Eurobodalla Shire Council

Integrated Water Cycle Management Strategy and Strategic Business Plan

FINAL DRAFT FOR PUBLIC EXHIBITION

10 June 2016

Eurobodalla Shire Council

IWCM Strategy and Strategic Business Plan

Prepared on behalf of Eurobodalla Shire Council by Hydrosphere Consulting.

Suite 6, 26-54 River Street
PO Box 7059, BALLINA NSW 2478
Telephone: 02 6686 0006
Facsimile: 02 6686 0078

Cover images: Deep Creek Dam (Eurobodalla Shire Council), Moruya River (http://www.warrenwindsports.com.au/) and Batemans Bay (Eurobodalla Shire Council).

PROJECT 12-050 – EUROBODALLA IWCM STRATEGY AND SBP

REV	DESCRIPTION	AUTHOR	REVIEW	APPROVAL	DATE
0	Draft for Council review	R. Campbell	M. Howland	M. Howland	26/4/16
1	Updated with water supply data	R. Campbell	M. Howland	M. Howland	2/6/16
2	Minor edits	R. Campbell		R. Campbell	10/6/16

Hydrosphere Consulting

DOCUMENT STRUCTURE

Eurobodalla Shire Council has reviewed and updated its Integrated Water Cycle Management (IWCM) Strategy and Strategic Business Plan (SBP). This document addresses the requirements for both the IWCM Strategy and SBP.

Part A of this document provides the information required for the IWCM Strategy development as listed in the *Integrated Water Cycle Management Strategy Check List – July 2014* (NSW Office of Water, 2014a). Background data are provided in the IWCM Issues Paper (Hydrosphere Consulting, 2016). Part B of this document provides further detail on IWCM options and scenarios.

Part C and Part D provide the additional information required for the SBP and financial plan development as listed in the *Water Supply and Sewerage Strategic Business Planning and Financial Planning Check List – July 2014* (NSW Office of Water, 2014b).

EXECUTIVE SUMMARY

In April 2003, Eurobodalla Shire Council (ESC) adopted its first Integrated Water Cycle Management (IWCM) Strategy. Key components of the 2003 IWCM Strategy have been implemented including pricing and demand management, water supply improvements, water filtration plants, sewerage system and STP augmentation and the development of village sewerage schemes. Council continues to undertake strategic planning of its urban water services including review of key data such as population growth, water supply availability and servicing requirements.

The majority of towns and villages in Eurobodalla Shire are supplied with water through the regional water supply scheme. There are currently five sewerage schemes serving the majority of towns and villages. The permanent resident population in the Shire is predicted to increase from 38,800 in 2016 to 49,000 in 2046 (0.88% p.a.) and the number of dwellings is predicted to increase from 23,540 to 26,600 in 2031. The current average annual potable water demand (4,840 ML/a) is predicted to increase to 6,125 ML/a by 2046. There is a clear variation in peak and off-peak demand for urban water services due to the high proportion of tourists in the Shire.

The key issues addressed by this current IWCM Strategy (i.e. this document) are drought security, sewerage system and treatment capacity and the adequacy of village water supply and sewerage services. This current IWCM Strategy has been developed from a review of Council's adopted strategic direction and considers the available information in developing ESC's future urban water strategy. In general, this IWCM Strategy confirms the appropriateness of Council's current strategic direction.

The key management issue faced by ESC is water supply security. Based on secure yield analysis, the existing supply is expected to be sufficient to meet demand until 2020. The secure yield of the existing headworks has also been assessed based on the rules documented in draft water sharing plans (WSPs) for the Clyde River, Deua River and Tuross River Unregulated and Alluvial Water Sources, which are expected to be gazetted in 2016. The secure yield analysis has been undertaken for current and future conditions assuming 1°C and 2°C warming due to climate change. If the WSP is gazetted with the proposed extraction rules, the secure yield will decrease by 400 ML/a and water supply sources will not be sufficient to supply the dry year demand during a repeat of the worst drought.

The current potable water demand management measures have been successful and the current expenditure on water conservation measures is considered to be appropriate. The existing effluent management practices are also considered to be the most appropriate and additional effluent reuse is not considered to be warranted to increase security of supply. Actions from the 2003 IWCM Strategy have been implemented including water supply system modifications including increased raw water transfer (harvesting of high river flows) and storage in Deep Creek Dam, groundwater extraction from Tuross bores and water filtration plants in the south and north. Council has also progressed the design and approvals for a new 3 GL southern storage and increased transfer capacity. This will become the major component of the next stage of the water supply augmentation combined with increased treatment capacity and transfer from south to north in the longer term (from a new 25 ML/d southern WTP near the southern dam). The proposed water supply augmentation strategy (shown in Figure 1 and Figure 2) will provide the required drought security with staged implementation of the strategy components. This strategy assumes the WSPs are gazetted and also considers the impacts of climate change and population growth. The forecast dry year demand and the secure yield of the water supply augmentation strategy are shown in Figure 3.

The long-term water supply strategy also includes supplementary water supplies for Nelligen and South Durras. Significant expenditure on water supply asset renewals and system upgrades has also been included in the capital works program.

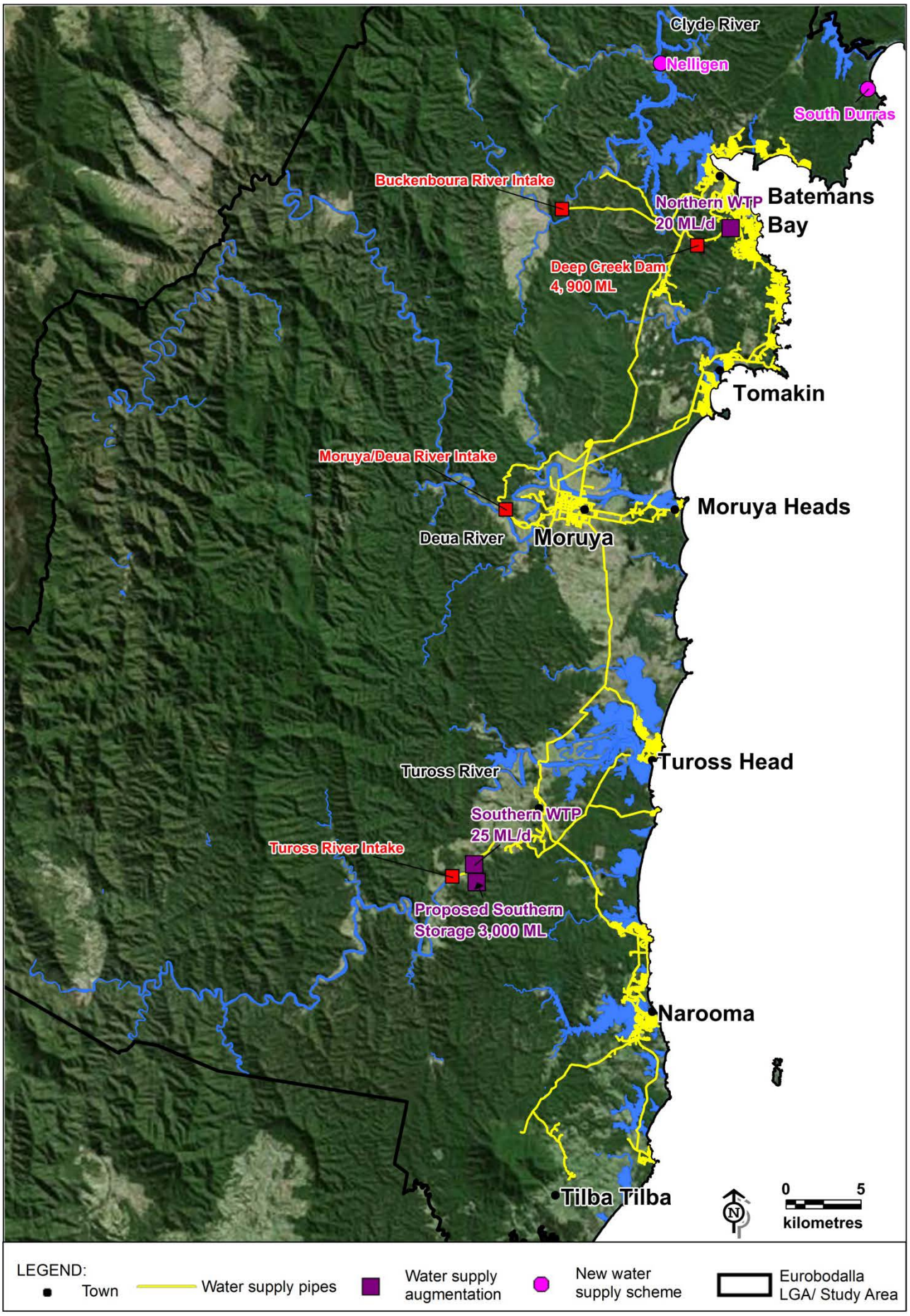

Figure 1: Water Supply Augmentation Strategy

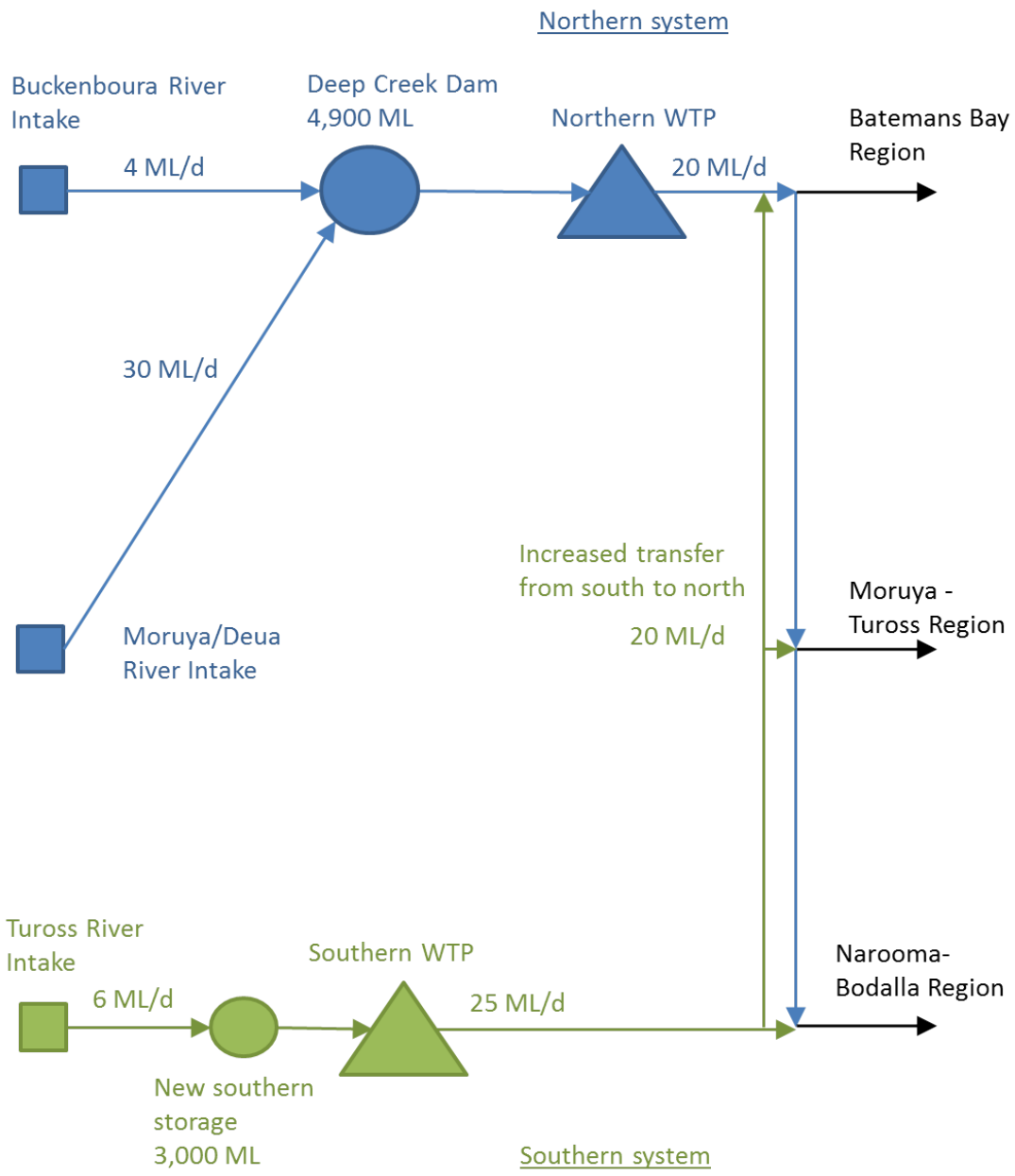

Figure 2: Water Supply Augmentation Strategy Schematic

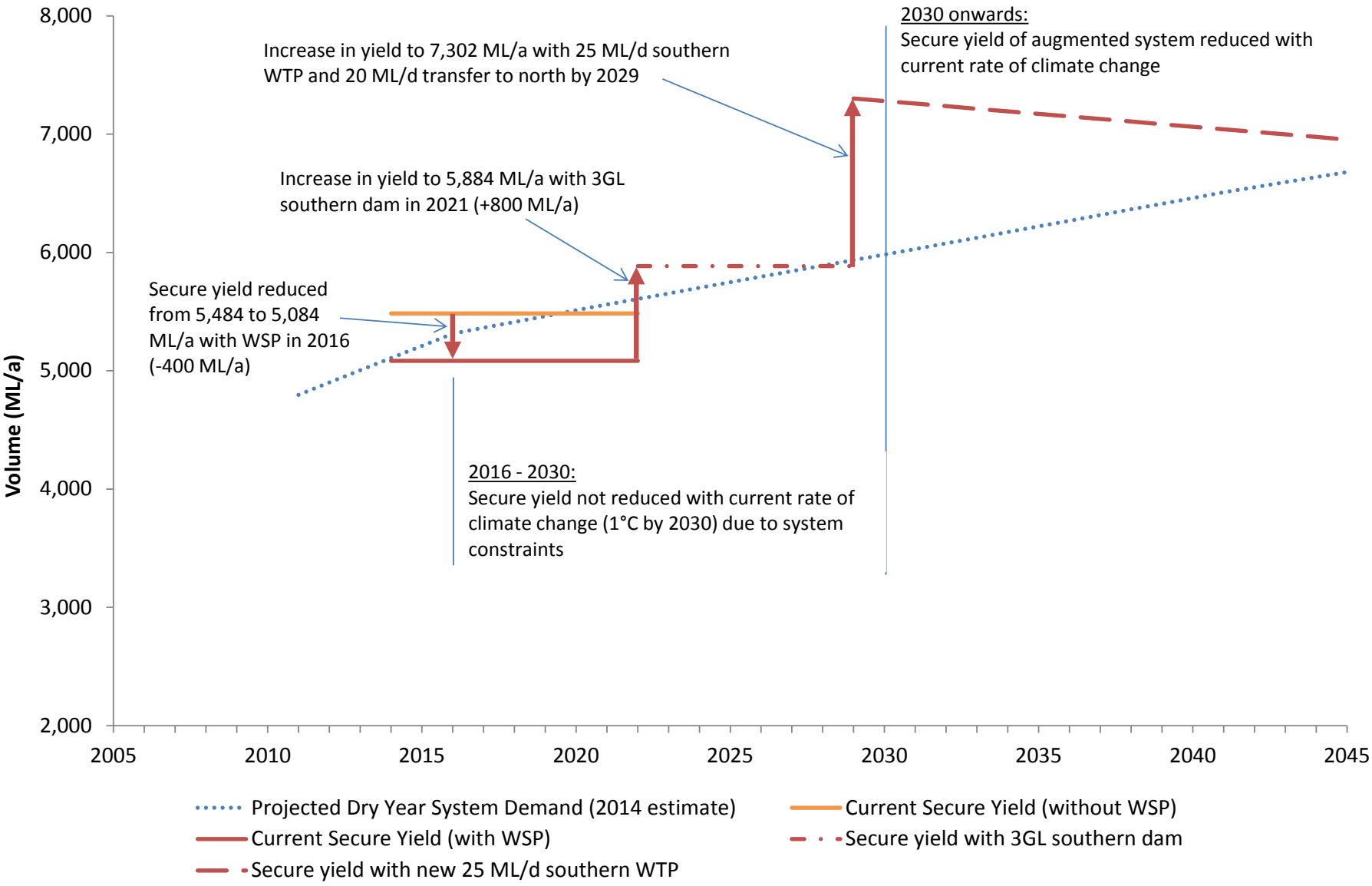

Figure 3: Forecast Dry Year Demand and Secure Yield of Proposed Water Supply Augmentation

Sewer network modelling has been completed for Moruya, Tuross, Batemans Bay and Tomakin sewerage systems and is in progress for Narooma. This has evaluated system flows, predicted overflow locations and frequency to identify catchments/locations that would benefit from sewer relining to reduce inflow and infiltration. Individual assets will be replaced/refurbished on a priority basis as part of the asset renewal program based on the results of CCTV inspections and the system modelling.

Four out of the five STPs experience clear variation between off-peak and peak loads and the treatment capacity is insufficient to treat the peak loads. This is largely due to the high proportion of holiday visitors but is exacerbated by high inflow and infiltration in some sewer catchments. Transfer of the southern catchments from Batemans Bay STP to Tomakin STP will address capacity issues at Batemans Bay, optimise the use of existing assets, utilise a better performing ocean outfall at Tomakin and allow more future reuse options at Tomakin than at Batemans Bay. STP upgrades and inflow and infiltration reduction measures will be progressively implemented in parallel with scheduled asset upgrades.

The risks to the environment and public health, community opinions, technical considerations and the availability of funding have been considered in the prioritisation of village water supply and sewerage schemes. While non-build options such as on-site sewerage management system (OSSM) inspections, water sensitive urban design and water conservation measures can reduce the risks of OSSMs and should be Council's focus until improved management systems are provided, it is considered that a significant residual risk from the village OSSMs remains. The IWCM Strategy includes the provision of improved water supply and sewerage services to all villages by 2036, depending on community consultation and funding.

The sewerage augmentation strategy is shown in Figure 4.

The capital works described above will be supported by ongoing strategic planning including review of demographic and water cycle projections, water supply and sewerage system modelling, drinking water management, recycled water management and review of best-practice planning documents.

This review of Council's IWCM Strategy has confirmed that the existing strategic direction is appropriate and should continue to be implemented as the preferred IWCM scenario. Updated capital works programs and operating budgets to continue this implementation are provided as part of this review. Financial analysis has confirmed that the proposed strategy is affordable and requires no significant increases in customer bills. The adopted levels of service (for drought security, drinking water quality, water supply, sewer overflows, STP licence compliance and availability of service) will all be met by the preferred IWCM scenario.

The capital works program documents the anticipated future capital works requirements and provides a basis for financial planning and capital budgeting. The estimated capital investment over the next 30 years for water supply is $198 million. About 38% of this amount is for improving levels of service, particularly drought security and potential village water supply schemes. Approximately 43% of the expenditure is for renewal of existing assets with the remaining 19% to service growth. The estimated capital investment over the next 30 years for sewerage services is $309 million. About 50% of this amount is for renewal of existing assets, 40% for improving levels of service, particularly potential village sewerage schemes and the remaining 10% is to service growth.

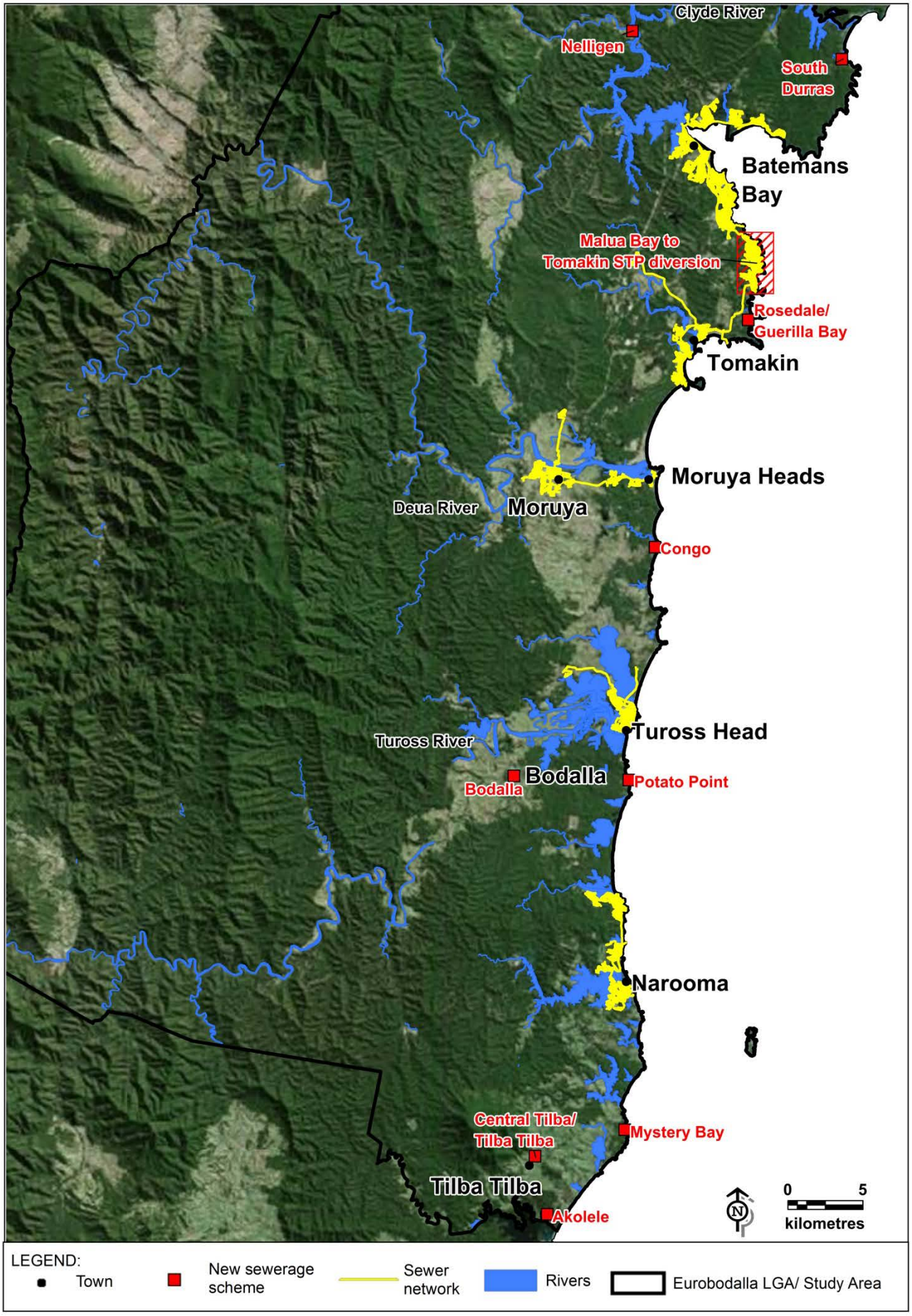

Figure 4: Sewerage Augmentation Strategy

Thirty year financial plans have been developed for the water supply and sewerage businesses. The financial plans indicate the typical residential bill for sewerage will need to increase in the medium term to fund the identified expenditure requirements. Additional subsidies have been assumed to fund major capital works including the southern dam and village water supply and sewerage schemes as these works are considered to be unaffordable without subsidy. The recommended medium-term price paths (in 2017$, not including payment of dividends) are provided in the following figures.

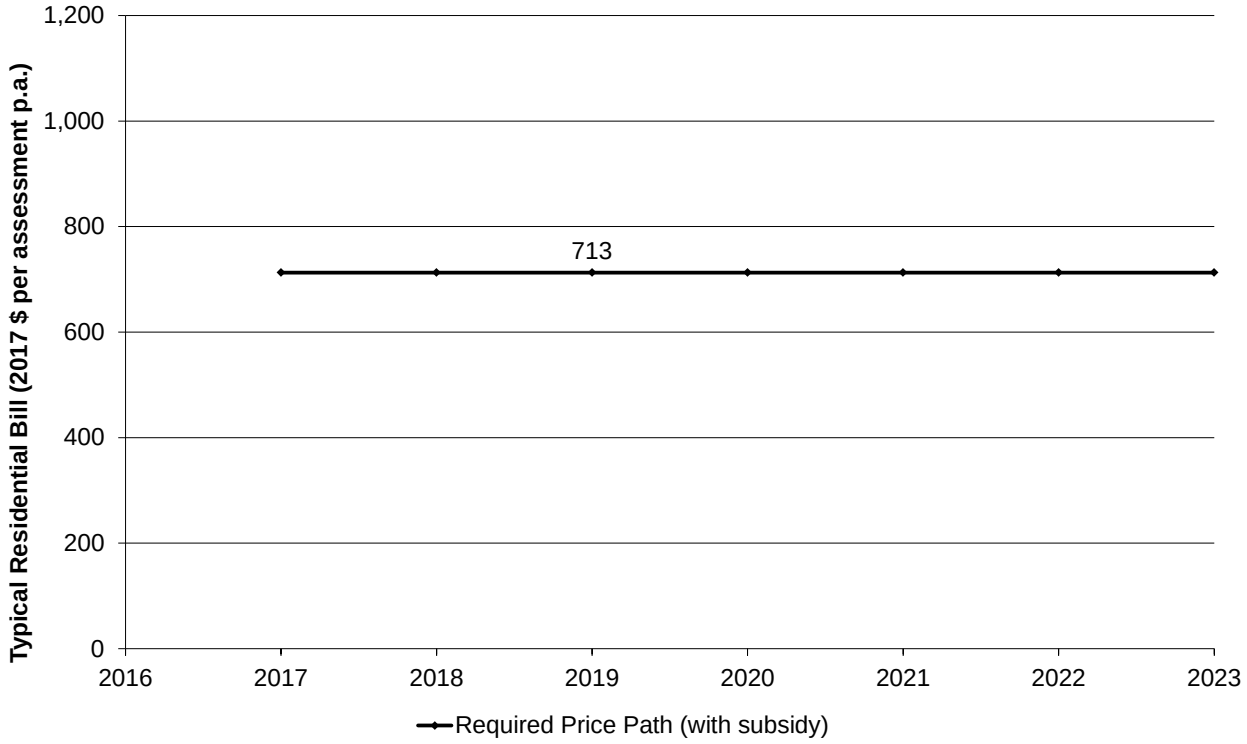

Figure 5: Recommended Water Supply Price Path

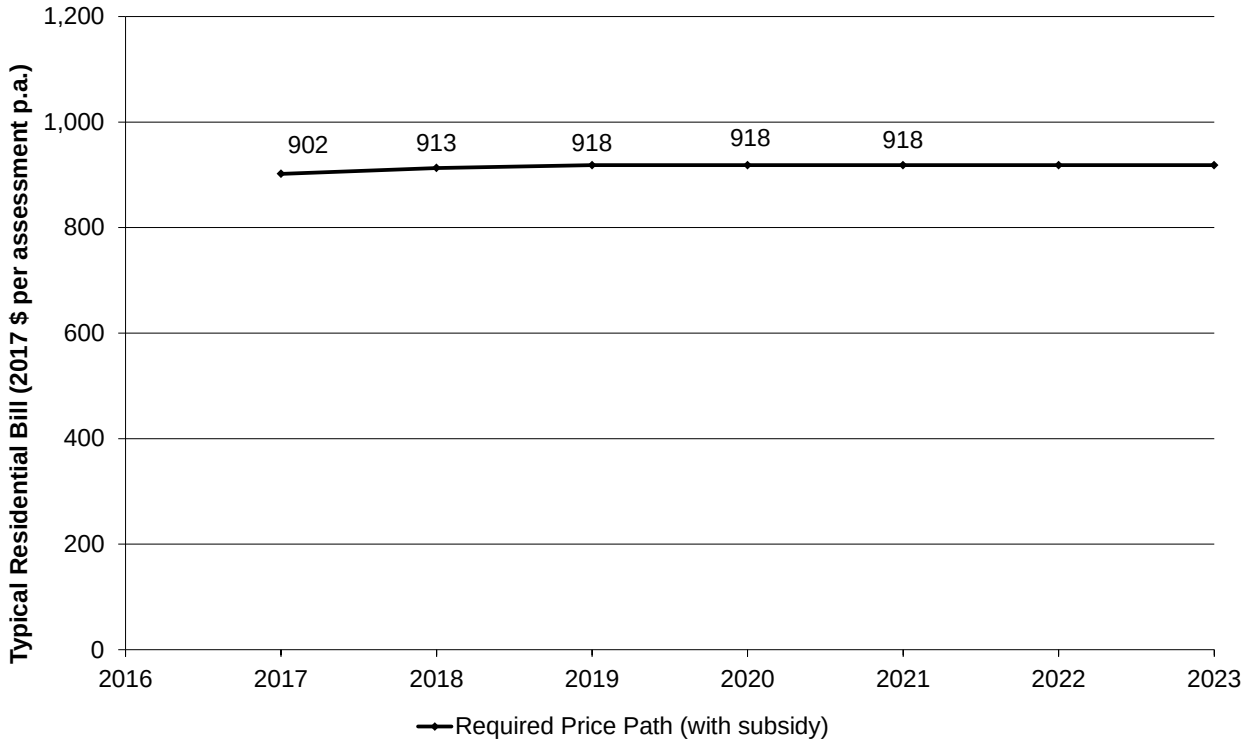

Figure 6: Recommended Sewerage Price Path

It is recommended that Council continues to implement the ongoing and short-term components of the preferred IWCM Strategy including:

- Asset renewals;
- STP upgrades;
- Rosedale and Guerrilla Bay sewerage scheme;
- Bodalla sewerage scheme;
- Malua Bay diversion (from Batemans Bay STP to Tomakin STP);
- Design, approvals and construction of the new southern dam; and
- Planning for the village water supply and sewerage schemes.

The medium-long term projects (particularly village water supply and sewerage schemes) will require further investigation and development in accordance with the timing specified in the IWCM capital works program.

The implementation of the IWCM Strategy should be supported by:

- Human resources as identified in the Strategic Business Plan (SBP, Part C);
- Ongoing strategic planning and review of data and assumptions; and
- Funding:
    - The recommended water supply and sewerage price paths as identified in the financial plans (Part D);
    - The appropriate level of developer income (identified through review of the Development Servicing Plans):
    - Loans for major capital projects; and
    - External funding, particularly for the larger projects with environmental or public health drivers such as the southern storage and village water supply and sewerage schemes.

The IWCM Strategy and SBP will be reviewed concurrently every five years following the release of new Census data and the update of demand forecasts and system modelling.

TABLE OF CONTENTS

TABLES

FIGURES

Eurobodalla Shire Council

IWCM Strategy and Strategic Business Plan

PART A: IWCM STRATEGY

A1. INTRODUCTION

The Eurobodalla IWCM Strategy adopted in 2003 was the first to be produced by local government in NSW. The key IWCM drivers at that time were:

- Water availability during the drought of 1998;
- The need to review the capacity of the Shire's sewerage systems;
- The need to identify opportunities to conserve water;
- Environmental impacts from treated water discharges; and
- The need to deliver long term cost savings to residences and businesses in the Shire.

The 2003 IWCM Strategy presented data on forecast population growth and predicted changes to the volume of water allowed to be extracted from rivers as a result of the introduction of Water Sharing Plans (WSPs). The Strategy also considered the natural trend toward incorporation of water efficient devices into new and renovated properties, the predicted impact of BASIX, improved demand management and mandating Water Sensitive Urban Design (WSUD) principles for new developments. Options were presented to provide a sustainable water supply, upgrade of the existing sewerage systems and provide town sewerage and water supply to unserviced villages.

In April 2003, ESC adopted the IWCM Strategy which included the following components:

- Waterwise education;
- Comprehensive demand management including water sensitive urban design for all new developments;
- 10 kL rainwater tanks in new developments and 20% of existing houses;
- Provision of reticulated water supply to Nelligen, South Durras and Congo;
- Reclaimed water use for agriculture;
- Regional water supply improvements (transfer main between Moruya River and Deep Creek Dam, upgrade pumping facilities, improved telemetry, upgrade power supply);
- Water filtration plants;
- A new 3-4 GL dam in the south of the Shire;
- Upgrade Batemans Bay transport system and Batemans Bay STP upgrade;
- Transfer Batemans Bay southern sewerage catchment to Tomakin STP and enhance existing Tomakin STP capacity;
- Enhance the existing Narooma STP capacity when load meets capacity;
- Improved management of urban stormwater in high priority catchments; and
- Provision of reticulated sewerage for South Durras, Nelligen, Bodalla, Rosedale and Guerilla Bay, Akolele, Central Tilba and Tilba Tilba, Mystery Bay, Potato Point and Congo.

Key components of the 2003 IWCM Strategy have been implemented including pricing and demand management, water supply improvements, water filtration plants, sewerage system and STP augmentation and the development of village sewerage schemes.

Council continues to undertake strategic planning of its urban water services including review of key data such as population growth, water supply availability and servicing requirements. This current IWCM Strategy (i.e. this document) has been developed from the results of this strategic planning as well as review of water supply and sewerage operational data. It is intended that this revised IWCM Strategy and SBP will be reviewed and updated every five years following the release of new Census data that will be used to review and update demand forecasts and system modelling.

A2. DESCRIPTION OF EXISTING SYSTEMS

The majority of towns and villages in Eurobodalla Shire are supplied with water through the regional water supply scheme which consists of two sub-systems (northern system and southern system). The water supply system stretches from Maloney's Beach in the north to Mystery Bay 90 km to the south and services approximately 20,000 properties including the main population centres of Batemans Bay, Moruya and Narooma (Figure 7). The northern area supplies from Maloney's Beach to Tuross Head and the southern area supplies from Bodalla to Central Tilba and Mystery Bay. These areas are interconnected and each can feed the other area if required.

The northern system draws water from the Deua/Moruya and Buckenboura Rivers which feed into an off river storage (Deep Creek Dam). The main components of the northern system includes a WTP at Denham's Beach with a capacity of 20 ML/d, 22 service reservoirs with a total capacity of 88 ML, 8 pumping stations and 535 km of distribution/reticulation mains.

The southern system draws water from the Tuross River/Tuross alluvial aquifer which feeds directly to the southern WTP. There is no intermediate raw water storage in this system. The southern system consists of a WTP on the Tuross River west of Bodalla (6 ML/d), 11 service reservoirs (26.7 ML), 3 pumping stations and 210 km of distribution/reticulation mains.

There are five sewerage schemes serving the majority of towns and villages (Figure 8). All the STPs consist of relatively similar process configurations that generally include primary treatment (screening and grit removal), secondary treatment (activated sludge and clarification processes) and tertiary treatment (maturation ponds, UV disinfection and/or chlorination for reuse streams). Current effluent management practices are as follows:

- Batemans Bay STP – Ocean outfall and reuse at Catalina Golf Course and at Hanging Rock Sporting Fields (8% on average);
- Tomakin STP – Ocean outfall;
- Moruya STP – Release to Ryans Creek which flows to the Moruya River. Reuse at Moruya Golf Course, Moruya High School and Riverside Park (25% on average);
- Tuross STP – Dune exfiltration with reuse at Tuross Golf Course (9% on average); and
- Narooma STP – Ocean outfall.

The urban water systems are summarised in Table 1. The rural areas of the Shire rely on on-site sewerage systems and local water supplies such as rainwater tanks.

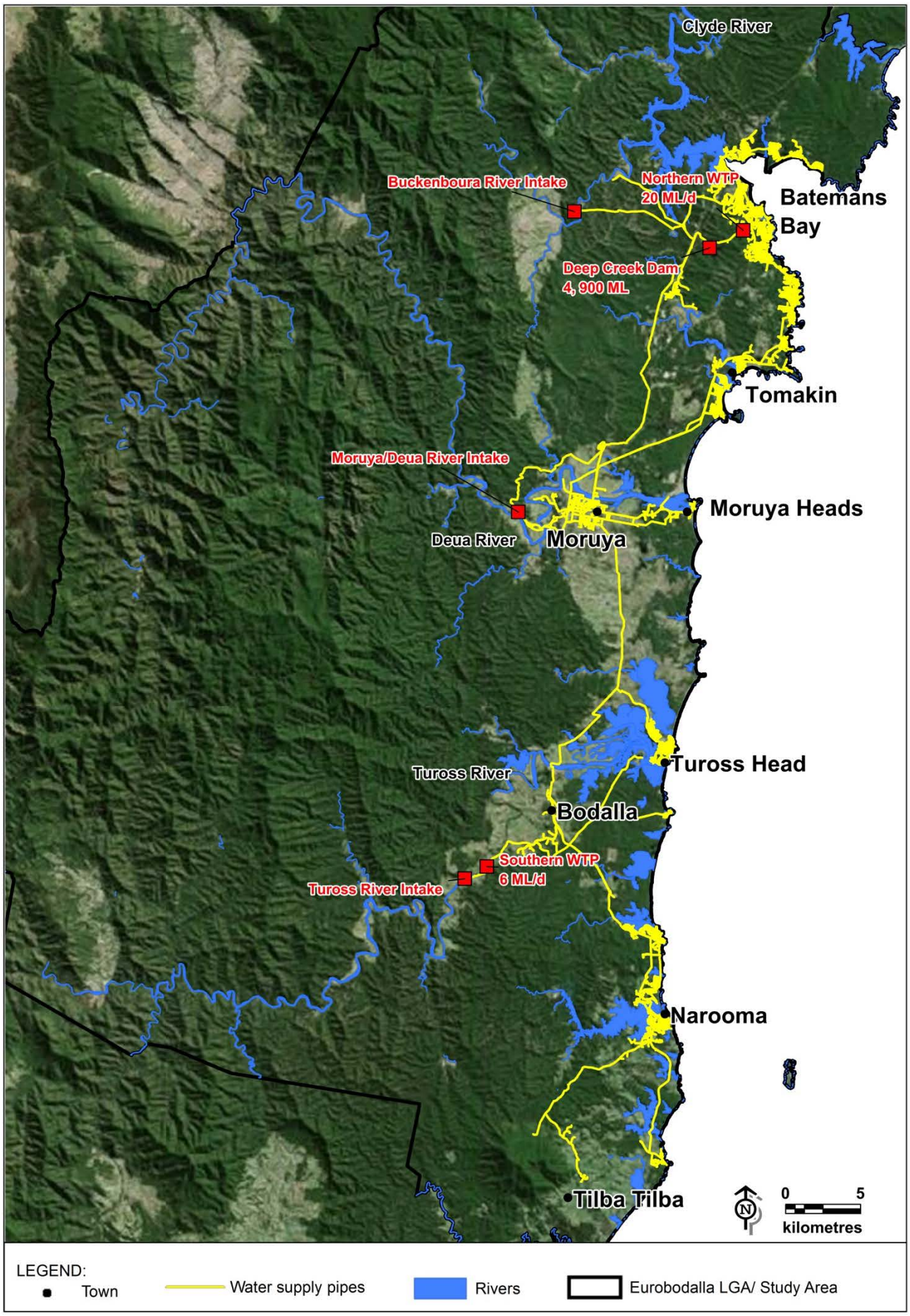

Figure 7: Eurobodalla Regional Water Supply

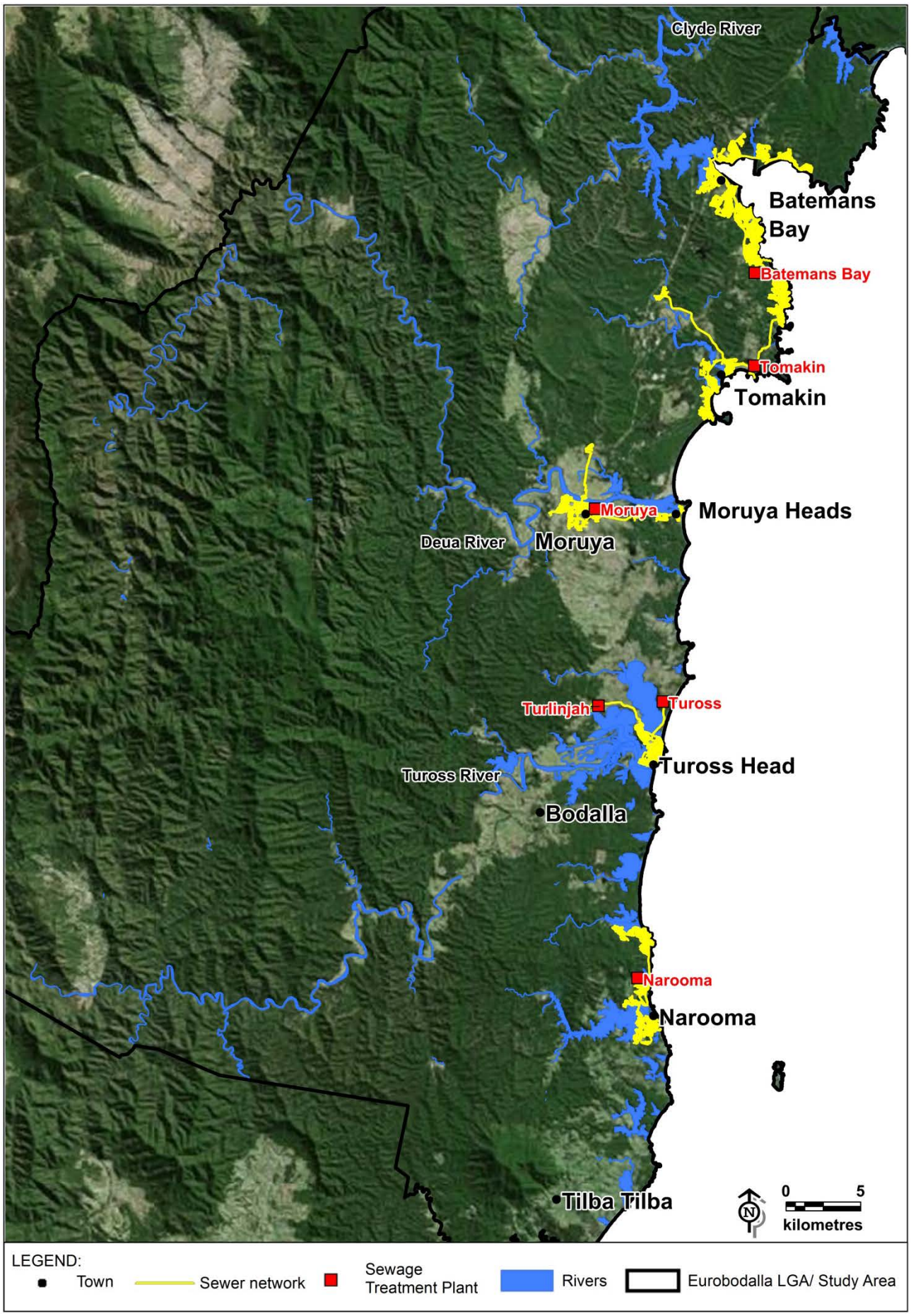

Figure 8: Eurobodalla Sewerage Schemes

Table 1: Urban Water Supply and Sewerage Services

Location	Sewerage Service	Water Supply Service
North Batemans Bay	Batemans Bay sewerage scheme	Regional water scheme - North
Batemans Bay		
Maloneys Beach		
Long Beach		
Surfside		
Catalina		
Batehaven		
Sunshine Bay		
Denhams Beach		
Surf Beach		
Lilli Pilli		
Malua Bay		
Rosedale	On-site sewerage systems	
Guerilla Bay	On-site sewerage systems	
Mogo	Tomakin sewerage scheme	
Tomakin		
Mossy Point		
Broulee		
Moruya	Moruya sewerage scheme	
Moruya Heads		
Tuross Head	Tuross Head sewerage scheme	
Mystery Bay	On-site sewerage systems	Regional water scheme - South
Central Tilba	On-site sewerage systems	
Narooma	Narooma sewerage scheme	
Dalmeny		
Kianga		
Bodalla	On-site sewerage systems	
Potato Point	On-site sewerage systems	
Tilba Tilba	On-site sewerage systems	Community scheme supplemented by rainwater tanks
South Durras	On-site sewerage systems	Rainwater tanks, private groundwater bores
Nelligen	On-site sewerage systems	Rainwater tanks
Congo	On-site sewerage systems	Rainwater tanks
Akolele	On-site sewerage systems	Bega Valley Shire Council water supply scheme

A3. POPULATION AND DEMOGRAPHIC PROJECTIONS

Council commissioned a study to forecast the future population and dwellings and future demand for water and sewerage services - *Population, Water Demand and Sewer Load Projections* (NSW Public Works, 2014a). This report provides data on:

- Shire-wide historic population and dwelling numbers;
- Future permanent population forecast;
- Current residential and non-residential land use and forecast development;
- Future number and spatial distribution of private dwellings and population;
- Historic metered water demand and bulk water production;
- Projected water demand; and
- Projected sewage load.

The study provides forecasts of future population and dwellings using information from NSW Planning population forecasts and the development and population forecast undertaken by .id Consulting (NSW Public Works 2014a) and updated in 2013 (Table 2 and Table 3).

Table 2: Forecast Permanent Resident Population

Parameter	2011	2016	2021	2026	2031	2036	2041	2046
People aged 0-4	1,930	1,728	1,751	1,752	1,738	1,747	1,813	1,882
People aged 5-19	6,334	6,346	6,396	6,482	6,561	6,632	6,884	7,145
People aged 20-69	22,197	23,488	23,787	23,930	23,978	24,260	25,180	26,135
People aged over 70	6,621	7,170	8,574	10,004	11,500	12,809	13,295	13,799
Total population	**37,082***	**38,758**	**40,517**	**42,194**	**43,794**	**45,456**	**47,180**	**48,970**
Growth rate (% per year)	0.89%	0.89%	0.89%	0.81%	0.75%	0.75%	0.75%	0.75%
Non-private dwelling population	670	670	755	880	1012	1127	1170	1214

Source: NSW Public Works (2014a)

Table 3: Adopted Dwelling Projection

	Area	2011	2016	2021	2026	2031
Dwellings	Batemans Bay - Catalina	2157	2194	2219	2253	2301
	Batemans Bay Rural Hinterland	1465	1517	1578	1654	1734
	Broulee - Tomakin - Mossy Point	2158	2329	2485	2600	2705
	Dalmeny	1128	1178	1244	1306	1388
	Malua Bay - Lilli Pilli - Rosedale - Guerilla Bay	1952	2129	2328	2533	2691
	Moruya Rural Hinterland	1270	1314	1348	1384	1424
	Narooma - North Narooma - Kianga	2130	2212	2245	2280	2307
	Narooma Rural Hinterland	1442	1477	1535	1609	1719
	Surf Beach - Batehaven - Sunshine Bay - Denhams Beach	3488	3576	3643	3708	3763
	Surfside - Long Beach - Maloneys Beach - North Batemans Bay	1818	1989	2172	2283	2310
	Tuross Head	1745	1778	1843	1890	1920
	Urban Moruya - Moruya Heads	1765	1843	1964	2122	2332
	Eurobodalla Shire	22518	23536	24604	25622	26594
Dwelling occupancy rate	Batemans Bay - Catalina	82.5%	82.9%	83.3%	83.7%	83.7%
	Batemans Bay Rural Hinterland	74.2%	74.3%	74.5%	74.6%	74.7%
	Broulee - Tomakin - Mossy Point	59.7%	59.9%	60.2%	60.3%	60.3%
	Dalmeny	74.5%	74.6%	74.8%	74.9%	75.1%
	Malua Bay - Lilli Pilli - Rosedale - Guerilla Bay	53.6%	53.7%	54.3%	54.3%	54.4%
	Moruya Rural Hinterland	87.8%	87.8%	87.8%	87.6%	87.4%
	Narooma - North Narooma - Kianga	75.3%	75.4%	75.6%	75.7%	75.5%
	Narooma Rural Hinterland	79.3%	79.4%	79.6%	79.8%	79.8%
	Surf Beach - Batehaven - Sunshine Bay - Denhams Beach	71.6%	71.9%	72.4%	72.9%	73.4%
	Surfside - Long Beach - Maloneys Beach - North Batemans Bay	68.0%	68.4%	68.8%	69.2%	69.7%
	Tuross Head	61.5%	61.6%	61.7%	61.6%	61.5%
	Urban Moruya - Moruya Heads	88.0%	88.0%	87.6%	87.4%	87.3%
	Eurobodalla Shire	72.2%	72.3%	72.4%	72.5%	72.6%
Household Size	Batemans Bay - Catalina	2.13	2.12	2.11	2.11	2.11
	Batemans Bay Rural Hinterland	2.43	2.37	2.33	2.31	2.31
	Broulee - Tomakin - Mossy Point	2.18	2.17	2.16	2.14	2.13
	Dalmeny	2.13	2.16	2.16	2.15	2.15
	Malua Bay - Lilli Pilli - Rosedale - Guerilla Bay	2.31	2.25	2.24	2.22	2.21
	Moruya Rural Hinterland	2.39	2.34	2.29	2.27	2.26
	Narooma - North Narooma - Kianga	2.00	1.96	1.94	1.92	1.91
	Narooma Rural Hinterland	2.28	2.25	2.21	2.20	2.21
	Surf Beach - Batehaven - Sunshine Bay - Denhams Beach	2.23	2.19	2.17	2.16	2.14
	Surfside - Long Beach - Maloneys Beach - North Batemans Bay	2.41	2.41	2.41	2.38	2.36
	Tuross Head	2.07	2.02	2.00	1.99	1.97
	Urban Moruya - Moruya Heads	2.27	2.22	2.20	2.23	2.24
	Eurobodalla Shire	2.23	2.19	2.18	2.17	2.16

Source: NSW Public Works (2014a)

A4. WATER CYCLE PROJECTION

The potable water demand forecast is provided in NSW Public Works (2014a) and summarised in the following tables and figures. The demand forecast was prepared using 2011 Census data, bulk water flows up to March 2011 and metered consumption up to March 2013.

The recent demand has generally been decreasing and is significantly lower than the forecast average year and peak day demand. The decrease in demand since 2010 shown on Figure 9 and Figure 10 may be due to climatic factors or demand management. Rainfall in Batemans Bay averaged 957 mm between 2009/10 and 2014/15 compared to the long-term average of 923 mm indicating that this period has experienced relatively normal rainfall. Similarly the temperature has been similar to the long-term average as shown in Table 4.

Table 4: Recent Demand and Climate Indicators

Year	Annual Demand (ML/a)	Peak Day Demand (ML/d)	Annual Rainfall at Batemans Bay (mm) [1]	Average Maximum Temperature (°C) [1]
2009/10	4,033	19.1	875	22.4
2010/11	3,761	24.3	853	21.3
2011/12	3,720	19.8	1,195	20.9
2012/13	3,411	22.5	951	21.6
2013/14	3,452	19.2	756	22.6
2014/15	3,331	17.3	1,114	21.7
Average 2009/10 – 2014/15			957	21.8
Long-term average			923	21.7

1. Source: BOM (2016), data for station 069134 Batemans Bay (Catalina Country Club)

The assumptions in this IWCM Strategy are based on the adopted demand forecast as shown in the following tables but there is flexibility in decision-making and timing of infrastructure upgrades. The demand forecast will be reviewed and updated every 5 years with the release of new Census data. Augmentations may be delayed if the forecast demand is not experienced.

Table 5: Annual Dry Year Demand Projection

System	District	Reservoir or trunk zone	Dry Year Demand including UAW (ML/year)							
			2011	2016	2021	2026	2031	2036	2041	2046
North	Maloneys Beach to Malua Bay	Long Beach	116	123	128	132	136	141	146	150
		Catalina 2	1,309	1,466	1,526	1,577	1,633	1,693	1,752	1,804
		Batemans Bay	47	48	49	51	52	53	55	56
		Vista Avenue High Level	5	5	5	6	6	6	6	6
		Denhams Beach	236	269	277	284	292	302	313	324
		Surf Beach	252	268	274	280	287	293	297	301
		Malua Bay	178	192	195	198	200	202	205	206
		Lilli Pilli	84	99	106	115	124	133	142	149
	Rosedale to Broulee	Rosedale Development	0	4	18	46	73	100	127	150
		Burri Point	255	279	299	305	310	316	322	326
		Tomakin Heights	3	4	4	4	4	4	4	4
		Mossy Point	253	284	292	299	306	312	320	326
	Moruya	North Moruya PRV	8	8	8	8	8	9	9	9
		Moruya Main	5	5	5	6	6	6	6	6
		Moruya Town 2	390	437	463	480	515	557	599	637
		Yarragee Zone	16	18	18	18	18	18	19	19
		Gundary 250mm Zone	9	11	11	11	11	11	11	11
		Moruya Heads	150	178	203	240	255	258	262	270
	Tuross	Tuross	288	316	327	336	343	353	363	370
		Tuross High Level	31	34	35	36	36	37	38	41
	Rural	Trunk - West of Batemans	4	4	4	5	5	5	5	5
		Mogo	43	49	49	51	52	53	54	56
		Trunk - Moruya South	10	10	11	11	11	11	11	11
		Trunk - Bodalla to Tuross to Moruya	19	20	21	22	23	24	25	26
		Trunk - Bodalla to Tuross South	10	10	10	11	11	11	11	12
South	Dalmeny and Narooma	Dalmeny	352	393	417	438	465	487	507	521
		North Narooma High Level	39	44	46	50	52	56	61	65
		North Narooma PRV	30	33	34	35	36	36	37	37
		South Narooma	289	309	316	324	329	344	359	367
		Narooma Town	208	216	221	225	229	232	235	238
	Rural	Bodalla Park	78	90	95	100	104	109	116	122
		Potato Point	31	33	33	33	34	34	34	34
		Trunk - Dalmeny to Bodalla Park	2	2	2	2	2	2	2	2
		Trunk - South Narooma to Engine Road	1	1	1	1	1	1	1	1
		Engine Road	4	5	5	5	5	5	5	5
		Tilba	10	10	11	11	11	11	11	11
		Mystery Bay	34	38	39	42	44	44	44	44
		Total	**4,797**	**5,314**	**5,560**	**5,795**	**6,029**	**6,268**	**6,509**	**6,723**

Source: NSW Public Works (2014a)

Table 6: Annual Average Year Demand Projection

			Average Year Demand including UAW (ML/year)							
System	District	Reservoir or trunk zone	2011	2016	2021	2026	2031	2036	2041	2046
North	Maloneys Beach to Malua Bay	Long Beach	105	112	116	120	124	128	132	136
		Catalina 2	1,196	1,337	1,392	1,439	1,491	1,546	1,600	1,648
		Batemans Bay	43	45	46	47	49	50	51	53
		Vista Avenue High Level	5	5	5	5	5	5	5	5
		Denhams Beach	214	244	251	258	265	274	284	294
		Surf Beach	233	248	254	260	266	272	276	280
		Malua Bay	163	175	178	180	182	184	186	188
		Lilli Pilli	76	90	97	104	112	121	129	135
	Rosedale to Broulee	Rosedale Development	0	3	16	42	66	91	115	136
		Burri Point	234	256	274	280	285	290	295	299
		Tomakin Heights	3	3	3	3	3	3	3	3
		Mossy Point	233	261	269	276	282	288	295	301
	Moruya	North Moruya PRV	7	7	8	8	8	8	8	9
		Moruya Main	5	5	5	5	5	5	6	6
		Moruya Town 2	356	398	422	438	470	508	546	580
		Yarragee Zone	15	16	16	16	16	17	17	17
		Gundary 250mm Zone	8	10	10	10	10	10	10	10
		Moruya Heads	136	162	184	218	231	234	238	245
	Tuross	Tuross	261	286	296	304	311	320	329	335
		Tuross High Level	28	31	32	33	33	33	34	38
	Rural	Trunk - West of Batemans	4	4	4	4	4	4	5	5
		Mogo	39	44	44	46	47	48	49	50
		Trunk - Moruya South	9	10	10	10	10	10	10	11
		Trunk - Bodalla to Tuross to Moruya	18	19	20	21	22	23	24	25
		Trunk - Bodalla to Tuross South	9	9	9	10	10	10	10	11
South	Dalmeny and Narooma	Dalmeny	319	355	378	397	422	442	460	473
		North Narooma High Level	35	40	42	45	48	51	55	59
		North Narooma PRV	27	30	31	32	33	33	33	34
		South Narooma	268	286	294	300	305	319	332	339
		Narooma Town	180	187	191	194	197	199	202	204
	Rural	Bodalla Park	71	82	86	90	94	99	105	111
		Potato Point	28	30	30	30	30	30	31	31
		Trunk - Dalmeny to Bodalla Park	1	2	2	2	2	2	2	2
		Trunk - South Narooma to Engine Road	1	1	1	1	1	1	1	1
		Engine Road	4	4	4	4	5	5	5	5
		Tilba	9	9	10	10	10	10	10	10
		Mystery Bay	30	34	36	38	39	40	40	40
		Total	**4,375**	**4,841**	**5,065**	**5,280**	**5,494**	**5,712**	**5,931**	**6,125**

Source: NSW Public Works (2014a)

Table 7: Peak Day Demand Projection

			Peak Day Demand (including UAW) (kL/day)							
System	District	Reservoir or trunk zone	2011	2016	2021	2026	2031	2036	2041	2046
North	Maloneys Beach to Malua Bay	Long Beach	1,040	1,061	1,094	1,125	1,162	1,198	1,237	1,268
		Catalina 2	9,628	9,966	10,328	10,629	10,977	11,347	11,721	12,037
		Batemans Bay	272	279	286	292	298	305	312	320
		Vista Avenue High Level	33	33	33	34	34	34	34	34
		Denhams Beach	1,685	1,771	1,817	1,864	1,912	1,974	2,039	2,108
		Surf Beach	1,898	1,922	1,950	1,978	2,006	2,034	2,056	2,075
		Malua Bay	1,680	1,695	1,722	1,743	1,756	1,772	1,789	1,801
		Lilli Pilli	777	861	927	1,001	1,078	1,158	1,234	1,295
	Rosedale to Broulee	Rosedale Development	0	34	169	431	684	931	1,175	1,386
		Burri Point	2,450	2,595	2,767	2,829	2,868	2,913	2,952	2,985
		Tomakin Heights	35	35	35	35	35	35	35	35
		Mossy Point	2,369	2,525	2,572	2,616	2,645	2,683	2,733	2,775
	Moruya	North Moruya PRV	33	34	35	36	36	37	38	39
		Moruya Main	24	24	25	26	26	26	27	28
		Moruya Town 2	2,462	2,630	2,778	2,878	3,084	3,330	3,576	3,796
		Yarragee Zone	101	101	102	103	103	104	104	105
		Gundary 250mm Zone	59	64	64	64	65	65	65	66
		Moruya Heads	987	1,107	1,257	1,488	1,576	1,592	1,614	1,661
	Tuross	Tuross	2,428	2,504	2,588	2,655	2,711	2,784	2,860	2,906
		Tuross High Level	270	283	289	294	295	300	308	336
	Rural	Trunk - West of Batemans	23	23	24	24	24	24	25	25
		Mogo	251	276	278	287	295	299	306	316
		Trunk - Moruya South	56	57	57	58	59	59	60	61
		Trunk - Bodalla to Tuross to Moruya	70	74	77	81	84	87	91	95
		Trunk - Bodalla to Tuross South	50	52	54	56	58	58	59	61
South	Dalmeny and Narooma	Dalmeny	2,492	2,607	2,745	2,859	3,014	3,133	3,246	3,324
		North Narooma High Level	301	307	321	344	363	388	414	438
		North Narooma PRV	220	225	234	240	243	244	246	250
		South Narooma	2,309	2,372	2,423	2,471	2,503	2,595	2,686	2,732
		Narooma Town	1,570	1,599	1,626	1,658	1,679	1,694	1,711	1,727
	Rural	Bodalla Park	482	520	548	572	597	626	662	698
		Potato Point	223	223	224	224	224	224	224	224
		Trunk - Dalmeny to Bodalla Park	7	7	7	8	8	8	8	9
		Trunk - South Narooma to Engine Road	7	7	7	7	7	7	7	7
		Engine Road	28	28	29	29	30	30	30	30
		Tilba	64	66	67	68	69	69	70	71
		Mystery Bay	243	258	266	281	294	294	294	294
		Total	**36,628**	**38,224**	**39,828**	**41,388**	**42,901**	**44,463**	**46,048**	**47,419**

Source: NSW Public Works (2014a)

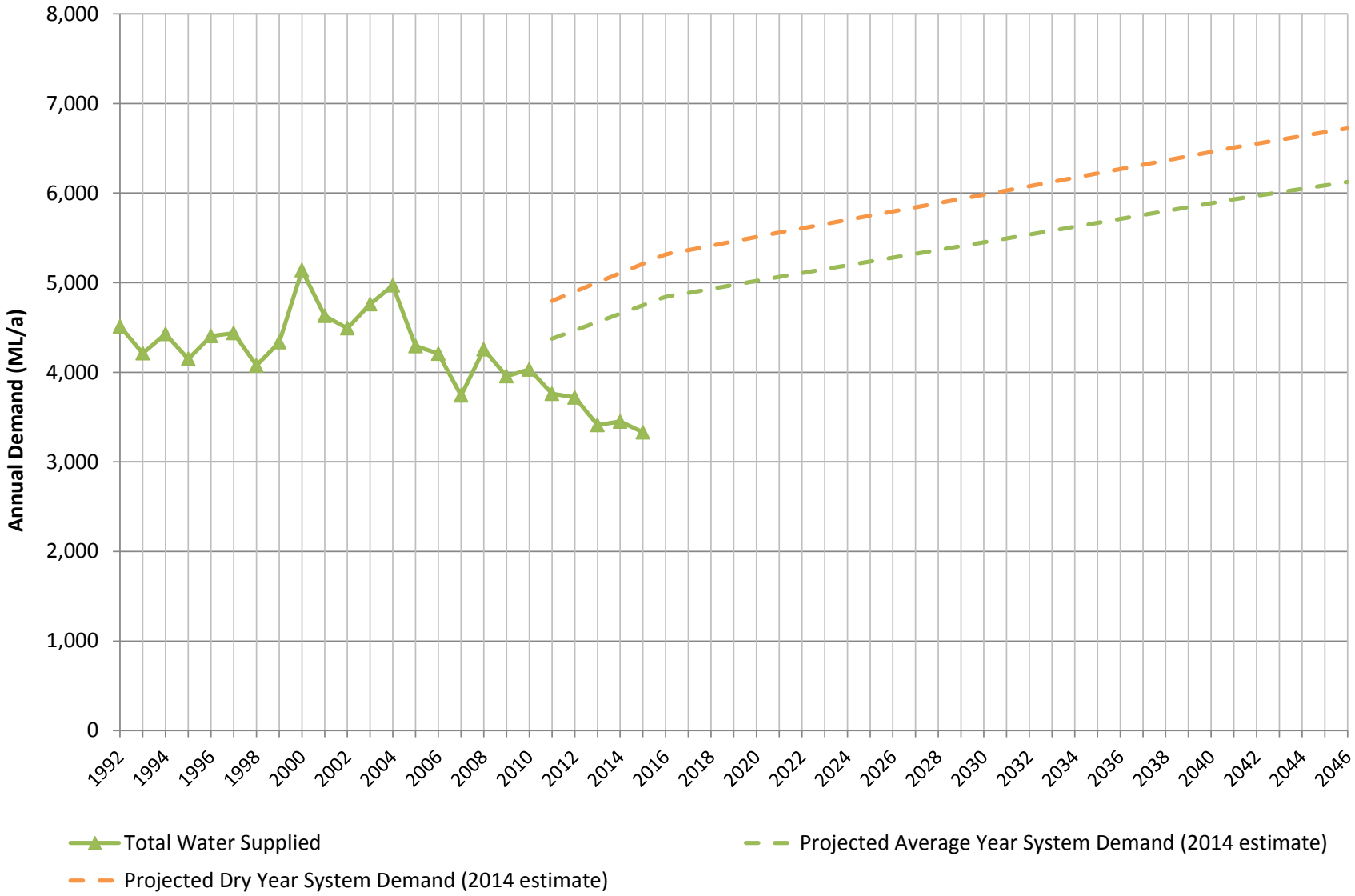

Figure 9: Historical and Forecast Average Annual and Dry Year System Demand

Source: ESC operational data and NSW Public Works (2014a)

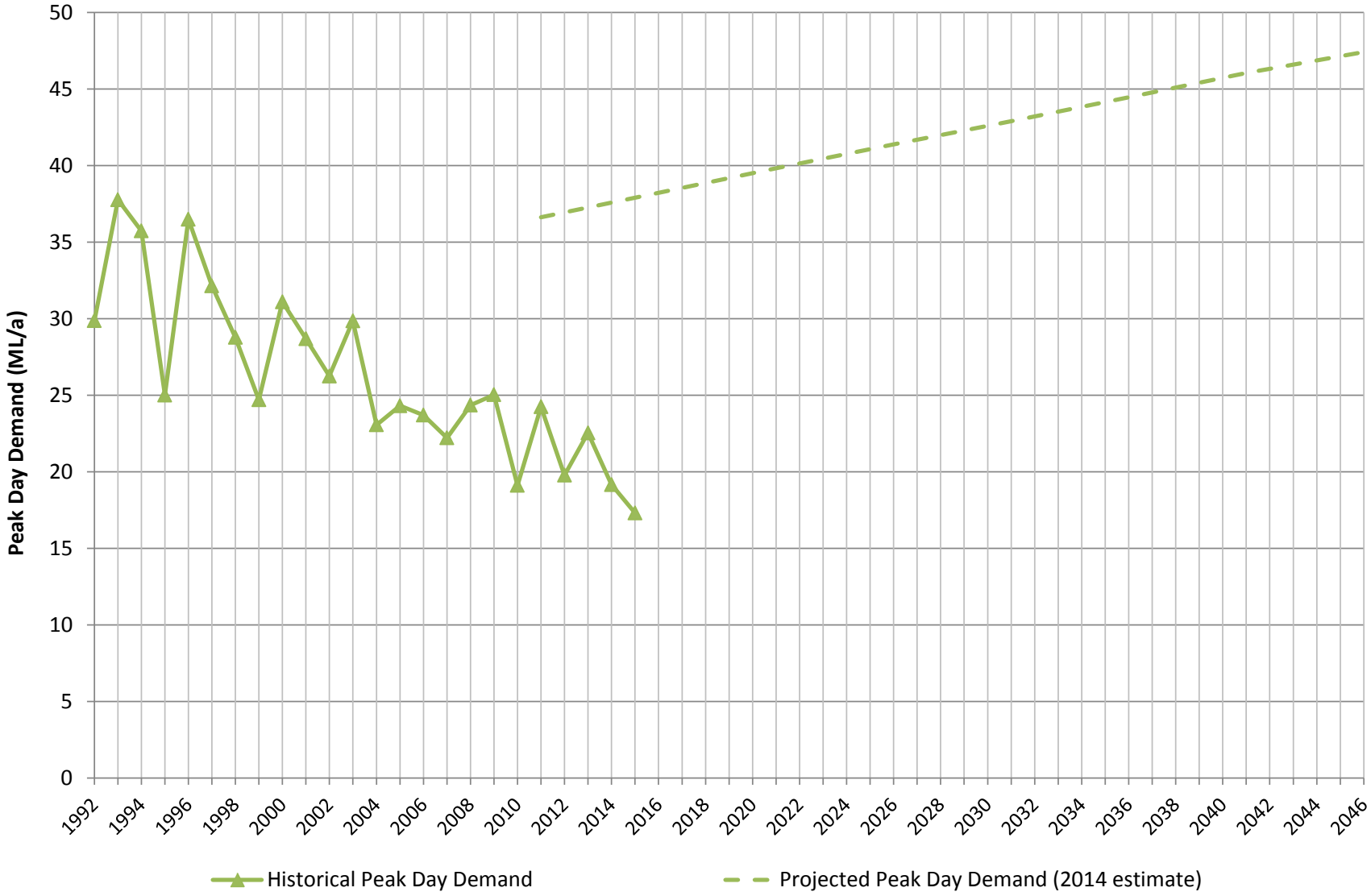

Figure 10: Historical and Forecast Peak Day Demand

Source: ESC operational data and NSW Public Works (2014a)

A5. LEVELS OF SERVICE

The levels of service for water supply and sewerage are listed in Table 8 and Table 9. The levels of service are targets that ESC aims to achieve and are not associated with a customer contract.

