ASSET MANAGEMENT PLAN – WATER SUPPLY 2013 **Procedure 3.4.4**

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Water Supply
Asset Management Plan

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EXECUTIVE SUMMARY

Water Supply

BACKGROUND

Kempsey Shire Council operates and maintains the town water supply. Our customers are the residents and ratepayers of the Kempsey Shire.

Kempsey Shire is located 430 km north of Sydney along the Mid North Coast of NSW. The Shire has a total area of 3379 square kilometres and is known as the Macleay Valley Coast.

With mountains and national parks to the west and flood plains, wetlands and sensitive estuaries along the east coast, the area is well known for tourism. Coastal towns and villages such as South West Rocks, Hat Head, Crescent Head and Stuarts Point have proven to be very popular during holidays, with their easy access to beaches and coastal waters.

The Kempsey Shire LGA also has a significant dairy and beef cattle industry and associated processing industries. The area is also home to Australian manufacturing homes of Milo (Nestle) and Akubra.

The Macleay River catchment is the second largest catchment on the north coast of NSW. The headwaters of the Macleay River originate on the New England tablelands forming several major waterways prior to entering the gorge country, bisecting the Shire before entering the South Pacific Ocean north of South West Rocks.

Kempsey Shire Council operates seven (7) separate water supply schemes comprising, Kempsey and Lower Macleay, South West Rocks, Crescent Head, Hat Head, Stuarts Point, Willawarrin and Bellbrook Water Supplies.

Water is extracted from two different sources, river water and groundwater. The two main sources of groundwater are the Macleay River Alluvium and the Macleay Coastal Sands.

Upper Macleay River

The largest water supply system is the Kempsey Lower Macleay water supply system which serves a population of approximately 12,000 in Kempsey, West Kempsey, Aldavilla, Frederickton, Clybucca, Bellimbopinni, Smithtown, Lower Kinchela and Gladstone.

The water source for the Kempsey Lower Macleay water supply system is the Sherwood borefield, which draws from the Macleay River Alluvium charged by the Macleay River.

Twenty bore pumps pump water to Steuart McIntyre Dam, a 2500 Megalitre off-stream storage dam. The Steuart McIntyre Dam WPS distributes chlorinated water to the three main storage reservoirs; Greenhill Reservoir (capacity 9.1 ML), Potters Hill (13.65 ML) and John Lane Road (2.5 ML)

Four of the six smaller village water supply systems of South West Rocks, Crescent Head, Hat Head and Stuarts Point are sourced from aquifers in the Macleay Coastal Sands. Bellbrook and Willawarrin townships are in the Five Day Creek and Hickeys Creek sub-catchments respectively and are supplied from shallow bores drawing from a shingle bed in the Macleay River.

This Asset Management Plan has been developed using an integrated approach. Council values and delivery strategies are considered, along with historical trends and infrastructure needs. These are integrated with key business drivers and service levels. Management strategies are defined, covering new investment, day to day programmes and risk. All of these are applied to knowledge of the assets, both physical and financial. Key outputs and outcomes are defined to enable ongoing monitoring of the Plan"s effectiveness.

WHAT COUNCIL PROVIDES

Kempsey Shire Council provides drinking water to the Australian Drinking Water Guidelines to residences and businesses and collects, treats and manages sewage in an environmentally and socially responsible manner.

Construction of a state-of-the-art recycled water supply scheme at South West Rocks including 1.65 Megalitre per day treatment plant is complete and will be commissioned in 2013. Adequate systems for the supply of both potable and non-potable water are a fundamental requirement for the health and general wellbeing of the community. Council"s potable water supply network comprises 4 treatment plants, 9 chemical dosing stations, 38 production bores, 62 Observation bores, 26 reservoirs, 2 dams, 16 water pumping stations and 594,000 metres of pipelines, supplying water to over 11,162 connections.

The current replacement cost of these assets is approximately $239 M.

WHAT DOES IT COST?

There are two key indicators of cost to provide the water supply service.

- The lifecycle cost being the average cost over the life cycle of the asset, and
- The total maintenance and capital renewal expenditure required to deliver existing service levels in the next 10 years covered by Council"s long term financial plan.

The life cycle cost to provide the water supply service is estimated at $5.4M per annum. Council"s planned life cycle expenditure for year 1 of the asset management plan was $9.6M which gives a life cycle sustainability index of 1.8.

The total maintenance and capital renewal expenditure required to provide the water supply service the in the next 10 years is estimated at $44.6M. This is an average of $4.6M per annum.

Council"s maintenance and capital renewal expenditure for year 2013/14 of the asset management plan of $4.1M giving a 10 year sustainability index of 0.63.

PLANS FOR THE FUTURE

In 2005/06 Council adopted the Macleay Water Integrated Water Cycle Management Strategy (IWCMS). The IWCMS directs the management of water issues on the basis of best result on a whole of water cycle basis, as opposed to traditional methods of separately addressing stormwater, water supply and sewerage issues. The IWCMS offers the opportunity to more sustainably manage water resources into the future, having a long term view of 30 years with review period every 5 years.
Population naturally has an impact on water demand, and current predictions are for slow steady growth in population over the next 30 years then expected to rise in the upcoming decade as the area attracts retirees, particularly within the baby boomer generation and others wishing to relocate. This population growth does have potential to affect demand in the planning period. It is anticipated a large percentage of sea-changes will be within this retiring population.
While this population growth alone is not anticipated to significantly affect demand within the planning period, development changes and changes in the local economy. This could be further reduced if the residents were water efficient, changing garden watering patterns and installing rainwater tanks. Water efficiency could be improved with low flow showerheads in houses and flats, public education, rainwater tanks, business water use Audits etc.

This asset management plan is prepared congruent with Council"s overarching plans, the Community Strategic Plan, the Delivery Programme and the Operating Plan to align vision, mission, goals and objectives.

Our Community's Vision

"We live in a community that provides opportunity to all, to prosper in an environment that supports well-being, connectedness and access to resources the community wants and needs."

Water Services Mission Statement

"To provide drinking water to the National Health & Medical Research Council standards to residences and businesses and collect, treat and manage the reclaimed water in an environmentally and socially responsible manner."

MEASURING OUR PERFORMANCE

Quality

Water supply assets will be maintained in a manner to achieve the required level of service. Defects found or reported that are outside our service standard will be programmed for repair. See the maintenance response service levels for details of defect prioritisation and response time.

Function

The aim is that a fit for purpose water supply network is constructed, operated, maintained and renewed in partnership with other levels of government and stakeholders to provide drinking water to the National Health & Medical Research Council standards to residences and businesses.

Water supply asset attributes will be maintained at a safe level and associated signage and equipment be provided as needed to ensure public safety.

Safety

We inspect all water supply assets regularly and prioritise and repair defects and OH & S issues in accordance with our inspection schedule to maintain safety levels.

THE NEXT STEPS

This actions resulting from this asset management plan are:

- Production of forms and procedures to assist asset database updating.
- Training for Council operational staff to explain AMP requirements

1 INTRODUCTION

This section defines the goals and objectives of this asset management plan, how the goals and objectives are addressed in the AMP and shows the plan framework.

1.1 GOALS AND OBJECTIVES OF ASSET MANAGEMENT

Kempsey Shire Council provides many services to its community. Some of these services are provided by infrastructure assets. Council"s goal in managing infrastructure assets is to meet the required level of service in the most cost effective manner for present and future consumers.

The key elements of infrastructure asset management are:

- Taking a life cycle approach,
- Developing cost-effective management strategies for the long term,
- Providing a defined level of service and monitoring performance,
- Understanding and meeting the demands of growth through demand management and infrastructure investment,
- Managing risks associated with asset failures,
- Sustainable use of physical resources,
- Continuous improvement in asset management practices.

This asset management plan is prepared congruent with Council"s overarching plans; the Community Strategic Plan, the Delivery Programme and the Operating Plan.

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1.2 ROLE OF AN ASSET MANAGEMENT PLAN

An asset management plan is a tool for combining management, financial, engineering and technical practices to ensure that the level of service required by the community is provided at the lowest long term cost to the community.

This water supply asset management plan documents the eight key asset management objectives below:

1. It provides the linkage between community outcomes and Council"s strategic values for water supply and the levels of service which are targeted performance objectives for the water system.
2. Specifically, the level of service the Kempsey LGA community require from water assets are defined and performance measures and performance data comparing actual service provided with target levels of service are documented.
3. Documents achievement of Council"s levels of service and how these levels of service are provided with the supporting accounting and financial management requirements.
4. It provides a detailed description of all components of the water asset, the condition of the asset or the assumed condition where data is lacking. Methods of assessing and monitoring and forecasting condition are developed.
5. It provides financial forecasts of expenditure based on the condition and estimated future life of components, and includes maintenance, renewal, and capital expenditure.
6. It provides a valuation of the complete water asset as well as individual components.
7. It identifies risks, which may cause failure of part of the water system and sets up a framework with which to manage risks for the future.
8. It identifies opportunities for improvements that will ensure financial resources are used wisely.

Relevant Council values, delivery strategies and how these are addressed in this asset management plan are:

Table 1.1 - Council Values and Delivery Strategies and how these are addressed

Value(s)	Delivery Strategy	Program	How the Values and Delivery Strategies are addressed
Healthy (85%) Wealthy (15%)	Primary Strategy HS-01 : Providing access to healthy diets	Provision of potable water supplies to services areas	Provide potable water supply to urban areas Replace/Renew water supply infrastructure to ensure continued operation of the system Upgrade water supply network and treatment systems to meet future demand Upgrade instrumentation, telemetry and SCADA systems to allow increased monitoring & automation Manage factors which affect the water quality of raw water entering the Kempsey supply system through the Sherwood bore field – Source Water Protection Manage factors which affect the water quality and quantity available for the schemes supplied from coastal aquifers
Healthy (100%)	Primary Strategy HS-01 : Providing access to healthy diets	Implement fluoridation – Kempsey & Crescent Head water supplies	Install and commission fluoridation equipment at Steuart McIntyre Dam to supply the Kempsey and linked Lower Macleay areas Install and commission fluoridation equipment at Crescent Head to supply the linked areas

1.3 OTHER KEY DOCUMENTS

This asset management plan is to be read in conjunction with the following associated planning documents:

- Macleay Valley 2036, Kempsey Shire Council"s Community Strategic Plan June 2013
- Council"s Kempsey Shire Council"s Delivery Program and Operating Plan, which includes Council"s long term budget outlining all aspects of the key financial objectives and commitments
- Councils Water Services Integrated Water Cycle Management Strategy, a 30 year strategy to improve urban water services, water supply, sewerage and stormwater.
- Council"s Water Services Strategic Business Plan for Water Supply & Sewerage Services. This document sets environmental objectives and environmental performance targets, sets the strategy for delivery of services to customers and defines the environmental requirements & goals of the water/sewerage businesses.
- Kempsey Shire Ecologically Sustainable Development Strategy, a broad scale plan designed to facilitate sustainable development within the Shire.
- Contracts – the service levels, strategies and information requirements contained in the AMP are translated into field staff work instructions, contract specifications and reporting requirements.
- By-Laws, Standards and Policies, tools to assist in the management of, and to support strategies.
- Business Plans – levels of service, processes and budgets defined in the AMP are incorporated into business plans as activity budgets, management strategies and performance measures.

1.4 ASSETS COVERED BY THIS PLAN

Council has acquired infrastructure assets by „purchase", by contract, construction by council staff and by donation of assets constructed by developers and others to meet increased levels of service. This asset management plan covers the following infrastructure assets. A detailed list is included in Appendix A.

Table 1.2 – Assets covered by this plan

Asset category	Quantity	Replacement Value (2013)
Water Treatment plants	4	$10,673,619
Dosing stations	9	$5,044,734
Reclaimed Water Treatment Plant, mains balance tank & pump stn (to progress from WIP in 2014)	1	$9,101,871
River Intakes	2	$3,809,172
Bores	33 Production 5 Emergency 73 Observation	$6,963,706
Reservoirs	17 potable, 1 recycled	$23,867,716
Dams	2	$28,123,579
Water Pump Stations	21	$1,314,180
Water pipes	605 km	$136,439,549
Bulk flowmeters	14	$229,560
Water service connection pipes	11,491	$15,603,189
Water meters	11,491	$4,438,462
Water Filling Stations	4	$39,360
Structures	18	$1,876,667
Studies/Reports	Various	$81,400
TOTAL WATER ASSETS		**$247,606,764**

Key stakeholders in the preparation and implementation of this asset management plan are:

Table 1.3 – Key stakeholders in this AMP

Federal and State Governments and Agencies	Funding assistance and standards development
Councillors / Elected members	Community representation and administration
Community, citizens and ratepayers	End-user involvement
Residential and commercial water consumers, tourists and visitors	End-user involvement
Developers / Utilities	Providers of services and infrastructure facilities
Employees / Volunteers	Operational and administration providers
Contractors / Suppliers	Suppliers of goods and services
Insurers	Remedy providers

1.5 PLAN FRAMEWORK

Key elements of the plan are

- Levels of service – specifies the services and levels of service to be provided by council.
- Future demand – how this will impact on future service delivery and how this is to be met.
- Life cycle management – how Council will manage its existing and future assets to provide the required services
- Financial summary – what funds are required to provide the required services.
- Asset management practices
- Monitoring – how the plan will be monitored to ensure it is meeting Council"s objectives.
- Asset management improvement plan

A road map for preparing an asset management plan is shown in Figure 1.

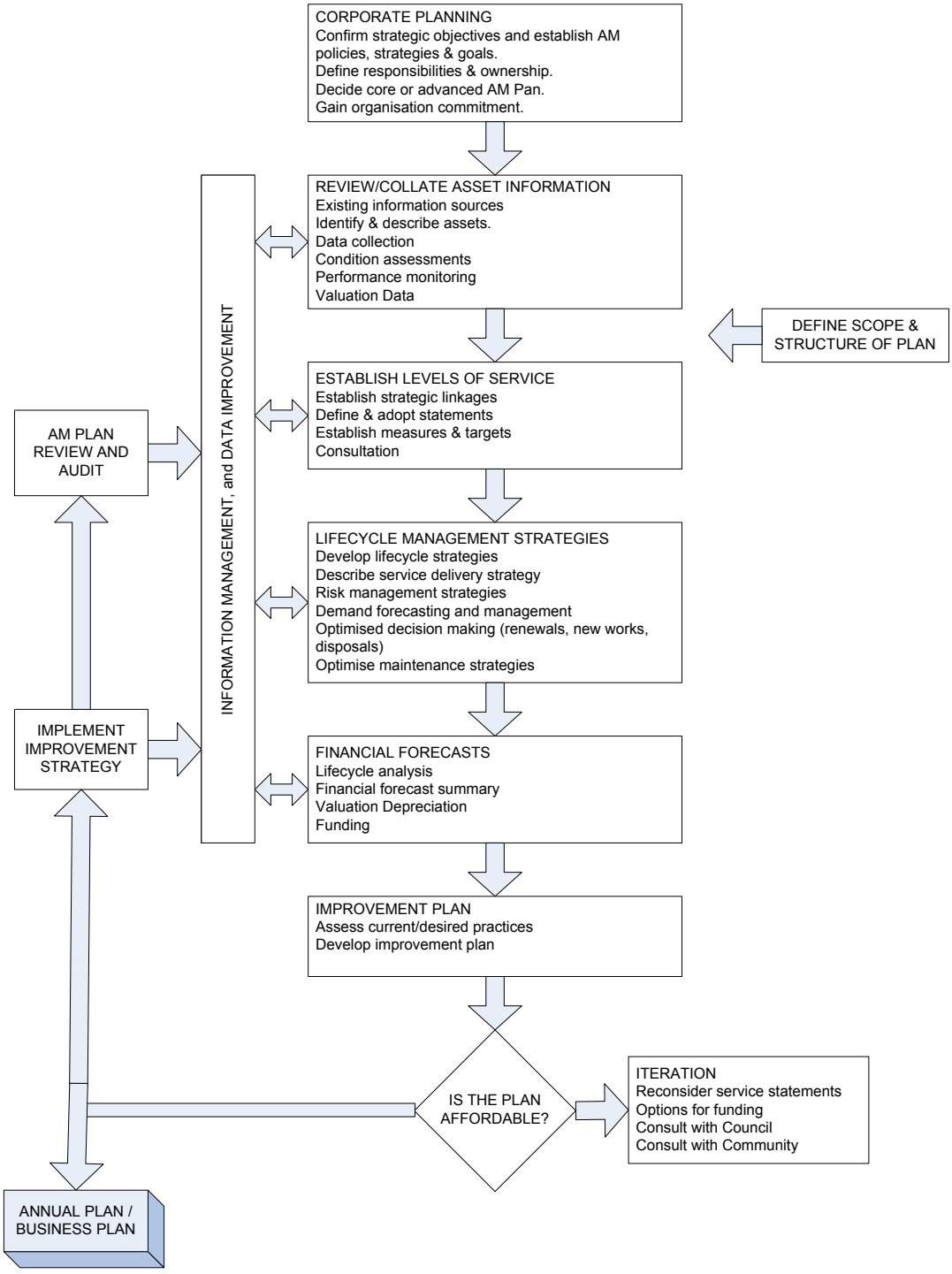
Belgrave Falls Booster Pumping Station

This asset management plan has been prepared using the National Asset Management Strategy (NAMS Plus) template for an advanced asset management plan in accordance with the International Infrastructure Management Manual. The aim of this plan is to achieve legislative and organisational requirements for sustainable service delivery and long term financial planning and reporting.

This asset management plan is progressively addressing „advanced" asset management using a „bottom up" approach for gathering asset information for individual assets to support the optimisation of activities and programs to meet agreed service level.

A vital ingredient of the Asset Management Plan is the Improvement Plan (Section 7). Incorporation of the task outcomes into revisions of the Asset Management Plan will lead to refinements and improved accuracy in the data.

Figure 1 - Road Map for preparing an Asset Management Plan



2 LEVELS OF SERVICE

This section defines the service levels or performance standards adopted and the extent to which they are being achieved. The service levels support Council's Values and Delivery Strategies and are based on customer expectations and statutory requirements.

2.1 WHAT ARE LEVELS OF SERVICE?

Before determining optimal strategies for managing the water supply assets, it is necessary to define the service delivery levels that these assets will deliver against. The levels of service provided by the assets should meet with statutory requirements, financial sustainability, and customer expectations.

The target levels of service determine the amount of funding that is required to operate, maintain, renew and upgrade the water supply infrastructure, the relationship between differing levels of service and the associated cost of delivering the service. This relationship can be used with customers and decision makers to establish the desired level of service. Defined or target levels of service can then be used to:

- Develop asset management strategies to deliver sustainable levels of service;
- Measure performance against defined targets;
- Identify costs and benefits of the services provided;
- Enable customers to assess suitability and affordability of the services offered.

Understanding the levels of service is vital for the lifecycle management of assets. They will determine what type of assets will be provided, how often they will be maintained, when assets will be rehabilitated or replaced and how the assets will be disposed of.

2.2 CUSTOMER RESEARCH AND EXPECTATIONS

Customer satisfaction can be measured in a variety of ways to give a valid indication of the extent to which customers feel satisfied with the type, quality, cost and performance of the service provided.

Customer desired service levels are determined in a variety of ways. Consultation is a key to understanding expectations and includes:

- Periodic Resident Surveys;
- Community consultations;
- Individual customer contact on a day to day basis.
- Customer contact follow-up call

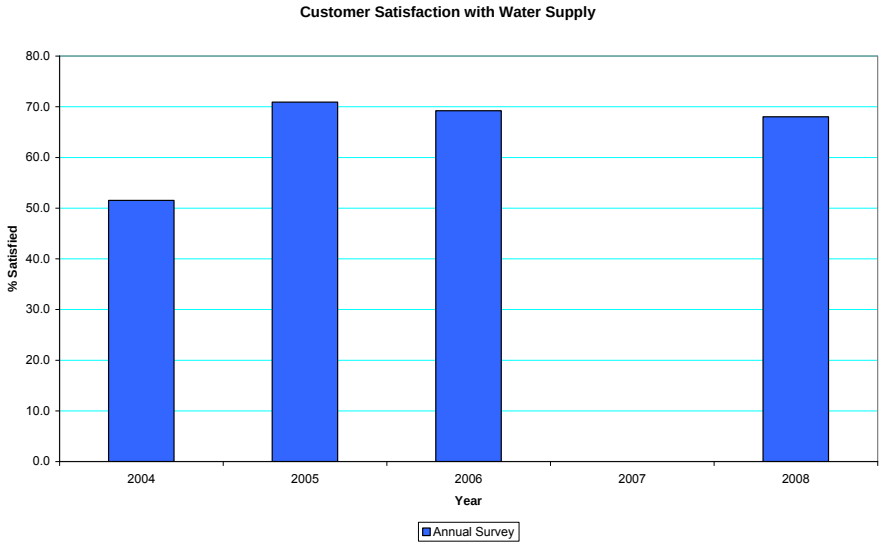
2.1.1 Periodic Resident Surveys

In response to the Local Government Act 1993 requirement for greater community input into the planning process of Councils, Kempsey Shire Council carries out regular community surveys. The aim of the survey is to poll a sample of residents on their level of satisfaction with Council"s services.

The survey takes many forms. The most recent written customer satisfaction survey was undertaken in November 2008. It reported 68% of the respondents were highly satisfied with the water supply. Water supply was the second most important service indicated.

More recently Council"s Customer Service team have evaluated customer satisfaction via customer contact follow up calls and Council has reaffirmed the results of the 2008 survey during the 2011 community consultations (see 2.1.2).

Figure 2 - Community Satisfaction Survey Levels



Note: In 2007 a customer survey was not completed.

2.1.2 Community Consultations

In 2011, Council undertook community consultation on the financial status of the organisation and the options for increasing rates to enable the improvement of infrastructure. It was recognised that Council had a backlog of asset renewals and during 2009 infrastructure was damaged in three floods, two of which were declared natural disasters. Subsequent floods in 2010, 2012 and 2103 only further decreased the status of infrastructure.

The consultations progressively determined the community"s priorities, explained the status of the infrastructure and their annual costs and gave options for improving the standards and accordingly the service levels associated with the different Council infrastructure. The focus of the series of consultations was predominantly infrastructure other than water and sewerage, however as part of the discussions, the results of the 2008 survey reaffirmed that water supply was the second most important service.

After the 2008 community survey and before the 2011 community consultations, in 2009, Council initiated a local action planning program to engage and work cooperatively with local communities to identify priorities and actions for improvements.

The Local Community Plans aim to make a difference through developing a relationship between communities and Council, solve problems through creative thinking and identify actions to bring about improvements. The foundation of the actions plans are visions and aspirations of the people who live in the Macleay Valley for the people of the Macleay Valley.

The Community Plans identify how Council will work with communities to identify, promote and enhance the distinctive character of the local areas.

Plans have been developed for the distinct catchment areas / village communities throughout the Macleay Valley as follows:-

- Bellbrook
- Crescent Head
- Frederickton & Collombatti
- Kempsey Township
- Smithtown
- Gladstone
- Hat Head
- South West Rocks
- Stuarts Point
- Willawarrin

Up until 2008, and following adoption of Council"s award winning Integrated Water Cycle Management Strategy (IWCMS), a Customer Consultative Committee was established with a view to obtaining customer input into planning and decision-making process. Membership was drawn from a wide variety of backgrounds including residential customers, business and agricultural customers from different parts of the Shire. This Committee ceased operation when Council"s Community Engagement Department was established and alternative feedback avenues were developed for the whole organisation.

More recently through 2010 to 2013, the Water Services section has established some specific customer contact groups to engage with regularly. These groups are usually generated from like water customer groupings, although once established the groups have been able to provide feedback more generally on service matters. The customer groups developed in this mode so far are Real Estate Agents, Solicitors and pensioner organisations. Further development is required in the two latter groups and future groupings include agricultural consumers, customers in debt recovery and large commercial consumers groups.

2.1.3 Individual Customer Contact on a Day to Day Basis

Members of the public can make complaints or service requests personally by telephone, calling into the Customer Service Centre, faxing or emailing. These are known as work orders and the work orders are investigated and generally replied to within 10 days. Other methods of communication include:

- Weekly advertisements and Mayoral column;
- On-site inspections, workshops and public meetings;
- Community committees;
- Community newsletters;
- Special media releases;
- Council website;
- Social media; Facebook and Twitter
- Opportunities to provide feedback ie. on-line forms, on-line polls and feedback forms etc.

Council uses this information in the development of the annual Delivery Plan in the allocation of resources in the budget

2.3 LEGISLATIVE REQUIREMENTS

Council has to meet many legislative requirements including Australian and State legislation and State regulations. These include:

Table 2.1 - Legislative Requirements

Legislation	Requirement
Local Government Act 1993 (NSW) and its associated Regulations	Sets out role, purpose, responsibilities and powers of local governments including the preparation of a long term financial plan supported by asset management plans for sustainable service delivery. Regulations made under this Act that relate to water supply include:
Water Management Act 2000 (NSW)	Regulates the sustainable extraction of water from rivers (water sharing plans and environmental flows) and allows Council to levy developer charges
Australian Drinking Water Guidelines 2012	Provides guidance on what constitutes good quality drinking water.
Soil Conservation Act	The Act addresses preservation of watercourse environments.
Public Health Act 2010 (NSW)	The primary function of water supply is to protect public health. The drinking water standards for Australia applies to water intended to be used for human consumption, food preparation, utensil washing, oral hygiene or personal hygiene. Drinking water standards list the maximum concentration of chemical, radiological and microbiological contaminants acceptable for public health in drinking water.
Public Works Act 1912 (NSW)	Role in planning and construction of new assets. Projects may be managed differently in the future.
Environment Planning & Assessment Act 1979 (NSW)	Sets out environmental planning instruments relevant to the provision of water & sewerage infrastructure and the carrying out of activities.
NSW Guidelines for Best Practice Management of Water And Sewerage	Guidelines for the effective and efficient delivery of water and sewerage services, including strategic business planning incorporating asset management.
Plumbing Code of Australia (PCA)	Calls up Australian Std AS/NZS 3500:2013 Plumbing and Drainage Set
AS/NZS 3500 (Parts 0-5) 2013 Plumbing and Drainage Set	Australian Standard Code provides plumbing and drainage standard requirements
Protection of the Environment Administration Act 1991 and Protection of the Environment Operations Act 1997	Council is required to exercise due diligence to avoid environmental impact.
Work Health and Safety Act and Regulation 2011	Council is required to provide a safe working environment and supply equipment to ensure safety.
Crown Lands Act	The reservation or dedication of Crown Land for public purposes and the management and use of Crown land.
Dams Safety Act 1978	Ensure dams are properly designed, constructed, commissioned and managed in order to prevent unsafe operation.
Fluoridation of Public Water Supplies Act	Sets out regulations for addition of fluorine to public water supplies.
NSW Food Act & Regulations	Ensures food for sale is safe and suitable for human consumption.
Government Information (Public Access) Act	Enabling members of the public an enforceable right to access information.
Farms Water Supply Act	Enables farmers to obtain advances for the purposes of carrying out works of water supply and empowers government instrumentalities to carry out such works on behalf of farmers.
Threatened Species Conservation Act	To protect critical habitat of threatened species, populations and ecologically communities.
Water Act	Governs the issue of new water licences and the trade of water licences and allocations.
Other relevant State and Federal Acts and Regulations	As appropriate.

2.4 CURRENT LEVELS OF SERVICE

Council has defined service levels as part of the Business Plans for the Water Supply. These are provided in Table 2.2 below. Achievement of these service levels is regularly monitored. The results of the monthly prime performance measures are listed in Table 2.2 and are reported monthly to Council as KPIs. Graphical representations of these KPI performances for 2012/13 are shown in Appendix B.

Additional service level achievements are recorded in the annual NSW Benchmarking of Water Utilities and National Benchmarking of Water Utilities. The most recent results are listed in Appendix C. These benchmarking processes are audited every 3 years by an external auditor requiring NSW Office of Water approval, to determine the accuracy of the data. Council"s most recent audit report can be found in Appendix D.

Table 2.2 - Council's Service Levels for Water Supply

Description	Level of Service	Current Performance
AVAILABILITY OF SERVICE		
Extent of area serviced: Bellbrook, Willawarrin, Kempsey District (West Kempsey, South Kempsey, Frederickton, Clybucca, Smithtown/Gladstone), Stuarts Point, South West Rocks, Hat Head, Crescent Head		
Domestic peak day	3,000 L/ tenement /day	Assessed annually as part of the utility reporting to NSW Office of Water
Domestic Annual	143 kL / connected property	
Total Annual Average Consumption (potable + non- potable)	3,340 ML / annum	
Peak day/average day consumption ratio	Kempsey and Lower Macleay 2.0 Bellbrook and Willawarrin 2.4 Stuarts Point 3.2 South West Rocks 2.8 Hat Head 3.1 Crescent Head 2.6	Assessed annually
Maximum static pressure	90 m head	
Minimum static pressure - new developments - existing customers	15 m head 12 m head	Met for new development Reviewed progressively and needs better programming to gain greater comprehensive assessment
Water flow rates Diameter of water service pipe (mm) - 20 - 25 - 32 - 40 - 50	Minimum flow rate (litres/minute) - 20 - 35 - 60 - 90 - 160	Measured and recorded, predominantly on customer enquiries lodged. A more consistent program is required for the larger meters.
SERVICE INTERRUPTIONS TO CONSUMERS:		
Planned: Notice given to customers Duration of interruptions Unplanned: Total number of interruptions per year	7 days Notification of duration will be given to affected customers No more than 2 per customer per year	Council has been achieving this target Being tracked via work orders and annual utility reporting

Description	Level of Service	Current Performance
SERVICE PROVIDED		
Time to provide an individual standard connection to water supply in a serviced area	14 working days	Being monitored
RESPONSE TIMES Defined as time to have staff on-site or to investigate problem or answer inquiry. The following response times are to be achieved in 90% of cases.		
System failure or complaint	Response Times	
PRIORITY 1: - Pump station failure - Water treatment plant malfunction - Valve failure - Major main break	1 hour (during business hours) 2 hours (during after hours)	Currently measured monthly as an englobo meeting of a 2 hour response to all priorities which is currently met almost 100% of the time.
PRIORITY 2: - Minor main break - Leaking property connection - Telemetry failure - Partial valve failure	2 hours (during business hours), 4 hours (during after hours)	
PRIORITY 3: - Leak from water main - Leak from hydrant - Partial failure of property connection	1 working day	
PRIORITY 4: - Minor problem or complaint which can be dealt with at a time convenient to customer and Council, e.g. a minor leak in a water service	Within 2 weeks	
CONSUMPTION RESTRICTIONS IN DROUGHTS		
Level of restriction applied through a repeat of the worst drought on record	80% normal usage	Met -last drought period was in 2006
Maximum duration of restrictions	6 months / 10 year period	Met
Maximum frequency of restrictions	1 in 10 year period	Met

Table 2.3 - Current Monthly Service Level Assessment via KPIs

Performance Indicator	Target	2010-11	2011-12	2012/13
Number of water main failures per year	40	30	28	21
Percentage of water and sewer supply failures will be responded to within two (2) hours of being reported	90%	98.8	97.7	100
Percentage of water quality analyses complying with Australian Drinking Water Guidelines	98	99.1	98.8	97.4

Steuart McIntyre Dam completed in 2001 has a capacity of 2,500 Megalitres

3 FUTURE DEMAND

This section analyses factors effecting demand including population growth, social and technology changes. The impact of these trends is examined and demand management strategies are recommended as a technique to modify demand without compromising customer expectations.

3.1 DEMAND FORECAST

Typically, there are a number of factors that directly impact on the demand for water supply. The following key drivers influence the water demand, demand variability and demand growth:

- Population & population growth
- Changes in demographics and urban growth
- Industrial/Commercial uses & growth
- Economic factors, both regionally and globally
- Tourism, particularly holiday accommodation
- Agricultural practices
- Climate and seasonal factors
- The availability of Recycled Water
- Water loss
- Geology and soils
- Legislative changes

Waterwise signs located around townships are used to display water restriction levels and remind customers to conserve water.

Additionally, the existing configuration of the seven potable water supply schemes and more recent wetter weather has presented difficulties for the preparation of water demand forecasts, as in each scheme the weather influences have had such a diverse range of impacts on the various customers.

The recent frequency of substantial flooding since 2009 (eight substantial floods in five years) has tested the previously noted consumption patterns and diurnal patterns (time of day consumption occurs). Water consumption of rural, particularly dairy and beef cattle related consumers, is very weather dependent which in turn has presented a significant challenge in both managing the operation of the water supply and forecasting future water use. Until the recent year"s demands can be further analysed to confirm a changed permanent patterns versus an interim flood impact pattern, the projections for water demand from the 2005 Integrated Water Cycle Management (IWCM) Strategy are being used cautiously with the more recent noted water demands.

In 2005 a comprehensive Integrated Water Cycle Management (IWCM) Strategy was completed. Many detailed IWCM sub-studies were commissioned to investigate the key water demand key drivers. The investigations determined 30 year population, area specific water demand strategies and recommended actions to be taken to reduce potable water demand.

Demand management strategies provide alternatives to the creation of new assets in order to meet demand and look at ways of improving asset efficiency and modifying customer demands in order that the utilisation of existing assets is maximised and the need for new assets is deferred or reduced.

The Demand Management Plan is the primary reference document for demand management strategies and actions. The demand management actions recommended in the IWCM Strategy are summarised in Section 3.7.

In 2010 Council updated the population and commercial/industrial growth forecasts. The forecasts are summarised in Section 3.2

3.2 POPULATION AND URBAN GROWTH

"The total population of New South Wales is projected to grow from 6.57 million in 2001 to 8.26 million in 2031, an increase of almost 1.7 million or 26 per cent over 30 years."[1]

Overall

In October 2010 Council developed the Kempsey Shire Council Local Growth Management Strategy which analysed population projections and dwelling demand projections to the year 2031. A 5 year review will be undertaken in 2014 to reassess the population growth projections against actual growth. The following is a summary of the relevant sections the Strategy.

Annualised average population growth rate in Kempsey Shire from 2001to 2007 was 0.71%. The historical dwelling growth rate from 1991 to 2006 has been 829 dwellings every 5 years.

The Department of Planning Mid North Coast Regional Strategy projected the Hastings-Macleay sub region will grow by 32,260 persons by 2031 with only 8.1% of that growth expected to occur in the Kempsey Shire. Council investigated the three growth scenarios shown in Table 1. Scenario 2, the Department of Planning projection is lower than the historical growth rates. Council adopted Scenario 3 – High Range growth as it better reflects the actual recent growth rates.

Reference 1 p.8, NSW Statistical Local Area (SLA) Population Projections 2001-2031, TPDC, 2005 Release)

Table 3.1 - Growth Scenarios 2006 to 2031

		% Growth	Macleay Population 2031	Macleay Total new dwellings	Macleay Urban	Macleay Rural
Scenario 1	Low Range	10	30,990	2,790 (558/yr)	2,093	697
Scenario 2	Medium Range	12	32,260	3,400 (680/yr)	2,550	850
Scenario 3	**High Range**	**15**	**33,229**	**3,900 (780/yr)**	**2,925**	**975**

Dwelling Types

The Kempsey Shire area has a range of residential dwelling types including a significant number of rural residential properties. In 2006, 66.5% of all dwellings were located in urban areas with only 51% of new dwelling growth being within urban areas. Although land availability pressure will favour the creation of smaller lots in the future, significant rural residential demand is expected continue.

It has been assumed 75% of new dwellings will be in urban areas with the balance (25%) in rural and rural residential areas.

Council"s Local Growth Management Strategy adopted a nominal ratio of 76% detached and 24% medium density with most medium density development assumed to occur in the coastal urban areas of South West Rocks and Crescent Head and detached housing development in new estates in the Kempsey and Frederickton townships.

Average net yield estimate for detached dwellings is 11 dwellings/ha.

Growth by Location

Urban growth will be focused in the major town of Kempsey, the township of South West Rocks, and in the villages of Crescent Head and Frederickton, with Stuarts Point in the long term.

The Pacific Highway Bypass of Kempsey township was completed in 2013 which was recognised would encourage residential growth in the Kempsey township and at Frederickton. The upgraded highway will also improve accessibility to the growth areas of South West Rocks, Frederickton and Crescent Head.

Appendix E contains more extensive discussion of residential land non-residential growth in each locality

Table 3.2 – Summary of Population Growth at each Locality

Locality	**Population**		
	2006	**Increase**	**2031**
Stuarts Point	750	145	896
South West Rocks	4,521	2,420	6,940
Hat Head	309	48	357
Crescent Head	1,114	242	1,356
Gladstone/Smithtown	994	0	994
Frederickton	1,021	194	1,214
Kempsey	8,434	581	9,015
Total Urban	**17,144**	**3,629**	**20,773**
Rural/Rural Res	**11,246**	**1,210**	**12,456**
Total	**28,390**	**4,839**	**33,229**

Table 3.3 - Summary of Dwelling Growth at each Locality

Locality	Locality Proportion	Proportion Medium Density 2006 Census	Projected % Detached Housing 2006-2031	Detached	Medium Density	Total
Stuarts Point	3.0%	8.0%	92%	108	9	117
South West Rocks	50.0%	26.4%	60%	1170	780	1950
Hat Head	1.0%	9.1%	91%	35	4	39
Crescent Head	5.0%	26.2%	60%	117	78	195
Gladstone/Smithtown	0.0%	0.0%	0%	0	0	0
Frederickton	4.0%	7.9%	92%	144	12	156
Kempsey	12.0%	12.9%	87%	407	61	468
Total Urban	**75%**			**1981**	**944**	**2925**
Rural/Rural Res	**25%**		**100%**	**975**	**0**	**975**
Total				**2956 (76%)**	**944 (24%)**	**3900**

Table 3.4 - Summary of Land Release Yield at each Locality

	Short Term				Medium Term				Long Term			
	2009-2012				2013-2019				2019+			
		Detached	Attached	Total		Detached	Attached	Total		Detached	Attached	Total
Kempsey	KUIA 1	22		**22**	KUIA 3	22		**22**	Med Dens		200	**200**
	KUIA 2	34		**34**	KUIA 4	330		**330**	KUIA 5	275		**275**
South West Rocks	SWRUIA 1 #	330	220	**550**	SWRUIA 4	154	66	**220**				
	SWRUIA 2 #	35	9	**44**	SWRUIA 5	35	9	**44**				
	SWRUIA3		40	**40**	SWRUIA 6		200 *					
	Med High		80	**80**								
Crescent Head	CHUIA 1	70	41	**111**								
Frederickton	FUIA 1	46		**46**				**10**	FUIA 2	65		**65**
	Macleay St		50	**50**								
Total		**537**	**440**	**977**		**541**	**75 - 275 ***	**616-906***		**340**	**200**	**540**

Notes: ^ not all land within an Urban Investigation Area will necessarily be zoned for residential or any development. The investigation process will identify the extent of land suited for development and also identify land that may be identified for environmental protection, or other uses.
Note these areas are now zoned residential, but still subject to further assessment prior to development.
* Yield from SWRUIA6 subject to detailed ecological assessment.

3.3 COMMERCIAL/INDUSTRIAL/INSTITUTIONAL GROWTH

The Kempsey LGA has many relatively large commercial water customers. In 2011/12, non-residential water consumption accounted for 40% of total metered water consumption.

There is a 60 Ha mixed industrial area in South Kempsey which includes Akubra Pty Ltd. The area is almost at capacity and Stage 1 of an additional 320 hectare industrial/transport hub is underway in the South Kempsey area, known as the South Kempsey Employment Land.

The South Kempsey Employment Land (SKEL) will generate significant jobs growth and economic benefit for the Shire. The Slim Dusty Centre is within the SKEL area and this Centre is planned to be a major convention and motel complex. Two large highway service centres are planned for either side of the new Pacific Highway interchange, as well as gravel mining and various sized industrial subdivisions.

The Nestle plant at Smithtown has recently augmented its operation by 25% and annual water consumption is likely to increase from 106 to 132 ML per year.

Kempsey District Hospital remains a Level 3 hospital and is to be upgraded to align with the population increases and medical requirements. This expansion will create the demand for specialists rooms and suitable accommodation for new staff drawn to the area. Construction of the now approved expansion of the hospital is currently underway.

Kempsey has a regional correctional facility. There are no known plans to expand the gaol in the future beyond that which has occurred in the recent five years.

At South West Rocks, planning for a new library building has commenced and zoning of land for specialist rooms will be required. Also, demand for an expanded or new primary school will require additional land in the main release area of South West Rocks. A third secondary school in the Shire needs to be planned with a preferred location in South West Rocks.

Frederickton will require a neighbourhood business centre to service the new and expanding Seniors Living development. Investigations into the potential for an industrial area at Fredericton are also underway.

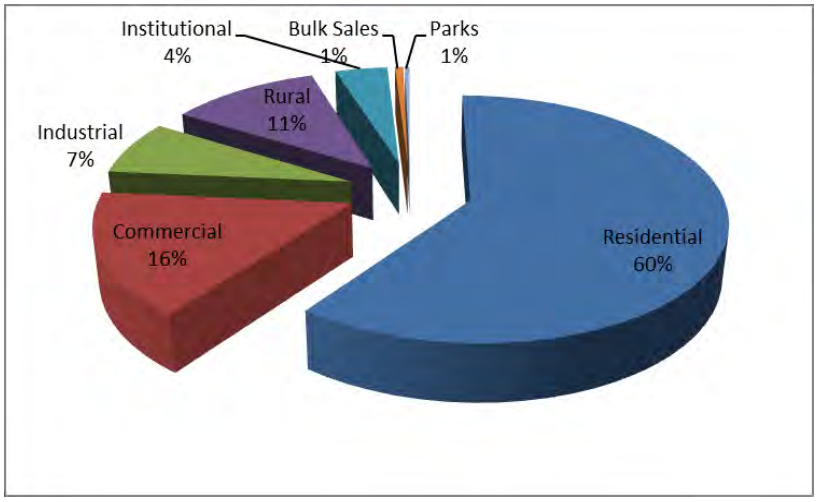
The Shire has several large tourist caravan parks at coastal communities and several residential villages.

Tallowwood Place is a new subdivision at South West Rocks to be supplied with the dual water supply (potable & recycle).

3.4 CURRENT WATER DEMANDS

The annual metered water consumption for 2011/12 was 2566 megalitres while the annual total water consumption was 3314 megalitres including "water losses".
The 2011/12 metered consumption was utilised as follows:

Customer Type	Megalitres per year	Percentage
Residential	1545	60%
Commercial	416	16%
Industrial	188	7%
Rural	290	11%
Institutional	102	4%
Bulk Sales	16	1%
Parks	9	0%
Total	**2566**	**100%**

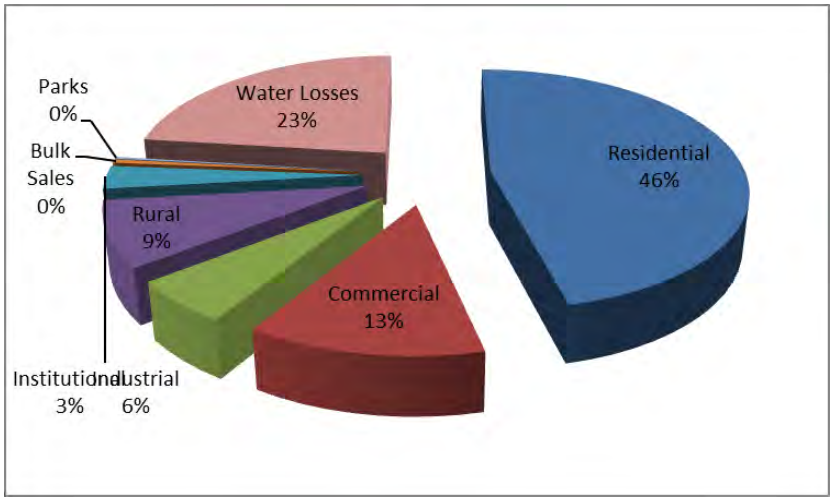


Appendix F contains a list of the 2013 major water users.

All reticulated water supply networks have "water losses" which are part of the overall total water demand. The term "water losses" is an industry standard term covering unmetered authorised yet unbilled water use for uses such as fire fighting and mains flushing, water leakage from water mains, valves and services upstream of customer"s meters and water meter inaccuracies. The 2011/12 "water losses" estimate was 767 Ml or 29% in addition to the metered consumption.

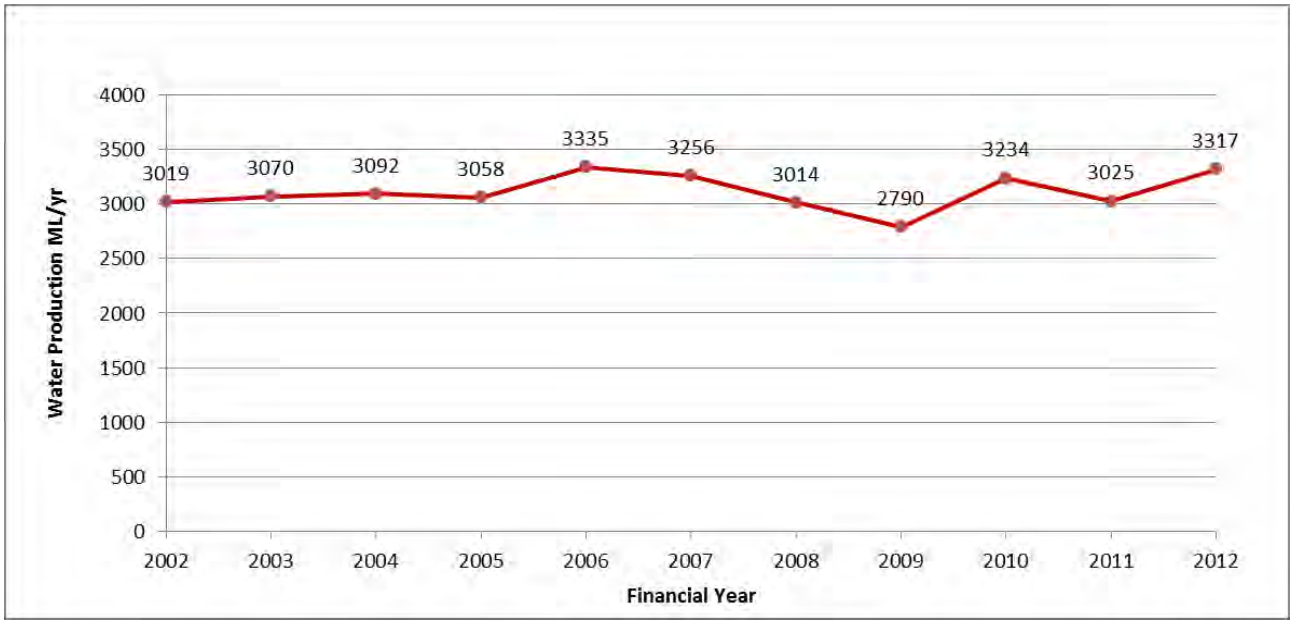
The 2011/12 total consumption was utilised as follows:

Customer Type	Megalitres per year	Percentage
Residential	1545	46%
Commercial	416	12%
Industrial	188	6%
Rural	290	9%
Institutional	102	3%
Bulk Sales	16	0.5%
Parks	9	0.3%
Water Losses	767	23%
Total	**3333**	**100%**



3.5 WATER DEMAND TRENDS

Figure 3 - Annual Water Demand Trends 2002-2012



Residential per household water demands have been trending downward for several years mainly due to Council"s active demand management and water education program, the introduction of BASIX requirements by the State Government for new building works, the improvement in efficiency of water delivery by fixtures such as shower heads and taps and user pays water pricing.

Council"s demand management and education programme is documented in the Demand Management Plan and summarised in the IWCM Demand Management action Section 3.7.

BASIX, the Building Sustainably Index, ensures homes are designed to achieve 40% water efficiency ratings in order to reduce demand on potable water supplies. These water reduction targets for new homes first came into force in July 2005. Typically, the most cost effective way of achieving BASIX certification is the installation of water efficient fixtures and a 2,000-5,000 litre rainwater tank.

Water efficiency of water fixtures and appliances such as toilets, showers, washing machines and dishwashers is continually improving. Only minimum 3-star rated products are now available for purchase and older non-efficient fixtures are being progressively replaced by owners.

The 2011/12 average annual water residential consumption was 145kl per annum per permanent residential household (including multi-residential unit buildings for permanent residential occupancy).

Kempsey Shire"s average annual water residential consumption compares favourability against other NSW Local Water Utilities, Kempsey rated 3 out of 5 in the 2011/12 NSW Water Supply & Sewerage Performance Monitoring Report, having an average consumption which has reduced from close to 200kl in 2002 to 143kl in 2011/12. Tourist influx during peak holiday periods significantly increases seasonal water demands up to a factor of four (4).
Non-residential growth within the Shire, potentially, has major implications on water demand. Economic growth, in recent years has been slow however with the Kempsey Bypass completed and the expansion of the Nestle complex, non-residential water consumption is likely to increase at a higher rate in the future. Fit-for-purpose water, such as rainwater harvesting and highly treated recycled effluent will reduce the rate of increase in potable water demand as areas grow.

There is considerable potential for rainwater harvesting and reuse throughout the Shire. Most rainwater systems are designed to be supplemented by town supply during low rainfall periods so customers can enjoy the security of town supply with the benefit of rainwater for irrigation, stock watering and toilet use.

