ASSET MANAGEMENT PLAN – SEWERAGE 2013 **Procedure 3.4.5**

Policy Goal	3.4	Asset Management Policy
Policy Sub Group	3.4.5	Asset Management Plan – Sewerage 2013
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Wastewater Asset Management Plan

KEMPSEY SHIRE COUNCIL
22 Tozer St, West Kempsey NSW 2440
Telephone: (02) 6566 3200

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EXECUTIVE SUMMARY

Wastewater

BACKGROUND

Kempsey Shire Council owns, operates and maintains the reticulated wastewater systems and is the regulator for on-site septic systems. 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. The coastal towns and villages of South West Rocks, Hat Head, Crescent Head and Stuarts Point have proven to be very popular destinations during holiday periods, with their easy access to beaches and coastal waters.

Peak holiday loads stress the sewerage systems. Several systems need to have additional treatment & storage assets to attenuate peak discharges.

The Kempsey Shire LGA also has a significant dairy and beef cattle industry and associated large processing plants.

There are seven separate sewage reticulation systems and one community effluent scheme in the Kempsey Shire.

The major schemes are located at West Kempsey and South Kempsey, with smaller, independent schemes provided at South West Rocks, Crescent Head, Smithtown/Gladstone, and Frederickton. A community effluent disposal scheme is located in Aldavilla.

Aerial view of West Kempsey Sewer Treatment Plant

In Bellbrook, Stuarts Point, Willawarrin and surrounding rural areas single households provide their own treatment through septic tanks.

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 collects, treats and manages sewage in an environmentally and socially responsible manner.

Council"s wastewater systems comprise 8 treatment plants, 78 pumping stations, 98 observation bores, 158 rising mains, 27 effluent mains, 4053 manholes, 212 kilometres of gravity mains connecting over 7400 properties.
The current replacement cost of these assets is $203 M.

WHAT DOES IT COST?

There are two key indicators of cost.

- 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 wastewater service is estimated at $4.3M per annum. Council"s planned life cycle expenditure for year 1 of the asset management plan was $10.7M which gives a life cycle sustainability index of 2.4.

The total maintenance and capital renewal expenditure required to provide the water supply service the in the next 10 years is estimated at $61.5M. This is an average of $6.15M per annum.

Council"s maintenance and capital renewal expenditure for year 2013/14 of the asset management plan of $8.1M giving a 10 year sustainability index of 1.28.

PLANS FOR THE FUTURE

The two large sewerage systems, West Kempsey and South Kempsey were constructed from 1936 to 1940 and are reaching the end of their useful lives. Both systems have high stormwater infiltration causing issues at the aging STPs.

Two main programs for the next ten years are:

- Stormwater Infiltration Reduction Program and
- Decommissioning of the three oldest sewage treatment plants and construction of one large replacement STP

Both will significantly reduce Council"s sewerage operating and maintenance costs and improve environmental outcomes.

Other priority programs are mechanical & electrical renewal and upgrade programs, including a major SCADA system upgrade.

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 & Sewerage Services Mission Statement

"To collect, treat and manage sewage in an environmentally and socially responsible manner."

MEASURING OUR PERFORMANCE

Quality

Sewerage 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 overarching aim is to have compliant, environmentally sensitive sewerage systems, maintained and renewed in partnership with other levels of government and stakeholders to collect, treat and manage sewage in an environmentally and socially responsible manner.

Safety

We inspect all sewerage 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 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.

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 supply customers with a sewerage service which is reliable, continuous and is operated in an environmentally responsible manner with minimal odours."

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 wastewater 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 wastewater and the levels of service which are targeted performance objectives for the sewer system.
2. Specifically, the level of service the Kempsey LGA community require from wastewater 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 wastewater 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 wastewater asset as well as individual components.
7. It identifies risks, which may cause failure of part of the wastewater 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	Delivery Strategy	Program	How Value and Strategy are addressed in this AMP
Healthy (95%) Wealthy (5%)	Primary Strategy HS-06 : Minimise risk to the community"s health	Removal of wastewater products from serviced areas	Remove wastewater from residential and business premises within the urban areas Treat and responsibly dispose of wastewater Construct a replacement wastewater treatment plant in West Kempsey Complete an augmentation of Hat Head Wastewater Treatment Plant Design and plan for the extension of the wastewater system in South Kempsey to service new development Investigate the construction of a wastewater collection and treatment system for Stuarts Point Replace/Renew wastewater infrastructure to ensure continued operation of the system Undertake improvement works necessary to meet new wastewater licensing requirements Provide a communal effluent collection and disposal system for the small urban allotments in the Sherwood Area Undertake investigation of infiltration into the West Kempsey wastewater system and completed repairs/remedial actions Increase the rate of effluent reuse/recycling within the shire Provide for beneficial reuse of sludge resulting from treatment of wastewater

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
- 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 2005/2006. This report 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:

Table 1.2 – Assets covered by this plan

Asset category	Quantity	Replacement Value (2013)
Treatment plants	8	$72,554,314
Structures	27	$2,692,699
Pump stations	78	$23,107,456
Observation bores	98	$939,208
Sewer retic & trunk mains	212 km	$59,671,560
Sewer rising mains	158	$16,867,184
Effluent mains	27	$7,969,232
Manholes	4053	$18,764,372
Study/Reports	4	$134,858
TOTAL WASTEWATER ASSETS		**$202,700,883**

A detailed list of assets is included in Appendix A.

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:

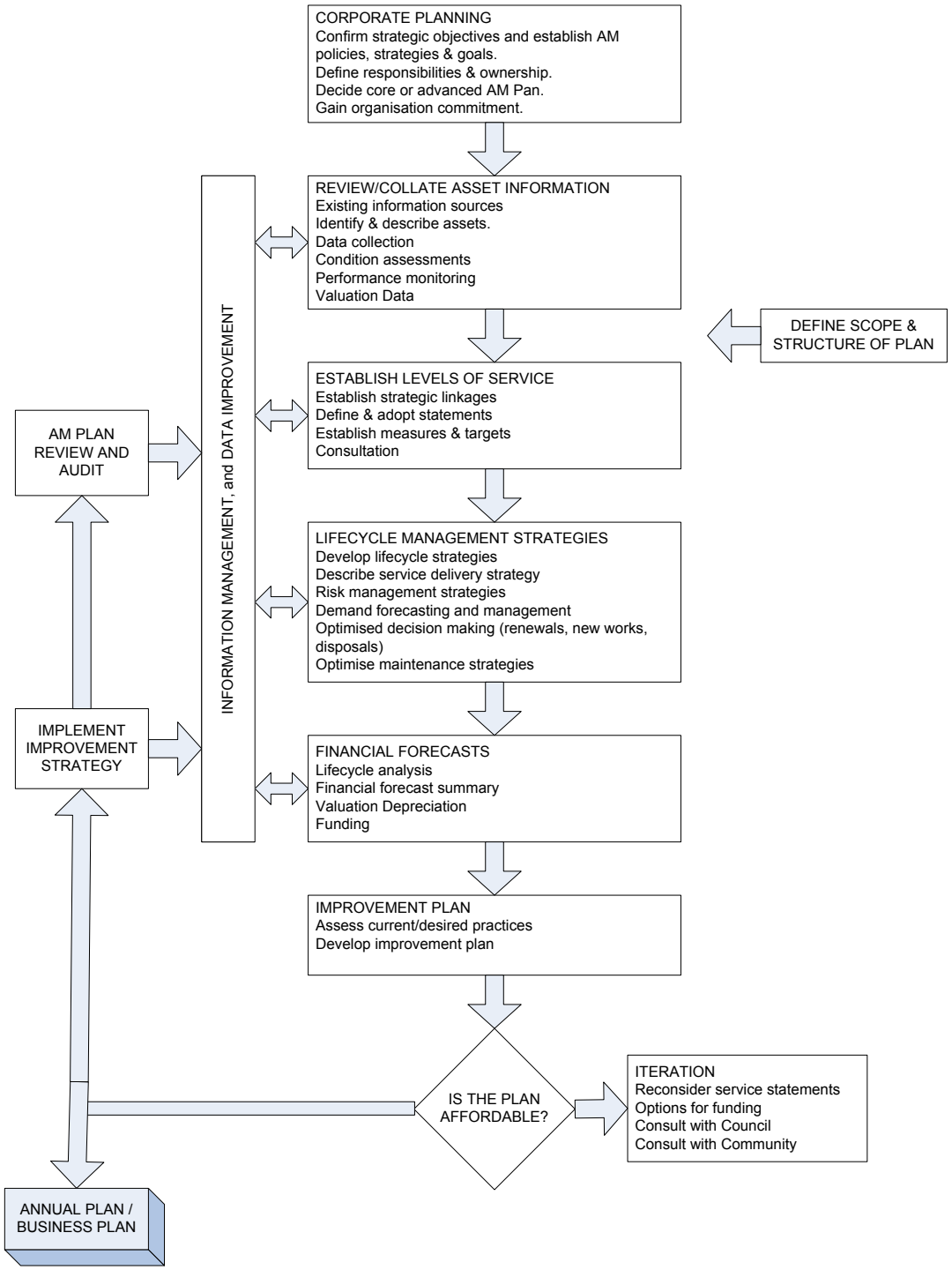
- Levels of service – specifies the services and levels of service to be provided by Council.
- Future demand – how this will impact on future service delivery and how this is to be met.
- Life cycle management – how Council will manage its existing and future assets to provide the required services
- 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.
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 strategic goals and are based on customer expectations and statutory requirements.

2.1 WHAT ARE LEVELS OF SERVICE ?

Before determining optimal strategies for managing the wastewater 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 wastewater infrastructure, and 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:

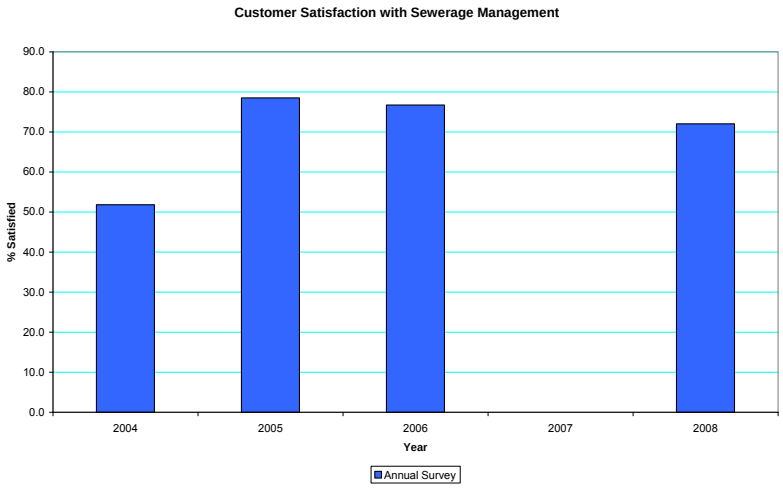
- Periodic Resident Surveys;
- Community consultations;
- Individual customer contact on a day to day basis.
- Customer contact follow-up call

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 72% of the respondents were highly satisfied with sewerage management. Sewerage management was the eleventh 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 natural disaster declared. Subsequent floods in 2100, 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
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. 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 2.3 and are reported monthly to Council as KPIs. Graphical representations of these KPI performances 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.

Cleaning the sedimentation tank at South Kempsey Sewer Treatment Plant

Table 2.2 - Current Service Levels

Sewerage System Design Parameters		
Average dry weather flow (ADWF)	0.011 L/s/tenement	
Peak wet weather flow including storm allowance (PWWF)	0.077 L/s/tenement	
Description	**Level of Service**	**Current Performance**
Extent of area serviced: West Kempsey, South Kempsey, Frederickton, Smithtown, Gladstone, South West Rocks, Hat Head, Crescent Head		
SERVICE INTERUPTION TO CUSTOMERS		
STP failure due to rainfall and deficient capacity	Maximum 2 failures per year	Being met in all but years of consecutive natural disaster declared floods. Assessed annually as part of the utility reporting to NSW Office of Water and nationally
Pumping station failures due to pump or other breakdown including power failure	Maximum 2 failures per year	
Unplanned interruptions	Maximum 3 unplanned interruptions per year	
Sewer main chokes and collapses per 100 km of sewer main per year	Maximum 50 per year	
Catastrophic and major dry-weather sewer overflows per 100 km of sewer main per year	Maximum 1 failure per year	Being met, assessed annually as part of the utility reporting to NSW Office of Water and nationally
Dry weather overflows resulting in pollution of waters from any sewage pumping station(s) installed within the sewage treatment system.	None as per Operating Licence	Some occurrences in some schemes due to mechanical failure or pipe damage. Incidences reported progressively under PIMP requirements and Assessed annually as part of the utility reporting to NSW Office of Water
Customer complaints about odours	2 per pumping station per year 5 per treatment works per year	Being met, assessed annually as part of the utility reporting to NSW Office of Water and nationally
SERVICE PROVIDED		
- Depth <=2m - Depth >2m	- 7 working days - 10 working days	Mostly met, need to assess any non-compliances
RESPONSE TIMES: Defined as maximum time to have staff on site to commence rectification after notification		
System failure or complaint	Response Times	Current Performance
PRIORITY 1: Break, collapse, blockage, overloading of system, failure of pumping station	1 hr (business hrs) 2 hours (after hrs)	Council has been achieving this target. Being tracked via work orders and annual utility reporting
PRIORITY 2: Cracked pipe or partial blockage of the sewer	2 hours (business hrs), 4 hours (after hrs)	

Table 2.3 - Current Monthly Service Level Assessment via KPIs

Performance Indicator	Target	2010-11	2011-12	2012/13
Number of sewer surcharges per year	90	65	34	39
Percentage of water and sewer supply failures will be responded to within two (2) hours of being reported	90%	90.6	99.4	99.0
Percentage of effluent analyses complying with EPA licences	95	95.4	95.3	96.3

Council's Maintenance team are responsible for repairs and maintenance of the mains and after hours response to failures

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 CUSTOMER TYPES

In the Kempsey Shire, there are two core types of customers for the wastewater systems; those directly connected to the sewerage systems and those indirectly connected by utilising the wastewater system"s septic recieval facilities. All wastewater customers that have reticulated sewerage are connected to the water supply. Those customers not directly connected utilise various contractors to „truck" septic waste to the wastewater treatment plants.

The wastewater customer types in the Kempsey Shire are:

- Permanent residential; house and flats
- Tourist residential/holiday accommodation; houses, flats, motels and caravan parks
- Processing Industries; Akubra
- General Commercial
- General Industrial
- Institutional; Kempsey Hospital, the various schools and Kempsey Correctional Facility
- Septic waste transport contractors

Reticulated wastewater services are not as widely available as reticulated water supply services in the Kempsey Shire. Below Kempsey in the lower Macleay River catchment, only water supply customers in the towns of Frederickton, Gladstone, Smithtown and Jerseyville have reticulated wastewater services.

3.2 DEMAND FORECAST

There are a number of unique factors that directly impact on the management of wastewater. The following key drivers influence the way in which wastewater assets are sized, maintained and renewed:

- Population and growth
- Infiltration of stormwater into the wastewater systems
- Acceptable management of effluent and re-use opportunities
- Legislative change

Flooding prevalence throughout the Kempsey Shire also presents demand forecasting and operational challenges for wastewater systems.

3.3 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 2010 Council"s Town Planning Department developed the Kempsey Shire Council Local Growth Management Strategy (Oct 2010) 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 of the Growth Strategy.

Annualised average population growth rate in Kempsey Shire from 2001 to 2007 was 0.71%. The historical dwelling growth rate from 1991 to 2006 has been 829 dwellings every 5 years. It is realistic to assume these growth rates will continue into the future.

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 below. 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.

Councils 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 2014 which should 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 ^

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.

Commercial/Industrial/Institutional Growth

The Kempsey LGA has one large volume industrial commercial wastewater customer and two larger institutional customers; Akubra, Kempsey Hospital and the Mid North Coast Correctional Facility. All of these larger customers have either just undergone or are in the process of increasing their businesses and hence their utilisation of the wastewater systems. 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 specialist"s 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.

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 (SKEL). The SKEL area 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.

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.

In 2009 at South West Rocks Sewer Treatment Plant, the existing 3 pasveer channels were supplemented with a dual tank sequential batch reactor

Areas Serviced

All sewerage schemes are planned to have some addition of new infrastructure. Significant new works for sewage treatment have been planned for the South Kempsey, South West Rocks, and West Kempsey schemes. Stuarts Point may have entirely new reticulated sewerage schemes constructed to serve these areas, effectively replacing the use of on-site sewage treatment systems, following further concept investigation and consultation.

The extension of sewerage services are dependent on a range of factors:

- Growth in urban areas and the integration of service provision with Council planning.
- Environmental impacts.
- Costs associated with new services – the community"s ability and willingness to fund these services and developer charges prospects.
- Public health concern.

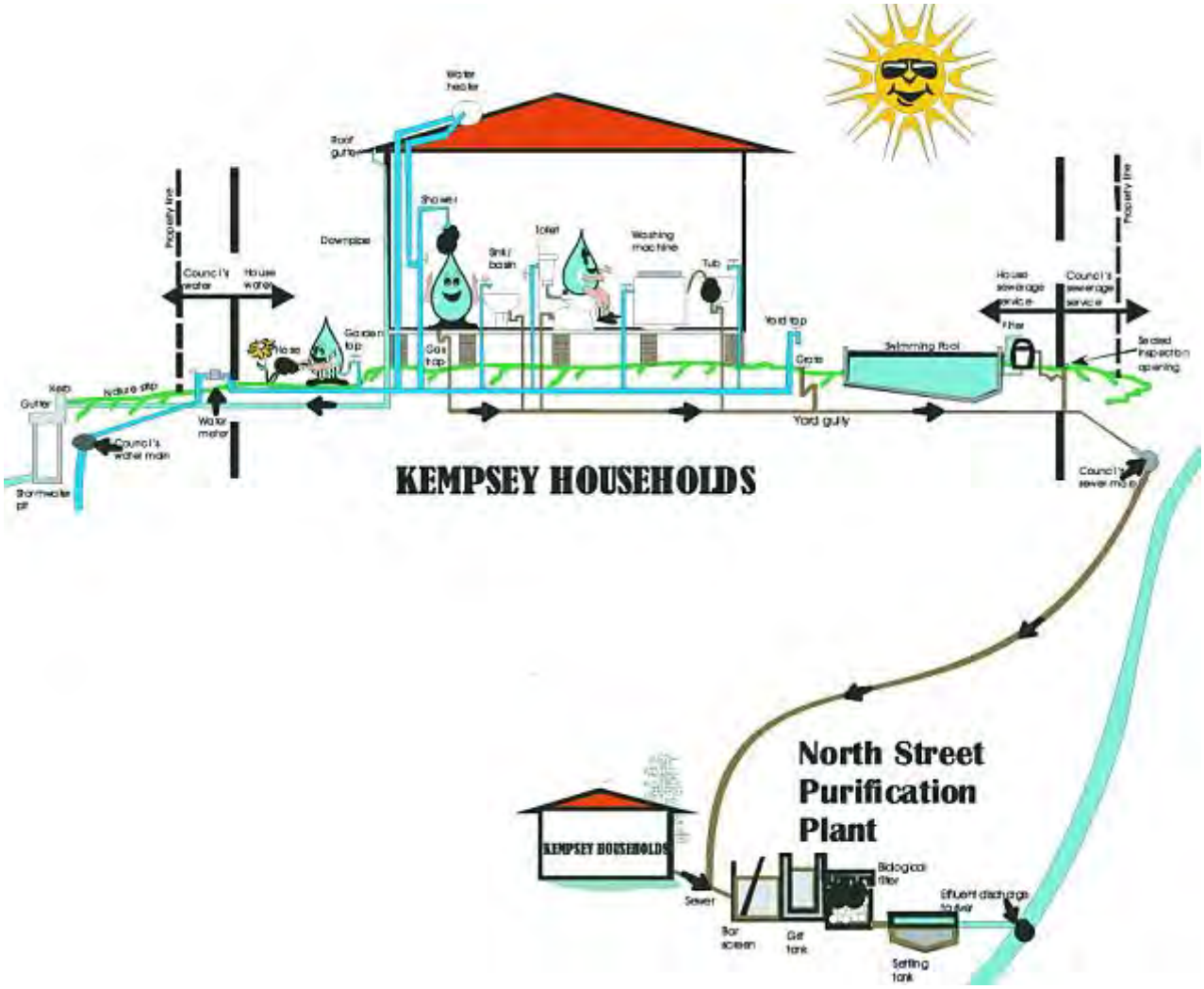
To accommodate growth in the townships it is essential that growth trends are regularly reviewed in conjunction with asset capacity. The long-term intention for the wastewater network is to continue development of the assets to cope with pressures from increasing population and more demanding wastewater quality standards.

3.4 WASTEWATER SOURCES & INFILTRATION OF STORMWATER INTO WASTEWATER SYSTEMS

Domestic consumers generate wastewater from sinks, basins, showers, baths and laundries (also referred to as grey water), as well as toilet waste. Other wastewater results from industry, commercial and institutional usage.

The growth in commercial, industrial and institutional service sectors, such as the commercial sectors of hospitality and transport servicing, results in growth of the liquid trade waste volumes to the wastewater systems. Liquid trade waste is the strength of wastewater deemed to be above normal domestic wastewater strength and the Kempsey Shire is a leader in NSW in Liquid Trade Waste management. Council has in place strategies that place a user-pays pricing system and assist customers place pre-treatment facilities within their premises to improve the overall efficiency and cost of wastewater treatment to all Council"s wastewater customers. In 2012/13, liquid trade waste accounted for 3% of the wastewater treated at Kempsey wastewater facilities.

Figure 3 - Diagram of Wastewater System



Wastewater, collected by the house drains, flows (usually by gravity) to sewerage reticulation mains. Sewer reticulation mains are typically, 150mm diameter and flow in gravity only partly full, under no pressure to a downstream manhole. Eventually the drainage of these local residential and commercial catchments reaches a point where pumping back to the surface is necessary. This occurs at sewage pump stations where electric-powered pumps deliver the wastewater under pressure through pipes known as rising mains to reticulation in an adjoining catchment or to a treatment plant.

The stormwater network is not connected to the sewerage network. Entry of stormwater from roofs, yards and roads into the wastewater system is not permitted. Faults and deterioration in the pipelines allow rainwater and groundwater to infiltrate the system when the groundwater level is above the pipes. Large quantities of stormwater that enter the system from illegal connections and faulty or damaged pipes can represent 75% of the total flow in the system during storms.

Overflows can also occur from inspection openings in branch lines. Branch lines are the lines connecting properties to the wastewater system. These overflows are considered to be dry weather overflows caused by blockages in the branch line or the house junction connecting the branch line to the main sewer. These are considered to be very minor, consisting of a very small volume of discharge, being localised and posing a minimal risk.

The current network other than a number of known low spots has adequate capacity for normal flows, but during heavy and prolonged rainfall events excess stormwater inflow/infiltration in the gravity systems can overload pump stations, pipe networks and cause manholes and gully traps to overflow creating a health hazard. Part of this problem is thought to be due to surface flooding of stormwater in low lying areas which greatly increase the rate of 1/1 to the wastewater system.

As the network assets age it is expected that the level of inflow and infiltration into the pipe system will increase.

Smoke testing and camera inspection of pipes for inflow and infiltration and status of functional condition has been successful in reducing the amount of stormwater entering the mains system, reducing demand for peak flow capacity and reducing the number and

size of overflows. Council is undertaking a renewal and rehabilitation program targeting the high risk areas in order to reduce the volume of stormwater infiltration.

Areas not sewered

Reticulated sewerage services are not provided to Bellbrook, Willawarrin, Stuarts Point, Grassy Head and Fishermans Reach, although there is community and utility interest in seeing these villages provided with such services. These villages and many rural properties still utilise septic tanks instead of conventional sewerage systems.

The characteristics of the sandy soils in the coastal areas include a low water holding capacity, and hence contribute to water permeation through soil and is a potential source of groundwater pollution. Possible impacts of the sewerage systems on the water quality and aquatic ecosystems have been noted in Killick Creek and Gills Creek.

The Stuarts Point area is currently served by on-site (280 septic tanks) sewage services. The aquifer below the town (from which the town water supply is taken) has been classified as „high" risk due to the potential for septic contamination. It is proposed to provide a reticulated sewerage system for this village and feasibility studies have been complied. Nonetheless a compliance plan for septic tanks is in place.

