Shoalhaven Council's Water Utility
WATER

Asset Management Plan Communications Facilities

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Policy Number: POL19/73
Adopted: 11/12/2018
Minute Number: MIN18.974
File: 46199E
Review Date: 1/9/2020

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1 Executive Summary

Shoalhaven City Council provides communications facilities in most urban areas of the Shoalhaven Local Government Area (LGA). Council meets these responsibilities and delivers these services through Shoalhaven Water, a defined Business Group of Council.

Shoalhaven Water seeks to manage the assets associated with the provision of communications services in a manner that meets the agreed level of service in the most cost effective manner for present and future consumers.

This Asset Management Plan (AMP) has been developed to provide a sustainable approach to the management of communications assets (and the services provided by those assets) for the Shoalhaven LGA. This AMP is prepared under the umbrella of Council's Community Strategic Plan and its vision, mission, objectives and strategies. This AMP is a support document to Council's Delivery Program and Operations Plan and complements the overall Shoalhaven Water Strategic Business Plan to ensure that the facilities are provided within economic, environmental and social sustainable criteria.

The communications assets consist of towers, poles, antenna and building assets with an overall asset replacement value of over $6.9M. The communications asset base is generally in excellent to good condition, and there does not exist a major backlog or renewal gap.

1.1 Key Achievements

The asset management improvements achieved over the past 2-3 years are summarised briefly below:

- Development of a Shoalhaven Water Asset Management Policy.
- Development of Shoalhaven Water's Asset Management Strategy.
- Adoption of a Community Engagement Policy, customer surveys and reporting.
- Critical assets and customers being mapped into GIS.
- Development of an Asset Information Framework.
- Development of a Capital Investment Framework and Prioritisation Methodology and documentation of the business processes and policy.
- Water and Wastewater servicing strategies to provide a program for system augmentation and capital works.
- Asset Criticality Framework and Management strategies, Criticality Framework Implementation and Critical Assets Management Strategies.
- Development of a Framework for the Water and Sewer Asset Management Plans.
- Asset Management Plan Review.
- Established a Shoalhaven Water Asset Management Steering Group and a Terms of Reference.
- Asset Data Hierarchy Review.
- Asset Information Confidence Rating.
- Development of Customer Service Plan

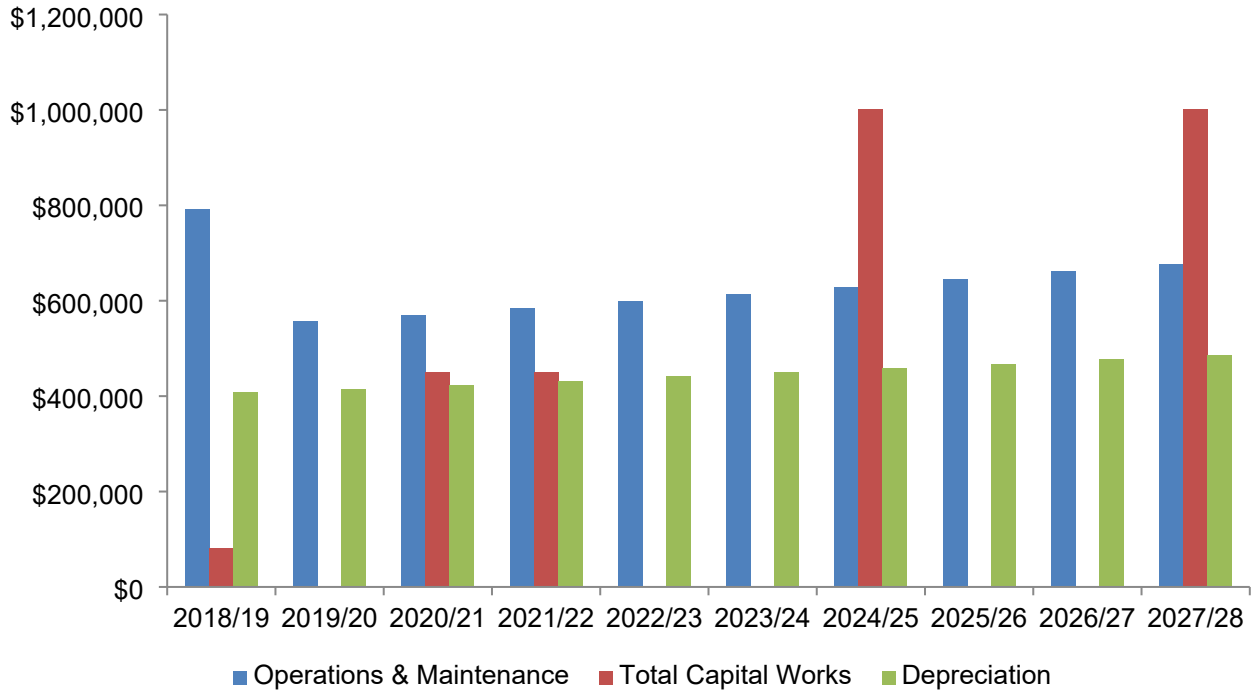
As the integration of Council's various information technology systems becomes more mature, this asset management plan will be improved through access to more data.

The detailed actions to improve this asset management plan and to take it to an intermediate approach are set out in Section 12.

1.2 Forecast Key Projects and Financials

The demand for space on telecommunication towers is expected to increase over the period to 2041. This is partially due to population growth, with the highest growth rate anticipated in the Nowra/Bomaderry area as demonstrated in Section 6.4 of this AMP, and partially due to technology changes that increase demand for transmission sites. The current 20 year financial plan allows for a capital works program of approximately $2M which includes renewals, growth, asset enhancement and other works. The capital works expenditure profile is shown below.

Figure 1-1 20-Year Financial Forecast



The key works projects are summarised below.

Table 1-1 Key Projects, Costs and Timing

Project	Relevant Expenditure Categories			Approximate Project Cost and Timing ($000)				
	Growth	Renewal	Asset Enhancement	16/17	17/18	18/19	19/20	20/21
Old Cambewarra Tower Demo		✓	✓	$126k				
Replacement Tower Vincentia Res	✓	✓	✓		$415k			
Replacement Tower Red Rocks	✓	✓	✓					$450k
New Road Moeyan Hill Tower		✓				$100k		
Repair Road Kangaroo Valley		✓		$6k				
Replacement Tower West Ulladulla	✓	✓	✓				$450k	
Vincentia Tower Generator			✓			$70k		
Huskisson Tower generator auto-start			✓			$10k		
Vincentia Res Tower Demo		✓			$85k			

Full details of capital projects are available in Council's DPOP.

1.3 Future Improvements

The following key asset management improvements are planned for the next three year period.

- Progressively update the new AMP framework.
- Develop a Replacement Costs Reference Database.
- Develop a Communications Capital Program Plan for projects approved within the program (e.g over 4-5 years) and those projects that fall outside of the program to be undertaken later.
- Develop further a proactive operational, maintenance and renewals program, placing the initial focus on the most critical assets as identified in the critical asset identification process, as per the critical asset policy and implementation project.
- Review the extent of non-Wastewater and Water assets owned by Shoalhaven Water and consider the need to develop an asset management plan for these assets.
- Update and further develop the Shoalhaven Water "Stories" concept and incorporate as the executive summary in the asset management plans.

- Review of Asset Information Handover Procedures and Asset Data and Drawing Standards.
- Undertake analysis to determine success rates and criteria for measuring future investment benefits.
- Continue to develop a risk register and risk action plan for Risk Management.
- Implement the identified management actions as specified in the Critical Assets Management Strategies Report.
- Develop and implement mobile device inspection and condition assessment capacity for asset management and maintenance.

2 Introduction

2.1 Background

Shoalhaven City Council owns and manages communication towers throughout the local government area. These sites are used for the provision of telecommunication services for Shoalhaven Council and Shoalhaven Water business requirements. Several telecommunication providers, broadcasters, emergency services, and government agencies also use these towers to provide services to the local community.

The purpose of this Asset Management Plan (AMP) is to formally document the management philosophy that is applied to all the Shoalhaven's communications assets. This approach ensures that acceptable levels of service are provided in the most cost-effective manner. AMPs are a key component of the strategic planning and management of Council, with links to the Shoalhaven Water Strategic Business Plan and Community Strategic Plan.

2.2 The Shoalhaven Region

Shoalhaven, although designated a city, is a dispersed region of 4,567 km2 in the south-eastern coastal region of New South Wales, spread over 125 km of coastline with the vast majority of its population located in the north-east around Nowra, Jervis Bay and Sussex Inlet. The estimated resident population of the City of Shoalhaven for 201 is 99,650.

Shoalhaven is bordered by the mountains to the west, coastal plains and 109 magnificent beaches to the east, and includes 49 towns and villages. Sydney is a two hours' drive north of 160 km, and Canberra is a two and a half hour drive southwest of around 200 km.

2.2.1 Economy

The Shoalhaven has a mature but growing economic base. With broad diversity in many value-adding sectors such as aircraft maintenance and overhaul, general manufacturing and logistics, the economic base is supported by domestic and international trade. Government administration and services are strong as is education, health and the construction industry. Many localities are also highly oriented to tourism and retail.

Population growth, based on in-migration from metropolitan areas, continues to grow the labour force and provide extension to existing and new businesses. A skilled workforce supports the business base and utilises the resources of local training facilities of the University of Wollongong and TAFE NSW.

2.2.2 Population

The Shoalhaven population forecast for 2018 is 103,201, and is forecast to grow to 123,168 by 2036.

The growth and demand section shows how the population, age structure and household types will change each year between 2015 and 2036. The forecasts are designed to provide community groups, Council, investors, business, students and the general public with knowledge to make confident decisions about the future.

These forecasts were last updated in October 2011 by .id, the population experts, on behalf of Shoalhaven City. Forecasts are available for each year from 2011 to 2036.

2.3 Overview of Asset Management Planning

2.3.1 Goals and Objectives of Asset Management

Effective asset management includes the planning, creation, operation, maintenance and review of assets over their whole life cycle to achieve the agreed Levels of Service at an affordable cost while satisfying corporate goals and statutory/regulatory requirements. Council acquires assets via purchase by contract, construction by Council staff and by handover of assets by developers.

The AMP delivers a range of benefits to the community as well as to the provider of the services, the main ones being:

- Maintain, replace and develop assets over the long term to meet required delivery standards and foreseeable future needs at minimal cost
- Continually improve asset management practices and service delivery to the customers
- Comply with strategic and regulatory requirements.

2.4 AMP Timeframes and Development

This AMP covers a 20 year timeframe from July 2018 until June 2038.

Version 1 of the Communications AMP was completed in 2011. The current plan has been developed with collective input from Shoalhaven Water Staff and Consultants. Much of the content has been derived from discussions, existing plans, reports and research.

This AMP will be reviewed during annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision-making process. The AMP has a life of 4 years and is due for revision and updating annually.

2.5 Roles and Responsibilities

Shoalhaven Water has established an Asset Management Steering Committee (AMSC). The purpose of the AMSC is to ensure that there is an effective level of governance in place to drive the asset management improvements required within Shoalhaven Water. The AMSC has responsibility for the business enhancement project tasks associated with Shoalhaven Water's Asset Management Capability – Progress Update (Sep 2014). These improvement tasks are given in the Plan Improvement (Section 12) in this AMP. The AMSC is responsible for providing and endorsing project rationale and objectives, making investment decisions, defining and realising benefits, and monitoring risks, quality and timeliness.

The AMSC consists of the following permanent members:

- Director Shoalhaven Water (Executive Sponsor)
- Water Asset Planning & Development Manager (Project Sponsor)
- Unit Manager Projects & Assets
- Executive Assistant

The AMSC will invite other representatives to attend meetings as required, including but not limited to the Manager Operations, Manager Finance Division, Manager Customer Services and External Advisor (as required).

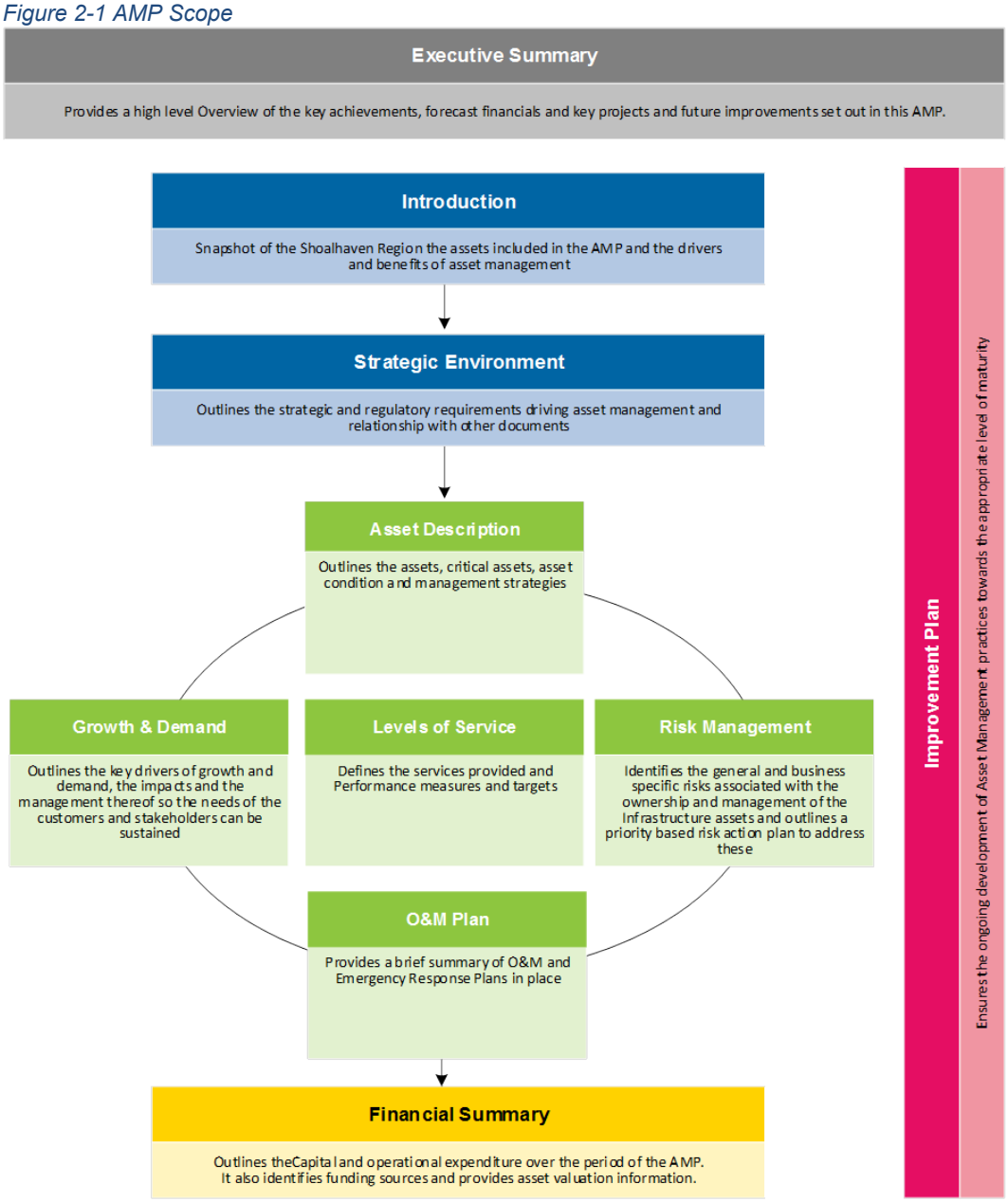
The AMSC meets monthly for approximately 1 – 2 hours, or at any point throughout the project where key information or a key decision is to be made and the timing of the next meeting would result in an untimely delay in the decision making process.

A Terms of Reference (April 2015) document provides overarching purpose and focus to the AMSC.

2.6 AMP Scope

The plan format shown below outlines the sections contained within this asset management plan (AMP), and how those sections link together.

Figure 2-1 AMP Scope

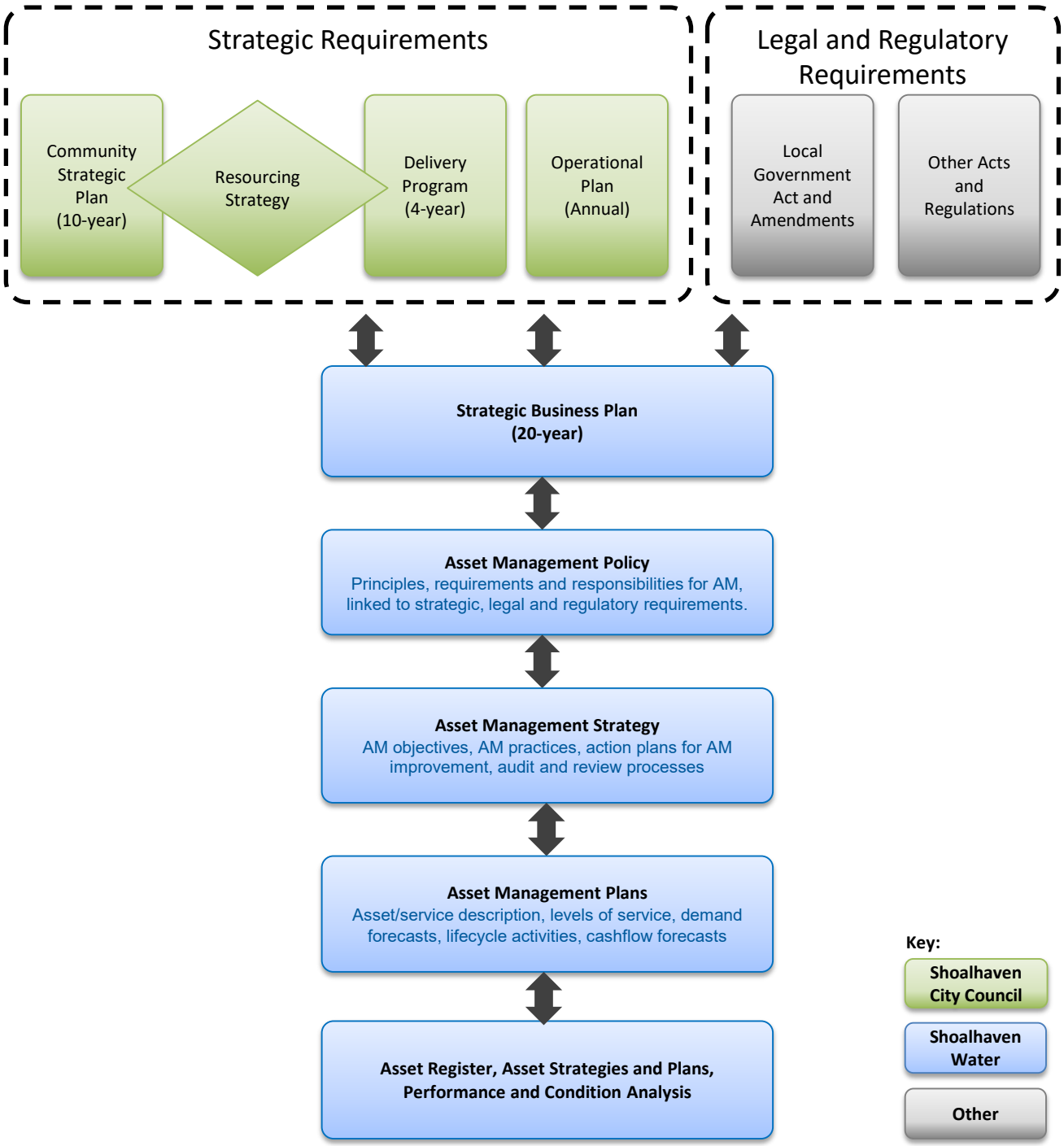


3 Strategic Environment

3.1 Strategic Overview

Council seeks to manage the communications assets in a manner that meets the required level of service in the most cost effective manner for present and future consumers. The key documents are set out in Figure 3-1.

Figure 3-1 Key Document Linkages



3.2 Asset Management Policy Linkages

The Shoalhaven Water Asset Management Policy presents a full summary of the strategic, legal and regulatory requirements for asset management, as well as the policy statements which are necessary to facilitate and support achievement of these requirements.

The Shoalhaven Water Policy statements relating to Asset Management Plans are provided below:

The Asset Management Plans (AMPs) will document the plan to manage Shoalhaven Water's assets to support the delivery of our strategic direction and our contribution to the Governments priorities and outcomes.

The AM Strategy and AMPs will be developed and updated to improve Shoalhaven Water's Asset Management process and procedures.

AMPs will be developed for all infrastructure assets.

The AM Strategy and AMPs will be for a minimum time period of 20 years.

AMPs will include 20 year financial projections of capital expenditure (separated into renewals and replacements, asset enhancements and growth) and operational expenditure (separated into asset maintenance and operations).

Shoalhaven Water has establish and maintain an Asset Management Steering Committee to guide the development, review and improvement of AM Strategy and AMPs.

The key business drivers are summarised below.

3.3 Shoalhaven City Council Strategic Requirements

3.3.1 Shoalhaven City Council Community Strategic Plan

The Community Strategic Plan sits at the top of the Council planning hierarchy and identifies the community's main priorities for the future and the ways to achieve these goals. Council's vision is set out in the Community Strategic Plan (CSP) as:

"We will work together in the Shoalhaven to foster a safe and attractive community for people to live, work, stay and play; where sustainable growth, development and environmental protection are managed to provide a unique and relaxed lifestyle"

In delivering Council's vision through a 20 year planning horizon for the provision of water supply and sewerage services, Shoalhaven Water's vision is set out in the Shoalhaven Water Community Strategic Business Plan 2015/16. The Shoalhaven Water Customer Service Plan also identifies that ***leading the way towards a bold future can sustain growth and economic development while retaining a lifestyle which is uniquely Shoalhaven, and describes our mission is to "Provide efficient, effective water and wastewater services to the Shoalhaven".***

3.4 Legal and Regulatory Requirements

As the Water Utility provider for the community, Shoalhaven Water operates as a Group within Shoalhaven City Council and subsequently there is a requirement to comply with the Local Government Integrated Planning & Reporting Guidelines. This includes a requirement to prepare;

- Community Strategic Plan (CSP),
- Resourcing Strategy,
- 4 year Delivery Program,
- Annual Operational Plan, and
- Annual Report

3.4.1 Local Government Act, Amendment Act and Amendment Regulation

The key legal and regulatory requirements for asset management are set out in the:

- Local Government Act 1993,
- Local Government Amendment (Planning and Reporting) Act 2009,
- Local Government (General) Amendment (Planning and Reporting) Regulation 2010.

The following key documents are used to guide asset management planning activities.

3.4.1.1 Integrated Planning and Reporting (IPR) Guidelines

The Integrated Planning and Reporting (IPR) Guidelines for local government in NSW list all the mandatory requirements from the Local Government Act and the Local Government Amendment Regulation 2013. Councils must comply with the Essential Elements set out in the IPR Guidelines *when planning and reporting to comply with the Local Government Act.*

3.4.2 Other Acts and Regulations

Table 3-1 Acts, Regulations, Guidelines and Standards

Type	Name
Acts and Regulations	Telecommunications Act 1997
	Broadcasting Services Act 1992
	Radiocommunications Act 1992
	ACMA Radiocommunications Licence Conditions (Apparatus Licence) Determination 2003
	Local Government Act 1993 & (General) Regulations 2005
	ARPANSA Radiation Protection Standard No.3 (RPS 3) – Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz
Guidelines	Third Party Infrastructure on Water Supply Reservoirs Guidelines – Volume 1 (2017) & Vol 2 (to be released)
	Telecommunications Code of Practice 1997
	Telecommunications Industry Ombudsman – Guidelines on the Installation and Maintenance of Low-Impact Facilities 2018
Standards	Australian Standard 4360: Risk Management 2008
	Australian Accounting Standards

For a full description of the Acts and Regulations refer to the Shoalhaven Water Strategic Business Plan 2015-2016.

3.5 ISO Requirements

The three ISO Asset Management Standards that are now published will potentially impact all organisations that have asset management responsibilities. These Standards, while framed on the management of physical assets, can be utilised for any asset type and by any sized organisation. They address the requirements for a management system (not software) for the management of assets and comprise:

- ISO 55000 Asset management – Overview, principles and terminology
- ISO 55001 Asset management – Management systems – Requirements
- ISO 55002 Asset management – Management systems – Guidelines for the application of ISO 55001
- ISO 55011 Asset management – Guidance on the development of government asset management policy

ISO 55001 is the most critical Standard in that it details the things required to be done – some 70 requirements with a number of sub elements. It documents 'What to do', not 'How to do it', thus providing a systematic management specification while allowing organisations to structure their activities to suit their needs, resources, capabilities and objectives.

ISO state that the main aim of Standards is to promote good practice, not to be there purely for compliance.

The Standards, per se, do not carry any force to require their application. In most cases, it will be up to the organisation itself to choose to apply them as part of good business practice. However, it is likely that in some highly regulated areas, involving significant asset values, the regulators, financiers and insurers may look to the comfort of requiring these Standards to be applied, to protect their interests.

Shoalhaven Water have analysed how the new ISO Standards are mapped to the sections proposed in the new AMP framework and the overall Shoalhaven Asset Management Framework.

3.6 Shoalhaven Water Strategies and Plans

3.6.1 Shoalhaven Water Strategic Business Plan (2015-2016)

Shoalhaven Water's vision, mission and values are presented in the Strategic Business Plan (SBP) 2015/16 (D15/135927) as follows:

Vision:

Defined by our spectacular beaches, surrounding natural forests and lakes, Shoalhaven Water connects distinct communities with water supply and sewerage services. Our Vision is "Through our Business Excellence, we will be a leader in the Water Industry".

Mission:

Leading the way towards a bold future that can sustain growth and economic development while retaining a lifestyle which is uniquely Shoalhaven, our Mission is to "Provide efficient, effective water and wastewater services to the Shoalhaven".

Values:

Our strategic decisions and day to day activities in achieving our Vision and Mission will be guided by the following organisational values;

Our Customer

Striving to understand and exceed customer expectation and satisfaction with an emphasis on quality service, consultation and continuous improvement.

Our Business

Provision of efficient and effective water and wastewater services, to an agreed “Levels of Customer Service” in an equitable and commercial manner.

Our Environment

Operating Shoalhaven Water in an environmentally responsible and sustainable manner for the betterment of present and future generations.

Our Community

Ensure quality of life and health to our community.

Our Team

Providing the Shoalhaven with efficient, dedicated and enthusiastic staff by working through trust, learning and communication.