Kempsey has a relatively high percentage of rural properties connected to the town water supply, just over eleven percent. In particular, the Kempsey / Lower Macleay Water Supply Scheme is unique in the number of agricultural customers, predominantly beef cattle properties, supplied with potable water. Whilst providing agricultural benefit to the Shire, Council needs to also balance those connections, their leakage risk, backflow risk and the impact on the availability of water for human consumption in dry times.

Council curbed expansion of rural town water connections by introducing a Water Supply Policy 2011 which assesses the benefit of supply versus Councils costs and risks before granting additional rural connections. The yield of the water supply system may be increased if rainwater was used for more non-potable water uses instead of town reticulated supply.

Commissioning of a Recycled Water Treatment Plant at South West Rocks is almost complete and will form an integral part of the water cycle infrastructure. Reduced potable water consumption will result in the ability to substantially defer planned water supply capital works to service the expansion of South West Rocks and is a working example of demand management utilising integrated water cycle principles.

3.6 FUTURE WATER DEMANDS

3.6.1 Integrated Water Cycle Management Strategy

In 2005 a comprehensive Integrated Water Cycle Management (IWCM) Strategy was completed to ensure best-practice management of its water supply, sewerage and stormwater systems.

IWCM is an approach to the management of urban water services that aims to maximise the benefit derived from the available water resources. The process encourages the evaluation of demand reduction and potable water replacement opportunities across urban water services, e.g. the potential of a rainwater tank to replace demands on a reticulated water supply and to assist in the management of stormwater and utilising highly treated effluent for non-potable water uses.

Five water cycle management scenarios were shortlisted and analysed in detail. The recommended scenario was **Scenario 3: Integrated Scenario 1.**

The recommendations effecting future water demands included:

- Pricing Adjustment: Pay for use pricing
- Community Education (external use target):
- Residential Showerhead Retrofit: Low flow showerhead program
- Reduce Water Losses: Reduce Kempsey LGA very high water loss rate.
- Business Water Audits: Assist business, particularly high water users, to become more water efficient.
- Recycled Water to New Development: Provide dual reticulation recycled water at South West Rocks
- Rainwater harvesting: Rainwater tanks at all new dwellings except south West Rocks. Assumed BASIX will mandate installation of rainwater tanks.

Kempsey Shire Council has since implemented all the above recommendations. The above recommendations are further discussed in the Demand Management section.

3.6.2 Water Demand Projections

As part of the IWCM, past water demands were analysed and future water demand predicted taking into account the projected population growth and estimated water savings. The three tables below show the Average Day, Peak Day and Annual water demands at five year intervals until the Year 2033. The demands are total water production including water losses.

Figure 4 below shows that the 2005 IWCM projections are significantly higher than actual 2003-2012 production demands.

Table 3.5 - Average Day Demand Forecasts (ML/d)

Supply Area	2003	2008	2013	2018	2023	2028	2033
Bellbrook	0.044	0.042	0.042	0.042	0.042	0.042	0.042
Willawarrin	0.041	0.038	0.038	0.038	0.038	0.038	0.038
Kempsey/Lower Macleay	10.72	10.05	10.20	10.35	10.48	10.60	10.70
Stuarts Point	0.60	0.57	0.60	0.63	0.66	0.69	0.71
South West Rocks	2.14	2.29	2.58	2.89	3.20	3.48	3.70
Hat Head	0.23	0.23	0.25	0.27	0.30	0.32	0.33
Crescent Head	0.67	0.65	0.72	0.79	0.86	0.92	0.97
Total	**14.45**	**13.87**	**14.43**	**15.01**	**15.58**	**16.09**	**16.49**

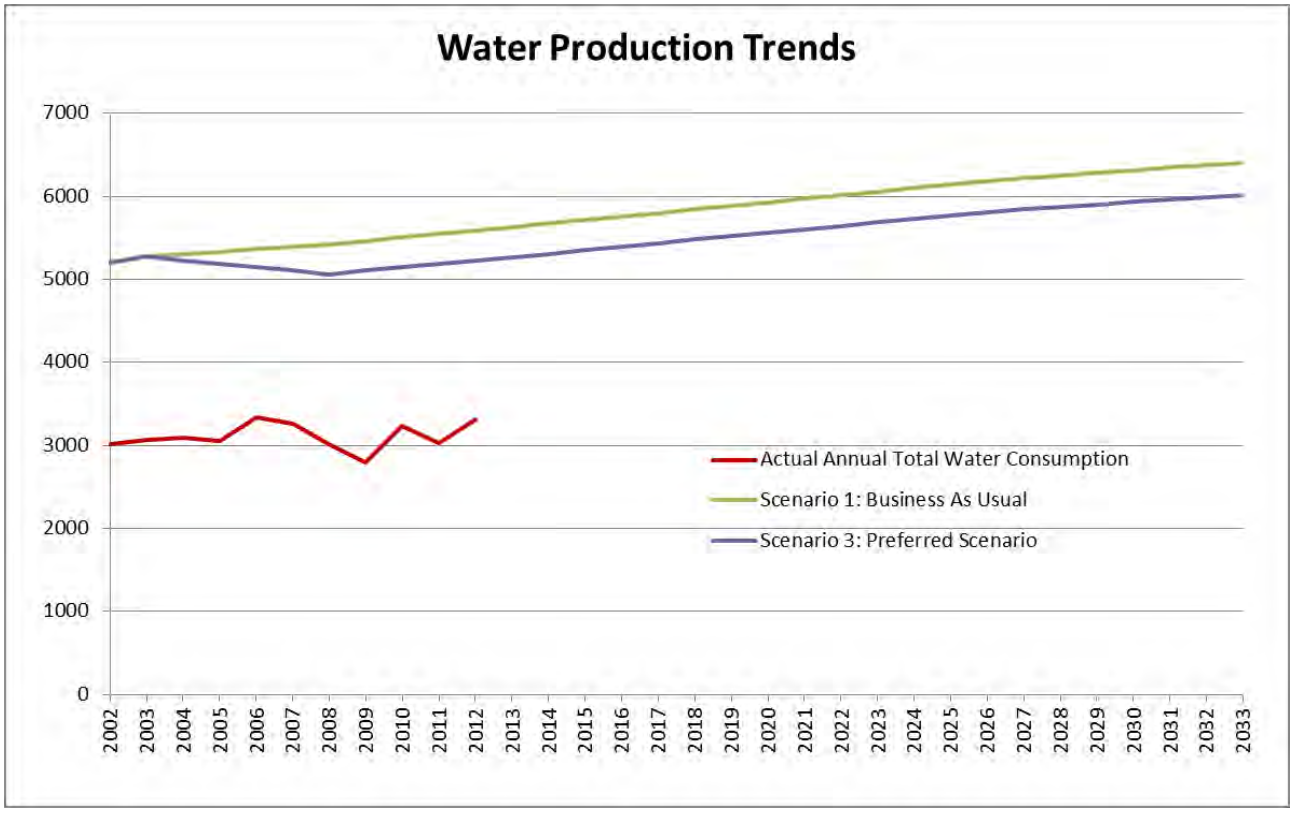
Table 3.6 - Peak Day Demand Forecasts (ML/d) - Scenario 3: Integrated Scenario 1

Supply Area	2003	2008	2013	2018	2023	2028	2033
Bellbrook	0.110	0.106	0.107	0.107	0.108	0.109	0.110
Kempsey/Lower Macleay	21.45	20.28	20.94	21.60	22.23	22.80	23.32
Stuarts Point	2.05	1.92	2.01	2.11	2.20	2.28	2.35
South West Rocks	6.65	7.05	8.04	9.12	10.19	11.17	12.01
Hat Head	0.76	0.74	0.82	0.91	1.00	1.08	1.14
Crescent Head	1.87	1.80	2.01	2.24	2.46	2.66	2.83
Total	**33.03**	**32.03**	**34.06**	**36.22**	**38.32**	**40.23**	**41.89**

Table 3.7 - Annual Demand Forecast (ML/yr) – Scenario 3 – Integrated Scenario 1

Supply Area	2003	2008	2013	2018	2023	2028	2033
Bellbrook	16	15	15	15	15	15	15
Willawarrin	15	14	14	14	14	14	14
Kempsey/Lower Macleay	3913	3668	3723	3778	3825	3869	3906
Stuarts Point	219	208	219	230	241	252	259
South West Rocks	781	836	942	1055	1168	1270	1351
Hat Head	84	84	91	99	110	117	120
Crescent Head	245	237	263	288	314	336	354
Total	**5272**	**5063**	**5267**	**5479**	**5687**	**5873**	**6019**

Figure 4 – Actual Annual Demand Trends & IWCM Forecasts (ML/yr)



3.7 IWCM DEMAND MANAGEMENT ACTIONS

3.7.1 User –pays Water Pricing

User-pays water pricing has proven to be a successful demand management and asset management tool. One of the key recommendations of the IWCM was Pay for Use Water Pricing.

NSW State Government Best Practice Management of Water and Sewerage Water Pricing Guidelines recommend an inclining block tariff (2 or 3 tier) for residential water usage as a demand management measure. The Guideline states that residential water usage charges must be set to recover at least 75% of residential revenue. Council implemented a 2 tier inclining block tariff water usage tariff in 2005 and is still working toward the 75/25 revenue target.

The 2013/14 water tariff is as follows:

Access Charge (20mm)	= $248.00 pa
Water Usage Charge -0-250 kl/yr	= $2.03/kl
Water Usage Charge ->250 kl/yr	= $2.92/kl (residential customers only)

Council has made significant progress toward financial sustainability from a very low income base and is working toward Best Practice Management of Water and Sewerage Water Pricing targets.

The 2011/12 water charge tariff structure resulted in residential water usage charges recovering 52% of the residential revenue. Council has requested dispensation from the regulator, NSW Office of Water, to have a reduced target of 60/40 by financial year 2017/2018 and 75/25 by financial year 2023/2024.

The Kempsey Macleay Local Government Area is a low socio economic area. Water charges have increased 6% per annum for the past five (5) years, steadily working toward full cost recovery however recently Council has experienced a sharp increase in the number of overdue water bills, which has been interpreted as a sign of community affordability stress.

Council sited several locality specific reasons why the 75/25 rule was difficult to achieve in the short term, namely:

1. The high percentage of holiday houses and units
2. Low socio –economic area with many large families
3. Weather variability causing large fluctuations in non-residential water usage

The Macleay Valley has several large processing facilities with very large water demands. Council decided to provide its large food based manufacturing businesses a concessional rate. This concessional rate is only accessible to food processing customers using greater than 10,000kL per year and who have achieved a broader economic benefit to the community. Every year, these businesses are asked to provide Council with ratified information on employment levels and the impacts of water pricing on their business in order to qualify for this concessional water pricing.

3.7.2 Community Education

Council has continued to provide education programmes to facilitate sustainable use of water resources, providing healthier catchments, improving catchment awareness and the Shire"s water cycle.
The Waterwise Schools Accreditation System was introduced as a partnership with Coffs Harbour City Council, Clarence Valley Council and the Cascade Environment Education Centre. Nambucca and Bellingen Shires have now joined this partnership to deliver the Waterwise Programme across the five Council areas.

The programme takes a whole-of-school, long-term approach to addressing water sustainability issues with students and provided teaching support to ensure ongoing and fun delivery.

It also promoted active citizenship and encouraged community/school involvement and education.

Aldavilla school students receiving Waterwise accreditation

Schools are now undergoing their 5-yearly re-accreditation under the Waterwise programme. The children in these schools have grown and are at different education stages, there have been changes to staff and the operation of many schools are differently focused to the previous five years. Most schools have implemented the water use improvements found in their initial accreditation as part of the normal day-to-day operation and are now eager for new targets.

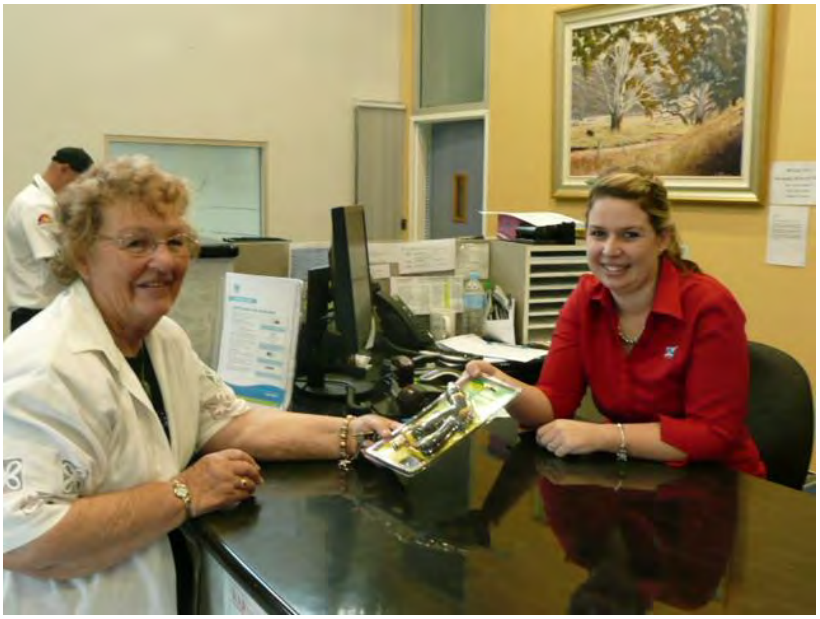
Community awareness was also provided through regular monthly columns in the local newspaper, an exhibition stand at the yearly agricultural show and through Council"s website http://www.kempsey.nsw.gov.au and Facebook.

Join us on facebook

3.7.3 Residential Showerhead Retrofit

The NSW State Government provided incentives through the Renewal Energy Scheme targeting substitution of old high flow showerheads with 3 Star rated low flow showerheads. Kempsey ran specific programmes to replace shower heads in key target areas and continues to do programme these retrofits.

Council also ran a garden hose trigger nozzle and shower timers education and give-away program.



Customer receiving the last of the garden hose trigger nozzle give-away from Customer Service staff

3.7.4 Business Water Audits

Council sponsored business water audits targeting high water users to assist them to become more water efficient. The audits identified immediate and long term water efficiencies and savings by calculating water use by fixture or process, then identifying water saving measures and preparing a costed implementation plan.

The installation or retrofitting of water-efficient equipment or irrigation systems can be very effective for businesses such as resorts, hotels, schools and other commercial premises.

3.7.5 Water Loss

The term Water Loss is the collective term used to describe the difference between the quantity of water drawn from the water source and the quantity of water paid for by customers. Losses in the water distribution network can be a result of a number of factors.

Water losses are authorised unbilled usage such as water used for fire fighting & mains flushing, unauthorised illegal connections and water theft as well as pipe network leakage and water meter under reading.

Many losses can readily be found and fixed however there is a level below which it is not cost effective. The NSW Best Practice benchmark Water Loss target is 12 %.

In the past, the Kempsey LGA had excessive water losses and one of the key findings of the IWCM Strategy was to reduce Water Loss. The results of the IWCM investigation are shown below.

Table 3.8 - 2002 Water Losses

Supply Area	Production Total (KL)	Consumption Total (KL)	Water Loss
	2 years July 2000 to June 2002	2 Years Dec 2000 to Nov 2002	
Bellbrook	32,167	21,113	34.40%
Crescent Head	487,848	340,888	30.10%
Hat Head	168,598	116,923	30.60%
Kempsey & Lower Macleay*	7,711,950	4,130,344	46.40%
South West Rocks	1,485,793	938,779	36.80%
Stuarts Point	440,707	264,362	40.00%
Willawarrin	29,966	17,358	42.10%
Total System	**10,357,029**	**5,829,767**	**43.70%**

The water supply system services many rural customers. It is common to have kilometres of lead jointed pipelines through low lying water charged ground servicing very few customers. Each of these is a common cause of water loss, the combination has resulted in uncharacteristically high water loss. The progressive renewal of these mains is rectifying water losses on Council watermains and water pricing is persuading customers to find and repair leaks downstream of their water meters.

Another water loss issue for the Shire is water theft. Unmetered, unknown connections are costly to find. 13% of the Shire"s population is not connected to the water supply, relying on rainwater and water carters for their potable water needs. Council has installed four specific water carter filling stations and banned other than metered standpipe use throughout the Shire in an attempt to reduce losses through theft.

Just over 10km of the Shire's 605km of water mains are at the end of their useful lives.

Council has worked very hard to reduce water losses. The 2011/12 quantity of Water Loss from the water supply systems was calculated to be 679 Megalitres or 23% of the total water production. Council is still continuing with programs to reduce unaccountable losses to acceptable levels.

3.7.6 Recycled Water to New Developments

Council"s long-term goal is to only use potable water for essential purposes such as consumption and hygiene. As urban and industrial development increases so does the community"s demand for water. Finding additional water resources can put environmental strain on the existing water sources especially during dry periods. Recycled water reduces demand on freshwater resources and also reduces discharge of wastewater to environments.

Meeting Council"s long-term goal will require a reliable water source, innovation and continual improvement with management practices.

Effluent reuse occurs at Frederickton, Gladstone / Smithtown, West Kempsey and South Kempsey. Council"s first high quality recycled water scheme is located at South West Rocks.

The 2005 IWCM determined that between 40 − 60% of a residential development"s water needs can be serviced by recycled water via dual reticulation supplying toilet flushing, clothes washing, outdoor activities such as irrigation and wash down purposes.

The South West Rocks recycled water scheme will initially service residential lots, the local golf course and sporting field. Ultimately the scheme will service an additional 600 lots as identified future subdivisions are developed. It is estimated that dual reticulation could service approximately half South West Rocks future residential developments. In terms of water supply this equates to 25% of the future water demand.

Another major benefit of the scheme is that it will reduce the amount of effluent discharged to the environment via the existing sand dune disposal site

New recycled water treatment plant at South West Rocks

Figure 5 – Map showing areas to be serviced with dual water reticulation within South West Rocks

A one megalitre above ground balance tank was constructed at the new recycle water treatment plant at South West Rocks for storage of tertiary treated effluent prior to use at the recycle water treatment plant

4 LIFECYCLE MANAGEMENT PLAN

This section applies the risk and investment policies to develop the broad strategies and specific work programmes required to achieve the goals and standards outlined in Section 2 and 3. It presents the lifecycle management plan for water supply infrastructure assets for the next 20 years. It includes asset information in physical and financial terms and detailed life cycle strategies and work programmes implemented to achieve the levels of service to meet future demand (Section 3) and manage risk.

The lifecycle management plan details how Council plans to manage and operate the assets at the agreed levels of service (defined in Section 2) while optimising life cycle costs. Life cycle management has a direct impact on the provision of water services to the customer. This section identifies the measures that require to be implemented to achieve these levels of service.

Council, as an asset owner, is committed to maintaining its water supply assets to ensure stakeholders" desired levels of service are maintained at sustainable levels commensurate with affordable expectations. To meet this requirement, Council seeks to match funding levels, condition and community expectations.

Some of the key lifecycle issues are:

- There is a considerable investment required for the upgrading of some water infrastructure.
- There has not been a significant shortfall in expenditure in the previous decade. Provisions have been made to deal with demand for cyclical maintenance within the next 10 to 20 years.

4.1 BACKGROUND DATA

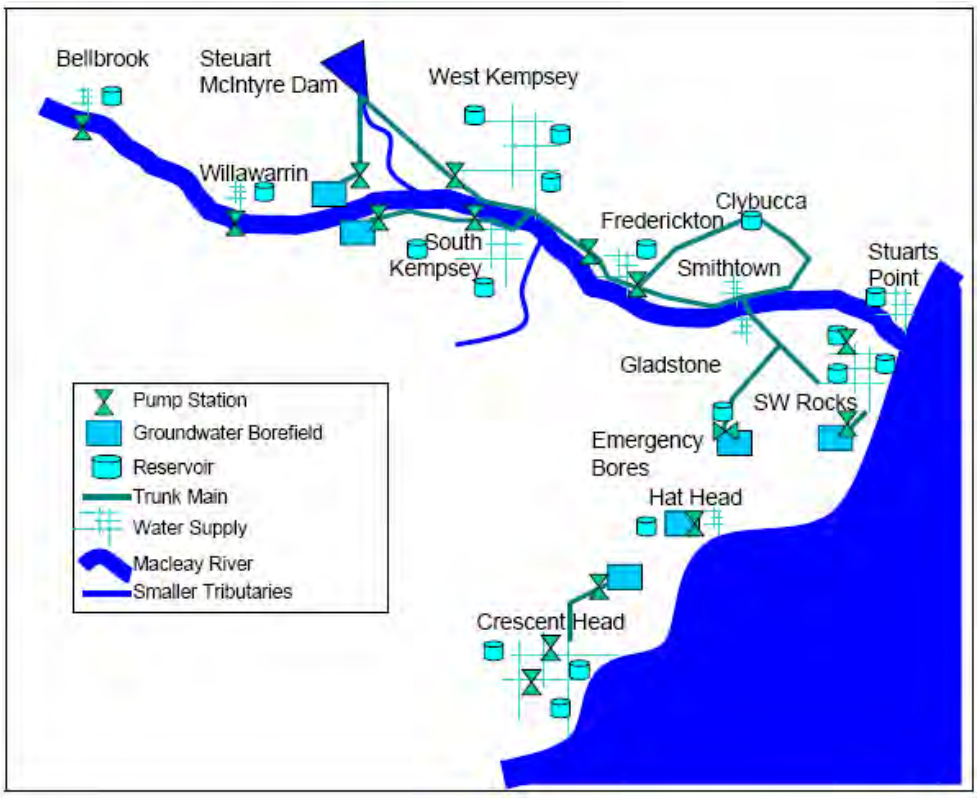
There are seven separate water supply schemes in the Kempsey Shire.

Water to the Kempsey Shire Water supply is provided by two sources, river water and groundwater. The two main sources of groundwater are the Macleay River Alluvium and the Macleay Coastal Sands.

The Macleay River Alluvium is a groundwater source linked to the flow of water in the Macleay River. The amount of water stored in the Macleay River Alluvium above Belgrave Falls is small. However, the water available is increased by rain falling over the aquifer and the recharge (causing water from the river to flow over the sands of the aquifer) of the alluvium with river water.

The Macleay Coastal Sands are a fresh groundwater source in the sands below the coastal dune system. The water stored in these dunes is recharged by rainfall. These fresh water sources are bordered by salty seawater.

Figure 6 - Water Supply Schemes of Kempsey Shire



Kempsey & Lower Macleay Water Supply

Kempsey & Lower Macleay water supply is the largest scheme serving a population of about 17,000 in Kempsey, West Kempsey, Aldavilla, Frederickton, Clybucca, Bellimbopinni, Smithtown, Lower Kinchela and Gladstone.

Water is drawn from Sherwood bores. In drought emergencies water can also be drawn from the Belgrave Falls borefield. The Sherwood borefield is located on a high level terrace of the alluvial flat of the Macleay River which draws from the underground water adjacent to the river which is recharged by the river. Belgrave Falls has a driftwell under the Macleay River.

Extracted water is pumped to Steuart McIntyre Dam then distributed to three major headworks reservoirs via the Steuart McIntyre Dam water pumping station. If the dam is off-line then the extracted water can be pumped directly to the three reservoirs, through the Sherwood lime dosing plant. The three headworks reservoirs are located at Yarravel (John Lane Road Reservoir), Greenhill (Greenhill Reservoir) and South Kempsey (Potters Hill Reservoir).

Macleay River at Riverside Park, Kempsey

Water from the Steuart McIntyre Dam is disinfected with Sodium hypochlorite prior to entering the distribution. Raw water from the Sherwood borefield, when not supplied from the dam, is stabilised with lime and disinfected with chlorine gas prior to entering the distribution system.

Steuart McIntyre Dam

Steuart McIntyre Dam, commissioned in 2000, is an off river storage located on Fattorini Creek, approximately 10 kilometres west of the town of Kempsey. Construction of the dam began in 1999 in response to a severe drought in 1994 during which time the Macleay River stopped flowing for a period of 5 weeks.

The dam was constructed to increase drought security for the Kempsey town water supply, provide storage for growth in the West Kempsey area, and to reduce the environmental impact of town water extractions on the Macleay River during low flow periods.

The design capacity of the dam is 2500 megalitre with a total catchment area of 55 hectares and surface area at full service level of 27 hectares. The dam is supplied from Sherwood Borefield. It is situated at the upper reaches of Fattorini Creek, the run-off from this small catchment area is insignificant, only just balancing out evaporation.

Overlooking Steuart McIntyre Dam

Emergency Supply

There are two emergency raw water supplies in the event Sherwood borefield were to become inoperable or needed supplementary supply during drought times. These sources are the Belgrave Falls drift well and Kinchela borefield, within Hat Head National Park.

Steuart McIntyre Dam can be bypassed should water quality be of concern. In this event, water extracted from the Sherwood borefield is pumped directly to the Sherwood Lime Plant and then to the three headworks reservoirs at Yarravel (John Lane), Greenhill and Potters Hill.

Dosing station at Kinchela which can be utilised as an emergency water system

Coastal Villages

The coastal towns of Crescent Head, Hat Head and South West Rocks each have borefields in the Macleay Coastal Sands aquifer which is a fresh groundwater source in the sands below the coastal dune system.

Stuarts Point township draws water from the Macleay Coastal Sands aquifer on the northern side of the Macleay River and this aquifer has no interaction with those south of the Macleay River. The Stuarts Point aquifer has a Groundwater Sharing Plan that has been operating for 10 years and will be renewed in 2014. Aeration is used in the coastal water supplies to reduce dissolved carbon dioxide and hydrogen sulphide. It is also used to precipitate out soluble iron, manganese and odour-producing substances.

Upriver Villages

Bellbrook and Willawarrin townships are in the Five Day Creek and Hickeys Creek sub-catchments respectively and are supplied from shallow bores drawing from a shingle bed in the Macleay River. At Bellbrook water is filtered for solids and heavy metals removal and subsequently dosed with Chlorine. Willawarrin supply is dosed with chlorine.

Water Quality

The most common sources of pollution are naturally occurring metals in the groundwater system and nutrients from fertiliser runoff such as superphosphate from farmlands and faecal coliform bacteria from animal manure or septic systems. Fertilisers also raise the nutrients in the water source and elevate the risk of algae growth in the dam. These nutrient levels are closely monitored and when too high water is not pumped into the dam.

There are two major management practices that ensure water is safe to drink; Water Treatment and Quality Monitoring.

The first practice is Water Treatment. Treatment of water is carried out to meet current Australian Drinking Water Guidelines (ADWG) which are set by the National Health & Medical Research Council. The guidelines were developed and are revised in consultation with the community, health agencies, water suppliers and regulators. Within Kempsey Shire all seven local water supplies use either chlorine in the form of sodium hypochlorite or chloramination, ammonia then chlorine, to disinfect or kill faecal coliforms and other microbiological organisms. Lime (calcium carbonate) or Soda Ash is added to balance pH levels. Aeration is used in the coastal water supplies to reduce dissolved carbon dioxide and hydrogen sulphide. It is also used to precipitate out soluble iron, manganese and odour-producing substances, which can be a nuisance in the reticulation system.

The second practice, Quality Monitoring, involves rigorous water quality sampling and testing regime that is undertaken before and after water treatment. The ADWG specify both chemical/physical and microbiological quality targets to be met and impose standards for water quality that are considered safe for people to drink over their full lifetime. Samples are taken from a variety of sites including customer"s taps on a routine basis and tested for:

Coliforms: total coliform bacteria are used to indicate the cleanliness of the water supply and to detect the possible presence of disease causing micro-organisms.

Chlorine: chlorine is added to kill bacteria that may cause disease. Chlorine residual is tested to ensure disinfection.

pH: pH is the range of acidity or alkalinity in your drinking water.

Arsenic, copper and manganese: these are substances naturally occurring at low levels in the water supply.

Turbidity: this is a measure of material held in suspension in water affecting the appearance which may look muddy or discoloured.

Total dissolved solids: the total amount of dissolved minerals in the water.

4.1.1 Kempsey & Lower Macleay Water Supply Scheme

Scheme Name		**Kempsey & Lower Macleay Water Supply Scheme**					
Source		8 production bores, 5 emergency bores					
Dosing stations		5					
Reservoirs	Name	Billy Goat Hill	Clybucca	Frederickton	Greenhill	John Lane Road	Potters Hill
	Capacity	2.15 ML	1.1 ML	1.15 ML	9.1 ML	3.5 ML	13.65 ML
Dams		1 – Steuart McIntyre – 2,500 ML					
Pump stations		9					
Length of mains		385 km					
Number of connections		7313					
Annual consumption		2,489,650 kilolitres					

The Kempsey Lower Macleay scheme serves a population of about 17,500 including Kempsey, West Kempsey, Aldavilla, Frederickton, Clybucca, Bellimbopinni, Smithtown, Lower Kinchela and Gladstone townships.

The water is mainly sourced from Sherwood borefield containing 8 production bores (5 of which provide standby capacity) in the Macleay River Alluvium with a river recharge channel and can pump 32 megalitres per day. Current average annual extraction is approximately 3000 ML with a current licence allocation of 9900 ML/a.

Water is generally pumped to Steuart McIntrye Dam for storage, disinfection then distribution. Alternatively, the dam can be bypassed. Water can be stabilised and disinfected at Sherwood Dosing Station then pumped directly to the three headworks reservoirs.

Steuart McIntyre Dam

Water from the Sherwood borefield is transferred to Steuart McIntyre Dam where it is stored until needed. Water is drawn through the outlet tower into the on-site water pumping station. The on-site chlorination plant doses water with chlorine and pumped to the three primary reservoirs, namely; Potters Hill reservoir (boosted by Belgrave Falls WPS, if required), John Lane Road or Greenhill reservoirs, then flows on to customers in the greater Kempsey and Lower Macleay areas. .

Water within the dam is prone to algal blooms and there are currently no treatment facilities to assist in the management of algal blooms. These are managed through one or a combination of the following practices:

- Use of variable depth draw off;
- Dam bypass;
- Use of an algaecide; and
- Use of alum to precipitate phosphorus.

John Lane Road Reservoir, Yarravel

Sherwood Dosing Station

When Steuart McIntyre Dam is off-line, the water from Sherwood borefield is pumped via the Sherwood dosing station. Water is Chlorine disinfected and stabilised with lime as it travels to the three primary storage reservoirs.

The Kempsey/Macleay system has many kilometres of remote mains (spaghetti system) resulting in higher than normal water loss and maintenance problems.

Sherwood Dosing Station

4.1.2 Coastal Village Schemes

Scheme Name		**Crescent Head Water Supply Scheme**		
Source		3 production bores		
Treatment facilities		1		
Reservoir	Name	No. 1 Big Nobby	No 2 Back Beach	Collection Tanks
	Capacity	1.14 ML	2.5 ML	0.10 ML, 0.96ML, 0,96ML & 0.25ML
Dams		Hypalon Dam- 9 ML (not operational)		
Pump stations		3		
Length of mains		38 km		
Number of connections		697		
Annual consumption		152,280 kilolitres		

The picturesque seaside village of Crescent Head is located 19kms south east of Kempsey. The village is tucked into the lee of Big Nobby, a volcanic remnant which slopes towards the sea in a tumble of basalt boulders. It fronts Killick Creek and the ocean, and is surrounded by the natural beauty of the Hat Head National Park, Goolawah Reserve and the Limeburners Creek Nature Reserve. It is renowned as one of Australia"s top surfing spots. To the west of the township lie wetlands and floodplains which link the Hastings and the Macleay River systems. This area is a haven for native flora and fauna.

The township has a large caravan park, golf course, tennis courts, bowling greens, swimming pool, motels, country club, tavern and a good selection of restaurants, cafes and shops.

The Crescent Head water supply scheme (constructed 1967) serves a population of about 1,300 people, however during holiday times the population trebles.

Source water for the Crescent Head water supply is obtained from 3 production bores at Maguires Crossing borefield about 10 kms north of Crescent Head. Current average annual extraction is approximately 200 ML with a current licence allocation of 520 ML/a.

Water from the borefield passes through a timber slat aerator to remove carbon dioxide and hydrogen sulphide gases. Iron is also oxidised from ferrous to the ferric form in the aerator and then discharges into a 0.1 ML capacity collection tank. From here it is pumped approximately 10 km to 3 balance tanks located at the treatment plant in Crescent Head Road.

The treatment plant has a capacity of 2.6 ML/day. Average daily consumption is 0.67 ML/day and during peak periods 1.87 ML/day.

Lime, carbon dioxide (not currently used), chlorine and ammonia are dosed in the suction main of the raw water pumps. The treated water is then transferred to the service reservoirs at Big Nobby and Back Beach. Water gravitates from these reservoirs and feeds two different areas of the town.

Water quality deficiencies at the bores include high carbon dioxide and hydrogen sulphide gases, low pH and excessive iron, colour, turbidity and organics. Detention within the in-ground storage further reduces the colour, turbidity and iron.

The internal condition of some existing pipe work needs to be examined in order to monitor the extent of corrosion and confirm the adequacy of lime and carbon dioxide dosages that are presently being used. The existing Hypalon dam is currently de-commissioned due to deterioration of the lining.

In November 2012 the water disinfection system was changed to chloramination.

Scheme Name		**Hat Head Water Supply Scheme**		
Source		3 production bores		
Dosing stations		1		
Reservoir	Name	No. 1 Concrete	No 2 Steel	Collection Tank
	Capacity	0.68 ML	1.1 ML	2.5 ML
Pump Stations		1		
Length of mains		12 km		
Number of connections		291		
Annual consumption		30,410 kilolitres		

Located 32 km north east of Kempsey and right in the heart of the Hat Head National Park lies the peaceful village of Hat Head. Popular with fishermen, families and bushwalkers, the town is renowned for its productive fishing due to its proximity to the continental shelf and tranquil lifestyle. Korogoro Creek meanders through the village providing a safe, protected site for swimming, snorkelling, fishing and paddling. The dominant feature of the area is the Hat Head Trig which towers 164 metres above sea level. Views from the top are awe inspiring and the trig, and Korogoro Point have been identified as good whale watching venues.

The township has a popular caravan park, bowling club, tennis courts and is serviced by two general stores.

The Hat Head water supply scheme (constructed 1968) serves a permanent population of about 350 at the village, however this increases during holiday times.

The scheme is supplied from three bores drawing from groundwater in Hat Head National Park about 1.5 km southwest of the village. Current average annual extraction is approximately 70 ML with a current licence allocation of 124 ML/a.

The borefield extraction has been capped due to a risk of over extraction and even sustainable levels of extraction may have an impact on the surrounding groundwater dependent ecosystems.

Water from the borefield is pumped to an aerator in Hungry Head Road to remove gases and then to a collection tank. From here it then passes to the dosing station.

The dosing station has a capacity of 2.6 ML/day. Average daily consumption is 0.67 ML/day and during peak periods 1.87 ML/day. Water is dosed with chlorine and soda ash and then pumped to two reservoirs.

Significantly poor water quality problems have been experienced, particularly high iron.

Dosing station at Hat Head

Hat Head concrete reservoir

Scheme Name	**South West Rocks Water Supply Scheme**				
Source	11 production bores				
Treatment facilities Dosing station	1 1				
Reservoirs	Name	Arakoon	SWR No 2 Gregory St	New Entrance	Collection Tank
	Capacity	23 KL	15 ML	1.0 ML	0.34 ML
Pump Stations	3				
Length of mains	64 km				
Number of connections	2465				
Annual consumption	558,690 kilolitres				

South West Rocks, the largest seaside town in the Macleay Valley, is located 39 kms north east of Kempsey at the mouth of the Macleay River. It combines a variety of beautiful beaches and breathtaking scenery, being a mecca for fishermen, divers and surfers. The South West Rocks water supply scheme serves a population of about 4,500 people in South West Rocks, Arakoon, Spencerville and Jerseyville areas.

The water is sourced from 11 bores in an underground aquifer located 4 kilometres south east of the town and has been used as the main water supply since the 1960"s. The area occupies about 100 hectares and was subsequently included in the Hat Head National Park in 1972. Average annual extraction is approximately 600 ML with a current licence allocation of 2500 ML/a.

Average daily consumption is 2.14 ML/day, however is subject to peak tourist demands of 6.64 ML/day during summer periods.

Water is pumped from the bores into an aerated collection tank which is used to reduce H2S & CO2 and aid in the precipitation of heavy metals. The water is then pumped to a membrane filtration plant in Frederick Kelly Street with an initial capacity of 6 ML/day, and future capacity of 9.8 ML/day. Water is dosed with lime and chlorine. Heavy metals such as iron and manganese are removed which are elevated despite the use of aeration. Silt/clay and other organic and inorganic substances are also removed. The membrane filter works in conjunction with a chemical flocculant such as Alum that allows for greater filtration effectiveness.

The water is pumped to two distribution reservoirs. The residential and commercial areas of South West Rocks are supplied by gravity flow from the Gregory Street reservoirs. New Entrance is supplied from a reservoir located in New Entrance. The majority of Arakoon is supplied by gravity flow from the Gregory Street reservoirs with the higher areas of Cardwell Street, supplied by a booster station.

Projections of future water supply show that the bore field will not meet projected growth in the near future, with peak day demand slightly higher than extraction capacity. A water recycling plant has recently been constructed to help alleviate some of this demand and will be used as dual reticulation in some new residential subdivisions, used for irrigation at the SWR Country Club Golf Course and for irrigation of some public open space areas.

Long term, this Recycled Water could be used to replenish the aquifers where the raw water is initially sourced. However, the science in this area is yet to be resolved. In the interim, Council has progressed studies to itemise the capacity and trigger levels of the aquifer

Pumps inside South West Rocks Water Filtration Plant. This plant uses new membrane filtration technology to filter the raw water supply prior to distribution

Scheme Name		**Stuarts Point Water Supply Scheme**	
Source		3 production bores	
Treatment facilities		1	
Reservoir	Name	No. 1	Collection Tank
	Capacity	3.2 ML	1.07 ML
Pump stations		1	
Length of mains		33 km	
Number of connections		558	
Annual consumption		229,919 kilolitres	

Stuarts Point is a quiet riverside village located 43 kms north east of Kempsey with miles of pristine beaches to the east and fertile farmland and peaceful forests to the west. It is a very popular area for fisherman being located on the Macleay River. A quaint footbridge, and a short walk through the sand dunes, links the village of Stuarts Point with a 9 kilometre beach.

The township has a caravan park, bowling club with 2 greens, tennis courts, tavern, restaurant, takeaway food outlets and shops.

The Stuarts Point water supply scheme (constructed 1984) serves a population of approximately 1,000 people in Stuarts Point, Fishermans Reach, Grassy Head and nearby rural dwellings however this increases during the holiday season.

Water is sourced from 3 bores in an underground aquifer located in Fishermans Bend Nature Reserve. The annual water extraction is approximately 180 ML. This aquifer is subject to a Water Sharing Plan restricting the access licence to 300 ML per year..

The treatment plant is located in Fishermans Reach Road, south of the township and has a capacity of 2.7 ML/day. Average consumption is 0.60 ML/day and peak day demand is 2.05 ML/day.

Water from the bores is dosed with Ferric Chloride, chlorine and soda ash. A sand type filtration plant is used to remove elevated arsenic levels and other heavy metals and impurities. These sand filters are currently being refurbished to improve the water quality being delivered. It is then pumped to a reservoir and feeds the town of Stuarts Point, Fishermans Reach and Grassy Head.

Stuarts Point township currently relies on septic tanks for sewerage services. Septic seepage is likely to contaminate waterways and groundwater sources in the area which may be used for drinking purposes.

A large number of rainwater tanks are also used within this town.

Sand filters at Stuarts Point WTP are used to remove heavy metals and impurities from the source water

4.1.3 Upriver Village Schemes

Scheme Name		**Bellbrook Water Supply Scheme**
Source		2 production bores
Treatment facilities		1
Reservoir	Name	No. 1 Bellbrook
	Capacity	0.1 ML
Pump stations		1
Length of mains		2.5 km
Number of connections		69
Annual consumption (estimated)		9,940 kilolitres

Bellbrook is a historic rural village located 50 kms west of Kempsey. The village is classified by the National Trust as a fine example of a turn of the century country hamlet. The late Slim Dusty and Shorty Ranger, both country music performers of renown, grew up at nearby Nulla Nulla and composed many songs about this picturesque area.

The township has a hotel, tennis courts and shops.

The Bellbrook water supply scheme (constructed 1974) serves a population of approximately 100 residents at the smaller upper Macleay River village.

Water is sourced from 2 bores drawing from the Macleay River shingle bed but is subject to intermittent additional demands. These additional demands on the water supply are a consequence of low water resources on outlying rural properties, where in times of drought or prolonged river turbidity, the normal water sources of rainwater tanks and dams are insufficient A large number of rainwater tanks are used within this town.

Current licence allocation is 18 ML/annum.

Media Filter tanks inside Bellbrook treatment plant

Poor and varying water quality from the two bores (particularly high levels of iron and manganese) has been identified as an issue in this scheme. In 2005 routine water testing detected slightly elevated levels of arsenic in the water supply. Pumping was stopped from the bores and water drawn directly from the river bed. Daily monitoring of water quality determines whether water is either drawn from the surface of the Macleay River, or carted in by truck. Water carting from Kempsey (a distance of 50 km) at considerable cost was necessary when river turbidity (or muddiness) prevents disinfection of the water supply.

A new water treatment plant was commissioned in 2010 to enable safe reconnection of the bore water source in the Macleay River. The plant has the capacity to treat 140,000 kl/day of potable water. The raw water is pumped to the system by feed pumps, chemicals and chlorine injected to the main line prior to the media filter absorbing the colour, TOC and arsenic concentrations. Soda ash and chlorine are then injected into the main line to adjust pH and disinfection.

New Bellbrook Treatment Plant constructed in 2010

Scheme Name		**Willawarrin Water Supply Scheme**
Source		2 production bores
Dosing station		1
Reservoir	Name	No. 1 Willawarrin
	Capacity	0.14 ML
Pump stations		0
Length of mains		2.7 km
Number of connections		56
Annual consumption		8,970 kilolitres

Willawarrin rural village is located 35 kms west of Kempsey on the Armidale Road. The township is surrounded by grazing land and forest and is close to the Macleay River.

The township has a hotel and shops.

The Willawarrin water supply scheme (constructed 1967) serves a population of about 100.

Water is sourced from 2 bores drawing from a shingle bed in the Macleay River. The annual water extraction is approximately 12 ML with a current licence allocation of 21 ML/a.

Water is dosed with chlorine and pumped to a reservoir.

River turbulence can affect quality of the water source and when this is poor potable water is trucked in from Kempsey township.

A high number of rainwater tanks are used within this town.

Low pressure occurs in certain parts of the supply system.

Willawarrin Hotel

Reservoir at Willawarrin

4.2 ASSET LIFE CYCLE

Council as an asset owner is committed to operating, maintaining and renewing its wastewater infrastructure assets to ensure stakeholders" desired levels of service are maintained at sustainable levels commensurate with affordable expectations.
Key stages in the asset life cycle are:

Asset planning; when the new asset is designed. Decisions made at this time influence the cost of operating the asset and the lifespan of the asset. Alternative, non-asset solutions, must also be considered.

Asset creation or acquisition; when the asset is purchased, constructed, or vested in Council. Capital cost, design and construction standards, commissioning the asset, and guarantees by suppliers influence the cost of operating the asset and the lifespan of the asset.

Asset operations and maintenance; when the asset is operated and maintained. Operation relates to a number of elements including efficiency, power costs and throughput. This is usually more applicable to mechanical where minor work is carried out to prevent more expensive work in the future, and reactive maintenance where a failure is fixed.

Asset condition and performance monitoring; when the asset is examined and checked to ascertain the remaining life of the asset, what corrective action is required including maintenance, rehabilitation or renewal and within what timescale.

Asset rehabilitation and renewal; when the asset is restored or replaced to ensure that the required level of service can be delivered.

Asset disposal and rationalisation. Where a failed or redundant asset is sold off, put to another use, otherwise disposed of.

An asset"s useful life will depend on a number of factors that include material, construction methods, design criteria, location, loading and transient pressure, environmental conditions, level of maintenance and technology change.

The lifecycle and costs of a typical asset can be demonstrated by the figure below:

Figure 7 - Theoretical Lifecycle Cost

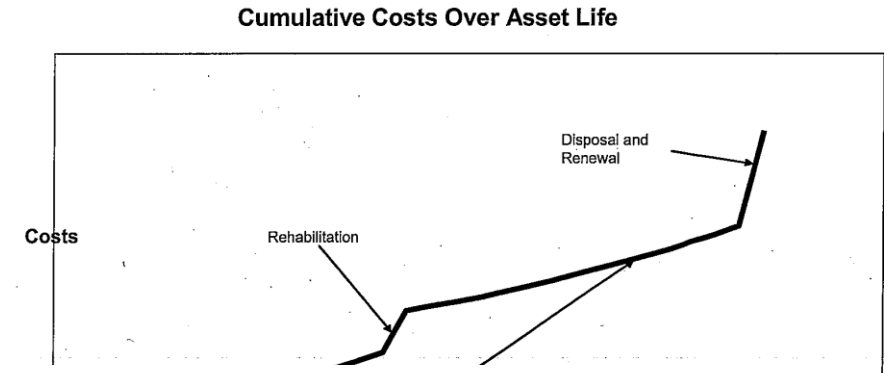
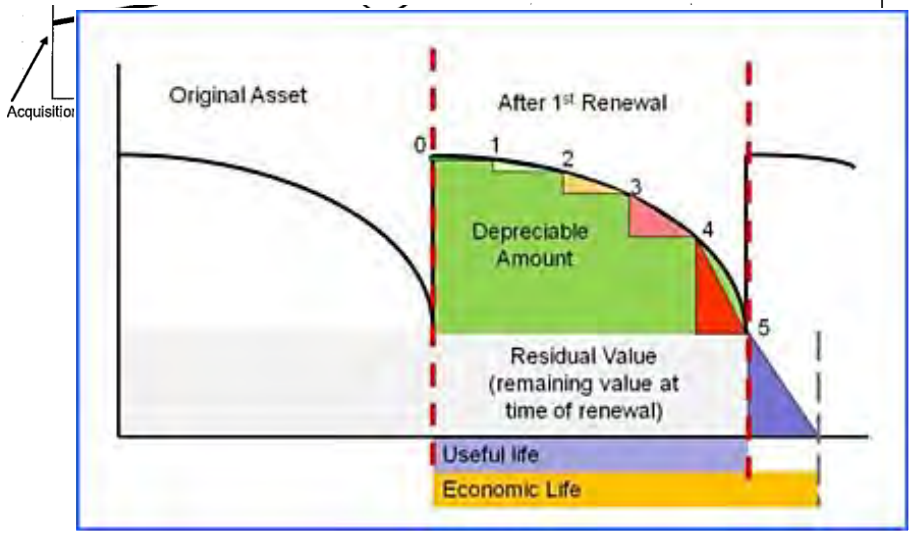


Figure 8 - Asset Performance terms



4.3 ASSET USEFUL LIVES

An asset is created or acquired to provide an identified service. It is then operated and has routine maintenance undertaken. Over the life of the asset there will become a point where the asset is no longer performing at a satisfactory level and may be rehabilitated or augmented. This can be repeated several times with certain assets, however, there will eventually be a point where the asset will be disposed of and potentially replaced.

Council as an asset owner is committed to maintaining its wastewater infrastructure assets to ensure stakeholders" desired levels of service are maintained at sustainable levels commensurate with affordable expectations. To meet this requirement, Council seeks to match funding levels, condition and community expectations.
The useful life of an asset is defined as the period over which an asset is expected to be fully utilised, however, this period can be significantly impacted by Council"s maintenance practices. The assessment of remaining life utilises all existing asset information combined with current asset performance and susceptibility of the asset to external influences.

An asset may need to be replaced due to functional obsolescence rather than structural obsolescence (wears out). This is particularly true for electrical and telemetrical assets where replacement parts and compatibility with fast moving technology are more likely to be the reasons for replacement rather than asset failure. Also, levels of service many change during the life of an asset and an asset will need to be replaced before the end of its useful life, due to it no longer providing the required level of service, despite its structural condition being sound.

Electrical and telemetrical assets have been given relatively short lives which reflect the reality of early replacement due to functional obsolescence, also some wastewater quality assets have relatively short lives due to technology changes and their need to consistently comply with EPA licences.

Depending on the type of asset, its lifecycle may vary from 5 years to over 100 years.

4.3.1 Asset Residual Values

Most asset types have zero residual values at the end of their Useful Life however it is generally recognised that several asset types will have a residual value at the end of their Useful Life due to their ability to be rehabilitated or reconditioned to return the asset to full operational capability.

For instance, relining a pit or even demolishing and rebuilding a pit in the same location is more cost effective than excavating and construction a new pit in a different location as ancillary component assets such as electrical conduits, telemetry, scour discharge locations etc can be retained.

