology; soil landscape units; soil series mapping with land degradation characterization (including stability, erosion and sedimentation). Soil characteristics are be important to correlate the relationships with ecological units, area water hydrology and landscape conditions for future land use allocation.

It is also important information to support the determination of the suitability of the soils for various agricultural, agro-forestry, effluent re-use and open space provision. More specific land resource capability/suitability assessments at the subsequent SMP stages will also be useful to evaluate options for stormwater harvesting and specific re-use options, especially for treated or partially treated effluent.

Basic land related data does exist in GIS form however this needs to be enhanced so that it is multi useable for urban development planning purposes. Landslip risk assessments have been completed but the work was limited to the coastal zones for the CIM Plans in 2001 and 2005. Lack of landslip and land capability analysis for the non-coastal areas is a major shortcoming for urban and rural development planning. In light of the gaps in land resources information, there is sufficient data for surrogates for land stability and basic landscape analysis to be applied.

Figure 25 shows the slope classification for the CDS area in percentages. This was generated using QGIS and imported to the CDS database (based on MapInfo GIS software). Slope classes can be used to define areas susceptible to hazard (landslip, erosion etc.).

Figure 25: Slope classifications

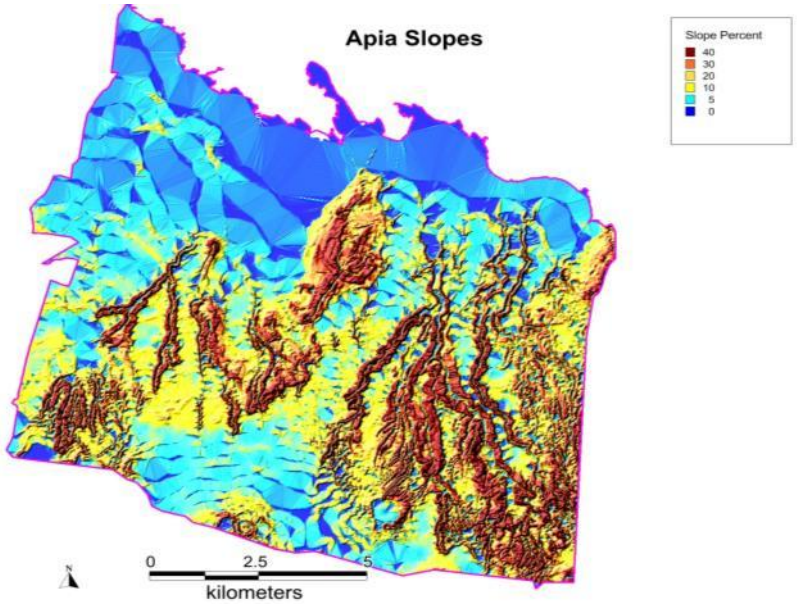
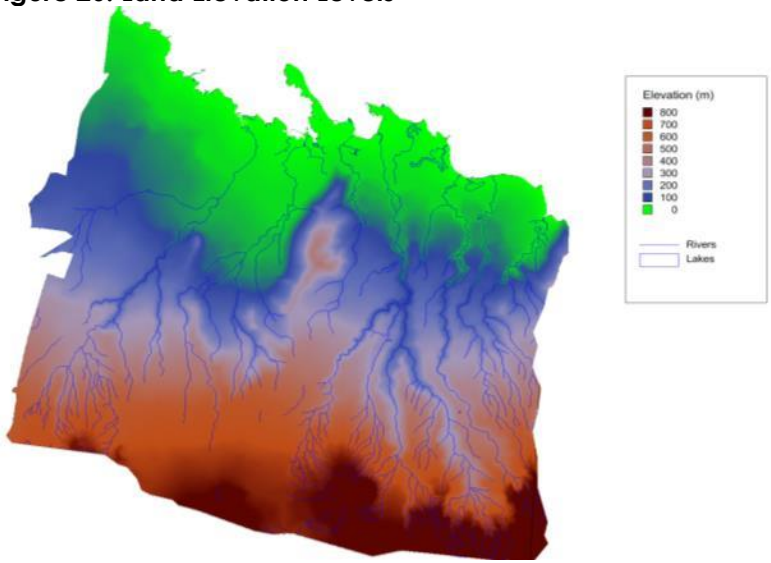


Figure 26: Land Elevation Levels



Urban land capability hazard classes are principally a reflection of geotechnical stability and erosion risks based on modeling using the Revised Universal Soil Loss Equation (RUSLE). The aggregation of soil characteristics (physical and chemical) will be important for the urban capability assessments. Outputs based on RUSLE modelling can be useful in establishing relationships between land resources, ecological units, hydro-geology, fluvial and landscape conditions. These relationships are useful for evaluating future land use allocation options.

7.6 Recommended Actions – Land Resources

The following actions shall be commenced prior to the roll out of the SMPs in regards to land resources:

1) The Land Resources mapping database shall be enhanced to enable its use for urban land capability assessments. The database should be sufficient to evaluate and map physical constraints to urban development, such as: areas susceptible to landslip and soil erosion, local waterlogging, rockiness, fertility and depth to rock etc.
2) The urban fringe areas and rural lands about the City shall be classified into broad classes of urban capability. The mapping will be underpinned by soil mapping using available tabular information on soils, LiDAR bases, remote sensing and aerial photo interpretation.

7.7 Landscape

Work with stakeholders considered the broad landscape and scenic quality of the backdrop to the City. While not a significant parameter in terms of identifying quantifiable constraints for development – landscape analysis has a useful purpose.

It provides a data layer on significant landscape features – that should be retained in future development scenarios. It can be used to save unique landscapes where other forms of constraints do not prevail.

For the CDS the depiction of elevation as shown on **Figure 26** enabled the identification of the key landscape features. The prominent blue, brown and dark red-brown shading – indicates the landscape units that should trigger specific controls as regards visual impact.

For subsequent more detailed SMPs, the work should involve:

- Mapping prominent view-sheds (spatially);
- Identifying the visual elements of the landscape;
- Describing the visual landscape context and character;
- Undertaking a very broad 'scenic quality assessment' (SQA) to determine areas/places where layout, form and type of development should be consistent with community visions.

The SQA process is based on the United States Bureau of Land Management's Visual Resource Management (VRM) system. It involves inventorying scenic values and establishing management objectives for those values through management planning process. Proposed uses are then evaluated to determine whether they conform to the management objectives i.e. retention of view-sheds, screening, etc. The scenic quality assessment for each 'city management unit' should focus on:

- Landform;
- Vegetation ;
- Key road and access corridors ;
- Colourand shape of built form;
- Influence of adjacent scenery ;
- Cultural modifications (e.g. Transmission lines, water pumps/pipes)

7.8 Recommended Action - Landscape

For each of the city management units scenic quality assessments (SQA) shall be undertaken by PUMA to confirm the landscape units that should be protected from urban intrusion.

8. Hazards & Vulnerability

In addition to climate change and natural disaster hazards and risks there are a number of other hazards and associated risks that need to be considered in City planning.

8.1 Geotechnical Hazards

Limited information was made available on geotechnical hazards such as landslip mapping and reporting.Such information does exist in the form of brief coastal mapping for the CIM Plans 2001 and 2005.

An appraisal of geotechnical and contamination hazards for the whole City was not required for this strategic planning work. In the future geotechnical constraints and risks can be incorporated as part of land resources assessments. Contamination assessments can be informed through data collected during the SMP roll out programme. Despite shortcomings in data availability the work on slopes and elevation has been used as a surrogate to rule out steeper unstable land from future urban development. Follow-up work at the City scale after the completion of the finer grained mapping for the SMPs can be used to consider land capability and suitable for various uses based on physical and chemical soil conditions and base geology.

8.2 Contamination Hazards

In order to determine the potential for land contamination as an environmental constraintto urban development, usually a preliminary contamination assessment is conducted. This will include an appraisal of the potential for site contamination that may have resulted from past and present land uses. However as such assessments could require multiple soil and water assessments, not all land in the City can be assessed. Understanding where dirty or hazardous uses and activities are being carried out is useful in highlighting prospect areas of contamination.

Validating further the land uses and activities at the village level is essential in flagging prospect contamination areas where further assessments may be required during the development consent process. This should be tackled at the SMP generation stage. Finer grained validation of the Land Use plan generated for the CDS, through village based field surveys, will realize additional areas for nomination as potential contamination areas. This information can be added to the Combined Risks and Constraints GIS Database for on-going use in SMPgeneration and in the development consent processes.

Potential contamination over the areas may have resulted from past activities associated with rural, emergency, fuel storage or community land use. Vagrant activities such as waste dumping – could also lead tocontaminants affecting the status of land. There may be a number of other sources including:

- imported fill used to raise or form site levels;
- potential landfilling using waste materials;
- application of pesticide chemicals;
- on-site storage of chemicals;
- contamination resulting from the effluent disposal ponds;
- movement of contaminated groundwater beneath the site;
- asbestos in demolition and construction waste materials, soil or sediments.

Preliminary assessments for SMPs can include a review of databases, review of historical information and site walkover inspection. The review can be undertaken for each land management or SMParea. This work will normally be done simultaneously with the Land Resources assessments in order to gain time and cost efficiencies. Potential contamination is also considered on a site-by-site basis in the development consent process.

8.3 Extractive and Mineral Resources

The status of extractive and mineral resource development can bring negatives and positives to the table. Development of quarries in the surrounding rural areas west of Vailima can affect land use pressures within the CDS area.

Little information was availed on the location of present quarries or mineral resource extraction sites. This can be addressed during the Land Use Plan validation follow-up work.

8.4 Land use Hazards and Buffers

Certain land uses require minimum safety, health or amenity setbacks to protect people or to protect assets from inadvertent damage.**Annex 6** includes land use allocation objectives and criteria (performance and quantitative criteria). Among other matters it nominates suitable buffer areas for certain land uses, activities and facilities.

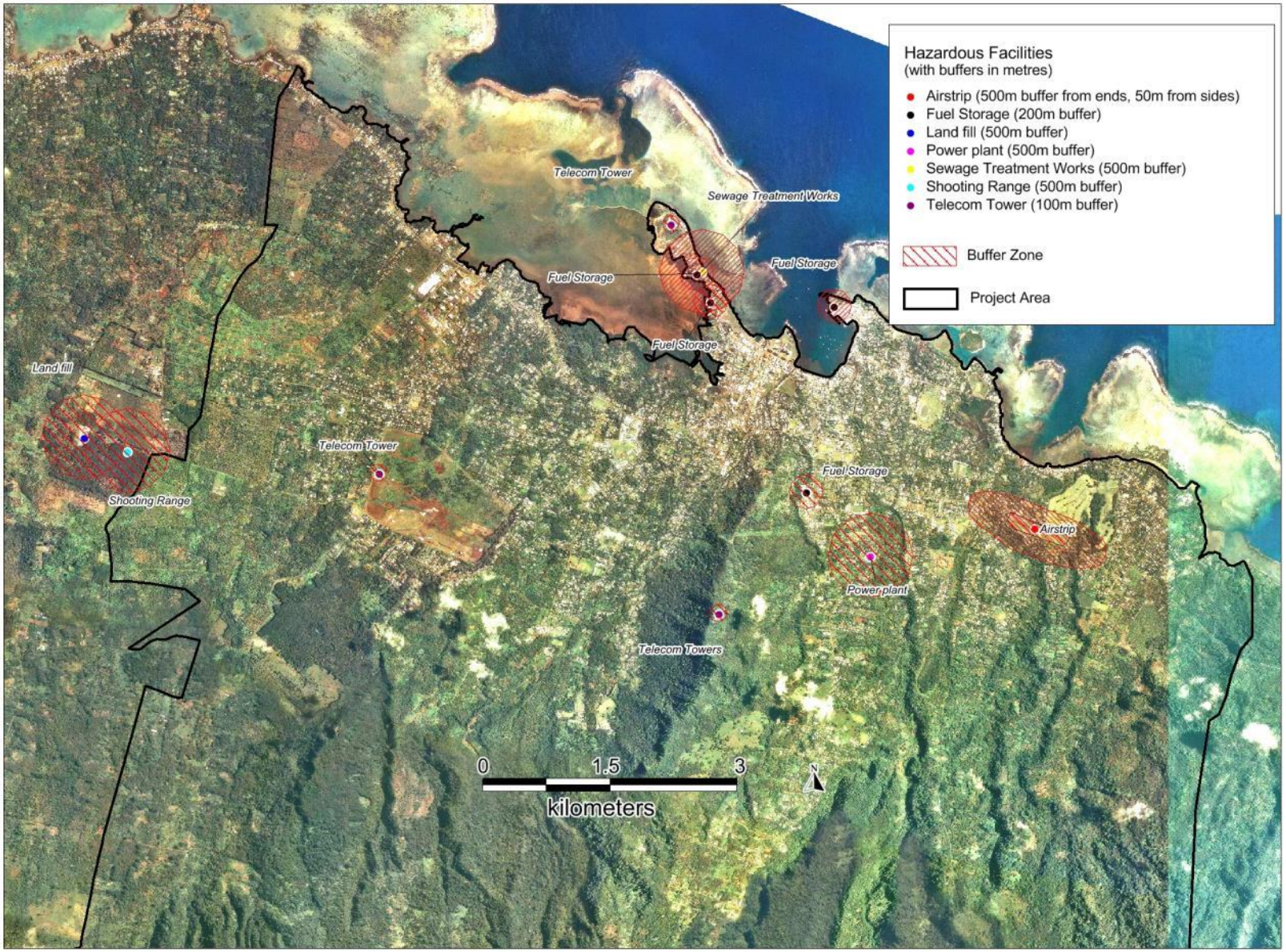
Figure 27 shows the known hazard areas about the City, some showing the buffers that may need to be enforced in the future.

8.5 Recommended Actions – Resource Hazards

The following actions shall be pursued to correspond with the SMP roll out programme:

1) Land resource assessments (see section 7.4) shall distinguish geotechnical hazards and areas subject to landslip as well as areas susceptible to erosion;
2) The Land use validation surveys and update of mapping in the GIS shall identify areas where past uses may have led to contamination. These areas shall be added to the Combined Risks and Constraints database;
3) Areas of potential extractive resources such as minerals or quarry materials shall be mapped. This information shall be used to consider the likely impact on urban systems such as road access to facilitate extraction;
4) The land use mapping survey work shall identify dangerous uses and activities within the urban area where setbacks and safety buffers should be employed in the future (Annex 6 can be used to determine suitable buffers for various land use categories).

Figure 27: Indicative Land Use Hazard Buffers



9. Risks, Constraints and Opportunities

9.1 Overall Risks and Constraints

The results of the technical data reviews, the synergy and cross-sectoral considerations and mapping (sections 4-8) were synthesized to develop the overall risk and constraints database and associated maps.

The GIS based Combined Risks and Constraints overlay maps are extracts from the database generated as a 'grid' query based system. It contains all the base GIS layers generated and used for the technical assessments and related mapping. It can be adapted and upgraded as data is improved, enhanced or created. The gridded system (currently at 100m grids due to processing power of the IT used in its development) can be refined over time as finer grained data layers are produce (e.g. LiDAR layers, SMP mapping). The MapInfo GIS system on which it was created enables more refined grid cells introduction over part of the City i.e. greater detail grid cells can be introduced within the broader cells. This has provided MNRE – PUMA with a powerful base to use in future strategic planning, as well as immediately in Development Consent processes under Part V of the PUM, Act, 2004.

For this CDS work at the strategic city-wide scale, the synthesis of individual constraints mapping was assisted by GIS work. Evaluations were broadly based on spatial connectivity and identification of conflicting matters that required trade-offs. This approach is effective in multi-scaled and multi-disciplined assessments at a landscape scale, and allows for analysis of the outcomes in relation to the management of the land for sustainable development.

9.2 From Constraints to Opportunities

The synthesis of constraints from individual theme or sectors, against principles, objectives and targets (criteria) for land use allocation can reveal Opportunities for urban development. Annex 6 was compiled as a reference of possible land use allocation objectives based on various land use categories. It also contains specific criteria for certain types of land uses or development themes, e.g. setback buffers for hazardous land uses. Theyare provided for reference for future SMP production and zoning plans or more detailed preferred use plans if this is the choice of the village communities require this.

Having evaluated the biophysical, socio-cultural and economic patterns and constraints, the spatial overlay of each or multiple discipline outputs were manipulated to develop land use development footprint options. Some of these were discussed with the stakeholders during engagement events as the data enhancement and outputs progressed. **Figure 28** was produced from stakeholder feedback regarding the urban drift into the elevated hill-scapes and the conflicts between industrial development and existing residential areas.

A series of clear constraints and opportunities emerged from the technical assessments, the socio-economic profiling and economic (land use) assessments. These constraints and opportunities were used togenerate strategic land use planning options, consider multiple risks to cementrecommendations for the Structure Plan.

Figure 29 is derived from population and demographic analysis and environmental constraints (e.g. environmental areas, water supply limits, slope and geo-hazards) to identify extant and potential growth area options for the City. The 'established central Apia area' shows areas with high population densities and a high proportion of built up area, derived from the population and demographics database. The 'established residential areas' are those that have shown medium to high population growth, but are still at low to medium density with lower proportion of and built up area as a percentage of the total areas of the village. 'Current growth areas' are villages currently experiencing high population growth and increased intensity of development.

For the subsequent SMPS, at a technical level, each disciplinary assessment will reveal both 'constrained' areas where risks for urban development are high and corresponding opportunity areas that are not constrained. Where constraints are relative – risks can be reduced through the application of certain design inputs (e.g. ground floors in flood prone areas being used as car parking).

Figure 28: Development Options – Upper Areas and Commerce

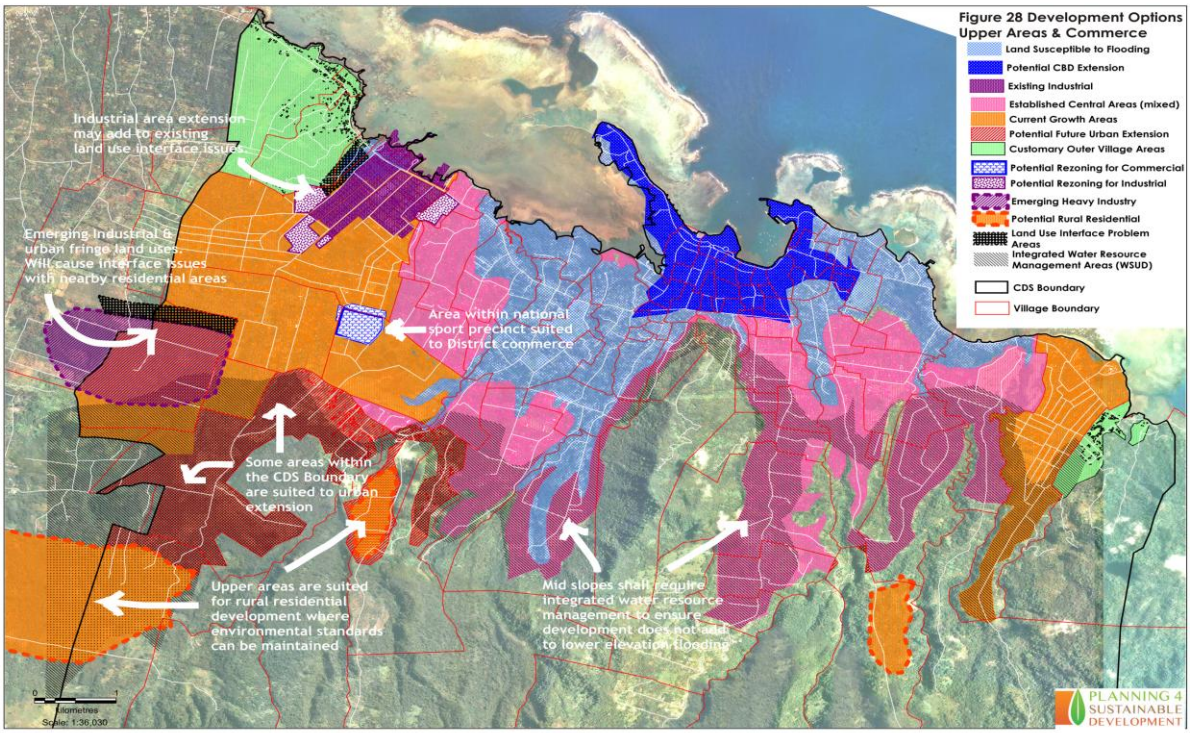
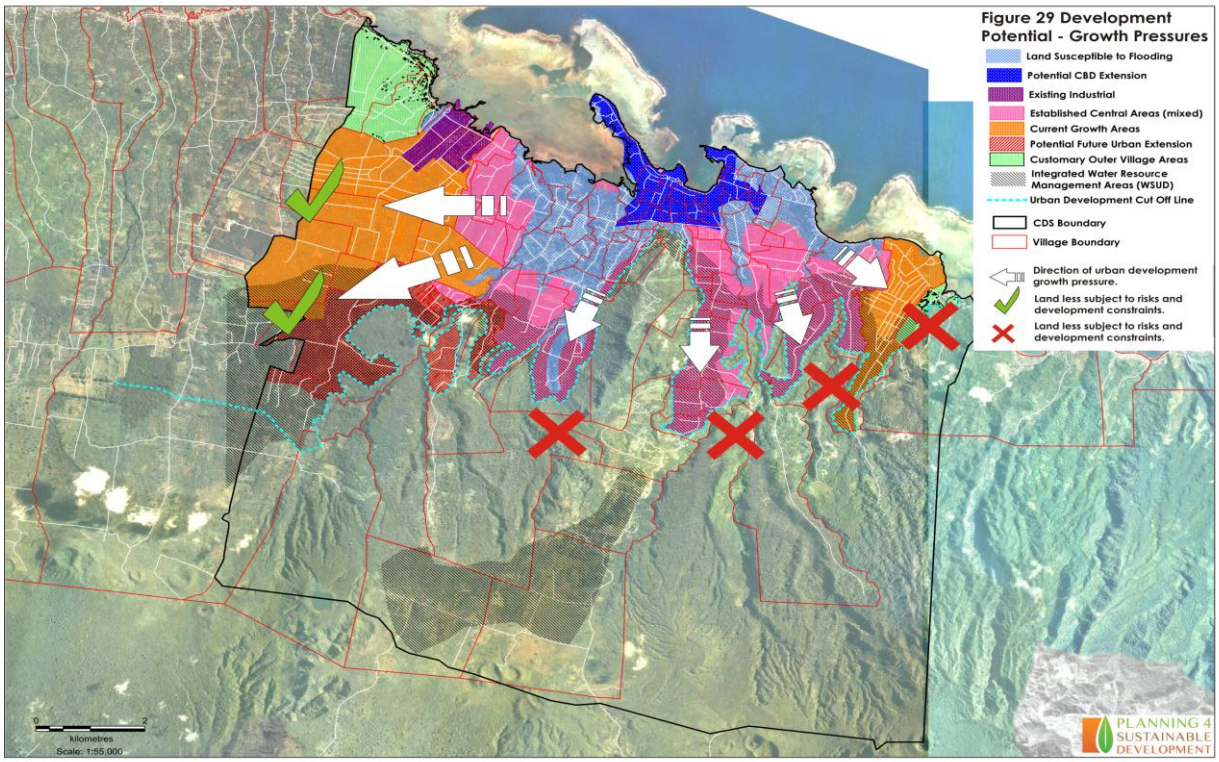


Figure 29: Development Potential –Growth Areas



Best practice may dictate that residential development not occur on land with a slope greater than 20%. However the Village may accept there will be demand for rural residential development (i.e. larger parcel development >2ha) in certain areas which may have a slope gradient of 23%. In this circumstance development standards made under Section 46 (e) of the PUM Act, 2004 could be employed for example: to restrict the size of the building, the cut and fill used and/or require the application of comprehensive erosion and sediment control measures.

9.3 Use of Constraints Databases for SMPs

At a higher level of detail during subsequent SMP generation, the base maps and multi-layers of data now contained with the GIS database at PUMA can be produced at Village scale. A series of plans can be prepared illustrating individual constraints or all the constraints and opportunities[8].These can be used to inform the Village community members of the land use and planning options to highlight optimum land uses, socio-cultural and livelihood opportunities that suit the specific village area/s.

The various plans can be annotated with notes describing the constraints and opportunities e.g. interface issue between residential and industrial land uses, buffer requirements etc. The work can also include the outcomes of the statutory planning, development and environmental instrument reviews for the particular areas of the City.

Figure 30 shows an extract from the Combined Risks and Constraints GIS gridded database – now housed in PUMA. Note that the pixel sizes represent 100metre x 100metre cells due to the processing power of the IT at the time of production. GIS Multi-layer inputs are at a finer scale. As mentioned in section 7.2 further work is needed on refining a joint classification system of inundation risks covering terrestrial flooding, coastal inundation and storm surge. This new classification system can be incorporated within the database to enable a finer grained risk suitability classification through GIS query functions.

Figure 31 below shows the composite key Risks and Constraints laid over the Land Use Plan. This output has been used also in the subsequent sections of the CDS.

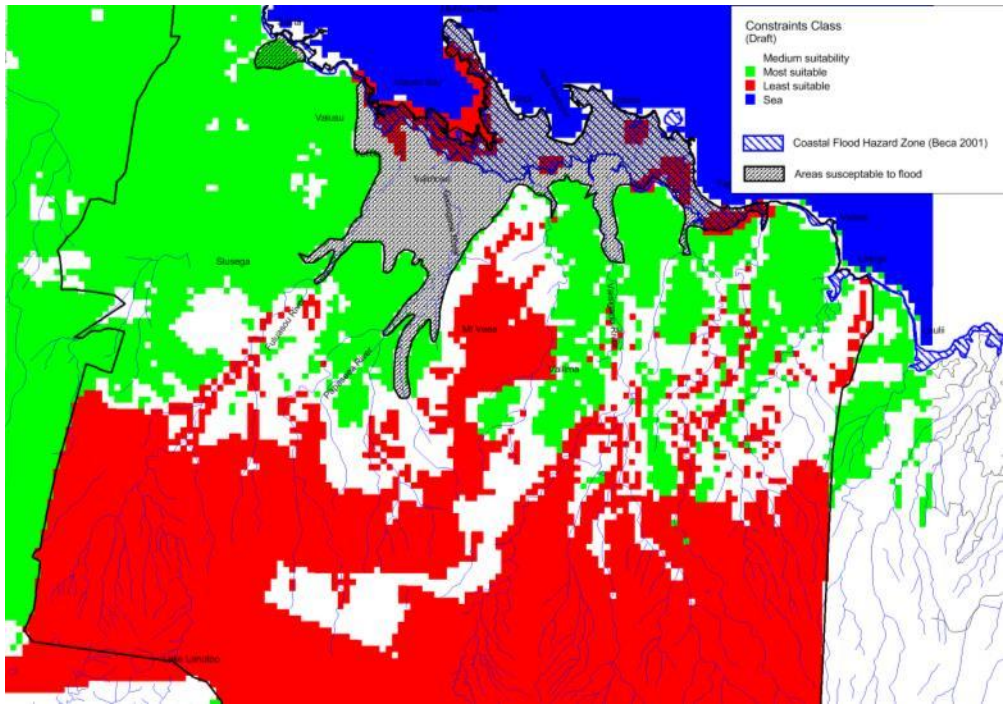
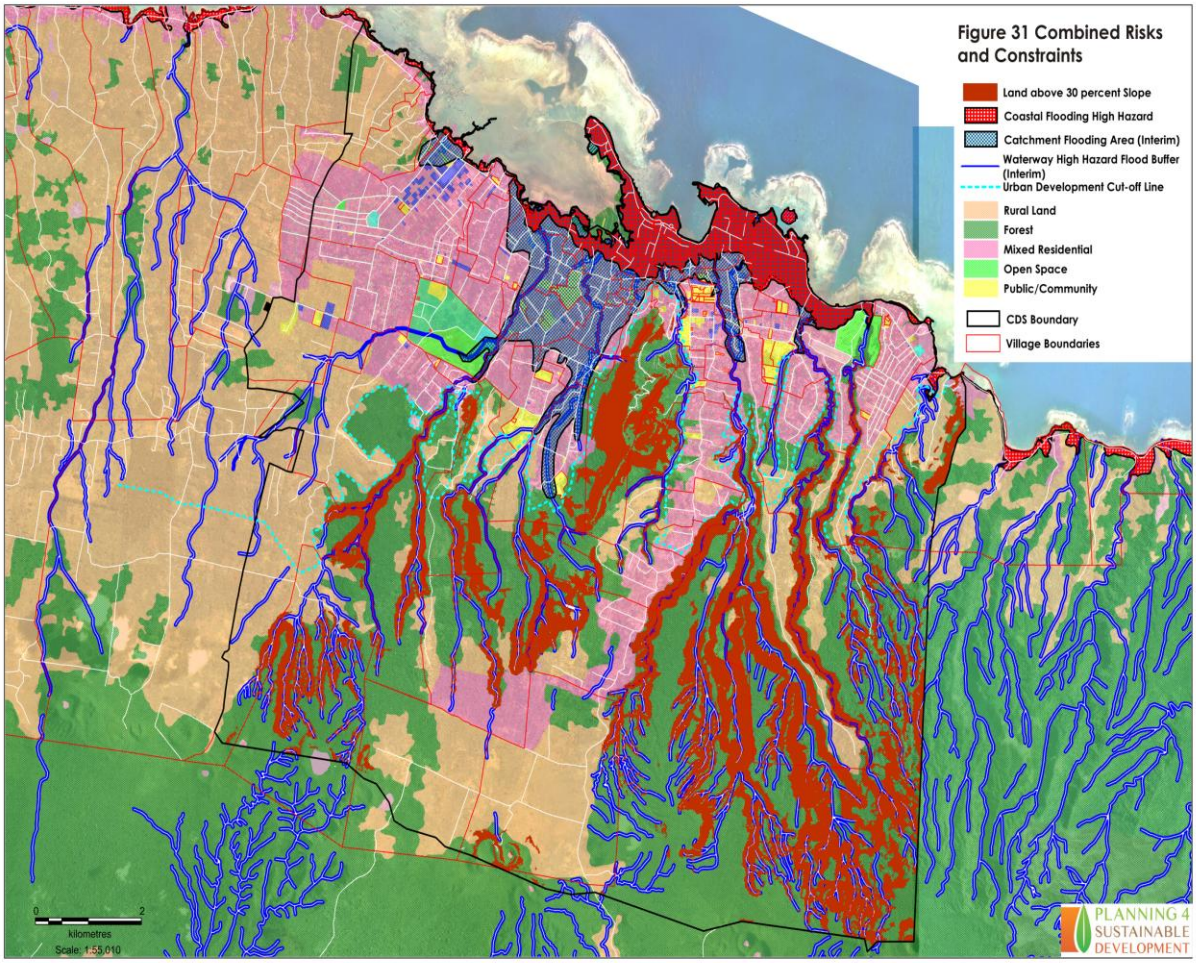


Figure 30: Extract from the Combined Risks and Constraints database

[8]NB: the 'opportunities' from the CDS work to date is at a very broad scale, given the high strategic level of land use planning, i.e. City wide level.

Figure 31: Combined Risks and Constraints over Land Use (2014)



10 Economic Development

It is widely recognized that the urban centres of countries account for significant proportions of the national income, and that is said to be the situation for Apia[9] .The following section provides commentary and associated mapping about economic development parameters in relation to the structure of the City, its components and interactions. Further specific studies in urban economics on the quantitative and qualitative changes in theeconomy can be undertaken to support this section.

The current enumeration of economic information is geared toward macroeconomics in that Samoa Bureau of Statistics data regarding GDP is generated for national reporting. There are however some key messages that can be drawn by reviewing the quarterly GDP overview reporting (December, 2014 report is referred). The economy overall slowed since the corresponding 2013 period, which was mostly assisted by key events like the UN SIDS Meeting, 2013. The report signals that there were declines in the construction, agriculture and other manufacturing sectors, the public administration sector, and thefood and beverage and accommodation and restaurants sectors. Many of these sectors would have received unusual spikes due to the preparatory and operational incomes from the SIDS Meeting in 2013. Of interest the transport, electricity and water, personal and other services, Commerce and Business Services sectors showed healthy growths over most of 2014. Transport, electricity and water were known to be positively assisted by reduced energy costs (e.g. power generation) and the introduction or increase in supply fees. However growth in the personal and other services sector andcommerce and business services sectors are positive. These are the sectors that would not usually be swayed by individual events and can also be the sectors that provide more consistent and long term employment opportunities.

Coordinated urban development and structure, orderly development (timing) and efficient supply of infrastructure and essential services can assist in providing healthy physical settings for commerce and business. It can also assist the construction and other industries sector by reducing development costs (e.g. lowering transport costs) and through associated institutional changes reduce costs of approval. These benefits in turn provide benefits for the broader community (e.g. higher quality living areas) with increasedlivelihood opportunities (e.g. decrease business costs can be conveyed to higher levels of employment).

The CDS through this part aims to assist with economic development opportunity by guiding the location of land use so that economies of scale and market thresholds (locational criteria) can be better achieved. It canvasses the need for better connectivity and transport networks that are efficient and effective. It also incorporates sections on land use (supply and demand) with reference to land use 'supply' criteria taken from best practice in the international arena.

This part also considers the economic investments required for effective and efficient urban management through infrastructure and essential service provision. As urbanization has increased, the lack of a local planning base has resulted in uncoordinated utility service and infrastructure provision, which can involve poor sequencing of development, breakages caused among service providers and poor water management undermining existing services even during minor rainfall events. As urban management budgets are limited, initiatives to remediate the situations are often reactive and based on inadequate information.

[9]The Samoa National Urban Policy states that Apia accounts for 75% of the national income, although the reference made "(GOS, 2003)" cannot be found.

10.1 Land Supply & Demand

The purpose of the land supply and demand analysis in urban planning is to determine the quantity of land that is being used (and will continue to be needed), that which is currently available for newdevelopment, and those areas that may be available for future needs. It gives the picture of the potential spatial needs of key development forms. It can also be used to identify timeframes for land development (i.e. a land development programme). Against this demand analysis based on physical trends, population and economic development projections can be overlayed using demographics and other metrics.

There is inadequate physical data and microeconomic enumeration to provide a robust land supply and demand analysis. The advent of the Land Use Plan, with an improved buildings GIS base, will provide the basis for this work through the SMP roll-out period.

10.2 Residential Land Supply

Many data sources, including the building locations, were dated and did not correlate with statistical information to enable robust analysis. However, through reliance on the population and demographic work describedin Section 6, it was demonstrated that while residential densities were high in the central CBD areas, overall the urban living area densities for the City are very low to low. Even in the new Government land development areas of Vaitele and Vailele, the residential land supply capacity is reasonably highas the estates are not yet fully developed.

It is recommended that PUMA with the Statistics Office work with MWTI on an update of the buildings data layer for the City so that follow up work can monitor the residential take up of land (the monitoring systems for urban development land uptake are often referred to as 'land bank' databases).

The new LiDAR remotely sensed data set can enable the update of building locations on GIS maps. Additional field survey work will be needed to quantify the types of buildings, their use (i.e. commercial office, retail, services, industrial etc.) and age. So that there is better correlation with the recently availed hazards mapping, the field work should also measure or record, floor levels, and note whether buildings are single or two storey (or above). Such data will also assist with disaster risk analysis and response.

A good residential land supply land bank will enable PUMA and others to understand:

- The quantity of land required to accommodate projected residential needs of the community over a 20 – 30 year timeframe to provide appropriate housing diversity and choice to meet demographic needs and projected growth (this task needs to link with the socio-economic mapping/profiling);
- Where new residential development is taking place or should take place taking into consideration:
  - road network capacity;
  - water supply capacity;
  - sewerage disposal capacity;
  - environmental constraints;
  - climate and disaster related hazards & risks
  - potential regulatory requirements;
- The demand for residential development based on patterns in the broader Apia area. Reverting this to forecast demand for housing for community members, and outlying communities.