3.6.2 Other Shoalhaven Water Policies, Strategies and Plans

Table 3-2 Shoalhaven Water Policies, Strategies and Plans

Type	Name
Policies	Asset Management Policy
	Risk Management Policy
	Asset Capitalisation Policy
	Community Engagement Policy
	Communications Site Charging Policy
	Communications Site Rental – Community FM Radio Stations
Key Management Plans	Emergency Response Plan
	Business Continuity Plan
	Risk Management Plans
	Operation Environment Management Plan
Asset Management Strategies and Plans	Asset Management Improvement Plan
	Critical Assets Framework and Strategy
	Treatment Plant Strategy
	Shoalhaven Water Customer Service Plan
	Shoalhaven Water’s Asset Management Strategy

4 Asset Description

4.1 Asset Summary

Table 4-1 Communications Asset Summary (quantities as per Asset Valuation 30-6-2017)

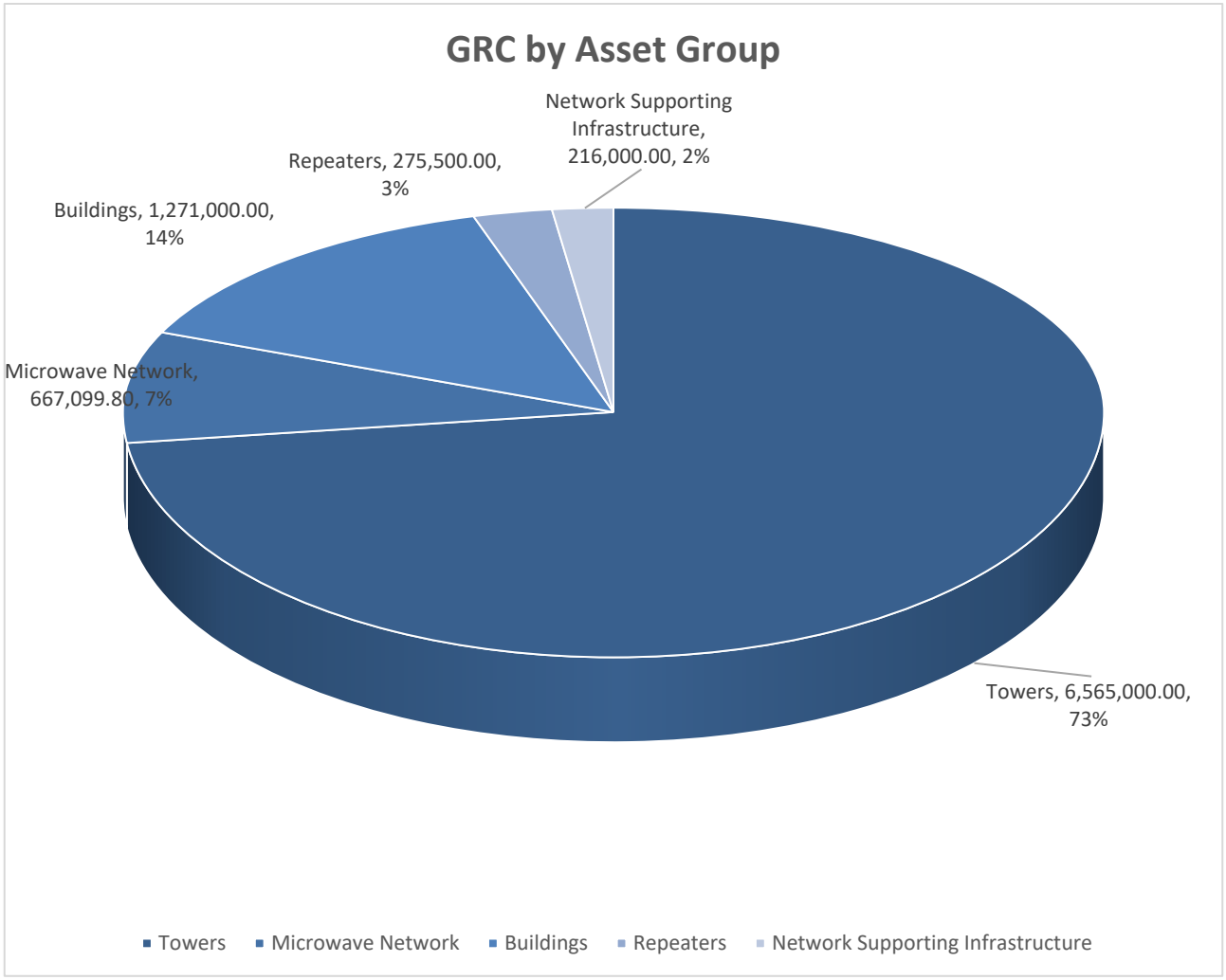
Asset category	**Number of Assets**	Number of Sites	Gross Replacement Cost ($)
Transmitter Towers	15	15 sites	$6,565,000
Microwave Network	74	14 sites	$667,100
Buildings	14	13 sites	$1,271,000
Repeaters	34	10 sites	$275,500
Network supporting infrastructure	47	13 sites	$216,000
Total	**184**	**17 sites**	**$8,443,962**

Gross Replacement Cost (GRC) is a methodology for measuring the estimated replacement cost of the communications asset, adjusted for new technologies and the changing nature of the fit of the asset within the developing network.

Tower asset valuations were undertaken in June 2016 using costs provided by Future Engineering, an external tower construction firm for the value of the towers. Asset valuations for contents are scheduled to be assessed in Q4 2017/18.

The components such as microwave links, brackets and the network supporting infrastructure category are not currently valuation items in the asset register as they are generally valued below Shoalhaven Water's threshold of $5,000 as an individual asset item. The cost of these items is currently included in reference rates used to calculate the value.

Figure 4-1 Proportion of Gross Replacement Cost by Asset Group (as at 1/7/16)



The key features and locality of the Shoalhaven communications network is demonstrated on the following overview map and schematics.

Figure 4-2 Shoalhaven Communications Sites

4.2 Asset Detailed Description

4.2.1 Overall System

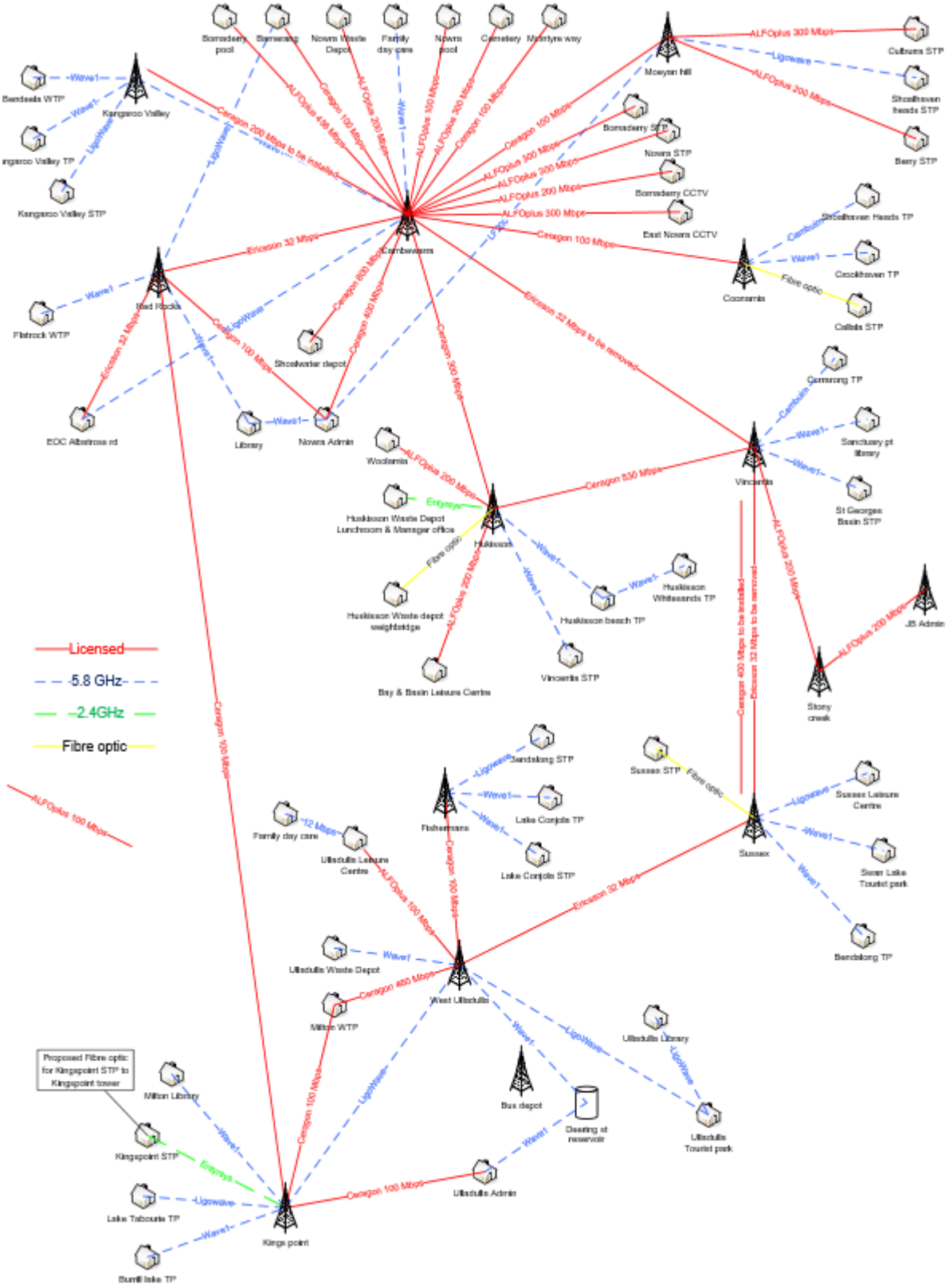
Shoalhaven Water manages the Communication Facilities used by Council. In order to offset the cost of these facilities, return a surplus to the community, and minimise the proliferation of towers these facilities are available for use by emergency and essential service operators, broadcasters and telecommunication providers, and other telecommunication users under a system of fees.

Some of Council's telecommunication facilities were built by telecommunication carriers on Council-owned land, with asset ownership passing to Council in return for a rent-relief period of typically 20 years, with the remainder built by Council. Since 2010 carriers have preferred to own and manage their own facilities, some of these are utilised by Council as part of the Council's communications network.

A microwave network serving Council facilities is run via links to remote Council sites, coming off a backbone network that runs through a number of Council's towers. These major towers are Cambewarra, Red Rocks, Kings Point, West Ulladulla, Fishermans Paradise, Sussex Inlet, Vincentia, Huskisson, Coonemia, Moeyan Hill and Kangaroo Valley.

A mobile radio network is also provided from a number of sites. This network is being replaced by a digital mobile radio network, which will provide enhanced communication for Council in operational areas and during emergency events. The current towers used by the mobile radio network are Sassafras, Red Rocks, Cambewarra, Saddleback (outside the Shoalhaven, in Kiama LGA), Budawang, Vincentia, Boyne, Fishermans Paradise, and Kangaroo Valley. Digital repeaters are also in use serving Water and Waste Water infrastructure.

Figure 4-3 Microwave Network – December 2017



4.2.2 Telecommunication Towers

Shoalhaven Water has responsibility for sixteen telecommunications towers. Nine of these towers are owned by Shoalhaven City Council and managed by Shoalhaven Water, with the remaining seven towers owned and managed by Shoalhaven Water. The Kings Point tower is used by Council, but owned by Telstra, with the site being managed by Shoalhaven Water with the exception of access to the tower itself.

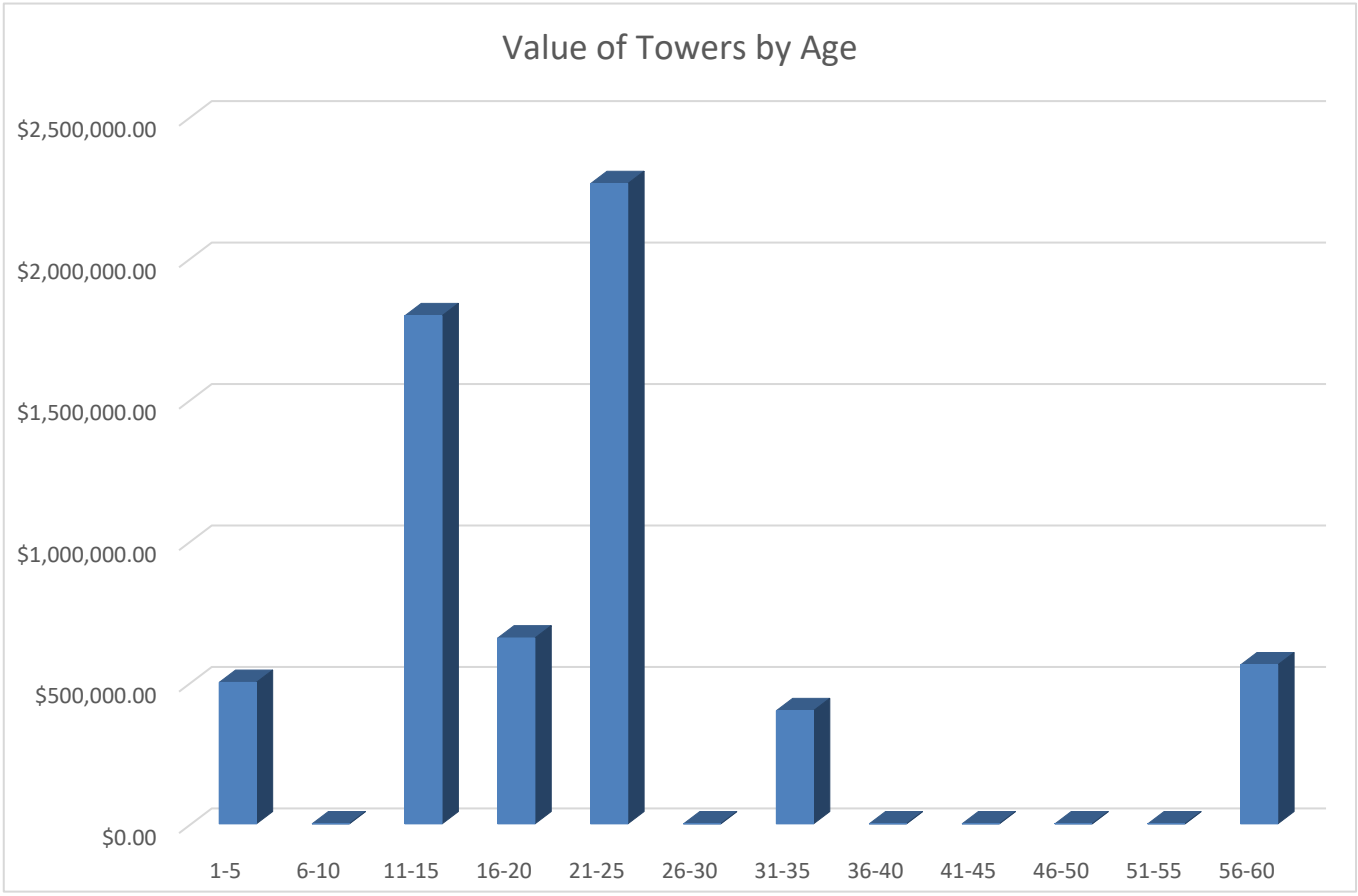
Table 4-2 Telecommunication Towers (quantities as per Asset Valuation 30-6-2017)

Name	Height (m)	Year of Construction	Fund	Type	Users	Owned & Operated By	Value ($)
Moeyan Hill	30	2005	General Fund	Pole	• Shoalhaven Water • Broadcast	Shoalhaven Water	$69,000
Clover Hill	30	2005	General Fund	Pole	• Shoalhaven Water • Emergency • Other	Shoalhaven Water	$69,000
Cambewarra	70	2007	General Fund	Lattice tower	• Shoalhaven Water • Council • Broadcast • Emergency • Telecommunications • Shoalhaven Council • SCC Radio • Hospitals • Other	Shoalhaven Water	$1,123,000
Red Rocks	38	1986	General Fund	Lattice tower	• Shoalhaven Water • Shoalhaven Council • Emergency • Broadcast • SCC Radio • Other	Shoalhaven Water	$400,000
Sassafras	30	2000	General Fund	Lattice Tower	• Emergency • SCC Radio	Shoalhaven Water	$345,000

Currarong	25	2006	General Fund	Pole	• Telecommunications	Shoalhaven Water	$281,000
Browns Hill	16.8	Unknown	General Fund	Disused Reservoir	• Telecommunications	Shoalhaven Water	$281,000
Coonemia	50	2001	Shoalhaven Water	Lattice Tower	• Shoalhaven Water • Telecommunications • Shoalhaven Council	Shoalhaven Water	$312,000
Huskisson	70	2005	General Fund	Lattice Tower	• Shoalhaven Water • Telecommunications • Broadcast • Shoalhaven Council	Shoalhaven Water	$249,000
Vincentia	55	2017	Shoalhaven Water	Lattice Tower	• Shoalhaven Water • Emergency • Hospital • Broadcast • Telecommunications • Shoalhaven Council	Shoalhaven Water	$500,000
Bewong	55	1996	Shoalhaven Water	Lattice Tower	• Telecommunications	Shoalhaven Water	$539,000
Sussex Inlet	55	1995	Shoalhaven Water	Lattice Tower	• Shoalhaven Water • Telecommunications • Shoalhaven Council	Shoalhaven Water	$498,000
Fishermans Paradise	50	1997	Shoalhaven Water	Lattice Tower	• Shoalhaven Water • Emergency • Telecommunications • Shoalhaven Council • Other	Shoalhaven Water	$663,000
Deering St	18		General Fund	Disused Reservoir	• Broadcast • Telecommunications • Shoalhaven Council	Shoalhaven Water	$281,000

Kings Point	70	2010	Shoalhaven Water	Lattice Tower	• Shoalhaven Water • Telecommunications • Shoalhaven Council • Other	Telstra	
West Ulladulla	45	1995	Shoalhaven Water	Lattice Tower	• Shoalhaven Water • Emergency • Telecommunications • Shoalhaven Council • Other	Shoalhaven Water	$563,000
TOTAL							**$6,565,000**

Figure 4-4 Value by Age



Note – 56-60 year towers are disused reservoirs

4.2.2.1 Planned Tower Projects:

West Ulladulla Tower was built in 1995 and is currently loaded over 90%. This tower has been strengthened a number of times and has been identified as a tower that should be replaced with a stronger tower in 2019/20, allowing an increased usage by Shoalhaven City Council and by other users.

Red Rocks Tower was built in 1986 and is currently loaded close to 100%. This tower has been strengthened a number of times and is also approaching the end of its useful life. The tower is scheduled to be replaced by a stronger tower in 2020/21.

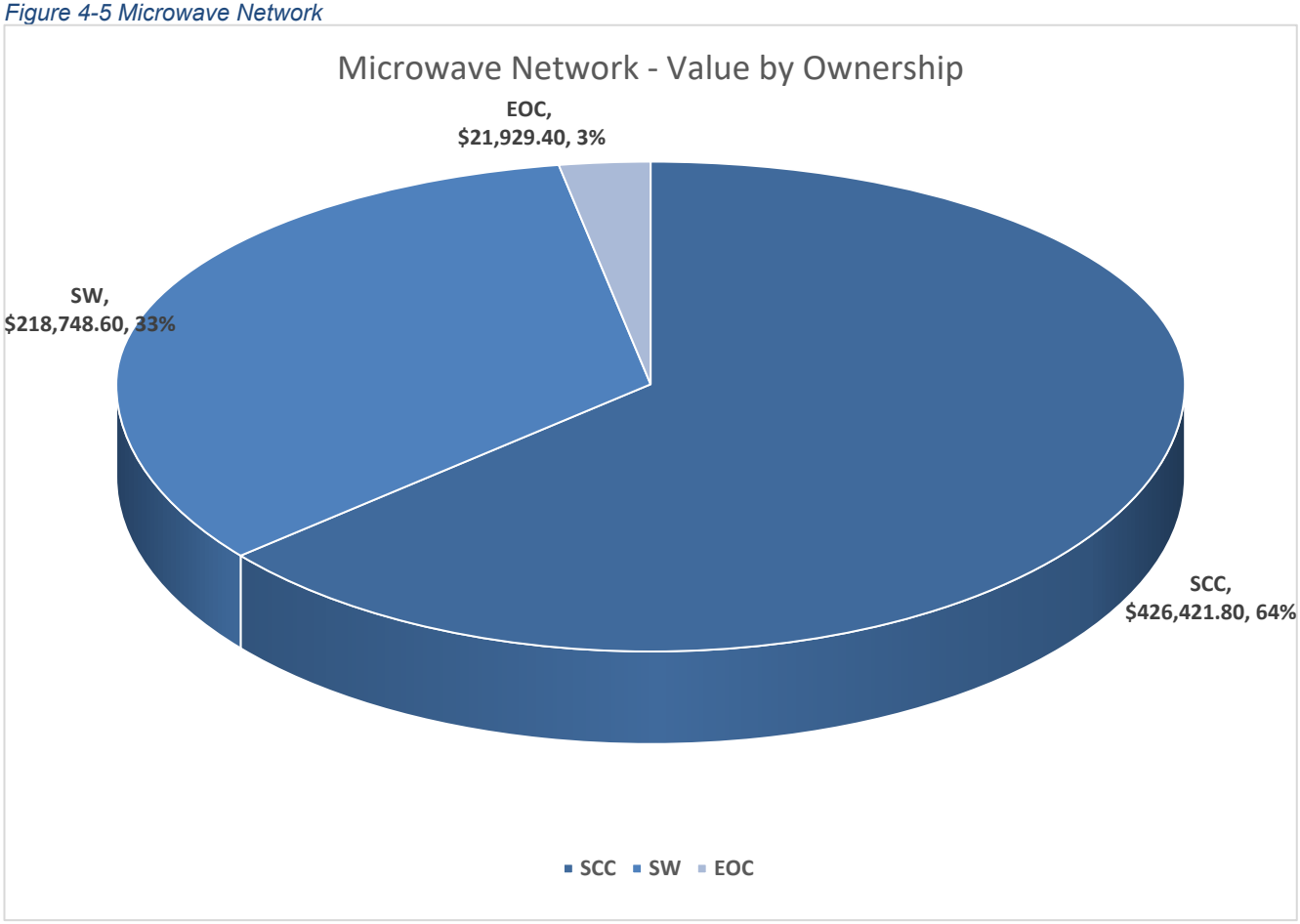
4.2.3 Microwave Network

A microwave network runs Shoalhaven Water and Shoalhaven City Council communications throughout the local government area. The backbone of this network runs via the telecommunications towers, and from there, links to individual sites.

Table 4-3 Microwave Network sites

Name	End Users	Value ($)
Cambewarra	Shoalhaven Water Shoalhaven City Council Emergency Operations Centre	$271,679
Nowra Admin Building	Shoalhaven City Council	$3,582
Red Rocks	Shoalhaven Water Shoalhaven City Council	$72,952
Moeyan Hill	Shoalhaven Water	$23,666
Kangaroo Valley	Shoalhaven Water Shoalhaven City Council	$10,746
Vincentia	Shoalhaven Water Shoalhaven City Council	$58,241
West Ulladulla	Shoalhaven Water Shoalhaven City Council	$57,483
Ulladulla Admin Building	Shoalhaven City Council	$3,582
Deering St	Shoalhaven City Council	$3,582
Sussex Inlet	Shoalhaven Water Shoalhaven City Council	$29,093
Huskisson	Shoalhaven Water Shoalhaven City Council	$49,178
Coonemia	Shoalhaven City Council	$14,382
Fishermans Paradise	Shoalhaven Water Shoalhaven City Council	$10,746
Kings Point	Shoalhaven Water Shoalhaven City Council	$58,187
Total		**$667,100**

Figure 4-5 Microwave Network



4.2.4 Telecommunication Buildings

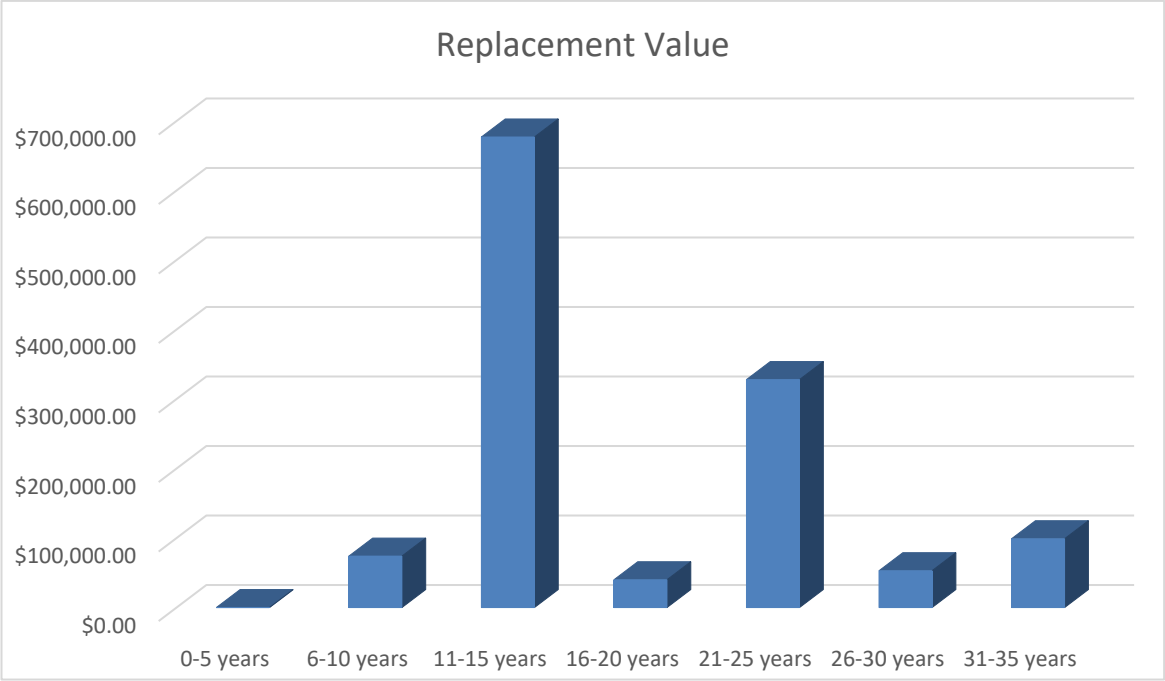
The telecommunications buildings house the radio equipment, electrical equipment and other various items associated with the sites.

Table 4-4 Telecommunication buildings

Site	Construction Material	Year of Construction	Replacement cost
Cambewarra – generator & broadcast hut	Brick walls, metal roof	2007	$405,000
Cambewarra – communications hut	Brick walls, metal roof	2007	$181,000
Moeyan Hill	Metal walls, metal roof	2005	$47,000
Red Rocks	Brick walls, metal roof	1986	$99,000
Fishermans Paradise	Brick walls, metal roof	1997	$89,000
Huskisson	Metal walls, metal roof	2009	$30,000
Sassafras	Shipping container	2000	$40,000
Sussex Inlet	Metal walls, metal roof	1995	$30,000
Bewong	Brick walls, metal roof	1996	$57,000
West Ulladulla	Brick walls, metal roof	1995	$63,000
Vincentia	Brick walls, metal roof	1997	$89,000
Coonemia	Brick walls, metal roof	1989	$53,000
Kangaroo Valley	Metal walls, metal roof	2005	$44,000
Kings Point	Metal walls, metal roof	2012	$44,000
Total			**$1,271,000**

The buildings have a total asset value of $1.233M. The value by asset age is represented in the graph below.

Figure 4-6 Building Value by Age (data as per Asset Valuation 30-6-2014)



There are spikes in asset value in the 11-15 and 21-25 year old categories, indicating that there may be a corresponding expenditure peak when these assets reach end-of-life.

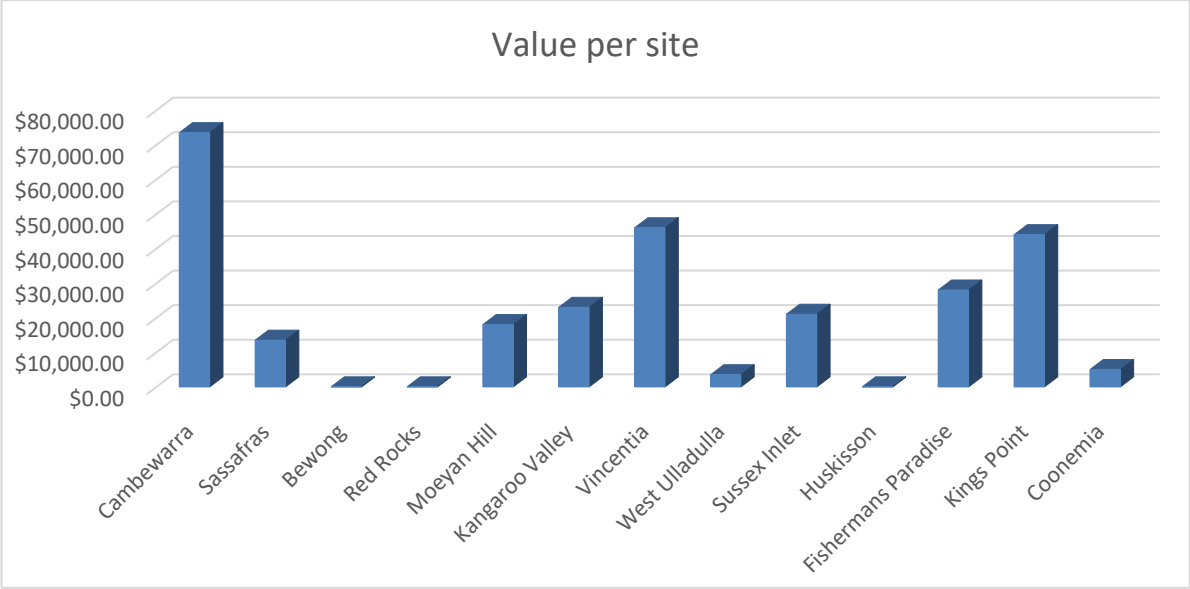
4.2.5 Repeaters

All radio systems that are not included in the microwave network are classified as repeaters. This covers telemetry systems and the PMR and DPMR radio networks. The antennas on the towers connect to the equipment in the buildings via feeders and are included as part of the repeater networks.