Table 8: Water Supply Levels of Service

Description	Units	Target Level of Service
System Performance		
Minimum pressure upstream of water meter	m head	20
Maximum static pressure	m head	80
Availability of water for fire fighting	-	Water will be available from fire hydrants for fire-fighting at minimum flow rates determined by guidelines for specific types of development as set out in Local Government Regulations and the conditions established by NSW Fire & Rescue
Consumption Restrictions in Droughts		
Maximum duration of restrictions	Months per 10 year period	6 (i.e. 5% of the time)
Maximum frequency of restrictions	number of times per 10 years	1 (i.e. 10% of years)
Ability to supply demand through the worst drought on record	% of water demand	90 (i.e. a 10% reduction in consumption).
Interruptions to Supply (per year per supply)		
Planned (95% of time)		
Maximum duration	hours	8
Maximum occurrence	Per year per customer	1
Notice given to domestic customers	days	2
Unplanned		
Maximum duration	hours	6
Maximum occurrence	Per year per customer	1
Maximum interruptions to supply	per 1,000 properties p.a.	100
Service Provided		
Time to provide an individual, residential connection to water supply in serviced area	Business days	10
Time to test a customer's water meter	Business days	10

Description	Units	Target Level of Service
Customer Complaints		
Verbal inquiry response time	Business days	2
Written inquiry response time	Business days	10
Water Quality		
Potable Water Quality		ADWG (2011)

Priority, Issues and Effects	**Response Time (time to have staff on-site or to investigate a problem or answer an enquiry)**
Priority 1: A complete failure to maintain continuity of supply to multiple customers or critical user at critical time	
Possible Issues: Broken water main, broken service, jammed hydrant, no water, dirty water, leak creating a major issue. Typical Effects: Personal injury or risk to public health, loss of supply, major property damage, failure to maintain quality or quantity of service, large volume of water wasted, significant unplanned depletion of service reservoir, major environmental impact.	1 hour (business hours) 2 hours (after hours)
Priority 2: Failure to maintain continuity of supply to a single customer or critical user at a non-critical time	
Possible Issues: Poor pressure, leaking tapping, stop tap, water main/service, valve or hydrant, minor leak on footpath or roadway, partial failure of connections, faulty or damaged meter. Typical Effects: Minor property damage, minor environmental impact	4 hours (business hours) 4 hours (after hours)
Priority 3: Known fault, non-urgent	
Possible Issues: Service disconnection, faulty hydrant/valve, missing hydrant. Typical Effects: Missing hydrant/valve lid, water hammer, need for preventative maintenance, minor customer impact.	Within 5 business days

Table 9: Sewerage Levels of Service

Description	Units	Target Level of Service
Availability of Service		
Residential Areas	-	All urban residential and industrial areas where practicable.
Frequency of System Failures		
Wet weather sewer overflows	ARI	General: 1 in 5 year CBD and oyster lease areas: 1:20
Customer Complaints		
Verbal inquiry response time	Business days	2
Written inquiry response time	Business days	10
Odours	Events per 1,000 properties per year	<1

Description	Units	Target Level of Service
Effluent Discharge Compliance		
Compliance with Licence Conditions	%	100

Priority, Issues and Effects	**Response Time (time to have staff on-site or to investigate a problem or answer an enquiry)**
Priority 1: Major environmental or health incident affecting a large number of customers	
Possible Issue: Blockage overflowing sewer system, manhole overflowing, broken gravity/rising main, pump station failure, missing manhole lid Typical Effects: Personal injury or significant risk to health, surcharge inside/outside a building, property damage e.g. subsidence of critical asset e.g. roadway, buildings, railway, etc., environmental impact e.g. trade waste spill, subsidence causing danger	45 minutes (business hours) 90 minutes (after hours)
Priority 2: Moderate environmental or health incident affecting a small number of customers	
Possible Issue: Cracked sewer pipe, odour complaint, partial sewer blockage, noisy manhole, noisy pump station. Typical Effects: Slow moving toilet flush	45 minutes (business hours) 90 minutes (after hours)
Priority 3: Minor environmental or health incident	
Possible Issue: Minor subsidence, restoration, locations Typical Effects: No impact on the environment, seepage investigation	60 minutes (business hours) 120 minutes (after hours)

A6. IWCM ISSUES AND OPTIONS

A6.1 Issues

The IWCM Issues Paper (Hydrosphere Consulting, 2016) provides background information relating to the current IWCM Issues. The issues and potential options considered to address them are listed in Table 10. The key management issue is water supply security (Issue 1).

Table 10: IWCM Issues

Issue		Type of Issue	Options Assessed in this IWCM Strategy
Water Supply			
I1	Based on the secure yield estimate for the existing water supply headworks system, the existing supply is expected to be sufficient to meet demand until 2020. If the WSP is gazetted with the extraction rules modelled in the secure yield study, the water supply sources will not be sufficient to supply the dry year demand during a repeat of the worst drought. The secure yield of the water supply system is partly constrained by the capacity of the WTPs.	Capacity, LOS	• Demand management – pricing, education, audit, residential and non-residential rebates and water loss reduction, mandatory BASIX and water sensitive urban design initiatives; • Local supply sources - roof water harvesting, stormwater harvesting and residential grey water reuse; • Increase in extraction, transfer and treatment capacities: • Expansion of drought storage; and • Increased reclaimed water use.
I2	The reticulated water quality does not always meet guideline values. The pH of the reticulated water was above the guideline value on many occasions which may cause corrosion of pipes and fittings, the level of fluoride has been lower than the concentration required for effective dental caries prevention for the majority of the time and the free chlorine in the distribution system in often below the level required for effective disinfection.	LOS	• Implementation of Drinking Water Management System Improvement Plan; • Review and audit of the DWMS • Replacement of southern WTP
I3	Water supply network modelling has identified deficiencies in the trunk water supply and reticulation system.	Capacity, LOS	• Augmentation of distribution and reticulation systems; and • Treatment plant augmentation.
Batemans Bay Sewerage			
I4	Batemans Bay experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Batemans Bay STP has insufficient capacity to treat current peak season loads.	Capacity, LOS	• Diversion of Malua Bay and Lilli Pilli sewer catchments to the Tomakin STP; • Inflow and infiltration reduction; and • Batemans Bay STP capacity upgrade.

Issue		Type of Issue	Options Assessed in this IWCM Strategy
I5	The recycled water to the Catalina Country Club exceeded the water quality guidelines for BOD, suspended solids and *E. coli* on a few occasions.	Regulatory compliance	• Development of Recycled Water Management System
I6	High inflow and infiltration into the Batemans Bay sewerage system affects the ability of the Batemans Bay STP to achieve licence conditions for effluent quality and load.	Regulatory compliance, LOS	• Sewer network modelling; • CCTV inspections and smoke testing; • Sewer main relining and replacement; • Junction sealing; • Manhole renewals; and • Batemans Bay STP capacity upgrade.
I7	Sewer network modelling predicts overflows from the Batemans Bay sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.	Capacity, LOS	• Sewer network modelling; • CCTV inspections and smoke testing; • Sewer main relining and replacement; • Junction sealing; • Manhole renewals; and • Upgrade of sewer mains and pumping stations.
Tomakin Sewerage			
I8	Tomakin experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Tomakin STP has insufficient capacity to treat current peak season loads.	Capacity, LOS	• Inflow and infiltration reduction; and • Tomakin STP capacity upgrade.
I9	Sewer network modelling predicts overflows from the Tomakin sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.	Capacity, LOS	• Sewer network modelling; • CCTV inspections and smoke testing; • Sewer main relining and replacement; • Junction sealing; and • Manhole renewals.
Moruya Sewerage			
I10	Sewer network modelling predicts overflows from the Moruya sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.	Capacity, LOS	• Sewer network modelling; • CCTV inspections and smoke testing; • Sewer main relining and replacement; • Junction sealing; • Manhole renewals; and • Upgrade of sewer mains and pumping stations.

Issue		Type of Issue	Options Assessed in this IWCM Strategy
Tuross Sewerage			
I11	Tuross Head experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Bingie STP has insufficient capacity to treat current peak season loads.	Capacity, LOS	• Inflow and infiltration reduction; and • Bingie STP capacity upgrade.
I12	The recycled water supplied to the Tuross golf course exceeded the water quality guidelines and targets for pH, suspended solids and faecal coliforms on a number of occasions.	Regulatory compliance	• Development of Recycled Water Management System
I13	High inflow and infiltration into the Tuross sewerage system affects the ability of the Bingie STP to achieve licence conditions for effluent quality.	Regulatory compliance, LOS	• Sewer network modelling; • CCTV inspections and smoke testing; • Sewer main relining and replacement; • Junction sealing; • Manhole renewals; and • Bingie STP capacity upgrade.
I14	Sewer network modelling predicts overflows from the Tuross sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.	Capacity, LOS	• Sewer network modelling; • CCTV inspections and smoke testing; • Sewer main relining and replacement; • Junction sealing; • Manhole renewals; and • Upgrade of sewer mains and pumping stations.
Narooma Sewerage			
I15	Narooma experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Kianga STP has insufficient capacity to treat current peak season loads.	Capacity, LOS	• Inflow and infiltration reduction; and • Kianga STP capacity upgrade.
I16	Sewer network modelling predicts overflows from the Narooma sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.	Capacity, LOS	• Sewer network modelling; • CCTV inspections and smoke testing; • Sewer main relining and replacement; • Junction sealing; • Manhole renewals; and • Upgrade of sewer mains and pumping stations.

Issue		Type of Issue	Options Assessed in this IWCM Strategy
Unserviced Areas [1]			
I17	Due to the sandy nature of the soil it is commonly acknowledged that sewage/effluent from on-site wastewater management systems in South Durras will infiltrate the groundwater aquifer and ultimately end up in the waterways (Durras Lake). Groundwater quality results (sampled in the mid-1980s) show elevated nitrate levels and the presence of faecal bacteria confirming the contamination of the groundwater from poorly managed on-site wastewater management systems.	LOS	• Current on-site sewerage management practices; and • Local or centralised water supply and sewerage scheme.
I18	Council inspections in South Durras have identified over 40 unlicensed bores/spearpoints which are close to septic absorption trenches. Due to the Category 1 soils (sand) and shallow groundwater there is a high risk of contamination of the groundwater supplies. Whilst some properties only use this water for garden/toilet flushing purposes, the absence of large water tanks on some properties indicates that bore water may also be used for showering and potable use. Even if used only for gardening/toilet flushing there is still the risk of contamination of food crops or inhalation of aerosols.	Regulatory compliance	• Current on-site sewerage management practices; and • Local or centralised water supply and sewerage schemes.
I19	The village of Nelligen drains into priority oyster aquaculture areas of the Clyde River. Water quality is a key concern for the oyster industry. Re-development of properties within Nelligen has resulted in limited space for on-site systems.	LOS	• Current on-site sewerage management practices; and • Local or centralised water supply and sewerage schemes.
I20	Site inspections have revealed approximately 50% of septic systems in Rosedale and Guerilla Bay are not satisfactory due to small lot sizes, high peak loads, poor soil permeability, clogging of the trenches and odours. These problems result in social and environmental impacts and significant potential public health risks.	LOS	• The Rosedale and Guerilla Bay Sewerage Scheme will be constructed by 2017.

Issue		Type of Issue	Options Assessed in this IWCM Strategy
I21	The existing on-site septic tank and effluent disposal systems in Bodalla are prone to failure due to hydraulic overloading, unsuitable lot sizes and poor ground conditions for effluent disposal. Apart from visual impacts and public health concerns, it is probable that these problems are having an impact on local water quality, including surface waterways and groundwater systems.	LOS	• The Bodalla Sewerage Scheme (pressure sewerage) will be constructed by 2018.
I22	The existing wastewater management systems in Mystery Bay are unsatisfactory due to hydraulic overloading and poor ground conditions for effluent disposal.	LOS	• Current on-site sewerage management practices; and • Local or centralised sewerage scheme.
I23	The existing wastewater management systems in Central Tilba and Tilba Tilba are unsatisfactory due to hydraulic overloading, unsuitable lot sizes, poor ground conditions for effluent disposal and disruptions and odours during pump out.	LOS	• Current on-site sewerage management practices; and • Local or centralised sewerage schemes.
I24	The existing wastewater management systems in Akolele are unsatisfactory due to overflows from on-site systems to sensitive water bodies including oyster lease areas.	LOS	• Current on-site sewerage management practices; and • Reticulated sewerage scheme with treatment at Bermagui STP (Bega Valley Shire Council).

Source: Hydrosphere Consulting (2016)

1. The IWCM Issues Paper did not present any data to suggest the existing wastewater management systems in Congo are unsatisfactory. However the requirement for improved water and wastewater management systems in Congo will also be addressed in the IWCM Strategy.

A6.2 Preferred Options

The current demand management measures have been successful and the current expenditure on water conservation measures is considered to be appropriate. A significant reduction in customer demand has already been achieved through the existing demand management measures and it is considered that additional measures will not achieve any cost-effective additional reduction in demand that could offset the need for water source augmentation. It is recommended that current demand management initiatives and pricing incentives continue to be implemented to assist with water conservation.

In 2014, ESC commissioned an investigation into alternative means of managing effluent from Council's five STPs (NSW Public Works, 2014c). The report compared the costs of supply of treated effluent with the cost of supplying potable water. Typically the effluent reuse options where infrastructure can be operated at a high level of utilisation and provide an alternative use for the majority of the STP production were found to provide a lower cost than potable water. The options that would replace potable water use or increase raw water availability are:

- Indirect potable reuse (Deep Creek Dam) – the regulatory and community risks are considered to be significant. The cost of pumping highly treated effluent from Batemans Bay or Tomakin STPs is significantly higher than pumping from the rivers to Deep Creek Dam;

- Residential reuse (dual reticulation) for large residential developments in Tomakin (900 ET) and Moruya (500 ET) – the additional capital costs for the developer in duplicating water supply infrastructure, additional maintenance costs for Council and community demand for the effluent and the willingness to pay through potential increased property prices and water use charges are considered to be significant. The cost of providing the recycled water is comparatively high compared to the existing effluent discharge practices due to the small scale of the development likely to occur. The urban reuse option (large residential development of 900 ET) would reduce the deficit in 30 years (2045) by 257 ML/a or 11% of the total deficit. A large storage and WTP augmentation would still be required to provide security of supply; and
- Municipal reuse at Gundary Oval, Moruya – effluent irrigation at Gundary Oval was investigated in the 2010 drought as part of the supply to Riverside Park. The low demand for irrigation at Gundary Oval does not justify the significant capital expenditure for this option.

The existing effluent management practices are considered to be the most appropriate and no additional reuse is considered to be warranted to address security of supply. Due to the high rainfall in the Shire and limited irrigation, additional local supply sources such as roof water harvesting, stormwater harvesting and grey water reuse are not considered to be feasible solutions to address drought security.

Secure yield analysis has shown that the implementation of the WSP will have a significant impact on water supply security (both current systems and the proposed augmentation) due to the reduced ability to access low river flows. The adopted IWCM Strategy from 2003 included water supply system modifications to improve security of supply including increased raw water transfer (harvesting of high river flows) and storage in Deep Creek Dam, groundwater extraction from Tuross bores and water filtration plants in the south and north. Council has also progressed the design and approvals for a new 3 GL southern storage with increased groundwater supply from Tuross aquifer and increased transfer capacity. The new dam will become the major component of the next stage of the water supply augmentation combined with increased treatment capacity and transfer to the north in the longer term. The augmentation strategy will provide the required drought security with staged implementation of the strategy components. This strategy assumes the WSPs have been gazetted and also considers the impacts of climate change and population growth.

Significant expenditure on water supply asset renewals and system upgrades has also been included in the capital works program.

Sewer network modelling has been completed for Moruya, Tuross, Batemans Bay and Tomakin sewerage systems and is in progress for Narooma. This has evaluated system flows, predicted overflow locations and frequency to identify catchments/locations that would benefit from sewer relining to reduce inflow and infiltration. Individual assets will be replaced/refurbished on a priority basis as part of the asset renewal program based on the results of CCTV inspections and the system modelling.

Four of the five STPs experience clear differences between off-peak and peak loads and the treatment capacity is insufficient to treat the peak loads. This is largely due to the high proportion of holiday visitors but is exacerbated by high inflow and infiltration in some sewer catchments. Transfer of the southern catchments from Batemans Bay STP to Tomakin STP will address capacity issues at Batemans Bay, optimise the use of existing assets, utilise a better performing ocean outfall at Tomakin and allow access to more future reuse options at Tomakin than available at Batemans Bay. STP upgrades and inflow and infiltration reduction measures will be progressively implemented in parallel with scheduled asset upgrades.

The risks to the environment and public health, community opinions, technical considerations and the availability of funding have been considered in the prioritisation of village water supply and sewerage schemes. While non-build options such as on-site sewerage management (OSSM) system inspections, WSUD and water conservation measures can reduce the risks of on-site systems and should be Council's focus until improved management systems are provided, it is considered that a significant residual risk from the village on-site systems remains. This IWCM Strategy includes the provision of improved water supply

and sewerage services to all villages by 2036, depending on community consultation and the availability of funding.

The above major capital works will be supported by ongoing strategic planning including review of demographic and water cycle projections, water supply and sewerage system modelling, drinking water management, recycled water management and review of best-practice planning documents.

A6.3 IWCM Scenario Development

The preferred options to address each issue have been bundled into a preferred IWCM scenario. Most of the issues identified (refer section A6.1) only have a single set of non-competing options (refer Part B) that are considered suitable for addressing the issue. Although numerous additional options may be possible, these have either been considered and dismissed previously or are not considered credible. Consequently, there is only one scenario considered in this IWCM Strategy. This preferred scenario builds on the adopted 2003 IWCM Strategy and incorporates the results of recent strategic planning investigations.

This review of the IWCM Strategy has confirmed that the current strategic direction is appropriate and should continue to be implemented as the preferred IWCM scenario. Updated capital works programs and operating budgets to continue this implementation are provided as part of this review. Financial analysis has confirmed that the proposed strategy is affordable and requires no significant increases in customer bills. The LOS issues (drought security, drinking water quality, water supply, sewer overflows, STP licence compliance and availability of service) will all be met by the preferred IWCM scenario.

A7. CONSULTATION/FEEDBACK OUTCOMES

Council continues to liaise with regulatory agencies (NSW EPA, DPI-Water, etc.) regarding sewerage system licence compliance, best-practice water supply and sewerage management and development of water sharing plans. Council has also consulted with the communities of Rosedale/Guerilla Bay, Bodalla and South Durras regarding the need for improved wastewater management. In 2010, ESC conducted a suite of community engagement activities to inform the development of the Eurobodalla Community Strategic Plan (*eurobodalla2030*). The outcomes of these consultation activities have been incorporated in the development of this IWCM Strategy.

A Project Reference Group (PRG) including agency representatives, Council staff and Councillors was formed to:

- Provide input on all existing and potential issues that affect the community relating to provision of the urban water service over the next 30 years;
- Help identify suitable options for managing these issues; and
- Help review and confirm the proposed IWCM Strategy.

The IWCM issues and potential options to address them were presented to the PRG for review in May 2016 with general support for the proposed IWCM approach. Council's Public and Environmental Health Unit supports the proposed water supply strategy as it provides a practical solution in the event of one of the water supplies being unable to provide potable water. In addition, the proposed location of the dam is preferred over other locations based on the pressures from land use in the catchment. The prioritisation of village sewerage schemes is also supported. No other feedback was received from the PRG.

This Draft IWCM Strategy will also be placed on public exhibition with any feedback considered prior to formal adoption of the IWCM Strategy by Council.

A8. RECOMMENDATIONS

It is recommended that Council continues to implement the ongoing and short-term components of the preferred IWCM Strategy including:

- Asset renewals;
- STP upgrades;
- Rosedale and Guerrilla Bay sewerage scheme;
- Bodalla sewerage scheme;
- Malua Bay diversion (from Batemans Bay STP to Tomakin STP);
- Design, approvals and construction of the new southern dam; and
- Planning for the village water supply and sewerage schemes.

The medium-long term projects (particularly village water supply and sewerage schemes) will require further investigation and development in accordance with the timing specified in the IWCM capital works program.

The implementation of the IWCM Strategy should be supported by:

- Human resources as identified in the SBP (Part C);
- Ongoing strategic planning and review of data and assumptions; and
- Funding:
    - The recommended water supply and sewerage price paths as identified in the financial plans (Part D);
    - The appropriate level of developer income (identified through review of the Development Servicing Plans in 2017):
    - Loans for major capital projects; and
    - External funding, particularly for the larger projects with environmental or public health drivers such as the southern storage and village water supply and sewerage schemes.

The capital works program is included in Appendix D1. An implementation plan for the first ten years of the strategy is given in Table 11 and Table 12.

The implementation plan relies on key data such as the water supply demand and sewer load forecasts as well as assessment of secure yield. The IWCM Strategy and SBP should be reviewed every five years when new Census data, updated demand forecasts and system modelling are available. Secure yield forecasts should also be updated at least every five years, or earlier, if new information on water sharing rules or climate change impacts becomes available.

Table 11: IWCM Strategy Indicative Timing – Major Sewer Projects, Year 1 to 10

Year	1	2	3	4	5	6	7	8	9	10
Project	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**
Asset renewals										
Batemans Bay STP Upgrade										
Tomakin STP Upgrade										
Malua Bay Diversion										
Moruya STP Upgrade										
Bingie STP Upgrade										
Kianga STP Upgrade										
Rosedale and Guerrilla Bay Sewerage Scheme										
Bodalla Sewerage Scheme										
Potato Point Sewerage Scheme										
Nelligen Sewerage Scheme										

Table 12: IWCM Strategy Indicative Timing – Major Water Supply Projects, Year 1 to 10

Year	1	2	3	4	5	6	7	8	9	10
Project	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**
Asset renewals										
Southern Dam										
Nelligen Water Supply Scheme										

Eurobodalla Shire Council

IWCM Strategy and Strategic Business Plan

PART B – IWCM OPTIONS AND SCENARIOS

B1. FEASIBILITY REVIEW OF OPTIONS

B1.1 Demand Management

B1.1.1 Pricing

User pays pricing was phased-in from about 2002 with a real increase of $2.34 per kL (2015 dollars) or 45% since 2002. Council's current (2015/16) tariffs for water supply and sewerage services (Table 13) comply with the best-practice requirements. In 2013/14 63% of residential revenue came from usage charges. The average since 2010/11 is 65%. In wet years, the revenue from usage charges is reduced due to reduced water sales. ESC is "deemed to comply" with best practice water pricing due to the high number of residential premises that are unoccupied for most of the year (i.e. holiday homes).

Table 13: Water Supply and Sewerage Charges – 2015/16

Water Supply Charges	Usage Charge (c/kL)	348
	Typical Residential Bill ($/assessment) based on 119 kL/residential property/a	703
	Vacant ($/assessment)	289
Water Supply Access Charge ($)		
Connection Size	20mm	289
	25mm	462
	32mm	751
	40mm	1,156
	50mm	1,820
	80mm	4,624
	100mm	7,225
Water Supply Developer Charge ($ per ET)		11,780

Sewerage Charges	Residential ($/assessment)	886
	Vacant ($/assessment)	886
Non-Residential	SDF x (AC + UC x C) where: SDF = sewerage discharge factor, AC = access charge based on size of water service, UC = sewerage usage charge ($1.75 per kL in 2015/16) and C = water consumption (kL)	

Non-residential Sewerage Access Charge, AC ($)		
Water Service	20mm	886
	25mm	1,417
	32mm	2,303
	40mm	3,544
	50mm	5,581
	80mm	14,176
	100mm	22,150
Special Sewerage Charges ($)		
Bodalla sewer	Urban residential and business	200
Sewerage Developer Charges ($ per ET)		
Headworks Contribution		10,250
Where entire townships are serviced by Pressure Sewer System		3,240

Trade Waste Charges TW = A + C x UC x TWDF Where C = Customer's annual water consumption (kL) TWDF = Trade waste discharge factor		
A - Annual fee ($)		94.50
A - Annual fee ($) Large discharger		507
UC - Usage charge ($/kL)	Compliant discharge	1.40
	Non-compliant discharge	13.00
Excess mass charges (per kg)	Contaminants	As per Liquid Trade Waste Policy

B1.1.2 Other Water Conservation Measures

A comprehensive review of non-build water conservation measures was undertaken as part of the 2003 IWCM Strategy (DPWS, 2003) and a suite of demand management measures was adopted. The current demand management measures are summarised in Table 14.

Table 14: Current Water Conservation Measures

Adopted Strategy	Implementation Progress	Current Budget
Waterwise education - targeting outdoor use	ESC has continued to implement school education programs and promote external programs such as Water Week. A Sustainability Education Officer was appointed in March 2013 to undertake community water education.	$72,000 p.a.

Adopted Strategy	Implementation Progress	Current Budget
Water price increase	ESC has progressively increased the price of water (in real terms) to ensure full cost recovery and provide price incentives for water saving. The usage charge for 2015/16 is $3.48 per kL and availability charge is $289 p.a. resulting in a typical residential bill of $701 p.a. based on the average household consumption of 119 kL/a. The typical residential bill has increased by 33% in real terms since 2004. Full cost recovery is achieved.	No cost
Active leak detection	ESC participated in the Water Directorate Water Loss Management Program in 2011 with predicted savings of 18.9 ML/a resulting from leak detection and repair.	Complete
Shower heads, active retrofit program	Council initially began offering incentive schemes in 2005 for reticulated water customers to manage demand. The current details of Council's incentive schemes are as follows: 1. $150 rebate for the purchase of a 4.5 star rated washing machine (maximum of one rebate per property). 2. Up to $1,500 rebate for rainwater tank installations connected for toilet or washing machine use for existing buildings that did not require a rainwater tank as a condition of consent. 3. $100 rebate for the installation of any 4 star water efficiency rated 3/4.5L dual flush toilet, provided the toilet replaces an existing single flush toilet (maximum of two rebates per property). 4. $100 rebates for eligible automated leak detections and shut-off systems. 5. Showerhead exchange program. 6. A $2,000 water rebate cap for businesses.	$50,000 p.a.
Non-residential audit	Audits commenced in 2008/09 targeting five non-residential customers per year. Grant funding was obtained in 2010 for audit and water saving programs for the top 30 water users over a two year period (Eurobodalla WaterSmart Business Program). Rebates of up to $15,000 were available to implement eligible projects identified through the water audits. Water savings of 97 ML/a (2.4% of total annual demand) were achieved by participating businesses. A similar program continued from 2012 with audit of largest nine water users per year which the current program expected to continue until 2017. Case studies are also being distributed to other businesses with the aim of providing education about water saving opportunities.	$23,000 p.a.
Introduce mandatory WSUD for all new developments	BASIX was mandatory for new residential dwellings in regional NSW from 2005/06. It has now been extended to all residential developments valued in excess of $50,000. BASIX sets energy and water reduction targets for new homes and apartments. Rainwater tanks are now required for all new developments in NSW including new developments for swimming pools or spas that require a BASIX certificate. The BASIX water target for Eurobodalla is a 40% reduction in mains-supplied potable water consumption, compared to the average 'pre-BASIX' home benchmark. Council's Residential Zones DCP (adopted 2011) requires stormwater management works that maximise the use of water sensitive urban design principles.	No cost

Adopted Strategy	Implementation Progress	Current Budget
Mandating 10 kL rainwater tanks in all new developments plus retrofitting 20% of existing houses	ESC has prepared "*Design guidelines for rainwater tanks where an existing reticulated water supply exists*". For new developments, tank capacity is to be as determined by BASIX or any other water conservation/stormwater management policy that applies to the development. Where BASIX does not apply, the guidelines require a minimum 10kL tank to be installed and connected to, at a minimum, all toilets, washing machines and external taps. For retrofitting of tanks on existing buildings, the property owner should select the most appropriate tank size based on the anticipated use of the tank, roof area and space available. Rebates have been provided by ESC (up to $1,500 as discussed above) for 123 rainwater tanks since 2005 (<1% of connected properties).	No cost
Permanent Water Conservation Measures - outdoor water use	The Water Restrictions Policy (2013) includes limiting watering with hoses, sprinklers, micro-spray systems and drip irrigation systems to morning and evening.	No cost
Meter replacement program	The meter replacement program introduced in 2013 has reduced the errors in metered consumption and hence the NRW from over 30% of total water supplied to an average of 13% p.a.	$260,000 p.a. for replacement of water meters after 10 years, at 5,000 kL or when failed
Water main replacement program	Replacement of water mains at approximately 1.0% of the network annually from 2014/15. Increasing to 1.25% from 2040 with an additional construction crew based at Batemans Bay.	$1,500,000 p.a.
Water saving measures – community buildings	Council has retrofitted simple energy and water efficiency measures in over 50 community buildings across Eurobodalla from 2013-2015 as part of the Community Building Sustainability Project. The project has resulted in these community buildings saving 7.4 ML/a. Council has also implemented water leak detection programs and upgraded fittings at public pools, community buildings and public toilets, which will save over 45 ML/a (1.3% of total demand).	Complete

In addition to the adopted water conservation measures, the following measures were considered in the 2003 IWCM Strategy:

- Educational programs that specifically target:
    - Builders and plumbers;
    - Architects, landscape gardeners, nursery owners and property developers;
    - Council staff; and
    - Tourists and holiday-makers.
- Water–efficient demonstration house; and
- Water waste ordinance - restrictions.

The above measures ranked the lowest on a triple bottom line basis (and were not included in the "comprehensive demand management program") as they were considered to provide lower environmental and social benefits than the adopted measures (DPWS, 2003).

Actual demand between 2003 and the present has been lower than predicted in the 2003 IWCM Strategy as shown in Figure 11. The current forecast average year and dry year demand (from NSW Public Works, 2014a) are also lower than predicted in the 2003 IWCM Strategy.

Figure 11: Comparison between Demand Forecast from the 2003 IWCM Strategy, Actual Demand and the Current Forecast Demand

The recent demand has generally been decreasing and is significantly lower than the forecast average year and peak day demand. The decrease in actual demand since 2010 shown on Figure 11 may be due to climatic factors or demand management. Rainfall in Batemans Bay averaged 957 mm between 2009/10 and 2014/15 compared to the long-term average of 920 mm indicating that this period has experienced relatively normal rainfall. Similarly the temperature has been similar to the long-term average as shown in Table 15. This indicates that the ongoing demand management measures appear to be having a positive effect.

The IWCM Issues Paper (Hydrosphere Consulting, 2016) identified that the major influences on water demand appear to be demand management measures. The Shire's population increased at about 5% p.a. between 1996 and 2001 then growth slowed to about 1.2% p.a. between 2001 and 2011. Demand since 2000 has generally decreased despite the population growth.

Figure 12 provides a comparison of the average annual residential water supplied by Council with the median of LWUs of a similar size. Data was sourced from the NSW Office of Water Benchmarking Reports. This shows the significant reduction in consumption achieved with the current demand management measures. ESC consumption is significantly lower than other LWUs with the difference increasing from 18% in 2005 to 30% in 2014.

Table 15: Recent Demand and Climate Indicators

Year	Annual Demand (ML/a)	Peak Day Demand (ML/d)	Annual Rainfall at Batemans Bay (mm) [1]	Average Maximum Temperature (°C) [1]
2009/10	4,033	19.1	875	22.4
2010/11	3,761	24.3	853	21.3
2011/12	3,720	19.8	1,195	20.9
2012/13	3,411	22.5	951	21.6
2013/14	3,452	19.2	756	22.6
2014/15	3,331	17.3	1,114	21.7
Average 2009/10 – 2014/15			957	21.8
Long-term average			923	21.7

1. Source: BOM (2016), data for station 069134 Batemans Bay (Catalina Country Club)

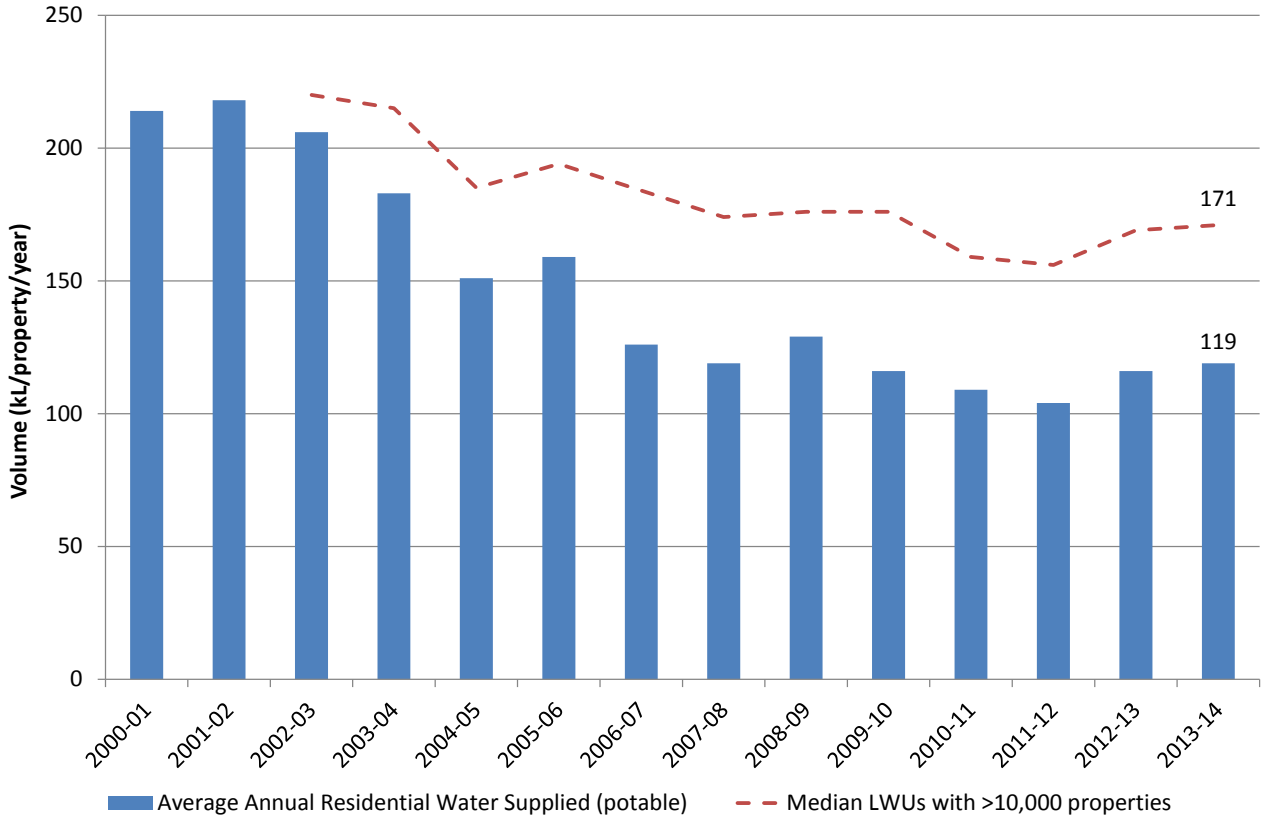

Figure 12: Comparison of ESCs Average Annual Water Supplied with Median of Similar Sized LWUs

Data for 2002/03 and 2003/04 are the NSW state medians.

In recent years, the level of non-revenue water (NRW) has been approximately 13% of total water supplied or 64 L/connection/day (refer Section 13.1.1 of the IWCM Issues Paper). The meter replacement program has reduced the errors in metered consumption and hence the NRW. The NRW is expected to continue to reduce with the ongoing implementation of the program.

The current demand management measures have been successful and the current expenditure on water conservation measures is considered to be appropriate. It is recommended that demand management initiatives and pricing incentives continue to be implemented to assist with water conservation.

A significant reduction in customer demand has already been achieved through the existing demand management measures and it is considered that additional measures would not be cost-effective and would not result in any meaningful additional reduction in demand that could offset the need for water supply source augmentation (refer Section B1.2).

B1.2 Water Supply Headworks Security

Issue 1 - Based on the secure yield estimate for the existing water supply headworks system, the existing supply is expected to be sufficient to meet demand until 2020. If the WSP is gazetted with the extraction rules modelled in the secure yield study, the water supply sources will not be sufficient to supply the dry year demand during a repeat of the worst drought. The secure yield of the water supply system is partly constrained by the capacity of the WTPs.

B1.2.1 Background to the Security of Supply Issue

The secure yield of the existing headworks has been re-assessed (NSW Public Works, 2013) based on the rules documented in the draft WSPs for the Clyde River, Deua River and Tuross River Unregulated and Alluvial Water Sources expected to commence in 2016 (refer Section 10.1.3 of the IWCM Issues Paper) and the current security of supply methodology (5/10/10 rule) for current and future conditions (refer IWCM Issues Paper, Section 14.1.1).

The *Water Supply Headworks Yield Study* (NSW Public Works, 2013a) found that the proposed WSP has a significant impact on the secure yield due to the increased restrictions on extraction during low flows. The total dry year system demand to 2030 (from NSW Public Works, 2014a) is compared to the secure yield estimates for the current system in Figure 13. Based on the secure yield estimates, the existing supply is expected to be sufficient to meet demand until 2020. If the WSP is gazetted with the extraction rules modelled in the secure yield study, the secure yield will decrease by 400 ML/a and water supply sources will not be sufficient to supply the dry year demand during a repeat of the worst drought.

The impact of climate change (1°C warming at approximately 2030) has also been assessed. The secure yield of the existing system with the WSP would not be reduced by 1°C warming as the secure yield is constrained by the transfer and treatment plant capacity and available storage.

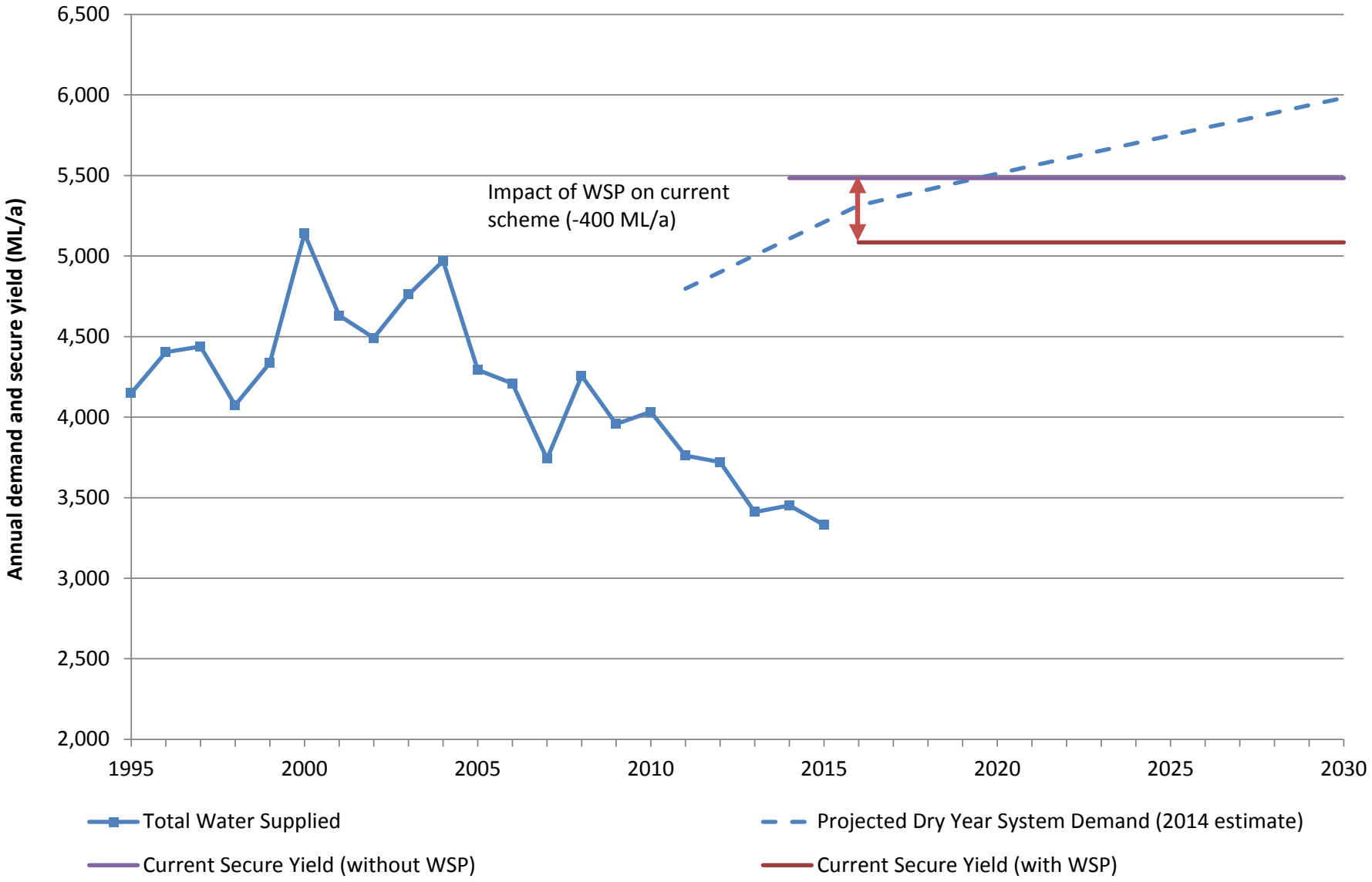

Figure 13: Comparison of Dry Year System Demand and Secure Yield

Based on the current dry year demand forecast and the secure yield of the current system assuming the WSP is gazetted, the current future demand – supply deficit is given in Table 16. The secure yield modelling (NSW Public Works, 2013a) found that the adjustment factor for 2°C climate change (at approximately 2060) was 0.70 (30% reduction in secure yield), resulting in a 2060 secure yield of approximately 3,559 ML/a. A linear reduction in yield between 2030 and 2060 has been assumed. Further investigation is required to confirm the impact of long-term climate change on the secure yield.

Table 16: Dry Year Demand – Supply Deficit

Year	Dry Year Demand (ML/a)[1]	Secure Yield (ML/a)[2]	Deficit (ML/a)
2014/15	5,211	5,084	127
2019/20	5,511	5,084	427
2024/25	5,748	5,084	664
2029/30	5,982	5,084	898
2034/35	6,220	4,830	1,390
2039/40	6,460	4,576	1,884
2044/45	6,680	4,321	2,359

1. Source: NSW Public Works (2014a)
2. Source: NSW Public Works (2013a)

B1.2.2 Options Considered in the 2003 IWCM Strategy

The 2003 IWCM Strategy considered various options to manage the demand versus security of supply deficit including:

- The non-build measures documented in Section B1.1;
- Local supplies sources:
    - Roof water harvesting;
    - Stormwater harvesting; and
    - Residential grey water reuse.
- Development of regional supply sources:
    - Immediate measures to improve existing system reliability:
        - Relocation of the Malua Bay booster pumps to Mossy Point (2006) – the proposal was to boost flows north from Moruya River to meet high demands. The southern areas are now supplied by the northern WTP so the booster bumps are no longer required;
        - Upgrading of power supply to Moruya River pumps – completed;
        - Installation of pumps or variable speed drives to overcome the flow mismatch between the low and high level pumps at Tuross River intake - groundwater bores replaced the Tuross River pump station and the southern WTP was constructed; and
        - Improved telemetry and control elements on reservoirs and valves – completed.
    - Short-term measures – increase in extraction and transfer capacities along with water filtration:
        - Harvest higher river flows – completed through the Moruya River to Deep Creek Dam pipeline and Northern WTP;

        - Transfer and store water quickly in Deep Creek Dam - completed through the Moruya River to Deep Creek Dam pipeline;
        - Pipeline between Moruya River intake and Deep Creek Dam – commissioned 2010; and
    - Long-term measures - expansion of drought storage; and
- Increased reclaimed water use.

The options for local supply sources, drought security and reclaimed water use options are discussed in the following sections.

Local Supply Sources

Roof water harvesting is currently addressed through BASIX, Council's rainwater tank guidelines and rebates (refer Section B1.1.2). These measures are considered to be appropriate in terms of maximising the use of rainwater to reduce reliance on potable water supplies while balancing economic considerations.

Stormwater harvesting and reuse may be incorporated into stormwater detention and treatment facilities in new developments. Considerations include:

- There are limited opportunities for large scale new developments within the Shire (refer Section B1.2.3);
- Human health and environmental risks need to be managed as stormwater run-off from urban areas is often contaminated with litter, pathogens, oil and other chemicals. For higher risk uses, where people are more likely to be in close contact with the water, more complex management controls are necessary;
- The main cost is due to the storage required, which is dependent on the rainfall pattern, reuse demand and required level of reliability. Due to the highly seasonal rain in the Eurobodalla region, storages need to be large enough to capture the stormwater during the wet months and store it to be available throughout the year. Unlike recycled water, which is a relatively constant source of supply, stormwater is climate dependent and supply is not guaranteed during periods of drought or below average rainfall;
- Regulatory requirements will depend on a number of factors including planned end use for the captured stormwater and potential impacts on the environment and public health;
- The environmental impact of storages and reduced environmental flows in creeks and rivers need to be balanced against the goal of stormwater harvesting; and
- Storages can provide potential mosquito habitats and increase the potential for upstream flooding.

The 2003 IWCM Strategy found that it is more environmentally beneficial to maximise the use of reclaimed water first before implementing stormwater harvesting systems in high rainfall locations such as Eurobodalla Shire with limited irrigation opportunities. This conclusion is still considered to be valid.

The provision of sewerage systems in currently unsewered areas would allow for the utilisation of suitable treatment systems for local greywater reuse. Greywater reuse is becoming more common but requires the householder to comply with stringent guidelines and the potential health, odour and runoff impacts. Improved upfront management involving community education and Council support is required for this to be successful. Backlog sewerage schemes are discussed further in Section B1.8.

Drought Security Options

The drought security options considered in the 2003 IWCM Strategy were enlarging the existing Deep Creek Dam, a new off-river storage either in the south or central region and the desalination of seawater.

Scheme cost estimates and a triple bottom line (TBL) assessment of the regional supply options were documented in the 2003 IWCM Strategy (refer Table 17 and Table 18).

Table 17: Social and Environmental Aspects of Regional Water Supply Opportunities (2003 IWCM Strategy)

Opportunities	Social	Environmental
Opportunity 1 Raise Deep Creek Dam	Maximises use of existing assets Drought security confined to one storage Limited construction work	Proposal footprint predominantly confined to previously disturbed areas Further increases extraction from Moruya River, although in high flows
Opportunity 2 New Southern Off-River Storage	Spreads drought security (and water quality) risk between two storages and two supply sources Acceptance (and social impact) of proposal to build new storage Reduced reliance on extended delivery mains	River harvesting shared between two sources Creates a new footprint and associated environmental impact
Opportunity 3 New Central Off-River Storage	Spreads drought security risk between two storages but extraction based on one supply source More water available to environment and irrigators on Tuross River Acceptance (and social impact) of proposal to build new storage High pumping costs	Increased reliance on Moruya River and higher environmental impacts to river environment Tuross River environment protected
Opportunity 4 Desalination	Plant located on possible development area Technology has potential to attract tourist visitation Public acceptance of this option for potable uses (unknown) Enhances drought-proofing of the scheme Reduced reliance on extended delivery mains Expensive to operate	High energy use, resulting in greenhouse gas emission Potential issues with brine disposal Reduced dependence on surface waters

Source: DPWS (2003)

Table 18: TBL assessment of Regional Water Supply Opportunities (2003 IWCM Strategy)

	Deep Creek Dam	Southern Dam	Central Dam	Desalination
	1	2	3	4
ENVIRONMENTAL				
Ensures efficient use of the fresh water resource	1	1	1	2
Minimises water extractions and protects low flows	1	1	1	3
Minimises greenhouse gas emissions	1	1	0	0
Minimises pollutants being discharged to the aquatic environment	2	2	3	0
Minimises urban stormwater volumes	0	0	0	0
Ensures sustainable practices	1	1	0	0
Environmental Sum	**6**	**6**	**5**	**5**
Environmental Rank	**1**	**1**	**4**	**4**
SOCIAL				
Improves security of town water supply	2	3	2	3
Improves the quality of drinking water	3	3	3	2
Improves urban water service levels	2	3	2	3
Increases public awareness of urban water issues	1	1	1	1
Minimises non-compliance to legislation	2	3	2	2
Protects public health	2	3	3	3
Social Sum	**12**	**16**	**13**	**14**
Social Rank	**6**	**1**	**3**	**2**
FINANCIAL				
$/ML	7.7-9.5	8.7	12.6	8.1
Financial Rank	**1**	**3**	**4**	**2**
TBL Sum	**8**	**5**	**11**	**8**
TBL Rank	**2**	**1**	**4**	**2**

Source: DPWS (2003)

The ranking in the 2003 IWCM Strategy suggested that if in the future the existing drought storage needs to be enhanced then the preferred strategy would be to develop a new 1.01 GL off-river storage facility in the south of the Shire. This off-river storage would be filled by harvesting high flows from the Tuross River. The justification for a second storage was:

- The second storage spreads drought security over two storages resulting in a reduced risk from water quality and/or structural problems;
- There is a limit on the expansion of Deep Creek Dam due to topographical constraints. Previous studies (DPWS, 1998) have identified the maximum increase in full supply level would be 7.4 m or an additional 4.1 GL. This limits the potential for future staged expansion;

- Raising Deep Creek Dam would increase extraction from the Buckenboura and Deua/Moruya Rivers whereas a southern storage would share extraction stress with the Tuross River which has a lower town water entitlement (0.33% of average annual runoff compared to 1.1% in the Deua/Moruya River, refer Section 11.2.1 of the IWCM Issues Paper);
- A second storage improves the operational flexibility of the scheme whereby water could be pumped from three river sources and transferred to both the northern and southern areas depending on demand; and
- A second storage reduces the impact that a trunk main break in the north of the Shire would have on supply to the south of the Shire (as demand could be supplied by the southern system only).

During the process of assessment of the options for water supply augmentation in the 2003 IWCM Strategy, 21 dam sites were examined for feasibility. Engineering and hydrological performance criteria were assessed, with the available yield of water after environmental flows are provided being a key consideration. For this reason the sharing of the demand between more than one river source was considered an important factor. The proposed off-stream dam adjacent to the Tuross River considers the long-term operation of the storage dam in terms of the effect of the other assets in the entire water supply system including pipelines, pump stations and water treatment facilities and would improve the reliability of supply to the southern part of the Shire in the long term.

A southern storage was preferred over a central storage filled by high flow from the Moruya River. Although extraction from the Tuross River could cease with a central storage, there was considered to be increased stress on the Moruya River and risk to regional water supply through greater reliance on a single source. In the long term the southern storage would assist in meeting peak day demand in both southern and central areas of the Shire without major pipeline upgrades.

Opportunity 4 (desalination) was considered to reduce the dependence on surface waters however disposal of the brine stream, high energy use and the availability of suitable land on the coast were considered to be risk factors with this option. These risks are still considered to be valid, however, temporary desalination facilities offer a flexible drought contingency measure at a relatively low cost as they would only be installed in a drought situation and as late as possible (emergency supplies). Desalination will be considered further as an emergency drought supply as part of ESC's drought planning.

Nineteen sites were initially identified for investigation to determine the best location for the proposed off-stream storage. A series of desktop investigations were carried out to determine the most appropriate site considering environmental impacts, engineering feasibility and cost-effectiveness. Six potential off-creek sites (four in the south and two in the centre of the Shire) were nominated after initial desk top studies indicated these to be the most attractive in terms of overall engineering, environmental and social impact.

A feasibility study undertaken in 2002 (DPWS, 2002) examined the engineering characteristics of the six potential off-stream storage sites and identified three preferred sites at Stoney Creek No. 2 and Tuross No. 2 in the south and Barretts Creek in the central area. Preliminary ecological and environmental planning investigations were undertaken on all potential sites in the south in early 2005 in conjunction with geotechnical, drilling and seismic investigations. The assessments supported the Stony Creek 2 site as the most viable for a new off-river storage.

Reclaimed Water Use Options

The 2003 IWCM Strategy considered increased reclaimed water use options as follows:

- Urban open space and industrial reuse;
- Residential non-potable reuse;
- Agricultural crop production;
- Northern Region Scheme – reclaimed water use from Batemans Bay and Tomakin STPs for irrigation of dairy farms around Moruya;

- Southern Region Scheme - reclaimed water use from Tuross Head and Narooma STPs for irrigation of agricultural and dairy farms around Tuross River; and
- Environmental flow substitution – discharge of highly treated reclaimed water back to the river or aquifer system to improve the sustainability of the water resources.

Of the options considered, only the residential non-potable reuse option would replace potable water demand. This is discussed further in Section B1.2.3.

Integrated Water Supply Options

The reclaimed water opportunities were bundled with demand management and drought security options into "integrated options" in the 2003 IWCM Strategy as shown in Table 19. The 2003 IWCM Shire-wide scenarios were compared on a TBL basis (refer Table 20).

Table 19: Regional Water Supply Integrated Options (2003 IWCM Strategy)

		Traditional	Integrated options						
			1	2	3	4	5	6	7
Limited Demand Management		✓	✓	✓	✓	✓	✓	✓	✓
Comprehensive Demand Management			✓	✓	✓	✓	✓	✓	✓
10 kL rainwater tanks in all new developments and 20% existing houses				✓	✓	✓	✓	✓	✓
Provision of reticulated water supply to high priority villages		✓			✓	✓	✓	✓	✓
Provision of reticulated water supply to low priority villages		✓				✓	✓	✓	✓
Reclaimed Water Reuse	Agriculture	✓					✓	✓	✓
	Non-potable water in new developments (dual reticulation)							✓	✓
	Aquifer recharge for subsequent non-potable water use							✓	✓
	Environmental flow substitution								✓
Southern dam for the regional scheme (x 1000 ML)		5.6	1.5	0.9	0.93	1.01	1.01	0.84	0

Source: DPWS (2003)

Table 20: TBL Assessment of Regional Water Supply Integrated Options (2003 IWCM Strategy)

	Trad.	Integrated Options						
	0	1	2	3	4	5	6	7
ENVIRONMENTAL								
Ensures the efficient use of the fresh water resource	0	1	2	2	2	3	3	3
Minimises water extractions and protects low flows	0	1	2	2	2	3	3	3
Minimises greenhouse gas emissions	1	3	3	2	1	1	1	2
Minimises pollutants being discharged to the aquatic environment	0	0	0	0	0	2	2	2
Minimises urban stormwater volumes	0	0	2	2	2	2	2	2
Ensure sustainable practices	0	1	2	2	2	3	3	3
Environmental Sum	**2**	**6**	**11**	**10**	**9**	**14**	**14**	**15**
Environmental Rank	**8**	**7**	**4**	**5**	**6**	**2**	**2**	**1**
SOCIAL								
Improves security of town water supply	3	3	3	3	3	3	3	3
Improves the quality of drinking water	3	3	3	3	3	3	3	3
Improves urban water service levels	1	1	2	2	3	3	3	3
Increases public awareness of urban water issues	0	2	3	3	3	3	3	3
Minimises non-compliance to legislation	0	1	1	2	3	3	3	3
Protects public health	0	0	0	2	3	3	3	3
Social Sum	**7**	**10**	**12**	**15**	**18**	**18**	**18**	**18**
Social Rank	**8**	**7**	**6**	**5**	**1**	**1**	**1**	**1**
FINANCIAL								
NPV $m over 30 years (with Rainwater Tanks)	149.1	64.2	73.2	74.7	76.8	86.3	86.8	80.7
Financial Rank	**8**	**1**	**2**	**3**	**4**	**6**	**7**	**5**
TBL Sum	**24**	**15**	**12**	**13**	**11**	**9**	**10**	**7**
TBL Rank	**8**	**7**	**5**	**6**	**4**	**2**	**3**	**1**

Adopted IWCM Scenario

Integrated Scenario 5 (with the Waterwise education, comprehensive demand management, 10 kL rainwater tanks in all new developments and 20% of existing houses and a southern dam of capacity 1.01 GL) was recommended in the 2003 IWCM Strategy on the basis of TBL rank and risks associated with other scenarios.

Council staff subsequently recommended bringing forward the construction of a larger southern storage (3.0 – 4.0 GL) to cater for a higher population growth and to avoid the inefficiency of building a small storage facility and repeating the pre-construction activities at a later date when enlargement would be required. This modified IWCM Scenario was adopted by Council in April 2003.

The construction of the southern storage was deferred due to the impact of water conservation measures, slower than anticipated growth and uncertainty associated with proposed water sharing plans. Due to this

uncertainty Council resolved not to proceed with the project beyond preparation of draft concept development and environmental assessment.

B1.2.3 Recent Investigations

Since the 2003 IWCM Strategy was prepared, new information has become available including:

- Draft WSPs for the Clyde River, Deua River and Tuross River Unregulated and Alluvial Water Sources were released for consultation in 2012;
- Revised water supply demand forecast (NSW Public Works, 2014a) – refer Section 13.1.2 of the IWCM Issues Paper;
- Security of supply analysis of augmentation options in accordance with the current security of supply methodology (NSW Public Works, 2013a) – based on the requirements of the draft WSPs and incorporating demand hardening (5/10/10 rule) and the potential impacts of climate change – discussed below;
- Security of supply analysis (updated for this IWCM Strategy, NSW Urban Water Services, 2016); and
- Effluent management investigations (NSW Public Works, 2014c) – discussed below.

Secure Yield

The *Water Supply Headworks Yield Study* (NSW Public Works, 2013a) assessed the secure yield of various source augmentation options (and combinations of options) including:

- Upgrading extraction rates from each supply source;
- Increasing capacity of the southern WTP (from 6.5 ML/d to 15 ML/d or 20 ML/d);
- Increasing capacity of the northern WTP (from 20 ML/d to 30 ML/d);
- Transfer from the southern (Tuross River) to northern system;
- Increased Deep Creek Dam storage (from 4.9 GL to 5.8 GL, 6.4 GL, 6.9 GL and 9.0 GL);
- New southern storage (2.0 GL, 5.0 GL and 8.0 GL);

The options were assessed both with and without the proposed WSP and included assessment of the impacts of 1°C and 2°C climate warming.

The 2013 study found that:

- The proposed WSP rules will result in significantly reduced secure yield for the existing system (-400 ML/a);
- Treatment capacity is the main constraint on secure yield without the new WSP. Once the WSP is gazetted, storage capacity also becomes a significant constraint;
- The proposed WSP rules will also result in significantly reduced secure yield for the augmented system. The impact of the WSP rules on a southern storage combined with a WTP upgrade is a reduction in secure yield of 1,800 ML/a;
- Increasing the capacity of the WTPs alone would have no effect on secure yield once the new WSPs are gazetted;
- The secure yield of a combination of increased WTP capacity and a southern storage is constrained by the WTP capacity;
- Raising Deep Creek Dam alone will not increase the secure yield unless the WTP capacity is also increased;
- The secure yield of the existing system with the WSP would be reduced by 30% with 2°C warming; and

- The secure yield of the augmented system (with an additional 8 GL storage) with the WSP would be reduced by 20% with 2°C warming.

The reductions due to climate change (1°C and 2°C warming) listed above vary according to constraints in the modelled system. The existing system is significantly constrained by treatment plant capacity and storage capacity. Climate change is not the limiting factor in this situation. As the system is augmented (i.e. by upgrading the treatment capacity or adding additional storage), climate, rather than infrastructure constraints become more evident and therefore influence the modelled secure yield.

The secure yield analysis was updated for this IWCM Strategy (NSW Urban Water Services, 2016) using the WSP rules documented in the draft Report Cards (NSW Office of Water, 2013a, 2013b and 2013c) and considering augmentation with the 3 GL southern dam combined with additional measures (in isolation):

- Increased Tuross River extraction;
- Increased Deua River extraction;
- Increased Buckenboura River extraction;
- Increased southern treatment capacity;
- Increased northern treatment capacity; and
- Increased transfer from south to north.

This analysis found that the main constraints on secure yield are:

- The reduced extraction at low flows (i.e. during drought conditions) – increasing the source water extraction does not increase the secure yield as the WSP rules limit the extraction at low flows (when the additional extraction would be advantageous);
- The available storage – the 3 GL southern dam will provide additional yield as the system can draw on the stored water in drought periods; and
- The ability to transfer water from the south to the north (the main demand centre) – the southern WTP needs to supply 20 ML/d to the northern areas (with 5 ML/d to the southern areas) to achieve the required secure yield.

The 2016 analysis also considered the impacts of 1°C climate warming. As was found in the 2013 study, the secure yield of the existing system with the southern dam is not affected by 1°C climate change as the system is constrained by transfer and treatment capacity. The 2016 study found that there would be a small impact on secure yield (4% reduction) with 1°C climate change once the increased treatment and transfer capacity was included in the system. The impact of 2°C climate warming was not considered in the 2016 study as longer-term predictions of climate change impacts are not considered to be sufficiently robust at this stage and the methodology is under review. Future secure yield analyses will consider longer term changes to secure yield.

The augmentation strategy providing the highest secure yield is:

- Provision of a 3 GL southern dam;
- Southern WTP capacity of 25 ML/d; and
- Transfer from south to north of 20 ML/d.

The predicted current secure yield of this strategy with the WSP is 7,584 ML/a and this is expected to be reduced by 4% with 1°C climate warming (by approximately 2030).

Treatment Capacity and Peak Demand

A hydraulic computer model has been developed for the existing water supply system, future trunk system and future reticulation network for all reservoir zones (NSW Public Works, 2014b). The existing treatment capacity and reservoir storage are sufficient to meet the current peak day demand.

The forecast PDD from the demand forecast report (NSW Public Works, 2014a) is shown with the historical PDD and the treatment capacity in Figure 14. The additional capacity provided by the distribution system reservoirs (115 ML) is not shown here.

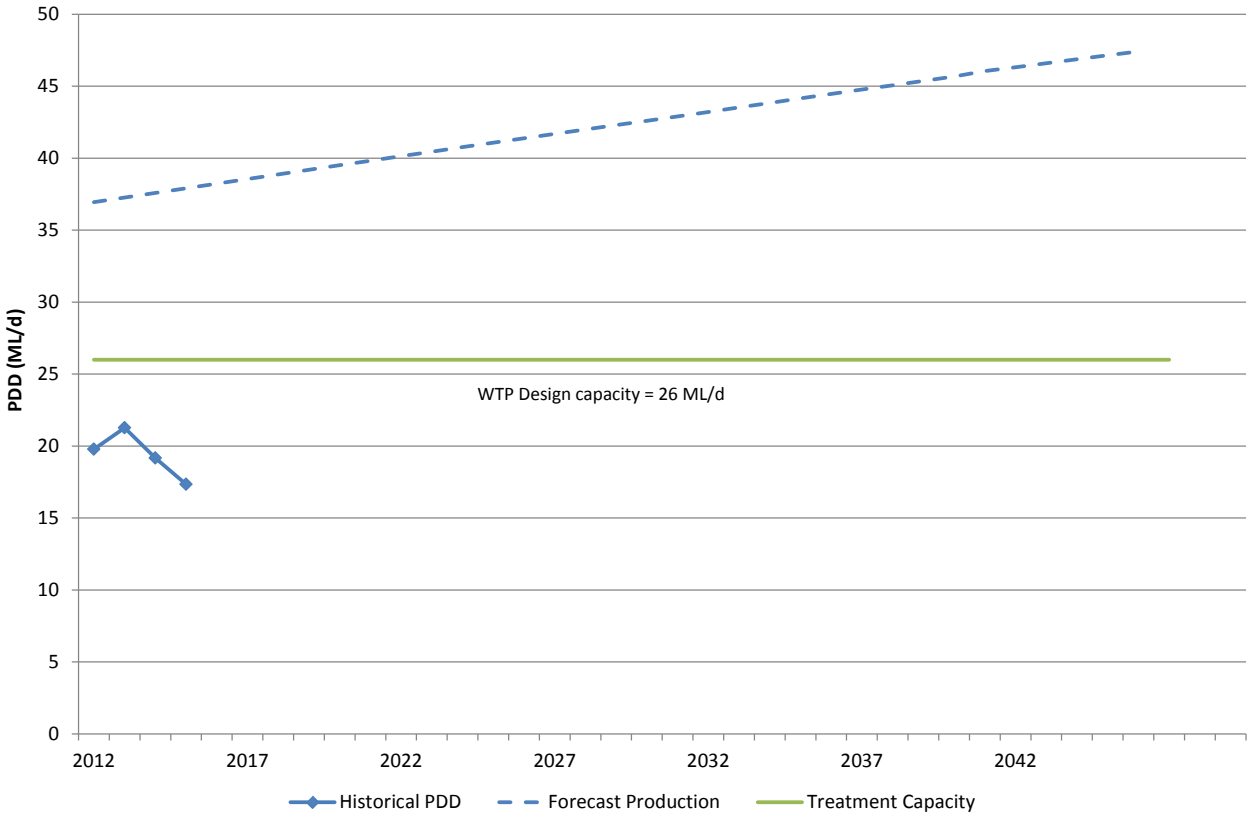

Figure 14: Historical and Forecast Peak Day Demand and Treatment Capacity

As discussed in Section 14.1 of the IWCM Issues Paper, analysis of the water treatment and trunk system has shown that the current PDD will be met over the next 30 years with the current treatment and distribution system capacity. A higher, more conservative PDD (1,500 L/ET/day compared to the actual PDD of 1,200 L/ET/day) can also be supplied for the next 15 years without an increase in treatment capacity.

As the secure yield of the water supply system is partly constrained by the treatment capacity (as discussed above), a new 25 ML/d southern WTP will be required to provide the required security of supply over the longer term.

Effluent Reuse

In 2014, ESC commissioned an investigation into alternative means of managing effluent from Council's five STPs (NSW Public Works, 2014c). The options considered were:

- Effluent reuse by irrigation;
- Industrial effluent reuse;
- Residential effluent reuse;
- Indirect potable reuse;
- Ocean discharges;
- River discharges;
- Sand dune exfiltration; and
- Groundwater recharge.

The study was an engineering assessment of costs associated with various options which are alternatives to the current effluent management strategies employed at each STP.

A summary of the potential options for each STP, the additional treatment and infrastructure requirements, volume of effluent reuse, potable demand reduction and the cost to Council are given in Table 21. The study reports the current (2014) cost of supply of potable water is $3.40 per kL ($3,400 per ML). For non-potable urban reuse schemes, additional analysis would be required to establish the total cost including additional costs to developers in constructing the infrastructure, additional costs to ESC in maintaining the infrastructure and impact on property prices. The cost of pumping from Moruya/Deua River to Deep Creek Dam is reported as 6.6 c/kL ($66 per ML) significantly lower than the indirect potable reuse cost estimates.

Any irrigation scheme that does not replace existing potable water use does not offer a benefit to the Council water and sewerage businesses. NSW Public Works (2014c) reports the cost per ML that would have to be recovered from the end user.

The report identified options that present a favourable cost compared to potable water production. Typically these are the schemes where infrastructure can be operated at a high level of utilisation and provide an alternative use for the majority of the STP production. The options that would replace potable water use or increase raw water availability are:

- Indirect potable reuse (Deep Creek Dam) – the regulatory and community impacts are considered to be significant. The cost of pumping highly treated effluent from Batemans Bay or Tomakin STPs is significantly higher than pumping from the rivers to Deep Creek Dam;
- Residential reuse (dual reticulation) for large residential developments in Tomakin (900 ET) and Moruya (500 ET) – the additional capital costs for the developer in duplicating water supply infrastructure, additional maintenance costs for Council and community demand for the effluent and the willingness to pay through potential increased property prices and water use charges are considered to be significant. The cost of providing the recycled water is comparatively high compared to release type options due to the small scale of the development likely to occur; and
- Municipal reuse at Gundary Oval, Moruya – effluent irrigation at Gundary Oval was investigated in the 2010 drought as part of the supply to Riverside Park.

The remaining options were not favourable on a cost basis or do not replace potable water consumption.