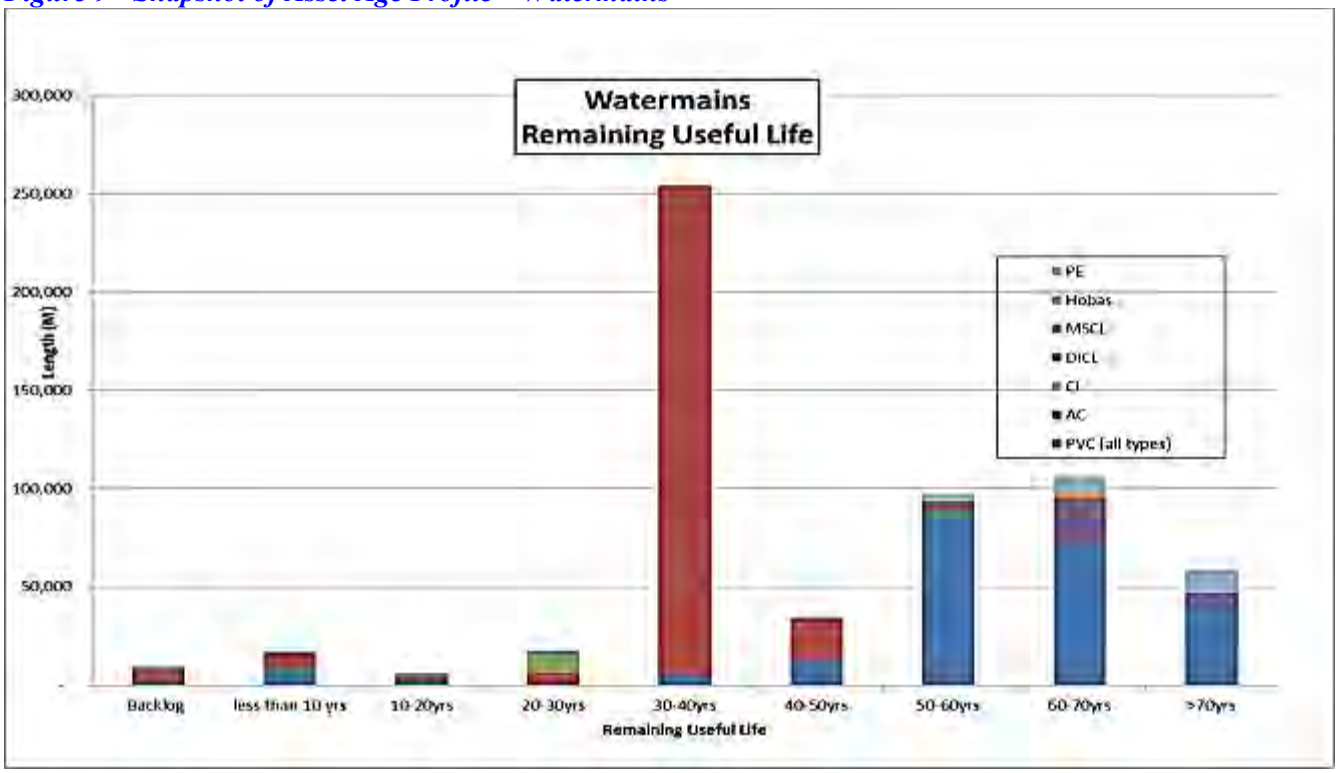
Replacing old water pipe

Table 4.2 – Water supply Asset Useful Lives and Residual Values

Component	Useful Life	Residual Values
Bores - Coastal	30 years	0%
Bores - Sherwood & inland	50 years	0%
Chemical tank	25 - 50 years	0%
Earthworks	25 - 100 years	0%
Electrical/Switchboard	20 - 25 years	0%
Fill Station	20 years	0%
Gantry crane	25 years	0%
Level instruments	10 years	0%
Mains - AC from 1980-1989	30 years	0%
Mains - UPV Class 9	30 years	0%
Mains - All others	80 years	0%
Mains CICL & MSCC	70 years	0%
Mechanical	20 - 25 years	60%
Observation Bore	30 years	0%
Pipework	20 - 50 years	0%
Pit	50 - 70 years	60%
PLC & SCADA	15 years	0%
Power supply	30 -70 years	0%
Pump - Booster	15 years	60%
Pump - Centrifugal	20 - 25 years	60%
Pump - Dosing	5 years	60%
Pump - Submersible	10 years	60%
Reservoir - concrete	100 years	0%
Reservoir - steel	70 years	0%
Reservoir roof - steel inland	30 years	0%
Reservoir roof - steel coastal	25 years	0%
Reservoir ladders & hatches	20 years	0%
Reservoir fall restraints	15 years	0%
Reservoir valves	50 years	0%
Road - bitumen	25 years	40%
Road - gravel	20 - 50 years	20%
Safety shower	50 years	0%
Security fence	15 years	0%
Soft starter	10 years	0%
Structure - concrete	50 - 100 years	60%
Structure - metal fab	25 - 50 years	35%
Telemetry	15 years	0%
Valves	20 years	0%
Variable speed drive	10 years	0%
Water Bulk/Magnetic flow meter	20 years	0%
Water Meters	15 years	0%
Water Services	40 years	0%
Weather station	15 years	0%

Construction of a new road in 2013 to Clybucca Reservoir has improved access to the site

Figure 9 - Snapshot of Asset Age Profile – Watermains



4.3.2 Asset capacity and performance

Water assets work together as a system and discussion of asset capacity and performance are best described in terms of their combined effect on the water supply system, customers and the environment. A detailed water system summary is contained in Section 4.2 – Water Supply Scheme Summary Sheets.

Locations where deficiencies in service performance are known are summarised below in Table 4.3.

Table 4.3 - Known Service Performance Deficiencies

Location	Service Deficiency
Long stretches of water mains supplying rural properties.	Water quality hotspots and high water leakage rates
Stuarts Point	Poor watermain material has led to numerous mainbreaks and poor supply security.
High elevation areas near Greenhill Reservoir	Low water pressure
South Kempsey Industrial area	Undersized water supply network due to adhoc development has led periods of poor water pressure.
Steuart McIntyre Dam	Taste and odour issues due to algal blooms
Crescent Head	Poor watermain material has led to mainbreaks on critical lines

4.3.3 Asset Valuation

In July 2006, the former Department of Local Government mandated that NSW councils commence valuing infrastructure, property, plant and equipment at fair value, in accordance with Australian Accounting Standard AASB 116, "Property, Plant and Equipment". The standard states that the fair value may be determined in either of two ways:

- **Market Based** - Evidence for Buildings & normal plant and equipment (cars, excavators, tools)
- **Depreciated Replacement Cost (DRC)** or **Written Down Value** for water supply assets such as dams, treatment plants, reservoirs, pumping stations, pipes and water meters

  DRC = Current Replacement Cost less the value of wear and tear which reduces the life to the asset

The Current Replacement Cost is the value of an asset that does the same job (ie. provides the same level of service for the same length of time, the "Modern Equivalent Asset")

Kempsey Shire Council has determined the value reduction due to "wear and tear" in accordance with the standards. That is, Council has determined the remaining useful life and then calculated the loss of value since the construction date of the asset using a recognised consumption based depreciation method.

Water supply and sewerage services assets were first revalued at fair value in June 2007. The "Local Government Code of Financial Practice and Accounting Reporting" states that Councils should revalue assets every five years. Council received correspondence from the NSW Premier & Cabinet, Division of Local Government on 24 April 2012 directing the revaluation of water & sewerage assets by 30 June 2012.

Council utilised APV Pty Ltd, accredited asset valuers, to assist with the 2012 water and sewerage asset revaluation. APV inspected and revalued several major water facilities, including Steuart McIntyre Dam, Crescent Head Dam, Crescent Head Water Treatment Plant, Hat Head Dosing Station along with numerous reservoirs.

The value of assets as at 30 June 2013 covered by this asset management plan is summarised below.

Current Replacement Cost	$247,606,765
Depreciable Amount	$66,238,119
Depreciated Replacement Cost	$181,368,645

Council"s sustainability reporting states the rate of annual asset consumption and compares this to asset renewal and asset upgrade and expansion.

Asset Consumption	5.2%
Asset renewal	11.6%
Annual Upgrade/expansion	4.9%

A copy of the Revaluation Methodology document which outlines Council"s process has been attached in Appendix G.

4.4 ASSET CONDITION & CONDITION ASSESSMENT

The assessment of failure probability or condition of water assets is central to any decision with regard to upgrading or replacement. Condition assessment is a critical factor in confirming the lifetimes used in assets planning or prioritisation procedures.

Condition assessment involves the assessment of the current structural integrity and physical characteristics of the asset and is independent of the standard of service or level of performance required. An asset can be in a very poor condition but still be performing adequately right up to the point of failure because the standard of service required is well within the capacity of the asset. Condition assessment is undertaken to provide data for deterioration modelling, which is used to predict when intervention is required.

The objectives of condition assessment are to:

- Trigger asset maintenance (condition based or predictive maintenance);
- Provide an indication of how the infrastructure assets are contributing to the current performance (level of service) in achieving the designated standards of service;
- To determine written down current value, rate of consumption of service potential (depreciation) and remaining useful life for valuation purposes; and
- Provide inputs into prioritisation of renewal programs.

Council adopted the APV condition rating numbering system and methodology for consistency of methodology and for ease of application by field staff.

Figure 10 - APV Asset Condition Profile

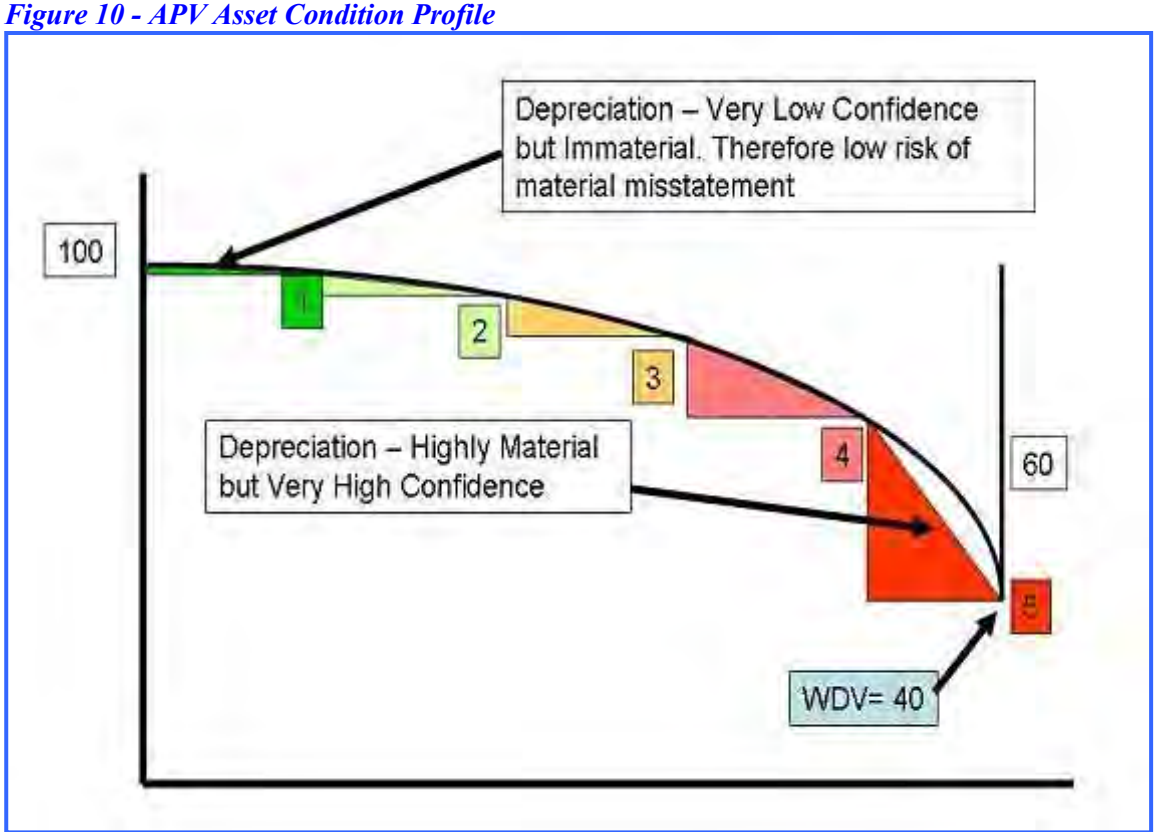


Table 4.4 - APV Condition Rating Numbering System

0H	VERY HIGH Level of Remaining Service Potential **(Less than 5 yrs old)**
0M	
1H	HIGH Level of Remaining Service Potential
1M	
2H	ADEQUATE Level of Remaining Service Potential
2M	**(Typical)**
3H	ADEQUATE Level of Remaining Service Potential (but with some issues indicating the need for action in short to medium term)
3M	
4H	BARELY ADEQUATE Level of Remaining Service Potential (action must be taken in short term)
4M	**(End of Water Asset Life)**
5H	At point where asset is now UNACCEPTABLE. Must be closed or renewed.
5M	
6H	
6M	TOTAL END of Life

Proactive condition assessment is now required for all assets. As part of the 2012 asset revaluation, Council utilised APV Pty Ltd services to inspect and rate a sample of assets while Council staff rated the majority of water assets. Council asset staff analysed historical condition assessment information on water main breaks and electrical/mechanical maintenance records and Council operations staff inspected each site and provided practical up to date condition ratings. For example, Council mechanical operations staff reviewed and rated pump & pumping station condition and electrical staff reviewed and rated both the switchboard and general electrical component condition.

The following table indicates who rated each asset class.

Table 4.5 – Delegated Inspection & Condition Rating of Assets

Asset Type	2012 Condition Rated By:
Treatment Plants	APV & Council field staff
Reservoirs	APV
Dams	APV
Dosing Stations	APV & Council field staff
Pump Stations	Council field staff
Bores	Council field staff
Mains	Asset Officer determined by interrogation of watermain break register.
Services & Meters	Age based
Observation Bores	Age based - these usually not replaced when decommissioned
Fill Stations	Age based
River Intakes	Council field staff
Structures	APV & Council field staff

The 2012 revaluation values were used as the basis for the recent 2013 valuation. The asset values used in this document are the 2013 values.
Mechanical and electrical assets inspected by Council field staff were graded in accordance with the table included in Appendix H.

Replacing a valve at Potters Hill Reservoir

4.5 RISK MANAGEMENT PLAN

Risk Management is an integral part of managing the lifecycle of major infrastructure assets.

Kempsey Shire has developed a risk management framework consistent with the joint Australian New Zealand Standard – AS/NZS 4360, in order to ensure that risks throughout the business are managed and that risk management is performed on a consistent basis.

Council"s risk management framework enables the likelihood and consequences of the failure of assets and systems to be evaluated. It identifies the need to review existing controls, develop contingency plans and, where appropriate, to define replacement or improvement programmes.

This process involves the systematic identification, analysis and evaluation of risks across all assets, from the wastewater treatment plants to the distribution system. The key risk criteria adopted for Council"s networks for assessing the consequences of identified risks are:

- Environmental and legal compliance
- Service Delivery – Loss of service (extent/duration)
- Financial
- Community health and safety

Risk action plans are continually being developed, with the priority being based on the likelihood and consequences of individual risks. These risks include events such as natural hazards, product risks, and asset risks.

The process involves qualitative measures from 2 tables Likelihood and Consequences of failure (frequency) ranking scores. Likelihood ranging from Almost Certain (Expected to occur in most circumstances) to Rare (may occur only in exceptional circumstances) and Consequence or impact scores cover the range from Insignificant to Catastrophic.

The Likelihood of a risk event occurring and Consequence impact rating used to determine initial risk ratings are defined in the tables below:

Table 4.5 - Measures of Consequences of Failure

Factor	Catastrophic	Major	Moderate	Minor	Insignificant
Environmental & Legal	Council sued or fined or otherwise liable for more than $20M	Council sued or fined or otherwise liable for $5M - $20M	Council sued or fined or otherwise liable for $250K - $5M	Council sued or fined or otherwise liable for up to $250K	Council prosecuted for minor offence
	Catastrophic environmental damage of national importance. Prosecution. Long term study. Impact permanent	Serious environmental damage of national importance. Prosecution. Long term study. Impact not fully reversible.	Serious environmental damage of national importance. Prosecution expected. Impact reversible within 10 yrs	Serious environmental damage of local importance. Prosecution probable. Impact fully reversible within 1 yr	Minor localised environmental damage. Prosecution possible. Impact fully reversible within 3 months
Service Delivery	Water supply & sewerage out for several weeks +	Water supply and/or sewage out for two suburbs for one week	Water supply and/ or sewerage out for town for one day	Water supply and/or sewerage out for 2 suburbs for one day	
		Water supply contaminated			
	Permanent loss of solid waste facility	Public amenity closed for one month or more	Public amenity closed for 2 weeks or more	Public amenity closed for 1 week or more	Public amenity closed for less than 1 week
				Systematic customer complaints, or complaints relating to more than one	Isolated customer complaints
				Repeated service standard failure or one that affects multiple people	Isolated service standard failure
Financial	Unplanned loss or cost to reinstate of $3.4M or greater	Unplanned loss or cost to reinstate between $1.75M - $3.5M	Unplanned loss or cost to reinstate between $1.0M-$1.75M	Unplanned loss or cost to reinstate between $500K-$1.0M	Unplanned loss or cost to reinstate less than $500K
	Ongoing loss of $400K pa	Ongoing loss $200-$400K pa	Ongoing loss $100K-$200K pa		
Community Health & Safety		People in several suburbs ill through contaminated water or similar	People in 2-3 suburbs ill through contaminated water or similar	People in one suburb ill through contaminated water or similar	Several people ill through contaminated water or similar
	Multiple loss of life or city-wide epidemic	Loss of life or widespread long-term hospitalisation required	Hospitalisation required	Medical treatment required	
		Dissatisfaction of community measure needs to be included			

Table 4.6 - Likelihood Rating Table

Likelihood	Description	Probability of occurrence
Rare	May occur only in exceptional circumstances	More than 20 years
Unlikely	Could occur at some time	Within 10-20 years
Possible	Might occur at some time	Within 3-5 years
Likely	Will probably occur in most circumstances	Within 2 years
Almost certain	Expected to occur in most circumstances	Within 1 year

Risk Evaluation: The matrix of probability and consequence of failure ratings shown in Table 4.7 below is used to assess the level of risk, ranking events as low, moderate, high or very high risk.

Table 4.7 - Risk Priority Rating Table

Likelihood	Consequences				
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Rare	**L**	**L**	**M**	**M**	**H**
Unlikely	**L**	**L**	**M**	**M**	**H**
Possible	**L**	**M**	**H**	**H**	**H**
Likely	**M**	**M**	**H**	**H**	**VH**
Almost Certain	**M**	**H**	**H**	**VH**	**VH**

This allows all asset and corporate risks to be compared and ranked. The risk policy specifies the following broad treatment strategy for the levels of risk:

L = Low Risk: Employ short term controls to make safe until control strategy is in place. The identified controls must be in place within thirty days.

M = Moderate Risk: Employ short term controls to make safe until control strategy is in place.

The identified controls must be in place within seven days.

H = High Risk: Immediate action required to control the risk. Cease work, take plant out of service. Employ short term controls to make safe until control strategy is in place.

VH = Very High Risk Immediate corrective action

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.

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 the table below

Table 4.8 - Critical Risks and Treatment Plans

Asset at Risk	What can Happen	Risk Rating (VH, H)	Risk Treatment Plan
Bushfire at Hat Head Bore field (within National Park)	Electrical equipment burnt making pumping impossible, power lines destroyed. Resulting in raw water supply failure. Storage for township is very limited, 2 -3 days storage	H	Fire protection raised as part of Emergency Management. Ability to fireproof in the National Park is limited. Being furthered under the Drinking Water Quality Plan
Sherwood Lime Plant fails to operate when required	Alternate supply, only operated in emergencies.	H	Scheduled servicing and reaction maintenance to an incident
Greenhill Reservoir or delivery trunkmain failure	Greenhill Reservoir and zone is the main supply for all the lower Kempsey Macleay water supply system. Customers would experience no water, poor water pressure or dirty water.	H	Inspection and maintenance program. Contingency Plans developed

4.6 ROUTINE MAINTENANCE PLAN

The lifecycle costs associated with the management actions to achieve the defined levels of service can be divided into one of the following expenditure categories:

- Operating Expenditure: These expenses are related to those which ensure the asset will continue to perform at a satisfactory level.
- Capital Expenditure: These expenses are related to major alterations to an asset.

Operating expenditure is traditionally funded from general rates revenue and includes the ongoing operation and maintenance of an asset. The different types of operating expenditure include:

- Operational: Day to day expenditure on activity of business operations eg. fuel costs, electricity costs, operational and regulatory monitoring, water treatment chemicals.
- Planned Maintenance: Expenditure on programmed activities related to the ongoing up keep of assets eg. Hydrant and valve maintenance and signage, reservoir cleaning, chemical dosing equipment maintenance, pump maintenance,.
- Unplanned Maintenance (Reactive): Expenditure on activities related to the immediate up keep of assets eg. water mains leaks and breaks, safety repairs, pump breakdown repairs, telemetry failures.

Capital expenditure is funded from a variety of sources, such as loans, depreciation/reserves and developer contributions/infrastructure charges. Examples of capital expenditure include:

- Capital rehabilitation/renewal: Expenditure on preserving the current level of service by reinstating the original life of an asset (rehabilitation) or replacing an asset with an equivalent asset (renewal) eg. watermain renewal, water meter replacement, pump station upgrade program, telemetry and SCADA renewal.
- Creation/Acquisition: Used in this Asset Management Plan to mean Improved Level of Service and Backlog Works. Expenditure associated with increasing the level of service by investing in a new asset or new more costly technology to service existing customers. eg. added treatment.
- Growth Works: Expenditure associated with increasing the capacity of a system by augmenting existing assets or building new assets to service future customers, both urban or employment growth.
- Disposal: Expenditure associated with the removal or decommissioning of an existing asset e.g. disposal of old pipes, asbestos removal etc.

A key element of asset management planning is determining the most cost effective blend of planned and unplanned maintenance.

Repairing a broken water main

4.6.1 Operations and maintenance strategies

The overall operations and maintenance strategy is intended to retain the current levels of service, and mitigate risk while minimising costs.

Maintenance includes reactive and planned cyclic maintenance work activities. Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions.

Planned maintenance is repair work that is identified and managed through a maintenance management system (MMS). MMS activities include 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. Sixty-five percent of the Water Fund operating budget is expensed on operational costs such as power and operational activities such as inspections and monitoring, chemical dosing. The remaining thirty five percent is spent on maintenance programs. Table 4.9 details general operations and maintenance service levels for water supply assets.

Current Kempsey Shire Council priority maintenance programs designed to retain water assets at their design level of service, improve water quality, maintain levels of service and minimise risk of future failure events are described in Table 4.10.

Table 4.9 - General maintenance program for Water Supply Assets

Asset/Failure Mode	Action	Key Service Criteria	Impact
GENERAL MAINTENANCE			
	Maintain assets in a manner that minimises long term overall total cost.	Cost/ Affordability	
UNPLANNED MAINTENANCE			
All Assets – Disaster i.e. flood	Maintain a suitable level of preparedness for prompt and effective response to emergencies and system failures by ensuring the availability of suitably trained and equipped staff and service delivery contractors. Specifically: fitters, electrical contractors, key contractors	Responsiveness	Low/ Medium –
Watermain leaks, breaks Pump - Failures Treatment Plant – Mechanical or Electrical	Provide a 24-hour callout repair service and respond to and repair failures	Responsiveness	Medium
	Sufficient spares to be stocked to address regular failures	Responsiveness	
PLANNED INSPECTIONS			
Reservoirs, WPS, Chlorine dosing plants & WTP	Undertake scheduled inspections as justified by the consequences of failure on levels of service, costs, public health and safety.	All	Nil
	Modify the inspection programme as appropriate in response to unplanned maintenance trends.	All	
PLANNED – PREVENTATIVE MAINTENANCE			
Reservoirs, WPS, Chlorine dosing plants & WTP	Undertake programme of planned asset maintenance to minimise the risk of critical equipment failure (e.g., pump overhaul) or where justified economically	All	Nil

Table 4.10 - Council's Priority Maintenance Programs for Water Supply Assets

Asset Group	Maintenance Activity	Frequency
Watermains	Watermain Cleaning Program Systematically swabbing water supply networks by inserting a bullet shaped rubber plug (pig) into the pipeline system. Water pressure moves the pig through the pipe while it cleans the pipe and removes debris. The new "Ice Pigging" swabbing process is under investigation.	Every 10 years 2012/13 – Crescent Head 2013/14 – Stuarts Point 2014/15 Hat Head
Watermains	Watermain flushing for Water Quality Flushing watermain dead ends and known poor water quality locations.	Currently reactive, developing a periodic program with dedicated resources.
Watermains	Vegetation Removal Program Vegetation clearing over pipelines to eliminate the risk of future failures due to tree roots. Makes leak detection more efficient and repairs faster.	Ongoing
Hydrants & Valves	Hydrant & Valve Maintenance Program High priority maintenance program to including cleaning pits, exercising valves, painting surface fittings and road labelling. In 2013, Council purchased a new vacuum excavation truck at a cost of $60,000. The truck has significantly improved productivity and WH&S.  *Cleaning a hydrant with the new vacuum excavation unit* Productivity and safety improvements from new vacuum excavation unit. Council has recently introduced new non-destructive excavation equipment into its plant fleet. The unit uses a combination of medium pressure water and vacuum to dig. The equipment will primarily be used to maintain Council's valves and fire hydrants. Historically this is high risk work with operators required to put their hands and arms into pits that are likely to contain numerous hazards. This unit has capacity to clean a valve chamber in seconds where an operator may take up to 30 minutes to do the task manually greatly enhancing Council's ability to get around it 's 5575 valves and hydrants. Additional the new vacuum excavation unit which can excavate safely onto underground water, sewer, electrical and communications infrastructure without risk of damage to underground assets or injury to the operators carrying out the activity.	2 year program
Reservoirs	Routine Inspection and Maintenance program Council staff inspect all component assets and carry out minor repair	Ongoing

Reservoirs	Reservoir Inspection and Cleaning Program Council engages Aqualift Pty Ltd to carry out periodic internal and external inspections and cleaning of reservoirs under contract. The cleaning procedure involves commercial divers entering the reservoirs and vacuuming up accumulated sediment using underwater vacuum equipment. Once completed they carry out visual inspections on the internal and then external components of each reservoir site. They do not inspect chlorination or electrical equipment. Aqualift use a standard colour coded condition rating system and practical descriptions of all issues. External items inspected include; the compound, vandalism, walls, ladder, entry hatch, walkways, roof, handrails, davit, ventilation, bird proofing. Internal items inspected include; walls, columns, roof framing, floor, inlet, outlet, scour, overflow, mixer and internal ladder. They also comment on general issues such as security, items which may affect water quality and cause contamination, WH&S issues. Aqualift records the inspection results in the ASAM RT web-based Reservoir Asset Management System. Records include physical data, photos and videos. Client Councils can access the information anywhere, the database also has 10 standard reports which can be exported to many formats including word, excel and PDF. Operations staff can add data, notes, photos and documents to the system. A copy of the reservoir cleaning schedule and Aqualift most recent maintenance reports are included in Appendix I. Table 4.12 contains the summary of current reservoir issues.   *Aqualift diver conducting internal inspection of Greenhill Reservoir*	Every reservoir is inspected once every two years. Clean varies depending on the quality of the water.
Mechanical & Electrical Equipment	Mechanical & Electrical Preventative Maintenance Program Documentation of the current periodic preventative maintenance program is nearing completion.	Varies depending on asset type and criticality
SCADA System	SCADA Maintenance Program Council's current RADTEL SCADA system is old and requires frequent inspection and leads to additional after hours callouts. Council is progressing with the replacement of the old system which should lead to a reduction in the current inspection program.	Varies depending on component type and criticality
Water Treatment Plants	Instrument Maintenance Water Quality instrument routine maintenance Water Quality instrument servicing and replacement as needed.	5 weekly Annually

Table 4.11 - Maintenance Expenditure

Year	Operations / Maintenance Expenditure		
	Operations	Maintenance	Cyclic (Included in Mtce)
2012/13	$4.1M	$1.9M	$
2013/14	$4.2M	$2.1M	$
2014/15	$4.3M	$2.2M	$

4.6.2 Standards and specifications

Maintenance work is carried out in accordance with the following Standards and Specifications:

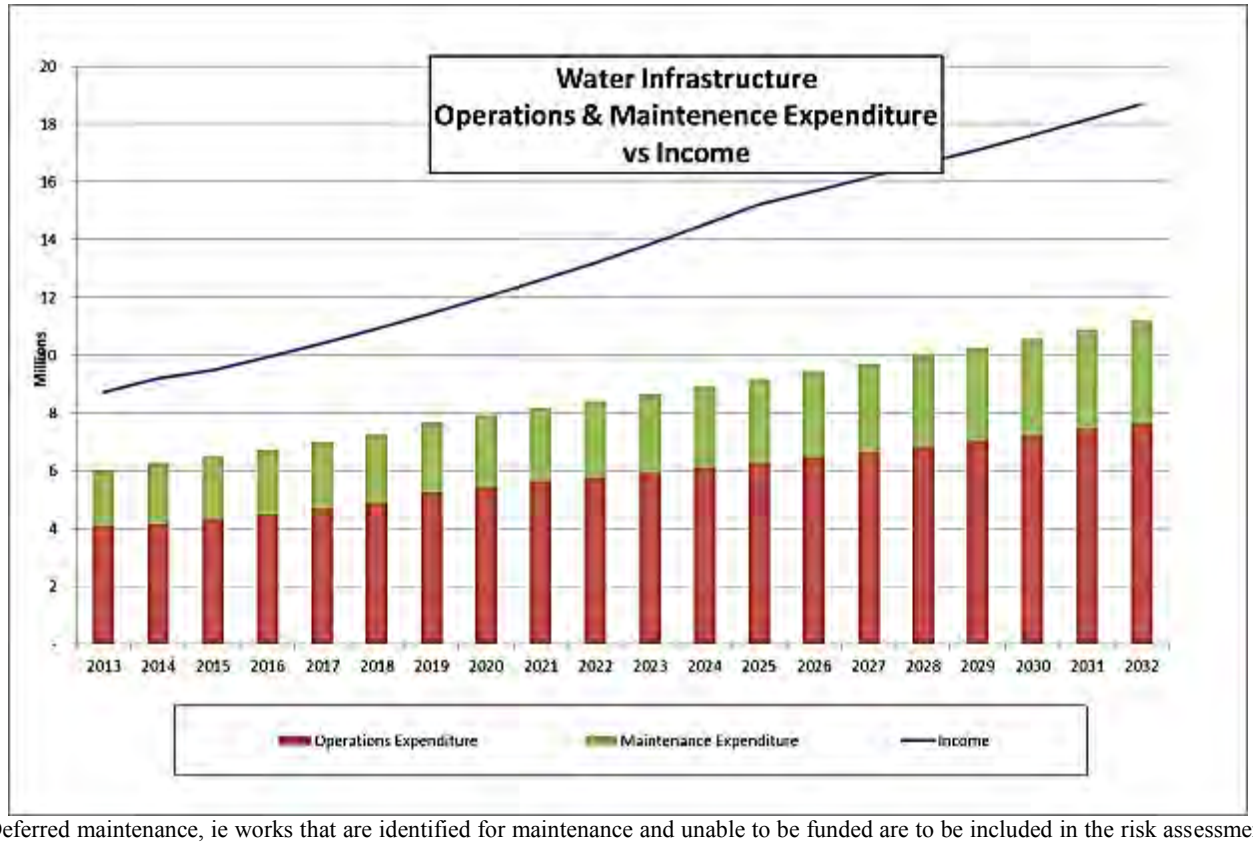
- WSAA 2003 Water Supply Code
- AUSSPEC
- NSW Code of Practice for Plumbing & Drainage
- Council"s Safe Work Method Statements (SWMS)

Job specific WH&S procedures and training such as confined spaces, working under power lines, working with asbestos training and traffic control training

4.6.3 Summary of future maintenance expenditures

Future maintenance expenditure is forecast to trend in line with the value of the asset stock as shown in Figure 11 below.

Figure 11 - Planned Maintenance Expenditure



Deferred maintenance, ie works that are identified for maintenance and unable to be funded are to be included in the risk assessment process in the infrastructure risk management plan.

4.7 RENEWAL PLAN

4.7.1 General

Renewal expenditure is major work which does not increase the asset"s design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is upgrade/expansion or new works expenditure.

Replacing a bore at Sherwood

The general renewal strategy is to rehabilitate or replace assets when justified by:

- **Risk**: The risk of failure and associated financial and social impact justifies action (eg. impact and extent of supply discontinuation, probable extent of property damage, health risk).

- **Asset performance**: Renewal of an asset when it fails to meet the required level of service. Non-performing assets are identified by the monitoring of asset reliability, capacity and efficiency during planned maintenance inspections and operational activity. Indicators of non-performing assets include:
  - repeated asset failure
  - repeated joint failure
  - excessive rate of water leakage
  - inefficient energy consumption, and
  - contamination of water.

- **Economics**: It is no longer economic to continue repairing the asset (ie. the annual cost of repairs exceeds the annualised cost of renewal). An economic consideration is the coordination of renewal works with other planned works such as road reconstruction.

- **Obsolescence:** Spare parts are on longer readily available and/or technology cannot communicate with a SCADA system

A broad 30-year renewal expenditure profile is regularly extracted from the asset register and used for long term financial planning. A detailed water asset renewal plan with many sub-programs are compiled each year for incorporation into the Integrated Planning & Reporting documents.

4.7.2 Asset Renewal Program

Work displaying one or more of the following attributes is classified as rehabilitation or renewal expenditure:

- Works which do not increase the capacity of the asset, ie. works which upgrade and enhance the assets restoring them to their original size, condition capacity, etc.
- The replacement component of augmentation works which does not increase the capacity of the asset, ie. that portion of the work that restores the assets to their original size, condition capacity etc.
- Renovation/Refurbishment of an existing assets, ie. restore the assets to a new or fresh condition.

Renewal will be undertaken using 'low-cost' renewal methods where practical. The aim of 'low-cost' renewals is to restore the service potential or future economic benefits of the asset by renewing the assets at a cost less than replacement cost.

Examples of low cost renewal include:

- Water network link mains
- Pipe Bursting

Deferred renewal, ie those assets identified for renewal and not scheduled for renewal in capital works programs are included in the risk assessment process in the risk management plan.

Funding of the current and future Renewal Program is further discussed in Section 5 – Financial Summary. Table 4.12 contains the current Major Asset Renewal Programs.

Council"s operations and assets staff developed a systematic program of investigation, risk assessment and renewal prioritisation. This information formed the basis of the works within each program and the updated asset condition ratings used in the Water & Sewer Asset Revaluation Project in June 2012.

Table 4.12 - Major Asset Renewal programs for 2013/14 to 2015/16

Water Treatment Plants	Treatment plant major periodic renewals Stuarts Point sand filter replacement − every 10-20 years Bellbrook WTP − arsenic treatment media − 1-2 years Bellbrook WTP − sand filters − 1-2 years South West Rocks WRP − sand filters 2-4 years South West Rocks WRP – membranes – 10-15 years South West Rocks WTP Membranes – 7 to 10 years   *Refurbishment of sand filters at Stuarts Point WTP*	
Reservoirs	Cathodic protection 5 steel reservoirs Reservoir refurbishment 4 reservoirs Roof replacement Stuarts Point Security fencing of water sites Many water reservoir sites are unfenced. A program to provide security fencing will assist with asset protection and public safety	
Headworks	Periodic inspection and maintenance of the Sherwood recharge channel. Environmental regeneration was carried out last year to reduce water quality risks, and will continue for a further 2 years. An annual inspection and maintenance program has been developed to monitor the regeneration growth at the recharge channel (acts as a raw water dam). Operation of emergency systems − annually • Operate all tower gates • Run Sherwood lime plant • Operate Kinchela emergency bore • Operate Belgrave bore pump • Operate Sherwood recharge channel pump	

Watermains	Watermain Renewal Program 10 high priority watermain renewals will be completed this year  *Tozer Street watermain renewal 2013 trunk main to underbore. Connection of the Macleay River pipeline underbore near the Kempsey rail bridge has reached the final stages of interconnection with the water supply pipes on the northern and southern sides of the river. Over the last few months, the 300mm pipe connections in Queen St on the southern side of the river (Photo above) and at Tozer St on the northern side (Photo below) have been underway* 	Ongoing budgetry item based on prioritised list of works
Water Services	Water Service Renewal Program $120,000 Generally, customer water services are installed in conjunction with the watermain construction. Theoretically water services have a useful life of 40years but typically they remain operational for the life of the watermain, ie.70 years. Services can fail at the connection to the watermain, just prior to the meter and anywhere along the service generally where it has been disturbed. The water lost from leaking or broken services is lost revenue and Council repairs known issues within 24 hours of notification. The water meter renewal program replaces individual water services and entire localities based on failure rates. Additionally, Council renews all water services and customer water meters when it renews the connecting watermain.	

Valves	Critical Valve Replacement Program $80,000 Council has almost 2000 stop valves in the watermain network, approximately 10% would be termed "critical valves". Valves remain in the same position, either open or closed, until an emergency arises. Valves are found to be broken during the emergency or during Council's valve maintenance and exercising program. Council plans to renew 8-10 critical valves each year. Note: Valve replacement means replace the valve, valve cover and one 5.5m length of watermain on either side of the valve.	
Customer Water Meters	Water Meter Replacement Program Every year over 100 water meters are replaced in the Kempsey Shire. Every now and again when a larger meter is replaced, it is also overhauled to align with current practices. A copy of the meter replacement program is included in Appendix J.  *The water meter replacement at Akubra raised the 100mm water meter assembly above ground to improve accessibility for reading the meter by the customer and by Council. At the same time, modern backflow prevention devices were added.*	
SCADA	Disposal of RADTEL, installation of ClearSCADA system at: Frederickton STP – water and sewer Gladstone/Smithtown – water & sewer South West Rocks Headworks communication and control To occur throughout all assets over next 2 years	
	Resources Council has actively recruited trades people who have proved to be very successful working alongside experienced field staff.	

Council is carrying a backlog liability of just over $7M. This backlog is being addressed, refer Table 4.13 below and Appendix K.

Table 4.13 - Asset Renewal Backlog

Asset Type	Backlog	Explanation – how backlog is to be addressed
Pipes	$2,233,510	2,191m Cast Iron main laid 1939-1940 with a $2012 Replacement Cost of $766,071. 8,405m Poor quality Asbestos Cement and uPVC Class 9 pipes laid 1980-1983 with a $2012 Replacement Cost of $1,467,439. Council has a watermain renewal program based on actual high failure rates. Some of the backlog mains are contained in this list and will be renewed by 2016. Council is carrying out a desktop investigation into all old AC, poor quality AC and uPVC and developing a priority renewal program which will be incorporated into the existing program.
Meters	$48,931	Water meter life = 15 years then backlog = $48,931 Council is striving to reduce the working life of water meters to 10 years. If Water Meter Life = 10 years then backlog = $443,840.17
Services	$249,305	Less than 10% are due for renewal. Services are replaced when watermains are renewed. Council also has a targeted renewal program replacing high failure rate services.
Production Bores	$1,623,888	Production Bores pump groundwater; the raw water source. Many bore casings, pumps and electrical installations are theoretically overdue for renewal. The priority 2013/13 Operational Plan Renewals are : -Sherwood Bore Field Pumping Station – Bores 4,6 and 11 -Willawarrin Bore Field Pumping Station - Bores 1 and 2 -South West Rocks Bore Field Pumping Station – Replace bore 6 -Bellbrook Bore Field Pumping Station - Refurbish southern bore -Water Pumping Station and Bore Fields - Security fence replacement Also, one of the three bores at Crescent Head is offline due to water quality issues (high metals) but is operational, if required. Funds will be set aside to refurbish/renew production bores over the coming years as they begin to have operational issues.
Observation Bores	$411,400	Observation bores are groundwater level and quality measuring locations. Council has a total of 72 observation bores at 37 locations ranging in commissioning dates from 1967 to 2008. Observation bores are operated to failure then a new bore hole is drilled nearby. Many observation bores are still in operation well after their nominal useful life of 30 years has expired. Records show that 44 of the 72 observation bores need renewal. Backlog areas are South West Rocks 8 bores, Crescent Head 20 bores and Sherwood 15 bores Over the next year Council officers will inspect each observation bore to determine individual renewal needs for each bore and update Council's records. Likely findings include: • the bores are in urgent need of replacement, • the theoretical Useful Life is underestimated and needs to be extended or • many of the bores many undergone extensive refurbishment in intervening years and should therefore have higher condition ratings and extended ULs.
Water Pumping Stations	$299,720	The asset register indicates that the Cardwell St, New Entrance, Big Nobby and Maguires Crossing pumps and some electrical installations are due for renewal. Operational staff have indicated that New Entrance and Big Nobby WPS are operating satisfactorily, Cardwell St switchboard was renewed in 2013 and Maguires Crossing pump motor was recently refurbished and switchboard is satisfactory. The asset register will be altered to more accurately reflect the actual component condition and operation.
River Intake WPS	$508,640	All backlog is Sherwood recharge channel pumps, electrical and telemetry which are all due for renewal/rehabilitation. Operations staff are currently retrieving the pumps and will soon determine the rehabilitation work required to bring them back to full service level. The switchboard and telemetry will be replaced as part of the switchboard renewal program and SCADA/telemetry upgrade program.

<table>
<tr><th>Asset Type</th><th>Backlog</th><th>Explanation – how backlog is to be addressed</th></tr>
<tr><td>Reservoirs</td><td>$25,000</td><td>Small backlog</td></tr>
<tr><td>Dams</td><td>$529,500</td><td>$435,000 backlog is due to the failure of the Crescent Head Hypalon dam liner. The dam is now off line. Council is investigating alternate options. In the 2014/15 financial year council proposes to either rehabilitate the dam or construct a new balance tank and then formally decommission the dam..</td></tr>
<tr><td>Water Treatment Plants</td><td>$643,094</td><td>Council owns and operates four Water Treatment Plants.
<table>
<tr><th>Location</th><th>Capacity (ML/day)</th><th>Construction Year</th></tr>
<tr><td>Stuarts Point WTP</td><td>2.7</td><td>1985</td></tr>
<tr><td>Crescent Head WTP</td><td>2.9</td><td>1980</td></tr>
<tr><td>South West Rocks WFTP No 2</td><td>6.0</td><td>2004</td></tr>
<tr><td>Bellbrook WTP</td><td>0.14</td><td>2010</td></tr>
</table>
Many treatment components have short theoretical useful lives and, when inspected, are found to be still operating to their full level of service level. The assets team is considering extending the standard useful life of some of these assets.

Crescent Head WTP is the oldest plant. The interim Clearwater tank (3 tanks – 2 smaller & one large) is plastic lined galvanised iron and should be replaced as soon as funds are available. The pumping station switchboard will be renewed within the next few years as part of the switchboard replacement program. Security fence was renewed in 2011.

Refurbishment of Stuarts Point WTP is almost complete (2013/14). It was the top priority for major renewal works. Most of the treatment plant components are 1985 vintage except the Clarifier Tank and Ferric Chloride Tank which were renewed in 2011.

Bellbrook WTP is a relatively new package plant. The short lived dosing equipment will be due for renewal in 2015. Council will monitor the performance of the equipment and program replacement based on actual condition.

South West Rocks is also a relatively new plant however has ongoing operational issues. The filtration membranes are due for replacement in this year however their performance continues to be satisfactory and renewal has been able to be delayed for 2 years.

SCADA and telemetry upgrade is due and is on current renewal programs.</td></tr>
<tr><td>Chlorine Dosing Stations</td><td>$554,550</td><td>Many chlorine dosing stations are also pumping stations. The main backlog stations, Belgrave Falls and Kinchela are emergency assets only and are operated periodically to test their operability.

The other backlog asset is Bloomfield WPS which is under high priority renewal in the 2013/14 year due partly to the South Kempsey Employment Lands development.

SWR security fence backlog was renewed in 2013.</td></tr>
<tr><td>Bulk Meters</td><td></td><td>Nil</td></tr>
<tr><td>Filling Stations</td><td></td><td>Nil</td></tr>
<tr><td>TOTAL</td><td>$7,078,608</td><td></td></tr>
</table>

The renewal program is reviewed at least annually, with any deferred work re-prioritised alongside new renewal projects and a revised programme established. When renewal works are deferred, the impact of the deferral on economic inefficiencies and the system's ability to achieve the required service standards are assessed. Although the deferral of some renewal works may not impact significantly on the short-term operation of assets, repeated deferral will create a liability in the longer term.

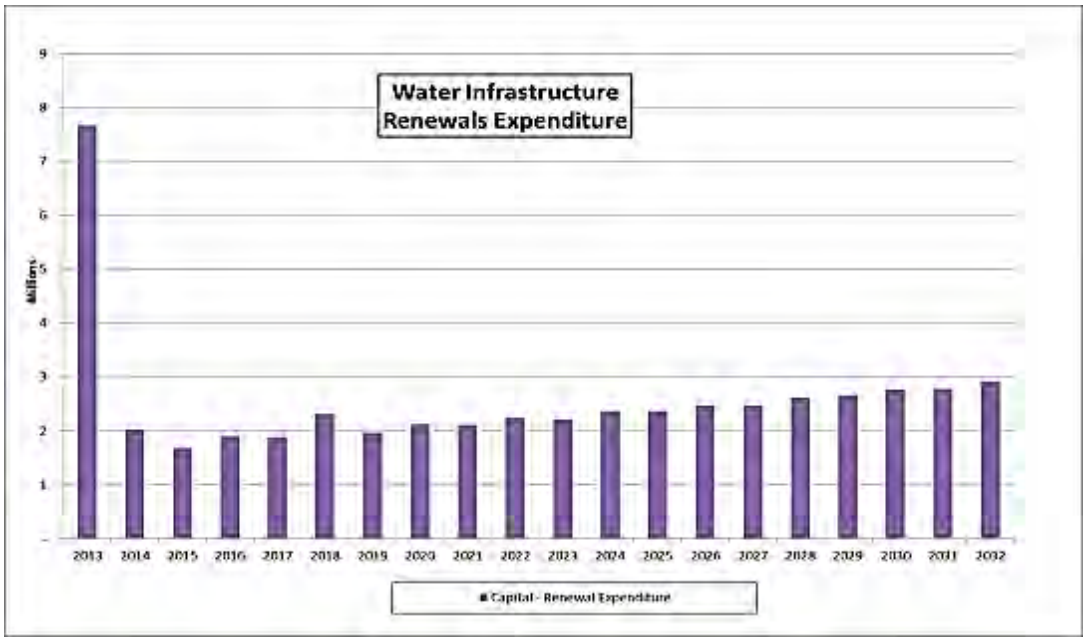
Table 4.14 - Renewal Priority Ranking Criteria

Criteria	Weighting
Regulatory Requirements	50%
Life Cycle Costs	30%
Level of Service	20%
Total	100%

4.7.3 Summary of future renewal expenditure

Projected future renewal expenditures are forecast to increase over time as the asset stock ages. The costs are summarised in Figure 12.

Figure 12 - Projected Capital Renewal Expenditure



4.8 CREATION/ACQUISION/UPGRADE PLAN FOR URBAN GROWTH, IMPROVED LEVEL OF SERVICE AND BACKLOG WORKS

New works are those works that create a new asset that did not previously exist, or works which upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. Assets may also be acquired at no cost to the Council from land development.

Capital expenditure projects display one or more of the following characteristics:

- Construction works which create a new asset that did not previously exist in any shape or form
- Expenditure which purchases or creates a new asset (not a replacement) or in any way improves an asset beyond it original design capacity
- Upgrading works which increase the capacity of the asset
- Construction works designed to produce an improvement in the standard and operation of the asset beyond its present capacity.

4.8.1 Selection criteria

New assets and upgrade/expansion of existing assets are identified from various sources such as changes in regulatory requirements, improved risk management, Community Strategic Plan (councillor or community requests). Candidate proposals are inspected to verify need and to develop a preliminary renewal estimate. Verified proposals are ranked by priority and available funds and scheduled in future works programmes. The priority ranking criteria is detailed Table 4.15.

Table 4.15 - New Assets Priority Ranking Criteria

Criteria	Weighting
Regulatory Requirements ie. Drinking Water Quality	50%
Reduce operational costs	20%
WHS and public safety	20%
General industry improvements.(eg. SCADA control) to reduce reactive callouts.	10%

Table 4.16 - Future Upgrade and Backlog Works

Dams	Crescent Head Hypalon Dam The dam is currently off line due to its poor condition. An options investigation soon to commence will determine whether to rehabilitate the dam or replace it with new balance tanks. This work is currently deferred though to enable investigation into the viability of linking the Kempsey, Hat Head and Crescent Head water supply schemes. At the same facility, Fluoridation will be provided in the upcoming year Steuart McIntyre Dam Fluoridation and replacement of the Chlorination system will occur within the upcoming year	
WTP	Willawarrin WTP The raw water for the small village has poor water quality during high river flows. A small package treatment plant will provide greater security of supply.	
WTP	South West Rocks WTP Drainage channel to protect the plant from flood and remove overflow issues	
WTP	South West Rocks WTP Process investigation to protect and prolong life of membranes	

Hypalon Dam at Crescent Head Water Treatment Plant

4.8.2 Future Capital Works for Growth

South Kempsey Employment Lands Hub

The South Kempsey Employment Lands Hub is a 520 hectare area located on the southern side of the Kempsey Township. The area is bounded by existing urban development in the north, State Forest to the south and west and the main north railway line to the east. There is significant existing industrial and commercial development in the northern section of the study area and strip development along the existing Pacific Hwy. The Kempsey Shire Council Local Growth Management Strategy identified this area as a "significant potential major industrial area, which is capable of generating significant jobs growth and economic benefit for the Shire and the southern end of the Mid North Coast". The Pacific Highway Kempsey Bypass project has already stimulated development proposal on the southern fringe of the investigation area.