Table 4-5 Repeater Assets

Site	Systems	Value ($)
Cambewarra	DMR, REMS, Sewer, Water	$73,500
Sassafras	DMR	$13,500
Moeyan Hill	DMR	$18,000
Kangaroo Valley	DMR, Water	$23,000
Vincentia	DMR	$46,000
West Ulladulla	DMR	$3,500
Sussex Inlet	Sewer	$21,000
Fishermans Paradise	DMR, Sewer	$28,000
Kings Point	DMR, Water, Sewer	$44,000
Coonemia	Sewer	$5,000
TOTAL		$275,500

Table 4-6 Repeater Value per site



4.2.6 Network Supporting Infrastructure

The communication buildings contain the equipment that supports the microwave network and repeater networks. This includes such items as multicoupling, batteries and UPS, security systems, racks, and electrical equipment. Some sites have back-up generators, and one site is solar powered.

The back-up generators are Plant, and are not covered by this AMP.

Table 4-7 Network Supporting Infrastructure

Site	Items	Replacement Value
Cambewarra	Security, Racks, Multicoupling, Batteries	$25,000
Bewong	Security, Racks	$2000
Red Rocks	Security, Racks, Multicoupling, Batteries	$20,000
Moeyan Hill	Security, Racks, Multicoupling, Batteries	$17,000
Sassafras	Racks, Solar Panels, Multicoupling, Batteries	$17,000
Clover Hill	Security, Racks, Multicoupling, Batteries	$17,000
Vincentia	Security, Racks, Multicoupling, Batteries	$27,000
West Ulladulla	Security, Racks, Multicoupling, Batteries	$27,000
Deering St Reservoir	Racks	$1000
Sussex Inlet	Security, Racks, Multicoupling, Batteries	$17,000
Huskisson	Security, Racks, Multicoupling, Batteries	$17,000
Fishermans Paradise	Security, Racks, Multicoupling, Batteries	$19,000
Kings Point	Security, Racks, Multicoupling, Batteries	$17,000
Total		**$216,000**

4.3 Critical Assets

4.3.1 Criticality

This section of the AMP summarises the framework in place to identify critical assets, the process followed to develop this framework, the critical assets identified and general strategies in place for their management. Improvement tasks are identified to further improve the criticality assessment.

It is important that Shoalhaven Water has a clear understanding of which assets within these systems are critical and why they are critical. Identifying critical assets allows Shoalhaven Water to develop appropriate management strategies that minimise the risk of catastrophic events and achieve an optimum balance between the risk of asset failure and the lifecycle costs of inspecting, maintaining, repairing, and renewing assets.

4.3.2 Criticality framework development and assessment

In 2018 Shoalhaven Water developed a criticality assessment framework and general management strategies for critical assets, and subsequently utilised the framework to identify critical assets. A workshop was conducted involving relevant staff across the organisation to agree upon the criticality criteria for each asset type. Analysis was carried out to identify which assets are critical and datasets were produced for use in management systems planning.

4.3.3 The definitions of critical assets

Asset criticality is defined in terms of the consequences of asset failure. Three criticality grades have been defined as follows:

- **Extremely Critical:** Assets where the consequences of failure are unacceptable and must therefore be reduced.
- **Critical:** Assets where the consequences of failure are sufficiently serious that it is desirable to avoid the failure of these assets to the extent that it is practicable to do so.
- **Non-critical:** Assets where the consequences of failure are not significant enough that Shoalhaven Water should actively commit resources to preventing their failure.

4.3.4 Critical asset identification criteria

Assets are potentially critical if their failure would have significant detrimental impacts on service delivery or compliance, on the local community, or on the financial performance of Shoalhaven Water.

The assets considered for criticality were all sites where Shoalhaven Water or Shoalhaven City Council microwave and / or repeater networks and towers are located.

Generally, the following attributes discussed in this section apply to potentially critical assets. Assets that fall under the categories explained below were assessed based on the significance of the consequences of asset failure that includes both operational and social impacts.

- **Operational impacts** of the asset failure are the effects on Shoalhaven Water's ability to operate, measured by the cost and time required to repair the asset, and the effect on Shoalhaven Water's ability to maintain compliance with legislative requirements.
- **Social impacts** of the asset failure are the effects on customers and the community, measured by the severity of the effects, their magnitude or scale, and their duration.

Table 4-8 Critical Asset Identification Criteria

Criteria	Description
Assets serving emergency services	The failure of assets serving emergency service providers may cause significant risk to the life and safety of emergency service workers and to the general public. They are also typically located in more remote areas that are difficult to access in emergency situations such as fire or wind storm and thus and be more difficult and take longer to repair. The sites identified as serving emergency services are those which host Police, NSW Fire Brigade paging, RFS paging and the Government Radio Network (GRN).
Assets serving broadcasters	The failure of assets serving broadcasters has two major risks to Shoalhaven Water. During an emergency event, members of the public may be relying on broadcasts to keep them updated on events, and the lack of broadcast service may pose a risk to the life and safety of the general public. In addition to this, the loss of broadcast service would pose a risk to the public reputation of Shoalhaven Water.
Assets that are critical to Shoalhaven Water operations	Some telecommunication assets provide the only communications for some Shoalhaven Water operational assets. Failure of these telecommunications assets would pose a serious risk to the operation of those assets.

4.3.5 Critical assets

A summary of the sites with critical telecommunications assets is provided in the table below.

Table 4-9 Telecommunications Critical Assets (as at November 2012 as used in the Criticality Assessment)

Extremely Critical	User Categories to assess criticality	Risks
Cambewarra	Emergency Services, Broadcasters, Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - Generator Failure, Storm, Access Loss
Vincentia	Emergency Services, Broadcasters, Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - no generator Storm, Access Loss
West Ulladulla	Emergency Services, Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - no generator, Storm
Red Rocks	Emergency Services, Broadcasters, Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - Generator Failure, Storm, Access Loss
Fishermans Paradise	Emergency Services, Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - no generator, Storm, Access Loss
Critical		
Sassafras	Emergency Services, Shoalhaven Water Operations	Fire, Solar Power Loss - no generator, Storm, Access Loss
Moeyan Hill	Shoalhaven Water Operations	Power Loss - no generator, Storm, Access Loss
Kangaroo Valley	Shoalhaven Water Operations, Shoalhaven City Council	Power Loss - no generator, Storm, Access Loss
Coonemia	Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - no generator Storm, Access Loss
Huskisson	Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - Generator Failure, Storm, Access Loss
Sussex Inlet	Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - no generator, Storm, Access Loss
Kings Point	Shoalhaven Water Operations, Shoalhaven City Council	Fire, Power Loss - no generator, Storm

Boyne	Shoalhaven Water Operations	Fire, Power Loss - no generator, Storm, Access Loss

4.4 Asset Management Strategies

This section identifies the management strategies for the following asset types:

- Transmitter towers
- Microwave Network
- Buildings
- Repeaters
- Network supporting infrastructure

The management strategies are focussed around critical assets.

4.4.1 Management Strategies – Transmitter Towers

While the specific structural failure modes for telecommunications towers are varied, there are two general categories:

- **Catastrophic failure:** Catastrophic failure of telecommunications assets result in the tower and/or site becoming completely unusable for an extended period of time. These failures are those that result in the complete failure of a tower, from either structural reasons such as collapse of a tower, or damage to infrastructure such as feeders and antennas on the tower such that complete replacement of these components is required.
- **Non-catastrophic failure:** Damage to a tower or some components during a fire or storm event, or due to vandalism can cause components of the system to fail. These failures tend to be quicker to repair. Access may be blocked to sites due to storm events or during a fire, which can prevent emergency maintenance in the short term, leading to failure, as can power failures.

Another cause of failure is interference with radio frequencies used in the telecommunications systems. This can be mitigated by using licensed links, whereby the interferer is legally required to stop using the interfering frequency.

Ultimately the accuracy of predictions about when telecommunication assets are likely to fail as a result of deterioration depends on what data is available, the reliability of that data, and the reliability of the analyses which are applied to it.

Four general sources of data for predicting likelihood of failure are:

- Asset age
- Environmental condition data
- Site performance data
- Physical condition data

Each source represents an increasing burden and therefore cost of data collection and analysis. The benefit is more accurate knowledge of asset condition and therefore more accurate prediction of failure likelihoods.

Critical towers should be renewed before a failure becomes likely as a result of condition deterioration. The management strategy for critical towers is therefore determined by:

- **The need to detect and repair non-catastrophic failures** – This is achieved by a regular inspection regime, with towers being inspected every three years by an external contractor.
- **The need to determine the optimum time to replace a tower before catastrophic failure occurs** – Tower replacement is based on predictive modelling from asset age. Critical towers are generally replaced prior to the age-based criteria due to asset utilisation. Once the tower can no longer be strengthened to allow for required usage it becomes due for replacement.

The rate of deterioration and the likelihood of failure are influenced by a wide range of factors, as shown below.

Table 4-10 Factors influencing the rate of deterioration and/or the likelihood of failure

Factors Influencing the Rate of Deterioration	Factors Influencing the Likelihood of Failure
Tower loading	High loading of site
Manufacturing and install quality	High wind events
Foundation quality	Corrosion of steel reinforcing
Foundation material	Use of lower-quality concrete
Soil type and moisture	Corrosion of steel fixings due to marine environment
Temperature	

For any given tower, the particular combination of factors at play may produce a life expectancy dramatically lower or higher than the average life expectancy for that type of tower.

4.4.1.1 Physical Condition Data (Towers)

Physically inspecting tower assets and assessing their condition provides the most reliable source of data for predicting likelihood of failure. Accurate condition information can identify those towers most at risk of failure.

Physical condition assessment can be achieved in a number of ways:

- **Opportunistic inspection:** Undertaken when opportunities arise, e.g. when towers are climbed or visited, and when other works are being carried out.
- **Planned inspection:** An external contractor inspects all telecommunications towers every three years. The results of these inspections are provided to Shoalhaven Water, allowing preventative maintenance to be done to those towers where the need is indicated.
    - **Y1 –** Cambewarra, Coonemia, Sussex Inlet
    - **Y2 –** Vincentia, Moeyan Hill, Huskisson, Clover Hill, Cambewarra, Bewong
    - **Y3 –** Red Rocks, Sassafras, Fishermans Paradise, West Ulladulla

Key condition information for towers that is collected during routine condition inspections include:

- **Bolts and members of tower structure:** Bolts are checked visually, and sample tested for correct tension.
- **Footing inspection:** Structural footings are visually inspected.
- **Earthing inspection:** Earthing is visually inspected, and may also be tested for impedance to see if it falls within acceptable parameters.
- **Cable tray and mounting inspection:** Cable trays are visually inspected, including earthing.
- **Safety climb wire system:** The safety climb system is visually inspected.

The following table summarises the review of current critical asset management practice for towers, and identifies specific strategies and recommendations requiring further action.

Table 4-11 Summary of Management Strategy Practice for Towers

Management Strategies			Current Practice	Recommendations
Category		**Description**	**Description**	
Resilience Strategies	Material	Construction material	Use materials in tower and foundation construction that is suitable for the projected loading.	Maintain current practice, and review incidents to ensure no further change required.
	Design	Design of tower and foundation	Towers and foundations are designed by tower manufacturer, with the exception of Red Rocks, which was purchased second hand from Telstra and uses engineered footings, and Deering St and Browns Hill reservoirs, which were initially concrete reservoirs and now serve as telecommunications towers.	Maintain current practice, and review incidents to ensure no further change required.
	Emergency Response Plan	Displan addresses response for telecommunications during emergency situations	Event based planning. Reliance on people.	Improve register of telecommunications sites – uses Webmap
Operations & Maintenance Practices	Asset Location	All towers are located in GIS	All towers are located in GIS	Identify critical towers in GIS.
		Critical assets maps	GIS identifies telecommunication towers	Update GIS to identify critical towers.
	Routine Inspection & Maintenance	Programmed inspections	Towers are inspected by external contractors every three years.	Review frequency of inspections on critical assets. Review current inspection process and procedures to

				incorporate inspection data into asset register.
Age & Condition Data	Age	Ages for all towers are recorded in the asset management system.	Age data is recorded. Largely confident of age data.	Schedule replacement date into renewals programme.
	Physical Condition Data	Data collected from programmed inspections	Inspections every three years by external contactors	Update database with asset information. Feed into long-term renewals programme. Review current inspection process and procedures to incorporate inspection data into asset register.
Renewals forecasting	Risk-based forecast, with likelihood of failure determined	Age + Standard Useful Life Environmental condition data Network performance data Physical condition data Advanced deterioration modelling	Age data is used as an input for renewals decisions making. Tower utilisation is used for renewals decisions making, when tower strengthening is no longer practical.	Improve current renewal planning by considering the criticality of assets along with age and utlisation rates.

Table 4-12 Summary of Recommendations for Towers

Management Strategies	Recommendations	Responsible	Time

Emergency Response Plan	Workshop actions required to respond during emergencies.	Communications Site Coordinator	6 months
Asset Location	Need to mark the critical assets in Web map as a first step. Need to make the criticality of assets known to operations staff.	Asset Unit	6 months
Routine Inspection & Maintenance	Review frequency of inspections on critical assets. Review current inspection process and procedures to incorporate inspection data into asset register.	Communication Site Coordinator / Communications Coordinator	12 months
Physical Condition Data	Assess age and condition of critical towers. Update database with asset information. Feed into long-term renewals programme. Update Asset Management System with condition data	Communications Site Coordinator / Asset Unit	9 months
Renewals forecasting	Improve current renewal planning by considering the criticality of assets along with age and utilisation rates.	Asset Unit	12 months

4.4.2 Management Strategies – Microwave Network

The key failure modes for the microwave network are:

- Catastrophic damage caused by fire or storm events
- Bushfire protection
- Criticality assessment
- Loss of alignment due to high wind events.
- Earth movement.

Current practices regarding critical components of the microwave network are summarised below. The current practice was considered to be reasonable, and as such no further recommendations were made.

Table 4-13 Summary of Management Strategy Practice for Microwave Network

Target Practice			Current Practice
Category		Description	Description
Resilience Strategies	Redundancy	Redundant pathways	Backbone of network has path diversity, meaning if one site is lost, the network will still be able to function.
	Emergency Supplier Arrangements	Contract with emergency supplier in place with agreed levels of service (I.e. response times).	Not deemed to be required.
Operations & Maintenance Practices	Routine Inspection & Maintenance	Visual inspection of antennas and dishes as part of three-yearly tower inspections	Identifies antennas and mounts that require repair or replacement.
	Detecting Failure	Network monitoring system	Towers have monitoring in place
Age & Condition Data	Physical Condition Data	Condition updated following routine inspection and testing.	Antennas requiring replacement or repair are identified.
	Based on Condition	Based on recommendations of the trained service personnel who routinely inspect, test, and	Meter replacement within 20 years. Ongoing calibration by manufacturer annually.

		maintain the microwave network.	

4.4.3 Management Strategies – Buildings

The key modes of structural failure for buildings are:

Structural failure: Structural failure usually occurs as a large deflection or excessive displacement of beams, columns, or walls, or the development of cracks beyond the limit of tolerability. These modes of failure typically occur over a significant period of time with clear warning signs

Damage during emergency event: A further mode of failure is during an emergency event such as a fire or windstorm, where either the building itself is destroyed or severely damaged during an event.

The management strategy for critical buildings is therefore determined by the following requirements:

The need to protect the building from damage during an emergency. All buildings should have an Asset Protection Zone maintained around them for protection during fires or wind storms.

The need to identify, monitor and repair building deterioration. Identification and monitoring of deterioration should be undertaken during routine site inspections.

The need to determine the optimum time to renew the building before structural failure becomes likely.

The following table summarises the review of current critical asset management practice for buildings, and identifies specific strategies and recommendations requiring further action.

Table 4-14 Summary of Management Strategy Practice for Buildings

Target Practice			Current Practice	Recommendations	Responsible	Time
Category		Description	Description			
Resilience Strategies	Asset Location	All critical buildings are located in GIS	All buildings are identified in GIS	Identify critical buildings in GIS	Asset Unit	9 months
Operations & Maintenance Practices	Routine Inspection & Maintenance	Routine site inspections	All telecommunications sites are inspected 6-monthly.	Review current inspection process and procedures to incorporate inspection data into asset register.	Operations	9 months
Age & Condition Data	Routine Inspection & Maintenance	Routine site inspections	All telecommunications sites are inspected 6-monthly.	Review current inspection process and procedures to incorporate inspection data	Asset Unit / Operations	6 months

				into asset register.		
Renewals forecasting	Routine Inspection & Maintenance Age-based forecasting	Age-based renewal. Renewal as recommended from condition assessment.	Age of assets identified in the asset management system.		Asset Unit	6 months

4.4.4 Management Strategies – Repeaters

Shoalhaven Water has repeaters not associated with the microwave network at a majority of the telecommunciation sites. These are inspected every 6 months as part of the audit process.

Table 4-15 Shoalhaven Water Repeaters

Tower	Repeater	Inspection Frequency[1]
Cambewarra	PMR, Shoalhaven Water	6-Monthly
Vincentia	PMR, Shoalhaven Water	6-Monthly
Fishermans Paradise	PMR, Shoalhaven Water	6-Monthly
Sassafras	PMR, Shoalhaven Water	6-Monthly
Red Rocks	PMR, Shoalhaven Water	6-Monthly
Moeyan Hill	Shoalhaven Water	6-Monthly
Coonemia	Shoalhaven Water	6-Monthly
Sussex Inlet	Shoalhaven Water	6-Monthly
Kings Point	Shoalhaven Water	6-Monthly
Huskisson	Shoalhaven Water	6-Monthly
Kangaroo Valley	Shoalhaven Water	6-Monthly
West Ulladulla	Shoalhaven Water	6-Monthly

The following table summarises the review of current critical asset management practice for repeaters. The current practice was considered to be reasonable, and as such no further recommendations were made.

[1] Source: Shoalhaven Water and Wastewater O&M Schedule Manual – Revised 2005

Table 4-16 Summary of Management Strategy Practice for Repeaters

Target Practice			Current Practice
Category		**Description**	**Description**
Resilience Strategies	Emergency Response Plan	Displan identifies sites that have repeaters critical for Shoalhaven Water	Critical repeaters listed on Webmap
Operations & Maintenance Practices	Routine Inspection & Maintenance	Repeaters inspected as part of 6-monthly site audits	6-monthly

4.4.5 Management Strategies – Network Supporting Infrastructure

Communication buildings contain equipment that supports the microwave and repeater networks. This equipment has the following general failure modes:

Non-catastrophic: Failure of UPS or batteries losing charge. Failure of airconditioning unit. For all critical sites it is desirable to prevent non-catastrophic failures before they occur. The management strategies for critical sites are therefore determined by:

- The need to routinely inspect.
- The need to determine the optimum time to replace an item before failure occurs.

Table 4-17 Shoalhaven Water's Current Inspection and Maintenance Strategies for Network Supporting Infrastructure

Network supporting infrastructure	Inspections
Sites containing critical components of repeater or microwave networks.	Inspections carried out 6-monthly

Table 4-18 Recommendations for Critical Sites

Management Strategies	Recommendations
Regular maintenance	Regular maintenance of UPS and batteries
Age-based replacement	Age-based replacement of UPS and batteries
Asset condition assessments / renewals	Update database with asset age information. Feed into long-term renewals programme.

Critical assets identified in Critical Asset Report have been identified in asset management system/GIS and will become the focus for future asset condition assessment programs.

4.5 Asset Condition

4.5.1 Regulatory Reporting of Asset Condition

Council is required to include the condition of its assets as part of Special Schedule 7 in its annual financial statements. The asset condition for each asset category is defined using a "key" as per the NSW Local Government Asset Accounting Manual. This "key" is as follows:

Table 4-19 Infrastructure Asset Condition Assessment "Key" (SCC Annual Financial Statements 30 Jun 2014)

1	Excellent – No work required (normal maintenance)
2	Good – Only minor maintenance work required
3	Average – Maintenance work required
4	Poor – Renewal required
5	Very Poor – Urgent renewal/upgrading required

The communications system information is considered as part of Other Assets in the 2016/17 Special Schedule 7. Special Schedule 7 information is available in Council's financial statements under Special Schedule 7.

The condition ratings of the towers and buildings for telecommunication sites are noted below. One asset was not rated in the previous round of condition assessments by the external assessor.

Table 4-20 Towers & Huts condition ratings

Condition Rating	Towers	%	Communication Huts	%
1	1	7	2	13
2	10	71	8	53
3	3	21	3	20
4	0	0	0	0
5	0	0	0	0
Asset not rated	1	7	1	7
Total Components	14		15	

4.6 Asset Systems

Shoalhaven City Council is in the process of reviewing its Asset Management Systems and requirements with the plan to update the system by 2019. This will include migrating Shoalhaven Water's asset information from Conquest (the current asset management information system) to a new asset management information system (AMIS).

Shoalhaven Water will completed a component-level valuation in June 2021 using rates derived from recent projects and figures provided by towers manufactures. As part of the 2016 valuation process Shoalhaven Water engaged an external consultant to value tower assets. Asset condition is continually monitored by an ongoing inspection process external consultant condition assesses all tower assets on a regular three year programme.

Asset registers are being updated progressively with greater detail with the goal of componentisation of critical assets and those with a valve of $5K plus.

Critical assets identified in Critical Asset Report have been identified in the asset management system/GIS. Other critical and high value items are also being componentised and updated as the data comes to hand. As assets are brought into the system they are considered against the critical asset criteria and are subsequently identified in the AMS and GIS.

For more information on the above projects refer to the Improvement Program in this AMP.

4.7 Data Confidence and Completeness

Table 4-22 provides a summary of the asset data confidence by asset group with Table 4-23 providing an explanation of the asset information rating framework.

Table 4-21 Asset Data Confidence

Water Supply Asset Group	Creation Date	Type & Dimension	Condition Rating	Unit Rates & Base Lives
Towers				
Microwave Network				
Buildings				
Repeaters				
Network Supporting Infrastructure				
Key: Highly Reliable	Reliable	Uncertain	Very Uncertain	Unknown

Table 4-22 Asset Information Confidence Rating Framework

Confidence Rating		Meaning	Basis of Confidence Rating for Different Data Attributes			
			Asset Creation Date	**Asset Type and Dimensions**	**Asset Condition Rating**	**Standard Unit Rates & Base Lives**
Highly Reliable	1	96-100% certain the correct asset data is captured in the asset management information system (AMIS)	The asset creation date is based on: As-built plans and construction records.	The asset type and dimensions are based on: Documented asset information collected during planned/unplanned maintenance, site investigation, survey or measurement using accepted industry practice; or As-built plans and construction records.	The condition rating is based on: Documented condition inspection and assessment by qualified personnel consistent with industry best practice not more than 3 years old.	Unit rate and base life data is based on: Independently peer reviewed and benchmarked rates/lives prepared for valuation purposes and not more than 3 years old. Unit rates are correctly escalated to current year rates based on accepted indices.
Reliable	2	76-95% certain the correct asset data is captured in the AMIS	The asset creation date is based on: Documented extrapolation from highly reliable contextual data.	The asset type and dimensions are based on: Documented extrapolation from very reliable contextual data.	The condition rating is based on: Actual condition data 3-5 years old; or Documented extrapolation from highly reliable contextual data not	Unit rate and base life data is based on: Documented extrapolation of highly reliable rates/lives for comparable asset types and not more than 3 years old. Base life data may be based on industry

					more than 3 years old; or Output from an industry-standard deterioration model based on very reliable data sources not more than 5 years old.	standard lives confirmed by consensus of experienced personnel with local knowledge. Unit rates are correctly escalated to current year rates based on accepted indices.
Uncertain	3	51-75% certain the correct asset data is captured in the AMIS	The asset creation date is based on: "Best guess" based on consensus of experienced personnel but not verified by field investigation or as-built records.	The asset type and dimensions are based on: "Best guess" based on consensus of experienced personnel but not verified by field investigation or as-built records.	The condition rating is based on: Actual condition data 5-10 years old; or "Best guess" based on consensus of experienced personnel but not verified by field investigation or other analysis techniques; or	Unit rate and base life data is based on: Documented local contract rates/standard base lives, not independently peer reviewed or benchmarked. Unit rates are between 5-10 years old and are correctly escalated to current year rates based on accepted indices.
Very Uncertain	4	0-50% certain the correct asset data is captured in the AMIS	The asset creation date is based on: Unconfirmed verbal reports.	The asset type and dimensions are based on: Unconfirmed verbal reports.	The condition rating is based on: Actual condition data more than 10 years old;	Unit rate and base life data is based on: Industry standard unit rates/base lives, not independently peer

					Unconfirmed verbal reports; or	reviewed or benchmarked. Unit rates are more than 10 years old and are no escalated to current year rates based on accepted indices.
Unknown	5	The source of data in the AMIShas not been verified or default values have been entered.	The asset creation date has not been verified or a default date has been entered.	The asset type and/or dimensions have not been verified or default values have been entered.	The asset condition rating has not been verified or a default rating has been entered (this includes where the Condition Rating is based solely on the consumed useful life of the asset).	The unit rate and/or base life data has not been verified.

Table 4-23 provides an indication of the completeness of asset register data (independent of date confidence).

Table 4-23 Overall Data Completeness

Asset Type	0-50%	50%	60%	70%	80%	90%	100%
Towers						✓	
Microwave Network					✓		
Buildings						✓	
Repeaters					✓		
Network supporting infrastructure				✓			

5 Levels of Service

5.1 Introduction

One of the basic cornerstones of sound asset management is:

"To provide Levels of Service in the most cost effective manner, through the management of assets that the present and future community expect and are prepared to pay for".

Asset management planning enables balance to be determined between the cost of the service and the level of the service delivered (i.e. the price/quality relationship).

Well defined levels of service (LOS) can be used to:

- Inform customers of the current level of service provided and any proposed changes to level of service and the associated costs
- Measure performance against these defined levels of service
- Develop AM strategies to deliver the required level of service
- Identify the costs and benefits of the services, and
- Enable customers to assess suitability, affordability and equity of the services offered.

5.2 Drivers for Levels of Service

There are three main drivers of LOS:

- **External Environment** – legislative and other external requirements that impose minimum standards
- **Internal Environment** – strategic goals and objectives, availability of resources, financial constraints
- **Customer Environment** – customer expectations of the quality of service, balanced against the price they are willing and able to pay for that service

These drivers influence the decisions that Shoalhaven Water makes regarding the range, quality and quantity of services provided. In turn, this impacts the communications assets used to support the network requirements.

5.3 Engaging the Community in Developing Levels of Service

Shoalhaven Water has reviewed its LOS documentation developing a new Customer Service Plan (CSP) and an updated Strategic Business Plan. The CSP is modelled on the requirements of the NSW Office of Water's Water & Sewer Strategic Business Guidelines. Council has adopted both the CSP and the Strategic Business Plans in mid-2015.

The Community Strategic Plan sits at the top of the Council planning hierarchy and identifies the community's main priorities for the future and the ways to achieve these goals. Council has adopted a Community Engagement Policy which is a planned process whereby Council will work with the whole of the community to address issues affecting their well-being.

Shoalhaven Water conducts Stakeholder Engagement and Project Delivery Plans for major capital works and seeks comment, feedback and opinion on a continual basis via website, telephone or mail.

As a proactive measure to engage the community, Shoalhaven Water attends sponsors and takes an active role in a range of Community Events where the services and capital works projects are publicly displayed.

5.4 Communications Levels of Service

Shoalhaven Water has developed LOS statements for the assets with the CSP. The review was conducted in accordance with the SMART (Specific, Measurable, Achievable, Relevant and Time bound) principal to ensure they are achievable, useful and relevant.