Table 21: Summary of Effluent Management Options

STP	Effluent Management Option	Additional Treatment and Infrastructure Required	Volume of Effluent (ML/a)	% of 2032 Effluent Volume	Potable Water Substitution/Increase in Yield (ML/a)	Capital Cost[1]	Annual Cost[1]	NPV Cost per ML[1]
Batemans Bay	Industrial reuse – Batemans Bay Industrial Area current businesses + expansion to 19 ML/a (outdoor use, process water and toilet flushing)	Ultra-Filtration (UF), chlorination, ultraviolet disinfection (UV), storage and reticulation	19	1%	19	$2,450,455	$37,057	$9,056
	Industrial reuse – Batemans Bay Industrial Area current businesses + expansion to 37 ML/a (outdoor use, process water and toilet flushing)	UF, chlorination, UV, storage and reticulation	37	2%	37	$2,716,455	$45,421	$5,162
	Residential Reuse Denhams – 100 ET Development	UF, chlorination, UV, rising main and reservoir	29	2%	29	$2,580,445	$46,224	$6,475
	Residential Reuse Denhams – 200 ET Development	UF, chlorination, UV, rising main and reservoir	57	4%	57	$3,087,945	$51,154	$3,786
	Indirect Potable Reuse (Deep Creek Dam)	UF, RO, advanced oxidation, chlorination, pump station and rising main	1,387	88%	0 (reduced surface water extraction)	$6,871,970	$293,124	$504
	Groundwater recharge – South Durras aquifer	UV, chlorination, pump station and rising main	1,456	92%	0	$10,126,305	$149,368	$472

STP	Effluent Management Option	Additional Treatment and Infrastructure Required	Volume of Effluent (ML/a)	% of 2032 Effluent Volume	Potable Water Substitution/Increase in Yield (ML/a)	Capital Cost[1]	Annual Cost[1]	NPV Cost per ML[1]
Tomakin	Tomakin golf courses	UV, chlorination, pumping station, rising main	90	11%	0	$1,784,888	$29,660	$1,392
	Residential Reuse Mossy Point – 100 ET development	UF, chlorination, UV, rising main and reservoir	29	4%	29	$3,718,330	$46,224	$8,464
	Residential Reuse – 200 ET development	UF, chlorination, UV, rising main and reservoir	57	7%	57	$4,096,330	$67,207	$5,008
	Residential Reuse – 900 ET development	UF, chlorination, UV, rising main and reservoir	257	32%	257	$5,896,734	$371,708	$2,900
	Indirect Potable Reuse (Deep Creek Dam)	UF, RO, advanced oxidation, chlorination, pump station and rising main	795	100%	0 (reduced surface water extraction)	$7,174,230	$176,700	$721
	Groundwater recharge – Broulee aquifer	UV, chlorination, pump station and rising main	795	100%	0	$5,181,155	$70,265	$433

STP	Effluent Management Option	Additional Treatment and Infrastructure Required	Volume of Effluent (ML/a)	% of 2032 Effluent Volume	Potable Water Substitution/Increase in Yield (ML/a)	Capital Cost[1]	Annual Cost[1]	NPV Cost per ML[1]
Moruya	Gundary Oval	Rising main	21	6%	21	$60,000	$5,441	$458
	Racecourse and aerodrome 30ha	Storage, pumping station, rising main	295	79%	0	$3,897,418	$29,309	$781
	Pasture up to 10 ha	Pumping station and rising main	70	19%	0	$774,788	$5,496	$649
	Pasture up to 30 ha	Storage, pumping station, rising main	295	79%	0	$3,313,688	$31,358	$691
	Industrial reuse – Moruya Business Park (outdoor use, process water and toilet flushing)	UF, chlorination, UV, reservoir	26	7%	26	$2,134,720	$51,976	$6,464
	Industrial reuse – Moruya Business Park and Yarragee (outdoor use, process water and toilet flushing)	UF, chlorination, UV, reservoir and reticulation	53	14%	53	$2,302,720	$68,858	$3,782
	Residential Reuse Moruya – 100 ET development	UF, chlorination, UV, rising main and reservoir	29	8%	23	$2,570,330	$46,224	$6,457
	Residential Reuse Moruya – 500 ET development	UF, chlorination, UV, rising main and reservoir	143	38%	143	$3,545,080	$127,133	$2,320
	Groundwater recharge – Broulee aquifer	UV, chlorination, pump station and rising main, exfiltration trench	295	79%	0	$3,651,725	$78,313	$941
	Ocean discharge	UV, pumping station, rising main, ocean outfall	295	79%	0	$7,461,888	$45,069	$1,450
	Industrial and residential reuse 100 ET	UF, chlorination, UV, reservoir, reticulation	55	15%	55	$3,603,740	$84,455	$5,142
	Industrial and residential reuse 500 ET	UF, chlorination, UV, reservoir, reticulation	196	52%	196	$4,531,240	$212,240	$2,471

STP	Effluent Management Option	Additional Treatment and Infrastructure Required	Volume of Effluent (ML/a)	% of 2032 Effluent Volume	Potable Water Substitution/Increase in Yield (ML/a)	Capital Cost[1]	Annual Cost[1]	NPV Cost per ML[1]
Tuross	Pasture up to 12.5 ha	Storage, pumping station, rising main	63	24%	0	$2,622,508	$7,078	$2,236
	Pasture up to 25 ha	Storage, pumping station, rising main	125	49%	0	$3,628,688	$12,853	$1,576
	Residential Reuse Tuross Heads – 100 ET development	UF, chlorination, UV, reservoir and reticulation	29	11%	29	$3,821,755	$46,224	$8,645
	Residential Reuse Tuross Heads – 500 ET development	UF, chlorination, UV, reservoir and reticulation	57	22%	57	$4,199,755	$67,207	$5,099
	Tuross Sport and Recreation Area	Rising main extension, chlorination, reservoir and irrigation system	21	7%	0	$702,548	$2,691	$1,828

STP	Effluent Management Option	Additional Treatment and Infrastructure Required	Volume of Effluent (ML/a)	% of 2032 Effluent Volume	Potable Water Substitution/Increase in Yield (ML/a)	Capital Cost[1]	Annual Cost[1]	NPV Cost per ML[1]
Narooma	Narooma Golf Course	UV, chlorination, pumping station, rising main	80	12%	0	$2,562,728	$11,689	$1,802
	Pasture up to 12.5 ha	Pumping station, rising main	135	21%	0	$1,005,088	$15,288	$510
	Pasture up to 25 ha	Pumping station, rising main	270	41%	0	$1,245,188	$27,200	$353
	Industrial reuse – Narooma and Dalmeny Industrial areas	UF, chlorination, UV, reservoir	26	3%	26	$4,113,270	$44,508	$14,040
	Industrial reuse – Narooma and Dalmeny Industrial areas	UF, chlorination, UV, reservoir	53	6%	53	$4,281,270	$58,021	$7,691
	Residential Reuse Dalmeny – 100 ET development	UF, chlorination, UV, reservoir	29	4%	29	$2,617,510	$46,224	$6,540
	Residential Reuse Kianga – 100 ET development	UF, chlorination, UV, reservoir	29	4%	29	$2,265,620	$46,224	$5,924
	Residential Reuse Narooma – 100 ET development	UF, chlorination, UV, reservoir	29	4%	29	$3,501,890	$47,416	$8,136
	Dune exfiltration	UV, pumping station, rising main, exfiltration trench	657	100%	0	$2,889,768	$13,627	$245
	Narooma – Municipal, industrial and residential reuse – 100 ET development	UF, chlorination, UV, reservoir	119	18%	119	$4,738,160	$72,801	$2,741
	Dalmeny - Industrial and residential reuse – 100 ET development	UF, chlorination, UV, reservoir	36	5%	36	$3,245,270	$56,432	$6,412

Source: NSW Public Works (2014c)

1. All costs are in 2014$

The ESC Rural and Residential Land Monitor (ESC, 2015) has identified the potential for large subdivision estates (Table 22) in the Shire.

Table 22: Development in Land Release Areas – Eurobodalla Shire

Release area name	Number of Lots			
	Current	Next 5 years	Beyond 5 years	Total
Longbeach (Longbeach Estate)	582	25	64	671
Longbeach (Longbeach East)	0	5	63	68
North Batemans Bay (Bay Ridge Estate)	22	25	98	145
Catalina (Glenella Road)	0	10	50	60
Batehaven (Grantham and Edward Roads)	49	35	0	84
Sunshine Bay	399	40	93	532
Malua Bay (Lilli Pilli Beach Estate)	177	13	0	190
Malua Bay (Seabreeze Estate)	133	15	38	186
Malua Bay (Ridge Road)	0	15	15	30
Malua Bay (Surfing Beach Estate)	9	10	27	46
Malua Bay (Sylvan Street West)	0	15	55	70
Malua Bay (Elford Way)	23	4	0	27
Malua Bay (Reservoir Road)	0	0	100	100
Rosedale (Marsim)	0	0	791	791
Rosedale (Rosedale Farm)	0	16	122	138
Tomakin (Barlings Beach)	107	40	54	201
Broulee (Broulee Beaches Estate)	95	25	475	595
Moruya South (The Brae)	0	0	393	393
Moruya East (Braemar)	0	14	27	41
Moruya East (Blue Mist)	0	0	77	77
Tuross Head	0	0	86	86
Dalmeny	0	0	320	320
Kianga	0	20	15	35
Narooma	0	0	280	280

Source: ESC (2015)

Based on the results of the Effluent Management Options Study, the only potential subdivision estate that is large enough to incorporate a dual reticulation scheme cost effectively is the Rosedale Urban Expansion Area. This development is being serviced by the new Rosedale regional SPS with sewage transported to Tomakin STP for treatment with potable water supplied by the regional water supply. Dual reticulation would require additional infrastructure as follows (NSW Public Works, 2014c):

- Tomakin STP – ultrafiltration, UV disinfection, chlorination and balancing storage (sized for the demand);
- Transport system – pump station, rising main and reservoir; and
- Plumbing – second supply main and internal plumbing.

The capital cost of the STP augmentation and transport system is estimated at $6.2 million (NSW Public Works, 2014c, 2016$). There would also be additional capital costs for the developer in duplicating water supply infrastructure and additional maintenance costs for Council.

Based on the demand-supply deficit (refer Table 16), the urban reuse option (large residential development of 900 ET) would reduce the deficit in 30 years (2045) by 257 ML/a or 11% of the total deficit. A large storage and WTP augmentation would still be required to provide security of supply.

The Effluent Management Options Study only considered additional treatment at the existing STPs to supply effluent reuse areas. Sewer mining combined with a smaller reclaimed water treatment facility may be more economical, however there would still be additional capital costs for the developer in duplicating water supply infrastructure and additional maintenance costs for Council. The potable water substitution would also be insufficient to defer a major water supply augmentation (including a new storage and larger WTP facilities). For these reasons, sewer mining will not be considered further in this IWCM Strategy.

B1.2.4 On-Stream Storages

Prior to adoption of the preferred IWCM Strategy in 2003, Council also considered options for on-stream storages including the raising of Buckenboura Weir and a dam on Swamp Creek. Input obtained from the various government agencies established that there would be difficulties in gaining approvals for on-stream dams, even on relatively minor streams with intermittent flow. The degree to which studies would be required to assess the natural environmental parameters was recognised as time consuming. The extent to which construction of dams on these streams would impact on these environmental parameters would then need to be considered in the approval process, with the potential for rejection of sites after a great deal of time and finances being invested.

A new storage on a permanent stream was considered to pose additional environmental impacts and the issue of siting a dam or weir on a naturally flowing stream was identified as being contrary to NSW Government policy at the time.

Off-creek storages were found to be generally more favourable from an environmental and regulatory point of view than on-creek storages. The safe yield of an on-stream dam would be compromised by the future requirements to provide for environmental flow releases in dry times. Moreover the cost of provision of the larger spillways and environmental flow release infrastructure would add significantly to the cost of on-stream dams.

B1.2.5 Preferred Headworks Security Option

The preferred water supply augmentation strategy (Figure 15 and Figure 16) includes the existing water supply infrastructure with the addition of:

- A new 3 GL southern dam;
- A new southern WTP with capacity of 25 ML/d; and
- The ability to transfer up to 20 ML/d treated water from south to north.

This strategy will provide the required drought security with staged implementation of the strategy components. The forecast dry year demand and the secure yield of the water supply augmentation strategy (compared to the current system) are shown in Figure 17 including the predicted impacts of climate change. The secure yield of the augmented system is predicted to be reduced from 7,584 ML/a to 7,280 ML/a (4% reduction) between 2016 (current) and 2030 with 1°C climate warming. As the augmentation is planned for completion in 2029, the secure yield assuming a linear reduction in demand due to climate warming is predicted to be 7,302 ML/a once commissioned. Beyond 2030, the secure yield is assumed to reduce at the current rate of climate change (4% over 14 years or 0.29% p.a.). Figure 17 also shows the predicted reduction in secure yield for the existing system with the higher rate of climate warming (30% reduction between 2030 and 2060 or 1% p.a.) as this was assessed in the 2013 study. The longer-term impacts of climate warming on secure yield will be re-assessed with future reviews of the secure yield analysis.

The proposed augmentation strategy provides a balance between utilisation of the Buckenboura and Moruya/Deua Rivers and the underutilised Tuross river system. The system configuration will provide flexibility in the ability to supply normal demand from the northern system as well as the ability to supply off-peak or restricted demand from the southern system to both the southern and northern systems. The storages and treatment facilities in both the south and the north will also provide redundancy in the event of major asset failure in either part of the system.

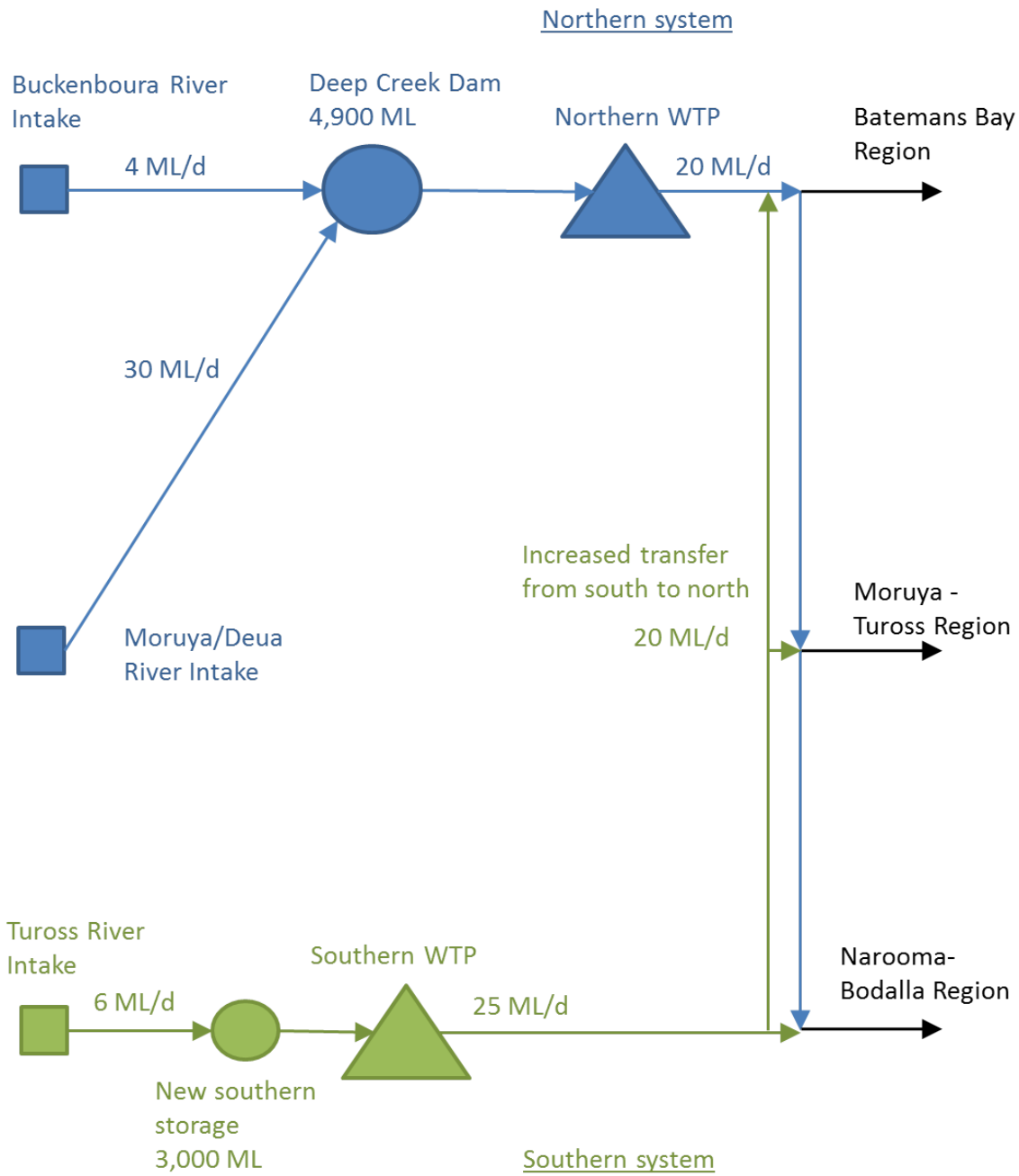

Figure 15: Regional Water Supply Schematic – Long-Term Strategy

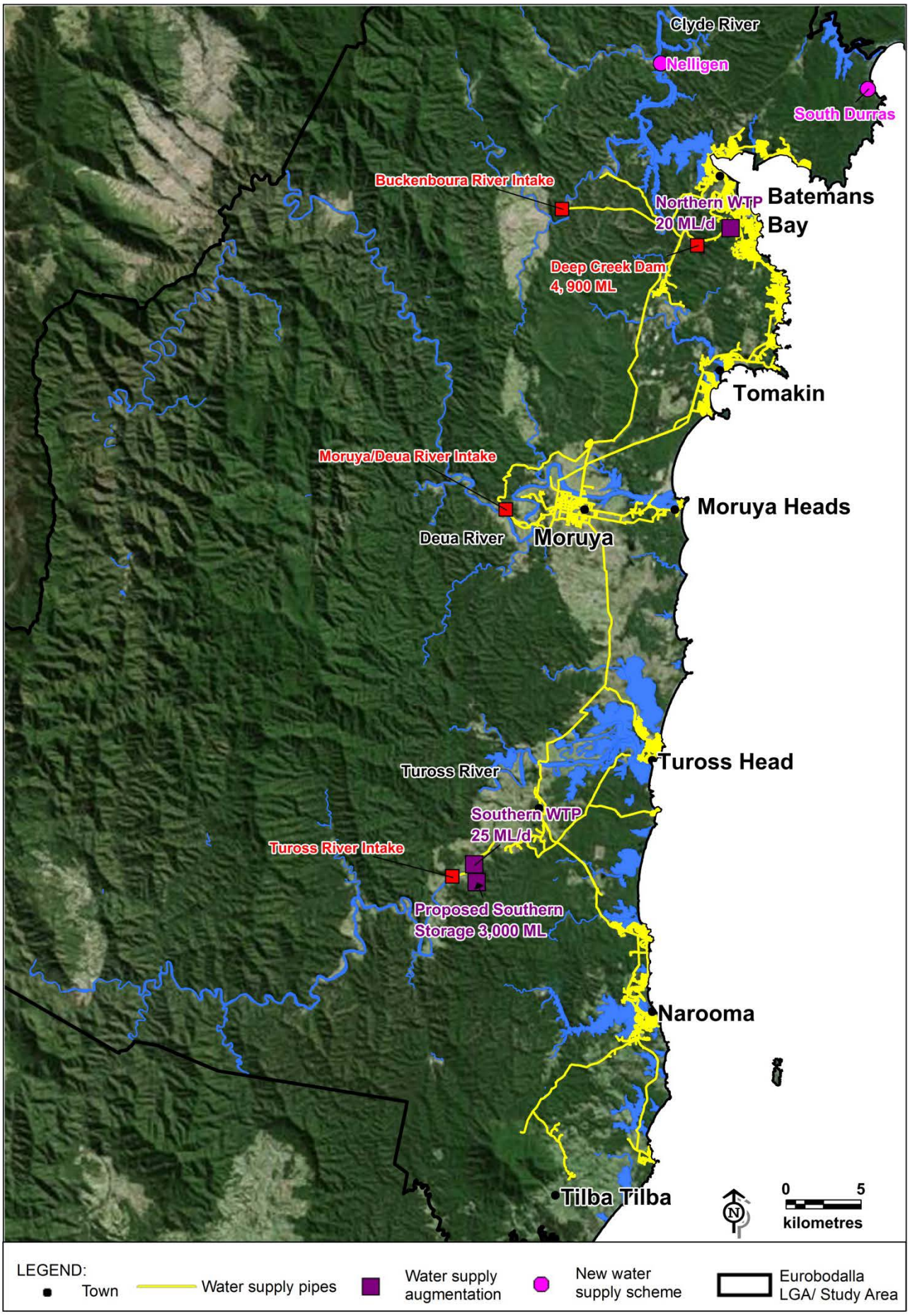

Figure 16: Water Supply Augmentation Strategy

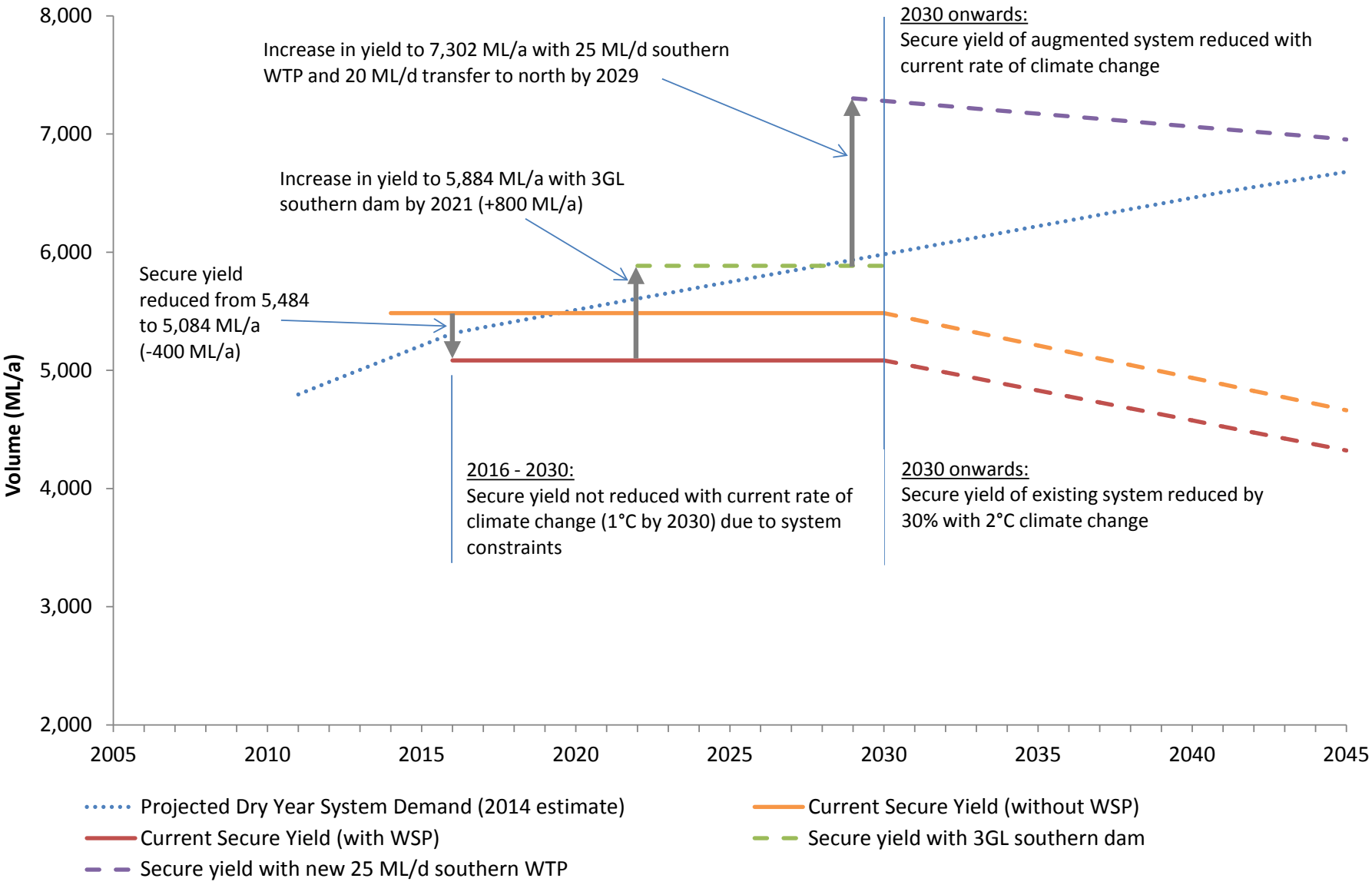

Figure 17: Forecast Dry Year Demand and Secure Yield of Proposed Water Supply Augmentation

ESC will progress the design and environmental assessment of a new southern storage from 2016/17. The current cost estimate is given in Table 23 (based on a risk-based cost estimate prepared in 2006). Construction will depend on the availability of grant funding but is planned for completion in 2021.

Table 23: Current Cost Estimate – Stony Creek 2 Off-River Storage

Component	Current Estimate (2016$)
3 GL storage and associated works	$49,232,000
Transfer to Big Rock Reservoir	$6,017,000
Land purchase	$1,656,000
Compensatory habitat	$1,553,000
Environmental assessment and detailed design	$2,174,000
Project management, construction management and tendering	$2,868,000
Total	*$63,500,000*

The new southern WTP is expected to be required from 2029 with an estimated capital cost of $30 million. The transfer from the southern WTP to the north can be achieved by transferring water from Big Rock Reservoir to Moruya Town 2 Reservoir by gravity, and using the existing Moruya Town 2 pumping station to transfer to Moruya Main Reservoirs. The Moruya Town 2 pumping station is adequate to supply the demand of the northern system with only minor modifications to valve arrangements (NSW Public Works, 2014j).

The timing of future works will be reviewed on a regular basis with any new data on water supply demand and secure yield.

B1.3 Water Quality and Treatment

Issue 2 - The reticulated water quality does not always meet guideline values. The pH of the reticulated water was above the guideline value on many occasions which may cause corrosion of pipes and fittings, the level of fluoride has been lower than the concentration required for effective dental caries prevention for the majority of the time and the free chlorine in the distribution system is often below the level required for effective disinfection.

The ESC Drinking Water Management System (DWMS, NSW Public Works and Atom Consulting, 2014) and the supporting systems address the requirements of the *Public Health Act 2010* (NSW) and the twelve elements of the "Framework for Drinking Water Quality Management" provided in the *Australian Drinking Water Guidelines* (ADWG). The DWMS acts as a roadmap of the activities that Council undertakes to ensure the provision of safe drinking water to its customers.

An Improvement Plan has been developed as part of the DWMS to demonstrate how Council will address the risks identified through the DWMS or to improve compliance with the ADWG. The Plan prioritises resources on high risks, ensuring the safest possible drinking water.

The DWMS identified a list of actions required to provide best-practice protection of public health in relation to drinking water while consistently meeting the ADWG levels. Some of these actions involve the modifying, upgrading and optimising of the Southern WTP to ensure the supplied water meets ADWG on a continuous basis. In addition, a few minor operational defects and plant control malfunctions have also been identified and rectified including fluoride dosing equipment (NSW Public Works, 2014h). ESC will conduct a review and audit of the DWMS in 2016 to assess the treatment plant effectiveness and identify any required remedial actions.

The new southern WTP will be constructed near the site of the new southern storage. This new plant will be based on best-practice technologies to meet the requirements of the ADWG.

B1.4 Water Distribution

Issue 3 - Water supply network modelling has identified deficiencies in the trunk water supply and reticulation system.

The water network modelling (NSW Public Works, 2014b) has identified the required system upgrades and reticulation system upgrades to meet minimum pressure at peak instantaneous demand for the estimated 2046 demand. The performance of the trunk main system is generally satisfactory. The following upgrade works were recommended in NSW Public Works (2014b):

- Activate the Lilli Pilli booster pump - complete;
- Construct approximately 170 metres of 250mm main along Drinnan Close, near the Surf Beach pumping station - complete;
- Reduce the operating speed of the Surf Beach pump - complete; and
- Activate the Malua Bay pumping station to pump from Malua Bay reservoir to Moruya Town 2 reservoir.

Reticulation system analysis of all the reservoir zones was carried out to identify the impact of future demand on the reservoir zones. Analysis indicated that six reservoir zones (Catalina 2, Bodalla Park, Surf Beach, Malua Bay, Burri Point and Tomakin Heights) would require additional works to meet the minimum pressure under the future (2046) demand.

The timing of the distribution and reticulation system upgrades is yet to be confirmed although these will be accommodated within the existing asset renewal program for mains, reservoirs and pumping stations.

The current water supply system model can also be utilised for any development assessment to ensure that the desired level of service can be provided to the proposed development. The necessary upgrade/extension work required to cater for the future developments can also be generated using this model.

NSW Public Works (2014b) recommended further improvement and analyses to improve the representation of the actual water supply system performance as follows:

- Peak day model simulation has indicated that there are significant numbers of nodes in the system that experience higher pressure. Development and simulation of an average day demand model was recommended to determine the extent and location of high pressure areas. This study will assist Council with a targeted approach for leakage management and water main break reduction;
- Fire flow analysis should be conducted for the entire system to ensure that the system is capable of handling the minimum pressure and flow requirement of the fire flow standard; and
- While a number of *ad-hoc* test results and Council experience of low pressure problems were used to validate the model, it was recommended that targeted pressure monitoring in strategic locations of the water supply system be carried out and further validation of the model is undertaken prior to the use of the model for operational purposes.

Council will review the model once new data are available on population and demand forecasts (proposed to be updated every five years following the release of Census data).

B1.5 Sewage Treatment and Effluent Quality

Issue 4 - Batemans Bay experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Batemans Bay STP has insufficient capacity to treat current peak season loads.

Issue 5 - The recycled water to the Catalina Country Club exceeded the water quality guidelines for BOD, suspended solids and *E. coli* on a few occasions.

Issue 6 - High inflow and infiltration into the Batemans Bay sewerage system affects the ability of the Batemans Bay STP to achieve licence conditions for effluent quality and load.

Issue 8 - Tomakin experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Tomakin STP has insufficient capacity to treat current peak season loads.

Issue 11 - Tuross Head experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Bingie STP has insufficient capacity to treat current peak season loads.

Issue 12 - The recycled water supplied to the Tuross golf course exceeded the water quality guidelines and targets for pH, suspended solids and faecal coliforms on a number of occasions.

Issue 13 - High inflow and infiltration into the Tuross sewerage system affects the ability of the Bingie STP to achieve licence conditions for effluent quality.

Issue 15 - Narooma experiences a high proportion of holiday visitors over the summer season and the STP experiences a clear peak and off peak load. The Kianga STP has insufficient capacity to treat current peak season loads.

As discussed in Section B1.2.3, the current effluent management approaches are considered to be the most cost-effective. Additional effluent reuse is not considered to be an appropriate strategy to supplement water supplies and no new effluent reuse options are proposed.

Four of the five STPs experience clear differences in off-peak and peak loads and the treatment capacity is insufficient to treat the peak loads. This is largely due to the high proportion of holiday visitors but is exacerbated by high inflow and infiltration in some sewer catchments. The strategies for upgrade and augmentation of the STPs are discussed in the following sections. Infiltration and inflow reduction is discussed in Section B1.6.

Recycled water management systems at Tuross Golf Course and Catalina Country Club are discussed in Section B1.5.2.

B1.5.1 Proposed Sewerage System and Treatment Plant Augmentation

Batemans Bay and Tomakin

ESC plans to divert flows from the Malua Bay and Lilli Pilli sewer catchments to the Tomakin STP to reduce the demand on the Batemans Bay STP (Commerce, 2004). This was adopted as part of the 2003 IWCM Strategy to accommodate current peak demands and future growth in the Batemans Bay region. This option was chosen instead of augmentation of Bateman's Bay STP as it:

- Optimises the use of existing assets;
- Reduces the augmentation needed at Batemans Bay STP;
- Utilises spare (off-peak) capacity at Tomakin STP;
- Utilises a better performing ocean outfall at Tomakin; and
- Would allow access to more reuse options at Tomakin than are available at Batemans Bay.

Due to the need for augmentation at Tomakin STP to provide for the projected peak loads, Batemans Bay STP will be slightly overloaded for the Christmas periods until the Malua Bay sewer diversion occurs in 2021.

A scheduled 25 year mechanical and electrical upgrade for Batemans Bay STP in 2019 will include capacity upgrades for the aeration system, sludge handling and reuse system (as well as provision of alum dosing for phosphorous removal and to improve clarifier performance and a UV system for the filtration system bypass) (NSW Public Works, 2015).

Flows to the Tomakin STP will increase (and flows to the Batemans Bay STP will decrease) by approximately 0.46 ML/d when the Malua Bay diversion is implemented (NSW Public Works, 2014c). Tomakin STP will also treat future sewer flows from Rosedale and Guerilla Bay. Capital upgrades and operational adjustments at Tomakin STP will be made to allow for appropriate peak period treatment including the provision of an additional (second) bioreactor, new inlet works and sludge lagoons (currently planned for 2020/21).

Moruya STP

The existing Moruya STP is sufficient to treat current peak loads. A scheduled 25 year mechanical and electrical upgrade planned for 2022 will include a review of capacity and any necessary upgrades.

Tuross Head (Bingie STP)

The nominal design capacity of the Bingie STP is 4,000 EP. The plant is lightly loaded (within design capacity) for the majority of the year. For the Christmas/New Year period, however, the plant loading increases substantially and performance suffers.

A capacity assessment (NSW Public Works, 2014g) found that the secondary treatment (Pasveer channels) within the plant would be capable of accommodating up to 5,160 EP load. This is sufficient to cater for projected peak season load to year 2021 with a combination of operational and minor upgrade works:

- Improved flow division - This will provide benefits in plant efficiency, capacity and control as the current flow division results in overloading of one process stream and lowering of overall plant capacity;
- Increasing aeration capacity – Current operation sees an increase in aeration duration during peak periods to match peak loading. Provision of supplementary aeration will provide a more reliable result without the operational risk of reduced settlement times. This will deliver a significant increase in capacity; and
- Alum dosing to improve sludge settlement – Modelling indicates this would increase capacity to 5,240 EP. While this is not a huge improvement it is considered a worthwhile inclusion as it is expected to control sludge bulking and improve settlement. The increase in reliability is considered beneficial for running the existing plant during the Christmas peak with potentially some benefits in sand filter performance. The incorporation of alum dosing is sufficient to cater for projected peak season load to year 2026.

A capacity upgrade is planned for Bingie STP with Stage 1 aeration and chemical dosing, electrical and mechanical upgrades in 2018 and replacement of the STP in 2044 at the end of its design life (60 years).

Narooma (Kianga STP)

Kianga STP is a nominal 8,000 equivalent persons (EP) STP that services the townships of Narooma, North Narooma, Kianga and Dalmeny. The area is a popular holiday destination, particularly in summer, resulting in short periods of dramatic load increases. The major capacity bottlenecks that need to be addressed through capital expansion are the return activated sludge (RAS) pumping system and the aeration system. Kianga STP is likely to continue to fail under peak holiday loading conditions until these works are completed and commissioned (Aspect Process Services, 2015).

A scheduled 25 year mechanical and electrical upgrade of Kianga STP in 2021 will include capacity upgrades required to prolong the life of the STP until its scheduled replacement at the end of its design life.

B1.5.2 Recycled Water Management

The Catalina Country Club and Tuross Golf Course recycled water schemes are subject to adopted operational environmental management plans (Peter Spurway & Associates (2009) and Peter Spurway & Associates (2005) respectively). The recycled water supply has exceeded the water quality requirements on a few occasions and the Operational Environmental Management Plans includes procedures to cease supply when water quality is inadequate.

The *Australian Guidelines for Water Recycling (AGWR): Managing Health and Environmental Risks* (2006) adopt a risk management approach to managing risks to human health and the environment from recycling of water from greywater and treated sewage. In accordance with the AGWR, any scheme that recycles water must ensure that public health and the environment are protected. The guidelines require that every scheme should have a risk management plan based on a 12 element framework. To comply with the guidelines, Council is required to prepare recycled water management plans and end user agreements. DPI-Water has also prepared the *NSW Guidelines for Recycled Water Management Systems* (NSW Office of Water, 2015c).

ESC will prepare Recycled Water Management Systems for all reuse schemes in accordance with current guidelines.

B1.6 Sewer Network

Issue 6 - High inflow and infiltration into the Batemans Bay sewerage system affects the ability of the Batemans Bay STP to achieve licence conditions for effluent quality and load.

Issue 7 - Sewer network modelling predicts overflows from the Batemans Bay sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.

Issue 9 - Sewer network modelling predicts overflows from the Tomakin sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.

Issue 10 - Sewer network modelling predicts overflows from the Moruya sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.

Issue 13 - High inflow and infiltration into the Tuross sewerage system affects the ability of the Bingie STP to achieve licence conditions for effluent quality.

Issue 14 - Sewer network modelling predicts overflows from the Tuross sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.

Issue 16 - Sewer network modelling predicts overflows from the Narooma sewerage system during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event.

High inflow and infiltration can be the cause of non-compliances with STP licence conditions (identified for Batemans Bay and Tuross STP) as well as overflows from the sewage systems during wet weather (a key issue in all sewerage systems). The network modelling reports (NSW Public Works, 2013c; NSW Public Works, 2014d; NSW Public Works, 2014e; NSW Public Works, 2014f; NSW Public Works, 2016) have identified the upgrades required to avoid overflows during the 1 in 5 year 1 hour rainfall event and 1 in 20 year rainfall event in the sewerage systems. The sewer network modelling also identified catchments that would benefit from sewer relining to reduce inflow and infiltration.

The priority areas for rehabilitation will be determined from the theoretical modelling, inflow and infiltration monitoring and regular condition assessments including CCTV inspections. The upgrades will be undertaken as part of the sewer main replacement program which is implemented based on condition assessments and

assessment of remaining asset life. Narooma, Tuross and Batemans Bay sewerage systems will be targeted initially.

The existing operations and maintenance budget includes up to $1.0 million p.a. for sewer main replacement, relining and junction sealing, up to $200,000 p.a. for the refurbishment or replacement of sewer access chambers and up to $1.5 million p.a. for renewal of sewer pump stations across the Shire.

A smoke testing program will also commence in 2016/17 in the Malua Bay catchment which has high recorded wet weather flows.

This is considered to be the most appropriate strategy to address the issues of high inflow and infiltration and reduce sewer overflows.

B1.7 Urban Stormwater

There are no IWCM issues related to urban stormwater management.

Urban areas generate large amounts of stormwater due to vast areas of impervious surfaces such as roads, pavements, car parks and buildings. Stormwater can be an alternative to mains water supply use, particularly for non-potable uses. However, there are health and environmental risks associated with the use of stormwater due to its associated pollutants. Unlike recycled water, stormwater supplies are very climate dependent with supply in dry times being unreliable. Any stormwater storage in the region would need to be large enough to capture large rainfall events during the wet season and supply it throughout the low rainfall times of the dry season.

As with the use of recycled water for non-residential uses, the large scale reuse of stormwater often contributes very little to the reduction in potable water demand.

The 2003 IWCM Strategy discussed the potential for stormwater harvesting as a local water supply source as discussed in Section B1.2.2.

B1.8 Unserviced Areas

Issue 17 - Due to the sandy nature of the soil it is commonly acknowledged that sewage/effluent from on-site wastewater management systems in South Durras will infiltrate the groundwater aquifer and ultimately end up in the waterways (Durras Lake). Groundwater quality results (sampled in the mid-1980s) show elevated nitrate levels and the presence of faecal bacteria confirming the contamination of the groundwater from poorly managed on-site wastewater management systems.

Issue 18 - Council inspections in South Durras have identified over 40 unlicensed bores/spearpoints which are close to septic absorption trenches. Due to the Category 1 soils (sand) and shallow groundwater there is a high risk of contamination of the groundwater supplies. Whilst some properties only use this water for garden/toilet flushing purposes, the absence of large water tanks on some properties indicates that bore water may also be used for showering and potable use. Even if used only for gardening/toilet flushing there is still the risk of contamination of food crops or inhalation of aerosols.

Issue 19 - The village of Nelligen drains into priority oyster aquaculture areas of the Clyde River. Water quality is a key concern for the oyster industry. Re-development of properties within Nelligen has resulted in limited space for on-site systems.

Issue 20 - Site inspections have revealed approximately 50% of septic systems in Rosedale and Guerilla Bay are not satisfactory due to small lot sizes, high peak loads, poor soil permeability, clogging of the trenches and odours. These problems result in not only social and environmental impacts, but also significant potential public health risks.

Issue 21 - The existing on-site septic tank and effluent disposal systems in Bodalla are prone to failure due to hydraulic overloading, unsuitable lot sizes and poor ground conditions for effluent disposal. Apart from visual impacts and public health concerns, it is probable that these problems are having an impact on local water quality, including surface waterways and groundwater systems.

Issue 22 – The existing wastewater management systems in Mystery Bay are unsatisfactory due to hydraulic overloading and poor ground conditions for effluent disposal.

Issue 23 - The existing wastewater management systems in Central Tilba and Tilba Tilba are unsatisfactory due to hydraulic overloading, unsuitable lot sizes, poor ground conditions for effluent disposal and disruptions and odours during pump out.

Issue 24 - The existing wastewater management systems in Akolele are unsatisfactory due to overflows from on-site systems to sensitive water bodies including oyster lease areas.

B1.8.1 Current On-Site Sewage Management

The 2013 ESC On-Site Sewage Management (OSSM) Code of Practice provides guidance in preparing applications to Council and describes how systems will continue to be monitored once installed. Council is required to implement and maintain an OSMS inspection program by the Department of Local Government and NSW State Legislation. A risk rating is applied to each system to determine the frequency of inspections.

The Code of Practice sets standard criteria for OSSM system design based on dwelling size and corresponding sewage volumes and land characteristics, which is consistent with Australian Standards and the (former) Sydney Catchment Authority requirements. Through implementation of this policy, on-site disposal is generally being found to be inappropriate for many standard residential houses due to small lot sizes, with a growing number of pump-out units being required with new and expanding houses.

B1.8.2 Village Sewerage Risk Assessment (2003 IWCM Strategy)

The 2003 IWCM Strategy included a risk assessment for the on-site sewerage systems in the villages. The villages were ranked on the criteria listed in Table 24. The resulting ranking is given in Table 25.

Table 24: Criteria for Ranking of Village On-Site Sewerage System Risk (2003 IWCM Strategy)

Criteria for Assessment	1	2	3	4	5
Public Health	Effluent from existing on-site system is creating a defined risk (eg primary recreation area, oysters and water supply catchment)		Visible overflow from existing on-site systems public places with potential health risks		Overflows not visible from existing on site systems (it is expected these would involve sandy soils)
Social	Over 400 lots or regular community complaints (eg smells and odour, visible flows)	Over 300 lots, some complaints	Over 200 lots or a complaint	Over 100 lots	Under 100 lots and no complaints
Environmental	Significant impact on sesntivie environment, coastal lakes and wetlands	Less significant impact on sensitive environment intermittently flowing rivers	Significant impact on less sensitive environment Major rivers	Less significant impact on less sensitive environment	No visible overflow but environmental impact is suspected
Technical (lot sizes and soil types)	Land unsuitable for septics, 50th percentile has lot size smaller than 800m2 sandy or granites		50th percentile has lot sizes smaller than 1000m2,		Land suitable for current on-site treatment practices
Town water	Yes				No

Source: DPWS (2003)

Table 25: Village Risk Assessment (2003 IWCM Strategy)

Village	Public Health	Social	Environmental	Planning	Town Water	Total	Rank
Nelligen	1	3	3	1	5	11	4
South Durras	1	1	1	1	5	7	2
Tilba Tilba/Central Tilba	3	1	5	1	1	11	4
Guerilla Bay/Rosedale	1	1	1	1	1	5	1
Bodalla	1	3	5	3	1	13	7
Potato Point	3	2	1	1	1	8	3
Mystery Bay	3	3	1	3	1	11	4
Congo	1	3	4	1	5	12	8
Weighting	1	1	1	1	0.5		

Source: DPWS (2003)

The high and low priority villages (2003 IWCM Strategy) are listed in Table 26. The current on-site wastewater management in the villages classed as high priority were considered to pose significant environmental, public health and social impacts.

Table 26: High and Low Priority Villages (2003 IWCM Strategy)

High Priority	Low Priority
South Durras	Akolele
Nelligen	Central Tilba, Tilba Tilba
Bodalla	Mystery bay
Rosedale and Guerilla Bay	Potato Point
	Congo

B1.8.3 Village Water Supply Risk Assessment (2003 IWCM Strategy)

The 2003 IWCM Strategy also included a risk assessment of the water supply systems in the villages based on the preferences of the local residents at the time. The residents of Nelligen have indicated a desire to have an improved water supply, therefore this village was placed in the high priority group. The South Durras and Congo villages were placed in the low priority group, as the residents from both villages did not rank an improved water supply as of high importance.

B1.8.4 Planned Village Sewerage Schemes

Rosedale and Guerilla Bay

Rosedale and Guerilla Bay are two coastal villages located between Batemans Bay and Tomakin. Development in Rosedale (the most northerly of the two villages) has been concentrated along Rosedale Beach and Saltwater Creek, while Guerilla Bay has an urban development corridor stretching in a west-east direction along Burri Point Road. There are two intermittently opening and closing lagoons near the villages. The two villages are bordered by the Pacific Ocean to the east but have the potential for urban expansion towards the north and west. Adjacent to the two villages are sensitive coastal lagoons which are popular for recreational activities. The towns are supplied with water through the regional supply scheme. Sewage from the villages is currently managed on site. Site inspections carried out since the 2003 IWCM Strategy have revealed approximately 50% of septic systems are not satisfactory (refer Section 14.9.2 of the IWCM Issues Paper).

The Rosedale and Guerilla Bay sewerage scheme will be constructed by mid-2017. Sewage will be treated at the Tomakin STP. This will resolve this issue.

Bodalla

Bodalla is located south of the Tuross River, approximately 7.5 km west of Potato Point. Urban development in Bodalla is concentrated along the Princes Highway which also serves as its major access. Bodalla is connected to the regional water supply scheme, supplied through the 3 ML Bodalla Park reservoir. There are approximately 170 on-site treatment facilities in the Bodalla urban area with approximately 70% conventional septic tank units disposing of effluent into absorption trenches. There are a small number of pump-out septic systems and the remaining systems are aerated wastewater treatment systems disposing of recycled water into absorption trenches and/or utilising it for garden watering. The existing on-site septic tank and effluent disposal systems are prone to failure due to hydraulic overloading, unsuitable lot sizes and poor ground conditions for effluent disposal (refer Section 14.9.2 of the IWCM Issues Paper).

Bodalla sewerage scheme (pressure sewerage) and Bodalla STP will be constructed by mid-2018. This will resolve this issue.

B1.8.5 Other Unsewered Villages

Existing On-Site Sewerage Systems

Data on the number and type of on-site sewerage systems in other villages from Council's inspection program are summarised in Table 27. Septic tanks with pump-out systems are considered to provide the highest risk as limited treatment is provided and overflows can occur during peak visitation periods. The cost of effluent pump-out is a financial disincentive and there are amenity issues (odours, traffic and noise) associated with pump-outs. Council's inspection results indicate that many of the pump-out systems require more frequent pump-out to avoid overflows of untreated sewage. With redevelopment and expansion of dwellings in popular tourist areas, many of the lots sizes are unsuitable for more advanced OSSM technologies and treatment systems with pump-out systems are becoming more common.

Table 27: Existing Villages OSSM Systems

OSSM Type	South Durras		Nelligen		Congo		Potato Point		Mystery Bay		Central Tilba		Tilba Tilba		Akolele	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Septic tank to Pump-out	105	29.6%	41	20.2%	30	20.1%	36	23.8%	21	14.8%	14	8.4%	-	-	10	17.5%
Septic Tank to Sub-Surface Disposal	227	63.9%	139	68.5%	90	60.4%	81	53.6%	63	44.4%	113	68.1%	42	85.7%	35	61.4%
Septic Tank to Aerobic Sand Filter to Sub-Surface Disposal	2	0.6%	3	1.5%	1	0.7%	-	-	-	-	-	-	-	-	1	1.8%
Aerated Wastewater Treatment to Sub-Surface Disposal	8	2.3%	8	3.9%	6	4.0%	4	2.6%	9	6.3%	13	7.8%	2	4.1%	3	5.3%
Aerated Wastewater Treatment to Surface Disposal	9	2.5%	11	5.4%	17	11.4%	30	19.9%	48	33.8%	15	9.0%	5	10.2%	8	14.0%
Chemical Toilet	-	-	-	-	1	0.7%	-	-	-	-	1	0.6%	-	-	-	-
Greywater Treatment System to Toilet Flushing	-	-	-	-	1	0.7%	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	1	0.7%	-	-	-	-	-	-	-	-	-	-
Waterless Composting Toilet with Separate Greywater Sub-Surface Disposal	2	0.6%	-	-	2	1.3%	-	-	-	-	6	3.6%	-	-	-	-
Wet Composting Toilet to Sub-Surface Disposal	2	0.6%	1	0.5%	-	-	-	-	1	0.7%	4	2.4%	-	-	-	-
Totals	*355*	*100%*	*203*	*100%*	*149*	*100%*	*151*	*100%*	*142*	*100%*	*166*	*100%*	*49*	*100%*	*57*	*100%*

South Durras

South Durras is located in the north-eastern part of the Shire. The village is divided into two main regions, the area immediately south of Durras Lake (an intermittently opening lagoon) and the area behind the dunes, north-west of Mill Point headland. Urban development is predominantly concentrated on the foreshores of the Tasman Sea (refer Figure 18). The LGA (study area) boundary with Shoalhaven City Council (North Durras) is along the northern shore of Durras Lake.

Figure 18: South Durras and Surrounds

The area surrounding the village consists of sensitive wetlands, Murramarang National Park and coastal dunes and lakes. These areas act as a natural barrier making it difficult to expand the current footprint/boundary of the village. Council's current planning instruments only allow low density, single dwelling developments and require the development to blend with the natural landscape to minimise the impacts on land and water management. It is the community expectation that this urban setting/characteristic will be retained in the future. The village also has three caravan parks and a small commercial area (DPWS, 2003).

The village residents rely on rainwater tanks for their potable water needs. Some residents also extract groundwater using private backyard bores to water their gardens. The caravan parks use both the harvested roof runoff and private bores. In periods of drought, water is purchased from the regional water supply (DPWS, 2003). Council inspections in South Durras have identified over 40 unlicensed bores/spearpoints which are close to septic absorption trenches. Due to the Category 1 soils (sand) and shallow groundwater there is a high risk of contamination of the groundwater supplies. Whilst some properties only use this water for garden/toilet flushing purposes, the absence of large water tanks on some properties indicates that bore water may also be used for showering and potable use. Even if used only for gardening/toilet flushing there is still the risk of contamination of food crops or inhalation of aerosols (DPWS, 2003). The risks to public

health from groundwater use are currently being addressed by DPI-Water as part of the water extraction licensing.

There are about 350 OSSM systems in South Durras. Of these, 64% are septic tanks with effluent disposal by absorption trench and 30% are septic tanks with effluent pump-out. Property owners arrange for their own septic tank pump-out, which in most instances is treated at Batemans Bay STP. The remaining 6% of the systems utilise aerated processes with on-site effluent irrigation that give higher levels of nutrient removal than septic systems.

Due to the sandy soils the sewage/effluent from on-site wastewater management systems can infiltrate the groundwater aquifer and ultimately end up in Durras Lake. Groundwater quality results (taken in mid-1980s) show elevated nitrate levels and the presence of faecal bacteria confirming the contamination of the groundwater from poorly managed OSSM systems (DPWS, 2003).

ESC consulted with Durras residents regarding the OSSM program during 2013. South Durras residents were opposed to the provision of a reticulated water and sewerage system, citing that this will allow the zoning of the village to change and may result in more medium density development (DPWS, 2003).

Nelligen

Nelligen is located on the brackish reaches of the Clyde River (Figure 19). Nelligen is not connected to the regional town water supply and depends on water from rainwater tanks. There are 203 on-site treatment systems in the village. 69% of these are septic tanks with effluent disposal by absorption trench, and 20% are septic tanks with effluent pump-out. The remaining systems utilise aerated processes that give higher levels of nutrient removal.

The village drains into oyster lease areas of the Clyde River where water quality is a key concern for the industry. Small fishing shacks have gradually been upgraded to larger houses with limited space for on-site systems requiring more pump-out systems and the associated risk of overflow.

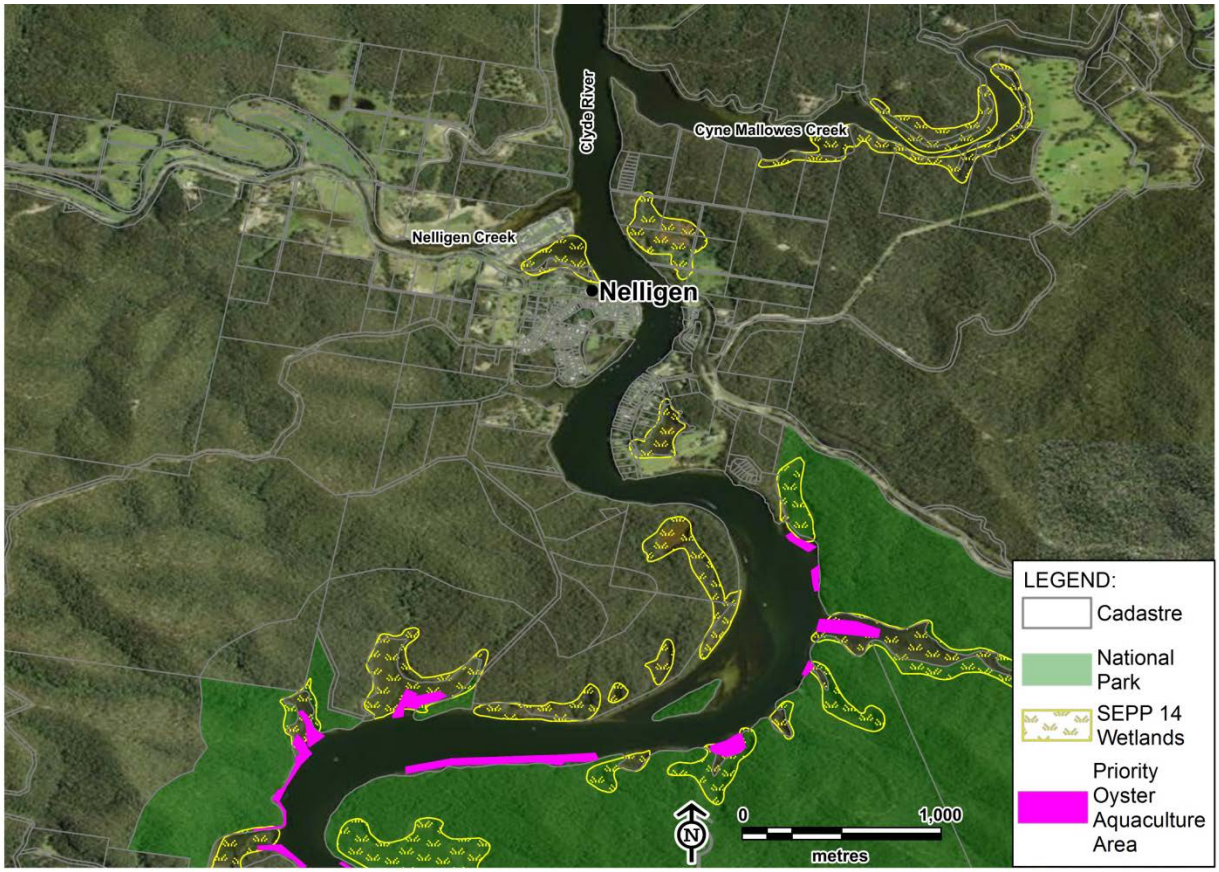

Figure 19: Nelligen and Surrounds

Congo

Congo is a small village located near Moruya. It is bounded by Congo Creek to the north and the Tasman Sea to the east (Figure 20). The village residents rely on rainwater tanks for their potable water needs. During periods of drought and low rainfall the individual property owners purchase water from the regional water scheme.

The village residents manage their own on-site wastewater systems. There are currently 149 on-site treatment facilities. 61% of these are septic tanks with effluent disposal by absorption trench and 20% are septic tanks with effluent pump-out. The remaining systems utilise aerated processes that give higher levels of nutrient removal than septic systems.

Figure 20: Congo and Surrounds

Potato Point

Potato Point is bounded by Eurobodalla National Park with Potato Point Beach to the north and Jamisons Beach to the south (Figure 21). Potato Creek flows to the north of the village and there is an intermittent lagoon to the south west of the village. Potato Point is supplied with water from the Potato Point Reservoir as part of the regional water supply scheme. There are currently 150 on-site treatment facilities. Of these 54% are septic tanks with effluent disposal by absorption trench and 24% are septic tanks with effluent pump-out. The remaining systems utilise aerated processes that result in a higher level of nutrient removal than septic systems.

Figure 21: Potato Point and Surrounds

Mystery Bay

The land surrounding Mystery Bay includes Gulaga National Park, sensitive vegetation ecosystems and farmland (Figure 22). Mystery Bay is connected to the regional water supply scheme and sewage is treated on site. There are 142 on-site treatment facilities. 44% of these are septic tanks with effluent disposal by absorption trench, which are unsuitable for the soil conditions and 15% are septic tanks with effluent pump-out. The remaining systems utilise aerated processes that give higher levels of nutrient removal than septic systems.

Figure 22: Mystery Bay and Surrounds

Central Tilba and Tilba Tilba

The land surrounding Central Tilba and Tilba Tilba includes Gulaga National Park, sensitive vegetation ecosystems and farmland (Figure 23). Central Tilba is connected to the regional water supply, Tilba Tilba has a community managed water supply scheme supplemented with private rainwater tanks and sewage is treated on-site. In Central Tilba and Tilba Tilba, there are 215 on-site treatment facilities, 72% are septic tanks with effluent disposal by absorption trench and 7% are septic tanks with effluent pump-out. The remaining 21% are treated by aerated systems.

Figure 23: Central Tilba and Tilba Tilba and Surrounds

Akolele

Akolele is situated on the north eastern shores of Wallaga Lake, which is at the border of Eurobodalla and Bega Shires (study area boundary, Figure 24). Akolele is connected to the Bega Valley Shire Council water supply scheme. There are 35 on-site treatment facilities in the village, of which 71% are septic tanks with effluent disposal by absorption trench and 9% are septic tanks with effluent pump-out. The remaining systems utilise aerated systems that result in higher levels of nutrient removal than septic systems.

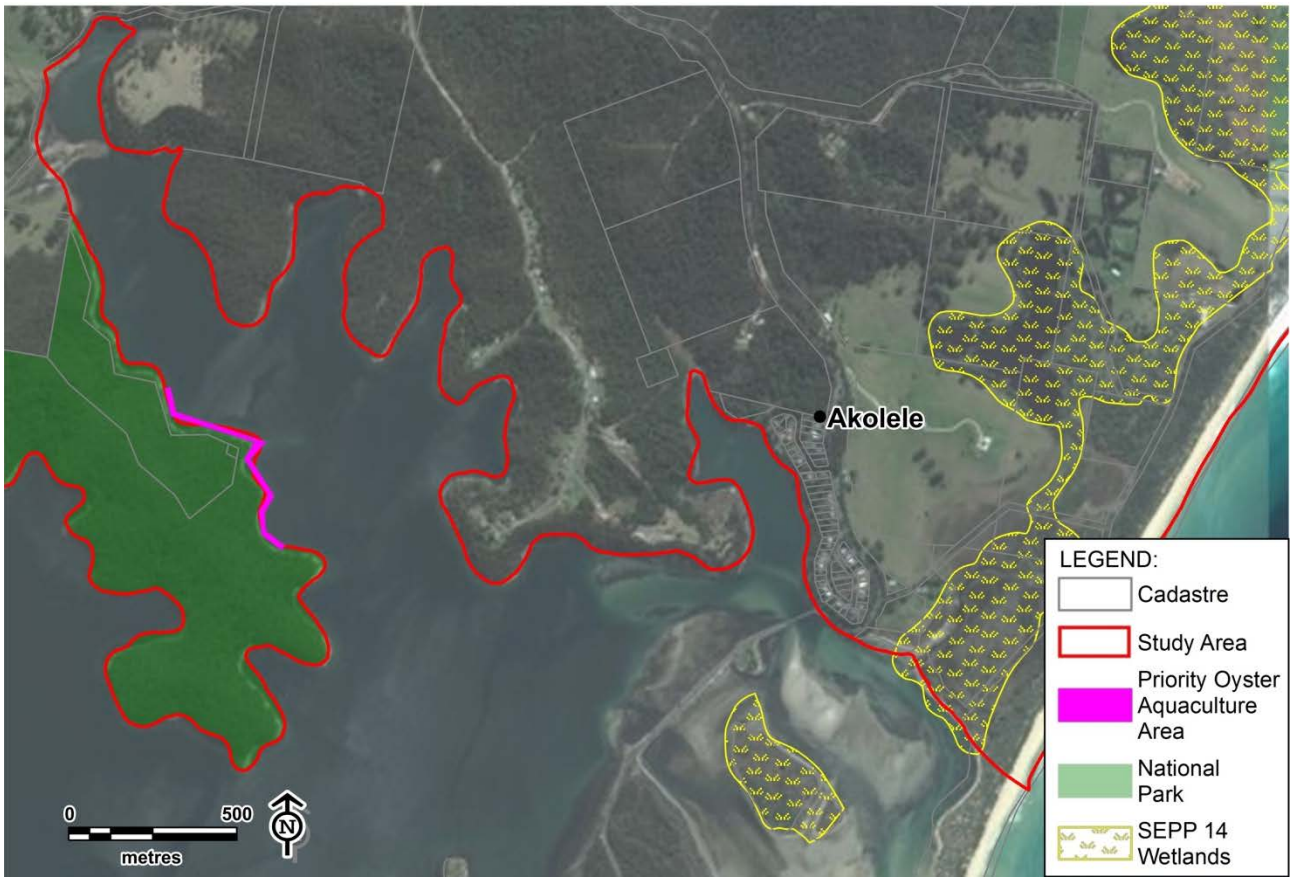

Figure 24: Akolele and Surrounds

B1.8.6 Village Sewerage Risk Assessment

A revised risk assessment for the unsewered villages has considered the following criteria:

- Performance of existing OSSM systems – number and type of OSSM systems, adequacy of systems during peak and non-peak times and in wet weather and water consumption;
- Technical considerations – lot sizes, slope and soil type;
- Risks to water supply – contamination of supplies; and
- Sensitivity of receiving environment – e.g. primary recreation area, priority oyster lease areas, coastal lakes and wetlands.

Risks have been determined based on each criterion and assigned a score out of 3 with the maximum score of 3 representing the highest risk (Table 28). Community feedback is also presented in the risk assessment. The current prioritisation of the village sewerage schemes is presented in Table 29 based on the results of the risk assessment. The resulting prioritisation is similar to the ranking reported in the 2003 IWCM Strategy. Council will undertake a monitoring program to verify the risks and servicing priorities.

The prioritisation provides a guide for Council in allocation of funding, however it is considered that all unserviced villages should be addressed within 15-20 years.

Table 28: Unsewered Villages Risk Assessment

Village	Performance of existing OSSM systems	Technical considerations	Water Supply	Receiving Environment	Community Feedback	Overall Risk (Risk Score)
South Durras	350 OSSM systems, 105 pump-out, high peak load causes hydraulic overloading. Absorption trenches are inadequate during wet weather. Increasing number of pump-out systems as old systems fail or new development occurs.	Sandy soils. Increasing density of development. The majority of lots are small (<700 m^2) and cannot accommodate sufficient treatment systems. Increasing density of development.	Rainwater tanks and bore water. Groundwater supplies for potable use may be contaminated.	Sensitive wetlands, Murramarang National Park, coastal dunes and lakes. Northern section of the village drains to Durras Lake (primary recreation area) and southern section generally drains to the ocean.	South Durras residents were opposed to the provision of a reticulated water and sewerage system in 2013. South Durras records the highest number of complaints relating to on-site wastewater management in the Shire (DPWS, 2003).	High (11.5)
Relative risk	*High (3)*	*High (3)*	*High (3)*	*Medium-High (2.5)*		
Nelligen	203 OSSM systems, 41 pump-out, high peak load causes hydraulic overloading. Absorption trenches are inadequate during wet weather. Increasing number of pump-out systems as old systems fail or new development occurs.	The majority of lots are small (<1,000 m^2) and cannot accommodate sufficient treatment systems. Increasing density of development. Poor quality of soils for sustainable on-site disposal of effluent. Amenity issues with pump-outs.	Rainwater tanks	Drains to Clyde River (primary recreation area), upstream of priority oyster lease area.	Residents would support the provision of water and sewerage services as it would allow further development of the village (DPWS, 2003).	High (10)
Relative risk	*High (3)*	*High (3)*	*Low (1)*	*High (3)*		

Village	Performance of existing OSSM systems	Technical considerations	Water Supply	Receiving Environment	Community Feedback	Overall Risk (Risk Score)
Congo	149 OSSM systems, 30 pump-out, high peak load causes hydraulic overloading. Absorption trenches are inadequate during wet weather. Increasing number of pump-out systems as old systems fail or new development occurs.	The majority of lots are small (<1,000 m^2) and cannot accommodate sufficient treatment systems. Increasing density of development.	Rainwater tanks	Congo Creek (primary recreation area) and the ocean.	None reported	Medium (7)
Relative risk	*Medium (2)*	*Medium (2)*	*Low (1)*	*Medium (2)*		
Potato Point	150 OSSM systems, 36 pump-out, high peak load causes hydraulic overloading. Absorption trenches are inadequate during wet weather. Increasing number of pump-out systems as old systems fail or new development occurs.	Headland. The majority of lots are small (<620 m^2) and cannot accommodate sufficient treatment systems. Increasing density of development.	Town water, higher consumption.	Creek, lagoon and ocean	None reported	Medium-High (9)
Relative risk	*Medium (2)*	*High (3)*	*Medium (2)*	*Medium (2)*		

Village	Performance of existing OSSM systems	Technical considerations	Water Supply	Receiving Environment	Community Feedback	Overall Risk (Risk Score)
Mystery Bay	142 OSSM systems, 21 pump-out, high peak load causes hydraulic overloading. Increasing number of pump-out systems as old systems fail or new development occurs.	Undulating, sandy soils The average lot size is>1,000 m^2 which can accommodate sufficient treatment systems.	Town water, higher consumption.	Intermittent streams and ocean	Odour complaints from residents from on-site systems (DPWS, 2003)	Medium (8)
Relative risk	*Medium (2)*	*Medium (2)*	*Medium (2)*	*Medium (2)*		
Central Tilba and Tilba Tilba	209 OSSM systems, 14 pump-out, high peak load causes hydraulic overloading. Increasing number of pump-out systems as old systems fail or new development occurs.	Undulating, mountainous, granite/basalt. Heritage requirements for above-ground infrastructure. Limited access for pump-out trucks in some streets, The majority of lots are small (<700 m^2) and cannot accommodate sufficient treatment systems. Amenity issues with pump-outs.	Town water, higher consumption.	Intermittent streams, Bobundara River catchment	At present, pump outs are causing odours and traffic disruptions. Community favours sewering of the villages to maximise the economic potential of tourism (DPWS, 2003).	Medium-High (9)
Relative risk	*Medium (2)*	*High (3)*	*Medium (2)*	*Medium (2)*		

Village	Performance of existing OSSM systems	Technical considerations	Water Supply	Receiving Environment	Community Feedback	Overall Risk (Risk Score)
Akolele	57 OSSM systems, 10 pump-out. Increasing number of pump-out systems as old systems fail or new development occurs.	The majority of lots are small (<1,000 m^2) and cannot accommodate sufficient treatment systems. Poor quality of soils for sustainable on-site disposal of effluent. Increasing density of development.	Town water, higher consumption.	Wallaga Lake (primary recreation area), priority oyster lease area.	None reported	Medium-High (9)
Relative risk	*Medium (2)*	*Medium (2)*	*Medium (2)*	*High (3)*		

Table 29: High and Low Priority Villages (Current IWCM Strategy)

Highest Priority	High Priority	Lowest Priority
South Durras Nelligen	Potato Point Akolele Central Tilba and Tilba Tilba Mystery Bay	Congo

B1.8.7 Non-Build Sewage Management Options

The non-build options for sewage management in the villages are:

- Continue current Council program of inspections including community education regarding sustainable on-site sewage management;
- Current WSUD and development controls - Residential Zones DCP (2011); and
- Water conservation measures as per current Council program – refer Section B1.1.

There are a large number of systems in the villages requiring regular pump-out which appears to be impractical, particularly during peak tourist times. The infrequent pump-out potentially results in overflows of untreated effluent to the receiving environments. While the above non-build options can reduce this risk and should be Council's focus until improved management systems are provided, it is considered that a significant residual risk from the village on-site sewage management systems remains.

B1.8.8 South Durras Sewerage and Water Supply

Water Supply

Due to the water quality risks associated with the untreated groundwater supplies in South Durras (Section B1.8.5) provision of reticulated water will be required at the same time as a new sewerage system.

The 2003 IWCM Strategy identified the water supply demand of 80 ML/a with PDD of 0.33 ML/d based on a full reticulated water supply or 68 ML/a (0.22 ML/d) for a supplementary water supply assuming rainwater tanks continue to be used for non-potable uses (toilet flushing and garden watering). The water could be sourced from the coastal aquifer or the regional water supply at Batemans Bay. The local groundwater supply would require treatment (aeration and filtration) for low pH and iron removal (DPWS, 2003).