A small STP associated with the Stuarts Point Convention Centre and licensed to the Seventh Day Adventist Church is located on Grassy Head Road. The effluent generated at this site is used to irrigate lands adjacent to the centre. The EPA has licensed a maximum discharge of 201 kL/d, and currently reports no difficulties with this operation.

Bellbrook and Willawarrin are both currently served by septic tanks. Both villages have approximately 50 septic tanks in each village.

At present there are a number of properties on outlying areas, rural residential land etc. that have their own on site effluent disposal systems. With maintenance difficulties on these systems and high running costs there is likely to be increasing pressure from many of these communities for connection to the public system. This will increase demand on the system with significant cost implications.

Septic system regulation

Council has adopted an On-Site Sewage Management Strategy which identifies the operating guidelines of treatment systems. The Shire has been rated in terms of high and low risk, and an auditing and inspection system is being undertaken.

Council undertook an assessment to prioritise the need to undertake sewerage reticulation works in Bellbrook and Willawarrin and found that the improvement of septic system management was sufficient to deem that reticulated sewerage schemes for these villages were unnecessary.

An area along Sherwood Road, close to Ponds Way found that the ability to improve septic system management on residential sized allotments was not possible and a community effluent system was developed. The initial stages addressed stormwater management and properties have progressively been connected to the scheme as the treatment facilities have expanded.

3.5 ACCEPTABLE MANAGEMENT OF EFFLUENT & RE-USE OPPORTUNITIES

Preserving the beauty of the area"s unspoilt natural environment is an integral part of Council"s vision statement.

As the community becomes more aware of how their actions affect the environment around them, they are expecting higher levels of effluent treatment before it is discharged to the environment. This may involve higher standards of effluent treatment and disposal.

Communities, customers, new legislation and policies all desire to improve the way effluent is managed.

Issues to be addressed include:

- Increasing the of effluent reuse
- At Stuarts Point, onsite sewage disposal systems have the potential to pollute the towns water source if they are overloaded
- The system"s infrastructure needs are continually changing due to government requirements and population growth
- Stormwater infiltration is a significant problem for a number of the schemes
- Council backlog of condition assessment of its sewerage assets
- Growth within unserviced areas may increase the risks to the environment and public health associated with onsite sewage disposal.

Biosolids removal is undertaken at each treatment works on an as needed basis. Sludge is dewatered using a mobile sludge centrifuge, and is then transported to approved farm properties under specific management plans, where the biosolids are distributed by agricultural spreader across the paddocks and then incorporated into the soils. Only a very minor percent of Council"s biosolid production is now available for other purposes such a landfill capping.

Effluent re-use opportunities

Council is actively investigating and incorporating nutrient reduction technology, and effluent reuse programs. Nutrient reduction programs are proving very successful at West Kempsey, and a similar plant has recently been commissioned at South Kempsey.

By the year 2014, Council aims to reuse 50% of the dry weather flows they generate. This target will be reviewed every five years as the Integrated Water Cycle management Strategy is reviewed.

The following key drivers influence the way in which effluent and sewage treatment is managed:

- Opportunities for Council to deliver urban water services more efficiently and sustainability, in economic, social and environmental terms
- Water demand and the pressure on this resource, particularly during drought and flood prevalence
- Community and customer desire to improve effluent management and sewerage treatment
- Sewerage treatment plant licence conditions and regulatory instruments that require changes in effluent management
- Current policy positions that encourage changes in effluent management
- Council"s desire to improve the level of urban water service provided
- The need for a level of consistency in the methods of operation and delivery of services by Council

Crescent Head - The golf course reuse scheduled for implementation in 2001 was opposed by the community due to possible water quality issues in the adjacent creek and cultural heritage areas. As an alternative, some effluent reuse has been established as a demonstration at the Wastewater Treatment Plant for visitors and for onsite processing requirements.

Frederickton - An effluent reuse capability of up to 100% of the dry weather flows exists at Frederickton Golf Course.

Gladstone/Smithtown - A beneficial effluent reuse opportunity was established on the neighbouring redundant race course. A death of one of the owners and the transition of the property to an estate management has meant this facility has not been operational and this opportunity needs to be renegotiated.

Hat Head – An evaluation of possible beneficial effluent reuse options was assessed during the planning of the sewerage system. Onsite reuse has been established at the Wastewater Treatment plant. A further review of the reuse options considered in the scheme"s planning is due in the upcoming years for reassessment in terms of any altered cost benefits.

South Kempsey - Effluent re-use of upto 20% of the dry weather flows is reused at the Kempsey Golf Course. No evaluation has been carried out to look at the possible effluent beneficial reuse options. This facility also serves the Akubra Factory.

South West Rocks - 20% of dry weather flows are reused at the South West Rocks Golf Course. A recycling plant is currently undergoing validation which will service a new residential subdivision. Reclaimed water will be used for toilet flushing, washing machine use and outdoor use in new development as well as the local golf course and sporting fields. This involves a significant upgrade to the STP treatment facilities to improve effluent quality.

West Kempsey - An effluent reuse capability with 50% of the dry weather flows is reused at pastures between the Macleay Valley Way and the Macleay River and Christmas Creek and also at Warwick Park Racetrack. A market assessment was carried out for beneficial agricultural use as part of the IWCMS investigations, however the wetter weather sequences and relatively low consistent reuse demands meant that these schemes were not financially viable at that time. A further review is to be undertaken in upcoming years.

The septic receival unit at South Kempsey STP is designed to pre-treat septic waste prior to further processing at the sewage treatment plant

3.6 LEGISLATIVE CHANGE

A number of Regulatory Acts influence the way in which Council can provide sewerage services to the community and can significantly affect the Council"s ability to meet minimum levels of service, and may require improvements to infrastructure assets. Over the past years, a number of regulatory reform processes have occurred in NSW. A number of these impact on the planning for the provision of water supply and sewerage business.

Wastewater Resource Consents

Every sewerage system within the Shire has to be licensed by the EPA. These licences include the reticulation network and the sewerage treatment plant. The continued long-term operation of the wastewater network is reliant on the successful renewal of the consents for discharges from the wastewater network.

The Environment Protection Authority issues licences under Section 55 of the Protection of the Environment Operations Act 1997 for the discharge of treated wastewater and sets the legal parameters that must be met by the discharges from each network. The quality of effluent under these licences does vary depending on the environmental sensitivity of the discharge point and the age of the STP. These licences also have financial incentives for effluent reuse. Any overflows or bypasses from the reticulation network or STP must be recorded and submitted with the annual licence return.

All effluent released from Council"s sewage treatment plants are monitored for quality and quantity in accordance with individual licences. Groundwater and associated surface waters are monitored at effluent disposal sites at South West Rocks and Hat Head. Surface waters are monitored where treated effluent is being released from the STP and discharged to waterways.
The following are the licences pertaining to Council are listed in Table 3.5.

Table 3.5 - Kempsey Council EPA Consents

Premises	Licence No.	Type of Discharge	Volume Limit kL/d	Category/scale of Treatment Plant size/per annum	Testing Frequency	Licence Term	Licence Review Due Date
Crescent Head	577	Discharge to waters	4,580 kL/d	> 219 – 1000 ML	fortnightly	5 years	7 April, 2014
Frederickton	363	Discharge to waters and 2 utilisation areas	1,830 kL/d	> 100-219 ML	4 weekly	5 years	2 April, 2016
Gladstone	1781	Discharge to waters	2,650 kL/d	> 100 – 219 ML	4 weekly	5 years	2 April, 2016
South Kempsey	720	Discharge to waters	8,860 kL/d	> 219 – 1000 ML	fortnightly	5 years	15 February, 2015
West Kempsey	763	Discharge to waters & 1 utilisation area	28,000 kL/d	> 1000-5000 ML	fortnightly	5 years	16 February, 2015
South West Rocks	2497	Discharge to dunal area	2,850 kL/d	> 219 – 1000 ML	4 weekly	5 years	7 January, 2014
Hat Head	11874	Discharge to dunal area	1,300 kL/d	> 100 – 219 ML	fortnightly	5 years	26 May, 2016

If there are any sewer overflows or bypasses with potential to affect public health or the environment, then Council is required to notify Department of Health, EPA, and any required emergency services immediately. Also Safe foods and the shellfish growers association are to be notified if an overflow has the potential to affect any oyster leases.

Changes in environmental standards may affect wastewater disposal options in the longer term.

Best Practice Management

The NSW Government encourages best-practice management by all NSW Local Water Utilities. The approach is to ensure effective, efficient and sustainable water supply and sewerage businesses.

Council is required to comply with the Department of Energy, Utilities and Sustainability Pricing Guidelines and Developer Charges Guidelines. The guidelines stipulate the types of tariffs and developer charges required to comply with best practice pricing.
Council has introduced user-pays sewerage pricing in line with the State Government requirements. The access charge relates to the size of the water supply meter. The usage charge identifies the proportion of a property"s use of the sewerage system (volume disposed) as well as the strength of that sewage and charges accordingly.

There are two broad categories for user-pays sewerage pricing and the usage details are calculated differently for each group in accordance to the Best Practice Guidelines. The broad pricing categories are residential and non-residential.

Residential properties have a set sewerage charge. As per the Guidelines it is assumed all residential properties have a 20mm water meter and dispose of domestic strength sewage. The residential volume component uses the average water consumption for all Kempsey Shire residential properties and assumes 70% of this volume is disposed to the sewerage system.

A Liquid Trade Waste Policy was also adopted by Council to ensure proper control of liquid trade waste discharges to the sewerage system and hence protect public health, worker safety, the environment and Council"s sewerage system.

Under this policy, sites that generate liquid trade waste may be required to pre-treat their waste before it can be accepted to the sewerage system. Development applications proposing to generate liquid trade waste are required to submit an application seeking approval from Council.

Reducing the biochemical load on the sewerage system can prolong the life of existing assets and allow Council to defer new work programmes as well as improve treatment processes. The operation of the sewerage system can also be affected by high biological or chemical loads.

The NSW Office of Water collects and analyses performance data for Local Water Utilities in NSW and produces an annual report. It addresses utility characteristics, social, environmental and economic aspects of water supply and sewerage businesses. The data is used for performance monitoring and benchmarking which is important for public accountability to the community. The monitoring also provides data determining the present position and assessing future water supply and sewerage needs for non-metropolitan NSW.

Appendix C contains Council"s performance results from the 2011/12 report.

3.7 DEMAND MANAGEMENT PLAN

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

It is expected that there will be increased pressure on the wastewater scheme in the future, as well as an increased need for rehabilitation and maintenance of existing services.

Demand management options will be considered as risk mitigation measures to maintain demand at reasonable and sustainable levels. The components of demand management are shown in Table 3.6.

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets, community education and providing new assets to meet demand and demand management. Demand management practices include non-asset solutions, insuring against risks and managing failures.

Opportunities identified to date for demand management are shown in Table 3.6. Further opportunities will be developed in future revisions of this asset management plan.

Table 3.6 - Demand Management Plan Summary

Service Activity	Demand Management Plan
Population	The strategy is to ensure assets provide for future population, development occurs where adequate facilities are provided and projects carried out in accordance with the capital works program. This can be achieved by a 5 yearly review of the financial plan to be undertaken at beginning of each financial year to determine upgrade projects to meet asset utilisation.
Infiltration of wastewater and stormwater	Locate points of stormwater inflow by a house to house survey and continue monitoring of areas of know high inflow/infiltration flows during peak storm events.
Acceptable management of effluent and re-use opportunities	Further investigation into increased use of treated effluent to facilitate development of agricultural and landscape effluent irrigation opportunities.
Legislative change	Review capacity of sewerage systems to meet whole of system licensing requirements. Implement any necessary upgrades Compliance with WH&S and EPA requirements with quarterly reporting. Practising a continuing and evolving effluent quality monitoring program in

	conjunction with the EPA.

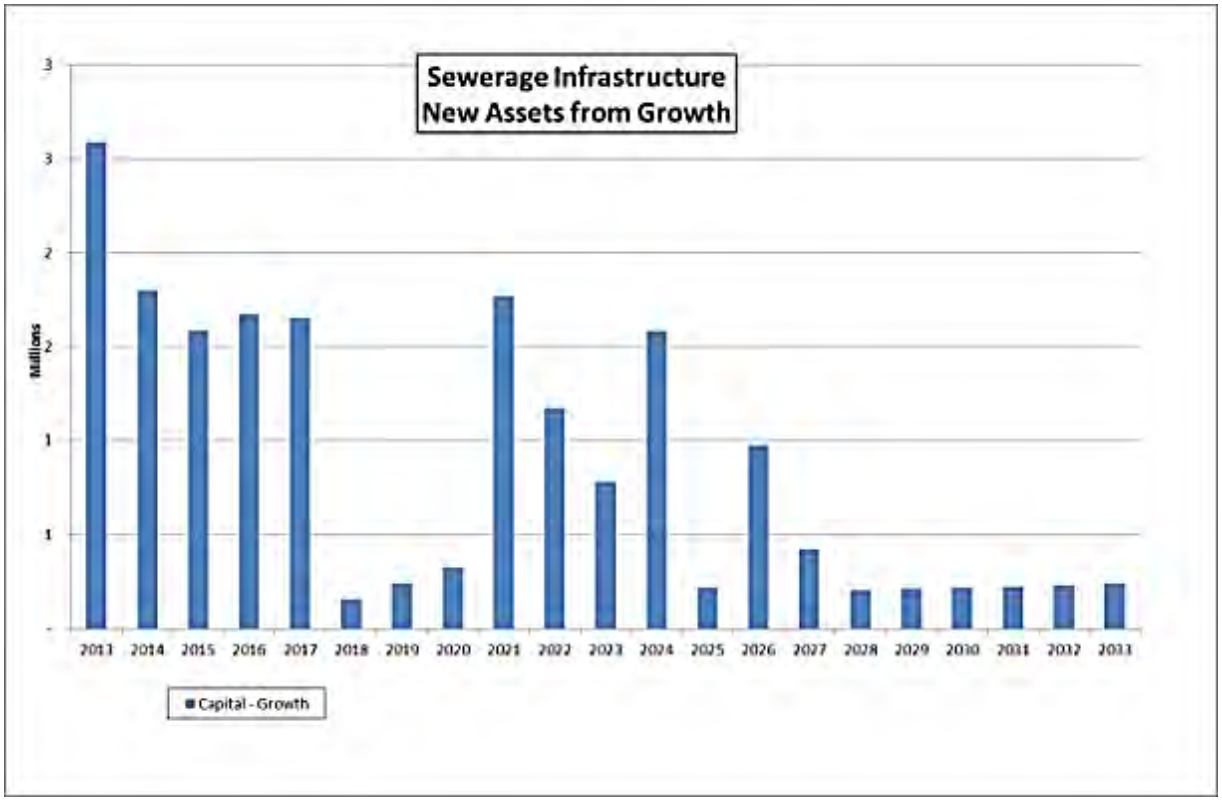
The strategy is to:

- Identify environmental issues, risks and activities and prepare procedures and controls for the operation of the existing water supply and sewerage schemes:
- Undertake environmental assessment of proposals for new water supply and sewerage infrastructure.
- Prepare and implement environmental management plans for new infrastructure as it is required.
- Review capacity of schemes in light of any new industrial developments.
- Review capacity of sewerage systems to meet whole of system licensing requirements. Implement any necessary upgrades.
- Ensure ongoing renewals program to minimise severe main chokes and collapses.
- Monitor and audit environmental management systems.

3.8 NEW ASSETS FROM GROWTH

The creation of new assets will reflect population growth in some measure. These assets will be constructed by developers and contributed to Council, or, be constructed or acquired by Council.The new asset values are summarised in Figure 4.

Figure 4 - New Assets from Growth



Acquiring these new assets will commit Council to fund ongoing operations and maintenance costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operating and maintenance costs.

This income is built into projections of future new / expansion expenditure by Council and is not readily extracted for charting purposes on a per allotment/residence or head of population basis, as there are works funded from loans incorporated also.

To enable fair and planned distribution of funding throughout the Council area, some of the factors influencing the prioritising of works are:

- Changing community expectations and demographics.
- Known areas of systems capacity limitations.
- Systems and processes with high maintenance demands.
- Known development areas and Planning Review outcomes.

In the relevant asset classes, some issues which may influence future asset provision are:

- A significant percentage of new land division will employ wastewater management. However, maintenance or replacement of infrastructure will still be required.
- Resident expectations will be raised in the established township areas for wastewater services matching those enjoyed by the newer areas.
- There will be an increased need to renew infrastructure in older land divisions and townships.

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 wastewater 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 wastewater 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 wastewater 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.

Over the past five years Council has developed a higher level of confidence in the baseline asset knowledge. Information researched on the standard physical lives of assets has been used in conjunction with field condition inspections, maintenance levels and lifecycle costs to develop a system-wide knowledge of asset condition and risk exposure, and to assess the remaining economic life of the assets.

This has formed the basis for the Lifecycle Management Plan which identifies strategies and actions that will be used throughout the lifecycle stages to make the best use of the available resources so the assets will continue to meet the target level of service now and into the future

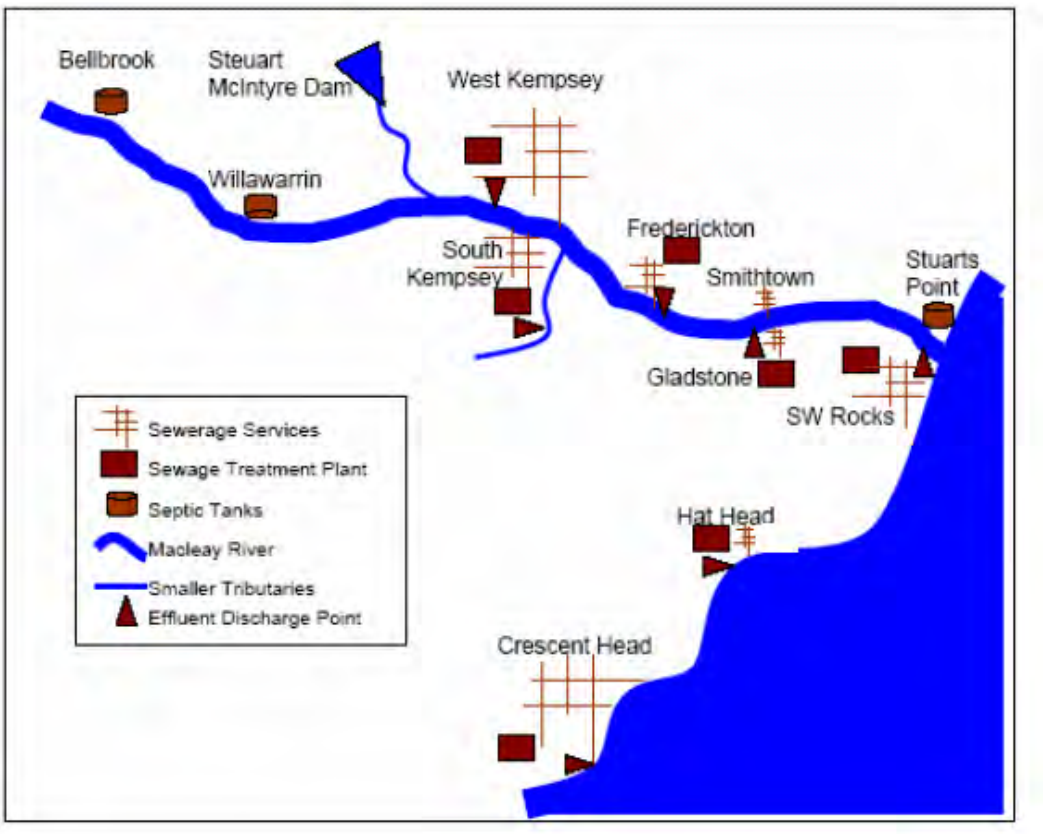
Some of the key lifecycle issues are:

- There is a considerable investment required for the upgrading of some wastewater infrastructure, particularly the West Kempsey and South Kempsey STPs and networks.
- There has been a significant shortfall in maintenance and renewal expenditure in the previous decade. Provisions have been made to catch up with inspection and maintenance programs and resultant rehabilitation works over the next 10 years.

4.1 SEWERAGE SYSTEMS

There are seven separate sewage reticulation systems and one community effluent scheme in the Kempsey Shire. The major schemes are located at West Kempsey and South Kempsey, with smaller, independent schemes provided at South West Rocks, Crescent Head, Smithtown/Gladstone, and Frederickton. The community effluent scheme is located in Aldavilla.

Figure 5 – Map showing location of sewer schemes



In Bellbrook, Stuarts Point, Willawarrin and surrounding rural areas single households provide their own treatment through septic tanks.

The Stuarts Point area is currently served by on-site sewage services (approximately 280 septic tanks). A Septic Safe compliance plan for septic tanks is in place. There is 1 privately owned pumping station.

Bellbrook is currently served by on-site sewage services (approximately 100 septic tanks) and Willawarrin (approximately 100 septic tanks).

Treatment Plants

The capacity of the treatment plants is measured by flow and load.

Flow - The design capacity of the plants is meeting a wide range of average and peak flow rates which vary in duration and with the time of year. Flows are monitored using a combination of manual flow meters and telemetry system. Where there is telemetry, the master monitoring unit is located in the treatment plant and telemetry maintenance hub at the depot administration office with remote units used by operational staff able to read from the master unit.

Load - The quantity and concentrations of the suspended and dissolved solids varies during the day, through the week and during wet and dry flow regimes. Treatment plants have been designed to reduce the concentrations of contaminants and to keep the daily mass-load in the treated water discharge below the limits specified in EPA Licence Agreements.

The characterisation of the influent to the treatment plant has been derived from a sampling programme at the plant, with reference to wastewater sampling from several catchments. The influent quantity continues to be monitored as part of the operations.

Wastewater Flow Forecasts

Dry weather wastewater flow forecasts at five yearly intervals for the baseline case are shown in the following table. Where possible, the starting point for the dry weather flow forecasts has been compared with sewer flow records and water demand rate.

Table 4.1 - Dry Weather Wastewater Flow Baseline & Forecasts (ML/d)

Wastewater Management Area	2003	2008	2013	2018	2023	2028	2033
Sewage Treatment Plant Catchments							
South Kempsey	0.88	0.89	0.80	1.35	1.37	1.39	2.01
West Kempsey	1.47	1.64	2.50	2.64	2.72	2.84	2.94
Frederickton	0.15	0.16	0.15	0.18	0.18	0.19	0.19
Gladstone	0.17	0.17	0.36	0.36	0.37	0.38	0.38
South West Rocks	1.03	1.19	2.20	2.24	2.28	2.32	2.36
Hat Head	0.13	0.14	0.80	0.81	0.82	0.83	0.83
Crescent Head	0.34	0.36	0.40	0.42	0.46	0.49	0.51
On-site Septic Villages							
Stuarts Point	0.17	0.18	0.18	0.19	0.20	0.20	0.21
Bellbrook	0.020	0.019	0.019	0.018	0.018	0.018	0.018
Willawarrin	0.019	0.019	0.018	0.018	0.018	0.017	0.017

Sewage Pump Stations

Pump stations are unmanned with automatic operation of the pumps being controlled by various level sensing devices. The installed pumps operate on an alternate cycle so that wear is equalised between the two pumps. Pump stations are designed to WSA 04 sewage Pump Station Code of Australia which allows backup for pump failure and removal of pumps for servicing without disrupting service. Generally most pumps have the capacity to cope with wet weather flow with one pump running and have 4 hours well storage for dry weather flows. Within this time the alarm will allow staff to organize a pump out truck to remove the sewage from the pump well to the sewerage treatment plant.

Remote Monitoring of Sewerage Schemes

A telemetric monitoring system is in place that enables remote monitoring of the sewerage schemes. Remote telemetry units (RTUs) are located at all sewage pump stations in each of the sewerage schemes. In addition there are RTUs at each of the sewage treatment works. Each RTU has a battery-sourced power back up in order that it can continue to operate in the event of failure of a power phase or the mains supply.

Data is processed by dedicated software and can be monitored on screens at PC"s at various locations such as a number of STPs, the Managers offices and the Works Depot. The system can also be monitored remotely to laptops and field tablets. This system has alarm monitoring and generates alarms to the designated responsible officers through an SMS alarm system. Hat Head STP and South West Rocks STP are operated through Citect which is also monitored remotely by the above outlined systems.