Development beyond full development of the Employment Lands was investigated to determine a logical long term water supply strategy for the new supply zone. The new South Kempsey Reservoir will provide significantly increased water pressure which could benefit areas outside the South Kempsey Employment Lands. Increased water pressure could facilitate development of higher elevation areas, provide improved level of service to existing areas and/or trigger the decommissioning of aging assets. It is important the proposed trunk pipeline network is adequately sized to supply potential longer term development.

Stages

Three stages were investigated namely;

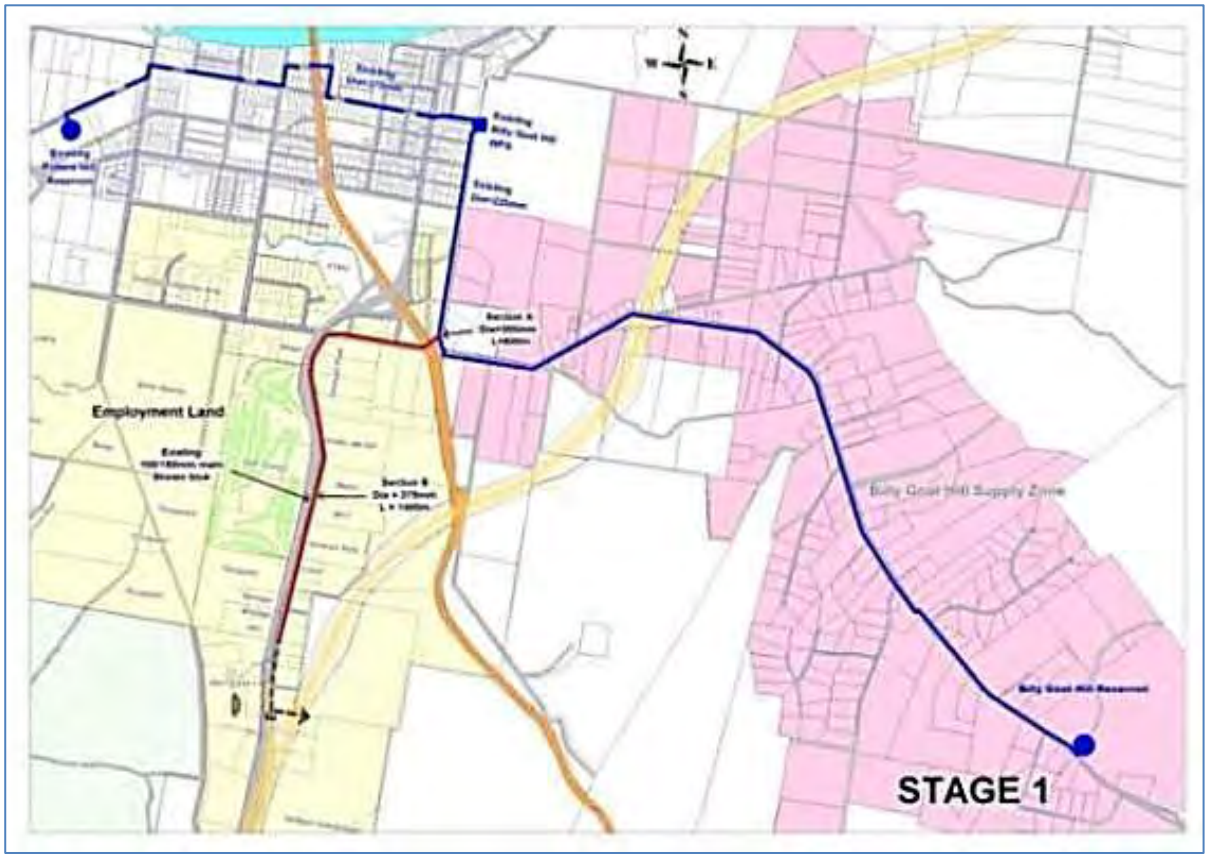
Stage 1: 3 to 10 year horizon including all the known current development proposals.
Total: Current development plus potential growth of 280ET.

Stage 2: 10 to 20 year horizon assuming full development of the South Kempsey Employment Lands Hub and full uptake of lots in Billy Goat Hill Zone.
Total: 3000ET (Employment Land = 2520 ET, Billy Goat Hill zone = 450 ET)

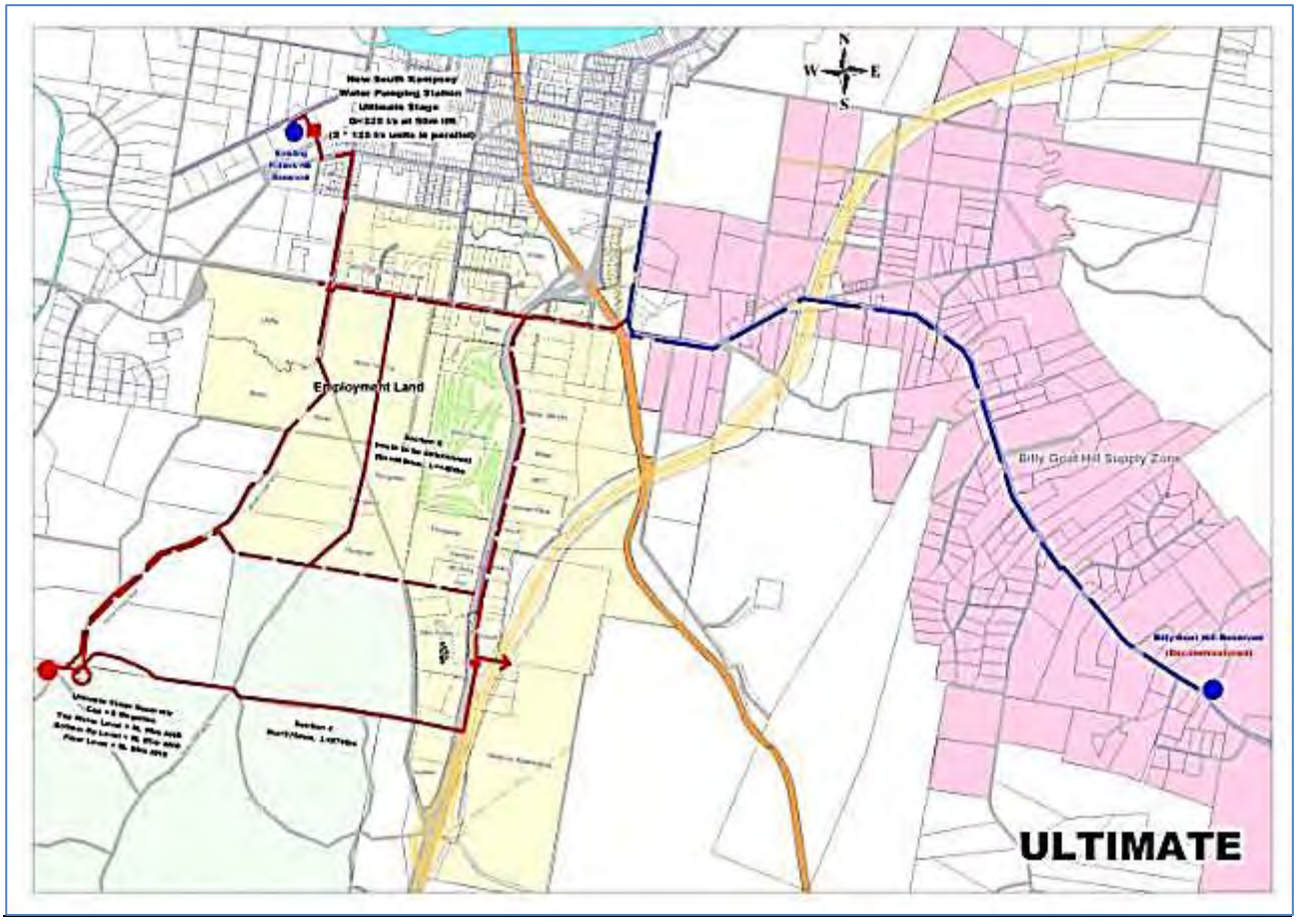
Ultimate: Includes full development of the South Kempsey Employment Lands Hub and further other growth of up to 4660 ET. The redevelopment of land along Crescent Head Rd between the Pacific Highway and Ronald Lyne Drive from rural residential to urban residential (ie. current Billy Goat Hill Zone) was used for investigation purposes.

Alternatively, this "Ultimate Servicing" option could service an additional 4200 ET in Crescent Head, future residential development in South Kempsey or further development along the Lower Macleay River.
Total: 7180 ET (Employment Land = 2520 ET, Billy Goat Hill zone = 4660 ET).

The following maps show the proposed staged capital works



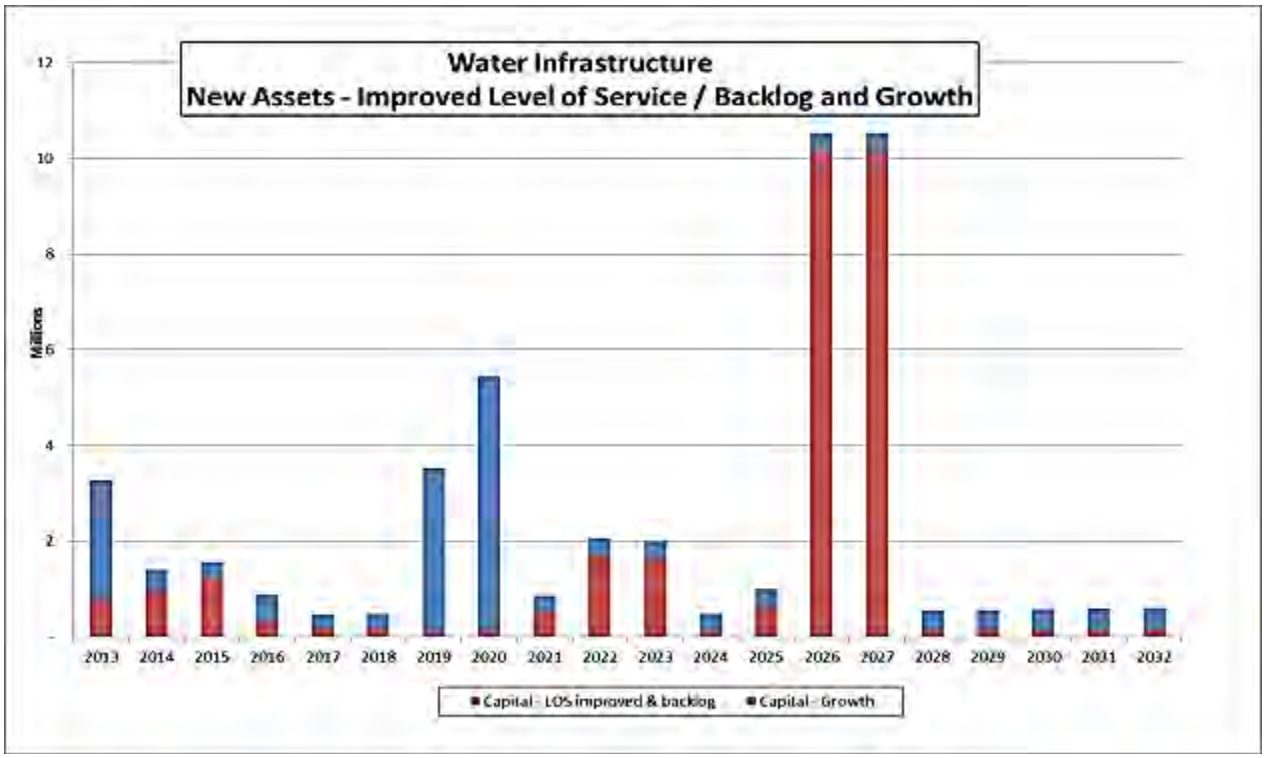

N
W
E
S
Employment Land
Billy Goat Hill Supply Zone
STAGE 2


N
W
E
S
Employment Land
Billy Goat Hill Supply Zone
ULTIMATE

4.8.3 Summary of future upgrade/new assets expenditure

Planned upgrade/new asset expenditures are summarised in Figure 13 below:

Figure 13 - Planned Capital Upgrade/New Asset Expenditure



Asset Officer, Consultant and Technical Asset Officer studying plans of the new South Kempsey Growth Strategy

4.9 DISPOSAL PLAN

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. Assets identified for possible decommissioning and disposal are shown in Table 4.17. These assets will be further reinvestigated to determine the required levels of service and see what options are available for alternate service delivery, if any.

The following is a list of the various "failure modes" or reasons for disposal:

- Structural; where the physical condition of the asset is the measure of deterioration, service potential and remaining life;
- Capacity; where the level of under or over capacity of the asset is measured against the required level of service to establish the remaining life.
- Level of service failure; where reliability of the asset or performance targets are not achieved.
- Obsolescence; where technical change or lack of replacement parts can render assets uneconomical to operate or maintain.
- Cost or economic impact; where the cost to maintain or operate an asset is greater than the economic return.
- Operator error; where the available skill level to operate an asset could impact on asset performance and service delivery.

Mechanical equipment that has been replaced will be cannibalised for parts or sold as scrap metal unless it is considered to have genuine re-sale value. In this case the piece of surplus equipment will be sold with income directed to the water fund account.

Table 4.17 - Assets identified for Disposal

Asset	Reason for Disposal	Timing	Cashflow from disposal
Asbestos Cement (AC) water main on the railway footbridge	Replaced by new underbore pipeline beneath the riverbed	December 2013	Nil
Existing chlorination at Steuart McIntyre Dam	Replaced by gas chlorination system, improved level of service and to meet legislative requirements	Late 2014	Nil

Asbestos cement main to be removed from Kempsey Railway Bridge

5. FINANCIAL SUMMARY WATER SUPPLY INFRASTRUCTURE

This section outlines the long term operations, maintenance and capital financial requirements for the operation, maintenance, renewal and development of the water supply network based on long-term strategies and tactics outlined earlier in the plan. Funding issues are discussed and key assumptions made in preparing financial forecasts are noted.

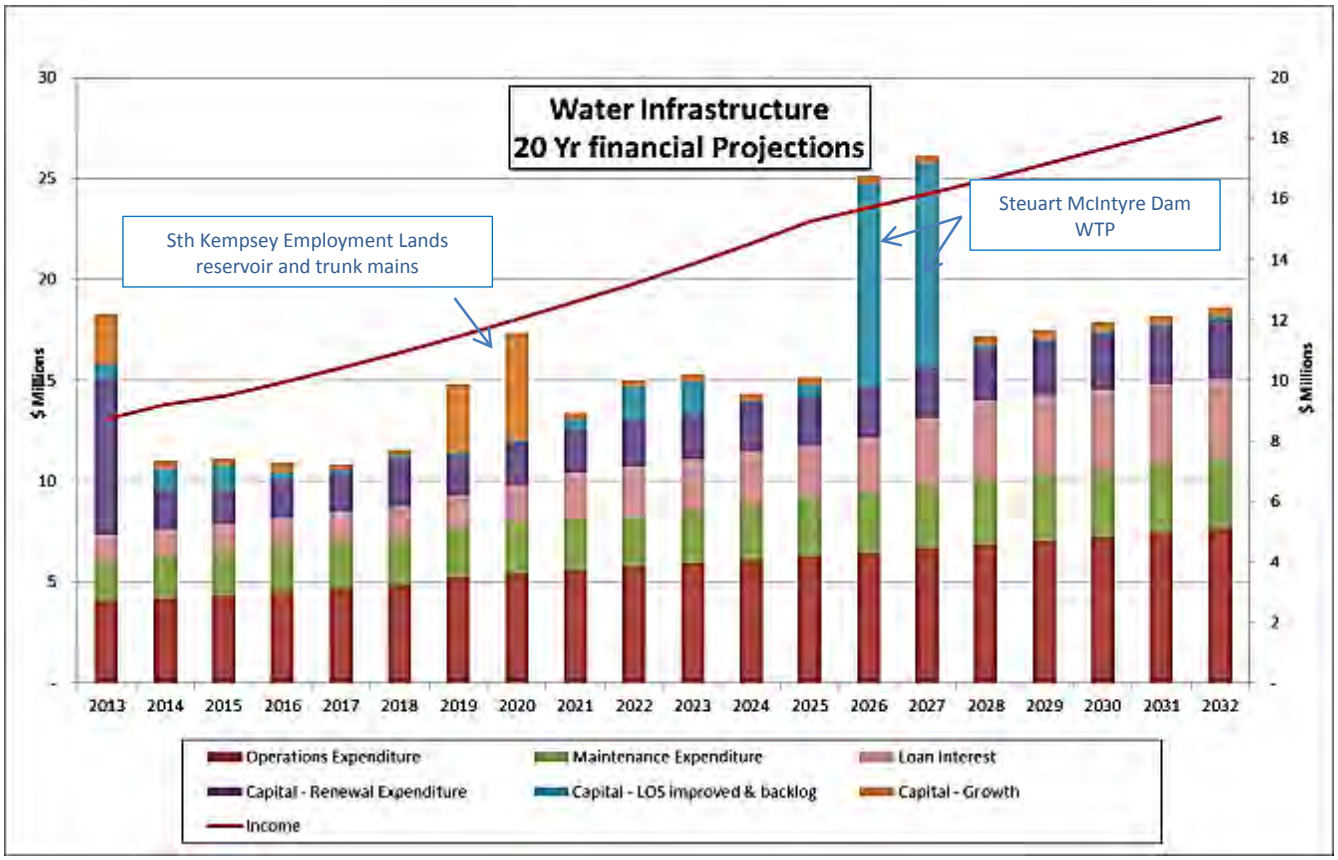
This chapter presents the forecast financial summary for the next 10 years based on all the information presented in the previous sections of this asset management plan. The financial summary will be reviewed annually and continue to be refined as planning studies/strategies are completed, desired levels of service are formalised and more information is known regarding current and projected future asset performance.

Council has a backlog of maintenance and renewal works which it is now addressing. The backlog catchup is shown below by the high current and proposed Capital – Renewal Expenditure and high Sustainability Index.

5.1 FINANCIAL STATEMENTS AND PROJECTIONS

The financial projections are shown in Figure 14 for planned operating (operations and maintenance) and capital expenditure (renewal, Upgrade, Improved Level of Service, Backlog, Growth Assets)

Figure 14 - Planned Operating and Capital Expenditure



Source: KSC Detailed Summary Spreadsheet

Commentary:

The significant expenditure on renewals in 2013 reflects the deferred renewals following the recent frequent flood events that hindered the renewal expenditure, as combating operational recovery was prioritised. The capital works identified over the 20years are predominantly addressing improved level of service due to legislative requirements.

The peaks in capital growth are:

- 2013 – South Kempsey Employment Lands – Stage 1
- 2019 & 2020 - South Kempsey Employment Lands – Stage 2 reservoir
- 2026 & 2027 a water treatment plant for the Kempsey/Lower Macleay scheme at Steuart McIntyre Dam .

Operating expenditure levels are relatively steady due to renewal and capital expenditure enabling improved cost efficiencies.

Water operators receive comprehensive training on testing procedures

5.2 SUSTAINABILITY OF SERVICE DELIVERY

Providing services in a sustainable manner will require matching of projected asset renewals to meet agreed service levels with planned capital works programs and available revenue.
A gap between projected asset renewals, planned asset renewals and funding indicates that further work is required to manage required service levels and funding to eliminate any funding gap.

There are two key indicators for financial sustainability that have been considered in the analysis of the services provided by this asset category, these being long term life cycle costs and medium term costs over the 10 year financial planning period.

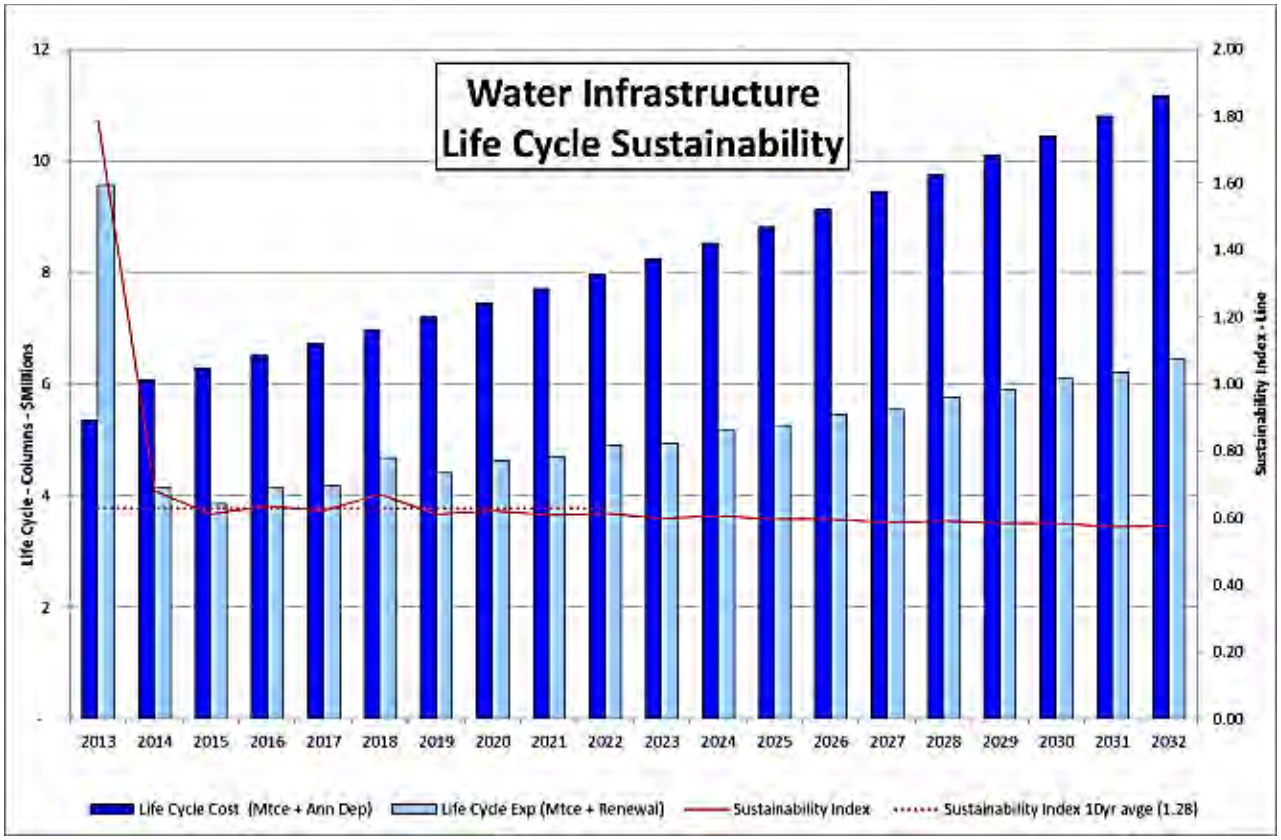
5.2.1 Long term - Life Cycle Cost

Life cycle costs (or whole of life costs) are the average costs that are required to sustain the service levels over the longest asset life. Life cycle costs include maintenance and asset consumption (depreciation expense). The annual average life cycle cost for the services covered in this asset management plan is $5.4 M.
Life cycle costs can be compared to life cycle expenditure to give an indicator of sustainability in service provision. Life cycle expenditure includes maintenance plus capital renewal expenditure. Life cycle expenditure will vary depending on the timing of asset renewals. The life cycle expenditure at the start of the plan is $9.6M.

A gap between life cycle costs and life cycle expenditure identifies whether present consumers are paying their share of the assets they are consuming each year. The purpose of this water supply asset management plan is to identify levels of service that the community needs and can afford and develop the necessary long term financial plans to provide the service in a sustainable manner.

The 2013/14 Life Cycle Expenditure was higher than the Life Cycle Cost resulting on a Life Cycle Sustainability Index of 1.8 due to the need to catchup backlog renewal works and achieve full level of service compliance post flood impacts. Figure 15 shows the Life Cycle Sustainability Index trend. The 10 year average Sustainability Index is 0.63.

Figure 15 - Life Cycle Sustainability Trend



5.2.2 Medium term – 10 year financial planning period

This asset management plan identifies the estimated maintenance and capital expenditures required to provide an agreed level of service to the community over a 20 year period for input into a 10 year financial plan and funding plan to provide the service in a sustainable manner. Council will manage the „gap" by developing this asset management plan to provide guidance on future service levels and resources required to provide these services.

The total maintenance and capital renewal expenditure required over the 10 years is $44.6M. This is an average expenditure of $4.5M. Estimated maintenance and capital renewal expenditure in 2013/14 is $4.1M. The 10 year sustainability index is 0.63

Pump station & dosing station at Steuart McIntyre Dam A new water treatment plant is planned for 2026/27

5.3 FUNDING STRATEGY

Projected expenditure identified in Section 5.1 is to be funded from Council"s operating and capital budgets. The funding strategy is detailed in the Council"s 10 year long term financial plan.

Council will fund the expenditure outlined in the financial forecast from the following funding sources.

Table 5.1 - Funding Sources

Category	Definition	Funding Sources
Maintenance	The investment in an existing asset related to the ongoing up-keep to ensure it meets its useful life.	Water Charges
Operations	The investment on day to day activities of business operations. Eg power costs, chemicals, licencing charges.	Water Charges
Existing Asset Rehabilitation / Renewal	The investment of maintaining the current level of service by reinstating the original life of the asset.	Reserves Water Charges
New Assets to improve Level Of Service to existing customers	The investment in a new asset to increase a level of service to existing customers and to meet legislative requirements. Eg. Electrical control equipment such as SCADA.	State & Federal Grants Loans Water Charges
New Acquired Assets	New assets constructed by developers for future customers at the developer"s own cost and handed over to Council for ongoing operation, management and renewal.	Contributed assets
New or Augmented Assets for Growth	Major new assets needed to service growth	Developer Charges : Development Servicing Plan -DSP State & Federal Grants Water Charges (Reduction Amount)
Disposal	Costs associated with the decommissioning and disposal of an asset.	Water Charges

The operating expenditure (operations and maintenance) are funded from the Water Fund reserve. Where possible, the capital works program (ie. asset renewal and new assets) are funded from the Water Fund reserve including saved depreciation expenses and accumulated developer charges. Where planned expenditure exceeds the available cash levels, loans are required.

The desired minimum cash reserve level is approximately 20% of average annual total expenditure, $10M. This is not currently achieved at Kempsey Shire Council. A much lower target of $ 2M has been set as an interim. Recent achievements have been severely eroded by flood recovery work.

The total of the 20 year capital works program is estimated at $99.9M. The proposed funding strategy is to use the available cash reserves and operational surplus to fund the capital works program.

Developer Charges

Developer Charges are up-front charges levied to recover part of the infrastructure costs incurred in servicing new developments or additions to existing developments.

The Developer Charges calculation is based on the net present value (NPV) approach adopted by the Independent Pricing and Regulatory Tribunal. The fundamental principle of the NPV approach is that the investment in assets for serving a development area is fully recovered from the development. The investment is recovered through up-front charges (ie. developer charges) and the present value (PV) of that part of annual bills received from the development in excess of operation, maintenance and administration costs.

A sensitivity analysis was undertaken to examine the effect of increases in typical developer charges on the typical residential bill. This was considered to be an important aspect of the financial model given the significant growth being projected in some parts of the Shire and the fact that Kempsey Shire Council is not currently levying full cost recovery developer charges. It is expected that in the future, Council will levy higher developer charges for new development to recover the cost of assets serving new developments and therefore lessen the financial burden on existing customers.

The 2012/13 developer charges levied on new development is $8,797 per assessment for water supply infrastructure.

5.4 VALUATION FORECASTS

In May-June 2012, Kempsey Shire Council carried out a comprehensive valuation of its water and sewerage. Council determined the Depreciated Replacement Cost (or Written Down Value) using a consumption based depreciation methodology based on the Advanced Straight-Line Asset Management methodology recommended by APV Pty Ltd, Valuers and Asset Management practitioners.
The 2012-2013 depreciation has been derived using the same consumption based depreciation methodology.

Asset values are forecast to increase as additional assets are added to the asset stock from construction and from assets constructed by land developers. Figure 16 shows the projected replacement cost asset values for the 20 year planning period.

Figure 16 - Projected Asset Values

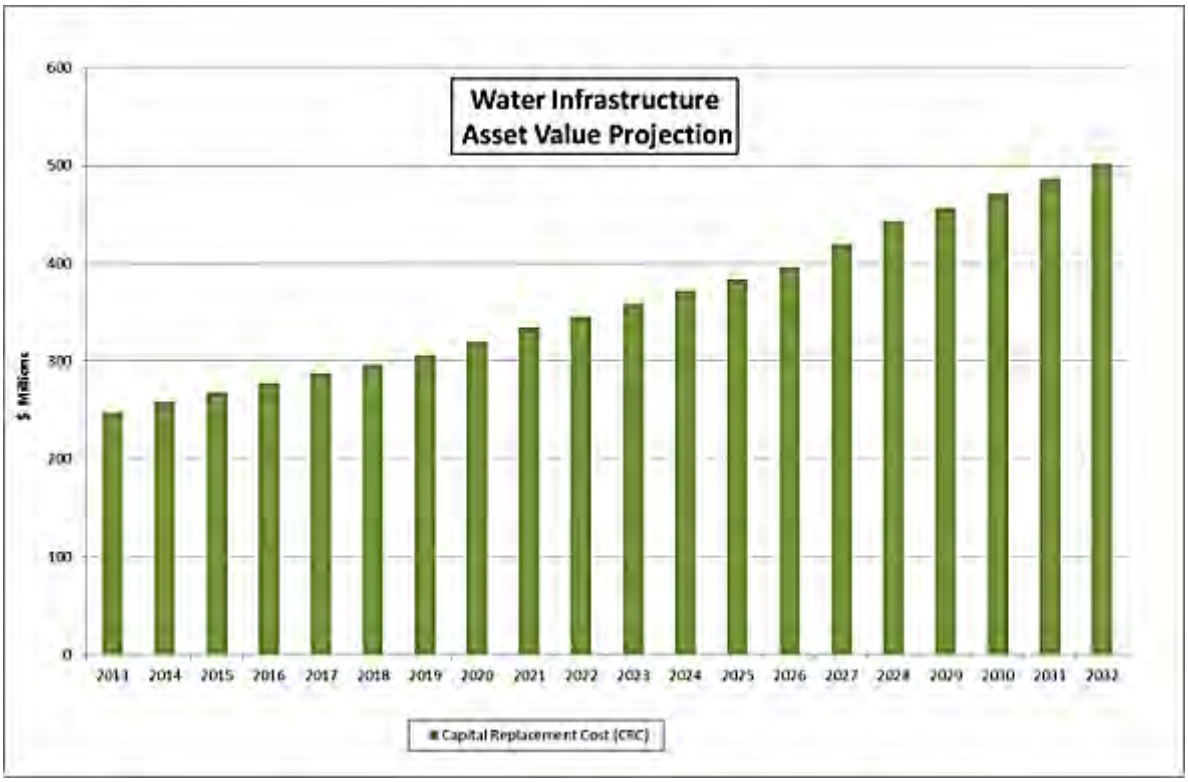
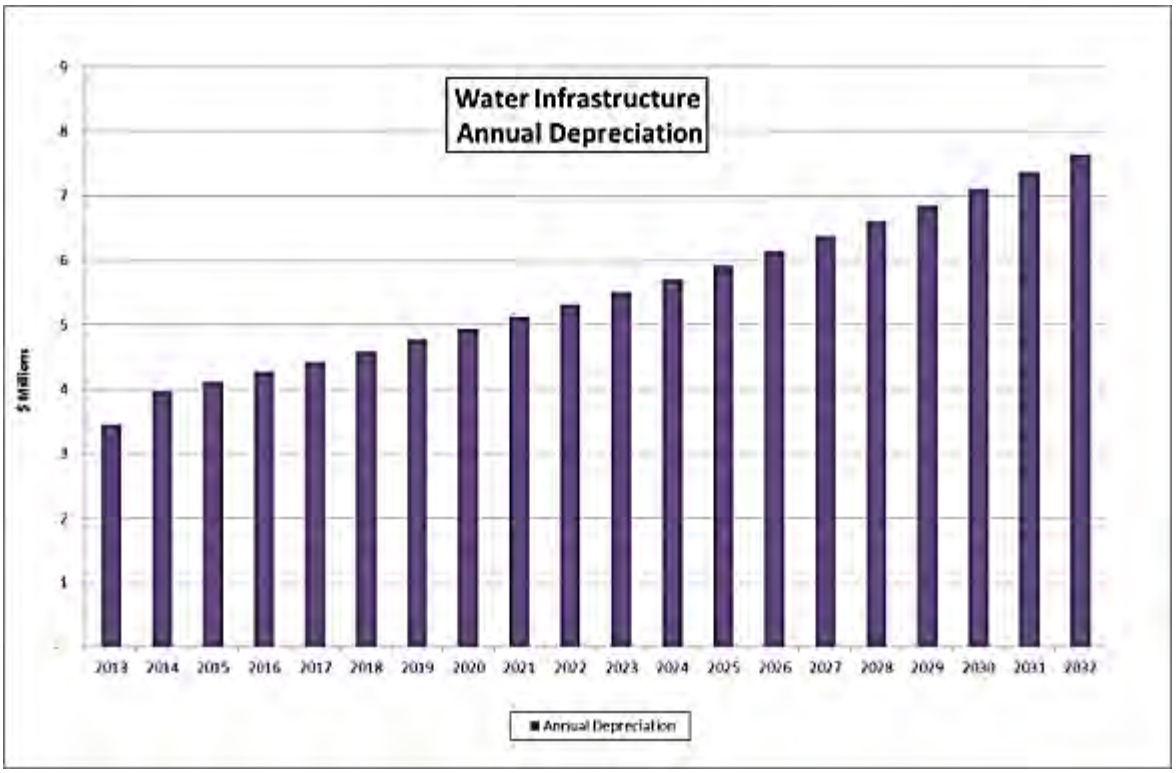


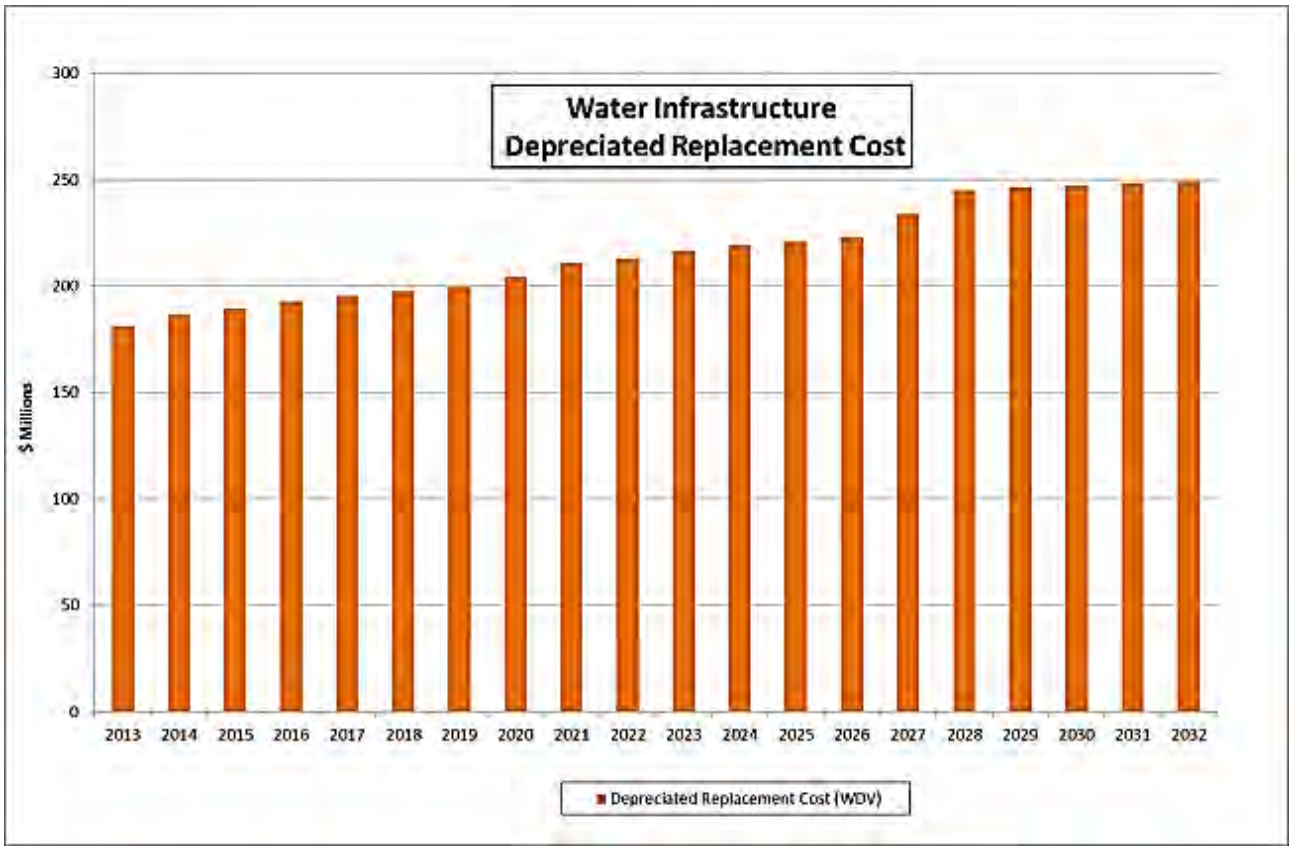
Figure 17 - Projected Depreciation Expense



Depreciation expense was sourced from Council"s financial projections.

The depreciated replacement cost (current replacement cost less accumulated depreciation) will vary over the forecast period depending on the rates of addition of new assets, disposal of old assets and consumption and renewal of existing assets. Forecast of the assets" depreciated replacement cost is shown in Figure 18.

Figure 18 - Projected Depreciated Replacement Cost



5.5 KEY ASSUMPTIONS MADE IN FINANCIAL FORECASTS

This section details the key assumptions made in presenting the information contained in this asset management plan and in preparing forecasts of required operating and capital expenditure and asset values, depreciation expense and carrying amount estimates.

Financial information was sourced from Council"s corporate financial information whose key assumptions are:

- Operating expenditure is indexed by 3.0% pa
- Depreciation is indexed by 3% pa
- Capital Replacement Cost is indexed by 3.0% pa
- Income is increased by: 4.9% pa from 2013/14 to 2024/25 then 3%pa (ie CPI) from 2025/26 to 2032/33.

6. ASSET MANAGEMENT PRACTICES

This section outlines the systems, processes, standards and guidelines used to provide the essential outputs for effective asset management.

6.1 ACCOUNTING/FINANCIAL SYSTEMS

Kempsey Shire Council uses Excel spreadsheets for all water and sewer asset accounting purposes, acquisition, disposal, revaluation and depreciation transactions. The water costing accounts are split into operating and capital.

The Finance Manager is responsible for the management of the Councils finances, information system, statuary and management reporting.

The Council"s financial statements are prepared in accordance with:

- The Local Government Act 1993 (as amended) and the regulations made there under and various other issued guidance such as "Circulars to Councils".
- The Australian Accounting Standards and professional pronouncements, and
- The Local Government Code of Accounting Practice and Financial Reporting.

There has been no established capital threshold amount set for items of infrastructure, plant and equipment.

Council utilises many sources to determine the current replacement costs of its assets. NSW Reference Rates Manual 2012, Rawlinson"s Construction Cost Guide, recent Council construction rates and APV values. Council also use supplier quotations as a starting point for the costs of some specialised water & sewerage asset components.

A comprehensive revaluation of water and sewer assets was carried out in June 2012. Council determined the Depreciated Replacement Cost (or Written Down Value) using a consumption based depreciation methodology based on the advanced straight-line asset methodology recommended by APV Pty Ltd, Valuers and Asset Management practitioners, refer Section 4.4.3 and Appendix G.

6.2 ASSET MANAGEMENT SYSTEMS

Council uses Excel spreadsheets to record asset information in the Asset Registers. Relevant information is manually updated on a monthly basis.

Mapinfo is used as a spatial representation of mains and attributes.

Customer billing information, water meter register and customer water consumption information is maintained in Council"s Civic View system.

Individual financial accounts, wages, payment of invoices etc are recorded and maintained by Council finance staff in Council"s Civic View system.

There is a collaborative cross departmental management of the different facets of the water asset management system.

The Water Services Asset Officer is responsible for the input, maintenance, reporting upon and monitoring condition status of water and sewer assets.

The three Water Managers (Operations, Strategy and Strategy) are collaboratively responsible for the prioritisation and draft budgeting for renewals and capital projects, with the Water Strategy Manager having the prime responsibility for the determination of valuations/depreciations/disposals and coordination of the asset management system for water and sewer.

The Finance Manager is responsible for the transfer of the values into the financial system and to test the accuracy and reasonableness of the values against the costs in the finance system and this is peer reviewed by Council"s auditors.

The Finance Manager is also responsible for the preparation of balanced operational, maintenance and capital budgets, which requires considerable interaction and collaborative work with the three water managers.

Bore at Sherwood

6.3INFORMATION FLOW REQUIREMENTS AND PROCESSES

The key information portions that flows into this asset management plan are:

- The asset register data on size, age, value, remaining life of the network
- The unit rates for categories of work/material
- The adopted service levels
- Projections of various factors affecting future demand for services
- Correlations between maintenance and renewal
- Asset Performance/Consumption curves

The key information portions that flows from this asset management plan are:

- The Renewals Works Program and trends;
- The resulting budget, valuation and depreciation projections;
- The useful life analysis.

The information from the asset management plan will impact the Long Term Financial Plan, Strategic Business Plan, annual budget and departmental business plans and budgets.

Data on new assets constructed by Council are captured by the Water Services Asset Officer. Actual construction costs for capital works are provided to the Asset Officer for input in the Asset Register via Civic View, post construction reports and Work Action Sheets completed by field staff from the various Water Services teams; Operations, Maintenance, Process or Projects Teams.

Plans and estimates of new assets gifted to Council by developers (as constructed drawings and asset values) are forwarded to the Development Engineer for checking and signing off as correct. The Development Engineer then sends this information to the Asset and GIS Officers for inclusion in the Asset Registers and mapping.

Forward works programs are generated within Water Services by the three Water Managers, the Asset Officer and staff based on asset register data based on break records and improved service levels identified for future development or to address changing legislation requirements. Some forward works are generated from field staff condition rating, for example, work generated on "Work Action Sheets" from the Water Services" engineering trades group. Some areas have been identified as in need of improvements and these include better identification of main break causation and streamlining the scheduled maintenance of electrical and mechanical assets with capital requirements.

6.4 STANDARDS AND GUIDELINES

The current standards and guidelines utilised in the preparation of this asset management plan include:

- Macleay Valley 2036 - Community Strategic Plan June 2013, Kempsey Shire Council
- Kempsey Shire Council Delivery Plan 2013-2017
- Council asset management policy
- International Infrastructure Management Manual, Institute of Public Works Engineering Australia, 2006
- NAMS Plus Template and documentation

7. PLAN IMPROVEMENT AND MONITORING

This section outlines how the asset management plan can be measured (Section 7.1) and details improvement programme to enhance these practices to enhance the future level of confidence in the asset management plan strategies and financial projections (Section 7.2). Section 7.3 identifies the timetable for future reviews of the plan and measures adopted to monitor its effectiveness.

7.1 PERFORMANCE MEASURES

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

- The degree to which the required cashflow identified in this asset management plan are incorporated into Council"s long term financial plan and Strategic Management Plan
- The degree to which 1-5 year detailed works programs, budgets, business plans and organisational structures take into account the „global" works program trends provided by the asset management plan

7.2 IMPROVEMENT PLAN

The Improvement Plan is to outline how asset management processes, information systems, data and knowledge can be improved.

A basic principle of good asset management practice, is that existing assets will be maintained and renewed where necessary, before the acquisition of new assets are considered. A major assumption therefore, is that any improvement plan will be assessed according to that principle, and that the allocation of resources for the proposed improvement plan will be prioritised separately from new capital works.

The improvement plan below includes all those items that have been identified as being beneficial to this plan. However as all the work can not be carried out immediately, the work has been prioritised and will be worked on in that order as time and resources permit.

Table 7.1 – Improvement Plan

Task	Action	Responsibility	Priority
Asset Information Improvement	Streamline the data capture for routine and reactive maintenance activities and renewal expenditure by progressing the current „paperwork" to electronic assessments on tablets.	Asset Officer / Team Leader Construction / Mechanical & Electrical Technical Officers/ Water Supply & Sewerage Technical Officers	3
	Improve the efficiency of workflows and data transfer for donated assets with the intent to accept this data by electronic means only	Development Engineer / Asset Officer	1
	Improve the post construction template report delivery to the Asset Officer with the aim of capturing all capital and newly constructed asset information within 6 months of its completion	Asset Officer / Team Leader Construction / Mechanical & Electrical Technical Officers/ Water Supply & Sewerage Technical Officers/ Water Project Engineers	2
	Streamlining the scheduled maintenance of electrical and mechanical assets with capital requirements	Mechanical & Electrical Technical Officers/ Water Supply & Sewerage Technical Officers	7
Condition Assessments	Determine a more efficient mechanism to transfer into the asset register the captured condition assessments of pipelines	Asset Officer / Team Leader Maintenance	4
	Better identification of main break causation	Asset Officer / Team Leader Maintenance	6
Risk Management	Compile the risk management assessments completed and prioritise remaining asset classes	Manger Water Strategy / Manager Water Operations / Manager Water Process	5
Levels of Service	Review internal and customer levels of service	Manager Water Strategy / Director Community Engagement	8

7.3 MONITORING AND REVIEW PROCEDURES

This asset management plan will be reviewed during annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision process.

The Plan has a life of 4 years and is due for revision and updating within 2 years of each Council election. It is intended to annually identify progress made with the asset management plan and provide these progress assessments as technical notes additions to the appendices. The improvement plan progress in particular, will be updated within these technical notes.

Water services staff on a site visit

REFERENCES

Kempsey Shire Council, Local Growth Management Strategy 2009

NSW Government, Department of Planning Mid North Coast Regional Strategy

Kempsey Shire Council, Kempsey/Lower Macleay Drinking Water Management Plan 2013.

Kempsey Shire Council, Management Plan 2010 – 2011.

KSC, 2013, „Community Strategic Plan", Kempsey Shire Council, Kempsey, www.kempsey.nsw.gov.au

Kempsey Shire Council, Delivery Program 2013-2017 and Operating Plan 2013 – 2014.