Shoalhaven Water has several historical performance measures and targets relating to managing the assets. Performance measures and targets are used for:

- development of the resourcing strategy
- identifying capital works requirements
- reporting progress to Council and the community

The existing performance measures are as follows:

5.5 Critical Customers

Shoalhaven Water has identified and prioritised a range of critical telecommunications customers:

- Shoalhaven Water
- Shoalhaven City Council
- Government Radio Network and Emergency Services
- Telecommunications Providers
- Broadcasters
- Hospitals

These customers' most critical sites have been identified in order to develop a hierarchy of sites' risk. Emergency Services, Shoalhaven Water, Shoalhaven City Council, Broadcasters, Telecommunication Providers and Hospitals are the most critical customers, and those sites where they are located are noted. Section 4.3 addresses those assets that have been identified as critical.

A list of key communications and actions which are required in response to incidents, emergencies, and disasters is provided in Appendix A of Shoalhaven Water's Emergency Management Plan July 2012. The second item on this list is to notify critical users. The Emergency Response Plan (ERP) also directs specific communications in relation to certain customers or stakeholders for some events. (e.g. power outages, site access and works on towers).

Shoalhaven Waters Customer Service Plan also addresses the management and operations in relation to critical customers.

The Council licence for use of a tower stipulates that no warranty is given as to the tower's suitability or availability of power.

5.6 Levels of Service

Table 5-1 lists the current and desired performance level for the communication assets.

Table 5-1 Performance Measures and Targets

Performance Measure	Desired Performance Target	Current Performance		
		2014/15	2015/16	2016/17
EME interference – refer to ACMA in instances where disagreement exists as to the cause of interference	Within 7 days of disagreement as to cause of the interference	N/A	N/A	N/A
Enable licensee to connect to electricity supply where available	Connection to electricity supply made available by commencement of licence	100%	100%	100%
Written notice to licensee in event of scheduled power outages	3 days advance notice	3.6 days	8.1 days	9.7 days
Notification to licensee in event of emergency power outage	Within 1 hour of becoming aware of outage	<1 hour	<1 hour	< 1 hour

Table 5-2 Performance Standards and Targets

Standards	Description	Target
Extent of unplanned power interruptions	An unplanned power interruption occurs when a telecommunications site is without a service due to any cause, other than an extreme weather event (such as flooding or windstorms) or bushfire	< 8 hours duration.
Time for restoration of power – unplanned interruptions.	Restoration occurs where site power is restored. This is applicable only when the power outage is not caused by an extreme weather event (such as flooding or windstorms) or bushfire.	< 8 hours.

5.7 Actions to close the gaps

It is noted that the current performance is within the target level and hence no actions are required to close the gaps.

However, an improvement in tracking the notifications in the event of power outages will provide the benefit of more accessible data. This can be achieved by creating a register of notifications and the timeframe involved, and will improve the data collection process. In addition to the performance measures and targets, Shoalhaven Water has the following service standards. These have been considered as part of the CSP preparation, and where possible incorporated into the development of SMART LOS statements.

Table 5-32 Service Standards

Service area	Standard
Interruptions to Electricity Supply	Unplanned Sites served by generator will receive back-up power for 24 hours (not guaranteed)
Interruptions to Electricity Supply	Planned Customers will receive 24 hours' notice.
Access to site and towers	Planned Customers to notify SCC 24hrs prior. Unplanned Notification prior to works commencing before accessing site.

5.8 Performance Monitoring and Reporting

The Australian Communications and Media Authority (ACMA) is the federal government body responsible for administering the requirements of the Radiocommunications Act 1992. Under this legislation Shoalhaven Water must not cause interference with licensed frequencies held by other users.

Shoalhaven Water telecommunications towers are listed on the Radio Frequency National Site Archive. ARPANSA (the Australian Radiation Protection and Nuclear Safety Agency) requires these be updated to show the calculated maximum levels of electromagnetic energy around the tower. These EME reports are used to ensure workers on the towers are aware of Radiation Hazard (RadHaz) areas.

6 Growth and Demand

6.1 Introduction

Planning for future growth and demand is imperative to provide economically sustainable services to meet the future needs of the region and its visitors.

This section describes the key growth and demand trends in the Shoalhaven Region, the demand forecast for telecommunication services, and the strategies that Shoalhaven Water will adopt to manage growth and demand related to this business unit.

6.1.1 Growth and Demand Definitions

Growth and demand planning allows for the identification and quantification of areas within the region that are likely to experience significant pressures. Although growth and demand are considered together in this section, it is worth noting that they do have different implications regarding the on-going function/delivery of the Shoalhaven Water services.

Growth in relation to the telecommunications activity mainly refers to the growth/changes in population or areas that are growing due to new residential developments. These changes increase the demand for telecommunications and essentially lead to an increase in the capacity required of each tower site. Growth can also relate to increases in commercial/industrial activities.

Demand for telecommunications can be influenced by growth, climate change, type of developments (e.g. commercial development will generally have greater requirements), technology changes and customer expectations and trends (e.g. seasonal demand and household technologies demand increases).

6.2 Key Demand Drivers for Shoalhaven Water

A number of factors affect the demand for communication services including:

- Population and demographic patterns
- Residential growth and development
- Commercial/industrial growth and development
- Climate change
- Technological changes
- Changing regulations, government policy or priorities
- Seasonal factors

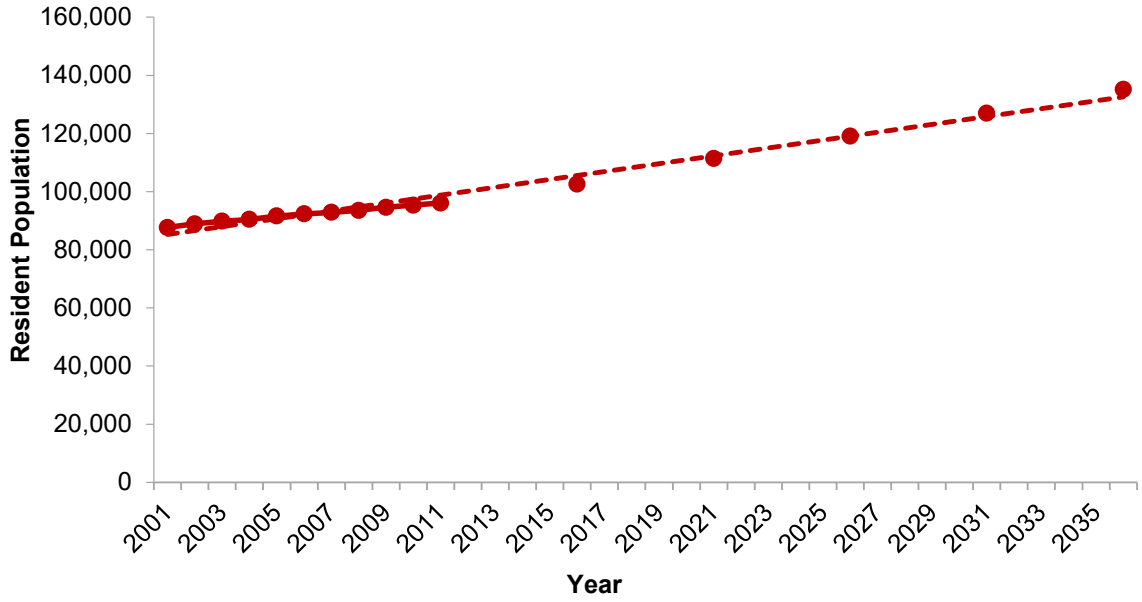
6.3 Growth and Demand Trends and Forecasts

The growth and demand trends and forecasts are described in this section.

6.3.1 Population Growth

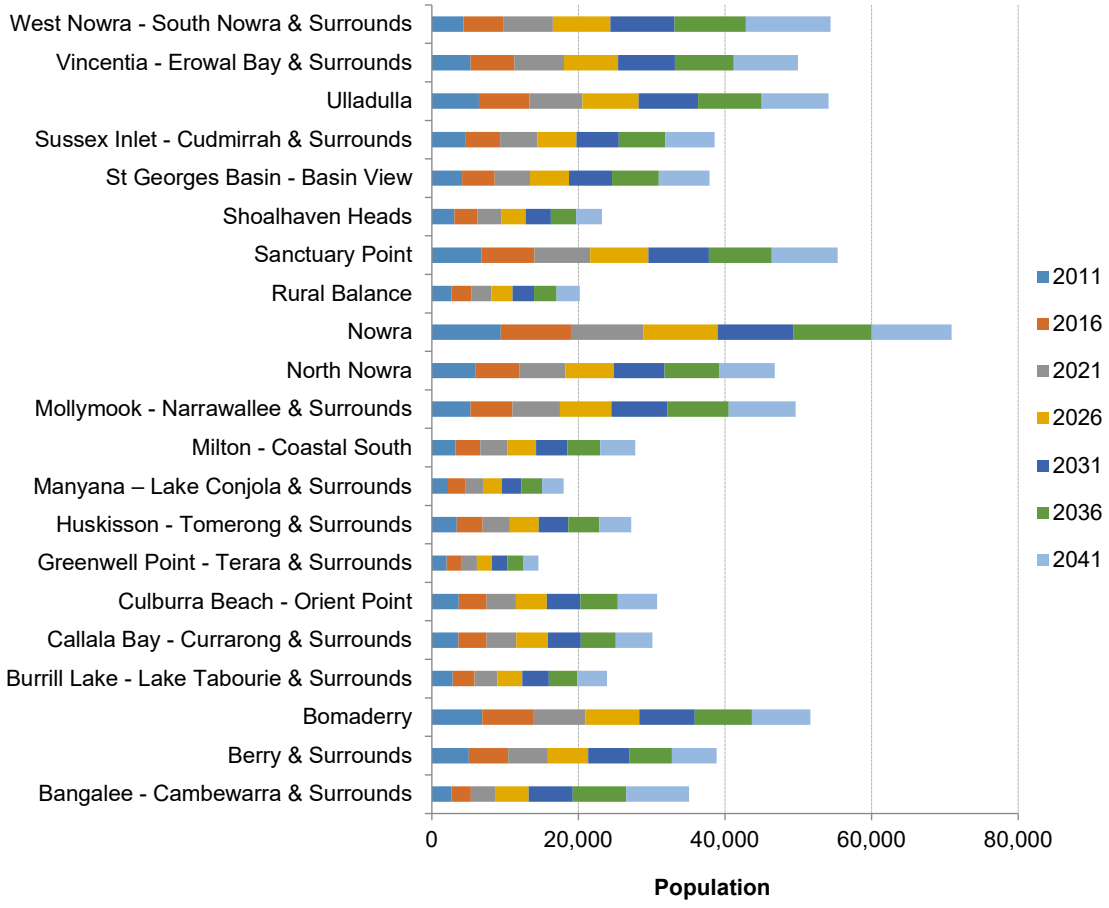
The population and demographic forecasts for Shoalhaven City were last updated in October 2017 by .id, the population experts, to develop the Growth Management Strategy for the Council. The forecast population for 2018 is 103,201, and is forecast to grow to 123,168 by 2036 as shown in the figure below. The extent of natural growth (the difference between birth and deaths) and the net migration are the two main factors that affect population. For Shoalhaven, rate of natural growth is considerably smaller compared to the rate of net immigration.

Figure 6-1 Resident Population Growth of the Shoalhaven – Historical and Future Projection.



Source: Growth Management Strategy Version 1, adopted 14th December 2012

Figure 6-2 Population Distribution by Area



Source: Water & Wastewater Servicing Strategy Part A (June 2013)

Key demographic features of Shoalhaven City are summarised below.

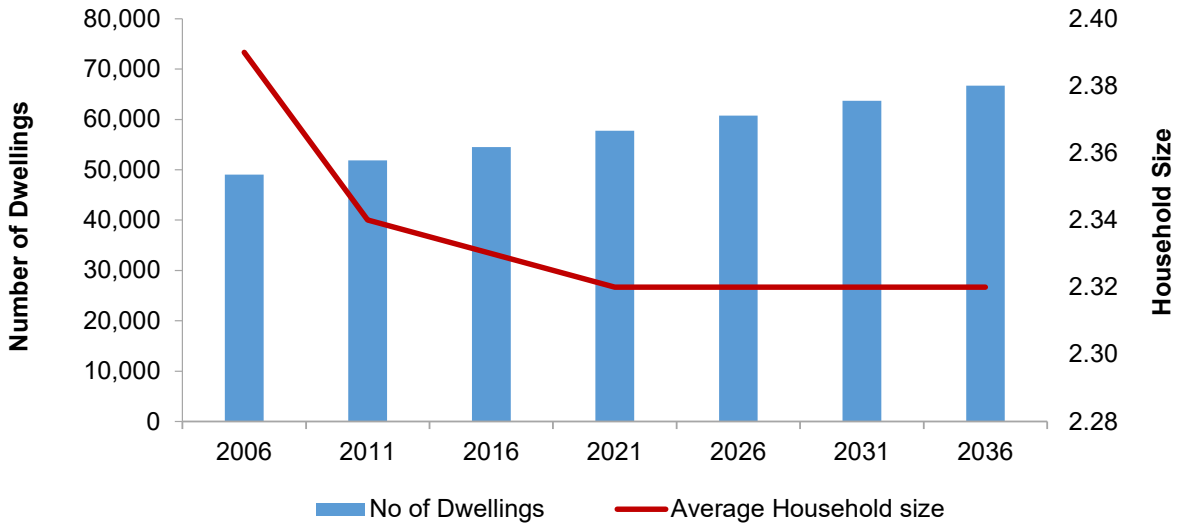
- Population Distribution by Area: Within Shoalhaven, Nowra/Bomaderry area has the highest population. However, the majority of growth within last 20 years has been within the South Nowra/Worrigee area.
- Population Distribution by Age: Shoalhaven has a higher average age compared to other cities in NSW. The number of people aged over 65 is expected to increase by 43.9% and represent 24.6% of the population by 2021. The number of people aged under 15 is forecasted to increase by 10.3% representing 17.6% of the population by 2021.
- Household Structure: In 2006 the dominant household type in Shoalhaven was couples without dependants, which accounted for 35.5% of all households. This is forecasted to be increased, comprising 39.8% of all households by 2021.
- Tourist Population: During the peak summer holiday period, total population of Shoalhaven grows up to three to five times of the residential population, increasing the demand for services and facilities.

6.3.2 Residential Growth

The forecast for number of dwellings in Shoalhaven up to 2036 is shown in figure 6-3 below. The factors that contribute to the residential growth are:

- Population growth
- Decrease in household size (as shown in 6.4)
- Relative housing affordability which encourages migration from the Sydney great metropolitan and Canberra areas
- A large proportion of older residents requiring accommodation that is adaptable to their particular needs
- A demand for temporary accommodation from tourists

Figure 6-3 Number of Dwellings and Household Size

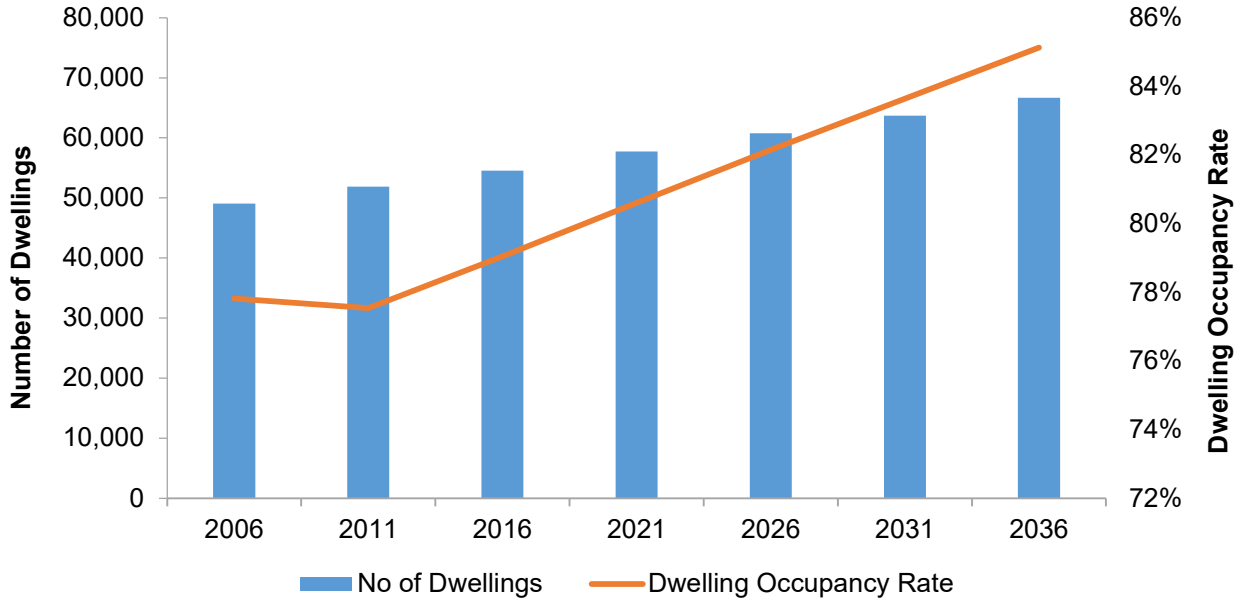


Source: Growth Management Strategy Version 1, adopted 14th December 2012

About 88% of the dwellings in Shoalhaven are single houses. The number of people living in caravans as permanent accommodation is higher than the state average.

Shoalhaven has a high rate of 'not permanently occupied' dwellings due to high tourist population. It is expected that, as the population ages and retirees start to move from Sydney and Canberra into their holiday homes, the vacancy rate will reduce. The figure below illustrates the expected change in dwelling occupancy rate.

Figure 6-4 Change in Dwelling Occupancy Rate



Note that the 'number of assessments' refers to the number of properties that have an entitlement to water supply and are assessed under the Local Government Act.

6.3.3 Growth and Demand Impacts and Strategic Response

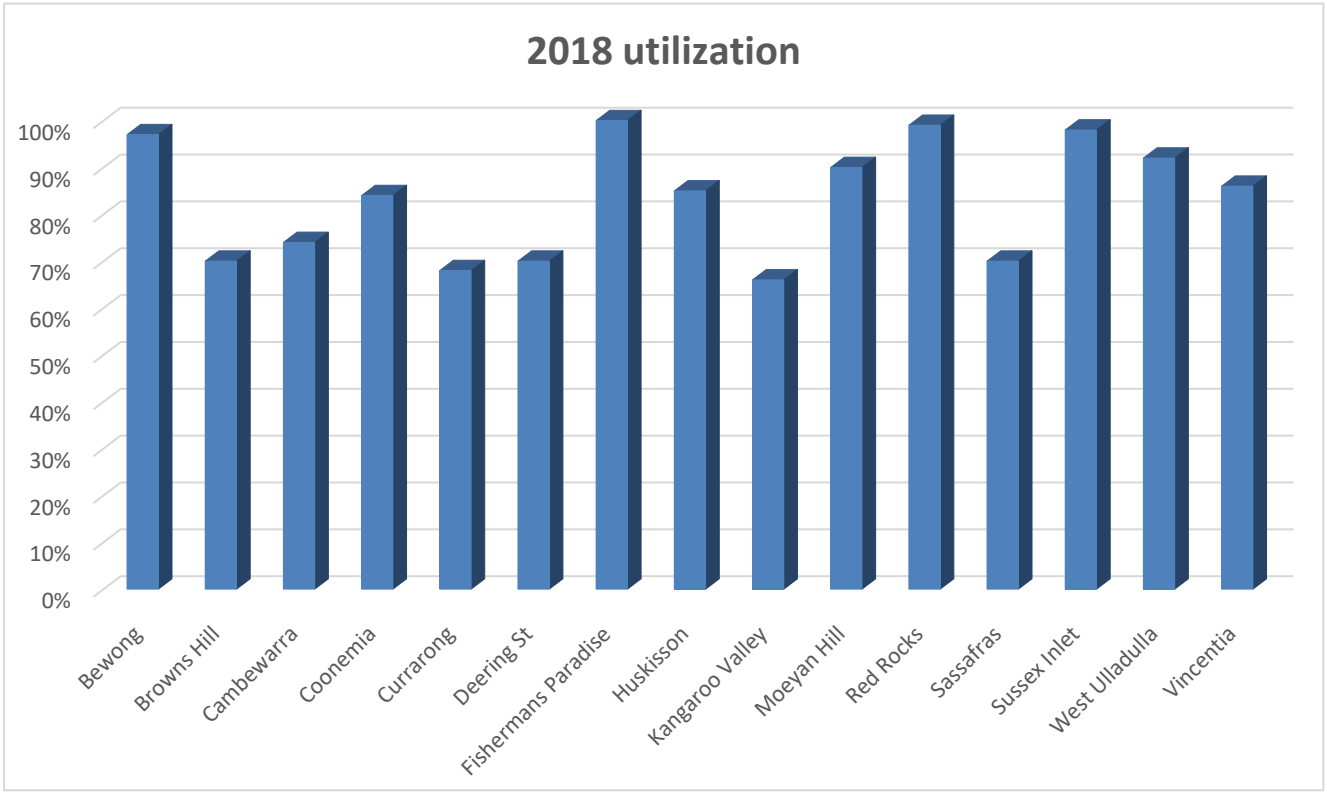
Historically, the utilization of the towers by telecommunications users has shown an upwards trend. This is due to population growth, and more importantly, new radio-based technologies emerging that increase the demand for space on towers.

Table 6.1 below shows the percentage utilization for each tower. Where structural assessments are not available, it has been assumed that the tower is loaded at 70%. Load decreases are caused by either removal of equipment or a strengthening of the tower.

Table 6-1 Tower Utilization 1999 - 2018

	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
Bewong	79%	79%	79%	79%	79%	79%	86%	111%	90%	94%	111%	111%	111%	111%	111%	83%	83%	99%	85%	97%
Browns Hill Reservoir																		70%	70%	70%
Cambewarra									24%	24%	24%	24%	24%	67%	56%	69%	84%	72%	68%	74%
Coonemia			70%	70%	70%	70%	70%	70%	70%	70%	53%	53%	53%	53%	53%	72%	80%	84%	84%	84%
Currarong								54%	54%	54%	55%	55%	55%	55%	74%	74%	74%	74%	68%	68%
Deering St Reservoir	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Fishermans Paradise	97%	97%	97%	97%	89%	96%	88%	105%	93%	99%	89%	89%	89%	89%	90%	90%	90%	100%	100%	100%
Huskisson							77%	77%	77%	77%	77%	82%	90%	91%	78%	82%	79%	76%	85%	85%
Kangaroo Valley						96%	96%	96%	96%	96%	96%	96%	96%	66%	66%	66%	66%	66%	66%	66%
Moeyan Hill							70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	87%	82%	90%	90%
Red Rocks	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	96%	96%	100%	100%	98%	99%	99%	99%
Sassafras		70%	70&	70%	70%	70%	70%	70%	70%	70%	70%	70&	70%	70%	70%	70%	70%	70%	70%	70%
Sussex Inlet	90%	90%	90%	90%	90%	90%	90%	93%	90%	145%	90%	90%	90%	90%	98%	98%	98%	98%	98%	98%
West Ulladulla	86%	86%	86%	86%	86%	78%	78%	78%	78%	78%	92%	97%	94%	97%	94%	93%	85%	89%	92%	92%
Vincentia																			88%	86%

Figure 6-5 Annual Tower Utlization – Historical



6.3.4 Asset Solutions

Growth in population and other demand trends can result in capital works being required to increase capacity of the network and expand the network footprint in certain areas. The Shoalhaven Water strategic response to these trends is explained below.

The assessment of the capacity and performance of existing infrastructure is reviewed as demand increases and customers increase loading. As infrastructure load reaches 90% additional strengthening is required by the customer. However, some capital works are required to meet the demand as the asset reaches a point of being no longer viable for strengthening. New developments and new service areas as summarised in the table below.

Table 6-2 Capital Work Requirements 2016-2046

Name	Location	Year	Type
Replacement Tower Vincentia Res	Vincentia	2017	Lattice tower
New Road Moeyan Hill Tower	Moeyan Hill	2018	Gravel access track
Huskisson Tower generator auto-start	Huskisson	2018	Addition of autostart
Vincentia Res Tower Demo	Vincentia	2018	Removal of monopole
Replacement Tower West Ulladulla	West Ulladulla	2019	Lattice tower
Vincentia Tower Generator	Vincentia	2019	Generator
Replacement Tower Red Rocks	Red Rocks	2020	Lattice tower
Replacement Tower Fishermans Paradise	Fishermans Paradise	2022	Lattice tower
Replacement Tower Sussex Inlet	Sussex Inlet	2025	Lattice tower
Replacement Tower Browns Hill Nowra	Nowra	2036	Monopole
Replacement Tower Deering St Ulladulla	Ulladulla	2038	Monopole

6.3.5 Non-Asset Solutions

Non-asset solutions provide an alternative to the creation of new or improved assets in order to meet demand changes. They address ways of modifying customer needs in order that the utilisation of existing assets is maximised and the need for new assets is deferred or reduced.

Utilization of the towers is managed by requiring a new structural analysis to be done each time equipment is added to a tower. This requires accurate records of antennas to be kept for each tower. Demand management by requiring the larger link dishes to be mounted towards the base of the tower (as low as can be managed whilst still maintaining line of sight), assists in keeping structural capacity below the 90% level and maximizes potential usage of the towers.

The non-asset solutions planned by Shoalhaven Water over the next period are:

- Colocation
- Link antennas mounted at lowest available level

- Designing for other users
- Multiplexing (an addition to the antenna system that allows multiple frequency signals to be sent over the same antenna, allowing multiple users to utilise the same antenna)
- Other non-asset solutions include the pricing strategy which is structured in such a way to encourage colocation and utilisation of existing assets
- Remove redundant infrastructure

6.3.6 Assumptions

Population and residential growth in Shoalhaven area will happen as per the predictions developed by Forecast id. This will result in a corresponding linear increase in demand of the communication networks serviced by the towers.

7 Operations and Maintenance Plan and Environmental Stewardship

7.1 Introduction

Operations and Maintenance Plans aim to maintain the current levels of service (achieve the performance targets), mitigate risk and minimise cost by implementing a balanced programme of planned and reactive works.

The operations of Shoalhaven Water facilities are undertaken in accordance with:

- Operating Environment Management Plans (OEMPs),
- Operations manuals that are produced during asset commission or upgrading and/or
- Emergency response plans are available as part of the Emergency Response Planning.
- Shoalhaven Water Emergency Response Plan

The key acts and regulations that set out the statutory requirements relating to environmental stewardship are summarised in Section 3 of this plan.

Specific operations and maintenance practices for individual asset groups are set out within the Management Strategies in Section 4.4 of this plan. Monthly reports are prepared by each operational area.

7.2 Operational Environment Management Plans (OEMPs)

Communications specific OEMPs are an item for development under the Improvement Plan.

7.3 Emergency Management Plan

The Shoalhaven City Communications supporting plan to the Shoalhaven DISPLAN details the roles and responsibilities for Shoalhaven City Council during an emergency event. Part of this role is to facilitate the use of mobile phones and / or radio communciations during an event.

As part of the plan, Shoalhaven Water Communications maintains a register of details of communications networks, available as a WebMap.

A list of radio sites, along with the areas that they cover, is available in the supporting plan. This list also includes the keyholder details.

8 Disposal Plan

This section provides guidance on the procedures to be adopted when disposing of an asset in the custody of Shoalhaven Water.

The custodian of Shoalhaven Water's Communications Assets resides with the Water Planning & Development Manager. To assist in the discharge of this responsibility, reliable management information regarding the assets in use by their unit is required.

The accurate and timely accounting for disposal of assets in Shoalhaven Water the provision of relevant information for both informed decision making and reporting purposes.

To dispose of an asset, Shoalhaven Water's units are responsible for:

- completing the Asset Disposal Form;
- obtaining approval for disposal of the asset from the asset custodian;
- the actual disposal of the asset;
- processing the system removal from the AMS and GIS system;
- forwarding the completed Asset Disposal Form and supporting documentation to Statutory and Management Reporting, Finance and Governance unit at Shoalhaven City Council.