It is strongly recommended that future provision of urban residential development follow the *Neighbourhood Planning principles* that are described in Annex 5. UN Habitat has much information on neighbourhood planning principles although much of these are geared toward the mega-cities of Asia http://unhabitat.org/wp-content/uploads/2014/05/5-Principles_web.pdf.

10.3 Rural Residential Land Supply

The term 'rural residential' refers to residences in rural settings often with larger than usual land parcels (e.g. greater than 5,000 sq. metres). They are not customary usehold settlement areas, but specific sub-divisions that cater for lifestyle house settings.

While the CDS concentrates on urban development within the City area the continued demand for rural residential dwellingscannot be dismissed. Simply this will be the land which is beyond the reasonable cut off level for urban development (higher elevated lands) or lands currently outside the built up areas which are above sensitive environmental receptors such as significant waterways or deep ravines. The acceptance of rural residential use would only be on land which had reasonable slopes and conditions that could accommodate large land parcel developments. There is a need to be cognizant of the following:

- how much rural residential development is required within the region over a 20 year timeframe;
- whatdemand is there to provide appropriate housing diversity and choice to meet housing needs having consideration of demographic and lifestyle trends in the locality;
- in what areas would new rural residential development be preferred:
    - Land does not compromise the sustainable future use of existing natural and land resources, including productive agricultural land, water, mineral and energy resources;
    - It is not subject to social – cultural constraints such as heritage assets, existing visual and environmental qualities of the area
    - It satisfies the need to protect environmental values: landscape, water quality, native vegetation, habitat and biodiversity values;
    - Potential areas avoid predictable adverse environmental processes and effects, such as flooding, erosion, or bushfire;
    - Areas can efficiently be serviced by social and physical infrastructure, at an acceptable and sustainable community cost.

10.4 Commercial Land

The Land Use Plans and Composite Risks and Constraints database and plans were used to review core land use areas or features of the City (**see Figure 32**).The purpose essentially was to confirm the core land use changes and features of the City where there had been emerging changes in land use. Identifying these areas can often determine the relationships between key centres - commerce versus industrial, residential versus community lands etc. Humans follow a natural pattern of living and working which has been the feature of urban centres for thousands of year. To plan existing Cities the starting point is often to understand these existing patterns and trends. Centres of commerce are usually the prominent features, but over the last century other structural elements have also become significant such as open space and education nodes.

The key choices in terms of city form to direct its 'structure' in simple terms is either one of:

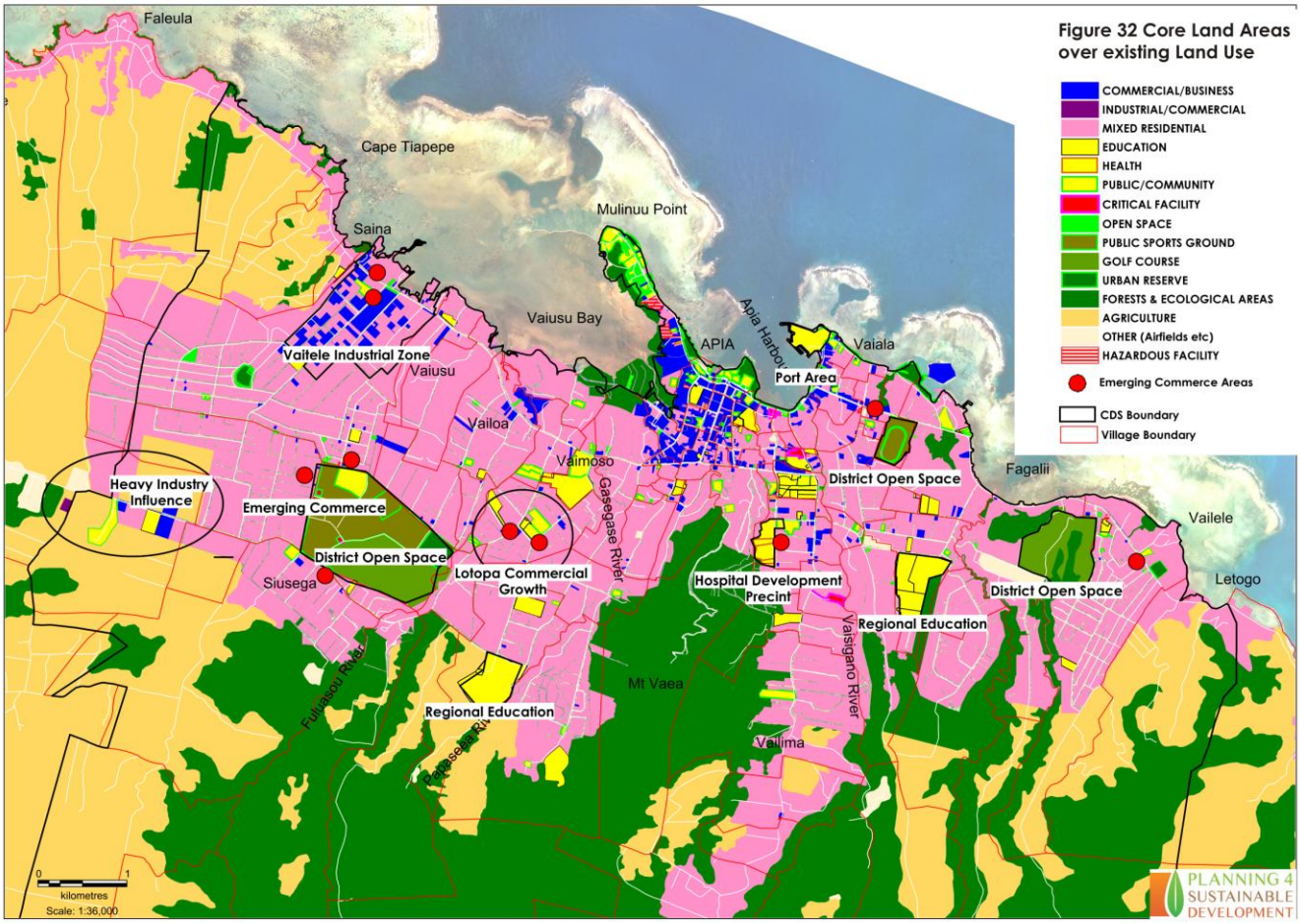
a) Radial development from a central node;

b) Multi-nodal (or polycentric) – consisting of multiple centres.

Modern city planning favours the later, as radial development often spawns urban sprawl and congestion. The multi-nodal structure of the city is determined by the location of key centres.

The Central Place Theory (CPT) was documented by German geographer Walter Christallerin 1923. It was one of the first attempts to explain the spatial arrangement, size, and number of centres in urban areas. He determined it was possible to model the pattern of settlement locations and sizes based on geometry.Modern concepts,some referred as the 'hierarchy of centres', have linked quantitative land use provision rates to different sizes of centres. This enables the confirmation of the different class of centres but also enables the review of the right population threshold that is needed to make the centre work.

Figure 32: Core Land Areas over existing Land Use



The hierarchy of centres approach enables the identification of existing or emerging centres. Their class within a hierarchical system is determinedby the range, size and intensity of uses and activities. For Apia the land use mapping confirmed the known centres of the CBD and the Vaitele Industrial area. However a few other key observations were made:

- the emergence of the hospital precinct, since redevelopment, as a major development precinct;
- theLotopa area having land uses reflective of an emerging commercial centre;
- the north-west part the sports centre of Siusega emerging as a prospect district centre;
- usesimmediately east of the gaol and Tafaigatawaste disposal site showing signs of emerging industrial use and/or heavy industry;
- The regional level education centres of the National University of Samoa and the University of the South Pacific as prime attractors to personal serviceand associated commercial uses.

Determining the best location and likely size of industrial and commercial land to assistwith economic development (and enhance employment generating uses in a locality) can be based on the use of common land use planning criteria/metrics – that have roots in the 'hierarchy of centres' approach. The 'distribution of centres' also follows common metrics in terms of distance between the centres:

- CBD's will have a zone of influence (inner area) of 1-2 kms
- District shopping areas will have a threshold of approximately a 1.5km radius, and
- Local neighbourhood centres will have a threshold of 500m (radius).

There are also relationships between the distances between the CBD and district centres. Using general criteria or metrics, mapping focussed on existing known centres and identified the likely location of intermediary centres(following the 'concentric ring model, Burgess, 1923). These concentric rings in part also represent the economic thresholds of certain commercial centres/uses. Some however have anthropogenic origins. For instance the walking distance of a person generally to get basic food stuffsor to catch public transport is on average 400-500m.

Figures 33 to 35 show the outputs of the centres threshold analysis for key Centres, District centres and local neighbourhoodcentres.

10.5 Recommended Actions – Land Supply and Structure

The following key actions are recommended:

1) PUMA with the Statistics Office work with MWTI on an update of the Buildings data layer for the City so that follow up work can monitor the residential take of land (as a 'land bank' system). New releases of government land should be based on meeting certain take up levels (e.g. 70% of available new leases)

2) That future provision of urban residential development follow the *Neighbourhood Planning principles* that are described in Annex 5 and through UN Habitat(see http://unhabitat.org/wp-content/uploads/2014/05/5-Principles_web.pdf).

3) That the pursuit of a multi-nodal (or polycentric) city structure based on the planning for multiple centres be supported.

Figure 33: Core Centres distribution

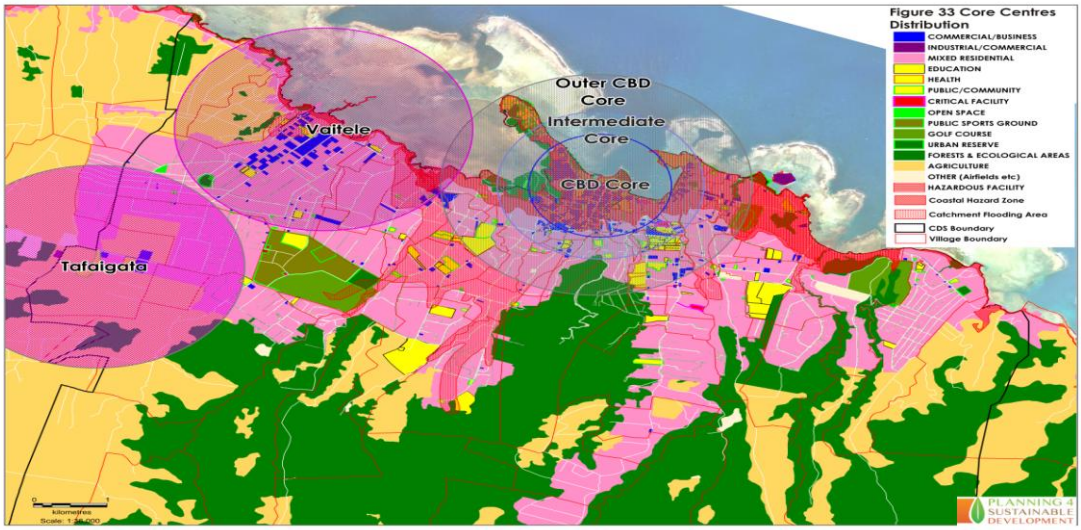


Figure 34: District Centres distribution

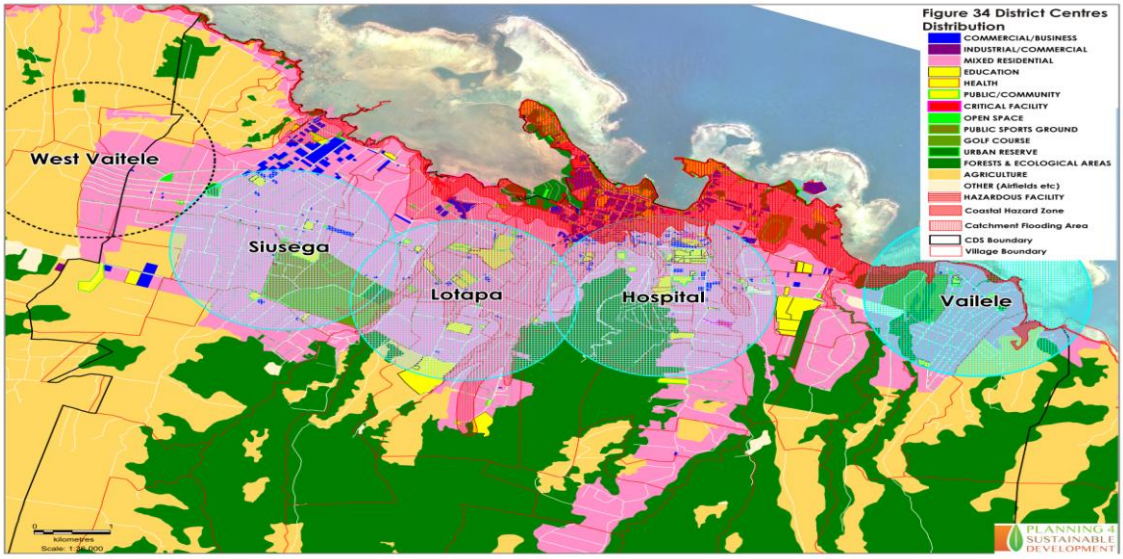
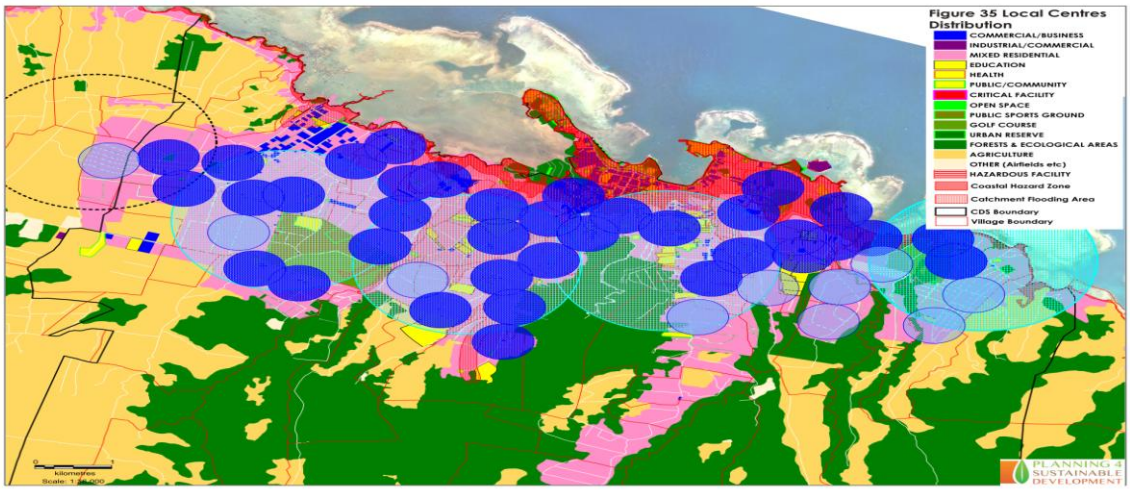


Figure 35: Local (Neighbourhood) Centres distribution



10.6 Enhancing Livelihood Opportunities

Co-locating like land uses through a hierarchy of centres approach in the City of Apiacan have positive economic impacts in improving livelihood opportunities. Anumber of discrete centres locatedthroughout the City can help with servicing, road and transport network planning, development and maintenance (reducing capital and whole of life costs). It can also reduce greenhouse gas emissions by ensuring smoother traffic flow, less congestion and less fuel/kilometre consumption (also a saving for families).

Grouping or concentrating similar land uses together provides advantages to businesses and local communities. The concentration of commercial activity can increase the demand for employment, primarily by creating larger thresholds for the demand of goods and services. This benefit of co-location does not occur with scattered development. As an example with the ad-hoc opening up of small shops scattered about the City, small single purpose shops would dominate. These small shops are often staffed by the families that live in the same building. Single trip essential shopping (i.e. small purchases) would prevail as people drive or walk past. If shops are concentrated this would lead to a larger threshold of people visiting the locationfor more extensive shopping and expenditure. There will be demand for other goods and services such as commerce, retail, health and personal service uses.

Mutually beneficial uses such as food shops, service shops, hardware, restaurants, public service outlets, health services, financial services etc. encouraged to locate in the same place can create demand or market thresholds for increased employment. People would travel there not only for larger convenience food shopping, but would stay on for other professional and/or personal services and shopping. This demandcan attract more commerce for selling of goods and services, which then creates additional demand for employment.

A hierarchy of centres from core centres to district centres to neighbourhood centres would support a spread of employment opportunities throughout the City. Residents would not need to travel to the bigger central core commerce areas such as the Apia City CBD or Vaitele for goods and services, or employment. Keeping a higher percentage of job opportunities about the residential areas reduces the travel to work time (amenity, lifestyle and emissions advantages), reduces the volume of traffic on key transport routes that are within high hazard areas and keeps jobs close to the home of more people which strengthens the sense of place of localities and in time can lead to better community cohesion.

One key advantage of dispersed opportunities in goods and service provision and employment is stemming the concentration of development along the coast, particularly the CBD which is within the extreme to high hazard areas. This can assist in building in climate change adaptation and disaster risk reduction.

The following parts explain the hierarchy of centres, giving an explanation of the situation in the City of Apia.

Urban Core Centres (Figure 33)

Urban core centres act as the focal point of the City, providing the widest range of services, facilities, commercial, retail, and residential uses – particularly at the higher order of scale and expense. At the core centres there is the highest mix of uses and density of development, with the primary core area (often referred to as the Central Business District [CBD]) having the highest density and mix in the city and usually located with the most major transport nodes.

Indicative primary and intermediate core centresare shown in **Figure 33**. These includethe CBD, the Vaitele industrial area and the emerging area in Tafaigata.

Core centres often act as the key business and employment areas for the City (sometimes referred to as employment nodes). A CBD central core for a small city will usually have a 1km radius of higher level business, office, personal services and retail uses. It is usual to also have outer CBD influence areas, sometimes referred to as the intermediate core and outer core centre (1.5km and 2km radius respectively). In

these areas are found scattered office developments, lower order commerce, large floor area retailing, city service trades uses and retail.

The intermediate core centres can be found within a1.5km radius of the primary core centre thresholds. . These concentric ring thresholds have been used to nominate the likely future CBD bounds that are shown on the Structure Plan (see Section 11).

Industrial centres like Vaitele which have a range of mixed uses but are primarily related to servicing industrial and service trades uses – can be classed as core centres. However these are not as high in order in terms of mix, density and costs of land and services – and therefore are seen as intermediate core centres. The area between the new SBC Brewery and the Tafaigatawaste disposal site is attracting a mix of heavy industry, processing industry and other mixed commercial uses, some of which are often featured as large land uses usually located on the fringe of urban areas. This too could become an intermediate level core centre which could become a significant employment node. However if the area is not planned, conflicting and disparate land uses may eventuate.

Core centres are located adjacent to arterial and key arterial roads for access and mobility.

District Centres (Figure 34)

District centres offer a range of commerce, retail and service trades uses that are predominantly centred on medium to higher order shopping, medical and associated health as well as finance services. It is at district centres that professional service offices also appear outside of the CBD core centres. District centres offer a wider range of goods and services than local neighbourhood shopping centres, but not the level of urban core areas. District centres are characterized by surrounding denser uses than say usual residential areas and service a collection of neighbourhoods. They are usually located close to sub-arterial and arterial roads to enable appropriate levels of mobility. Land use change patterns in Apia can distinguish areas that are likely to generate into District Centres.

Indicative district centresare shown in **Figure 34**. These include the Hospital Precinct, the Lotopa centre, theVailele area, the Suisega area, and the area west of theVaitele Industrial area.

The level of investment in the hospital precinct has seen major land use change in this locality with a range of higher density residential, service trades, medically orientated professional services, shops, restaurants and personal service uses usually associated with a district centre. The subtle changes in a mix of land uses about the Lotopa Village area also reveals signals of a potential district level centre. Out near Siusega the development of the sporting and major playing fields near the new golf course, combined with the location of the essential emergency services and new nearby commercial uses – has revealed this locality as a potential key district centre. With expansive areas of government land available for development and land use change, as well as possible augmentation of arterial roads to service this area, the Siusega centre has the potential to service the whole of west Apia. The centre would also be free of significant hazards.

With reference to the concentric ring mapping of district centres (**see Figure 34**) further opportunity areas for the siting of district level centres are possible outside of hazard constraint areas near Vailele and further west of Vaitele. For this later area the Samoa Land Corporation will need to consider this likely core use in its programme for subdivision of government land.

Local Neighbourhood Centres

The next level of centres is the neighbourhood centres which provide a range of services and activities that meet the day to day needs of nearby residents. They are usually located on collector or sub-arterial roads with good local access. Connectivity between neighbourhoods is desired with the location of key off-road open space and networks (e.g. paths, tracks and cycle paths) connecting centres with schools, local playing fields and community spaces.

The **local neighbourhood centres** distribution is shown in **Figure 35** over the District Centres. The concentric ring configuration was mapped by firstly identifying the location of existing retail areas scattered

throughout the City (it should be noted that a full land use survey may reveal more local shops than currently shown on the 2014 Land Use map). Using the neighbourhood principle criteria (see **Annex 5**) the concentric service thresholds of 500m radius was used to delineate the location of likely centres. Locations where residential areas are poorly serviced by shopping/retail uses are shown in a lighter colour. The area between Magiagi and Vailele is particularly poorly serviced, as it appears not to be serviced by either a Local or District Centre service threshold. The west Vaitele area will also require better planned local centres to service the growing population, before the advent of the West Vailima District Centre.

10.7 Recommended Actions – Livelihoods & Centres

The work on city centres for the CDS concentrates on the location parameters and relationships of and between centres as a key input to city structure planning. Given that there are some discrepancies with population statistics related to enumeration (growth since 2011 and shortfalls with household (building) details) demographic and land use review will be necessary in time to determine the size criteria for the various centres. Annex 6 provides general metrics from Australian and New Zealand references; however the suitability of these to the Samoa situation will need to be determined. Key choices will also need to be made by the communities as regards the acceptance of district and local centres – and this will enable choices on the right size and make up of centres. This feedback is best completed via the roll-out of SMPs.

Given the current size and form of the city and noting key core land use changes and patterns the number of core and district centres as shown on Figures 33 and 34 should suffice for the city over the next 20 years.

Supporting the work on livelihoods and centres the following is recommended:

1) That to support a multi-nodal city structure a hierarchy of centres be supported;
2) That the hierarchy of centres cascade from the Core CDB, to Core Centres (non-core CBD), to District Centres, to local Neighbourhood centres, distributed about the City based on well practice metrics (concentric ring approach);
3) That by following the hierarchy of centres the City provides dispersed opportunities in goods and service provision and employment, with centres distributed as far as practicable away from high to critical hazard areas;

10.8 Community Services Needs

To support effective SMPs and development consent processes PUMA should undertake community services and infrastructure needs assessments. These can be completed through the engagement required for SMP preparations, or may be best arranged for each of the city management units (see Section 13). The objective is to:

- determine the social infrastructure and service needs of the various communitiesover a 20 year timeframe;
- identify the levels of physical and social services that will provide an adequate level of community service having consideration of:
  - the future demographic characteristics of the City;
  - future demographic characteristics of the population;
  - the projected population figures;
  - the intended settlement patterns;
  - cross-regional service provision;
  - opportunities for training within the community, and likely budgetary capacity.

Standard land use planning criteria/metrics exist to determine the suitable level of community services and infrastructure for a particular number of residents in a given area. Indicativeland use allocation objectives and criteria are provided in **Annex5**and **Annex 6**.

10.9 Open Space & Recreation

PUMA can undertake an assessment of the open space and recreation provided in each of the city management units or SMP area (see Section 13). The aim of these assessments is to determine:

- **Type of open space**: Identify the types of open space i.e., formal playing fields / sports grounds; informal green spaces; sport complexes; parks and reserves; and, school grounds that are used by the public for playing games etc.;
- **Distribution of open space**: The location of open space. Try to establish any patterns in the distribution of open space, and determine if there are areas that don't appear to have enough open space for residents. Open space should be generally provided within easy walking distance of most houses.
- **Development Potential**: Identify any sites that could be developed for new open space and recreation purposes to serve the community.

Standard land use planning criteria/metrics exist to determine the suitable level of open space for a particular number of residents in a given area. These are also provided in the Land Use allocation objectives and criteria within **Annex 5 and Annex 6**.

10.10 Access & Movement

Review of access and movement networks was based on the data and information supplied by the Land Transport Authority (LTA). An evaluation of the present situation was undertaken on the access and movement networks, including:

- **Road Network**: Identification of the hierarchy of roads (distributor roads, arterial roads, collector, local roads), and assessment from available information the level of use and traffic volumes. While some data was available from counts, the data was restricted to some arterials in part of the City. Follow-up work can continue the road traffic counts on all major roads about the City so that a road hierarchy can be confirmed.

  Evaluation work using this data can also identify key problem areas; any issues at intersections or need for improvements. Plans can identify any proposed road projects or upgrades. Over time work can also assess the quality of the road condition / surface. Where possible, traffic modelling can be undertaken based on the preferred use concepts to determine future traffic volumes and capacities, with the nomination of any required improvements to the road network.
- **Public Transport Network**: While the intent was to document the public transport network including key bus routes and bus stops, information was not available. Follow-up work with LTA can lead to maps and the characterization of public transport systems in and about Apia. This can identify current limits to the services, with an assessment of the service frequency and need for improved service coverage based on type of service.
- **Pedestrian Environment**: The pedestrian environment was assessed based on field observations, to understand if it is easy for people to walk in and around the City. There was a lack of comprehensive data to enable such evaluation. Future field work with LTA can identify issue areas including where there are no footpaths, and problems with linkages and connections to key services, retail, open space and schools. This assessment can be done by walking around the study area during the SMP roll-out programme or tied to the further validation of the Land Use Plan.

At the SMP level traffic, parking and access requirements of existing and potential uses of the land can be assessed in accordance with the AustRoadsand/or New Zealand Institute of Engineers best practices, guidelines and requirements. Parking needed for various land use types and trip rates can be checked against traffic management criteria. Public transport requirements can also be assessed.

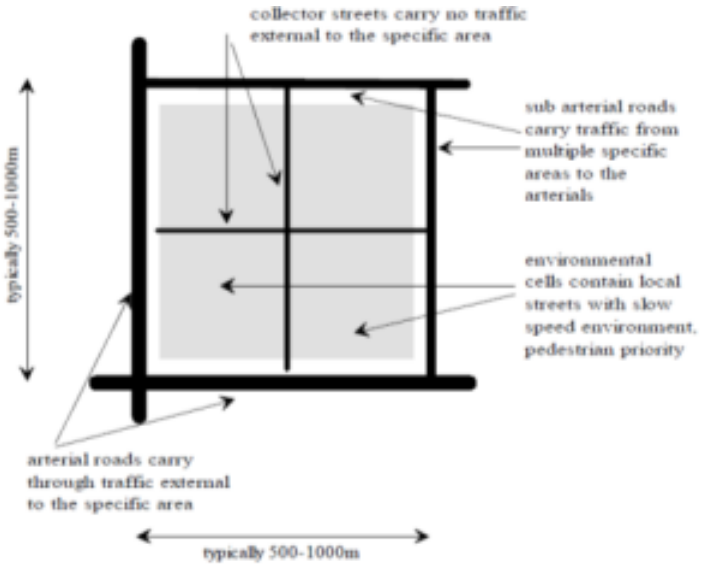
10.11 Road Hierarchy

The confirmation of the present and desired future road hierarchy is one of the key parameters for spatial land use analysis and structure planning. As mentioned in Section 10.8 there is a lack of sufficient road count data to confirm the present land transport road hierarchy. **Figure 36** shows atypical hierarchy for road network systems.

A well-formed road hierarchy will reduce emissions, provide energy efficiencies and reduce overall impact of traffic by:-

- concentrating longer distance flow onto routes in less sensitive locations;
- ensuring land uses and activities that are incompatible with traffic flow are restricted from routes where traffic movement should predominate;
- preserving areas where through traffic is discouraged;
- ensuring activities most closely related to frontage development, including social interaction and parking, can be

Figure 36: Concept of the Road Hierarchy



- given more space within precincts where environmental and access functions should predominate;
- efficient land use provision slows down urban sprawl;
- reduces infrastructure & essential service costs – especially after disasters;
- efficient for more cost effective public services such as police, hospitals, emergency response, public transport etc.;
- decreases car dependency and increases support for public transport.

The road hierarchy principles will assist planning agencies with:-

- orderly planning of heavy vehicle and dangerous goods routes;
- planning and provision of public transport routes;
- planning and provision of pedestrian and bicycle routes;
- identifying the effects of development decisions in and on surrounding areas and roadways within the hierarchy;
- facilitates urban design principles such as accessibility, connectivity, efficiency, amenity and safety;
- enables the assigning control over access onto traffic carrying roads to ensure safe and efficient operation for traffic;
- enables the identification of treatments such as barriers, buffers and landscaping to preserve amenity for adjacent land uses.
- accommodating the need for pedestrian access and movement by the more vulnerable in the community (i.e. physically and mentally impaired, elderly and youth) through better public transport provision, wheelchair accessibility (especially to public transport and car parking spaces) and crossings of major roads and intersections.

Table 1, below shows potential classification criteria to determine a road hierarchy based on road counts and desired speed levels. Again this information is from Australian and New Zealand references and suitable criteria should be developed for Samoa.

Table 1: Road hierarchy classification criteria

Type of Road	Volume	Speed	Notes
1. Local access (small)	<300 vpd	<15km/hr	Not needed for Strategic Planning
2. Access	0-2000 vpd	<40 km/hr	Not needed for Strategic Planning
3. Collector	2000-3000 vpd	<50 km/hr	Desired max volume in 'residential areas'; Within 500x500m grids
4. Trunk Collector	3000-6000 vpd	Based on engineering standard	Not best for residential areas, but maybe mixed areas
5. Sub-arterial	6000 – 10,000 vpd	Based on engineering standard	Based on 1x1km grid, or 500m-1km apart
Arterial or Main Road	<20,000 vpd	Based on engineering standard	Use 2x2m grid to overlay desired arterial pattern

Figure 37 over shows the depiction of the available LTA data based on two-way traffic counts. The heavy concentration of traffic about the sports field area of Siusega gives an indication that these counts were taken about the time of the UN SIDS meeting.**Figure 38** was generated based on field observations and local knowledge of road use. It was confirmed as being representative of the current informal road hierarchy and used in subsequent planning analysis.

Bearing in mind the road hierarchy system, demographics and the expressed need to accommodate pedestrian/cycling systems in future planning the Movement Network Plan was produced, as shown in **Figure 39**. Two particular features of this plan are:

- the plotting of the East-West Corridor, which should double as the Infrastructure Corridor for the City; and
- the network incorporates an off-road movement system and riparian corridors – to accommodate bike paths and walking, establishing corridors for walking and to accommodate WSUD protection measures

10.12 Public Transport Provision

Planning for public transport provision also requires adequate land use, population, building/occupancy data, so that thresholds can be determined to satisfy various public transport options. Confirming the road hierarchy would also be a necessary input. Table 2 below provides some guidance on criteria for public transport provision, based on UK examples.

Table 2: Public Transport thresholds

	Stop interval	Corridor width area served	Catchment per stop
Minibus	200M	800M	320-640
Bus	200M	800M	480-1,760
Guided Bus	300M	800M	1,680-3,120
Light Rail	600M	1,000M	4,800-9,000
Rail	1,000M+	2,000M+	24,000+

Source: Urban Design Compendium (ww2.newham.gov.uk/Documents/UDC.pdf)

10.13 Recommended Actions – Movement Networks

The following key actions are recommended:

1) That the Land Transport Authority (LTA) continues the road traffic counts on all major roads about the City so that a road hierarchy can be confirmed;
2) That the LTA confirm the desired road hierarchy classifications (including confirmation of desired terminology) aligning counts to the hierarchy;

3) That once the road counts are completed and a road hierarchy is confirmed, the Structure Plan be amended to suit and subsequent SMPs note the agreed hierarchy;

4) That PUMA work with LTA to undertake field work to identify issue areas including: where unsealed roads service residential areas, streets have no footpaths, and where there are problems with linkages and connections to key services (e.g. retail, open space and schools). This assessment can be done by walking around the study area during the SMP roll-out programme;

5) That once the road hierarchy is confirmed and statistical data is improved (assisted by the updated land use plan and building layers) PUMA work with the villages to determine the best routes for public transport to service village areas;

6) That as the main custodian of public lands associated with roadways the LTA confirm the location and use of the off-road network system, especially as regards the opportunities it provides in implementing WSUD measures to ensure uncontrolled flows of water do not damage LTA assets.