During working hours the monitor screens are generally under surveillance by those staff stationed at the relevant locations. After hours general surveillance is conducted by the staff members that are on-call. Alarms are also generated and are sent out through a SMS alarm system to designated staff throughout the day and to the appropriate after hours on-call staff.

New ideas improve our wastewater services

In the past, level regulators have been used in sewer wells to start and stop pumps. However, objects often get caught on the level regulators preventing them from starting and stopping the pumps. There is also a switch in the level regulator that tips around 200 times a day and this switch can wear out.

The Radar wave sensor was chosen to replace the level regulators because it solves many of the problems experienced with level sensors and provides additional benefits. This advanced technology shoots out a radar signal that hits the water and deflects back to the sensor to identify the water level height. This water level height then tells the pumps when to start and stop.

Trial testing of new radar SCADA system at Frederickton STP

The radar wave sensor is very accurate with water level measured in millimetre increments, which enables accurate measurement of the sewer that has been collected. These sensors have no contact with the sewer in the well, as they sit just below the lid of the well. This then limits the need to clean the sensor, where as a level regulator needs to be cleaned regularly. The sensors have no moving parts, which allows longer use before replacement of the sensor is required.

A new SCADA system is being trialled at Frederickton & Gladstone sewer systems. It is windows based and utilises Telstra"s 3G network for communications. Initial indications are good with operators reporting a noticeable reduction in false alarms coming through on all sites trialled.

Effluent Water Quality Testing

Routine testing of water quality is carried out by staff and sent off to contracted laboratories. Relevant water quality testing presently carried out includes:

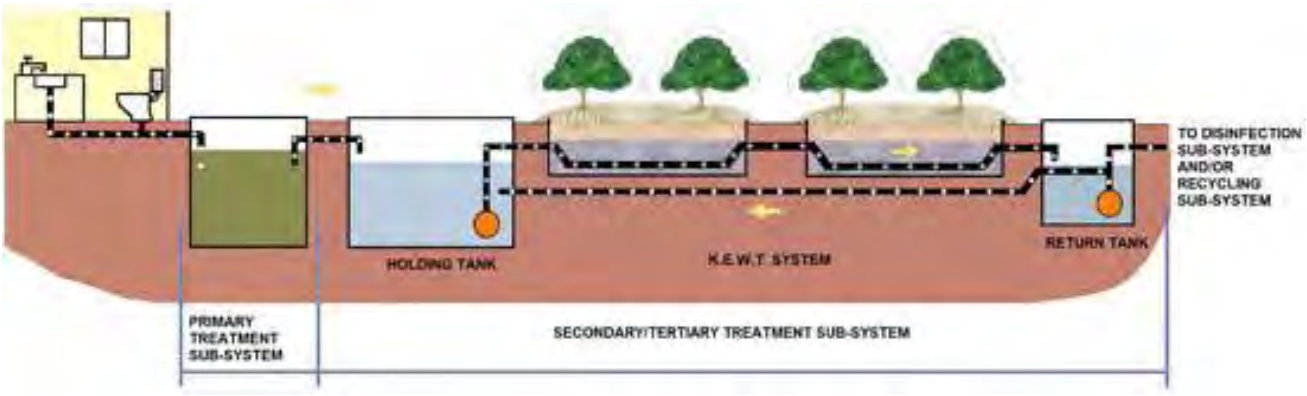
- Sewerage treatment works, comprehensive testing at effluent discharge points of all treatment plants to prove appropriate parameters are met for each of the works to meet any licence conditions.
- Saltwater Creek, South West Rocks, comprehensive testing to establish the background in this wetland area. The developing urbanisation of the catchment of this creek increases the potential impact on the wetland and recreational swimming areas downstream.
- Macleay River Shellfish Quality Assurance Program. Members of the Macleay River SQAP Committee carry out sampling at four sites testing for faecal coliforms.

Community Effluent Scheme

The Sherwood Road Environmental Improvement Precinct is located 9 kilometres at Aldavilla. It is comprised of thirty small residential allotments with an average size of 750m^2 and utilises septic tanks to treat household sewage. The combination of small lot size, clay soil and poor stormwater management within the precinct was raising health risks with failing septic systems discharging stormwater & grey water to the lower adjacent properties. These issues were accentuated by road drainage passing through the properties.

To resolve these problems a KELE Effluent and Wastewater treatment system coupled with an evapocycle system, in conjunction with a storm water collection and bio-treatment swale were initially installed to 6 properties. Following the successful implementation of this system further properties have been added to the system. Stage 5 currently nearing completion includes extension of the sewer main and the placement of a small pump station.

Figure 6 – Process Diagram of KEWT system



The KEWT system at Aldavilla

The KEWT system accepts effluent from property septic tanks, via a conventional gravity sewer system. The effluent collects in the holding tank and recirculates through to the channel pots.

The channel pots each planted out with a series of native/exotic plants and bamboos of ranging heights use the treated effluent as their primary water source and the plant variety furthers the effluent absorption and nutrient uptake. The effluent flows through the channel pots to the return tank.

The Evapocycle system is a pressure dosed evapotranspiration-absorption/mound hybrid system designed to evaporate the applied wastewater to atmosphere following biological treatment.
Two biotreatment swales (moist channels with rock inclusions) have been vegetated, to drain and retain water run-off, providing treatment prior to entering the waterway.

Evapocycle system at Sherwood Rd, Aldavilla

Sewerage Scheme Summary Sheets

Scheme Name	Crescent Head Sewerage System
License No:	577, Limit = 4.58 Ml/d
Population served Holiday Peak	615 ET 759 ET
Treatment Plant Capacity	769 ET
Average day flow	0.40 ML/day
No. of Pump Stations Effluent Privately owned	6 1 2
Length of Mains Rising mains Gravity mains Effluent mains	 4.6 km 14 km 1.8 km

The treatment plant was constructed in 1975 and augmented in 1991. It is located in Belmore Street and serves a population of 1600 people, however during holiday times this increases. The plant has a current capacity of 769 ET with an off-peak load of approximately 615 ET and peak load in holiday time of just over 769 ET. It has been assessed to have sufficient capacity to treat dry weather flows until at least 2034.

The plant is based on a conventional gravity sewerage system of 2000 EP IDAL which consists of two intermittent aeration tanks.

Excess sludge from the plant is stored in two sludge lagoons and displaced supernatant liquor is returned to the head of the plant.

The effluent from the plant is stored throughout the day and pumped out, after UV disinfection, at night time via an effluent rising main at an ocean outfall at the end of Little Nobby Headland with an EPA licence to discharge a maximum of 4.58 ML per day. Total average annual flow is approximately 150ML.

Additional storm water attenuation is available on site through the use of two pasveer channels. There are no constructed overflow structures within the system.

Since the STP was commissioned new rising mains and effluent mains were constructed in 1975. In 1998 new inlet works were constructed, 2 aeration tanks, an alum tank, storage shed and extension to the amenities block. A new UV disinfection system was installed in 2012. Both pasveer channels were upgraded and converted to stormwater attenuation systems in 2012.

The majority of the pipe work within the system was constructed in 1975, with more recent additions occurring in 1992. The pumping stations within the system vary in age from 1976 through to 2000. Pipes constructed in 1975 are mostly VC, pipes constructed after 1975 are mainly UPVC.

The STP has been maintained to a high standard with an on-going maintenance program and replacing and upgrading of mechanical and electrical equipment as necessary.

Amenities building

Aeration tanks

New UV disinfection system installed 2012

Scheme Name	Frederickton Sewerage System
License No:	363, Limit = 1.83 Ml/d
Population served	307 ET
Treatment Plant Capacity	384 ET Designed for a population of 1000
Average day flow	0.15 ML/day
No. of Pump Stations Effluent Privately owned	4 1 1
Length of Mains Rising mains Gravity mains Effluent mains	 1.9 km 11.0 km 1.8 km

The treatment plant was constructed in 1980 (commissioned in 1981) and is located in Yarrabandini Road serving a population of 800 people. The plant has a current capacity of 384 ET, with a current load of approx. 307 ET, currently close to capacity.
The scheme is bounded by Christmas Creek to the south, the Macleay River to the east, and rural lands to the west and north, which could all potentially be impacted upon by overflows from the system.

The plant consists of one 1000EP pasveer channel with excess sludge from the treatment process being stored in two sludge lagoons and displaced supernatant liquor being returned to the pasveer channel.

The average dry weather flow from this population is 0.15 ML/day. Tertiary treatment is provided in the form of three effluent ponds providing 15 days detention at ADW.
Effluent is discharged into the Macleay River, with an EPA licence to discharge a maximum of 1.83 ML/d. Average annual flow is approx 55ML. Current effluent reuse capability of up to 100% of dry weather flows discharges on the following sites:

- Frederickton Golf Course – area 101 Ha; and
- Private pasture irrigation with an area of 8.5 ha.

No upgrades have been carried out since the STP was commissioned. The majority of the pipe work within the system dates from 1980 through to 2006. The pumping stations were constructed in 1981 and 2004. Pipes within the system are mostly AC and UPVC.

This treatment plant is approaching full capacity and has been identified in a concept design for the new treatment plant to be constructed at West Kempsey and may be decommissioned if it is incorporated into this new system.

Pasveer with Amenities building & dog pound at rear of photo

Pasveer (front) & sludge lagoon

Scheme Name	Gladstone/Smithtown Sewerage System
License No:	1781, , Limit = 2.65Ml/d
Population served	615 ET
Treatment Plant Capacity	769 ET
Average day flow	0.36 ML/day
No. of Pump Stations Effluent Privately owned	8 1 1
Length of Mains Rising mains Gravity mains Effluent mains	 2.6 km 8.6 km 0.7 km

The Gladstone/Smithtown sewage scheme is bisected by the Macleay River.
Smithtown is bounded on three sides by the Macleay River, with open farmland located to the north.
Gladstone is bounded by the Macleay River to the west and farm land to the north, east and south. All this land could potentially be impacted upon by overflows from the system.
The treatment plant is located in Darkwater Street, Gladstone approximately 0.5 km west of the township adjacent to the racecourse and was constructed in 1978.
It has a design capacity of 769 ET, with a current load of 615 ET.
The plant has an intermittent extended aeration tank (Bathurst Box).

The tertiary ponds provide 15 days retention at ADWF.

Effluent is discharged into the Macleay River near the park jetty in Gladstone. Total annual average flow is approx. 130ML. Average daily flow is approx 360 kl. The EPA licence allocates a maximum effluent discharge of 2.65 ML/d. The system has effluent reuse capability of 100% dry weather flows on private pasture irrigation with an area of 20 ha.
No upgrades have been carried out since the STP was commissioned. The majority of the pipe work within the system dates from 1978 through to 1999. The pumping stations were all constructed in 1982. Pipes within the system are mostly UPVC.

Aerial photo of Gladstone STP

Aeration Tank

Scheme Name	Hat Head Sewerage System
Licence No:	11874, Limit = 219 ML/yr
Population served Holiday Peak	134 ET 769 ET
Treatment Plant Capacity	769 ET Upgrade planned for growth of 192 ET
Average day flow	0.80 ML/day Winter = 0.60 ML/day, Summer 2.00-3.00 ML/day
No. of Pump Stations Effluent Privately owned	1 1 2
Length of Mains Rising mains Vacuum mains Effluent mains	 1.3 km 10.3 km 3.0 km

The Hat Head scheme is bounded by coastal sand dunes to the north and National Park to the east, south and west. The scheme is bisected by Korogora Creek, which is subject to primary contact recreation and thus classified as sensitive. All of this land could potentially be impacted upon by overflows from the system.

The treatment plant was constructed in 2003, serves a population of 350 people and is located in Hungry Head Road.

The system has an ultimate design capacity of 769 ET. There is a large variation between the permanent residential population of approximately 134 ET and peak holiday populations of approximately 769 ET. The STP treats an average of approximately 80 kL/day with a current capacity of 150 kL/d. During peak holiday periods the plant can experience flows in excess of 250 kL/d and during these periods the treatment performance of the STP is compromised. The plant is an intermittently decanted extended aeration plant with sand filtration and effluent hypochlorite disinfection.

Amenities building & SBR tank

The reticulation system is predominately a vacuum system with a small component of conventional gravity installations. In the vacuum system, sewage flows by gravity from a household"s service line into a small well usually shared between 2 – 3 properties. Pneumatic controllers apply vacuum to a submerged valve effectively sucking the material through a network of vacuum-sealed mains into the transfer pump station.

Chemical tanks at Hat Head STP

The vacuum system experiences problems during local high intensity rainfall events as the pneumatic controllers are submerged and fail. Also, some manholes are impacted by surface water allowing stormwater to enter the sewerage system. For example, due to excessive rain in February 2009 the sewer vacuum system was flooded at Hat Head township causing the system to be shut down. Port a loos were required to be trucked into the township to service the community.

Port a loos were installed while the sewer systems was not functioning during the 2009 flood event

The main treatment facility within this plant is referred to as the Sequence Batch Reactor, this is where the main treatment process occurs. Also in the SBR, alum is injected to reduce phosphorous and caustic soda is injected to balance pH. Disinfection is achieved via a chlorine contact tank and small particle removal is achieved via a sand filtration unit. Waste sludge removed from the SBR is treated in a digester and stored in sludge tanks. When sludge tanks are full, a mobile centrifuge unit dewaters the sludge, and a truck removes the dewatered sludge from site. Sludge is removed to Crescent Head Landfill Site, where it is used as a soil conditioner ingredient.

The bulk of effluent is discharged to a sand dune disposal area north-west of the village. However a small amount is reused at the treatment plant for hosing and wash down purposes. The EPA licence conditions include a limit of 219 ML/year discharged to sand dunes. The pipe work within the system dates from 2003 and are mostly UPVC. Smoke tested was conducted in 2013 and will be followed up with CCTV & rectification work (ie. some pots will be raised to stop infiltration). A risk strategy is to be developed for the sewer system during excessive rain.

Scheme Name	South Kempsey Sewerage System
License No:	720 Limit =8.86 ML/d
Population served	1538 ET

Treatment Plant Capacity	2076 ET
Average day flow	0.80 ML/day
No. of Pump Stations Effluent Privately owned	17 1 4
Length of Mains Rising mains Gravity mains Effluent mains	 6.2 km 44.6 km 0.8 km

This system is divided into 3 separate sub-systems (South Kempsey, East Kempsey and Burnt Bridge), which each independently discharge to the STP.

The treatment plant was constructed in 1940 and is located off the Pacific Highway in the South Kempsey industrial estate. It has a design capacity of 2076 ET with a current load of about 1538 ET.

The plant consists of a trickling filter built in 1960 with a nominal capacity of 3400 EP, and a 2000 EP intermittent extended aeration tank (pasveer channel P2000).

There are also three effluent ponds including a catch pond. The effluent ponds have a detention time of 10 days at ADWF for 5400 EP. The sludge from the digestion tanks and excess sludge from the pasveer channel is treated in sludge lagoons and displaced supernatant liquor is returned to the head works.

Sedimentation tanks & trickling filters

The effluent from the pasveer channel, trickling filters, and any stormflow by-pass, is directed to the one day catch pond; this is provided to prevent any sludge passing into the tertiary ponds. Flow from the catch pond passes through the detention effluent ponds before being finally discharged to Gills Bridge Creek.

A septic receival station is located at the plant allowing for a controlled discharge from tankers. It consists of a screen and a grit removal system in a preassembled tank. This helps to avoid overloading of the municipal inlet works both with solids and organics.

The majority of effluent is discharged into Gills Creek (a tributary of the Macleay River). Total annual flow is about 350ML. Average daily flow is approximately 1ML/day. The EPA licence conditions include a limit of 8.86 ML/d of effluent discharge. There is a need to consider the current effluent discharge location as it is believed to be impacting on Gills Creek.

Lagoon monitoring platform

The system has an effluent reuse capability of 20% of dry weather flows reused at Kempsey Golf Course on an area of 50 ha and a volume of 43 ML/a. Investigations are being undertaken to evaluate other possible effluent reuse options

There is one constructed overflow within the system discharging to the environment, located at K11B pump station. An additional high level overflow is located at K11C sewer pump station which overflows to K11B pump station.

Since the STP was commissioned new inlet works were augmented in 1989 including coarse screening, flow distribution, grit removal, balance tank, 1 pasveer channel and 3 sludge lagoons.

The majority of the pipe work within the system dates from 1937 through to 2003. The pumping stations within the system vary in age from 1936 through to 2001. Pipes within the system are mostly VC and UPVC.

This treatment plant is approaching full capacity with limited capability to meet current and future licence discharge requirement and may be decommissioned once the new treatment plant is built in West Kempsey. Flooding is also an issue on the existing site. The plant is currently being upgraded to include effluent disinfection, with hypochlorite to be commissioned in December 2013.

The wastewater reticulation scheme suffers from stormwater ingress and this will be addressed in a comprehensive program following the completion of West Kempsey.

Scheme Name	**West Kempsey Sewerage System**
License No:	763, Limit = 28 ML/d
Population served	2692 ET
Treatment Plant Capacity	4615 ET
Average day flow	2.5 ML/day

No. of Pump Stations Effluent Privately owned	18 3 45
Length of Mains Rising mains Gravity mains Effluent mains	 16.6 km 67.8 km 3.1 km

This system is the largest in the Shire servicing West Kempsey, Central Kempsey, parts of East Kempsey, Greenhill and the North Coast Correctional Centre.

The treatment plant was constructed in 1935 and is based on a conventional sewer reticulation network. It is located in North Street with a design capacity of 4615 ET and a current load of about 2692 ET.

The current average dry weather flow is 2.5 ML/day. This can increase substantially after rain, due to stormwater inflow and infiltration to the reticulation system. There is one formal overflow structure within the system, at the K6C pump station.

The plant consists of trickling filters and a series of four maturation ponds. There are two distinct trickling filter plants onsite, which were constructed in 1939 and 1966. There have been various upgrades since 1966, which have included construction of the maturation ponds, a new inlet works and a final trickling filter humus clarifier.

The trickling filter plant removes the majority of the organic and suspended solids material from the sewage. The effluent from the trickling filter plant is disinfected by retention in a series of four maturation ponds. The trickling filter and maturation ponds act together to achieve a degree of nitrogen removal. Final treated effluent from the plant is pumped from the last maturation pond to the Macleay River.

Amenities (above) & Inlet works (below)

A number of pump stations, including private pump stations, independently discharge to the treatment works and there is a sizeable gravity catchment which discharges through two large carrier mains.
Effluent reuse capability of 50% of the dry weather flows reused at the following sites:

- Private pasture irrigation – part of 20% ADWF on an area of 5.7 ha.
- Warwick Park Racetrack – 20% ADWF on an area of 3 ha.

There are a number of issues relating to this site:

- Residential areas as close as 200m from the boundary of the treatment works and there has been a history of odour complaints from nearby residents.
- The effluent produced from the plant regularly breaches the EPA licence maximum suspended solids limit during summer. Algae growth occurs in the maturation ponds, which has the effect of increasing the effluent suspended solids level as effluent travels through the ponds. Algae levels are higher during summer periods where the majority of licence compliance issues are experienced.
- Key parts of the plant are below the 1 in 100 flood level and are subject to flooding. This includes the humus clarifier, sludge storage lagoons and maturation ponds. The final effluent pump station is above flood level, however it will be surrounded by floodwaters and will not be accessible in the event of a flood.
- The inlet structures (ie. screening, transfer pump station and secondary plant bypass) are hydraulically limited.

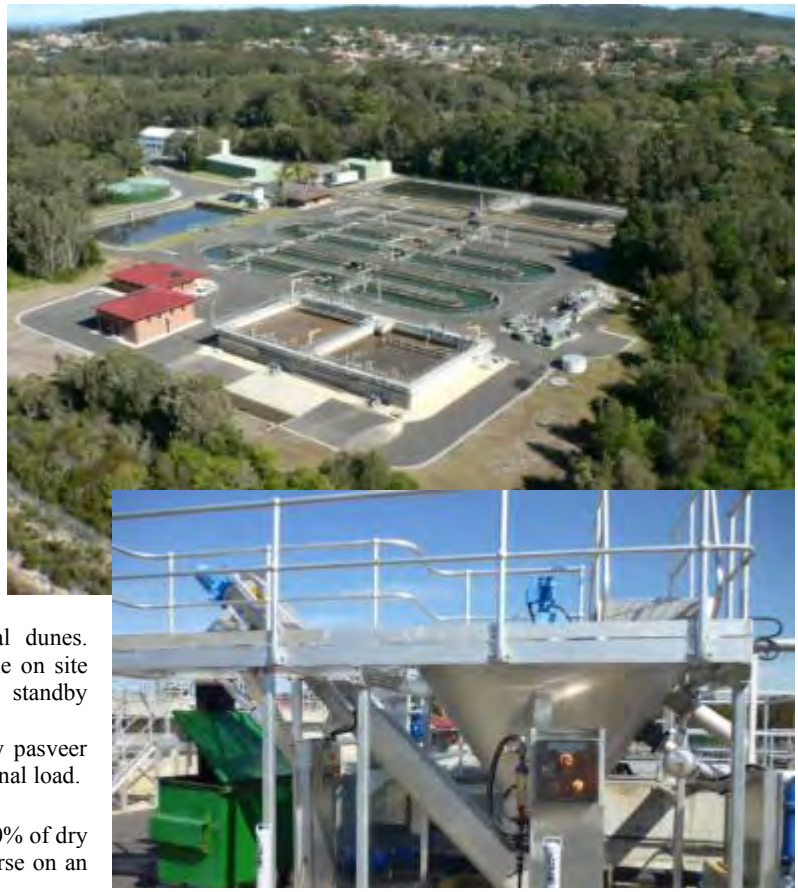
Due to the above factors this treatment plant is to be decommissioned and a new treatment plant constructed in Heyson Street, West Kempsey adjacent to the existing site. It is proposed this new Plant will accept flows from the existing West Kempsey system area as well as flows from the South Kempsey Plant (East Kempsey, South Kempsey, Burnt Bridge) and possibly Frederickton. Construction is due to commence in approximately 2014.

The pipe work within the system dates from 1935 through to 2004, with approximately 80% of the system constructed from 1935 to 1940. The pumping stations within the system vary in age from 1936 through to 1991. Pipes constructed before 1981 are mostly vitrified clay and cast iron, pipes constructed after 1981 are mainly uPVC.

Scheme Name	**South West Rocks Sewerage System**
License No:	2497, Limit = 2.85 ML/d
Population served Holiday Peak	1538 ET 2307 ET
Treatment Plant Capacity	4615 ET
Average day flow	2.2 ML/day
No. of Pump Stations Effluent	25 1

Privately owned	41
Length of Mains	
Rising mains	10.2 km
Gravity mains	54.3 km
Effluent mains	3.7km

This system is divided into 3 separate systems, South West Rocks, New Entrance and Arakoon which each independently discharge to the STP.
The treatment plant was commissioned in 1984 and is located off Belle O"Connor Street with a design capacity of 4615 ET with a current loading of 1538 ET and a holiday peak load of approx 2307 ET.
The plant consists of a 6000EP sequence batch reactor with a further 6000EP pasveer treatment capacity.
Excess sludge from the plant is stored in three sludge lagoons and displaced supernatant liquor is returned to the head of the plant.
The effluent is treated with hypochlorite, stored in an effluent balance tank before being discharged to sand dunes 2.6 km east of the treatment plant, between the town and the mouth of the Macleay River. The EPA licence conditions include a limit of 2.85 ML/d of effluent discharge into the coastal dunes. Additional storm water attenuation is available on site through the use of one or all of the three standby pasveer channels.
During peak periods of visitation the standby pasveer channels are brought on line to treat the additional load.



New grit removal system

There is an effluent reuse capability of up to 20% of dry weather flows at South West Rocks Golf Course on an area of 100 ha.
For excessive wet weather flow the pasveer channels are now used for stormwater attenuation and there is provided a manually controlled by-pass channel discharging the excess effluent into the adjoining creek.
A number of private pump stations in Jerseyville independently discharge to the treatment plant.
A new Water Recycling Plant has also been constructed on site to tertiary treat the effluent for residential dual reticulation (toilet flushing, garden irrigation and laundry use). This plant has needs to undergo verification testing and regulatory approval prior to operation for full use.