IPWEA, 2006, „International Infrastructure Management Manual", Institute of Public Works Engineering Australia, Sydney, www.ipwea.org.au

KCS. 2005, „Integrated Water Cycle Management Strategy", Kempsey Shire Council

Calculation Files:

1 AMP Calcs using WATER ASSET REVALUATION 2012- FINAL VERSION

1 AMP Calcs Water Financials 10 Nov 2013

APPENDIX A – WATER ASSETS

WATER TREATMENT PLANTS – (4)

Name	Location	Year Constn	Life (years)	Telemetry Installed	Capacity (ML/day)
STUARTS POINT WATER TREATMENT PLANT	off Fishermans Reach Rd, Stuarts Point	1985	70	Yes	2.7
CRESCENT HEAD WATER TREATMENT PLANT	Pacific Street, Crescent Head	1980	70	Yes	2.9
SOUTH WEST ROCKS WATER FILTRATION TREATMENT PLANT NO 2	Frederick Kelly St, South West Rocks	2004	70	Yes	6.0
BELLBROOK WATER TREATMENT PLANT	Main Street, Bellbrook	2010	70	Yes	0.14

RECLAIMED WATER TREATMENT PLANTS (1)

Name	Location	Year Constn	Life (years)	Telemetry Installed	Capacity (ML/day)
SOUTH WEST ROCKS RECYCLE WATER PLANT	off Belle O"Connor St, South West Rocks	Not commissioned	70	Yes	1.65

RIVER INTAKES – (2)

Name	Location	Year Constn	Life (years)	Telemetry Installed	Capacity (ML/day)
KEMPSEY DRIFTWELL	Off Oakland Rd. Dondingalong	1936	100	No	
KEMPSEY RECHARGE WELL	Off Sherwood Rd, Aldavilla	1936	100	Yes	

DAMS - (2)

	Location	Year Constn	Life (years)	Telemetry Installed	Capacity (ML)
STEUART MCINTYRE	Link Road, Yarravel	2000	100	Yes	2500
CRESCENT HEAD HYPALON	Pacific Street, Crescent Head	1980	100	No	9

RESERVOIRS - (18)

	Location	Year Constn	Life (years)	Shape	Construction Material	Roof	Telemetry Installed	Capacity (ML)
ARAKOON RESERVOIR	Gladstone Street, Arakoon	1991	100	On ground	Concrete	Yes	No	0.02
BACK BEACH, CRESCENT HEAD	off Back Beach Road, Crescent Head	1988	100	On ground	Concrete	Aluminium	Yes	2.50
BELLBROOK	Armidale Road 600m NW of Bellbrook Village	1968	100	Standpipe	Concrete	Galvanised flat sheet	Yes	0.10
BIG NOBBY, CRESCENT HEAD	Skyline Crescent, Crescent Head	1967	100	On ground	Concrete	Aluminium	Yes	1.14
BILLY GOAT HILL	Crescent Head Road, South Kempsey	1989	70	Standpipe	Steel	Aluminium	Yes	2.15
CLYBUCCA	Pacific Highway 400m south of BP service station, Clybucca	1969	70	Standpipe	Steel	Aluminium	Yes	1.15
FREDERICKTON	Great North Road, Frederickton	1969	70	Standpipe	Steel	Aluminium	Yes	1.15
GREENFIELDS AVENUE (NOT USED)	Greenfields Avenue, West Kempsey	1938	100	On ground	Concrete		No	3.80
GREENHILL	Queen Street, Greenhill	1969	70	Standpipe	Steel	Aluminium	Yes	9.10
HAT HEAD CONCRETE RESERVOIR NO. 1	O'Connors Hill 1.2km south of Hat Head Village	1969	100	On ground	Concrete	Aluminium	Yes	0.68
HAT HEAD STEEL RESERVOIR NO. 2	O'Connors Hill 1.2km south of Hat Head Village	1994	70	On ground	Steel	Aluminium	Yes	1.10
JOHN LANE ROAD	NW side of John Lane Road Yarravel 320m off Armidale Rd	1994	70	Standpipe	Steel	Aluminium sheet	Yes	3.50
NEW ENTRANCE	Track on RHS end of Gilbert Cory St, New Entrance	1992	100	On ground	Concrete	Aluminium	Yes	1.00
POTTERS HILL	Gowings Hill Road, South Kempsey	1963	100	On ground	Concrete	Aluminium	Yes	13.65
SOUTH WEST ROCKS RECYCLE WATER	Gregory Street, South West Rocks	1969	100	On ground	Concrete	Aluminium	Yes	3.40
SOUTH WEST ROCKS STEEL RESERVOIR NO. 2	Gregory Street, South West Rocks	1991	70	On ground	Steel	Aluminium	Yes	15.00
STUARTS POINT	Stuarts Point Road 1.5 km west of Stuarts Point Village	1984	70	On ground	Steel	Aluminium	Yes	3.50
WILLAWARRIN	Armidale Rd 800m SW of Willawarrin Village on the property Holmwood	1971	100	Standpipe	Concrete	Galvanised flat sheet	Yes	0.14

WATER FILL STATIONS – (4)

Name	Location	Year Constn	Life (years)
CRESCENT HEAD	Belmore Street, Crescent Head	2009	20
GLADSTONE	South West Rocks Road, Gladstone	2009	20
GREENHILL	Out front of 257 River Street, Greenhill	2009	20
SOUTH KEMPSEY	Out front of 17-23 South Street, South Kempsey	2009	20

WATER DOSING STATIONS - (9)

	Location	Year Constn	Life (years)	Telemetry Installed	Capacity (ML/d)
BELGRAVE FALLS PUMP STATION	off Oakland Rd, Dondingalong	1990	50	Yes	7.7
BELLIMBOPINNI CHLORINATION UNIT	Pacific Highway, Bellimbopinni	2003	50	Yes	
BILLY GOAT HILL/BLOOMFIELD ST PUMP STATION	Cnr Bloomfield & East St, South Kempsey	1988	50	Yes	
HAT HEAD WATER TREATMENT PLANT	Hungry Head Rd Hat Head	1994	50	Yes	1.4
KINCHELA WATER TREATMENT PLANT	McKays Access Road, Kinchela	1996	50	Yes	1.9
STEUART MCINTYRE DAM CHLORINATION PLANT	Link Road, Yarravel	2000	50	Yes	38.1
SHERWOOD LIME PLANT WATER TREATMENT PLANT	Link Road, Yarravel	1988	50	Yes	21.6
SOUTH WEST ROCKS WATER TREATMENT PLANT NO. 1	KSC Borefields, South West Rocks	1970	50	Yes	6
WILLAWARRIN WATER TREATMENT PLANT	Unnamed Rd off Armidale Rd, Willawarrin	1970	50	Need to check	0.2

WATER PUMP STATIONS (21)

Name	Location	Year Constn	Life (years)	Installed Power (kW)
BELLBROOK WTP CLEARWATER TANK TO RESERVOIR TRANSFER PUMPS	Main St, Bellbrook	2010	50	10
CRESCENT HEAD WPS 1 - (MAGUIRES) TRANSFER PUMPS TO WTP	Tea Tree Lane, Crescent Head	1989	50	37.8
CRESCENT HEAD WPS 2 - MAIN TRANSFER PUMPS	Pacific St, Crescent Head	1988	50	110
CRESCENT HEAD WPS 3 - BIG NOBBY TRANSFER PUMPS	Back Beach Rd, Crescent Head	1988	50	22
HAT HEAD WTP BALANCE TANK TO RESERVOIRS TRANSFER PUMPS	O"Connors Hill, Hat Head	1995	50	0.8
BELGRAVE FALLS INFILT WELL LIFT PUMPS TO POTTERS HILL RES	off Oaklands Rd, Dondingalong	1936	50	186.4
BELGRAVE FALLS BOOSTER TO POTTERS HILL RES	off Oaklands Rd, Dondingalong	2000	50	264
SHERWOOD RECHARGE CHANNEL (WELL) TRANSFER PUMPS	off Sherwood Rd, Sherwood	1936	50	11
GREENHILL RES TRANSFER PUMP STATION TO JOHN LANE RES	Armidale Rd, Yarravel	2000	50	15
DAM/JOHN LANE RESERVOIR TRANSFER PUMP STN	Link Rd, Yarravel	2000	50	180
DAM/GREENHILL RESERVOIR TRANSFER PUMP STN	Link Rd, Yarravel	2000	50	220
DAM / POTTERS HILL RESERVOIR TRANSFER PUMPS	Link Rd, Yarravel	2000	50	60
EVERINGHAMS LANE_BOOSTER PUMP STN	Collombatti Rd, Frederickton	2004	50	9
BLOOMFIELD STREET_TRANSFER PUMPS TO BILLY GOAT HILL RES	Bloomfield St South Kempsey	1988	50	37
BURNT BRIDGE_BOOSTER PUMP STN	Gowings Hill Rd, Burnt Bridge	2008	50	6
KINCHELA_BOOSTER PUMPS TO KEMPSEY/LOWER MACLEAY	McKays Access off Hat Head Road, Kinchela	1994	50	110
SWR WPS NO. 1 (BOREFIELD) TRANSFER PUMPS TO WTP	Borefield in Hat Head National Park, South West Rocks	1999	50	150
SWR WTP NO. 2 TRANSFER PUMPS TO GREGORY ST RES	25 Frederick Kelly St, South West Rocks	2004	50	180
SWR WPS NO. 3 TRANSFER PUMPS TO NEW ENTRANCE RES	Keith Andrews Ave, South West Rocks	1992	50	22
SWR WPS NO. 4 BOOSTER PUMPS TO CARDWELL ST	Cardwell St, Arakoon	1992	50	11
STUARTS POINT WPS NO. 1 TRANSFER PUMPS TO STUARTS POINT RES	off Fishermans Reach Rd, Stuarts Point	1985	50	74

WATER BORES - (38)

Name	Location	Year Constn	Life (years)	Installed Power (kW)
BELLBROOK BORE 1	Toose Rd, Bellbrook	2000	50	1.4
BELLBROOK BORE 2	Toose Rd, Bellbrook	1968	50	1.4
CRESCENT HEAD BORE C1	Tea Tree Lane, Crescent Head	2000	50	5.6
CRESCENT HEAD BORE C2	Tea Tree Lane, Crescent Head	2004	50	15
CRESCENT HEAD BORE C3	Tea Tree Lane, Crescent Head	2003	50	5.6
HAT HEAD BORE H1	Hungry Head Rd, Hat Head	1970	50	7.5
HAT HEAD BORE H2	Hungry Head Rd, Hat Head	1970	50	7.5
HAT HEAD BORE H3	Hungry Head Rd, Hat Head	1984	50	43
KEMPSEY BORE S1	Sherwood Rd, Sherwood	1999	50	15
KEMPSEY BORE S11	Sherwood Rd, Sherwood	1990	50	45
KEMPSEY BORE S12	Sherwood Rd, Sherwood	1990	50	55
KEMPSEY BORE S2	Sherwood Rd, Sherwood	1999	50	45
KEMPSEY BORE S3	Sherwood Rd, Sherwood	1999	50	45
KEMPSEY BORE S4	Sherwood Rd, Sherwood	1999	50	38
KEMPSEY BORE S5	Sherwood Rd, Sherwood	1999	50	45
KEMPSEY BORE S6	Sherwood Rd, Sherwood	1989	50	37
KINCHELA (HAT HEAD ROAD) BORE 1 PUMP STN	McKays Access Rd, Kinchela	1995	50	11
KINCHELA (HAT HEAD ROAD) BORE 2 PUMP STN	McKays Access Rd, Kinchela	1995	50	5.5
KINCHELA (HAT HEAD ROAD) BORE 3 PUMP STN	McKays Access Rd, Kinchela	1995	50	11
KINCHELA (HAT HEAD ROAD) BORE 4 PUMP STN	McKays Access Rd, Kinchela	1995	50	15
BELGRAVE FALLS DRIFTWELL	off Oaklands Road, Dondingalong	1936	50	
SOUTH WEST ROCKS BORE NO. R10 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1980	50	3.7
SOUTH WEST ROCKS BORE NO. R11 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1980	50	3.7
SOUTH WEST ROCKS BORE NO. R12 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1994	50	11
SOUTH WEST ROCKS BORE NO. R2 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1990	50	2.2
SOUTH WEST ROCKS BORE NO. R3 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1990	50	3.7
Name	**Location**	**Year Constn**	**Life (years)**	**Installed Power (kW)**
SOUTH WEST ROCKS BORE NO. R5 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	2011	50	11

SOUTH WEST ROCKS BORE NO. R6 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1999	50	2.2
SOUTH WEST ROCKS BORE NO. R7 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1989	50	2.2
SOUTH WEST ROCKS BORE NO. R8 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1976	50	3.7
SOUTH WEST ROCKS BORE NO. R9 PUMP STN	Borefields off South West Rocks Rd, South West Rocks	1991	50	3.7
STUARTS POINT BORE NO. P1 PUMP STN	off Fishermans Reach Rd, Stuarts Point	1985	50	11
STUARTS POINT BORE NO. P2 PUMP STN	off Fishermans Reach Rd, Stuarts Point	1985	50	5.5
STUARTS POINT BORE NO. P3 PUMP STN	off Fishermans Reach Rd, Stuarts Point	1989	50	11.4
WILLAWARRIN BORE NO. W1 PUMP STN	Crown Rd off Armidale Rd, Willawarrin	1994	50	3.7
WILLAWARRIN BORE NO. W2 PUMP STN	Crown Rd off Armidale Rd, Willawarrin	1994	50	3.7
WILLAWARRIN BORE NO. W2 PUMP STN	Crown Rd off Armidale Rd, Willawarrin	2013	50	

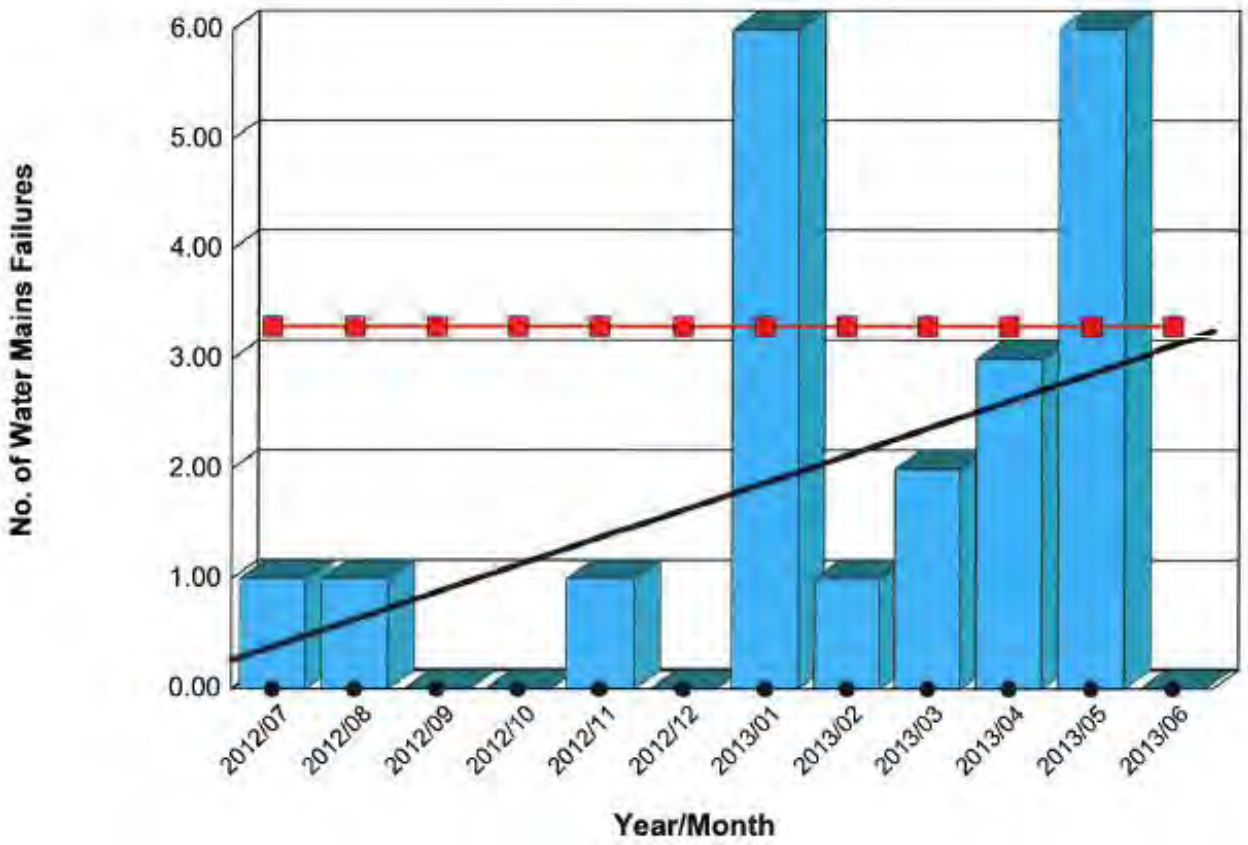
APPENDIX B – KPI CHARTS 2012/13

Water Operations

Number of Water Main Failures

(Target Accum. Avg. 3.3 per month, 40 per year)

BW1



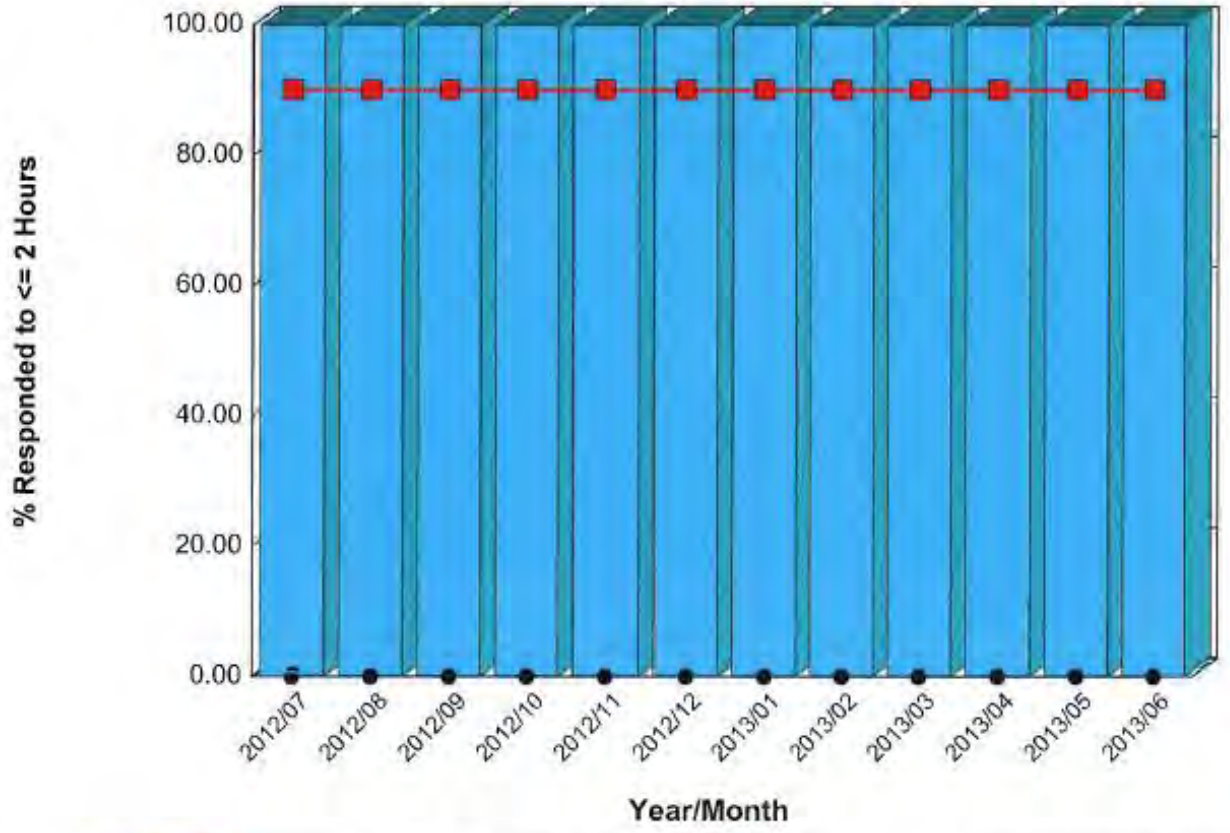
Year/Month	No. of Water Mains Failures	Progressive Total	Accum. Average	KPI Register Record #
2012/07	1.00	1.00	1.00	KPI-10138
2012/08	1.00	2.00	1.00	KPI-10267
2012/09	0.00	2.00	1.00	KPI-10371
2012/10	0.00	2.00	1.00	KPI-10438
2012/11	1.00	3.00	1.00	KPI-10574
2012/12	0.00	3.00	1.00	KPI-10823
2013/01	6.00	9.00	2.25	KPI-10828
2013/02	1.00	10.00	2.00	KPI-10957
2013/03	2.00	12.00	2.00	KPI-11052
2013/04	3.00	15.00	2.14	KPI-11153
2013/05	6.00	21.00	2.63	KPI-11270
2013/06	0.00	21.00	2.63	KPI-11379

Fmt 2

Water Operations

BW3

Percentage of water supply failures will be responded to within two (2) hours of being reported
(Target Accum. Avg. 90%)



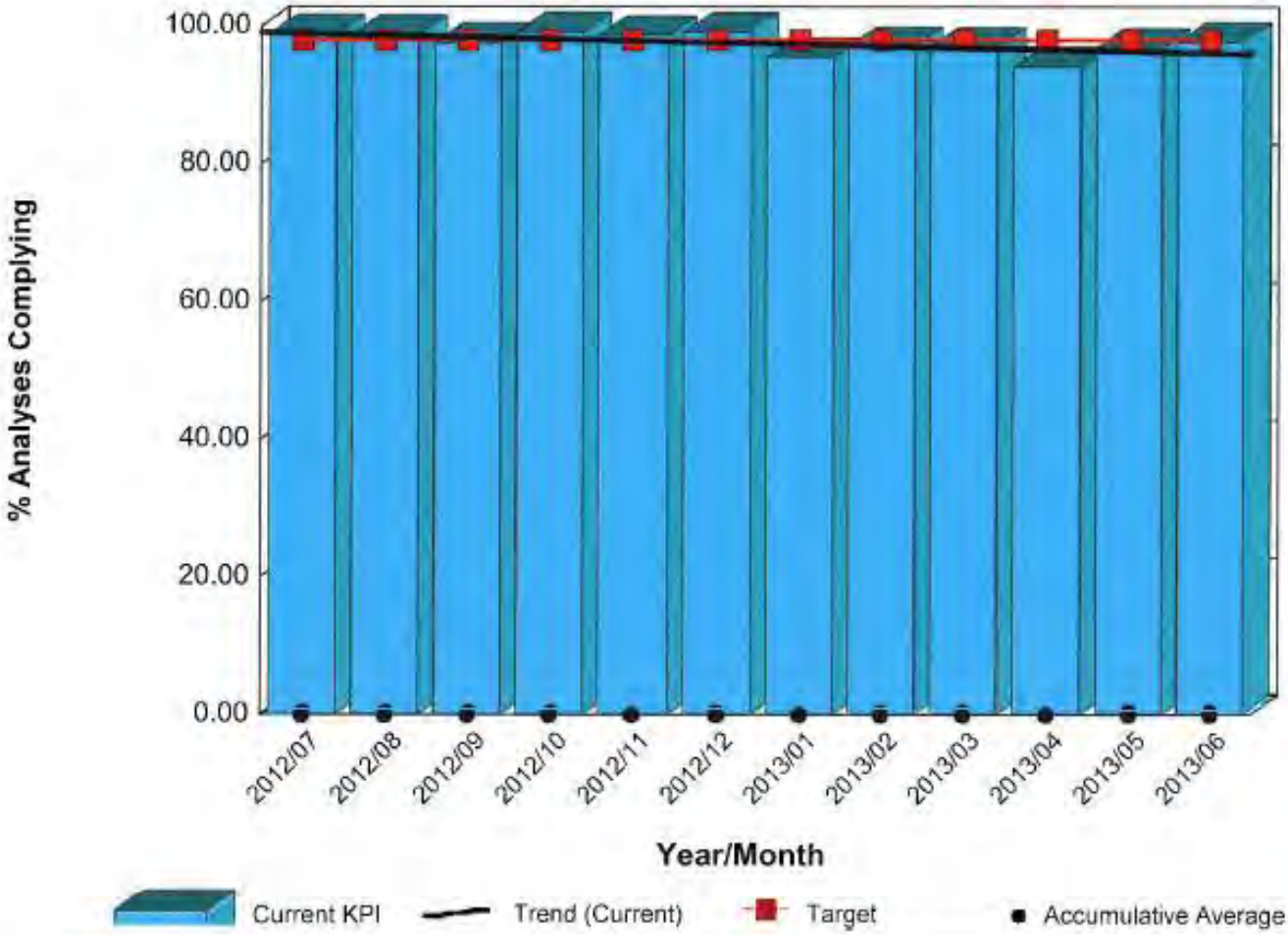
Year/Month	No. Responded to <= 2 Hours	No. Responded to	% Responded to <= 2 Hours	Accum. Average	KPI Register Record #
2012/07	7.00	7.00	100.00	100.00	KPI-10133
2012/08	9.00	9.00	100.00	100.00	KPI-10262
2012/09	6.00	6.00	100.00	100.00	KPI-10369
2012/10	10.00	10.00	100.00	100.00	KPI-10439
2012/11	10.00	10.00	100.00	100.00	KPI-10568
2012/12	8.00	8.00	100.00	100.00	KPI-10665
2013/01	15.00	15.00	100.00	100.00	KPI-10801
2013/02	8.00	8.00	100.00	100.00	KPI-10899
2013/03	8.00	8.00	100.00	100.00	KPI-11037
2013/04	10.00	10.00	100.00	100.00	KPI-11104
2013/05	10.00	10.00	100.00	100.00	KPI-11248
2013/06	9.00	9.00	100.00	100.00	KPI-11362

Fmt 1

Water Process

BW8

Percentage of Water Quality analyses complying with ADWG
(Target Accum. Avg. 98%)



Year/Month	No. Analyses Complying	No. Analyses	% Analyses Complying	Accum. Average	KPI Register Record #
2012/07	333.00	337.00	98.81	98.81	KPI-10136
2012/08	323.00	327.00	98.78	98.80	KPI-10268
2012/09	281.00	288.00	97.57	98.42	KPI-10372
2012/10	343.00	346.00	99.13	98.61	KPI-10548
2012/11	294.00	298.00	98.66	98.62	KPI-10570
2012/12	110.00	111.00	99.10	98.65	KPI-10824
2013/01	126.00	132.00	95.45	98.42	KPI-10829
2013/02	299.00	308.00	97.08	98.23	KPI-10958
2013/03	352.00	363.00	96.97	98.05	KPI-11048
2013/04	426.00	453.00	94.04	97.44	KPI-11149
2013/05	153.00	158.00	96.84	97.40	KPI-11271
2013/06	290.00	297.00	97.64	97.43	KPI-11380

Fmt 1

APPENDIX C – NSW BENCHMARKING OF WATER UTILITIES 2011/12 REPORT

Kempsey Shire Council — **TBL Water Supply Performance** — **2011-12**

WATER SUPPLY SYSTEM - Kempsey Shire Council serves a population of 25,200 (12,590 connected properties). Water is drawn from Macleay River and 38 bores to supply Kempsey, South West Rocks, Crescent Head and Hat Head. Council has 2 storage dams (total capacity 2510 ML). The water supply network comprises 2 treatment works (8.8Ml/d); 6 chlorinators (48ML/d), 24 service reservoirs (56 ML), 22 pumping stations, 51.8 ML/d delivery capacity into the distribution system, 159 km of transfer and trunk mains and 411 km of reticulation. The water supply is unfiltered (chlorinated).

PERFORMANCE - Kempsey Shire Council achieved 80% compliance with Best Practice requirements. The 2012-13 typical residential bill was $487 which was close to the statewide median of $480 (Indicator 14). However, the economic real rate of return was negative (Indicator 43). The operating cost (OMA) per property was $411 which was close to the statewide median of $360 (Indicator 49). Water quality complaints were less than the statewide median of 3 (Indicator 25). Compliance was achieved for microbiological water quality (7 of 7 zones compliant), chemical water quality (7 of 7 zones compliant) and physical water quality. The chlorination system failed to operate on 2 days. There were no failures of the treatment system. Kempsey Shire Council reported no water supply public health incidents. Current replacement cost of system assets was $240M ($19,800 per assessment). Cash and investments were $4.1M, debt was $17M and revenue was $8.1M (excluding capital works grants).

IMPLEMENTATION OF REQUIREMENTS OF BEST-PRACTICE MANAGEMENT FRAMEWORK

(1)	Complete Current Strategic Business Plan & Financial Plan	YES	(3)	Sound water conservation implemented	YES
(2)	(2a) Pricing - Full Cost Recovery, without significant cross subsidies	Yes	(4)	Sound drought management implemented	YES
	(2b,2c) Pricing - Appropriate Residential Charges		(5)	Complete performance reporting (by 15 September)	YES
	(2d) Pricing - Appropriate Non-residential Charges	Yes	(6)	Integrated water cycle management strategy	YESC
	(2e) Pricing - DSP with Commercial Developer Charges	Yes		IMPLEMENTATION OF ALL REQUIREMENTS	80%

TRIPLE BOTTOM LINE (TBL) PERFORMANCE INDICATORS

	NWI No.			LWU RESULT	RANKING: >10,000 properties (Note 1, Col 2)	RANKING: All LWUs (Note 2, Col 3)	MEDIANS: LWUs >10,000 properties (Note 3, Col 4)	MEDIANS: All LWUs (Note 4, Col 5)
					Col 2	Col 3	Col 4	Col 5
UTILITY – CHARACTERISTICS		1 Population served:	25200					
		2 Number of connected properties:	12590	Number of assessments: 12110				
		3 Residential connected properties (% of total)		%	87		81	
		4 New residences connected to water supply (%)		%	0.5	5	0.9	
	A2	5 Properties served per kilometre of water main		Properties	26		32	35
		6 Rainfall (% of median annual rainfall)		%	137	2	138	
	W11	7 Total urban water supplied at master meters (ML)		ML	3,340		6,100	9,610
		8 Peak week to average consumption (%)		%	138	4	130	
		9 Renewals expenditure (% of current replacement cost of system assets)		%	0.4	2	0.4	
		10 Employees per 1000 properties		per 1,000 prop.	1.6	4	1.6	
SOCIAL – CHARGES & BILLS	W1	Residential tariff structure for 2012-13: inclining block; independent of land value; access charge $230						
	P13	12a Residential water usage charge for 2011-12 for usage <250 kL (c/kL)		c/kL (2011-12)	167	3	170	167
		12 Residential water usage charge for 2012-13 for usage <250 kL (c/kL)		c/kL (2012-13)	187	3	185	
	P2	13b Typical residential bill for 2011-12 ($/assessment)		$ (2011-12)	474	3	457	474
		14 Typical residential bill for 2012-13 ($/assessment)		$ (2012-13)	487	3	490	
		15 Typical developer charge for 2012-13 ($/equivalent tenement)		$ (2012-13)	6,800	2	5,200	
	F4	16 Residential revenue from usage charges (% of residential bills)		%	54	6	69	65
	F5	17 Revenue per property - water ($)		$	540	3	559	551
SOCIAL – HEALTH		18 Urban population without reticulated water supply (%)		%	0.1	2	0.6	
		18a Risk based drinking water quality plan?			Yes			
		19 Physical compliance achieved? Note 11			Yes	1		
		19a Chemical compliance achieved? Note11			Yes	1		
	H1	19b Number of zones with chemical compliance			7 of 7			
		20 Microbiological (E. coli) compliance achieved? Note 11			Yes	1		
	H1	20a % population with microbiological compliance		%	100	1	100	100
SOCIAL – SERVICE LEVELS	D5	25 Water quality complaints per 1000 properties		per 1,000 prop.	0.2	1	3	3
	C10	26 Water service complaints per 1000 properties		per 1,000 prop.	0.2	1	4	7
	C11	27 Average frequency of unplanned interruptions per 1000 properties		per 1,000 prop.	35	4	37	66
	C15	28 Average duration of interruption (min)		min	132	4	169	119
	W	30 Number of water main breaks per 100 km of water main		per 100km	9	2	9	13
		31 Drought water restrictions (% of time)		%	0	1	0	
		32 Total days lost (%)		%	0.2	2	2.0	
ENVIRONMENTAL – HUMAN RESOURCE MANAGEMENT	W12	33 Average annual residential water supplied per property (kL)		kL	143	2	150	167
		33a Average annual residential water supplied - COASTAL (kL/property)		kL	143	2	140	
		33b Average annual residential water supplied - INLAND (kL/property)		kL			203	
	A10	34 Real losses (leakage) (L/service connection/day)		L/service connection/day	50	2	65	73
		35 Energy consumption per Megalitre (kiloWatt hours)		kWh	569	3	660	
		36 Renewable energy consumption (% of total energy consumption)		%			0	
	E17	36a Net greenhouse gas emissions - WS & Sge (net tonnes CO2 - equivalents per 1000 properties)		t CO2	370	3	370	399
ECONOMIC – FINANCE	F1	43 Economic real rate of return - Water (%)		%	-0.9	4	0.5	0.6
		44 Return on assets - Water (%)		%	-1.5	6	0.0	
	F22	45 Net Debt to equity - WS&Sge (%)		%	9	2	2	11
	F23	46 Interest cover - WS&Sge			0	6	1	2
		47 Loan payments per property - Water ($)		$	190	1	60	
	F24	47b Net profit after tax - WS & Sge ($'000)		$'000	-4,070	5	73	2591
ECONOMIC – EFFICIENCY		48 Operating cost (OMA) per 100km of main ($'000)		$'000	1,050	2	1,250	
	E11	49 Operating cost (OMA) per property ($) Note 9		$	411	4	389	393
		50 Operating cost (OMA) per kilolitre (cents)		c/kL	154	3	131	
		51 Management cost per property ($)		$	164	6	130	
		52 Treatment cost per property ($)		$	109	5	49	
		53 Pumping cost per property ($)		$	49	3	28	
		54 Energy cost per property ($)		$	37	5	18	
		55 Water main cost per property ($)		$	69	3	69	
	W20	56 Capital Expenditure per property ($)		$	140	3	189	213

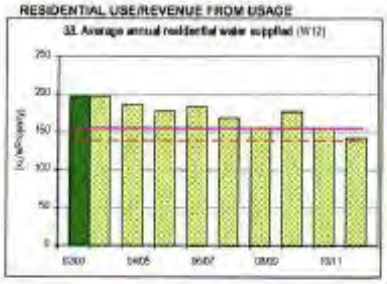
NOTES:

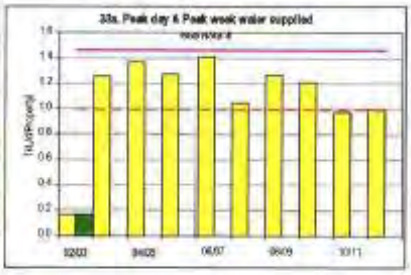
1 Col 2 rankings are on a % of LWUs basis - best reveals performance compared to similar sized LWUs (ie. Col 1 is compared with LWUs with >10,000 properties).
2 Col 3 rankings are on a % of LWUs basis - best reveals performance compared to all LWUs (ie. Col 1 is compared with all LWUs).
3 Col 4 (Statewide Median) is on a % of connected properties basis- best reveals statewide performance (gives due weight to larger LWUs & reduces effect of smaller LWUs).
4 Col 5 (National Median) is the median value for the 67 utilities reporting water supply performance in the National Performance Report 2011-12 (www.nwc.gov.au)
5 LWUs are required to annually review key projections & actions in their Strategic Business Plan and annually update their financial plan. The SBP should be updated after 4 years.
6 Kempsey Shire Council has a good quality unfiltered groundwater supply.
7 2012-13 Non-residential Tariff: Access Charge based on Meter Size: 40 mm: $920. Two Part Tariff: Usage Charge 187c/kL
8 Non-residential water supplied was 39% of potable water supplied excluding non-revenue water.
Non-residential revenue was 35% of annual rates and charges, indicating fair pricing of services between the residential and non-residential sectors.
9 The operating cost (OMA) per property was $411. Components were: management ($164), operation ($95), maintenance ($103), energy ($37) and chemical ($11).
10 Kempsey Shire Council rehabilitations included 0.7% of its water mains and 0.07% of its service connections. Renewals expenditure was $216,000/100km of main.
11 Compliance with ADWG 2011 for drinking water quality is shown as "Yes" if compliance has been achieved (indicators 19, 19a & 20), otherwise the % of samples complying is shown.

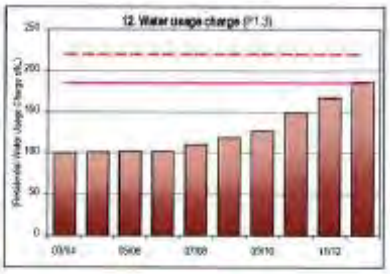
Kempsey Shire Council — **TBL Water Supply Performance (page 2)** — **2011-12**

(Results shown for 10 years together with 2011-12 Statewide Median and Top 20%)

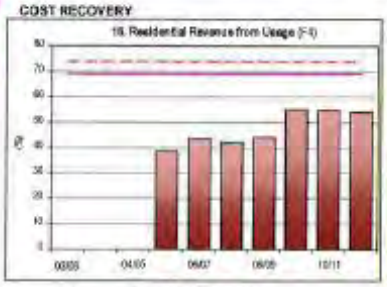
RESIDENTIAL USE/REVENUE FROM USAGE

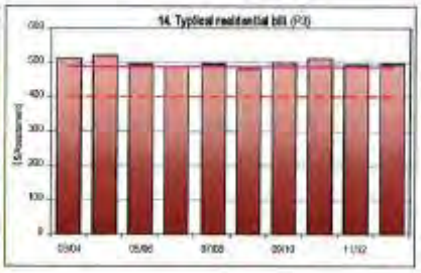


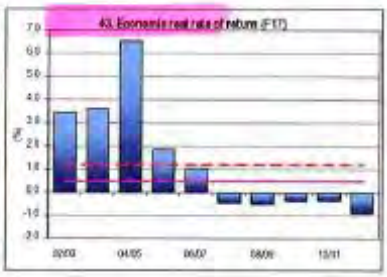




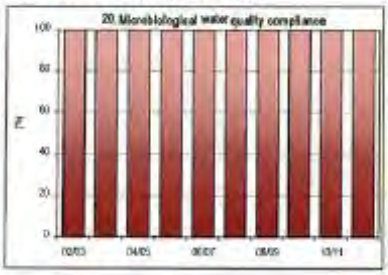
COST RECOVERY

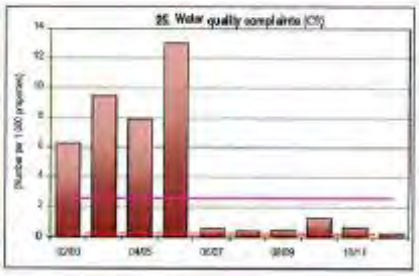




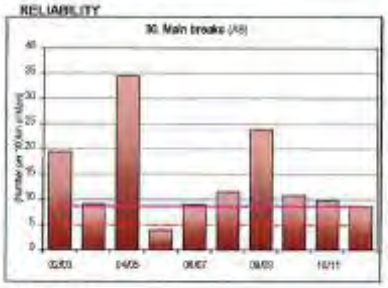


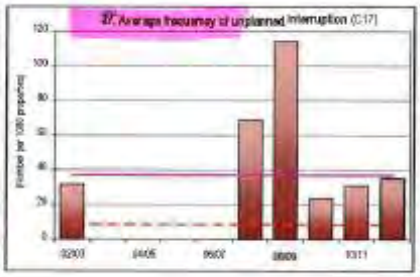
WATER QUALITY/CUSTOMER SERVICE

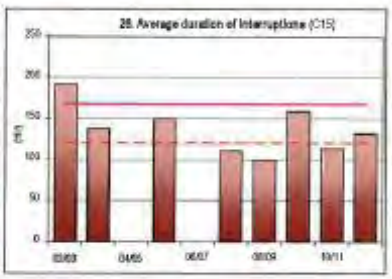




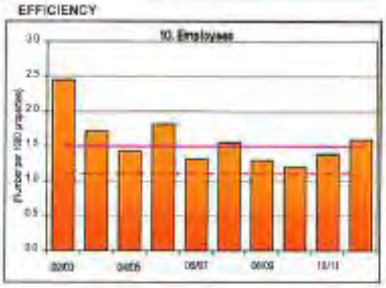
RELIABILITY

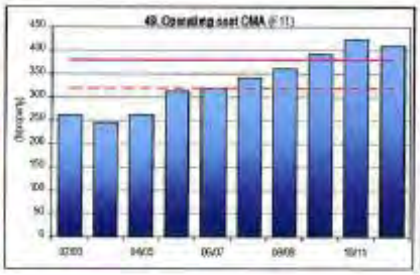






EFFICIENCY





NOTES:

1. Costs are in Jan 2012$ except for graphs 12 and 14, which are in Jan 2013$.
2. Microbiological water quality compliance 1999-00 to 2003-04 was on the basis of 1996 NHMRC/ARMCANZ Australian Drinking Water Guidelines for E. coli; from 2004-05 to 2010-11 compliance was on the basis of the 2004 NHMRC/NRMMC Australian Drinking Water Guidelines (ADWG) and for 2011-12 compliance was on the basis of the 2011 ADWG.
3. Indicators 33 and 33a - Green shading shows % of Time Drought Water Restrictions applied in each year: Nil or < 30%, 30-50%, >50%
4. Indicator 33a - Yellow bars show Peak Week Water Supplied for comparison with Peak Day Water Supplied: Peak Week Water Supplied

LEGEND
2011-12 State Median
2011-12 Top 20%

APPENDIX D – NSW OFFICE OF WATER AUDITOR REPORT 2012/13

Audit of National Performance Indicators for Kempsey Shire Council, 2012/13

October 2013

Final Report

Prepared by:

SUSTAINABLE WATER SOLUTIONS Pty Ltd

Document History & Status

Issue	Revision	Author	Issued to	Date	Reviewed by	Approved for release
1	1	CE	BS	28/09/13	CE	Draft
1	2	CE	CS	28/09/13	CE	Draft
1	3	CE	CS	29/09/13	CE	Draft
1	4	CE	Client (AB)	30/09/13	CE	Interim Draft
2	1	CE	CS	09/10/13	CE	Draft
2	2	CE	Client (JS)	10/10/13	CE	Final Draft
2	3	CE	Client (JS)	21/10/13	CE	Final Draft text adjustments

Charles Essery
Managing Director
09 December 2013

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1. Scope & Methodology

Under the conditions of the NSW Office of Water (NOW) Standard Audit Brief, Sustainable Water Solutions (*SWS*) undertook the following activities:

- Review procedures and/or instructions for data collection and management
- Ensure that the generated information is in accordance with the documented procedures
- Interview responsible staff and assess their understanding of the task and the procedures, their training and their qualifications/suitability for the task
- Review relevant records and ensure that the procedures are being followed
- Assess each indicator for reliability and accuracy using the grading system specified by NOW
- For selected indicators for which there is a large volume of data (e.g. water main breaks, complaints), analyze a sample of data for accuracy and adequacy of reporting
- Assess the compliance of the data for each indicator using the compliance reporting system specified by NOW
- Comment on the adequacy of data collection and management procedures and if warranted, provide recommendations for improvement. Such recommendations are to be provided for any non-compliant indicators.

In fulfilling the audit, SWS undertook a preliminary review of the data entered into NOW's online database using the "pre input reports", namely Water Business, Water Treatment Plants, Sewerage Business and Sewerage Treatment Plants. These reports were provided by Kempsey Shire Council as a record of the core data from which the NWI Performance Indicators are derived.

Following the review, Kempsey Shire Council was issued with a letter summarizing the information that would be required during an on-site audit by SWS. For each group of indicators (W7, W8-W14, W18-W27,A2-A14, E1-E13, C2-C19 and H2-H7) Kempsey Shire Council was issued with a table indicating the processes and information that would be examined, along with the type of evidence that would be required. This enabled staff to be scheduled for face to face interview and evidence to be collated from the numerous sites operated by the utility.

Upon completion of the draft Audit Table, Kempsey Shire Council was asked to review and confirm the accuracy of data and intent of comments. These were incorporated, where appropriate, in the final Audit Table located in section 4 of this report.

2. Reliability & Accuracy

Reliability and Accuracy were determined for each of the indicators included in the Audit Table in accordance with methodology for grading outlined in the NOW Standard Brief. This defines Reliability and Accuracy as follows:

Reliability (A, B, C, D)
Is data based on sound information and records, documented procedures, do staff have training and understanding of procedures, is the data in accordance with procedures, have the procedures been reviewed, how are records kept?

A	Based on sound records with adequate procedures
B	Mostly conforms to A but some deviations which have minor impact on integrity
C	Data has significant procedural deviations or extrapolation
D	Unsatisfactory data

Accuracy (1, 2, 3, 4, 5)
The accuracy of each indicator should be assessed using a combination of professional opinion (based on the standard of reporting and data management), accuracy of the measuring equipment and record sampling where appropriate.

1	+/- 5%
2	+/- 10%
3	+/- 20%
4	+/- 50%
5	Greater than +/- 50%

Source: NOW Standard Brief

Upon review of the procedures and systems employed by Kempsey Shire Council with the appropriate staff, each indicator was assessed using this methodology.

3. Compliance Reporting

Compliance was determined for each of the indicators included in the Audit Table in accordance with methodology for grading outlined in the NOW Standard Brief. This defines Compliance as follows:

- **Y** Yes, the reported data for the indicator is fully compliant,
- **S** the reported data for the indicator is substantially (materially) compliant, and
- **N** the reported data for the indicator is not compliant

Source: NOW Standard Brief

Upon grading of the performance indicators, each was assessed in accordance with the above definition.

Table 1 summarizes compliance by indicator category for Kempsey Shire Council as a result of the 2012/13 audit. KSC has demonstrated 100% compliance with those 43 indicators selected under the 2012/13 NWI audit schedule.

Table 1. Summary of compliance by indicator categories

Indicator Category	No.	Y Compliance	S Compliance	N Compliance
Water Volumes	W7	1 of 1	0	0
Water Usage	W8-W14	5 of 5	0	0
Effluent Volumes	W18-W27	3 of 5	0	0
Assets	A2-A13	7 of 7	0	0
Environment	E1-E13	11 of11	0	0
Customers	C1-C17	10 of 10	0	0
Health	H2-H7*	4 of 4	0	0
Total		43 of 43	0	0
%		100%	0%	0%

Compliance in all indicators demonstrates that the processes and procedures being used at KSC are robust and well managed. However, in undertaking the audit, it is clear that improvement within the business could be made through less reliance on manual transcriptions into spreadsheets. KSC does have the capacity to introduce more automated downloads which could reduce the amount of time and resources required to enter data and the subsequent cross-checking. Resourcing of such automation, including new database coding would be required, but would ultimately reduce efforts required for performance reporting by staff.

The current system is robust and reliable and certainly meets the requirements of the NWI Performance Indicator Reporting Process. Improvements through greater automation in collation would need to be assessed and justified from internal efficiency gains within the organisation. If such improvement were undertaken, this would further improve the likelihood of KSC retaining 100% compliance in future annual reporting to NOW and NWI.

4. Table of Audit Findings

NOW has produced a standard template for the Audit Table. Data and information were transcribed from the Pre Input Reports from the NOW Database, along with Grading, Compliance and Auditor Comments. These were presented to Kempsey Shire Council for comment and verification prior to finalizing this Audit Report.

Some issues regarding the actual Indicator derivation and process were made and these have been included in the Comments column (9) of the Audit Table (**Table 2**).

Illustrations of example data collection systems, maintenance records, spreadsheets, databases and reporting mechanisms are referenced within the Comments column (9) and these are contained in **Appendix A**.

While the Audit Table is clearly structured and user friendly, the process of accessing data from the NOW database, use of spreadsheets and final transcription into the Audit Table has the potential to lead to erroneous entries. While this is overcome by repeated cross checking, it is suggested that future audits ensure that the Auditor is given the actual indicators by means of an automated process that enters the indicators directly from the NOW database into the Audit Table template.

Issues over the access to the NOW database remain. During this 2013 audit, significant access issues continued, the only solution being advice to use Google Chrome or Mozilla to overcome the issue. While auditors have the flexibility to do this, LWUs are constrained by their own corporate IT systems with respect to this. The source of this should be addressed by NOW to reduce the inefficiencies and frustration caused to both LWUs and auditors. This issue should be resolved by NOW before the next annual data entry in 2014.

Table 2 Table of Audit Findings Kempsey Shire Council LWU

A table of audit findings template is shown below. The table shows the indicator, compliance criteria and procedure in the shaded columns (1), (2), (4) and (8). Example data for an example utility is also provided in columns (3), (5), (6), (7) and (9). Auditors should delete the example data and enter new data and assets in columns (3), (5), (6), (7) and (9).