Figure 37: Indicative LTA Data from Traffic Counts

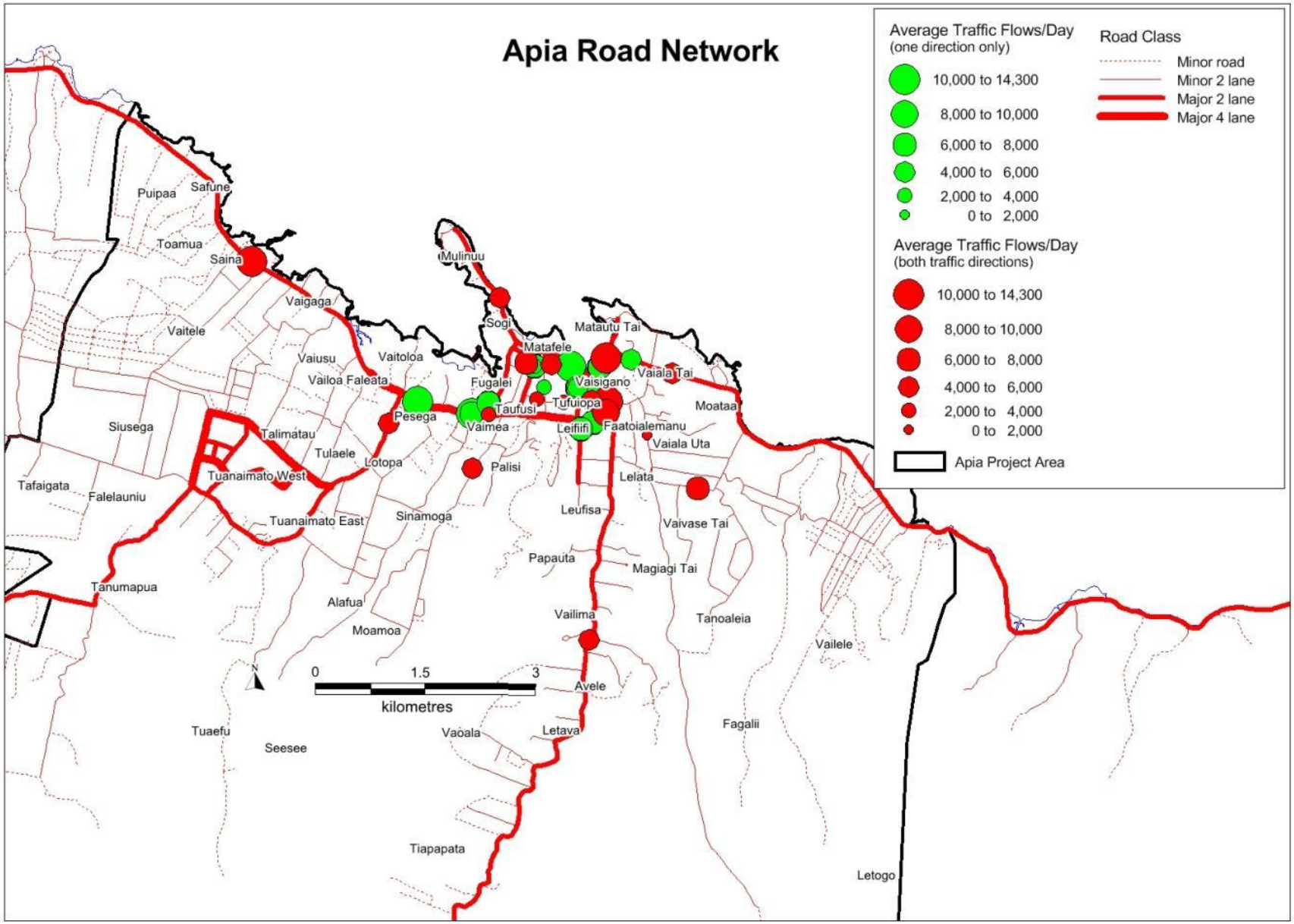


Figure 38: Present Road Hierarchy (Indicative)

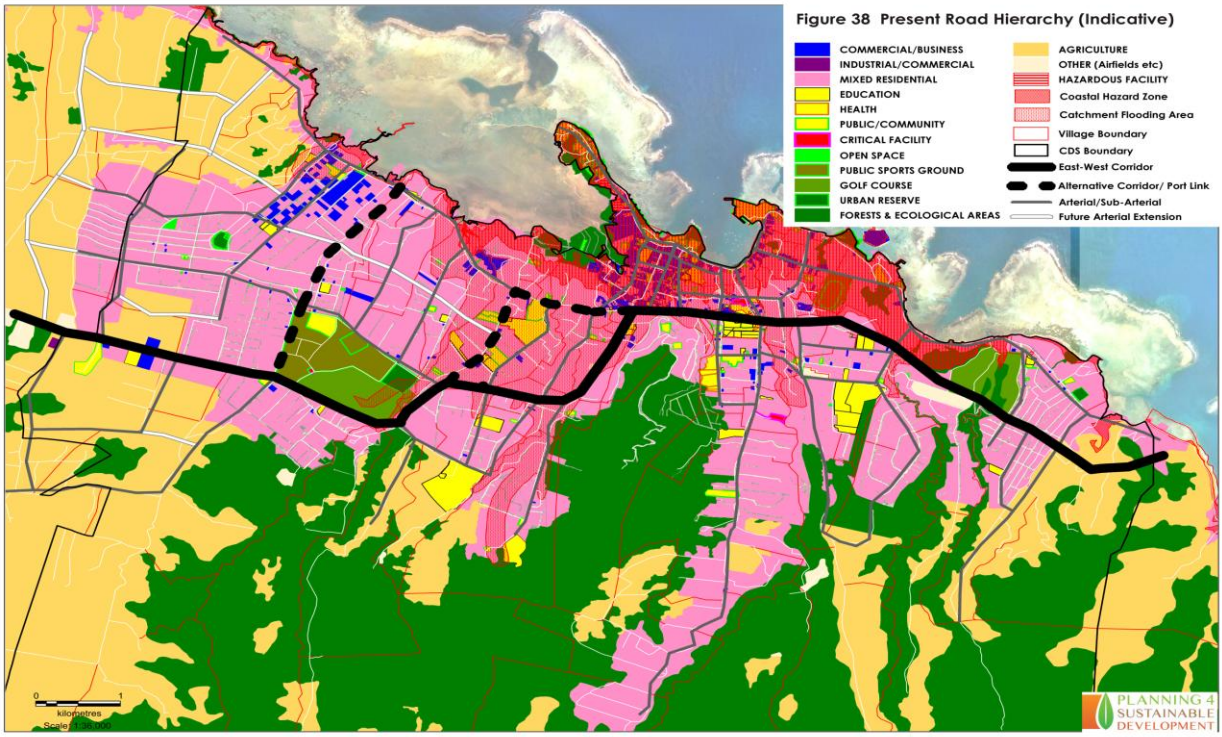
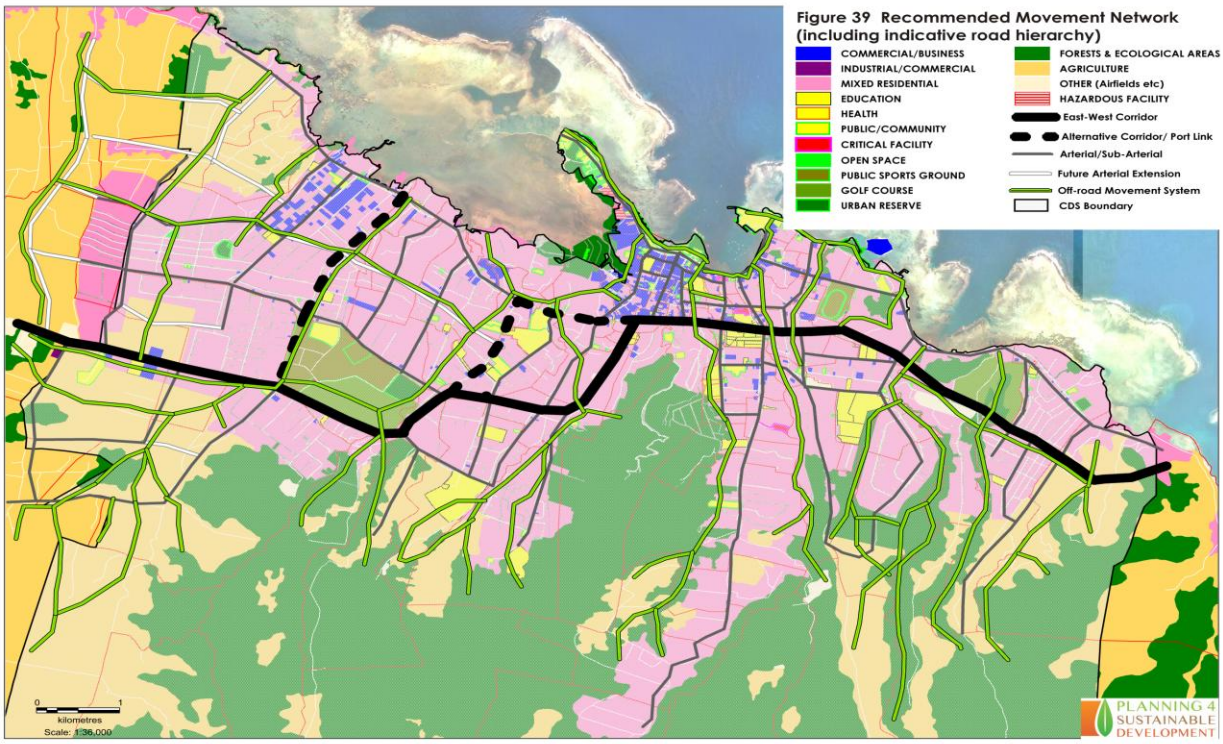


Figure 39: Recommended Movement Network – including Indicative road hierarchy



10.14 Infrastructure & Essential Services

An engineering infrastructure and essential service high-level review, evaluation and assessment was undertaken.In general terms Samoans are well serviced with infrastructure and essential services. Over 95% of the population has access to electricity, 97% have access to clean water and 98% have direct road access. 32.8% of power is generated from hydro-electric power plants; however Samoa continues to depend on imported petroleum for much of its energy needs. The intent is to switch from reliance on fossil duels to renewable energy soon, with the opportunities being in solar, wind, coconut oil and urban waste.

For the CDS, the civil engineering input was intended to characterize the level of present servicing, to identify gaps and to review the risks to assets from climate change and natural disasters. Matters for consideration included the following:

- Flood constrained areas – limiting location of essential services or infrastructure corridors;
- Water resource management: bore management, water security;
- Trunk power corridors and risks
- Water supply trunk corridors and risks
- Sewer trunk infrastructure location, treatment capacity and areas required for land application; beneficial use opportunities (of treated or partially treated effluent);
- Telecommunications infrastructure;
- Future Infrastructure easement requirements.

There was a lack of access to relevant infrastructure and essential services with regard to water and electricity services by the Samoa Water Authority (SWA) and the Electricity Power Corporation (EPC). However, schematic maps of current service alignments from both agencies were obtained from publicly available reports and on-line maps. Demonstrated benefits of strategic plans may support increased access to data sets to support the roll-out of SMPs. For each SMP area PUMA will need to:-

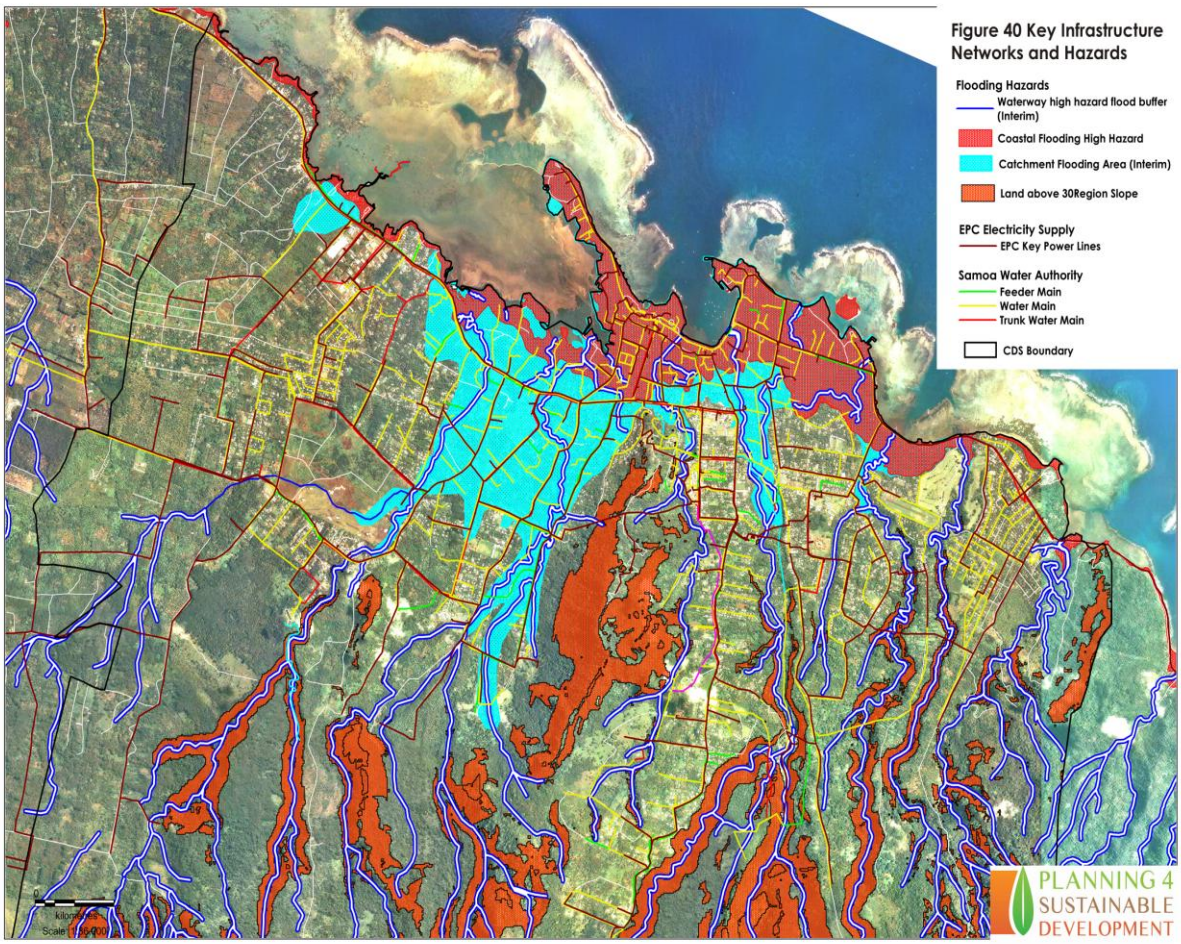
- Determine the current situation regarding services, capacities and gaps in infrastructure and essential services;
- Review the needs with regard to traffic and access;
- Identify likely future servicing needs based on possible land uses/development options;
- Assist with the preparation of preliminary constraints plans to identify the best corridors for future servicing ;
- Outline likely costings for infrastructure and service needs based on preferred development concepts;
- Assist with determining the best scheduling of infrastructure and essential service provision; and
- Identify opportunities for energy efficient development options.

The limited assessments and mapping were undertaken with some discussion with the relevant engineers in the Government or service providers. It is important that relevant bodies understand that the planning process is underway and that it may/will have implications for their asset management and capital works programs in the future.

Of particular interest would be the quantification of the extent of key infrastructure services that are currently within medium to high risk areas, as represented in **Figure 40**. It demonstrates that for EPC and the SWA much of their present assets are in high to very high hazard areas especially along the Main West Coast Road.

The nominal location of the East – West Corridor to act as the key infrastructure corridor within the bounds of the City (as planned schematically in the City Spatial Plan) – should assist with future infrastructure and essential service planning. The final Structure Plan provides a rational reference to ensure that any future significant infrastructure programme or project supports essential services to be located in less hazardous areas or in locations where resilience can be managed.

Figure 40: Key Infrastructure Networks and Hazards



It is important to note that the Land Transport Authority (LTA) under its jurisdiction is responsible for management and administration of any infrastructure works within the road reserve. There is a Utility Service Committee (USC) which is made up of representatives from the Utility Service Providers such as Bluesky, EPC, SWA, Digicel and PPS. A specific allocation of the road reserve has been assigned to the respective utility service providers. This has been designed to set a standard allocation for services, so that the assets' location can be consistent within the road reserve thus being easier for identification and maintenance as most of these services will be underground. The Utility Service Committee (USC) will therefore play an essential role in ensuring that future key Infrastructure and Essential services are provided in a manner which is consistent with theStructure Plan and any further detailed land use plans generated through the roll-out of the SMPs.

10.15 Stormwater Drainage

In addition to flooding and inundation issues and water supply, the implications of existing and future land use on stormwater drainage, treatment and re-use have been considered.

Data and information at this juncture is insufficient to be able to characterize the status of all urban waterways and drainage-ways, especially within the lower elevated coastal areas of the City. It is important to determine the threshold points or triggers for new infrastructure or upgrades to waterways/pipes. New development may be able to be provided for within the current capacity of waterways/pipes. It is important to identify where new development can be accommodated based on existing service capacity so that land uses can be planned around this parameter. However, if waterways/pipes are nearing capacity and upgrades are proposed, the efficiency and cost recovery of upgraded infrastructure will be dependent on the amount of new development that they are servicing. In this instance, it will be important to discuss the likelihood of upgrading infrastructure on the basis of long term development proposals.

It is also important to ensure that the existing drainage ways in the built up areas are well maintained especially in the lower flood prone areas. Past practices of filling in and reclaiming drainage-ways for development should be stopped. LTA has annual maintenance contracts for drainage (within the road reserve) whereby contractors carry out maintenance works. If drainage assets are well maintained, this contributes to planning of future upgrade works for drainage-ways. It also makes nuisance flooding of lower areas less prevalent in small to medium rainfall events. While proper maintenance plays a vital role in the sustainability and longevity of the drainage infrastructure, priority needs to be given to tackling the 'issue at the source' by reducing the velocity and quantity of water coming from higher elevated areas where past and ongoing development has exacerbated run-off.

Any areas required for overland flow paths in new development areas, or through existing built up areas should be identified by the city engineers and planners. That is, areas to accommodate surface water in a standard storm event i.e. swales, rain gardens, roads & associated landscape strips – should be clearly identified in land use plans. This should be taken up at the SMP roll-out phase.

Updating information on existing drainage-ways in terms of their capacity, current function, condition and required maintenance (including annual costs of rehabilitation) will enable decision-makers to determine when upgrades are needed to accommodate land use intensification. Where proponents forward large scale development proposals that will dramatically affect the capacity of existing drainage-ways, with the above quantification – they can be asked to upgrade the public system or contribute to its cost in upgrading (this is similar to the user-pays development contribution systems instituted in many countries).

Water sensitive urban design (WSUD) practices should be employed in both existing drainage and future drainage systems.Strategic planning should direct development to locations that create efficiencies in infrastructure provision, and enable the sequencing of development to respond to drainage capacity and upgrade plans.

For higher elevated areas above the recommended urban development cut-off line, WSUD measures within all waterways and

drainage-lines will be essential. They will also need to be employed strategically in the mid elevation areas of the urban development zones, as it is within these areas that water run-off and flood flows can be alleviated before they drain to the flood prone lower coastal plains. The Structure Plan identifies these areas for attention (see Section 11).

In terms of managing existing drainage-ways and those that will need to be accommodated in road reserves, again the LTA would be instrumental in coordinating work on integrated stormwater management. Their jurisdiction covers all assets within road reserves. Many drainage-ways are located within road reserves as prior flow paths and old drainage-ways were built over. This has exacerbated drainage and localized flooding in the low lying flat areas of the City.

10.16 Effluent

Provision of suitable effluent management, treatment and disposal systems is also of critical importance to the City. As with drainage, it is important to understand the extent of the current reticulated network; the capacity issues;options for the future and any proposed upgrades and timing. The provision of effluent services is needed for all new development areas and can typically be a trigger for attracting further development. Creative use of small 'advanced water treatment systems' (AWTS) and composting toilets in more sensitive parts of the City should not be ruled out. Even with a formal Sewerage Treatment Plant (or its enhancement) reuse of treated or partially treated waters for nutrient supply to agriculture and horticulture endeavours should be considered.

As much of Apia is not serviced by an augmented sewerage collection system (as well as a sewerage treatment plant), a number of strategic land use parameters need to be noted:

- If a reticulated system is to be implemented in the future, land use planning at the SMP stage should identify the logical location of potential pipeline alignments;
- If there is to be continued reliance of home based systems i.e. septic systems, the sizes of land parcels needs to be adequate to enable site based absorption trenches (or the like) to dispose of partially treated sewage – without causing health or environmental impacts;
- Whichever future system is relied upon adequate rural or open space areas should be retained within the City or on the periphery for the land disposal of treated or partially treated effluent;
- The re-use potential of partially treated effluent should be recognized and land uses supported which aim to recycle effluent or use it for alternate forms of fertilizer, mulch or soil reconditioning mediums;
- Partially and fully treated effluent can be used on playing fields and community gardens under certain circumstances;
- There needs to be an effluent re-use policy developed for use by public agencies as well as by residents;
- The Land Resource information and data layers will need to be enhanced to enable the location of suitable areas for land disposal of partially or fully treated effluent. This should precede the SMP roll out phase.

10.17 Telecommunications and Renewable Energy

The location of telecommunication and energy assets, and resultant constraints and opportunities for surrounding land uses need to be considered. Additionally, any capacity shortfalls and the need to service future development need to be considered. As information was not available at the City scale this will need to be taken up during the SMP stages.

Opportunities for self-generation of power, use of photo-voltaic and other energy-efficient measures will also need to be investigated while working with communities at the SMP stages.

The work should document telecommunication network coverage and any issues with capacity, including issues related to natural disasters and the appropriate location of overhead and underground cables.

10.18 Waste Management

The Domestic Waste Reduction Initiative being undertaken by the DEC Division of MNRE, commenced in March 2012. This project aims to reduce household waste and manage the storage of waste through participatory approaches to urban waste management. This responds to issues raised by the community through the Structure Planning process.

Whatever options prevail, planning at the SMP stage will need to be conscious of the possible need to set aside land for urban waste management. This might be to accommodate waste transfer stations at certain locations about the City.

10.19 Recommended Actions – Infrastructure & Services

The following actions are recommended:

1) The key infrastructure and service agencies be asked to respond to the implications of a significant amount of their assets being located within high to critical hazard areas (refer to Figure 40);
2) The EPC and the SWAamong other service agencies be asked to advise on present difficulties with service residential areas, commercial and industrial areas. Information provided should report on the current situation regarding services, capacities and gaps in infrastructure and essential services;
3) Infrastructure and service agencies are asked to identify likely future servicing needs based on possible land uses/development options shown in the Structure Plan;
4) Thatinfrastructure and service agencies assist with the preparation of SMPs through preliminary constraints plans to identify the best corridors for future servicing within village areas;
5) that infrastructure and service agencies outline likely costings for infrastructure and service needs based on preferred use areas and structure presented in the CDS;
6) That infrastructure and service agencies assist with determining the best scheduling of infrastructure and essential service provision;
7) that the nominal location of the East – West Corridor to act as the key Infrastructure Corridor within the bounds of the City be supported by the Utility Service Committee (USC);
8) That the existing drainage ways in the built up areas are located, mapped. Updated information on existing drainage-ways is to be aggregated in terms of their capacity, current function, condition and required maintenance (including annual costs of rehabilitation). The implications for land use intensification about drainage-ways shall be assessed.
9) Past practices of filling in and reclaiming drainage-ways for development shall be stopped. Any areas required for overland flow paths in new development areas, or through existing built up areas shall be identified by the city engineers and planners
10) It is important to understand the extent of the current reticulated sewerage network; the capacity issues; options for the future and any proposed upgrades and timing.Creative use of small 'advanced water treatment systems' (AWTS) and composting toilets shall be required n more sensitive parts of the City;
11) If a reticulated sewerage system is to be implemented in the future, land use planning at the SMP stage should identify the logical location of potential pipeline alignments;
12) If there is to be continued reliance of home based systems i.e. septic systems, the sizes of land parcels needs to be adequate to enable site based absorption trenches (or the like) to dispose of partially treated sewage – to minimize health or environmental impacts;
13) Whichever future system is relied upon adequate rural or open space areas should be retained within the City or on the periphery for the land disposal of treated or partially treated effluent;
14) The Land Resource information data layers will need to be enhanced to enable the location of suitable areas for land disposal of partially or fully treated effluent

15) Utility agencies should be asked to identify all telecommunication systems and assets, nominate the constraints that should be applied to nearby development, identify capacity shortfalls and needs for future development. Much of this will be needed during the SMPdelivery stages.

16) Opportunities for self-generation of power, use of photo-voltaic and other energy-efficient measures will need to be canvassed while working with communities at the SMP stages.

17) Planning at the SMP stage will need to set aside land for urban waste management. This might be to accommodate waste transfer stations at certain locations about the City.

PART 3: Implementation

11. The Structure Plan

The Structure Plan, as shown in **Figure 43**, is the key tool in the delivery of the CDS [10]. The Structure plan has been derived through consideration of numerous land use planning and development matters as drawn out from sections 3 to 10. It presents the broad 'preferred land use areas' at the city wide strategic level in a logical spatial plan. It combines the Movement Network Plan (**Figure 39**) and the Preferred Use Areas (**Figure 42**) to show the main intended structure of the City. The Structure Plan promotes a hierarchy of centres across the Apia urban area; differentiates areas of vulnerability across the preferred use areas, showing the key roads and infrastructure corridor servicing the land use areas.

Stakeholder consultations undertaken from December 2014 through to May 2015 were used to confirm community values and needs and to inform of the needs for the Structure Plan. The multiple thematic, sector and cross-disciplinary assessments were steered by stakeholder responses. Outcomes as provided in Sections 4-10 were presented to stakeholder forums as they were generated. The feedback, ideas and inputs were used to prepare the final plans.

Many of the recommendations covered in Section 13 are also derived from the technical assessments, supporting maps, diagrams and schematics provided in Sections 4-10. The assembled data has been aggregated into a GIS database, managed by PUMA. Availability of data was a constraint to the level of detail of some technical and thematic analysis. As new and improved data is realised and aggregated through the roll out of SMPs, the Land Use Planning GIS database, including the Combined Risk and Constraints database, can be updated.

Figure 39, the Movement Network Plan incorporates the prospect alignment of the East-West Infrastructure Corridor proposed in the City Spatial Plan. The Preferred Use Areas map (**Figure 42**), was primarily driven by the objective for future urban development to readily accommodate climate change adaptation and reduce risks from natural and human induced disasters over time. These risks were elucidated in the multi-thematic, sector and cross-sector analyses summarized in Sections 4-10, and incorporated in the combined risks and constraints mapping.

The GIS database can be used to generated 'Overlays of Risks and Constraints'. There was concern that for customary land the usual 'zoning' restriction approach of UK derived planning methods was inappropriate. The use of 'Overlays' recognizes the basic right of individuals in Samoa to use and occupy lands consistent with traditional use, but provide information on risks and constraints so that future decisions (individual, village and national based) can work toward reducing risks. This approach is consistent with the 'planned retreat' approach to climate change adaptation principles espoused by the UNFCCC.

The spatial allocation of preferred land uses depicted generally in the Structure Plan can be adjusted, amended and validated through the roll out of SMPs. The SMPs can also add categories of land uses that can occur within each of the preferred use areas, and align development standards and guidelines for use in decision-making. Development standards, plans and guidelines directed at supporting the designation of land use have yet to be generated for PUMA. Some exist in the VaiteleSMP however these are more site specific standards. Land use designation or controls are commonly formed as objective based provisions and locational or intensity criteria. In the absence of guides for Samoa, Annex 5 and 6 have been generated to assist as surrogate provisions. Annex 5 targets 'neighbourhood planning principles' – as suggested guides for improving the amenity and

[10] The Structure Plan is a spatially orientated 'master plan' at the City level. It should guide the planning and development of key infrastructure, should assist with the allocation of dominant land uses, nominate the general location and form of commercial centres (that become employment nodes) and be used to instigate specific urban wide initiatives to reduce hazards, minimize risk and afford better environmental outcomes.

function of village communities. Annex 6 contains broader land use allocation criteria by type of land use or matters that affect the location and control of land use.

As with the anticipated updating of the Structure Plan through SMP generation, it is expected that PUMA's land use planning programme will see the generation of associated development standards, guidelines, codes and manuals to assist decision-making. Annex 5 and 6 can be used as reference material for these.

The Structure Plan is therefore a 'living document' that can be updated as community level land use planning progresses via the SMP generation phase.

11.1 Layout and Urban Form of Apia

The overall layout and promoted urban form of the City has in part been determined by the significant constraints of the steep landscape to the south and south-east of the City. Additionally the multi-nodal city approach, consisting of dispersed centres, informs the city structure.

The nomination of key preferred uses (instead of zoning) has been captured through collective constraints and opportunities analysis. The various aspects considered in the generation of the Structure Plan can be grouped into three dimensions:

a) The bio-physical characteristics of the City setting;

b) The environmental characteristics, including socio-cultural aspects;

c) The existing land use, interactions and relationships.

The CDS examined the following types of physical characteristics at the city macro scale, and at a finer grain where possible (further detail shall come through SMP preparation):

- Topography and slope.
- Sensitive ecological areas & vegetation cover.
- Aspect and orientation.
- Land resources (soil conditions, geology& capability).
- Flooding and Water management
- Core Land Use Features
- Composite Constraints
- Movement networks (on-road and off-road)
- Hierarchy of Centres and Livelihood Opportunities
- Infrastructure and Essential services.

Land use interactions and relationships are important matters for strategic land use planning as well as statutory development control. As Apia experiences intensification of land uses and increased densities of buildings and people conflicts can prevail between adjacent uses. Clustering like uses together through strategic plans (e.g. Structure Plan, SMPs that may confirm 'zones' or preferred use precincts) with development standards that control site specific development matters – is an effective means to manage urban conflict.

The degree of compatibility between land uses and activities is best determined through the roll out of SMPs using essential community engagement processes. Community visioning at the village level can support consensus on the primary preferred uses in the locality. Land use allocation through the nomination of key 'preferred use areas' can be supported by development standards and design requirements.

The adjustment of the Structure Plan over time will include better information on and characterization of hazards and risks. Formative work on hydrologic and hydraulic impacts from flooding and coastal inundation is progressing. The work on the lower Vaisigano river catchment is to be repeated over the other primary catchments covering Apia. Among other things this will provide discrete classification of hazards and risks from low, medium, high and critical hazards. It will also nominate desired future floor levels of buildings to reduce risk over time. This is an important outcome which again is consistent with the 'planned retreat' form of adaptation to risks. The modelling will enable the use of data to determine the best means of adapting to risks via measures to protect people, or to accommodate

known and future hazards. The current installation of protection measures along the lower Vaisigano is a practical example of this use.

11.2 Key Structure Plan Features

The Structure Plan shows a number of key features and spatial representations of Apia to guide delivery of the four key City Spatial Plan goals through the use of: key 'preferred use areas'; a logical road hierarchy; an off-road network system and through highlighting areas where disaster risk reduction should be focussed.

Preferred Use Areas

As future fine grain land use and governance choices are anticipated to be achieved through SMP development in consultation with local village fono, formal nomination of land use zones is not proposed as part of the CDS. Rather key 'Preferred Use Areas' provide the flexibility required before SMPs are generated. Advocating more formal land use control via a Structure Plan would not be conducive to the objective based PUM Act, 2004, nor be consistent with 'prior informed consent' principles. 'Zoning' of land within SMPs in the future will also need careful consideration as UK styled zoning provisions directly conflict with customary usehold systems.

Before an SMP is generated for a particular part of the City the preferred use areas as shown on the Structure Plan can be used in decision-making if the CDS is made under the PUM Act, 2004. For instance if a significant industrial development was proposed within a rural or residential 'preferred use area', the Structure Plan and the information provided in Annex 5 and 6 can be used to identify pertinent matters for consideration, with some metrics (such as buffer requirements) that could assist during the development consent process.

The work on this CDS has enabled the documentation of a number of qualitative and quantitative objectives and criteria for a range of land use categories that can be aligned with the various 'Preferred Use Areas'. These are contained within Annex 6 'Land Allocation Objectives and Criteria'. While not generated solely for Samoa, in the absence of Development Standards made under the PUM Act, 2004, these could be used by PUMA in the role out of the SMPs, as well as in the development consent processes in the absence of SMPs and development standards.

Limits to Urban Growth

The combined risks and constraints work of sections 4-10 culminated with the identification of an urban development cut-off limit to development, as shown in Figure 31. This limit was set having regard to multiple criteria namely being as follows:

- Limits to the ability to supply water from existing sources based on gravity feed (noting that some urban areas already require pumping for supply);
- Steep slopes in excess of 20% and/or location of steep ravines;
- Healthy forested areas that can assist with flood alleviation through retention and enhancement;
- The expressed need to sustain landscape qualities that prevail mostly above the 300 metre contour (ASL).

Creeping of urban development into the foothills, escarpments and hill-scapes about Apia has caused detrimental impacts including:

- Increased flooding on lower coastal areas (increased peak flows, reduced climate and disaster resilience);
- Increased erosion and sedimentation;
- Loss of natural waterway features and ecological service;
- Greater pollution of waterways, drainage-ways and the coastal waters;
- Increased cost of service and infrastructure provision;
- Higher incidence of service and infrastructure breakages from limited ability to control stormwater and site drainage;
- Greater incidence of traffic congestion from inability to provide a rational hierarchy of service roads;
- Loss of visual backdrop provided by the treed landscape.

There are land uses and activities occurring above this level and existing use rights will prevail. SMPs that cover these areas can incorporate development standards (or refer to standalone standards, plans or guidelines) that place performance measures or controls on these land uses. They may nominate a range of land use categories that would be supported in these areas, subject to specific requirements and conditions.

Limiting urban extension will have advantages for catchment management in this important landscape.

Resilience, Disaster Risk Reduction and Community Safety

The Structure Plan supports the four goals of the City Spatial Plan through a hazard-risk reduction and resilience lens. The Combined Risk and Constraints Map (Figure 31) and database can be used in conjunction with the Structure Plan and eventual SMPs to effectively manage and minimise development in highand critical hazard areas.

Strategic response via land use planning instruments and application of standards is consistent with best practice provisions in flood and coastal inundation policy (see Moreton Bay Regional Council *Flood and Coastal Hazard Evaluation Report*, 2015). This form of table application will only succeed once the flood and inundation hazard mapping completed by Water Technology Pty Ltd for the Vaisigano catchment is extended to the rest of the CDS area. The gradations of risk from None/Negligible (H1), Low (H2), Medium (H3), High (H4) and Extreme Hazard (H5) can be distinguished in Figures 21 and 22, as the Moreton Bay work guided the basis of risk assessment. Plate 4 below is extracted from the Moreton Bay flood and coastal hazard assessment by BMTWBM (2015).

The combined river and creek hydraulic hazard categories H1-H5 were firstly proposed in the Newcastle Concept Flood Planning Report (BMTWBM, 2009). This was a modification from the key reference manual '*Floodplain Management in Australia*' (CSIRO, 2000) and the NSW '*Floodplain Development Manual*' (NSW Government, 2005). Separately GHD (2012) proposed the storm tide hydraulic categories H1-H5, which gave consideration to the potential impacts of combined wave action and storm surge. GHD based the hydraulic hazard categorisation on the US Federal Emergency Management Agency (FEMA) guidelines.

Plate 8, below is a graph of the combined hazards based on the work of BMTWBM (2015) and GHD (2012).

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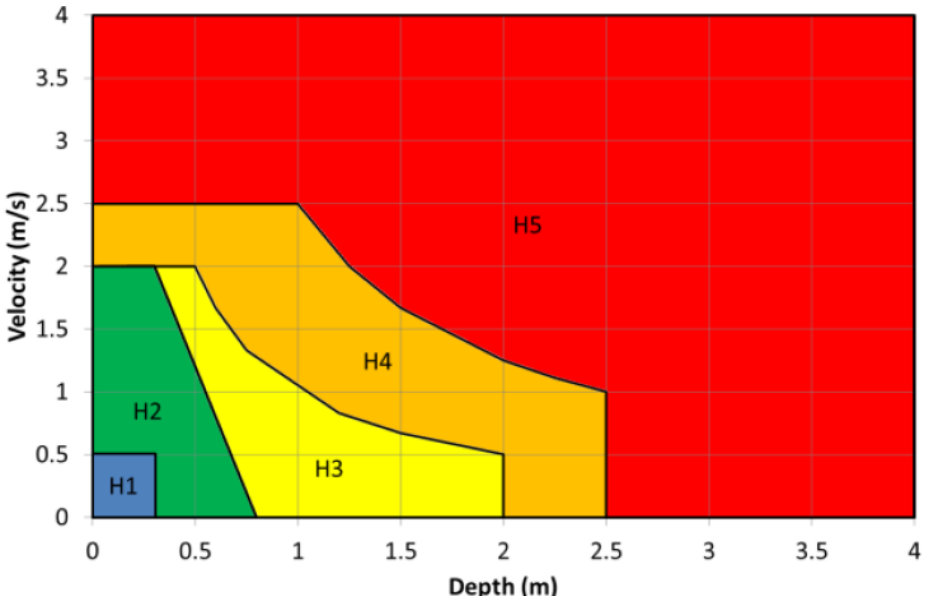


Plate 8: Combined Hazard Classification based on velocity and depth (flooding and storm surge). Source: BMTWBM, 2015

Table 3 below relates the hydraulic criteria to land use and development limitations, as well as access constraints.

Table 4over then interprets the combined classifications and criteria to identify various hazard risk classifications by land use category or type (i.e. this is land use types within a 'preferred use category), and provides a framework for applying hazard-relevant standards and guidelines that will be needed for assessments and conditions of consent. The inclusion here in the CDS is partly to assist with the commitment to generate appropriate development standards for

application with the land use planning system to address climate change and disaster risks.

Table 3: Combined Hazard Category & Land Use Limitations

Hazard category	Suitability/ Description	Hydraulic Criteria
H1	Hydraulically suitable for parked or moving cars; No significant life risk; property risk only to items that come in contact with floodwaters	v < 0.5m/s and d<0.3m
H2	Hydraulically suitable for parked or moving heavy vehicles and wading by able-bodied adults; Low life risk; Cars can float and precautions must be followed to keep assets out of floodwaters	v < 2m/s , d<0.8m and v<3.2-4*d
H3	Hydraulically suitable for light construction (e.g. timber frame and brick veneer) based on contemporary building codes; Moderate life risk; abled-bodied adults cannot wade safely; only large trucks can travel safely	v < 2m/s, d<2m and v*d <1
H4	Hydraulically suitable for heavy construction (e.g. steel frame, reinforced concrete); Major life risk; Light frame buildings can fail structurally	v < 2.5m/s, d<2.5 and v*d <2.5
H5	Unsuitable for development; Extreme life risk; Majority of buildings could fail	v < 2.5m/s, d>2.5 and v*d >2.5

v = velocity d = depth

The work on the CDS compared the past coastal flood assessments (e.g. BECA, 2001 & 2005) with the outputs of Water Technology (Watertech), 2015, which was based on BMTWBM, 2015. Of particular interest is the fact that much of the lower Vaisigano catchment that had previously been nominated as Coastal Flood High Hazard areas (BECA, 2001) are actually of Moderate Risk under the Water Technology Pty Ltd outcomes.