Finance and Business Services is responsible for:

- reviewing the disposal process and determining any impairment;
- confirming the removal of the asset from AMS;
- ensuring the integrity between the General Ledger and AMS;
- providing advice and assistance on related assets matters.

Council Governance Unit is responsible for:

- Notifications to Insurance Mutual to remove from insurance schedule

9 Risk Assessment and Management

9.1 Overview

This section covers the risk management implemented by Shoalhaven Water and how it applies to current and future telecommunications activities.

Risk management is a process used to identify the specific business risks, together with any possible risks associated with the ownership and management of the tower assets. This can be used to determine the direct and indirect costs associated with these risks, and form a priority-based action plan to address them.

The outcome of this evaluation is to be used to:

- Emphasize the importance of continuing to provide Council's telecommunications services and manage inherent risks.
- Continually identify improvements required to Council telecommunication services to avoid risk events, or minimise their impact or to realise identified opportunities.

A ***Risk*** is defined in AS/NZS ISO 31000:2009 – Risk management – Principles and guidelines, as:

"Effect of Uncertainty on Objectives"

Effect: Deviation from the expected – positive or negative.

Objectives: Can have different aspects (see Risk Types) and can apply at different levels (see Risk Hierarchy Levels).

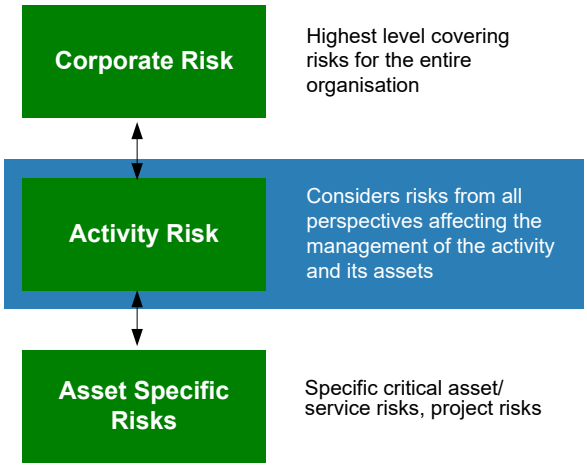
Risks: Often characterized by reference to potential events and consequences, and is often expressed in terms of a combination of the consequences of an event and the associated likelihood.

Uncertainty: The state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequence, or likelihood.

9.1.1 Level of Risk

The purpose of this risk plan is to identify the risks associated with the tower assets. This requires approaching the risks from many perspectives including financial, operational, reputational, public health and safety. These risks are pertinent to both a higher, corporate level, and to a more detailed asset – specific level, but do not substitute for more specific risk analysis at those levels (see Figure 9-1). The next step beyond this risk analysis is to develop more detailed risk plans where the criticality of specific assets are assessed and an action plan developed as appropriate.

Figure 9-1 Risk Hierarchy Levels



9.2 Current Situation

A risk register is currently maintained at a Shoalhaven City Council level, site level and at an individual project level. Shoalhaven Water has identified that there is a need to develop a risk register at an activity level specific to the Communications facilities activity and this is a key task identified in the Improvement Plan.

9.2.1 Risk Types

Risks events will derive from, or impact in one or more of the following ways. These risk types are considered when populating the risk register.

Figure 9-2 Risk Types

Operational	Risks that affect the efficient operation of the service or facility and its' ability to function effectively.
Financial / Economic	Risks related to the financial management of Shoalhaven Water and its' ability to fund Council services now, and into the future Risks resulting from the external economic environment.
Health and Safety	A risk event with adverse impacts on the health and safety of the community and Council staff.
Reputation / Image	Risks that affect the way Council and staff are perceived: By the community By staff Nationwide and internationally By stakeholders By the media
Legislative	A risk event that results in Shoalhaven Water either unknowingly or knowingly breaching statutes and regulations, or being exposed to liability

9.2.2 Risk Assessment Methodology

The overall risk exposure an asset represents to Shoalhaven Water is a combination of Condition (likelihood of failure) and Criticality (consequences of failure). The procedure for identifying and assessing risks is summarised below.

9.2.2.1 Identify Possible Activity Risks

All possible risks affecting the asset activity need to be identified. Once identified, risks are entered into the risk register (see Table 9-5). The register is used to record and summarise each risk and to outline current mitigation measures and potential future management options.

9.2.2.2 Determine Likelihood and Consequence for Initial Risk Factor

Table 9-1 and Table 9-2 demonstrate the scales used to determine the likelihood and consequence levels, which are used to evaluate a risk event.

The likelihood of occurrence and severity of consequences should be based on as much real data as possible; for example local knowledge or recorded events such as maintenance records and weather events.

The likelihood scales identify how likely, or often, a particular event is expected to occur, these are shown in the table below.

Table 9-1 Likelihood Rating Scale

Likelihood	Level	Description
Almost Certain	5	Is expected to occur nearly every year e.g. 80% chance within the next 12 months
Likely	4	Will probably occur often e.g. 25% chance within the next 12 months or once in 4 years
Possible	3	Might occur from time to time e.g. 10% chance within the next 12 months or once in 10 years
Unlikely	2	Could occur only very occasionally e.g. 4% chance within the next 12 months or once in 25 years
Rare	1	May occur in exceptional circumstances e.g. 1-2% chance within the next 12 months or once in 50+ years

Table 9-2 Consequence Rating Scale

Consequence	Level	Description
Catastrophic	5	Disaster with extensive loss and long term consequences; Threat to viability of service or operation
Major	4	Critical loss or event requiring replacement of property or infrastructure; Long term impact on organisation
Moderate	3	Significant loss with temporary disruption of services ; Medium term impact on organisation
Minor	2	Minor loss with limited downtime; Short term impact; Mostly repairable through normal operations
Very Minor	1	Isolated or minimal loss; short term impact; repairable through normal operations

After the likelihood and consequence factors have been determined, the level of risk is calculated by multiplying the likelihood of occurrence and consequence rating together.

Risk = the likelihood of an event occurring X the consequence of such an event.

The final outcome is a risk rating. The risk rating enables definition between those risks that are significant and those that are of a lesser nature. Having established the comparative risk level applicable to individual risks, it is possible to rank those risks. Four risk categories were used: Extreme, High, Medium, and Low.

Table 9-3 Risk Factor Assessment Matrix

Likelihood	Consequence				
	Very Minor (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost Certain (5)	Medium	Medium	High	Extreme	Extreme
Likely (4)	Medium	Medium	Medium	High	Extreme
Possible (3)	Low	Medium	Medium	High	Extreme
Unlikely (2)	Low	Low	Medium	Medium	High
Rare (1)	Low	Low	Low	Medium	Medium

Table 9-4 Risk Level

Overall Risk Level	Actions
Extreme	Immediate action required to reduce risk
High	Senior management attention to manage risk
Medium	Management responsibility must be specified and risk controls revised
Low	Managed by routine procedures

The initial risk is calculated based on considering the likelihood and consequences as if there are no measures in place to prevent or mitigate the risk occurrence. Essentially, initial risk is an exercise to determine “What is the worst that could happen?” Once the initial risk is determined it is necessary to evaluate the effectiveness of current systems and processes to identify the revised risk and then formulate an action plan to further reduce the likelihood or consequences of identified risks occurring.

9.3 Asset Resilience Planning

The NSW State Infrastructure Strategy 2012 highlighted the importance of resilient public and private infrastructure, defining resilience as the capacity to withstand disruption, absorb disturbances, act effectively in crisis and deal with climatic variability. The IIMM defines resilience as "*The Concept of resilience is wider than natural disasters and covers the capacity of public, private and civic sectors to withstand disruption, absorb disturbance, act effectively in a crisis, adapt to changing conditions, including climate change and grow over time".*

From an asset management perspective there are two important dimensions of resilience that are particularly relevant. These are technical or asset resilience and organisational resilience. International Infrastructure Management Manual provides a risk management approach to resilience planning - Section 3.2.8 – Assessing Infrastructure Resilience.

State Infrastructure Plan also recommended that -
To ensure whole-of-life assessment of infrastructure risk and resilience issues. To ensure Shoalhaven Water's assets are managed in a sustainable way, Shoalhaven Water needs to:

- consideration of risk and resilience outcomes for new and upgraded infrastructure be embedded in project business case guidelines, capital asset planning and assurance processes as a matter of course.
- as part of the new asset management processes Shoalhaven Water undertake periodic assessments of the vulnerability of assets to the impacts of climate change (such as sea level rise), natural disasters (such as floods, bushfires, heatwaves and storms) and human-related threats (such as cyberattacks).

9.3.1 Resilience Planning Steps

1. Identification of asset to determine hazards and vulnerability. Short term/long term impacts.
2. Risk assessment to determine likelihood and consequence – short term/long term impact.
3. Lifecycle cost analysis of high risk assets (maintenance costs, remaining useful life, rehab - replace or renewal options, cost benefit analysis of options, other issues).
4. Determine resilience approach, Accommodate, Protect/defend or Retreat based on cost benefit/business cases.
5. Consult with stakeholders.
6. Priorities and implementation of mitigation measures, or resilience approach.

9.3.2 Other Options

- Financial resilience – Having funds available to deal with unplanned events
- Links to the emergency management
- Designing for resilience at the planning and concept stage of asset development.
- Resilience in supply chain.

9.3.3 Adaptation

To improve resilience, Shoalhaven Water will need to consider how to adapt to these risks. The IPWEA Practice Note 12 identifies *climate change adaption as a range of response that are implemented with the expectation of reducing the impact of climate change*.

Adaptation measures include –

- Accommodate;

- Protect/defend; or
- Retreat.

Accommodate is described as accommodating the affects in a harmonious way without resisting or retreating. This involve modifying existing infrastructure in situ without any addition protection methods. An example of this would be to utilising pressure sewer system in the same location to provide an alternative approach to the management of wastewater services.

Protect/defend is described as placing a physical barrier between the asset and the impact zone to reduce the expose. This option would include the construction of retaining structures or sea walls however if these measures are implemented then the measure themselves should become assets which would require management into the future and adequate budgeting would need to be allocated for the whole of life costs of these protection assets.

Retreat from climate changes is self-explanatory. This option is identified as the most difficult particularly with high value long life assets such as SPS and STP's.

To determine the most effective and cost-effective approach Shoalhaven Water will need to undertake a cost benefit analysis considering the whole of life costs of options to determine the most cost-effective approach which is consistent with Shoalhaven Water's/Council's levels of service.

The effects of natural disasters and climatic change has the potential to significantly affect Shoalhaven Water's assets and the operation of those assets and affords a significant risk to the organisation if not managed effectively.

9.4 Risk Register and Action Plan

Critical events relating to tower assets have been identified as part of a preliminary risk assessment and the controls and risk treatment are summarised in the table below.

Table 9-5 Risk Register and Action Plan

Risk Issues	Causes	Consequences	Current plans	Initial Risk				Recommendations, strategies to mitigate	Residual Risk				Responsibility
				Cat.	Consequence	Like-hood	Risk Level		Cat.	Consequence	Like-hood	Risk Level	
Structural Failure of Tower	Storm event	Loss of telecommunications, including emergency services - loss of life	Towers engineered and constructed to withstand wind events	Health & Safety	Catastrophic	Unlikely	High	Condition assessment every 5 years, carriers required to provide structural analysis when adding new equipment, limiting load on towers to 90%	Health & Safety	Catastrophic	Rare	Medium	Water Asset Planning & Development Manager
Structural Failure of Tower	Storm event	Loss of telecommunications, including emergency services - loss of local telemetry and monitoring for Water & Waste Water facilities	Towers engineered and constructed to withstand wind events	Operational	Moderate	Unlikely	Medium	Maintenance schedules	Operational	Moderate	Rare	Low	Water Asset Planning & Development Manager
Loss of antennas, feeders, communications hut	Bushfire	Loss of telecommunications, including emergency services - loss of life	Monitoring of tower locations during bushfire events	Health & Safety	Catastrophic	Likely	Extreme	Maintenance of APZ, identified high risk sites in emergency plan to be protected during fire events, communications staff in EMC during fire events, monitoring during fire events.	Health & Safety	Catastrophic	Unlikely	High	Water Asset Planning & Development Manager
Loss of antennas, feeders, communications hut	Storm	Loss of telecommunications, including emergency services - loss of life	Monitoring of tower locations during storm events	Health & Safety	Catastrophic	Likely	Extreme	Identification of nearby trees likely to pose risk to site, trimming trees for storm mitigation, Lightning protection and earthing checks, good housekeeping, regular asset inspections, monitoring during storm events.	Health & Safety	Catastrophic	Possible	High	Water Asset Planning & Development Manager
Loss of antennas, feeders, communications hut	Bushfire	Loss of telecommunications, including emergency services - loss of life	Monitoring of tower locations during bushfire events	Operations	Moderate	Likely	Extreme	Maintenance of APZ, identified high risk sites in emergency plan to be protected during fire events, communications staff in EMC during fire events, monitoring during fire events.	Operations	Moderate	Rare	Low	Water Asset Planning & Development Manager
Loss of antennas, feeders, communications hut	Storm	Loss of telecommunications, including emergency services - loss of life	Monitoring of tower locations during storm events	Operations	Moderate	Likely	Extreme	Identification of nearby trees likely to pose risk to site, trimming trees for storm mitigation, Lightning protection and earthing checks, good housekeeping, regular asset inspections, monitoring during storm events.	Operations	Moderate	Possible	Medium	Water Asset Planning & Development Manager
Loss of antennas, feeders, communications hut	Vandalism	Loss of telecommunications, including emergency services - loss of life	Security fencing	Health & Safety	Catastrophic	Unlikely	High	Locked gates, barriers to prevent entry, removing clients identified as high-risk, identified at-risk sites install CCTV	Health & Safety	Catastrophic	Rare	Medium	Water Asset Planning & Development Manager

Risk Issues	Causes	Consequences	Current plans	Initial Risk				Recommendations, strategies to mitigate	Residual Risk				Responsibility
				Cat.	Consequence	Like-hood	Risk Level		Cat.	Consequence	Like-hood	Risk Level	
Loss of antennas, feeders, communications hut	Vandalism	Impairment to telecommunications, loss of some services, minor damage	Security fencing	Operations	Moderate	Unlikely	Medium	Locked gates, barriers to prevent entry, removing clients identified as high-risk, identified at-risk sites install CCTV	Operations	Moderate	Rare	Low	Water Asset Planning & Development Manager
Site Access unavailable	Storm	Site repairs not able to be undertaken quickly, no access for generators, loss of site due to no power	Operational		Moderate	Likely	Medium	Road maintenance, condition assessment of access tracks, ensure roads are suitable for access requirements	Operational	Moderate	Possible	Medium	Water Asset Planning & Development Manager
Site Access unavailable	Track deterioration	Site repairs not able to be undertaken quickly, no access for generators, loss of site due to no power	Operational		Major	Likely	High	Road maintenance, condition assessment of access tracks, ensure roads are suitable for access requirements	Operational	Moderate	Possible	Medium	Water Asset Planning & Development Manager
Unauthorised tower access	Site clients accessing tower without permission	Site users or contractors climbing towers without permission, Death or other WHS incidents, damage to tower or antennas / feeders	Intruder resistant fence	Health & Safety	Catastrophic	Likely	Extreme	Compulsory site inductions, list of site inductees, site security, locked gates, climb prevention physical barriers, CCTV at identified high-risk sites, controlled keys, access certification requirements, licence agreements for site users	Health & Safety	Catastrophic	Unlikely	High	Water Asset Planning & Development Manager
Unauthorised tower access	Members of the public accessing tower	Death or injury, damage to tower or antennas / feeders	Intruder resistant fence	Health & Safety	Catastrophic	Likely	Extreme	Site security, locked gates, climb prevention physical barriers, CCTV at identified high-risk sites, controlled keys	Health & Safety	Catastrophic	Rare	Medium	Water Asset Planning & Development Manager
Terrorism	Attack on telecommunications site	Loss of communications from site	Intruder resistant fence	Health & Safety /	Catastrophic	Unlikely	High	Site security, locked gates, climb prevention physical barriers, CCTV at identified high-risk sites, controlled keys	Health & Safety / Operatio	Catastrophic	Rare	Medium	Water Asset Planning & Development Manager
Radio Frequency	Interference with other users in area	ACMA forcing shutdown of transmitter, loss of communications from component of network		Operational /	Major	Unlikely	Medium	Use of licensed links	Operational / Legislative	Very minor	Unlikely	Low	Water Asset Planning & Development Manager
Water / Waste water supply – Radio interference/frequency interuption	Interference from other users in the area with Shoalhaven Water frequencies	Loss of communications from that part of the network	Mainly licensed frequencies	Eng / Operational	Moderate	Possible	Medium	Exclusive use of licensed frequencies	Eng / Operational	Minor	Possible	Medium	Water Asset Planning & Development Manager

10 Financial Summary

10.1 Introduction

10.1.1 Expenditure Definitions

Expenditure and revenue projections within this plan have been classified as capital (new and renewal) or operating, in accordance with generally accepted accounting practice.

Shoalhaven Water has developed an asset management policy that reflects accounting treatment of activities for infrastructure asset components. It has approved the use of this policy, and these definitions have been applied during the development of this asset management plan.

Expenditure on infrastructure assets can be categorised into five main areas:

- Operations and Maintenance (Sustaining Assets)
- New Works - Growth
- New Works – Asset Enhancement
- Renewals/Replacement
- Disposals

These are discussed below.

10.1.2 Operations and Maintenance (Sustaining Assets)

Operations and maintenance expenditure that is required for the day-to-day operation of the network whilst maintaining the current levels of service. Examples of this type of expenditure are:

10.1.3 Routine maintenance

This includes day to day maintenance which is required on an ongoing basis and is budgeted for, and reactive maintenance is unexpected and necessary to attend to immediately to continue operation of the service.

10.1.4 Major periodic replacements

This includes non day-to-day maintenance which is identified in advance and is incorporated into a maintenance budget for a certain time period.

10.1.5 Other operating costs

These include energy consumption costs, cleaning costs, fleet and management and administration costs.

10.1.6 New Works – Asset Enhancement

Enhancing service delivery (ie the level of service provided by the business unit) through upgrades to the asset base.

10.1.7 Renewals/Replacement

Renewal expenditure includes rehabilitation and replacement of assets to restore an asset to its original level of service, i.e. capacity or the required condition. Renewals expenditure forecasts cover the cost of asset renewal through its whole lifecycle through to disposal of the asset.

Renewal expenditure is work that restores an existing asset to its original level of service, i.e. capacity or the required condition.

Rehabilitation involves the repair of an existing asset, or asset component. Rehabilitation doesn't provide for a planned increase in the operating capacity or design loading. It is intended to enable the assets to continue to be operated to meet the current levels of service.

10.1.8 Disposals

Disposal is the retirement or sale of assets whether surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under utilisation
- Obsolescence
- Provision exceeds required level of service
- Assets replaced before its predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social).

10.1.9 Assumptions

Shoalhaven Water has adopted a 20 year planning horizon for water and sewer, the minimum required by State Government Best Practice Guidelines. The following assumptions are incorporated into the current 20 year model:

- No State Government subsidies
- CPI increases for future years = 3% p a
- Loan borrowings – Period of loan = 15 years
- Interest rates for new loans = 8.75%

10.2 Asset Valuation

Asset valuations are currently undertaken by the finance division using aggregated asset data (high level). Shoalhaven Water will complete a component level valuation in 2015/2016. Asset valuations were based on externally-provided valuations.

The MEERA valuation for 2015-2016 was $6,178,000.

Valuations for the Browns Hill and Deering St sites are based on replacing the reservoir with a monopole of the same type as the Currarong tower.

Table 10-1 Tower Age and Value

Tower	Age	Age Range (years)	Value
Cambewarra	11	11 - 15	$1,123,000
Moeyan Hill	13	11-15	$69,000
Red Rocks	32	31-35	$400,000
Fishermans Paradise	21	21-25	$663,000
Currarong	12	11-15	$281,000
Huskisson	13	11-15	$249,000
Sassafras	18	16-20	$345,000
Sussex Inlet	23	21-25	$498,000
Bewong	22	21-25	$539,000

West Ulladulla	23	21-25	$563,000
Vincentia	1	1-5	$500,000
Coonemia	17	16-20	$312,000
Clover Hill	13	11-15	$74,000
Browns Hill	58	56-60	$281,000
Deering St	58	56-60	$281,000

Figure 10-1 Historical Asset Value (Replacement Cost)

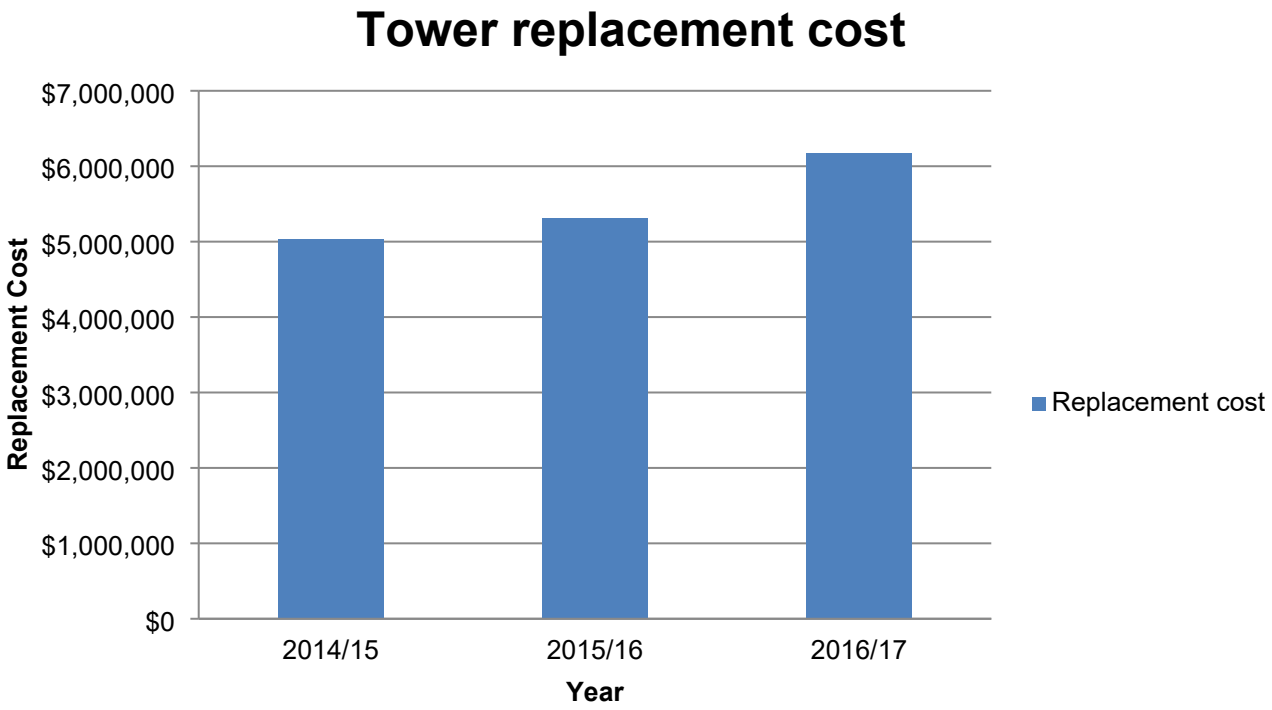
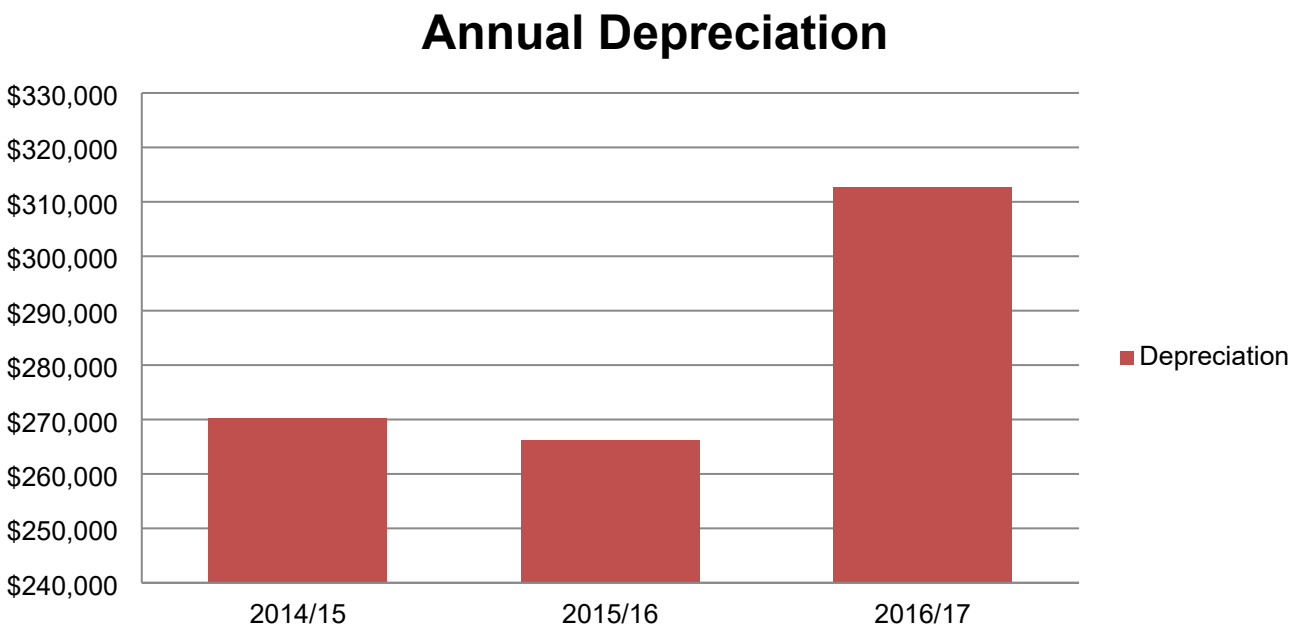


Figure 10-2 Historical Annual Depreciation



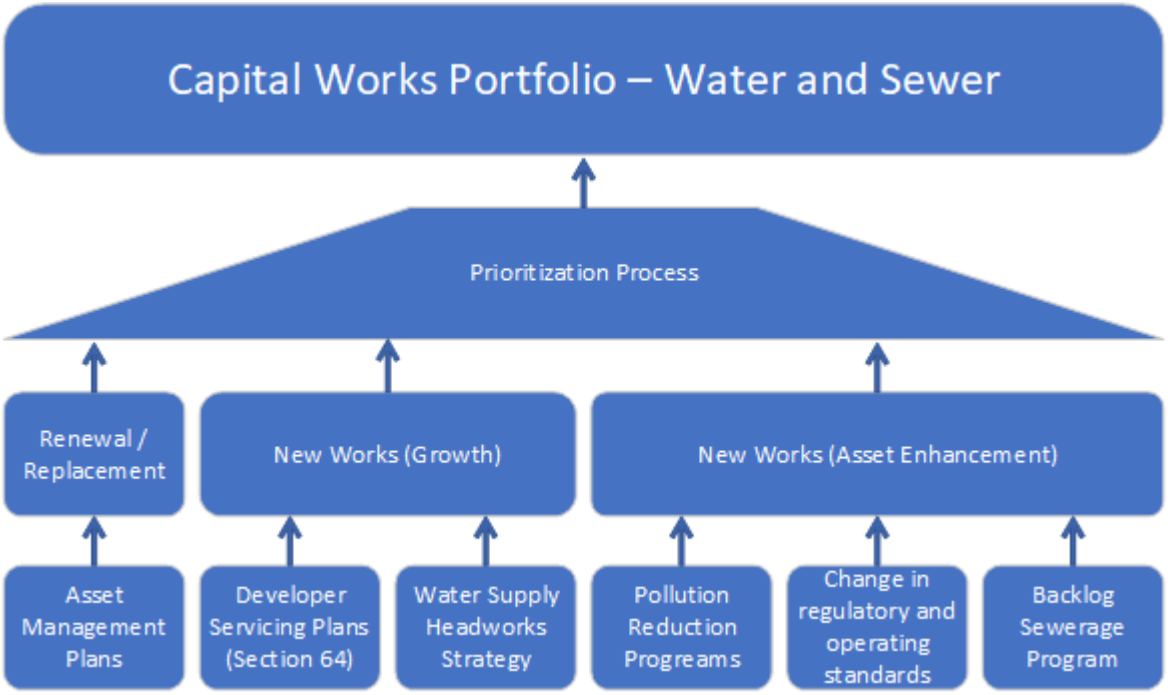
The towers revaluation in 2016/17 caused the increase in the annual depreciation for that year.