Sewerage

Options for improved sewerage facilities include:

- Advanced on-site systems – on-site treatment with greywater reuse or local reuse;
- Centralised sewerage – common effluent drainage (CED) and treatment at Batemans Bay STP or a new local package STP; or
- Full reticulated sewerage and treatment at Batemans Bay STP or a local package STP with dune infiltration and local reuse.

The limited land availability for effluent irrigation in South Durras and limited options for effluent release (Durras Lake or dune infiltration) provide a challenge for local STP options.

Despite the high prioritisation for sewerage in South Durras, there is significant community opposition to a reticulated sewerage system. Based on community feedback, the NSW EPA has requested that ESC consider a long-term plan for local treatment and re-use of effluent and no ocean outfall disposal.

Integrated Approach

The 2003 IWCM Strategy identified the preferred integrated approach on a TBL basis as harvested roof water with a supplementary water supply from a local supply source and enhanced management of existing on-site facilities. The capital cost for this scenario (water supply and sewerage) was estimated to be $5.0 million (indexed to 2016$). Based on the recent costs for village sewerage schemes, a capital budget allowance of $25 million is considered to be appropriate.

Due to the significant environmental and public health risks and highest prioritisation for sewerage services, it is recommended that Council continue to consult with South Durras residents with the aim of developing a preferred water supply and sewerage scheme for the village based on the above integrated approach. Due to the close proximity to North Durras and Depot Beach in Shoalhaven LGA, opportunities for servicing all three villages should also be investigated. Construction of the scheme will depend on confirmation of impacts through monitoring, community consultation and the availability of funding.

B1.8.9 Nelligen Water Supply and Sewerage

Water Supply

The 2003 IWCM Strategy identified the water supply demand of 28 ML/a with PDD 0.20 ML/d based on a full reticulated water supply or 24 ML/a (0.13 ML/d) for a supplementary water supply assuming rainwater tanks continue to be used for non-potable uses (toilet flushing and garden watering). The water could be sourced from the regional water supply at Batemans Bay.

Sewerage

Options for improved sewerage facilities include:

- Advanced on-site systems – on-site treatment with greywater reuse or local reuse;
- Centralised sewerage – common effluent drainage (CED) and treatment at Batemans Bay STP or a new local package STP;
- Local reuse of grey water and transfer of blackwater to Batemans Bay STP for treatment; and
- Full reticulated sewerage at a local package STP or transfer to Batemans Bay STP.

Integrated Approach

The 2003 IWCM Strategy identified the preferred integrated approach for Nelligen on a TBL basis as harvested roof water with a supplementary water supply from the regional water supply and provision of a reticulated sewerage system with local greywater reuse and transfer of sewage for treatment at Batemans Bay STP. The capital cost for this scenario (water supply and sewerage) was estimated as $3.4 million (indexed to 2016$). Based on the recent costs for village sewerage schemes, a capital budget allowance of $14 million is considered to be appropriate.

Due to the significant environmental and public health risks including impact on oyster aquaculture, and high prioritisation for sewerage services, it is recommended that Council commence options development and assessment and consultation with Nelligen residents with the aim of constructing the scheme within 10 years. Construction of the scheme will depend on community consultation and the availability of funding.

B1.8.10 Potato Point Sewerage

The Bodalla sewerage scheme and STP will be constructed by 2017/18. Future loads from Potato Point have been accommodated in the stage 1 design of Bodalla STP civil works with a process equipment upgrade required to accommodate additional loads from Potato Point. Grant funding is expected to be available for the Potato Point scheme.

Due to the significant environmental and public health risks and high prioritisation for sewerage services and the potentially available grant funding, it is recommended that Council commence design, assessment and consultation with residents within the short-term. Construction of the scheme will depend on community consultation and the availability of funding but should be planned for the next five years with a capital cost of $10 million (based on the recent costs for village sewerage schemes).

B1.8.11 Congo Water Supply and Sewerage

There does not appear to be any significant public health driver for improved water supplies in Congo and the residents appear to be satisfied with the current local supplies. The provision of improved sewerage management would improve the public health and environmental health of the area although significant expenditure is not considered to be warranted in the medium-term based on the village sewerage risk assessment (Section B1.8.6) as other villages are a higher priority.

The options for improved sewerage management considered in the 2003 IWCM Strategy included:

- Centralised effluent management and transport to Moruya STP for treatment;
- Reticulated sewerage system with treatment at Moruya STP; and
- Reticulated sewerage system with local grey water reuse and treatment of blackwater at Moruya STP.

The costs of these options were estimated to be up to $4.1 million (indexed to 2016$). Based on the recent costs for village sewerage schemes, a capital budget allowance of $6.2 million is considered to be appropriate.

It is recommended that Council commence options development and assessment and consultation with residents with the aim of constructing the scheme within 20 years. Construction of the scheme will depend on community consultation and the availability of funding.

B1.8.12 Mystery Bay Sewerage

The provision of improved sewerage management would improve the public health and environmental health of the Mystery Bay area although significant expenditure is not considered to be warranted in the medium-term based on the village sewerage risk assessment (Section B1.8.6) as other villages are a higher priority.

Options for improved sewerage facilities considered in the 2003 IWCM Strategy include:

- Enhanced on-site systems – upgraded on-site treatment and/or effluent management systems;
- Centralised sewerage – common effluent drainage (CED) and treatment at Kianga STP or a new local package STP;
- Full reticulated sewerage at a local package extended aeration STP with dune exfiltration and local reuse.

The 2003 IWCM Strategy identified the preferred integrated approach for Mystery Bay on a TBL basis as enhanced management of existing on-site facilities or local treatment with greywater reuse. The capital cost was estimated to be between $0.75 million (for enhanced management of existing on-site facilities) and $4.0 million (for local treatment with greywater reuse) (indexed to 2016$).

In 2006, a feasibility study on sewering of the southern villages was prepared (Commerce, 2006). This study investigated the sewering of Mystery Bay with either pressure sewerage or aerobic on-site treatment systems (AOTS) and construction of a local STP with effluent managed locally by either irrigated reuse or dune exfiltration. The capital cost estimates were reported as $5.0 million for the dune exfiltration option with pressure sewerage and $2.3 million for the AOTS and reuse option (indexed to 2016$).

B1.8.13 Central Tilba and Tilba Tilba Sewerage

Options for improved sewerage facilities considered in the 2003 IWCM Strategy include:

- Enhanced on-site systems – upgraded on-site treatment and/or effluent management systems;
- Centralised sewerage – CED or pressure sewerage system and transport (or pump-out) to (augmented) Kianga STP or a new local package STP for treatment; and
- Full reticulated sewerage at a local package STP with dune infiltration and local reuse.

The 2003 IWCM Strategy identified the preferred integrated approach for Central Tilba and Tilba Tilba on a TBL basis as centralised management of effluent from existing on-site facilities with agricultural reuse. The capital cost was estimated to be $3.1 million (indexed to 2016$).

In 2006, a feasibility study on sewering of the southern villages was prepared (Commerce, 2006). This study investigated sewering of Central Tilba and Tilba Tilba with either pressure sewerage or AOTS and construction of a Tilba STP with effluent reuse. The capital cost estimates were reported as $3.5 million for the pressure sewerage scheme and STP and $2.2 for the AOTS and STP option (indexed to 2016$). If sewage from Central Tilba and Tilba Tilba is to be treated at Kianga STP, an upgrade of Kianga STP will need to accommodate this additional load.

The feasibility study also considered the combined treatment of sewage from Central Tilba, Tilba Tilba and Mystery Bay at a single STP to the south of Tilba Tilba. This option has been included in the preferred IWCM scenario with a capital cost estimate of $22 million (based on the recent costs for village sewerage schemes). Construction of the scheme will depend on community consultation and the availability of funding.

B1.8.14 Akolele Sewerage

A new sewerage scheme has recently been constructed for Wallaga Lake (in Bega Valley Shire) and the Koori Village with treatment at Bermagui STP. This scheme allows for future servicing of Akolele. The rising main to Koori Village is located along Wallaga Lake Road adjacent to Akolele to the west. A sewerage scheme in Akolele could be connected to this system.

The provision of improved sewerage management in Akolele would improve the public and environmental health of the area although significant expenditure is not considered to be warranted in the medium-term based on the village sewerage risk assessment (Section B1.8.6).

The feasibility study on sewering of the southern villages (Commerce, 2006) identified the cost of a pressure sewerage collection or AOTS system in Akolele as $1.6 million (indexed to 2016$). Based on the recent costs for village sewerage schemes, a capital budget allowance of $2.1 million is considered to be appropriate.

It is recommended that Council commence sewerage collection system options development and assessment and consultation with residents with the aim of constructing the scheme within 20 years. Construction of the scheme will depend on community consultation and the availability of funding.

B2. EVALUATION AND ASSESSMENT OF FEASIBLE OPTIONS

B2.1 Water Supply

The preferred strategy to increase the secure yield of the water supply system has been developed over more than 10 years. After extensive TBL investigations into the available options (refer Sections B1.1 and B1.2), Council has adopted a long-term water supply strategy based on increased transfer system capacity, provision of a southern storage and augmented treatment facilities. Some major components of the long-term water supply strategy have been completed:

- Moruya River to Deep Creek Dam pipeline (supplying up to 30 ML/d to Deep Creek Dam);
- Northern WTP (20 ML/d) near Denhams Beach;
- Tuross aquifer bores; and
- Southern WTP (6 ML/d) near the Tuross bores.

The main components of the long-term water supply strategy yet to be implemented are:

- 3 GL off-creek storage at Stoney Creek near Bodalla;
- A new 25 ML/d WTP near the off-creek storage site; and
- Minor transfer system modifications to allow transfer of up to 20 ML/d from the southern system to the northern system.

The capital cost estimates for the water supply augmentation strategy and identified changes to operation and maintenance costs are given in Table 30.

Table 30: Summary of Costs of Water Supply Augmentation Strategy

Component	Capital Works Estimate	Timing	Impact on Operation and Maintenance Costs [1]
Southern dam	$63.5 million	2021	Additional operational staff from 2021
New southern WTP	$30.0 million	2029	Additional water treatment operation costs and operational staff from 2029

1. Refer Section C8 - Work Force Plan.

B2.2 Sewage Treatment and Effluent Quality Options

The preferred strategies for upgrade and augmentation of the STPs have been developed through the 2003 IWCM Strategy and recent strategic planning and concept design reports. There are no other options for improvement of sewage treatment and effluent quality.

The capital cost estimates for the 30 year STP upgrade strategy (refer Section B1.5.1) and identified changes to operation and maintenance costs are given in Table 31.

Table 31: Summary of Costs of STP Upgrades

STP	Project	Capital Works Estimate	Timing	Impact on Operation and Maintenance Costs [1]
Batemans Bay	Centrifuge renewal	$0.5 million	2018	None
	Scheduled 25 year mechanical and electrical upgrade with minor capacity upgrade and WHS upgrade	$5.2 million	2019	Minor increase in chemical costs
	Replacement at end of design life	$41.2 million	2042	None
Tomakin	Upgrade to cater for Rosedale/ Guerrilla Bay sewerage scheme and urban expansion zone	$1.6 million	2016	None
	Scheduled 25 year mechanical and electrical upgrade with capacity upgrade to cater for Malua Bay diversion and WHS upgrade	$20.75 million	2021	Minor increase in chemical costs. Additional operational staff
	Replacement at end of design life	$20 million	2045	None
Moruya	Scheduled 25 year mechanical and electrical upgrade and WHS upgrade	$1.3 million	2022	None
Bingie	Scheduled 25 year mechanical and electrical upgrade with capacity and WHS upgrade	$1.15 million	2018	Minor increase in chemical costs
	Replacement at end of design life	$10.6 million	2044	None
Kianga	Scheduled 25 year mechanical and electrical and WHS upgrade	$5.3 million	2021	None
	Replacement at end of design life	$10.6 million	2046	None
Bodalla	New STP servicing the village of Bodalla and Potato Point	$8.0 million	2018	Increase in sewer treatment costs
	Process augmentation to service Potato Point	$3.0 million	2021	Additional operational staff
	Scheduled 25 year mechanical and electrical upgrade	$1.0 million	2043	None

1. Refer Section C8 - Work Force Plan.

The Recycled Water Management Systems may identify additional operational requirements, however these are expected to be accommodated within existing budgets.

B2.3 Unserviced Areas Options

The preferred strategy to address the issues in unserviced areas is discussed in Section B1.8 for each village. While technical options for provision of water supply and sewerage in each village have been considered, further investigation, design, cost estimation and community consultation is required before a preferred system can be selected. The total asset management plan includes capital cost allowances for the village schemes as summarised in Table 32.

Table 32: Summary of Costs of Village Water Supply and Sewerage Schemes

Village	Project	Capital Works Estimate	Timing
Rosedale/ Guerrilla Bay	Pressure sewer system with treatment at Tomakin STP	$6.2 million	2017
	Rosedale regional sewage pump station (completed 2016)	$1.6 million	2016
Bodalla	Pressure sewer system with treatment at Bodalla STP	$2.7 million	2018
Potato Point	Sewerage system (preferred collection system to be confirmed) with treatment at Bodalla STP	$4.8 million	2021
Nelligen	Supplementary water supply and sewerage system (preferred collection and treatment system to be confirmed)	$14.3 million	2026
South Durras	Supplementary water supply and sewerage system (preferred collection and treatment system to be confirmed)	$25.3 million	2028
Central Tilba, Tilba Tilba and Mystery Bay	Sewerage system (preferred collection and treatment system to be confirmed)	$22 million	2032
Akolele	Sewerage system (preferred collection system to be confirmed) with connection to Koori Village rising main and treatment at Bermagui STP	$2.1 million	2034
Congo	Sewerage system (preferred collection and treatment system to be confirmed)	$6.2 million	2036

Operation and maintenance costs are expected to increase with the additional sewerage assets provided for the villages. Increases in budgets will be allocated to the following:

- Mains operation and maintenance;
- Pumping stations operation and maintenance; and
- Additional operational staff (refer Section C8 - Work Force Plan).

These cost increases will be offset by corresponding increases in income due to customers in the new villages and future growth.

B3. PREFERRED IWCM SCENARIO

The preferred strategies to address each option have been bundled into a preferred IWCM scenario. Most of the problems identified only have a single set of non-competing options that are considered suitable for addressing the issue. Although numerous additional options may be possible, these have either been considered and dismissed previously or are not considered credible. Consequently, there is only one IWCM scenario considered in this IWCM Strategy. The preferred IWCM Strategy is summarised in the following sections.

B3.1 Non-Build Measures

The non-build measures in the preferred IWCM Strategy are:

- Water pricing; and
- Water conservation measures (Waterwise education, rebate scheme, non-residential audits) with a budget of $145,000 p.a.

The level of consumption per connection has been minimised through previous demand management actions, particularly pricing. The additional water saved as a result of these ongoing measures is not significant however these measures will be implemented in order to maintain the current low level of consumption.

Strategic planning actions include:

- Drought management planning – Review and update of the 2011 Drought Management Plan in 2016/17 and following completion of the water supply augmentation components;
- Development of Recycled Water Management Systems;
- Review of Drinking Water Management System;
- Demand Forecast – Population, water demand and sewer load projections on a five year cycle following release of Census data;
- Reticulation Modelling – Recalibrate water and sewer reticulation models, review previous growth assumptions, review LEP changes and ESC Land Monitor, model the impact of growth (from the Demand Forecast) on the water and sewer reticulation systems;
- Secure yield modelling – Review of adopted strategies and climate change impacts;
- Integrated Water Cycle Management Strategy and Strategic Business Plan – Review and update on a five year cycle following completion of the demand forecast, reticulation modelling, secure yield modelling and other investigations;
- Development Servicing Plan – Review and update on a 5-6 year cycle;
- Dam safety review – Five yearly dam safety report for Deep Creek Dam and the new Southern Storage;
- Asset Management Plan – Review and develop asset renewal strategies and budgets for water and sewer infrastructure;
- Fair Value Asset Review – Review current replacement costs of water and sewer assets and review and update the asset depreciation model;
- CCTV Asset Condition Assessments;

- Reservoir condition assessments - Rolling 5 year program of reservoir cleaning and condition assessments including inspection of steel reservoirs by contract paint technologist to assess protective coating condition;
- Water quality monitoring, design and consultation for the village water supply and sewerage schemes; and
- Miscellaneous Investigations such as capacity reviews, asset data collections, miscellaneous asset condition assessments and participation in industry/government programs.

B3.2 Build Measures

The build measures in the preferred IWCM Strategy are:

- Meter replacement program to minimise non-revenue water with a budget of $260,000 p.a.;
- Water main replacement program to minimise water main breaks and leakage with a budget of $1,500,000 p.a. and associated renewal of services ($60,000 p.a.), valves and hydrants ($140,000 p.a.);
- Water supply asset renewal program – SCADA and telemetry, treatment, mains and service connections, reservoirs and pumping stations with a budget of $2.27 million p.a.
- 25 year mechanical and electrical upgrade of the Northern WTP;
- Water supply augmentation as discussed in Section B1.2.5;
- Nelligen and South Durras water supply schemes subject to community consultation, design and funding as discussed in Section B1.8;
- Sewer asset renewal program – STPs, SCADA and telemetry, mains and service connections, manholes and pumping stations with a budget of $2.85 million p.a.
- STP upgrades as discussed in Section B1.5;
- Diversion of sewer flows from Malua Bay/Lilli Pilli to Tomakin STP;
- STP upgrades to resolve non-compliances for process units, civil and electrical installations based on current WHS legislation requirements;
- Servicing of land release areas;
- Rosedale/Guerrilla Bay and Bodalla sewerage schemes as discussed in Section B1.8.4; and
- Other village sewerage schemes (South Durras, Nelligen, Potato Point, Congo, Central Tilba and Tilba Tilba and Akolele) subject to community consultation, design and funding as discussed in Section B1.8.

B3.3 Demand Forecast

B3.3.1 Potable Water Demand

The forecast average and dry year annual potable water demand is shown in Figure 25. The forecast peak day demand is shown in Figure 26. The total treatment capacity with the augmented scheme will be 45 ML/d and the total reservoir capacity is 115 ML.

The recent demand is generally decreasing and is significantly lower than the forecast average year and peak day demand. The demand forecast was prepared using 2011 Census data, bulk water flows up to March 2011 and metered consumption up to March 2013. There has been a decrease in demand since 2011

which may be due to climatic factors or demand management. Rainfall in Batemans Bay averaged 1,006 mm between 2011 and 2015 compared to the long-term average of 923 mm indicating that this period has experienced relatively normal rainfall. Similarly the temperature has been similar to the average. This indicates that the ongoing demand management measures appear to be having a positive effect.

The assumptions in this IWCM Strategy are based on the adopted demand forecast but there is flexibility in decision-making and infrastructure upgrades. The demand forecast will be reviewed and updated every 5 years following the release of new Census data. Augmentations may be delayed if the forecast demand is not experienced.

B3.3.2 Non-Potable Water Demand

The non-potable demand (existing effluent reuse schemes) is dependent on seasonal climate but is otherwise unlikely to change over time. The historical demands are shown in the following table.

Table 33: Non-Potable Water Demand – Effluent Reuse Schemes

STP	**Reuse Areas**	**Annual Demand (ML/a)**						
		2009	**2010**	**2011**	**2012**	**2013**	**2014**	**Average**
Batemans Bay	STP on-site - equipment wash down and irrigation	-	28	3.2	8.1	10	11	12
	Overhead fill	-	29	0	0	0	0.3	7.3
	Batemans Bay Golf Course	-	92	0	14	125	117	69
	Total Batemans Bay STP	*-*	*149*	*3.2*	*22*	*135*	*128*	*87*
Tomakin	STP on-site and off-site for dust suppression and roadwork operations	No data						
Moruya	Moruya Golf Course and Moruya High School	79	61	44	59	28	36	51
	North Moruya - Riverside Park, overhead filler and on-site reuse	10	7.9	9.8	8.0	2.4	9.4	8.0
	Total Moruya STP	*89*	*69*	*54*	*67*	*31*	*45*	*59*
Bingie	Tuross Golf Course	33	24	18	23	27	22	25
	STP on-site	3.4	2.8	2.6	2.6	2.2	0.9	2.4
	Total Bingie STP	*36*	*26*	*20*	*25*	*29*	*23*	*27*
Kianga	STP on-site	No data						
All STPs		**125**	**245**	**78**	**115**	**195**	**197**	**174**

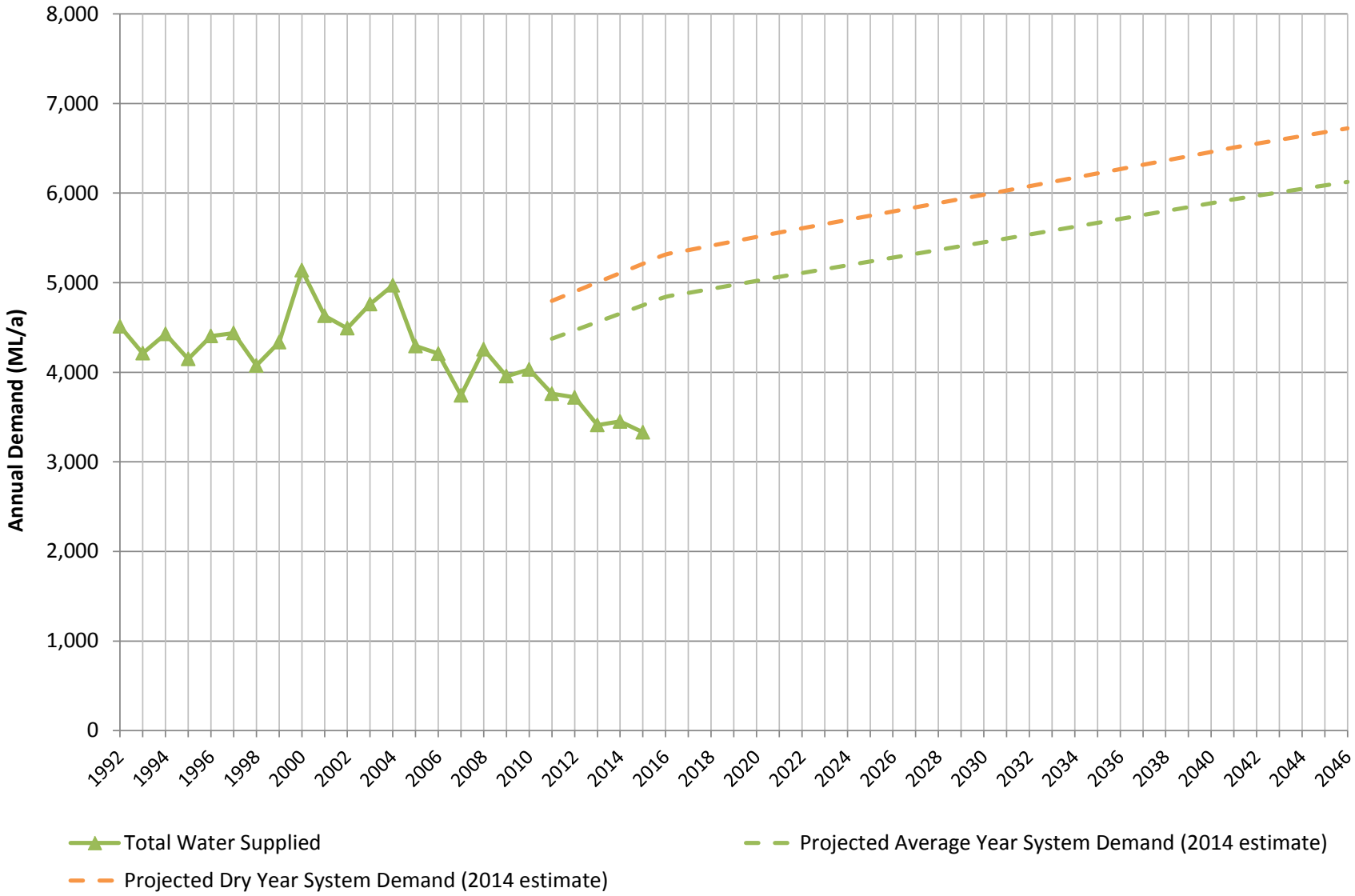

Figure 25: Historical and Forecast Average Annual and Dry Year System Demand

Source: ESC operational data and NSW Public Works (2014a)

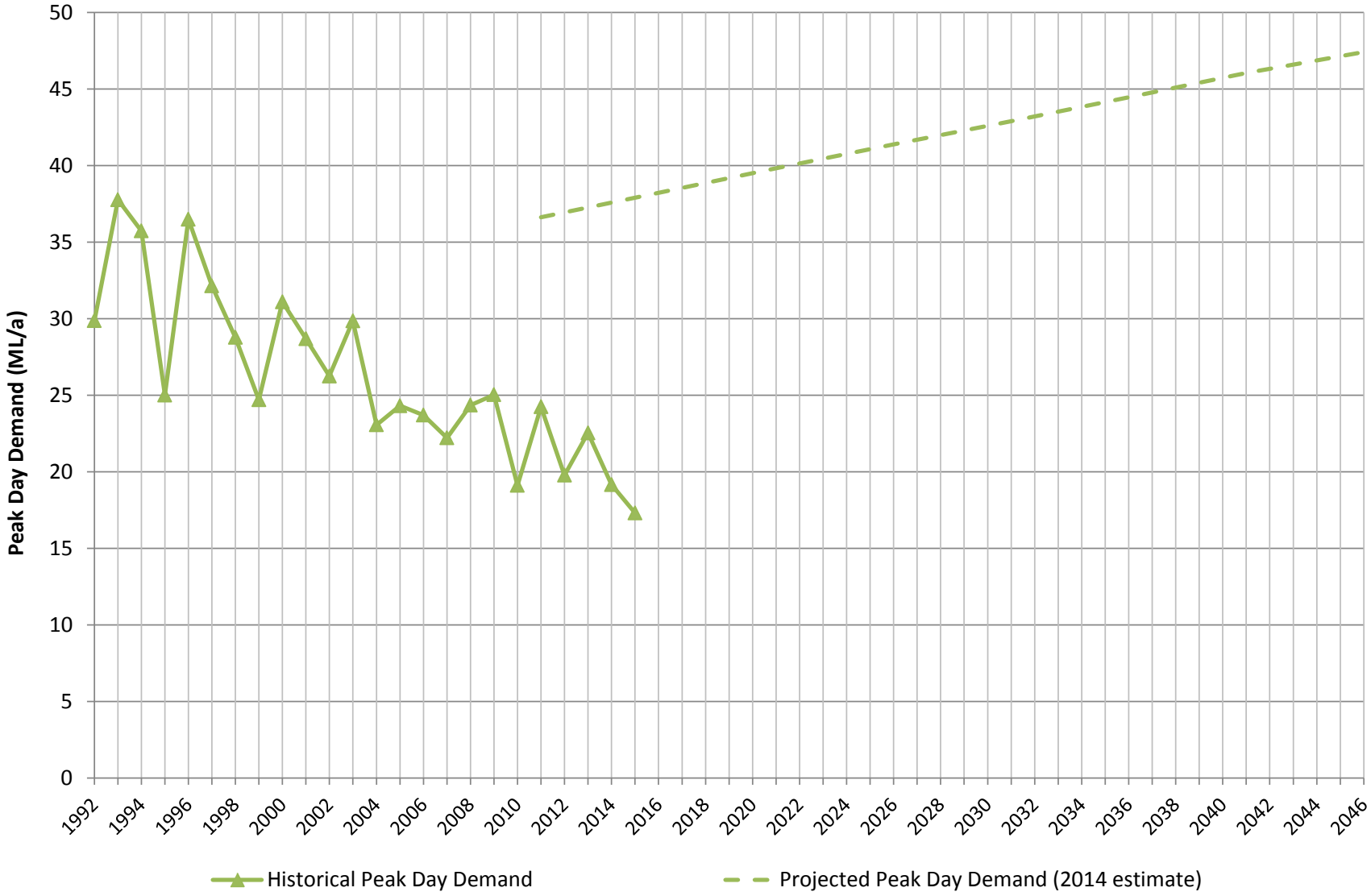

Figure 26: Historical and Forecast Peak Day Demand

Source: ESC operational data and NSW Public Works (2014a)

B3.3.3 Sewer Loads

Forecast STP inflows were reported in Section 13 of the IWCM Issues Paper and are shown in the following figures. Forecast sewer loads will also be updated every 5 years with the release of new Census data.

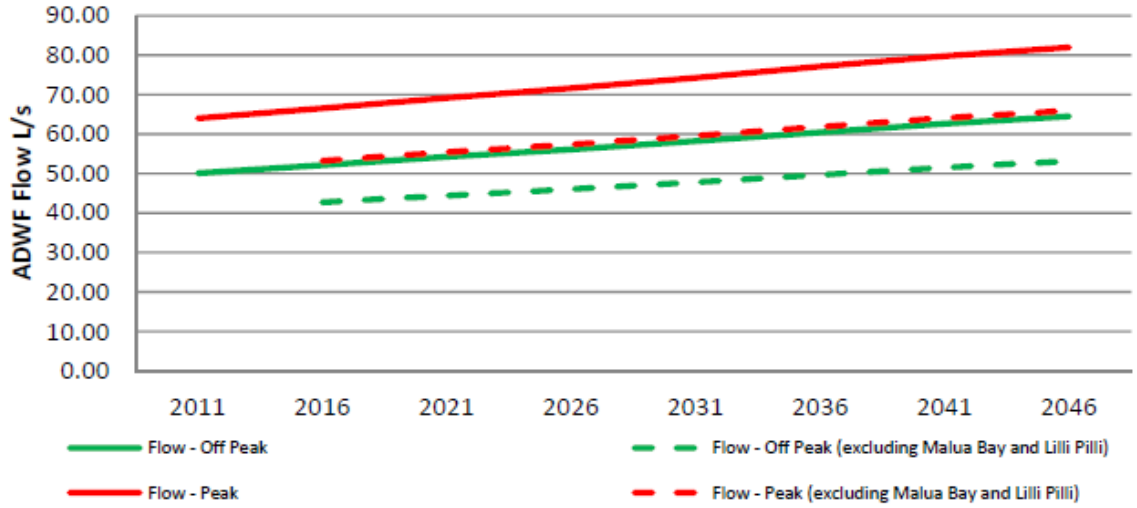

Figure 27: Future Peak and Off-Peak Daily Flow (ADWF) – Batemans Bay STP

Source: NSW Public Works (2015b)

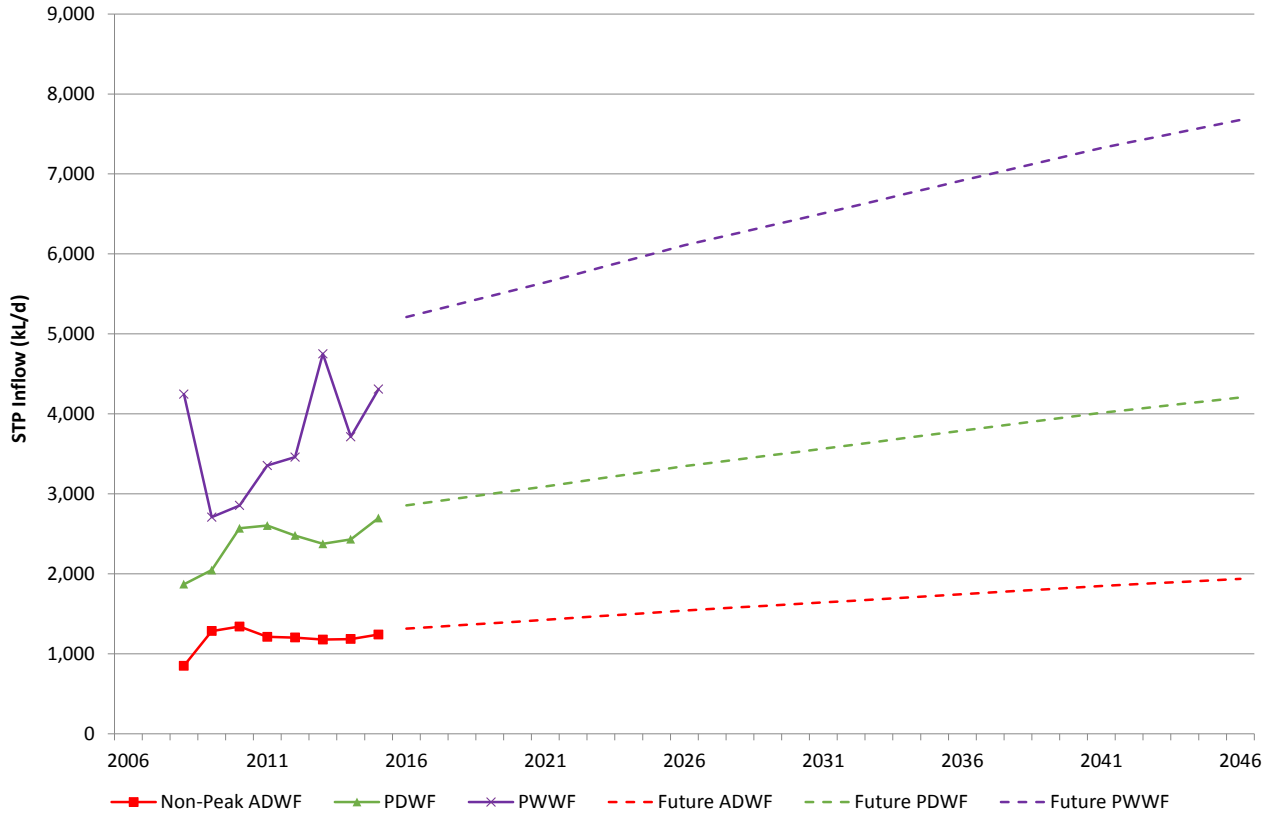

Figure 28: Tomakin STP Forecast Inflow

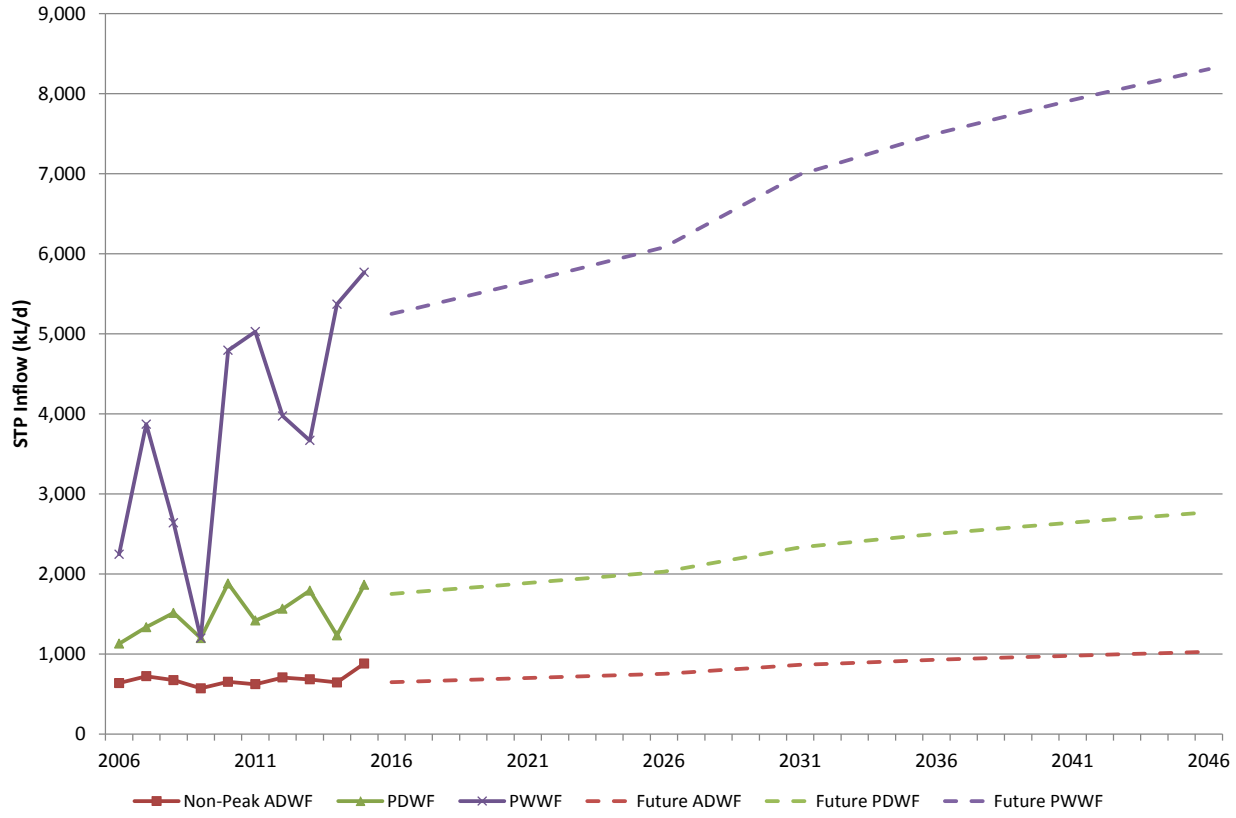

Figure 29: Moruya STP Forecast Inflow

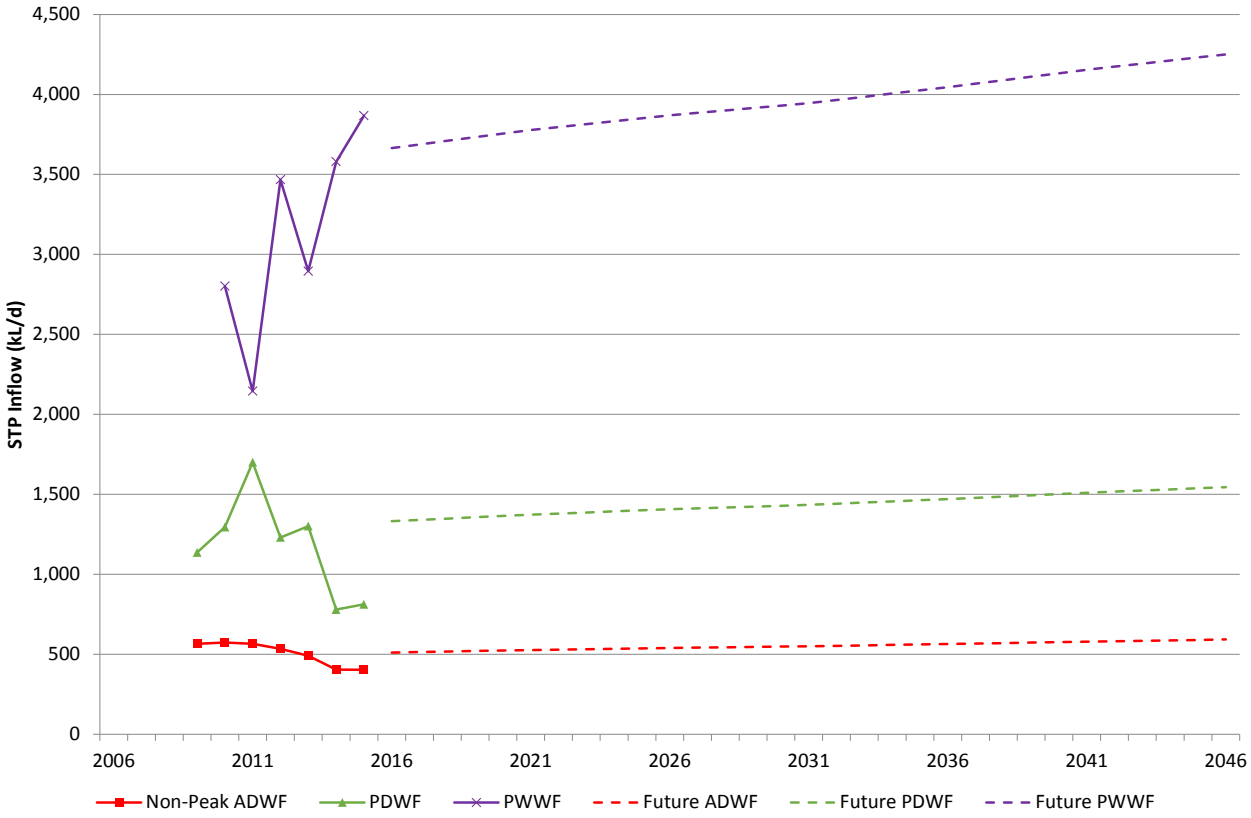

Figure 30: Bingie STP Forecast Inflow

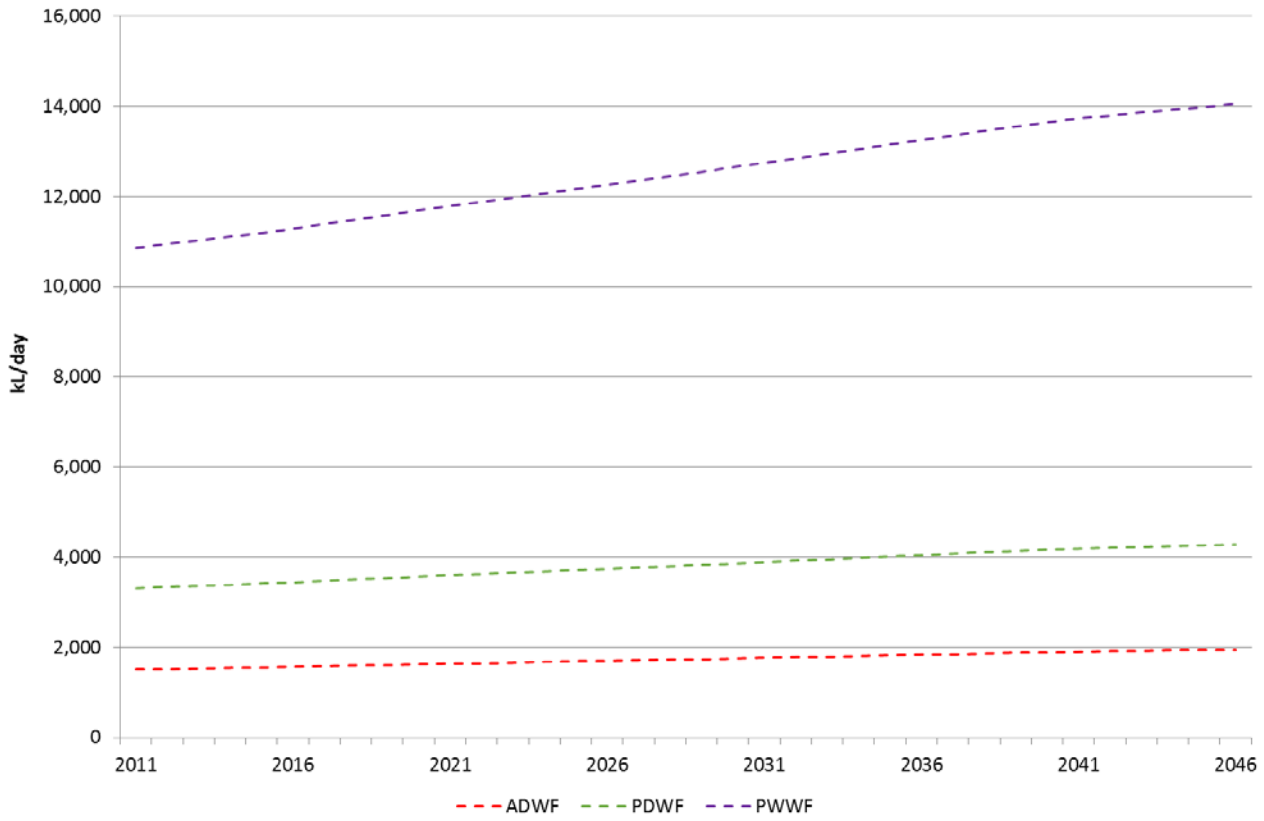

Figure 31: Kianga STP Forecast Inflow

B3.4 Levels of Service

The target levels of service are discussed in Section A5.

The key levels of service addressed by the preferred IWCM Strategy are:

- Drought restrictions (5/10/10 rule) – staged water supply augmentation will be undertaken to increase the secure yield above the dry year demand forecast;
- Unplanned interruptions to water supply – to be addressed through the water supply asset renewal program:
    - Maximum duration: 6 hours; and
    - Maximum occurrence: 1 per year per customer, 100 per 1,000 properties;
- Potable water quality: meets AWDG (2011) – to be addressed through WTP modifications and major augmentations;
- Frequency of wet weather sewer overflows: General: 1 in 5 year, CBD and oyster lease areas: 1:20 – to be addressed through sewerage system upgrades and the sewer asset renewal program;
- Compliance with Environment Protection Licence Conditions: 100% compliance – to be addressed through STP upgrades; and
- Urban water services: available to all urban areas where practical – to be addressed through water supply and sewer extensions to service growth and village water supply and sewerage schemes.

Key risk factors in achieving these levels of service are:

- Availability of funding – the proposed works (particularly the new southern storage and village water supply and sewerage schemes) are capital intensive and will rely on external funding sources;

- Community consultation – extensive consultation will be required before preferred water supply and sewerage schemes for South Durras, Nelligen, Potato Point, Congo, Central Tilba and Tilba Tilba and Akolele are developed;
- Environmental assessment and approvals – an environmental assessment prepared in 2009 for the southern storage proposal identified impacts on native vegetation due to inundation. A species impact statement prepared in 2007 recommended ameliorative measures to reduce the impact on threatened species including compensatory habitat to offset impacts resulting from the dam inundation. Detailed design and final environmental assessment will be undertaken during 2016/17 and 2017/18. The budget estimate includes allowances for compensatory habitat; and
- The asset renewal program has been designed to minimise asset failure and will rely on ongoing asset inspections to identify priority works as well as ongoing funding of the renewal program.

B3.5 Total Asset Management Plan

The capital works program and operating and maintenance budgets are attached in Appendix D1 and summarised in the following figures.

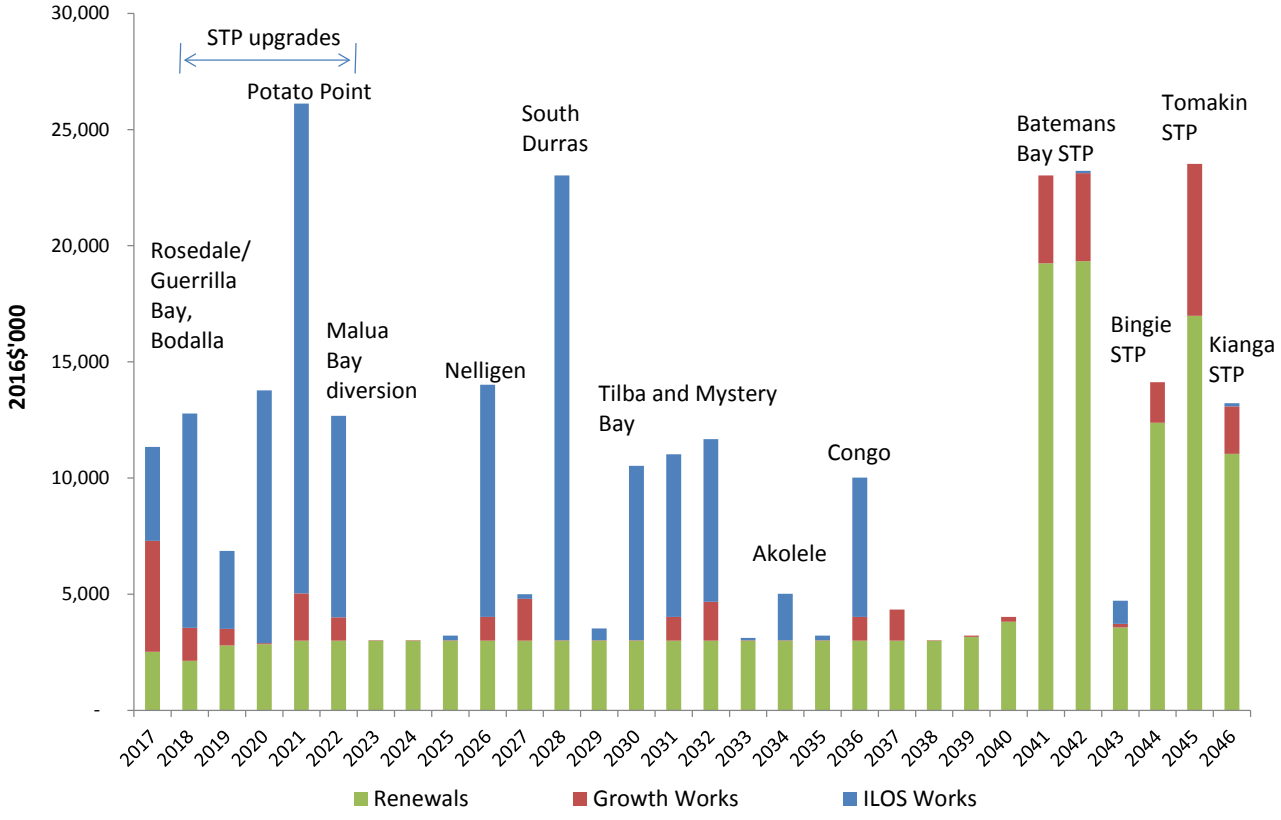

Figure 32: Sewer Capital Works Program

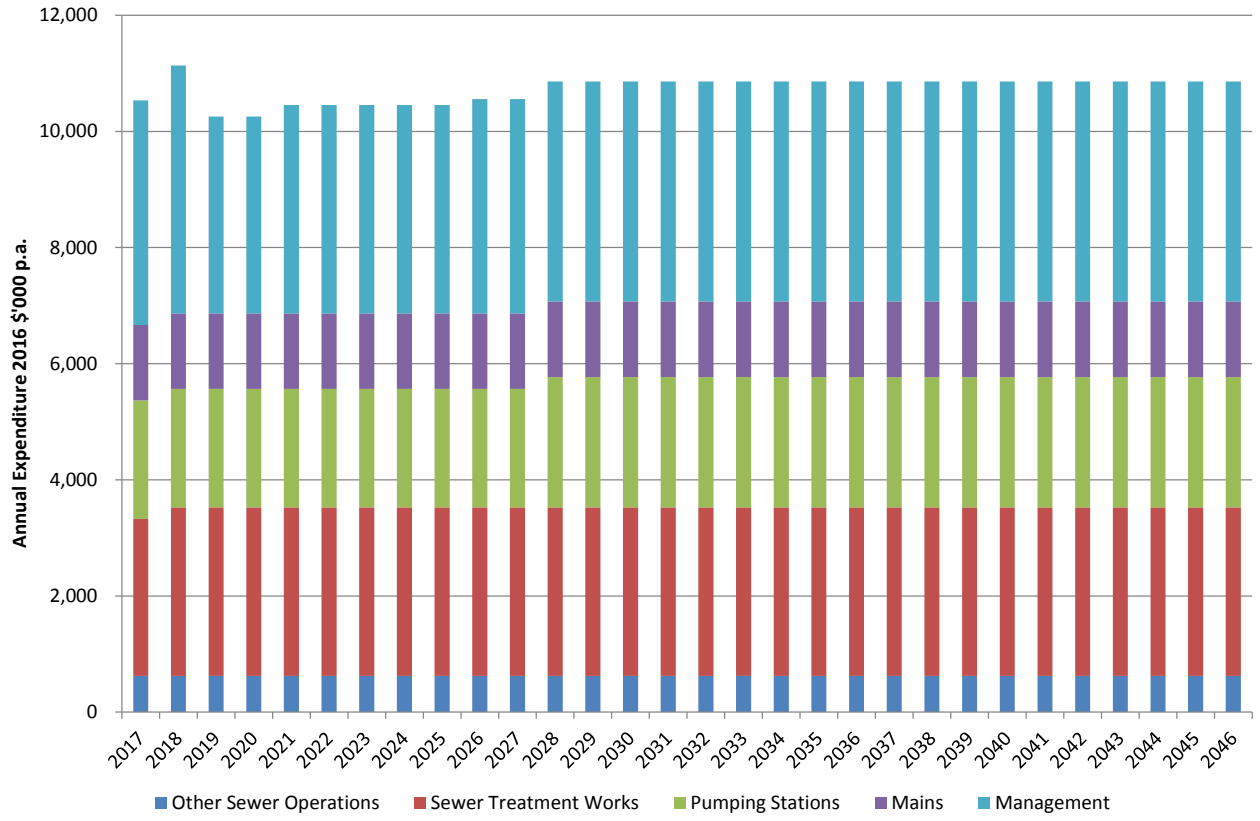

Figure 33: Sewer Operation and Maintenance Budget

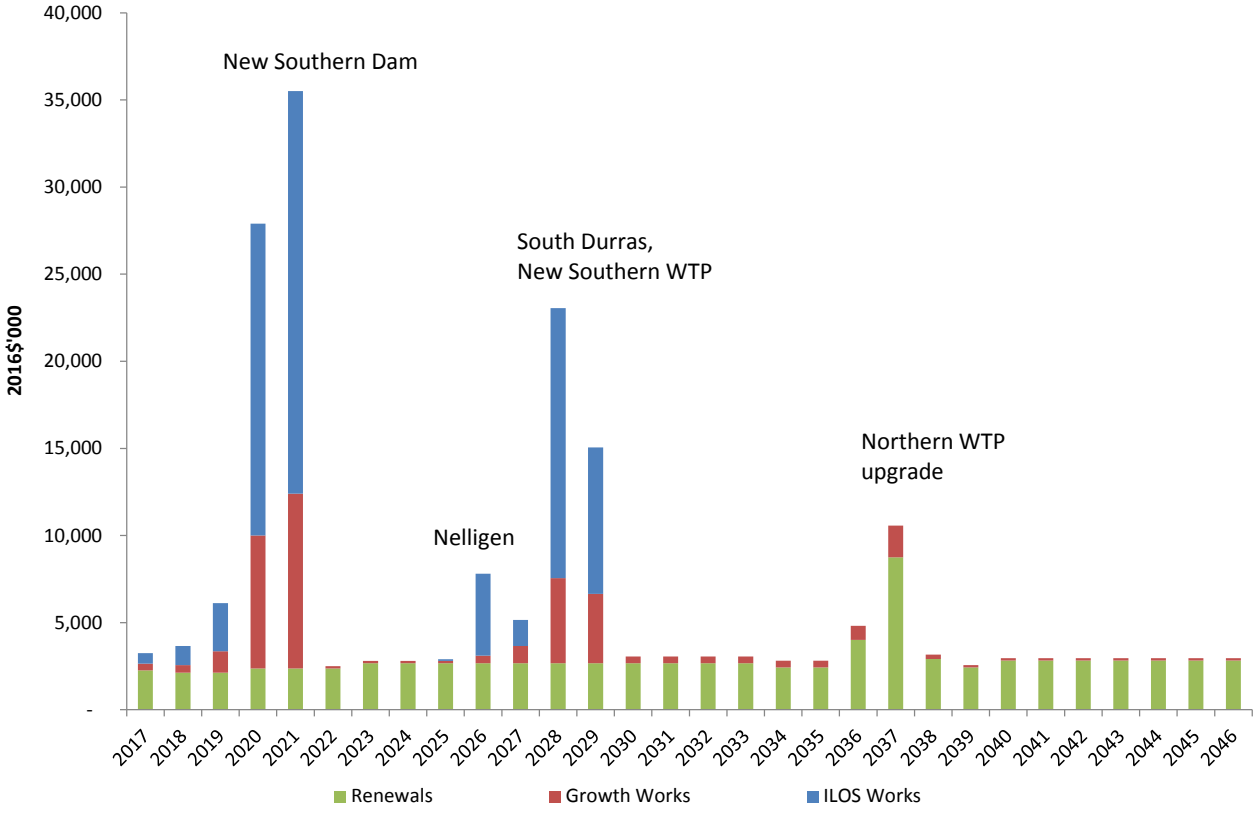

Figure 34: Water Supply Capital Works Program

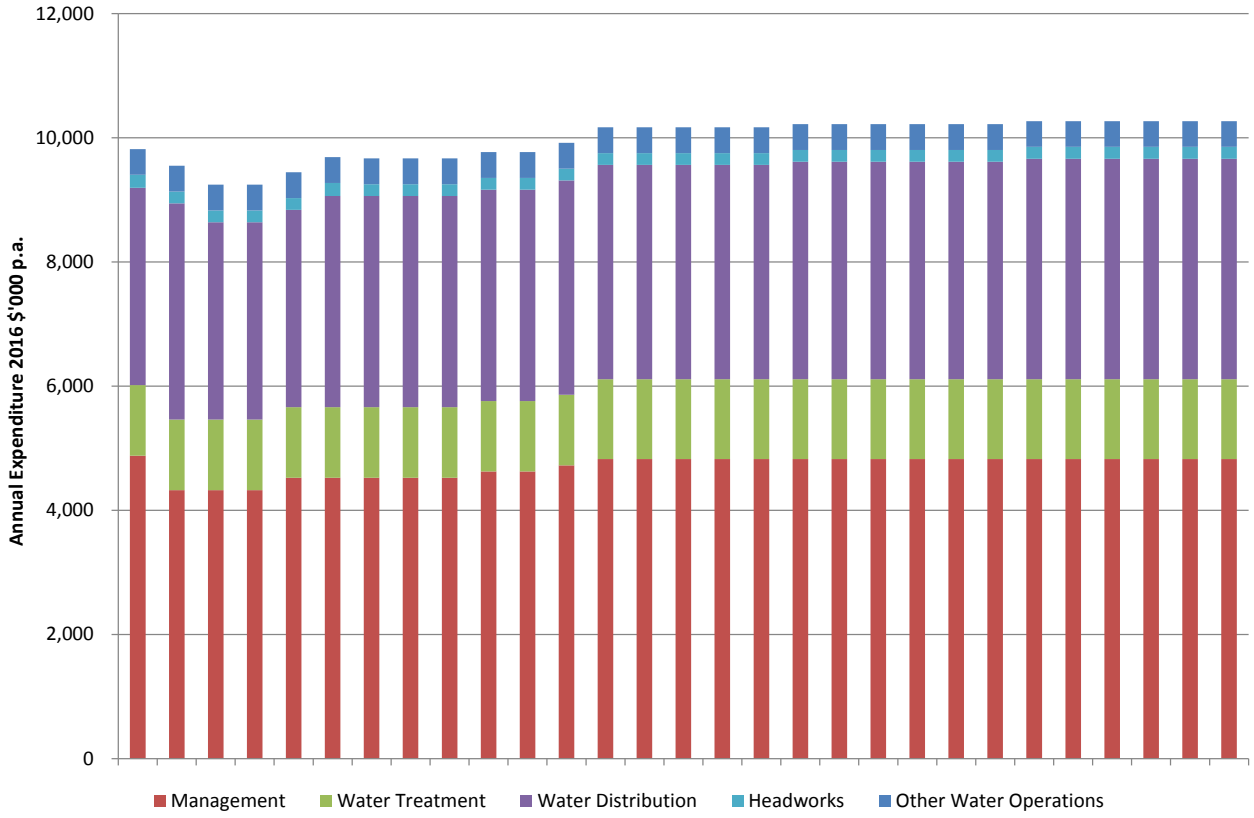

Figure 35: Water Supply Operation and Maintenance Budget

B3.6 Financial Analysis

The financial analysis for the preferred IWCM Strategy is included in PART D – FINANCIAL PLAN.

The current water supply TRB is considered to be at the appropriate level for the medium-term.

It is recommended that Council increase the sewer TRB from the current level of $902 per assessment p.a. (2017$) to $918 per assessment p.a. over the next two years (an increase of 1.8% above inflation over two years).

The Development Servicing Plans are currently being reviewed and any change in projected developer income that will impact on the required income from annual bills should be considered in setting the future price path.

Council may elect to pay dividends from the water supply and/or sewer businesses to the General Fund. Should ESC wish to make such payments, the price path will need to be increased to create a surplus that will enable payment of dividends.

PART A AND B REFERENCES

ASpect Process Services (2015) *Kianga Sewage Treatment Plant Capacity Assessment.* Document Reference PR-000-100-188/02, Version 150604

BOM (2016) *Climate Data Online* http://www.bom.gov.au/climate/data/

Commerce (2004) *Batemans Bay Sewerage Scheme Strategy Study.* Report Number WS030058, May 2004

Commerce (2006) *Eurobodalla Southern Villages – Sewerage Scheme Feasibility Study.*

Commerce (2006) *Stony Creek Storage Concept Design Report.* Report Number DC05202, Draft March 2006

DPI-Water (2015a) *Draft Water Sharing Plan for the Clyde River Unregulated and Alluvial Water Sources* http://www.water.nsw.gov.au/water-management/water-sharing/plans-on-exhibition/exhibitions-closed/clyde-river

DPI-Water (2015b) *Draft Water Sharing Plan for the Deua River Unregulated and Alluvial Water Sources* http://www.water.nsw.gov.au/water-management/water-sharing/plans-on-exhibition/exhibitions-closed/deua-river

DPI-Water (2015c) *Draft Water Sharing Plan for the Tuross River Unregulated and Alluvial Water Sources* http://www.water.nsw.gov.au/water-management/water-sharing/plans-on-exhibition/exhibitions-closed/tuross-river

DPWS (1998) *Deep Creek Dam – Feasibility Study to Increase Dam Capacity.* Report No. DC98080, June 1998

DPWS (2002) *Eurobodalla Water Supply Augmentation Dam Site Feasibility Studies*. Report no. DC02249, November 2002

DPWS (2003) *Eurobodalla Integrated Water Cycle Management Strategy*

DWE (2007) *Best Practice Management of Water Supply and Sewerage Guidelines*

EPA (2000) *Environmental Guidelines: Use and Disposal of Biosolids Products*

ESC (2012a) *Greenhouse Action Plan*

ESC (2012b) *Eurobodalla Shire Council Water and Sewer Asset Management Plan*

ESC (2013) *Eurobodalla Shire Council Liquid Trade Waste Regulation Policy*

ESC (2014) *Eurobodalla Shire Council – Resourcing Strategy – Workforce Management Plan 2014-2018*

ESC (2015) *Eurobodalla Rural and Residential Land Supply Report 2014/15*

Hydrosphere Consulting (2016) *Eurobodalla Integrated Water Cycle Management Strategy – IWCM Issues Paper*

ngh environmental (2007) *Off-Stream Storage Stony Creek Site 2, Eurobodalla Shire Regional Water Supply Scheme Species Impact Statement*

NSW Office of Water (2013a) *Report Card for the Buckenbowra River Water Source*

NSW Office of Water (2013b) *Report Card for the Deua River Water Source*

NSW Office of Water (2013c) *Report Card for the Tuross River Water Source*

NSW Office of Water (2014a) *Integrated Water Cycle Management Strategy Check List – July 2014*.

NSW Office of Water (2014b) *Water Supply and Sewerage Strategic Business Planning and Financial Planning Check List – July 2014*.

NSW Office of Water (2015a) *Eurobodalla Shire Council Water Supply and Sewerage Planning Data Set*

NSW Office of Water (2015b) *2013-14 Eurobodalla Shire Council TBL Water Supply and Sewerage Performance Reports*

NSW Office of Water (2015c) *NSW Guidelines for Recycled Water Management Systems*

NSW Office of Water (2015d) *2013-14 Water Supply and Sewerage NSW Benchmarking Report*

NSW Public Works (2012) *Tomakin STP Plant Capacity and Upgrade Strategy Assessment.* Report Number WT 120085, 23 October 2012

NSW Public Works (2013a) *Eurobodalla Water Supply Headworks Yield Study*

NSW Public Works (2013b) *Draft Narooma Sewerage Scheme Sewer Network Modelling.* Report Number: WS13059 July 2013

NSW Public Works (2014a) *Population, Water Demand and Sewer Load Projections for Eurobodalla Shire Council*. Report Number: WSR - 14020 December 2014

NSW Public Works (2014b) *Eurobodalla Water Supply Reticulation System Modelling for the Existing and Future Demand*: WSR - 12082 May 2014

NSW Public Works (2014c) *Eurobodalla Effluent Management Options Report*: WS130014, June 2014

NSW Public Works (2014d) *Moruya Sewerage Scheme Sewer Network Modelling.* Report Number: WSR 13040, January 2015 Final Report

NSW Public Works (2014e) *Tuross Head and Turlinjah Sewerage Schemes Sewer Network Modelling.* Report Number: WSR 13050, July 2014 Final Report

NSW Public Works (2014f) *Tomakin Sewerage Scheme Sewer Network Modelling.* Report Number: WSR 13033, April 2014 Final Report

NSW Public Works (2014g) *Bingie Sewage Treatment Plant - Assessment of Treatment Capacity.* Report Number: WSR 14071, December 2014

NSW Public Works (2014h) *Optimisation of Southern Water Treatment Plant, Concept Design Report.* Report Number: WSR 14043, September 2014

NSW Public Works (2014i) *Eurobodalla Sewerage and Water Schemes - Sewage Treatment Plants and Water Treatment Plants Physical Work Health Safety Assessment.* Report No. WSP14016, 15 December 2014

NSW Public Works (2014j) *Eurobodalla Water Supply Reticulation System Modelling for the Existing and Future Demand*: *Addendum 1: An analysis of the transfer capacity from the Southern to the Northern System*. WSR - 12083 September 2014

NSW Public Works (2015) *Batemans Bay Sewage Treatment Plant – Plant Capacity and Optimisation Report.* Report Number: WSR 14049, December 2015

NSW Public Works (2016) *Batemans Bay Sewerage Scheme Sewer Network Modelling*. Report Number WSR 13020, February 2016

NSW Public Works and Atom Consulting (2014) *Eurobodalla Shire Council Risk-Based Drinking Water Management System.* April 2014

NSW Urban Water Services (2016) Addendum to 2013 Yield Study – Eurobodalla Shire Council

Peter Spurway & Associates (2005) *Tuross Head Country Club Effluent Reuse Operational Management Plan*, March 2005

Peter Spurway & Associates (2009) *Catalina Country Club Effluent Reuse Operational Management Plan*, November 2009

Strategic Environment Services (2014) *Eurobodalla Shire Housing Needs Study: Eurobodalla Housing Needs, Supply and Market Issues Paper*

WorleyParsons (2009) *Proposed Stony Creek 2 Off-Stream Storage at Bodalla, Environmental Impact Assessment.* Issue 3, April 2009

PART A AND B GLOSSARY AND ABBREVIATIONS

ADWF	Average dry weather flow
ADWG	Australian Drinking Water Guidelines
AGWR	Australian Guidelines for Water Recycling
ARI	Average return interval
AWTS	Aerated wastewater treatment systems
BASIX	Building Sustainability Index
BOD	Biological oxygen demand
CBD	Central Business District
CCTV	Closed-Circuit Television
DCP	Development Control Plan
DAFF	Dissolved air flotation and filtration
DPI	NSW Department of Primary Industries
DWE	Department of Water Energy, former name for DPI-Water
DWMS	Drinking Water Management System
EAT	Extended Aeration Treatment
EP	Equivalent persons
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
ERRR	Economic Real Rate of Return
ESC	Eurobodalla Shire Council
ET	Equivalent tenements
FTE	Full time equivalent
HU	Hazen Units - Units for measuring True Colour
IDEA	Intermittent Decant Extended Aeration
IDS	Infrastructure Design Standard (ESC)
IWCM	Integrated Water Cycle Management
k	Thousand (dollars)
kL	Kilolitres
kL/d	Kilolitres per day
km	Kilometres
LEP	Local Environmental Plan
LOS	Level of Service
LWU	Local Water Utility
ML	Megalitres (million litres)
ML/a	Megalitres per annum

ML/d	Megalitres per day
NRW	Non-Revenue Water
OMA	Operation, Management and Administration (cost)
OSSM	On-site Sewage Management System
PDD	Peak Day Demand
PDWF	Peak Dry Weather Flow
PRP	Pollution Reduction Program
PWWF	Peak Wet Weather Flow
RAS	Return activated sludge
SBP	Strategic Business Plan
SEPP	State Environmental Planning Policy
SPS	Sewage pumping station
SSD	State Significant Development
SSI	State Significant Infrastructure
STP	Sewage Treatment Plant
TRB	Typical Residential Bill
TAMP	Total Asset Management Plan
UV	Ultraviolet
WAS	Waste activated sludge
WSP	Water Sharing Plan
WSUD	Water Sensitive Urban Design
WTP	Water treatment plant

Appendix B1: IWCM Checklist

Eurobodalla Shire Council has reviewed and updated its Integrated Water Cycle Management (IWCM) Strategy and Strategic Business Plan (SBP). This document addresses the requirements for both the IWCM Strategy and SBP.