Table 4 suggests where different forms of development should be discouraged;only supported where disaster risk criteria can be supported, or where development may supported depending on the hazard category. It is a preliminary and interim land use planning control mechanism to assist with mitigating hazard risk pending the adoption of SMPs. The SMPs will need to incorporate the outcomes of the balance of the flood and coastal inundation modelling once all the catchments in Apia have been subject to the modelling consistent with that completed for the Vaisigano catchment. **Table 5** provides the key to the hazard classes and symbols used in Table 4.

Only in the Vaisigano River catchment has flooding and inundation assessment work proceeded to the point where the hazards and risks can be classified as negligible, low, medium, high or extreme. The Water Resources Division of MNRE plans to extend the flood and inundation modelling to the remaining catchments covering Apia. In the meantime all areas nominated in red hatch as high coastal hazard in Figure 31 or within 10 metres of the top bank of rivers can be deemed as being high to extreme hazard areas for the purposes of Table 3 and 4.

It is intended that the SMPs will not only improve the level of detail of the data, but will enable the refinement of integrated hazard and risk classification and the nominated criteria to be addressed through development standards. The database and Table 3 can be used in the interim to inform the strategic land use planning and development consent process and over time reduce the number of people subject to medium to high hazard risks.

The Urban Design Manual (City Spatial Plan), future development standards (made under the PUM Act, 2004, the revised National Building Code and other planning guidelines can provide further provisions to be used in conjunction with the Combined Constraints database, and Table 3 Land Use and Development Controls for Hazard Areas, prior to SMPs.

Table 4: Land Use and Hazard-Related Development Controls

(NB: relates to new development/buildings)

No.	Use/Activity	Extreme Hazard Levels (H5)	High Hazard Areas (H4)	Medium Hazard Areas (H3)	Low Hazard (H2)	None/ Negligible (H1)	Notes (as regards development within High and Critical Hazard areas)
1	CBD Commercial	EIA required ©	EIA required ©	☻ PEIA DS &©	☺ DS	☺	Need to recognize existing CBD is within Extreme, High & Medium Hazard Areas. EIA & heavy conditions on approvals based on Development Standards will be required. No new commercial zoning in extreme or high hazard areas.
2	CBD Retail	EIA required ©	EIA required ©	☻ PEIA DS &©	☺ DS	☺	As above. Retail only above Extreme & High hazard levels i.e. 2nd or 3rd levels of buildings only approved based on an EIA which proves the development satisfies global best practice and the Development Standards
3	CBD Residential	✖	✖	☻ PEIA DS &©	☺ DS&©	☺	High density residential above commerce and located above extreme & high hazard levels, only where egress during extreme events can be guaranteed. Need to ensure there is not the concentration of residents that cannot flee extreme hazards
4	CBD Service Trades	✖	EIA required ©	☻ PEIA DS &©	☺ DS	☺	Not desired in Extreme Hazard areas, but need to note existing CBD use rights in high hazard areas. Medium hazard areas will require a PEIA to demonstrate that Development standard criteria have been satisfied.
5	CBD Bulky Goods Retail	✖	✖	☻ PEIA DS &©	☺ DS	☺	As above
6	Tourism Related	EIA required ©	EIA required ©	☻ PEIA	☺ DS	☺	Existing use rights may prevail in some Extreme and High hazard areas. Tourism operators usually pursue coastal & water

				DS &©			feature locations that may be in extreme and high hazard areas. Full EIA will be required to demonstrate the ability to satisfy global best practice and the development standards. Heavy conditions on approvals with site based environmental management plans (SEMPs) requiring annual audits.
7	Residential non-traditional	**Existing uses only**	**Existing uses only**	**EIA required ©**	☺ **DS&©**	☺	Existing use rights may prevail in Extreme&High Hazard areas – no new dwellings. Incentives for dwellings within Extreme and High hazard areas to move. Full EIA will be required to demonstrate the ability to satisfy global best practice and the development standards. Heavy conditions on approvals with site based environmental management plans (SEMPs) requiring annual audits. Heavy conditions for new houses on existing land parcels in medium hazards.
8	Traditional Living & Activities	**Existing uses only**	**Existing uses only**	**EIA required ©**	☺	☺	Traditional areas in Critical & High Hazard areas should be respected, but relocation encouraged. Advocacy through incentives to reduce risks.
9	New Residential Areas - Single	✖	✖	**EIA required ©**	☺ **DS&©**	☺	No approval in Extreme and High hazard areas. Note existing property rights where proven. Full EIA will be required to demonstrate the ability to satisfy global best practice and the development standards. Heavy conditions on approvals with site based environmental management plans (SEMPs) requiring annual audits. Heavy conditions in High and Medium areas
10	Residential Units: Low – medium density	✖	✖	**EIA required**	☺ **DS&©**	☺	As above

				©			
11	Residential Units: Medium – high density	✖	✖	**EIA required** ©	☺ **DS&©**	☺	As above
12	Business Development Areas	✖	**EIA required** ©	☻ **PEIA DS &©**	☺ **DS**	☺	Business development forms can provide resilience but heavy conditions of approval are needed. Full EIA will be required for High and Medium hazard areas to demonstrate the ability to satisfy global best practice and the development standards. Heavy conditions on approvals with site based environmental management plans (SEMPs) requiring annual audits.
13	Employment Areas	✖	**EIA required** ©	☻ **PEIA DS &©**	☺ **DS**	☺	As above
14	Industry – General	✖	**EIA required** ©	☻ **PEIA DS &©**	☺ **DS**	☺	Full EIA will be required to demonstrate the ability to satisfy global best practice and the development standards. Heavy conditions on approvals with site based environmental management plans (SEMPs) requiring annual audits. Mixed Industry can include some 'dirty' industries so heavy conditions required in High and Medium areas.
15	Industry – Bulky Goods	✖	**EIA required** ©	☻ **PEIA DS &©**	☺ **DS**	☺	As above. Less likely to incorporate chemicals etc. Lower employment to size ratio so less people in high risk areas
16	Industry – Service Trades	✖	**EIA required** ©	☻ **PEIA**	☺ **DS**	☺	As above

				DS &©			
17	Industry - Heavy	✖	EIA required ©	☻ PEIA DS &©	☺ DS	☺	As above. Notorious for chemical and outside storage users. Tight conditions in High to Medium hazard areas
18	Industry – professional services	✖	✖	EIA required ©	☺ DS	☺	Less likely to incorporate chemicals etc. Facilities can be raised with parking underneath. Heavy conditions in High hazard areas
19	Local Shops	✖	✖	EIA required ©	☺ DS&©	☺	Local shops should not be located within Extreme or High hazard areas. Classes note that existing shops have existing use rights. Upon their upgrade heavy conditions will apply.
20	Neighbourhood Centres	✖	✖	EIA required ©	☺ DS&©	☺	Neighbourhood centres shall not be supported in Extreme and High hazard areas. Classes note that some may be on the fringe of medium-high hazard areas and measures can be employed to reduce risks.
21	District Centres	✖	✖	EIA required ©	☺ DS&©	☺	New District Centres shall not be approved within Extreme and High hazard areas. They shall be discouraged from medium hazard areas. Heavy conditions will be applied to reduce risk.
22	Regional District Centres	✖	✖	EIA required ©	☺ DS&©	☺	As above.
23	Local Playing Fields	✖	✖	☺ DS	☺	☺	Not to be supported in Extreme or High hazard areas, but existing facilities can assist with flood retention, where human risk can be minimized. Also can provide a buffer between hazards and existing living areas

24	District Playing Fields	✖	**EIA required ©**	☻ **PEIA DS &©**	☺	☺	As above
25	Regional Sport/ Playing areas	✖	**EIA required ©**	☻ **PEIA DS &©**	☺	☺	Can be used as part of flood attenuation works. Usually big investments so water management can be included as part of design.
26	Open Space - community	**EIA required ©**	**EIA required ©**	☺ **DS**	☺	☺	More frequent use so care needed to minimize human risk.
27	Open Space networks	☻	☺	☺	☺	☺	Networks usually in Extreme and High hazard areas along coasts and rivers. Areas of congregation of people to be avoided where risks cannot be minimized

Table 5: Key to Hazard Classes and symbols

No.	Symbol	Location based Limits	Design & Siting Based Limits	Development Standards, Guidelines & Criteria (Required)
1	✖	**Not supported unless extreme reasons based on customary or existing use rights etc. (based on proof)**	NA	NA
2	**EIA required ©**	**Not supported, unless extreme reasons based on customary or existing use rights etc. (based on proof). New developments need full EIA based on global best practices as well as Development Standards. Heavy conditions will be applied including the need for site environmental management plans (SEMP) where annual audits are conditionally required**	Applied on merits using global best practices and guidelines, but only in extreme cases where risks can be proven to be acceptable or measures employed to reduce risks without transferring those risks to other people or places.	Flood Hazard Risk Assessment Coastal Hazard Risk Assessment Landslip Code Building Code (Update) Flood zone building requirements Footing and foundations Water Balance Modelling Stormwater Management Soil Investigations for Flood prone areas Emergency Evacuation provision Erosion & Sediment Controls Urban Design Guidelines
3	☻	**Supported: but only where existing uses prevail; risk assessments need to show the**	Conditions will be applied where the onus of proof can	As above

	PEIA **DS &©**	**means to reduce risk (determined through Preliminary EIA, which may then lead to full EIA as part of development consent). Development standards will need to be satisfied and conditions of approval will be extensive based on global best practice as well as the criteria contained in the development standards.**	demonstrate that risks can be adequately reduced. Heavy conditions will apply to Development Consents	
4	☺ **DS&©**	**Supported where area and site conditions reveal opportunities to address risks to an acceptable level based on criteria outlined in Development standards. Planning reports will have to accompany applications for Development consent. Conditions of approval will relate to criteria in Development standards**	Conditions will be applied where the onus of proof can demonstrate that risks can be adequately reduced. Standard conditions will apply to Development Consents	As above
5	☺ **DS**	**Supported where planning reports (accompanying applications for Development consent) successfully address development standards related to hazards.**	Conditions will be applied where risk reduction is relatively simple. Low-medium level conditions will apply to Development Consents.	Flood Hazard Risk Assessment Coastal Hazard Risk Assessment Landslip Code Building Code (Update) Flood zone building requirements Footing and foundations Water Balance Modelling Stormwater Management Soil Investigations for Flood prone areas Emergency Evacuation provision Erosion & Sediment Controls Urban Design Guidelines
6	☺	**All development accepted in terms of hazards and risks. Other planning criteria may relate to satisfying other development standards not related to hazard and disaster risk reduction.**	No conditions related to hazards and disaster risk reduction need to be applied	As above, plus Landscaping Code

CSP Goal 1: Creating a unique City – diverse living and affordability

Residential areas are recommended to be maintained as shown in the Structure Plan. There may be an increase in density over time where the land is not within high to extreme hazard areas, if development is consistent with future development standards.

In mid to upper elevated areas, below the urban cut-off limit, it is preferred that large physical land parcels be maintained by residents (i.e. greater than 1000 sq. m.). These large parcels can accommodate urban gardens and landscaping which will improve amenity but also provide a land use that helps with water sensitive urban design (WSUD)[11] that will assist with flood management and water quality management in the lower areas. Land should be set aside in the lower flat areas subject to local inundation and poor drainage (due to ill-defined drainage paths), to facilitate improved water management.

New development within existing preferred residential use areas but within moderate to high hazard areas are recommended to be subject to hazard-specific development and building controls and conditions of consent. The Combined Risks and Hazards GIS database enables the generation of 'Constraint Overlays' which can be used in conjunction with the Structure Plan to highlight the various risk levels of hazards about the City. These can be used at the SMP generation phase for communities to decide on: areas that should not be developed; areas where specific building requirements are necessary; and, areas where hazards and risks can be accommodated with good site and area management. All new developments and uses within the high to extreme hazard areas should be deterred.

[11] The instigation of water sensitive urban design measures should be implemented at strategic land use planning, village development and site development levels across the whole City. The Structure Plan nominates two zones at mid elevation and in the upper catchment areas where integrated catchment based WSUD measures (i.e. large scale measures) will be essential and will require the support of Government to alleviate current and future flooding.

Hazard-specific controls will be further developed as part of development standards andthe revised National Building Code.

Further community engagement in the lead up to or during the roll out of SMPs should aim for communities to identify those parts of their village where they wish to retain the traditional village built form and use.

The Structure Plan and subsequent SMPs should strive to stem urban sprawl along the coast, coastal roads or other main roads. The encouragement of a hierarchy of centres aims to be instrumental in this pursuit. Existing use rights are protected (common law and international law does not enable planning and development law to be retrospective). Where industrial or commercial uses are already located within residential areas for instance, existing use rights prevail. However if there are proposals for major extension to commercial or industrial activities within residential areas, then the Structure Plan and subsequent SMPs can be used to discourage and manage such development.

To ensure sustainable development of land to support Apia as a unique city, any significant subdivision (i.e. subdivisions of ten or more allotments) should not be approved unless it is consistent with the relevant SMP made for the area. Mechanisms should be put in place for proponents to prepare a SMP consistent with the provisions of the PUM Act, 2004. Among other matters the SMP shall ensure appropriate land use and adequate servicing and access is provided to the residential areas, prior to sale or occupancy of the land.

CSP Goal 2: Enhancing Employment Opportunities

The Structure Plan identifies preferred locations where accessible employment opportunities can progress about the city through the instigation of a hierarchy of centres as shown in Figures 33-35. The current Apia central business district is expected to remain the core commercial area of the city. Where land in the CBD is within high or extreme hazard areas, development standards and design requirements will be applied to existing uses if any future proposals are

received to further develop the land. New commercial development within extreme hazard areas will be discouraged. Where a proponent is able to demonstrate that a risk can be made manageable, including through measures accommodated in development standards or design guidelines, conditioned approval may be supported.

The planning work currently being undertaken for the Waterfront Development will need to be cognizant of the high to extreme hazard areas.

The industrial centre of Vaitele is anticipated to remain the focus of non-CBD commercial and service trade uses in the medium term (i.e. 10-15 years), while the emerging urban fringe industrial use area adjacent to Tafaigata is recommended for further investigation and detailed planning (possibly through a discrete SMP) as a future employment node. This area is a high priority as uncontrolled development that is emerging will cause conflict with existing uses and could have dramatic impacts on groundwater resources in the locality.

In addition to the major and potential district centres located beyond or adjacent to the bounds of high hazard areas, the regional education nodes of NUS and USP, as well as the hospital precinct can be encouraged to accommodate greater intensities and mix of land uses, including commercial activities and higher density residential development to assist with their growth as employment nodes.

Commercial use within Preferred Residential Areas

Small scale service trades and business uses within the residential and mixed residential areas should be supported where they do not adversely impact upon the hierarchy of centres or residential amenity, including through significant noise, odour or traffic generation.

CSP Goal 3: Accessibility and Connection - Movement Networks

Both the on-road and off-road movement networks as shown in Figure 39 should be confirmed as the primary networks to service the City in the future. The extension of the arterial road connection from the Vaitele area sports precinct toward the coast is recommended for further investigation and its alignment to be validated with the surrounding villages. It is needed in conjunction with the new port development if that were to proceed. This connection is essential to:

- Ensure appropriate access to the new port precinct;
- Encourage future heavy traffic to be diverted around residential precincts;
- Discourage the connection of industrial uses and heavy through traffic between the Vaitele Industrial Area and the emerging industrial precinct adjacent to Tafaigata.

The off-road movement system is to be supported to:

- Provide walking and bicycle connections between neighbourhoods and key areas of the City;
- To accommodate water sensitive urban design features to improve water quality and quantity management, especially in the low-lying areas;
- Enable the co-location of movement corridors and water management features;
- Provide connectivity between community and district level open space, sporting facilities and conservation areas/reserves.

Infrastructure Corridor

The East-West Infrastructure Corridor is recommended to be adopted into the key planning polices and sector plans of the key infrastructure and essential service agencies or their projects. This should increase urban development efficiencies, coordination and the resilience of assets over time.

CSP Goal 4: Natural Environment and Cultural Values

Development should follow the Structure Plan to ensure that significant environmental and ecological values are protected. These as far as practicable are incorporated in the 'Environmental Protection Area'

shown on Figures 42 and 43. The off-road network overlay shown in Figure 39 incorporates routes that coincide with rivers and waterways, and therefore will also incorporate areas of ecological value.

Development and land uses should not adversely impact on water catchments and ensure catchment modification does not exacerbate flooding or increase water quality impacts.

The remaining wetland and mangrove areas of the City should also be retained to maintain their ecological services as well as to ameliorate expected climate change impacts. As the areas surrounding them will shift from medium to higher hazard in the advent of climate change, people are anticipated to progressively relocate to less hazardous areas. The remaining vacant land can be rehabilitated to accommodate inward movement of mangrove and wetland ecosystems.

New urban development or the extension/intensification of existing uses should be minimised up-slope from the Urban Development Cut-off level shown on the Structure Plan at **Figure 43**. Urban development has crept up into the elevated foothills and escarpments of the hinterland increasing flood flows and exacerbating erosion and sedimentation of waterways.

Areas of mid-slope and the upper reaches of the surrounding escarpments have been nominated in Figures 28 and 29 as needing specific Government sponsored intervention in terms of integrated water resource management measures (often referred to as 'water sensitive urban design' measures). Such interventions may include flood management 'at the source' primarily through the protection of existing vegetated land-cover. Additional 'soft' and 'hard' engineering responses will also be needed on the mid-slopes of the landscape. The intent is to control water run-off velocity and quantity during extreme events to minimize damage to the lower elevated areas. . These works will require extensive modelling and substantial investments for retardation basins, catchment rehabilitation and ongoing sustainable land management.

In addition to these key integrated water resources measures requiring public investment, water sensitive urban design works will be required as part of private developments through the development consent and building approval processes. Focus should be along waterways to provide flood retention, to channelize natural water flow under near natural conditions and to provide opportunity for water quality management facilities to stem the flow of pollutants and sediment to the coastal environs.

11.3 Use of the Structure Plan

The primary purpose of the Structure Plan is to guide the delivery of SMPs over the coming 3-5 years. The Structure Plan provides a spatial master plan of the intended form of future city development, nominating the location of key preferred land uses, aggregating data on bio-physical and socio-economic parameters, informing of city-wide issues and suggesting important elements that are best taken up with the local communities.

There are likely to be at least 8 SMPs generated to cover the more detailed land use planning at the local scale over the City. Without some form of city-wide logical guidance, as provided with the Structure Plan, the SMPs could be disparate and conflict with each other, especially along their likely boundaries.

The vulnerability assessments and mapping undertaken to complete sections 4-10 of the CDS identifies further strategic and technical work to be completed prior to or concurrent with the SMP programme (see Section 13). These are designed to address analytical gaps and many are required to inform effective SMP consultation and production with village councils.

The Structure Plan is supported by reference information provided in Annexes 5 and 6 to assist with present development consent processes in the absence of SMPs. Even with the Vaitele SMP a brief review of PUMA capacities revealed thelack of development guidelines, codes and/or standards adversely impacting on effective decision-making.

In terms of encouraging local economic development the Structure Plan nominates the preferred location of commercial centres about

the City. Section 10 provides the framework for considering a hierarchy of centres, noting the role also of existing and emerging commerce and industrial areas within the City. Without specific research on the form of centres suited to Apia, Annex 5 and 6 provide some metrics on the sizing of various forms of centres and the area requirements for different land use types within commercial centres and neighbourhoods.

Capacity assessments and stakeholder engagement revealed some critical challenges in existing land use policies and development standards that impact on effective decision-making. The adoption of the CDS under section 32 and/or Section 46 (e) under the PUM Act, 2004 can provide an interim effective guide for land use planning and development consent processes, prior to the adoption of fit-for-purpose development standards and urban design guidelines.

Figure 41 depicts the surrogate use of the Structure Plan and other information provided in the CDS during the period when SMPs and Development standards are to be produced. The intermediate use of the Structure Plan is reliant on the ongoing use and the maintenance of the Land Use Plan Database and the Combined Risk and Constraints Database.

11.4 Benefits of the Structure Plan

The anticipated benefits of improved land use planning through application of the Structure Plan and production of SMPs are as follows:

a) Improved efficiencies in urban infrastructure and services;
b) Improved productivity within the various sectors by better managing land and infrastructure;
c) Improved sustainability of Samoa's natural and built environment through better resource and risk management;
d) Enhanced appreciation of urban design, planning and access to amenity facilities;
e) Enhanced community wellbeing; and,
f) Enhanced cultural identity within the City of Apia.

Figure 41: Use of the Structure Plan

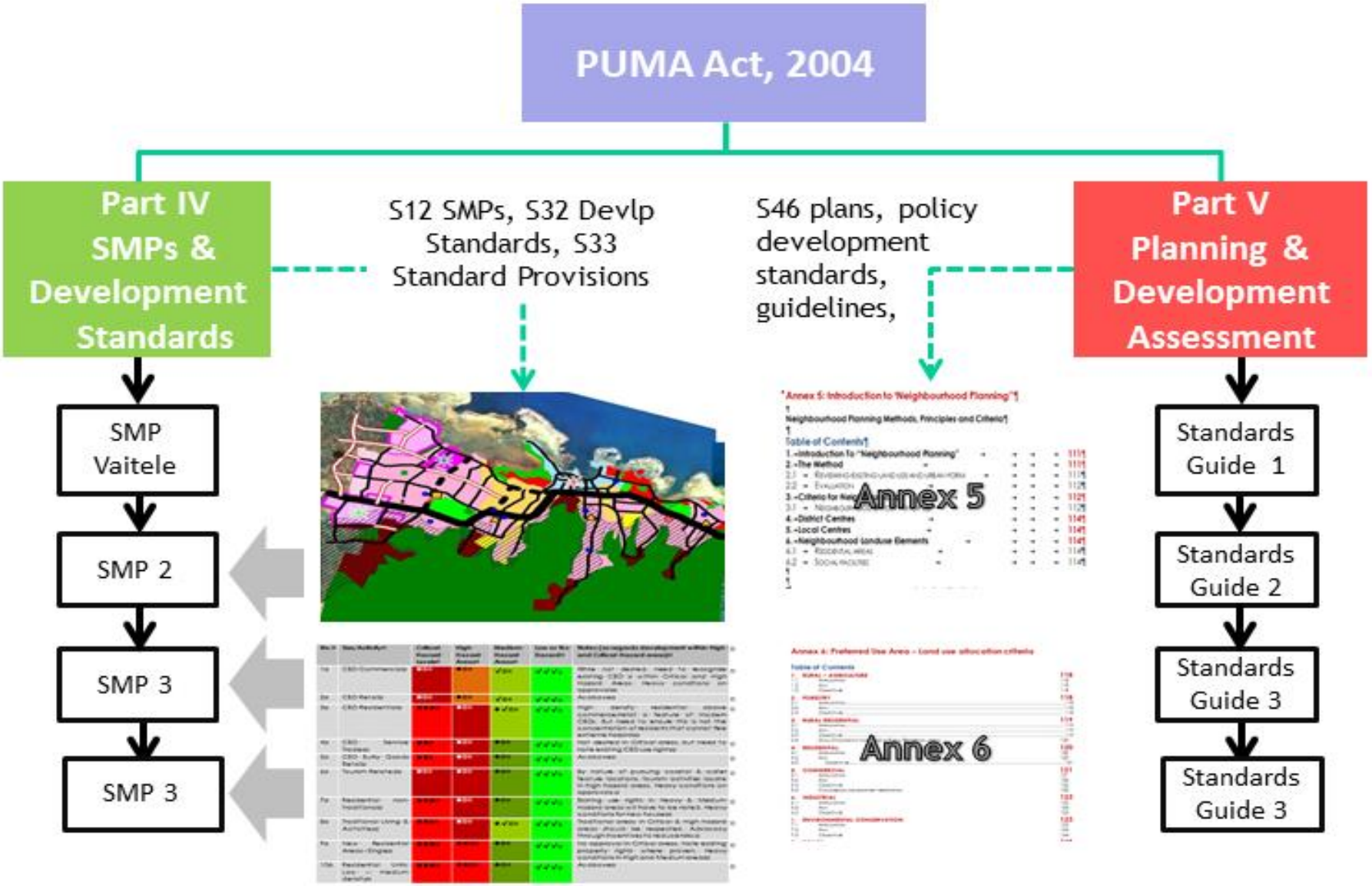


Figure 42: Preferred Use Areas

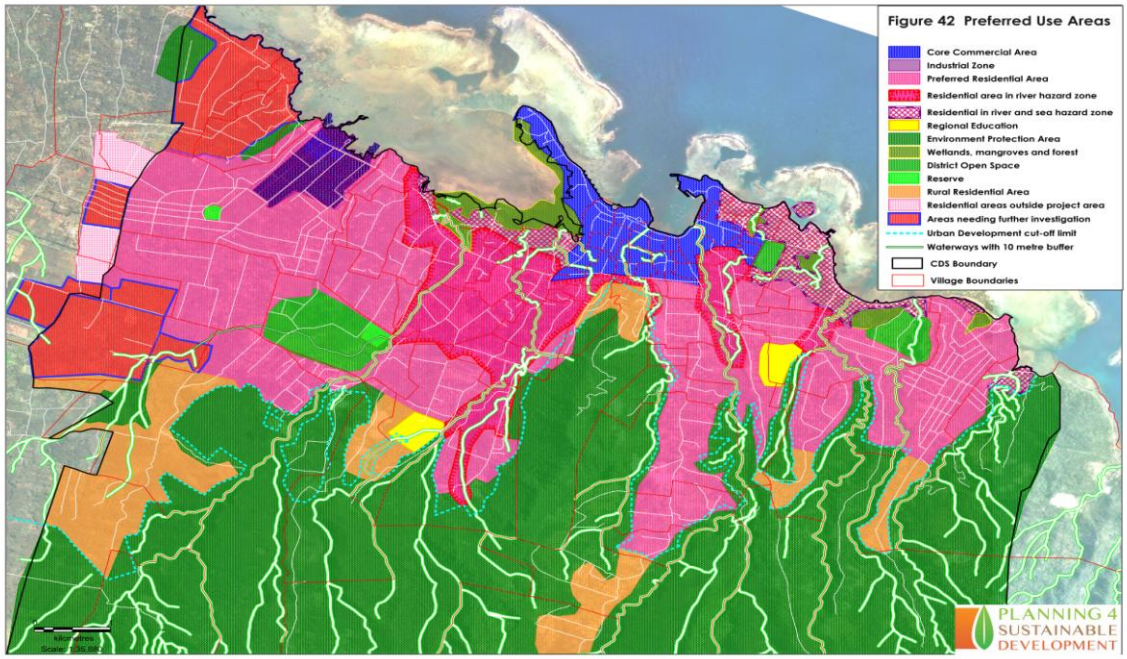
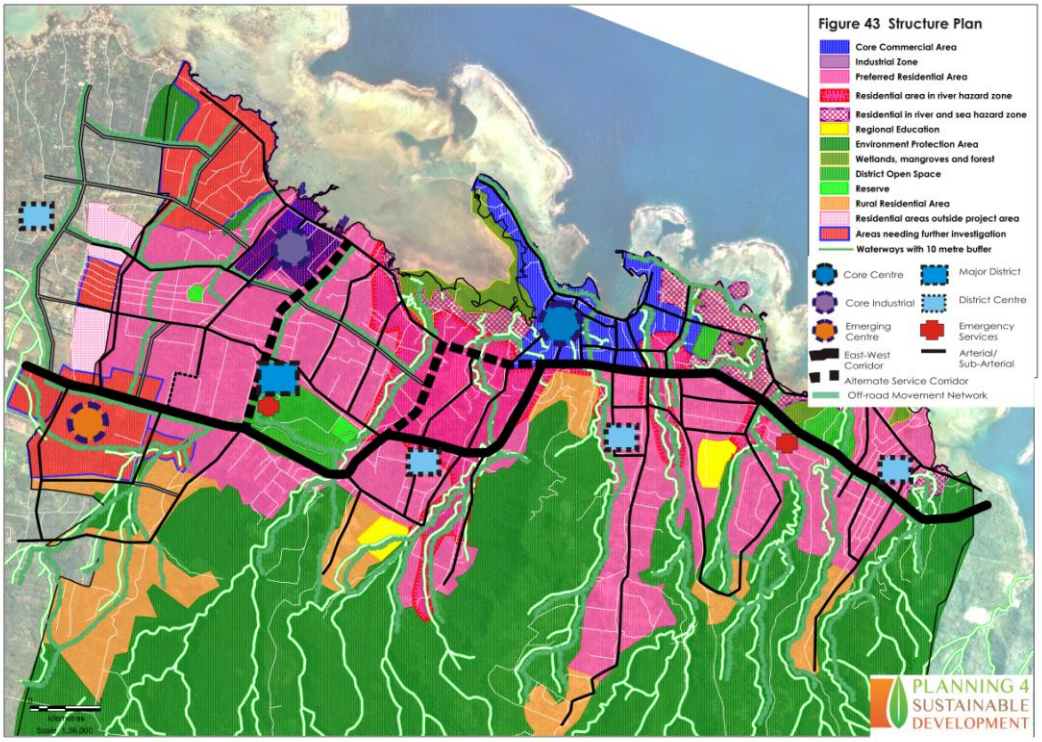


Figure 43: Final Structure Plan



12. Development Standards and Guidelines

This component concentrates on the non-locational parameters for City planning, consistent with the functional aspects of land use planning decision-making depicted in Figure 3. While the Structure Plan addresses locational parameters at the City wide strategic level, there is a need to address the lack of development controls to assist with present and future decision-making.

The PUM Act, 2004 through a number of provisions enables PUMA to use development standards, guides, codes and policies to assist in strategic as well as development control planning. Currently the PUMA office has a limited number of decision-support tools for use by the land use planners, including:

a) Draft Planning and Development Guidelines for Housing (2003);
b) Code of Environmental Practice: made by the Board but originated as a guide for Extractive industries for a road building programme some years ago
c) Noise quality guidelines – for nuisance assessments
d) Environmental impact assessment guidelines – limited to project based assessments

The functional use of Table 3 and 4 in Section 11 to assist with implementing the principles of the Structure Plan is indicative of the need to use a number of varying technical standards and guidelines. Below is a discussion on the extent of development standards and decision-support tools that are able to be used by MNRE-PUMA.

12.1 Strategic Planning

Part IV of the PUM Act, 2004 accommodates the use of strategic assessment and planning tools for decision-making.

Section 32, Development standards of the PUM Act, 2004 enables the Board toapprove a set of development standards as regards:

a) 'the area, shape or frontage of any land, the dimensions, or the distance from any point;
b) the percentage of the area of a site a development can occupy;
c) the character, location, siting, bulk, scale, shape, size, height, density, design or external appearance of a building or work;
d) the cubic content and floor space of a building;
e) the intensity and density of the use of any land, building or work;
f) the provision of public access, open space, landscaped space, tree planting and other treatment for the conservation, protection or enhancement of the environment;
g) the provision of facilities for the standing, movement, parking, servicing, manoeuvring, loading and unloading of vehicles;
h) the volume, nature and type of traffic generated by the development;
i) road patterns;
j) surface and wastewater;
k) drainage;
l) the carrying out of earthworks;
m) the effects of development on patterns of wind, sunlight, daylight and shadows;
n) the provision of services, facilities and amenities demanded by development;
o) the emission of pollution and means for its prevention, control and mitigation; and
p) such other matters as prescribed…'

This section enables a range of technical parameters to be covered in these 'development standards'. The Urban Design Manual that is referred in the City Spatial Plan can be made as a 'development standard'. These 'development standards' are often loosely referred to

as Codes or Development Guidelines. The contemporary means for their documentation is to lead with graphics and incorporate performance measures rather than be dominated by prescriptive and inflexible requirements

In support of the use of SMPs, Section 33 of PUM Act, 2004 enables theBoard to prepare and approve standard planning provisions to be called the Samoa Planning Provisions. These would usually represent consistent requirements that would be uniform across all SMPs. Most times these accommodate much of the process issues in land use planning tools.

12.2 Development Control

Under the Development Assessment (Development Consents) Part V of the Act, the PUMA can ask that development plans and reports be submitted with applications to cover.

Section 41, enables such a request for information by way of plans or reports to cover a number of parameters:

a. site analysis;
b. building envelopes;
c. property boundaries;
d. existing environment;
e. arrangements for –
    i. electricity;
    ii. roads;
    iii. water;
    iv. effluent disposal; and
    v. telecommunications;
f. made and unmade roads;
g. access and egress;
h. how the proposed development relates to the existing or likely use and development of adjoining and nearby land; and
i. where a staged subdivision, how the balance of the land may be subdivided.

Section 46 outlines the form of 'Matters' that can be used by PUMA in making decisions. Two are specifically related to this discussion:

(c) the provisions of a sustainable management plan or draft sustainable management plan;

(e) any strategic plan, policy statement, development standards, guideline, or the like, which has been adopted by a public authority;

Both of these are useful to PUMA. Point (c) enables PUMA to even apply draft SMPs, so if there are bureaucratic delays in finalizing SMPs, their provisions may still be relevant in some decisions. Point (e) is most useful for PUMA. The generation of good graphic or performancebased guidelines and criteria for a range of technical matters can take some time to generate. However there are many development guides, manuals or best practices that are made for universal application (e.g. International Erosion Control Association, Erosion and Sediment Controls for development). This provision can be

used to make this CDS a 'matter' that could be used in current decision-making.

Section 46 goes further in describing the technical matters and parameters that the strategic plans, guidelines, policies can cover:

(h) likely effects on cultural and natural heritage;
(i) the sustainability of the proposed development;
(j) suitability of the site for the proposed development, including consideration of natural hazards such as flooding, earthquake, cyclone, subsidence, slip, drainage and erosion;
(k) the character of the proposed development, including its bulk, size and shape;
(l) adequacy of arrangements relating to waste water, sanitation and access to the proposed development;
(m) provision of private and public open space;
(n) adequacy of arrangements made for the parking of vehicles generated by the proposed development;
(o) proposed safety features of the development, including fire safety features;
(p) adequacy of the structure of buildings and other structures to fulfil the purpose for which they are to be used;
(q) the public interest…

12.3 Urban Design and Building Control

Given that MWTI Building Section is in the midst of reviewing the Samoa Building Code, there is a good opportunity for PUMA and MWTI collaboration. Many of the parameters accommodated above are relevant for building and subdivision control as well. At the moment MNRE and MWTI employ a two to three step Development Application then Building Application process. Efforts should be made at every juncture to reduce the burden of approval processes.

12.4 Adaptation and Risk Reduction priorities

With regard to the climate adaptation and risk reduction messages extracted from this CDS development, the following technical arenas would be of priority for guideline/ development standards generation:

a) The medium protection forecasts that Samoa will experience a 2 °C increase in warmer weather with a corresponding increase in the number of days of extreme heat. The Urban design guidelines need to ensure the Urban form, layout and design elements of the City accommodates more cooling environs, especially through provision of additional open space and landscaping (shading & general softening of hard surfaces) close to peoples' living areas and in the city centres. Landscaping, open space provision, use of network spaces and treatment of buffers between key land use types are important. How water sensitive urban design measures can be built into final community development layout and designs also will need guidance. Increasing vegetate open space areas throughout the City will alleviate the prospect heat sinks that will be created with climate change;

b) More energy efficient buildings and Village areas: layout features can be improved; more shaded areas; breeze-ways; increased natural light in buildings; more heat resistant buildings, more landscaping about buildings etc. What standard building height should be maintained? Are two storeys with breeze-ways underneath a good scenario - they can provide flood proofing of lower parts of a house as well);

c) Water efficiency options and water harvesting capabilities need to be brought into development approval processes to ensure water security in future development areas. This is especially important in higher elevated areas where the satisfactory service from existing reticulated water supply systems cannot be efficiently achieved. Again it is important that these matters be addressed at environmental assessment and preliminary design stages of subdivisions and new development areas.

d) While the statistics show a probable decline in the number of tropical cyclones, there is expected to be an increase in their intensity.