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. Note 1 (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example Note 2 (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
WATER RESOURCES				'Y'	'S'					
53	W7	Total sourced water (ML) *Note: If total sourced water is not reported, sub-categories of W1, W2, W3.1, W4, W5 and W28.4 must be audited in order to be reported (NSW Indicator Nos 48, 49, 50, 51, 52, 52a, 52b). The same grading thresholds apply.*	3554	A2	B2	A2	**Y**	Jodie Shelley (JS) is coordinator for collation of all water and sewerage services performance Belinda Green collates and manages operators and ensures data is provided consistently all supply schemes, with Todd Graham (TG) directly coordinating operators data collection.	Sum of W1 to W5. Review any adjustments.	No adjustments required, Total is consistent with measured and recorded volumes using calibrated and cross-referenced data collection sources. Spreadsheets viewed and totals checked. Data is derived from a combination of Scada and manually recorded daily readings. Instruments are calibrated by a combination of internal and contracted suppliers and scheduled according to manufacturer˝s specifications System was viewed at all steps including Scada collection, spreadsheets and reporting. The process is well developed, but not automated. It involves significant input and scrutiny by users which, while open to human encryption errors, benefits from regular user review and is hence less likely to have long periods of erroneous data. Current system is robust and accurate for the

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
										purposes that information is required. Further automation could be achieved, but funding priorities make this a low priority. Manual system is adequate and fulfills requirements of NWI. BG collates data and electrical staff handle calibration of instruments via contractors TG coordinates data collections from operators.
54a, 63, 150	W8	Volume of water supplied - Residential (ML) *Note: If W8 total not reported then sub-categories W8.1, W8.2 and W20 must be audited (NSW Indicator Nos 54a, 63, 150).*	1682	A2	B2	A2	**Y**	Jodie Shelley (JS) is coordinator for collation of all water and sewerage services performance. Stacey Millagan (SM) manages data collection	Review data source (eg. database, estimates of unmetered) and review calibration and verification of meters, review any validation checks (eg. bulk water, secondary meters).	Volumes based on meter readings. Meter replacement policy is on a running 10 year cycle, with abnormal readings being automatically flagged within billing system. Central water consumption and billing is undertaken within a corporate data "Civicview " which is commonly used in Local Government. Meter replacement is undertaken by Kempsey Council staff as are tests and certifications requested by customers.. this years program of replacements was examined.
62, 64, 158, 174	W11	Total urban water supplied (ML) *Note: If total urban water supplied is not reported, sub-categories of W11.1, W11.2, W26 and W28.4 must be audited in order to be reported (NSW Indicator Nos 62, 64, 158, 174). The same grading thresholds apply.*	2962	A2	B2	A2	**Y**	JS & SM	.Review each category of water supplied. Verify sum of volume of residential water, commercial, municipal, industrial and other water supplied. Check any adjustments	No Adjustments . JS spreadsheet sighted and checked.
54a, 55, 56a, 56b,	W11.1	Total urban potable water supplied (ML) *Note: If total urban potable water supplied is not reported, sub-*	2962	A2	B2	A2	Y			No Adjustments . JS spreadsheet sighted and checked

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
56c, 56d, 60, 61		*categories of W8.1, W9.1 and W10.1 must be audited in order to be reported (NSW Indicator Nos 54a, 55, 56a, 56b, 56c, 56d, 60, 61). The same grading thresholds apply.*								
`63, 63a, 63b, 63c, 63d, 63e, 63f, 63g, 63h, 63k	W11.2	Total urban non-potable water supplied (ML) *Note: If total urban non-potable water supplied is not reported, sub-categories of W8.2, W9.2 and W10.2 must be audited in order to be reported (NSW Indicator Nos 63, 63a, 63b, 63c, 63d, 63e, 63f, 63g, 63h, 63k). The same grading thresholds apply.*	73	A2	B2	A2	Y			No Adjustments . JS spread sheet sighted and checked
	W11.3	Total volume of potable water produced (ML) *Note: Derived audit (inputs W11.1 and W14.1 audited)* TOTAL VOLUME OF POTABLE WATER PRODUCED *NWI indicator W11.3:* *W11.3 = W11.1 + W14.1*	2962	A2	Y	A1	**Y**		Review invoice records. Review any validation checks (e.g. meter records).	Derived from (2962 * 0) = 2962
59, 63j, 157, 171	W14	Volume of bulk water exports (ML) *Note: If W14 total not reported then sub-categories W14.1, W14.2, W15 and W28.1 must be audited (NSW Indicator Nos 59, 63j, 157, 171). The same grading thresholds apply.*	0	A2	B2	N/A	**Y**	JS and Barry Young (BY)	Review invoice records. Review any validation checks (eg. Meter records)	N/A
T15	W18	Total sewage collected (ML) *Note: If total sewage collected is not reported, sub-categories W16 and W17 must be audited in order to be*	2587	A2	B2	A1	**Y**	JS and BY	Review each category of sewage collected. Verify sum of volume of trade waste, residential sewage non residential sewage and non-trade waste collected. Check any adjustments.	Sum of totals from 7 STPs Sum of totals from 7 STPs

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
		reported (NSW Indicator Nos T12, T13, T31, T32, T33, T14, T34). The same grading thresholds apply.								1. 149 2. 104 3. 418 4. 1045 5. 201 6. 631 7. 39 8. Total 2587
T17, T18, T19	W18.5	Volume of treated sewage effluent (ML)	2574	A2	B2			JS and BY		1. 149 2. 106 3. 417 4. 1082 5. 201 6. 578 7. 41 8. Total 2574
T25	W26	Total recycled water supplied (ML) *Note: If total recycled water is not reported the sub-categories of W20 to W25 must be audited in order to be reported (NSW Indicator Nos T20 to T24c). The same grading thresholds apply.*	10	A2	B2	A2	**Y**	JS	Identify and review sources of data including STW meter readings (Residential, Commercial, municipal & industrial, Agricultural, On-site, Environmental and Other recycled water supplied). Review calibration and verification of meters. Identify and review any adjustments.	Currently manually collated from plant totals and analysed on spreadsheet
	W27	Recycled water (percent of effluent recycled) Recycled water (percent of effluent rec PERCENT OF EFFLUENT RECYCLED *NWI IndicatorW27 = (W26 + W15 - W6) / W18.5 * 100)*	0.4	A2	B2	A2	**Y**		Divide total recycled water supplied by volume of treated sewage effluent.	Recycled water (percent of effluent recycled) ((10+0+0)/2574)*100 = 0.4
ASSETS										

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
22	A2	Length of water mains (km)	491	A1	B2	A1	**Y**	JS & Rad Davis	Identify source and accuracy of base data. Identify source for additions and subtractions. Includes trunk mains and reticulation.	Map info is core data store with feeds from works orders and is source for excel reporting sheets Note Reduction since 2010 (547). This is explained by removals and shortenings in system thru recent work over last three years and reclassifications between head works pipes and mains pipes
9	A5	Length of sewerage mains and channels (km) *(NSW Indicator Nos 7 and 8).*	272	A1	B2	A1	**Y**	JS & Rad Davies (RD)	Identify source and accuracy of base data. Identify source for additions and subtractions. Includes trunk mains, reticulation and rising mains.	Original data digitized from old drawings and all new additions/removals are notified from completed works executed Information if derived from information stored on the Mapinfo database
104	A8	Water main breaks (number) *Only audit number of main breaks. Exclude property service connection breaks.*	36	A1	B4	A1	**Y**	Anne Adams (AA)	Divide number of water main breaks by length of water main. This is a straight number definition incompatible with NOW description	Data derived from works Orders and Crystal corporate database:-
78		Average Operating Pressure (m)	6.9	A2	B4	NA	**S**			

Indicator				Accuracy & Reliability				Staff Interviewed *Example	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	(7)	(8)	(9)
68	A10	Real losses - leakage (ML)	207	A2	B4	A1	**Y**	JS	Identify source and accuracy of base data including assumptions. Review calculations for leakage. Leakage should be based on results from latest drop test or waste metering. A water balance can also be done as a check. However, as a water balance has large inherent inaccuracies due to metering errors and imprecise estimated un-metered water, it is inadequate for determining the relatively JS all real losses. Divide real losses (L) by number of connections and by 365. Note that number of connections	Derived from NOW Database figures entered by LWU. Volumes used involve measurement and data processing as audited under indicators W7-W15.
30		Service connections (number)	N/A	A2	B4	B3	**S**	JS	The number of service connections is not the same as the number of connected properties. It can be taken as the number of metered accounts less the total of any sub meters (after master meters eg. To shops and flats) plus the estimated number of unmetered service connections (eg. Fire service connections).	N/A
	A11	"Real losses - (kL /km water mains/day)	0.422		A11					Derived (207/491) =0.4216
64 + 65	A14	Sewerage mains breaks and chokes (number) *Note: Do not include property connection breaks and chokes.*	66	A1	B2	A1	**Y**	JS and AA	Identify break and choke classification criteria. Identify systems for capturing and reporting break data. Review records for a representative number of events including field record, computer record and extent of affected area.	Field records show break and choke data. From Work Orders created by Customer Service staff and modified by field staff.. Reviewed and collated by AA Figure includes 65 from gravity mains and 1 from rising main Data summary value delivered to DWE/NWI is collated by Information officer (AA) for internal and external use. Robust and traceable system ensures accuracy of

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. Note 1 (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example Note 2 (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
										reported numbers of breaks Process is as follows:- 1. Work orders are created by KSC customer service officers from enquiries and/or customer advice. Customer service officer logs it as 'Unknown' classification at time of creating work order 2. Field staff attend site & investigate/rectify. Field staff then complete an Action Sheet (copy attached) that records various data and includes a map showing the location of the incident. 3. Classification is then altered to appropriate category on the work order based on field staff findings onsite 4. Data is then captured on Excel spread sheet from the work order and Action Sheet content by Anne Adams to identify/monitor problem areas
67	A15	Property connection sewer breaks and chokes (number) *Note: Do not include sewerage main breaks and chokes.*	93	A1	B2	A1	**Y**	JS and AA	Identify break and choke classification criteria. Identify systems for capturing and reporting break data.	Information recorded From Work Orders created by Customer Service staff and modified by field staff. . Data summary value delivered to DWE/NWI is collated by Information officer (AA) for internal and external use. Robust and traceable system ensures accuracy of reported numbers of breaks
ENVIRONMENTAL										

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
T17	E1	Percent of sewage treated to a primary level *NSW Indicator No T17 reported in ML.*	0	A2	B2	A2	**Y**	JS, AES and BY	Verify process and volume treated (from STW inlet meter) compared to all sewage treated.	Processes agree with definitions supplied by NWI. Volumes measured by inlet meters to STW.
T18	E2	Percent of sewage treated to a secondary level *NSW Indicator No T18 reported in ML.*	22.2	A2	B2	A2	**Y**	JS, AES and BY	Verify process and volume treated (from STW inlet meter) compared to all sewage treated.	Processes agree with definitions supplied by NWI. Volumes measured by inlet meters to STW. All values are collated from daily operator records and tabulated in spreadsheet. Derived from the 578ML secondary at one plant divided by the 2605ML annual total
T19	E3	Percent of sewage treated to a tertiary level *NSW Indicator No T19 reported in ML.*	77.8	A2	B2	A2	**Y**	JS, AES and BY	Verify process and volume treated (from STW inlet meter) compared to all sewage treated.	Processes agree with definitions supplied by NWI. Volumes measured by inlet meters to STW. Derived as difference between total treated minus secondary treated as percentages 149 137 417 1082 201 41 ------ 2027 divided by 2605 total*100 All values are collated from daily operator records and tabulated in spreadsheet
T49 to T62	E4	Percentage of sewage volume treated that was compliant	25.9	A2	B2	A2	**Y**	JS	Verify licence reporting and confirm volume compliant. Divide volume compliant by total	NOW derived value. Auditor did review sample EPA licence returns and noted most recent EPA

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
		Derived from NSW Indicator Nos T49 to T62.							volume treated.	compliance audit which occurred in August 2010. See weighting calculation below in E5 comments entry.
T49 to T62	E5	Number of sewage treatment plants compliant at all times *Derived from NSW Indicator Nos T49 to T62.*	7/7	A2	B2	A1	**Y**	JS	Verify licence reporting and confirm compliance. Verify reporting of compliant plants.	Reporting is in accordance with licence. Compliant plants agree. CH=Y F=Y KS=Y KW=y SG=y SWR=y HN=y Hence % compliance by volume is 25,9% STP performance reported monthly using corporate database (CivicView) to Council and in annual report
	E6	Public disclosure of your sewage treatment plant performance *Note: Process audit only*	YES	N/A	N/A	N/A	**Y**	JS	Verify that performance is publicly disclosed (eg. on a public website).	Performance is publicly disclosed on website via Council minutes and annual report. Corporate database (CivicView) provides monthly reports to Council Performance is also publicly disclosed in NOW annual Performance Monitoring Reports.
T64	E7	Compliance with environmental regulator – sewerage	YES	N/A	N/A	N/A	**Y**	JS	Verify licence reporting and confirm compliance. Verify performance complies with licence.	Reporting accurately conveys compliance with regulator. While not fully compliant, EPA regulator appears satisfied with current performance and reporting systems. Licence performance by EPA August of each

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
										year. Last review by EPA currently underway and in draft form as of Sep 2013
T27	E8	Percent of biosolids reused *Note: Process audit only*	100	A2	B3	A1	**Y**	JS	Review and verify determination of biosolids dry weight and percent reuse. Validate any assumptions. Verify reuse is beneficial reuse.	Weight based on weighbridge records. Auditor sighted spreadsheet with bill records. Total biosolids extracted from 5 plants , 1702.39 T. 839.31 T was re-used from the West Kempsey STP giving a total % re-used as 839.31 / 1702.39 * 100 = 49%. Rest of Biosolids were used as capping material at the landfill Intermittent centrifuging occurs General principle applies to reuse 100% biosolids.
148a	E9	Greenhouse gas water	2533			B1	**Y**		Prior to review JS uncovered that the data provided was incomplete and needed checking with Energy supplier. Updated information provided during audit and was forwarded to Now for updating on 01/10/2013	Derived from data & invoice/statements received from Energy Australia, Essential Energy & Power Direct. Admin component derived from 2.5% calculated portion of Civic Centre billing account Confirmation received from Andrew Vaughan for data changed on NOW database. Copy forwarded by email 03.10.13 by JS
80a	E10	Greenhouse gas sewerage	2957			B1	**Y**		Prior to review JS uncovered that the data provided was incomplete and needed checking with Energy supplier. Updated information provided during audit and was forwarded to Now for updating on 01/10/2013	Derived from data & invoice/statements received from Energy Australia, Essential Energy & Power Direct. Admin component derived from 2.5% calculated portion of Civic Centre billing account for Water and 2.5% for Sewer Confirmation received from Andrew Vaughan for data changed on NOW database. Copy forwarded

Indicator				Accuracy & Reliability				Staff Interviewed *Example	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	(7)	(8)	(9)
										by email 03.10.13 by JS
	E11	Greenhouse gas other	324			B1	**Y**			Admin water = 162, Admin sewer = 162
WS: 148a + 148b Sge: 80a + 80b										
63b	E13	Sewer overflows reported to environmental regulator (number) *Note: Only audit number of sewer overflows required to be reported to environmental regulator (NSW Indicator No 63b).* ***Previously this was per 100km is it now just numbers?***	17	A2	B2	A1	**Y**	JS	Divide number of water main breaks by length of water main. This is a straight number definition incompatible with NOW description	Reporting of overflow to regulator is regular and rapid. Incident management reporting procedure is documented.
CUSTOMERS										
32	C2	Residential assessments – water supply	10548	A1	B2	A1	**Y**	JS &Jan Forslund (JF)	Identify source and accuracy of base data. Reconcile with financial data including assessments and vacant lots. Review number of multiple dwellings and number of properties per multiple dwelling.	It is noted by the auditor that some confusion is apparent in the actual definition of property, connection, assesJSent etc. This figure is the one provided by KSC. Data derived from corporate "Civicview" database.
36	C4	Total assessments – water supply	12130	A1	B2	A1	**Y**	JS	Identify source and accuracy of base data. Reconcile with financial data including assessments and vacant lots. Review number of multiple dwellings and number of properties per multiple dwelling.	Data derived from corporate "Civicview" database.

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
17	C8	Total assessments – sewerage	8944	A1	B2	A1	**Y**	JS & AA	Identify source and accuracy of base data. Reconcile with financial data including assessments and vacant lots. Review number of multiple dwellings and number of properties per multiple dwelling.	Data derived from corporate "Civicview " database
WS: 102 + Sge: 40	C13	Total water and sewerage complaints (number) *Note: If „total complaints" is not reported, sub-categories of C9 to C12 must be audited in order to be reported. The same grading thresholds apply. Derived from NSW Indicator No 102 (WS) = 96 + 99 + 100 + 101a + 101b plus 40 (Sge) = 34 + 37 + 38 + 39.*	15	A1	B2	A1	**Y**	JS & AA	Divide number of water and sewerage complaints by number of water connected properties. Actual number reported	Data derived from customer call centre and reported through internal corporate database/intranet. Summary data extracted from this and reviewed by Asset and business analyst Figures used:- 1 water service 3 other water 5 water quality 1 sewer break & chokes 1 sewer service 4 odour 15 Total Previous value in NOW database was 36. This was *a transcription error during data entry by Kempsey staff (AA)*
WS: 103 or Sge: 41	C14	Per cent of calls answered by operator within 30 seconds (%) *Derived from NSW Indicator No 103 (WS) **or** 41 (Sge).*	49	A1	B2	A1	**Y**	JS and JMF	Review systems for capturing and reporting connect time. Ensure definition of connect time is as per NWI. Review method of assessing calls which drop out or are diverted and ensure „auto attendant" (IVR) messages are included in the connect time.	Automated system to record telephone connect time. Corporate services manages this system and uses what is known as " Interactive Client" database to manage calls and data.
107	C15	Average duration of an unplanned	165	A2	B2	A1	**Y**	JS & Ann Adams	Review systems for capturing and reporting	Work Order Action sheets are completed and

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. Note 1 (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example Note 2 (5)	Audit Result *Example Y/S/N (6)	*Example (7)	(8)	(9)
		interruption – water (minutes) *Derived from NSW Indicator No 107.*						(AA)	duration of interruption. Review records for a representative number of events, including field record, computer record and means of verification.	records relevant information for future reporting within corporate CivicView database. Calculations based on sum of all events duration* customers affected by each and then divided by total no. of customers affected.
43	C16	Average sewerage interruption (minutes) *Derived from NSW Indicator No 43.*	170	A2	B2	A1	**Y**	JS & AA	Review systems for capturing and reporting duration of interruption. Review records for a representative number of events, including field record, computer record and means of verification.	Work Order Action sheets are completed and records relevant information for future reporting within corporate Civic View database.
106	C17	Incidence of unplanned interruptions – water (number)	853	A2	B2	A1	**Y**	JS & AA	Review systems for capturing and reporting duration of interruption. Review records for a representative number of events, including field record, computer record and means of verification.	. Work Order Action sheets are completed and records relevant information for future reporting within corporate Civic View database. .
132a	C18	Customers to which restrictions applied for non-payment of a water bill (number)	23	A1	B1	A1	**Y**	JS & Jan Forslund (JF)	Review systems for capturing and reporting restrictions. Divide number of customers with restrictions by number of water connected properties	Data logged, and collated from corporate billing system. Derived from 9 restrictions from 11369 customers.
132b	C19	Customers to which legal action applied for non-payment of a water bill (number)	7	A1	B1	A1	**Y**	JS & Jan Forslund (JF)	Review systems for capturing and reporting restrictions. Divide number of customers with restrictions by number of water connected properties	Data logged, and collated from corporate billing system. Spreadsheet is produced by Finance staff, Note: the current value is estimate due to delays in Councils Special Schedule 3 reporting..

Indicator				Accuracy & Reliability				Staff Interviewed *Example	Procedure (min. suggested shown, auditors insert actual)	Comments (incl suggestions for remedial action) *Example
NSW No.	NWI No. *Note 1* (1)	Description (2)	Data *Example (3)	Audit Result Thresholds Grading reqd to achieve 'Y' or 'S' (4)		Grading *Example *Note 2* (5)	Audit Result *Example Y/S/N (6)	(7)	(8)	(9)
										Kempsey staff (JS) notified this to NOW via email 29thSept 2013 and this was acknowledged
HEALTH										
T27	H2	Number of zones where microbiological compliance was achieved.	8 of 8	A2	B2	A1	**Y**	JS collates data in database and this is analyzed by AMB/BG	Verify results for each zone and verify number of zones complying.	Compliance achieved based on the results from the NSW Health state database. Data collated in database and analysed in Spreadsheet by JS.
	H3	% of population where microbiological compliance was achieved.	100	A2	B2	A1	**Y**	JS collates data in database and this is analyzed by AMB/BG	Verify results for each zone. Verify population for each zone from utility accounts, utility database or from census.	Compliance achieved based on the results from the NSW Health state database. Data collated in database and analysed in Spreadsheet by JS.
T19	H4	Number of zones where chemical compliance was achieved.	8 of 8	A2	B2	A1	**Y**	JS collates data in database and this is analyzed by AMB/BG	Verify results for each zone and verify number of zones complying.	Compliance achieved based on the results from the NSW Health state database. Data collated in database and analysed in Spreadsheet by JS.
	H7	Public disclosure of drinking water quality performance (Yes/No)	Yes	N/A	N/A	A1	**Y**	JS collates data in database and this is analyzed by AMB/BG	Verify that drinking water performance is publicly disclosed (eg. on a public website).	Monthly council meeting disclosure using CivicView reports and summary provided in Kempsey annual report. Both are accessible to public on Kempsey website. DWQMS is in draft form and under internal review. Plan is being prepared by external consultant. Auditor has noted and sited Sept 2013 version

Notes **1** If an indicator has not been audited, enter "Not Audited" in column (5).

2 Accuracy and Reliability should be based on the following: [refer also to page 4]

Reliability (A, B, C, D)

A Based on sound records with adequate procedures
B Mostly conforms to A but some deviations which have minor impact on integrity
C Data has significant procedural deviations or extrapolation
D Unsatisfactory data

Accuracy (1, 2, 3, 4, 5)

1 +/- 5%
2 +/- 10%
3 +/- 20%
4 +/- 50%
5 Greater than +/- 50%

3 The values shown in column (3) are the total for the indicator. E.g. for A8, it is the total number of water main breaks. The normalized value of the indicator will calculated by the NSW Office of Water by dividing this value by the length of water mains A2.

Similarly, the number of say water supply connected properties will be determined by the NSW Office of Water as the product of the total number of water supply assessments (NSW Indicator No 36) and the ratio of connected properties per assessments in column 19 of Table 9 of the 2011-12 NSW Benchmarking Report.

4 Leakage will be calculated by the NSW Office of Water in accordance with pages 299 and 151 of the 2011-12 NSW Water Supply and Sewerage Benchmarking Report*. Values for leakage for the 2009-10 to 2011-12 financial years are shown in Tables 8A, 10 and 10A on pages 149, 159 and 162 of the Benchmarking Report.

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* http://www.water.nsw.gov.au/ArticleDocuments/36/utilities_performance_nsw_water_supply_and_sewerage_benchmarking_report_2011_12.pdf.aspx

Appendix A

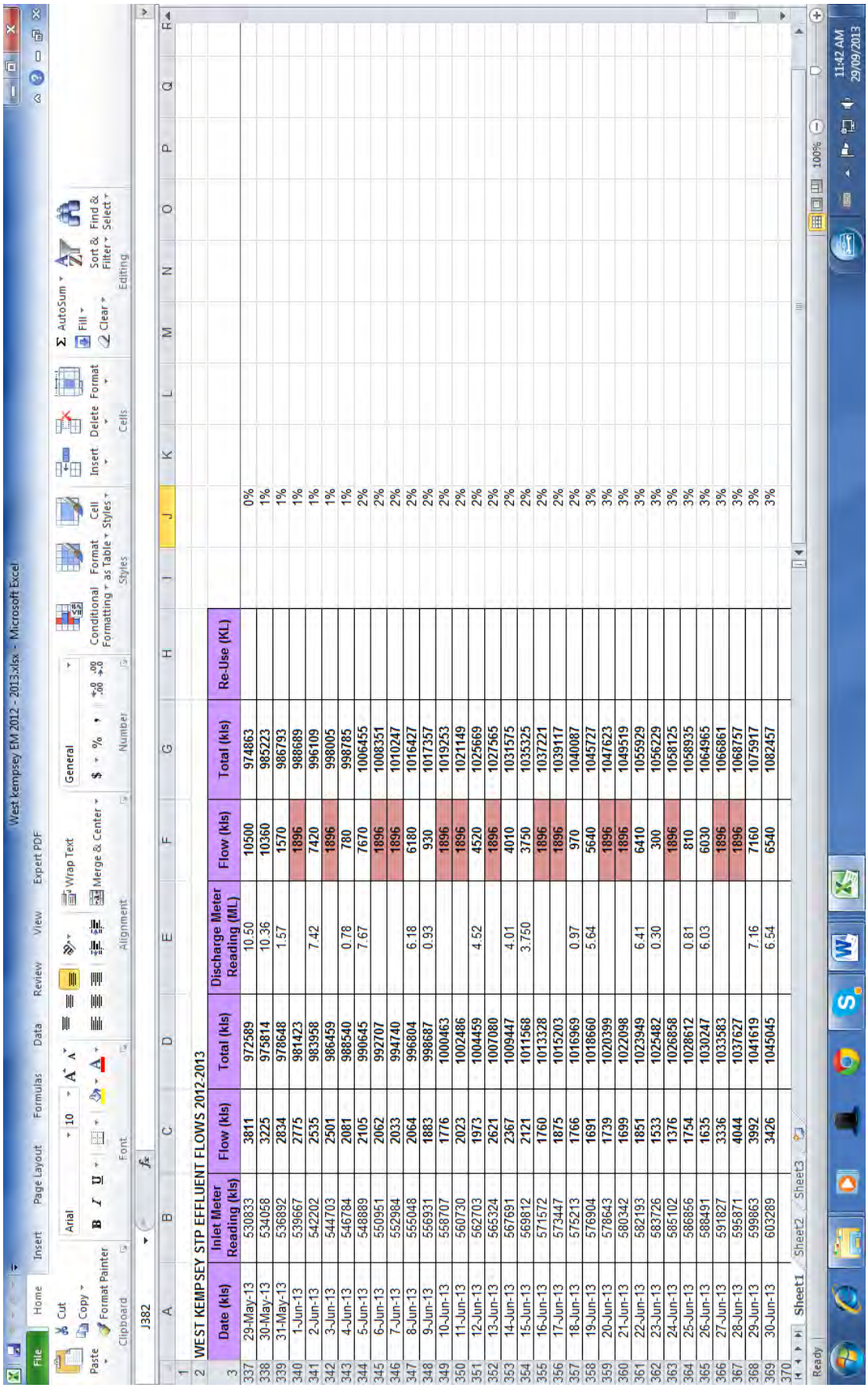
In conducting this audit, the auditor made random requests from staff to view the actual systems used to record, analyze and track the information used to deliver information and data that is used to derive the NWI Performance indicators.

The following examples are the result of “live screen dumps” to demonstrate monitoring, reporting or analysis systems used by the LWU to demonstrate traceability and sound procedural practice. In manually logged reports, examples of written reports were viewed and sample copies included in this attachment.

The following randomly selected items that demonstrate this LWU’s systems used to provide National Performance Reporting Indicators

1. Sample of spread sheet for West Kempsey effluent flows
2. KSC corporate database (Interactive Intelligence) for indicator C14
3. Performance reporting spread sheet indicating source and location of data files
4. Sample monthly water quality reporting for West Kempsey STP
5. Daily Flow charts for West Kempsey (including Rainfall)
6. Sample Calibration instrument report.

Sample 1 Sample of spread sheet for West Kempsey effluent flows



WEST KEMPSEY STP EFFLUENT FLOWS 2012-2013

Date (kls)	Inlet Meter Reading (kls)	Flow (kls)	Total (kls)	Discharge Meter Reading (ML)	Flow (kls)	Total (kls)	Re-Use (KL)	
29-May-13	530833	3811	972589	10.50	10500	974863		0%
30-May-13	534058	3225	975814	10.36	10360	985223		1%
31-May-13	536892	2834	978648	1.57	1570	986793		1%
1-Jun-13	539667	2775	981423		1896	988689		1%
2-Jun-13	542202	2535	983958	7.42	7420	996109		1%
3-Jun-13	544703	2501	986459		1896	998005		1%
4-Jun-13	546784	2081	988540	0.78	780	998785		1%
5-Jun-13	548889	2105	990645	7.67	7670	1006455		2%
6-Jun-13	550951	2062	992707		1896	1008351		2%
7-Jun-13	552984	2033	994740		1896	1010247		2%
8-Jun-13	555048	2064	996804	6.18	6180	1016427		2%
9-Jun-13	556931	1883	998687	0.93	930	1017357		2%
10-Jun-13	558707	1776	1000463		1896	1019253		2%
11-Jun-13	560730	2023	1002486		1896	1021149		2%
12-Jun-13	562703	1973	1004459	4.52	4520	1025669		2%
13-Jun-13	565324	2621	1007080		1896	1027565		2%
14-Jun-13	567691	2367	1009447	4.01	4010	1031575		2%
15-Jun-13	569812	2121	1011568	3.750	3750	1035325		2%
16-Jun-13	571572	1760	1013328		1896	1037221		2%
17-Jun-13	573447	1875	1015203		1896	1039117		2%
18-Jun-13	575213	1766	1016969	0.97	970	1040087		2%
19-Jun-13	576904	1691	1018660	5.64	5640	1045727		3%
20-Jun-13	578643	1739	1020399		1896	1047623		3%
21-Jun-13	580342	1699	1022098		1896	1049519		3%
22-Jun-13	582193	1851	1023949	6.41	6410	1055929		3%
23-Jun-13	583726	1533	1025482	0.30	300	1056229		3%
24-Jun-13	585102	1376	1026858		1896	1058125		3%
25-Jun-13	586856	1754	1028612	0.81	810	1058935		3%
26-Jun-13	588491	1635	1030247	6.03	6030	1064965		3%
27-Jun-13	591827	3336	1033583		1896	1066861		3%
28-Jun-13	595871	4044	1037627		1896	1068757		3%
29-Jun-13	599863	3992	1041619	7.16	7160	1075917		3%
30-Jun-13	603289	3426	1045045	6.54	6540	1082457		3%

Sample 2 KSC corporate database (Interactive Intelligence) for indicator C14

...bution Queue Performance (Queue by Date Grouping)

INTERACTIVE INTELLIGENCE

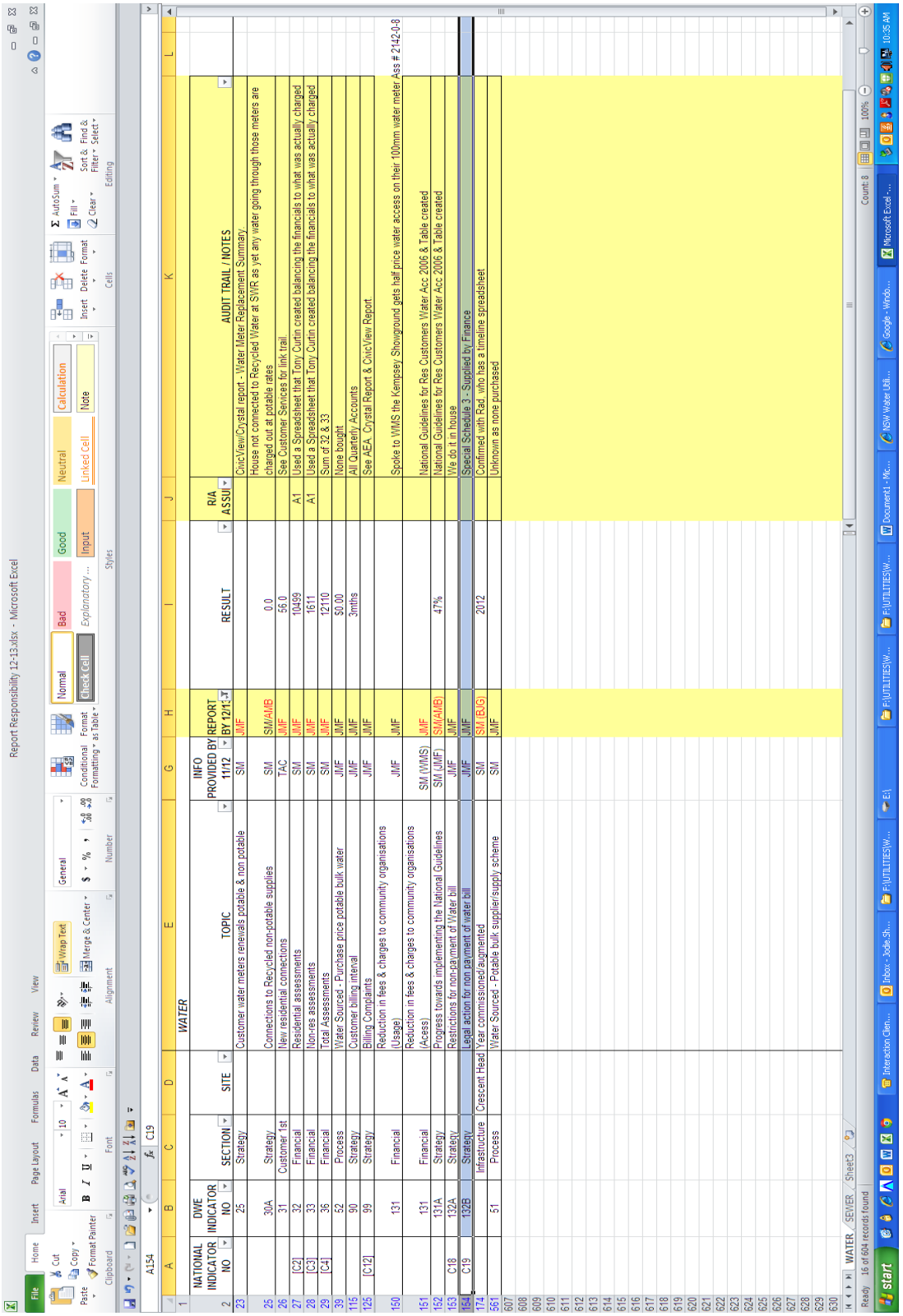
entered 28/8/13
J.E.S.

Sorted by : **Sorted by Month**
Queue Range: !-zzz
Date Time Range: 01/07/2012 08:30:00 - 30/06/2013 16:30:00
Shift Time Range: 00:00:00 - 23:59:59
Site ID Range: 0-999

	Ints Ans	Avg Talk	Total Talk	Avg ACW	Total ACW	Ints Aban	Avg Aban	% Aband	Max Wait Ans	Avg Speed Ans	Svl Lvl 1	Load Ratio
SiteID: 140												
OTHER												
10	4,405	:03:27	253:49:05	:00:17	21:23:46	633	:01:29	12.56%	:18:30	:00:58	42.86%	100.01%
11	3,730	:03:04	190:53:00	:00:18	18:51:44	392	:01:51	9.51%	:10:24	:00:48	44.88%	100.17%
12	2,775	:03:16	150:56:54	:00:17	13:27:13	273	:01:28	8.96%	:11:06	:00:50	46.38%	100.07%
OTHER	44,687	:02:56	2187:33:19	:00:18	223:41:39	4,165	:01:36	8.50%	:22:19	:00:43	49.22% ✓ (C 14)	100.06%
PLANNING AND BUILDING												
01	0	:00:00	:00:00	:00:00	:00:00	0	:00:00	0.00%	:00:00	:00:00	0.00%	0.00%
02	0	:00:00	:00:00	:00:00	:00:00	0	:00:00	0.00%	:00:00	:00:00	0.00%	0.00%
03	0	:00:00	:00:00	:00:00	:00:00	0	:00:00	0.00%	:00:00	:00:00	0.00%	0.00%
04	0	:00:00	:00:00	:00:00	:00:00	0	:00:00	0.00%	:00:00	:00:00	0.00%	0.00%
05	0	:00:00	:00:00	:00:00	:00:00	0	:00:00	0.00%	:00:00	:00:00	0.00%	0.00%
06	0	:00:00	:00:00	:00:00	:00:00	0	:00:00	0.00%	:00:00	:00:00	0.00%	0.00%

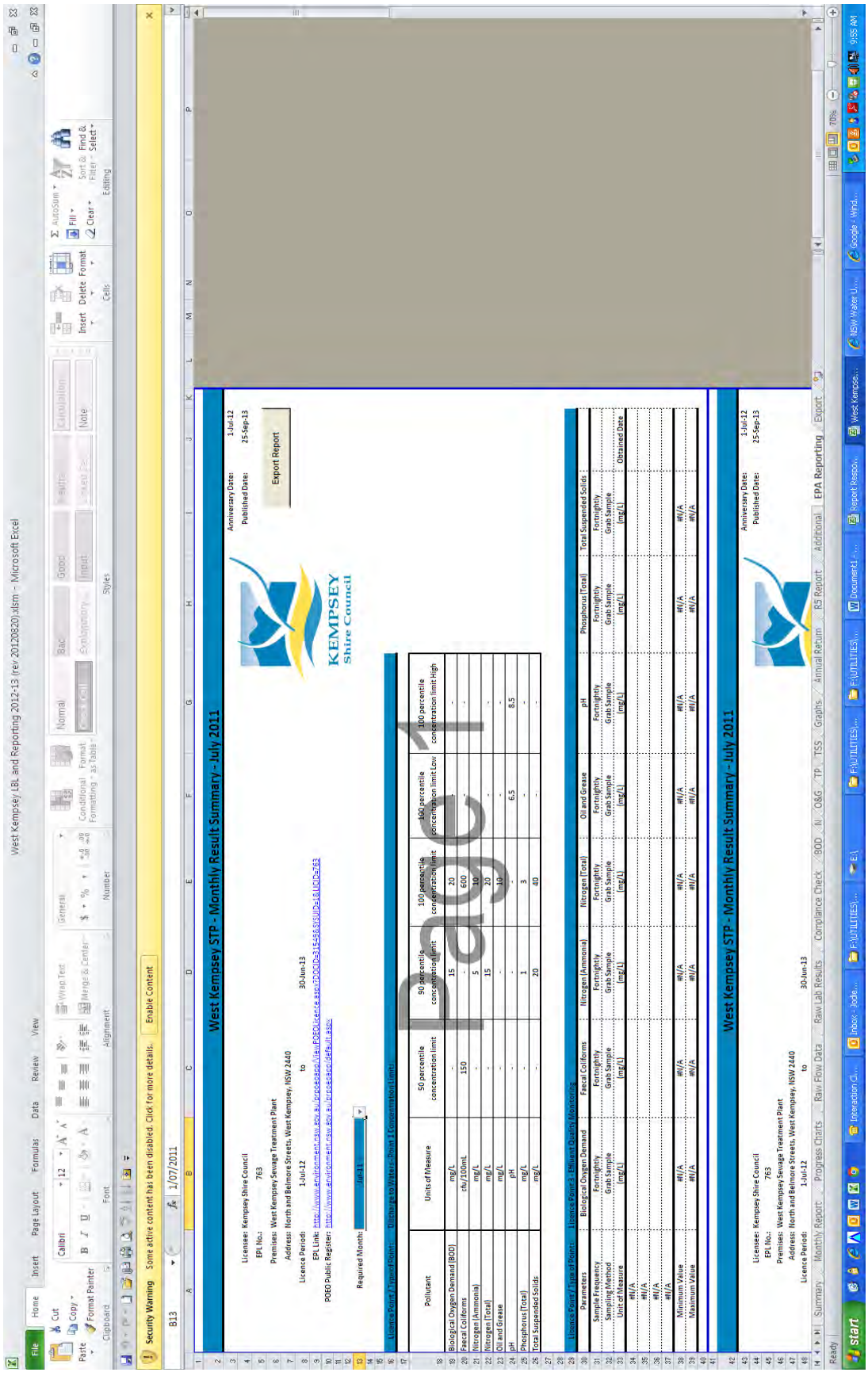
Question 103 water

Sample 3 Performance reporting spread sheet indicating source and location of data files

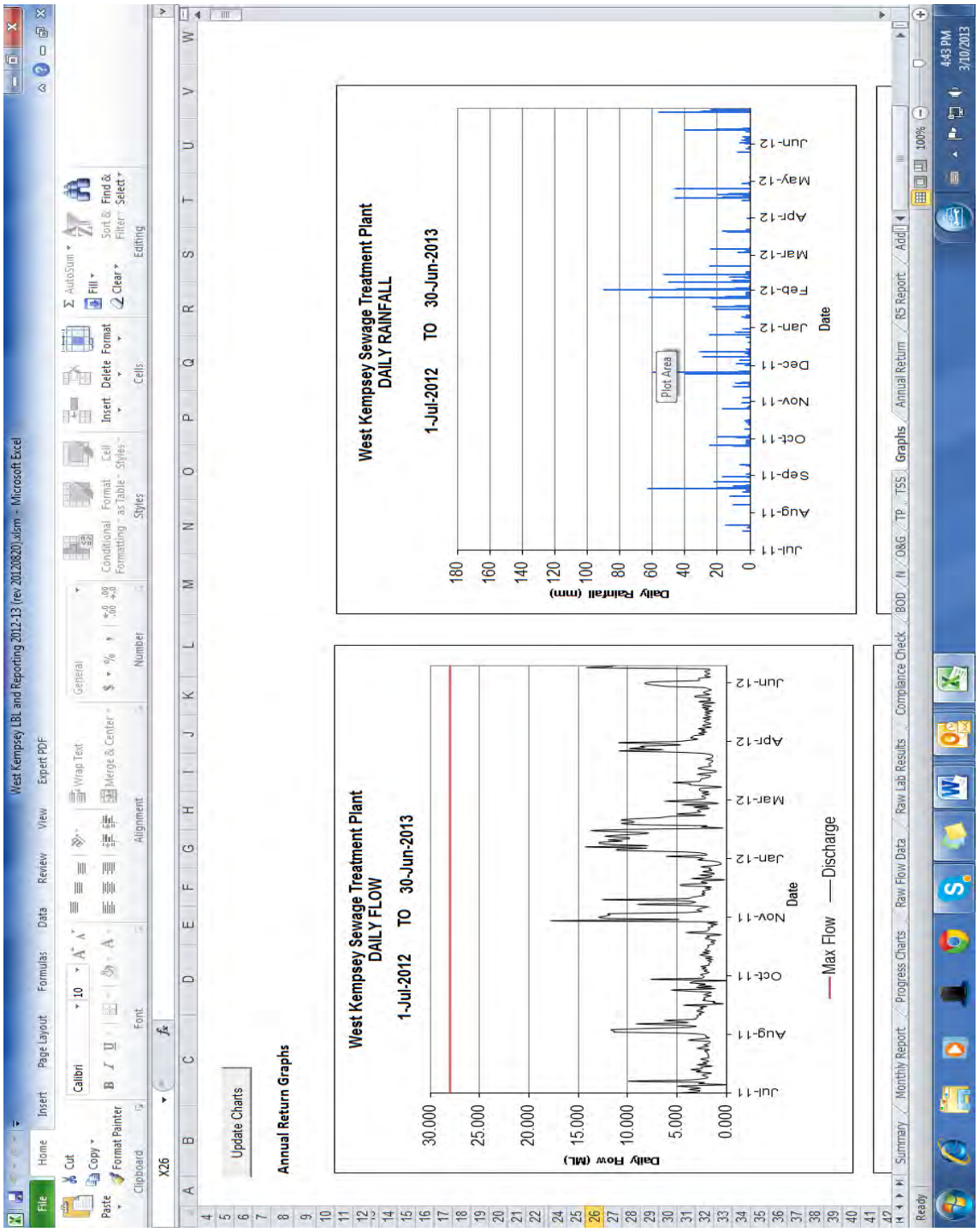


NATIONAL INDICATOR NO	DWE INDICATOR NO	SECTION	SITE	TOPIC	INFO PROVIDED BY 11/12	REPORT BY 12/13	RESULT	R/A ASSUR	AUDIT TRAIL / NOTES
				WATER					
23	25	Strategy		Customer water meters renewals potable & non potable	SM	JMF			ChicView/Crystal report - Water Meter Replacement Summary
25	30A	Strategy		Connections to Recycled non-potable supplies	SM	SM/AMB	0 0		House not connected to Recycled Water at SWR as yet any water going through those meters are charged out at potable rates
26	31	Customer 1st		New residential connections	TAC	JMF	56 0		See Customer Services for link trail
27	32	Financial		Residential assessments	SM	JMF	10499	A1	Used a Spreadsheet that Tony Curtin created balancing the financials to what was actually charged
28	33	Financial		Non-res assessments	SM	JMF	1611	A1	Used a Spreadsheet that Tony Curtin created balancing the financials to what was actually charged
29	36	Financial		Total Assessments	SM	JMF	12110		Sum of 32 & 33
39	52	Process		Water Sourced - Purchase price potable bulk water	JMF	JMF	$0.00		None bought
115	90	Strategy		Customer billing interval	JMF	JMF	3mths		All Quarterly Accounts
125	99	Strategy		Billing Complaints	JMF	JMF			See AEA Crystal Report & ChicView Report
150	131	Financial		Reduction in fees & charges to community organisations (Usage)	JMF	JMF			Spoke to WMS the Kempsey Showground gets half price water access on their 100mm water meter Ass # 2142-0-8
151	131	Financial		Reduction in fees & charges to community organisations (Acess)	SM (WMS)	JMF			National Guidelines for Res Customers Water Acc 2006 & Table created
152	131A	Strategy		Progress towards implementing the National Guidelines	SM (JMF)	SM/AMB)	47%		National Guidelines for Res Customers Water Acc 2006 & Table created
153	132A	Strategy		Restrictions for non-payment of Water bill	JMF	JMF			We do it in house
154	132B	Strategy		Legal action for non payment of water bill	JMF	JMF			Special Schedule 3 - Supplied by Finance
174	C19	Infrastructure	Crescent Head	Year commissioned/augmented	SM	SM (EUG)	2012		Confirmed with Rad. who has a timeline spreadsheet
561	51	Process		Water Sourced - Potable bulk supplier/supply scheme	SM	JMF			Unknown as none purchased

Sample 4 Sample monthly water quality reporting for West Kempsey STP



Sample 5 Daily Flow charts for West Kempsey (including Rainfall)



Sample 6 Sample Calibration instrument report

SERVICE REPORT

MCT
MID-COAST TELEMETRY

Customer: KSC Sewerage

Job: Test Suspect Faulty Outlet Flowmeter

Date: 19.6.13

Location: Gladstone STW

Job Requested By: Darren Sutherland KSC

Observations On Arrival:
Unit seemed to be reading ok.

Work Carried Out:
Removed sensor from mounting bracket and Target tested unit against known distances. Changed totalizer from litres to m3. Ajusted current output from 3.8mA-20.5 to 4-20mA.

Results:				Correct Reading		
Test 1.	624mm	unit reads	59.00 L/S	TBA	Full	ok
Test 2.	813mm	unit reads	16.60 L/S	TBA	Half	ok
Test 3.	908mm	unit reads	4.75 L/S	TBA	Quarter	ok
Test 4.	957mm	unit reads	1.2 L/S	TBA	Eighth	ok
Test 5.	1005mm	unit reads	0 L/S	TBA	Empty	ok
Totalizer:						
Test.	59L/S	5 minute test	8.85 pulses recorded	Correct		

Conclusions/Recommendations:
Unit was having some communications problems until connection in pit was redone. Unsure if this may have been giving some false readings. Tested after connection redone and unit is funtioning perfectly as per parameters programmed into unit. Values in sensor for min and max are empty 1005mm and full 624mm. Range = 381mm over 59L/S. These figures were already provided. Flow rates need to be confirmed. Unit is funtioning all ok.

Work carried out by:	Dan Hayes-MCT

Water Management Services

- *Integrated & Sustainable water cycle management*
- *Demand management & water conservation*
- *Reuse, rainwater, storm water planning & management*
- *Water cycle audit*
- *Catchment & system modeling*

Planning & Reporting

- *Strategic & business planning*
- *IWCM, SWCM and Scenario planning*
- *Catchment planning*
- *Policy & regulation performance planning, evaluation & reporting*
- *Triple bottom line performance & reporting*

Environmental Services

- *Environmental audits, monitoring & planning*
- *Pollution management strategies*
- *Stakeholder management*

Specialist Services

- *Expert advice & business reviews*
- *Project management & procurement*
- *Risk analysis & assessment*
- *GIS & remote sensing analysis*
- *Contracted R&D*

sustainable water solutions Pty Ltd

PO Box 232, Brooklyn

Sydney, NSW 2083,

Australia

Phone (++612) 9985 8472

Fax (++612) 9985 8471

www.swspl.com.au

APPENDIX E – POPULATION AND DWELLING GROWTH BY LOCALITY

The following is a summary of the relevant sections of the Kempsey Shire Council Local Growth Management Strategy (Oct 2010) for each township.

Kempsey, will cater for approximately 12% of the total of new dwellings. Initially, this growth will occur in existing zoned areas and smaller releases in close proximity to the existing urban areas at West Kempsey and East Kempsey. In the medium term a larger release in Greenhills and in the longer term an area on the western edge of South Kempsey will meet demand.

The Kempsey District Hospital will need to expand to cater for the growing Shire population and adjacent land will need to be rezoned for specialist rooms.

Growth in business and light manufacturing will require adequate industrial land which is being provided at South Kempsey.

Kempsey District Hospital remains a Level 3 hospital and needs to be upgraded as the population increases. This will require adequate land to accommodate expansion of Kempsey Hospital, zoning of adjacent land for specialists rooms and suitable accommodation for new staff drawn to the area.

South West Rocks, will cater for 50% of the total new dwellings in the Shire from 2006 to 2031. Approximately 40% of these dwellings are expected to be attached or medium to medium high density. The growth rate of medium density housing is 20 dwellings every 5 years.

The Saltwater and former Shell site release areas will cater for growth in the shorter term, together with increased density in key locations around business centres.

The medium term demand will be provided through the Seascape Grove eastern area and, subject to detailed investigation of contamination, the former Caltex site.

The medium to long term growth will be met through continued consolidation of higher density areas. The Spencerville to New Entrance investigation area is subject to significant constraints and may not provide significant additional supply of land to meet long term growth.

Planning for a new library building has commenced and zoning of land for specialist rooms will be required.

Demand for an expanded or new primary school will require additional land in the main release area of South West Rocks. The provision of a third secondary school in the Shire needs to be planned with a preferred location in South West Rocks.