Part A of this document provides the information required for the IWCM Strategy development (Table 34, Items 13 to 17) as listed in the *Integrated Water Cycle Management Strategy Check List – July 2014* (NSW Office of Water, 2014a). Items 2 to 8 of the checklist are addressed in the IWCM Issues Paper (Hydrosphere Consulting, 2016). Part B of this document provides the available data in response to the IWCM Checklist items 9 to 12 (further detail on IWCM Options and Scenarios, Table 34).

Table 34: IWCM Strategy – Check List Requirements (Items 9 to 17)

Outcome Achieved	Section in this Document
9. Feasibility Review of Options	
For All water supply and sewerage related issues the first step is to complete the following: 9A. Check that the current and proposed future water pricing is best-practice. Also refer to Circular LWU 11 of March 2011 on how to update your water supply tariff to ensure best-practice pricing. Implement corrective action if this is not the case as this has been proven to provide great value for money to the community.	Section B1.1.1
9B. Includes an assessment to ascertain if previously dismissed non-build water conservation measures/options are now attractive/effective based on current performance data, new knowledge and technology, new policy and regulation, community acceptance, availability of resources, etc. 9C. Includes a review of current program and potential new non-build water conservation measures with respect to their cost effectiveness (e.g., system wide measures such as leakage reduction, pressure reduction, unmetered usage and metering error, replacement of worn customer meters (typically over 10 years old), communication, permanent water conservation measures, etc. and site specific retro-fit and conservation measure to existing dwellings/premises). 9D. Check to ensure the supplementary water source to comply with BASIX requirements for new dwellings is not double-counted. 9E. Includes a priority and cost-effectiveness review (based on current performance data, new knowledge and technology, regulation, community acceptance, etc.) of current program, previously dismissed and potential new measures to reduce sewer system inflow/infiltration at both the premises and network levels. 9F. Check that all available options for the water services have been identified and reviewed at individual site level, urban centre/area level, existing scheme/system level and broader regional level.	Section B1.1.2

Outcome Achieved	Section in this Document
For issues relating to water supply headworks system security of supply the following is demonstrated: 9G. Includes a suitability assessment of the previously dismissed options as a stand-alone and/or supplementary water source based on current information such as new knowledge, updated costs and yield estimates, legal context, technology changes resulting in lower cost and/or effective treatment, community feedback, higher affordability, etc. 9H. Available new supply sources (regional, local, site specific) together with any legislative/policy considerations is briefly described and its potential as a stand-alone and/or supplementary source has been reviewed with indicative yield and cost estimates. 9I. Includes the reasons for short-listing or not short-listing of each non-build and build option and an overview of the decision process. Options may only be excluded from the short-list where they are demonstrably less competitive than the short-listed options on a TBL basis.	Section B1.2
For issues relating to water quality and treatment improvement the following is demonstrated: 9J. Includes a review of all available water quality improvement measures such as catchment protection, in-situ storage management, alternate water sources, improved operation of existing treatment facilities and distribution system management together with a brief description of their effectiveness as a stand-alone and/or supplementary measure to water filtration (if any) of the existing source. Include cost estimate for each measure 9K. Includes a brief outline of the shortlisted water treatment process and process unit options to meet the LOS target and the option chosen for IWCM scenario analysis with reasons. 9L. Includes the reasons for short-listing or not short-listing of each non-build and build option and an overview of the decision process. Options may only be excluded from the short-list where they are demonstrably less competitive than the short-listed options on a TBL basis.	Section B1.3
For issues relating to water distribution improvement the following is demonstrated: 9M. Includes a description of all options and their costs and the reasons for short-listing or not short-listing the options.	Section B1.4

Outcome Achieved	Section in this Document
For issues relating to sewage treatment and effluent quality improvement including recycled water systems the following is demonstrated: 9N. Since the level of sewage treatment is dependent on the end use of the effluent and the receiving environment, all options (i.e., previously dismissed and potential new) such as urban open space watering, industrial recycling, non-potable reuse, indirect potable recycling (IPR), direct potable recycling (DPR), agricultural recycling, environmental substitution, waterways discharge, etc. are to be identified and reviewed along with indicative cost estimates and urban water cycle benefits such as secure yield, potable water demand reduction, etc. 9P. Includes the reasons for short-listing or not short-listing of each non-build and build option and an overview of the decision process. Options may only be excluded from the short-list where they are demonstrably less competitive than the short-listed options on a TBL basis. 9Q. Includes a brief outline of the shortlisted sewage treatment process and process unit options to meet the LOS target and the option chosen for IWCM scenario analysis with reasons. 9O. Includes consideration of sewer mining (new and previously dismissed) with recycling within existing developed areas and new release areas. 9P. Includes the reasons for short-listing or not short-listing of each non-build and build option and an overview of the decision process. Options may only be excluded from the short-list where they are demonstrably less competitive than the short-listed options on a TBL basis. 9Q. Includes a brief outline of the shortlisted sewage treatment process and process unit options to meet the LOS target and the option chosen for IWCM scenario analysis with reasons.	Section B1.5
For issues relating to sewer network improvement the following is demonstrated: 9R. Includes a description of all options and their costs and the reasons for short-listing or not short-listing the options.	Section B1.6
9S. Include a brief outline of all the options reviewed with indicative yield (dry, wet and average year), cost estimates and urban water cycle benefits along with the reasons for short-listing or not short-listing the option.	Section B1.7
For each unserviced town and village the following is documented: 9T. A brief overview of all the options to improve the current practices as well as all available community-wide options. 9U. Process and factors used in the short-listing of the options and risk ranking of the unserviced towns/villages.	Section B1.8

Outcome Achieved	Section in this Document
For issues relating to your water-sensitive urban design and 'liveable cities and towns' objectives include where practicable: 9V. The non-build and build opportunities and/or options (e.g. watering of parks and gardens and playing fields and the use of water sensitive urban design principles to encourage the greening of urban areas and healthy urban creeks and waterways) to address the issues along with the appropriate financial contributions from each beneficiary of such 'broader solutions' (e.g. a large water user, or Council's Planning, Parks and Gardens, Stormwater and/or Roads, Waterways and/or Estuary functions) such that the implementation can be coordinated through your IWCM Strategy. 9W. The potable water demand, sewer flow and stormwater flow reductions associated with each opportunity/option.	There are no specific issues related to water-sensitive urban design and 'liveable cities and towns' objectives. It is recommended that Council's current WSUD initiatives (development controls) continue.
10. Evaluation and Assessment of Feasible Options	
All shortlisted water supply feasible options should be evaluated and optimised and include the following minimum information: 10A. A brief description of each option. 10B. Include a description of the non-build measures with their costs, benefits, estimated take-up rates and subsidies, etc. Identify separately the cost and benefit to the community and the utility. 10C. For build measures a schematic layout showing the infrastructure measures in each option including their costs, benefits, size, location, route, staging proposed, etc. 10D. The secure yield of each option (the analysis to incorporate lot/prescient level solutions such as rainwater tanks, recycled water, urban stormwater use, etc.) undertaken in accordance with draft NSW Guidelines on Assuring Future Urban Water Security – Assessment and Adaption Guidelines for NSW Local Water Utilities (Reference 17 on page 21). 10E. Includes the sustainable yield of groundwater sources for options that incorporate groundwater. 10F. Includes for each option the environmental flow regime that has been agreed 'in principle' with the stakeholders. 10G. The capital, operation and maintenance cost estimates for each option including the assumptions, risk factors, etc. with the estimates. 10H. At least a 30-year present value analysis of each option at annual real discount rates of 10%, 7% and 4% per annum including sensitivity analysis with risk factors that influence the life cycle cost.	Section B2.1

Outcome Achieved	Section in this Document
All shortlisted feasible sewage treatment and effluent quality improvement and recycled water system options should be evaluated and optimised and include the following minimum information: 10I. A brief description of each option. 10J. Include a description of the non-build measures with their costs and benefits. 10K. For build measures a schematic layout showing the infrastructure measures in each option including their costs, benefits, size, location, route, staging proposed, etc. 10L. Includes a preliminary estimate of the sustainability measures (e.g., nutrient, salt and hydraulic, etc) for land based effluent reuse options. 10M. The capital, operation and maintenance costs estimate for each option including the assumptions, risk factors, etc with the estimates. 10N. At least a 30-year present value analysis of each option at annual real discount rates of 10%, 7% and 4% per annum including sensitivity analysis with risk factors that influence the life cycle cost.	Section B2.2
For the short-listed urban stormwater harvesting and use options include the following: P. A brief description and schematic of each option including the assessed benefits and risks. Q. The life cycle costs (capital, operation and maintenance) and a 30-year present value analysis.	Not required.
For unserviced towns and villages the short-listed options to include: 10R. The capital, operating and maintenance costs estimate and a 30-year present value analysis for each option including the assumptions, risk factors, etc with the estimates. 10S. For each unserviced town/village a risk based priority ranking of the town/village for option implementation.	Section B2.3
For the short-listed 'broader solutions' that satisfy the water-sensitive urban design and 'liveable cities and towns' objectives include: T. A brief description and schematic of each broader solution including the assessed benefits and risks. U. An order of estimate of the life cycle costs (capital, operation and maintenance). V. Identification of each beneficiary of such 'broader solutions' (e.g. a large water user, or Council's Planning, Parks and Gardens, Stormwater and/or Roads, Waterways and/or Estuary functions) including the appropriate financial contributions from each beneficiary.	Not required.

Outcome Achieved	Section in this Document
11. Development and Assessment of IWCM Scenarios	
Ensure the options have been bundled into IWCM Scenarios in accordance with IWCM Information Sheet 3 and cover all the towns/villages proposed to be serviced. Each scenario should be evaluated and optimised and include the following minimum information: 11A. Description of the non-build measures including program costs, estimated take-up rates, subsidies, etc. Identify separately the cost and benefit to the community and the utility. 11B. Description of the build measures including their size, staging proposed, etc. and schematic where possible. 11C. The projected peak day and annual potable and non-potable water demand of each scenario. 11 D. The sewer flows (ADWF, PDWF, PWWF) and loads and the annual volumes reused/recycled and discharged to waterways. 11 E. Check to ensure the water cycle benefits from non-build measures and from bundling have been incorporated in the demands and sewer volumes, and in the sizing, staging, etc. of the build measures. 11 F. The secure yield of each scenario (the analysis to incorporate lot/prescient level solutions such as rainwater tanks, recycled water, stormwater use, etc.) undertaken in accordance with draft NSW Guidelines on Assuring Future Urban Water Security – Assessment and Adaption Guidelines for NSW Local Water Utilities. 11 G. A summary table outlining for each scenario the risk factors, assumptions, benefits and the timeframe when LOS outcomes are achieved. Note each scenario must achieve the same LOS target outcomes at the end of the 30-year planning horizon. 11 H. The capital, operation, maintenance and administration cost estimates for each scenario including the renewals associated with the new works. 11I. Includes a renewals plan for each scenario that has been adapted from the TAMP in your LWU's latest Strategic Business Plan to suit the works/measures in each scenario. 11J. A present value analysis of each scenario at annual real discount rates of 10%, 7% and 4% per annum. Ensure the costs associated with the non-build options are included in the present value analysis. 11K. Check to ensure the avoided capital, operation, maintenance and administration costs associated with existing infrastructure for each scenario have been correctly calculated and applied. 11L. The approximate annual Typical Residential Bill (TRB). 11M. Check to ensure the water cycle benefits and any associated avoided costs from the short-listed 'broader solutions' that satisfy the water-sensitive urban design and 'liveable cities and towns' objectives have been incorporated in the demands and sewer volumes, and in the sizing, staging, etc. of the build measures. These broader solutions may be bundled into a separate scenario with appropriate allocation of costs to the respective beneficiaries (e.g. a large water user, or Council's Planning, Parks and Gardens, Stormwater and/or Roads, Waterways and/or Estuary functions) such that the implementation can be coordinated through your IWCM Strategy.	Section B3

Outcome Achieved	Section in this Document
12. Evaluation and Ranking of IWCM Scenarios 12A. The scenarios have been evaluated and ranked using the Triple Bottom Line (TBL) basis following the process outlined in IWCM Information Sheet 6 (Reference 8 on page 21). 12B. Includes as an Attachment to the report the methodology and process used in the scoring of the criteria together with any pertinent information and/or comments used in the scoring process.	Not required
Draft IWCM Strategy	
13A. Includes an executive summary of all the outcomes from items 2 to 12, a table showing the measures in each scenario, their present value cost, appropriate TRB, and TBL score and rank and a plan and description of the recommended IWCM scenario.	Executive Summary
13B. The body of the report to include the pertinent information with sufficient detail provision under the headings of introduction, description of existing systems, population and demographic projection, water cycle projection, LOS, issues, options assessed, IWCM scenario evaluation and ranking, consultation/feedback outcomes and recommendations.	Sections A1 to A8
13C. Includes a recommended scenario.	Section A6.3
Broad Community Feedback	
14. Community involvement throughout the IWCM strategy development process has been undertaken in accordance with IWCM Information Sheet 4.	Section A7
Final IWCM Strategy	
15A. In addition to the contents outlined in the draft, the final report also includes a summary of the feedback received and how it has been addressed within the adopted IWCM Strategy	To be addressed in Final IWCM Strategy
15B. Includes an implementation plan for the recommended IWCM Scenario.	Section A8
15C. Includes a 30-year TAMP and Financial Plan for the adopted IWCM Scenario.	Part D
Council Adoption	
16. It should be noted that the Councillors as the elected representatives of the local water utility will need to review the IWCM scenarios and community feedback, and select an adopted IWCM Scenario for implementation.	To be adopted.
Financial Planning	
17A. A sound Financial Plan and Report for your adopted IWCM Scenario.	Part D
17B. A 30-year Total Asset Management Plan (TAMP) for the Adopted IWCM Scenario is appended to the Financial Plan.	Appendix D1
17C. Provide water supply and sewerage inputs to your Council's Integrated Planning and Reporting (IPR).	Part C - Section C9

Eurobodalla Shire Council

IWCM Strategy and Strategic Business Plan

PART C – STRATEGIC BUSINESS PLAN

C1. SBP EXECUTIVE SUMMARY

This strategic business plan addresses the management and operation of the Eurobodalla Shire Council (ESC) water supply and sewerage businesses.

The majority of towns and villages in Eurobodalla Shire are supplied with water through the regional water supply scheme (Figure 36) which consists of two sub-systems (northern system and southern system). There are five sewerage schemes serving the majority of towns and villages (Figure 37).

C1.1 Mission Statement

Council's water supply mission is to:

> *Provide a reliable, high quality, cost-effective water supply service to meet the current and future needs of the community.*

Council's sewerage mission is to:

> *Provide a quality sewerage collection, treatment and disposal service that meets community needs.*

C1.2 Operating Environment

As a local government owned business, a water utility is subject to a number of legislative obligations. The operation of the water supply and sewerage schemes is driven by the following key requirements:

- Council's Integrated Planning and Reporting documents;
- The NSW Government Best-Practice Requirements for Water Supply and Sewerage;
- Water Access Licences under the *Water Act, 1912*;
- Environment Protection Licences under the *Protection of the Environment Operations Act, 1997*; and
- The adopted Levels of Service (LOS) documented in this SBP.

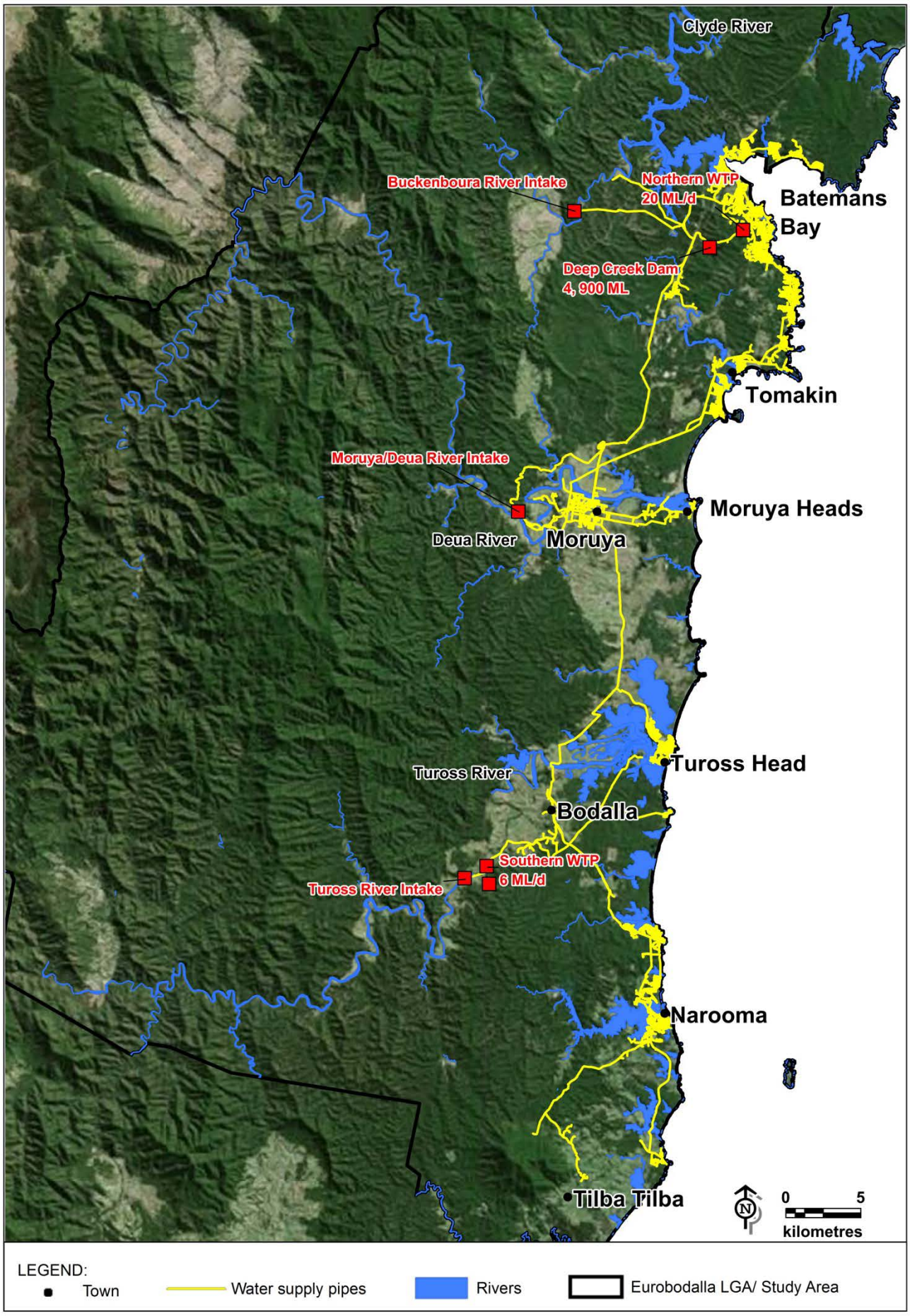

Figure 36: Eurobodalla Regional Water Supply

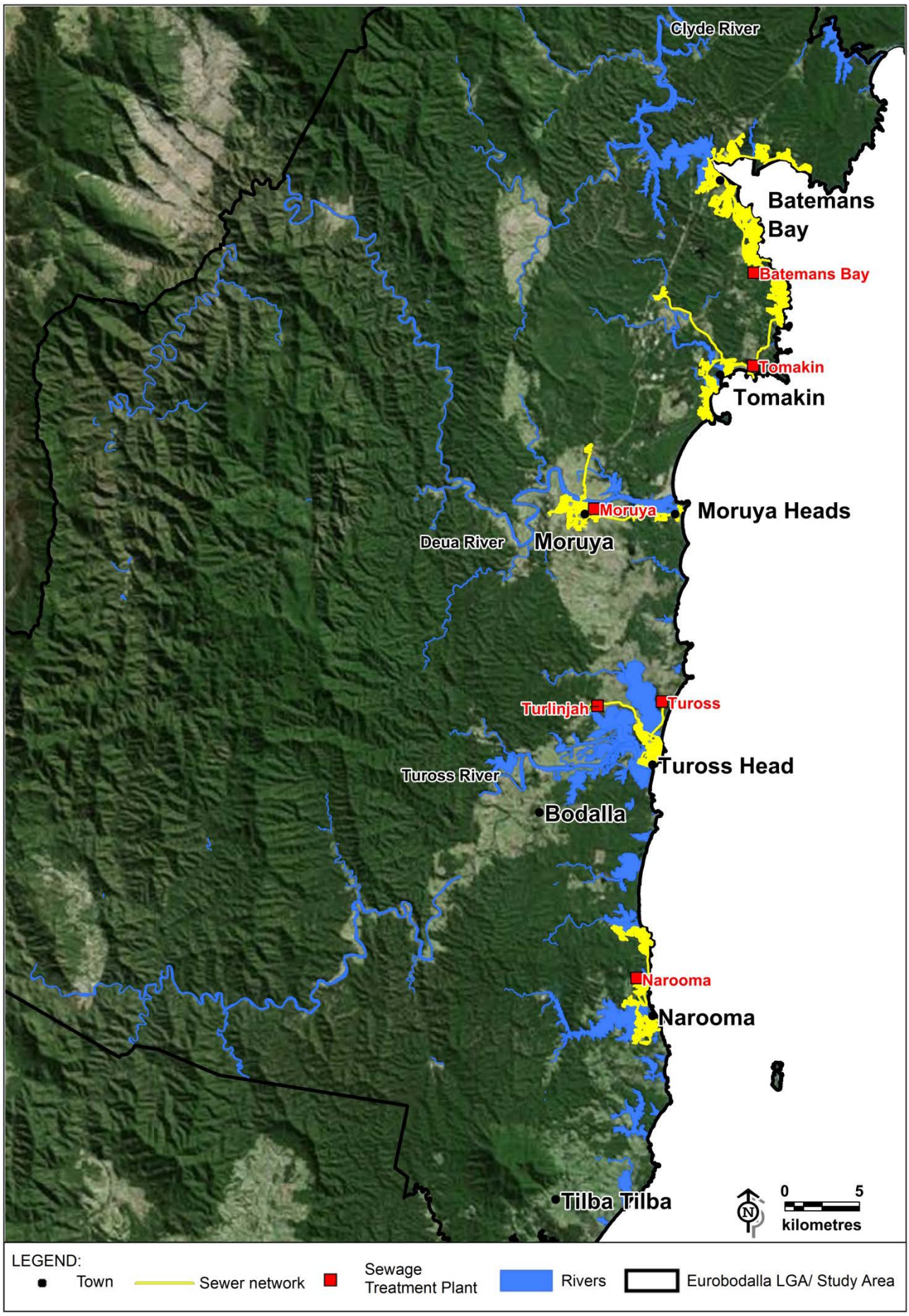

Figure 37: Eurobodalla Sewerage Schemes

C1.3 Levels of Service

The Levels of Service (Table 35) are the primary driving force for the water supply and sewerage businesses. They explicitly define the standards required from the water and sewerage systems and will largely shape Council's detailed operations, maintenance and capital works planning. Council's primary objective with water supply and sewerage services is to meet the adopted levels of service.

Table 35: Summary of Levels of Service

Water Supply Targets	Sewerage Targets
100% compliance with ADWG water quality requirements	Service provided to all residential and non-residential properties where practicable.
During drought, duration of restrictions does not exceed 5% of the time, frequency of restrictions does not exceed 1 time per 10 years and the severity of restrictions does not exceed 10% of the unrestricted water demand.	100% compliance with sewerage system Environment Protection Licences.
Minimum pressure 20 m head at the water main	Frequency of wet weather sewer overflows: 1 in 5 year ARI (general), 1 in 20 year ARI (CBD and oyster lease areas)
Maximum static pressure 80 m head	
100% compliance with NSW Fire Fighting requirements	
Eight hours maximum duration of planned supply interruptions	

C1.4 Service Delivery

The majority of operational and maintenance tasks for the sewerage and water supply schemes are undertaken by Council's in-house staff. Most major capital works are contracted out, including design, construction and commissioning.

C1.5 Customer Service

The customer service plan in this SBP covers the adopted levels of service, determines the areas to be serviced and analyses demand management and sewer load management. It also establishes the pricing structure, determines customer satisfaction targets and establishes methods for customer and community involvement in decision making.

C1.6 Total Asset Management

Asset Management Plans for water and sewerage services have been developed by Council to define levels of service, how the services will be provided and how much it will cost. The Plans also detail information about infrastructure assets (condition, age, life cycle, etc.) and actions required to provide the agreed level of service in the most cost effective manner. ESC's asset register lists all water supply and sewerage assets with basic physical data (location, material, size, age and remaining useful life) and financial statistics (depreciation and current replacement cost) for each asset.

The principal issues addressed in the SBP have been identified as part of the IWCM Strategy development. The capital works program documents the anticipated future capital works requirements and expenditures to meet the Levels of Service and provide a basis for financial planning and capital budgeting. The estimated capital investment over the next 30 years for water supply is $198 million. About 38% of this amount is for improving levels of service, particularly drought security and potential village water supply schemes. Approximately 43% of the expenditure is for renewal of existing assets with the remaining 19% to service growth. The estimated capital investment over the next 30 years for sewerage services is $309 million. About

50% of this amount is for renewal of existing assets, 40% for improving levels of service, particularly potential village sewerage schemes and the remaining 10% is to service growth.

C1.7 Work Force

The Work Force Plan identifies strategies to ensure staff levels and skills are adequate for the operation and management of the water supply and sewerage businesses. Additional engineering staff positions will be required to undertake strategic planning projects and deliver major projects.

C1.8 Summary of Action Plan

This SBP has identified actions to address the issues identified in relation to management of the water supply and sewerage businesses. A summary of the objectives, performance targets and strategies is given in the following table.

Table 36: SBP Objectives, Performance Targets and Strategies

Key Result Area		Objective	Performance Target	Strategy
1	Levels of Service	Operation of the water supply and sewerage systems meets the adopted Levels of Service which take into account financial implications, statutory/regulatory requirements, customer desires and industry standards	100% compliance with the Levels of Service	Monitor and report on levels of service being achieved. Address non-compliances. Review of adopted levels of service.
2	Areas Serviced	Provide sewerage services to all areas where there are identified significant environmental and health risks, community desires and economic feasibility	Adequate water and sewer services are available to all areas by 2036.	Consult with affected communities regarding options and design. Provide water supply and sewerage services to all backlog villages on a priority basis when funding is available.
3	Environmental Management	Water and sewerage activities are environmentally sustainable	100% compliance with Environment Protection Licences and statutory obligations	Assess and manage environmental risks
4	Service Pricing	Pricing system is equitable and reflects the actual cost of service provision	Best-practice pricing structure is achieved	Review and update tariffs and charges
5	Demand Management	Efficient water use in all customer sectors	Average annual residential demand is less than 130 kL/residential property.	Implement best-practice demand management strategies. Review pricing annually.
6	Inflow and Infiltration	Reduce sewer infiltration and inflow	Targeted mains and manhole relining programs are implemented. Identified sewer defects are repaired	Complete sewer system repairs as part of renewal program

Key Result Area		Objective	Performance Target	Strategy
7	Drought Management	Responsive, efficient and acceptable drought management strategies are implemented	A feasible emergency and drought management strategy is developed. Water supplies are “secure”.	Increase drought storage. Prepare and implement sound drought management procedures
8	Customer and Community Involvement	Gain community ownership of major asset management decisions and ensure affordability and marketability of the project outcomes	All major projects (greater than $2 million construction cost) and decisions are subject to a community information process	Provide accurate information to the community to create awareness of the issues, receive community input into decision-making processes including willingness-to-pay for asset development and create a sense of community ownership
9	Customer Satisfaction	Achieve customer satisfaction in water supply and sewerage services	The majority of customers are satisfied with Council water supply and sewerage services	Communicate with customers and measure customer satisfaction.
11	Operations	Operate the water supply and sewerage assets in a safe and cost-effective manner which meets the required levels of service	Operations issues do not cause a failure to meet the Levels of Service	Operate the schemes in accordance with documented system procedures, rules and due diligence programs
12	Capital Works	Adequate water supply and sewerage infrastructure is provided for present and future customers.	Infrastructure capacity and condition issues do not cause a failure to meet the Levels of Service	Review and implement the capital works programs
13	Human Resources	Appropriate and qualified staff deliver the water supply and sewerage services in a safe manner	Sufficient and adequately trained staff can provide the levels of service. Zero lost time injuries.	Ensure all staff training is up to date. Review staff requirements (numbers and competency) and maintain appropriate staff numbers.

C1.9 Financial Planning

Thirty year financial plans have been developed for the water supply and sewerage businesses. The financial plans indicate the typical residential bills for sewerage will need to increase in the medium term to fund the identified expenditure requirements. Additional subsidies have been assumed to fund major capital works including the southern dam and village sewerage schemes as these works are considered to be unaffordable without subsidy. The medium-term price paths (2017$) are provided in the following figures.

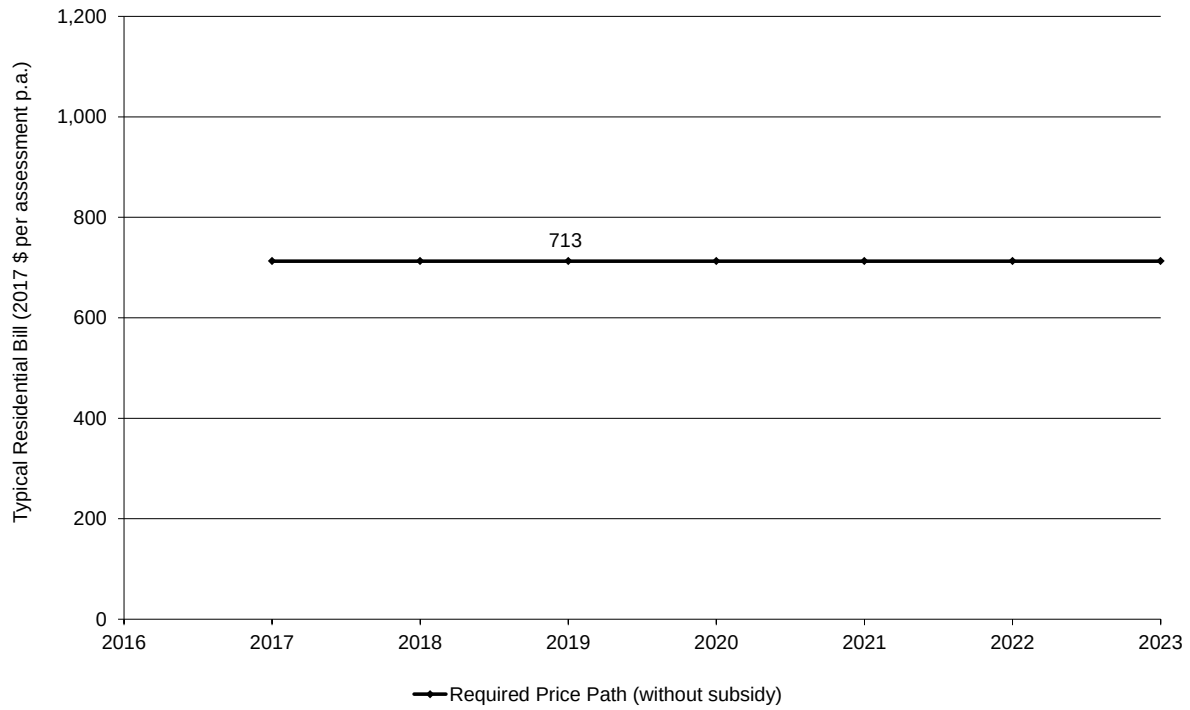

Figure 38: Water Supply Price Path

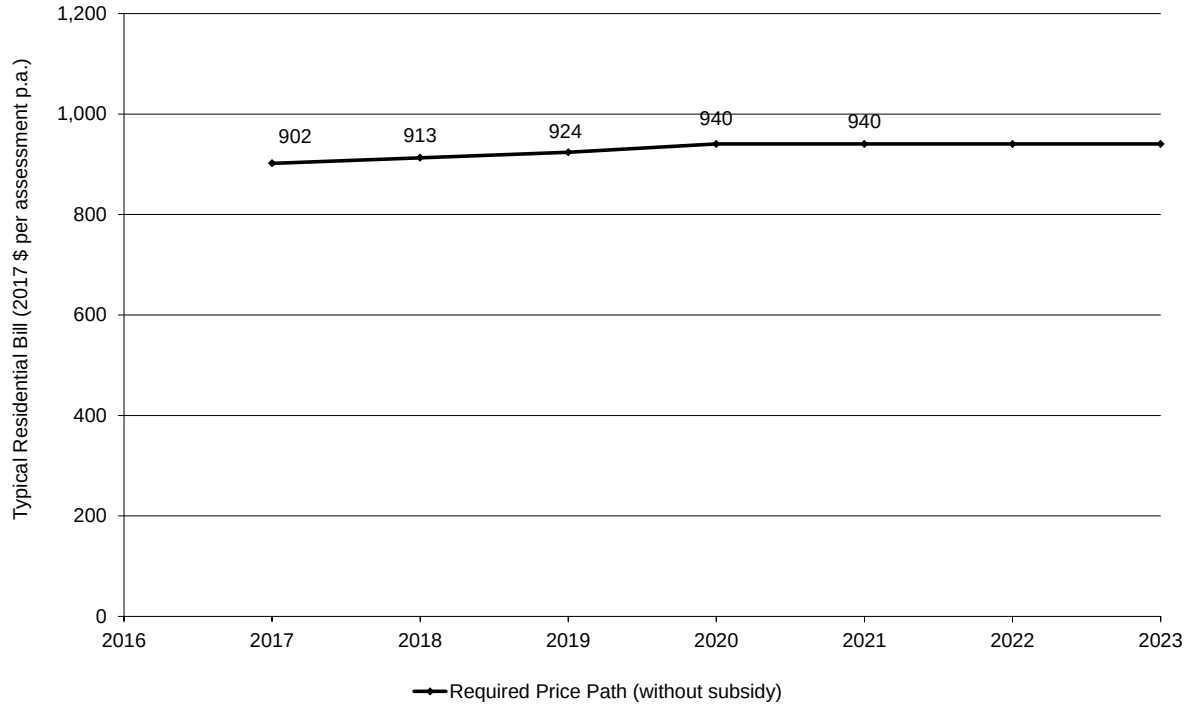

Figure 39: Sewerage Price Path

Council may elect to pay dividends from the water supply and/or sewer businesses to the General Fund. Should ESC wish to make such payments, the price path will need to be increased to create a surplus that will enable dividend payment.

The Development Servicing Plans are currently being reviewed and any change in projected developer income that will impact on the required income from annual bills should be considered in setting the future price path.

The TRBs should be checked and adjusted annually in accordance with changes to the CPI.

C2. OPERATING ENVIRONMENT REVIEW

C2.1 Mission Statement

Council's water supply mission is to:

> *Provide a reliable, high quality, cost-effective water supply service to meet the current and future needs of the community.*

Council's sewerage mission is to:

> *Provide a quality sewerage collection, treatment and disposal service that meets community needs.*

Council's mission statement is a key driver of water supply and sewerage strategic planning. The key implications for the provision of water supply and sewerage services are:

- Council will provide water that meets the water quality standards and sewerage services that meet environmental licence requirements in order to protect the public health and the environment;
- Council will operate, maintain and administrate the water supply and sewerage systems efficiently and meet the proposed levels of service in order to provide value-for-money to all customers in the Shire;
- Council will incorporate ecologically sustainable development principles into all planning and operations in order to become an environmentally responsible local water utility; and
- Council will engage customers in the decision-making process to provide satisfaction with the service provided.

C2.2 Institutional Arrangements

C2.2.1 Legislative Framework and Statutory/Regulatory Obligations

As a local government owned business, a water utility is subject to a number of legislative obligations and requirements. These are summarised in Section 10.1 of the IWCM Issues Paper. In general, more regulation, stringent enforcement and fewer subsidies from government is imposing heavy burden on Council's management responsibilities and hence on its finances. In addition, recent government policies have transferred more regulatory responsibilities to Local Government that further burdens Council's limited resources.

The regulatory and contractual compliance requirements are discussed in Section 10.1 of the IWCM Issues Paper and listed below:

- Key legislation:
    - *Local Government Act, 1993, and Local Government (General) Regulation 2005;*
    - *Environmental Planning and Assessment (EP&A) Act, 1979;*
    - *Water Management Act, 2000;*
    - *Water Act, 1912;*
    - *Protection of the Environment Operations (POEO) Act, 1997;*
    - *Public Health Act, 2010;*
    - *Fisheries Management Act, 1994;*

- *Work Health and Safety Act 2011 and Regulation 2011;*
- *Competition Policy including Competition Policy Reform Act, 1995;*
- *Water Industry Competition Act, 2006;*
- *Dam Safety Act, 2015;*
- *Fluoridation of Public Water Supplies Act, 1957;*
- *Independent Pricing and Regulatory Tribunal Act 1992;*

- Environmental Planning Instruments:
  - *SEPP Building Sustainability Index (BASIX), 2004;*
  - *State and Regional Development SEPP, 2011;*
  - *SEPP Infrastructure, 2007;*
  - *Eurobodalla LEP 2012;*
  - Development Control Plans (DCPs);
- Guidelines:
  - *Best Practice Management of Water Supply and Sewerage Guidelines;*
  - *Australian Drinking Water Guidelines (ADWG, 2011);*
  - *Australian Guidelines for Water Recycling (AGWR): Managing Health and Environmental Risks (2006);*
  - *NSW Interim Guidelines for Management of Private Recycle Schemes (2008);*
  - *NSW Guidelines for Greywater Reuse in Sewered, Single Household Residential Premises (2008);*
  - *Environmental Guidelines: Use and Disposal of Biosolids Products (2000);*
  - *Environment and Health Protection Guidelines: On-site Sewage Management for Single Households (known as the 'Silver Book'), 1998;*
  - *Managing Urban Stormwater: Soils and Construction Guidelines;*
- Water Act Extraction Licences; and
- Environment Protection Licences for sewerage schemes;

C2.2.2 Organisation Structure

Council delivers services to the community through five departments and the General Manager's Office. Water and sewer services are provided through the Infrastructure Services department. The Water and Sewer Services organisation structure is shown in Figure 40. Workforce requirements are discussed in Section C8 - Work Force Plan.

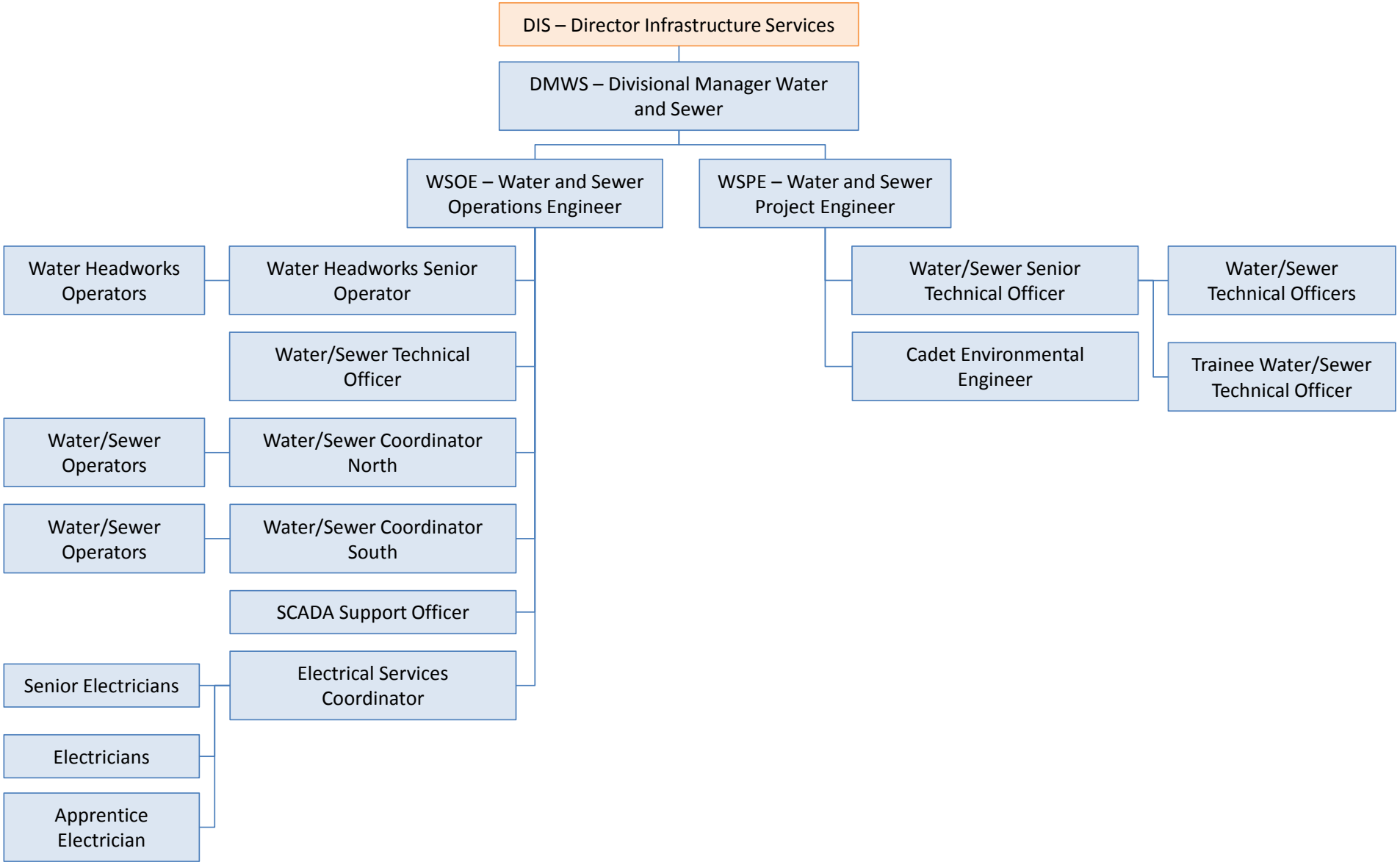

Figure 40: ESC Water and Sewer Services Organisation Chart

C2.3 Principal Issues

The principal issues affecting the water supply and sewerage businesses were documented in the IWCM Issues Paper (Hydrosphere Consulting, 2016) and addressed in the IWCM Strategy (refer Part A of this Document).

C2.4 Situation Analysis

Compliance will be reported through:

- Five yearly reviews of the IWCM Strategy and SBP;
- EPL Annual returns; and
- Annual Performance Indicator reporting.

The Operating Environment Situation Analysis is documented in Section 10.2 of the IWCM Issues Paper.

ESC complies with all legislative and contractual requirements discussed in Section C2.2.1.

The DWMS guidelines (NSW Health and DPI-Office of Water, 2013) require a review of the effectiveness of the management system and its implementation, at least annually, to ensure that it maintains currency with the drinking water supply. ESC will undertake this review in 2016.

Recycled Water Management Systems will be prepared in accordance with the Australian Guidelines for Water Recycling and the DPI-Water *NSW Guidelines for Recycled Water Management Systems* (NSW Office of Water, 2015c).

ESC generally complies with EPA sewerage system licences apart from exceedances relating to high rainfall, hydraulic load and inflow/infiltration into the sewer systems.

Council currently complies with the Best-Practice Management Guidelines and compliance is audited annually.

Council holds all required insurances related to the water supply and sewerage businesses including buildings and contents, public liability, professional indemnity, Councillors and officers liability, motor vehicles, environmental impairment liability and personal accident insurance.

C3. PERFORMANCE MONITORING

The performance reports for ESC water supply and sewerage (2013/14) are included in Appendix 1 of the IWCM Issues Paper. The required improvement actions are discussed in Section 10.2.5 of the IWCM Issues Paper and are summarised below:

- A Human Resources Plan will be developed following reviews of the IWCM Strategy and Strategic Business Plan to ensure that Council has the appropriate staff numbers with the necessary skills to meet current and future requirements;
- Typical residential bills will be reviewed as part of the Financial Planning for the IWCM Strategy;
- Sewerage schemes will be constructed at Rosedale, Guerilla Bay and Bodalla;
- Operator reporting will be upgraded to include collection of data on duration of sewerage interruptions;
- Effluent recycling opportunities will be assessed using a triple bottom line approach during the IWCM Strategy review;
- A long-term biosolids management strategy will be developed;
- ESC will continue to participate in water supply and sewerage benchmarking;
- Power costs will be monitored through planet Footprint and anomalies in pumping costs will be investigated;
- ESC will establish an infrastructure renewals reserve; and
- ESC will monitor water main breaks, including past performance and trends.

C4. LEVELS OF SERVICE

The Levels of Service (LOS) are the primary driving force for the water supply and sewerage businesses. They explicitly define the standards required from the water and sewerage systems and will largely shape Council's detailed operations, maintenance and capital works planning. The LOS are designed to reflect an optimisation of the desired service provision, what is affordable as well as the system capability. These considerations take into account legislative requirements, industry standards and customer demands. The desired LOS must be balanced against the cost of providing the service. Achieving the LOS is the primary objective. Minimum standards (regulatory requirements) apply for water quality, effluent discharge and biosolids management.

The levels of service documented in the 2011 SBP have been reviewed as part of the review of the IWCM Strategy (refer Section 10.3 of the IWCM Issues Paper). The proposed levels of service for water supply and sewerage are listed in Table 8 and Table 9.

Council may need to revise the LOS in the future in accordance with customer demand and industry trends.

SBP Objective 1 – Levels of Service

Objective				
Operation of the water supply and sewerage systems meets the adopted Levels of Service which take into account financial implications, statutory/regulatory requirements, customer desires and industry standards.				
Performance Target				
100% compliance with the Levels of Service.				
Strategy				
Monitor and report on levels of service being achieved. Address non-compliances. Review of adopted levels of service.				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
1.1	Review the Levels of Service.	DMWS[1]	Annually.	Included in recurrent budget
1.2	Compile performance indicator (TBL) data.	WSPE	By September each year	Included in recurrent budget
1.3	Develop actions plans in response to TBL Performance Reports in accordance with best-practice requirements and report to Council.	WSPE	Within 3 months of receipt of TBL Performance Reports	Included in recurrent budget

1. DMWS: Division Manager Water and Sewer
2. WSPE: Water and Sewer Project Engineer

C5. SERVICE DELIVERY

The service delivery strategy is the means ESC uses to provide or deliver service to its customers. It applies to all three main areas of asset management: operations, maintenance and capital works. It also has significant implications for customer service, human resources and the financial plan. This section outlines options for the delivery of water supply and sewerage services.

The delivery of ESC water supply and sewerage services is the responsibility of the Division Manager Water and Sewer (DMWS). Further discussion is provided in Section C8: Work Force Plan.

C5.1 In-House Resources and External Contracts

The majority of operational and maintenance tasks for the sewerage and water supply schemes are undertaken by Council's in-house staff. The number of services contracted out by Council has been gradually increasing, particularly in areas where specialist services are required. Current operations contracted out include sewer main CCTV, large and critical sewer main flushing, smoke testing, leak detection, reservoir cleaning and condition assessment. Council intends to contract out work where it is the most effective service delivery option.

Most major capital works are contracted out, including design, construction and commissioning. Council uses its own labour force for minor capital works items such as minor pipe extensions and asset renewals. Most strategic planning, asset management and specialist design services are undertaken by external consultants.

C5.2 Resource Sharing

Akolele is currently served by Bega Valley water supply and future sewerage services for Akolele are also likely to be provided by Bega Valley Shire Council. Other resource sharing with neighbouring Councils is currently limited to informal assistance. Council's external contracts e.g. for maintenance activities are considered to be at an optimum size for efficiencies and to promote local services.

C5.3 Private Sector Participation

Due to the small scale of the planned new assets for ESC, the attraction and participation of private investors appears to be unlikely. Therefore Council does not perceive the opportunity for any private sector involvement in the near future.

C6. CUSTOMER SERVICE PLAN

C6.1 Unserviced Areas

Sewerage services will be provided in Rosedale, Guerilla Bay and Bodalla within the next few years. Based on the risk assessment undertaken for the IWCM Strategy (refer Part B, Section B1.8), Council plans to investigate the provision of sewerage services to South Durras, Nelligen, Potato Point, Congo, Mystery Bay, Central Tilba, Tilba Tilba and Akolele within the next 20 years and the provision of water supply to Nelligen and South Durras.

SBP Objective 2 – Areas Serviced

Objective				
Provide sewerage and water supply services to all areas where there are identified significant environmental and health risks, community desires and economic feasibility				
Performance Target				
Adequate water and sewer services are available to all areas by 2036.				
Strategy				
Consult with affected communities regarding options and design. Provide water supply and sewerage services to all backlog villages on a priority basis when funding is available.				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
2.1	Rosedale and Guerrilla Bay sewerage	DMWS[1]	2017	$6.2 million
2.2	Bodalla sewerage	DMWS	2018	$8.5 million
2.3	Potato Point sewerage	DMWS	2021	$10.3 million
2.4	Nelligen water supply and sewerage	DMWS	2026	$16.3 million
2.5	South Durras water supply and sewerage.	DMWS	2028	$25.3 million
2.6	Central Tilba, Tilba Tilba and Mystery Bay sewerage	DMWS	2032	$22 million
2.7	Akolele sewerage	DMWS	2034	$2.1 million
2.8	Congo sewerage	DMWS	2036	$6.2 million

1. DMWS: Division Manager Water and Sewer
2. Costs are included in the IWCM Strategy Capital Works Program

C6.2 Environmental Management

Council holds Environment Protection Licences for the five STPs. The licences specify load, concentration and volume limits for the discharge monitoring points as well as monitoring conditions. Under the licences, Council is required to produce annual return documents, notify of any harm to the environment as a result of the sewerage system operation, provide written reports as requested by the authority, notify of bypass or overflow incidents and supply annual performance reports. The licences include pollution reduction programs (PRPs) and Special Conditions if improvements to operation of the sewerage systems are required. Compliance with the sewerage system licences is discussed in Section 10.2.3 of the IWCM Issues Paper.

In response to the Pollution Reduction Program (PRP100) included on the sewerage system Environment Protection Licences, Sewer Overflow Investigation Reports were prepared for the ESC sewerage systems.

The reports assess the location and cause of overflows and the evaluation of environmental and public health impacts. Management priorities and action plans are also presented.

The NSW Environmental Protection Authority (EPA) issued a notice under the *Protection of the Environment Administration Act 1991* to all NSW councils early in 2012, requiring each council to develop a Pollution Incident Response Management Plan (PIRMP) for each licence held. ESC has prepared PIRMPs for the licensed treatment works in accordance with the *Environmental Guidelines: Preparation of Pollution Incident Response Management Plans*. The purpose of the PIRMP is to provide a vehicle for identifying potential pollution incidents, understanding and evaluating the likelihood of occurrence, identification of mitigation techniques and a clear "who to advise" protocol.

Energy audits of water and sewer facilities were completed in 2010. This identified a range of opportunities that will reduce energy used and also reviewed possibilities for renewable energy generation. Water and sewer operations account for about 2/3 of the Council's electricity usage. The ESC *Greenhouse Action Plan 2012-2017* has a target to reduce the energy intensity of the water supply and sewer services. Moruya, Tomakin, Batemans Bay, Bingie and Kianga STPs, Deep Creek Dam water pumping station and both WTPs now include solar power systems (ESC, 2012a). Council has also implemented energy controls at water and sewer sites, operating strictly in off-peak times where possible.

Pre-construction planning is undertaken for all asset development including environmental assessment where required to identify and address any environmental issues associated with the projects.

SBP Objective 3 – Environmental Management

Objective				
Water and sewerage activities are environmentally sustainable				
Performance Target				
100% compliance with Environment Protection Licences and statutory obligations				
Strategy				
Assess and manage environmental risks				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
3.1	Report on compliance with Environment Protection Licences	WSOE[1]	Annual	Included in budget
3.2	Publish pollution monitoring data on Council's website	WSOE	Monthly	Included in budget

1. WSOE: Water and Sewer Operations Engineer

C6.3 Pricing and Developer Charges

Council's tariff structure addresses the following general principles:

- Resource allocation: pricing which properly reflects the costs of providing the service and promotes efficient investment in water supply and sewerage infrastructure;
- Equity: the user pays principle (it is considered equitable that people pay for the cost of the services they use);
- Financial: provision of adequate and predictable funding to meet operating costs and future capital works;
- Customers: provision of service of desired quality and reliability at a fair and reasonable price;

- Community service obligations: provision of services to pensioners, disadvantaged groups, and general community amenities consistent with Council policy; and
- Simplicity: a pricing structure that is easy to administer and is understood by customers.

All water supply and sewerage pricing complies with best-practice requirements (refer Part B – Section B1.1.1).

The *Eurobodalla Shire Council Liquid Trade Waste Regulation Policy* (ESC, 2013) sets out the process for local approvals and pricing of discharge of liquid trade waste to Council's sewerage systems (refer Part B – Section Pricing).

Revised Developer Servicing Plans will be adopted during 2016/17. Assumptions regarding future developer income are discussed in PART D – FINANCIAL PLAN.

SBP Objective 4 – Service Pricing

Objective				
Pricing system is equitable and reflects the actual cost of service provision				
Performance Target				
Best-practice pricing structure is achieved				
Strategy				
Review and update tariffs and charges annually				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
4.1	Obtain feedback on pricing structure through public exhibition of Revenue Policy	DMWS[1]	Annually	Included in recurrent budget
4.2	Annual review of tariff structure and best-practice compliance.	DMWS	Annually	Included in recurrent budget
4.3	Review and update Development Servicing Plans	DMWS	Every 5-6 years	Included in strategic planning budget

1. DMWS: Division Manager Water and Sewer

C6.4 Water Cycle Analysis and Projection

C6.4.1 Demand Management Measures

The current level of residential demand is considered to be at a sustainable level based on benchmarking against other LWUs. The existing demand management measures (refer Part B, Section B1.1) are considered to be appropriate.

SBP Objective 5 – Demand Management

Objective				
Efficient water use in all customer sectors.				
Performance Target				
Average annual residential demand is less than 140 kL/residential property.				
Strategy				
Implement best-practice demand management strategies. Review pricing annually.				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
5.1	Annual review of water supplied, customer demand and losses for each scheme to identify any trends and inform future demand management planning.	WSPE[1]	September each year	Included in recurrent budget
5.2	Annual review of demand as part of TBL Action Plan	WSPE	Annual	Included in recurrent budget
5.3	Daily monitoring and reporting of demand during drought or periods of high demand.	WSPE	As required	Included in recurrent budget
5.4	Five year review of demographic and demand forecasts	WSPE	Every 5 years	Included in strategic planning budget

1. WSPE: Water and Sewer Project Engineer

The 2013/14 NSW Benchmarking Report provides performance indicator data (Table 37). Council also participated in the 2010 Water Loss Management Program (identification and rectification of leaks) with predicted savings of 18.9 ML/a. Best-practice leakage management initiatives have been implemented and the data suggests leakage is at a sustainable level.

In recent years, Council has implemented a meter replacement program which has reduced the level of non-revenue water (refer IWCM Issues Paper, Section 13.1.1).

Table 37: Water Supply Performance Indicators

Indicator	**Unit**	**ESC Result (2013/14)**	**Median (LWUs >10,000 Properties)**	**Medians (all LWUs)**
Real Losses (Leakage)	L/d per connection	50	70	80
	kL/km/d	1.1	2.1	2.1
	ILI	1.0	1.0	1.2
Leakage Test		Zoning and flow metering for 59% of service connections (2007) - Result 8% leakage	N/R	N/R
NRW	L/d per connection	75	98	N/R

Indicator	Unit	ESC Result (2013/14)	Median (LWUs >10,000 Properties)	Medians (all LWUs)
Main Breaks	Per 100 km Main	13	10	12
Unplanned Interruptions to Supply	Per '000 Properties	93	50	16
Rehabilitations	% total water mains	0.6	0.35	0.7
	% water meters	10.9	3.9	N/R
Renewals	$'000 per 100km Main	169	252	151
	% of CRC	0.4	0.4	0.4
Mains Maintenance Cost	$'000 per 100km Main	100	179	N/R

N/R – Not Reported
Source: NSW Office of Water (2015)

C6.4.2 Sewer Flow Management

Reducing hydraulic loading on the system can:

- Effectively prolong the life of the existing assets;
- Defer new works programs;
- Make treatment processes more effective;
- Reduce operation costs; and
- Improve environmental performance.

Issues with load management may occur due to excessive stormwater or ground water infiltration. ESC's primary strategies for reducing inflow and infiltration are:

- Inspection of sewers to identify condition (CCTV);
- Sewer re-lining; and
- Identification and removal of illegal connections (smoke testing).

ESC undertakes CCTV inspections to identify priority sewer mains requiring relining and inspects sewer manholes to identify manholes requiring relining and resealing. The budgeted renewal program will fund these works on a priority basis with Narooma, Tuross and Batemans Bay sewerage systems to be targeted initially.

SBP Objective 6 – Inflow and Infiltration

Objective				
Reduce sewer infiltration and inflow.				
Performance Target				
Targeted mains and manhole relining programs are implemented. Identified sewer defects are repaired.				
Strategy				
Complete sewer system repairs as part of renewal program.				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
6.1	Continue CCTV inspections (5% of sewers aged < 40 years, 10% of sewers aged 40-80 years, 20% of sewers aged >80 years p.a.) and implement mains renewal program	WSPE[1]	Ongoing	Included in recurrent and capital budgets
6.2	Smoke testing in high flow catchments to identify illegal sewer connections	WSPE	Ongoing	Included in recurrent budget

1. WSOE: Water and Sewer Project Engineer

C6.4.3 Demographic and Water Cycle Projection

Council commissioned a study to forecast the future population and dwellings and future demand for water and sewerage services - *Population, Water Demand and Sewer Load Projections* (NSW Public Works, 2014a) as discussed in Section A3.

ESC plans to review and update the demographic projection and underlying assumptions on a 5 year cycle following the release of Census data.

C6.5 Integrated Water Cycle Management

The IWCM Strategy is given in PART A: IWCM STRATEGY. The review of the key IWCM assumptions is summarised below.

Assumption 1 – potential unplanned increase in water demand due to a water intensive industry, large new development, etc.

No new large water users have been identified. The demand forecast is based on the available data on future non-residential demand.

Assumption 2 – potential unexpected changes to existing water access/use licence regime.

The proposed Water Sharing Plans for the Clyde River, Deua River and Tuross River Unregulated and Alluvial Water Sources (expected to be gazetted in 2016) will have a significant impact on the secure yield of Council's water sources due to the restrictions on extraction during low flows. These new water access requirements have been considered in the development of the IWCM Strategy.

Assumption 3 – significant potential changes to raw water quality and/or non-compliance with ADWG 2011.

There is not expected to be any change in water supply catchment land use that would affect raw water quality. More intense storms in the future due to climate change may impact on raw water quality. ESC will conduct a review and audit of the DWMS in 2016/17 to assess the effectiveness of the treatment plants and operating protocols and implement any remedial actions.

Assumption 4 – unexpected major change in distribution system characteristics.

None identified. Deterioration of the distribution system assets is being addressed through the renewal program.

Assumption 5 – unexpected extension/provision of water service to a new area/urban centre.

Servicing of new growth areas has been considered in the development of the demographic and demand forecast.

Assumption 6 – potential unexpected increase in sewage load due to industry, large development, etc.

No new industry or large development has been identified.

Assumption 7 – unexpected changes in sewage transport system characteristics.

None identified. Deterioration of the transport system assets is being addressed through the renewal program.

Assumption 8 – potential unexpected changes to existing sewerage management licence regime.

The EPA has not foreshadowed any changes to licence conditions.

Assumption 9 – unexpected extension/provision of sewerage service to new area/urban centre

Servicing of new growth areas has been considered in the development of the demographic and demand forecast.

C6.6 Drought Management

ESC monitors and records extraction from each water source, inflow to WTPs and treated water production. Raw and treated water quality are also monitored and recorded. River flow is monitored at gauging stations on the Tuross River, Moruya River and Buckenboura Rivers. Deep Creek Dam water level is monitored daily and recorded. Tuross River Aquifer level is not monitored. The need for monitoring of aquifer level will be determined as part of a review of the 2011 *Eurobodalla Water Supply Drought Management Plan*.

Analysis of water demand over time is presented in Section 13.1.1 of the IWCM Issues Paper and summarised below.

The Shire population growth is compared to the total demand in Figure 41. The Shire population increased at about 5% p.a. between 1996 and 2006 then growth slowed to about 1.2% p.a. between 2006 and 2011. Demand since 2000 has generally decreased despite population growth.

Mean annual rainfall varies across the water supply area. The long-term average annual rainfall is 956 mm in Moruya, 920 mm in Batemans Bay and 1,036 mm in Central Tilba. Annual rainfall in Batemans Bay has been compared to the annual demand in Figure 42. Due to the range of climate (rainfall and maximum temperature) across the water supply area, there is not expected to be a strong correlation between total Shire demand and climate factors. Despite this, high temperatures and low rainfall are expected to increase demand.

The history of water restrictions is shown in Figure 43. It appears that the higher levels of restrictions (>level 2) may have some impact on demand. Daily demand reduced once level 3 restrictions were imposed in summer 2009/10.

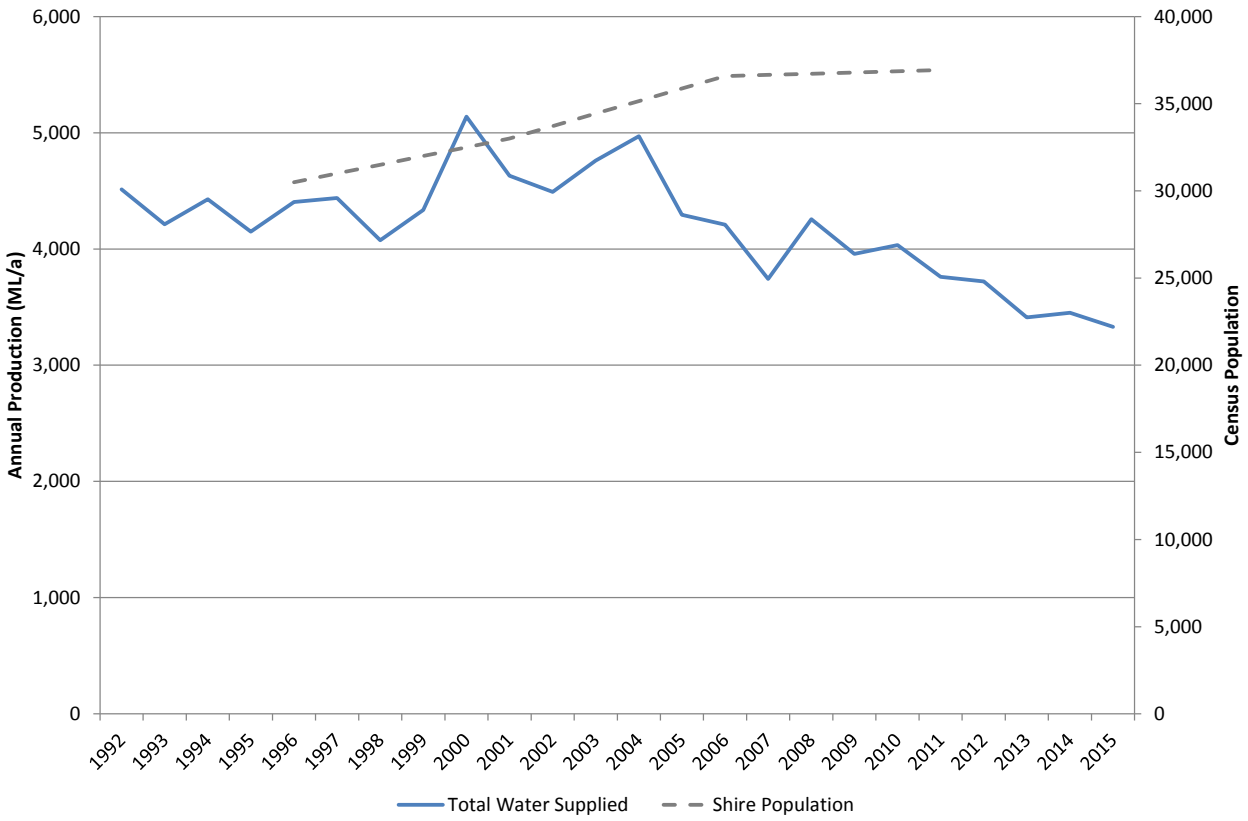

Figure 41: Total Water Supplied from all Sources and Shire Population from Census Data

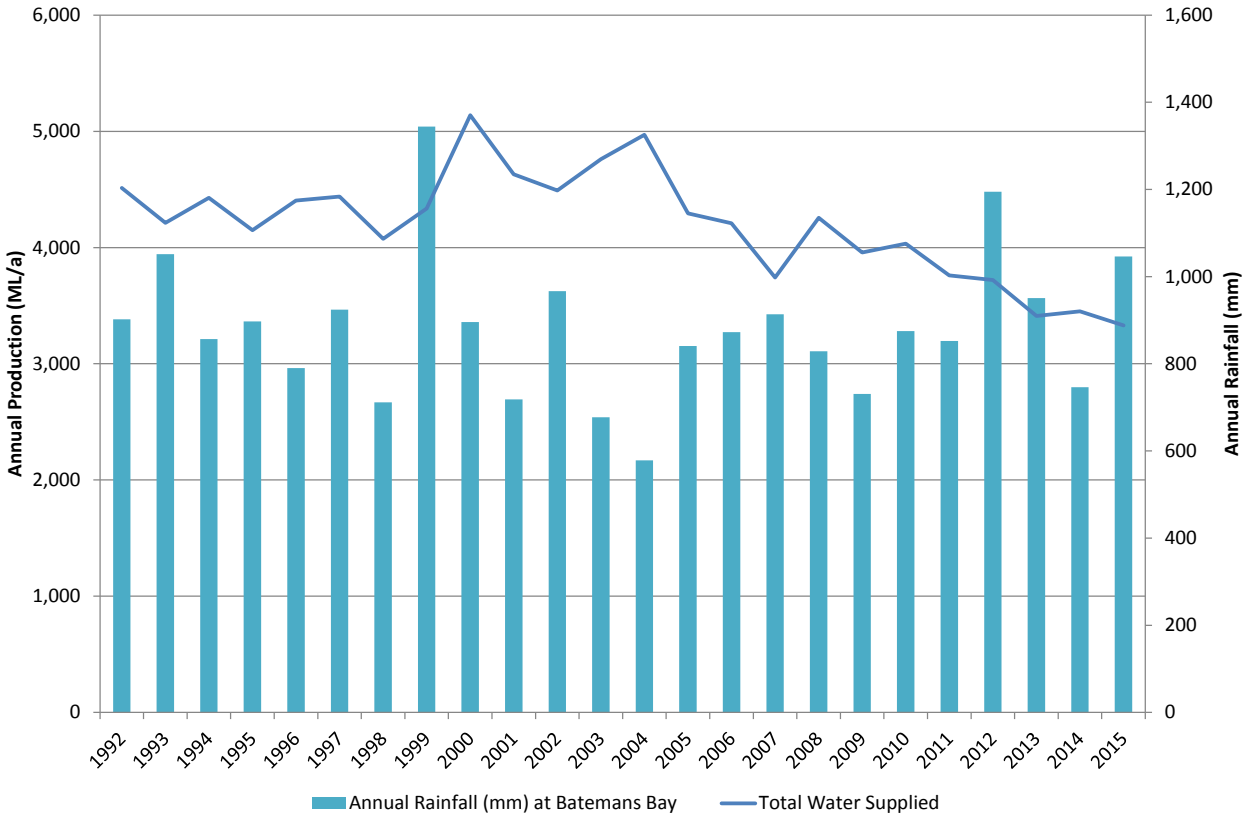

Figure 42: Total Water Supplied from all Sources and Rainfall at Batemans Bay

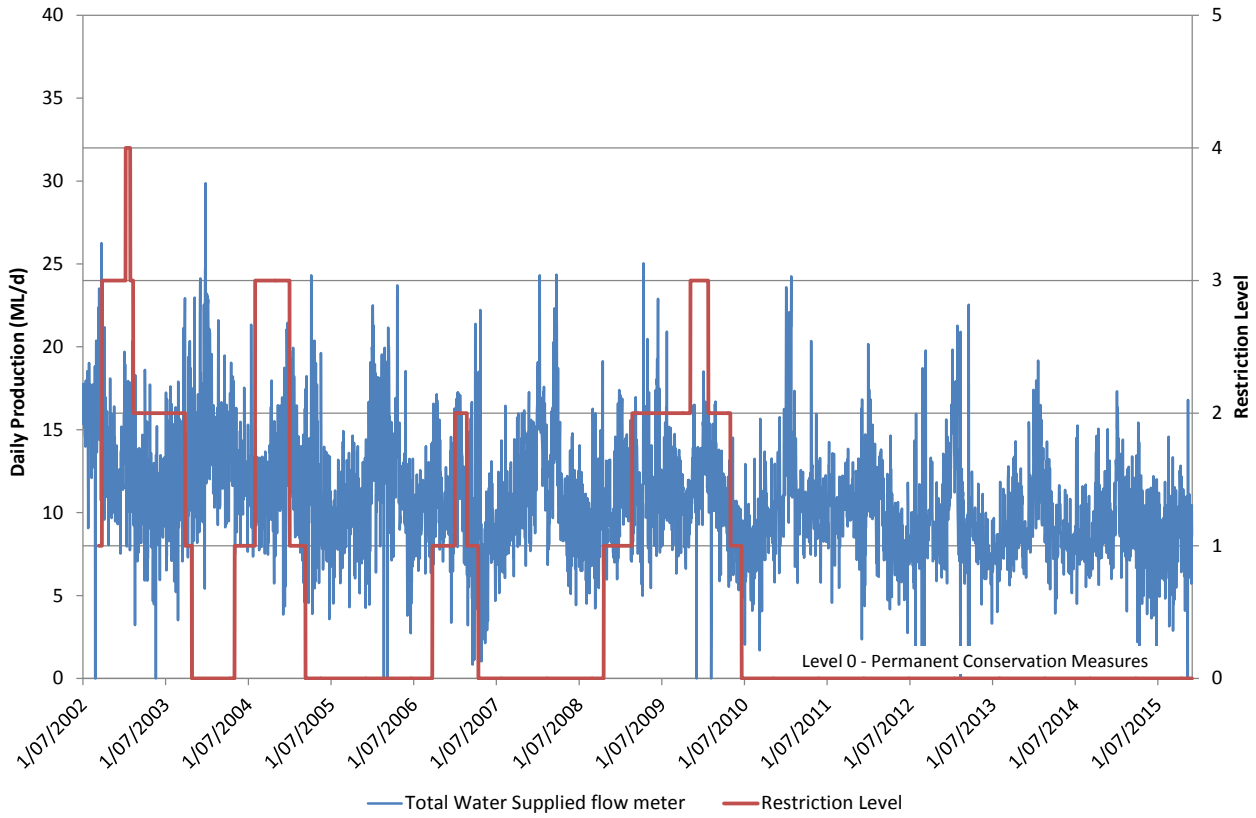

Figure 43: Total Water Supplied from all Sources and Restrictions Imposed

Figure 44 shows the recorded storage level in Deep Creek Dam, daily rainfall and monthly water supplied from Deep Creek Dam from 2010-2015. As shown in Figure 43, water restrictions were in place from October 2008 to July 2010. Figure 44 shows the period between January and July 2010 when water restrictions were gradually lifted from Level 3 to Level 0 (permanent water restrictions) as dam levels increased to over 90% full. After water restrictions were lifted in July 2010, demand decreases to 0, which is a result of water supply switching to the Moruya River source as river flows increase to levels suitable for extraction. During this time storage levels in Deep Creek Dam remain steady at approximately 90% full. After January 2012, Moruya River extractions were transferred to Deep Creek Dam and the Northern WTP was complete. Since July 2010, there have not been any drought periods requiring water restrictions and storage levels have remained above 80% full.