While 'planned retreat' options are preferred for built up central areas including the CBD, more resilient coastlines through defence and protection mechanisms will be required. These measures should be a mix of 'hard' and 'soft' engineering and non-engineering options that suit the circumstances of the geomorphology of the coast. Development and building designs need to adapt to the new threats and be consistent with international best practice.

e) To assist with the application of Table 3 and 4 for the Structure Plan (Section 11) the following codes and guidelines should be availed as soon as possible and made under Section 46 (e) of the PUM Act, 2004:

- Flood Hazard Risk Assessment
- Coastal Hazard Risk Assessment
- Landslip Code
- Flood zone building requirements
- Footings and foundations
- Water Balance Modelling
- Stormwater Management
- Soil Investigations for Flood prone areas
- Emergency Evacuation provision
- Erosion & Sediment Controls

13. Implementation of the Strategy

13.1 Role of the CDS:

The role of the City Development Strategy (CDS) is to provide the strategic framework for land use planning, development and environmental management for the City of Apia. It is accommodated by the PUM Act, 2004 and will particularly rely on the subsequent generation of Sustainable Management Plans (SMPs) under Part IV of the Act. These SMPs will provide the interface between National advocated forms and location of development and community needs. The CDS will guide the SMPs so they can be used to successfully manage and direct future land use and development, and guide decision-making within the City area.

Having a Structure Plan for the City is central to the implementation of the CDS. The role of the Structure Plan is to:

- spatially represent the best potential uses for particular areas at a City wide scale;
- guide the location and form of development to ensure that the impact of development on communities and the environment is minimized;
- guide the location and range of strategic land uses including activity centres, transit corridors and new growth areas; and,
- foster new urban development forms where needed.

13.2 Land to which it applies

This CDS applies to land described as the greater urban area of Apia being the Districts of Vaimauga East, Vaimauga West, Faleata East, and Faleata West. Through the generation of the CDS it became evident that there were significant land use changes and development issues to the west and immediate south-west of Vaitele. The Structure Plan picks up on this and as such the roll-out of SMPs as part of the CDS delivery may at times involve lands outside the nominated City area.

13.3 Capacity Development & Investment Plan

Based on the assessments, evaluations and reporting in sections 4 to 10 of this CDS, there are a number of discrete recommendations nominated in each section to cover the various themes, sectors and cross-sectors. The Structure Plan itself (Figure 43, section 11), brings together a number of key strategic actions that need to be programmed over the coming three (3) to five (5) years. **Annex 3** contains the Capacity Development and Investment Plan (CDIP) with indicative costings provided over a five (5) year suggested programme period.

Most of the Strategic Actions in the Capacity Development and Investment Plan area geared toward the scheduling and roll-out of SMPs as the key instruments for strategic planning under the PUM Act, 2004. Some tasks are more strategic in nature and are either catchment based or broader area based. Their completion will also ultimately assist with successful SMP completion and implementation as they fill important gaps. Some big ticket items such as the repeating of the Vaisigano flood/inundation modelling to other City catchments, while essential for good land use planning has not been included as a Strategic Action, as the works are currently in train and resources committed through MNRE programming (Water Resources Division, MNRE, advice).

Aspects of the implementation of the Structure Plan can be actioned independently. The Land Use Controls for Hazard Areas, nominated through Table 3 and 4 of Section 11 – are designed to be implemented as soon as the flood and inundation modelling (as accomplished for the Vaisigano catchment) is completed for the balance of the City. With the role out of the SMPs it is expected that more refined hazards and risks will be known and more receptive requirements can be outlined via the SMPs or associated development standards. In the meantime the Table 3 represents a control mechanism that enables a degree of flexibility in decision-making. Endorsement of the CDS as a strategy includes it as a matter for consideration in Part V determinations of Development Applications under Section 46 (e) of

the PUM Act, 2004. This can enable adequate force to this land use control mechanism while the programme of SMPs is rolled out.

Additionally Annexes 5(neighbourhood planning) and 6 (Preferred Uses - Land Allocation Criteria) will be useful guideline references for PUMA planners where current policy and development standards are lacking.

Finally the use of the Structure Plan is reliant on the ongoing use and the maintenance of the Land Use Plan (and database) and the Combined Risk and Constraints database. These two important databases shall be updated as information and data is availed.

13.4 Implementation Schedule

An implementation schedule has been included in Annex 4 to correlate with the Capacity Development and Investment Plan. The schedule supports PUMA's stated land use planning programme over the coming 24 months:

- City Development Strategy
- Urban Design Manual (tied to new Building Code)
- Waterfront Development
- Detailed Sustainable Management Plans (SMPs)
- Use of SMPs derived from the village level for decisions

There is need for general consideration of the CDS by the community. The CDS and through it the Stucture Plan relies on the role out of SMPs to fill important data and information gaps. As such the Implementation Schedule is only detailed through to the end of 2016, as it is expected that at least 2 SMPs would be generated in that time and major advances would have been made in terms of data enhancement and commitment of village councils and government agencies. It is at this juncture that there can be a review of the proposed Structure Plan.

13. 5 City Management Units

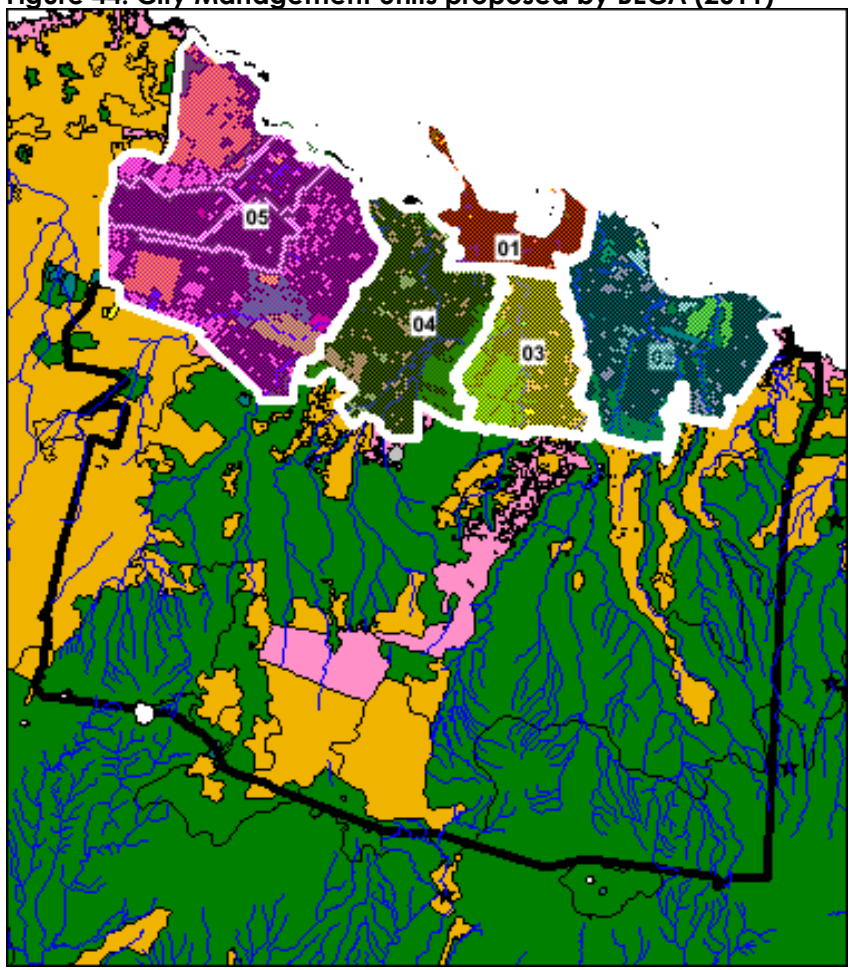
The City Spatial Plan nominated the production of six (6) SMPs to cover the City based in part on major catchment boundaries – and assigned a likely schedule for the role out of these SMPs:

2015 – 2016	1. Alesia River Catchment (RC) SMP	2. Central Business District (CBD) SMP
2017 – 2018	3. Faleasui RC SMP	4. Vaisigano&Vailima RCs SMP
2019 – 2020	5. Fuluasou&Papaseea RCs SMP	6. Vaivase&Letogo RCs SMP

Having reviewed the socio-economic, bio-physical, cultural and economic dimensions of the City, the use solely of river catchments to drive the roll out of SMPs may be problematic. It is considered that 'management units' based in part on catchments, as well as governance boundaries and city landscape features – may present a better means to prioritize SMP production.

The nomination of city management units has been progressed previously (BECA, 2011), as presented in Figure 44, below. Some 20 years ago a town planning study recommended up to 18 management units. This would be an unwieldy number; however some adjustment of those proposed by BECA was also warranted.

Figure 44: City Management Units proposed by BECA (2011)



T
he Figure 45 shows the proposed City Management Units that will assist with the role out of SMPs as well as the management of other key capacity development initiatives under this CDS. There was some trepidation with the nomination of the City Management Units at the time of the Stakeholders meetings, as some of the traditional leaders saw these as threatening village fono mechanisms. However at this stage they would only have a programme administrative role as not all planning and development issues can be taken up with the 80+ individual village fono within the City. Some matters cross village boundaries or are universal to major portions of the City e.g. flood modelling in certain catchments.

13.7 Priority SMP Scheduling

Based on the suggested City Management Units the scheduling of SMPs proffered by the City Spatial Plan was revisited. These adjustments also take on board some matters that were addressed at the last Stakeholders Meeting, May 2015.

The following **Table 5**nominates an indicative priority order of SMP development. **Figure 46** shows the location of these scheduled SMPs in the context of the City. The final priority may be dictated by other project directions, investment and commitment – noting that the Waterfront Development project had recently gained momentum and commitment from the highest level of Government. It is expected that the programming of other relevant agencies may impact on the final priority scheduling.

It is considered essential that the actual boundaries of the SMPs as suggested be confirmed with village representatives' input to ensure there is ownership and transfer of knowledge from the outset of this programme.

13.8 Strategic Technical Assessments

In addition to recommending matters for the Structure Plan and matters to be taken up with village communities during the roll out of SMPs, the vulnerability assessments in Part 2 identified a number of City wide assessments and actions to be undertaken. Many of these are currently part of programmes and projects of various government agencies and/or authorities; however they are summarized here as they are pertinent to strategic land use planning.

a) Land Use (refer to page 33)

- PUMA shall facilitate the completion of the land use survey and update land use maps and databases to validate and uses about the City. The land use survey should enable differentiation of multiple uses on land parcels. The land use survey should identify the location, size of land parcel, type of uses, interface issues, building form/type, condition and site coverage estimate. The update of the buildings layer using the LiDAR base shall incorporate the relative level (RL) of the ground to enable future minimum floor levels to be applied (see also section 7.3);
- PUMA working with the Statistics Office shall correlate the improved land use and buildings databases with census data to quantify the numbers of people, population densities and buildings in each hazard classification area applied to the City (low, medium, high and critical hazards). This shall become the baseline for future reviews of the CDS and Structure Plan. The work should make 'risk' areas more immediately identifiable – so will also entail updating the Combined Risks and Constraints GIS database.

b) Social assessments (refer to page 42)

- PUMA shall generate a template for Population Profiles to be used during the SMP development phase;
- Work with the Lands Office, Technical Services Division of MNRE and the Statistics Office correlate the statistics' enumeration boundaries with validated village council boundaries;
- Work with the Lands Office and Technical Services Division of MNRE match confirmed Village Council boundaries with the District boundaries to assist with future governance options.

c) Environment and Natural Resources (refer to page 46)

- Implement community education initiatives as needed to address the filling of mangroves, wetlands, waterways and drainage-ways relating to the implications to catchment and flood management;
- Ecological assessments and classification of urban ecology and aquatic ecology within the City is a priority. City wide or management unit assessments should be undertaken to:
  - Identify habitat areas/zones within the City;
  - Identify any waterways (natural springs, pools, rivers, wetlands, waterholes etc.) that have ecosystem services potential;
  - Agree on which waterways and drainage-ways (urban waterways) need to be protected or made free of development to assist with ecosystem services, off-road network provision, WSUD measures and recommend required setbacks from the major waterways.

d) Water Resources (refer to page 47)

- Use the LiDAR bases to improve the topographic and coastal bases for catchment and coastal inundation modelling;
- Modelling and vulnerability assessments similar to that completed for the Vaisigano catchment to be undertaken for the remaining catchments covering the City. Modelling outcomes can assist in defining hazard and risk classification from low, medium, high and extreme hazards about the City;
- Quantity, velocity and depth outcomes of the modelling shall be used to nominate future floor levels of buildings to assist with reducing risk over time.
- The hydrologic modelling will be used to recommend integrated catchment management responses for the elevation foothill and escarpment catchments. Maps shall demonstrate the form and location of catchment based water quantity and quality measures (WSUD measures) for the upper catchments and mid-slopes of the City;
- These WSUD measures will aim to reduce present flooding conditions at the source, and within the lower mid-slopes to minimize velocities and depths before water flows to the lower flood prone areas of the coastal plains.
- The substantial catchment based WSUD measures shall be costed and incorporated into Government Sector Plans and programming for implementation.
- The outcomes of the WSUD modelling and assessments will assist the Division of Water Resources (MNRE) confirm catchment protection areas.

- Catchment strategies for the catchment protection areas should identify the best location for water retention and control facilities elsewhere in the catchments to address hydrological changes from the expected changes in land use;
- Groundwater resource assessments should be undertaken for the western catchments of the City to determine their status in terms of: quality and yield potential (aquifer capacity); numbers and location of bores, groundwater recharge points and rates, main water users and their uptake volumes, threats based on prospect land use changes.
- The groundwater resources work shall highlight the specific land uses and activities which pose the most significant threats to groundwater resources and infrastructure. It shall confirm suitable buffers for a range of land use types and categories;
- In areas where existing groundwater resources exist, provide a network of observation points to satisfactorily monitor groundwater resources shall be instigated.

e) Land Resources (refer to page 55)

- The Land Resources mapping database shall be enhanced to enable its use for urban land capability assessments. The urban fringe areas and rural lands about the City shall be classified into broad classes of urban capability. The mapping will be underpinned by soil mapping using available tabular information on soils, LiDAR bases, remote sensing and aerial photo interpretation.

f) Landscape – refer to page 55

- For each of the city management units undertake scenic quality assessments (SQA) to confirm the landscape units that should be protected from urban intrusion.

g) Resource Hazards – refer to page 58

- Land resource assessments (see section 7.4) shall distinguish geotechnical hazards and areas subject to landslip as well as areas susceptible to erosion;
- The land use validation surveys and update of mapping in the GIS shall identify areas where past uses may have led to contamination. These areas shall be added to the Combined Risks and Constraints database;
- Areas of potential extractive resources such as minerals or quarry materials shall be mapped. This information shall be used to consider the likely impact on urban systems such as road access to facilitate extraction;
- The land use mapping survey work shall identify dangerous uses and activities within the urban area where setbacks and safety buffers should be employed in the future

h) Land Supply and City Structure – refer to page 69

- PUMA with the Statistics Office work with MWTI on an update of the Buildings data layer for the City so that follow up work can monitor the residential take of land (as a 'land bank' system).

i) Movement Networks – refer to page 77

- Land Transport Authority (LTA) continue the road traffic counts on all major roads about the City so that a road hierarchy can be confirmed;
- LTA confirms the desired road hierarchy classifications (including confirmation of suitable terminology) aligning counts to the hierarchy;
- That once the road counts are completed and a road hierarchy is confirmed, the Structure Plan be amended to suit and subsequent SMPs note the agreed hierarchy;
- That PUMA work with LTA to undertake field work to identify issue areas including: where unsealed roads service residential areas, streets have no footpaths, and where there are problems with linkages and connections to key services (e.g. retail, open space and schools).
- That once the road hierarchy PUMA work with the villages to determine the best routes for public transport to service village areas;
- the LTA confirm the location and use of the off-road network system, especially as regards the opportunities it provides in

implementing WSUD measures to ensure uncontrolled flows of water do not damage LTA assets.

j) Infrastructure & Services- refer to page 85

- The key infrastructure and service agencies review the hazards and risks to their assets in the context of the Structure Plan and the nomination of the future Infrastructure Corridor;
- The EPC and the SWA among other service agencies confirm their present difficulties with servicing residential areas, commercial and industrial areas. Information provided should report on the current situation regarding services, capacities and gaps in infrastructure and essential services as well as future servicing needs for the City;
- The infrastructure and service agencies outline likely costings for infrastructure and service needs based on preferred use areas and the Structure Plan presented in the CDS. This work should incorporate the best scheduling of infrastructure and essential service provision;
- The Utility Service Committee (USC) confirm its support of the East – West Infrastructure Corridor
- Existing drainage ways in the lower built up areas are located, mapped and assessed in terms of their: capacity; current function; condition and required maintenance (including annual costs of rehabilitation). The implications from land use intensification about drainage-ways shall be assessed.
- The practices of filling in and reclaiming drainage-ways for development shall be stopped.
- Report on the current reticulated sewerage network; the capacity issues; options for the future and any proposed upgrades and timing. Recommendations on the use of small 'advanced water treatment systems' (AWTS) and composting toilets shall be forwarded. If a reticulated sewerage system is to be implemented in the future, land use planning at the SMP stage should identify the logical location of potential pipeline alignments;
- The land resource information data layers shall be enhanced to enable the location of suitable areas for land disposal of partially or fully treated effluent;
- All telecommunication systems and assets shall be located, with nomination of the constraints that should be applied to nearby development. The work should identify current capacity shortfalls and the needs to service future development;

13.9 Land Use and Governance

A significant issue that will impinge on the success of the Land Use Planning Programme and CDS implementation over the coming three (3) to five (5) years shall be the matter of governance. Annex 2 broaches choices for collaborative arrangements between PUMA (national government) and village fono. These were discussed at the major stakeholder's forum in February, 2015. While there was some concern, village fono elders could see the benefit of some type of land use zoning in traditional village areas – however a nurtured and consultative approach was suggested. Graphic based guidance and incentivization was preferred over prescriptive zoning models.

The continuing land use planning program (PUMA) will require a good social marketing/community engagement plan to maintain awareness and enhance momentum before the roll-out of the SMPs. It is suggested that governance and mechanisms for joint determination of land use decisions (both strategic and development control orientated) be a key theme of the engagement plan.

13.10 Financing Urban Development

Urban growth and development is an expensive business. Reliance cannot continue on general government financial resources through public finance management systems. Financing urban development through development assistance programmes is also not sustainable.

Alternative financial resources need to be availed. Annex 6 contemplates a number of avenues to address the financing of urban development. The options canvassed include:

- Developer contributions
- Fees on essential services invoices

- Approval fees
- Rating of non-traditional land; differential rating systems
- Betterment taxes
- Other taxes: stamp duties, capital gains tax etc.
- Payment for ecological services (e.g. carbon sequestration)

Some strong decisions need to be made over the coming years as finance for urban development becomes more difficult. These debates will need to be made at a high level as all have significant impacts on broader fiscal and economic systems.

In terms of the most plausible options, it is noted that the PUM Act, 2004 provides the ability for the Government to levy Developer Contributions via section 49s. This may represent for first priority for research with regard to the longer term financing of urban development. To institute developer contributions much data collection on costs of servicing and modelling of infrastructure provision is needed – so that contribution strategies are targeted at the extra demand on public services created by different forms of development.

Present practice of private development on customary, private and government land is for proponents to provide very basic services, with reliance on government agencies to build and absorb costs for the balance of infrastructure and essential service provision. This is inconsistent with principles of user pays in development processes. Where there is significant private benefit in green fields development, all infrastructure and essential services need to be provided by the proponent to engineering and environmental standards. Transferring infrastructure provision to the proponents of development will provide large cost savings for Government.

Engagement with communities guided by the Social marketing / engagement plan could broach further discussions at the local level – as positive outcomes at this level, ease the political burden of complex decisions.

13.11 Human Resource Capacity Needs

Through the CDS development phase, in addition to key Stakeholder meetings, there were individual one-on-one events and group training sessions undertaken. The purpose was two-fold. Firstly, to garnish ideas on the direction of the CDS; and secondly, to gain an affinity with present decision-making processes. Secondly it gave opportunity for participants to agree on human and related technological capacity needs.

Annex 9 summarizes those human resource development needs as expressed by PUMA team members over the last 5 months.

13.12 Monitoring and Evaluation (M&E)

The Monitoring and Evaluation (M&E) system is essentially captured within Annex 3 where Indicators and targets are nominated. It will include a mix of 'easy wins' (short term, low cost outcomes) as well as longer term outcomes, to ensure that some initiatives get off the ground early and demonstrate conviction to the CDS. This will assist in attracting interest for longer term implementation.

Table 5: Priority Sustainable Management Plans – Schedule

No.	Programme Year	City Management Unit	Focus Area &Rationale
1	2015	01 CBD	Waterfront Development Strategic assessments and preliminary design work is underway. The project has momentum with commitment at the highest level of Government
	2015	01 Broader CBD	Stimulated by Waterfront project there may be significant consequences for the outer core of the CBD. There are extant issues with low lying lands and ill-formed drainage due to past filling. Significant impacts in flood events and nuisance flooding with small rainfall events
2	2015	06 Peri-urban areas about the Tafaigata Waste Centre and east toward Siusega	Area showing signs of land use conversion to heavy industry in part and processing – setting a complex precedent. Some parts are adjacent to newly subdivided SLC residential land – buffer issues. More broadly if heavy industrial takes hold without planning there is a likelihood of heavy trafficproceeding through residential streets between this area and the Vaitele Industrial area. There has been mention of moving the Tafaigata facility and Water resources have raised concerns of land use change threatening water bores / aquifers. Industrial focus will also enable review of Vaitele SMP provisions – which have proved difficult to implement for some areas.
3	2016	05 Vaiusu Bay to Sports Complex Siusega	Focus on Vaiusu Village and potential new Port location. Implications for new Arterial Road connection in north – south direction. Major economic ana amenity changes for Vaiusu. Extant transition land use issues with Vaitele. Low elevation areas but manageable risk
4	2016	02 Vailele	SLC subdivision and rapid development over last 5 years. High and growing population with little commercial or personal service centres. Limited road access& public transport
5	2016	02 Balance of Vaitele	Enable completion of Vaitele area within CMU 2.
6	2016/2017	03 Vaisigano Catchment	Modelling of flood liable land completed. Has incorporated prospect building floor level controls. Will provide an opportunity to see how best these can be instigated. Also much engineering work along Vaisigano– will require community to consider implications and plan for changed circumstances
7-12	2017+	Balance of areas	Subject to CDS and Structure Plan Review (2016)

Figure 45: Proposed City Management Units

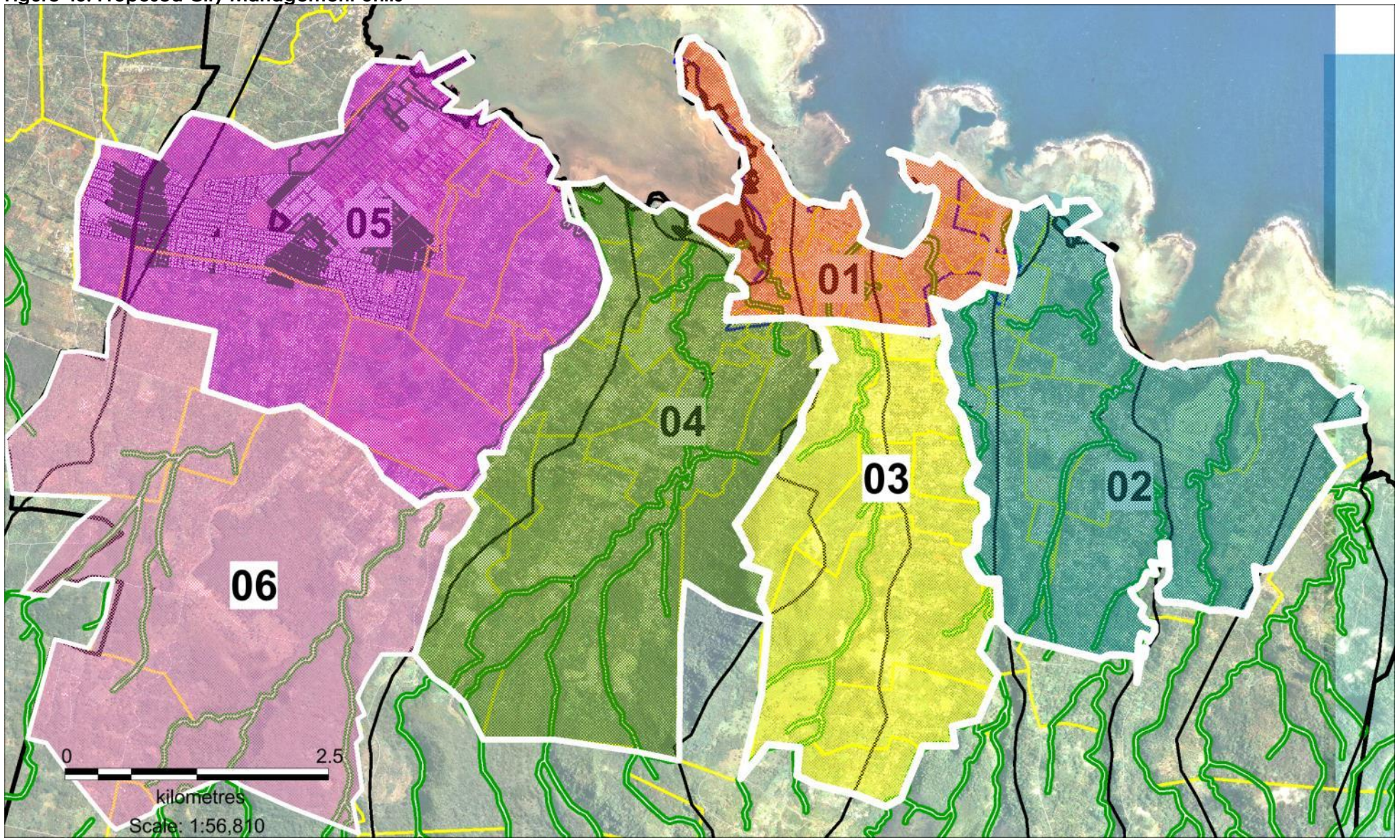
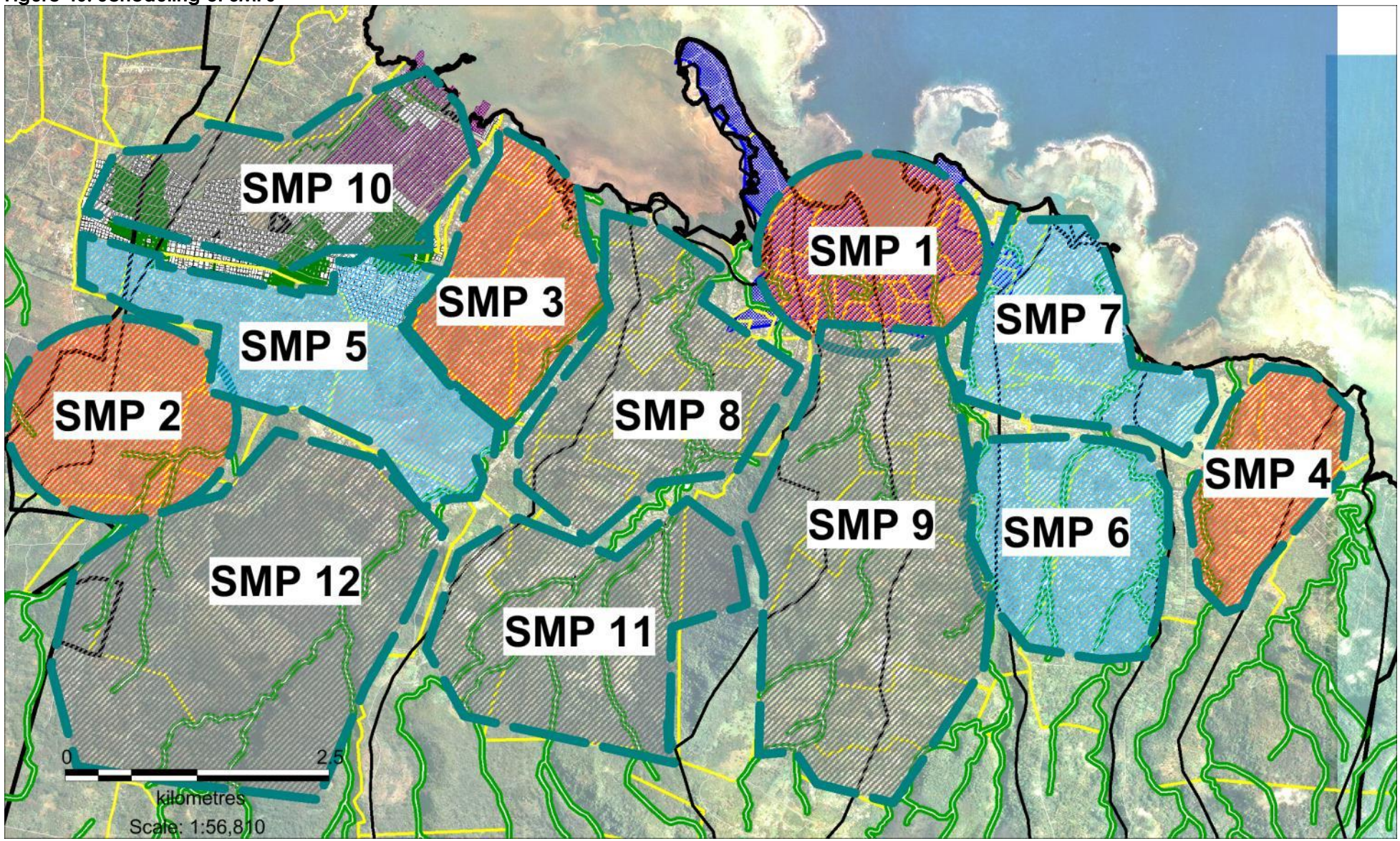


Figure 46: Scheduling of SMPs



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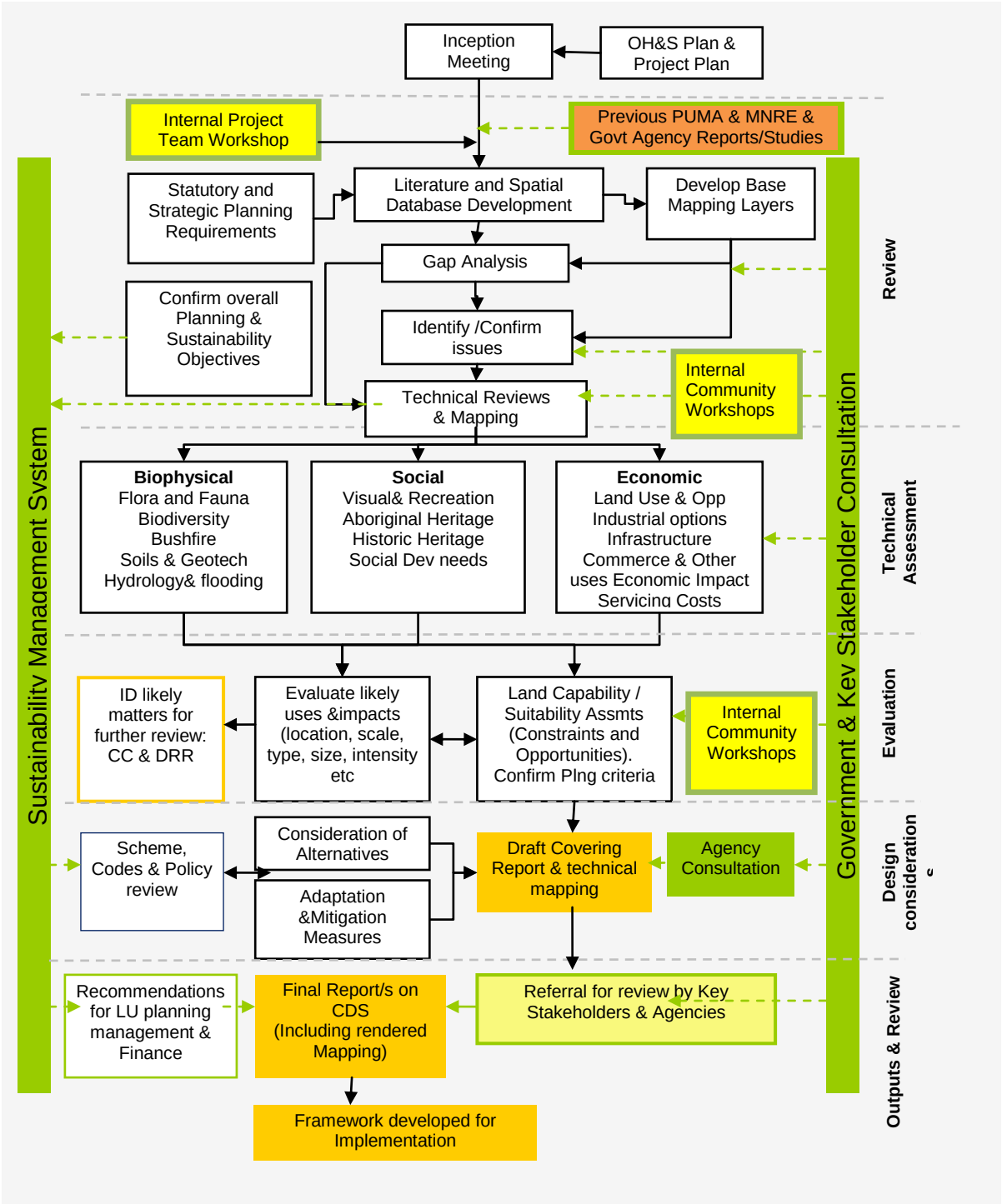
Annex 1: CDS Development Process



Annex 2: Functions of PUMA & Governance

1. Functions of PUMA

The Planning and Urban Management Act 2004 (PUM Act, 2004) has been progressively implemented over the last ten (10) years through the Planning and Urban Management Agency (PUMA), guided by the Planning Board established under the Act.

Prior to the Act, land use and associated development approval was managed rather haphazardly at the national level through a mix of Acts, instruments and charters of various Government Departments, agencies and authorities. There were the use of building codes and regulations under the Public Works Act (including the Draft Building Regulations, 2003); the land conversion permit processes managed by the Land Division of the Dept. of Land Management, Ministry of Natural Resources, Environment (MNRE) for Government lands; the role of the Samoa Land Corporation (SLC) in designing and developing new release areas; the work of the Crops Division of the Ministry of Agriculture and Fisheries (MAF) in sustainable rural land use; the work of the Catchment office of the former Dept. of Forestry (now with MNRE?) and the various utility and infrastructure agencies/corporations such as the Electricity and Power Corporation (EPC) and the Samoan Water Authority.

There was still some overlap evident with land use planning after the making of the PUM Act, which did not repeal other Acts or provisions. The PUM Act covers all land in Samoa. There is a perception that it only covers the urban areas of Apia. In addition the Land Board under the Lands, Survey and Environment Act, 1989 is mandated with the management and development of all government land. Its administrative arm, the Land Management Division, interprets this to include deciding upon use of government land. This overlap had caused some angst in decision-making in the early period of the PUM Act, 2004.

Under the PUM Act 2004, EIA provisions are very much tied to a development planning and development consent process, however there are difficulties in adapting the draft Regulations to suit the PUM Act, as they apply a different statutory definition on the 'environment'. Under the PUM Act, consistent with contemporary environmental law the "environment" includes all social, economic, physical, cultural, amenity and ecological dimensions, whereas under the LS&E Act, 1989, the definition is restricted to what is usually deemed the 'natural environment'.

The PUM Act contains specific provisions for requesting an EIA as part of the development consent application process, provides for EIA regulations, as well as makes it one of the matters that are to be taken into consideration when considering a development application (s46 (f)). In addition s 63 enables the PUMA to act on matters of environmental nuisance outside of the development application process. The call for an EIA is discretionary under the PUM Act, which is again consistent with modern practices. The more 'mandatory' need to complete an EIA under the LS&E Act 1989, suffers from the age old quandary of determining what is 'significant impact' and 'significant development'.