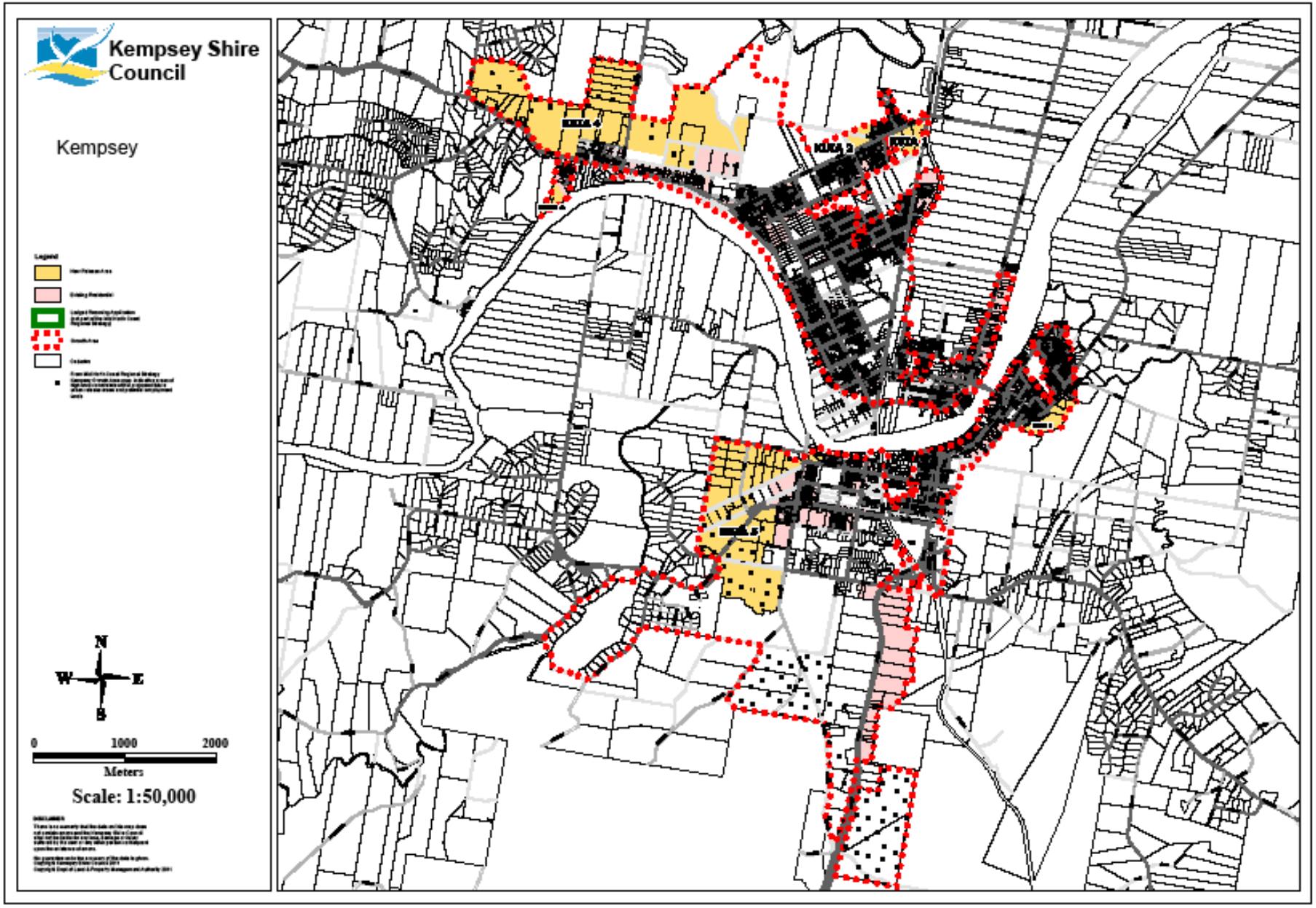
Crescent Head, will cater for 5% of the total new dwellings. Demand in this location is likely to exceed available supply leading to redevelopment and consolidation of the existing urban areas. The only zoned un-subdivided land in Crescent head is owned by Department of Lands who has advised that they will not be developing the site due to environmental considerations.

Frederickton, will cater for 4% of the total new dwellings. A significant proportion will be provided in a Seniors Living development that is expected to commence construction following completion of the nursing home which is currently under construction. A neighbourhood business centre should be identified to serve the growing population.

Stuarts Point, will cater for 3% of the total dwellings to 2031. There are many vacant lots and two large areas of zoned un-subdivided land. This growth is expected to be in the medium to long term as, generally, development is unable to proceed until a reticulated sewerage system is available.

Hat Head will cater for 1% of the total dwellings to 2031. It has a high seasonal peak population and a significant proportion of dwelling growth is expected to be holiday house development.

Development of Hat Head is limited pending the commissioning of the STP. Once the STP is operational there would be significantly more supply available through smaller lot size/increased densities in the "Phase 3 area" and redevelopment potential in the existing village.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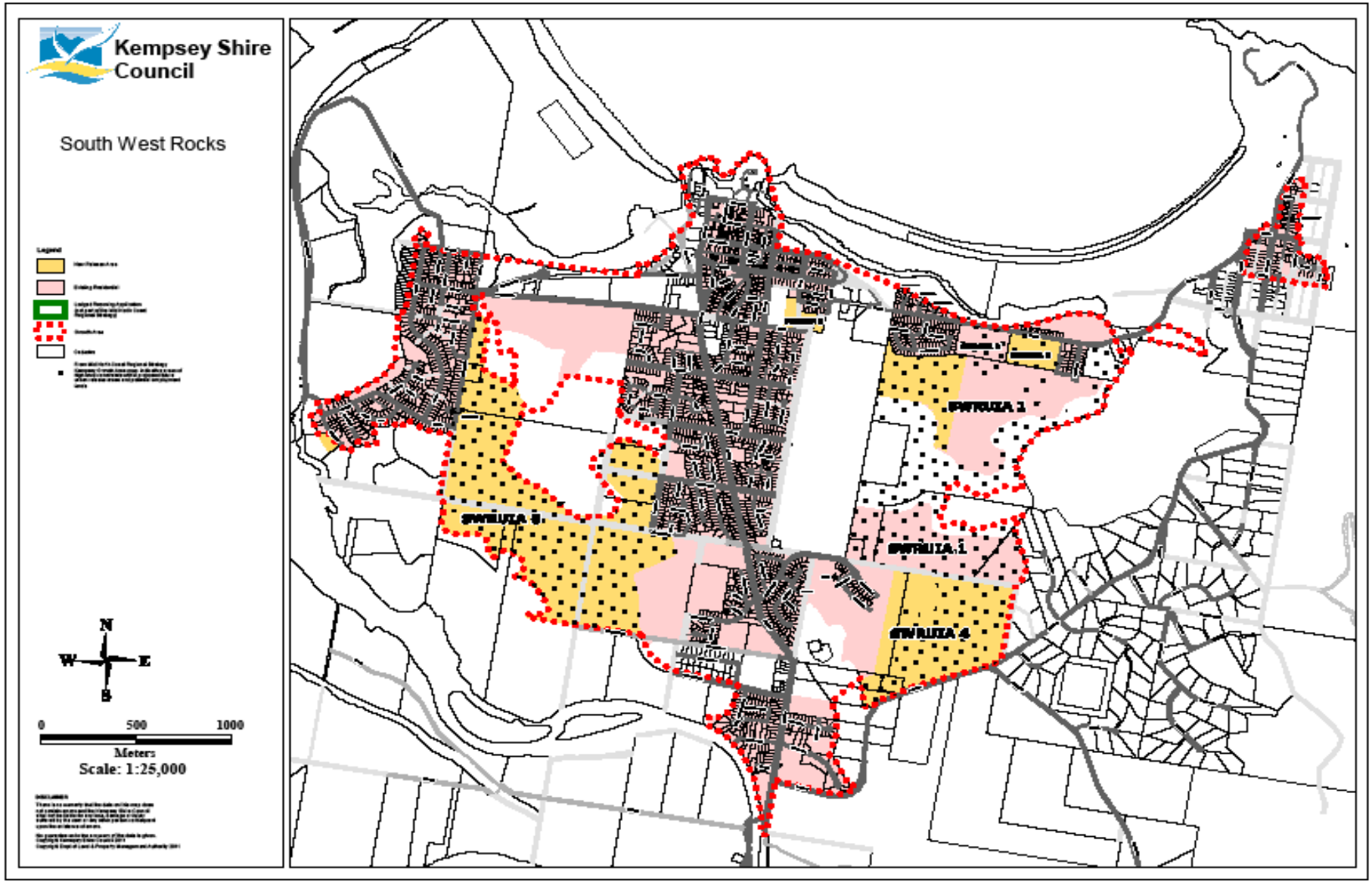
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South West Rocks
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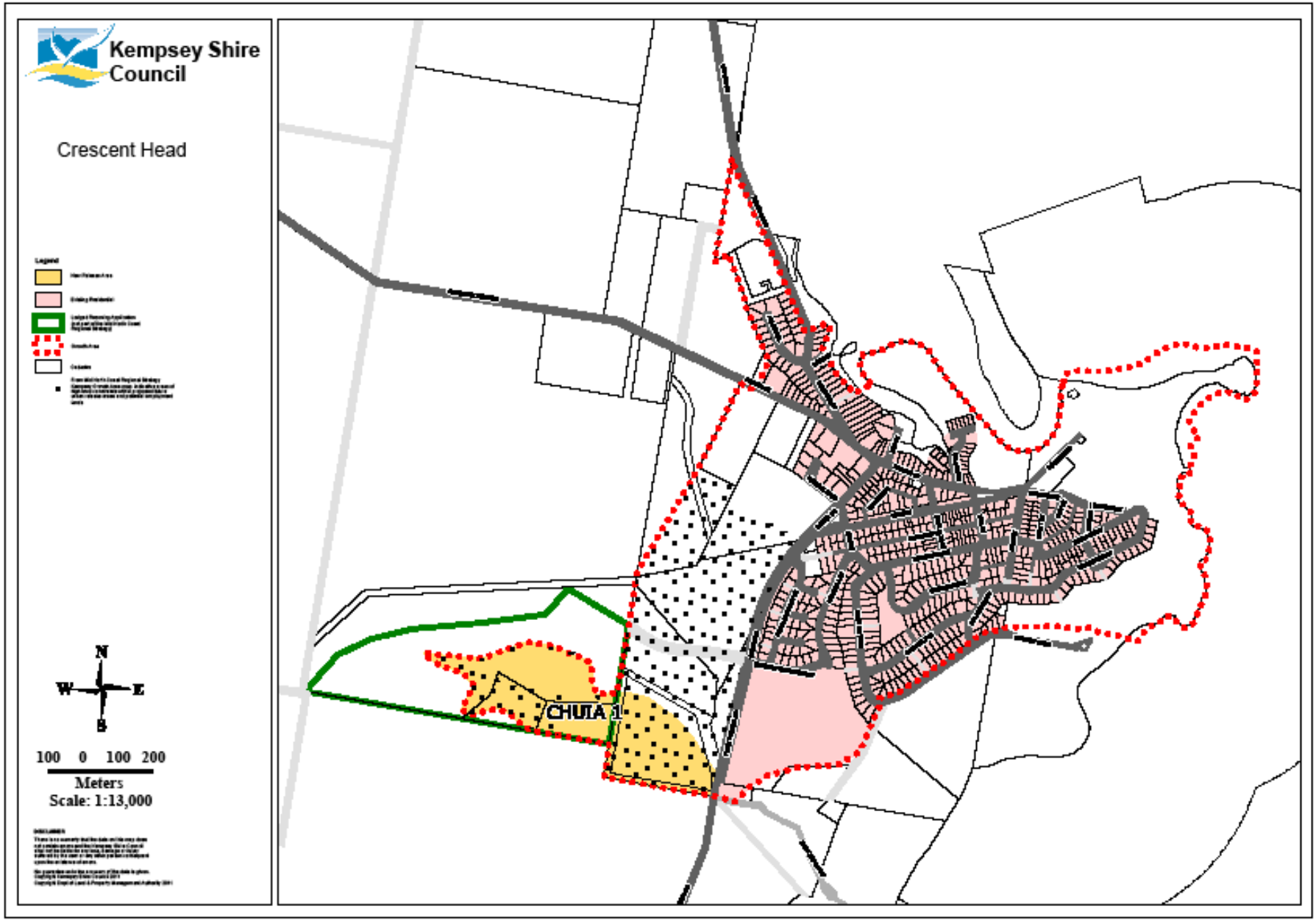
Kempsey Shire Council
Crescent Head
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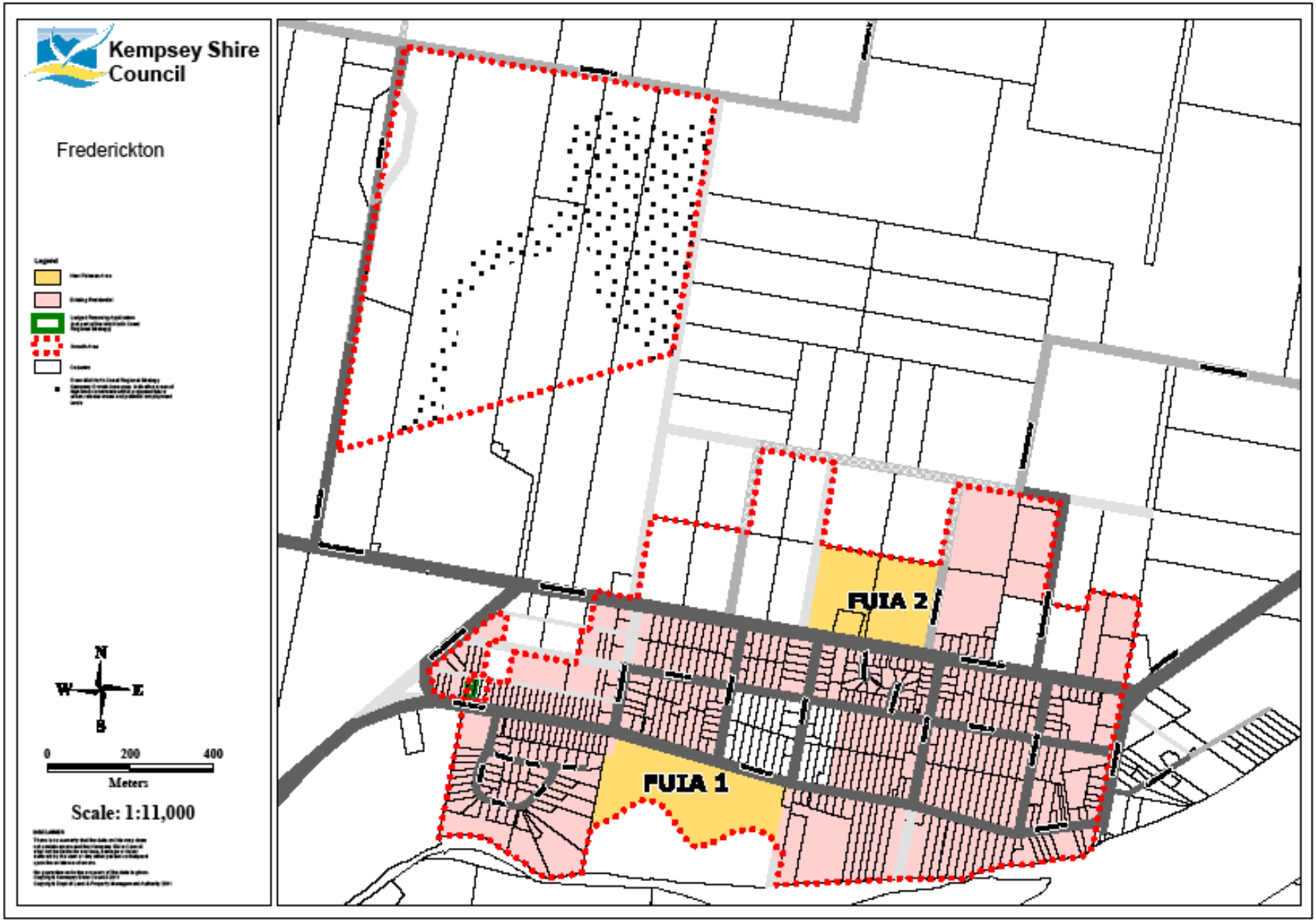
CHUIA 1


Kempsey Shire Council
Frederickton
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Meters
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FUIA 2
FUIA 1

APPENDIX F – 2013 MAJOR WATER USERS

Name	Location	Scheme	Meter size	Consumption (kL/) 2013
Nestle Pty Ltd	61-67 Rawson St, Smithtown	Kempsey/Lower Macleay	100mm	114194
Tolsat Pty Ltd	151 Great North Rd, Frederickton	Kempsey/Lower Macleay	100mm	63171
Mid North Coast Correctional Centre	370 Aldavilla Rd, Aldavilla	Kempsey/Lower Macleay	100mm	59169
Abi Group	Pacific Highway Bypass	Kempsey/Lower Macleay	40mm	21111
South West Rocks Tourist Park	39-89 Gordon Young Dr, SWR	South West Rocks	80mm	16372
Roads & Maritime Services	Pacific Highway Bypass	Kempsey/Lower Macleay	50mm	14530
Crescent Head Caravan Park	Main St, Crescent Head	Crescent Head	100mm	13417
South West Rocks Sewer Treatment Plant	Off Belle O"Connor St, SWR	South West Rocks	100mm	12707
Hat Head Caravan Park	Bay St, Hat Head	Hat Head	100mm	11680
Arakoon State Recreational Area	Cardwell St, Arakoon	South West Rocks	100mm	10423

APPENDIX G – REVALUATION METHODOLOGY

Kempsey Shire Council 2012 Asset Revaluation

BACKGROUND & INTRODUCTION

In July 2006, the former Department of Local Government mandated that NSW councils commence valuing infrastructure, property, plant and equipment at **fair value**, in accordance with Australian Accounting Standard AASB 116, "Property, Plant and Equipment".

The standard states that the value may be determined in either of two ways:

- **Market Based Evidence** for Buildings & normal plant and equipment (cars, excavators, tools)
- **Depreciated Replacement Cost (DRC)** for water supply and sewerage assets such as dams, treatment plants, reservoirs, pumping stations, pipes and manholes

*DRC = Current Replacement Cost **less** the value of wear and tear which reduces the life to the asset*

The Current Replacement Cost is the value of an asset that does the same job (ie. provides the same level of service for the same length of time, the "Modern Equivalent Asset")

Kempsey Shire Council has determined the value reduction due to "wear and tear" in accordance with the standards. That is, Council has determined the remaining useful life and then calculated the loss of value since the construction date of the asset using a recognised consumption based depreciation method.

Water supply and sewerage services assets were first revalued at fair value in June 2007. The "Local Government Code of Financial Practice and Accounting Reporting" states that Councils should revalue assets every five years.

Council received correspondence from the NSW Premier & Cabinet, Division of Local Government on 24 April 2012 directing the revaluation of water & sewerage assets by 30 June 2012.

This report detail's Kempsey Shire Council's [KSC's] methodology for undertaking the revaluation of water supply and sewerage assets.

METHODOLOGY

For the last five year period Council has worked diligently on the three main valuation components, namely;

1. Further development of Council's Asset Register to improve completeness and accuracy
2. Development and application of a condition rating system to determine the Remaining Useful Life of every asset and component assets.
3. Determine, using industry standard methods, the Fair Value for all assets and component assets.

This report details the methodology utilised by Council to demonstrate the accuracy improvements gained since the last revaluation to achieve compliance with relevant Accounting standards such as AAS116.

ASSET REGISTER

Data from Council's integrated financial and asset management system, CivicView was used as the basis of the updated EXCEL based Water and Sewerage Asset Register and it is Council's intention to incorporate the updated data into CivicView once the audit is complete.

The initial inventory of assets was completed in 1997 and since then Council has updated this database on an annual basis to reflect the financial capitalisation of new Council funded assets and developer contributed assets.

Council's Geographic Information System contains an up-to-date, comprehensive register of all passive assets including relevant asset attributes such as; Asset Unique Identifier, size, material, depth (where relevant), length and construction date.

New asset details are captured when work as executed drawings are submitted. Developer contributed asset Work As Executed plans are tracked through applications for interconnection. This ensures that all assets are identified before they are connected to the system. Works constructed by Council are also correlated to their respective capital expenditure. Major renewal expenditure is tracked using a Work Order system.

Council constructed over $45M in major facilities over the past 5-10 years, has had significant staff turnover and considered a comprehensive review of the Water & Sewerage Asset Register was required.

Following an initial in-house review, Council recognised that several high value complex facilities needed further componentisation and chose to engage professional Infrastructure Valuers, APV Pty Ltd, to revalue key assets. Appendix A contains APV Pty Ltd qualifications and experience.

Passive assets and common, lower value active assets such as water and sewerage pumping stations, were well documented and Council considered it would be more cost and resource effective to value these assets in-house and include Council's operational staff in the process as part of their professional development.

REMAINING USEFUL LIVES

Previous Standard Useful Lives and Residual Values were reviewed prior to commencement of this revaluation. The resultant comprehensive list of Asset Useful Lives was compiled from NSW Reference Rates Manual, APV Default Useful Lives and local knowledge & experience.

Most asset types have zero residual values at the end of their Useful Life however it is generally recognised that several asset types will have a residual value at the end of their Useful Life due to their ability to be rehabilitated or reconditioned to return the asset to full operational capability. For example, it is very cost effective to reline a sewer manhole to return it to full operational capacity rather than rebuilding the entire manhole so for valuation purposes a manhole has a residual value of 50% at the end of its Useful Life. Other examples are sewer mains and mechanical components.

A full list of the adopted Useful Lives and Residual Values is contained in Section 4

Council adopted the APV condition rating numbering system and methodology for consistency of methodology and for it's ease of application by field staff. Appendix C contains APV Condition Rating System

Council reviewed historical condition assessment information on watermain breaks, sewer chokes, and electrical/mechanical maintenance and also enlisted operations staff to provide practical up to date condition ratings.

For example;

- Council mechanical operations staff reviewed and rated SPS & WPS pump & pumping station condition and electrical staff reviewed and rated both the switchboard and general electrical component condition.
- In addition to desk top watermain break and sewer choke information, Council utilised Operations staff field knowledge of the underground passive assets to determine the lowest condition assets. Field staff were asked "Which assets needed replacing within the next five years?" and these assets were given a very low condition rating.

DETERMINATION OF FAIR VALUE

Current Replacement Cost

Council utilised many sources to determine the current replacement costs of its assets. NSW Reference Rates Manual 2012, Rawlinsons Construction Cost Guide, Hunter Water Australia Report , Tenix Report., recent Council construction rates and APV values. Council also used supplier quotations as a starting point for the costs of some specialised water & sewerage asset components.

Depreciation Methodology

Council then utilised the APV consumption based depreciation method to determine the Written Down Value Factor (WDVF) (% Remaining Useful Life Factor) for each asset.

The APV method utilises a set of non-linear depreciation rates for each asset type based on the current condition of an asset rather than merely its age. An explanation of the APV consumption based depreciation method, it's curves & factors are contained in the attached figure.

Determination of Fair Value

For assets with zero Residual Values at the end of their Useful Life

Fair Value = WDVF * CRC

For assets with a nominated percentage Residual Value (RV) at the end of their Useful Life

Fair Value = (RV*CRC) + (1-RV)*(WDVF*CRC)

APV Condition Rating Methodology

INSTRUCTIONS & EXPLANATIONS TO COMPLETE VALIDATION OF ASSUMPTIONS

1. All below tabs must be reviewed and validated

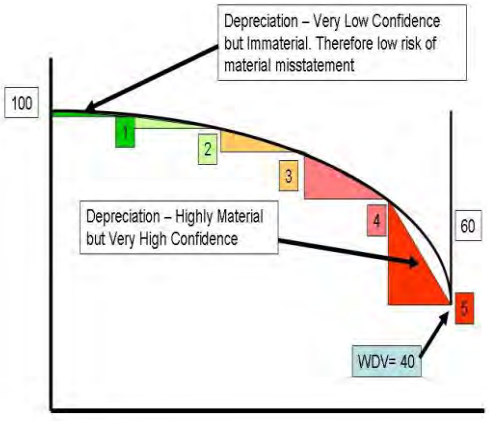
2. Please complete the details of the the reviewing officer and postion held in each tab

3. Follow instructions at the top of each Sheet

4. Depreciation & Condition Score (High Level Explaination):

The Depreciation Methodology adopted is a Consumption Based Depreciation (CBD) method based on the Prabhu-Edgerton Consumption Model and is referred to as the "Advanced SLAM" or "Advanced Straight-Line Asset Management" approach. Detailed explanation of the methodology can be obtained from the paper published by APV on their website - www.apv.net .

The methodology can be diagrammatically represented as follows –



Phase Points	Description
0	New or very good condition – **Very High level of remaining service potential**
1	Not new but in Very Good condition with no indicators of any future obsolescence and providing a **high level of remaining service potential**
2	Aged and in good condition provide an **adequate level of remaining service potential**. No signs of immediate or short term obsolescence
3	Providing an **adequate level of remaining service potential but some concerns** over the ability of the asset to continue to provide an adequate level of service in the short to medium term. May be signs of obsolescence in short to mid-term.
4	Indicators that will need to renew, upgrade or scrap in near future. Should be reflected by **inclusion in the Capital Works Plan** to renew or replace in short-term. **Very low level of remaining service potential**
5	At intervention point. **No longer providing an acceptable level of service**. If remedial action is not taken immediately the **asset will need to be closed or decommissioned**.
End of Life	Theoretical end of life

Essentially, the asset lifecycle is divided into a number of distinct phases. They can be broadly described as –

The factors included in the Dynamic Matrix can generally be split into two types. Those that impact at the whole of asset level (Holistic) and those that relate specifically each component (Component). Examples include –

Holistic Level	Component Level
Functionality	Physical Condition
Capacity	Breakage & Repair History
Utilization	
Safety	
Obsolescence	
Equitable Access	

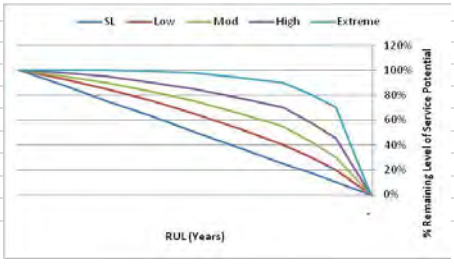
Having initially assed the "Lifecycle" phase the asset is current in, the rater must then assess whether the asset is in the High (H) end of the scale or Mid-way (M) to the next phase.

5. Patterns of Consumption (explained)

For simplicity, the method allows adoption of one of five consumption patterns –

- Straight-Line (constant consumption)
- Low (the rate of acceleration of the rate of consumption is low)
- Moderate (the rate of acceleration of the rate of consumption is Moderate)
- High (the rate of acceleration of the rate of consumption is High)
- Extreme (the rate of acceleration of the rate of consumption is Extreme)

They various "patterns of consumption" are shown in the following diagram.



There are many reasons why assets experience different patterns of consumption. Typically assets that have a very long life are maintained in a reasonable condition and their life can be extended considerably beyond original design.

For these assets, the biggest driver of consumption towards the end of their life tends to be obsolescence and other holistic factors. The impact of these drivers is usually significant leading to high levels of consumption over a very short duration. As a general rule – the longer the "Useful Life" of the asset the higher the level of acceleration of consumption and lower the level of confidence over the accuracy of the "Useful Life".

Due to the significant uncertainty about predicting the eventual total life of an asset there is only small room for error using the traditional straight-line approach. A miscalculation of 5% in total life will drive a 5% (material) error in the annual calculation of depreciation. Whereas, under the Prabhu-Edgerton Consumption Model (or Advanced SLAM) there is significantly increased room for error at all phases levels.

In phases of the asset's lifecycle where the rate of consumption (and therefore depreciation) is significantly less (i.e. Phases 0 & 1) the confidence levels if the predictions are very low. However, because the depreciation rate is also low there is a significantly increased level of room for error.

In the phases where most consumption (and therefore depreciation) is greatest (i.e. 3 onwards) the room for error is reduced. However, the room for error is still significantly greater than the traditional Straight-Line approach. This is because this phase is generally very short and the confidence levels are very good due to the fact that it is also the phase that receives the most asset management attention and data collection. For most infrastructure assets this occurs towards the end of the asset's life and reflects an increase in usage due to increased populations, loading, volumes of traffic flow, etc.

6. Once Validation is completed - please return by email to APV, either to the issuing Valuer or admin@apv.net

APPENDIX H – CONDITION GRADING TABLE, MECHANICAL & ELECTRICAL ASSETS

CONDITION GRADING – SURFACE OPERATIONAL ASSETS – ELECTRICAL & MECHANCIAL PLANT

Condition Grade	General Meaning	Expected residual life
1.	**Excellent** Sound plant designed to current standards, all operable and well maintained.	> 21 years
2.	**Good** As for grade 1, but not designed to current standards or showing wear and tear. For example , minor oil leaks, gland wear although protective coatings intact and efficiency undiminished; requires major overhaul within the medium term. Deterioration causing minimal influence on performance.	16 – 20 years
3.	**Moderate** Functionally sound plant and components, acceptable but showing some signs of wear and tear with minor failures and some diminished efficiency. For example, bearing and gland wear and corrosion of metal parts becoming more evident. Deterioration beginning to be reflected in performance and a higher level of maintenance.	11 – 15 years
4.	**Poor** Plant and components function but require a high level of maintenance to remain operational. likely to cause a marked deterioration in performance in the medium term. Some asset replacement or rehabilitation needed within the medium term.	6 - 10 years
5.	**Very Poor** Plant and component effective life exceeded and excessive maintenance costs incurred. A high risk of breakdown with a serious impact on performance. No life expectancy, requiring urgent replacement or rehabilitation.	0 - 5 years

APPENDIX I – RESERVOIR MAINTENANCE PRIORITIES & CLEANING SCHEDULE

Aqualift has been carrying out periodic internal and external inspections and cleaning of reservoirs for Council for several years.

External items inspected include; the compound, vandalism, walls, ladder, entry hatch, walkways, roof, handrails, davit, ventilation, bird proofing. Internal items inspected include; walls, columns, roof framing, floor, inlet, outlet, scour, overflow, mixer and internal ladder. They also comment on general issues such as security, items which may affect water quality and cause contamination.

Records are stored in ASAM RT a web-based system and include physical data, photos and videos. Client Councils can access the information anywhere, the database also has 10 standard reports which can be exported to many formats including word, excel and PDF. Operations staff can add data, notes, photos and documents to the system.

ASAM Benchmarking

The following areas have been targeted to provide an overview of the asset condition and to identify potential problems that may occur if maintenance is not carried out:

- Security
- Contamination
- Safety
- Confined spaces
- Carbonation (deterioration of concrete structures)
- External Structural condition and Protective Coatings
- Internal Structural condition and Protective Coatings

Each area is given a priority number that can be used to compare conditions between similar assets - some areas will also influence the outcomes of others.

Security relates to the possibility of unauthorized tank access - it directly affects **Contamination** if substances can be introduced into the stored water. **Safety** includes all features that may cause injury, and is influenced by **Confined Spaces** in most cases. **Structural** condition can be directly affected by deterioration of the protective **Coating** or a high **Carbonation** percentage. **Carbonation** is expressed as a percentage between remaining sound concrete and steel cover depth, with 100% carbonation meaning the steel is fully exposed to the surrounding environment.

By using these benchmarks, an average life span and working environment can be predicted, allowing protective measures to be taken before serious damage or personal injury occurs.

ASAM Priority and Status

Priorities are placed against each inspected item -this creates a benchmark and time schedule for planned maintenance.

P0 - immediate attention from date of inspection
The highest action priority -this is only to be used in cases of:

- Personal safety being compromised when carrying out routine operations on the asset.
- Water quality being affected to a level that places the consumers at risk.
- Structural defects that have the potential for costly reinstatement if left unattended

P1 - one year from date of inspection
Also urgent, but will not place at risk the day-to-day operation of the asset. Dealing with safety, water quality and structural defects likely to cause further damage if not rectified within twelve months.

P2 - two years from date of inspection
To be used for priority maintenance.
Coating defects both external and internal, entry hatches, safety rails, roofing defects, deteriorating internal ladders, pipework and supports.

P3 - three years from date of inspection
General rating for structural and coating maintenance that is required to preserve the effective asset life.
Additions that can be carried out to improve access and safety as finances permit.
Steel tanks and their internal fittings should be inspected at three-yearly intervals to establish a maintenance pattern.

P4 - four years from date of inspection
Items rated under this priority are those that are likely to remain structurally sound during normal wear and tear for at least 3–4 years, based on past experience of the asset.
This includes roofing, external fixtures not requiring coating, ventilation systems, animal proofing and concrete structures with a proven history.
New coatings that have passed the warranty period.

Inspected items are also allocated a Status indicator of Action, Flagged or Deferred. This defines the urgency of items, and is a good criterion when using ASAM search

A - Attention required on date
F - Item to be reassessed on date

Internal

Area	Priority	Status	Comments
Walls	4	D	Appears to be in good order
Columns	4	D	There is only one centre post present in the tank
Roof Spider	4	D	Appears to be in good order
Roof Framing	4	D	Appears to be in good order
Floor	4	D	Appears to be in good order
Inlet	3	F	The inlet penetration is corroded
Outlet	3	F	The outlet penetration is corroded
Scour	3	F	The penetration is corroded
Overflow	2	A	The overflow riser is heavily corroded
Mixer Motor	Na	Na	No Comment
Motor Type	Na	Na	No Comment
Supports	Na	Na	No Comment
Supports Type	Na	Na	No Comment
Ladder Internal	1	A	The ladders, platform and cages are heavily corroded and should be replaced with a Nextep vertical FRP system 8500mm long
Electrical	Na	Na	No Comment

Internal Comments

The platform and ladders are heavily corroded and should be replaced with a Nextep vertical FRP system 8500mm long - the lower ladder is set @ 90 degrees to the wall. The ladder system should fit out through the entry hatch if it is unbolted into individual sections prior to lifting out - the bolts should all be OK.

The latest report from Aqualift (see below) lists current maintenance reservoir issues:

Potable Diving Pty Ltd.

Reservoir Executive Summary Comments Report

3/11/2013 **Kempsey Shire Council**

The following table contains a brief summary of the key findings from the reservoir inspection and cleaning services performed by Aqualift

Back Beach Reservoir

Type	Comment
OH&S	The internal ladder is caged, so a confined space rescue would be very difficult. There are only minimal handrails around the platform area to prevent a fall from heights.
Security	There is no secure compound around the site and there is extensive graffiti and vandalism on the reservoir. There were small trees placed up against the tank near the ladder, possibly an attempt to access the reservoir roof. The stilling pipe cover is unsecured and can easily be lifted off allowing access to the reservoir.
Structural	The internal ladder is heavily corroded and will require replacement.
Water Quality	The internal ladder is heavily corroded and debris is falling into the reservoir. At 10oclock there is a defect in the bird proofing mesh which may allow birds to enter the reservoir. Water ponds on the platform area due to poor drainage and could drain back into the tank if deep enough.

Bellbrook Reservoir

Type	Comment
OH&S	There is no solid area on the roof to set up a confined space access or rescue system.
Water Quality	The centre roof cap has not been fitted and there is a significant hole present where birds can enter the tank. The internal ladder is corroded and this will also be affecting the water quality.

Billy Goat Hill Reservoir

Type	Comment
OH&S	The internal ladder only extends down to a platform and any sort of confined space rescue would be difficult due to this platform taking up space under the entry hatch.
Structural	The internal coating is still adequate if an Impressed CP system is installed soon. This tank will be one of the last to be re-coated along with Clybucca tank.

Clybucca Reservoir

Type	Comment
OH&S	The internal ladder cage makes a confined space access or rescue situation difficult.

Crescent Head (Maguires Crossing) Balance Tank

Type	Comment
OH&S	There is no internal ladder and a rope ladder is required for diver entry.

Crescent Head Reservoir No 1

Type	Comment
OH&S	The roof has no fall protection around the top and there is no lifting access from the platform area due to the aerials. There are many telco aerials on the roof so the EMF site plan must be reviewed prior to starting work.
Security	With no compound fence, the reservoir is at risk of vandalism. There is graffiti on the upper walls from the first platform where vandals have climbed up through broken security fencing. The meter box on the side of the electrical compound has been damaged and does not lock.
Structural	The external ladder is heavily corroded and may need replacement.
Water Quality	There are multiple items corroding within the reservoir which will increase the demand on the chlorine. The water was quite turbid with very low visibility.

Crescent Head WTP No 1 Balance Tank

Type	Comment
Water Quality	There was over 1m of sediment in the bottom of this settling tank. It could not be cleaned with the normal vacuum/scoop method.

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Crescent Head WTP No 3 Balance Tank

Type	Comment
OH&S	There is no internal ladder.
Structural	A piece of ply board is required to create a platform as the roof does not self support with personnel and equipment on it.

Frederickton Reservoir

Type	Comment
OH&S	The caged internal ladders will make any sort of confined space access or rescue scenario difficult.
Structural	This tank should be re-coated after Stuarts Point (No2 in the coating program) - the corrosion is developing and an Impressed CP system is highly recommended to reduce any pitting that will continue to occur.

Greenhill Reservoir

Type	Comment
OH&S	The walkway areas are becoming unsafe to walk on, due to severe corrosion on the checkerplate panels.
Structural	There is very heavy corrosion present on the walkways - these will need to be re-coated soon to avoid structural damage and safety issues from occurring.
Water Quality	There is a loose mesh panel adjacent to the level pulley where birds are entering the tank - the pulley is redundant and could be removed to allow the area to be sealed effectively

Hat Head Aeration Balance Tank

Type	Comment
Water Quality	The two overflow penetrations are set lower in the wall than the plan shows - the existing water levels are set too high and the overflows are operating constantly whenever the fill cycle occurs.

Hat Head No1 Reservoir

Type	Comment
Water Quality	The entry hatch area is not sealed against contamination and a mesh panel adjacent to the platform area has been damaged and is not sealed against bird or vermin entry. The heavily corroded ladder and internal pipe fittings will also be affecting the stored water quality.

Hat Head No2 Reservoir

Type	Comment
Structural	This is the No4 tank in the re-coating priority list at present. There is corrosion on the floor,

	mainly around the top fill inlet area - an impressed CP system is recommended to extend the existing coating life.
Water Quality	The entry hatch area is not sealed effectively against water borne contamination and vermin - there were 6 dead frogs in the sediment. The water levels also need to be cycled up and down more to keep the walls free of suspended sediments. The galvanised ladder is heavily corroded and this will be affecting the water quality.

John Lane Road Reservoir

Type	Comment
OH&S	The upper internal ladder cage needs to be removed to make confined space access and rescue situations achievable.
Security	The compound fence has been pushed over on one corner and there is a lot of graffiti activity around the lower wall areas.
Structural	The internal coating is deteriorating - an impressed CP system needs to be fitted ASAP to slow down the significant corrosion that is already present across the floor and lower wall areas.
Water Quality	The entry hatch area is not sealed - it needs to be upgraded to include a hinged, overlapping cover combined with a raised front edge area.

New Entrance Reservoir

Type	Comment
OH&S	The corroded internal ladder has a cage fitted and this would make a confined space access or rescue situation difficult.
Water Quality	The corroded internal ladder and fittings will be affecting the stored water quality.

Potters Hill Reservoir

Type	Comment
OH&S	The internal ladder is caged making a confined space rescue and entry difficult.
Security	The fence has a major gap which could allow motor bike entry to the site. The inlet riser support structure also provides an avenue for unauthorised roof access and there is a graffiti on the lower walls at 12 o`clock.
Structural	Multiple areas of the roof edge are unsecured due to loose or missing screws - the roof centre cap is also unsecured.
Water Quality	There are several unsealed areas around the platform where water can drain into the reservoir.

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South West Rocks Borefield Balance Tank

Type	Comment
Security	There are no padlocks fitted on either the entry or rescue hatches.

South West Rocks No 2 Reservoir

Type	Comment
Security	There is no effective security around the tank area - the external aluminium ladder can easily be by-passed by determined persons.
Water Quality	The roof mounted inlet penetration is unsealed and leaves and contamination are entering the tank - there needs to be an aluminium checker plate section fitted under the roof sheets to seal off this area more effectively.

Stuarts Point Reservoir

Type	Comment
OH&S	The sloping internal ladder makes a confined space access or rescue situation difficult.
Structural	The edges of the roof sheets have not been screwed down and they are likely to be damaged in a storm event. This is the first tank in the group of steels that requires re-coating - the coating breakdown is extensive across the floor and lower walls, but non-threatening to the structure at this stage. An impressed CP system would still be recommended if the tank cannot be re-coated in the next 4 years.
Water Quality	The entry hatch area is unsealed and significant amounts of contamination are entering the tank - there were 4 dead bush rats in the tank at the time of cleaning.

Willawarrin Reservoir

Type	Comment
OH&S	There is no solid area on the roof to set up a rescue system if required.
Water Quality	The entry hatch was partially open upon arrival and birds have been accessing the tank. The water carriers have been using a temporary filling hose placed under the entry hatch cover and preventing full closure from occurring - they must be made aware of the contamination consequences of not locking and fully securing the entry hatch after each visit.

The list below is the adopted cleaning schedule for Council reservoirs.

Kempsey Shire Council

Name	Cleaned Date	Cleaning Interval (yrs)	Clean Due	Inspection Date	Inspection Interval (yrs)	Inspection Due	Clean Time (hrs)	Sediment Depth (mm)	Waste Volume (KL)
Arakoon	21/06/2001	0	21/06/2001	22/08/2000	0	22/08/2000	0.00	0.00	0.00
Back Beach	11/03/2011	2	11/03/2013	14/10/2013	2	14/10/2015	1.00	30.00	25.00
Bellbrook	28/08/2012	2	28/08/2014	28/08/2012	2	28/08/2014	0.20	100.00	8.00
Billy Goat Hill	11/03/2011	2	11/03/2013	12/03/2011	2	12/03/2013	0.35	30.00	13.00
Clybucca	09/03/2011	3	09/03/2014	09/03/2011	3	09/03/2014	0.30	15.00	12.00
Crescent Head Collection	27/08/2013	2	27/08/2015	27/08/2013	2	27/08/2015	0.45	300.00	18.00
Crescent Head No1	18/02/2013	2	18/02/2015	30/08/2013	2	30/08/2015	0.45	15.00	18.00
Crescent Head WTP No1	14/10/2013	0	14/10/2013	14/10/2013	0	14/10/2013	0.00	1,000.00	0.00
Crescent Head WTP No2	14/10/2013	1	14/10/2014	14/10/2013	0	14/10/2013	0.40	150.00	16.00
Crescent Head WTP No3	14/10/2013	0	14/10/2013	14/10/2013	0	14/10/2013	1.00	50.00	25.00
Frederickton	08/03/2011	3	08/03/2014	08/03/2011	3	08/03/2014	0.20	25.00	16.00
Green Hills	21/09/2011	2	21/09/2013	21/09/2011	2	21/09/2013	3.20	200.00	90.00
Hat Head Aeration	18/08/2011	3	18/08/2014	18/08/2011	3	18/08/2014	2.00	250.00	50.00
Hat Head No1	10/03/2011	3	10/03/2014	09/03/2011	3	09/03/2014	0.30	30.00	12.00
Hat Head No2	10/03/2011	3	10/03/2014	09/03/2011	3	09/03/2014	0.50	40.00	24.00
John Lane Rd	28/08/2012	3	28/08/2015	28/08/2012	3	28/08/2015	1.00	10.00	25.00
New Entrance	10/03/2011	2	10/03/2013	10/03/2011	2	10/03/2013	0.45	20.00	18.00
Potters Hill	08/04/2002	2	08/04/2004	27/08/2013	2	27/08/2015	8.50	10.00	240.00
South West Rocks Collection	27/08/2013	2	27/08/2015	27/08/2013	2	27/08/2015	1.30	50.00	37.00
South West Rocks No1	21/06/2001	2	21/06/2003	15/05/2001	2	15/05/2003	2.30	40.00	62.00
South West Rocks No2	27/08/2012	3	27/08/2015	27/08/2012	3	27/08/2015	4.00	10.00	100.00
Steuart McIntyre Dam	07/08/2009	0	07/08/2009	07/08/2009	0	07/08/2009	0.00	0.00	0.00
Stuarts Point	08/03/2011	2	08/03/2013	08/03/2011	2	08/03/2013	1.50	40.00	48.00
Thungutti No1	03/04/2013	4	03/04/2017	03/04/2013	4	03/04/2017	0.15	10.00	6.00
Thungutti No2	03/04/2013	4	03/04/2017	03/04/2013	4	03/04/2017	0.15	10.00	6.00
Willawarrin	28/08/2012	2	28/08/2014	28/08/2012	2	28/08/2014	0.20	5.00	8.00

APPENDIX J – WATER METER REPLACEMENT PROGRAM

INTRODUCTION

Kempsey Shire Council (KSC) manages 11,340 customer water meters, valued in 2012 by APV Pty Ltd, at $4,463,963.
The aim of this study was to review the existing water meter renewal program and incorporate recent new initiatives into future programs.
The strategy driving the current water meter renewal program is to renew a water meter after 10 years of service or at failure whichever occurs first, regardless of level of usage.

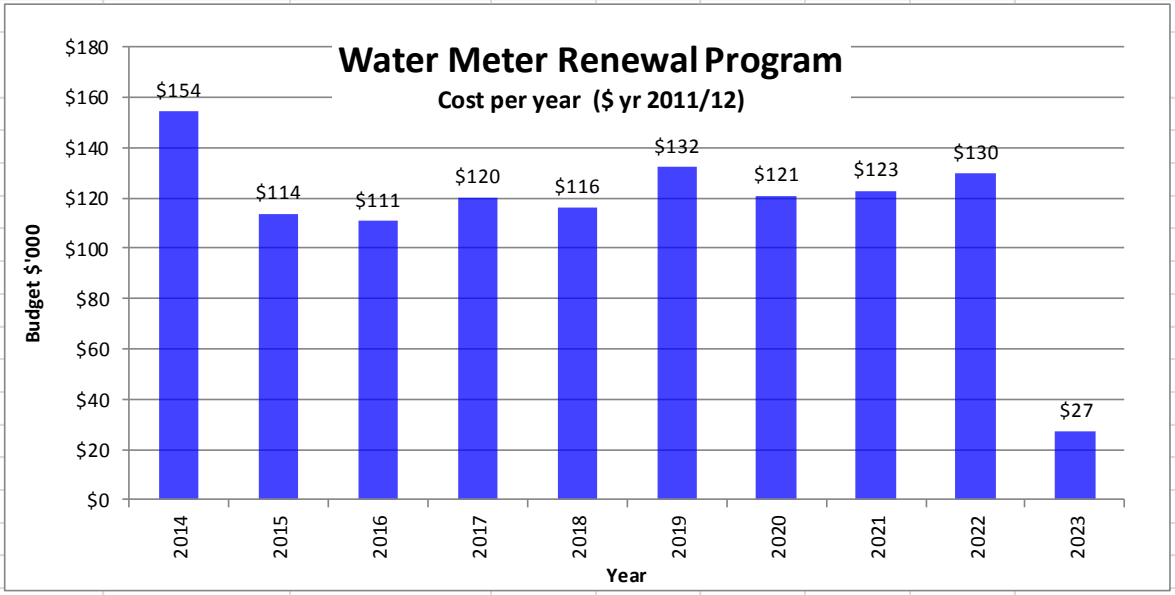
The three high priority customer areas were water meters supplying :

- Agricultural properties – review consumption and
- Large water users with consumption >10,000 Kl per year – meters are to be renewed every 5 years
- Fire Services

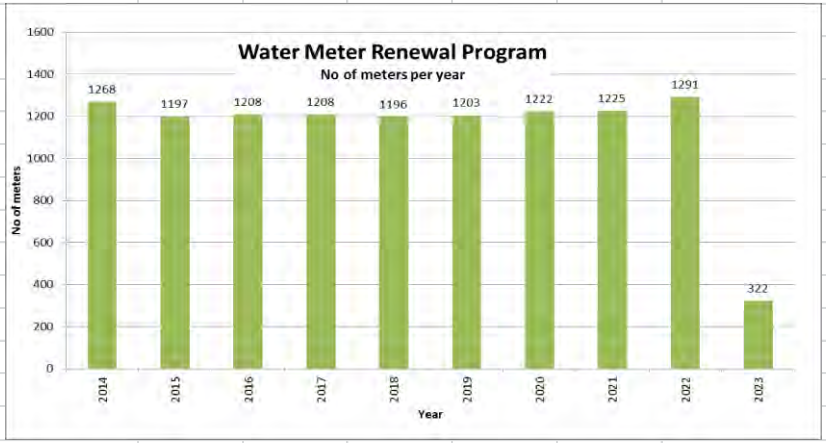
This study was carried out in May 2013 using 2011/12 data.

Water Meter Renewal Program Summary

Installation Year	Age Now	No of Meters	Renewal Year	Age when Renewed
1981	33	1	2014	32
1985	29	4	2014	28
1986	28	4	2014	27
1987	27	2	2014	26
1988	26	4	2014	25
1989	25	6	2014	24
1990	24	4	2014	23
1991	23	8	2014	22
1992	22	9	2014	21
1993	21	5	2014	20
1994	20	9	2014	19
1995	19	13	2014	18
1996	18	19	2014	17
1997	17	17	2014	16
1998	16	28	2014	15
1999	15	39	2014	14
2000	14	264	2014	13
2001	13	670	2014	12
2002	12	1061	2015	12
2003	11	2012	2016,2017	12,13
2004	10	1067	2017,2018	12,13
2005	9	950	2018/2019	12,13
2006	8	557	2019	12
2007	7	502	2020	12
2008	6	428	2020	11
2009	5	683	2020,2021	10,11
2010	4	1051	2021,2022	10,11
2011	3	952	2022	10
2012	2	295	2023	10
Grand Total		10665		



Year	Renewal Budget KSC Act Costs
2014	$154,424
2015	$113,731
2016	$110,770
2017	$120,061
2018	$116,227
2019	$132,199
2020	$120,721
2021	$122,893
2022	$129,608
2023	$27,207
Total	$1,147,842



SUMMARY OF 2011/12 WATER METER STOCK

There are 11,018 Land Parcels with 11,382 active water meters. Within the meter stock are 42 non-customer bulk meters. These meters are used by Council to measure raw water drawn from water sources and water passing through treatment plants, pump stations and reservoirs.