Since the STP was commissioned new inlet works were constructed in 2003. A new grit removal system, dual sequential batch reactor tank & aeration system, and new amenities and blower buildings were completed in 2009. The pipe work within the system is relatively recent, dating from 1984 through to 2004. The pumping stations vary in age from 1985 through to 2003. Pipes within the system are almost exclusively UPVC.

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

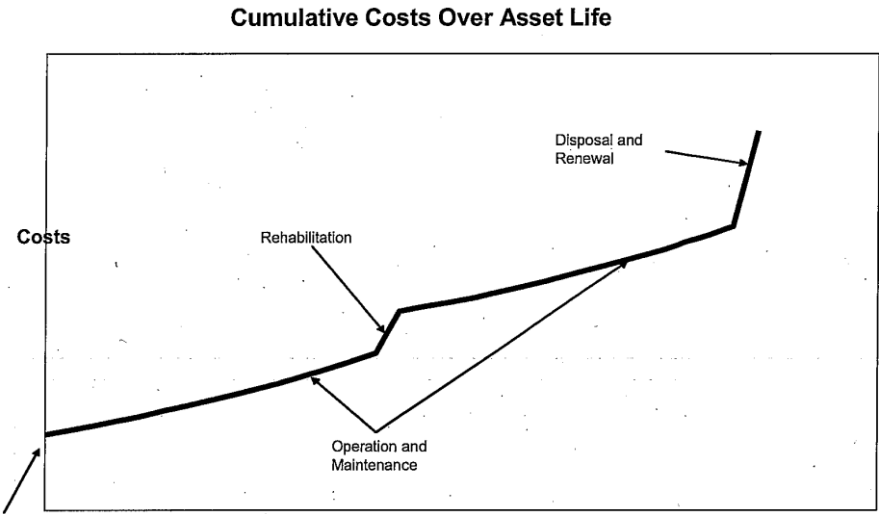
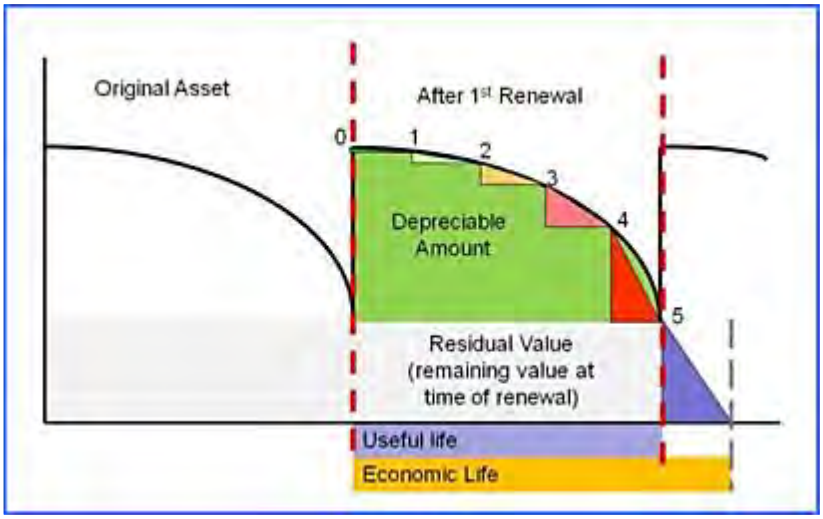


Figure 8 - Asset Performance terms



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.

Mechanical fitters replacing discharge bends & rising main at K11B pump stn

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.

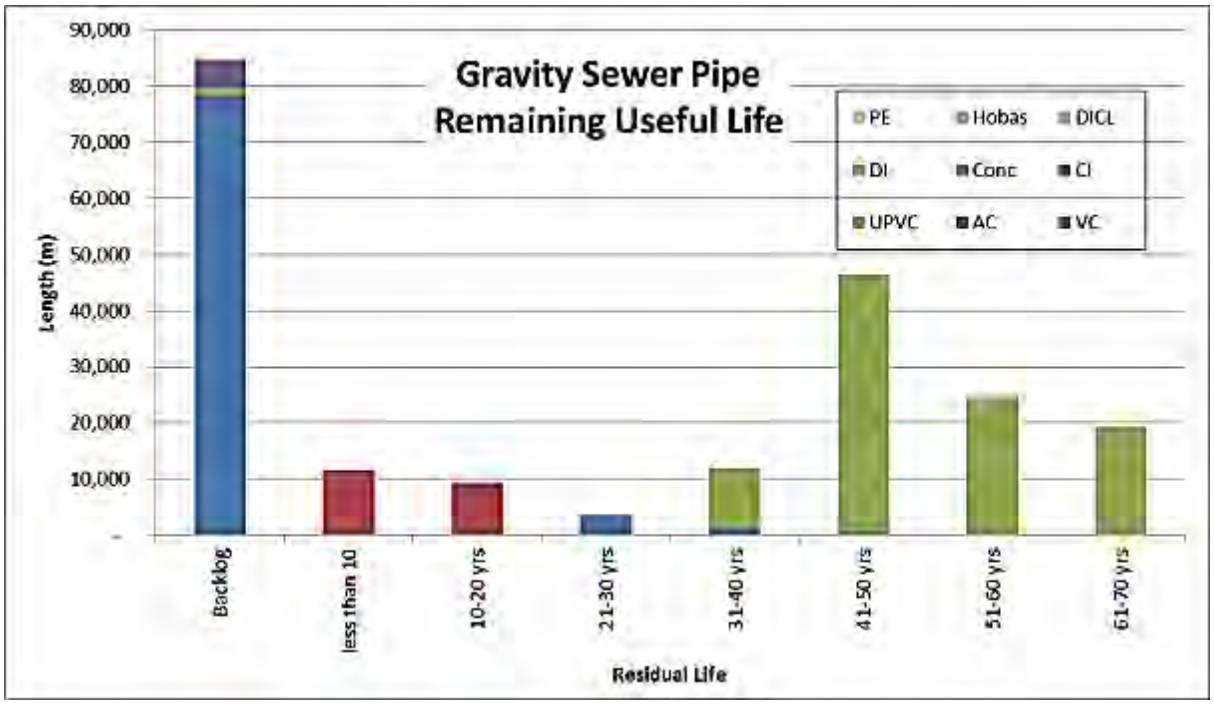
For instance, relining a pit or even demolishing and rebuilding a pit in the same location is more cost effective than excavating and construction a new pit in a different location as ancillary component assets such as electrical conduits, telemetry, scour discharge locations etc can be retained.

South Kempsey STP Digester pump house was inundated during the May 2009 flood event

Table 4.2 - Wastewater Asset Standard Useful Lives and Residual Values

Component	Useful Life	Residual Values
Chemical tank	30 years	0%
Earthworks	25 - 100 years	0%
Electrical/Switchboard – Pump stns	25 years	0%
Electrical/Switchboard/SCADA – Treatment plants	20 years	0%
Crane	10 - 20 years	0%
Flow meter	20 years	0%
Level instruments	10 years	0%
Mains – DI, DICL, MSCL	40 years	40%
Mains – AC, Conc & RCP	45 years	40%
Mains – CI, CICL, GI, MS, GAL, Hobas, OPVC, Poly, PVC, UPVC, VC	70 years	40%
Manholes	70 years	50%
Mechanical	20 - 25 years	60%
Multitrode	15 years	0%
Observation Bore	30 years	0%
Pipework – Pump Stations	40 years	10%
Pipework & valves – Treatment plants	10 – 25 years	0%
Pit	50 - 70 years	60%
PLC	15 years	0%
Power supply	30 -70 years	0%
Pump - Dosing	5 years	60%
Pump – Pump stn	20 years	60%
Road - bitumen	15 - 25 years	30%
Road - gravel	20 - 50 years	20%
Safety shower	50 years	0%
Security fence	15 - 35 years	0%
Sludge lagoon	50 - 100 years	50%
Soft starter	10 years	0%
Structure - concrete	50 - 100 years	60%
Structure - metal fab	20 - 50 years	0%
Telemetry	10 - 15 years	0%
Valves	20 - 40 years	0%
Weather station	15 years	0%
Well - concrete	70 years	50%
Well – Fibreglass/Poly & GRC	30 years	50%
Weather station	15 years	0%

Figure 9 - Snapshot of Asset Age Profile – Gravity Sewer Pipes



The first sewerage systems were constructed from 1935 to 1940 and have just reached the end of their theoretical useful life in 2010. In the recent past, Council has committed significant funds to catch up on backlog works. There are now ongoing programs to investigate, repair and, where needed, reline or replace poor condition pipes and manholes.

4.3.2 Asset capacity and performance

Sewerage assets work together as a system and discussion of asset capacity and performance are best described in terms of their combined effect on the sewerage system, system customers and the environment. A detailed sewerage system description, statement of capacity and summary for each STP catchment is contained in Section 4.2 – Sewerage 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
Hat Head	Portions of the vacuum system experience problems during local high intensity rainfall events as the pneumatic controllers are submerged and fail. In these events, some manholes are impacted by surface water allowing stormwater to enter the sewerage system.
West Kempsey STP catchment	High stormwater infiltration mainly due to the age of the sewerage pipe network. Pipes are cracked and often collapsed allowing significant stormwater into the sewerage system, then overloading the STP leading to emergency raw effluent discharges into the Macleay River. Council has an ongoing investigation and remediation program which is showing great results. Limited ability to meet the increasing nutrient removal requirements of EPA Licences. Odour complaints.
South Kempsey STP catchment	High stormwater infiltration and more detailed assessments to determine the clear causes is yet to be undertaken. The stormwater into the sewerage system then overloads the STP leading to emergency raw effluent discharges into Gills Creek. A program to address this infiltration will follow after the current priority of West Kempsey catchment. Limited capability to meet increasing nutrient removal requirements of EPA Licences. Subject to odour issues generated from the Septic removal facility.

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 and sewerage 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 wastewater facilities, including Frederickton, Gladstone, South Kempsey & West Kempsey sewer treatment plants.

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

The value of assets as at 30 June 2012 covered by this asset management plan is summarised below.

Current Replacement Cost	$202,700,881
Depreciable Amount	$49,504,371
Depreciated Replacement Cost	$153,196,509

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

Asset Consumption	5.8%
Asset renewal	18%
Annual Upgrade/expansion	11%

4.4 ASSET CONDITION & CONDITION ASSESSMENT

The assessment of failure probability or condition of wastewater 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

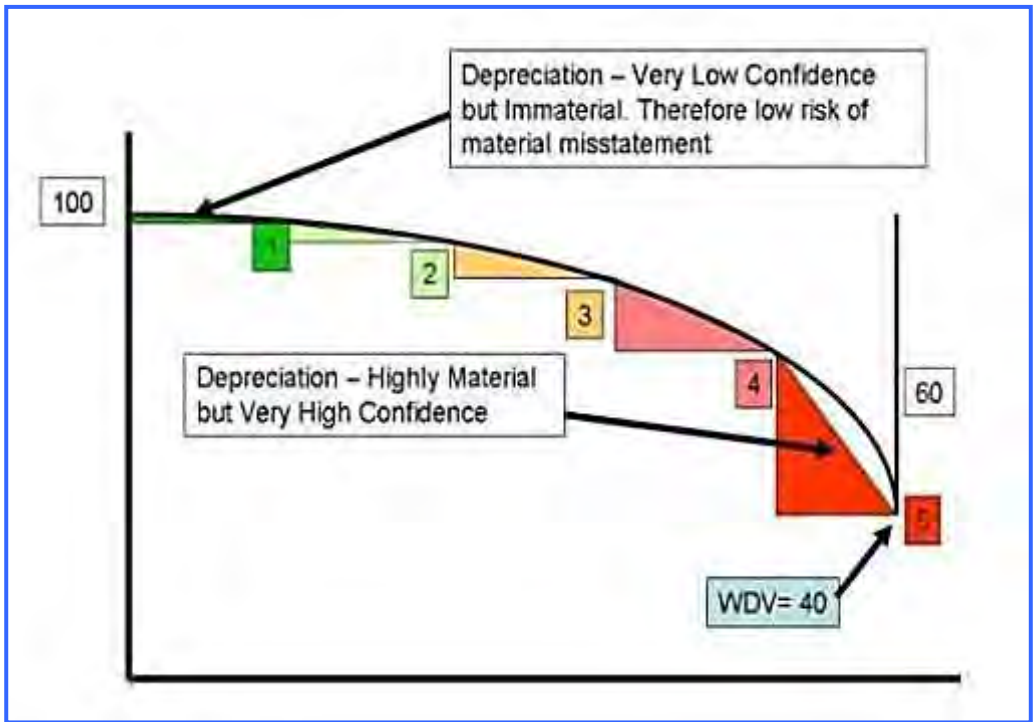


Table 4.4 - APV Condition Rating Numbering System

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 wastewater assets. Council asset staff analysed historical condition assessment information on sewer main breaks, chokes, 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 SPS 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 – Condition rating assessment

Asset Type	**2012 Condition Rated By:**
Treatment Plants	APV & Council field staff
Mains – Gravity, rising, effluent mains	Asset Officer determined by interrogation of CCTV and routine maintenance register.
Manholes	Age based and Asset Officer determined by interrogation of routine maintenance register
Pump Stations	Council field staff detailed inspection and condition rating
Observation Bores	Age based - these usually not replaced when decommissioned
Structures	APV & Asset Officer

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 G.

Sewer pipes are graded following CCTV inspections. The sewer pipe service & structural condition grading table is included in Appendix H.

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 4.6 & 4.7 below:

Table 4.6 - 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 seweage out for town for one day	Water supply and/or sewage 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 4.7 - 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 4.3.3 below is used to assess the level of risk, ranking events as low, moderate, high or very high risk.

Table 4.8 - 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[1] 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 Table 4.9.

Table 4.9 - Critical Risks

Asset at Risk	What can Happen	Risk Rating (VH, H)	Risk Treatment Plan
West Kempsey STP	Excessive stormwater infiltration causing raw effluent discharges into the Macleay River	VH	Inspect, repair and reline sewer pipes and manholes, raise assets in low lying flood prone areas.
	Odour complaints	H	Address improved buffer zone with new STP.
	Licence Failure	H	Establish direct alert system with customers. Improve capability of nutrient treatment at new STP
South Kempsey STP	Excessive stormwater infiltration causing raw effluent discharges into Gills Creek and then Macleay River	VH	Inspect, repair and reline sewer pipes and manholes, raise assets in low lying flood prone areas.

	STP flood prone Odour complaints Licence Failure	 H H	Decommission Address improved buffer zone with new STP. Establish direct alert system with customers. Improve capability of nutrient treatment at new STP
Hat Head STP	Poor effluent quality during peak Christmas period leading to EPA compliance failure.	VH	Upgrade STP
Hat Head Vacuum System	Failure of controls causing failure of system	H	Replace/raise controllers, raise and seal specific manholes and repair other defective components as per the reticulation Flood proofing Plan
South West Rocks STP	Poor effluent quality during peak Christmas period leading to EPA compliance failure	VH	Investigate, high growth area
South West Rocks - Jerseyville low head pressurised system	System failure leading to discharges into low Macleay River and EPA licence failures	H	Flood proof systems and develop isolation procedures for major events

4.6 ROUTINE MAINTENANCE PLAN

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

- Operating Expenditure: Expenses related to ensuring the asset will continue to perform at a satisfactory level.
- Capital Expenditure: Expenses related to an asset"s major alterations.

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 of business operations eg. fuel costs, electricity costs, operational and regulatory monitoring, sludge removal.
- Planned Maintenance: Expenditure on programmed activities for the ongoing asset"s up keep eg. Jetting, CCTV inspections, local repairs, manhole clearing, pump maintenance, wet well washing and cleaning.
- Unplanned Maintenance (Reactive): Expenditure on activities related to the immediate up keep of assets eg. sewer chokes, safety repairs, pump breakdown repairs.

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. pipe and manhole relining, sewage 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, inlet works grit removal.
- 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 eg. disposal of old pipes, etc.

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

Carrying out routine maintenance on a sewer pump (above) and servicing the rainfall and river height telemetry canisters (below)

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 , for example STP filters, mixers, building major refurbishment.

Kempsey Shire Council"s coastal villages have high peak loads over the Christmas period leading to additional maintenance and operation of assets additional assets and seldom used.

Seventy five percent of the Sewer Fund operating budget is expensed on operational costs such as power and operational activities such as inspections and monitoring. The remaining twenty five percent is spent on maintenance programs.

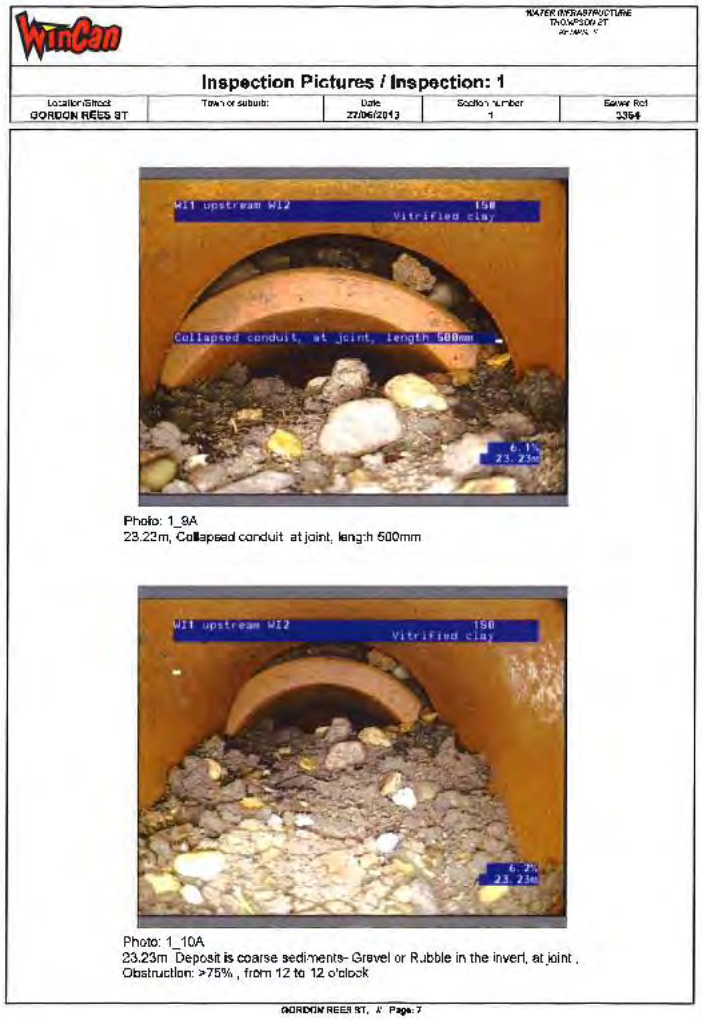
Table 4.10 details general operations and maintenance service levels for sewerage assets.

Current Kempsey Shire Council priority maintenance programs designed to return sewer assets to their design level of service, maintain levels of service and minimise risk of future failure events are described in Table 4.11.

Table 4.10 - General maintenance program for wastewater 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 −
Sewer Chokes Pump - Failures Treatment Plant − Mechanical or Electrical	Provide a 24-hour callout repair service and respond to and repair sewer chokes and localised over flows	Responsiveness	Medium
	Sufficient spares to be stocked to address regular failures	Responsiveness	
PLANNED INSPECTIONS			
SPS, STP	Undertake scheduled inspections as justified by the consequences of failure on levels of service, costs, public health, safety or corporate image.	All	Nil
Pipes in known high infiltration areas	Modify the inspection programme as appropriate in response to unplanned maintenance trends.	All	
PLANNED − PREVENTATIVE MAINTENANCE			
SPS, STP	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 4.11 - Council's Priority Maintenance Programs for Wastewater Assets

Asset Group	Maintenance Activity	Frequency
Sewer pipes and Manholes	Infiltration Reduction Program (HD-06-03) Investigation of stormwater infiltration and undertake repairs/ remedial action. A comprehensive program including pressure jetting of all sewer pipes to remove roots and clean pipes to enable CCTV investigation. Replace badly cracked and collapsed sections. Council purchased a new pressure jetter at a cost of $70,000, a new CCTV van and has dedicated resources. The new jetter has improved root removal capacity and can clean pipes large than 150mm. The photo below show a typical failure mode. Significant improvement was seen in the last flood when stormwater infiltration was significantly lower as evidenced by the fact that Emergency Pumping Station of raw sewage into the Macleay river was not needed. The system also experienced a large reduction in sewer surcharges The results of this program feed into the sewer pipe relining program.  WinCan Inspection Pictures / Inspection: 1 Location/Street: GORDON REES ST | Town or suburb: | Date: 27/06/2013 | Section number: 1 | Sewer Ref: 3364 WI1 upstream WI2 150 Vitrified clay Collapsed conduit, at joint, length 500mm Photo: 1_9A 23.22m, Collapsed conduit at joint, length 500mm WI1 upstream WI2 150 Vitrified clay Photo: 1_10A 23.23m Deposit is coarse sediments- Gravel or Rubble in the invert, at joint , Obstruction: >75% , from 12 to 12 o'clock GORDON REES ST, Page: 7	Ongoing until backlog is complete. Priority areas: West Kempsey South Kempsey East Kempsey
Sewer pipes and Manholes	Manhole Inspection Program Carried out in conjunction with CCTV program	Priorities 2013-2016 West Kempsey STP catchment.- due to age of system Hat Head Catchment

Asset Group	Maintenance Activity	Frequency
Sewer pump stations	Radtel System – Process staff inspect system Maintenance Cleaning – Process staff are responsible to maintain and clean pump stations. A copy of the checklist and staff roster is included in Appendix I.	Daily Weekly/fortnightly
STP	Outfall - Monitored by Process staff Vegetation control – Maintained by Process staff Discharge Valves – Rotated by Process Staff	Weekly Weekly Monthly
STP	Handheld lab WQ test instruments – calibrated and Serviced annually by specialist instrument company Other lab instruments – Scales etc.	Annually
STP	Instrument Maintenance Wastewater quality instrument routine servicing, maintenance & calibration and repair	5 weekly
STP	Flowmeter Periodic Calibration Program Annual Service and calibration of major flowmeters used for EPA reporting.	Annually
STP	Mechanical and electrical programmed maintenance, Follow checklist – servicing of operational and standby assets.	Various, as per program and specifications
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

Maintenance expenditure trends are shown in Table 4.12.

Table 4.12 - Maintenance Expenditure

Year	Operations / Maintenance Expenditure		
	Operations	Maintenance	Cyclic (Incl in Mtce)
2012/13	$3.6M	$1.4M	$
2013/14	$3.9M	$1.6M	$
2014/15	$4.0M	$1.7M	$

4.6.2 Standards and specifications

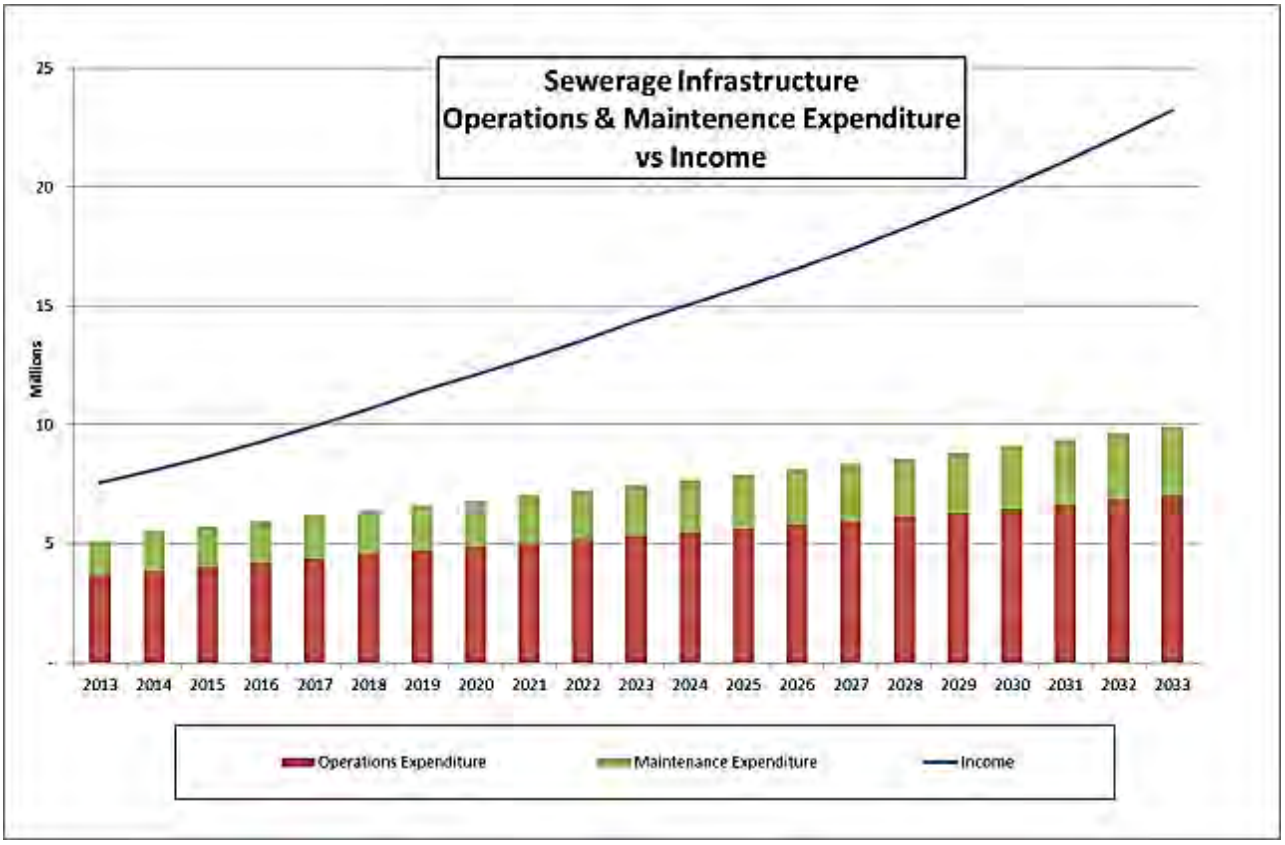
Maintenance work is carried out in accordance with the following standards and specifications.