2. Administrative Processes

While the PUM Act 2004 does not outline an administrative process, it does require an EIA to be prepared in accordance with written specifications from PUMA (s42 (2)). These requirements can be generated without Regulation although this is not ruled out as the power to institute Regulations under s105, includes the following with respect to environmental assessment:

(e) the documents and information required to accompany development applications, including documents that will assist the Agency in assessing the environmental effects of development;

(j) the form of statements of environmental effects and environmental impact assessments;

(k) the documents and information required to accompany statements of environmental effects and environmental impact statements;

(r) the factors to be taken into account when consideration is being given to the likely impact of a development on the environment;
(s) the preparation, contents, form and submission of environmental impact assessments;
(t) the making of environmental impact assessments available for public comment;
(u) the methods of examination of environmental impact assessments and representations made with respect to activities to which any such statements relate.

Ongoing endeavours of PUMA aim to distil current overlaps in environmental impact assessment procedures to improve their use and lessen the current confusions. Defining the 'environment' as it has been done in the PUM Act is consistent with contemporary international practice as it appreciates the dynamics of the environment in terms of the pursuit of sustainable development.

3. Understanding Village Councils

At the village level the Village Councils, *pulenu'u* and *pulemataі* underpinned by the fa'asamoa (Samoa custom) instil local governance that has ensured stability of village lifestyles for some generations. Village systems incorporate a hierarchical structure of chieftain kinship ties and customs that govern the relationships among the people steeped in values defined by long-held principles of giving, sharing, reciprocation, respect, and service to the family.

While there is no provision in the Constitution for a system of elected local government, the Village Fono Act, 1990 validates the authority of village fono to have authority "in accordance with Samoan custom and tradition". The Internal Affairs Act 1995 establishes the [Ministry] Division of Internal Affairs, whose purpose among other things is to make provisions to recognize and organize village authority, and to advance local government through the development of village authority (s5(1)). "Local Government" is defined as including the Government of Samoa and administration of a village by its Fono. It advocates a partnership in governance.

The Village Council (or fono) may exercise authority over any person ordinarily resident in a village, and make rules governing the development and use of village land (s4 Village Fono Act, 1990). Some village councils have set their own rules for land use, development and protection of lands, although these are not recorded nor have they been assessed in terms of their effectiveness in changing societal expectations.

It has been the role of the pulenu'u (representative of the village) to provide the link between village level governance and national government. The pulenu'u are nominated by the village matai and Village Council and are often long-standing respected representatives. The Government of Samoa (GoS) through the Cabinet confirms the appointment of nominations. Where there are no customary villages, a Sui-ole-malo is appointed by the GoS to represent the Government at the village level. The pulenu'u and Sui-ole-malo receive stipends through the Ministry of Women, Community and Social Development, Internal Affairs Division. There are no formal Terms of Reference (TOR) for the pulenu'u as till now it was expected that they would act consistent with fa'asamoa traditions, and as guided by the Village Fono Act, 1990 and Internal Affairs Act, 1995.

4. Traditional Village Governance

In traditional village settings the Government has been able to rely on systems that have been used for: consensus building; maintaining basic social justice; providing harmony with development; assisting with community services/support, and strong respect for the environment and basic lawfulness. However societal changes from subsistence to cash-crop and commercial enterprise; increased population densities and urbanization; and dominance of 'individualism' over communal sharing – has placed pressures on existing village and national level governance.

As communities have experienced the cash and development economy, aspirations are changing and land use and development scenarios are getting more complex, intensive and extensive in their impacts and implications. Individualism is placing pressure on the sharing and consensus based fa'asamoa, and natural and human induced hazards have villages facing scenarios beyond their usual governance capacity.

Population growth and pressures from a development economy have national government agencies and service corporations under pressure to maintain basic human services especially in urban areas. The pressures and driving forces have culminated in the unusual (for Samoa) appearance and growth of non-traditional village settings. The Government now finds itself having to provide additional services that would usually be covered by Village Councils. People are settling in peri-urban settings, often away from good transport, basic services and employment opportunities. The communities often comprise of people originating from different villages, living on freehold land and having no social obligations to their neighbours as would be the case in traditional village settings. In these circumstances unemployment is rife, especially among the high percentage of youth. Opportunities for activity including sport are negligible and land for farming is not as readily available. In some areas crime has escalated.

5. Roles and Responsibilities of Villages

The Village Fono Act, 1990 and the Internal Affairs Act, 1995 – both dictate roles of village fonos and national Government institutions in servicing Village fonos. While the PUM Act objectives may introduce mechanisms foreign to many locals, the flexible nature in which Sustainable Management Plans (SMPs) can be formed and implemented does open up opportunities for them to be melded with existing powers, roles and responsibilities in a manner which strengthens local governance. In addition, for the inception and implementation of the eventual more detailed and community focused SMPs, the following information reveals protocols and requirements that may need to be followed.

Village Fonos receive guidance, advice and assistance from the [Ministry] Division of Internal Affairs (Internal Affairs Act, 1995). This includes the drafting of local government by-laws proposed by the Village Fono, as well as policies on social and economic development. Villages can request assistance with development projects through Internal Affairs.

This includes the exercise of any power as provided in any other law (s3). It gives Village Fonos specific powers to (s4):

- Make rules for the maintenance of hygiene in the village
- Make rules governing the development and use of village land for the economic benefit of the village
- Require persons to perform work in relation to the above matters.

Village Councils can impose penalties on residents through impositions such as fines in money, fine mats, animals or food; or the ordering of an offender to undertake work on village land (s6, Village Fono Act, 1990).

The pulenu'u is nominated by the village and appointed by the Minister in traditional villages, whereas a Sui-ole-malo is appointed by the Minister as a representative of Government for non-traditional villages. Their roles are to act as a liaison focal point between Villages and central Government. Their duties usually include the maintenance of health, village cleanliness, communications, and basic law and order. While there are no standard TORs for pulenu'us or Sui-ole-malos, some requirements have included:

- Encourage health and sanitation activities
- Report to the police use of dynamite or chemicals for fishing
- Inform government of new pests and diseases
- Assist Government in implementing its projects
- Any other duty imposed by Regulation.

6. Good Urban Governance

In essence good urban governance focuses on the quality of governance at the local level. The need for this arose out of the recognition of emerging democratic processes, the growth of civil society involvement and the overall emerging complexities of the development economy and the pressures it presents to local communities. There are growing responsibilities and needs for accountabilities for outcomes, impacts, and central governments under increasing pressure to deliver an expanding range of public and social services.

The mounting pressures on local Village governance stakeholders, many of whom are ill equipped – make communities vulnerable to corruption, crime and other forms of poor organizational behaviour. It also increases susceptibility for citizens to be alienated. The pressures manifest in lack of clarity regarding roles and responsibilities, confusing regulatory frameworks delivered from above, complex administration and poor information flows to the local levels, as well as between local government stakeholders and central government. Poor decision making prevails or there are often disjointed actions that are not sustainable.

Good urban governance extends beyond transparency, accountability and corruption to address the forces of urbanization, globalization, decentralization and democratization (UN-Habitat, 2004). These forces manifest at the local level, and there are 2 critical implications for local actions:

i) Immediate quality of life of a citizen is affected by factors that are mostly determined at the local level. This may relate to: the location of settlement, land use, activities; the quality of development and of the environment; types of services and facilities provided; opportunities for livelihoods and the availing of means to influence the range of choices and options through decision-making. Additionally where systems are not in place the impacts of corruption and alienation are acutely felt at the local level whether through inequitable and arbitrary allocation of land, provision of services, bribery and or extortion.

ii) Localizing governance: the local area or village efforts to improve governance can provide catalytic lessons and effects for fundamental reforms at the national level. Whether this be the coordination of agencies in service provision, strategic decision-making (improved effectiveness and efficiencies), better resource provision or the tackling of corruption. For instance Transparency International suggests that tackling corruption at the national level requires a 10-15 year timeframe, whereas actions at the local level have provided good results in as little as two (2) years (UNHabitat, 2004).

7. Rights based Development

There are four important legally binding international conventions addressing different aspects of indigenous rights, human rights, social justice and participatory governance, which incorporate provisions of relevance to the CDS and broader Urban Planning and Development Programme. The conventions and the dates of ratification are:

- UN Declaration on the Rights of Indigenous Peoples, UNGA, 61st session at UN Headquarters in New York City on 13 September 2007
- International Covenant on Civil and Political Rights (ICCPR) (01/05/72) – Accession by Samoa, 2008
- International Covenant on Economic, Social and Cultural Rights (ICESCR) (01/05/72). Reservation to art. 10 (2).
- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) (09/03/84)

Samoa adheres to the UNGA Declaration as a member of the UN. It is party also to the Convention on Civil and Political Rights (Signature/ Accession, 2008) and (CEDAW). While not yet a signatory to the ICESCR the push for 'rights based' governance by the GoS is consistent with the Covenants key ambitions. Reflections on the objectives of these International conventions is healthy and should be explored further as the urban planning and development management programme progresses.

The UNGA Declaration on the Rights of Indigenous Peoples, 2007 has significant implications on Governance options in Samoa. Indigenous peoples involved in customary societies have 'absolute' right to self-determination, governance, use and management of their resources.

8. Implications for Village Governance

Introducing a land use approach consistent with good governance and rights based principles to assist Villages address mounting pressures and complexities beyond their usual control and

resources can serve broader ambitions: to improve transparency, accountability, clarify roles and responsibilities, simplify regulatory platforms, provide better information and extend capacities for decision-making.

Features of contemporary community based (or 'integrated') planning systems in additional to those canvassed previously include:

1) Incorporation of forward assessment/forecasting of threats or cumulative impacts;
2) Incorporation of community and local knowledge in decision making;
3) Objective based guidelines and EIA as part of a simple planning process;
4) Flexible and modular systems able to be adapted or adopted by local communities with local additions or variations;
5) Relies and supports community empowerment, information and continued involvement throughout the development and resource use process.

The PUM Act, 2004 under Part IV 'Sustainable Management Plans' accommodates the pursuit of these principles and ambitions in a forward positive manner via the SMPs.

A SMP of whatever form will need to consider the potential roles of stakeholders at the local and national level. This is a crucial consideration for the success of the City Development Strategy as well as the fuller implementation of the PUM Act, 2004. 'Roles and responsibilities' will evolve with the role out of subsequent more detailed and community focused SMPs. A programme of SMPs could be determined with the Village Councils, and should be preceded with community profiling work, which should be undertaken with the Village fono to consider specific options as regards roles and responsibilities.

There are general precedents on the differentiation of roles between the state and local government bodies. Notwithstanding the above comments the distilling of the implications of good governance principles, sustainable development objectives and international commitments to human rights and social justice – enables the proffering of potential roles and responsibilities of stakeholders in urban planning and good urban governance.

The following notes are provided to stimulate discussion on the options.

9. Potential roles Village Councils and PUMA

At the local level (Village Fono)

- participate in the deliberation of development issues, consensus building, concept generation, evaluation of and implementation of programmes and projects stemming from SMPs, coordinating on-the-ground activities from national government programmes;
- Suggest areas of possible legislation (by-laws), or in terms of Part IV of the PUM Act, suggest when SMPs could satisfactorily address a land use, development or environmental protection issue in the village;
- Ensure local messages are delivered to the national level, and through representation participate at 'committee level' of national government deliberations; and
- Act as people's representative in the exercise of their constitutional rights and human rights, and to access information on matters of public interest or consequence.

Of specific relevance to the PUM Act, 2004 and SMPs, local stakeholders could have a role in partnership with national government - in the following:

- Land use planning activities, specifically, 'participatory community planning/plans' leading to SMPs or satisfactory application of other parts of the Act (e.g. EIA, development consent evaluation, community surveys etc.)

- Management activities, specifically, where community development projects are spawned from locally driven participatory plans or SMPs (e.g. sports, small-scale water management works, small-scale sanitation works, local roadingetc.); and
- Monitoring of national government and corporation activities, specifically that of utility and infrastructure agencies, public service providers and business.

At the national level (PUMA and the Planning Board – in addition to roles established by the Act)

- Provide the mechanisms for local stakeholders through the Village Councils or similar – partake in planning activities, including the ability to promulgate the generation of a SMP.
- Oversee local planning and coordination of development, incorporating where possible incentives and endeavours for resources to be equitably distributed between urban and rural populations;
- Be mindful that local level governance, may in time (or sooner for non-traditional settlements) require an ability to accumulate financial resources for local level actions;
- Provide opportunities for local Village Councils and stakeholders to be continuously involved in land use, development and urban management - deliberation and decision making;
- Provide information accessible to local stakeholder on the state of the local environment, local land use and future development prospects;
- Ensure the pulenu'u is supported and active in providing the link between local and national level governance;
- Ensure the implementation of the PUM Act 2004, is based on principles of Participatory Governance, Subsidiarity and Inclusiveness (i.e. prior informed consent). Special service may need to be availed to the socially disadvantaged groups;
- Be aware of the divisions within local communities, and seek to promote the participation of marginalized and excluded groups in development and community processes, taking special care with the participation of women and the youth;
- Continually consult communities, residents and other stakeholders on their development needs and priorities; and
- Provide for locals' participation in the drafting process and review of SMPs, Development standards/guides, Planning provisions and the making of Regulations.

Annex 3: Capacity Development & Investment Plan

STRATEGIC ACTION 1: Confirmed Land Use Plan for Apia and Surrounds					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year 1**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Confirm Cadastral Base, including SLC approved subdivisions	Base confirmed by Tech Services	Oct-15	PUMA	Tech Services	2,500.00			2,500.00
Activity 2: Confirm buildings layer using LiDAR base, incorporate improved DTM & use to update land uses by buildings(See links to Strategic Action 2)	Building Section, MWTI approved	Dec-15	MWTI, Building Section	PUMA, DMO. LTA	5,500.00	2,750.00		8,250.00
Activity 3: Use new bases to commence LU surveys, record floor levels above ground (link to hazards work)	LU Plan vetted by Village Fonos	Feb-15	PUMA	Tech Services, Building (MWTI), DMO, SLC		17,500.00	4,500.00	22,000.00
Activity 4: LU validation programmed by SMP generation (see below): maintain LU database and adjust Risks and Constraints database as data is accumulated	LU confirmed for targeted SMP	2 SMPs/year	PUMA	Tech Services, DEC, DMO, MWTI, SLC		3500	2,500.00	6,000.00
Totals					**$8,000.00**	**$23,750**	**$7,000.00**	**$38,750.00**

STRATEGIC ACTION 2: Updated Buildings database					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year 1**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Analyze new LiDAR layer – interrogate to distinguish buildings, and separately overlay on improved DEM/DTM layer	Base confirmed MWTI	Nov-15	Tech Services	MWTI, PUMA, DMO	5,500.00	1,500		7,000.00
Activity 2: Validate buildings by survey of Land Use: Confirm buildings layer using LiDAR base, incorporate improved DTM (See links to Strategic Action 1)	Building Section, MWTI approved	Dec-15	MWTI, Building Section	PUMA, DMO, SLC, LTA		5,500.00		5,500.00
Activity 3: Use new bases to commence LU / building surveys, record floor levels	LU Plan vetted by	Jun-16	Building	Tech Services, Building (MWTI),		22,000.00	2,500.00	24,500.00

STRATEGIC ACTION 2: Updated Buildings database					Indicative Budget (USD)			
above ground-level; height of buildings, materials used, age, construction style, condition, with sketches of main pylons/foundation form – for post review of stability. Record ground conditions	Village Fonos			DMO, SLC				
Activity 4: Use revised Buildings layer to update the Risks and Combined Hazards database	LU confirmed for targeted SMP	SMPs/year	PUMA	Tech Services, DEC, DMO, MWTI		2250	500	2750
Totals					**$5,500.00**	**$31,250.00**	**$3,000.00**	**$39,750.00**

STRATEGIC ACTION 3: Water Resources – Integrated Catchment Management					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year 1**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Use GIS Bases with Risks & Hazards to work with Water Resources Division (WRD) on IWRM: establish likely boundaries of upper area catchment protection areas	Base confirmed by Tech Services	Nov-15	WRD	Tech Services, PUMA	5,000.00			5,000.00
Activity 2: Use agreed bases with WRD to confirm the areas nominated as high priority to WSUD measures: mid-slope and higher elevated areas. Field work required with GPS and merge with improved DTM base using LiDAR.	Building Section, MWTI approved	Dec-15	WRD	PUMA, DMO, LTA	3,500.00	7,500.00		11,000.00
Activity 3: Use aquatic ecology input to identify prospect urban waterways and ill-defined drainage-ways in lower urban catchments. Classify with stream order, with data fields on quality, fluvial form, conditions, ecological benefits etc: consider ranking in terms of incorporation as part of the 'Sensitive Ecological Areas" layer or Off-road opens space movement network.	LU Plan vetted by Village Fonos	Jun-16	WRD	DEC, PUMA, DMO		12,000.00	2,500.00	14,500.00
Activity 4: Confirm waterways and drainage-ways of significance – i.e. that require protection or noting under the	LU confirmed for targeted	2 SMPs/year	WRD	DEC, PUMA		3,500.00	1,250.00	4,750.00

STRATEGIC ACTION 3: Water Resources – Integrated Catchment Management					Indicative Budget (USD)			
LU Planning database. Amend Sensitive Ecological Areas GIS layer as may be necessary.	SMP							
Totals					**$8,500.00**	**$23,000.00**	**$3,750.00**	**$35,250.00**

STRATEGIC ACTION 4: Development Standards/Urban Design Manual					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year 1**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Internal MNRE and MWTI workshop sessions on integrating new Building Code and Urban Design Manual	Framework for Code/Manual agreed	Nov-15	PUMA	MWTI, DMO, SLC	3,250.00	1,750		5,000.00
Activity 2: Use external workshop with industry reps to agree on where merging requirements would be suited. Identify the Specifications that still may need to be made separately under the Building Act, versus the PUM Act, 2004	Building Section, MWTI approved	Dec-15	MWTI, Building Section	PUMA, DMO, SLC, LTA	5,000.00	3,500.00		8,500.00
Activity 3: Assemble materials (local sources) of guides, design standards, manuals, best practice etc. Document a framework to manage external inputs –use this to generated an annotated TORs	Materials aggregate & Situation Analysis generated	Jun-16	PUMA &MWTI Building	Tech Services, LTA SLC, DMO		2,500.00		2,500.00
Activity 4: Procure external assistance to help document Codes/Manuals/Guidelines	Draft Code/ Manual circulated	July 2016ar	PUMA	MWTI Building		22,500.00	2,750.00	25,250.00
Totals					**$8,250.00**	**$30,250.00**	**$2,750.00**	**$41,250.00**

STRATEGIC ACTION 5: Operationalizing the Combined Risks and Constraintsdatabase					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year 1**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Use existing GIS system to catalogue all available data and information on past inundation, storm surge, terrestrial flooding - add required base layers (including hopefully the LiDAR base)	Base confirmed Tech Services	Nov-15	Tech Services	WRD, PUMA, DMO	5,500.00	1,500		7,000.00
Activity 2: Work with NIWA and WRD and others as required to mesh spatial data with known hydrological and hydraulic and fluvial data -	MIWA MOU & Contract	Dec-15	NIWA	PUMA, DMO, MWTI Building, LTA, Met	7,500.00	3,500.00		11,000.00
Activity 3: Review hazard criteria between each theme: wave run-up, terrestrial flooding, coastal inundation models to consider consistencies	MNRE Vetting of all Outputs	Jan 2016	NIWA	Tech Services, Building (MWTI), DMO, PUMA, LTA, MET	2,500.00	1,200.00	500.00	4,200.00
Activity 4: Review available international best practice, science based on integrated hazard criteria	Data Catalogued	Feb 2016	NIWA	Tech Services, DEC, Met Office, DMO, MWTI		2,500.00	750.00	3,250.00
Activity 5: Generate a simple Excel based model which assists with either integrated risk criteria and multiple query of separate parameters to build an overall hazard risk/index	Spreadsheet Circulated	May 2016	PUMA with NIWA	Building (MWTI), DMO, LTA, MET	7,500	4,500		12,000
Activity 6: Use the simple Excel linked to Combined Risk and Constraints database to enhance with response based parameters –dependent on risk class	NIWA & MNRE partners agree to spreadsheet	June 2016	PUMA	Building (MWTI), DMO, SLC LTA		6,500	1500	8,000
Totals					**$23,000.00**	**$19,700.00**	**$2,750.00**	**$45,450.00**

STRATEGIC ACTION 6: Increased knowledge & awareness of land use planning					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year 1**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Social marketing plan for communications, stakeholder involvement, awareness and knowledge management (the plan should engender cooperative responsibility; target Governance & include knowledge building info on urban finance choices. Templates developed to commence community profiling in programmed SMP areas.	Marketing Plan circulated	Sep-15	Tech Services	MWTI, PUMA, DMO	12,500.00	1,500		14,000.00
Activity 2: Awareness raising & education activities organized for local communities, the public, government agencies and schools.	SUNGO or other engaged	Oct-15	MWTI, Building Section	PUMA, DMO	37,500.00	5,000.00	1500	44,000.00
Activity 3: Information on land use, environmental planning and SMPs available to the community.	LU Plan vetted by Village Fonos	Jun-16	PUMA	Tech Services, Building (MWTI), DMO	5,500.00	5,500.00	1,500.00	12,500.00
Activity 4: Commence community awareness and education campaign	Present to Chamber of Commerce	Jun-16	PUMA	Tech Services, DEC, DMO, MWTI		7,500.00	500.00	8,000.00
Totals					**$55,500.00**	**$19,500.00**	**$3,500.00**	**$78,500.00**

STRATEGIC ACTION 7: Enhanced technical & systemic capacities for land use planning					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year 1**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Improved Geographic Information Systems (GIS) to enable the aggregation and characterization and analysis of information on land use, natural resource systems, physical, social and economic development features	Bases confirmed	Nov-15	Tech Services	MWTI, PUMA, DMO	2,500.00	1,000		3,500.00
Activity 2: Resource Inventory for natural resources, physical and economic resources, cultural systems and social resources	GIS layers developed	Dec-15	DEC	PUMA, DMO, SLC, MWTI, Building Section	3,500.00	1,500.00		5,000.00
Activity 3: Environmental assessments and evaluations of future needs for land management, open space, water resource management, habitat protection, pollution control and waste management.	Workshop with Village Fono	Feb-16	PUMA	Tech Services, Building (MWTI), DEC DMO		2,500.00		2,500.00
Activity 4: Land use analysis and evaluation of future needs for residential, industrial, commercial, communal, recreational and public use	LU Plan presented to Village Fono	Mar-16	PUMA	Tech Services, DEC, DMO, MWTI		2,500.00		2,500.00
Activity 5: Vulnerability and hazard assessments and evaluation of future needs for mitigation, adaptation and/or protection (melding CIM Plans with SMP).	Data layers Combined Risk and Constraints database	Apr-16	PUMA	Tech Services, SLC, WRD, DEC, Met, MWTI Building, LTA		2500		2,500.00
Activity 6: Social and cultural assessments of traditional practices, social services and human rights, and evaluation of future needs, roles and responsibilities	Social and Cultural bases in GIS	Apr-16	PUMA	MWTI, Min of Women		2500		2500
Activity 7: Synthesis of absolute and relative constraints of environmental, land use, economic, vulnerability and social assessments – and identification of opportunity areas.	Maps produced	May-16	PUMA	Tech Services, MWTI Building, DMO, SLC		2500		2500
Activity 8: Production of the SMPs through involvement of the village communities and other stakeholders	SMP ready for Village (2-3 per year)	Jun-16	PUMA	MWTI Building, SLC,		3500		3500
Totals					**$6,000.00**	**$18,500.00**	**$0.00**	**$24,500.00**

STRATEGIC ACTION 8: Enhanced Institutional and Local Governance capacity building					Indicative Budget (USD)			
ACTIVITIES	**INDICATOR**	**TARGET**	**Lead**	**Partners**	**Year**	**Year 2**	**Years 3-5**	**Total**
Activity 1: Assessment of legal frameworks that relate to land use planning, land management, lease administration, village governance – with options for addressing inconsistencies.	Situation Analysis	Dec-15	Tech Services	MWTI, PUMA, DMO	2,500.00	1,500		4,000.00
Activity 2: Assessment of institutional structures, entities and linkages between state level and village governance – with options for improvements based on the needs established for local urban governance	Institutions and Governanc e Paper	Feb-16	MWTI, Building Section	PUMA, DMO		3,500.00		3,500.00
Activity 3: Assessment of human rights and rights based governance obligations from international conventions and agreements as they relate to development processes, land use planning and urban management	Social Justice and Equity Paper	Mar-15	PUMA	Tech Services, Building (MWTI), DMO		3,500.00		3,500.00
Activity 4: Community and Social Development Survey – to determine local governance aspirations, roles and responsibilities.	Survey Monkey results & report	April- May 2016	PUMA	Tech Services, DEC, DMO, MWTI		3,750.00		3,750.00
Activity 5: Development of a Strategy and road-map for advancement of local village governance for integrated land use planning and urban management in Samoa, through the use of SMPs	Road map presented to 3 Village Fono	Jun-16	PUMA	Att Gens, MNRE, MWTI, DMO		5500		5,500.00
Activity 6: PUMA Strategic Planning & GIS training	No. of staff trained	June 16	PUMA	MNRE, MWTI, DMO, WRD	15,000.00	7,500.00	5,000.00	27,500.00
Totals					**$17,500.00**	**$25,250.00**	**5,000.00**	**$47,750.00**

Annex 4: Programme Scheduling

Strategic Action/ Activities	Notes	2015	Aug	Sept	Oct	Nov	Dec	2016 Mar	Qtr June	Sept	Dec	2017 Marc	June	Sept	Dec
1. Confirmed Land Use Plan for Apia and Surrounds															
Activity 1: Confirm Cadastral Base, including SLC approved subdivisions	Base confirmed by Tech Services	♥1								♥6					
Activity 2: Confirm buildings layer using LiDAR base, incorporate improved DTM	Building Section, MWTI approved														
Activity 3: Use new bases to commence LU surveys, record floor levels above ground (link to hazards work)	LU Plan vetted by Village Fonos														
Activity 4: LU validation programmed by SMP generation (see below): maintain LU database and adjust Risks and Constraints database	LU confirmed for targeted SMP														
2. Updated Buildings Database															
Activity 1: Analyze new LiDAR layer – interrogate to distinguish buildings,	Base confirmed MWTI									♥6					
Activity 2: Validate buildings by survey of Land Use: Confirm buildings layer using LiDAR base, incorporate improved DTM	Building Section, MWTI approved														
Activity 3: Use new bases to commence LU / building surveys, record floor levels above ground-level; height of buildings, etc	LU Plan vetted by Village Fonos														
Activity 4: Use revised Buildings layer to update the Risks and Combined Hazards database	LU confirmed for targeted SMP														
3. Water Resources – Integrated Catchment Management															
Activity 1: Use GIS Bases with Risks & Hazards to work with Water Resources Division (WRD) on IWRM	Base confirmed by Tech Services									♥6					
Activity 2: Use agreed bases with WRD to confirm the areas nominated as high priority to WSUD measures	Building Section, MWTI approved														
Activity 3: Use aquatic ecology input to identify prospect urban waterways and ill-defined drainage-ways	LU Plan vetted by Village Fonos							♥2							
Activity 4: Confirm waterways and drainage-ways of significance	LU confirmed for targeted SMP														

Strategic Action/ Activities	July	2015 Jul	Aug	Sept	Oct	Nov	Dec	2016 Mar	Qtr June	Sept	Dec	2017 Mar	June	Sept	Dec
4. Development Standards – Development Standards/Urban Design Manual															
Activity 1: Internal MNRE and MWTI workshop sessions on integrating new Building Code and Urban Design Manual	Framework for Code/Manual agreed									♥6					
Activity 2: Use external workshop with industry reps to agree on where merging requirements would be suited.	Building Section, MWTI approved														
Activity 3: Assemble materials (local sources) of guides, design standards, manuals, best practice etc.	Materials aggregate & Situation Analysis generated							♥3							
Activity 4: Procure external assistance to help document Codes/Manuals/Guidelines	Draft Code/ Manual circulated														
5. Operationalizing the Combined Risks and Constraints database															
Activity 1: Use existing GIS system to catalogue all available data and information	Base confirmed Tech Services									♥6					
Activity 2: Work with NIWA and WRD and others as required to mesh spatial data	MIWA MOU & Contract														
Activity 3: Review hazard criteria between each theme: wave run-up, terrestrial flooding, coastal inundation	MNRE Vetting of all Outputs							♥2							
Activity 4: Review available international best practice, science based on integrated hazard criteria	Data Catalogued							♥3							
Activity 5: Generate a simple Excel based model	Spreadsheet Circulated														
Activity 6: Use the simple Excel linked to Combined Risk and Constraints database	NIWA & MNRE partners agree to spreadsheet														
6. Increased knowledge and awareness of Land Use Planning															
Activity 1: Social marketing plan for communications, stakeholder involvement,	Marketing Plan circulated									♥6					
Activity 2: Awareness raising & education activities	SUNGO or other engaged														
Activity 3: Information on land use, environmental planning	LU Plan vetted by Village Fonos														

Activity 4: Commence community awareness and education campaign	Present to Chamber of Commerce														
7. Enhanced Technical & Systemic Capacities for Land Use Planning															
Activity 1: Improved Geographic Information Systems (GIS)	Bases confirmed									♥6					
Activity 2: Resource Inventory for natural resources,	GIS layers developed														
Activity 3: Environmental assessments and evaluations	Workshop with Village Fono							♥2							
Activity 4: Land use analysis and evaluation	LU Plan presented to Village Fono														
Activity 5: Vulnerability and hazard assessments and evaluation	Data layers in Combined Risk and Constraints database								♥3						
Activity 6: Social and cultural assessments	Social and Cultural bases in GIS								♥5						
Activity 7: Synthesis of absolute and relative constraints	Maps produced								♥3						
Activity 8: Production of the SMP through involvement of the Vailele village	Trial SMP ready for Village									♥**4**					
8. Enhanced Institutional and Local Governance capacity building															
Activity 1: Assessment of legal frameworks	Situation Analysis								♥6						
Activity 2: Assessment of institutional structures, entities and linkages	Institutions and Governance Paper							♥3							
Activity 3: Assessment of human rights and rights based governance	Social Justice and Equity Paper							♥3							
Activity 4: Community and Social Development Survey	Survey Monkey results & report								♥5						
Activity 5 Development of a Strategy and road-map	Road map presented to 3 Village Fono										♥**7**	♥8			
Activity 6: Training of PUMA staff															

Milestones

♥**1**	Project Inception & Management Report	♥**5**	Social & Institutional Options Report
♥**2**	Information & Environmental assessments Report	♥**6**	Annual Programme Review
♥**3**	Evaluation and Synthesis Report	♥**7**	Draft Strategy for local village governance
♥**4**	Draft Sustainable Management Plan	♥**8**	Final Strategy for local village governance

Annex 5: Introduction to 'Neighbourhood Planning"

Neighbourhood Planning Methods, Principles and Criteria

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1. Introduction to “Neighbourhood Planning”

In order to review the existing Apia City and its village areas, and to plan for areas needed for future development, a planning methodology known as "Neighbourhood Planning" was used. Neighbourhood planning was first promoted by Clarence Perry in NewYork in 1929.

At that time it was recognised that towns and villages, even those within cities, acted as single communities – much the same small and large villages do today in Apia. However the threat is that communities subject torapid growth develop into "sprawling suburbia" resulting in a breakdown of the community feeling. The “Neighbourhood Unit” was promoted as a means of reviving the feeling of a local community in the interests of social well-being and sustainable development.

Neighbourhood Unit planning principles adopted by various planning authoritiesstill reflect the initial models promoted by Perry and others. Features involved in village level planning are still relevant:

- Distinct physical boundary of the village or components of larger village;
- Focus on social activity;
- Connectivity between the centres and living areas (e.g. walking);
- Thresholds to support a primary school (larger villages);
- Divided by major traffic roads/streets (major Collector or Distributors);
- Balanced social structure: range of community land uses;
- Ultimate size to plan for generally 4000/5000 persons (up to 10000 persons).

Modern use of neighbourhood principles and models has seen more detailprovided in the elements of a neighbourhood. These additional criteria pursue a more sustainable and low carbon form of development, as follows:

- Good accessibility to work and recreation opportunities: (minimise journeys by vehicles: energy efficiency, reduced pollution, improved safety, improved quality of life);
- Land suitability: good subsoil drainage, minimal cut and fill, protection of productive land, etc;
- Free from water hazard: e.g. flooding, cyclonic waves and winds; total catchment or ridge to reef approaches;
- Free from general climate change exposure with good aspect:-e.g. strong trade winds; avoidance of hazardous areas, ability to respond;
- Pleasantness of the landform i.e. good views, segregation from industrial land use, freedom from air pollution and noise sources
- Low to medium gradients: expensive to develop on higher gradients, more disturbance to the environment (20% for Urban development cut-off is consistent in some countries)
- Suitable land size area: the land mass should be capable of forming either complete neighbourhoods or being coupled with adjacent neighbourhoods in order that the threshold required for dominant uses and facilities such as schools, shops etc. can be fulfilled. The choice of boundaries for neighbourhoods will be determined by well-defined features such as landscape, vegetation, main roads, open space spines, soil/geology hazard areas etc.
- Free from alien development which will lead to land use conflict: e.g. houses near quarries;
- Well served or capable of servicing by transport facilities: roads, streets, access ways etc.;
- Well served or capable of being served by utility and engineering services built concurrently with development.

2. The Method

2.1 Reviewing existing land use and urban form

The existing urban area is usually split up into "neighbourhood units",or segments based on features such as village council boundaries, old development blocks, land use, vegetation cover, sensitive ecosystems, topography or geology. Because of the strength and function of the Village Fono areas within Apia, the Village boundaries are a good starting base for the CDS. For implementation, grouping of Villages or key development areas (e.g. the Waterfront area of the CBD) may be worthy.

The **components of land use** are then documented. The following features are usually mapped or recorded in databases for more specific analysis in subsequent planning processes:

- existing retail floor areas: location and quantity;
- existing commercial and industrial floor areas;
- amount and location of playing areas;
- amount and located of other public open space;
- major and secondary roads, plus hierarchies (if documented; if not - nominate a hierarchy)
- number of dwellings (if aggregated);
- traffic volumes (if documented)
- walking distances thresholds to local shops, dairies etc.
- thresholds for primary schools (amended by the provision of school bus services)
- location and number of community facilities;
- demographic characteristics (if felt relevant to compare with other similar sized villages)
- natural features (hillsides, escarpments, chasms, caves, bush etc).

For the CDS much of the land use and development information was not in a form, or accessible at the time of consideration. GIS mapping was used to produce surrogate outputs. This is included in sections 4 to 11 of this document. Data, information and initial evaluations centred on separating socio-economic, physical and environmental as well as socio-cultural matters for initial assessment of the current situation.

2.2 Evaluation

The evaluation stage of the planning process starts to draw conclusions about physical development, socio-economic patterns and land use activity, often by cross-correlation of thematic data layers e.g. considering road hierarchy with urban amenity in mind. Firstly the mapping of the relative and absolute physical, socio-cultural, environmental and landform constraints and opportunities is undertaken. For the CDS this has been documented in sections 4 through to 11.

The characterizing of neighbourhood units can be done by considering the present location of commerce, local shops, centres and industrial areas, using approaches like the ‘concentric ring’ overlay (well accepted metrics are used to establish rough thresholds for centres). This work is assisted by community participation stage: where community issues and values can be documented and used to consider components between and within the neighbourhood units. Opportunity areas for various land uses or activities can be mapped during the community participation process. For the City of Apia, Village Council ‘units’ will initially be used instead of the identification of separate ‘neighbourhood units’.