The Asset Information Framework report (April 2013), prepared by GHD, included a review of Shoalhaven Water unit rates and base lives. That report also included recommendations with respect to Shoalhaven Water's valuation practices and development of a new component-level valuation methodology by 2017.

10.3 Capital Investment Decision-Making

The water, wastewater, and general funds provide for capital programs each year for renewal/ replacement works, new works for growth and new works for asset enhancement. The "building blocks" or drivers of these programs are given in the diagram below.

10.3.1 Building Blocks for Capital Investment Programs



10.3.2 Capital Investment Program

The capital investment program will include Moeyan Hill roadworks, West Ulladulla and Red Rocks tower replacements and Vincentia generator. The West Ulladulla and Red Rocks tower replacements are required due to growth, with both towers above 90% loading, and further strengthening impractical and not cost effective.

Council models the 20-year financial forecasts as required under the Best Practice Guidelines. The water and sewer funds are managed in a manner to achieve an operating surplus in each fund and seeks to pay a dividend to Council. Dividends were paid to Council's General Fund in accordance with Best Practice allowances since 2003/04. (SW Strategic Business Plan 2015/16 – Pg. 5)

10.3.3 Project Prioritisation

Through the Capital Investment Master Project Program (2013) each project is ranked in priority based on the scores generated from the priority matrix. There are 3 (three) key areas from which the scores are determined and these areas are further broken down into smaller sub-groups. The scoring for each sub-group is out of 10 and weighted in relation to its overall importance.

The list below shows each group and its weighting

- Spend (25%)
  - Budget value ($) (40%)
  - Duration / Timeframe (years) (30%)
  - Required Completion Date (30%)
- Condition (25%)
  - Condition (50%)
  - Meets Regulatory Requirements (50%)
- Criticality (50%)
  - Availability of other options (20%)
  - Consequence of Failure (70%)
  - Human Intervention (10%)

Once ranked each project is then assigned a start date based on either on need or on its position against the other projects currently running and pending. This is then reassessed visually on the Gantt chart to ensure it is able to be resourced appropriately and that it will be completed before any deadlines that may apply.

10.3.4 Renewal/Replacement Decision Making

Assets are renewed when it is more cost effective in the long term to replace rather than continue to maintain the asset. There are two elements to renewal decision-making:

- **Renewal financial forecasts** are based on asset depreciation, lifecycle costs and reliability/operational redundancy.
- **Asset renewal decisions** are identified through analysis of criticality, condition and performance information gained through inspections, advanced analysis techniques and maintenance activities.

Renewal decision-making has been reviewed in conjunction with Asset Criticality Framework & Management Strategies Report (GHD 28 March 2013). This report used population, critical customer, environmental considerations, critical infrastructure and legislative requirements to categorise infrastructure.

10.3.5 New Works (Growth and Enhancements) Decision Making

New works (growth and enhancement) is generally driven by the capacity of the asset to continue to service stakeholders' requirements. Council's position is that once a tower reaches 90% loading, and strengthening is required, but the cost and practical considerations mean that asset replacement can be brought forward where even though the asset is still in good condition, replacement is the most cost effective option.

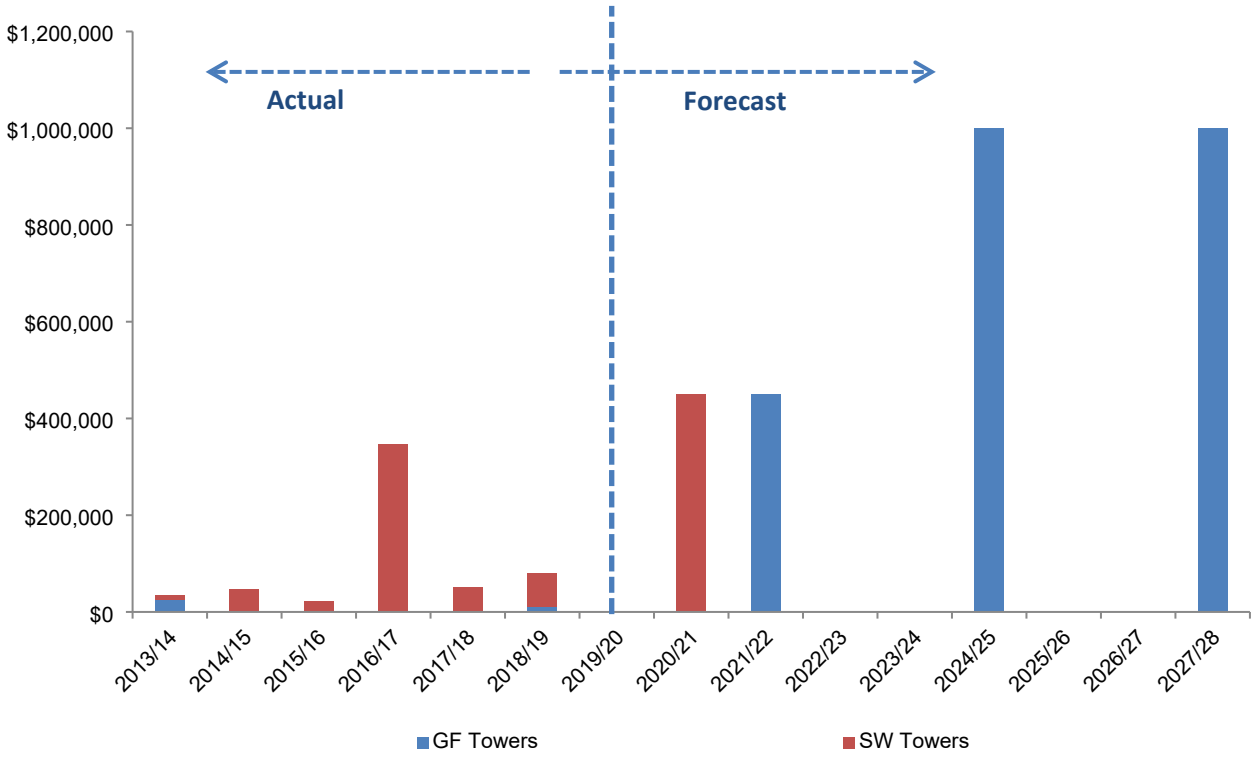
10.4 Financial Statements and Projections

10.4.1 Capital Works Expenditure

Over the period 2002 to 2013 the amount of renewal capital works has been relatively minor, primarily due to the relatively new age and quality of the existing communications assets. In 2016/17 the expenditure increased to around $350,000, due to a new tower being built.

These figures provide a broad-based categorization of the drivers for the capital works program, but some caution also needs to be applied. Individual projects do not necessarily fall neatly into a "growth", "renewal" or "enhancement" category and can be a combination of all three, which would not be reflected in the financial information for the project.

Figure 10-3 Capital Works Expenditure History and Forecast



Renewals/replacements dominate the capital works expenditure forecast, particularly over the second 10 years. Asset enhancements are significant in the first two years as a result of 3 key projects, Cambewarra tower demolition, Vincentia tower replacement and the proposed towers at West Ulladulla and Red Rocks. Other capital works proposed include the Moeyan Hill road upgrade, however further investigation is required prior to finalising this project.

The supporting expenditure table is shown below.

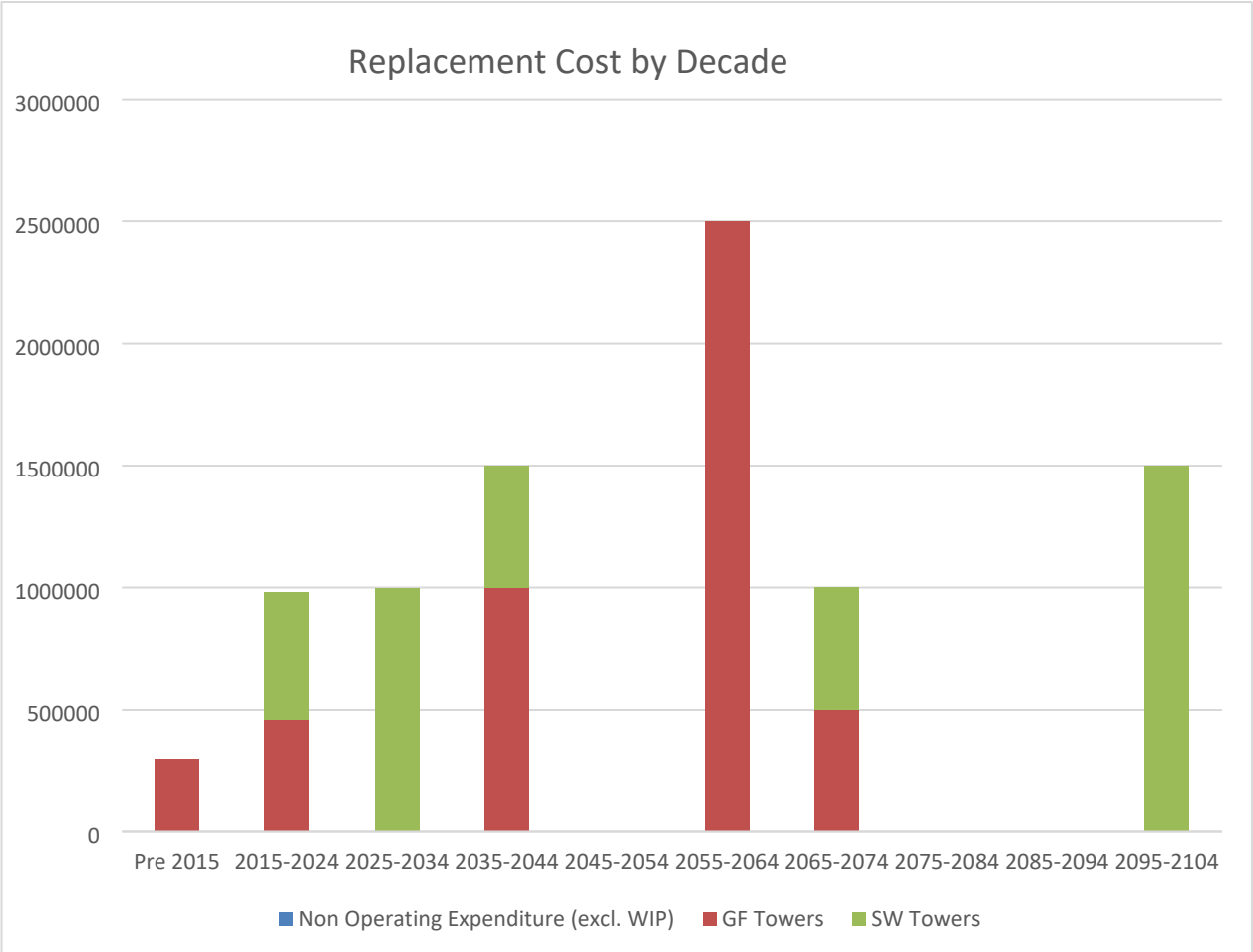
Table 10-2 Capital Works Expenditure Forecast

	Revised Budget incl revotes excl WIP	Budget Yr	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Budget		**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**	**2027/28**
Non Operating Expenditure (excl. WIP)											
GF Towers		10,000			450,000			1,000,000			1,000,000
SW Towers		70,000		450,000							
Total - Non Operating Expenditure		**80,000**	**0**	**450,000**	**450,000**	**0**	**0**	**1,000,000**	**0**	**0**	**1,000,000**

10.4.2 Renewals Forecast

The following graph provides a snapshot of future tower replacement requirements, based on design asset life only. The timeline has been grouped into decades for simplicity.

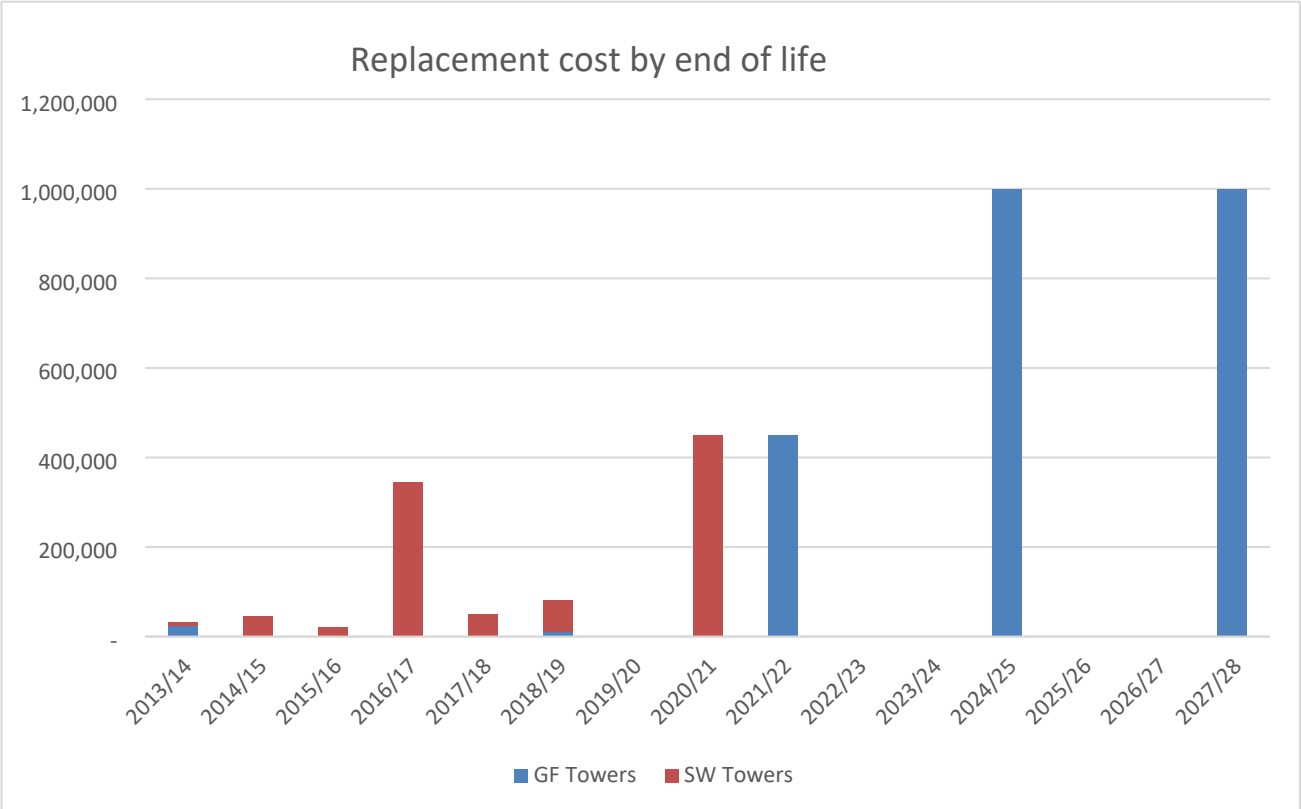
Figure 10-4 Replacement Cost by Decade to be Replaced (based on the End-of-Design Life)



The graph indicates major replacement liabilities between 2055 and 2064. This is a reflection of the relatively young age of the towers, and their assumed life.

The financial planning period for the capital works program is 20 years, and the 20 year period expanded from the above graph is given below.

Figure 10-5 20-Year Replacement Cost by End-of-Life (Design Life)



10.4.2.1 Microwave Renewals

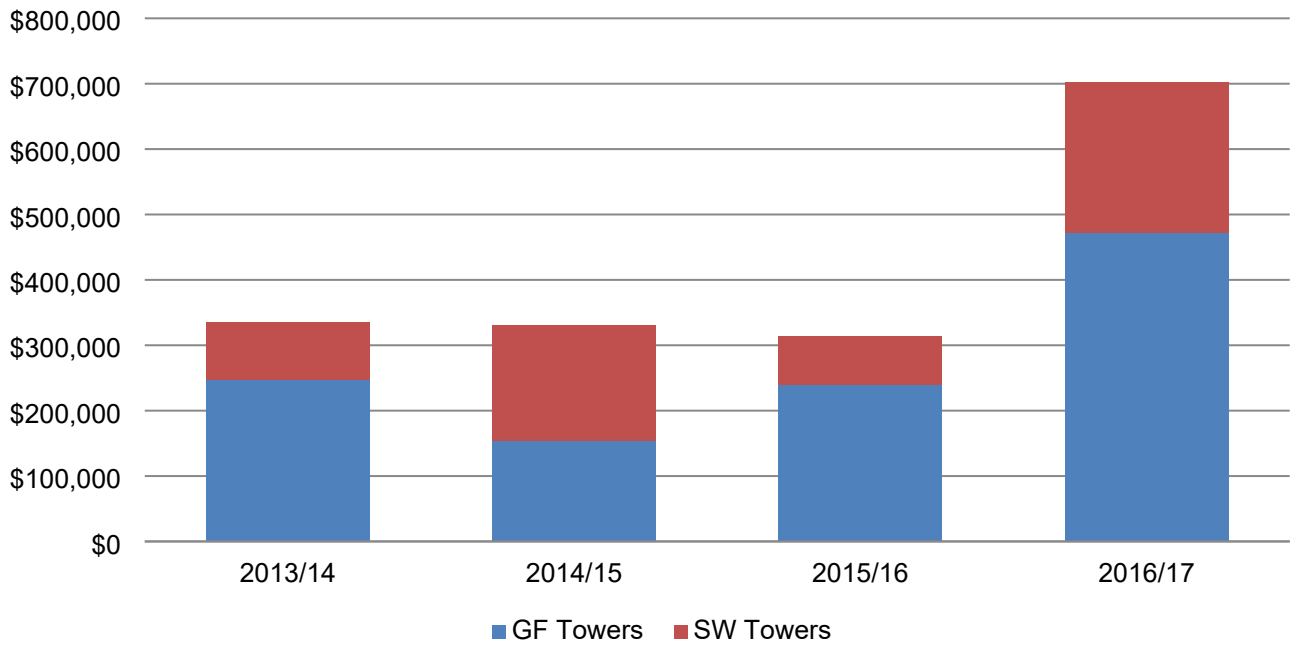
The condition and performance of the microwave network is an integral component of Shoalhaven Water and Shoalhaven City Council's level of customer service. The replacement of the microwave network from an industry perspective is largely driven by technology changes.

10.4.3 Operations and Maintenance Expenditure

10.4.3.1 Operations and Maintenance Expenditure History

Communications site historical maintenance expenses are shown in the graph below.

Figure 10-6 Maintenance Expenditure History



Although current maintenance expenditure are considered to be sufficient to meet current service levels, further work is required to develop more robust projections of future best practice maintenance scheduling.

10.4.3.2 Operations and Maintenance Expenditure Forecast

The 20-year operations and maintenance expenditure forecast is shown in the graph below, broken down into the expenditure categories.

Figure 10-7 Microwave Network Operations and Maintenance Expenditure Forecast

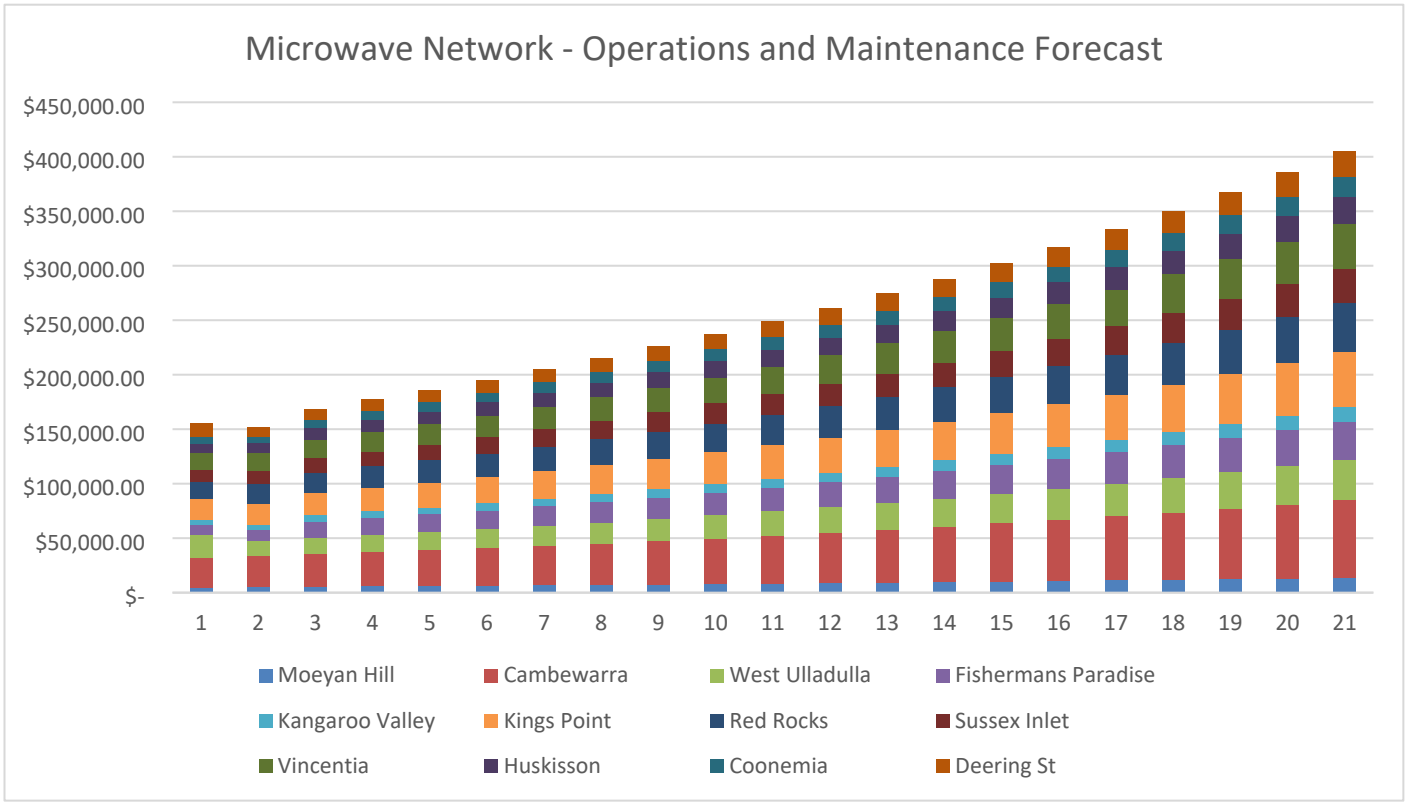
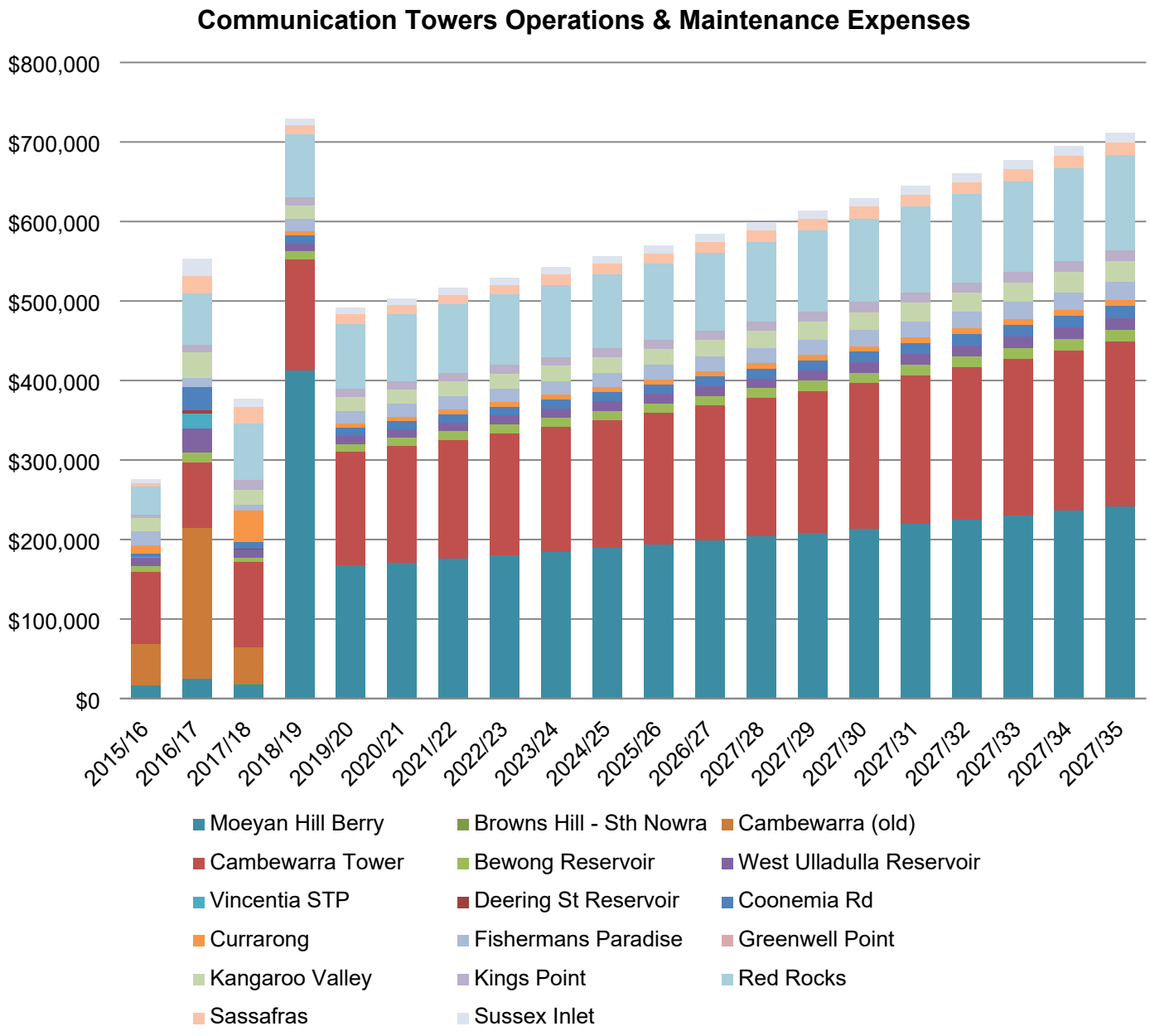


Figure 10-8 Communication Towers Operations and Maintenance Expenditure Forecast



Note – High value in 2016/17 year due to works associated with site maintenance prior to demolition of old Cambewarra tower

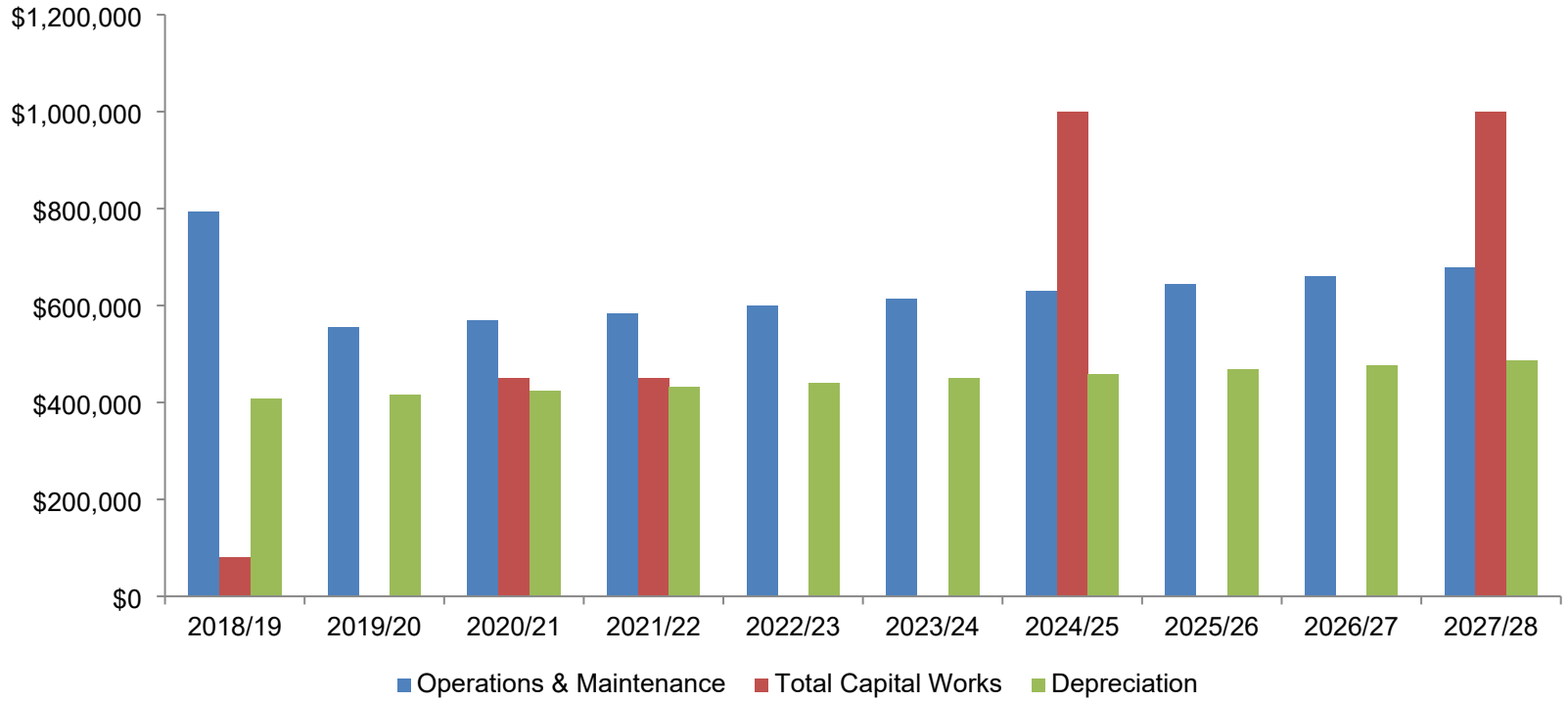
Note – High value forecast for 2018/19 year due to planned road maintenance at Moeyan Hill communications site

Note – Management, plant and other expenses excluded from graph above as these are expenses which are not directly attributed to individual asset or asset classes.