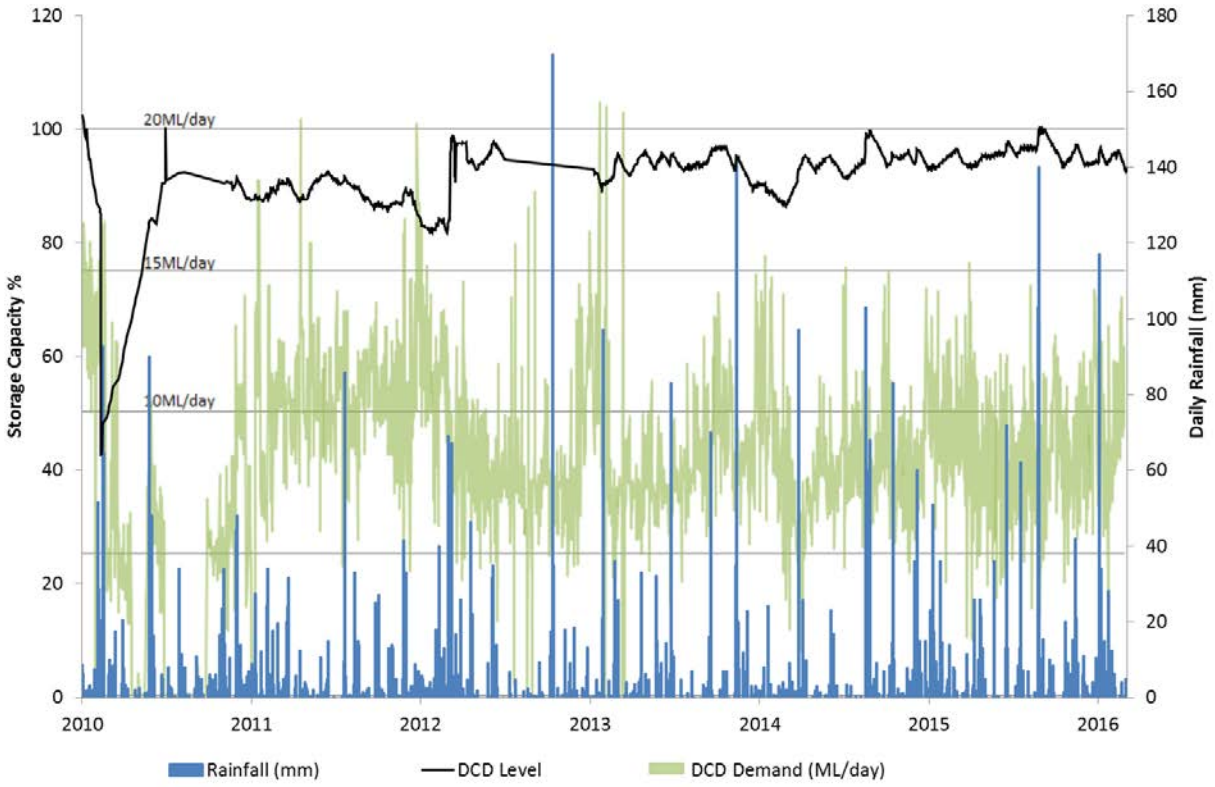

Figure 44: Deep Creek Dam water demand, storage level and rainfall from 2010-2015

There has not been any drought periods since the Drought Management Plan was completed in 2011.

The 2011 *Eurobodalla Water Supply Drought Management Plan* will be reviewed during 2016/17 as follows:

- Existing Scheme - reflect recent changes to water supply system, WTPs and pipeline transfers, unaccounted for water, current and restricted demand in accordance with the demand forecast;
- Review of triggers and monitoring requirements;
- Graph of the water demand over time with super-imposed restriction periods, storage/ground water level and relevant climatic data since 1999 and analysis to provide greater insight into the effectiveness of the restriction regime. A more comprehensive analysis of the historical data would help to highlight where restrictions are not achieving the desired aims and assist in making changes to drought management to improve effectiveness;
- Review of water supply system performance during droughts and any management/emergency response actions undertaken – including demand data and comparison with existing demands;
- Update of predicted water production requirements with reference to the demand forecast predictions and hence restriction levels, triggers, target demand etc.;
- Review of Drought Response Measures to incorporate water supply changes and impacts on drought supply, advances in technology etc.; and
- Review of Drought Management Response Strategies - restriction triggers and policy, water saving measures – particularly at higher restriction levels, potentially incorporating stricter non-residential requirements, communications plan, operational readiness plan.

This review of the plan needs to be cognisant of the potential risk of water supply failure if there is a repeat of the worst drought on record (based on the secure yield analysis and expected introduction of the new water sharing plan rules).

The storage behaviour model set up for the secure yield assessments will be used to establish/review drought trigger points and restriction levels as follows:

1. Incorporate Council's proposed restriction rules in the System Behaviour model used for the Secure Yield Study;
2. Run the model in operational mode for the nominated demand and determine performance for a repeat of historic climate flow series (i.e. testing of past droughts) providing a storage behaviour diagram and summary of frequency and duration of the different restrictions; and
3. Run the model as in 2 but using flow series from the global climate models that gave the lowest secure yield (i.e. testing of more severe droughts).

SBP Objective 7 – Drought Management

Objective				
Responsive, efficient and acceptable drought management strategies are implemented.				
Performance Target				
A feasible emergency and drought management strategy is developed. Water supplies are "secure".				
Strategy				
Increase drought storage. Prepare and implement sound drought management procedures.				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
7.1	Review the 2011 *Eurobodalla Water Supply Drought Management Plan*	WSPE[1]	2016/17	Included in strategic planning budget
7.2	Review effectiveness of drought management procedures during drought conditions	WSPE[1]	During drought	Included in recurrent budget

1. WSPE: Water and Sewer Project Engineer

C6.7 Drinking Water Management System

The ESC Drinking Water Management System (DWMS, NSW Public Works and Atom Consulting, 2014) and the supporting systems address the requirements of the *Public Health Act 2010* (NSW) and the twelve elements of the "Framework for Drinking Water Quality Management" provided in the *Australian Drinking Water Guidelines* (ADWG). The DWMS acts as a roadmap of the activities that Council undertakes to ensure the provision of safe drinking water to its customers.

An Improvement Plan has been developed as part of the DWMS to demonstrate how Council will address the risks identified through the DWMS or to improve compliance with the ADWG. The Plan prioritises resources on high risks, ensuring the safest possible drinking water.

A review of the DWMS will be undertaken in 2016.

C6.8 Community Involvement

Effective communication provides a strong foundation upon which Council can more effectively develop and maintain the community's assets. If aligned with Council's operating goals and plans, effective communication can increase the speed at which these goals are achieved. The ESC Community

Engagement Policy Plan was adopted in 2013 and assists Council in working towards these goals. Council is committed to consulting with water supply and sewerage customers regularly to keep them informed of current developments and to obtain feedback on major projects.

Council continues to liaise with regulatory agencies (NSW EPA, DPI-Water, etc.) regarding sewerage system licence compliance, best-practice water supply and sewerage management and the development of water sharing plans. Council has also consulted with the communities of Rosedale/Guerilla Bay, Bodalla and South Durras regarding the need for improved wastewater management. In 2010, ESC conducted a suite of community engagement activities to inform the development of the Eurobodalla Community Strategic Plan (*eurobodalla2030*). The outcomes of these consultation activities have been incorporated in this IWCM Issues Paper.

Customers in the unserviced villages and the wider community will be consulted in relation to the development of water and sewerage facilities, particularly with regard to technical options, affordability and willingness to pay.

Consultation regarding pricing of water and sewerage services will be undertaken through the annual public exhibition of the proposed revenue policy.

ESC aims to be responsive to complaints raised by the community. Council adopted a Complaints Policy 2013 to facilitate a consistent, fair and equitable resolution to customer complaints at the earliest opportunity and in the most efficient, prompt and professional manner.

As part of the development of the IWCM Strategy, a Project Reference Group (PRG) was formed to:

- Provide input on all existing and potential issues that affect the community relating to provision of the urban water service over the next 30 years;
- Help identify suitable options for managing these issues; and
- Help review and confirm the proposed IWCM Strategy.

The IWCM Issues and potential options to address them were presented to the PRG for review (refer Section A7.

SBP Objective 8 – Customer and Community Involvement

Objective				
Gain community ownership of major asset management decisions and ensure affordability and marketability of the project outcomes.				
Performance Target				
All major projects (greater than $2 million construction cost) and decisions are subject to a community information process.				
Strategy				
Provide accurate information to the community to create awareness of the issues, receive community input into decision-making processes including willingness-to-pay for asset development and create a sense of community ownership.				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
8.1	Provide information on the feasible options for the village water supply and sewerage schemes including financial impacts.	WSPE[1]	As available	Included in recurrent budget

1. WSPE: Water and Sewer Project Engineer

SBP Objective 9 – Customer Satisfaction

Objective				
Achieve customer satisfaction in water supply and sewerage services.				
Performance Target				
The majority of customers are satisfied with Council water supply and sewerage services.				
Strategy				
Communicate with customers and measure customer satisfaction.				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
9.1	Communicate important initiatives with customers.	DMWS[1]	As required	Included in recurrent budget
9.2	Include questions in customer surveys to determine satisfaction with water supply and sewerage services.	GM[2]	Annually	Included in recurrent budget
9.3	Advertise IWCM Strategy/SBP and invite submissions.	DMWS	July/August 2016	Included in recurrent budget

1. DMWS: Division Manager Water and Sewer
2. GM: General Manager

C6.9 Work Health and Safety

ESC has adopted a Work Health and Safety (WHS) Policy which documents Council's commitment to WHS to ensure that adequate resources are made available to comply with Council's legal obligations. This policy also sets out responsibilities and accountabilities in relation to the management of WHS. The objectives of this policy are:

a) To ensure that Council complies with the 'reasonably practicable' standard, which is intended to be very high;

b) To give the highest level of protection from hazards and risks arising from work so far as is 'reasonably practicable';

c) To provide for consultation, co-operation and co-ordination between all 'persons conducting a business or enterprise undertaking' (PCBUs) and workers and others at a workplace; and

d) A workplace at which the PCBU has management or control is without risks to the health and safety of any person, including the means of entering and exiting the workplace.

Performance indicator data from the NSW Performance Reporting is shown in the following figures. Between 2007 and 2013 there were two staff members with long-term absences which affect these data.

Council has implemented a strong preventive approach to WHS issues which is designed to reduce workplace injuries. This approach was augmented by a training program designed to affect behavioural awareness and change (SafeStart) which was attended by all operational employees, who due to the physical nature of their work, are most at risk of injury (ESC, 2014). The ESC Workforce Management Plan includes an action to implement a new WHS Strategy.

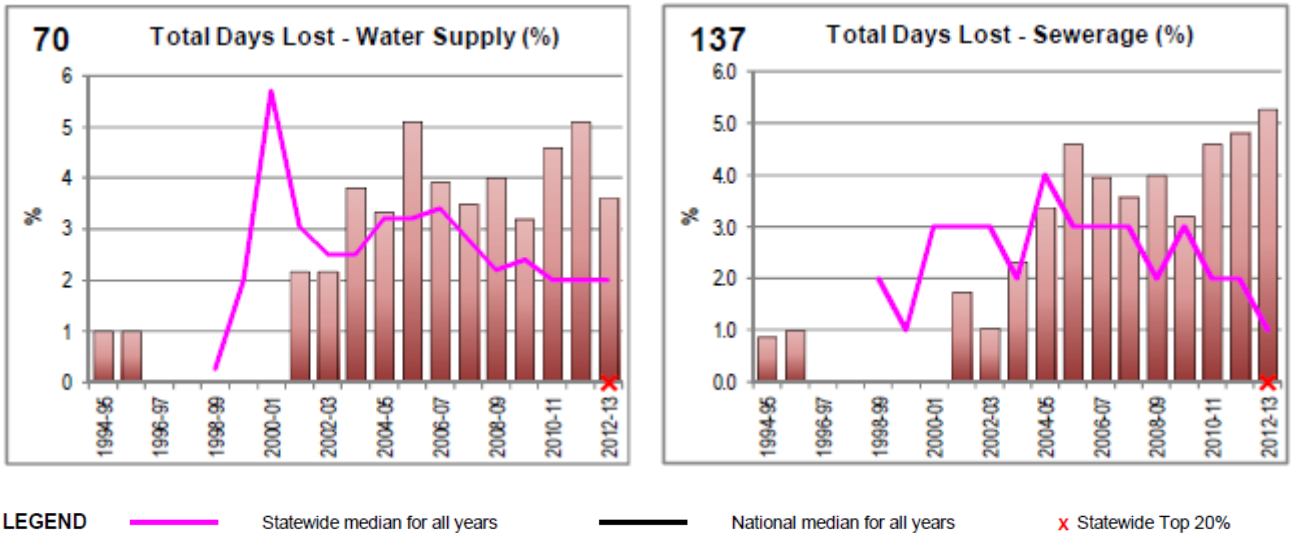

Figure 45: Total Days Lost – Water Supply and Sewerage

Source: NSW Office of Water (2015a)

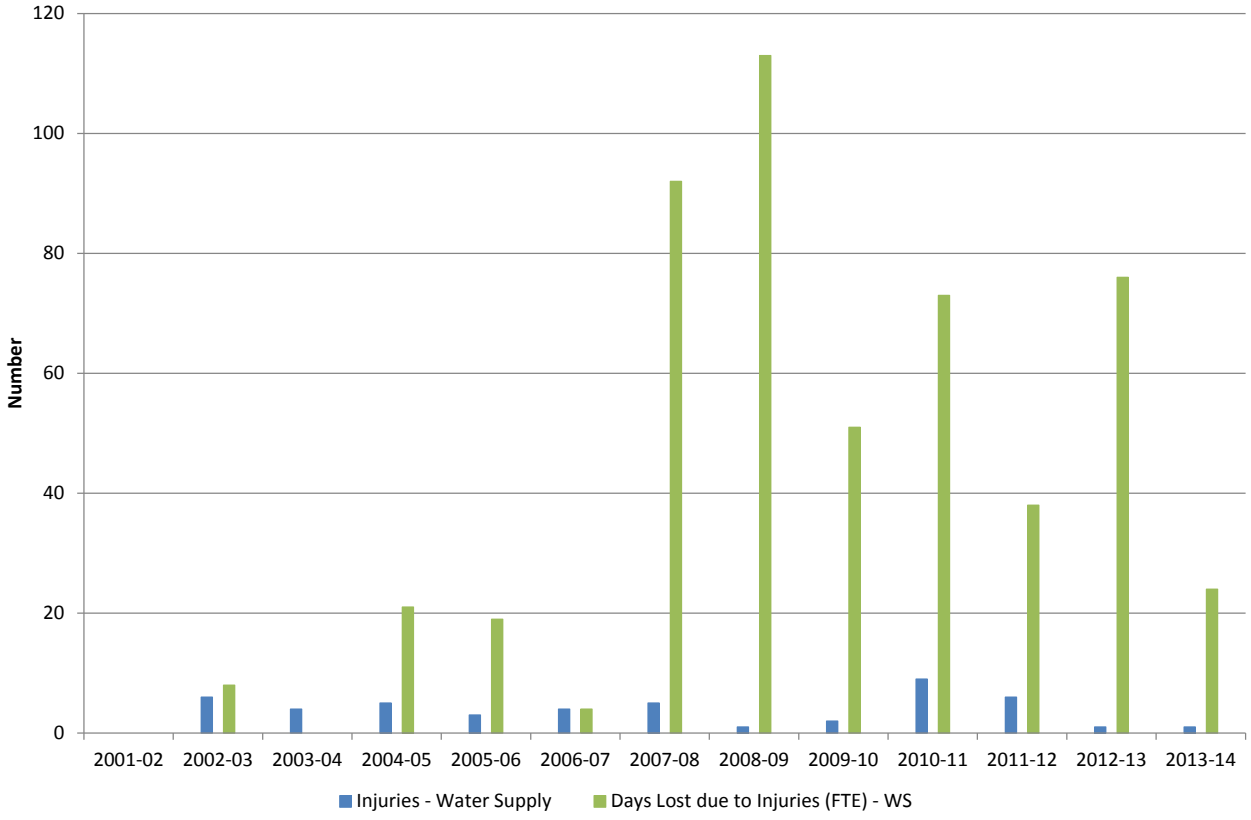

Figure 46: Injuries and Days Lost Due to Injuries – Water Supply

Source: NSW Office of Water (2015a)

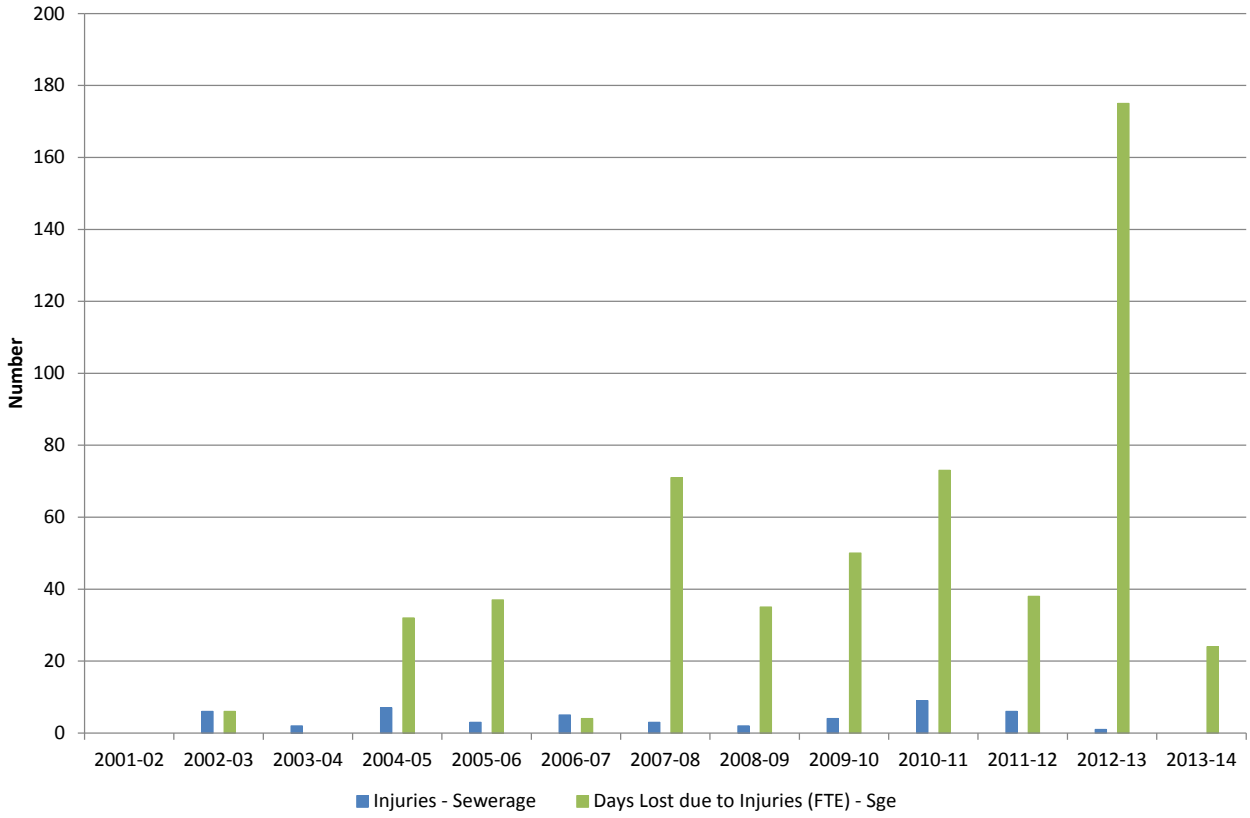

Figure 47: Injuries and Days Lost Due to Injuries – Sewerage

Source: NSW Office of Water (2015a)

Work health and safety upgrades have been implemented for:

- Water reservoirs including modification of internal ladders, platforms and gantry systems; and
- SPSs including safe entry/exit

ESC completed Facility Audits for the WTPs and STPs in 2014 (NSW Public Works, 2014i). The objective of the safety assessment was to identify non-compliances for process units, civil and electrical installations based on current WHS legislation requirement. This provides a basis for Council to remedy non-compliances in accordance with regulatory requirements and relevant Australian Standards. The STP augmentation budgets have been increased to address the WHS non-compliances.

ESC also conducts scheduled inspections targeting work practices of operations teams on a 6 monthly basis and construction teams on a 3 monthly basis.

C6.10 Other Risk Management Measures

An assessment of risks associated with service delivery from infrastructure assets has identified critical risks to Council. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, develops a risk rating, evaluates the risk and develops a risk treatment plan for non-acceptable risks.

Council's current risk management system is based on AS 4360-2004 and the StateWide Mutual Best Practice Manual. Maintenance works are planned and prioritised on priority and resource availability. Critical risks, being those assessed as 'Very High' - requiring immediate corrective action and 'High'– requiring prioritised corrective action identified in the infrastructure risk management plan are summarised in Table 38.

Table 38: Critical Risks and Treatment Plans

Asset at Risk	What can Happen	Risk Rating (VH, H,M, L)	Risk Treatment Plan
Mechanical – Pumps	Power Failure	Medium	Maintain contingency plan, replacement program.
Mechanical -Other (Probes, Flanges)	Breakdown	Low	Maintain contingency plan, replacement program
Pump Station –Electrical	Power Failure	Low	Maintain contingency plan, Contact provider for provision of service.
Pump Station – Telemetry	Breakdown	Low	Contingency Plan
Pump Station – Civil	Blockage, Silting	Medium	Contingency Plan
Property Connections	Blockage	Low	Have residents clear
Flushing Points	Silting	Low	Maintenance plan
Manholes	Silting	Low	Maintenance plan
Flow Meter	Blockage	Low	Maintenance plan
Rising Mains	Blow out	Medium	Repair or Replace line
Reuse Pipe	Blow out	Medium	Replace line

Source: ESC (2012b)

An emerging concern is the effect of sea level rise due to climate change. As sea level rises, more infrastructure will be at risk of prolonged or at least regular inundation due to tidal variation and the water level will be increased during storm activities (ESC, 2012b).

C7. TOTAL ASSET MANAGEMENT PLAN

The aim of total asset management is to provide, operate, and maintain physical assets over their whole life cycle to achieve the LOS at the least cost while still satisfying statutory and regulatory requirements. The key elements of a total asset management approach are:

- Operation Plan;
- Maintenance Plan; and
- Capital Works Plan.

The total asset management plan components are shown in Figure 48 and discussed below.

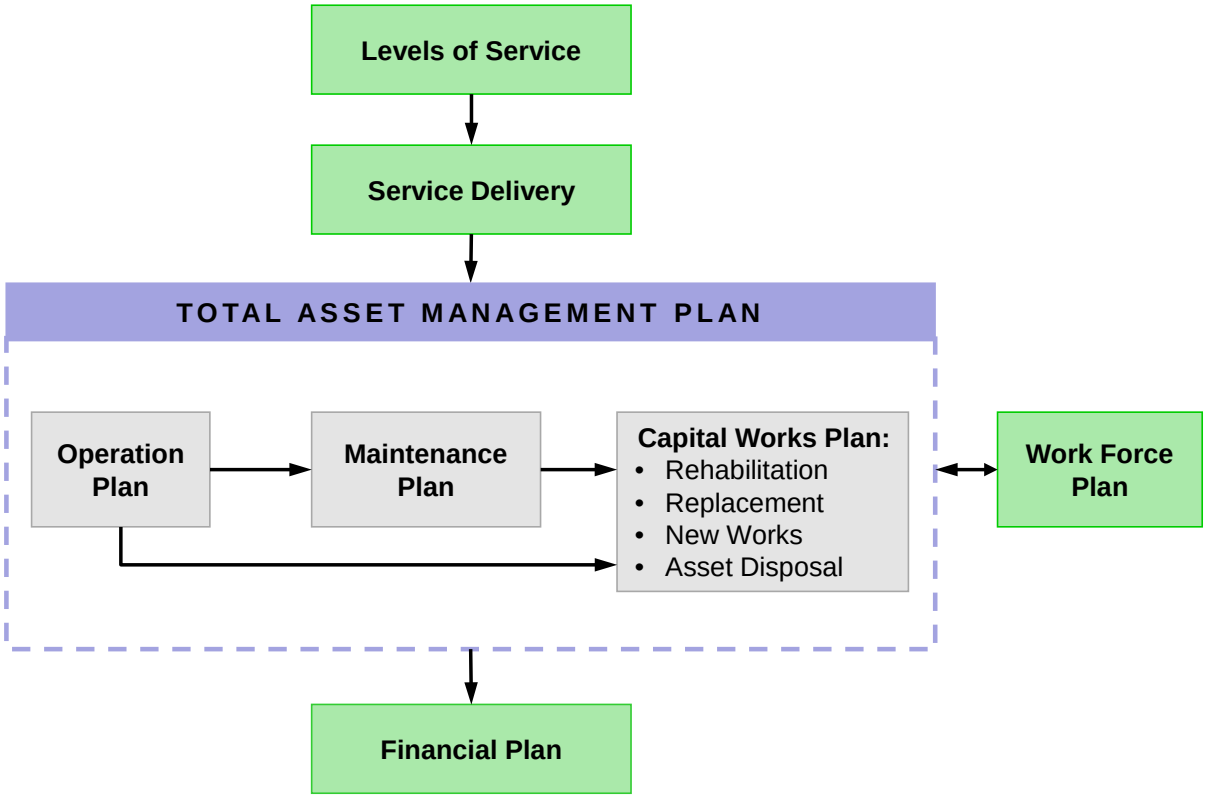

Figure 48: Total Asset Management Plan components

C7.1 ESC Asset Management System

Asset Management Plans for water and sewerage services have been developed by Council to define levels of service, how the services will be provided and how much it will cost. The Plans also detail the available information about infrastructure assets (condition, age, life cycle, etc.) and actions required to provide the agreed level of service in the most cost effective manner.

C7.2 Operation Plan

The purpose of the Operation Plan is to ensure that the service objectives are achieved at the least cost and that the impact of any breakdowns or outages is minimised.

C7.2.1 Asset Register and Data

ESC's asset register lists all water supply and sewerage assets with basic physical data (location, material, size, age and remaining useful life) and financial statistics (depreciation and current replacement cost) for each asset. The assets were re-valued using the fair value methodology in 2012.

Asset valuations are summarised in the following tables (indexed to 2014/15).

Table 39: Asset Values – Sewer (2014/15 $'000)

Asset Class	Current Replacement Cost	Depreciated Replacement Value	Residual Value
Sewer Gravity Manholes and Valves	$74,148	$48,786	$8,577
Sewer Gravity Pipe	$96,564	$70,433	$18,412
Sewer Low Pressure System	$159	$148	$19
Sewer Pressure Node	$2,450	$1,538	$281
Sewer Pressure Pipe	$33,667	$18,493	$3,894
Sewer Pump Station	$38,985	$20,018	$4,453
Sewer Reuse Node	$108	$90	$13
Sewer Reuse Pipe	$3,416	$3,105	$395
Sewer Telemetry	$1,877	$368	$216
Sewer Treatment Plant	$147,395	$73,160	$16,763
Total	*$398,770*	*$236,139*	*$53,023*

Table 40: Asset Values – Water Supply (2014/15 $'000)

Asset Class	Current Replacement Cost	Depreciated Replacement Value	Residual Value
Water Dams / Weirs	$25,858	$18,390	$2,991
Water Valves and Hydrants (Retic)	$13,772	$6,378	$1,576
Water Valves and Hydrants (Trunk)	$13,149	$6,634	$1,509
Water Pipe (Retic)	$96,652	$62,754	$11,171
Water Pipe (Trunk)	$189,014	$134,229	$21,853
Water Pump Station	$5,290	$2,226	$606
Water Reservoir	$50,227	$32,245	$5,753
Water Telemetry	$665	$95	$77
Water Treatment Plant	$23,062	$19,896	$2,648
Total	*$417,691*	*$282,847*	*$48,184*

C7.2.2 Asset Condition Data

Condition of the sewerage and water supply pipeline assets is assessed using CCTV inspections with a target of 5% of the network inspected each year. Reservoir condition assessments will commence in 2016. Condition of other assets is assessed on an ad hoc basis through general inspections and operational procedures or as part of major upgrades.

A detailed register of asset condition for the water supply and sewerage assets has not been prepared. Documented asset condition and adjusted remaining life would assist with development of maintenance and renewal programs.

Asset condition issues can also be identified through reported asset failures. Relevant indicators from the NSW Office of Water Benchmarking Reports are given below.

ESC is implementing an asset renewal program which is expected to reduce the number of failures. The program was developed from CCTV inspections which have identified priority mains for rehabilitation.

Table 41: Asset Performance Indicators

Indicator	2010/11	2011/12	2012/13	2013/14	2013/14 Median[1]
Water main breaks (per 100km of main)	4	12	11	13	10
Sewer main breaks and chokes (per 100km of main)	47	32	29	30	43
Sewer overflows (per 100km of main)	8	6	8	12	12
Water Service Complaints (per 1,000 properties)	0	0	0	0	5
Unplanned interruptions (per 1,000 properties)	49	131	57	93	41
Drought water restrictions (% of time)	5	0	0	0	0

1. NSW LWUs with >10,000 properties. Source: NSW Office of Water (2015d)

C7.2.3 Operations Analysis

The Water and Sewer Asset Management Plan (ESC, 2012b) identifies the following issues:

- A significant portion of the water network was constructed in the 1960s and 1970s and large sections are constructed from asbestos cement, which is now between 40 and 50 years old. The performance of these pipes with time is not fully understood;
- Often sewerage systems were extended or “piggy-backed” as development occurred, leading to excessive flows; and
- Small length clay pipes with mortar joints were often used when earlier schemes were constructed and manholes were not fully sealed. This increases susceptibility to root intrusion and infiltration which leads to system overflows during wet weather and failure of pumps during peak times;

ESC prepared a Drinking Water Management System in accordance with the ADWG in 2014. Compliance with water quality indicators is summarised in the following table.

Table 42: Compliance with Water Quality Indicators

Indicators	2010/11	2011/12	2012/13	2013/14
Physical (%)	90	92	95	94
Chemical (%)	100	100	100	100
Microbiological (%)	100	100	100	100
Water quality complaints (per 1,000 properties)	0	0	0.5	0.9

Source: NSW Office of Water (2015d)

In 2013/14, 100% of sewage treated was compliant, with 100% compliance with BOD and SS licence limits.

C7.2.4 Due Diligence

Due diligence implies that efforts should be made to anticipate hazards which may harm the environment and take all feasible steps to prevent, control and mitigate the potential of their occurrence. ESC's due diligence actions are discussed in the following sections.

Emergency Response Procedures

Pollution Incident Response Management Plans have been prepared for all premises with environment protection licenses in accordance with the *Protection of the Environment Legislation Amendment Act 2011*.

Flood Risk

Council has prepared a Floodplain Management Plan and climate change assessment for the Moruya River including mapping of the extent of flooding in Moruya. A Dam Safety Emergency Plan has been prepared for Deep Creek Dam. Flood studies are currently being prepared for Narooma, Tomakin, Mossy Point and Mogo.

Standard Operating Procedures

ESC utilises the standard operating procedures and technical guidelines published by the Water Directorate as well as a sewage pumping station operation manual and operation and maintenance manuals developed as part of asset upgrades.

SBP Objective 10 – Operations

Objective				
Operate the water supply and sewerage assets in a safe and cost-effective manner which meets the required levels of service				
Performance Target				
Operations issues do not cause a failure to meet the levels of service				
Strategy				
Operate the schemes in accordance with documented system procedures, rules and due diligence programs				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
10.1	Document and review asset condition as part of the annual review of asset register data	DMWS[1]	June 2017 and annually	Included in strategic planning budget

1. DMWS: Division Manager Water and Sewer

C7.3 Maintenance Plan

The purpose of the Maintenance Plan is to support the Operation Plan by ensuring that the actual outputs, reliability and availability of the individual sub-systems, facilities, and components, as specified in the Operation Plan, are achieved in the most cost effective manner.

Maintenance includes reactive, planned and cyclic maintenance work activities. Typical activities include:

- Mains flushing;
- Exercising valves; and
- Sewer jetting and foaming.

Reactive maintenance is unplanned repair work carried out in response to service requests. Planned maintenance is repair work that is identified and managed through a maintenance management system and includes inspection, assessing the condition against failure/breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

Cyclic maintenance is replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, etc. This work generally falls below the capital/maintenance threshold.

Currently, no detailed break-up of maintenance expenditure between the categories is available. The assumption is made that the majority of maintenance work is reactive due to staff levels and other factors. Maintenance expenditure levels are considered to be adequate to meet current service levels. Future revision of the asset management plan will include linking required maintenance expenditure with required service levels (ESC, 2012b).

The principle adopted for the asset management plan is that maintenance funding levels should be kept at existing levels with appropriate allowances for the increase in asset size. Although it may be desirable to increase maintenance levels of service, it is considered a higher priority to utilise increased renewal funding levels in preference to increasing maintenance funding. As a general rule, increased renewal funding will allow the network to be kept in a better condition, thereby reducing the level of maintenance required. Where practicable, maintenance should be directed to pro-active tasks as the actions that are likely to assist in achieving the assumed useful life of the asset and/or lower risk.

Deferred maintenance (i.e. works that are identified for maintenance and unable to be funded) is managed by prioritisation of works based on Council's risk management policy.

SBP Objective 11 – Maintenance

Objective				
Maintain the water supply and sewerage assets in a cost-effective manner which meets the required levels of service				
Performance Target				
Maintenance issues do not cause a failure to meet the levels of service				
Strategy				
Maintain the schemes in accordance with documented procedures				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
11.1	Review Scheduled Maintenance Program and Breakdown Response Plan to confirm the ability to meet LOS	WSOE[1]	Annually	Included in strategic planning budget

1. WSOE: Water and Sewer Operations Engineer

C7.4 Capital Works Plan

The purpose of the Capital Works Plan is to document the anticipated future capital works requirements and expenditures to meet the Levels of Service and provide a basis for financial planning and capital budgeting.

Asset renewal, growth and improved levels of service projects have been reviewed as part of the development of this SBP, IWCM Strategy and the associated Financial Plan.

SBP Objective 12 – Capital Works

Objective				
Adequate water supply and sewerage infrastructure is provided for present and future customers.				
Performance Target				
Infrastructure capacity and condition issues do not cause a failure to meet the levels of service				
Strategy				
Review and implement the capital works programs				
No.	**Action**	**Responsibility**	**Timing**	**Cost ($k)**
12.1	Review capital works program annually	DMWS[1]	December each year	Included in budget

1. DMWS: Division Manager Water and Sewer

C8. WORK FORCE PLAN

The water and sewer services organisation structure is given in Section C2.2.2. There are currently two senior engineers reporting to the Division Manager Water and Sewer (DMWS). The operations department includes over 50 operators, five technical officers/coordinators and seven electricians. The engineering department includes four technical officers and one engineer.

Council has an ageing workforce (26% of the workforce is over 55 years of age and 60% of the workforce is over 45 years of age) which is a challenge that may affect delivery of urban water services. The ESC Workforce Management Plan (2014-2018) includes actions to attract and retain younger workers, increase flexible working arrangements for older employees and increase diversity of employees.

Other issues identified include:

- Performance indicator benchmarking suggests there are a high number of employees in the sewer business (2.0 per 1,000 properties in 2013/14 compared to the state-wide median of 1.6 per 1,000 properties). Council has a low connected property density and a high number of sewage pumping stations and sewage treatment plants per connected property compared with the state-wide median. The additional assets require additional human resources for operation and management;
- Additional operational staff will be required to service planned new infrastructure; and
- Additional engineering staff positions are required to undertake strategic planning projects and deliver major projects.

SBP Objective 13 – Human Resources

Objective
Appropriate and qualified staff deliver the water supply and sewerage services in a safe manner
Performance Target
Sufficient and adequately trained staff can provide the levels of service. Zero lost time incidents.
Strategy
Ensure all staff training is up to date. Review staff requirements (numbers and competency) and maintain appropriate staff numbers.

No.	Action	Responsibility	Timing	Cost ($k)
13.1	Convert Trainee Technical Officer position to permanent Technical Officer.	DMWS[1]	2017	120 p.a.
13.2	Convert Cadet Engineer position to permanent Engineer position.	DMWS	2017	150 p.a.
13.3	Employ an additional operational team (Bodalla and Potato Point water and sewerage)	DMWS	2021	200 p.a.
13.4	Employ an additional headworks operator (new southern dam)	DMWS	2021	100 p.a.
13.5	Employ an additional operator (Tomakin STP)	DMWS	2021	100 p.a.
13.6	Employ an additional operational team (Batemans Bay - Nelligen water and sewerage)	DMWS	2026	200 p.a.

No.	Action	Responsibility	Timing	Cost ($k)
13.7	Employ an additional operational team (Batemans Bay – South Durras water and sewerage)	DMWS	2028	200 p.a.
13.8	Employ an additional headworks operator (southern WTP)	DMWS	2029	100 p.a.
13.9	Staff training and competency review	DMWS	Annual	Included in budget

1. DMWS: Division Manager Water and Sewer

C9. INPUT TO COUNCIL'S INTEGRATED PLANNING AND REPORTING

The Integrated Planning and Reporting (IPR) framework was introduced by the NSW Government in October 2009 to improve all NSW councils' long-term community, financial and asset planning. In response ESC has developed the following strategic plans:

- Community Strategic Plan – One Community;
- Long-term Financial Plan 2015-2025;
- Workforce Management Plan 2014-2018;
- Asset Management Strategy and Asset Management Plans;
- Delivery Program 2013-2017;
- Operational Plan 2015-16; and
- Annual Reports.

This SBP is Council's Resourcing Strategy for water supply and sewerage.

Outcomes from this SBP will be considered for inclusion in the next review of ESC's IPR documents:

- Sustainable Communities - Provide a safe, reliable and sustainable sewer/water service that meets future needs:
    - ESC will review and implement the Water Supply and Sewerage Strategic Business Plans and Integrated Water Cycle Management Strategy every 5 years in accordance with best-practice requirements; and
    - ESC will actively pursue external funding sources for major capital works including the southern dam and village sewerage/water supply schemes.

Key actions from this SBP will also be considered for inclusion in ESC's Delivery Program and Operational Plans and budgets.

Following implementation of the actions from this IWCM Strategy/SBP, ESC's annual report will include the following:

- Compliance with best-practice requirements;
- Compliance with ADWG requirements;
- Investment in water supply and sewerage system renewals;
- Status of major projects including the southern dam and village sewerage/water supply schemes; and
- Other key achievements.

PART C REFERENCES

DWE (2007) *Best Practice Management of Water Supply and Sewerage Guidelines*

EPA (2000) *Environmental Guidelines: Use and Disposal of Biosolids Products*

ESC (2012a) *Greenhouse Action Plan*

ESC (2012b) *Eurobodalla Shire Council Water and Sewer Asset Management Plan*

ESC (2013) *Eurobodalla Shire Council Liquid Trade Waste Regulation Policy*

ESC (2014) *Eurobodalla Shire Council – Resourcing Strategy – Workforce Management Plan 2014-2018*

Hydrosphere Consulting (2016) *Eurobodalla Integrated Water Cycle Management Strategy – IWCM Issues Paper*

NSW Office of Water (2014b) *Water Supply and Sewerage Strategic Business Planning and Financial Planning Check List – July 2014*.

NSW Office of Water (2015a) *Eurobodalla Shire Council Water Supply and Sewerage Planning Data Set*

NSW Office of Water (2015b) *2013-14 Eurobodalla Shire Council TBL Water Supply and Sewerage Performance Reports*

NSW Office of Water (2015c) *NSW Guidelines for Recycled Water Management Systems*

NSW Office of Water (2015d) *2013-14 Water Supply and Sewerage NSW Benchmarking Report*

NSW Public Works (2014a) *Population, Water Demand and Sewer Load Projections for Eurobodalla Shire Council*. Report Number: WSR - 14020 December 2014

NSW Public Works and Atom Consulting (2014) *Eurobodalla Shire Council Risk-Based Drinking Water Management System.* April 2014

PART C GLOSSARY AND ABBREVIATIONS

ADWG	Australian Drinking Water Guidelines
AGWR	Australian Guidelines for Water Recycling
CBD	Central Business District
CCTV	Closed-Circuit Television
DPI	NSW Department of Primary Industries
DWE	Department of Water Energy, former name for DPI-Water
DMWS	Division Manager Water and Sewer
DWMS	Drinking Water Management System
EP	Equivalent persons
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
ERRR	Economic Real Rate of Return
ESC	Eurobodalla Shire Council
ET	Equivalent tenements
FTE	Full time equivalent
GM	General Manager
IWCM	Integrated Water Cycle Management
kL	Kilolitres
kL/d	Kilolitres per day
km	Kilometres
LEP	Local Environmental Plan
LOS	Level of Service
LWU	Local Water Utility
ML	Megalitres (million litres)
ML/a	Megalitres per annum
ML/d	Megalitres per day
NRW	Non-Revenue Water
OMA	Operation, Management and Administration (cost)
OSSM	On-site Sewage Management System
PDD	Peak Day Demand
PDWF	Peak Dry Weather Flow
PRP	Pollution Reduction Program
PWWF	Peak Wet Weather Flow
SBP	Strategic Business Plan
SEPP	State Environmental Planning Policy

SPS	Sewage pumping station
SSD	State Significant Development
SSI	State Significant Infrastructure
STP	Sewage Treatment Plant
TRB	Typical Residential Bill
TAMP	Total Asset Management Plan
WSP	Water Sharing Plan
WSPE	Water and Sewer Project Engineer
WSUD	Water Sensitive Urban Design
WTP	Water treatment plant

Appendix C1: SBP Checklist

Eurobodalla Shire Council has reviewed and updated its Integrated Water Cycle Management (IWCM) Strategy and Strategic Business Plan (SBP). This document addresses the requirements for both the IWCM Strategy and SBP.

Part C of this document provides the information required for the SBP development (Table 46, Items 1 to 9) as listed in the *Water Supply and Sewerage Strategic Business Planning and Financial Planning Check List – July 2014* (NSW Office of Water, 2014b).

Table 43: Strategic Business Plan – Check List Requirements

Outcome Achieved	Section in this Document
Strategic Business Plan	
1. Executive Summary Covers all major issues, main actions, a summary of the Financial Plan Report, price path and a 30-year projection of the Typical Residential Bill in Year 2$. Includes a plan of the system.	Section C1
2. Operating Environment Review A. Includes the mission statement with regard to your water supply and sewerage services B. All principal issues are addressed with appropriate strategy, actions and performance indicators in the Strategic Business Plan. C. A compliance monitoring and reporting system is in place. D. The regulatory and contractual compliance requirements have been identified. E. Includes all issues from an operating environment compliance situation analysis F. Includes a business and insurable risk profile analysis and a summary of the insurance policies.	Section C2
3. Performance Monitoring A. LWU's latest TBL Performance Report and Action Plan included. B. In addition to addressing any areas of under-performance, the Action Plan 'closes the planning loop' with the utility's financial plan by: • Comparing the Typical Residential Bill (TRB) with the projection in the financial plan and documenting any necessary corrective action for implementation by the LWU. • Reporting results for the financial year for the key actions set out in the utility's strategic business plan or IWCM strategy, whichever is the more recent.	Section C3
4. Levels of Service (LOS) A. Are clear, meaningful and measurable B. Target LOS has been identified. These LOS are also to be used in the IWCM Strategy, Water Cycle Analysis and Projection and Development Servicing Plan. C. Includes all issues from a LOS situation analysis D. Community consultation is essential on the proposed levels of service (LOS) in order to negotiate an appropriate balance between LOS and the resulting Typical Residential Bill.	Section C4

Outcome Achieved	Section in this Document
5. Service Delivery A. Overall service delivery options examined and conclusions reported. B. Includes examination of project specific service delivery options for the measures included in the Total Asset Management Plan (TAMP). C. The utility is cognisant of 'demand risk' and avoids investing in assets which may become redundant, 'stranded' or oversized, e.g. as a result of a developer obtaining approval to provide water supply and/or sewerage services to a large release area (under the *Water Industry Competition Act 1994*).	Section C5
6. Customer Service Plan Business objectives developed for each key result area:	
6.1 Unserviced Areas A. All unserviced towns and villages listed showing the population, whether the present facilities are satisfactory and the priority ranking of each town/village for option implementation from the IWCM Strategy. B. Proposals for serving unserviced towns and villages are included and discussed in your LWU's strategic business plan and capital works program.	Section C6.1
6.2 Regulation and Pricing of Water Supply, Sewerage and Trade Waste A. Full Cost Recovery Full cost recovery for each of the water supply and sewerage businesses. The total annual revenue should be consistent with the financial plan. This generally results in a positive economic real rate of return (ERRR).	Section C6.3
B. Water Supply: Residential Pay-for-use: appropriate water usage charge/kL with no water allowance; independent of land value. At least 50% of residential revenue from water usage charges [for utilities with under 4,000 connected properties]	
C. Sewerage: Residential Uniform annual sewerage bill per residential property, independent of land value.	
D. Water Supply: Non-Residential Two-part tariff with appropriate water usage charge/kL and access charge.	
E. Sewerage: Non-Residential Two-part tariff with appropriate sewer usage charge/kL and sewer discharge factor.	
F. Liquid Trade Waste Pricing Appropriate trade waste fees and charges adopted and implemented for all liquid trade waste dischargers. Appropriate trade waste usage charge implemented for dischargers with prescribed pre-treatment. Excess mass charges and non-compliance excess mass charges implemented for large dischargers and industrial waste.	
G. Trade Waste Regulation Policy and Approvals Trade Waste Regulation Policy implemented. Trade waste approval issued to each liquid trade waste discharger. Annual report provided to NSW Office of Water listing all of the trade waste dischargers approved by Council for the year	

Outcome Achieved	Section in this Document
H. Developer Charges Development Servicing Plan with commercial developer charges; disclosure of any cross-subsidies	
I. Dual Water Supplies LWUs with a dual water supply i.e. a potable reticulated water supply for indoor uses and a separate non-potable supply reticulated for outdoor uses to over 50% of their residential customers need to comply with element 2(g) of Criterion 2 in Table 1 on page 25 of the Best-Practice Management Guidelines	Not required
6.3 Environmental Management Summary of LWU's Environmental Management achievements is included.	Section C6.2
6.4 Water Cycle Analysis and Projection A. Includes a summary of the adopted water conservation program and the key assumptions underpinning the program measures. B. For utilities with 4,000 or more connected properties, has 75%/25% split been achieved with water tariff? If not, update water supply tariff in accordance with Circular LWU11 of March 2011. C. Water & sewer pricing of all customer categories is best-practice, if not implement best-practice requirements.	Section C6.4
Also include review of the key assumptions and commentary on its current status. Report outcomes in the strategic business plan. Address matters such as: D. Is bulk water extraction and production metered and recorded daily? If not, Implement daily metering and recording. E. Do all free standing residential premises have separate meters? If not, implement F. Do all free standing and multi-unit residential developments (both strata and non-strata) built after July 2007 have separate meters? If not, implement, where cost effective. G. Utilities are strongly encouraged to separately meter all new free standing and multi-unit residential and non-residential developments. In addition to encouraging efficient use of water services, this facilitates fair water supply, sewerage and trade waste pricing. Such metering is recommended by the August 2011 Productivity Commission Report No.55 (www.pc.gov.au). H. Is customer water consumption billed at least three times a year? If not, implement. I. Are all your LWU's premises (e.g., parks, ovals, toilets, cemetery, etc.) metered and billed? If not, implement. J. Review the effectiveness of the adopted demand management measures and summarise the outcomes and planned corrective actions. K. Review the effectiveness of any leakage reduction program undertaken and summarise the outcome and the planned corrective actions. L. Review the effectiveness of any sewer flow management program undertaken and summarise the outcome and the planned corrective actions M. Briefly review the demographic projection and update as appropriate. N. A scheme specific data collection and monitoring system and plan is in place.	Yes

Outcome Achieved	Section in this Document
O. Review and update the adopted water cycle projection (water demands and sewer flows and loads) as appropriate	
6.5 Integrated Water Cycle Management (IWCM) A. Includes a summary of the adopted IWCM scenario and the principal assumptions/risks underpinning the scenario Also include review of the principal assumptions and risks underpinning the IWCM Strategy and report outcomes in the strategic business plan. Address matters such as: B. Assumption 1 – potential unplanned increase in water demand due to a water intensive industry, large new development, etc. C. Assumption 2 – potential unexpected changes to existing water access/use licence regime. D. Assumption 3 – significant potential changes to raw water quality and/or non-compliance with ADWG 2011. E. Assumption 4 – unexpected major change in distribution system characteristics. F. Assumption 5 – unexpected extension/provision of water service to a new area/urban centre. G. Assumption 6 – potential unexpected increase in sewage load due to industry, large development, etc. H. Assumption 7 – unexpected changes in sewage transport system characteristics. I. Assumption 8 – potential unexpected changes to existing sewerage management licence regime. J. Assumption 9 – unexpected extension/provision of sewerage service to new area/urban centre.	Section C6.5
6.6 Drought Management A. Are all water supply sources suitably monitored (e.g. level, flow, relevant water quality) and recorded? If not, implement suitable monitoring and recording. B. Includes a graph of the water demand over time with super-imposed restriction periods, storage/ground water level and relevant climatic data since the last SBP Update. C. Includes a summary of water supply system performance since the last SBP Update and any management/emergency response actions undertaken. D. Review the adopted drought management plan, especially the schedule of trigger points for drought water restrictions and the level of water restrictions, and the associated measures. Update where warranted and include as an Appendix.	Section C6.6
6.7 Drinking Water Management System A. Includes a Report on the complete review of your Drinking Water Management Systems. B. The update items identified in the Report are included in the SBP with appropriate actions and performance indicators. C. Community involvement and consultation has been undertaken	Section C6.7
6.8 Community Involvement Includes a summary of community involvement completed since the last SBP Update	Section C6.8

Outcome Achieved	Section in this Document
6.9 Work Health & Safety A. Includes a summary of LWU's work health and safety achievements against the adopted performance indicators. B. Includes a summary of completed audits and any planned corrective actions to achieve target	Section C6.9
6.10 Other Risk Management Measures Summary of other risk management measures implemented by your LWU.	Section C6.10
7. Total Asset Management Plan (TAMP) A. Summary of changes required to operation and maintenance (O & M) procedures (e.g. to operate new facilities) are reported, including impact on OMA (operation, maintenance and administration) expenditures.	Section C7
B. Summary of outstanding Development Consent Conditions relating to capital works projects identified and reported, including impact on costs.	None
C. Asset register completed and is up to date and the assets are valued in accordance with Reference 16	Yes
D. Summary of best-practice operation plan is included. Also report: • Whether you failed to achieve microbiological compliance with ADWG in either of the last 2 financial years, the corrective action implemented and whether it was successful. • Any 'boil water alerts' issued in the last 18 months, the corrective action implemented and whether it was successful. • Whether the requirements of Circular LWU 18 of June 2014 have been addressed in order to assure the safety of your drinking water supplies.	Section C7.2
E. Summary of best-practice maintenance plan is included. Also report your LWU's implementation of any NSW Office of Water section 61 recommendations (*Local Government Act 1993*) for corrective action with respect to water and sewage treatment works, dams, water recycling systems or biosolids recycling systems	Section C7.3
F. Review and update the existing TAMP in your IWCM Strategy/SBP. New TAMP to show your LWU's 30-year capital works program which nominates each proposed project and its annual capital expenditure, including an evidence-based cost-effective asset renewals plan10. TAMP is integrated with the strategic business plan to meet the target levels of service. Template is available from NOW (page 16). Disclosure of the funding required for each of growth, improved standards and renewals is required for each project. TAMP has been updated in accordance with Items 6.4 and 6.5.	Section C7.4
G. All major projects in the TAMP are discussed in the SBP and are consistent with the adopted IWCM Scenario and business objectives	Yes
8. Work Force Plan Organisation Chart is included. Work force requirements to meet the needs of TAMP, including items 6.4 to 6.7 have been incorporated.	Section C8

Outcome Achieved	Section in this Document
9. Input to Council's Integrated Planning and Reporting (IPR) Provide water supply and sewerage inputs to your Council's: • Community Strategic Plan • 4-year Delivery Plan • Annual Operating Plan • Annual Report.	Section C9

Eurobodalla Shire Council

IWCM Strategy and Strategic Business Plan

PART D – FINANCIAL PLAN

D1. INTRODUCTION

This report documents the outcomes of the financial analysis of the ESC Water Supply and Sewer Funds. The aim of this report is to provide information to ESC on the required revenue to be recovered through residential bills. The financial analysis results will also be used to develop a medium term price path for ESC customers in terms of the typical residential bill (TRB) for water supply and sewer. ESC also undertakes other financial analyses to review and adopt shorter-term budgets.

D2. OVERVIEW OF FINANCIAL PLANNING

The objectives of financial planning are to recognise the full life cycle costs of service provision and determine appropriate funding strategies to ensure that services remain affordable in the long term. A 30 year planning horizon has been adopted for the modelling of ESC water supply and sewerage businesses. Taking a long-term view highlights the current impact of future actions, and allows financial peaks and troughs to be smoothed out to give a consistent pricing path.

The aim of financial modelling is to:

- Meet the funding requirements of the capital works program and other life-cycle costs associated with each system's assets;
- Ensure an appropriate level of cash and liquidity; and
- Provide forecasts of sustainable annual residential bills over the long term.

D3. METHODOLOGY

A financial model was developed for the ESC water supply and sewer funds using FINMOD, the financial planning software developed by DEUS (now DPI-Water) for use by non-metropolitan water utilities. The model is used to forecast income streams and projected expenditure.

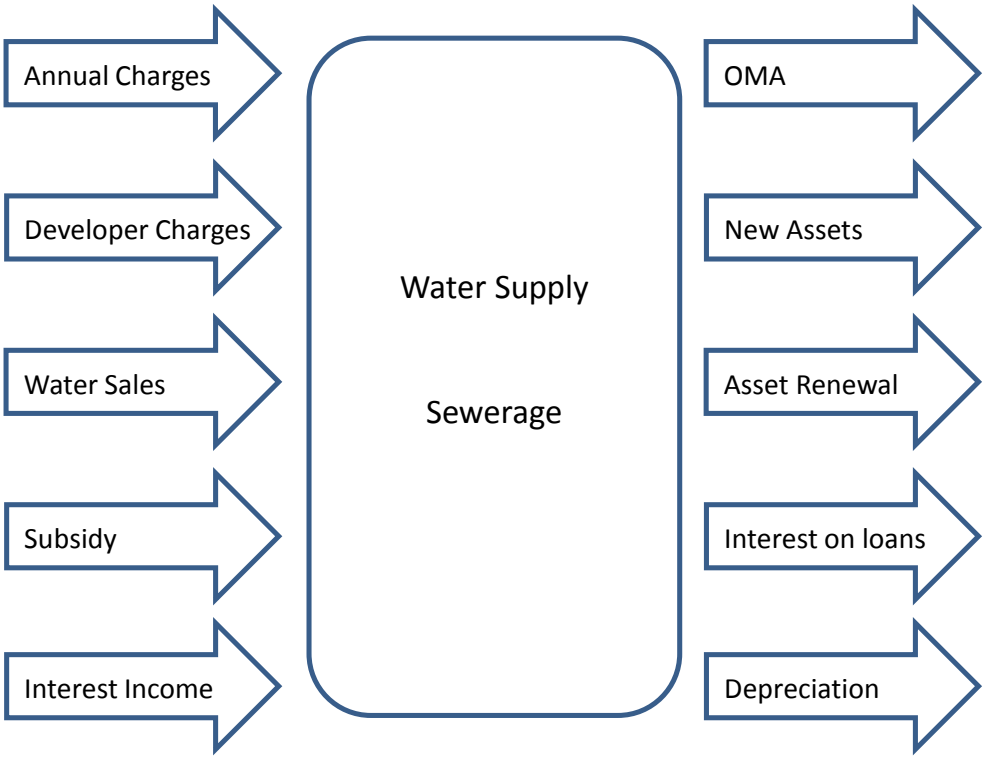

Figure 49: Elements of Financial Modelling

Capital works programs provide a guide for estimating long term capital costs. It is accepted that the level of confidence in capital works projections decreases with time from the present. However it is important to identify future commitments as accurately as possible.

D4. DATA AND ASSUMPTIONS

Base data utilised in the financial models are summarised in the following table.

Table 44: Input Data (2016$)

Item	**Data Used**	
Historical data	Historical financial statements for 2013/14 and 2014/15	
Financial data (30 years)	Inflation 2.5%, Borrowing interest rate 6.5%, Investment interest rate 5.5%	
Term of new loans	20 years	
Assessments/Bills	**Water Supply**	**Sewerage**
Residential assessments (2014/15)	18,611	17,085
Non-residential assessments (2014/15)	976	1,061
Growth rate – Residential assessments	Average 0.80% p.a. (1)	Average 0.88% p.a. (1)
Growth rate – Non-residential assessments	Average 0.70% p.a. (1)	Average 0.62% p.a. (1)
2015/16 TRB per assessment	$703	$886
2015/16 typical residential developer charge per ET	$11,780	$10,250
Revenue split – total residential revenue	82.8%	87.3%
Revenue split – total non-residential revenue	17.2%	11.9%
Revenue split – total trade waste revenue	N/A	0.8%
30 year (2016-2045) capital works program ($k)	$197,800 (refer Appendix D1)	$304,400 (refer Appendix D1)
Capital works grants ($)	No approved grants	Approved grants: $900,000 – Bodalla sewerage (in addition to the $1,200,000 grant already received from NSW Department of Aboriginal Affairs); $3,100,000 – Rosedale/Guerrilla Bay sewerage; $200,000 Tomakin STP upgrade; $130,000 West Moruya sewerage; and $400,000 Rosedale Regional Sewerage Pump Station. 40% subsidy for Potato Point has also been assumed ($4.12 million).
30 year (2016-2045) operation, maintenance and administration (OMA) costs ($k)	$303,600 or $10,100 p.a. (refer Appendix D1)	$331,400 or $11,000 p.a. (refer Appendix D1)

Item	Data Used	
Balance Sheet (2014/15)	**Water Supply**	**Sewerage**
Cash	$10,676,000	$15,664,000
Debt [(2)]	$2,649,000	$18,974,000
Replacement cost of system assets	$417,691,000	$398,770,000

1. Based on data provided in the demand forecast (NSW Public Works, 2014a), excluding backlog villages.
2. $7,645,000 of sewer loans and $2,052,000 of water loans was repaid in 2015/16 in addition to normal principal payments.

D5. MODEL OUTPUTS

The financial modelling provides an indication of the relative cost to ESC and its customers of the water supply and sewerage services. The main output of the financial plan is the TRB which is defined as the annual bill paid by a customer who is not a pensioner and not a vacant lot and uses the average water demand.

The purpose of the modelling is to identify the lowest TRB that will enable Council to fund the operation, maintenance and administration expenses and the capital investment of the schemes. The TRB is used as a measure of affordability and sets the price path Council needs to set in order to meet the levels of service. Council will develop a tariff structure that will provide this income.

FINMOD provides detailed financial statements for each scheme. The financial statements for the Base Cases are included in Appendix D2. Sensitivity analysis cases have been developed to identify the impact of different variables on the TRB (refer Section D7).

The financial outcomes (e.g. TRB, borrowings and cash and investment) are shown in 2015/16 dollars. The figures shown in this plan need to be adjusted annually for inflation.

D6. INITIAL CASES

Initial cases were developed for the water supply and sewer financial models to determine the preferred funding scenario. The initial cases were developed by finding the combination of funding from internal and external sources (i.e. loans and subsidies) that gives a stable and affordable TRB.

Where possible, the capital works programs and recurrent expenditure are funded through existing cash levels which are determined by the amount of income generated from bills. Where planned expenditure exceeds the available cash levels, loans are required. The level of borrowing can be adjusted with resulting changes in the TRB to suit ESC's requirements. For example, additional borrowing in the short to medium term can reduce the required TRB in later years. Grants may also be available for works that improve the level of service.

A minimum cash level of $3.5 million for the sewer and $3.0 million for water funds has been maintained (approximately 20% of annual turnover).

D6.1 Water Supply

The initial cases consider the affordability of all capital works identified in the IWCM Strategy and SBP. In particular, the affordability of the new southern dam will depend on the availability of funding.

Two initial cases have been modelled for the water fund as follows:

- Case 1: no subsidy; and
- Case 2: 50% subsidy for the new southern dam and 40% subsidy for Nelligen and South Durras water supplies.

The following figures show the resulting TRB, cash and investments and borrowing required for each of the initial cases. The benefit of subsidy for the dam is approximately $57 per assessment p.a. in the medium-term. The water supply augmentation is a key component of the IWCM Strategy and SBP and is affordable if subsidy is available. Therefore Case 2 is Council's preferred base case.

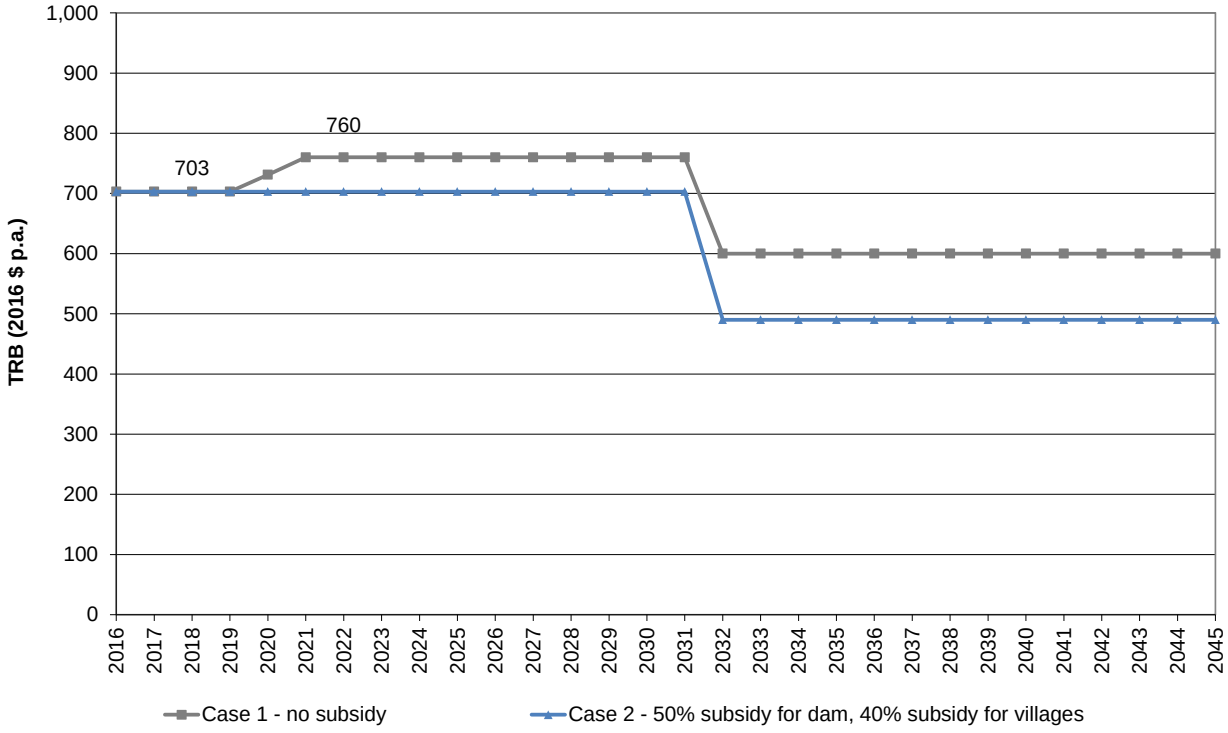

Figure 50: Water Supply TRB – Initial Cases

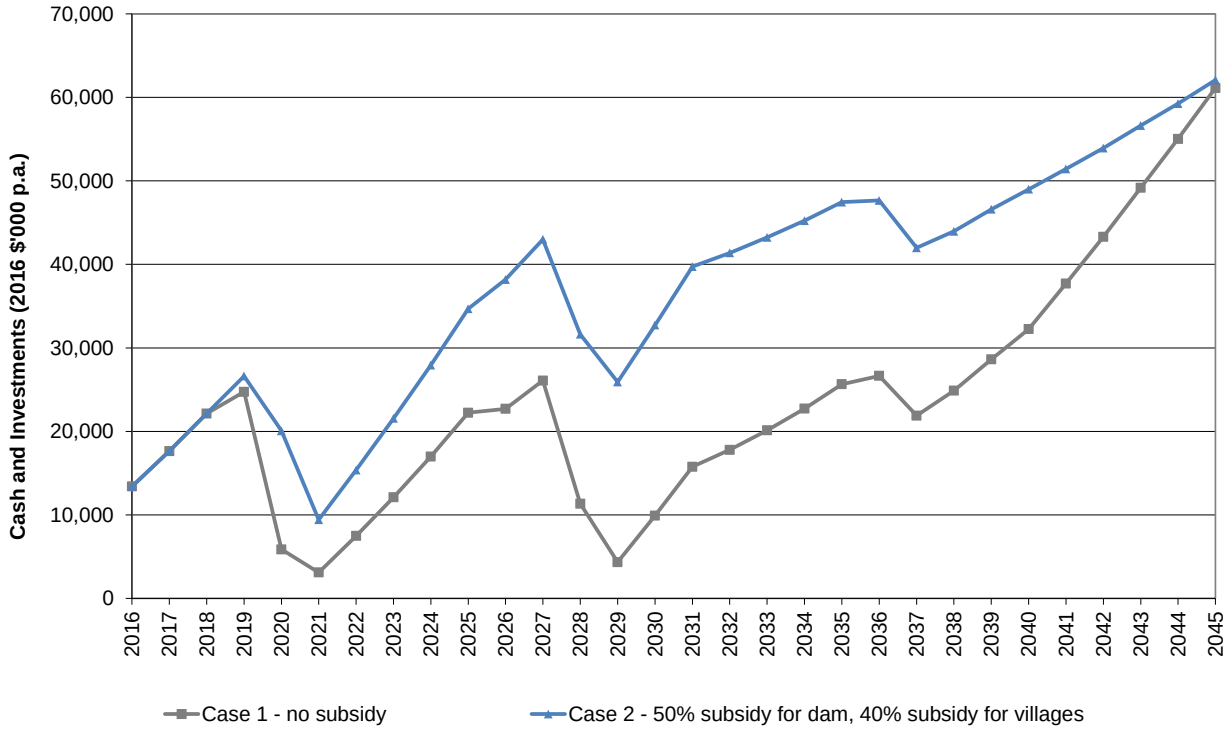

Figure 51: Water Supply Cash and Investments – Initial Cases

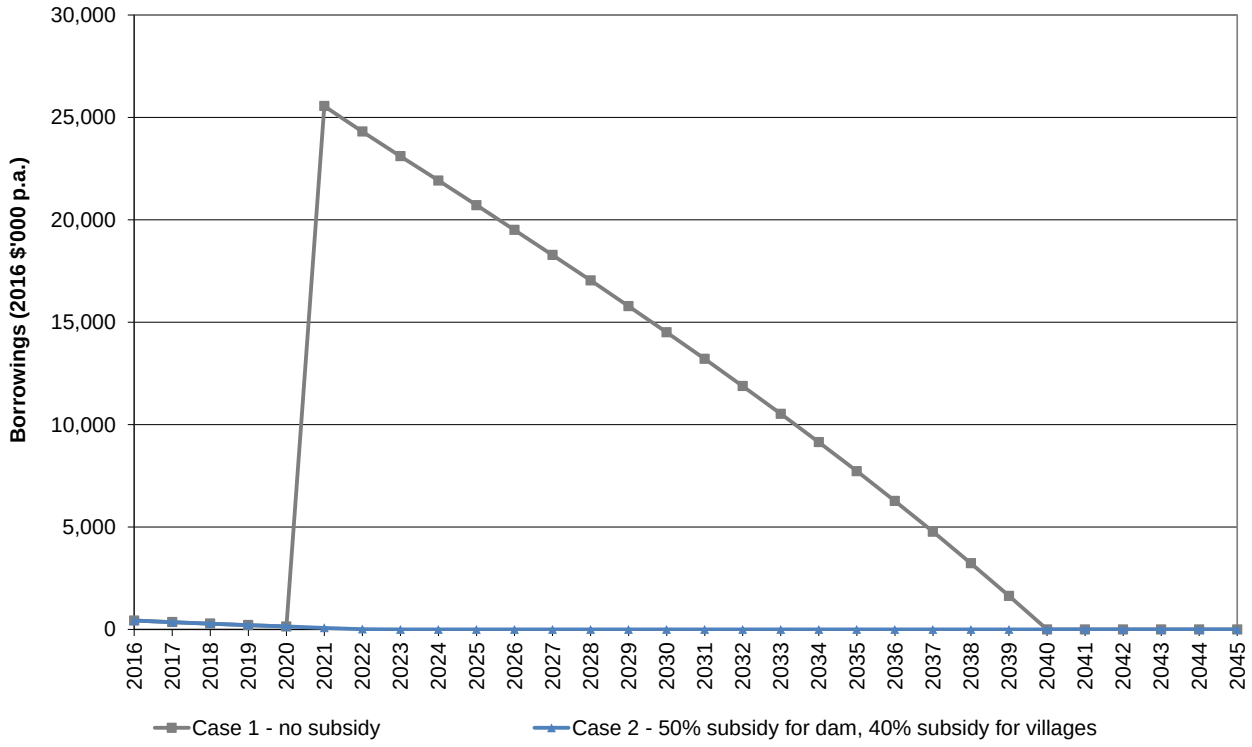

Figure 52: Water Supply Borrowings – Initial Cases

The modelling for Case 2 indicates that Council can maintain the water supply TRB at $703 per assessment per annum. This does not take account of the results of the sensitivity analysis as outlined below.