- Sewerage Code of Australia WSA 02 – 2002 v2.3
- 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.

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.

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 sewerage asset renewal plan with many sub-programs are compiled each year for incorporations 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:

- Sewer pipe relining
- Manhole Relining

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.

The following table 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.

Religning a sewer main in West Kempsey. The mains are first checked with CCTV camera, cleared of roots and jetted with water until the pipe is sufficiently cleaned. The line is then re-camered and the new internal lining pipe is inserted inside the old pipe and lastly new junctions are inserted. Finally the mains are re-camered to ensure workmanship is satisfactory

Table 4.13 - Major Asset Renewal programs for 2013/14 to 2015/16

Sewer Pipe & Manholes	Sewer and Manhole Relining Program Relining deteriorated sewer pipes and manholes found as high risk as part of the CCTV program. 2013/14 Main replacements proposed following CCTV include: Skyline Crescent & Noongah Tce - Crescent Head, Cochrane St & Leith St – West Kempsey, Gordon Young Dr – South West Rocks, Harry Boyes Ave & Bloomfield St – South Kempsey	2013/14 Hat Head raise controllers & manholes that become inundated during flooding events.
SPS	SPS Renewal and Upgrade Program Council has a dedicated SPS Renewal Program. Operations staff has developed a SPS Renewal Prioritisation spreadsheet. Renewal criteria & risk scores are based on Environmental / Public Health consequences, breakdown history, obsolescence of pump parts, adequacy of storage capacity and flood risk. Refer to Appendix J for a copy of the spreadsheet. Failing and obsolete components are replaced and also design shortcomings are remedied. Items such as enlargement of insufficient wet well storage and rising of flood prone wet wells and electrical equipment.	Avge 6 SPS per year (Council has 78 SPS) 2013/14 - 8 SPS Gladstone – G8 Gladstone – G1 SWR – R10 SWR – R11 Kempsey – K14 Kempsey – K17 Kempsey – K3 Fredrickton – F3 Crescent Head – C3
SCADA SPS	Instrument Upgrade Program There are many components to a SCADA system. The "primary device" is the instrument which measures the actual criteria (eg. Chlorine concentration, water level, flow). Council has hundreds of instruments measuring continuously. These primary devices usually have a short life, costs range from $500 to $5,000 each. Council has a program to systematically replace a category of instrument each year based on reliability/failure rate and obsolescence of spare parts. 2013/14 –UPGRADES TO THE SEWER INSTRUMENTATION LEVEL CONTROLLERS New level controllers are being replaced in sewer wells. In the past, level regulators have been used in sewer wells to start and stop pumps. However, objects often get caught on the level regulators preventing them from starting and stopping the pumps. There is also a switch in the level regulator that tips around 200 times a day and this switch can wear out. *New level controllers are being replaced in sewer pump wells* 	

	 ***New radar unit*** The radar wave sensor provides fantastic accuracy with water level measured in millimetre increments, which enables accurate measurement of the sewer that has been collected. These sensors have no contact with the sewer in the well, as they sit just below the lid of the well. This then limits the need to clean the sensor, where as a level regulator needs to be cleaned regularly. The sensors have no moving parts, which allows longer use before replacement of the sensor is required.	
STP	<u>Treatment Plant Major periodic renewals</u> SWR SBR – annual inspection, cleaning and replacement of aqua blade diffusers. Hat Head SBR – annual inspection, cleaning and replacement of aqua blade diffusers South Kempsey – new chlorine disinfection, ferric tank removed Activated Sludge tanks cleaned out every 3 years at STPs without grit removal 1. Crescent Head 2. Gladstone 3. Frederickton Concept design over next 5 years for adding grit removal at Crescent Head, Gladstone & Frederickton STP.	
SCADA	<u>Disposal of RADTEL, installation of ClearSCADA SCADA system at:</u> Frederickton STP – water and sewer Gladstone/Smithtown – water & Sewer	
Sewer Rising & Effluent Mains	Replace 1 Frederickton STP Rising Main 2 Effluent main upgrades due to Kempsey Bypass works. Hat Head effluent main was moved from pedestrian bridge across creek to underground (PE underbore).	

Council is carrying a backlog liability of just over $ 50 M. This backlog is being addressed, refer Table 4.14 below:

Table 4.14 – Asset Renewal Backlog

Asset Type	Backlog	Explanation
Sewer Pipes	**$ 22,790,402**	The original sewerage system was constructed between 1935 and 1940. These mains reach the end of their theoretical useful life ain 2010. Council is addressing the backlog via the Infiltration Reduction Program and subsequent sewer relining program. Construction dates for sewer networks constructed between 1940 to 1960 were not recorded at the time and many have been conservatively dated 1940. The assets team is investigating subdivision construction records and updating sewer asset construction dates.
Manholes	**$ 4,900,833**	Same as above
Observation Bores	**$ 130,900**	Observation bores are operated to failure then decommissioned and another bore drilled. Several bores have reached the end of their theoretical useful life but are still operating satisfactorily.
Sewer Pump Stations	**$ 3,923,044**	The SPS upgrade program is addressing this backup.
Sewer Treatment Plants	**$ 18,957,929**	West Kempsey STP is the oldest treatment plant. The first process train was constructed in 1939 with a duplicate process constructed in 1966. Followed by South Kempsey STP which was constructed in 1960 South Kempsey STP and West Kempsey STP are due to be decommissioned in approximately 5 years. They account for $5,255,454 & 6,998,632 of the backlog respectively. South West Rocks older pasveer channels account for a further $4,907,261. They brought back on line during peak summer holiday periods.
Structures	**$ 31,283**	
TOTAL	**$ 50,734,391**	

After adjustment the backlog work reduces to the following:

Table 4.15 - Result after Backlog Work

Asset Type	Backlog	Explanation
Pipes	**$ 22,790,402**	No change but will improve over the next 3 years
Manholes	**$ 4,900,833**	No change but will improve over the next 3 years
Observation Bores	**$0**	Extended the remaining useful life several Observation Bores
Sewer Pump Stations	**$ 3,923,044**	No change but will improve over the next 3 years
Sewer Treatment Plants	**$1,649,773**	South Kempsey STP and West Kempsey STP & SWR deducted.
Structures	**$ 31,283**	No change
TOTAL	**$33,295,335**	

The overall wastewater asset renewal budget can be found in Appendix K.

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.

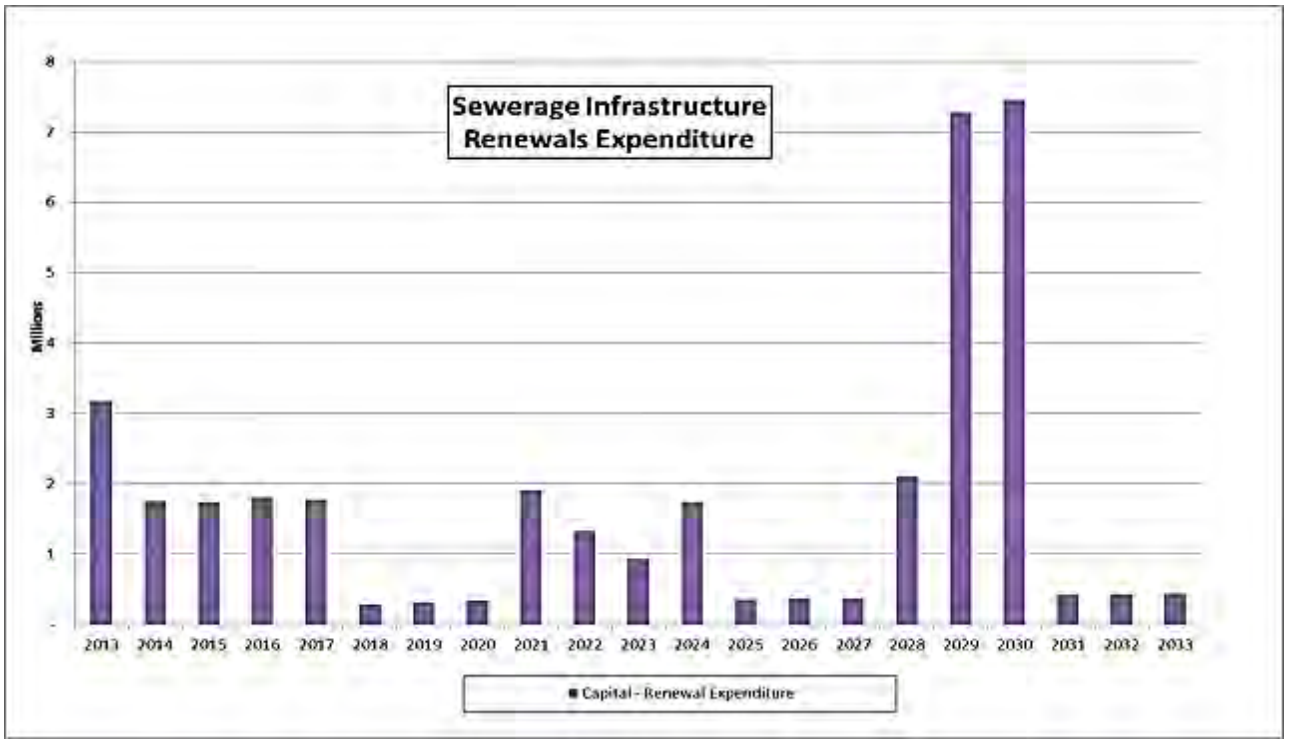
Table 4.16 - Renewal Priority Ranking Criteria

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 - Planned Capital Renewal Expenditure



Data analysis indicates an adjusted backlog of $34M of renewal projects, based on present condition and theoretical useful life. Planned renewals over the reporting period will take the backlog into account.

The forecasts are based on the best available knowledge of asset condition and performance, and on the levels of service that are being delivered.

4.8 CREATION/ACQUISITION/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 below.

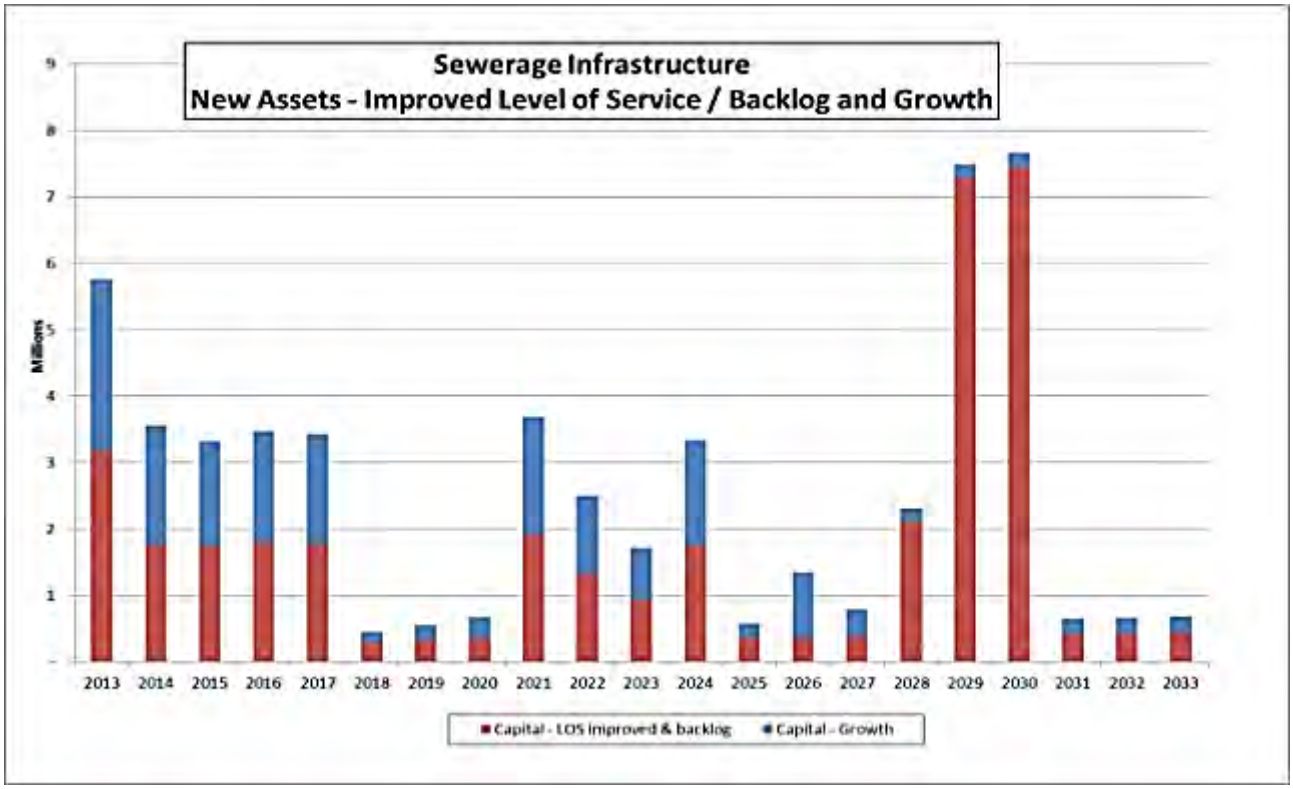
Table 4.17 - New Assets Priority Ranking Criteria

Criteria	Weighting
Regulatory Requirements	50%
General industry improvements.(eg. SCADA control) to reduce reactive callouts.	30%
Local economic development or environmental improvements	20%

4.8.2 Summary of future upgrade/new assets expenditure

Planned upgrade/new asset expenditures are summarised in Figure 13.

Figure 13 - Planned Capital Upgrade/New Asset Expenditure



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 5.6. 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.

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 5.6. 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.

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 sewer fund account.

Table 4.18 - Assets identified for Disposal

Asset	Reason for Disposal	Timing	Cashflow from disposal
South Kempsey STP	Regulatory Performance Poor condition due to age and old technology	Next 10 years	Nil
West Kempsey STP	Regulatory Performance Poor condition due to age and old technology	Next 10 years	Nil

During the May 2009 flood the sewer operator was flown in by helicopter to attend to duties at the treatment plant

5. FINANCIAL SUMMARY SEWERAGE INFRASTRUCTURE

This section outlines the long term operations, maintenance and capital financial requirements for the operation, maintenance, renewal and development of the wastewater 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.

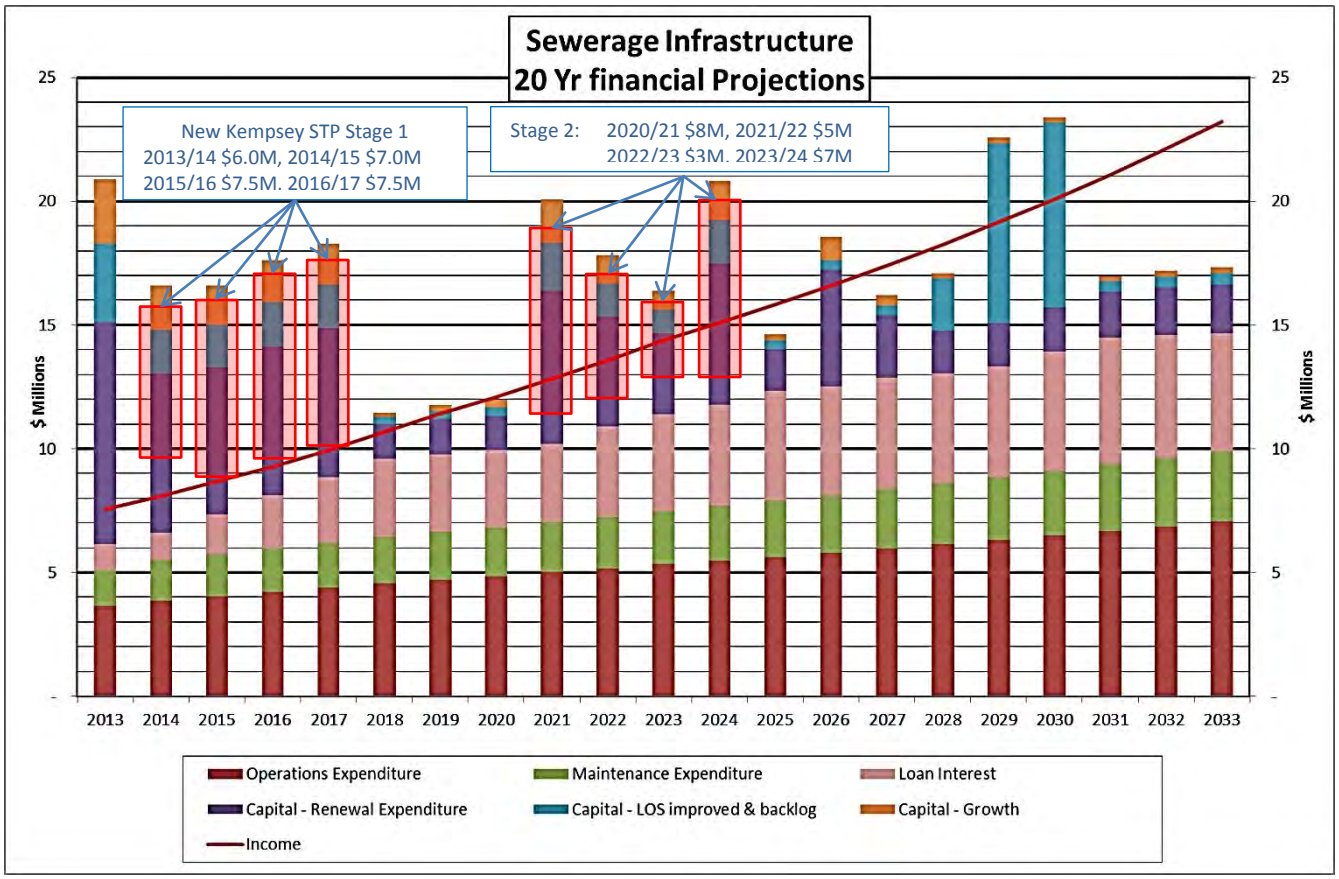
This chapter presents the forecast financial summary for the next 10 years based on all the information presented in the previous sections of this asset management plan. The financial summary will be reviewed annually and continue to be refined as planning studies/strategies are completed, desired levels 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 and Growth Assets)

Figure 14 - Planned Operating and Capital Expenditure



Source: KSC Financial Detailed Summary Spreadsheet

The significant expenditure on renewals in 2013-17 reflects the deferred renewals following the recent frequent flood events that hindered the renewal expenditure, as combating operational recovery was prioritised. The primary significant new asset project is the New Kempsey STP which is 60% renewal funded, 20% a level of service improvement to meet legislative requirements and 20% to accommodate future growth. The capital works identified over the 30 years are predominantly addressing improved level of service due to legislative requirements with the exception of the Stuarts Point sewerage system planned in 2029/30.

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

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 $4.3 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 $10.7M.

A gap between life cycle costs and life cycle expenditure gives an indication as to 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 2.4 due to the need to catchup backlog renewal works, to once again, achieve full level of service compliance. Figure 15 below shows the Life Cycle Sustainability Index trend.

This trend indicates the following:

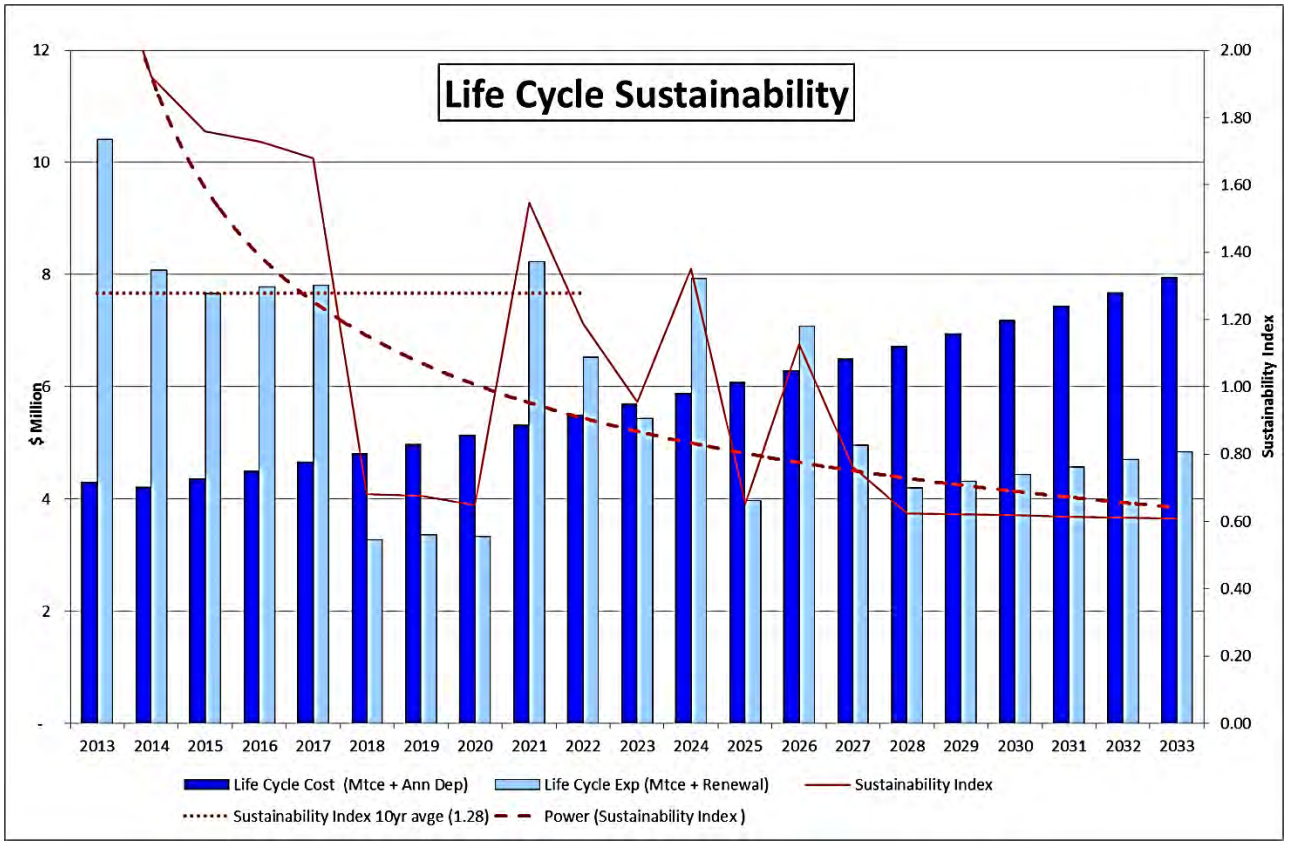
2013-2017: Continued emphasis on renewal of poor performing and obsolete assets

2018-2020: Follow up work and investigation work ahead of future renewals programs

2021-2026: Act of investigation work

2028-2033: Basic renewal costs only, further costs to be added in the future.