3. Criteria for Neighbourhoods

The criteria for "neighbourhood" layout and design can then be used as a 'benchmark' in conjunction with existing and planned major road systems to map locational options for:

- schools, child care or preschools
- open space systems including recreation areas
- local shops or other retail, commercial or mixed uses.
- community facilities.
- rural residential areas (larger dwelling panels).
- medium to high density dwelling areas (if there is a demand)
- small-lot residential dwelling areas

3.1 Neighbourhood layout principles

1. New development areas are to be contained within major ridgelines and to follow natural topographic or catchment boundaries (surface and/or subsurface).

2. Standard urban development areas will be limited to the lower and medium valley areas (i.e. less steep areas).

3. Standard urban development shall be limited to the level as shown on Figure 31 of the CDS. This limit may be adjusted where water supply cannot be supplied efficiently with a minimum 12 metre pressure head through gravity (rather than pumping), and where environmental assets need protecting (see Figure 19)

4. For higher elevated areas, where slopes are steeper, a change in subdivision form will be required (e.g. away from loop road system to branch cul-de-sacs) and larger land parcels may be required

5. The major road system should allow the shortest travel distance between neighbourhood units and other villages:

6. Ideally the major road system should be planned on a1.5 to 2 kilometres grid system. Where linear forms of settlement occur the topographical features will require adjustment to this principle.

7. The grid should be able to accommodate between 1200 and 2600 dwellings (standard block sizes – may need adjusting to accommodate cultural norms for the Pacific)

8. The major roads within the grid should be maintained to service a maximum volume of 4000 vehicles per day.

9. Within the neighbourhood planning unit there should be a hierarchy of roads from the main arterial grid to consist of -
    - Distributor roads or Main Roads: To accommodate possible future public transport routes. Maximum traffic volume to be 3000/7000 vehicles per day. No direct access to single residential allotments.
    - Collector roads: to provide the access from the main roads to the residential living areas. Maximum traffic volume to be 1200/3000 vehicles per day. Not normally for bus service. Collectors serve up to 250 dwellings.
    - Local Access Streets: less than 2000 vehicles per day or a maximum of 200 dwellings. Provides the access to the bulk of the residential dwellings.
10. Larger traffic generating uses such as Industry, High schools or major sporting complexes should be located on the periphery of the neighbourhood unit with direct access to the main road system.
11. Around the centralised local centre there should be promoted a "zone of care" to promote reduced-traffic speeds and awareness of pedestrian activity.

12. The off road open space system should satisfy the following:
    - The system should be linear and connective, the axis approximating the half way marks of the grid arterial road system.
    - The main east-west and north-south axis should meet close to the Primary School location and Local Centre if possible.

    The layout should link the Primary School, Local Centre, neighbourhood and district Playing Fields
    - Landscaping or open space linkages within the layout grid should create a series of spaces of variety and character taking advantage of conservation and recreation areas.
13. The neighbourhood unit should be able to be serviced by public transport along the main road. 95% of all residential dwellings should be within 500 metres of this route.
14. There should be a maximum walking distance within the grid cell from any residence to centralised facilities of 1 kilometre (up to 1000 dwellings) or 1.5 kilometres (1800 + dwellings)

4. District Centres

1. In new areas (government sponsored or Crown land), large neighbourhood units/centres, which accommodate a number of smaller neighbourhood units, should be planned to cater for a population threshold of 5000 to 10,000 people. This would enable support for a larger range of communal facilities such as:

    - Restaurants
    - Community centres/health centre/clinic
    - School (primary) nearby
    - Branch Library
    - Cinema
    - Indoor sporting facilities

5. Local Centres

1. Primary schools should be planned for the neighbourhood.

2. Local shops should be supplied centrally/or adjacent to the mass of serviceable dwellings - consisting of a Supermarket of about 600sq.m. retail floor space with other local retailing shops to support the centre (for a total of about 750 sq. m). The threshold to support such a local centre usually is of 1600 dwellings. However for some villages aboutApia 800-1000 dwellings may be sufficient.

3. The optimum dwelling numbers to support various thresholds of uses, is usually 1600/1800 dwellings. This would approximate a population of 4500 - 5000 persons.

4. Local facilities are to be provided in a central location on the main roads of the village and if possible the off-road movement systems (e.g. walking & cycling tracks). ,

5. The Primary School should be located in a central position.

6. The local Centre should have a minimum retail size of 750sq.m. and include a Supermarket.

7. The road layout and block design should enable energy efficient and solar passive housing e.g. a wider east/west axis of residential blocks.

6. Neighbourhood Land Use Elements

The following gives an example of modern criteria for landuse supply within a neighbourhood unit.

6.1 Residential areas

1. On average new subdivisions on government land or other freehold land should have a dwelling density of 10 dwellings per hectare for standard residential areas. Some areas should be kept for higher density, flats (cheaper housing) at 20 dwellings per hectare.

2. Medium to higher density dwelling areas (20+ dwellings/ha) should be located adjacent to the central local facilities, major public transport routes or other special facilities.

3. Landscape treatment of streets and pedestrian ways should be the dominating unifying element within the precinct.

6.2 Social facilities

1. Each neighbourhood area will require land for various social facilities andcommunity activities.

2. Churches - sites should generally be close to village centres for major denominations, with individual sites within the neighbourhood generally where landuse conflict will not result.

3. Pre-school Kindergarten - One (1) site per 1500 residents may be required catering for classes up to 25 children. A suggested space standard is 3.25sq.m. per child inside space, and 14sq.m. for outside play space.

4. Clubs and Meeting Halls - small public hall required at each village centre.

5. Shops and Community Buildings- A centre minimum of 750sq.m. is required at the neighbourhood centre. Corner stores or Dairies about the neighbourhood will be appropriate

- Church site: 0.3 hectares
- Meeting hall: 0.3 hectares
- Clinic & Health Centre: 0.5 hectares
- Library: 0.2 hectare
- Hotel/Club: 0.4 hectare
- Cinema: 0.4 hectare (shared with other centres)
- Community Centre: 1.2 hectares (consisting of games room, reading room, club rooms, assembly hall etc.)
- Schools: one Primary school of 2.0 hectares per neighbourhood (4000 -5000 people). Radius of access should be 750m.One High school site of 5.0 hectares is required for larger centres (e.g. Vaitele).
- Open Spaces: 2.8 hectares of open space per 1000 persons is consistent practice. (N.S.W. Dept. of Planning, 1984). This figure does not include uses such as golf courses, outstanding natural features, environmental protection areas etc. The sub-classes may be as follows:

i) 1.46ha/1000 persons (52%) for active open space (sport fields, tennis courts etc.).

ii) 1.34 ha/1000 persons (48%) for passive open space.

Other standards require 4 hectares of open space per neighbourhood, concentrated mainly near the neighbourhood centre and including a large playing field of approx. 2 hectares.

At the national level when the population nears 5000 people about 1.5 hectares will be required to support a series of sports fields, swimming pool, sporting clubs and various buildings for indoor sporting activities. They can be located so that parking facilities are shared.

Annex 6: Preferred Use Area – Land use allocation criteria

Table of Contents

1.
1. COMMERCIAL

1.1 Application

This clause applies to areas within the limits of the built up areas of the City and village areas; where such preferred use areas have been identified through the CDS or subsequent SMPs by the community.

1.2 Aim

Provide necessary opportunities for the growth of commercial areas and uses to facilitate the community, and to stimulate sustainable economic activity and employment opportunities.

1.3 Objectives

(a) To ensure that major commercial development is subject to development and environmental assessment.
(b) To encourage a range of commercial land uses while recognizing the pivotal role of the main commercial centre of Apia;
(c) To ensure that commercial land is available and coordinated in its release to encourage sustainable economic activity;
(d) To guide the aggregation or grouping of commercial activities into CBD, District, and Local centres, or special Business Development areas to assist with concentrating business activity to spawn mutual demands;
(e) To provide areas for a range of office accommodation, business and retail services, tourist uses, retailing and/or integrated housing close to the Central Business District of Apia, District and local centres to facilitate existing commercial and retail businesses;
(f) To encourage as much as possible the location of Government of Samoa (GOS) head offices and other major office employers in close proximity to the Apia CBD where they are not within critical high hazard risk areas or have adaptive measures to increase resilience;
(g) To encourage as much as possible the location of Government of Samoa (GOS) essential service offices in close proximity to District Centres and Business Development Areas where they are not within high hazard risk areas or have adaptive measures to increase resilience;
(h) To ensure that new local and major commercial uses and activities do not jeopardize the functioning of the main commercial centre of Apia;
(i) To enhance the environmental quality, improve the social and aesthetic amenity within existing commercial centres;
(j) To encourage a wide choice of goods, personal and business services and promote job generation close to where people live;
(k) Provide programmes to ensure that the road network around commercial centres leads to acceptable traffic volumes, and that redevelopment does not exacerbate congestion, noise and pollution;
(l) To ensure that adequate car parking and loading/unloading facilities required by development is provided on the land or that funds are collected from the developers to build purpose built parking in close proximity to the CBD, District or Local centres;
(m) To provide for potential future public transport facilities;
(n) To provide convenient pedestrian networks around the commercial centres;
(o) To encourage provision of land suitable for small scale retail (e.g. "dairies", corner shop), commercial, mixed retail/commercial and residential development which does not adversely affect neighbours;
(p) To facilitate the location of small-scale retail/commercial use at nominated tourist development (physical) areas, which may be supported by Village Councils to coordinate user-pay for local benefit from the use of tourism attractions.

1.4 Commercial development restriction

(a) Retail, office or commercial uses associated with tourism or large area residential development shall only be supported within existing village areas (physical) where:

i. It accords with the location of Centres as provided by the CDS or subsequent SMPs;
ii. adequate services are shown to be available;

iii. Car parking, circulation and loading/unloading areas are provided on-site;
iv. No adverse impacts on businesses and commercial uses in the CBD, District or Local Centres can be demonstrated.
v. The floor space ratio for commercial use and developments shall be a maximum of :
   a. CBD and District Centres – 1:1
   b. Other areas - 0.5:1

(b) Drive in take-away food shops shall be supported only where:
   (i) the site area is not less than 1000 square metres, and
   (j) the land is located within or immediately adjacent to the CBD, District Centres or Business Development Areas;
   (ii) adequate parking, unloading and circulation areas are provided on –site, and
   (iii) the location does not adversely affect the functioning of public access and road systems.

2. ECONOMIC DEVELOPMENT AND EMPLOYMENT.

2.1 Application

This clause applies to all land in Samoa.

2.2 Aim

To ensure land and resource use planning encourages economic development and employment opportunities.

2.3 Objectives

(a) Enable consistent provision mechanisms for land, economic and statistical information for sustainable development initiatives;

(b) Stimulate and strengthen the role of Apia as the main centre for commercial and industrial bases;

(c) Promote commercial and industrial activities in other villages;

(d) Provide for a range of land-use options aimed to improve employment opportunities;

(e) Enable the provision of land and information to stimulate and strengthen local tourism potential to facilitate economic and employment opportunities through-out Samoa;

(f) Provide information on land use criteria to the public to assist knowledge and understanding of land use as well as environmental economics.

3. INDUSTRIAL

3.1 Application

This clause applies to areas within the limits of the built up areas of the City and village areas where industry is identified in the CDS or subsequent SMPs as the preferred use, as well as areas where existing industry operates.

3.2 Aim

To encourage industrial development in a form, manner, in locations, and at a scale or intensity which generates employment opportunity while maintaining or improving the amenity for surrounding uses and nearby residents.

3.3 Objectives

(a) To provide for a range of industrial land uses, and to encourage diversification of the industrial base, in order to expand employment opportunities and economic activity;

(b) To provide for a range of non-industrial uses within industrial areas which are compatible in land-use economic and physical terms, and support industrial estate developments;

(c) To ensure that the natural environment and human environment is protected, and that the detrimental impacts of industrial development do not exceed prescribed standards and criteria;
(d) To ensure that parking generated by the use, loading and circulation areas are provided onsite and do not detrimentally affect the safe and efficient functioning of public access or roads;
(e) To ensure that the traffic systems provide easy access to industrial estates and land uses within.
(f) To ensure the location of industry minimizes noise and other nuisances on nearby residents, public health, education, community uses and facilities;
(g) Where new industry is planned in close proximity to residential or potential residential areas, ensure it is of a type, density, scale, style and design which minimizes adverse impacts on those neighbouring areas;
(h) To ensure new major industrial development incorporates landscaping and is of a high design quality;
(i) New industrial areas should be located or be of a scale or intensity which:

i. Facilitates the economic functioning of nearby compatible or associated uses, within environmental criteria and standards;
ii. Facilitates adequate buffer zones or protection areas (e.g. for hazardous industry);
iii. Minimizes direct or indirect impacts on water supply bores;
iv. Is not scattered thereby discouraging inefficient traffic generation through living or commercial areas;
v. Enables satisfactory water supply of a minimum 21 metre hydraulic head, preferably by gravity feed;
vi. Is on land with less than 8% slope and with less than 20% rock/makatea out cropping;

(j) New industrial areas shall only be on areas of scrub, bush or open areas where substantial clearing has occurred previously;
(k) Industrial land parcels created by subdivision shall be an area of less than 1500 square metres.

4. RESIDENTIAL

4.1 Application

This clause applies to areas within the limits of the built up areas of the City and village areas; those limits identified by the community, or those areas of potential future village extension (nominated as the "preferred use") within the CDS or subsequent SMPs.

4.2 Aim

To provide for the orderly development of the City and existing village areas in a manner that offers:

- A choice in residential living styles
- Provide housing mix and location acceptable to the community
- Provides a means to address conflict over access
- Enables future development that improves amenity, reduces nuisances, protects privacy and maximizes communal or family outdoor living spaces.

4.3 Objectives

(a) To encourage standard scale residential development, where desired by the community;
(b) To encourage alterations, additions or redevelopment which maintains or improves the amenity of existing residents and which provides good amenity for future residents;
(c) To encourage alterations, additions or redevelopment which has regard to and complements the scale, fabric and character of the older and traditional housing areas;
(d) To limit new subdivisions to areas with low to medium climate or natural hazard classes;
(e) To restrict new subdivisions or the intensification of development within high hazard areas and only allow development where it can be demonstrated that adaptation measures can

increase the resilience of built form and the community, and does not transfer the hazard or likely risks elsewhere;

(f) To deter any new subdivisions or intensification of development within critically high hazard risk areas;

(g) To ensure that new subdivisions or intensification of development does not require trunk or main essential services and infrastructure to be located within critically high or high hazard areas;

(h) Permit a broader range of low to medium density housing types, where they are compatible, and service the local community;

(i) To encourage alternative and more intense residential development about the CBD, District and Local centres or Business Development Areas, providing they are outside of high hazard and risk areas;

(j) To allow subdivision which is consistent with the subdivision patterns of adjoining land and best practices;

(k) To provide opportunities for small scale non-residential uses usually within a dwelling-house or building ancillary to a dwelling-house and which operate so that they do not adversely affect adjoining neighbours;

(l) Promote and facilitate solar energy use and design and siting of dwellings that capitalize on solar orientation and cooling breezes;

(m) Encourage modest urban consolidation where such new development or redevelopment is compatible with the existing residential framework, infrastructure services and local community aspirations;

(n) Provide for energy conservation by enabling alternative multi-unit or medium density housing close to employment centres, major public roads, or large Crown land parcels which are underutilized;

(o) Ensure that new development and redevelopment is in keeping with the existing residential environment in scale, bulk, height and character, through performance based criteria;

(p) Ensure the adequate provision of public roads for access, easements for services and facilities, pedestrian and cycling systems;

(q) To ensure that design and siting of residential development is compatible with the surrounding area with regard to safety, health and privacy of nearby residents;

(r) To ensure that traffic and parking generated by development and/or redevelopment, does not increase pressures on the road systems;

(s) To ensure new development areas are adequately serviced (in terms of capacity & capability) by water, electricity, telecommunications and means of effluent disposal to the satisfaction of the relevant agencies;

(t) To encourage the involvement of Village Councils in decisions relating to residential developments, other than standard low density housing.

5. RURAL RESIDENTIAL

5.1 Application

This clause applies to land on the fringe of the physical built up areas of the City and villages or development nodes which due to physical capability and suitability may be suited to rural living, while maintaining the rural character.

5.2 Aim

To provide alternative living styles within rural settings, in carefully planned rural-residential areas as designated in the CDS or subsequent SMPs and designed to allow the land to predominantly retain its natural or rural character.

5.3 Objectives

(a) ensure that rural residential development (including use and subdivision) does not detrimentally effect prime agricultural areas or land with potentially higher and better use whether close to villages or not;

(b) encourage the location of rural-residential areas in close proximity to existing village areas (physical bounds); but,

(c) ensure that rural residential development close to villages does not undermine longer term use for extension of villages, public purposes, commercial or industrial use;
(d) ensure that development does not intrude on areas nominated as significant landscape, of environmental sensitivity or subject to human induced or natural hazards;
(e) ensure that new rural-residential development areas are promoted as part of "development areas" provided by the City Development Strategy implementation or subsequent SMPs, where subdivision development concept has been generated and supported to guide layout and land use;
(f) ensure that rural residential development is supported in areas where this form of use is nominated as the "preferred use" and where existing utility and infrastructure services are or can be efficiently supplied to the area;
(g) locate rural residential development in areas where the land is accessible by existing or planned public access;
(h) locate "preferred use" areas for rural residential development in close proximity to villages or established development nodes to act as a transition between urbanizing village areas and bush areas, and to restrict "strip" development or disjointed land development which results in high community and servicing costs;
(i) to restrict the location or scale and intensity of rural residential development on lands identified for future standard residential release, or investigation for other preferred uses, or potentially suited to other essential village fringe uses;
(j) to restrict rural residential development to within 2 kilometers of existing physical villages and to areas currently serviced by water and electricity;
(k) to restrict development from areas identified as having or potentially having a geological or quarrying resource;
(l) to ensure that subdivision layout and parcel size is based on land gradients (or slope), elevation, visual significance, vegetation cover retention, land capability micro-climate conditions and relationships with neighboring uses;
(m) ensure that development is located on land with a slope of less than 20% and with rock/makatea outcropping of less than 50%;
(n) ensure that rural residential development is at least 500m from noise and hazard sources such as the power generation plant or quarries;
(o) to restrict development from areas nominated as a hazard area due to either; cyclonic waves or wind, wave run-up, flood inundation, high bush fire risk, contamination by past land uses, geological constraint or land instability;
(p) to ensure that parcels are large enough to satisfy environmental conditions, and to allow large enough dwellings and outbuildings for self-sufficient water supply through water harvesting (roof catchment and hardstand runoff);
(q) To ensure that rural residential development is located in areas (with large enough parcels) that are suitable for on-site effluent disposal (may require water, nutrient and toxicity modeling);
(r) To restrict development from ridgelines;
(s) To promote rural-residential development in locations:
    - that have topographic features (e.g. flat treed benches) that allow the siting of houses which will not be visually obtrusive;
    - that provide open or filtered views of the coast, the ocean or bush areas;
    - that have flat areas of scrub, light bush or fringing forest areas which are secluded, quiet with unique scenery and surrounds;
(t) To detail by means of sustainable management plan (SMP) provisions or guidelines controls which:
    - Restricts development to single dwellings;
    - Controls on the height, scale, bulk and colour of materials;
    - Nominate the location of dwellings and ancillary development;
    - Implement appropriate sustainable development principles, methods and practices.

5.4 Dual Occupancy dwellings in Rural Residential areas

Dual occupancy may be permitted in rural residential areas, with consent, but only if:

(a) The land parcel is a minimum of 2 ha;
(b) Consists of two attached dwellings;

(c) Can adequately be supplied with electricity and water (either augmented or catchment), and
(d) Have sufficient remaining land to adequately dispose of partially treated effluent.

6. COMMUNITY USE

6.1 Application

This clause applies to all village areas (physical), supported development areas (preferred use areas) and tourism development located at development nodes in rural areas.

6.2 Aim

To guide the provision of land and facilities for communal and public use.

6.3 Objectives

(a) Ensure provision of opportunities for the establishment of community, health, welfare and cultural facilities in accessible places for residents;
(b) Encourage cultural events and participation activities by the community;
(c) Provide "preferred land use" areas to accommodate community facility land uses either by themselves or combined with other uses;
(d) To ensure through the development phase that there is appropriate land set aside for community services and facilities;
(e) Promote the multi-use and co-location of facilities such as schools, libraries, child care centres/kindergartens e.g. Playing fields etc.;
(f) Provide adequate sites for emergency services in new "development areas";
(g) Promote active involvement or input from community members in strategic decision making processes, local management or maintenance programs;
(h) To locate community facility sites close to potential future public transport and pedestrian traffic systems;
(i) Promote cultural activities in each village to generate community identity and communication.

7. CULTURAL HERITAGE

7.1 Application

This clause applies primarily to village areas (physical) and rural areas where traditional customs and structures are healthy, and cultural and archaeological features have been identified.

7.2 Aim

To conserve the customary and cultural heritage of Samoa and enable use and development of identified sites, items, structures and places, where this will not adversely affect their status.

7.3 Objectives

(a) Integrate cultural and archaeological heritage conservation into planning, resource use, biodiversity and development decision processes;
(b) Continue to identify and investigate the customary and heritage status of sites, items, structures and places of heritage significance;
(c) Where heritage features have been identified develop guidelines and incentives for their protection, maintenance, preservation, or development;
(d) Facilitate education and interpretation initiatives;
(e) Encourage and plan for the provision of interpretation trails, associated scenic routes or walks about cultural heritage sties and places to facilitate local tourism;

(f) Ensure Village Councils and the community is involved in decisions relating to heritage conservation and development;

(g) Recognize in any resource use planning or conservation plan cultural heritage conservation areas identified by the community and ensure that guidelines, land use provision and/or action plans recognize the controls and objectives determined by the community;

(h) Ensure that appropriate land use or conservation buffers are placed around cultural and archaeological heritage features;

(i) Where a number of heritage items, sites and structures are found in close proximity advocate the inclusion of these in cultural heritage places or areas to incorporate them all as well as the surrounding lands (boundaries to be identified by the community);

(j) Where items or buildings of heritage interest are identified within villages investigate opportunities for funding to have these maintained or developed to enhance their conservation or heritage status.

8. RECREATION AND OPEN SPACE

8.1 Application

This clause applies to village areas (physical).

8.2 Objectives

(a) Enable the improvement of existing landscaping and promote the provision of landscaped areas and community open space associated with new developments;

(b) Enable or promote actions to enhance the image of villages, the characteristics of each location and the built environment in order to improve the quality of life for the community;

(c) Provide for a range of active and passive recreation activities using criteria to plan locations and are requirements;

(d) Within large scale new development areas enable open space linkages and community space;

(e) Use open space links or corridors as one means to protect or conserve significant natural or cultural features;

(f) Promote dual or multi-uses of open space areas where they are compatible e.g. Child care centres, schools, and community facilities;

(g) Ensure that new development does not adversely affect existing or planned open space, the landscape or scenic quality of areas.

9. ENVIRONMENTAL CONSERVATION

9.1 Application

This clause applies to areas of:

(a) Important primary forest;

(b) Diverse secondary forest (nominated by community members or from studies involving the community);

(c) Areas nominated as of visual/landscape significance;

(d) Habitat areas nominated by the community or from studies involving the community;

(e) Traditional hunting and use areas nominated by the community;

(f) Cultural and archaeological heritage areas or places identified from studies or by the community;

(g) Areas of significance identified within the coastal zone;

9.2 Aim

To protect, sustain and enhance areas of natural and cultural sensitivity from harm through application of sustainable development principles and criteria.

9.3 Objectives

(a) To restrict development within areas of significant primary forest or diverse secondary forest (as nominated by the community) to subsistence and cash crop agricultural uses, and;

(b) To restrict development within the Catchment Areas to subsistence or cash crop agriculture, other than that supported by the village communities and guided by approved standards and criteria;

(c) To support Village Councils in the restriction of all development and access to tapu areas and/or potential tapu areas;

(d) Protect significant landscapes and associated environmental attributes of the coastal zone and major terrace escarpments, and where beneficial, only support low density rural use where it is compatible with landscape qualities;

(e) Provide protection of remnant bush, secondary forest and primary forest deemed to have high conservation status;

(f) Ensure that significant habitats for flora and fauna are protected from adverse forms of development;

(g) Protect significant traditional hunting and use areas from intense and broad acre development forms;

(h) To protect and conserve significant natural, cultural and archaeological resources, and only allow forms of development which do not adversely affect their status;

(i) Identify and advocate the enhancement of remnant bush and secondary forest areas known to be part of movement corridors or habitat for uga, lupe, peka or other fauna;

(j) Restrict development in areas of potential World Heritage or Wilderness Status;

(k) Deter development from coastal areas nominated as significant uga habitat;

(l) To provide opportunities for tourism, cultural and recreation activities and use of primary forest, diverse secondary forest and bush areas of significance;

(m) To promote environmental education and interpretation of the attributes of forests, bushlands and significant coastal zone areas;

(n) Ensure development does not adversely affect uga and other important hunting stations and tracks;

(o) Ensure rural development does not result in strip clearance of forests and bushlands along main roads, by retaining belts of significant vegetation to assist genetic and species diversity and movement;

(p) Where significant vegetation exist along roads ensure that if clearance is required for subsistence or cash-crop use, that clearance areas are setback a minimum of 10 metres to maintain roadside bush/forest characteristics.

(q) Ensure development of areas within villages, nominated as of local significance, does not involve broad scale vegetation clearance;

(r) Ensure that rural and forestry research areas and activities involving clearing are located outside of conservation areas and areas nominated as of biodiversity significance;

(s) Ensure that electricity supply to or through conservation areas is deemed as unavailable for general public service;

(t) Restrict the development of additional water supply sources within significant conservation or habitat areas;

(u) Ensure that intense tourism, commercial or rural development does not promote major increase in traffic movements through contiguous primary and secondary forests of significance;

(v) Promote the maintenance of the intrinsic scientific, scenic, habitat and educational values of natural and semi-natural environments;

(w) Assist the community in identifying habitats of endangered, threatened or vulnerable species requiring protection;

(x) Encourage traditional or community development projects within sensitive areas, especially those of known endangered flora and fauna and their habitat.

10. RURAL – AGRICULTURE

10.1 Application

This clause applies to land outside of physical built up areas of the City and village areas and includes all land covered by forests, fernlands, bush areas, coastal areas and agricultural areas.

10.2 Aim

To provide means for sustainable agricultural development.

10.3 Objectives

(a) maintain prime agricultural land (subsistence cash crop and intensive) from adverse development forms and activities, and prevent its fragmentation from poor land-use allocation;

(b) Exclude land of environmental sensitivity (primary forests, diverse secondary forests, fauna habitat, areas, coastal zone) from alternative and more intensive agriculture which promotes major land clearance and use of polluting chemicals;

(c) Exclude areas of significant scenic and cultural heritage value from alternate and more intensive agricultural forms;

(d) Plan alternative forms or more intensive agriculture based on known physical, biological and chemical capabilities, combined with local knowledge of suitability;

(e) Restrict the clearance of significant and scenic landscapes, and coastal zone areas;

(f) Avoid clearance of vegetation for agricultural activities along ridgelines;

(g) Balance the extension of intensive agriculture (vegetables, horticulture etc.) facilitated by rural water supply against the need to protect lands immediately surrounding water bores from contaminants such as chemicals, effluent and fertilizers and pest infestations;

(h) Ensure that village and rural residential development does not impede the continued use of rural lands nominated as of prime agricultural purposes or potential;

(i) Ensure that new alternative or intensive agricultural activities or developments do not prejudice the use of land about villages for necessary village or village-fringe land uses;

(j) Identify previous broad acre and more intensive alternative crops and primary production activities as a means to assist in identifying opportunity areas;

(k) Locate areas of land adversely impacted by previous human activities to assist growers in choosing suitable agriculture areas;

(l) To ensure that the type and intensity of development will not prejudice the likely future uses of the land for either environmental protection, conservation, world heritage, recreation or tourist purposes;

(m) Ensure that village councils are involved in decision making relative to major agriculture development, or other forms of development, which may adversely impact subsistence or cash crop agriculture.

11. FORESTRY

11.1 Application

This clause applies to land outside of physical built up areas of the City and physical village areas and includes all land covered by forests, fernlands, bush areas, coastal and agricultural areas.

11.2 Aim

To provide means for sustainable forestry

11.3 Objectives

(a) ensure forestry activities do not impede use of prime agricultural areas or cause adverse impacts on those areas;
(b) Ensure plantation forestry is located in areas of suitable soils and micro-climate;
(c) Deter forestry activities, which have adverse impacts, from conservation areas or areas of cultural and natural significance;
(d) Ensure forestry activities do no jeopardize neighboring areas of natural or cultural sensitivity;
(e) Ensure intense forestry activities or associated activities are not located within areas of soil, whose chemical and physical characteristics are such that soil structure decline could occur;
(f) Ensure forestry and associated activities are located and at a scale which does not cause disruption to village lifestyles and amenity;
(g) Ensure forestry and associated activities are located outside the coastal zone and/or areas susceptible to extreme winds and salt spray;
(h) Ensure forestry and associated activities are located and/or of a scale and intensity, which does note exacerbate areas of poor soil fertility or structure decline;
(i) Ensure forestry and associated activities are located and/or of a scale and intensity so as not to cause any adverse impacts on existing and potential tourism developments, sites or areas;
(j) Ensure forestry and associated activities are located outside of areas nominated as significant landscape;
(k) Ensure forestry and associated activities (other than indigenous plantations) are located outside of areas of known habitat or movement corridors rare or endangered species;
(l) Ensure forestry and associated activities are located outside of existing or potential world heritage or wilderness areas;
(m) Ensure plantation forestry or agro-forestry using species requiring irrigation are located in proximity to existing agricultural production bores, water supply assets, or areas where strategic and well planned extension of those services are intended in the short-term;
(n) Ensure that Village Councils are involved in decision-making relative to forestry (and associated activity) development.

12. ROADS

12.1 Application

This clause applies to the village areas and rural areas of Samoa.

12.2 Objectives.

(a) To ensure that over time all individual parcels of land are provided with public access to reduce conflict;
(b) To ensure that future intended or required road access is strategically planned and identified by maps (released for community involvement) to achieve:
    i. Good shaped and orientated parcels;
    ii. Equitable access;
    iii. Quality living and working environments;
    iv. Good village structure and land use provision.
(c) To provide mechanisms to enable the establishment of local roads, access ways, laneways or Right of Ways, with Village Council and general community input.
(d) To enable future main and local roads to ensure:
    i. That noisy traffic is guided away from living and community facility environments;
    ii. Roads are built or improved to address minimum standards for traffic and pedestrian safety, hazard reduction and environmental management.
    iii. Good connectivity between like or associated land use or activities.
(e) Ensure that planning of opportunity or preferred use areas is undertaken through integrated consideration of road location and geometry and potential land use provision;
(f) Enable the widening or re-alignment of roads to benefit the community and village structure and to facilitate emergency access;

(g) Provide means for road and traffic planning preferably through sustainable development guidelines;

(h) Encourage the use of a road hierarchical system for existing and future extension to villages;

(i) Restrict individual parcel access directly onto main arterial roads, where alternatives can be provided or are planned for;

(j) Restrict access onto main arterial roads for all development and activities within 50 metres of an intersection;

(k) Enable the government to acquire land at intersections where such is required to improve the function of those intersections, include suitable sight clearance distances or plan for future intersection upgrades.

13. WATER RESOURCES – GENERAL

13.1 Application

This clause applies to all land in Samoa.

13.2 Aim

To protect the natural water resources of Samoa and provide for its sustainable use.

13.3 Objectives

(a) Ensure protection of the water lens and natural water resources of Samoa – by ensuring that preferred land use, development opportunity areas and general development is of suitable location, intensity and scale;

(b) Identify areas and/or components of the hydro-geological system which require protection through non-development or use of buffer areas and criteria or use and activities;

(c) Ensure control of the location, type and management of bore hole drilling;

(d) Ensure integrated land and water resource use is planned, developed and managed based on sustainable development principles;

(e) Provide for opportunities for multi-purpose use of water resources and over-time-recycled water;

(f) Provide a range of water uses which are compatible with conservation values and address environmental constraints and threats;

(g) Ensure that changes in water use and/or major land use is consistent with water resource sustainability principles;

(h) For intensive or large-scale developments ensure that provision is made for water catchment, and water re-use (including grey water re-use);

(i) Ensure that water run-off and effluent from development meets water quality guidelines of the WHO or similar such as the Australian and New Zealand Environmental Conservation Council (ANZECC);

(j) Provide appropriate buffers around water supply bores that in part:

  i. Restricts all development and uses;

  ii. Controls certain forms of development with high standards and environmental output criteria;

  iii. Advocates only agricultural pursuits of a subsistence or cash-crop nature.

(k) Protect potential bore and tank sites from non-compatible land use and forms of activity;

(l) Ensure new bores are located on lands subject to individual title, with reasonable public access by way of road, public easement or ROW, and that buffer zones affect the least number of land owners;

(m) Support initiatives to research and protect cave and karst systems containing freshwater and unique fauna and flora.

14. WATER SUPPLY

14.1 Application

This clause applies primarily to villages (physical).

14.2 Aims

To provide effective and efficient water supply to all village land uses and development, in a coordinated manner, line with best environmental practices.

14.3 Objectives

(a) Enable the provision of necessary infrastructure (capability) and servicing capacity to existing and new development areas in a coordinated manner;

(b) Ensure water supply to new development areas has a minimum hydraulic head of 21 metres to suit standards for domestic supply and firefighting requirements, preferably through gravity feed rather than pumping systems;

(c) Ensure water supply to existing development areas has a minimum hydraulic head of 15 metres;

(d) Ensure that water supply capability and capacity is suitable to supply peak instantaneous demand to housing, commercial and industry uses;

(e) Ensure domestic water supply is provided to suit demand needs and conservation initiatives;

(f) Enable provision of suitable water supply to all major land uses including commercial and industrial uses;

(g) To ensure that the programme for water supply is correlated with the planned growth of the villages;

(h) To ensure that the water supply system is integrated to provide the best efficiency and consistency in supply;

(i) To ensure that the elevation limits of development are such that water supply to all village uses can be maintained.

(j) To support mechanisms and land use decisions to enable the placement of water assets in easements, or Right of Ways (ROWs) to enable access for maintenance;

(k) Limit the supply of water to areas nominated as high natural or cultural heritage value.

15. DRAINAGE AND FLOODING

15.1 Application

This clause applies to village areas (physical).

15.2 Aim

To ensure consideration of drainage and local flooding in planning, physical development, resource use and conservation decision processes.

15.3 Objectives

(a) Ensure provision of adequate stormwater drainage (including road drainage) measures are incorporated in subdivisions and building developments;

(b) To protect and conserve the water quality and aquatic habitats of coastal waters especially those nominated as having significant habitat or cultural/customary importance;

(c) Ensure uncontrolled run off from development does not cause erosion or Flooding;

(d) To ensure that there is the best protection against flooding of life, property and public infrastructure;

(e) To ensure for new areas that all village development, especially residential development, is kept clear of flood hazard areas;

(f) Promote the capture of run-off from private developments and public areas for re-use for irrigation and outside domestic purposes (i.e. Non-potable use).

16. ELECTRICITY AND UTILITY SERVICES

16.1 Application

This clause applies to village areas (physical) and to nominated development nodes (as preferred use areas).

16.2 Aims

To ensure that development and resource use areas supported by the government and communities are adequately serviced with power and utility services, using principles of sustainable development.

16.3 Objectives

(a) Enable the provision of necessary services to existing, and new development ("preferred use areas") which have been supported by the GOS and Village Councils;

(b) To ensure power is supplied to minimum technical and environmental Criteria;

(c) To ensure that the capacity of power supply to existing village uses and supported rural development areas (preferred use areas) meets minimum best practice criteria, with a capacity which meets the demonstrated demands;

(d) Ensure that electricity capacity to existing and new development areas is planned and coordinated in line with resource use planning or physical development initiatives supported by the GOS and Village Councils.