The projected TRB, levels of borrowing and cash and investments associated with the base case (Case 2) for sewer are shown in the following figure.

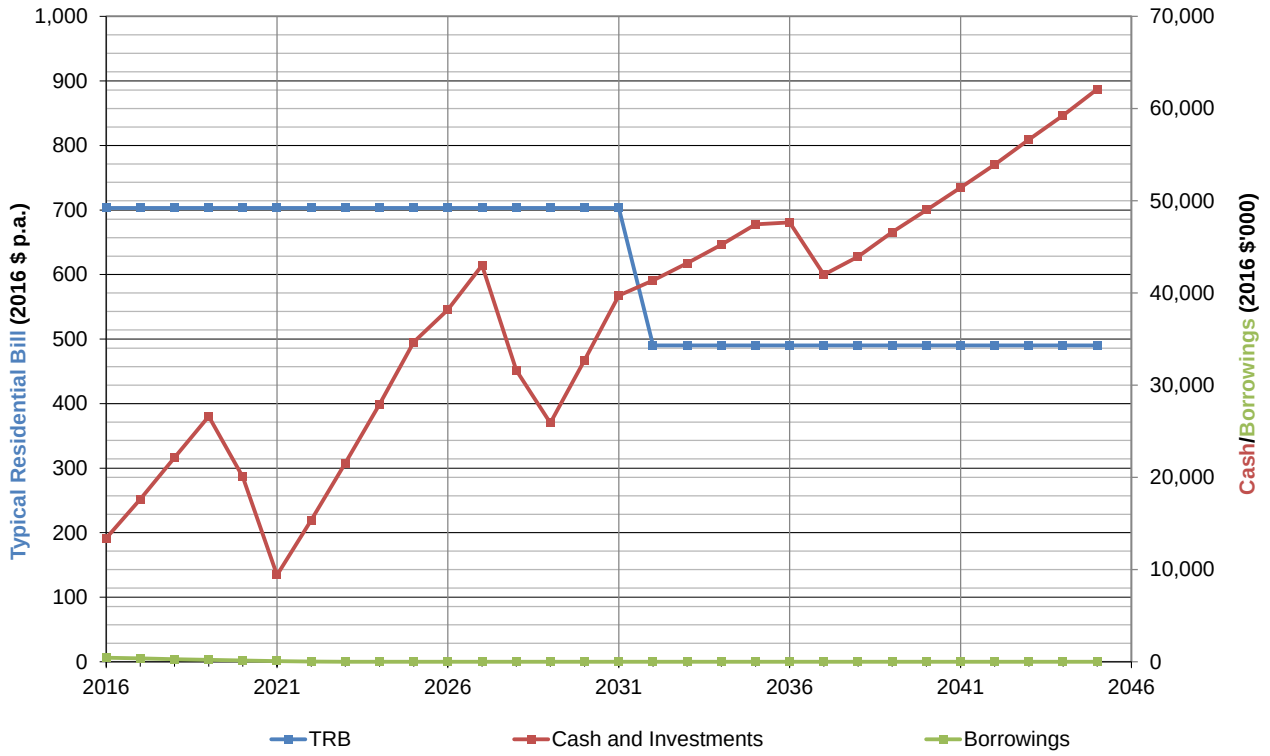

Figure 53: Water Supply TRB, Cash and Investments and Borrowing – Base Case

Note: The long-term cash levels and TRB required are dependent on future unconfirmed expenses and therefore there is limited confidence in results beyond ten years.

D6.2 Sewerage

The initial cases consider the affordability of all capital works identified in the IWCM Strategy and SBP. In particular, the sewering of backlog villages (Nelligen, South Durras, Central Tilba, Tilba Tilba, Mystery Bay, Akolele and Congo) will depend on the availability of funding.

Three initial cases have been modelled for the sewer fund as follows:

- Case 1: no new village sewerage schemes (apart from Rosedale/Guerrilla Bay, Bodalla and Potato Point);
- Case 2: all new village sewerage schemes (including Nelligen, South Durras, Central Tilba, Tilba Tilba, Mystery Bay, Akolele and Congo) with no subsidy; and
- Case 3: all new village sewerage schemes with 40% subsidy.

A comparison of the capital works expenditure for Case 1 and Case 2/3 is given below.

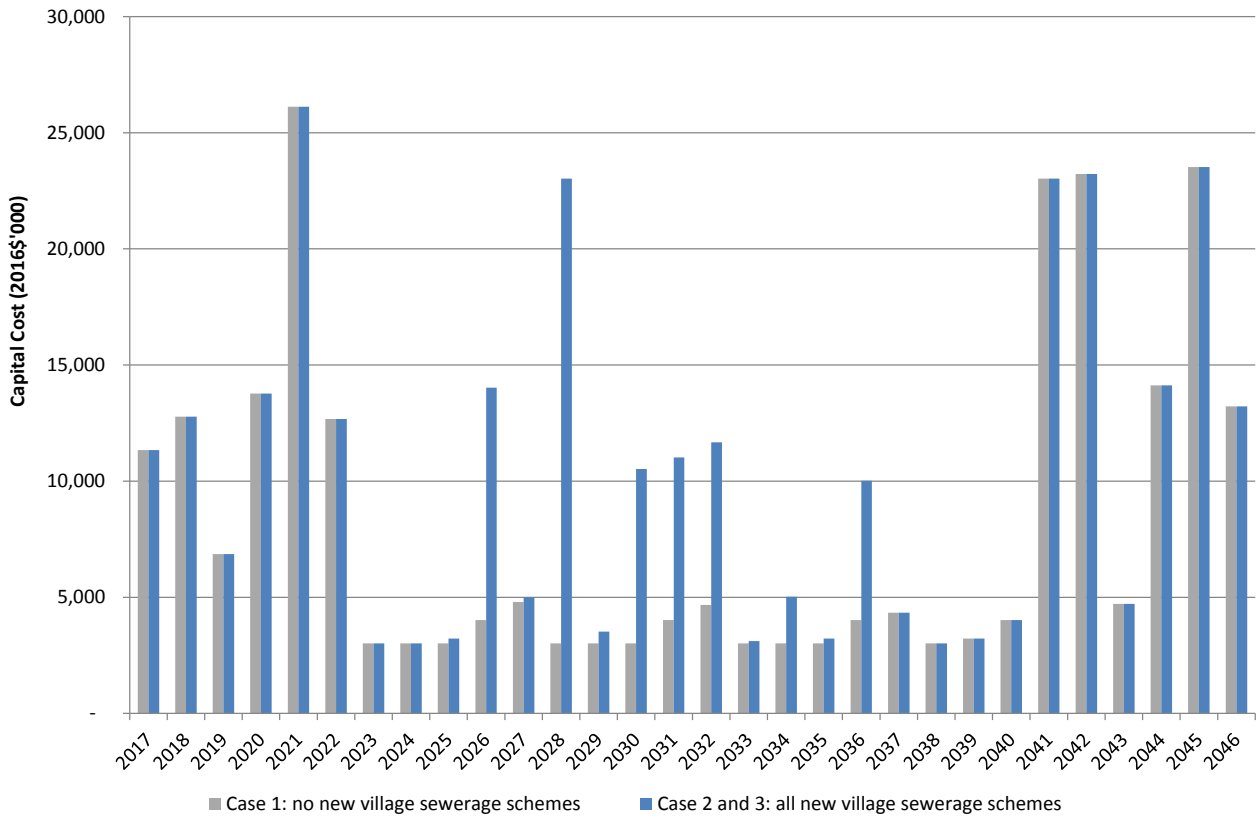

Figure 54: Capital Works Expenditure for Case 1 and Case 2/3

The following figures show the resulting TRB, cash and investments and borrowing required for each of the initial cases. Case 1 shows that the TRB is currently at an appropriate level if the village schemes are not implemented. Comparing Case 1 and Case 2, the impact of sewering the villages (without subsidy) is approximately $82 per assessment p.a. in the medium-term. Comparing Case 2 and Case 3, the benefit of subsidy for the village sewerage schemes is also $82 per assessment p.a. The sewering of the villages is a key component of the IWCM Strategy and SBP and is considered to be affordable if subsidy is available. Therefore Case 3 is Council's preferred base case.

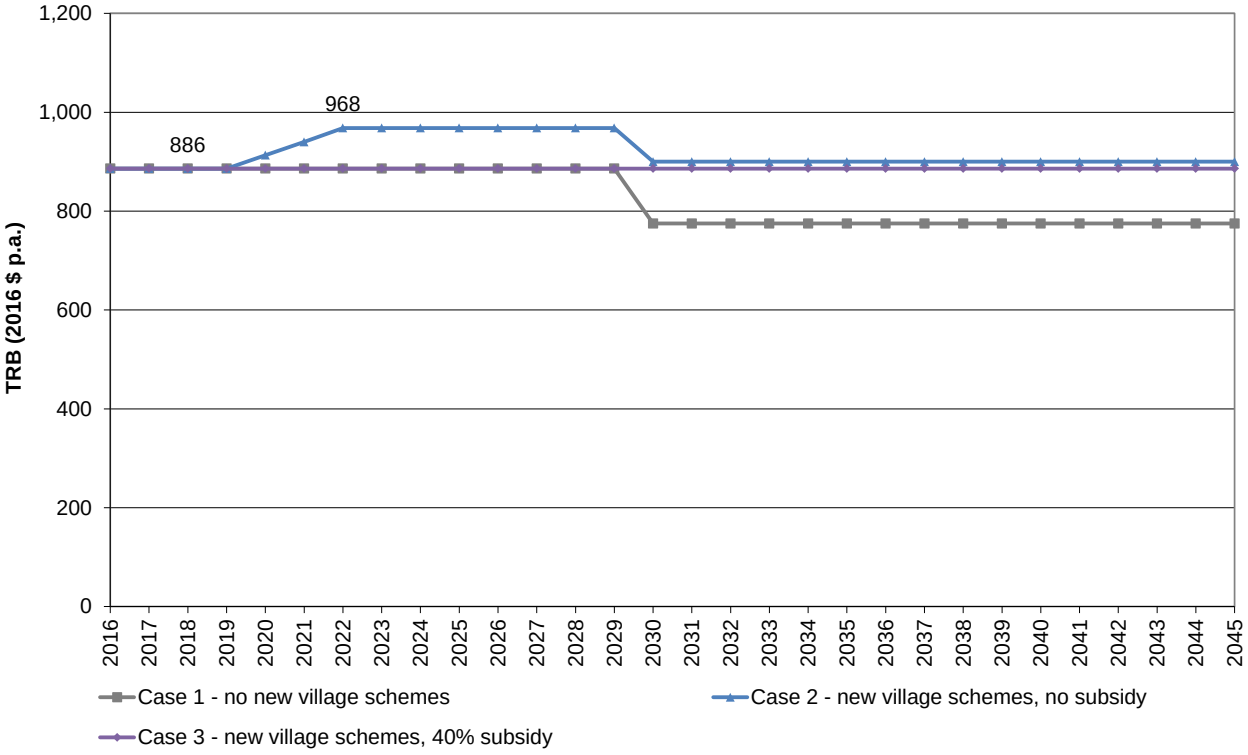

Figure 55: Sewerage TRB – Initial Cases

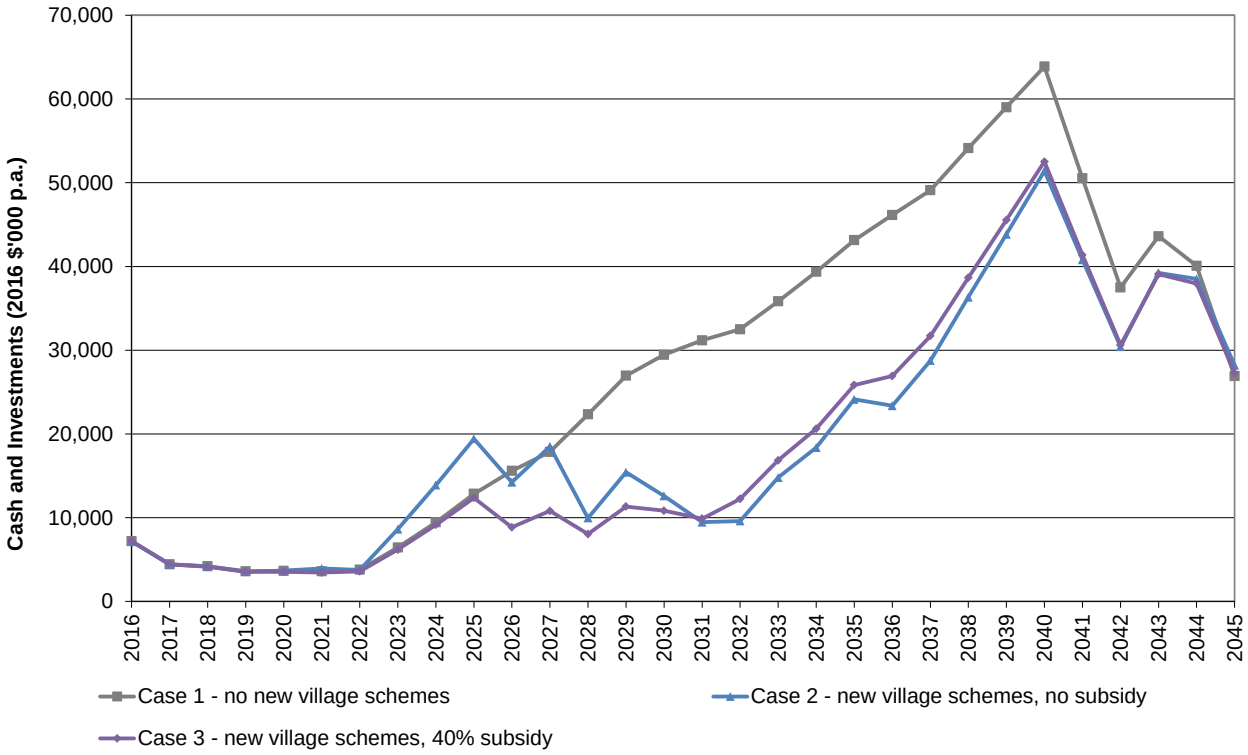

Figure 56: Sewerage Cash and Investments – Initial Cases

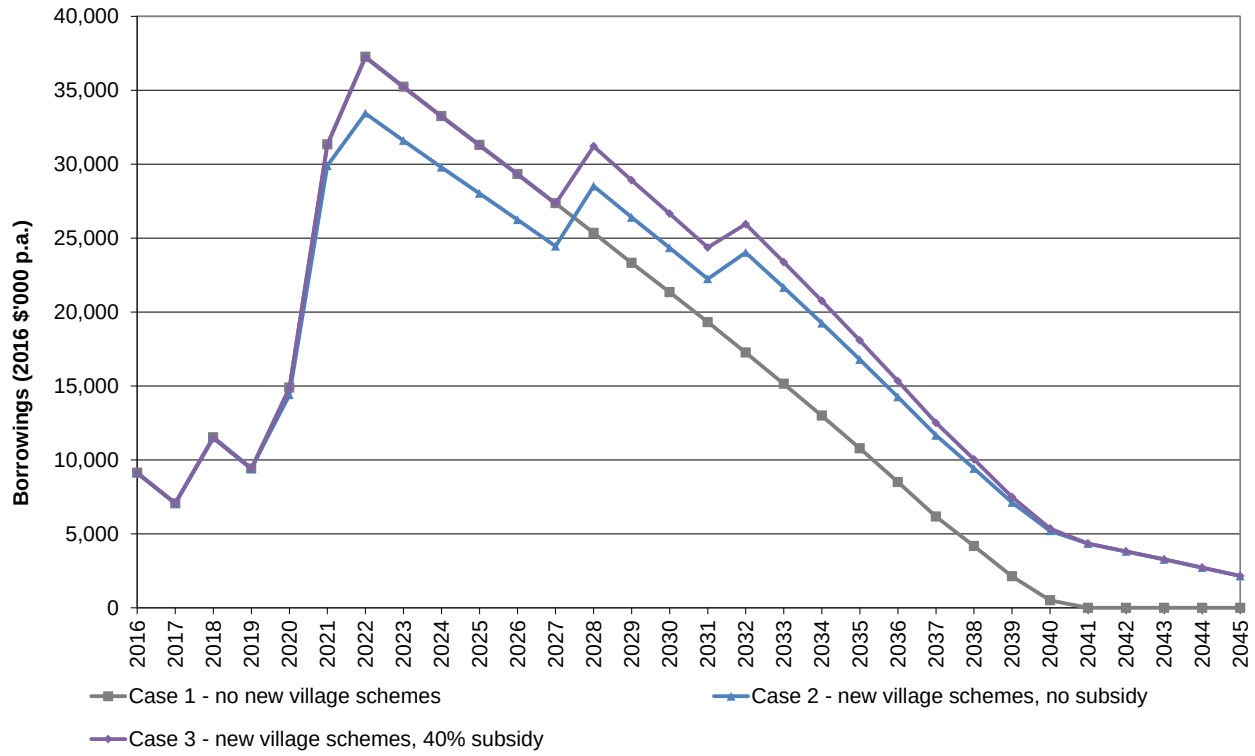

Figure 57: Sewerage Borrowings – Initial Cases

The modelling for Case 3 indicates that Council can maintain the sewer TRB at $886 per assessment per annum. This does not take account of the results of the sensitivity analysis as outlined below.

The projected TRB, levels of borrowing and cash and investments associated with the Base Case (Case 3) financial projection for sewer are shown in the following figure.

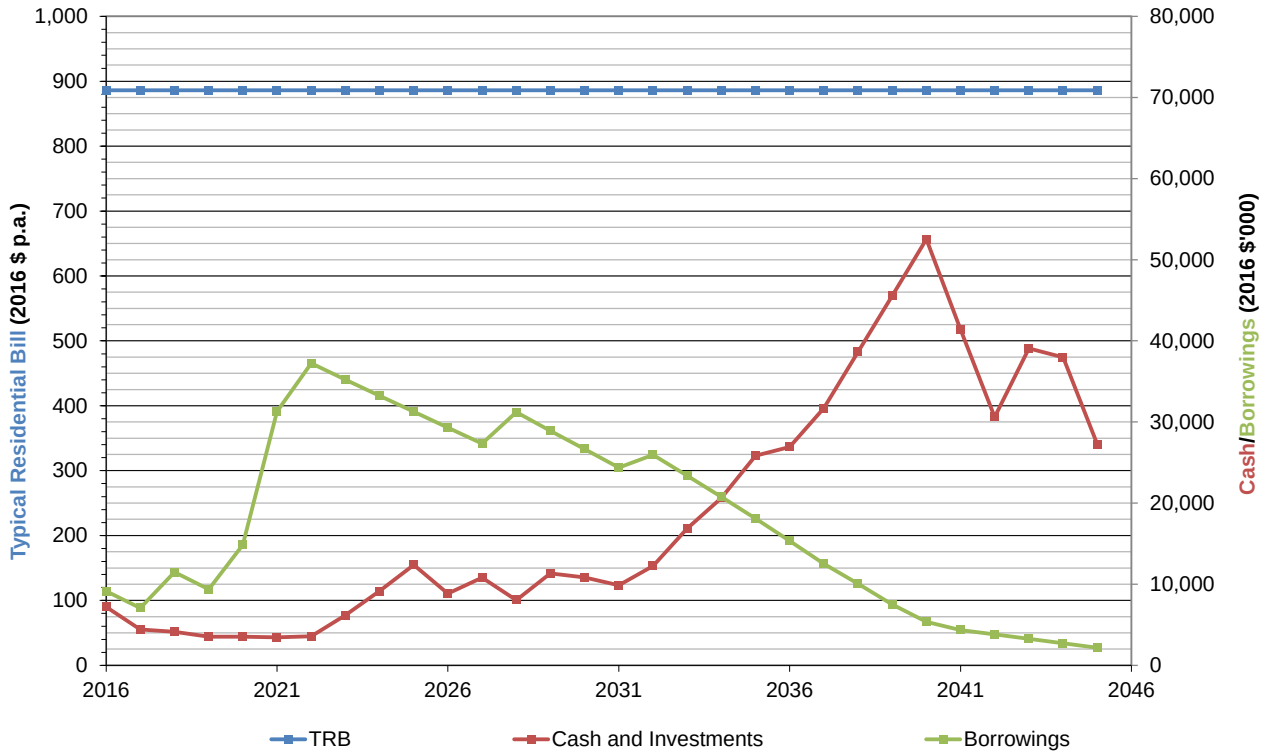

Figure 58: Sewer TRB, Cash and Investments and Borrowing – Base Case

Note: The long-term cash levels and TRB required are dependent on future unidentified expenses and therefore there is limited confidence in results beyond ten years.

D7. SENSITIVITY ANALYSIS

ESC will adopt a medium term price path to provide certainty to its customers. Prior to selection of the TRB to be adopted, it is necessary to undertake a sensitivity analysis to determine the impact of various parameters on the TRB. Relevant parameters include:

- Higher interest rates;
- Lower interest rates;
- Increase in capital costs; and
- Lower rate of population growth.

Each of the cases can be described as a variation of the base case. One parameter is varied between the preferred case and the sensitivity cases. The difference between cash and investments and borrowing outstanding (net cash and investments) at the final year of the model is similar for all cases.

Depending on the results of the sensitivity analysis, the required TRB is selected from the most likely set of financial conditions. Whilst the preferred scenarios are defined as the most likely, there is still a significant level of uncertainty as to the future conditions that will affect the financial status of the water supply and sewerage businesses and the subsequent bills. Council should set price paths higher than the base case in order to allow for some of this uncertainty, and reduce the need to increase the price path in the following years.

The sensitivity analysis is summarised in the following table.

Table 45: Sensitivity Analyses

Case	Description	TRB and Loans for next 5 years (2016 $ per assessment)	
		Water Supply	Sewer
Base Case	Input data as above.	The TRB can remain at $703 p.a. with no new loans.	The TRB can remain at $886 p.a. Loans of $40 million are required from 2018 to 2022.
Higher Inflation and Interest	Inflation = 3.5% p.a., Borrowing = 9.5% p.a., Investment = 7.5% p.a.	Same as Base Case.	No change to the TRB. Additional loans of $0.5 million are required.
Lower Inflation and Interest	Inflation = 1.5% p.a., Borrowing = 7.5% p.a., Investment = 5.5% p.a.	Same as Base Case.	Same as Base Case.
Higher capital costs	Capital costs are increased by 10% over 30 years	Same as Base Case.	The TRB will need to increase by 3% in 2018 and 2019 (to $940 p.a.). Loans of $46 million are required from 2017 to 2022.
Lower Growth	Growth is 0.45% p.a. (approximately halved)(1)	Same as Base Case.	The TRB will need to increase by 3% in 2018 (to $913 p.a.). Loans of $40 million are required from 2018 to 2022.

1. With lower growth, the income from developer charges would reduce however the projected developer income for the sensitivity cases has been kept the same as the base case (based on previous levels of income). ESC will review the Development Servicing Plans in 2016/17 which may impact on developer charges income.

Reduced borrowing may be considered although the shortfall would need to be covered by increased annual bills. To reduce borrowings in the sewerage base case to $26.5 million (from $50 million over 30 years) the TRB would need to increase to $1,006 per assessment per annum by 2020 (additional $120 per assessment per annum).

The following figures show the resulting TRB, loans, cash and investments and borrowing required for each of the sensitivity cases.

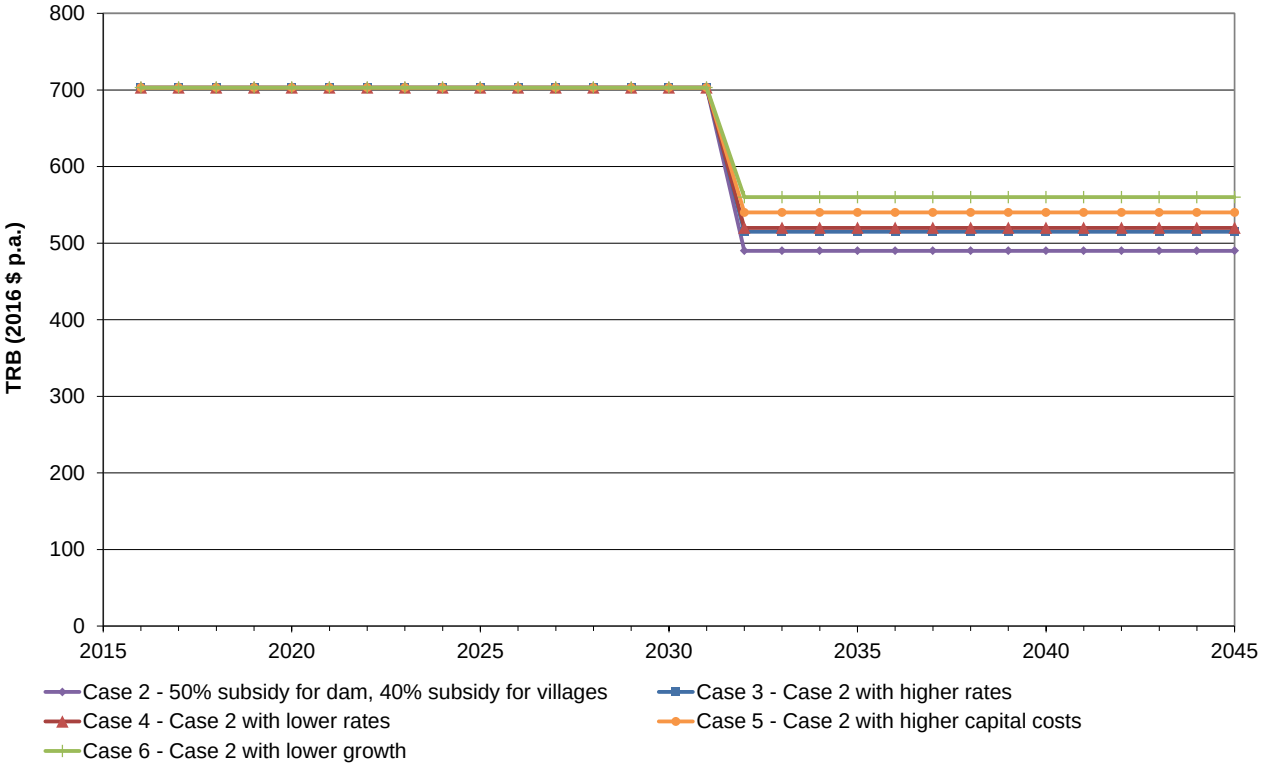

Figure 59: Water Supply TRB - Sensitivity Analysis

Note: The TRB is the same for all cases in the medium term

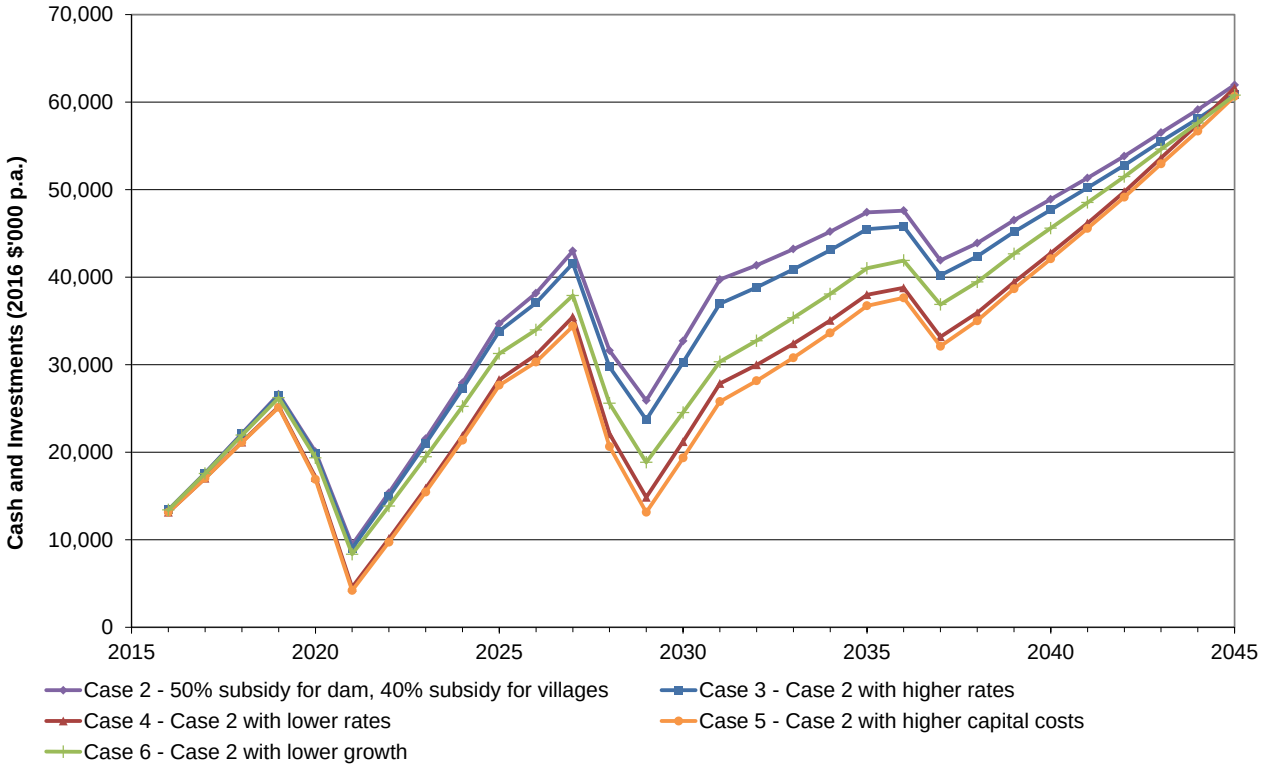

Figure 60: Water Supply Cash and Investments - Sensitivity Analysis

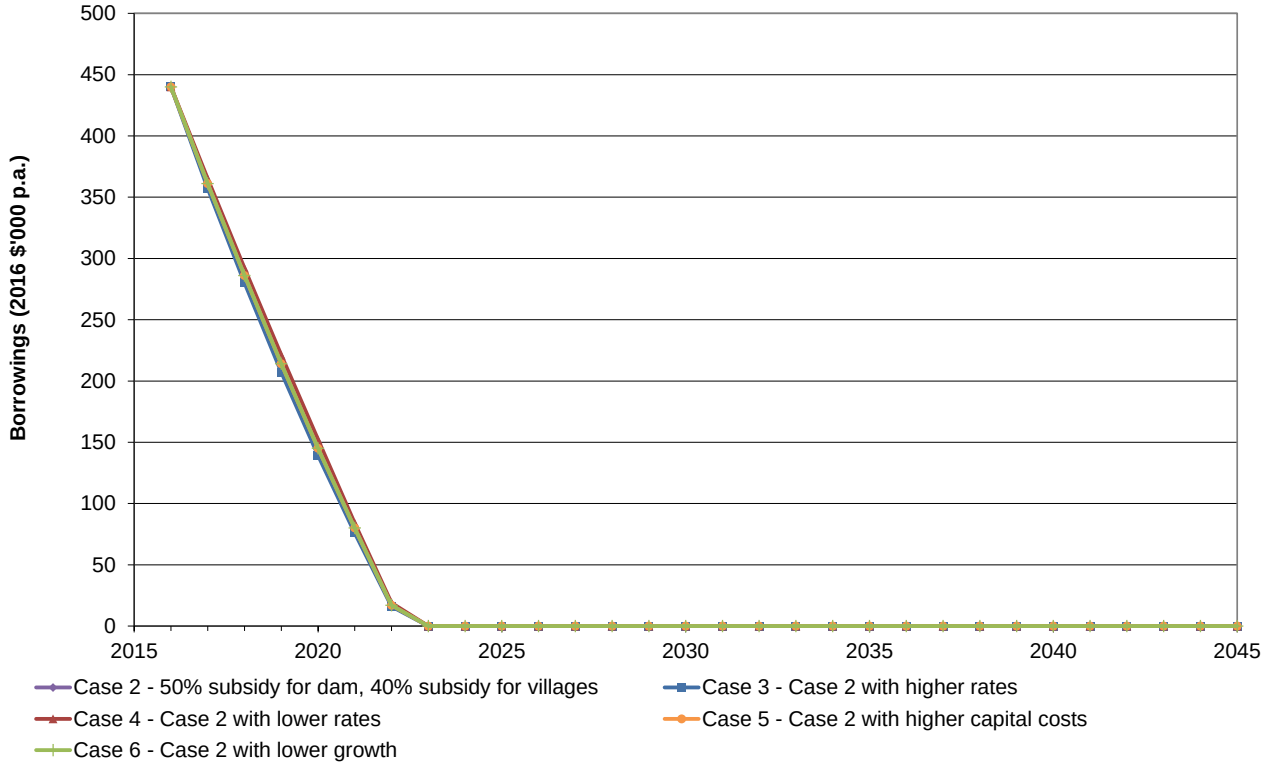

Figure 61: Water Supply Borrowings - Sensitivity Analysis

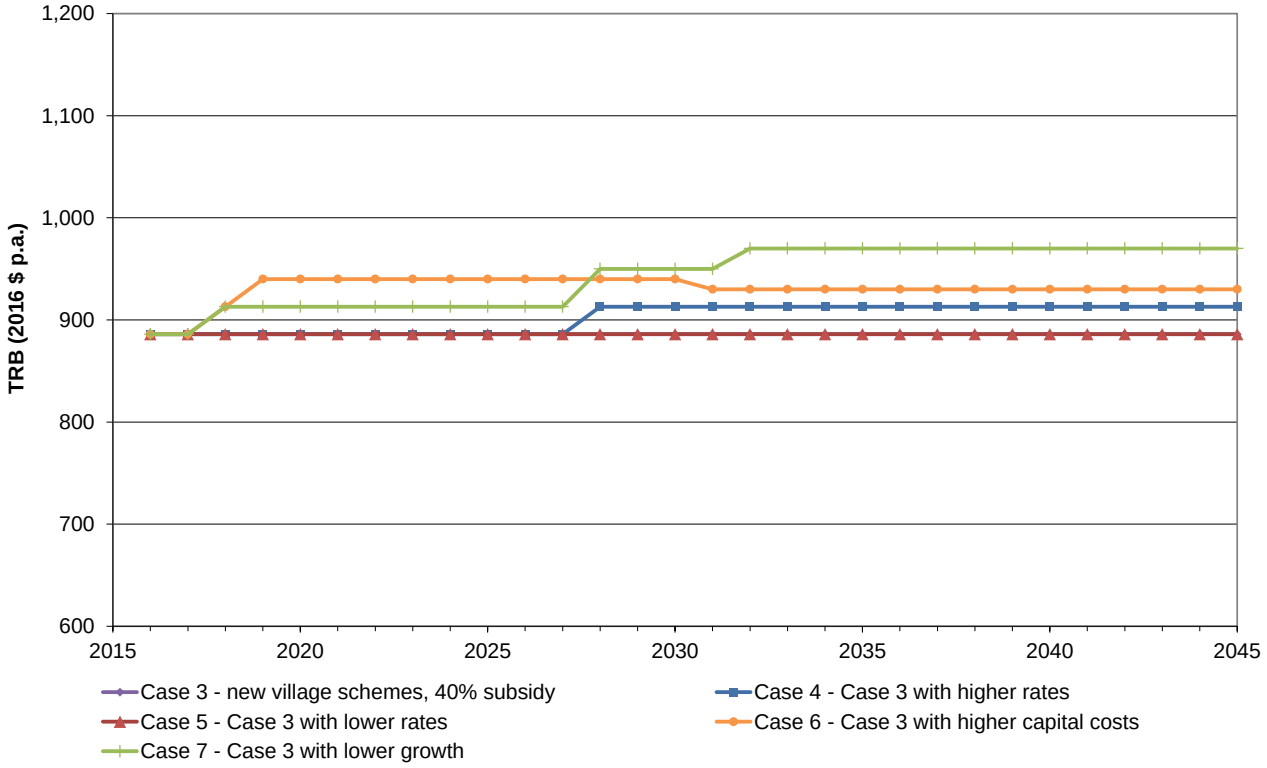

Figure 62: Sewer TRB - Sensitivity Analysis

The TRB for Cases 4 and 5 are the same as Case 3 over the medium-term.

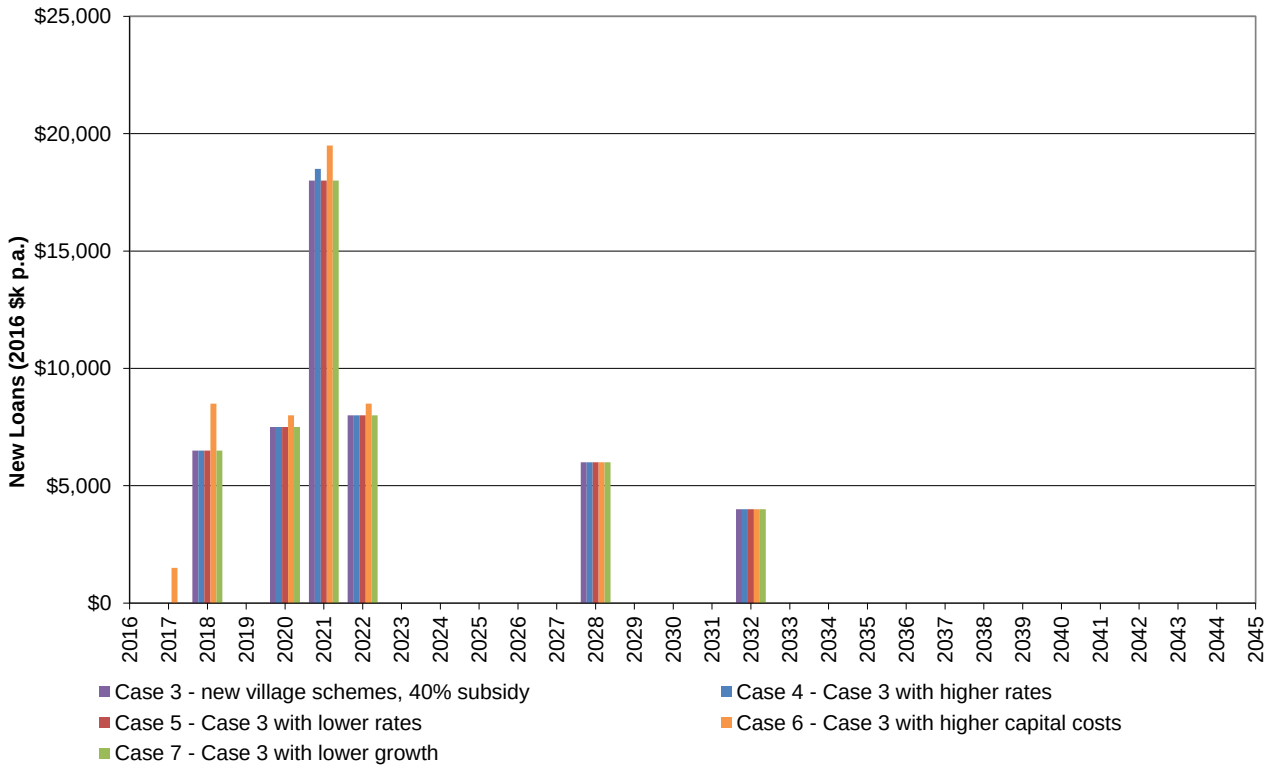

Figure 63: Sewer Loans - Sensitivity Analysis

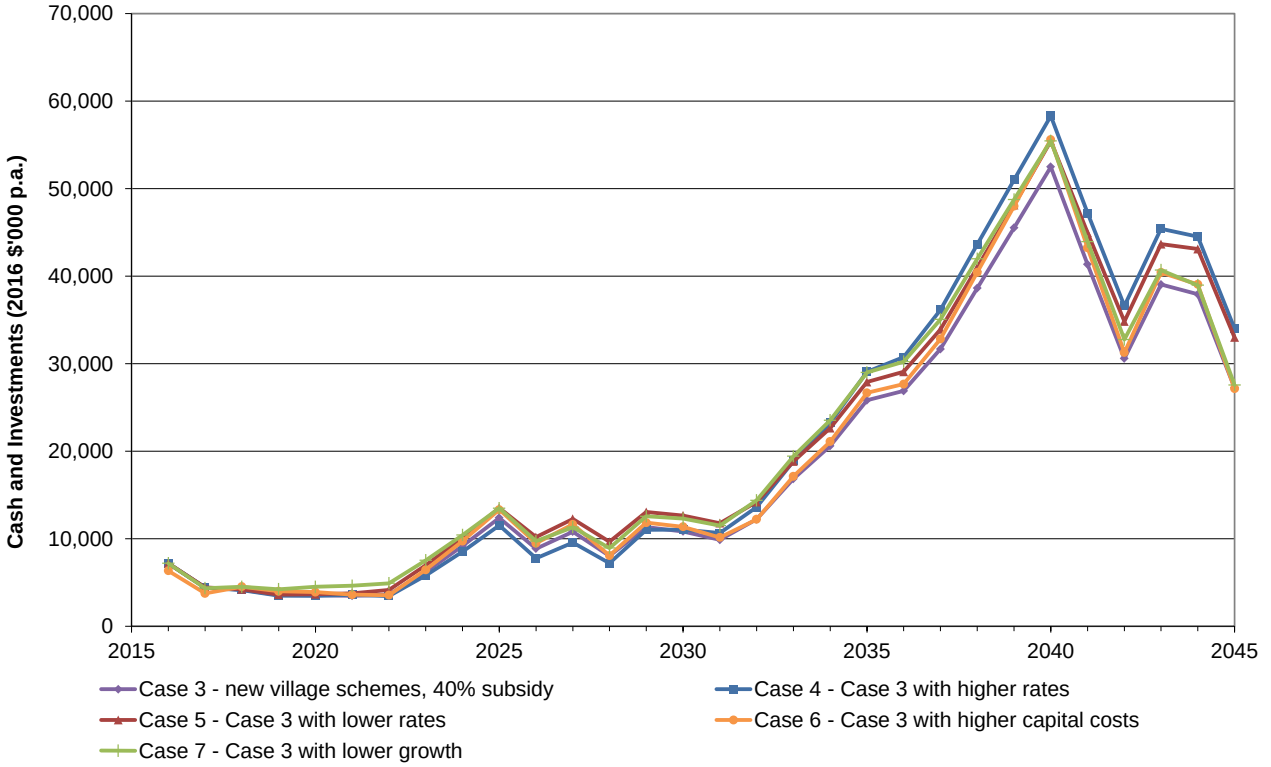

Figure 64: Sewer Cash and Investments - Sensitivity Analysis

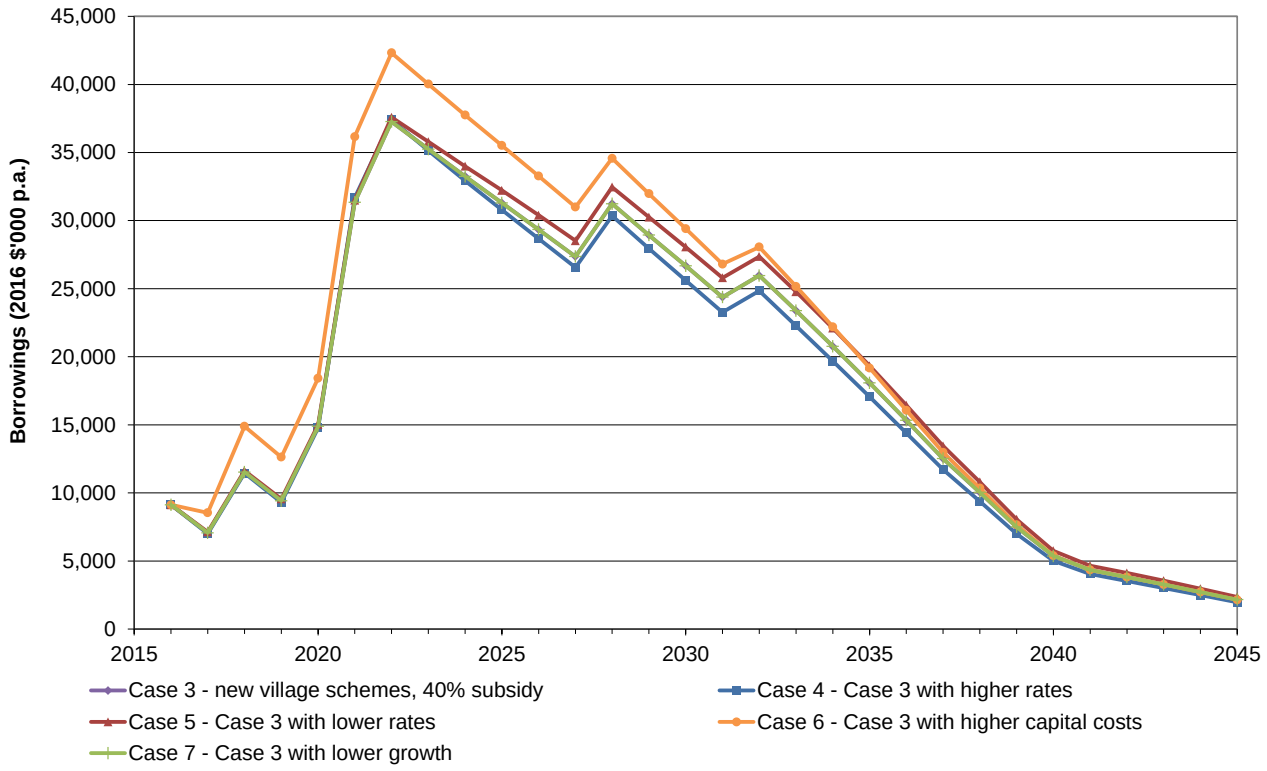

Figure 65: Sewer Borrowings - Sensitivity Analysis

D8. PROPOSED PRICE PATHS

There is a significant level of uncertainty as to the future conditions that will affect the financial status of the water and sewer businesses and the subsequent bills. Council should set price paths which allow for some of this uncertainty and reduce the need to change the price path every year.

Council may elect to pay dividends from the water supply and/or sewer businesses to the General Fund. Should ESC wish to make such payments, the price path will need to be increased to create a surplus that will enable dividend payment.

The Development Servicing Plans are currently being reviewed and any change in projected developer income that will impact on the required income from annual bills should be considered in setting the future price path.

Future changes due to uncontrollable variables such as interest rates, growth rates, energy costs, etc. may be significant. Thus, the financial models must be revisited on an annual basis and the data updated to avoid a potential shortfall.

The TRBs should be checked and adjusted annually in accordance with changes to the CPI.

D8.1 Water Supply

It is recommended that Council maintains the water supply TRB at the current level. The recommended water supply price path is shown in Figure 66 in year 1 (2017) dollars.

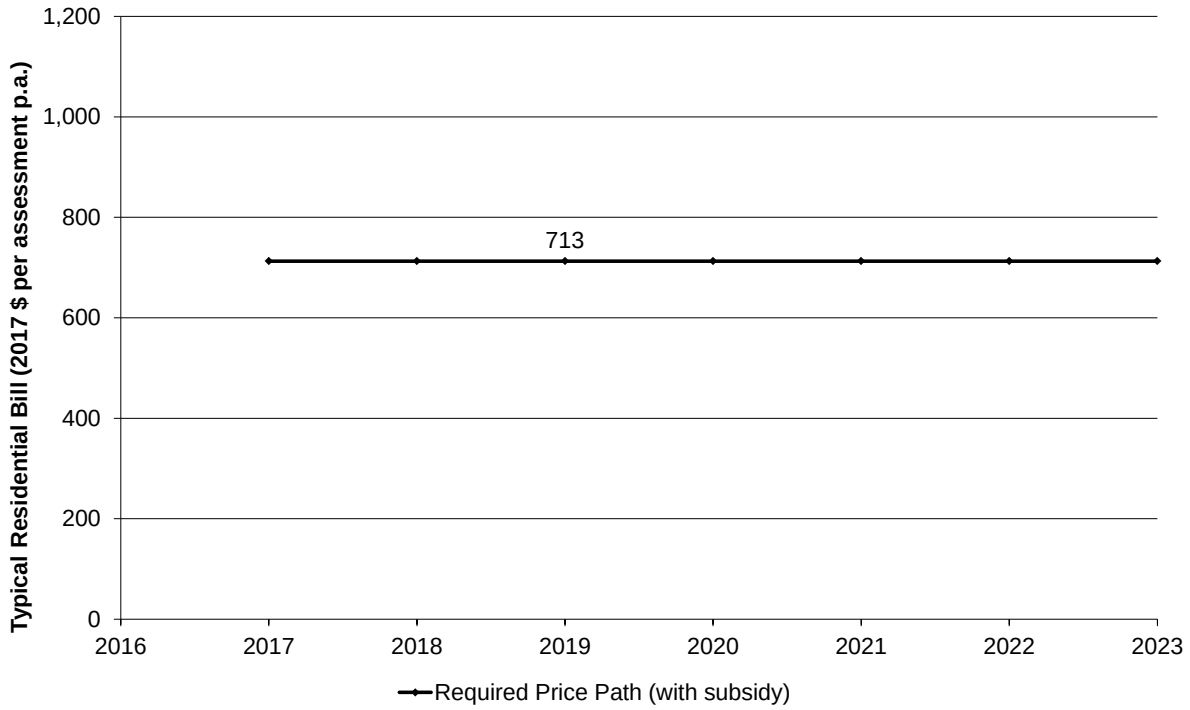

Figure 66: Recommended Water Supply Price Path

D8.2 Sewer

Higher capital costs (case 6) and reduced growth rate (case 7) would have a significant impact on the required sewer TRB. It is recommended that Council increases the sewer TRB in the medium-term to address some of this uncertainty. The recommended sewer price path is shown in Figure 67 in year 1 (2017) dollars.

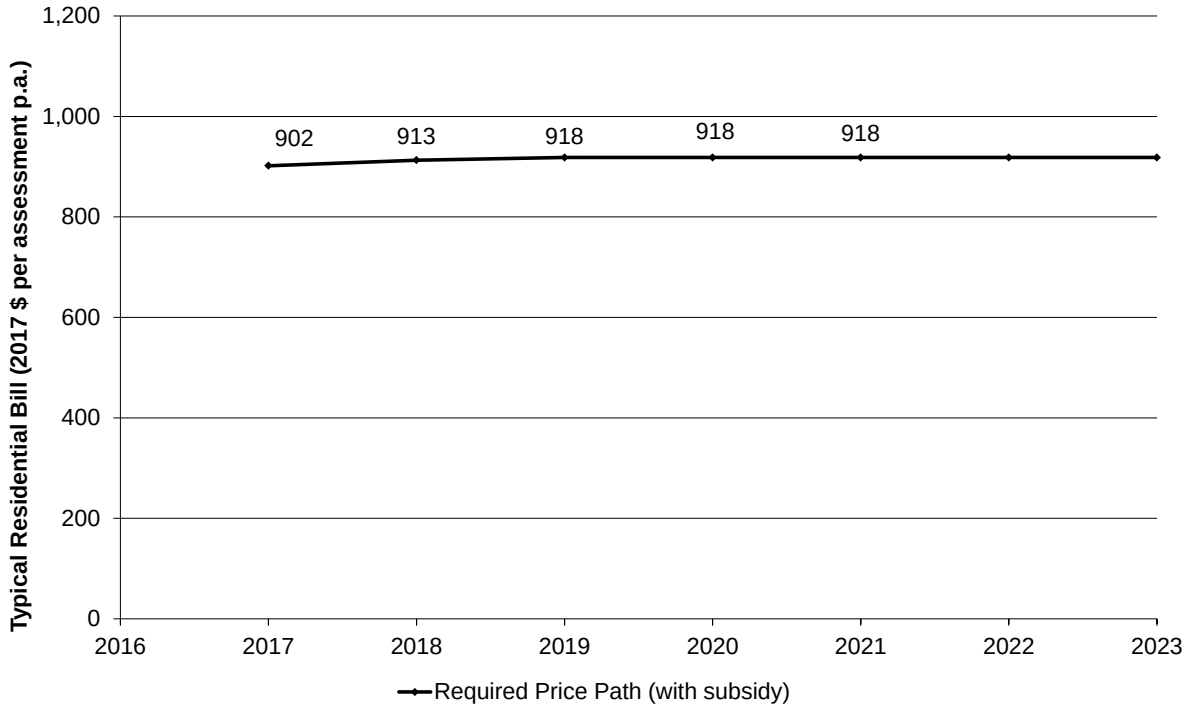

Figure 67: Recommended Sewer Price Path

PART D REFERENCES

DWE (2007) *Best Practice Management of Water Supply and Sewerage Guidelines*

NSW Office of Water (2014b) *Water Supply and Sewerage Strategic Business Planning and Financial Planning Check List – July 2014*.

PART D GLOSSARY AND ABBREVIATIONS

DPI	NSW Department of Primary Industries
DWE	Department of Water Energy, former name for DPI-Water
ERRR	Economic Real Rate of Return
ESC	Eurobodalla Shire Council
ET	Equivalent tenements
k	Thousand (dollars)
OMA	Operation, Management and Administration (cost)
TRB	Typical Residential Bill
TAMP	Total Asset Management Plan

Appendix D1: 30 Year Total Asset Management Plan – Capital Works, Operation and Maintenance and Strategic Planning Budgets

IWCM Eurobodalla Shire Council
Water Supply
2016$

							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Item	**Project**	**ILOS**	**Growth**	**Renewal**	**30 year total**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**
1	New Service Connections (developer funded)		100%		4,200	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
2	Asset Renewal - Water Meters			100%	7,800	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260
3	Asset Renewal - Telemetry & SCADA			100%	1,350	120	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
4	Asset Renewal - Water Treatment			100%	3,360	-	-	-	-	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Asset Renewal - Services			100%	1,800	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
6	Asset Renewal - Valves and Hydrants			100%	4,200	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
7	Asset Renewal - Mains			100%	47,750	1,400	1,450	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,900	1,900	1,900	1,900	1,900	1,900	1,900
8	Asset Renewal - Pumping Stations			100%	3,590	106	110	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
9	Asset Renewal - Reservoirs			100%	7,200								300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
10	New Narooma Reservoir		20%	80%	600																						600									
11	Reticulation system upgrades		100%		2,500												250	250	250	250	250	250	250	250	250	250										
12	Northern Water Treatment Plant Upgrade		21%	79%	10,000																					2,000	8,000									
13	Southern Dam Construction	70%	30%		63,450	50	800	1,000	3,650	25,000	33,000																									
14	New Southern WTP	70%	30%		30,000	-										1,000	2,000	15,000	12,000																	
15	Pressure Reduction	100%			400	-		200	200																											
16	Water Refill Stations	100%			40	30	40																													
17	Deep Creek Dam Cathodic Protection			100%	-	40																														
18	Deep Creek Dam drainage works			100%	200		200																													
19	Water Treatment Sludge Management	100%			400					400																										
20	Southern WTP upgrades	100%			-	210																														
21	Nelligen Water Supply Scheme	100%			4,100										100	4,000																				
22	South Durras Water Supply	100%			5,100												100	5,000																		
23	WHS Upgrade - Southern WTP	100%			36			36																												
24	WHS Upgrade - Northern WTP	100%			12			12																												
	TOTAL				198,089	2,556	3,245	3,513	6,115	27,905	35,505	2,505	2,805	2,805	2,905	7,805	5,155	23,055	15,055	3,055	3,055	3,055	3,055	2,815	2,815	4,815	10,565	3,165	2,565	2,965	2,965	2,965	2,965	2,965	2,965	2,965
	ILOS Works				75,503	275	600	948	2,755	17,900	23,100	-	-	-	100	4,700	1,500	15,500	8,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Growth Works				36,949	155	380	440	1,235	7,640	10,040	140	140	140	140	440	990	4,890	3,990	390	390	390	390	390	390	809	1,817	258	140	140	140	140	140	140	140	140
	Renewals				85,636	2,126	2,265	2,125	2,125	2,365	2,365	2,365	2,665	2,665	2,665	2,665	2,665	2,665	2,665	2,665	2,665	2,665	2,665	2,425	2,425	4,006	8,748	2,907	2,425	2,825	2,825	2,825	2,825	2,825	2,825	2,825
	Grants																																			
	Southern Dam Construction	50%			30,825				1,825	12,500	16,500	-	-	-	-	-	-	-	-	-	-															
	Nelligen Water Supply Scheme	40%			1,640	-	-	-	-	-	-	-	-	-	40	1,600	-	-	-	-	-															
	South Durras Water Supply	40%			2,040	-	-	-	-	-	-	-	-	-	-	-	40	2,000	-	-	-															
	Total possible grants				34,505	-	-	-	1,825	12,500	16,500	-	-	-	40	1,600	40	2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

IWCM Eurobodalla Shire Council
Sewerage
2016$

							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Item	**Project**	**ILOS**	**Growth**	**Renewal**	**30 year total**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**
1	New Service Connections (developer funded)		100%		600	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
2	Asset Renewal - Sewage Treatment Plants			100%	7,440	210	220	230	240	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
3	Asset Renewal - SCADA and Telemetry			100%	1,494	44	46	48	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
4	Asset Renewal - Sewer Mains and Service Connections			100%	29,500	900	800	850	900	950	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
5	Asset Renewal - Sewer Manholes			100%	5,600	50	100	100	100	100	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
6	Asset Renewal - Pumping Stations			100%	43,850	1,100	1,350	500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
7	Batemans Bay STP upgrade and augmentation	81%	19%		5,200	100	200	1,500	3,500																											
8	Batemans Bay STP replacement		19%	81%	41,200																							200	1,000	20,000	20,000					
9	Servicing land release areas - Batemans Bay		100%		4,000						1,000					1,000					1,000				1,000										
10	Batemans Bay STP - Sewage Sludge Management		19%	81%	500			500																												
11	Malua Bay Diversion	100%			8,000	60						8,000																								
12	Tomakin STP capacity upgrade - Malua Bay diversion	100%			20,750		50	350	350	10,000	10,000																									
13	Servicing land release areas - Tomakin		100%		3,000							550					875					875				700									
14	Tomakin STP replacement		32%	68%	21,200																											200	1,000	20,000	
15	Moruya STP Upgrade	100%			1,300						100	1,000																							200
16	West Moruya Sewerage		100%		-	1,100																													
17	Servicing land release areas - Moruya		100%		530							110					150					150				120									
18	Moruya STP Storage Shed	100%			80			80																											
19	Bingie STP upgrade and augmentation	86%	14%		1,150	-	150	1,000																											
20	Bingie STP replacement		14%	86%	10,600																										100	500	10,000		
21	Servicing land release areas - Tuross		100%		450												180					150				120									
22	Kianga STP upgrade and augmentation	80%	20%		5,300				200	100	5,000																								
23	Kianga STP replacement		20%	80%	10,600																												100	500	10,000
24	Servicing land release areas - Narooma		100%		1,425												570					475				380									
25	Rosedale and Guerilla Bay sewerage scheme	100%			5,200	1,000	5,200																												
26	Rosedale Regional Sewage Pumping Station	100%			-	1,600																													
27	Tomakin STP upgrade (including RAS/WAS and amenities upgrade)	50%	35%	15%	-	1,600																													
28	Bodalla sewerage - collection and transfer system	100%			2,600	100		2,600																											
29	Bodalla STP and effluent management	87%	13%		5,500	320	3,000	2,500																											
30	Bodalla STP upgrade and augmentation	100%			1,100																										100	1,000			
31	South Durras sewerage scheme	100%			20,200												200	20,000																	
32	Nelligen sewerage scheme	100%			10,200										200	10,000																			
33	Potato Point sewerage scheme	100%			4,800					300	4,500																								
34	Bodalla STP augmentation - Potato Point	100%			5,500			2,500		500	2,500																								
35	Central Tilba, Tilba Tilba and Mystery Bay sewerage scheme	100%			22,000														500	7,500	7,000	7,000													
36	Congo sewerage scheme	100%			6,200																				200	6,000									
37	Akolele sewerage scheme	100%			2,100																		100	2,000											
	Total Capital Works				309,169	8,204	11,136	12,778	6,860	13,770	26,120	12,680	3,020	3,020	3,220	14,020	4,995	23,020	3,520	10,520	11,020	11,670	3,120	5,020	3,220	10,020	4,340	3,020	3,220	4,020	23,020	23,220	4,720	14,120	23,520	13,220
	ILOS Works				124,294	3,920	8,153	9,787	3,354	10,880	21,120	9,000	-	-	200	10,000	200	20,000	500	7,500	7,000	7,000	100	2,000	200	6,000	-	-	-	-	-	100	1,000	-	-	200
	Growth Works				31,070	1,740	467	857	716	40	2,000	680	20	20	20	1,020	1,795	20	20	20	1,020	1,670	20	20	20	1,020	1,340	20	58	208	3,776	3,790	153	1,739	6,542	1,980
	Renewals				153,806	2,544	2,516	2,134	2,790	2,850	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,162	3,812	19,244	19,330	3,567	12,381	16,978	11,040

IWCM Operating and Maintenance Expenditure Program
Water Supply
2016$

Component	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Management	4,880	4,326	4,326	4,326	4,526	4,526	4,526	4,526	4,526	4,626	4,626	4,726	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826	4,826
Headworks	210	190	190	190	190	210	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
Water Distribution	3,178	3,483	3,178	3,178	3,178	3,401	3,401	3,401	3,401	3,401	3,401	3,451	3,451	3,451	3,451	3,451	3,451	3,501	3,501	3,501	3,501	3,501	3,501	3,551	3,551	3,551	3,551	3,551	3,551	3,601
Water Treatment	1,135	1,135	1,135	1,135	1,135	1,135	1,135	1,135	1,135	1,135	1,135	1,135	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285
Other Water Operations	415	415	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416
Total	**9,818**	**9,549**	**9,245**	**9,245**	**9,445**	**9,688**	**9,668**	**9,668**	**9,668**	**9,768**	**9,768**	**9,918**	**10,168**	**10,168**	**10,168**	**10,168**	**10,168**	**10,218**	**10,218**	**10,218**	**10,218**	**10,218**	**10,218**	**10,268**	**10,268**	**10,268**	**10,268**	**10,268**	**10,268**	**10,318**

IWCM Operating and Maintenance Expenditure Program
Sewerage
2016$

Component	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Management	3,868	4,268	3,388	3,388	3,588	3,588	3,588	3,588	3,588	3,688	3,688	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788	3,788
Mains	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Pumping Stations	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244	2,244
Sewer Treatment Works	2,700	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900
Other Sewer Operations	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626
Total	**10,534**	**11,134**	**10,254**	**10,254**	**10,454**	**10,454**	**10,454**	**10,454**	**10,454**	**10,554**	**10,554**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**	**10,858**

IWCM Strategy Budget **Eurobodalla Shire Council**

Water Supply

2016$

				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Item	**Project**	**30 year total**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**
1	Miscellaneous Investigations	800	40	80	100	40	40	40	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
2	Demand Forecast	480	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-
3	Secure Yield Modelling	180	10		-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	-	30	-	-	-	-	30	-	-	-	30	-
4	Drought Management Plan	240		40			-	-	40	-	-	-	-	40	-	-	-	-	40	-	-	-	-	40	-	-	-	-	40	-	-	-	-
5	Reticulation Modelling	360	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	
6	Integrated Water Cycle Management Plan	360	40	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60
7	Strategic Business Plan	90	5	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15
8	Development Servicing Plan	90	5	-	-	-	-	15	-		-	-	15	-		-	-	15	-		-	-	15	-		-	-	15	-		-	-	15
9	Asset Management Plan	180	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-
10	Fair Value Asset Review	120	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-
11	Dam Safety Review	120	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-
12	Dam Stability Analysis	200	-	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	-	-	-	-	-	-	-
13	DWMS review/audit	360		10	10	20	10	10	10	10	20	10	10	10	10	20	10	10	10	10	20	10	10	10	10	20	10	10	10	10	20	10	10
14	Reservoir Condition Assessment	750	22	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
15	Trunk Main Condition Assessment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Southern Deep Groundwater Investigation	125	125	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	4,455	247	350	235	225	105	165	165	55	205	85	145	165	55	205	85	145	165	55	205	85	145	165	155	205	85	145	165	55	205	85	145