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 $61.5M. This is an average expenditure of $6.15M. Estimated maintenance and capital renewal expenditure in 2013/14 is $8.1M. The 10 year sustainability index is 1.28.

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.	Sewerage Charges
Operations	The investment on day to day activities of business operations. Eg power costs, chemicals, licencing charges.	Sewerage Charges
Existing Asset Rehabilitation / Renewal	The investment of maintaining the current level of service by reinstating the original life of the asset.	Reserves Sewerage 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. Eg. Increased detention time, improved STP processes.	Competitive Grants & opportunities for low interest loans, Reserves, Loans, Sewerage 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	Development Servicing Plan –DSP, Competitive Grants, Sewerage Charges
Disposal	Costs associated with the decommissioning and disposal of an asset.	Sewerage Charges

The operating expenditure (operations and maintenance) are funded from the Sewer Fund reserve. Where possible, the capital works program (ie. asset renewal and new assets) are funded from the Sewer 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, $13M. 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 $132M. 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 $7,421 per assessment for sewerage infrastructure.

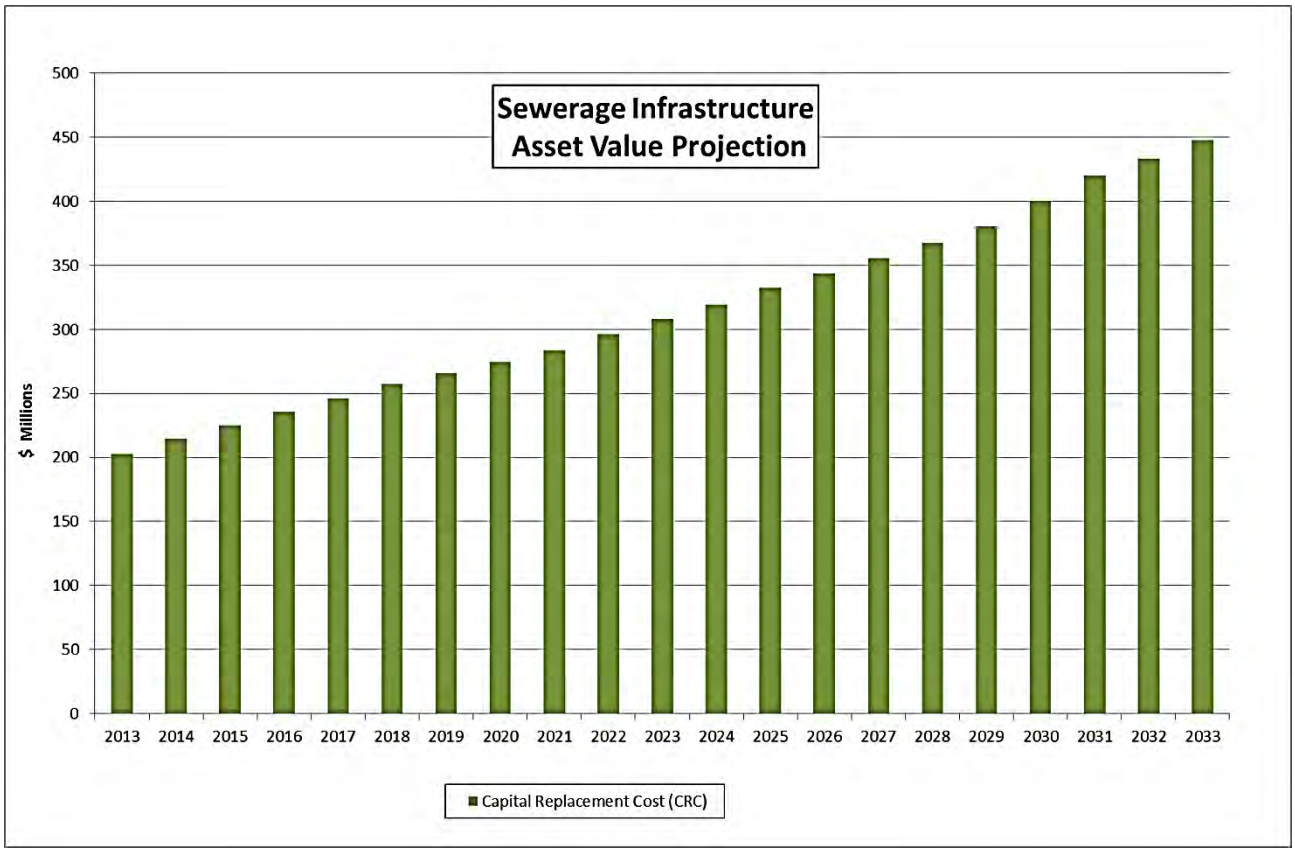
5.3 VALUATION FORECASTS

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



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.

Mobile centrifuge dewatering the sludge at Hat Head STP

Figure 17 - Projected Depreciation Expense

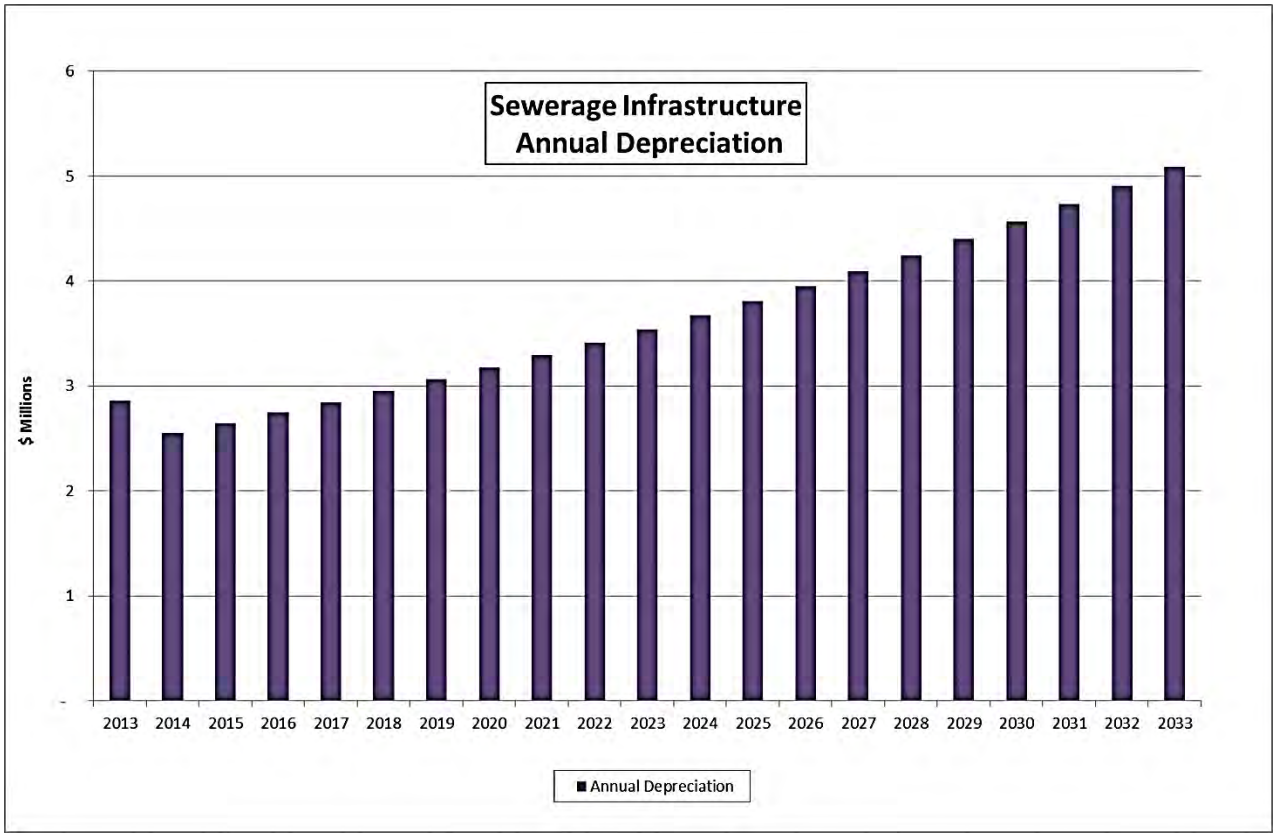
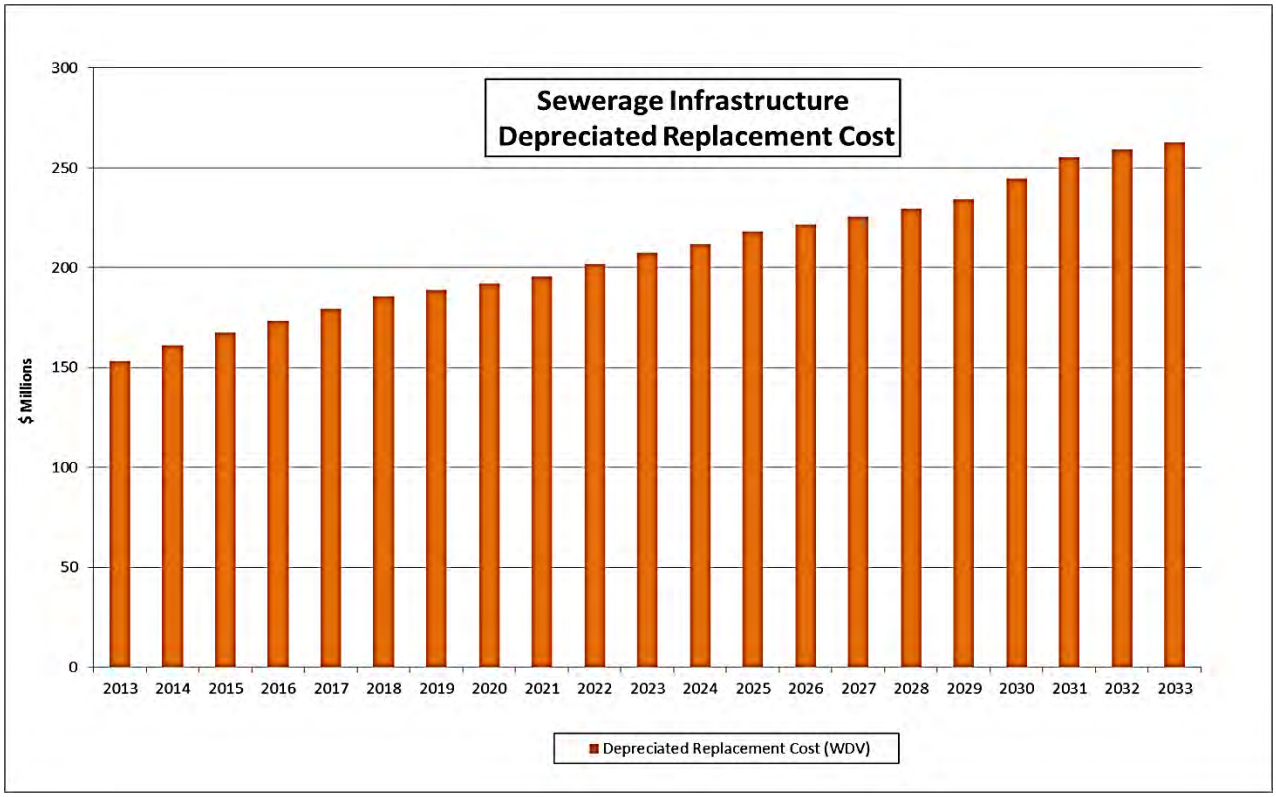


Figure 18 - Projected Depreciated Replacement Cost



5.4 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: 7% pa from 2013/14 to 2018/19, 6%pa from 2019/20 to 2022/23, 5% 2023/24 to 2032/33.

These switchboards & PLC run the pasveer channels at South West Rocks STP

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 sewer 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 4.3.

6.2 ASSET MANAGEMENT SYSTEMS

Council uses Excel spread sheets 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 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 wastewater 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.

Sewer Process Operator attending to duties at West Kempsey STP

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.

6.3 INFORMATION 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 assumed 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 Civicview, 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 flows onto 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, that generated on Work Action Sheets from the Water Services" engineering trades group.

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 Program 2013-2017
- Council asset management policy
- International Infrastructure Management Manual, Institute of Public Works Engineering Australia, 2006
- NAMS Plus Template and documents

Vacuum tank at Hat Head H1 pump station

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 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 of 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 & 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 & Sewerage Technical Officers / Project Engineers	2
	Streamlining the scheduled maintenance of electrical and mechanical assets with capital requirements	Mechanical & Electrical Technical Officers / Water & Sewerage Technical Officers	7
Condition Assessments	Determine a more efficient mechanism to transfer into the asset register the captured camera 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	Manager 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, "Draft Pollution Incident Response Management Plan" 2012

CH2MHILL, "West and South Kempsey Sewage Treatment Plants" Options Investigation May 2012

Kempsey Shire Council, "Local Growth Management Strategy" 2009

NSW Government, Department of Planning "Mid North Coast Regional Strategy"

Kempsey Shire Council "Management Plan 2010 – 2011".

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

Calculation Files:

1 AMP Calcs using SEWER ASSET REVALUATION 2012- FINAL VERSION

APPENDIX A – WASTEWATER ASSETS

SEWER TREATMENT PLANTS – 8

Name	Location	Year Constn	Life (years)	Telemetry Installed	Capacity (ET)
Crescent Head Sewer Treatment Plant	Belmore St, Crescent Head	1974	50	Yes	769
Frederickton Sewer Treatment Plant	97 Yarrabandini Rd, Frederickton	1977	50	Yes	384
Gladstone Sewer Treatment Plant	Darkwater St, Gladstone	1978	50	Yes	769
Hat Head Sewer Treatment Plant	Hungry Head Rd, Hat Head	2004	50	Yes	769
South Kempsey Sewer Treatment Plant	Woolford Cres, South Kempsey	1940	50	Yes	2076
South West Rocks Sewer Treatment Plant	off Belle O"Connor St, South West Rocks	1985	50	Yes	4615
West Kempsey Sewer Treatment Plant	North St, West Kempsey	1939	50	Yes	4615
Sherwood Rd Environmental Precinct	150 Sherwood Rd, Aldavilla	2010	20	Yes	

RAW SEWER PUMP STATIONS - 78

Name	Location	Year Constn	Life (years)	Installed Power (kW)
C1 Sewer Pump Station	Lake St, Crescent Head	1976	70	22
C2 Sewer Pump Station	Willow St, Crescent Head	1976	70	29
C3 Sewer Pump Station	KSC Reserve, Baker Dr, Crescent Head	1992	70	7.4
C4 Sewer Pump Station	Loftus Rd, Crescent Head	2000	70	7.4
C5 Sewer Pump Station	Loftus Rd, Crescent Head	2000	70	2.4
C6 Sewer Pump Station	Crescent Head STP, Belmore St, Crescent Head	2000	70	1.3
F1 Sewer Pump Station	Cnr Lawson & Henry Sts, Frederickton	1981	70	7.5
F2 Sewer Pump Station	Creek St, Frederickton	1981	70	2.2
F3 Sewer Pump Station	Great North Rd, Frederickton	1981	70	7.5
F4 Sewer Pump Station	Frederickton Cemetery, Yarrabandinni Rd, Frederickton	2004	30	1.5
G1 Sewer Pump Station	Gladstone Lane, Gladstone	1982	70	13.5
G2 Sewer Pump Station	Kinchela St, Gladstone	1982	70	3.1
G3 Sewer Pump Station	Darkwater St, Gladstone	1982	70	4.4

Name	Location	Year Constn	Life (years)	Installed Power (kW)
G5 Sewer Pump Station	Croads Esplanade, Smithtown	1982	70	2.4
G6 Sewer Pump Station	Cnr Rawson & Jeffery St, Smithtown	1982	70	2.7
G7 Sewer Pump Station	Belmore St, Smithtown	1982	70	1.3
G8 Sewer Pump Station	Rawson St, Smithtown	1982	70	2
H1 Sewer Pump Station	Hungry Head Rd, Hat Head	2003	70	28
H2 Sewer Pump Station	Hat Head STP, Hungry Head Rd, Hat Head	2003	70	4
K2 Sewer Pump Station	Nancy Ellis St, West Kempsey	1986	70	9
K3 Sewer Pump Station	Leith St, West Kempsey	1965	70	13
K4 Sewer Pump Station	Cnr Leith & Cochrane St, West Kempsey	1965	70	20
K5 Sewer Pump Station	Cochrane St, West Kempsey	1936	70	22
K6A Sewer Pump Station	Thompson St, West Kempsey	1936	70	9
K6B Sewer Pump Station	Thompson St, West Kempsey	1989	70	55
K6C Sewer Pump Station	Thompson St, West Kempsey	1989	70	40
K7 Sewer Pump Station	Smith St, Kempsey	1985	70	2
K8 Sewer Pump Station	Smith St, Kempsey	1991	70	2
K9 Sewer Pump Station	Victoria St, East Kempsey	1965	70	7.5
K10 Sewer Pump Station	Washington St, East Kempsey	1965	70	7.5
K11B Sewer Pump Station	Wharf St, East Kempsey	1988	70	22
K11C Sewer Pump Station	Wharf St, East Kempsey	2001	70	2.7
K12 Sewer Pump Station	Cemetery, East St, South Kempsey	1965	70	13.5
K13A Sewer Pump Station	Angus McNeill Cr, South Kempsey	1965	70	8.4
K13B Sewer Pump Station	Boral, Angus McNeill Cr, South Kempsey	1985	70	1.3
K14 Sewer Pump Station	Bloomfield St, South Kempsey	1963	70	20
K15 Sewer Pump Station	Vernon St, South Kempsey	1992	70	15
K16 Sewer Pump Station	West St, South Kempsey	1993	70	3.1
K17 Sewer Pump Station	Harry Boyes Ave, South Kempsey	1989	70	9
K18 Sewer Pump Station	Nance Rd, South Kempsey	1997	70	12.7

Name	Location	Year Constn	Life (years)	Installed Power (kW)
K20 Sewer Pump Station	Kemp St, West Kempsey	1982	70	2.6
K21 Sewer Pump Station	North St, West Kempsey	1987	70	6
K23 Sewer Pump Station	Akubra Pl, South Kempsey	1992	70	1.5
K24 Sewer Pump Station	Springfield Dr, Greenhill	1994	70	2.2
K25 Sewer Pump Station	New Burnt Bridge, Sandy Creek Rd, Burnt Bridge	1996	70	7.5
K26 Sewer Pump Station	Old Burnt Bridge, Gowings Hill Rd, Burnt Bridge	1996	70	4.4
K27 Sewer Pump Station	South Kempsey STP, Woolford Cres, South Kempsey	1989	70	7.5
K29 Sewer Pump Station	Queen St, Greenhill	1986	70	9
K30 Sewer Pump Station	Alverton St, Greenhill	1986	70	6
K32 Sewer Pump Station	Kemp St, West Kempsey	2008	70	4.4
R1 Sewer Pump Station	Simpson St East End, South West Rocks	1985	70	45
R2 Sewer Pump Station	Currawong Cres, South West Rocks	1985	70	7.5
R3 Sewer Pump Station	Roy Sanders St, South West Rocks	1985	70	22
R4 Sewer Pump Station	Brighton Park, Landsborough St, South West Rocks	1985	70	7.5
R5 Sewer Pump Station	Horseshoe Bay Reserve, South West Rocks	1985	70	7.5
R6 Sewer Pump Station	Gilbert Cory St, South West Rocks	1985	70	7.5
R7 Sewer Pump Station	Ocean St, South West Rocks	1985	70	7.5
R8 Sewer Pump Station	Figtree Estate, Mayta Moran Close, South West Rocks	1985	70	1.6
R9 Sewer Pump Station	Phillip Dr, South West Rocks	1985	70	7.5
R10 Sewer Pump Station	Gladstone St, South West Rocks	1985	70	15
R11 Sewer Pump Station	Cnr Phillip Dr & Grey St, Arakoon	1985	70	3
R12 Sewer Pump Station	Simpson St West End, South West Rocks	1985	70	7.5
R13 Sewer Pump Station	Saltwater Estate, Waianbar Ave, South West Rocks	1999	70	1.5
R14 Sewer Pump Station	Lindsay Noonan Drive, South West Rocks	1985	30	13
R15 Sewer Pump Station	Gilbert Cory St, South West Rocks	1985	70	2
R17 Sewer Pump Station	Cardwell St, Arakoon	1993	70	2.4
R18 Sewer Pump Station	Arakoon State Recreational Area, Arakoon	1995	70	3.9

Name	Location	Year Constn	Life (years)	Installed Power (kW)
R20 Sewer Pump Station	Marlin Drive, South West Rocks	1996	70	13.5
R21 Sewer Pump Station	Lindsay Noonan St, South West Rocks	2001	70	0.6
R22 Sewer Pump Station	Spencers Creek Rd, South West Rocks	2002	70	10
R23 Sewer Pump Station	Gregory St, South West Rocks	2002	70	3.1
R25 Sewer Pump Station	SWR Surf Lifesaving Club, Horseshoe Bay, South West Rocks	1998	30	1.9
R26 Sewer Pump Station	Naval Cadets, Gordon Young Drive, South West Rocks	2000	30	2.2
R27 Sewer Pump Station	New Entrance Rd, South West Rocks	2001	70	4.4
R28 Sewer Pump Station	Trial Bay Tourist Park, Phillip Dr, South West Rocks	2007	70	4.4

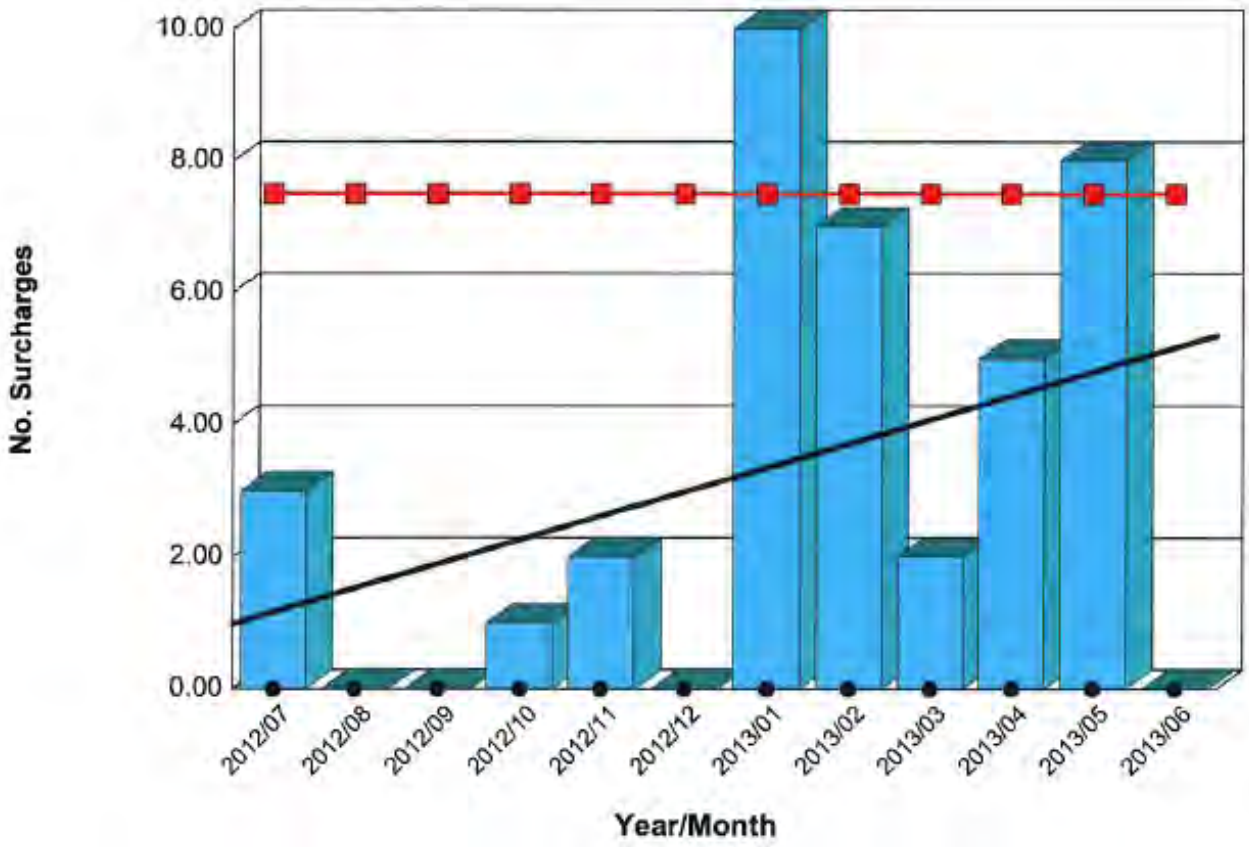
APPENDIX B – KPI CHARTS 2012/13

Water Strategy

Number of Sewer Surcharges

(Target Accum. Avg. 7.5 per month, 90 per year)