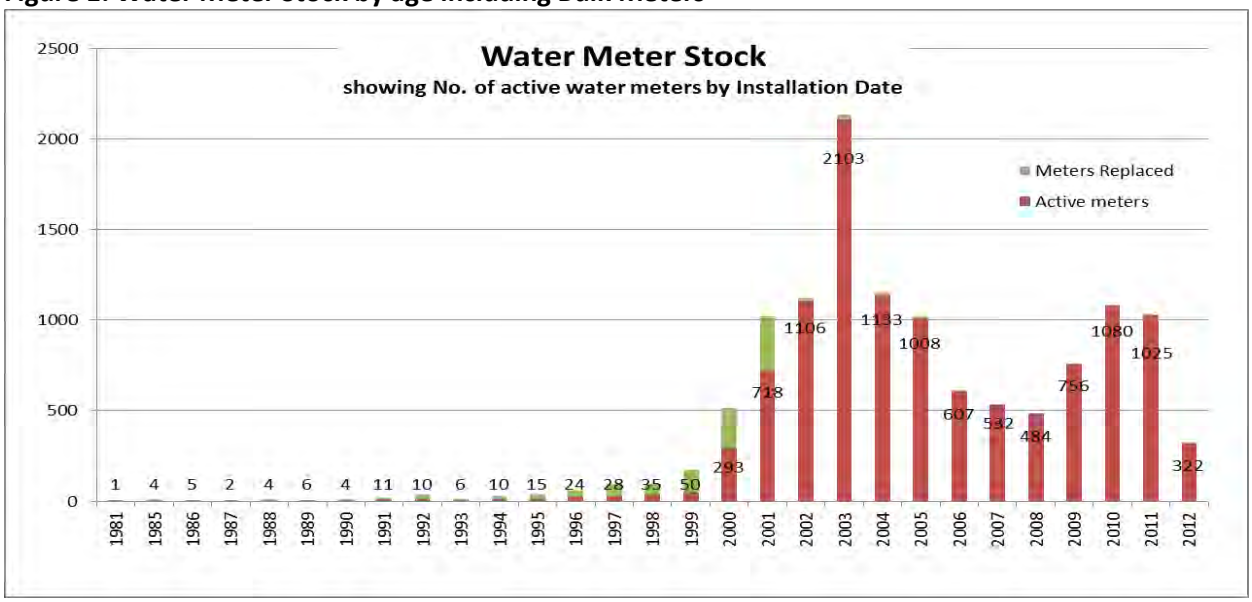
The total 2011/12 Water Meter stock was actually 12,365 including the 983 old meters replaced during the 2011/12 financial year.

Most customer meters are read quarterly except meters supplying major water users which are read every month. The total number of water meter reads was 48,060.

Table 1 : Customer water meter stock.

Customer Type	No. of Meters	History - replaced	No of active meters	Annual Consumption (kl)
Agriculture	779	104	675	303,480
Council Buildings - Public Use	78	9	69	26,021
Multi Residential	774	42	732	168,002
Non Residential	887	49	838	613,512
Parks Ovals	76	7	69	8,950
Residential	9,610	769	8,841	1,394,888
Sewer Installations	83	1	82	63,528
Thungutti	26		26	6,680
Water Installations	8		8	7,784
Grand Total	**12,321**	**981**	**11,340**	**2,592,845**
Bulk Meters	44	2	42	8,111,532

Figure 1: Water Meter Stock by age including Bulk Meters



2011/12 Meter Replacement Statistics

Install Year	Size							
	20mm	25mm	32mm	40mm	50mm	100mm	150mm	Grand Total
1985	3							3
1988	3							3
1990	3	1						4
1991	7	2						9
1992	10	14	1					25
1993	4	2		1				7
1994	15	4						19
1995	17	4						21
1996	24	13						37
1997	54	13		1				68
1998	41	17			1		1-bulk	60
1999	108	13						121
2000	204	14		1				219
2001	287	13		1				301
2002	11	1		1				13
2003	22	5						27
2004	9	3		1	4			17
2005	8	3						11
2006	2	1			1			4
2007	1			1	1			3
2008	2							2
2009	3	1						4
2010	1							1
2011	3							3
2012						1-bulk		1
Grand Total	842	124	1	7	7	1	1	983

Note: 83 of 983 meters replaced were less than 10 years old : assume this is typical – (8.5%)

2011/12 Meter Stock

Customer Type	No. of Meters	Number replaced	Active meters	Annual Cons (kl)
Agriculture	**779**	**104**	**675**	**303,480**
20mm	497	67	430	180,714
25mm	274	36	238	116,265
32mm	3	0	3	1,456
40mm	3	0	3	3,430
50mm	2	1	1	1,615
Council Buildings - Public	**78**	**9**	**69**	**26,021**
20mm	46	5	41	5,427
25mm	18	3	15	2,366
32mm	2	0	2	1,145
40mm	7	1	6	8,027
50mm	1	0	1	563
100mm	4	0	4	8,483
Multi Residential	**774**	**42**	**732**	**168,002**
20mm	581	33	548	67,546
25mm	100	8	92	30,185
32mm	24	1	23	14,085
40mm	43	0	43	23,485
50mm	19	0	19	23,471
80mm	3	0	3	2,219
100mm	4	0	4	7,011
Non Residential	**887**	**49**	**838**	**613,512**
20mm	446	27	419	53,880
25mm	211	11	200	66,884
32mm	55	0	55	25,246
40mm	64	6	58	65,677
50mm	59	5	54	74,690
80mm	10	0	10	46,519
100mm	37	0	37	280,584
150mm	5	0	5	32
Parks Ovals	**76**	**7**	**69**	**8,950**
20mm	53	4	49	3,973
25mm	15	3	12	2,689
32mm	2	0	2	1,347
40mm	2	0	2	363
50mm	2	0	2	573
100mm	2	0	2	5
Residential	**9610**	**769**	**8841**	**1,394,888**
20mm	8932	705	8227	1,252,255
25mm	664	63	601	137,018
32mm	11	0	11	4,852
40mm	2	0	2	516
50mm	1	1	0	247

Sewer Installations	**83**	**1**	**82**	**63,528**
20mm	63	1	62	37,723
25mm	11	0	11	5,155
32mm	1	0	1	
40mm	1	0	1	
50mm	5	0	5	2,788
100mm	2	0	2	17,862
Thungutti	26	0	26	6,680
20mm	26	0	26	6,680
Water Installations	**8**	**0**	**8**	**7,784**
20mm	2	0	2	18
25mm	3	0	3	3,745
32mm	1	0	1	122
40mm	1	0	1	3,803
100mm	1	0	1	96
Bulk Meters	**44**	**2**	**42**	
25mm	1	0	1	
40mm	1	0	1	
80mm	8	0	8	
100mm	19	1	18	
150mm	6	1	5	
200mm	2	0	2	
300mm	3	0	3	
375mm	1	0	1	
450mm	1	0	1	
500mm	2	0	2	
Grand Total	**12365**	**983**	**11382**	

Findings

The current water meter renewal program is working well. Figure 1 shows that there are only 172 meters installed prior to year 2000, (14 year old) still in service. Many of these meters had zero consumption during the 2011/2012 financial year which is likely to mean the meters are either disused or cannot be found.

It is recommended that all pre 2000 water meters should be found and either replaced or disconnected and removed during the 2013/2014 financial year.

Renewal Priorities

The water meter renewal strategy has three main priorities namely

High consumption water meters, ie with consumption >10,000 kL/yr should be renewed every 5 years.

Water meters supplying agricultural businesses, specifically dairy and beef cattle, stock watering have had issues with accuracy The desired replacement age (useful life) of the general water meter stock is 10 yrs.

There is a water meter stock of 11,340

Need to renew approximately = 1,150 per year

Early replacements account for 8.5% or 98 meters per year, say 100 meters per year

Replacement program needed for 1,050 meters per year.

Priorities

Agricultural meters with high consumption and age ??? 5 yrs, -

10yr old with high cons -2 meters

>5 yr old with high cons (>1500kl/yr) – 10 meters

Any meter older than 15 years (up to and including 1997) = 130 (only 13 meters have >500KL usage)

10-15 year (2062+134=2,196) – replace over three years

With high consumption meters (<1500kl) = (21+3 = 24)

With high consumption meters (<1000kl) = (21+3+ 66+12 = 24+78 = 102)

Then all 14 (yr 1998) = 35

Then all 13 (yr 1999) = 50

Then all 12 (yr 2000) = 293

Customer Types

Agricultural Property Meters

Customer Type	No. of Meters	History - replaced	No of active meters	Annual Consumption (kl)
Agriculture	**779**	**104**	**675**	**303,480**
20mm	497	67	430	180,714
25mm	274	36	238	116,265
32mm	3	0	3	1,456
40mm	3	0	3	3,430
50mm	2	1	1	1,615

Install Year	No of Meters	Cumulative
1986	1	1
1991	3	4
1992	1	5
1993	1	6
1994	1	7
1995	2	9
1996	5	14
1997	10	**24**
1998	6	30
1999	11	41
2000	29	70
2001	48	118
2002	40	**158**
2003	75	233
2004	61	294
2005	56	350
2006	47	397
2007	30	427
2008	54	481
2009	72	553
2010	25	578
2011	70	648
2012	27	675
Total	**675**	

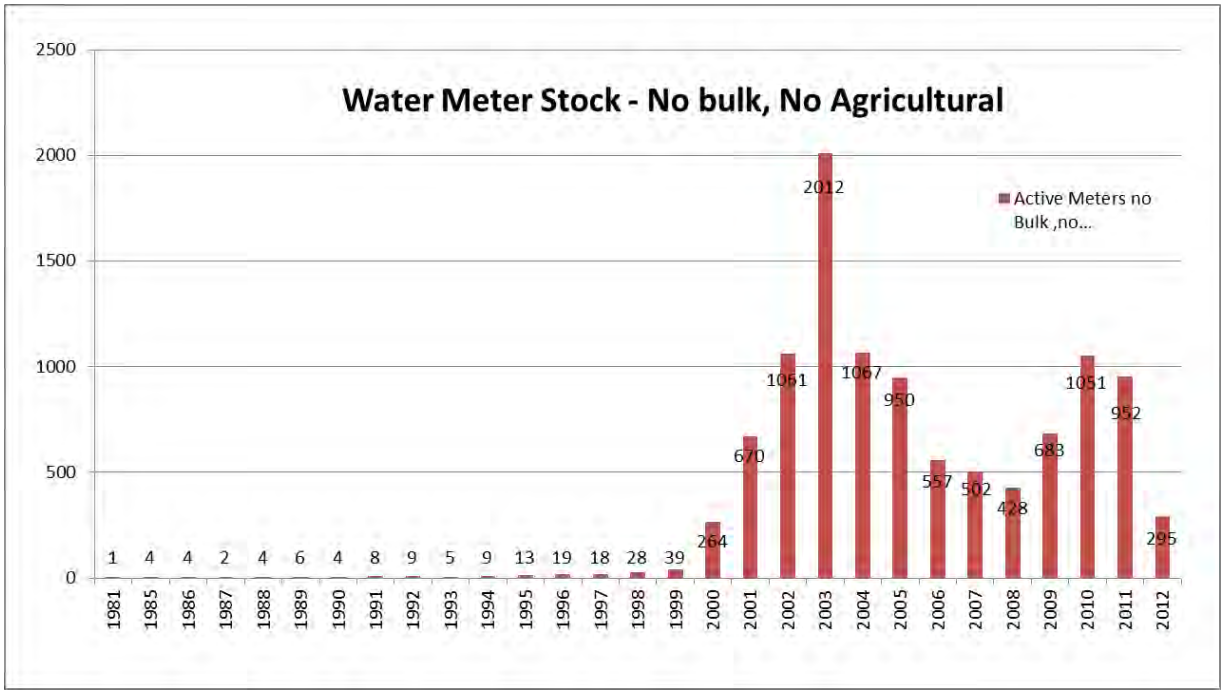
Agricultural Meters - Age/Size/Consumption

		Consumption range (kl/yr)								
Install Year & Meter Size	**Total**	>6000	4000 3000	3000 2000	6000 4000	2000-1500	1500-1000	1000-500	500-1	Zero Reading
1986	**1**									**1**
20mm										1
1991	**3**								**3**	
20mm									1	
25mm									2	
1992	**1**									**1**
20mm										1
1993	**1**								**1**	
20mm									1	
1994	**1**									**1**
25mm										1
1995	**2**						**1**		**1**	
25mm							1		1	
1996	**5**								**5**	
20mm									4	
25mm									1	
1997	**10**							**4**	**5**	**1**
20mm								4	2	
25mm									3	1
1998	**6**							**1**	**5**	
20mm								1	4	
25mm									1	
1999	**11**							**1**	**10**	
20mm								1	7	
25mm									3	
2000	**29**							**1**	**27**	**1**
20mm								1	22	1
25mm									4	
32mm									1	
2001	**48**			**1**		**3**	**3**	**2**	**33**	**6**
20mm				1		1	2	1	23	1
25mm						2	1	1	10	5
2002	**40**			**2**			**2**	**4**	**31**	**1**
20mm				1			1	2	20	
25mm				1			1	2	11	1
2003	**75**			**1**		**2**	**2**	**9**	**55**	**6**
20mm				1		1	2	7	39	4
25mm								2	16	2
40mm						1				
2004	**61**			**2**			**8**	**9**	**40**	**2**
20mm				2			4	5	28	1
25mm							3	4	12	1
32mm							1			

2005	**56**			**2**			**1**	**13**	**37**	**3**
20mm				1				6	22	2
25mm				1			1	6	15	1
40mm								1		
2006	**47**		**2**			**2**		**8**	**30**	**5**
20mm						2		4	20	2
25mm			2					4	10	3
2007	**30**			**1**			**2**	**4**	**21**	**2**
20mm				1			1	4	8	2
25mm							1		13	
2008	**54**		**1**	**1**	**2**		**5**	**8**	**34**	**3**
20mm			1	1	2		1	3	22	1
25mm							4	5	12	2
2009	**72**			**3**		**3**	**2**	**9**	**50**	**5**
20mm				1			2	4	28	4
25mm				2		3		5	22	
32mm										1
2010	**25**	**1**					**2**	**5**	**14**	**3**
20mm							2	4	12	2
25mm		1						1	2	1
2011	**70**	**1**		**1**	**1**	**2**		**14**	**49**	**2**
20mm		1			1			10	36	1
25mm				1		2		3	13	1
50mm								1		
2012	**27**						**1**	**1**	**21**	**4**
20mm								1	13	4
25mm									8	
40mm							1			
Grand Total	**675**	**2**	**3**	**14**	**3**	**12**	**29**	**93**	**472**	**47**

All Active Meters except bulk and Agricultural Property Meters

Year	No of Meters	Cumulative
1981	1	1
1985	4	5
1986	4	9
1987	2	11
1988	4	15
1989	6	21
1990	4	25
1991	8	33
1992	9	42
1993	5	47
1994	9	56
1995	13	69
1996	19	88
1997	18	**106**
1998	28	134
1999	39	173
2000	264	437
2001	670	1107
2002	1061	**2168**
2003	2012	4180
2004	1067	5247
2005	950	6197
2006	557	6754
2007	502	7256
2008	428	7684
2009	683	8367
2010	1051	9418
2011	952	10370
2012	295	10665
Total	10665	


Water Meter Stock - No bulk, No Agricultural
Active Meters no Bulk ,no...
2500
2000
1500
1000
500
0
1 4 4 2 4 6 4 8 9 5 9 13 19 18 28 39 264 670 1061 2012 1067 950 557 502 428 683 1051 952 295
1981 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

Bulk Meters

There are 42 meters labelled Bulk Meters. Two bulk meters were replaced in 2011/12
The oldest meter is 15 years old (vintage 1998). It is an 80mm meter at Bellbrook (Label= BELLBPUMP) and should be replaced next financial year.
All other meters are 2 – 11 years old.

Suggested Renewal Program for Bulk Meters
Work toward renewal every 10 yrs for meters in constant usage and 15 yrs for meters used intermittently - eg. Emergency bores.
The Crescent Head Bore meters and Dam WPS meters are 11 years old and should also be replaced in 2013/14.
Many meters are 10 years old. I suggest all Hathead and SWR meters should be replaced in 2014/15.

Meter Size	Installation Year											
	1998	2002	2003	2004	2005	2006	2008	2009	2010	2011	2012	Total
25mm			1									1
40mm				1								1
80mm	1	3	2		1			1				8
100mm			12	1		1			2	2	**1**	18
150mm	**1**		1	1		1			2			5
200mm					1					1		2
300mm		1				1	1					3
375mm				1								1
450mm		1										1
500mm				1			1					2
Total	**1**	**5**	**16**	**5**	**2**	**3**	**2**	**1**	**4**	**3**	**0**	**42**
RED - replaced in 2011/2012												

Meter Size	**No . of meters**	
25mm	1	Kinchela
40mm	1	C/HD Treat
80mm	8	
150mm	5	
200mm	2	
300mm	3	
375mm	1	Dam- Belgrave
450mm	1	Dam outlet to Greenhill
500mm	2	Dam inlet, Lime Plant
Grand Total	42	

Bulk Meter Renewal Year (Sorted by Age)

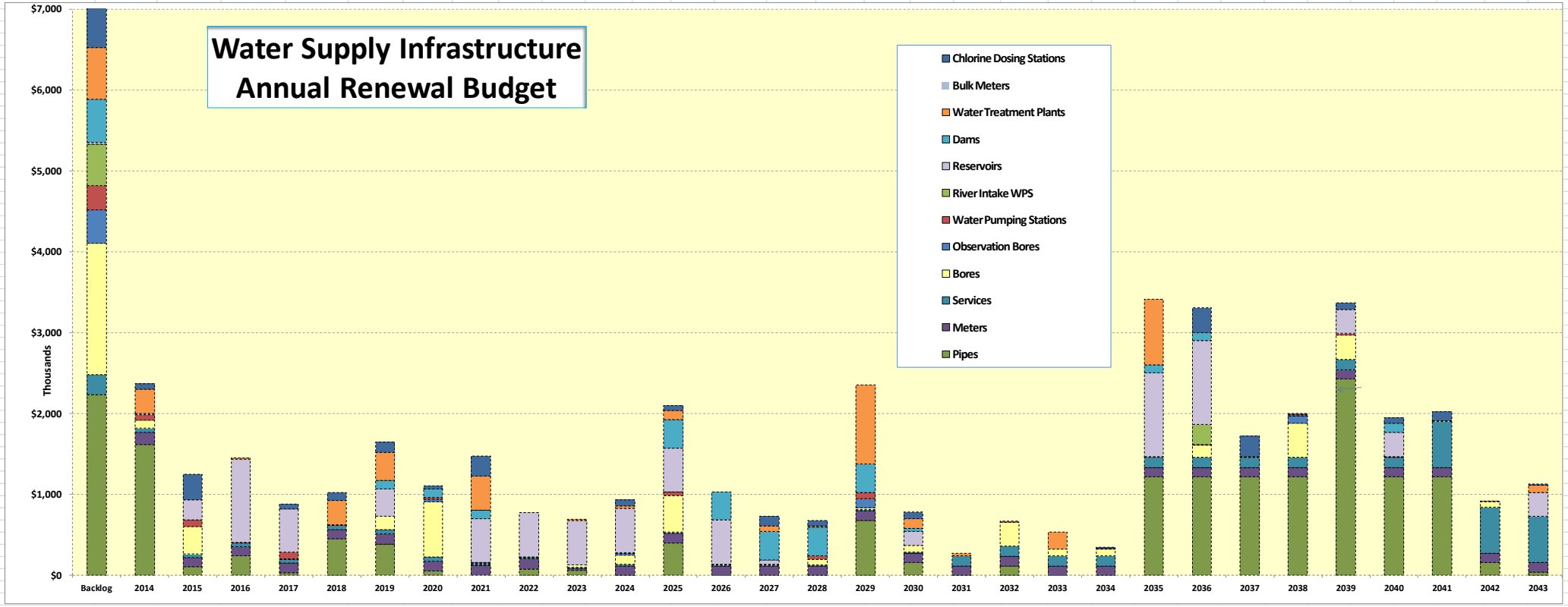
Supply	Source	Meter No	Meter Size	Street Name	Location	Cons	Const Yr	Age	Renewal Year
Bellbrook	Bellbrook	BELLB PUMP	80mm	MAIN STREET	BELLBROOK	8,029	1998	15	2014
Crescent Hd	Back Beach	CRES RES00	150mm	POINT PLOMER ROAD	CRESCENT HEAD	1,074	1998	15	2012
Crescent Hd	Borefield	C/HD BORE3	80mm	TEA TREE LANE	BELMORE RIVER	96,513	2002	11	2014
Crescent Hd	Borefield	C/HD BORE2	80mm	TEA TREE LANE	BELMORE RIVER	57,242	2002	11	2014
Crescent Hd	Borefield	C/HD BORE1	80mm	TEA TREE LANE	BELMORE RIVER	40	2002	11	2014
Kempsey	Greenhill	DAM JOHN/L	300mm	ARMIDALE ROAD	YARRAVEL	169,816	2002	11	2014
Kempsey		DAM GREENH	450mm	ARMIDALE ROAD	YARRAVEL	1,671,759	2002	11	2014
Hat Head	Borefield	H/HD BORE1	100mm	HAT HEAD BOREFIELD	HAT HEAD	19,809	2003	10	2015
Hat Head	Borefield	H/HD BORE2	100mm	HAT HEAD BOREFIELD	HAT HEAD	18,712	2003	10	2015
Hat Head	Borefield	H/HD BORE3	80mm	HAT HEAD BOREFIELD	HAT HEAD	18,073	2003	10	2015
Kempsey	Greenhill	EVE LN BOO	100mm	COLLOMBATTI ROAD	COLLOMBATTI	0	2003	10	2020
Kempsey	Greenhill	MX35619000	25mm	MCKAYS ACCESS ROAD	KINCHELA	0	2003	10	2020
Kempsey	Potters Hill	BLOOMFIELD	150mm	BLOOMFIELD STREET	SOUTH KEMPSEY	0	2003	10	2020
SW Rocks	Borefield	SWR BORE10	100mm	SWR BOREFIELD ACCESS	ARAKOON	327,364	2003	10	2015
SW Rocks	Borefield	SWR BORE03	100mm	SWR BOREFIELD ACCESS	SOUTH WEST ROCKS	137,882	2003	10	2015
SW Rocks	Borefield	SWR BORE12	100mm	SWR BOREFIELD ACCESS	ARAKOON	123,014	2003	10	2015
SW Rocks	Borefield	SWR BORE08	100mm	SWR BOREFIELD ACCESS	ARAKOON	79,574	2003	10	2015
SW Rocks	Borefield	SWR BORE02	100mm	SWR BOREFIELD ACCESS	SOUTH WEST ROCKS	65,423	2003	10	2015
SW Rocks	Borefield	SWR BORE09	100mm	SWR BOREFIELD ACCESS	ARAKOON	47,450	2003	10	2015
SW Rocks	Borefield	SWR BORE11	100mm	SWR BOREFIELD ACCESS	ARAKOON	47,186	2003	10	2015
SW Rocks	Borefield	SWR BORE04	100mm	SWR BOREFIELD ACCESS	SOUTH WEST ROCKS	34,719	2003	10	2015
SW Rocks	Borefield	SWR BORE06	100mm	SWR BOREFIELD ACCESS	SOUTH WEST ROCKS		2003	10	2015
SW Rocks	Borefield	SWR BORE07	80mm	SWR BOREFIELD ACCESS	SOUTH WEST ROCKS	57,984	2003	10	2015
Crescent Hd	Big Nobby	C/HD TREAT	40mm	BELMORE STREET	CRESCENT HEAD	4,675	2004	9	2016
Kempsey	Greenhill	DAMB/GRAVE	375mm	ARMIDALE ROAD	YARRAVEL	366,752	2004	9	2016
Kempsey	Potters Hill	GRAVE PUMP	100mm	OAKLAND ROAD	DONDINGALONG		2004	9	2016
Kempsey		DAM INLET0	500mm	BELLB	YARRAVEL	1,928,965	2004	9	2016
SWR Eff Golf		EFFSWRGOLF	150mm	OFF BELLE OCONNOR	SOUTH WEST ROCKS		2004	9	2016
Kempsey	Greenhill	O4HC033270	80mm	PACIFIC HIGHWAY	KEMPSEY		2005	8	2017
Stuarts Point	Borefield	STUARTS PT1	200mm	STUARTS PT BOREFIELD	STUARTS POINT	149,639	2005	8	2017
Hat Head	Hat Head	H/HD PROD1	100mm	HUNGRY HEAD ROAD	HAT HEAD	30,429	2006	7	2017
SW Rocks	New Entranc	O5W7066330	150mm	GILBERT CORY STREET	SOUTH WEST ROCKS	118,255	2006	7	2017
Kempsey	Greenhill	BELL CHLOR	300mm	PACIFIC HIGHWAY	BELLIMBOPINNI	701,115	2008	5	2018
Kempsey	Greenhill	LIME PLANT	500mm	LINK ROAD	YARRAVEL	345,645	2008	5	2018
SWR Eff Golf		EFFSKGOLF0	80mm	OFF WOOLFORD CRES	SOUTH KEMPSEY	14,532	2009	4	2019
Bellbrook	Bellbrook	BELLWTPRAW	100mm	MAIN STREET	BELLBROOK	9,361	2010	3	2020
Bellbrook	Bellbrook	BELLWTPCLR	100mm	MAIN STREET	BELLBROOK	6,413	2010	3	2020
Crescent Hd	Big Nobby	CRES PUMPO	150mm	PACIFIC STREET	CRESCENT HEAD	137,057	2010	3	2020
SW Rocks	Gregory ST	SWREFFLUEN	150mm	OFF BELLE OCONNOR ST	SOUTH WEST ROCKS	599,842	2010	3	2020
Crescent Hd	Back Beach	CRES RES01	100mm	POINT PLOMER ROAD	CRESCENT HEAD	28,142	2011	2	2021
Stuarts Point	Borefield	STUARTS PT	200mm	STUARTS PT BOREFIELD	STUARTS POINT	158,080	2011	2	2021
Willawarrin		WILLAWARIN	100mm	RD OFF ARMIDALE RD	WILLAWARRIN	8,130	2011	2	2021
SW Rocks	Borefield	SWR BORE05	100mm	SWR BOREFIELD ACCESS	SOUTH WEST ROCKS	200	2012	1	

Supply	Source	Meter No	Meter Size	Street Name	Location	Cons	Const Yr	Replaced in 2011/12	Age
Bellbrook	Bellbrook	BELLWTPRAW	100mm	MAIN STREET	BELLBROOK	9,361	2010	0	3
Bellbrook	Bellbrook	BELLWTPCLR	100mm	MAIN STREET	BELLBROOK	6,413	2010	0	3
Bellbrook	Bellbrook	BELLB PUMP	80mm	MAIN STREET	BELLBROOK	8,029	1998	0	15
Crescent Head	Back Beach	CRES RES01	100mm	POINT PLOMER ROAD	CRESCENT HEAD	28,142	2011	0	2
Crescent Head	Big Nobby	CRES PUMPO	150mm	PACIFIC STREET	CRESCENT HEAD	137,057	2010	0	3
Crescent Head	Back Beach	CRES RES00	150mm	POINT PLOMER ROAD	CRESCENT HEAD	1,074	1998	1	15
Crescent Head	Big Nobby	C/HD TREAT	40mm	BELMORE STREET	CRESCENT HEAD	4,675	2004	0	9
Crescent Head	Borefield	C/HD BORE3	80mm	TEA TREE LANE	BELMORE RIVER	96,513	2002	0	11
Crescent Head	Borefield	C/HD BORE2	80mm	TEA TREE LANE	BELMORE RIVER	57,242	2002	0	11
Crescent Head	Borefield	C/HD BORE1	80mm	TEA TREE LANE	BELMORE RIVER	40	2002	0	11
Hat Head	Hat Head	H/HD PROD1	100mm	HUNGRY HEAD ROAD	HAT HEAD	30,429	2006	0	7
Hat Head	Borefield	H/HD BORE1	100mm	HAT HEAD BOREFIELD ACCESS ROAD	HAT HEAD	19,809	2003	0	10
Hat Head	Borefield	H/HD BORE2	100mm	HAT HEAD BOREFIELD ACCESS ROAD	HAT HEAD	18,712	2003	0	10
Hat Head	Borefield	H/HD BORE3	80mm	HAT HEAD BOREFIELD ACCESS ROAD	HAT HEAD	18,073	2003	0	10
Kempsey	Potters Hill	GRAVE PUMP	100mm	OAKLAND ROAD	DONDINGALONG	-	2004	0	9
Kempsey	Greenhill	EVE LN BOO	100mm	COLLOMBATTI ROAD	COLLOMBATTI	-	2003	0	10
Kempsey	Potters Hill	BLOOMFIELD	150mm	BLOOMFIELD STREET	SOUTH KEMPSEY	-	2003	0	10
Kempsey	Greenhill	MX35619000	25mm	MCKAYS ACCESS ROAD	KINCHELA	-	2003	0	10
Kempsey	Greenhill	BELL CHLOR	300mm	PACIFIC HIGHWAY	BELLIMBOPINNI	701,115	2008	0	5
Kempsey	Greenhill	DAM JOHN/L	300mm	ARMIDALE ROAD	YARRAVEL	169,816	2002	0	11
Kempsey	Greenhill	DAMB/GRAVE	375mm	ARMIDALE ROAD	YARRAVEL	366,752	2004	0	9
Kempsey		DAM GREENH	450mm	ARMIDALE ROAD	YARRAVEL	1,671,759	2002	0	11
Kempsey		DAM INLET0	500mm	BELLB	YARRAVEL	1,928,965	2004	0	9
Kempsey	Greenhill	LIME PLANT	500mm	LINK ROAD	YARRAVEL	345,645	2008	0	5
Kempsey	Greenhill	O4HC033270	80mm	PACIFIC HIGHWAY	KEMPSEY	-	2005	0	8
South West Rocks	Borefield	SWR BORE10	100mm	SWR BOREFIELD ACCESS RD	ARAKOON	327,364	2003	0	10
South West Rocks	Borefield	SWR BORE03	100mm	SWR BOREFIELD ACCESS RD	SOUTH WEST ROCKS	137,882	2003	0	10
South West Rocks	Borefield	SWR BORE12	100mm	SWR BOREFIELD ACCESS RD	ARAKOON	123,014	2003	0	10
South West Rocks	Borefield	SWR BORE08	100mm	SWR BOREFIELD ACCESS RD	ARAKOON	79,574	2003	0	10
South West Rocks	Borefield	SWR BORE02	100mm	SWR BOREFIELD ACCESS RD	SOUTH WEST ROCKS	65,423	2003	0	10
South West Rocks	Borefield	SWR BORE09	100mm	SWR BOREFIELD ACCESS RD	ARAKOON	47,450	2003	0	10
South West Rocks	Borefield	SWR BORE11	100mm	SWR BOREFIELD ACCESS RD	ARAKOON	47,186	2003	0	10
South West Rocks	Borefield	SWR BORE04	100mm	SWR BOREFIELD ACCESS RD	SOUTH WEST ROCKS	34,719	2003	0	10
South West Rocks	Borefield	SWR BORE05	100mm	SWR BOREFIELD ACCESS RD	SOUTH WEST ROCKS	200	2012	1	1
South West Rocks	Borefield	SWR BORE06	100mm	SWR BOREFIELD ACCESS RD	SOUTH WEST ROCKS	-	2003	0	10
South West Rocks	Gregory Street	SWREFFLUEN	150mm	OFF BELLE OCONNOR STREET	SOUTH WEST ROCKS	599,842	2010	0	3
South West Rocks	New Entrance	O5W7066330	150mm	GILBERT CORY STREET	SOUTH WEST ROCKS	118,255	2006	0	7
South West Rocks	Borefield	SWR PUMP00	300mm	SWR BOREFIELD ACCESS ROAD	SOUTH WEST ROCKS	522,637	2006	0	7
South West Rocks	Borefield	SWR BORE07	80mm	SWR BOREFIELD ACCESS RD	SOUTH WEST ROCKS	57,984	2003	0	10
Stuarts Point	Borefield	STUARTS PT	200mm	STUARTS PT BOREFIELD ACCESS RD	STUARTS POINT	158,080	2011	0	2
Stuarts Point	Borefield	STUARTS PT1	200mm	STUARTS PT BOREFIELD ACCESS RD	STUARTS POINT	149,639	2005	0	8
SWR Effluent Golf		EFFSWRGOLF	150mm	OFF BELLE OCONNOR STREET	SOUTH WEST ROCKS	-	2004	0	9
SWR Effluent Golf		EFFSKGOLF0	80mm	OFF WOOLFORD CRES	SOUTH KEMPSEY	14,532	2009	0	4
Willawarrin		WILLAWARIN	100mm	UNNNAMED RD OFF ARMIDALE RD	WILLAWARRIN	8,130	2011	0	2

APPENDIX K – WATER SUPPLY ASSETS ANNUAL RENEWAL PROGRAM

Water Supply Infrastructure Annual Renewal Budget - Adjusted

No.		This Year 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
Year	Backlog	2014	2015	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
TOTAL	**$7,078,608**	**$2,369,043**	**$1,246,932**	**$1,447,776**	**$881,399**	**$1,025,778**	**$1,647,988**	**$1,106,500**	**$1,470,362**	**$773,874**	**$689,816**	**$934,891**	**$2,100,306**	**$1,031,346**	**$729,832**	**$675,325**	**$2,389,203**	**$780,280**	**$267,385**	**$671,700**	**$537,096**	**$343,186**	**$3,412,407**	**$3,303,632**	**$1,723,748**	**$2,000,987**	**$3,370,165**	**$1,943,516**	**$2,023,537**	**$918,810**	**$1,126,816**
Asset Type																															
Pipes	$2,233,510	$1,615,264	$103,462	$240,959	$28,247	$451,119	$380,112	$53,662	$0	$71,959	$57,086	$1,282	$401,109	$0	$0	$0	$679,266	$155,350	$681	$116,128	$2,033	$2,034	$1,214,530	$1,214,531	$1,214,532	$1,214,533	$2,424,990	$1,214,535	$1,214,536	$157,061	$40,635
Meters		$154,424	$113,731	$110,770	$120,061	$116,227	$132,199	$120,721	$122,893	$129,608	$27,207	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784	$114,784
Services	$249,305	$49,804	$49,804	$49,804	$49,804	$49,804	$49,804	$49,804	$15,968	$15,968	$15,968	$15,968	$15,968	$15,968	$15,968	$15,968	$15,968	$15,968	$126,920	$126,920	$126,920	$126,920	$126,920	$126,920	$126,920	$126,920	$126,920	$126,920	$571,321	$571,321	$571,321
Bores	$1,623,888	$98,770	$335,566	$0	$5,680	$0	$165,838	$685,354	$6,400	$6,439	$26,770	$120,118	$453,772	$3,280	$1,835	$65,420	$24,700	$80,278	$0	$293,018	$81,328	$80,278	$6,560	$148,764	$2,644	$425,092	$304,788	$3,280	$5,500	$69,084	$0
Observation Bores	$411,400							$28,050	$9,350			$18,700					$112,200									$85,050					
Water Pumping Stations	$299,720	$64,900	$84,460	$5,660	$85,000	$7,440	$1,000	$28,260	$0	$2,500	$4,800	$7,560	$41,300	$0	$0	$46,850	$77,470	$0	$0	$20,850	$0	$5,000	$0	$8,200	$0	$19,956	$16,208	$8,200	$0	$6,560	$0
River Intake WPS	508640																							247640							
Reservoirs	$25,000	$16,400	$245,800	$1,028,082	$531,730	$0	$337,240	$0	$547,399	$547,399	$547,399	$547,399	$547,399	$547,399	$57,330	$0	$0	$178,700	$0	$0	$0	$0	$1,041,600	$1,041,600	$0	$0	$298,425	$298,425	$0	$0	$298,425
Dams	$529,500	$0	$0	$0	$0	$0	$103,628	$103,628	$103,628	$0	$0	$0	$349,914	$349,914	$349,914	$349,914	$349,914	$34,000	$0	$0	$0	$0	$94,313	$94,313	$0	$0	$0	$115,000	$0	$0	$0
Water Treatment Plants	$643,094	$300,000	$0	$12,500	$0	$299,587	$351,048	$0	$423,032	$0	$10,585	$28,700	$116,059	$0	$69,535	$13,538	$976,500	$121,600	$25,000	$0	$212,031	$1,520	$813,700	$0	$4,952	$0	$0	$0	$0	$0	$89,000
Chlorine Dosing Stations	$554,550	$69,480	$314,108	$0	$60,876	$101,600	$127,118	$37,020	$241,691	$0	$0	$80,380	$60,000	$0	$120,465	$68,850	$0	$79,600	$0	$0	$0	$12,650	$0	$306,880	$259,917	$14,652	$84,050	$62,372	$117,396	$0	$12,650
Bulk Meters																															
Filling Stations																	$38,400														



ABBREVIATIONS

AAAC	Average annual asset consumption
AMP	Asset management plan
ARI	Average recurrence interval
BOD	Biochemical (biological) oxygen demand
CRC	Current replacement cost
CWMS	Community wastewater management systems
DA	Depreciable amount
DoH	Department of Health
EF	Earthworks/formation
IRMP	Infrastructure risk management plan
LCC	Life Cycle cost
LCE	Life cycle expenditure
MMS	Maintenance management system
PCI	Pavement condition index
RV	Residual value
SS	Suspended solids
vph	Vehicles per hour

GLOSSARY

Annual service cost (ASC)
An estimate of the cost that would be tendered, per annum, if tenders were called for the supply of a service to a performance specification for a fixed term. The Annual Service Cost includes operating, maintenance, depreciation, finance/ opportunity and disposal costs, less revenue.

Asset class
Grouping of assets of a similar nature and use in an entity's operations (AASB 166.37).

Asset condition assessment
The process of continuous or periodic inspection, assessment, measurement and interpretation of the resultant data to indicate the condition of a specific asset so as to determine the need for some preventative or remedial action.

Asset management
The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.

Assets
Future economic benefits controlled by the entity as a result of past transactions or other past events (AAS27.12).

Property, plant and equipment including infrastructure and other assets (such as furniture and fittings) with benefits expected to last more than 12 month.

Average annual asset consumption (AAAC)*
The amount of a local government"s asset base consumed during a year. This may be calculated by dividing the Depreciable Amount (DA) by the Useful Life and totalled for each and every asset OR by dividing the Fair Value (Depreciated Replacement Cost) by the Remaining Life and totalled for each and every asset in an asset category or class.

Brownfield asset values**
Asset (re)valuation values based on the cost to replace the asset including demolition and restoration costs.

Capital expansion expenditure
Expenditure that extends an existing asset, at the same standard as is currently enjoyed by residents, to a new group of users. It is discretional expenditure, which increases future operating, and maintenance costs, because it increases council"s asset base, but may be associated with additional revenue from the new user group, eg. extending a drainage or road network, the provision of an oval or park in a new suburb for new residents.

Capital expenditure
Relatively large (material) expenditure, which has benefits, expected to last for more than 12 months. Capital expenditure includes renewal, expansion and upgrade. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

Capital funding
Funding to pay for capital expenditure.

Capital grants
Monies received generally tied to the specific projects for which they are granted, which are often upgrade and/or expansion or new investment proposals.

Capital investment expenditure
See capital expenditure definition

Capital new expenditure
Expenditure which creates a new asset providing a new service to the community that did not exist beforehand. As it increases service potential it may impact revenue and will increase future operating and maintenance expenditure.

Capital renewal expenditure
Expenditure on an existing asset, which returns the service potential or the life of the asset up to that which it had originally. It is periodically required expenditure, relatively large (material) in value compared with the value of the components or sub-components of the asset being renewed. As it reinstates existing service potential, it has no impact on revenue, but may reduce future operating and maintenance expenditure if completed at the optimum time, eg. resurfacing or resheeting a material part of a road network, replacing a material section of a drainage network with pipes of the same capacity, resurfacing an oval. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

Capital upgrade expenditure
Expenditure, which enhances an existing asset to provide a higher level of service or expenditure that will increase the life of the asset beyond that which it had originally. Upgrade expenditure is discretional and often does not result in additional revenue unless direct user charges apply. It will increase operating and maintenance expenditure in the future because of the increase in the council"s asset base, eg. widening the sealed area of an existing road, replacing drainage pipes with pipes of a greater capacity, enlarging a grandstand at a sporting facility. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

Carrying amount
The amount at which an asset is recognised after deducting any accumulated depreciation / amortisation and accumulated impairment losses thereon.

Class of assets
See asset class definition

Component
An individual part of an asset which contributes to the composition of the whole and can be separated from or attached to an asset or a system.

Cost of an asset
The amount of cash or cash equivalents paid or the fair value of the consideration given to acquire an asset at the time of its acquisition or construction, plus any costs necessary to place the asset into service. This includes one-off design and project management costs.

Current replacement cost (CRC)
The cost the entity would incur to acquire the asset on the reporting date. The cost is measured by reference to the lowest cost at which the gross future economic benefits could be obtained in the normal course of business or the minimum it would cost, to replace the existing asset with a technologically modern equivalent new asset (not a second hand one) with the same economic benefits (gross service potential) allowing for any differences in the quantity and quality of output and in operating costs.

Current replacement cost "As New" (CRC)
The current cost of replacing the original service potential of an existing asset, with a similar modern equivalent asset, i.e. the total cost of replacing an existing asset with an as NEW or similar asset expressed in current dollar values.

Cyclic Maintenance**
Replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, cycle, replacement of air conditioning equipment, etc. This work generally falls below the capital/ maintenance threshold and needs to be identified in a specific maintenance budget allocation.

Depreciable amount
The cost of an asset, or other amount substituted for its cost, less its residual value (AASB 116.6)

Depreciated replacement cost (DRC)
The current replacement cost (CRC) of an asset less, where applicable, accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired future economic benefits of the asset

Depreciation / amortisation
The systematic allocation of the depreciable amount (service potential) of an asset over its useful life.

Economic life
See useful life definition.

Expenditure
The spending of money on goods and services. Expenditure includes recurrent and capital.

Fair value
The amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties, in an arms length transaction.

Greenfield asset values **
Asset (re)valuation values based on the cost to initially acquire the asset.

Heritage asset
An asset with historic, artistic, scientific, technological, geographical or environmental qualities that is held and maintained principally for its contribution to knowledge and culture and this purpose is central to the objectives of the entity holding it.

Impairment Loss
The amount by which the carrying amount of an asset exceeds its recoverable amount.

Infrastructure assets
Physical assets of the entity or of another entity that contribute to meeting the public's need for access to major economic and social facilities and services, eg. roads, drainage, footpaths and cycleways. These are typically large, interconnected networks or portfolios of composite assets The components of these assets may be separately maintained, renewed or replaced individually so that the required level and standard of service from the network of assets is continuously sustained. Generally the components and hence the assets have long lives. They are fixed in place and are often have no market value.

Investment property
Property held to earn rentals or for capital appreciation or both, rather than for:
(a) use in the production or supply of goods or services or for administrative purposes; or
(b) sale in the ordinary course of business (AASB 140.5)

Level of service
The defined service quality for a particular service against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental, acceptability and cost).

Life Cycle Cost **
The life cycle cost (LCC) is average cost to provide the service over the longest asset life cycle. It comprises annual maintenance and asset consumption expense, represented by depreciation expense. The Life Cycle Cost does not indicate the funds required to provide the service in a particular year.

Life Cycle Expenditure **
The Life Cycle Expenditure (LCE) is the actual or planned annual maintenance and capital renewal expenditure incurred in providing the service in a particular year. Life Cycle Expenditure may be compared to Life Cycle Expenditure to give an initial indicator of life cycle sustainability.

Loans / borrowings
Loans result in funds being received which are then repaid over a period of time with interest (an additional cost). Their primary benefit is in „spreading the burden" of capital expenditure over time. Although loans enable works to be completed sooner, they are only ultimately cost effective where the capital works funded (generally renewals) result in operating and maintenance cost savings, which are greater than the cost of the loan (interest and charges).

Maintenance and renewal gap
Difference between estimated budgets and projected expenditures for maintenance and renewal of assets, totalled over a defined time (eg 5, 10 and 15 years).

Maintenance and renewal sustainability index
Ratio of estimated budget to projected expenditure for maintenance and renewal of assets over a defined time (eg 5, 10 and 15 years).

Maintenance expenditure
Recurrent expenditure, which is periodically or regularly required as part of the anticipated schedule of works required to ensure that the asset achieves its useful life and provides the required level of service. It is expenditure, which was anticipated in determining the asset"s useful life.

Materiality
An item is material is its omission or misstatement could influence the economic decisions of users taken on the basis of the financial report. Materiality depends on the size and nature of the omission or misstatement judged in the surrounding circumstances.

Modern equivalent asset.
A structure similar to an existing structure and having the equivalent productive capacity, which could be built using modern materials, techniques and design. Replacement cost is the basis used to estimate the cost of constructing a modern equivalent asset.

Non-revenue generating investments
Investments for the provision of goods and services to sustain or improve services to the community that are not expected to generate any savings or revenue to the Council, eg. parks and playgrounds, footpaths, roads and bridges, libraries, etc.

Operating expenditure
Recurrent expenditure, which is continuously required excluding maintenance and depreciation, eg power, fuel, staff, plant equipment, on-costs and overheads.

Pavement management system

A systematic process for measuring and predicting the condition of road pavements and wearing surfaces over time and recommending corrective actions.

Planned Maintenance**
Repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown criteria/experience, prioritising scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance. **PMS Score**
A measure of condition of a road segment determined from a Pavement Management System.

Rate of annual asset consumption*
A measure of average annual consumption of assets (AAAC) expressed as a percentage of the depreciable amount (AAAC/DA). Depreciation may be used for AAAC.

Rate of annual asset renewal*
A measure of the rate at which assets are being renewed per annum expressed as a percentage of depreciable amount (capital renewal expenditure/DA).

Rate of annual asset upgrade*
A measure of the rate at which assets are being upgraded and expanded per annum expressed as a percentage of depreciable amount (capital upgrade/expansion expenditure/DA).

Reactive maintenance
Unplanned repair work that carried out in response to service requests and management/supervisory directions.

Recoverable amount
The higher of an asset's fair value, less costs to sell and its value in use.

Recurrent expenditure
Relatively small (immaterial) expenditure or that which has benefits expected to last less than 12 months. Recurrent expenditure includes operating and maintenance expenditure.

Recurrent funding
Funding to pay for recurrent expenditure.

Rehabilitation
See capital renewal expenditure definition above.

Remaining life
The time remaining until an asset ceases to provide the required service level or economic usefulness. Age plus remaining life is economic life.

Renewal
See capital renewal expenditure definition above.

Residual value
The net amount which an entity expects to obtain for an asset at the end of its useful life after deducting the expected costs of disposal.

Revenue generating investments
Investments for the provision of goods and services to sustain or improve services to the community that are expected to generate some savings or revenue to offset operating costs, eg public halls and theatres, childcare centres, sporting and recreation facilities, tourist information centres, etc.

Risk management
The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.

Section or segment
A self-contained part or piece of an infrastructure asset.

Service potential
The capacity to provide goods and services in accordance with the entity's objectives, whether those objectives are the generation of net cash inflows or the provision of goods and services of a particular volume and quantity to the beneficiaries thereof.

Service potential remaining*

A measure of the remaining life of assets expressed as a percentage of economic life. It is also a measure of the percentage of the asset"s potential to provide services that is still available for use in providing services (DRC/DA).

Strategic Management Plan (SA)**
Documents Council objectives for a specified period (3-5 yrs), the principle activities to achieve the objectives, the means by which that will be carried out, estimated income and expenditure, measures to assess performance and how rating policy relates to the Council"s objectives and activities.

Sub-component
Smaller individual parts that make up a component part.

Useful life
Either:
(a) the period over which an asset is expected to be available for use by an entity, or
(b) the number of production or similar units expected to be obtained from the asset by the entity.
It is estimated or expected time between placing the asset into service and removing it from service, or the estimated period of time over which the future economic benefits embodied in a depreciable asset, are expected to be consumed by the council. It is the same as the economic life.

Value in Use
The present value of estimated future cash flows expected to arise from the continuing use of an asset and from its disposal at the end of its useful life. It is deemed to be depreciated replacement cost (DRC) for those assets whose future economic benefits are not primarily dependent on the asset's ability to generate new cash flows, where if deprived of the asset its future economic benefits would be replaced.

Source: DVC 2006, Glossary
Note: Items shown * modified to use DA instead of CRC
Additional glossary items shown **

AWARDS

2005 – Winner of the Green Globe Award
hosted by the former Department of Energy Utilities and Sustainability in November 2005.
Integrated Water Cycle Management. Macleay Water, Kempsey Shire Council demonstrated outstanding commitment to the IWCM process. As the Kempsey Shire Council local water utility, Macleay Water has been continually planning its water and sewerage business activities. In 2002 Macleay Water committed to developing an IWCM strategy for the delivery of urban water services. The IWCM plan considered alternative solutions for the provision of its water supply and demonstrated commitment to large scale effluent reuse.

2007 DOTARS National Award for Local Government, Community Water Grant, Water Savings Category – Commendation for the South West Rocks Water Recycling Scheme

2008 – IPWEA Excellence in Engineering Award
Highly commended Category 4 Occupational Health & Safety for Hat Head vacuum sewerage system.

2010/2011 – Local Government & Shires Associations of NSW Excellence in the Environment Award, Joint Winner – Division C Water Conservation Award for Water Loss Management Plan