10.4.4 Expenditure Summary

The 20-year financial projections for planned operating expenditure (operations and maintenance), total capital works and depreciation are given in the graph below.

Figure 10-8 20-Year Financial Forecast



Note – Management expenses excluded from graph above as these are expenses which are not directly attributed to individual asset or asset classes.

The current program allows for a “smoothing” of the replacement peaks With little data to validate or dispute the assumed asset lives at this stage, the model will be refined through “what if” scenarios.

Table 10-1 Total Expenditure Forecast

Category	Year 1	Year2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Total Capital Works	80,000	0	450,000	450,000	0	0	1,000,000	0	0	1,000,000
Depreciation	406,841	414,978	423,277	431,743	440,378	449,185	458,169	467,332	476,679	486,213
Operations & Maintenance	792,192	555,747	569,640	583,881	598,479	613,440	628,776	644,496	660,608	677,124

11 Service Delivery Model

The operations and majority of routine maintenance activities for communications assets are currently undertaken by council workforce. Some specialized maintenance tasks (eg tower inspections) are carried out by external contract as Council does not have the resources and/or equipment to economically undertake the activity.

Mechanical and electrical maintenance is currently carried out by Shoalhaven Water's communications services sections that operate under Shoalhaven Water's, Water Operations and Maintenance sections.

Some minor construction activities are undertaken by Council staff, but the majority of construction projects are undertaken by contract. This model places more emphasis on internal project management resources and further assessment of technical resources will be required to determine future requirements.

12 AMP Improvement and Monitoring

12.1 AMP Performance Measurement

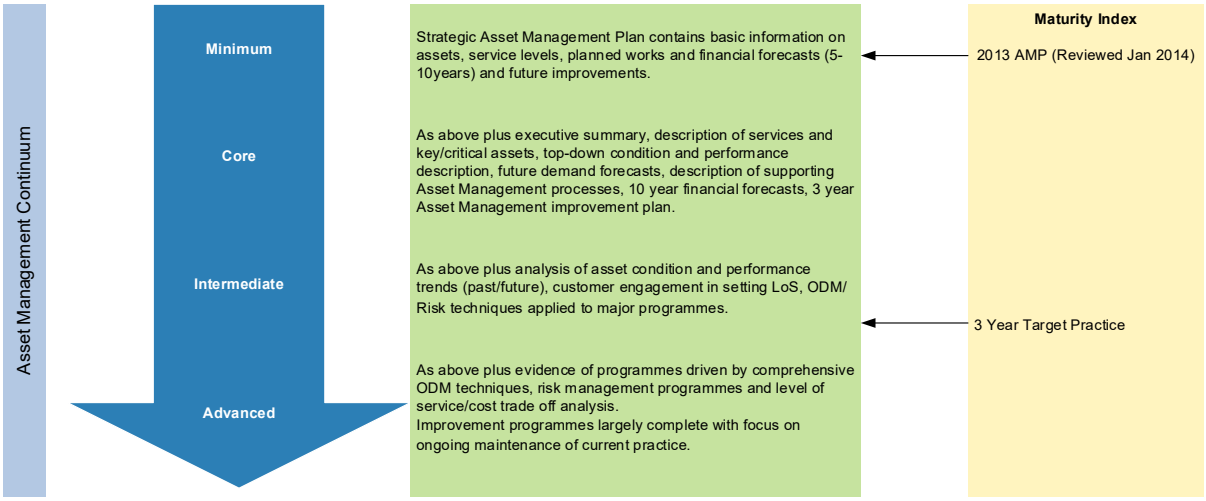
The effectiveness of the asset management plan can be measured in the following ways:

- The degree to which the required cash flows identified in this asset management plan are incorporated into council's long term financial plan and Strategic Management Plan;
- The degree to which 1-5 year detailed works programs, budgets, business plans and organisational structures take into account the 'global' works program trends provided by the asset management plan;
- External or internal assessment against best practice guidelines.

12.1.1 Core and Advanced Asset Management

The development of an Asset Management Plan (AMP) is undertaken over a number of years. Its evolution is dependent on the commitment by Shoalhaven Water and the organisation as a whole to continuous improvement and to provide ongoing investment in its asset management capability. The maturity index provides an indication of where the AMP sits in the asset management continuum, based on the International Infrastructure Management Manual (IIMM 2011).

Figure 12-1 The Asset Management Maturity Index



12.1.2 Shoalhaven Water Communications AMP

In January 2014, Shoalhaven Water engaged an external consultant to undertake a review of the 2013 Water and Sewer AMPs. The AMPs were reviewed against a range of criteria under ten aspects of the asset management framework. The purpose of the review was to identify and prioritise any gaps in the AMP documents and focus improvements to provide the greatest benefit towards achieving Intermediate to Advanced AMP status (based on the International Infrastructure Management Manual AMP Maturity Index).

Overall, the 2011 AMP was found to present a preliminary summary of the asset information available to Shoalhaven Water, however significant improvements were required to both structure and content to improve the AMP. The AMP was found to be at the minimum level of AMP development as demonstrated in Figure 12-1 above.

Shoalhaven Water aims to improve the AMP to an intermediate level, with a score of above 0.70. A prioritised list of improvement tasks was provided as part of the AMP review and was used to inform this update to the AMP. Due to time constraints this AMP update incorporates some, but not all of the recommended AMP improvements. Further improvements are required to advance the asset management activity to the upper intermediate level of development and these improvements are outlined in the improvement plan section of this AMP.

The AMP status and programme for improvements is explained below:

The 2013 AMP Review showed the AMP at core level of development.

Since the 2013 AMP Shoalhaven Water has continued to make significant improvements in asset management planning and practices and these are recorded in this AMP update.

Shoalhaven Water aim to improve the AMP to an intermediate level and an AMP framework has been developed (not yet populated) to achieve this.

The new AMP framework will be progressively updated.

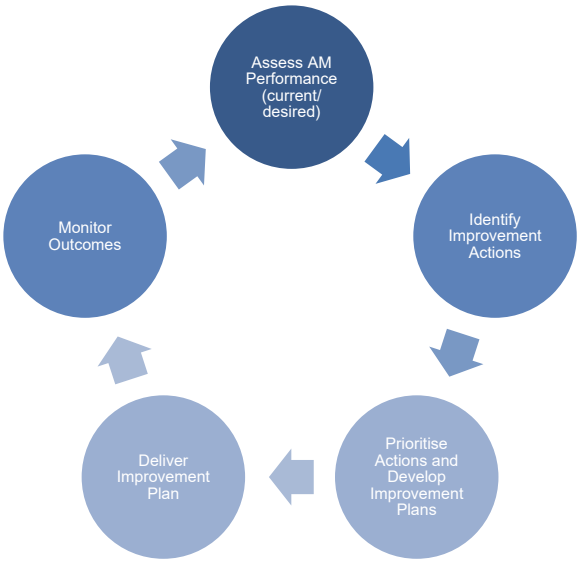
12.2 Continuous Improvement

Shoalhaven Water is adopting a strategic management approach to improvement planning, and implementing improvement processes and practices. This Improvement Plan is integral to that approach, quantifying current business practice and measuring progress toward an identified future position.

12.2.1 Improvement Cycle

The purpose of the Improvement Plan is to identify, prioritise and implement specific projects and tasks that will increase the level of maturity over time.

Figure 12-2 Continuous Improvement Cycle



12.2.2 Current Practice Assessment

The first step of asset management improvement planning is to understand the current and future "appropriate practices". To do this in a systematic way the following elements will be assessed:

- Asset Management Policy Development
- Levels of Service and Performance Management
- Demand Forecasting
- Asset Register Data
- Asset Condition
- Risk Management
- Decision Making
- Operational Planning
- Maintenance Planning
- Capital Works Planning
- Financial and Funding Strategies
- Asset Management Teams
- Asset Management Plans
- Information Systems
- Service Delivery Mechanisms
- Quality Management
- Improvement Planning

These key elements are critical to achieving sustained performance of the organisation at the lowest life cycle cost and to form a clear picture of how well it is performing in each of these elements and where the weaknesses lie. Each of the elements "adds value" to the raw business processes which leads to good asset management practice.

12.2.3 Identified Improvement Actions

A clear understanding of the gap between current and appropriate practice will help drive identification of improvement actions. However identifying improvements should also be an on-going activity, not just a "one-off" gap assessment process.

Improvement actions need to be clearly scoped and defined. Failure to recognise the full costs associated with improvements may see the projects inadequately resourced and potentially not meeting the desired outcomes.

12.2.4 Develop Improvement Plan & Prioritise Actions

The Improvement Plan will be developed to identify the high priorities requiring action to focus the organisation on the most important areas. Utilising a simple improvement framework that has a clear relationship to the assessment elements will help people understand how the actions relate to the appropriate level of asset management required.

12.2.5 Deliver the Improvement Plan

The Improvement Plan needs to be strongly led, properly resourced and regularly monitored and reported by a steering group. Clear targets must be well defined with well specified deliverables that help focus on what is required.

12.2.6 Monitor the Outcomes

Organisations are under pressure to show the quantifiable benefits from improving asset management outcomes and this is a real challenge across local government. Regular asset management assessments using the frameworks in this section are currently the best way to demonstrate on-going improvement to asset management practices. Assessments should be undertaken over a number of years to track progress.

12.3 Current Asset Management Practice Assessment

In September 2012 Shoalhaven Water, as part of its commitment to improving asset management practices over time, commissioned GHD to undertake an Asset Management Capability review. Following the recommendations made in this review, Shoalhaven embarked on a number of improvements across the business and in September 2014 commissioned GHD to review progress against the initial set of recommendations.

The maturity of the activity across the 9 assessment areas and 17 key asset management elements are shown in Table 12.2 and below. The blue bar in Figure 12-3 represents the baseline maturity determined in September 2012. Green is the recommended target to be achieved by 2016/17. Orange depicts the progress to September 2014 confirming the maturity advancements over the last 2 years.

The framework used to assess the maturity levels of each AM element is from the International Infrastructure Management Manual (IIMM). These elements have also been utilised to develop strategies for improving asset management practices over the next three years later in the section.

As depicted in Figure 12-3 below, progress to September 2014 shows consistent and steady improvements in asset management with the largest increases are in programming and data and information.

An updated list of business enhancement projects and priorities was produced to enable Shoalhaven Water to achieve an intermediate (competent 60 status) level of Asset Management Practice by June 2017.

Figure 12-3 Asset Management Maturity Assessment and Improvements as at September 2014

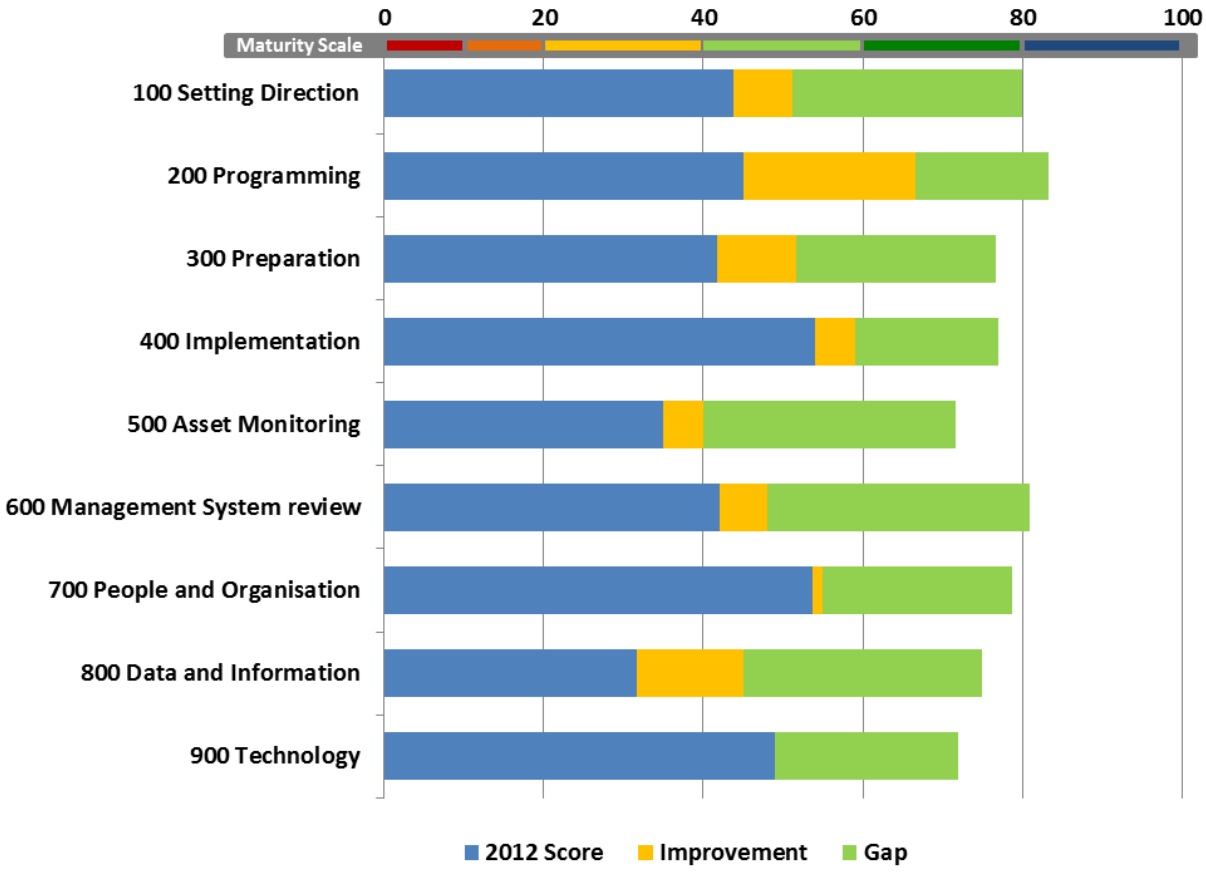
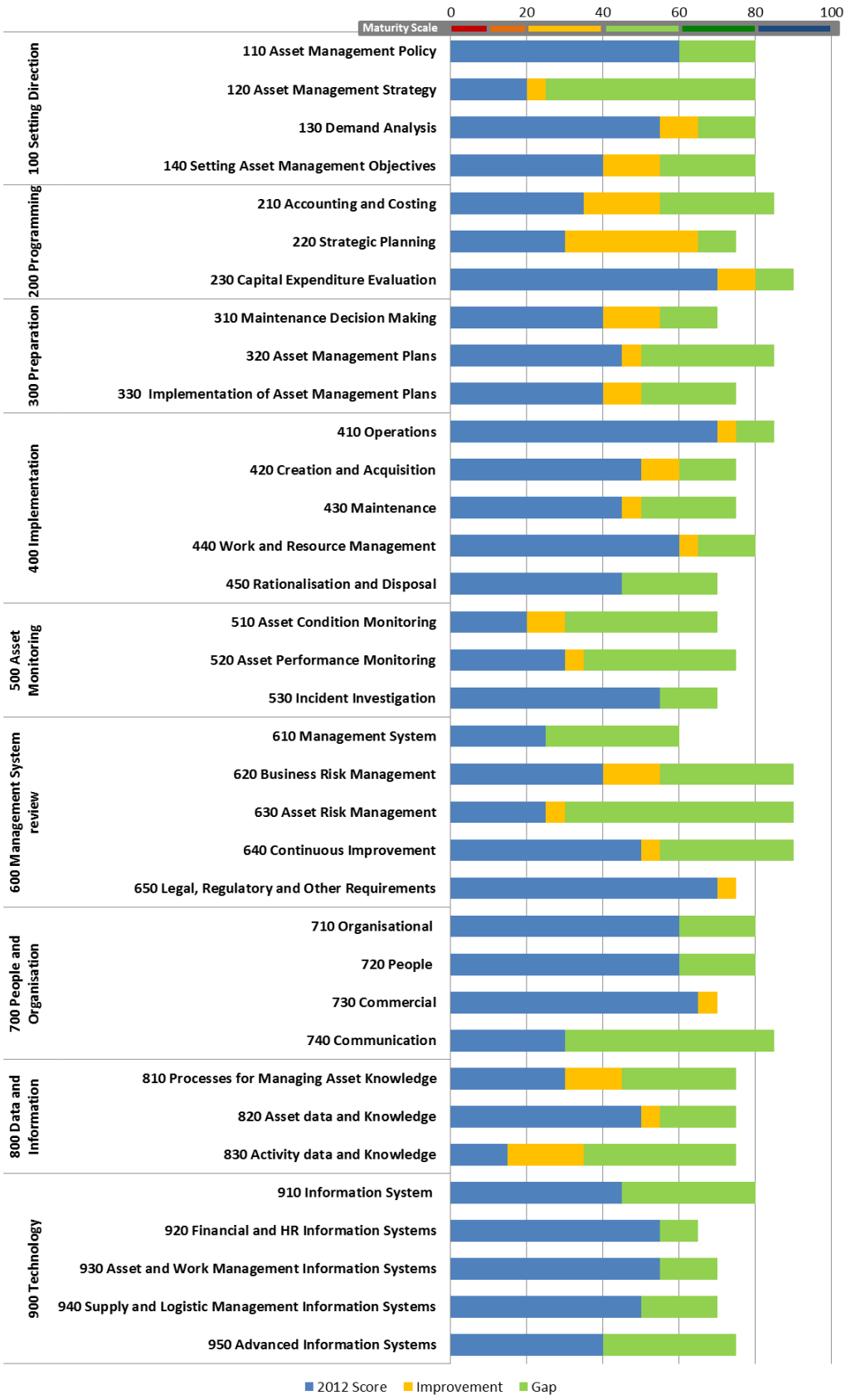


Figure 12-4 Assessment Element Results



12.4 Achievements

The improvements achieved over the past 2-3 years are summarised briefly below:

- Implementation of ArcGIS Collector App for mobile condition assessment
- Development of Survey 123 for complex asset condition assessment.
- Development of GIS Officer Procedures documentation.
- Componentisation of Asset Register to component level
- Development of a Shoalhaven Water Asset Management Policy
- Review of Shoalhaven City Council Asset Management Strategy
- Adoption of a Community Engagement Policy, customer surveys and reporting
- Development of an Asset Information Framework
- Development of a Capital Investment Framework and Prioritisation Methodology and documentation of the business processes and policy
- Strategies to provide a program for system augmentation and capital works
- Asset Criticality Framework and Management strategies, Criticality Framework Implementation and Critical Assets Management Strategies
- Development of a Framework for the Asset Management Plans
- Asset Management Plan Review
- Established a Shoalhaven Water Asset Management Steering Group and a Terms of Reference.
- Collector and other Asset Data Collections
- Asset Data Hierarchy Review.
- Asset Information Confidence Rating.
- Development of Customer Service Plan
- Update AMP's

12.4.1 Setting Priorities

A thorough asset management review process will often identify more improvements that an organisation is able to realistically deliver within a short timeframe. Therefore, there is a need to prioritise these actions so they are realistic and affordable.

The projects/tasks are prioritised based on the gap between the current maturity and what is the appropriate target for the business unit, versus the cost. Table 12-1 below provides a general meaning ranging from Priority A (very high priority) to Priority E (very low priority).

Table 12-1 Prioritisation General Meeting

Priority		Explanation
A	Very High priority	These improvement tasks provide very high value for money and should be implemented in the short term (ie in the next year). The improvement tasks identified will provide the most benefit (e.g. overall improvement towards the appropriate target) for the least cost (less than $10,000) Typically the higher benefit ones improve legislative compliance, greatly enhance operational efficiency, provide significant cost savings or mitigate major risk
B	High Priority	These improvement tasks provide high value for money and should be implemented in the short to medium term
C	Medium Priority	These improvement tasks provide a medium level of value for money and should be considered for implementation in the longer term
D	Low Priority	These improvements provide relatively low value for money, and should only be implemented after higher priority improvement tasks
E	Very Low Priority	These improvement tasks provide the least benefit for the highest cost, and should only be implemented if they are a pre-requisite for another task, or there are no other higher priority tasks.

12.4.2 Three-Year Improvements

The tables that follow contain the improvement projects/tasks to be undertaken over the next 3 years across the organisation and specific improvements to be undertaken for the water supply activity. The table includes levels of resources, funding and priorities (based on the above matrix) for each identified improvement task.

- Improvements specific to the communications sites are: Streamlining of billing processes to allow clients that are on a licence or lease to be invoiced automatically every year.
- Transitioning older clients on to a licence for site usage.
- Process mapping
- Business process development
- Tracking of power interruption notifications

Table 12-2 Improvement Plan

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW120.02	Shoalhaven Water and Wastewater Asset Management Strategy	Shoalhaven City Council has an asset management strategy, which provides guidance to Shoalhaven Water. Developing a water and wastewater strategy will enable specific management of issues and tactics. Ideally this project would be completed prior to the appointment of the new Council to allow for it to be adopted.	Develop a Shoalhaven Water Asset Management Strategy that aligns with the Shoalhaven Water Asset Management Policy and incorporates inputs from the various teams that contribute to the management of Shoalhaven Water assets Undertake workshops with relevant staff.	Complete	Dec 2018	½ day	C	$20-$40K	Project Sponsor : Rob Horner Project Lead: Matthew Kidd Dependencies : SW110.01
SW130.02	Key Customer Engagement Schedule	Supplementary Item	Consider developing a stakeholder schedule and approach for the frequency of engagement with key customers, such as Manildra and the Naval Base. Engagement with customers and stakeholders provides an understanding of their service level expectations and future requirements.	In Progress 40% Complete	Dec 2018	1 day	B	<$5k	Critical customers are currently being mapped into in GIS Trade waste customers are displayed in GIS. This information is utilised as part of monitoring critical points in the system. Project Sponsor: Rob Horner Project Lead: Tony Holmes Dependencies: Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW140.01	Levels of Service Framework	There are linkages in place from the strategic objectives set by Shoalhaven City Council and Shoalhaven water, through to the tactical and operational measures and targets. A robust Levels of Service Framework would demonstrate the linkages more clearly. A need to review the performance measures was also identified, as there are areas where performance could be measured that would be valuable to the organisation, however they are not currently being measured.	Document the linkages between the levels of service and the Shoalhaven Water Asset Management Policy and Shoalhaven City Council Asset Management Policy Demonstrate how the legal, regulatory, statutory, stakeholder, customer and business requirements have been considered in developing the levels of service Define the existing and future performance measures and targets Define the period and process for reviews of the levels of service Informally benchmark the LoS against other similar sized service providers to assess appropriate practice for Shoalhaven Water.	Completed	2nd revision is due for release in late 2016	1 day	C	<$20K	Version 1 Customer Service Plan has been released in May 2015 This document will be continuously updated on an annual basis. Project Sponsor : Rob Horner Project Manager : Matthew Kidd Dependencies : SW110.01

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW210.01	Manufacturers Lifecycle Costs	Obtain lifecycle costs from the manufacturers so this information can be utilised in the decision making process for purchasing. It may prove more economical in the long run to have assets that initially cost more to purchase and install but have a longer base life and lesser maintenance requirements.	Establish a life cycle information check during project scoping / business case / design phases. This will require the ability to recognise that proposed assets are new types and therefore trigger request to manufacturers for life cycle cost information	In Progress 35% Complete	Sept-Dec 2020	2 days	B	<$5k	This information requirement has been incorporated into the preferred supplier agreement for pumps The mini hydro project also captures the life cycle cost information and was used in decision making process. Lifecycle costs utilised for REMS and Porters Creek Dam projects. \ Built Life Cycle costs into AMS. Data will need to be populated as it becomes available. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: SW210.04

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW210.04	Asset Valuation	Asset valuations are currently undertaken by the finance division using aggregated asset data (high level). SW will be required to complete a component level valuation in 2017 using rates and base lives that are regularly revised and consider the local context. It is likely that comparable component level unit rates will become available in the future as the practice of valuing infrastructure assets at component level becomes more widespread in NSW. To bridge the gap in the interim, the Asset Information Framework report (2013) recommended that Shoalhaven Water: Develop a database of actual contract values for water and wastewater infrastructure projects. Where possible, obtain comparable component-level unit rate or contract values from local councils or water utilities elsewhere in Australia, especially neighbouring regions. Develop a programme to determine component-level unit rates appropriate to Shoalhaven's context for use in future revaluations. This project addresses the above recommendations.	Develop a Replacement Costs Reference Database Develop and implement a methodology for how Shoalhaven Water will develop standard component unit rates and base lives for application in the 2016/17 valuation. Refer to the Asset Valuation Project Scope for more detailed description of these tasks.	80% Progress	Dec 2018	100 hours	B	$160K	SW have continued to implement the existing valuation methodology. The Asset Information Framework report (April 2013), prepared by GHD, included a review of SW unit rates and base lives (see above – SW210.03 – for a summary of the recommendations). That report also included recommendations with respect to SW's valuation practices and development of a new component-level valuation methodology by 2017. These recommendations have been incorporated into the revised scope of this project. Shoalhaven Water have engaged GHD to undertake valuation, componentisation and condition assessment of all above ground headworks and distribution assets for the 2016/17 valuation. Asset Register is being componentised to bring valuation level down to component level. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: SW820.04

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW220.02	Capital Works Program Plan	Shoalhaven Water have a capital works program in place, however they recognise that there could be a more proactive approach used to identify the projects over a longer period of time.	Develop a water and wastewater Capital Program Plan for projects approved within the program (e.g over 4-5 years) and those projects that fall outside of the program to be undertaken at a later date The Plan should include an assessment or explanation for each program on the following: What it involves Why it is being done Benefit of implementing Consequences of not doing the program Options considered Impact on operations Program delivery risks Total cost Robustness of the cost estimate	25% Progress	June 2022	5 day	C	$20K-$40K	Although the suggested summary capital program plan has not been utilised significant efforts have been made to identify and program capital works requirements for both water and wastewater through the development of the water and wastewater servicing strategies (outlined below) Shoalhaven Water will be revising the existing Strategies and updated the Development Servicing Plans over the next 12 months. Project Sponsor: Rob Horner Project Lead: Craig Singleton

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW310.01	Operations, Maintenance and Renewals Program	It is recognised that Shoalhaven Water maintains assets effectively. A more proactive approach to maintaining or renewing these assets, considering the criticality of the assets would be beneficial. The Berry project will provide a pilot set of information for the development of the Operations, Maintenance and Renewals Program.	Develop and implement a proactive operational, maintenance and renewals program, placing the initial focus on the most critical assets as identified in the critical asset identification process, as per the critical asset policy and implementation project (SW630.01). Consider using a reliability centred maintenance approach in the development of the proactive maintenance program.	In Progress 30% Complete	June 2021	5 days	A	TBA	The Asset Criticality Framework and Management Strategies were completed in late 2013 and mid 2014 as outlined below. Asset Criticality Framework and Management Strategies (March 2013): Definitions of critical assets and customers and the criteria for identifying them Methodology for implementing the criticality framework General strategies for managing critical assets and customers. Criticality Framework Implementation (Oct 2013): Critical assets and customers identified for both water and wastewater Next Steps and Recommendations provided. Critical Assets Management Strategies (July 2014): Review of SW management strategies for critical water and wastewater assets Recommendations to improve SW practices. Project Sponsor : Rob Horner Project Manager : Craig Singleton Dependencies : : Criticality Framework and Strategies SW630.01

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW320.01a	Development of Water & Sewer Asset Management Plans (Version 2 & (Version 3)	Shoalhaven Water have complete Version 1 of the Water and Sewer AMPs adopting the section heading above in SW320.01. These sections have been populated with readily available information but there are a number of gaps that will need filling over the next 12-18 months.	Develop an AMP template including headings, tables, base text and notes for the following sections: Introduction Business overview Strategic Overview Levels of Service Growth & Demand Environmental Stewardship Risk Management Life Cycle Management Business Processes Projects and Financial Forecasts Improvement Planning Relevant appendices	Annual updates proposed. 100% Complete	2nd Version April - June 2015 3rd Version Dec 2016	5 days 5 days	B B	$40-$50K $20-$40k	Progress will be made throughout the year to populate the Water and Sewer AMPs. Revision 3 - Water AMP completed Sep 16. Project Sponsor : Rob Horner Project Manager : Matthew Kidd Dependencies: The outputs of many of the projects identified through this report will: Provide key information inputs Be summarised or referenced or Could be standalone chapters (eg Risk).