BW2



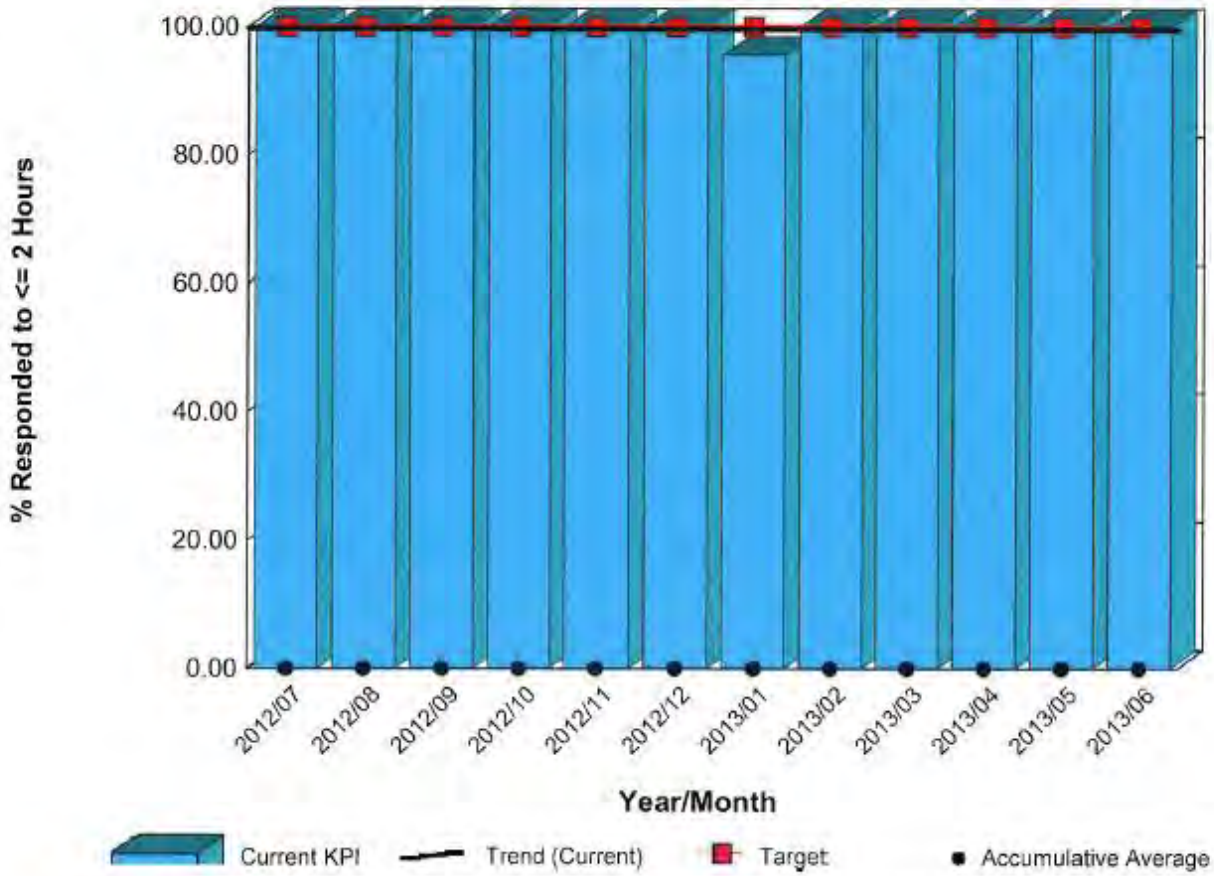
Year/Month	No. Surcharges	Progressive Total	Accum. Average	KPI Register Record #
2012/07	3.00	3.00	3.00	KPI-10140
2012/08	0.00	3.00	3.00	KPI-10271
2012/09	0.00	3.00	3.00	KPI-10375
2012/10	1.00	5.00	1.67	KPI-10437
2012/11	2.00	7.00	1.75	KPI-10573
2012/12	0.00	7.00	1.75	KPI-10827
2013/01	10.00	17.00	3.40	KPI-10832
2013/02	7.00	24.00	4.00	KPI-10961
2013/03	2.00	26.00	3.71	KPI-11051
2013/04	5.00	31.00	3.88	KPI-11152
2013/05	8.00	39.00	4.33	KPI-11274
2013/06	0.00	39.00	4.33	KPI-11383

Fmt 2

Water Operations

BW4

Percentage of sewer 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	15.00	15.00	100.00	100.00	KPI-10134
2012/08	9.00	9.00	100.00	100.00	KPI-10263
2012/09	14.00	14.00	100.00	100.00	KPI-10370
2012/10	7.00	7.00	100.00	100.00	KPI-10440
2012/11	9.00	9.00	100.00	100.00	KPI-10569
2012/12	7.00	7.00	100.00	100.00	KPI-10666
2013/01	43.00	45.00	95.56	98.11	KPI-10802
2013/02	34.00	34.00	100.00	98.57	KPI-10900
2013/03	14.00	14.00	100.00	98.70	KPI-11038
2013/04	20.00	20.00	100.00	98.85	KPI-11105
2013/05	24.00	24.00	100.00	98.99	KPI-11249
2013/06	12.00	12.00	100.00	99.05	KPI-11363

Fmt 1

APPENDIX C – NSW BENCHMARKING OF WATER UTILITIES

Kempsey Shire Council — **TBL Sewerage Performance** — **2011-12**

SEWERAGE SYSTEM - Kempsey Council has 7 sewage treatment works providing secondary and tertiary treatment. The system comprises 38,900 EP treatment capacity (Intermittent Extended Aeration (Activated Sludge) and Trickling Filter), 83 pumping stations (123.4 ML/d), 62 km of rising mains and 218 km of gravity trunk mains and reticulation. 2% of effluent was recycled and treated effluent is discharged to land river and ocean.

PERFORMANCE - Residential growth for 2011-12 was 0.5% which is lower than the statewide median. Kempsey Shire Council achieved 100% implementation of Best-Practice requirements. The 2012-13 typical residential bill was $680 which was above the statewide median of $600 (Indicator 12). The economic real rate of return was 0% which was less than the statewide median (Indicator 46). The operating cost per property (OMA) was $533 which was above the statewide median of $410 (Indicator 50). Sewage odour complaints were less than the statewide median of 0.5 (Indicator 21). Kempsey Council reported no public health incidents. Council did not comply with the SS & faecal coliforms & ammonia requirements of the environmental regulator for effluent discharge. The current replacement cost of system assets was $198M ($23,000 per assessment), cash and investments were $7M, debt was $16M and revenue was $7.4M (excluding capital works grants).

IMPLEMENTATION OF REQUIREMENTS OF BEST-PRACTICE MANAGEMENT FRAMEWORK

(1) Complete current strategic business plan & financial plan		YES	(2e) Pricing - DSP with commercial developer charges		Yes
(2)	(2a) Pricing - Full Cost Recovery without significant cross subsidies	Yes	(2f) Pricing - Liquid trade waste approvals & policy		Yes
	(2b) Pricing - Appropriate Residential Charges	Yes	(3) Complete performance reporting (by 15 September)		YES
	(2c) Pricing - Appropriate Non-Residential Charges	Yes	(4) Integrated water cycle management strategy		YESC
	(2d) Pricing - Appropriate Trade Waste Fees and Charges	Yes	IMPLEMENTATION OF ALL REQUIREMENTS		100%

TRIPLE BOTTOM LINE (TBL) PERFORMANCE INDICATORS

	NWI No.				LWU RESULT	RANKING (3,001 to 10,000 LWUs) Note 1 Col 2	RANKING (All LWUs) Note 2 Col 3	MEDIANS Statewide Note 3 Col 4	MEDIANS National Note 4 Col 5
UTILITY	CHARACTERISTICS	C1	1	Population served: 19,800					
		C2	2	Number of connected properties: 9,009	Number of assessments: 8,650				
		C3	3	Number of residential connected properties: 8,340					
			4	New residences connected to sewerage (%)	%	0.5	4	0.8	
		A5	5	Properties served per kilometre of main	Properties	33		40	42
		W18	6	Volume of sewage collected (ML)	ML	3,035		5,400	6,630
			7	Renewals expenditure (% of current replacement cost of system assets)	%	0.9	2	0.3	
			8	Employees per 1000 properties	per 1,000 prop	2.4	5	1.6	
SOCIAL	CHARGES & BILLS	P4		Description of residential tariff structure:	access charge/pros. independent of land value				
		P4	11a	Residential access charge for 2011-12 ($/assessment)	$ 2011-12	663	5	570	537
			11	Residential access charge for 2012-13 ($/assessment)	$ 2012-13	680	4	598	
		P6	12a	Typical residential bill for 2011-12 ($/assessment)	$ 2011-12	663	4	574	595
			12	Typical residential bill for 2012-13 ($/assessment)	$ 2012-13	680	3	600	
			13	Typical developer charge for 2012-13 ($/equivalent tenement)	$ 2012-13	7,420	3	4,500	
			14	Non-residential sewer usage charge (c/kL)	c/kL	170	2	125	
		F3	15	Revenue per property - Sge ($)	$	820	1	713	791
	HEALTH		16	Urban properties without reticulated sewerage service (%)	%	6.2	3	3.8	
		E1	17	Percent of sewage treated to a tertiary level (%)	%	79	3	94	92
		E4	18	Percent of sewage volume treated that was compliant (%)	%	80	4	100	98
		E5	19	Number of sewage treatment works compliant at all times		5 of 7			
	SERVICE LEVELS		21	Odour complaints per 1000 properties	per 1,000 prop	0.4	3	0.5	
		C11	22	Service complaints - sewerage per 1000 properties	per 1,000 prop	1	1	11	1
		C16	23a	Average sewerage interruption (minutes)	(hrs)	191	5	102	116
			25	Total days lost (%)	%	4.9	3	2.0	
ENVIRONMENTAL	NATURAL RESOURCE MANAGEMENT	W19	26	Volume of sewage collected per property (kL)	kL	337	5	250	236
		W28	26b	Total recycled water supplied (ML)	ML			450	1362
		W27	27	Recycled water (% of effluent recycled)	%	2	5	5	14
		E8	28	Biosolids reuse (%)	%	99	1	100	100
			30	Energy consumption - sewerage (kWh/ML)	kWh	709	4	790	
			31	Renewable energy consumption (% of total energy consumption)	%	0	1	0	
		F12	32	Net greenhouse gas emissions - WS & Sge (net tonnes CO2 equivalents per 1000 properties)		370	3	370	399
	ENVIRONMENTAL PERFORMANCE		33	90th Percentile licence limits for effluent discharge:	BOD 15 mg/L; SS 20 mg/L; Total N 15 mg/L; Total P 1 mg/L				
			34	Compliance with BOD in licence (%)	%	100	1	100	
			35	Compliance with SS in licence (%)	%	80	4	100	
		A14	36	Sewer main breaks and chokes (per 100 km of main)	per 100km main	11	1	33	21
			37a	Sewer overflows (per 100 km of main)	per 100km main	31	4	15	
		E13	37b	Sewer overflows reported to environmental regulator (per 100km of main)		0.7	3	0.3	0.4
			39	Non res & trade waste % of total sge volume	%	13	3	17	
ECONOMIC	FINANCE		43	Revenue from non-residential plus trade waste charges (% of total revenue)	%	24	2	17	
			44	Revenue from trade waste charges (% of total revenue)	%	2.4	2	2.4	
		F18	46	Economic real rate of return - Sge (%)	%	0.0	4	1.0	1.6
			46a	Return on assets - Sge (%)	%	0.6	5	0.5	
			48a	Loan payment per property - Sge ($)	$	204	1	97	
		F34	48b	Net profit after tax - WS & Sge ($'000)	$'000	-4,057	5	73	2591
	EFFICIENCY		49	Operating cost (OMA) per 100 km of main ($'000)	$'000	1,780	5	1,870	
		F12	50	Operating cost (OMA) per property ($) (Note 9)	$	533	5	410	398
			51	Operating cost (OMA) per kilolitre (cents)	c/kL	158	3	162	
			52	Management cost per property ($)	$	174	5	140	
			53	Treatment cost per property ($)	$	200	4	137	
			54	Pumping cost per property ($)	$	92	5	70	
			55	Energy cost per property ($)	$	67	5	35	
			56	Sewer main cost per property ($)	$	63	3	45	
		F29	57	Capital Expenditure per property - Sewerage ($)	$	210	3	244	236

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 3,001 to 10,000)
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). - see attachment.
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
4. Col 5 (National Median) is the median value for the 66 utilities reporting sewerage 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. Non-residential access charge - $627, proportional to square of meter size. Sewer usage charge - 170 c/kl.
7. Non-residential and trade waste volume was 13% of total sewage collected.
   Non-residential revenue was 24% of revenue from access, usage & trade waste charges, indicating fair pricing of services between the residential and non-residential sectors.
8. Compliance with Total N in Licence was 100%. Compliance with Total P in Licence was 100%.
9. Operating cost (OMA)/property was $533. Components were: management ($174), operation ($143), maintenance ($112), energy ($67), chemical ($11) & effluent/biosolids ($25).
10. Kempsey Shire Council rehabilitations included 0.1% of its sewerage mains and 0% of its service connections. Renewals expenditure was $684,000/100km of main.


Kempsey Shire Council
TBL Sewerage Performance
(page 2)
2011-12
(Results shown for 10 years together with 2011/12 Statewide Median and Top 20%)
COST RECOVERY
12. Typical residential bill (F6)
14. Non-residential Sewer Usage Charge
46. Economic real rate of return (F18)
COMPLIANCE
34. Compliance with BOD in licence
35. Compliance with SS in licence
18. % Sewage volume that complied (E4)
CUSTOMER SERVICE/RELIABILITY
36. Sewer main breaks and chokes (A12)
37. Sewer overflows to environment
21. Odour complaints
ENVIRONMENT
27. Effluent recycled (W27)
32. Net Greenhouse gas emissions W5 & SGE (E12)
28. Biosolids reuse (E8)
EFFICIENCY
8. Employees
50. Operating cost (O+MA) per property (F12)
52. Management cost per property
NOTES:
1. Costs are in Jan 2012$ except for graph 12, which is in Jan 2013$.
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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sustainable water solutions pty ltd
PO Box 232, Brooklyn,
Sydney, NSW 2083,
Australia.
ABN 48 107 167 457
Phone (++612) 9985 8472
Fax (++612) 9985 8471
www.swspl.com.au

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 assest 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,

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)
										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 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,	W11	Total urban water supplied (ML)	2962	A2	B2	A2	**Y**	JS & SM	.Review each category of water supplied. Verify	No Adjustments .

Indicator				Accuracy & Reliability				Staff Interviewed	Procedure	Comments
								(min. suggested shown, auditors insert actual)		(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)
64, 158, 174		*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.*							sum of volume of residential water, commercial, municipal, industrial and other water supplied. Check any adjustments	JS spreadsheet sighted and checked.
54a, 55, 56a, 56b, 56c, 56d, 60, 61	W11.1	Total urban potable water supplied (ML) *Note: If total urban potable water supplied is not reported, sub-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.*	2962	A2	B2	A2	Y			No Adjustments . JS spreadsheet sighted and checked
`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*	2962	A2	Y	A1	**Y**		Review invoice records. Review any validation checks (e.g. meter records).	Derived from (2962 * 0) = 2962

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)
		and W14.1 audited) TOTAL VOLUME OF POTABLE WATER PRODUCED *NWI indicator W11.3: W11.3 = W11.1 + W14.1*								
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 reported (NSW Indicator Nos T12, T13, T31, T32, T33, T14, T34). The same grading thresholds apply.*	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 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

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)
										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 re 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										
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

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)
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	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)
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

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)
										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 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*	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. .

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)
		breaks and chokes.								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										
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

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)
										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 *Derived from NSW Indicator Nos T49 to T62.*	25.9	A2	B2	A2	**Y**	JS	Verify licence reporting and confirm volume compliant. Divide volume compliant by total volume treated.	NOW derived value. Auditor did review sample EPA licence returns and noted most recent EPA 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

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)
										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 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

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)
										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

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)
										forwarded 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.

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)
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.
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*

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)
										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 interruption – water (minutes) *Derived from NSW Indicator No 107.*	165	A2	B2	A1	**Y**	JS & Ann Adams (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 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.	. 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)
									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 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.. 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	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.

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)
								AMB/BG		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

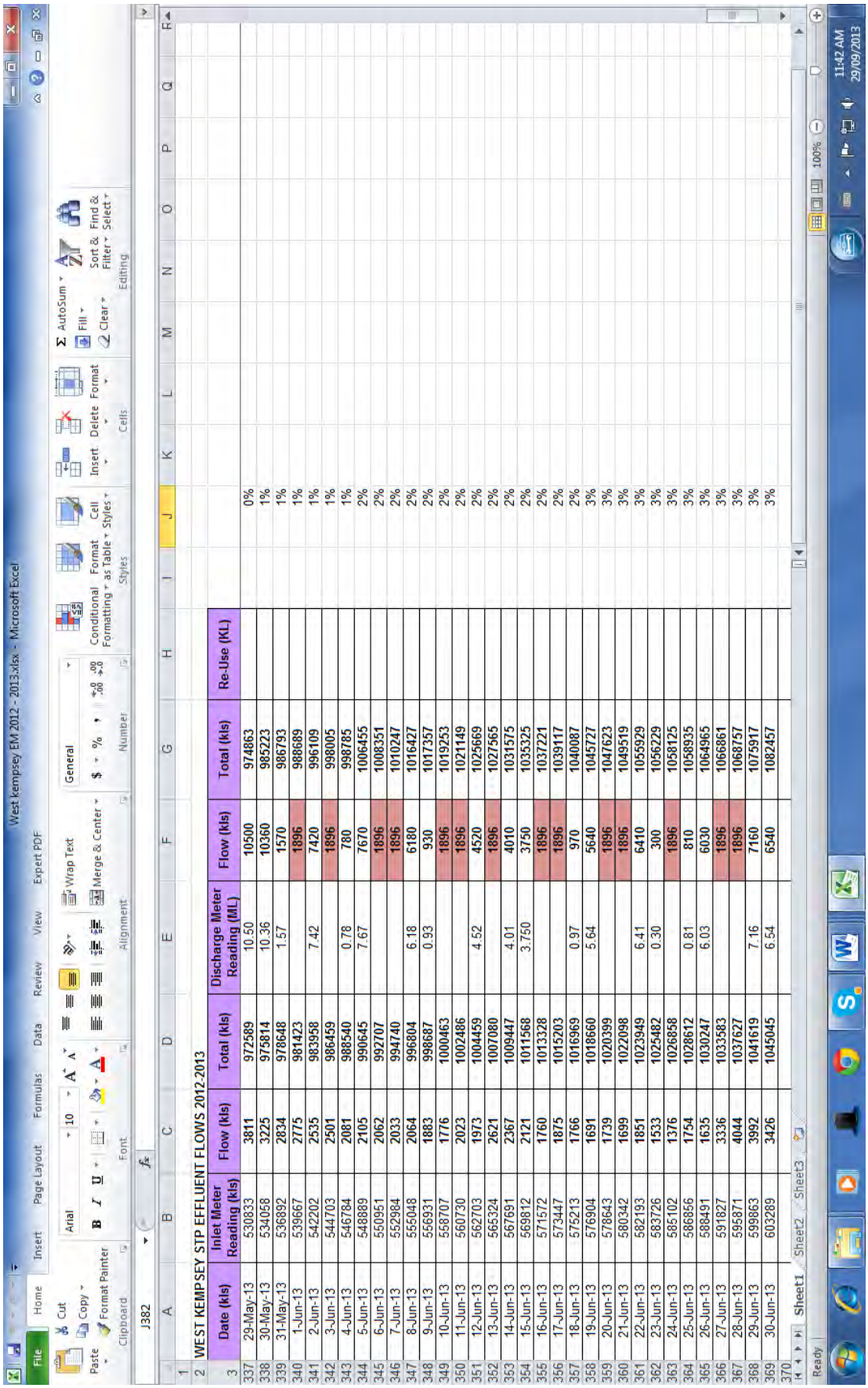
In conducting this audit, the auditor made random requests from staff to view the actual systems used to record, analyze and track the information used to deliver information and data that is used to derive the NWI Performance indicators.

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.