PART 2: MATTERS FOR CONSIDERATION FOR ALL AREAS

17. CONTAMINATION (AIR, WATER, SOIL, NOISE AND GROUND WATER.)

17.1 Potential Impact

(a) The responsible agency shall support development where it is satisfied that the development is not likely to give rise to significant air, soil, water or noise pollution; or,

(b) Where the responsible agency cannot satisfy itself that such pollution will not arise, a Preliminary Environmental Report and/or Environmental Impact Assessment is produced which addresses the following matters:

i. The expected (and/or anticipated) composition and quantity of any gaseous emissions or liquid discharges (apart from uncontaminated stormwater runoff) which may possibly be emitted from any part of premises or any plant or equipment present on premises as a result of the proposed development and, in the case of liquid discharges and contaminated stormwater runoff, the expected frequency, composition and quantity of any discharges to the stormwater, groundwater or sewer systems;

ii. The means to ensure the emissions and discharges are within international environmental best practices and criteria (including the WHO and/or ANZECC Guidelines) i.e. nomination of accepted criteria and proposals for monitoring;

iii. Any anticipated noise emissions from the premises when assessed against the requirements of internationally recognized noise control criteria (e.g. PUMA, MNRE Noise Control Manual)[12];

iv. Details of any pollution control equipment and structures to be used as a result of the development;

[12]The Manual produced for MNRE was taken from other sources and is not as comprehensive as other available and internationally recognized sources. The NSW Environmental Protection Authority's Noise Control Manuals are a primary source of reference in multiple states of Australia, as they contain among other things reference to measures to ameliorate noise in various circumstances, whether through setbacks, use of materials, muffling of noise sources etc.

v. Details of any measures to be used to control gaseous emissions and liquid discharges and to attenuate noise emissions;

vi. Details of methods to be used to minimize the opportunities for pollution incidents to occur;

vii. Any operating practices and technology to be employed to overcome the effect of such incidents.

17.2 Potential Contamination from previous use.

Where the responsible agency has reasonable grounds to believe that land has been contaminated by virtue of its land use history or current condition, it may support a development application only if it is satisfied that the levels of contamination are below background levels or if not so, it:

(a) Has considered an assessment of the site of the proposed development prepared in accordance with the WHO or Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, being guidelines of the Australian and New Zealand Environment Council and the National Health and Medical Research Council dated January 1992;

(b) Is satisfied that remedial measures are either not necessary or have been (or will be) undertaken to make the site suitable for the proposed development.

18. WASTE MINIMIZATION AND DISPOSAL.

18.1 Potential Impact

The responsible agent shall support significant development only when it is satisfied with a development application, preliminary environmental report or EIA, which details:

(a) The facilities and programs to be provided within the proposed development to promote waste minimization and recycling practices, and

(b) The proposed method of disposing of any other wastes, only after due consideration of waste source reduction, re-cycling and re-use.

18.2 Location Restrictions for Waste Facilities

The following criteria may apply for the location and siting of Waste Disposal Facilities:

(a) Within 2km of main waste production centre (Apia);

(b) Minimum 500m from residential areas;

(c) At least 1000m from water bores (preferred 1.6 kms - Water Resources Bill, 1996);

(d) At least 50 m from major caves, geological fractures or fissures;

(e) To be on the coastward side of any existing water supply bore;

(f) To be within 1km from the coast (max 1.5kms);

(g) Not to be in areas of steep contours (i.e. greater than 10% (natural or manmade from quarry development for example);

(h) Within 50m of main transportation routes;

(i) Provide 20m buffer around site with a 50 meter buffer from the coast;

(j) Land required to be a minimum of 1 ha with an ability to expand to 2 hectares;

(k) Location not to influence the sustainable use of nearby land, or reduce that lands capability for economic and ecological sustainable development (NB Land already constrained would be desirable).

19. GREENHOUSE EMISSIONS.

For any development, which has an estimated value in excess of $500,000 approval may only be given where the proposal has taken into account the following issues:

(a) The possible measures which can be incorporated in the development to reduce the consumption of non-renewable energy and the production of greenhouse gases which contribute to the greenhouse effect;

(b) Whether any measure incorporated in the development are designed to improve energy efficiency or to reduce the emission of greenhouse gases;

(c) Details of the total energy requirements of the development;

(d) Any measures which minimize energy requirements of the proposed development, including building design, construction methods, materials, solar orientation, plant and equipment technology, space heating, cooling and lighting systems, and landscaping.

20. DEVELOPMENT NEAR TELECOMMUNICATION FACILITIES

The responsible agency shall only support development within one (1) kilometer of the Telecommunication facilities where it is satisfied that:

(a) land use and development is not likely to give rise to significant interference to telecommunication (including satellite) transmissions and receipt;

(b) land use and activities will not set a precedent for activities associated with the primary use and development of the land, which will cause significant interference to transmissions and receipt;

(c) land use and development is of a type, scale, intensity, design and layout that enables the continued functioning of the Station as the primary telecommunications base for Samoa;

(d) development enables the location of easements, right of ways, roads, laneways etc. for the alignment of cabling and associated facilities required to distribute communications to the rest of the island;

(e) development forms located in close proximity in the short term do not prejudice the higher and better use of the land for uses and activities associated with telecommunications;

(f) appropriate buffers are put in place to ensure the health and environmental safety of residents located nearby.

21. DEVELOPMENT NEAR AIRPORT

The responsible agency shall only support development in close proximity to the airport where it is satisfied that:

(a) Developments satisfy Airport Master Plans, Noise Exposure Forecast zones, Obstacle Height Limitations or other protocols and restrictions instigated which are consistent with Annex 14 to the Convention on International Civil Aviation adopted by the International Civil Aviation Organization (ICAO);

(b) Development is consistent with the abovementioned strategies or controls, which may be adapted from international best practices to suit ICAO requirements. For example these may include the Australian based "Rules and Practices for Aerodromes (RPAs)" generated under the Federal Civil Aviation Act (1988) and the Airservices Act (1995); Noise Exposure Forecasts (ANEF) generated under the Federal Airports Authority's (FAA) "Integrated Noise Model" or acoustic requirements from the Australian Standard AS 2021 - 1994 Acoustics - Aircraft Noise Intrusion - Building Siting and Construction;

(c) Land use and activities do not prejudice the long term viability of land adjacent to the airport as potential development sites for airport associated commerce and industry;

(d) That new development does not detrimentally affect the environment and amenity of nearby land uses, especially living environments;

(e) That new development, in close proximity to the airport incorporates measures to minimise the impact of aircraft noise and associated nuisances;

(f) That development associated with airport uses is located, designed and managed so as not to result in adverse environmental impacts, and that measures are in place to manage pollutants that may arise from fuel, detergents, paint and paint stripping chemicals and aqueous film forming foam (AFFF).

21.1 Noise Compatibility near Airports

In the absence of any airport noise exposure forecast data, zoning or requirements for Samoa, the following table is produced as one means to gain an understanding of land use compatibility near the airport. The table is from the Standards Association of Australia AS 2021 - 1994. Without ANEF zones depicted by map it is not applicable at this stage however can be used to identify the hierarchical compatibility of uses with close proximity to airports.

TABLE 1: Land Use Compatibility about Airports

Building Type	Acceptable	ANEF Zone Conditional	Unacceptable
Houses, home units, flats, caravan parks	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hotels, motels, hostels	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
Schools, universities	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hospitals, nursing homes	Less than 20 ANEF (Note 1)	20 to 25 ANEF	Greater than 25 ANEF
Public buildings	Less than 20 ANEF (Note 1)	20 to 30 ANEF	Greater than 20 ANEF
Commercial buildings	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

NOTES:
1.The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variations in aircraft flight paths.
2.Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate.
3.This table is included in the Standards Association of Australia's AS 2021 – 1994 which gives design information for the design of facilities which may be subject to aircraft noise.

22. NOISE IMPACT

PUMA has its Noise Manual.

22.1 Reducing Noise Impact

For new or existing development the responsible agency shall consider means to reduce noise impact from uses, activities or roads. In the past it was thought that a number of measures could reduce impacts (e.g. traffic bumps to slow traffic, dense landscaping). These have proven to be ineffectual, as for example large vehicles slowing and speeding up to/from a traffic bump will actually increase nuisance noise.

Moving roads, redirecting noisy traffic and increasing building setbacks are means to adequately reduce noise impact. However these are very costly scenarios in existing village areas. Future land and resource use planning should guide developments which increase noise impacts away from sensitive areas (e.g. hospitals, living areas), or ensure there is adequate separation between such uses.

In existing built up areas there are noise attenuation measures which can be implemented. These are detailed in Table 4 below. Using some of these measures in combination with building setbacks,

redirecting noisy traffic, or promoting the shift of noisy uses away from sensitive areas – can reducenoise impact.

TABLE 1: Acceptable Receiver Noise Levels and Attenuation Measures

LAND USE or ACTIVITY	Acceptable Noise Level [1] (Internal)	Extreme Noise Level [1]	Attenuation Measures			
			Single Glazing [2]	Double Glazing [2]	Barriers 2M[3]	Noise Insulation [4]
A. Residential	50 (50)[5]	55	- 20 dB(A)	- 30 dB(A)	- 6 dB(A)	- 30 dB(A)
B. Rural-Residential	50 (50) [5]	55	- 20	- 30	- 6	- 30
C. Light Residential	60 (55) [5]	65	- 20	- 30	- 6	-

NOTES:
1 NSW EPA: Environmental Noise Control Manual: 1 metre from external walls.
2 NSW SPCC, RTA and Department of Housing, "Reducing Traffic Noise", 1991.
3 NSW SPCC, RTA and Department of Housing, "Reducing Traffic Noise", 1991: 2 metre barrier at property boundary.
4 Reference as per 2 and 3 above: Noise insulation techniques are outlined in Section 6 – Building Techniques. Measures include sealed windows, frames, cornices, skirtings and doors, solid core doors, thermal insulation to ceiling and walls (average reductions used from Table 4).
5 Acceptable internal noise levels AS 2021 – 1994.

23. BUSHFIRE HAZARD

Subdivision of land for the erection of a building in an area nominated as subject to high bushfire hazard should occur only if:

(a) Adequate provision has been made for access for fire fighting vehicles, and
(b) Adequate safeguards will be adopted in the form of fire breaks, reserves and fire radiation zones, and
(c) Adequate water supplies will be available for firefighting purposes, and
(d) Appropriate measures can be taken to reduce the hazard, after have regard to any guidelines, plan or the like adopted from time to time by the Government.

24. SCENIC OR LANDSCAPE PROTECTION AREAS

Development consent for a building within a scenic area will occur only if:

(a) The height, scale and bulk of the building as well as the construction materials used, and the colours of external surfaces of, the building will accord with the visual character of the locality, and
(b) Any landscaping, particularly around buildings for screening purposes, will enhance the visual character of the locality, and
(c) The building will be located so as to be unobtrusive, and
(d) The part of the site to be used for the building is stable or can be stabilized in accordance with the requirements of the GOS and has a slope of less than 20% and rock outcropping of less than 20%, and
(e) Adequate measures can be taken during and after construction to protect endangered flora and fauna where these are known to occur on the subject site or on immediately adjoining land, and

(f) Where required, a tree survey of significant trees showing the likely impact on significant trees of the proposed development has been taken into account and adequate measures are taken to retain significant trees.

25. SUBDIVISION OF LAND

The responsible agency may grant approval for subdivision of land for a purpose or potential use other than agriculture, tourism of forestry only if:

(a) The land can be adequately serviced with water and electricity without major extensions of mains; and such is not in conflict with planned extensions by the infrastructure and utility agencies, or
(b) Alternative methods and technology is planned to be used for water catchment and power generation and a report adequately demonstrates an ability to satisfy the potential demands;
(c) Water and effluent re-use or reduction methods are proposed;
(d) Access roads are located to provide suitable and unimpeded access; and
(e) Each parcel to be created by the subdivision of land provides potential development sites with minimum risk of adverse environmental impact, and
(f) Adequate provision is made for soil conservation measures to be carried out, including measures to be carried out prior to and during the construction phase of the subdivision taking place, and
(g) Adequate provision is made for drainage control, and
(h) Each new parcel has sufficient building area on it, being land with a natural slope of less than 20% , and rock outcropping of less than 30%, and
(i) The size of parcels to be created meets any minimum or average area requirements determined by the Minister and the ratio of depth to frontage of each new parcel is adequate in terms of its likely intended use, and
(j) Where the land in the opinion of the responsible agency is unstable, a geophysical report on the stability of land has been prepared by acceptable consultants and the report indicated which part of the land is suitable for development or the appropriate measures that need to be taken to stabilize the area proposed for development, and
(k) Adequate measures will be taken during construction to protect endangered flora and fauna and their habitat as well as other native vegetation, when these are known to occur on the subject site and adjoining land, and
(l) Adequate measures will be taken to retain heritage items and places, significant trees and other significant native vegetation or natural features of significance, and
(m) Those parts of a site to be developed for the purpose of a building will not intrude on visibly prominent or significant landscaping qualities when viewed from outside the area being developed.
(n) Parcels are orientated to acknowledge local microclimatic conditions and to enable future buildings to be designed to achieve maximum solar efficiency, and take advantage of cooling breezes, and
(o) Any subdivision of land on a main or proposed main road will not increase the potential for ribbon development along that road.

26. CLEARING, EXCAVATION OR FILLING OF LAND.

26.1 Restriction on disturbance

Development approval is required for clearing, excavation or filling over 500 sq. metres, of any land, except as provided sub-clause 26.2.

26.2 Exemptions

Development approval is not required for clearing, or excavation or filling, that is ordinarily incidental or ancillary to agricultural or forestry use or development that is consistent with the "preferred use area" and may be carried out on the land without development consent.

26.3 Restriction on filling

For placing a building or structure on land filling without engineered retaining walls cannot exceed 1 metre in depth.

26.4 Research activities not exempted

Research for forestry, conservation and/or biodiversity activities is not exempted under sub-clause 26.2.

27. LAND USE BUFFERS

27.1 Land use buffers

To minimize land use conflicts and avoid undue interference to the amenity of residents, new residential or living areas shall be located to ensure minimum buffers around intensive agricultural, industrial, quarries, sewage disposal areas, waste disposal tips and noise sources as follows:-

- Intense feed lots (Pigs, Chickens, Cattle etc.): 1 km
- Quarantine uses (guided by international standards): 1 km
- Intensive horticulture (with extensive use of chemicals): 0.5 km
- Sewage disposal areas: 0.5 km
- Waste disposal sites: 0.5 km
- Power generators (non-renewable source): 0.5 km
- Quarries: 0.5 km
- Cattle dairies: 0.25 km
- Chemical disposal or use sites (including animal dipping): 0.25 km
- Animal carcass disposal sites: 0.5 km
- Bulk fuel storage: 0.5 km
- Heavy industry (manufacturing): 0.25 km

27.2 Protection Buffers

Protection buffers around certain natural and human resources may be applied to protect those resources from any use or activity as follows:

- Water Supply bores 0.2 km
- Intensive agriculture, commercial and industrial uses involving toxic and reactive substances – near airport terminals. 0.4 km

27.3 Protection Measures

(1) Development within buffer zones nominated in sub-clause 27.1 and 27.2 maybe proposed and considered where methods and technologies are used to minimize adverse impacts and these are argued in a PER or EIA supported by the responsible agency. This may involve an independent assessment of the issues by a person nominated by the responsible agency at the cost of the applicant for development.

(2) The applicant must demonstrate that the intention of this clause to protect resources and minimize land use conflicts will not be compromised by providing flexibility in administration of the nominated buffer areas.

(3) In requesting a variation to buffers advocated in this clause the following matters must be addressed by applicants in reports.

(a) Consultation with the Director in respect of individual cases to determine specific matters to be addressed.

(b) Operational characteristics of the land use.

(c) Advice from the relevant authorities.

(d) Details of surveys undertaken and data/analysis provided.

(e) Prevailing wind conditions and velocity of winds.

(f) Description and analysis of topography, height of slope, and hydro-geology conditions.

(g) Potential for pollutant flows, discharges, odour, dust, noise.

(h) Economic impact to demonstrate that the long-term viability of the use to be buffered is not compromised.

28. HEIGHT OF BUILDINGS

Generally the height of buildings in commercial areas (CBD, District, Regional District Centres, Business Development areas, Employment Areas) will be based on the merits of the design and siting of proposed structures. Among other factors structures should not cause detrimental impact on the neighbours, have adverse environmental impacts generally and should enable efficient and effective essential service provision e.g. water service.

28.1 Height restricted in non-commercial areas

For all development in non-commercial areas the height of buildings shall be limited to 2 storeys.

28.2 GOS able to vary heights

Subject to the merits of the case the Planning Board (either directly or delegated authority to the PUMA) may vary the restriction nominated under sub-clause 35.1 to 3 storeys where adverse environmental impacts will not occur and the third storey is not a prominent feature of the building nor will it affect the amenity of neighbours.

Annex 7: Financing Urban Development

1. Introduction

Managing urban development is a costly business. The provision of capital infrastructure and essential services, as well as the offering of advisory and regulatory services by Governments is often far beyond existing public finance management capability.

Even in countries like Australia and New Zealand who have the luxury of rating land for local government service provision, there has been a tendency over the last 30 years to look at alternative income streams to fix the growing shortfalls in the costs of urban development. Samoa does not have a land rate system so most development costs have to be borne by Government. To date significant shortfalls are addressed in part by specific project budget funding items or through attracting foreign development assistance. However still there are glaring gaps between the needs of the communities and the available resources to pay and maintain services.

High capital and recurrent costs are the general rule in urban development. The assets suffer from significant use and decline in quality and capacity, with replacement costs for infrastructure and essential service provisions becoming increasingly exorbitant. For instance the sealing of new or existing roads whether by bitumen or bitumous concrete has on average working life of 7-10 years. This is without accounting for extra stresses that may occur from flooding, water exposure and extreme events.

2. Leakages

As with Australia and New Zealand much of the country's development investment is also provided by the private sector. Investors, builders and community members pay for the buildings, the roads and services of new private land development and the linking of essential services to dwellings and buildings.

However there are many instances where infrastructure and essential support services in subdivisions are not provided by private developers. The fiscal support either comes directly or indirectly from Government budgets. Roads, telecommunications, water supply, electricity supply and stormwater services to new development areas are either not provided by investors/builders or are provided at a very low quality of finish – often inconsistent with best practices. Both scenarios for new development areas see Government making up the shortfall. So in essence the whole community is paying for the new investment areas. Investors and developers take risks in development and as such seek a high return. However if development is of a poor quality services or services are not provided to best practice, then the return versus risk is not balanced (i.e. not fair and reasonable). The cumulative cost to Government in stepping in to provide services or fix defaults after the event, is a financial leakage.

3. Paying for Urban Development Costs

There are a number of alternatives for financing urban development costs. The following provides a summary of key options. They are not in order of priority or preference.

a) Developer Contributions

Within existing built up areas, as is consistent globally, the Government pays for the upgrading of infrastructure and services that result from the increased demand from more intense use, new buildings or the attraction of more traffic. This new demand on existing Government infrastructure and essential services can be quantified with metrics developed to determine the unit costs factors for additional forms and types of development.

Land use planning, subdivision and building development approval systems invariably require developers to pay contributions to assist with offsetting the additional costs to government for this extra demand on current infrastructure and services, including the need to provide additional open space and amenity areas. These are 'contributions' paid in addition to the costs of services they provide in their subdivision or unit development. The philosophy being that despite their provision of new infrastructure as part of their development there are additional costs to society in providing new infrastructure elsewhere to service the increased demand from that development.

Instituting developer contributions is an extension of the 'user pays' approach to development, where funds are collected to address financial leakages. Such costs are usually built into the overall development costs, and the developer/investor would factor these total costs in determining a selling price (e.g. the price of land, or price or rental of residential flats).

Section 94 of the NSW Environmental Planning and Assessment Act, 1979 (as amended) was one of the first land use planning instruments in Australia to require 'developer contributions' for a range of services including[13]:

a) Extra demand on traffic and roads from more intense development;
b) Higher use costs on water supply head works as a result of development
c) Higher costs on drainage systems, sewerage systems etc – from more intense or scattered development;
d) Higher costs for public area storm-water management;
e) Demand on essential services such as emergency services, or local community buildings;
f) Provision of water sensitive urban design (WSUD) in existing areas to control localised flooding and to maintain water quality.

The Government of Samoa is able to levy similar developer contributions under section 49 of the PUM, Act, 2004. Where contribution systems are enacted the legal impediment is for contributions to be well rationalized, based on regular assessment of service provision costs and only directed at the **additional demand** costs stemming from particular development forms. Evaluation of additional demand costs for various types of services and infrastructure are documented as unit costs for particular components of development. For example, a sewerage developer contribution may be calculated on the basis of additional toilets provided in a hotel extension.

b) Fees on Essential Service Bills

Where essential services are corporatized it is not unusual for Authorities to document likely future 'head-works' costs or trunk infrastructure provision, with a percentage of the costs paid by the domestic clients, through billing. It is common practice for Electricity, Water and Telecommunications Authorities (or independent companies). It is understood that EPC operate in this fashion.

c) Approval fees

Planning and Building agencies also use 'application fees' and sometimes 'approval fees' to cover the costs of administration of development approval systems. These tend to be quite contentious as it is often hard to distinguish human resource costs particular to 'development' in lieu of providing the usual public service. Incentive fees are increasing used by Councils in Australia, to offer fast-track approvals where additional fees are paid. These incentive systems usually have performance criteria by the Council (e.g. approval within so many days) and the Proponent (plans and reports have to be of a high quality).

d) Rating of land

Land rates and land taxes are used in most Australian and New Zealand local Councils to cover local government services including infrastructure and essential service provision.

Rating of customary land is difficult and not often possible under national Constitutions or Land Laws. However where new development areas are 'freehold' or government released land, a rating system could be applied. In many areas foreign investors have purchased land and benefit from increasing value as services are provided by Government, or the usual market growth. While they enjoy the benefits of the investment, they are not 'paying' for increases in services provided by the city.

[13] The NSW Environment Assessment and Planning Act, 1979 (as amended) is globally recognized as the first development legislation to integrated environmental and land use planning successfully under one legislative framework and administrative process. It has been used as a model in many states of the USA, as well as for coastal management legislative platforms in many countries. The work behind Section 94 also successfully infused 'user pay' principles into land use and development planning – another first globally. 'Developer contributions' are now recognizable in most land use planning frameworks in developing and developed countries.

In both these situations a ***differential rating system*** could be applied. That is rates are applied to certain parts of the City only. One necessity for any rating system is the need for a land valuation system. To set these up takes time and effort and comes at a high set up and maintenance cost.

e) Betterment taxes

A system common in leasehold tenure systems like Canberra, Australia, or increasingly used in community title developments especially for affordable housing provision - is the application of betterment taxes.

Essentially this is a tax on land once it is sold or title transferred. Among other fiscal leakages it is designed to cover the additional value of land that a person may gain over time – whether from market trends or better services over time. A proportion of the additional value gained by a person is taxed with the collected funds being pooled to pay for key infrastructure and essential services.

f) Other taxes

There are a number of other land related taxes that are used by national governments like Capital Gains Tax (Federal Govt, Australia) or stamp duties (Australian States). Both are applied at the time of title transfer – however often funds are pooled for general government purposes, so they are not often referred as options to pay for urban development costs.

4. Climate Change Opportunities

There may be opportunities to capitalize on formal (i.e. REDD+) or voluntary carbon accreditation schemes with agriculture, horticulture and landscaping activities on land about the City. Such endeavours can be pursued as part of planned open space and conservation area provision. Various international and national methods could be employed, and management processes will need to establish mechanisms to equitably transfer carbon rights and develop equitable income sharing mechanisms with Community stakeholders. Work needs to contend with likely carbon balances against targeted carbon standards, net carbon financial projections, and registration risk analysis. Partners will need to be identified to manage the carbon credit registration process.

Such an avenue for public financing of open space and conservation areas will require technical capabilities which will include:

- GIS, GPS and Remote-sensing experience at the site/project, locality, regional and national levels;
- Familiarity with LiDAR, multispectral and hyperspectral platforms in use for carbon assessments;
- Experience with large geographical datasets and data manipulation;
- Project management skills in working with multiple partners and collaborators, including third-party verifiers;
- Extensive experience with predicting/foreseeing land-use and land cover changes using in-house rational strategic environmental (SEA) methods. This approach meshes bio-physical, cultural, social and economic data/information/trends – assisted by use of GIS;
- Forestry experience for in-situ and ex-situ carbon quantification including field surveys, plot establishment, forest mensuration, and ground-truthing.
- Geographic spread of work in land use classification, change detection and carbon feasibility studies in: Queensland, Pacific Island Countries (various), the Maldives and Asia;
- Experience in integrating forest/farming carbon assessments and management within broader development agendas.
- Specialist status with regard to working with customary landowners and communities in the Asia-Pacific region.

Annex 8: Disaster Risk Management – relevant to Land Use Planning

Institutional Frameworks

Disaster Risk Reduction Management and Disaster Management in Samoa are legislated under the *Disaster and Emergency Management Act 2007*. Among other things the Act requires response agencies to prepare and maintain their own Disaster Management Plans specific to their roles and responsibilities. 'Agencies' includes such organisations as utilities, educational providers, Government Ministries, NGOS and private companies. Hazard and Risk Management Plans are to direct the implementation of measures that had to either reduce the likelihood of people being affected by a hazard, or reduce the consequences of hazards. Samoa maintains a number of hazard and risk management plans, varying from those applied at a community level to a national level. The following summarizes these.

Community Level Plans

In order to promote disaster risk reduction, increase resilience and plan effective recovery with support of the Disaster Management Office (DMO), local villages generate their own Disaster Management Plans. These set out the steps to meet the communities' needs in times of emergency as regards food, shelter, water, and sanitation etc. The community level plans also provide details of the role of various community groups during extreme events and disasters. There is currently a programme to develop these local Community Disaster Management Plans in 38 villages across Samoa by 2016 under a joint programme involving the Government of Samoa and the Adventist Development and Relief Agency (ADRA). Previously the Red Cross (Samoa) were involved in the initial programme. The programme is managed by the Disaster Management Office (DMO).

National Disaster Management Plan (NDMP)

The National Disaster Management Plan (2011-2014) is the over-arching Plan document which outlines the key stakeholders in disaster risk management in Samoa and outlines the strategic activities for disaster risk reduction, disaster management and recovery. The plan outlines the roles and responsibilities of all the stakeholders and provides the framework for decision-making and reporting requirements. The National Disaster Management Plan is managed by the Disaster Management Office (DMO) with authority provided by the National Disaster Council (NDC) under the Act.

The national Plan is a high level strategic document that aims to promote a common response to a range of disasters rather than to specific events. It additionally promotes guidance and considerations for disaster management, rather than set 'steps' as to how to respond to the situation. This facilitates flexibility in responding to various situations.

National Action Plan for Disaster Risk Management

Under the NDMP the National Action Plan (NAP) for Disaster Risk Management (2011-2016) was made as the supporting Plan that outlines more specific initiatives to be implemented by the Disaster Management Office (DMO). It targets Disaster Risk Reduction Management, Response, and Resilience by identifying key areas for capacity building and improvement.

Agency Plans

Responsible agencies and organizations (i.e. those that have disaster relief functions or manage high risk activities) are required to maintain their own Disaster Response Plans (DRP) under the Act. These Agency Plans outline the specific responsibility of each agency and nominates the tasks they are responsible for.

Specific Disaster Plans

A number of agencies also have responsibilities for specific disaster events and these are covered by specific Disaster Plans. They provide more specific requirements, methods, approaches and details on how they respond to given situations. Examples include the National Tsunami Plan (2008) and the National Tropical Cyclone Plan (2006) both managed by the DMO.

Capacity Gaps for Disaster Management

In a number of arenas there are capacity and information gaps for the Government and other stakeholders. Provided below are discussions on pertinent thematic matters to the land use planning for Apia.

Topographic Information
Catchment information is a shortcoming for most of Samoa. For land use planning of Apia it is a major shortcoming. Good topographic information is needed for flood assessments, storm surge and coastal inundation mapping, erosion risk analysis, landslip analysis, for water balance modelling and local drainage control, constraints mapping, among other things. It has been a particular gap in flood hazard assessments although the recent programme to acquire the LiDAR coverage will fill a huge void.

Flood Management
Related to the above has been the dearth of survey detail of waterways and catchment topography that would enable adequate flood modelling to determine 10, 20, 50, 100 and 500 ARI levels of catchments. Hydrologic and hydraulic analysis is needed for all significant catchments that flow down and through the City. The work by Water Technology Pty Ltd on the Vaisigano River catchment is typical of the level of work that is required for hazard assessment and risk categorization across the City. Flood hazard mapping needs to define the water quantity, velocity and depth characteristics of catchments, and be able to classify the different risk levels – for decision-making.

Storm-surge
Related to coastal flooding and inundation with the lack of survey and DTM/DEM there has little work done on storm surge modelling – although there has been some recent achievements. Work completed for the CIMS covered storm surge but was not of a standard to differential depth characteristics upon which a risk classification could be assigned.

Landslip
While reference had been made to Landslip mapping, no evidence was found that mapping exists. There is a very good Land Resources GIS layer (and relational database) upon which a Landslip assessment could be based – and this work is needed to validate the surrogate work done for the CDS using slope and elevation analysis.

Tsunamis
Samoa has been significantly affected by Tsunamis. There has been some recent mapping work covering Apia however further work is needed in synthesizing this with other inundation and flooding analysis. Determining a means to classify risk for future decision-making is a capacity development area worth pursuing.

Reactive Soils
The DMO have identified gaps in the knowledge of reactive soils in Samoa, as regards influence building and foundation standards. There would be implications too for erosion and sedimentation control in disturbed catchments. Soils in Samoa can be extensively leached and soils of predominant clay bases can be found about the urban catchments. Land capability analysis and Suitability mapping is needed using the Land Resources layers with particular efforts needed in distinguishing and classifying reactive soils. High shrink swell characteristics can seriously affect the stability of infrastructure and building foundations.

Coastal Erosion
The Coastal Erosion Hazard Mapping undertaken as part of CIMS Plans was reasonable for this time and the availability of data. While it distinguished areas susceptible to coastal erosion, it did not quantify the levels of hazard and risk. Such classification is needed to assist with decision-making.

Status of Groundwater systems (potential aquifer contamination)
DMO report that there is limited information on the extent and quality of groundwater resources in Samoa. Samoa Water Authority among others has raised the issue of expanding urban and industrial uses in close proximity to water resource bores in the Tafaigata area west, south west of Siusega. There is a need for better knowledge on the extent, capacity and water quality of aquifers about the City and peri-urban areas. Determining the likely risk of groundwater contamination from salinization, pollutants and poor effluent disposal is needed.

Annex 9: Human Resource Capacity Needs

Capacity Building Category	Details of Skills, Training & Education needs	Audience	Rationale
Policy Development and Implementation	Policy planning, preparation process, policy writing, use of research in evidence based policy development and decision making	PUMA Sustainable Development & Strategic Planning sections	From one-on-one discussions and training (PUMA) on decision-making needs. Staff expressed frustration in understanding where new policy & standards are required but not having the skills, time or resources to fill the gaps themselves. Much land use policy is consistent around the world and just needs adapting to suit Apia. Section 46 (e) enables the Board to adapt other's policies where it can assist decision-making.
	Economic valuation of resources, ecosystem services versus development services.	MNRE	From one-on-one discussions, PUMA. Payment for Ecological Services (PES) could have a significant role to play in assisting with urban financing. Little is understood on how PES potential, as regards future land use allocation, can be managed. Natural resource economics training could assist with policy and development consent conditions.
Implementation: Decision-making, Law Making and Enforcement	Alternate dispute resolution and regulatory enforcement	Village fono traditional leaders, Sustainable Development team at PUMA	LU Decision-making is much about conflict management. As SMPs are rolled out and the inclusive role of Village fonos gathers momentum, there will be debate about use of regulatory provisions (such as zoning) and incentive based approaches such as quantitative & qualitative Guidelines. The latter option will be reliant on negotiation skills. Already there is demand for ADR skill needs with current Development Consent processes.
	Environmental impact assessment	PUMA, plus benefits for other MNRE Divisions, SLC	Need to progress from project based EIA (which is overly prescriptive) to strategic environmental assessments that assists land use planning & policy. Social and health Impact assessment training would also be beneficial.
	Integrated water resources management – Including Erosion & Sediment Control	PUMA, MNRE – Water Resources, LTA, SLC	Catchment management planning, sub-catchment modelling and the implementation of erosion & sediment control planning standards will necessitate training needs. Increasing resilience will necessitate revitalizing urban drainage-ways requiring a better understanding of urban waterways fluvial needs and the means to introduce Water Sensitive Urban Design (WSUD) measures.
	Merging Urban Design Manual	SLC, MNRE	Updating the Building Code, could be meshed with the need for

Capacity Building Category	Details of Skills, Training & Education needs	Audience	Rationale
	(Development Standards) with new Building Code	Development planners, Engineers, Building surveyors, developers and decision makers	an Urban Design Manual (City Spatial Plan). The latter can be made as a Development Standard under S15 and/or S46 (e) of the PUM Act, 2004. Integrating the Manual/Codes will have joint training implications regarding the new planning and building standards.
	Climate change and disaster risk reduction considerations into infrastructure, land development and development consents	LTA, SLC, EPC, SWA, MNRE Water Resources, with PUMA Sustainable Development team	While strategic consideration of CCA and DRR measures can be taken up in SMPs, continuing Development Consent processes need to be assisted. Methods for adjusting area/site based tools/guides and development standards need to be agreed across development approval and infrastructure management agencies.
	Resource use planning, management and monitoring - namely baselines, stock and ecosystem assessments	Relevant to functions and personnel of PUMA, but also Forestry, Water Resources, LTA & DOE as well as Agriculture.	Participants identified the following as very important: Resource use planning methods, techniques, approaches and systems; GIS development; resource inventory methods; multi-criteria and objective based planning; ecosystems approaches to land use planning; land capability/suitability methods; and, integrated catchment and coastal zone approaches
Community Education & Awareness	Awareness raising and community educational programmes related to: • Benefits of LU Planning • Operation of the PUM Act, 2004 • Governance of LU involving Village fonos in partnership with Government • Involving business in LU Planning	MNRE, traditional leaders of Village fonos, Dept of Education, SUNGO, SLC	Need for community targeted activities to build awareness and understanding the benefits of LU Planning. A social marketing plan/campaign (design & commencement) needs to precede the roll out of SMPs. Debate on formal zoning options versus incentive based mechanisms, needs to be preceded by information flows to increase understanding of the options and mechanisms. Choices in urban financing should also be canvassed. SUNGO could assist with City wide outreach. Programme needs to involve the DOE to realize any opportunities in future curriculum development (Schools and NUS)
GIS, Data Analysis & Management	GIS data collation, enhancement, administration and management	PUMA, with assistance from MNRE Technical Services.	GIS training of PUMA staff is essential now that the LU Plan database and Gridded CCA/DRR Risk and Constraint mapping base has been developed. Such systems need management. There is crucial enhancement work that is needed to benefit the role out of SMPs. 2-3 staff already have self-taught skills but these

Capacity Building Category	Details of Skills, Training & Education needs	Audience	Rationale
			need to be enhanced.
	Field data collection, data basing, analysis, mapping, maintenance and practical utilization of Geographic Information Systems in decision making	PUMA, with assistance from MNRE Technical Services. Other MNRE Divisions may have an interest	Linked to the above, there are separate skills development requirements for use of GIS in decision-making. Linking statistical data with GIS bases, modelling the landscape with LU Planning criteria for SMP planning, monitoring population and risk factors, use of multiple data layers in SEA, incorporating risk assessments and V&A for SMPs etc. are all specialized GIS/decision-making skills that are needed within PUMA. Tech Services (MNRE) has some experience in delivering GIS and mapping training, however external assistance may be required