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW320.03	Non Water or Wastewater Assets, Asset Management Plan (long term)	While water and wastewater assets are key to delivering the services provided by Shoalhaven Water, there are also non water or wastewater assets that support the service delivery that need to be considered such as vehicles, equipment and other plant.	Link to the Non Water or Wastewater Asset Information Capture project (SW820.02) Review the extent of non-Wastewater and Water assets owned by Shoalhaven water Consider the need to develop an asset management plan for these assets If a need is identified, develop an AMP for the corporate assets (in the corporate template)	Complete	Sept 2018	10 days	C	$20k	An asset management plan has been developed for the communication towers and is being utilised however this will be updated to standard template as per water and sewer AMP's Tracking devices have been installed on a number of mobile assets Minor progress has been made for AMP inputs for plant, vehicle fleet and buildings Fixed plant and equipment will be captured in GIS and the Asset Register as part of the componentisation of complex assets (cf. SW210.04). This is proposed as part of Valuation project currently underway with GHD. Project Sponsor : Rob Horner Project Manager : Matthew Kidd Dependencies : SW820.02

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW320.04	Expand and Update the Water and Sewer Stories	Shoalhaven Water currently has Water and Wastewater “Stories” that communicate the services they provide to customers and stakeholders. These documents were produced in 2005, so are now out of date. There is also an opportunity to develop these documents further so they can become the user friendly executive summaries of the asset management plans.	Update and further develop the Shoalhaven Water and Sewer “Stories” concept. Incorporate as the executive summary in the asset management plans.	50% Complete	June 2020	3 days	C	$5k-$10k	Shoalhaven Water CSP completed and finalised August 2016. Project Sponsor : Rob Horner Project Manager : TBA Dependencies : : Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW420.02a	National Codes of Practice	The Water Services Association of Australia (WSAA) has developed a series of national codes of practice covering the design and construction of water and wastewater infrastructure. The benefits of these national codes are: To facilitate consistent national reform and regulation of the water industry To provide a transitional mechanism for sharing water industry specialist expertise as internal Water Agency resources diminish To provide a common technical reference fo the development of industry training and skills accreditation programs for private setor suppliers To enhance the mobility of suppliers eg designers and constructors by reducing parochial technical impediments to trade, and Improve the Australian water industry's interface with international companies.	Shoalhaven Water will be progressively adopting the following codes as the foundation to its technical specification for the design and construction of water, wastewater and reclaimed water assets in the Shoalhaven Local Government Area: WSAA Polyethylene Pipeline Code – WSA01-2004 WSAA Sewerage Code of Australia – WSA02-2002 V2.3 WSAA Water Reticulation Code of Australia – WSA02-2011 V3.1 WAA Sewage Pumping Station Code of Australia – WSA04-2005 V2.1 WSAA Conduit Inspection Reporting Code of Australia – WSA05-2008 V2.2 WSAA Pressure Sewerage Code of Australia – WSA07-2007 V1.1. Develop a Supplement to each code which will contain additional information to cover: Shoalhaven Water's detailed requirements for specific matters which the Code anticipates individual water agencies will address Variations to the Code where its requirements are not compatible with Shoalhaven Water's specific requirements.	Complete	June 2017	20 days	C	<$10k	Shoalhaven Water's, Water and Sewer Supplements to the WSAA code in being updated proposed completion March 2017 Shoalhaven Water staff on WSAA Pumping Station Code review panel. Review expected to be completed March 17 Project Sponsor : Rob Horner Project Manager : Matthew Kidd Dependencies : SW420.02

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW430.02	Complete the Recycled Water Quality Management Plans	Recycled Water Quality Management plans are a legislative requirement for Shoalhaven Water. These are currently under development.	Develop a Recycled Water Quality Management Plan	Complete	March 2017	1 day	B		A policy was adopted in 2013 for recycled water quality The REMs project is following the new Australian Guidelines (AGWR) Focus is being given to management at the treatment level and monitoring of the water quality to ensure it meets the compliance requirements The current agreements with users (expires in 2016) sets out what users can do. These will be renegotiated as part of REMs 1B for completion in 2017. Project Lead: Walter Moore
SW430.03	Accessibility to information improvement process		There are a number of processes and procedures in place around the operation of assets; however the documentation around these processes is difficult to access. Review accessibility and implement improvements to increase the accessibility of these documents.	30%	Dec 2019	3 days	C	<$10k	Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: Asset Management System Review and Implementation.

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW430.04	Development of a Disinfection Code of Practice	A Disinfection Code of Practice outlines work practices to be followed by anyone working on the networks. The driver for this project is to protect public health by protecting the water supply from contamination that can arise through poor handling during maintenance or construction works.	Develop a Disinfection Code of Practice that outlines best practices to be followed by any person working on the water supply network Review current disinfection processes being carried out Meet with Operations and Project Management staff to understand disinfection processes and issues Develop a step-by-step process and methodology for this to be integrated into operational and construction processes. Communicate new processes with relevant staff.	Cancelled no longer required.					Project no longer required. SOP being developed by Water Engineer to work in with WSAA Water Supply Code and SW Supplement to the Code.

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW430.05	Develop a Formal Capital Handover Policy Acceptance Procedure	While there is a conscious effort in the organisation to keep the Operations Team involved in each stage of project delivery, there are generally no formal project handovers.	Develop a Capital Handover Procedure stipulating the details for final inspection, connection of new assets, asset information to be collected and formal handover requirements. Consider parties (operations, contractors, developers) and ensure the procedure meets requirements from each. Run a workshop session to brainstorm how this process could be improved, or incorporated into the detailed design review process. Consider incorporating a CCTV check on new pipes prior to handover. Investigate options to improve the “work as executed” and design plans being lodged with Council for capital works prior to final contract payment, if these are specified in the contract. Develop a step-by-step process and methodology for this to be integrated into operational and construction processes. This project should be carried out in conjunction with SW430.06.	In Progress 40% Complete	Dec 2019	6 days	A	<$20K	The new structure has made allowance for a new role to implement the new standards. This role is intended to be appointed prior to the end of the year. A streamlined approach has been implemented involving the following stakeholders in the initiation, planning and construction of Capex projects Operations Representative Project Manager Representative Mechanical or Electrical Representative Shoalhaven Water is part of a working group to develop an industry standard. CCTV checks are now undertaken as appropriate prior to acceptance of the asset. New Survey Design and WAE specification finalised Sep 2016 New GIS procedures document completed in draft form. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: Nil.

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW430.06	Asset Information Transfer and Recognition Procedures	A number of significant changes to asset data management are occurring at SW: Shoalhaven Water's asset information is to be migrated to a new asset management system The SCC Finance Department are implementing a move to monthly capitalisation of assets (currently this done on an annual basis). SW's complex assets will be componentised in the asset register to meet future requirements to value SW's assets on a component basis (refer project SW820.04). It is intended that budgets and lifecycle actions and costs will allocated and recorded against individual assets in the Authority system The process for receiving and processing new or updated asset information between the SW Development and Assets Units has recently been redesigned (as part of a restructure of the Shoalhaven Water Asset Planning and Development section). This project addresses the development of procedures and controls required to: Ensure on-going data quality and alignment between GIS and the asset register (this is an	Review of Asset Data and Drawing Standards Develop asset data and drawing standards to ensure received information meets completeness and reliability standards. Review of Asset Information Handover Procedures Develop asset information handover procedures which ensure: Asset information is received and processed in a timely manner. Asset data and drawing standards are implemented for all handovers Asset information changes originating from all sources of WAE and Data Correction Requests are formally documented as part of the handover process. Review Protocols for Creating or Updating Asset Records Develop asset record creation/updating protocols which ensure: Asset records are created/updated in both GIS and the Asset Register in a timely manner. Additions or changes to asset information in GIS are transferred to the Asset Register in a timely manner. Define Requirements for Asset Capitalisation and Reconciliation	New Project 80%	Dec 2018	10 days	A	$20-$40k	This is a new project and will be part of the Asset Data Migration Program. Complex assets being componentised in existing asset register. Revised Survey, Design and WAE specification completed. GIS procedures document completed. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: TBA

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
		objective of SCC's Asset Management Strategy). Enable component-level management of asset lifecycle information. Support the monthly capitalisation of assets.	Liaise with SCC Finance to define Determine the requirements for asset capitalisation and reconciliation going forward, and Develop the processes and procedures to ensure these requirements are met going forward Refer to the Asset Data Migration Program Scope for more detailed description of the scope of this project. This project should be carried out in conjunction with SW430.05 and SW440.03.						

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW440.01	Project Management Framework	The current project management system has been developed intermittently and is not considered to be as effective as it could be.	Develop a Project Management Framework incorporating both systems and practices. Review current project management systems and practices used by Shoalhaven Water and identify issues with these systems. Identify key business drivers and how these relate to, and are incorporated into the systems and practises. Identify any issues. Run a workshop session to brainstorm how this process could be improved. Incorporate Health and Safety considerations. Develop a step-by-step process to demonstrate when and how the systems and practices should be used. Communicate the process to staff. Research and recommend a mechanism (eg intranet?) for staff to follow the framework. Identify and recommend systems and practises that need to be further developed.	In Progress 60% Complete	Dec 2020	7-10 days	C	<$5K	A draft project management policy has been developed. Stakeholder survey has been undertaken to gain insight into the different methodologies that are being utilised. Workshops have been undertaken with various groups and a methodology has been outlined to stakeholders. Continuous Improvement Team working on project. Project Sponsor: Robert Horner Project Lead: Craig Singleton Dependencies: Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW440.02	Customer Services Water Manual with Work Order Priority Schedule	Work orders are currently ranked by importance; however the understanding of level of importance varies from person to person. Customer services would benefit from a better understanding of water and wastewater issues and definitions around appropriate response times for work orders logged in Merit.	Develop a manual with structured questions relevant to water/wastewater. Include photographs of assets and faults Introduce the prioritisation of response definitions as part of this process	In Progress 5% Complete On hold Pending CRM upgrade and system admin	Dec 2020	5-10 days	C	$5K	Some inception thinking has been undertaken including the review of categories in merit Project Sponsor: Tony Holmes Project Lead: Michelle Murden Dependencies: Nil
SW440.03	Contractors review	Identify and record which contractors undertake remedial and capex works in the asset register. This will provide the ability to review contractor performance over the entire network and identify possible construction issues.	Include the following attribute fields in asset records: Name of Contractor, Contract Number, Contract Value. Also capture this information in the Replacement Cost Reference Database (refer SW 210.04) This project should be undertaken in conjunction with SW430.06.	In Progress 100%	Dec 2018	2 days	C	$5k	Contractor details fields added to the AMIS. Replacement cost database to be supplied as part of Valuation project.

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW510.01	Asset Condition Assessment Program	A cyclic asset condition assessment program is not currently in place with condition assessed on an ad hoc basis. This means there is not a holistic view of the condition of assets, or a holistic understanding of what the renewal liability looks like over the short-medium or long term.	Develop and implement a cyclic asset assessment program that uses an industry accepted condition and performance grade based assessment framework i.e. from the International Infrastructure Management Manual (IIMM). Note: the condition assessment programme should be co-ordinated with the field surveys of complex assets that will be carried out under SW 820.04. Review existing practises and develop a complete list of asset types and the current inspection frequencies. Develop the required frequency and type of inspections. Align condition assessments to the asset valuation cycle to provide a greater linkage between depreciation funding and renewal spend. Agree the delivery model for collecting condition information on an ongoing basis considering in-house use of operations and maintenance staff or contract resources	In Progress 60% Complete	Dec 2019	10 days	A	$20K	Funding has been secured for the 2014/2015 financial year to undertake condition surveys ($400k). A program will be developed with identified critical assets as the first priority Condition ratings will also be captured as part of the field surveys required to componentise complex assets (treatment plants, pump stations, etc.) (refer SW 820.04). Mobile applications used to collect asset condition information for hydrants, valves, manholes and mains. Condition assessment will be undertaken on above ground headworks and distribution assets (excluding pipes) as part of 2016/17 asset valuation project. Project will result in condition based valuation and depreciation in lieu of current practices. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: TBA
SW510.01a	Trunk Main Relining Benefits Analysis	Relining has been undertaken on a number of trunk mains. Analysis needs to be undertaken to assess the benefits of the relining program	Undertake analysis to determine success rates and criteria for measuring future investment benefits	Deleted					Project deleted as cost benefit analysis undertaken on a project by project basis

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW530.02	Incident Investigations Criteria	Supplementary Item	Develop and implement a formal criteria and process for conducting incident investigations	In Progress 10% Complete	Dec 2019	3 days	C	<$10k	Project Sponsor: Rob Horner Project Lead: Andrew McVey Dependencies: Nil
SW620.01	Tactical Risk Identification, Analysis, Register and Action Plan	There is a need to improve the identification, analysis, management and communication of risk at a tactical level. A simple but effective risk register that is linked to the corporate risk register, and identifies the gross risk, mitigation measures in place, and management options available will improve the understanding of Shoalhaven Water risks. The process will allow Shoalhaven Water to identify the current level of risk, make an assessment on whether the level of risk is acceptable, and identify the options to reduce the level of risk to an acceptable level.	Develop a risk register and risk action plan for Risk Management based on AS/NZS ISO 31000:2009 (supersedes AS/NZS 4360) Integrate existing risk framework elements i.e. policy, and risk framework Establish criteria for identification, analysis and evaluation of risk, including consequence and likelihood criteria. Develop a suitable format of risk register table / spread sheet to enable the incorporation of risks identified to date Undertake a risk workshop to identify risks at a tactical level. Analyse the level of risk and identify controls to reduce the level of risk to an acceptable level. Develop and implement a risk action plan. Develop risk action plan format Populate and complete risk action plan This project has been incorporated as part of the Asset Management Plan (SW320.01a), but can be done as a standalone project.	In Progress 60%	May 2019	1 day	B	$25K-$35K	Project Sponsor: Carmel Krogh Project Lead: Robert Horner Dependencies: Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW630.01a	Operations Criticality Implementation	In 2013/14 Shoalhaven Water undertook the development and implementation of a criticality framework (refer SW630.01). The Critical Asset Management Strategies report (July 2014) identified a number of operational actions with respect to identified critical asset management strategies. These included: Identification of critical assets and customers in GIS (this has been included within the scope of SW820.03) Implementation of management strategies in relation to specific asset classes.	Implement the identified management actions as specified in the Critical Assets Management Strategies Report (July 2014).	New Project	June 2021	30 days	B	<$20k	This is a new project.
SW640.01	WSAA Benchmarking Mobilisation & Review	Shoalhaven Water does not currently undertake Water Services Association of Australia (WSAA) benchmarking process. While it is a current practice adopted by the water sector to take part in the reviews, it is recognised that at this stage in Shoalhaven Waters level of maturity, there would be more value in investing in business improvement and undertake the benchmarking during the next round of assessments in 2015/16	In the long term, consider participating in the Water Services Association of Australia (WSAA) benchmarking process (Next scheduled for 2015/2016).	Complete	Sept 2019	30-40 days	D	TBA approx $75-$100K	The registration process will need to be completed in late 2015 with the preparation for the assessment being done January-March 2016. Resource allocation and program to be developed once timing confirmed Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW740.02	AM Internal Communication Strategy	Supplementary Item	Develop a communication strategy for AM Policies, Strategies and Plans to staff at all levels in Shoalhaven Water.	Complete	Oct - Dec 2018	2 days	C	<$10k	Shoalhaven Water's Assets and Projects Unit is responsible for management of Policy, Plans and Standards related to Asset & Asset Management. A strategy will be developed to outline communication within the organisation to review, disseminate and monitor internal documentation. Asset Management Steering Committee will be responsible for review and implementation of plans, policies and strategies. Existing doc - SW design standards, supplements, WAE documentation, AMP's AM Policy Project Sponsor: Rob Horner Project Lead: Matthew Kidd Project Manager: Fiona Bowman Dependencies: Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW810.02	Prioritisation of CCTV investigations and program	CCTV is currently used to investigate the condition of underground assets and there is an on-going program in place. The investigations are not currently aligned to a condition survey program. Ideally assets should be assessed at regular intervals so that risks and issues can be identified in advance and good information is available to support the development of renewals forecasts.	CCTV investigations are a subset of the Asset Condition Assessment Program (SW510.01) Review CCTV investigations undertaken over the past 5 years and the method by which assets are currently prioritised for inspection. Develop an understanding of the frequency of inspections, completeness of inspections and information recorded. Develop a methodology for prioritising CCTV investigations (based on asset size, criticality, existing condition information and known areas of concern for Shoalhaven Water). Workshop and confirm the proposed prioritisation method. Prioritise future CCTV investigations and develop a CCTV survey and re-survey schedule to ensure condition information is up to date and can be used to support decision making Information from the CCTV surveys should be used to grade the condition of the pipes in accordance with the definitions in the condition grade framework and this condition grade information should be captured against the asset in AMIS and GIS Align asset condition grading with the Asset Condition	In progress 80%	Sep 2019	2 days	B	$10-$15K	Undertake analysis to assess benefits(inflow and infiltration) Review root cause analysis approach. Review expired assets Review critical assets Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
			Assessment Program (SW510.01)						
SW820.03	Data Remediation and Improvements	Shoalhaven City Council (SCC) is in the process of reviewing its asset management needs. This will include migrating Shoalhaven Water's (SW) asset information to a new asset management system. The migration presents an opportunity to establish a new asset register which is as up-to-date as possible. Shoalhaven Water has determined that the GIS database, rather than the current asset information system, will be the master source of asset data to be transferred, because the data in GIS is more up-to-date. This project addresses a number of data fixes and improvements required to prepare for the migration, including fixing known data issues and implementing recommended improvements in GIS. If these issues are not addressed prior to the migration there is a risk that they will not be addressed later.	General Data Remediation and Improvements: Water Asset Hierarchy Adjustments Asset IDs and Naming Conventions in Authority Asset Documents and Drawings GIS Remediation and Improvements: Valves classification and symbology adjustment Fixing continuity problems GIS Backlog Fixing the "Touga" issue Criticality fields (critical assets + critical objects) Data confidence rating fields Refer to the Asset Data Migration Program Scope for detailed scope descriptions of these tasks.	In progress 80%	Ongoing	10 days	A	$TBC	Ongoing Data remediations and improvements (see data completeness report 2016) Asset componentisation underway as part of valuation, componentisation and conditions assessment project for above ground headworks and distribution assets (excluding pipes). Valve classification and symobology adjustments complete. GIS backlog completed. Critical assets and customers identified. Data confidence rating applied to all incoming WAE information and included in asset register. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: New AMS.

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW820.04	Componentisation of Complex Assets	The componentisation of SW's complex assets within the asset register is a pre-requisite to carrying out component-level valuations (refer SW210.04). SCC is in the process of migrating to a new enterprise software suite, Civica Authority. This will include migrating Shoalhaven Water's asset information from Conquest (the current asset management information system) to the asset management module of Authority. Although SW will not be required to complete a component-level valuation until 2016/17, the migration to Authority presents an important opportunity to establish the componentised asset hierarchy across all asset classes in the new asset register. This means that the new hierarchy structure can be implemented when the Authority asset register is set up, thereby avoiding the need to make significant changes later.	Assets which need to be componentised include: dams, water treatment plants, water pump stations, reservoirs and balance tanks, satellite chlorinating stations, wastewater treatment plants and wastewater pump stations. The tasks required to develop the component-level hierarchies for these assets are: Draw the parent asset (facility) in GIS Determine the componentisation level and define the template component hierarchy Define the component assets for each facility Capture component asset attribute information Refer to the Asset Data Migration Program Scope for further detail on the scope of these tasks.	In progress 40%	Sept-Dec 2018		A	$TBC Included as part of valuation project being undertaken by GHD.	SPS componentised in asset register to component level with 20% asset attributes completed. Reservoirs componentised with 10% asset attributes completed. Water pump stations high level componentisation completed but limited attribute info available. Treatment plants being reviewed and will be further componentised with attribute data collected as part of condition assessment and valuation project. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Project Manager: Christopher Dougherty Dependencies: New AMS

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW830.01	History of Life Cycle Cost	Some of the maintenance history for assets is captured, however it is now easily accessible or used electively to inform decisions around asset replacement and future operational expenditure requirements. Shoalhaven Water would benefit from a process to effectively capture the history of the asset life cycle costs and using to inform decisions.	Develop processes to allow the collection of life cycle costs at the asset level Develop a process to analyse this information so it can inform decisions around asset replacement and future operational expenditure requirements.	On hold 5% Complete	March 2021				Life cycle cost field added to asset register however limited data available The means to collect this information at asset level will be addressed with the move to a new asset management system and the componentisation of complex assets (refer SW210.04, Part 1). Longer-term, SW should commit to analysing this information to inform asset renewal and operational decision making. Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: New AMS

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW830.03	Mechanical & Electrical Works Program & Asset Information	Currently electrical and mechanical works are implemented by the electrical and mechanical group of council and insufficient information is made available to Shoalhaven Water. This project aims to improve the level of information available on the Mechanical and Electrical works and improve accessibility to this information.	Review and document Shoalhaven Water M&E asset information requirements Develop a process flowchart to summarise optimal information flows to and from the M&E Group Develop a detailed schedule of services required from the mechanical and electrical group for proactive management of the assets to ensure the routine maintenance checks meet compliance requirements and manufacturer's recommendations Develop inspection checklist sheets for the mechanical and electrical group to fill in and deliver to Shoalhaven Water Set up a process for entering the asset information into the AMIS Consider the optimal level of investment over the lifecycle and the manufacturers recommendations	In progress 50% Complete	Dec 2018	2-5 days	C	$5K	Inspection checklist developed for electrical and mechanical inspections. Inspection checklist for electrical set up as mobile application (survey 123) being trialled. Asset componentisation underway to allow data to be input into asset register. The original driver for this project was the legacy work orders arrangements and lack of systems integration with the Mechanical and Electrical groups, which were previously independent business units of Shoalhaven City Council. As part of the recent restructure, these groups have been integrated into the Shoalhaven Water structure. The works orders and information transfer issues still remain. However, it is expected that these will be addressed by the following developments: New works orders and budget allocation processes to be established through a new asset management system. Establishment of maintenance strategies and priorities for critical assets Project Sponsor: Rob Horner Project Lead: Matthew Kidd Project Manager: Greg Baker Dependencies: Nil

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW910.01a	AMS Post-Migration Review and Action Plan	Shoalhaven City Council is migrating to a new enterprise Asset Management System, Civica Authority. Shoalhaven Water is implementing a number of asset data and process improvement projects prior to the migration to Authority. It is recommended that SW implement a formal review of the Authority migration in 2016 to ascertain whether the desired outcomes have been achieved and to identify any gaps and improvement actions required to address them.	In 2016 carry out a review of the migration to Authority and the outcomes of the improvement projects, documented here, which are intended to support that move. Identify any gaps and improvements required to address them.	On Hold	June 2019	180 days	A	$TBC	This is a new project and will be part of Asset Data Migration Program. On hold subject to Project Q.
SW930.01a	Integration of AMS with other Systems	Shoalhaven City Council is migrating to a new enterprise Asset Management System, Tech One. To date, there has been little consultation with Shoalhaven Water with regard to the Authority migration. It is recommended that as part of the Migration Program, SW should review the intended integration of Tech One with other Council systems to ascertain that SW's information and management needs are being met.	Review the integration of Authority with other Council systems to ascertain that SW's information and management needs are being met. Develop a future system improvement programme which addresses both SW's and SCC's business needs	On Hold	June 2019	5 days	B	TBC	This is a new project and will be part of the Asset Data Migration Program. On hold subject to Project Q.

Project Number	Project Title	Background for Project	Indicative Scope (Project Tasks)	Project Status	Programed for completion	Internal Resource (FTE)	Priority	Est. Cost	Progress Update (Sep 2016) Actions and Outcomes Achieved
SW940.01	Mobile Asset tracking	A number of assets are mobile and are difficult to track if they have been removed for maintenance or repairs and then relocated. This has been highlighted as an issue for pump assets.	Identify Mobile assets, such as pumps etc. Develop a tracking process that provides the ability to track the location of mobile assets	In progress 30% complete	April 2021	2 days	C	<$20K	Shoalhaven City Council have implemented GPS tracking on some mobile assets.
SW950.01	Failure modes predictive models	Predictive failure models are not currently used to inform the management of critical assets.	Link this project to the criticality framework (SW630.01) Develop predictive failure modes for the critical assets, as identified in the asset criticality assessment Document the approach	In progress 25% complete	April 2019	2-3 days	B	$8-$10K	Failure mode analysis has been undertaken for 230-315 PVC pipes throughout the city. Critical assets identified late 2013 and critical assets management strategies reviewed in 2014. Renewals are planned to address issues where these are identified (e.g. White uPVC pipe issue). However, systemic predictive failure modelling requires a cyclic condition assessment programme, which has not yet been implemented (refer SW 510.01). Project Sponsor: Rob Horner Project Lead: Matthew Kidd Dependencies: Nil
2018 AMS Audit	Asset Management Strategy Self-Audit	Continually updating AMPs with audit information	Audit updated in AMPs	100% Complete	October 2018	2 days			Matt Kidd, Ivan Wady, Mark Jennings
2018 AMS Audit	Critical Asset (hydrants) Risk Assessment	Identify hydrants in bushfire prone zones	Criticality audit to identify hydrants in bushfire prone areas	100% Complete	July 2018	2-3 days	C		Matt Kidd, Chris Dougherty
2018 AMS Audit	Environmental Risk Assessment (Acid Sulphate Soils)	Impact on assets' useful life when located in areas of acid sulphate soils	Identify assets located in areas of acid sulphate soils	0% Complete	November 2021	2-3 days	C		Chris Dougherty, Jordan Alcorn

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2018 AMS Audit	Special Schedule 7 Reporting	Special Schedule 7 requirements to be included	Formula used updated and figures updated based on components	100% Complete	Sep 2019	44 days	B		Matt Kidd, Keith Adams