IWCM Strategy Budget **Eurobodalla Shire Council**
Sewerage
2016$

Item	Project	30 year total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Miscellaneous Investigations	760	80	60	80	40	40	40	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
2	Demand Forecast	480	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-	-	-	80	-	-
3	Reticulation Modelling	600	-	-	-	-	100	-	-	-	-	100	-	-	-	-	100	-	-	-	-	100	-	-	-	-	100	-	-	-	-	100	-
4	Integrated Water Cycle Management Strategy	360	40	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60	-	-	-	-	60
5	Strategic Business Plan	90	5	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15	-	-	-	-	15
6	Development Servicing Plan	90	5	-	-	-	-	15	-		-	-	15	-		-	-	15	-		-	-	15	-		-	-	15	-		-	-	15
7	Asset Management Plan	180	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-	30	-	-	-	-
8	Fair Value Asset Review	120	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-	20	-	-	-	-
9	CCTV Asset Condition Assessment	6,910	140	150	150	150	180	180	200	200	200	200	200	240	240	240	240	240	250	250	250	250	250	260	260	260	260	260	270	270	270	270	270
10	Biosolids Management Strategy	300				100										100										100							
11	Recycled Water Management Systems	120		60	60																												
	TOTAL	10,010	270	320	290	370	320	310	270	220	300	320	310	310	260	440	360	350	320	270	350	370	360	330	280	460	380	370	340	290	370	390	380

Appendix D2: Financial Planning Outputs

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

FINMOD
Eurobodalla Shire Council

Summary Report of Assumptions and Results

	2015/16	2019/20	2024/25	2029/30	2034/35	2039/40	2044/45
Inflation Rates - General (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Inflation Rates - Capital Works (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Borrowing Interest Rate (%)	8.50	8.50	8.50	8.50	8.50	8.50	8.50
Term of New Loans (years)	20	20	20	20	20	20	20
Investment Interest Rate (%)	6.50	6.50	6.50	6.50	6.50	6.50	6.50
Growth Rate - Residential (%)	0.95	0.92	0.85	0.81	0.79	0.76	0.63
Developer Charges per Assessment - Residential (2015/16 $)	11780	11780	11780	11780	11780	11780	11780
Subsidised Scheme Capital Works ($m)	0.28	17.90	0.10	0.00	0.00	0.00	0.00
Grants on Acquisition of Assets ($m)	0.00	12.50	0.04	0.00	0.00	0.00	0.00
Renewals ($m)	2.13	2.37	2.67	2.67	2.43	2.83	2.83
Renewals (%)	0.50	0.51	0.54	0.50	0.45	0.52	0.52
Borrowing Outstanding ($m)	0.44	0.14	0.00	0.00	0.00	0.00	0.00
Mgmnt Cost / Assessment	259	216	215	218	209	201	195
Debt Equity Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OMA Cost Per Assessment	509	456	456	454	439	425	410
Economic Real Rate of Return (%)	0.24	0.53	0.49	0.43	-1.14	-1.04	-0.94
Return on Capital (%)	0.47	1.27	0.92	0.78	-0.44	-0.36	-0.15
Net Debt ($m)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt Service Ratio	0.13	0.01	0.00	0.00	0.00	0.00	0.00
Average Residential Bills	658	663	668	672	467	470	473
Typical Residential Bills (2015/16$)	703	703	703	703	490	490	490

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

FINMOD
Eurobodalla Shire Council

STANDARD LOAN PAYMENT SCHEDULE

	Drawdown	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Total Principal	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Interest		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

Historical Operating Statement

	2013/14*	2014/15*
EXPENSES		
Management Expenses	*4118*	*4028*
Administration	4118	4028
Engineering and Supervision		
Operation and Maintenance Expenses	*4152*	*3895*
Operation Expenses	2165	2093
Maintenance Expenses	1234	1165
Energy Costs	526	410
Chemical Costs	227	227
Purchase of Water		
Depreciation	*6070*	*6077*
System Assets	6055	6066
Plant & Equipment	15	11
Interest Expenses	622	584
Other Expenses	31	31
TOTAL EXPENSES	**14993**	**14615**
REVENUES		
Rates & Service Availability Charges	*4649*	*5862*
Residential	4223	5335
Non-Residential	426	527
User Charges	*9612*	*9258*
Sales of Water : Residential	7439	7332
Sales of Water : Non-Residential	2173	1926
Extra Charges		
Interest Income	333	455
Other Revenues	360	334
Grants	*201*	*250*
Grants for Acquisition of Assets		49
Pensioner Rebate Subsidy	201	201
Other Grants		
Contributions	*710*	*1342*
Developer Charges	590	1148
Developer Provided Assets	120	29
Other Contributions		165
TOTAL REVENUES	**15865**	**17501**
OPERATING RESULT	**872**	**2886**
OPERATING RESULT (less Grants for Acq of Assets)	**872**	**2837**

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

Historical Statement of Financial Position

	2013/14*	2014/15*
Cash and Investments	10299	10676
Receivables	3182	3301
Inventories	59	59
Property, Plant & Equipment	*284228*	*283701*
System Assets (1)	279102	278273
Plant & Equipment	5126	5428
Other Assets	166	122
TOTAL ASSETS	**297934**	**297859**
LIABILITIES		
Bank Overdraft		
Creditors	7	2
Borrowings	8621	2649
Provisions		
TOTAL LIABILITIES	**8628**	**2651**
NET ASSETS COMMITTED	**289306**	**295208**
EQUITY		
Accumulated Operating Result	147010	149289
Asset Revaluation Reserve	142296	145919
TOTAL EQUITY	**289306**	**295208**
(1) Notes to System Assets		
Current Replacement Cost	411621	417691
Less: Accumulated Depreciation	132519	139418
Written Down Current Cost	279102	278273

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

FINMOD
Eurobodalla Shire Council

Base Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Financial Data																									
Inflation Rate - General (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Inflation Rate - Capital Works (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Borrowing Interest Rate for New Loans (%)	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
Investment Interest Rate (%)	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
Number of Assessments																									
Growth Rate (%)																									
Residential Assessments	0.95	0.95	0.94	0.93	0.92	0.91	0.88	0.87	0.86	0.85	1.34	0.83	1.54	0.82	0.81	0.80	0.81	0.81	0.80	0.79	0.79	0.78	0.77	0.77	0.76
Non-Residential Assessments	0.78	0.78	0.78	0.77	0.76	0.76	0.71	0.71	0.70	0.70	0.69	0.65	0.64	0.64	0.63	0.63	0.67	0.66	0.66	0.65	0.65	0.72	0.71	0.71	0.70
Total Assessments	0.94	0.94	0.93	0.92	0.91	0.90	0.87	0.86	0.85	0.84	1.31	0.82	1.49	0.81	0.80	0.79	0.80	0.80	0.79	0.78	0.78	0.78	0.77	0.77	0.76
Number of New Assessments																									
Residential	177	178	178	178	178	177	173	173	172	172	273	171	320	173	173	172	175	177	176	175	177	176	175	176	175
Non-Residential	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	8	8	8	8
Total New Assessments	185	186	186	186	186	185	180	180	179	179	280	178	327	180	180	179	182	184	183	182	184	184	183	184	183
Projected Number of Assessments																									
Residential	18788	18966	19144	19322	19500	19677	19850	20023	20195	20367	20640	20811	21131	21304	21477	21649	21824	22001	22177	22352	22529	22705	22880	23056	23231
Non-Residential	984	992	1000	1008	1016	1024	1031	1038	1045	1052	1059	1066	1073	1080	1087	1094	1101	1108	1115	1122	1129	1137	1145	1153	1161
Total Projected Assessments	19772	19958	20144	20330	20516	20701	20881	21061	21240	21419	21699	21877	22204	22384	22564	22743	22925	23109	23292	23474	23658	23842	24025	24209	24392
Backlog Assessments																									
Residential	0	0	0	0	0	0	0	0	0	0	100	0	150	0	0	0	0	0	0	0	0	0	0	0	0
Non-Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Backlog Assessments	0	0	0	0	0	0	0	0	0	0	100	0	150	0	0	0	0	0	0	0	0	0	0	0	0
Developer Charges / Vacant Assessments (Values in 2015/16 $)																									
Developer Charges $/Assessment																									
Residential	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780	11780
Non-Residential	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108
Number of Vacant Residential Assessments	1147	1124	1101	1079	1058	1036	1016	995	975	956	937	918	900	882	864	847	830	813	797	781	765	750	735	720	706
Average Charge of Vacant Assessments	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
% of Occupied Assessments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation of Existing Plant and Equipment (Values in 2015/16 $'000)																									
Current Replacement Cost of System Assets	428133																								
Override																									
Written Down Current Cost of System Assets	285230																								
Override																									
Annual Depreciation of Existing System Assets	6218																								
Override																									
Written Down Value of Plant and Equipment	5428																								
Override																									
Annual Depreciation of Existing Plant and Equipment	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

Base Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Existing Loan Payments (Values in Inflated $'000)																									
Existing Loan Payments : Principal (Total:2649)	2209	70	70	70	70	70	70	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Loan Payments : Interest (Total:498)	162	62	58	54	51	47	43	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capital Works Program (Values in 2015/16 $'000)																									
Subsidised Scheme (Total:75778)	275	600	948	2755	17900	23100	0	0	0	100	4700	1500	15500	8400	0	0	0	0	0	0	0	0	0	0	0
Other New System Assets (Total:36964)	155	380	440	1235	7640	10040	140	140	140	140	440	990	4890	3990	390	390	390	390	390	390	809	1817	258	140	140
Renewals (Total:84937)	2126	2265	2125	2125	2365	2365	2365	2665	2665	2665	2665	2665	2665	2665	2665	2665	2665	2665	2425	2425	4006	8748	2907	2425	2825
Total Capital Works (Total:197679)	2556	3245	3513	6115	27905	35505	2505	2805	2805	2905	7805	5155	23055	15055	3055	3055	3055	3055	2815	2815	4815	10565	3165	2565	2965
Grant For Acquisition of Assets (% of Subsidised Scheme)	0.00	0.00	0.00	66.24	69.83	71.43	0.00	0.00	0.00	40.00	34.04	2.67	12.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grant For Acquisition of Assets ($) (Total:34505)	0	0	0	1825	12500	16500	0	0	0	40	1600	40	2000	0	0	0	0	0	0	0	0	0	0	0	0
Developer Provided Assets (Total:2250)	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Plant and Equipment Expenditure / Asset Disposal (Values in 2015/16 $'000)																									
Plant and Equipment Expenditure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proceeds from Disposal of Plant and Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Written Down Value of Plant and Equipment Disposed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gain/Loss on Disposal of Plant and Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proceeds from Disposal of Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Written Down Value of Assets Disposed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gain/Loss on Disposal of System Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

Revised/Additional Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
OMA / Revenue Overrides (Values in 2015/16 $'000)																									
Administration	4168	4207	4246	4285	4324	4363	4401	4439	4477	4515	4574	4612	4681	4719	4757	4795	4833	4872	4910	4948	4987	5026	5065	5104	5143
Override	4880	4880	4326	4326	4326	4526	4526	4526	4526	4526	4626	4626	4726	4826	4826	4826	4826	4826	4826	4826	4826	4826	4826	4826	4826
Engineering and Supervision	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Override	247	350	235	225	105	165	165	55	205	85	145	165	55	205	85	145	165	55	205	85	145	165	155	205	85
Operating Expenses	2165	2185	2205	2225	2245	2265	2285	2305	2325	2345	2376	2395	2431	2451	2471	2491	2511	2531	2551	2571	2591	2611	2631	2651	2671
Override	4938	4938	5224	4919	4919	4919	5162	5142	5142	5142	5142	5142	5192	5342	5342	5342	5342	5342	5392	5392	5392	5392	5392	5392	5442
Maintenance Expenses	1205	1216	1227	1238	1249	1260	1271	1282	1293	1304	1321	1332	1352	1363	1374	1385	1396	1407	1418	1429	1440	1451	1462	1473	1484
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Costs	424	428	432	436	440	444	448	452	456	460	466	470	477	481	485	489	493	497	501	505	509	513	517	521	525
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical Costs	235	237	239	241	243	245	247	249	251	253	256	258	262	264	266	268	270	272	274	276	278	280	282	284	286
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Purchase of Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Expenses	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Revenue	346	349	352	355	358	361	364	367	370	373	378	381	387	390	393	396	399	402	405	408	411	414	417	420	423
Override																									
Other Grants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Override																									
Other Contributions	171	173	175	177	179	181	183	185	187	189	191	193	196	198	200	202	204	206	208	210	212	214	216	218	220
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Developer Charges Overrides (Values in 2015/16 $'000)																									
Calculated from Scheme Data	2422	2434	2434	2434	2434	2422	2333	2333	2321	2321	2333	2309	2297	2333	2333	2321	2356	2380	2368	2356	2380	2410	2398	2410	2398
Override	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Pensioner Rebate (Values in Inflated $)																									
Pensioner Rebate per Pensioner ($)	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50
Override																									
Pensioner Rebate Subsidy (%)	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00
Override																									
Number of Pensioner Assessments	4216	4256	4296	4336	4376	4416	4454	4493	4532	4570	4632	4670	4742	4781	4819	4858	4897	4937	4977	5016	5056	5095	5134	5174	5213
Override																									
Percentage of Pensioners (%)	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44	22.44
Override																									
Pensioner Rebate	369	372	376	379	383	386	390	393	397	400	405	409	415	418	422	425	428	432	435	439	442	446	449	453	456
Pensioner Rebate Subsidy	203	205	207	208	211	212	215	216	218	220	223	225	228	230	232	234	235	238	239	241	243	245	247	249	251
Revenue Split (%)																									
Residential Rates	32.54	32.55	32.56	32.57	32.58	32.58	32.59	32.60	32.61	32.62	32.66	32.67	32.71	32.72	32.73	32.74	32.75	32.76	32.77	32.77	32.78	32.78	32.79	32.79	32.79
Override																									
Non-Residential Rates	3.24	3.23	3.23	3.23	3.22	3.22	3.21	3.21	3.20	3.20	3.18	3.18	3.16	3.15	3.15	3.14	3.14	3.13	3.13	3.13	3.12	3.12	3.12	3.12	3.12
Override																									
Sales of Water: Residential	50.29	50.31	50.32	50.32	50.34	50.36	50.38	50.39	50.41	50.41	50.47	50.48	50.56	50.58	50.59	50.61	50.61	50.63	50.63	50.65	50.67	50.67	50.67	50.68	50.68
Override																									
Sales of Water: Non-Residential	13.93	13.91	13.89	13.88	13.86	13.84	13.82	13.80	13.78	13.77	13.69	13.67	13.57	13.55	13.53	13.51	13.50	13.48	13.47	13.45	13.43	13.43	13.42	13.41	13.41
Override																									
Extra Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Override																									
Total Non-Residential Revenue (%)	17.17	17.14	17.12	17.11	17.08	17.06	17.03	17.01	16.98	16.97	16.87	16.85	16.73	16.70	16.68	16.65	16.64	16.61	16.60	16.58	16.55	16.55	16.54	16.53	16.53
Total Residential Revenue (%)	82.83	82.86	82.88	82.89	82.92	82.94	82.97	82.99	83.02	83.03	83.13	83.15	83.27	83.30	83.32	83.35	83.36	83.39	83.40	83.42	83.45	83.45	83.46	83.47	83.47
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

Revised/Additional Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

Revised/Additional Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
New Loan Payment Overrides (Values in Inflated $'000)																									
Standard Loan Payments: Principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standard Loan Payments: Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Structured Loan Payments: Principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Structured Loan Payments: Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitalised Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Loan Payments: Principal Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Loan Payments: Interest Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitalised Interest Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

FINMOD
Eurobodalla Shire Council

Operating Statement

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
EXPENSES																									
Management Expenses	*5127*	*5230*	*4561*	*4551*	*4431*	*4691*	*4691*	*4581*	*4731*	*4611*	*4772*	*4791*	*4781*	*5032*	*4911*	*4971*	*4991*	*4881*	*5031*	*4911*	*4971*	*4991*	*4981*	*5031*	*4911*
Administration	4880	4880	4326	4326	4326	4526	4526	4526	4526	4526	4626	4626	4726	4826	4826	4826	4826	4826	4826	4826	4826	4826	4826	4826	4826
Engineering and Supervision	247	350	235	225	105	165	165	55	205	85	145	165	55	205	85	145	165	55	205	85	145	165	155	205	85
Operation and Maintenance Expenses	*4938*	*4938*	*5224*	*4919*	*4919*	*4919*	*5162*	*5142*	*5142*	*5142*	*5142*	*5142*	*5192*	*5342*	*5342*	*5342*	*5342*	*5342*	*5392*	*5392*	*5392*	*5392*	*5392*	*5392*	*5442*
Operation Expenses	4938	4938	5224	4919	4919	4919	5162	5142	5142	5142	5142	5142	5192	5342	5342	5342	5342	5342	5392	5392	5392	5392	5392	5392	5442
Maintenance Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Purchase of Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	*6405*	*6415*	*6431*	*6485*	*6847*	*7318*	*7318*	*7317*	*7317*	*7318*	*7389*	*7422*	*7711*	*7885*	*7888*	*7893*	*7896*	*7900*	*7904*	*7908*	*7918*	*7942*	*7944*	*7945*	*7945*
System Assets	6225	6239	6260	6318	6684	7159	7163	7166	7169	7174	7248	7285	7577	7755	7761	7768	7775	7782	7789	7795	7808	7835	7839	7843	7846
Plant & Equipment	180	176	171	167	163	159	155	151	148	144	141	137	134	131	127	124	121	118	115	113	110	107	105	102	100
Interest Expenses	162	60	55	50	46	42	37	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EXPENSES	**16632**	**16643**	**16271**	**16005**	**16244**	**16970**	**17208**	**17057**	**17190**	**17071**	**17302**	**17355**	**17684**	**18259**	**18141**	**18206**	**18229**	**18123**	**18328**	**18211**	**18281**	**18325**	**18317**	**18368**	**18299**
REVENUES																									
Rates & Service Availability Charges	*5341*	*5403*	*5462*	*5521*	*5580*	*5635*	*5692*	*5755*	*5813*	*5869*	*5952*	*6006*	*6102*	*6160*	*6217*	*6273*	*4374*	*4419*	*4457*	*4496*	*4538*	*4579*	*4622*	*4662*	*4699*
Residential	4857	4915	4969	5023	5078	5128	5182	5239	5293	5344	5424	5474	5565	5619	5671	5724	3991	4034	4068	4104	4144	4181	4221	4257	4291
Non-Residential	484	488	493	498	502	506	510	516	520	524	528	533	538	541	546	549	383	385	389	392	394	398	401	405	409
User Charges	*9585*	*9697*	*9801*	*9900*	*10005*	*10106*	*10208*	*10317*	*10419*	*10514*	*10656*	*10749*	*10910*	*11014*	*11111*	*11210*	*7814*	*7894*	*7958*	*8028*	*8103*	*8175*	*8250*	*8321*	*8387*
Sales of Water : Residential	7506	7596	7681	7759	7846	7927	8011	8100	8182	8258	8382	8458	8601	8687	8766	8848	6168	6234	6285	6343	6405	6462	6523	6580	6632
Sales of Water : Non-Residential	2079	2100	2120	2140	2160	2179	2197	2218	2237	2256	2273	2290	2309	2327	2345	2362	1646	1659	1672	1685	1698	1713	1727	1741	1755
Extra Charges	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Income	762	971	1220	1470	1350	815	724	1039	1350	1661	1862	2032	1708	1309	1408	1688	1786	1821	1860	1905	1885	1662	1647	1702	1750
Other Revenues	346	349	352	355	358	361	364	367	370	373	378	381	387	390	393	396	399	402	405	408	411	414	417	420	423
Grants	*203*	*200*	*197*	*2018*	*12691*	*16687*	*185*	*182*	*179*	*216*	*1774*	*211*	*2170*	*167*	*164*	*162*	*158*	*156*	*153*	*151*	*148*	*146*	*143*	*141*	*139*
Grants for Acquisition of Assets	0	0	0	1825	12500	16500	0	0	0	40	1600	40	2000	0	0	0	0	0	0	0	0	0	0	0	0
Pensioner Rebate Subsidy	203	200	197	193	191	187	185	182	179	176	174	171	170	167	164	162	158	156	153	151	148	146	143	141	139
Other Grants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contributions	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1674*	*1675*	*1675*	*1674*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*	*1675*
Developer Charges	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Developer Provided Assets	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Other Contributions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	**17912**	**18295**	**18708**	**20938**	**31659**	**35278**	**18849**	**19335**	**19805**	**20307**	**22297**	**21053**	**22952**	**20715**	**20968**	**21404**	**16206**	**16367**	**16507**	**16663**	**16760**	**16651**	**16754**	**16921**	**17073**
OPERATING RESULT	**1280**	**1652**	**2437**	**4933**	**15416**	**18308**	**1641**	**2277**	**2615**	**3237**	**4995**	**3699**	**5268**	**2456**	**2827**	**3199**	**-2023**	**-1755**	**-1820**	**-1548**	**-1521**	**-1674**	**-1563**	**-1447**	**-1225**
OPERATING RESULT (less Grants for Acq of Assets)	**1280**	**1652**	**2437**	**3108**	**2915**	**1808**	**1641**	**2277**	**2615**	**3197**	**3395**	**3659**	**3268**	**2456**	**2827**	**3199**	**-2023**	**-1755**	**-1820**	**-1548**	**-1521**	**-1674**	**-1563**	**-1447**	**-1225**

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

FINMOD
Eurobodalla Shire Council

Cashflow Statement

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Cashflow From Operating Activities																									
Receipts																									
Rates and Charges	14926	15100	15263	15420	15585	15741	15900	16072	16231	16382	16607	16755	17013	17174	17327	17483	12188	12313	12414	12524	12641	12754	12872	12983	13087
Interest Income	762	971	1220	1470	1350	815	724	1039	1350	1661	1862	2032	1708	1309	1408	1688	1786	1821	1860	1905	1885	1662	1647	1702	1750
Other Revenues	346	349	352	355	358	361	364	367	370	373	378	381	387	390	393	396	399	402	405	408	411	414	417	420	423
Grants	203	200	197	2018	12691	16687	185	182	179	216	1774	211	2170	167	164	162	158	156	153	151	148	146	143	141	139
Contributions	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Total Receipts from Operations	**17837**	**18220**	**18633**	**20863**	**31584**	**35203**	**18774**	**19260**	**19730**	**20232**	**22222**	**20979**	**22877**	**20640**	**20893**	**21329**	**16131**	**16293**	**16432**	**16588**	**16685**	**16576**	**16680**	**16846**	**16998**
Payments																									
Management	5127	5230	4561	4551	4431	4691	4691	4581	4731	4611	4772	4791	4781	5032	4911	4971	4991	4881	5031	4911	4971	4991	4981	5031	4911
Operations (plus WC Inc)	5058	5059	5345	5042	5043	5043	5286	5266	5268	5270	5288	5271	5349	5473	5474	5475	5476	5476	5528	5529	5530	5531	5531	5533	5583
Interest Expenses	162	60	55	50	46	42	37	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Payments from Operations	**10347**	**10349**	**9962**	**9644**	**9521**	**9776**	**10014**	**9865**	**9999**	**9880**	**10059**	**10062**	**10130**	**10505**	**10385**	**10445**	**10467**	**10357**	**10559**	**10440**	**10501**	**10522**	**10512**	**10564**	**10494**
Net Cash from Operations	**7490**	**7870**	**8671**	**11219**	**22064**	**25427**	**8760**	**9395**	**9731**	**10352**	**12162**	**10917**	**12747**	**10136**	**10508**	**10884**	**5665**	**5935**	**5873**	**6148**	**6184**	**6054**	**6168**	**6282**	**6504**
Cashflow from Capital Activities																									
Receipts																									
Proceeds from Disposal of Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Payments																									
Acquisition of Assets	2556	3246	3513	6115	27905	35505	2505	2805	2805	2905	7804	5155	23055	15055	3055	3055	3055	3055	2815	2815	4815	10565	3165	2565	2965
Net Cash from Capital Activities	**-2556**	**-3246**	**-3513**	**-6115**	**-27905**	**-35505**	**-2505**	**-2805**	**-2805**	**-2905**	**-7804**	**-5155**	**-23055**	**-15055**	**-3055**	**-3055**	**-3055**	**-3055**	**-2815**	**-2815**	**-4815**	**-10565**	**-3165**	**-2565**	**-2965**
CashFlow from Financing Activities																									
Receipts																									
New Loans Required	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Payments																									
Principal Loan Payments	2209	68	67	65	63	62	60	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Cash from Financing Activities	**-2209**	**-68**	**-67**	**-65**	**-63**	**-62**	**-60**	**-17**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL NET CASH	**2725**	**4556**	**5091**	**5040**	**-5905**	**-10140**	**6195**	**6574**	**6925**	**7447**	**4358**	**5762**	**-10309**	**-4919**	**7452**	**7828**	**2610**	**2880**	**3058**	**3333**	**1369**	**-4511**	**3002**	**3718**	**3539**
Current Year Cash	2725	4556	4941	5040	-5905	-10140	6195	6574	6925	7447	4358	5762	-10309	-4920	7452	7828	2610	2880	3058	3333	1369	-4511	3002	3718	3539
Cash & Investments @Year Start	10676	13074	17200	21601	25991	19596	9225	15044	21090	27332	33931	37355	42065	30982	25427	32077	38932	40529	42350	44301	46472	46674	41135	43060	45637
Cash & Investments @Year End	13401	17630	22141	26641	20086	9455	15420	21617	28015	34779	38289	43117	31757	26062	32879	39905	41542	43409	45409	47634	47841	42163	44137	46778	49176
Capital Works Funding:																									
Internal Funding for New Works ($'000)	430	980	1538	2165	13039	16640	140	140	140	200	3540	2450	18390	12390	390	390	390	390	390	390	809	1817	258	140	140
Internal Funding for Renewals	2126	2265	2125	2125	2365	2365	2365	2665	2665	2665	2665	2665	2665	2665	2665	2665	2665	2665	2425	2425	4006	8748	2907	2425	2825
New Loans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grants	0	0	0	1825	12500	16500	0	0	0	40	1600	40	2000	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital Works	**2556**	**3246**	**3664**	**6115**	**27905**	**35505**	**2505**	**2805**	**2805**	**2905**	**7804**	**5155**	**23055**	**15055**	**3055**	**3055**	**3055**	**3055**	**2815**	**2815**	**4815**	**10565**	**3165**	**2565**	**2965**

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

FINMOD
Eurobodalla Shire Council

Statement of Financial Position

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Cash and Investments	13401	17630	22136	26622	20054	9410	15360	21544	27928	34679	38176	42991	31618	25911	32716	39731	41356	43212	45201	47415	47612	41923	43888	46519	48908
Receivables	3415	3447	3479	3511	3543	3575	3606	3637	3668	3699	3747	3777	3834	3865	3896	3927	3958	3990	4021	4053	4085	4117	4148	4180	4212
Inventories	61	61	62	62	63	63	63	63	64	65	66	66	68	68	69	69	69	70	71	71	72	73	73	74	74
Property, Plant & Equipment	*286884*	*283662*	*280699*	*280290*	*301316*	*329479*	*324646*	*320121*	*315602*	*311189*	*311609*	*309352*	*324711*	*331899*	*327089*	*322280*	*317470*	*312661*	*307611*	*302562*	*299506*	*302180*	*297454*	*292131*	*287211*
System Assets (1)	281636	278718	276046	275918	297214	325636	321052	316766	312477	308284	308916	306861	322415	329789	325158	320520	315875	311223	306323	301418	298500	301306	296706	291503	286698
Plant & Equipment	5248	4944	4652	4372	4102	3843	3594	3355	3125	2905	2694	2491	2296	2110	1931	1759	1595	1438	1287	1143	1006	874	748	628	513
Other Assets	126	127	128	129	130	132	133	134	135	136	138	139	141	142	144	145	146	147	148	150	151	152	153	154	155
TOTAL ASSETS	**303887**	**304928**	**306503**	**310615**	**325107**	**342658**	**343808**	**345498**	**347397**	**349768**	**353735**	**356326**	**360372**	**361885**	**363913**	**366151**	**363000**	**360079**	**357052**	**354250**	**351425**	**348444**	**345716**	**343058**	**340560**
LIABILITIES																									
Bank Overdraft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Creditors	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Borrowings	440	361	286	214	145	80	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Provisions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL LIABILITIES	**442**	**363**	**287**	**215**	**147**	**81**	**19**	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
NET ASSETS COMMITTED	**303445**	**304565**	**306216**	**310399**	**324960**	**342577**	**343789**	**345497**	**347396**	**349766**	**353734**	**356324**	**360370**	**361884**	**363912**	**366150**	**362998**	**360078**	**357051**	**354249**	**351423**	**348443**	**345715**	**343057**	**340559**
EQUITY																									
Accumulated Operating Result	150569	148548	147362	148700	160489	174883	172258	170334	168795	167914	168814	168395	169556	167877	166609	165744	159679	154029	148452	143283	138267	133221	128409	123830	119585
Asset Revaluation Reserve	152876	159917	167059	174310	181738	189940	199150	208458	217872	227391	237016	246902	256968	267808	279173	290659	302264	313987	325826	337770	349816	362045	374696	387466	400326
TOTAL EQUITY	**303445**	**304565**	**306371**	**310565**	**325135**	**342762**	**343985**	**345703**	**347612**	**349993**	**353970**	**356570**	**360626**	**362150**	**364187**	**366434**	**363291**	**360379**	**357360**	**354567**	**351750**	**348777**	**346057**	**343406**	**340915**
(1) Notes to System Assets																									
Current Replacement Cost	428638	429694	431157	435222	460837	494052	494267	494481	494697	495013	500227	502791	523257	535721	536186	536651	537116	537581	538046	538511	539395	541287	541620	541835	542050
Less: Accumulated Depreciation	147002	150976	155111	159304	163623	168417	173215	177716	182220	186728	191312	195931	200843	205932	211028	216131	221241	226358	231722	237093	240895	239981	244913	250331	255352
Written Down Current Cost	281636	278718	276046	275918	297214	325636	321052	316766	312477	308284	308916	306861	322415	329789	325158	320520	315875	311223	306323	301418	298500	301306	296706	291503	286698

FINMOD created for IWCM Strategy 2016 : Case 2 - 50% subsidy for dam, 40% for

FINMOD
Eurobodalla Shire Council

Performance Indicators

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Typical Residential Bills	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	490	490	490	490	490	490	490	490	490
Average Residential Bills (2015/16$)	658	660	661	661	663	664	665	666	667	668	669	669	671	672	672	673	465	467	467	467	468	469	469	470	470
Mgmnt Cost / Assessment (2015/16$)	259	262	227	224	216	226	225	218	222	215	220	219	216	225	218	219	218	211	216	209	210	210	207	208	201
OMA Cost per Assessment (2015/16$)	509	509	485	466	456	464	472	462	465	456	457	454	449	464	454	454	451	442	448	439	438	435	432	431	425
Operating Sales Margin (%)	3.54	3.86	6.87	9.18	8.66	5.37	4.87	6.48	6.47	7.88	7.77	8.21	7.75	5.55	6.89	7.31	-27.08	-25.23	-25.77	-24.03	-23.52	-22.88	-21.85	-21.29	-20.00
Economic Real Rate of Return (%)	0.24	0.26	0.45	0.60	0.53	0.31	0.29	0.39	0.40	0.49	0.49	0.53	0.48	0.35	0.43	0.47	-1.20	-1.14	-1.20	-1.14	-1.14	-1.10	-1.08	-1.08	-1.04
Debt Service Ratio	0.13	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt/Equity Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Cover	8.90	28.31	45.14	62.98	64.10	44.53	45.26	129.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Return on capital (%)	0.47	0.56	0.81	1.06	1.27	1.10	0.49	0.66	0.75	0.92	1.06	1.03	1.05	0.68	0.78	0.87	-0.56	-0.49	-0.51	-0.44	-0.43	-0.48	-0.45	-0.42	-0.36
Cash and Investments (2015/16$'000)	13401	17630	22291	26787	20229	9595	15556	21750	28145	34905	38412	43237	31874	26178	32991	40015	41649	43514	45511	47733	47938	42258	44229	46868	49264
Debt outstanding (2015/16$'000)	440	361	286	214	145	80	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Debt (2015/16$'000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Summary Report of Assumptions and Results

	2015/16	2019/20	2024/25	2029/30	2034/35	2039/40	2044/45
Inflation Rates - General (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Inflation Rates - Capital Works (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Borrowing Interest Rate (%)	8.50	8.50	8.50	8.50	8.50	8.50	8.50
Term of New Loans (years)	20	20	20	20	20	20	20
Investment Interest Rate (%)	6.50	6.50	6.50	6.50	6.50	6.50	6.50
Growth Rate - Residential (%)	0.92	1.08	0.97	0.87	0.94	0.88	0.69
Developer Charges per Assessment - Residential (2015/16 $)	10250	10250	10250	10250	10250	10250	10250
Subsidised Scheme Capital Works ($m)	3.92	10.88	0.20	7.50	0.20	0.00	0.00
Grants on Acquisition of Assets ($m)	0.00	0.32	0.08	3.00	0.08	0.00	0.00
Renewals ($m)	2.54	2.85	3.00	3.00	3.00	3.81	16.98
Renewals (%)	0.61	0.63	0.62	0.57	0.55	0.68	2.94
Borrowing Outstanding ($m)	9.13	14.89	31.30	26.68	18.08	5.37	2.15
Mgmnt Cost / Assessment	226	191	191	190	181	173	167
Debt Equity Ratio	0.04	0.05	0.10	0.07	0.04	0.01	0.00
OMA Cost Per Assessment	590	544	525	513	489	466	451
Economic Real Rate of Return (%)	1.36	0.83	0.93	0.96	1.25	1.68	1.60
Return on Capital (%)	1.59	0.91	1.08	1.36	1.47	1.96	1.72
Net Debt ($m)	1.94	11.08	18.63	15.53	0.00	0.00	0.00
Debt Service Ratio	0.50	0.16	0.18	0.17	0.16	0.10	0.03
Average Residential Bills	866	868	870	872	873	875	876
Typical Residential Bills	886	886	886	886	886	886	886

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

STANDARD LOAN PAYMENT SCHEDULE

Drawdown		2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
2017/18	Principal 6828			139	151	163	178	192	210	228	247	269	292	318	345	376	408	443	482	524	570	619	672	0	0	0
	Interest			577	565	553	538	522	506	488	468	446	424	398	371	340	308	272	234	191	146	97	44	0	0	0
2019/20	Principal 8278					168	182	198	215	234	254	276	300	327	355	386	419	455	495	538	584	635	690	750	815	0
	Interest					700	686	670	653	634	613	592	568	541	513	482	449	413	373	330	284	233	178	118	53	0
2020/21	Principal 20365						413	449	488	529	576	625	680	739	803	872	948	1031	1120	1217	1323	1438	1563	1699	1846	2006
	Interest						1723	1687	1648	1605	1560	1509	1456	1396	1332	1262	1186	1104	1015	917	812	697	572	437	289	129
2021/22	Principal 9278							188	204	222	241	262	285	310	337	366	398	433	470	510	555	603	655	712	774	841
	Interest							784	768	751	731	710	688	663	637	607	575	541	503	462	418	370	318	261	198	132
2025/26	Principal 1											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Interest											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2027/28	Principal 8069													163	178	194	210	228	248	269	292	318	345	376	408	444
	Interest													683	668	652	636	618	598	576	554	528	500	470	438	402
2031/32	Principal 5937																	120	131	143	155	168	182	198	215	234
	Interest																	502	491	481	468	455	440	424	407	389
Total Principal	58756	0	0	139	151	331	773	1027	1117	1213	1318	1432	1557	1857	2018	2194	2383	2710	2946	3201	3479	3781	4107	3735	4058	3525
Total Interest		0	0	577	565	1253	2947	3663	3575	3478	3372	3257	3136	3681	3521	3343	3154	3450	3214	2957	2682	2380	2052	1710	1385	1052

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Historical Operating Statement

	2013/14*	2014/15*
EXPENSES		
Management Expenses	*3510*	*3381*
Administration	3510	3381
Engineering and Supervision		
Operation and Maintenance Expenses	*6668*	*5669*
Operation Expenses	3857	3366
Maintenance Expenses	1530	1110
Energy Costs	941	857
Chemical Costs	340	336
Depreciation	*6253*	*6361*
System Assets	6239	6350
Plant & Equipment	14	11
Interest Expenses	1383	1227
Other Expenses	46	46
TOTAL EXPENSES	**17860**	**16684**
REVENUES		
Rates & Service Availability Charges	*17329*	*17801*
Residential	15245	15680
Non-Residential	2084	2121
Trade Waste Charges	144	139
Other Sales and Charges	0	0
Extra Charges		0
Interest Income	404	445
Other Revenues	80	75
Grants	*190*	*299*
Grants for Acquisition of Assets	0	110
Pensioner Rebate Subsidy	190	189
Other Grants		
Contributions	*1054*	*1096*
Developer Charges	481	910
Developer Provided Assets	571	67
Other Contributions	2	119
TOTAL REVENUES	**19201**	**19855**
OPERATING RESULT	**1341**	**3171**
OPERATING RESULT (less Grants for Acq of Assets)	**1341**	**3061**

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

Historical Statement of Financial Position

	2013/14*	2014/15*
Cash and Investments	13320	15664
Receivables	150	176
Inventories		
Property, Plant & Equipment	*240933*	*241436*
System Assets (1)	238738	239292
Plant & Equipment	2195	2144
Other Assets	1133	1900
TOTAL ASSETS	**255536**	**259176**
LIABILITIES		
Bank Overdraft		
Creditors	34	32
Borrowings	20882	18974
Provisions		7
TOTAL LIABILITIES	**20916**	**19013**
NET ASSETS COMMITTED	**234620**	**240163**
EQUITY		
Accumulated Operating Result	108759	110948
Asset Revaluation Reserve	125861	129215
TOTAL EQUITY	**234620**	**240163**
(1) Notes to System Assets		
Current Replacement Cost	397979	398770
Less: Accumulated Depreciation	159241	159478
Written Down Current Cost	238738	239292

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Base Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Financial Data																									
Inflation Rate - General (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Inflation Rate - Capital Works (%)	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Borrowing Interest Rate for New Loans (%)	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
Investment Interest Rate (%)	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
Number of Assessments																									
Growth Rate (%)																									
Residential Assessments	0.92	0.92	2.15	1.88	1.08	1.73	0.99	0.98	0.97	0.97	1.47	0.90	1.64	1.76	0.87	0.87	0.96	0.96	1.23	0.94	1.53	0.90	0.89	0.89	0.88
Non-Residential Assessments	0.76	0.76	0.76	0.75	0.75	0.74	0.74	0.73	0.73	0.72	0.71	0.70	0.69	0.69	0.68	0.68	0.65	0.64	0.64	0.63	0.63	0.42	0.42	0.42	0.42
Total Assessments	0.91	0.91	2.07	1.81	1.06	1.67	0.97	0.96	0.95	0.96	1.43	0.89	1.59	1.70	0.86	0.86	0.94	0.94	1.20	0.92	1.48	0.88	0.86	0.87	0.85
Number of New Assessments																									
Residential	158	159	374	334	196	317	184	184	184	186	285	177	325	355	178	180	200	202	262	202	332	199	198	200	199
Non-Residential	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	5	5	5	5
Total New Assessments	166	167	382	342	204	325	192	192	192	194	293	185	333	363	186	188	208	210	270	210	340	204	203	205	204
Projected Number of Assessments																									
Residential	17243	17402	17776	18110	18306	18623	18807	18991	19175	19361	19646	19823	20148	20503	20681	20861	21061	21263	21525	21727	22059	22258	22456	22656	22855
Non-Residential	1069	1077	1085	1093	1101	1109	1117	1125	1133	1141	1149	1157	1165	1173	1181	1189	1197	1205	1213	1221	1229	1234	1239	1244	1249
Total Projected Assessments	18312	18479	18861	19203	19407	19732	19924	20116	20308	20502	20795	20980	21313	21676	21862	22050	22258	22468	22738	22948	23288	23492	23695	23900	24104
Backlog Assessments																									
Residential	0	0	215	173	34	154	4	5	4	6	104	5	153	181	3	5	1	2	62	2	132	1	2	2	2
Non-Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Backlog Assessments	0	0	215	173	34	154	4	5	4	6	104	5	153	181	3	5	1	2	62	2	132	1	2	2	2
Developer Charges / Vacant Assessments (Values in 2015/16 $)																									
Developer Charges $/Assessment																									
Residential	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250
Non-Residential	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127	23127
Number of Vacant Residential Assessments	1037	1016	995	976	956	937	918	900	882	864	847	830	813	797	781	766	750	735	721	706	692	678	665	651	638
Average Charge of Vacant Assessments	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Occupied Assessments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation of Existing Plant and Equipment (Values in 2015/16 $'000)																									
Current Replacement Cost of System Assets	408739																								
Override																									
Written Down Current Cost of System Assets	245274																								
Override																									
Annual Depreciation of Existing System Assets	6509																								
Override																									
Written Down Value of Plant and Equipment	2144																								
Override																									
Annual Depreciation of Existing Plant and Equipment	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	104	0	0	0	0	0	0	0

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Base Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Existing Loan Payments (Values in Inflated $'000)																									
Existing Loan Payments : Principal (Total:18974)	9845	1883	1820	1814	1660	566	494	209	168	103	103	103	103	103	0	0	0	0	0	0	0	0	0	0	0
Existing Loan Payments : Interest (Total:3023)	866	490	383	336	293	256	224	67	34	26	20	15	9	4	0	0	0	0	0	0	0	0	0	0	0
Capital Works Program (Values in 2015/16 $'000)																									
Subsidised Scheme (Total:128014)	3920	8153	9787	3354	10880	21120	9000	0	0	200	10000	200	20000	500	7500	7000	7000	100	2000	200	6000	0	0	0	0
Other New System Assets (Total:30831)	1740	467	857	716	40	2000	680	20	20	20	1020	1795	20	20	20	1020	1670	20	20	20	1020	1340	20	58	208
Renewals (Total:145308)	2544	2516	2134	2790	2850	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3162	3812
Total Capital Works (Total:304153)	8204	11136	12778	6860	13770	26120	12680	3020	3020	3220	14020	4995	23020	3520	10520	11020	11670	3120	5020	3220	10020	4340	3020	3220	4020
Grant For Acquisition of Assets (% of Subsidised Scheme)	0.00	0.00	10.22	0.00	2.94	13.26	0.00	0.00	0.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	0.00	0.00	0.00	0.00
Grant For Acquisition of Assets ($) (Total:28400)	0	0	1000	0	320	2800	0	0	0	80	4000	80	8000	200	3000	2800	2800	40	800	80	2400	0	0	0	0
Developer Provided Assets (Total:9570)	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319
Plant and Equipment Expenditure / Asset Disposal (Values in 2015/16 $'000)																									
Plant and Equipment Expenditure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proceeds from Disposal of Plant and Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Written Down Value of Plant and Equipment Disposed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gain/Loss on Disposal of Plant and Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proceeds from Disposal of Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Written Down Value of Assets Disposed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gain/Loss on Disposal of System Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Revised/Additional Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
OMA / Revenue Overrides (Values in 2015/16 $'000)																									
Administration	3497	3529	3602	3667	3706	3768	3805	3842	3878	3915	3971	4006	4070	4139	4175	4211	4251	4291	4342	4382	4447	4486	4525	4564	4603
Override	3868	3868	4268	3388	3388	3588	3588	3588	3588	3588	3688	3688	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788
Engineering and Supervision	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Override	270	320	290	370	320	310	270	220	300	320	310	310	260	440	360	350	320	270	350	370	360	330	280	460	380
Operating Expenses	3482	3514	3587	3652	3691	3753	3789	3825	3861	3898	3954	3989	4052	4121	4156	4192	4231	4271	4322	4362	4427	4466	4504	4543	4582
Override	6666	6666	6866	6866	6866	6866	6866	6866	6866	6866	6866	6866	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070
Maintenance Expenses	1148	1158	1182	1203	1216	1236	1248	1260	1272	1284	1302	1314	1335	1358	1370	1382	1395	1408	1425	1438	1459	1472	1485	1498	1511
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Costs	886	894	913	930	940	956	965	974	983	992	1006	1015	1031	1049	1058	1067	1077	1087	1100	1110	1126	1136	1146	1156	1166
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical Costs	348	351	358	364	368	374	378	382	386	390	396	400	406	413	417	421	425	429	434	438	444	448	452	456	460
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Expenses	48	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Revenue	78	79	81	82	83	84	85	86	87	88	89	90	91	93	94	95	96	97	98	99	100	101	102	103	104
Override																									
Other Grants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Override	1930	2800																							
Other Contributions	123	124	127	129	130	132	133	134	135	136	138	139	141	143	144	145	146	147	149	150	152	153	154	155	156
Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Developer Charges Overrides (Values in 2015/16 $'000)																									
Calculated from Scheme Data	1805	1815	1815	1835	1846	1856	2030	2020	2030	2030	2040	1948	1948	1969	1979	1979	2225	2235	2235	2235	2235	2145	2125	2145	2135
Override	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Pensioner Rebate (Values in Inflated $)																									
Pensioner Rebate per Pensioner ($)	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50	87.50
Override																									
Pensioner Rebate Subsidy (%)	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00
Override																									
Number of Pensioner Assessments	3964	4001	4087	4163	4209	4281	4324	4366	4408	4451	4517	4557	4632	4714	4755	4796	4842	4888	4949	4995	5071	5117	5163	5209	5254
Override																									
Percentage of Pensioners (%)	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99	22.99
Override																									
Pensioner Rebate	347	350	358	364	368	375	378	382	386	389	395	399	405	412	416	420	424	428	433	437	444	448	452	456	460
Pensioner Rebate Subsidy	191	193	197	200	202	206	208	210	212	214	217	219	223	227	229	231	233	235	238	240	244	246	249	251	253
Revenue Split (%)																									
Residential Rates	87.34	87.36	87.50	87.62	87.65	87.75	87.77	87.80	87.82	87.85	87.92	87.94	88.03	88.13	88.15	88.17	88.20	88.23	88.29	88.32	88.40	88.45	88.49	88.54	88.58
Override																									
Non-Residential Rates	11.86	11.84	11.70	11.58	11.55	11.45	11.43	11.40	11.38	11.35	11.28	11.26	11.16	11.06	11.04	11.02	10.99	10.96	10.90	10.87	10.79	10.74	10.70	10.65	10.61
Override																									
Trade Waste Charges	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Override																									
Other Sales and charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Override																									
Extra Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Override																									
Total Non-Residential Revenue (%)	12.66	12.64	12.50	12.38	12.35	12.25	12.23	12.20	12.18	12.15	12.08	12.06	11.97	11.87	11.85	11.83	11.80	11.77	11.71	11.68	11.60	11.55	11.51	11.46	11.42
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Residential Revenue (%)	87.34	87.36	87.50	87.62	87.65	87.75	87.77	87.80	87.82	87.85	87.92	87.94	88.03	88.13	88.15	88.17	88.20	88.23	88.29	88.32	88.40	88.45	88.49	88.54	88.58

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Revised/Additional Forecast Data

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
New Loan Payment Overrides (Values in Inflated $'000)																									
Standard Loan Payments: Principal	0	0	139	151	331	773	1027	1117	1213	1318	1432	1557	1857	2018	2194	2383	2710	2946	3201	3479	3781	4107	3735	4058	3525
Standard Loan Payments: Interest	0	0	577	565	1253	2947	3663	3575	3478	3372	3257	3136	3681	3521	3343	3154	3450	3214	2957	2682	2380	2052	1710	1385	1052
Structured Loan Payments: Principal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Structured Loan Payments: Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitalised Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total New Loan Payments: Principal Override	0	0	139	151	331	773	1027	1117	1213	1318	1432	1557	1857	2018	2194	2383	2710	2946	3201	3479	3781	4107	3735	4058	3525
Total New Loan Payments: Interest Override	0	0	577	565	1253	2947	3663	3575	3478	3372	3257	3136	3681	3521	3343	3154	3450	3214	2957	2682	2380	2052	1710	1385	1052
Capitalised Interest Override	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Operating Statement

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
EXPENSES																									
Management Expenses	*4138*	*4188*	*4558*	*3758*	*3708*	*3898*	*3858*	*3808*	*3889*	*3908*	*3998*	*3998*	*4048*	*4228*	*4148*	*4138*	*4108*	*4058*	*4138*	*4159*	*4148*	*4118*	*4068*	*4248*	*4168*
Administration	3868	3868	4268	3388	3388	3588	3588	3588	3588	3588	3688	3688	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788	3788
Engineering and Supervision	270	320	290	370	320	310	270	220	300	320	310	310	260	440	360	350	320	270	350	370	360	330	280	460	380
Operation and Maintenance Expenses	*6666*	*6666*	*6866*	*6866*	*6866*	*6866*	*6866*	*6866*	*6866*	*6866*	*6866*	*6866*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*	*7070*
Operation Expenses	6666	6666	6866	6866	6866	6866	6866	6866	6866	6866	6866	6866	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070	7070
Maintenance Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation	*6714*	*6839*	*6993*	*7054*	*7211*	*7544*	*7684*	*7687*	*7689*	*7694*	*7853*	*7884*	*8172*	*8183*	*8292*	*8410*	*8537*	*8531*	*8496*	*8503*	*8608*	*8633*	*8637*	*8643*	*8650*
System Assets	6594	6722	6879	6942	7103	7438	7580	7586	7590	7598	7760	7792	8083	8096	8208	8327	8456	8463	8496	8503	8608	8633	8637	8643	8650
Plant & Equipment	120	117	114	111	109	106	103	101	98	96	94	91	89	87	85	83	81	68	0	0	0	0	0	0	0
Interest Expenses	866	478	914	837	1401	2831	3352	3064	2882	2721	2560	2402	2744	2557	2366	2178	2324	2112	1896	1678	1452	1222	993	785	582
Other Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EXPENSES	**18384**	**18172**	**19331**	**18514**	**19186**	**21138**	**21759**	**21425**	**21326**	**21190**	**21278**	**21150**	**22034**	**22038**	**21877**	**21795**	**22038**	**21772**	**21600**	**21409**	**21279**	**21042**	**20768**	**20746**	**20470**
REVENUES																									
Rates & Service Availability Charges	*16957*	*17118*	*17472*	*17782*	*17979*	*18271*	*18455*	*18644*	*18842*	*19010*	*19289*	*19477*	*19782*	*20103*	*20289*	*20464*	*20661*	*20861*	*21116*	*21306*	*21629*	*21814*	*22004*	*22192*	*22397*
Residential	14930	15075	15412	15706	15886	16162	16328	16501	16680	16835	17095	17266	17557	17861	18031	18190	18372	18557	18796	18971	19277	19452	19630	19809	20001
Non-Residential	2027	2043	2061	2075	2094	2109	2126	2143	2162	2175	2194	2211	2225	2242	2258	2274	2289	2305	2320	2335	2353	2362	2373	2383	2396
Trade Waste Charges	137	138	141	143	145	148	149	151	152	153	155	157	161	164	166	167	168	170	172	174	176	178	179	181	183
Other Sales and Charges	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Extra Charges	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Income	722	369	284	245	223	216	213	293	436	588	526	511	445	495	515	466	518	678	829	1008	1063	1196	1418	1641	1855
Other Revenues	78	79	81	82	83	84	85	86	87	88	89	90	91	93	94	95	96	97	98	99	100	101	102	103	104
Grants	*2121*	*2988*	*1188*	*186*	*503*	*2982*	*179*	*177*	*174*	*251*	*4169*	*247*	*8166*	*365*	*3162*	*2959*	*2957*	*195*	*953*	*230*	*2549*	*146*	*145*	*142*	*140*
Grants for Acquisition of Assets	0	0	1000	0	320	2800	0	0	0	80	4000	80	8000	200	3000	2800	2800	40	800	80	2400	0	0	0	0
Pensioner Rebate Subsidy	191	188	188	186	183	182	179	177	174	171	170	167	166	165	162	159	157	154	153	150	149	146	145	142	140
Other Grants	1930	2800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contributions	*1619*	*1620*	*1619*	*1619*	*1619*	*1619*	*1619*	*1619*	*1619*	*1619*	*1619*	*1620*	*1619*	*1619*	*1619*	*1619*	*1619*	*1619*	*1620*	*1619*	*1619*	*1619*	*1619*	*1619*	*1619*
Developer Charges	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Developer Provided Assets	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319
Other Contributions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	**21634**	**22311**	**20785**	**20057**	**20552**	**23320**	**20701**	**20969**	**21310**	**21709**	**25847**	**22101**	**30264**	**22838**	**25845**	**25771**	**26020**	**23620**	**24788**	**24436**	**27137**	**25055**	**25467**	**25878**	**26298**
OPERATING RESULT	**3250**	**4140**	**1453**	**1542**	**1366**	**2181**	**-1058**	**-457**	**-16**	**520**	**4569**	**952**	**8230**	**800**	**3969**	**3976**	**3982**	**1848**	**3188**	**3027**	**5858**	**4013**	**4699**	**5133**	**5828**
OPERATING RESULT (less Grants for Acq of Assets)	**3250**	**4140**	**453**	**1542**	**1046**	**-619**	**-1058**	**-457**	**-16**	**440**	**569**	**872**	**231**	**600**	**969**	**1176**	**1182**	**1808**	**2388**	**2947**	**3458**	**4013**	**4699**	**5133**	**5828**

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Cashflow Statement

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Cashflow From Operating Activities																									
Receipts																									
Rates and Charges	17094	17256	17613	17925	18124	18419	18604	18795	18994	19163	19444	19634	19944	20267	20455	20631	20829	21032	21289	21480	21806	21992	22183	22373	22580
Interest Income	722	369	284	245	223	216	213	293	436	588	526	511	445	495	515	466	518	678	829	1008	1063	1196	1418	1641	1855
Other Revenues	78	79	81	82	83	84	85	86	87	88	89	90	91	93	94	95	96	97	98	99	100	101	102	103	104
Grants	2121	2988	1188	186	503	2982	179	177	174	251	4169	247	8166	365	3162	2959	2957	195	953	230	2549	146	145	142	140
Contributions	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Total Receipts from Operations	**21315**	**21992**	**20466**	**19737**	**20234**	**23001**	**20382**	**20650**	**20991**	**21391**	**25528**	**21782**	**29945**	**22519**	**25526**	**25452**	**25701**	**23301**	**24469**	**24117**	**26818**	**24736**	**25148**	**25559**	**25979**
Payments																									
Management	4138	4188	4558	3758	3708	3898	3858	3808	3889	3908	3998	3998	4048	4228	4148	4138	4108	4058	4138	4159	4148	4118	4068	4248	4168
Operations (plus WC Inc)	6736	6737	6963	6959	6944	6958	6944	6945	6945	6946	6957	6945	7167	7172	7152	7153	7156	7157	7165	7158	7174	7160	7160	7161	7161
Interest Expenses	866	478	914	837	1401	2831	3352	3064	2882	2721	2560	2402	2744	2557	2366	2178	2324	2112	1896	1678	1452	1222	993	785	582
Other Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Payments from Operations	**11740**	**11403**	**12435**	**11554**	**12053**	**13686**	**14154**	**13817**	**13716**	**13576**	**13516**	**13345**	**13959**	**13957**	**13666**	**13468**	**13588**	**13327**	**13199**	**12994**	**12774**	**12499**	**12221**	**12194**	**11910**
Net Cash from Operations	**9575**	**10589**	**8031**	**8184**	**8181**	**9314**	**6228**	**6833**	**7274**	**7815**	**12012**	**8437**	**15986**	**8562**	**11860**	**11984**	**12113**	**9974**	**11270**	**11123**	**14044**	**12237**	**12927**	**13366**	**14068**
Cashflow from Capital Activities																									
Receipts																									
Proceeds from Disposal of Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Payments																									
Acquisition of Assets	8204	11137	12777	6860	13770	26120	12680	3020	3020	3221	14020	4994	23020	3520	10520	11020	11671	3120	5020	3220	10020	4340	3020	3220	4020
Net Cash from Capital Activities	**-8204**	**-11137**	**-12777**	**-6860**	**-13770**	**-26120**	**-12680**	**-3020**	**-3020**	**-3221**	**-14020**	**-4994**	**-23020**	**-3520**	**-10520**	**-11020**	**-11671**	**-3120**	**-5020**	**-3220**	**-10020**	**-4340**	**-3020**	**-3220**	**-4020**
CashFlow from Financing Activities																									
Receipts																									
New Loans Required	0	0	6499	0	7499	18000	8000	0	0	0	1	0	6000	0	0	0	3999	0	0	0	0	0	0	0	0
Payments																									
Principal Loan Payments	9845	1837	1865	1825	1804	1183	1312	1116	1133	1138	1199	1265	1457	1539	1553	1645	1826	1936	2052	2176	2307	2445	2170	2300	1949
Net Cash from Financing Activities	**-9845**	**-1837**	**4634**	**-1825**	**5696**	**16816**	**6689**	**-1116**	**-1133**	**-1138**	**-1198**	**-1265**	**4542**	**-1539**	**-1553**	**-1645**	**2174**	**-1936**	**-2052**	**-2176**	**-2307**	**-2445**	**-2170**	**-2300**	**-1949**
TOTAL NET CASH	**-8474**	**-2384**	**-111**	**-501**	**107**	**11**	**237**	**2697**	**3121**	**3457**	**-3206**	**2177**	**-2492**	**3503**	**-212**	**-681**	**2616**	**4918**	**4198**	**5727**	**1716**	**5451**	**7738**	**7846**	**8100**
Current Year Cash	-8474	-2384	-111	-501	107	11	237	2697	3121	3457	-3206	2177	-2491	3503	-213	-681	2617	4917	4197	5727	1716	5451	7738	7846	8100
Cash & Investments @Year Start	15664	7015	4517	4298	3704	3718	3638	3781	6320	9211	12359	8929	10835	8141	11360	10875	9945	12255	16754	20440	25528	26580	31250	38037	44764
Cash & Investments @Year End	**7190**	**4630**	**4406**	**3797**	**3811**	**3729**	**3875**	**6478**	**9441**	**12668**	**9153**	**11106**	**8344**	**11644**	**11147**	**10193**	**12562**	**17173**	**20951**	**26166**	**27244**	**32031**	**38988**	**45883**	**52863**
Capital Works Funding:																									
Internal Funding for New Works ($'000)	5660	8620	3144	4070	3100	2320	1680	20	20	140	7020	1915	6020	320	4520	5220	1870	80	1220	140	4620	1340	20	58	208
Internal Funding for Renewals	2544	2516	2134	2790	2850	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3162	3812
New Loans	0	0	6499	0	7499	18000	8000	0	0	0	1	0	6000	0	0	0	3999	0	0	0	0	0	0	0	0
Grants	0	0	1000	0	320	2800	0	0	0	80	4000	80	8000	200	3000	2800	2800	40	800	80	2400	0	0	0	0
Total Capital Works	**8204**	**11137**	**12777**	**6860**	**13770**	**26120**	**12680**	**3020**	**3020**	**3221**	**14020**	**4995**	**23020**	**3520**	**10520**	**11020**	**11670**	**3120**	**5020**	**3220**	**10020**	**4340**	**3020**	**3220**	**4020**

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Statement of Financial Position

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Less: Accumulated Depreciation	167515	171721	176465	180617	184870	189308	193889	198475	203065	207662	212423	217215	222298	227393	232601	237928	243383	248846	254342	259845	265454	271086	276723	282203	287041
Written Down Current Cost	247203	251937	258154	258392	265377	284378	289796	285550	281299	277240	283819	281340	296597	292341	294971	297984	301517	296493	293336	288372	290103	286130	280832	275728	271417
Cash and Investments	7190	4423	4183	3566	3572	3482	3619	6214	9169	12388	8865	10811	8042	11334	10830	9870	12231	16835	20607	25817	26889	31670	38622	45513	52489
Receivables	182	183	188	191	193	196	198	200	202	204	207	209	212	215	217	219	221	223	226	228	231	233	235	237	239
Inventories	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Property, Plant & Equipment	*249227*	*253794*	*259852*	*259937*	*266776*	*285637*	*290921*	*286546*	*282172*	*277996*	*284462*	*281877*	*297031*	*292677*	*295215*	*298138*	*301587*	*296493*	*293336*	*288372*	*290103*	*286130*	*280832*	*275728*	*271417*
System Assets (1)	247203	251937	258154	258392	265377	284378	289796	285550	281299	277240	283819	281340	296597	292341	294971	297984	301517	296493	293336	288372	290103	286130	280832	275728	271417
Plant & Equipment	2024	1858	1698	1545	1399	1259	1124	996	873	756	644	537	434	337	243	155	70	0	0	0	0	0	0	0	0
Other Assets	1965	1982	2024	2061	2083	2118	2138	2159	2179	2200	2232	2251	2287	2326	2345	2366	2388	2411	2440	2462	2498	2520	2542	2564	2586
TOTAL ASSETS	**258564**	**260383**	**266246**	**265755**	**272624**	**291432**	**296877**	**295118**	**293722**	**292789**	**295766**	**295148**	**307572**	**306552**	**308607**	**310592**	**316427**	**315962**	**316608**	**316879**	**319722**	**320554**	**322231**	**324042**	**326731**
LIABILITIES																									
Bank Overdraft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Creditors	33	33	34	35	35	36	36	36	36	37	37	38	39	39	40	40	40	41	41	41	42	42	42	43	43
Borrowings	9129	7069	11531	9425	14891	31344	37268	35244	33251	31302	29340	27359	31235	28934	26676	24380	25959	23390	20767	18084	15335	12516	10041	7497	5365
Provisions	7	7	7	7	6	6	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4
TOTAL LIABILITIES	**9169**	**7109**	**11572**	**9467**	**14933**	**31387**	**37311**	**35286**	**33293**	**31345**	**29383**	**27403**	**31278**	**28978**	**26720**	**24425**	**26004**	**23435**	**20812**	**18130**	**15382**	**12563**	**10088**	**7543**	**5412**
NET ASSETS COMMITTED	**249395**	**253274**	**254674**	**256288**	**257691**	**260046**	**259566**	**259832**	**260429**	**261444**	**266383**	**267745**	**276293**	**277574**	**281887**	**286168**	**290423**	**292527**	**295796**	**298749**	**304340**	**307992**	**312143**	**316499**	**321319**
EQUITY																									
Accumulated Operating Result	114198	115552	114187	112945	111556	111017	107251	104178	101621	99662	101800	100269	106054	104268	105693	107091	108461	107664	108226	108613	111822	113107	115047	117374	120339
Asset Revaluation Reserve	135197	137929	140710	143574	146374	149277	152571	155918	159080	162062	164870	167772	170542	173616	176511	179401	182293	185201	187915	190487	192874	195246	197463	199496	201356
TOTAL EQUITY	**249395**	**253481**	**254897**	**256519**	**257930**	**260293**	**259822**	**260096**	**260701**	**261724**	**266671**	**268041**	**276596**	**277884**	**282205**	**286492**	**290754**	**292865**	**296141**	**299100**	**304696**	**308354**	**312510**	**316870**	**321694**
(1) Notes to System Assets																									
Current Replacement Cost	414718	423658	434619	439009	450248	473687	483686	484024	484364	484903	496241	498555	518895	519734	527572	535911	544901	545339	547678	548217	555556	557216	557555	557932	558458

Sewer FINMOD created for IWCM 2016 : Case 3 - new village schemes, 40% sub

FINMOD
Eurobodalla Shire Council

Performance Indicators

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Typical Residential Bills	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886	886
Average Residential Bills (2015/16$)	866	866	867	867	868	868	868	869	870	870	870	871	871	871	872	872	872	873	873	873	874	874	874	874	875
Mgmnt Cost / Assessment (2015/16$)	226	226	242	196	191	197	194	189	191	191	192	191	190	195	190	188	185	181	182	181	178	175	172	178	173
OMA Cost per Assessment (2015/16$)	590	587	605	553	544	545	538	531	529	525	523	517	522	522	513	508	502	496	493	489	482	476	470	474	466
Operating Sales Margin (%)	14.93	18.17	3.98	9.31	9.68	8.39	8.73	9.80	10.27	10.88	10.88	11.53	10.28	10.74	11.36	11.58	11.92	12.95	13.73	14.32	15.11	15.80	16.67	16.55	17.56
Economic Real Rate of Return (%)	1.36	1.67	0.42	0.82	0.83	0.70	0.72	0.81	0.86	0.93	0.92	0.98	0.85	0.91	0.96	0.97	0.99	1.09	1.18	1.25	1.33	1.41	1.52	1.55	1.68
Debt Service Ratio	0.50	0.11	0.14	0.13	0.16	0.20	0.23	0.20	0.19	0.18	0.17	0.17	0.19	0.18	0.17	0.17	0.18	0.17	0.17	0.16	0.15	0.15	0.13	0.12	0.10
Debt/Equity Ratio	0.04	0.03	0.05	0.04	0.06	0.12	0.14	0.14	0.13	0.12	0.11	0.10	0.11	0.10	0.09	0.09	0.09	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.02
Interest Cover	4.75	9.66	1.50	2.84	1.75	0.78	0.68	0.85	0.99	1.16	1.22	1.36	1.08	1.23	1.41	1.54	1.51	1.86	2.26	2.76	3.38	4.28	5.73	7.54	11.02
Return on capital (%)	1.59	1.77	0.53	0.90	0.91	0.87	0.77	0.88	0.98	1.08	1.35	1.12	1.63	1.05	1.36	1.36	1.40	1.25	1.44	1.47	1.83	1.63	1.77	1.83	1.96
Cash and Investments (2015/16$'000)	7190	4630	4406	3797	3811	3729	3875	6478	9441	12668	9153	11107	8344	11644	11147	10194	12562	17173	20952	26168	27246	32032	38989	45884	52864
Debt outstanding (2015/16$'000)	9129	7069	11531	9425	14891	31344	37268	35244	33251	31302	29340	27359	31235	28934	26676	24380	25959	23390	20767	18084	15335	12516	10041	7497	5365
Net Debt (2015/16$'000)	1939	2439	7125	5628	11080	27615	33393	28766	23810	18634	20187	16252	22891	17290	15529	14186	13397	6217	0	0	0	0	0	0	0

Appendix D3: Financial Planning Checklist

Eurobodalla Shire Council has reviewed and updated its Integrated Water Cycle Management (IWCM) Strategy and Strategic Business Plan (SBP). This document addresses the requirements for both the IWCM Strategy and SBP.

Part D of this document provides the information required for the financial plan development (Table 46, Items 10 to 22) as listed in the *Water Supply and Sewerage Strategic Business Planning and Financial Planning Check List – July 2014* (NSW Office of Water, 2014b).

Table 46: Financial Plan – Check List Requirements

Outcome Achieved	**Section in this Document**
Financial Plan	
10. Financial Plan Objective A. The financial plan includes all foreseeable costs and income and achieves the lowest uniform level of stable typical residential bill (in Year 2$) to meet the levels of service negotiated with the community. B. Long-term financial sustainability is demonstrated to comply with National Competition Policy and the National Water Initiative.	Section D2 and D5
11. Financial Model LWUs using the FINMOD software for their financial plan have used the latest version (FINMOD 2.1 or FINMOD 4.0)	Yes
12. Timeframe The financial plan covers a period of 30 years in accordance with the IWCM Strategy.	Yes
13. Growth and Number of Assessments A. Input accurate numbers of existing residential and non-residential assessments from the water cycle analysis and projection. B. New assessments for backlog water supply or sewerage projects are included in the growth projections. C. Growth projection input into your LWU's financial planning is consistent with the demographic and water cycle analysis and projections and SBP document	Section D4
14. Interest Rates Appropriate values have been used. Such rates in July 2014 were: • Inflation 2.5% pa • Investment 5.5% pa • Borrowing 6.5% pa	Section D4
15. Grants No capital works grants under the CTWSS program are assumed after about 2016/17.	Section D4
Forecast Data 16. A. Forecast data, such as future operation, maintenance and administration (OMA) costs and the income split (between the annual residential revenue and the annual non-residential revenue), have been carefully considered as part of the LWU's total asset management planning (refer to Item 7 on page 10).	Section D4
B. Increases or reductions to OMA costs have been discussed in the SBP document	PART C – STRATEGIC BUSINESS PLAN
17. Residential Bills	Appendix D2

Outcome Achieved	Section in this Document
The financial plan must provide a 30-year projection of Typical Residential Bills in Year 2$.	
18. Results The input data, key output graphs and the full projected results and the annual financial statements (i.e. Income Statement, Balance Sheet and Cash Flow Statement) are included for the preferred case. Results are presented in Year 2 dollars (i.e. not in inflated dollars).	Appendix D2
19. Sensitivity Analysis A. Sensitivity Analysis has been carried out and results are included. B. A description of the cases analysed, and the reasons for their selection have been included in the SBP document	Section D7
20. Financial Plan Report and Price Path A. Financial Plan Report prepared to document your financial planning. B. Price path adopted for the typical residential bill over the next 4 years in Year 2$. This provides some price certainty to your LWU's customers	PART D – FINANCIAL PLAN