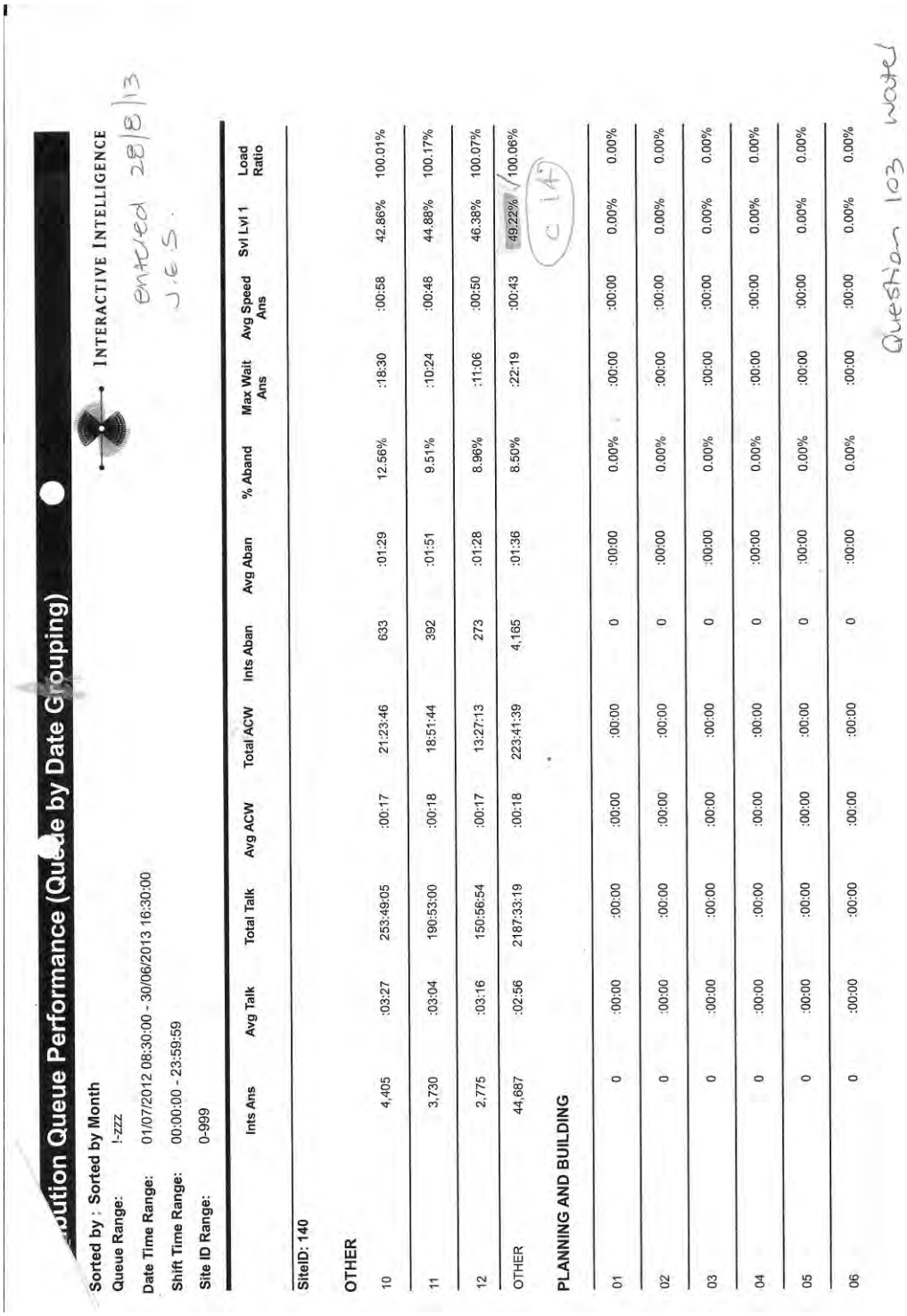
Sample 1 Sample of spread sheet for West Kempsey effluent flows



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



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

INTERACTIVE INTELLIGENCE

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

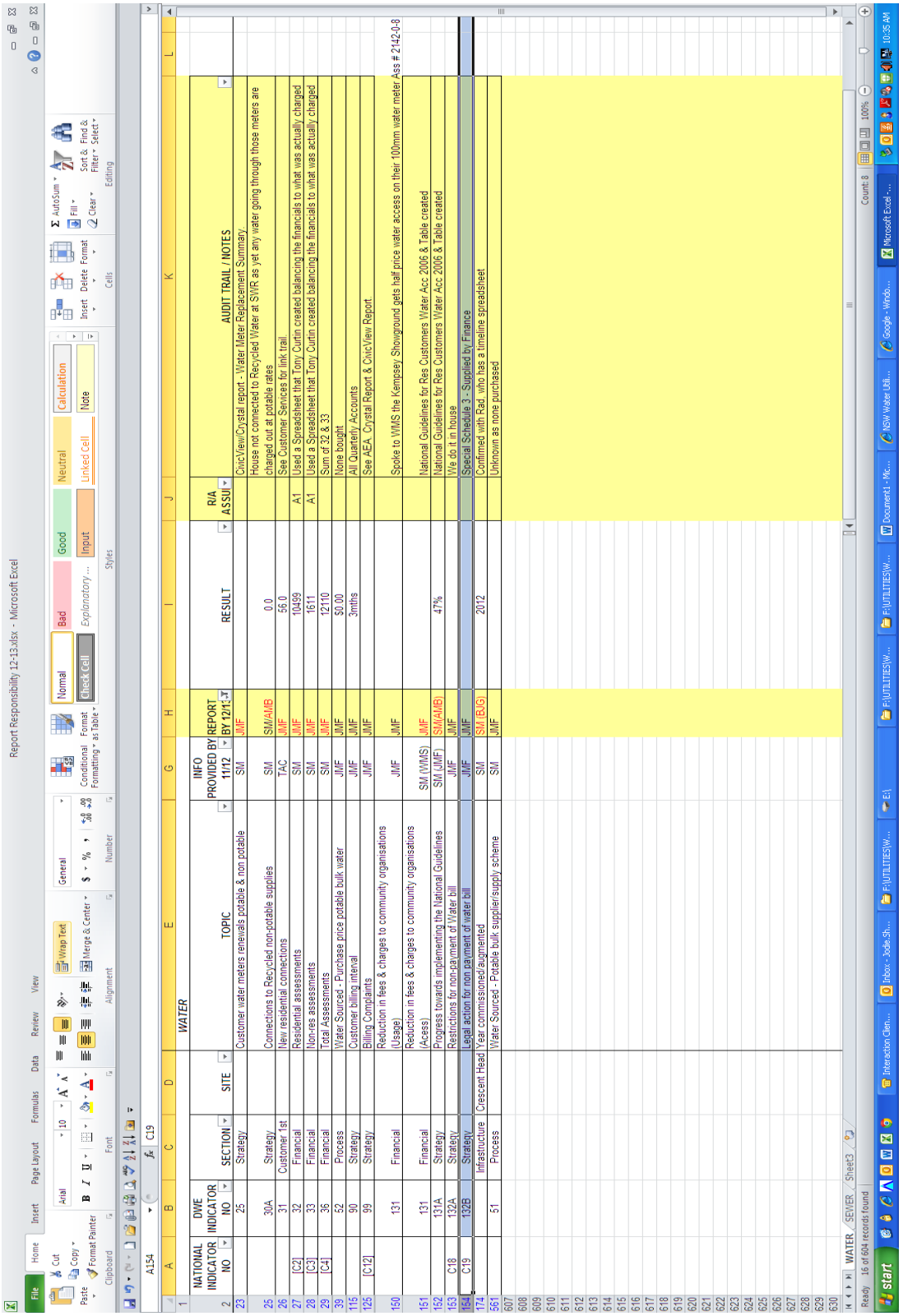
entered 28/8/13 J.E.S.

	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%	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%

C14

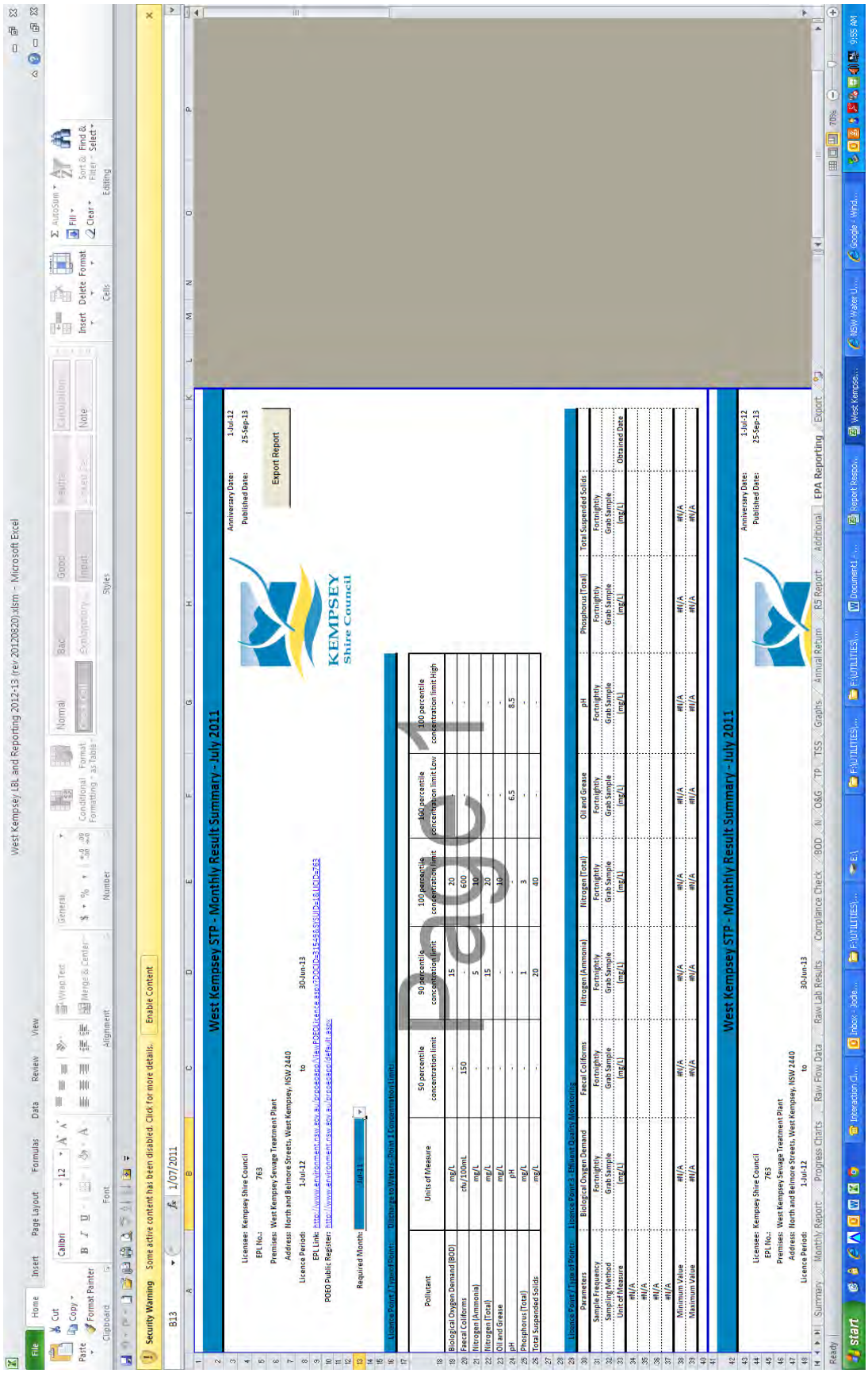
Question 103 water

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

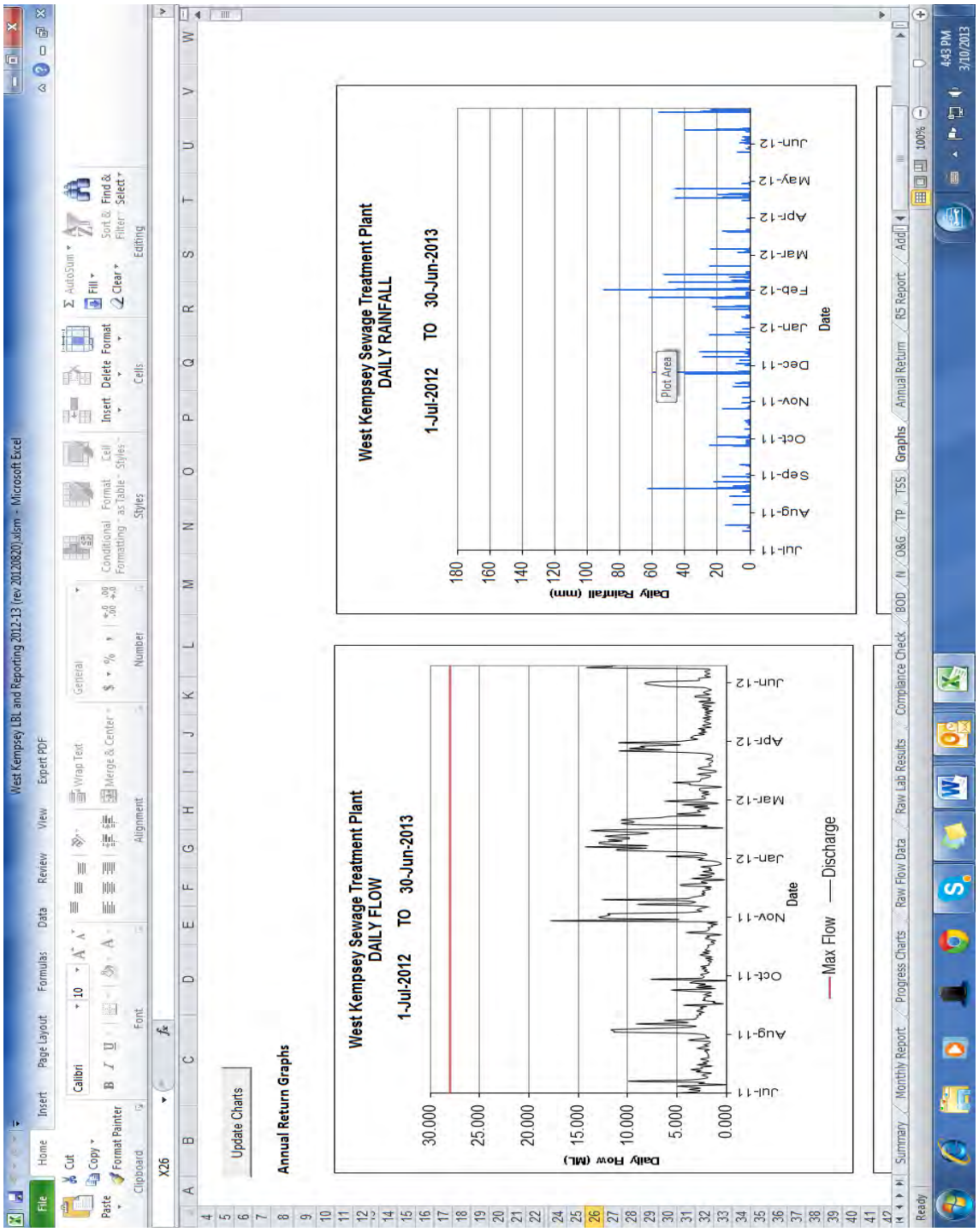


NATIONAL INDICATOR NO	DWE INDICATOR NO	SECTION	SITE	TOPIC	INFO PROVIDED BY 11/12	REPORT BY 12/13	RESULT	R/A ASSUR	AUDIT TRAIL / NOTES
				WATER					
23	25	Strategy		Customer water meters renewals potable & non potable	SM	JMF			ChicView/Crystal report - Water Meter Replacement Summary
25	30A	Strategy		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		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

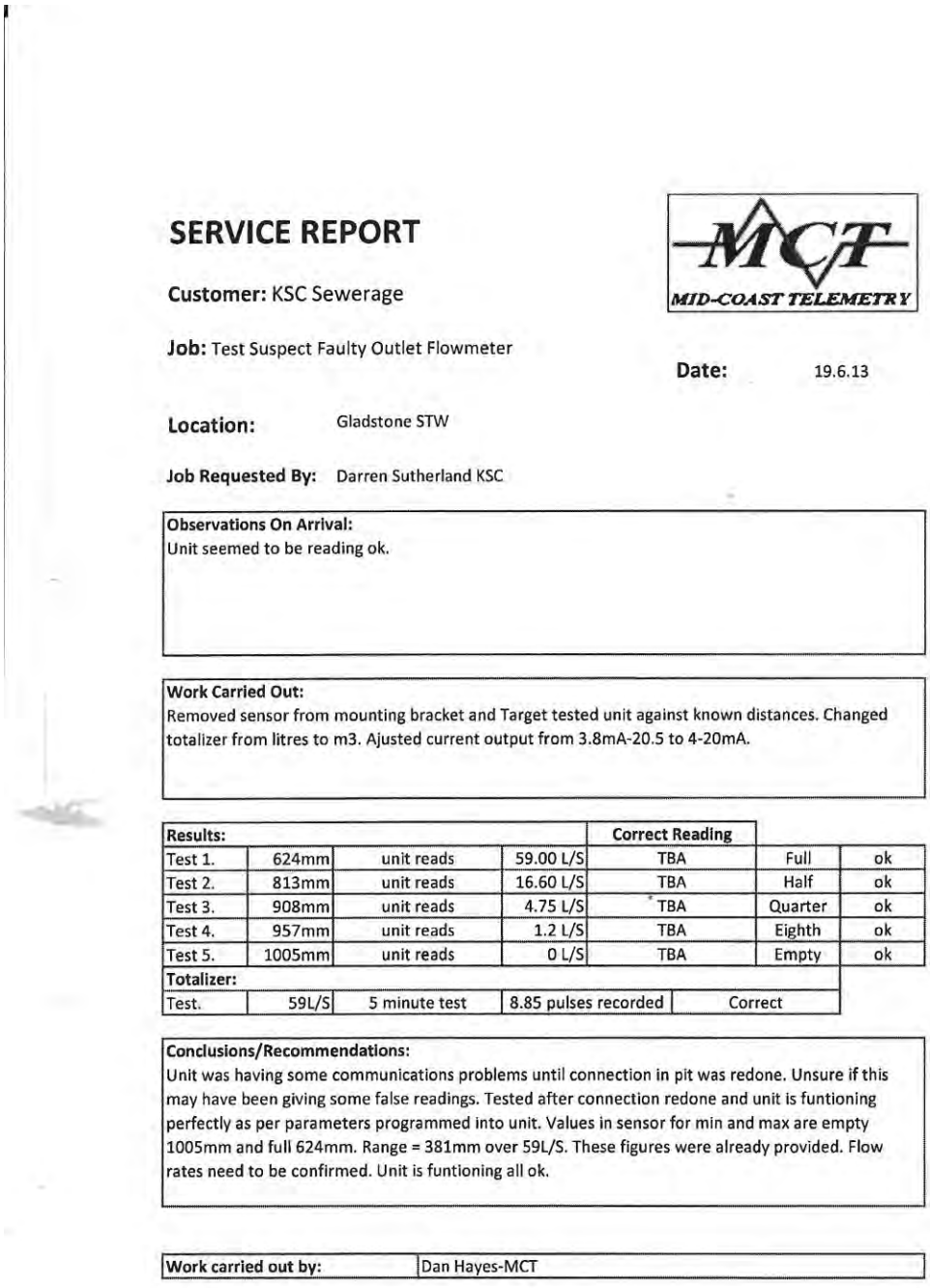
Sample 4 Sample monthly water quality reporting for West Kempsey STP



Sample 5 Daily Flow charts for West Kemspey (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.

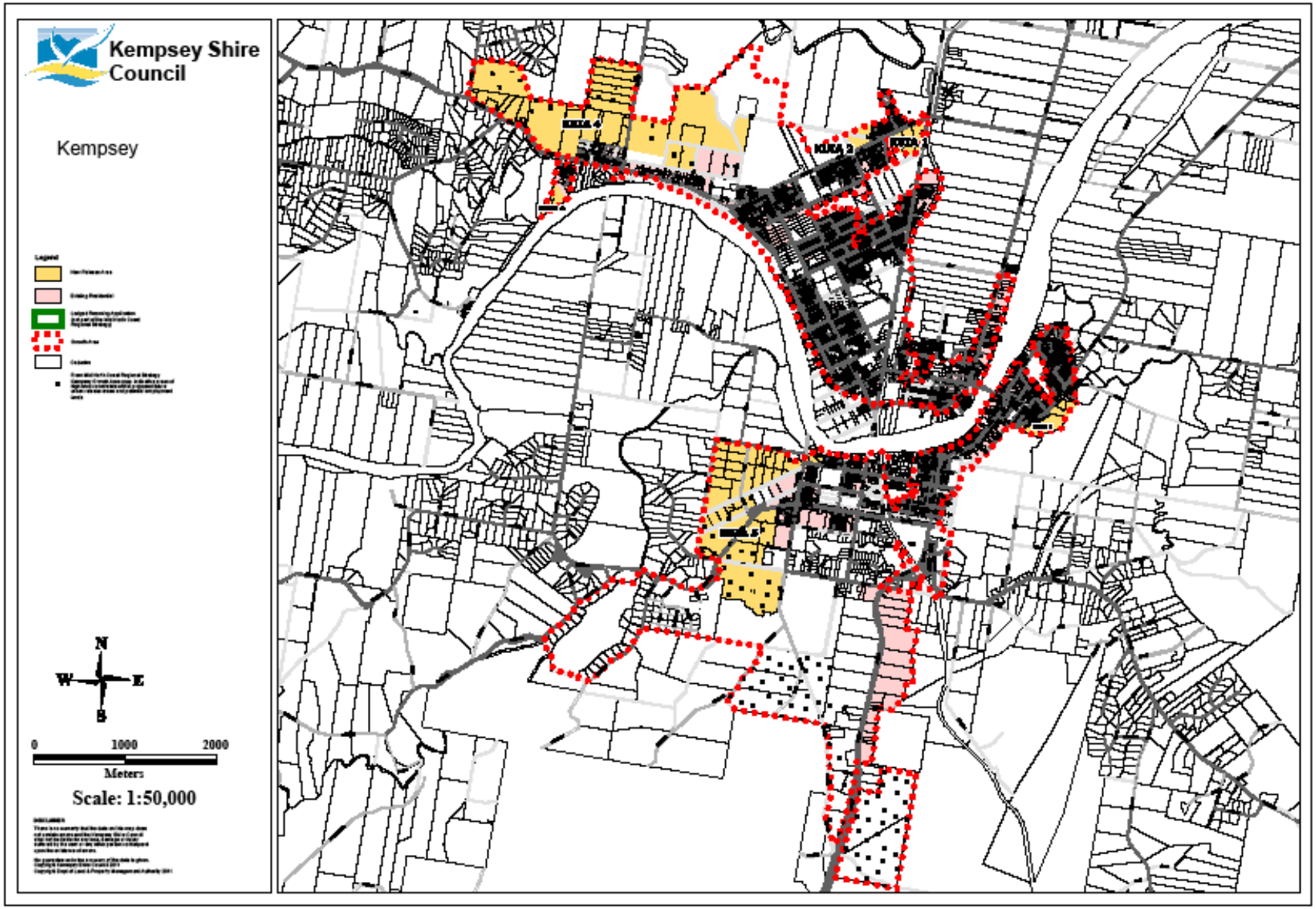
Crescent Head, will cater for 5% of the total new dwellings. Demand in this location is likely to exceed available supply leading to redevelopment and consolidation of the existing urban areas. The only zoned unsubdivided land in Crescent head is owned by Department of Lands who has advised that they 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 unsubdivided 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.


Kempsey Shire Council
Kempsey
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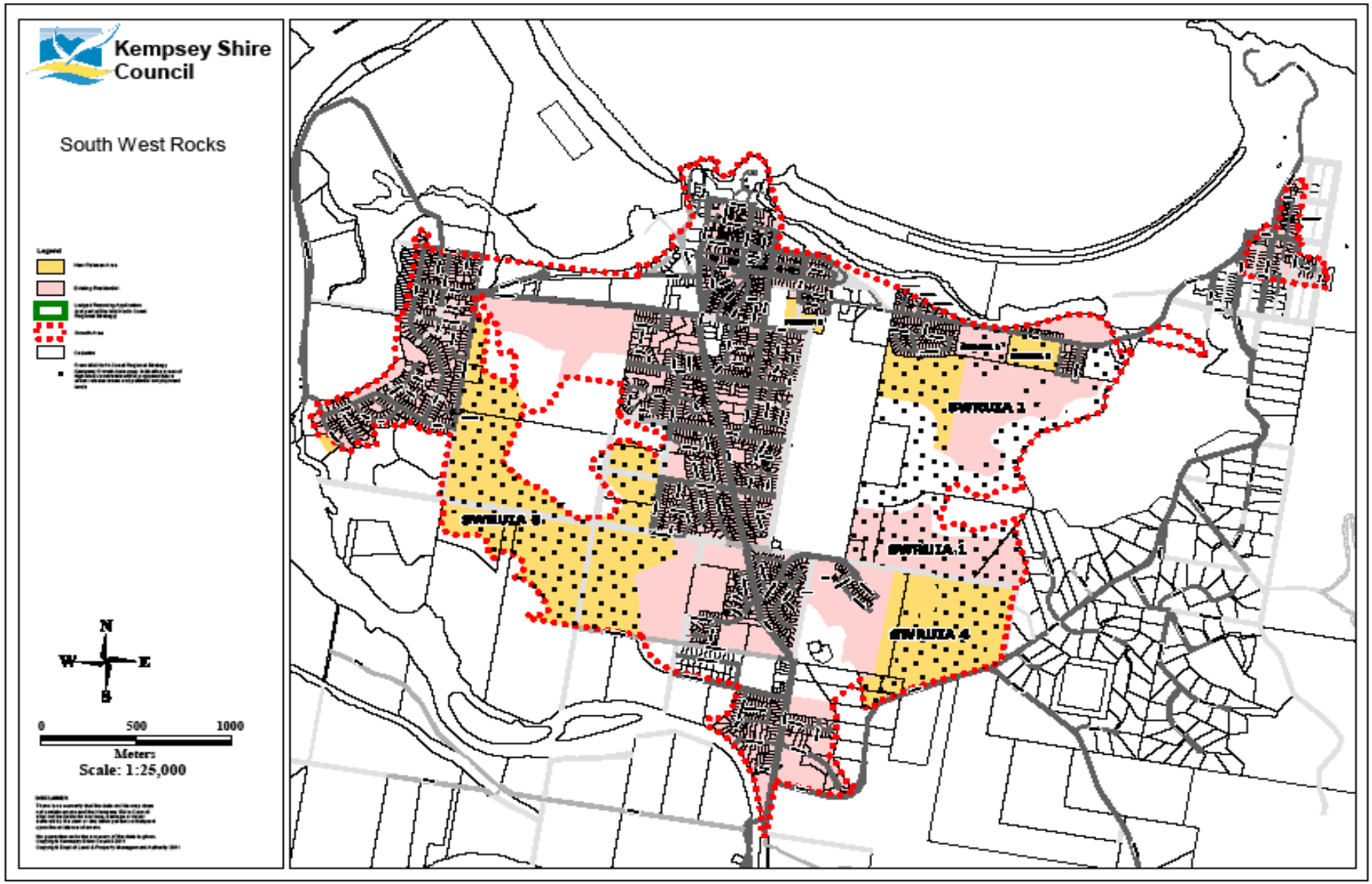
Scale: 1:50,000


Kempsey Shire Council
South West Rocks
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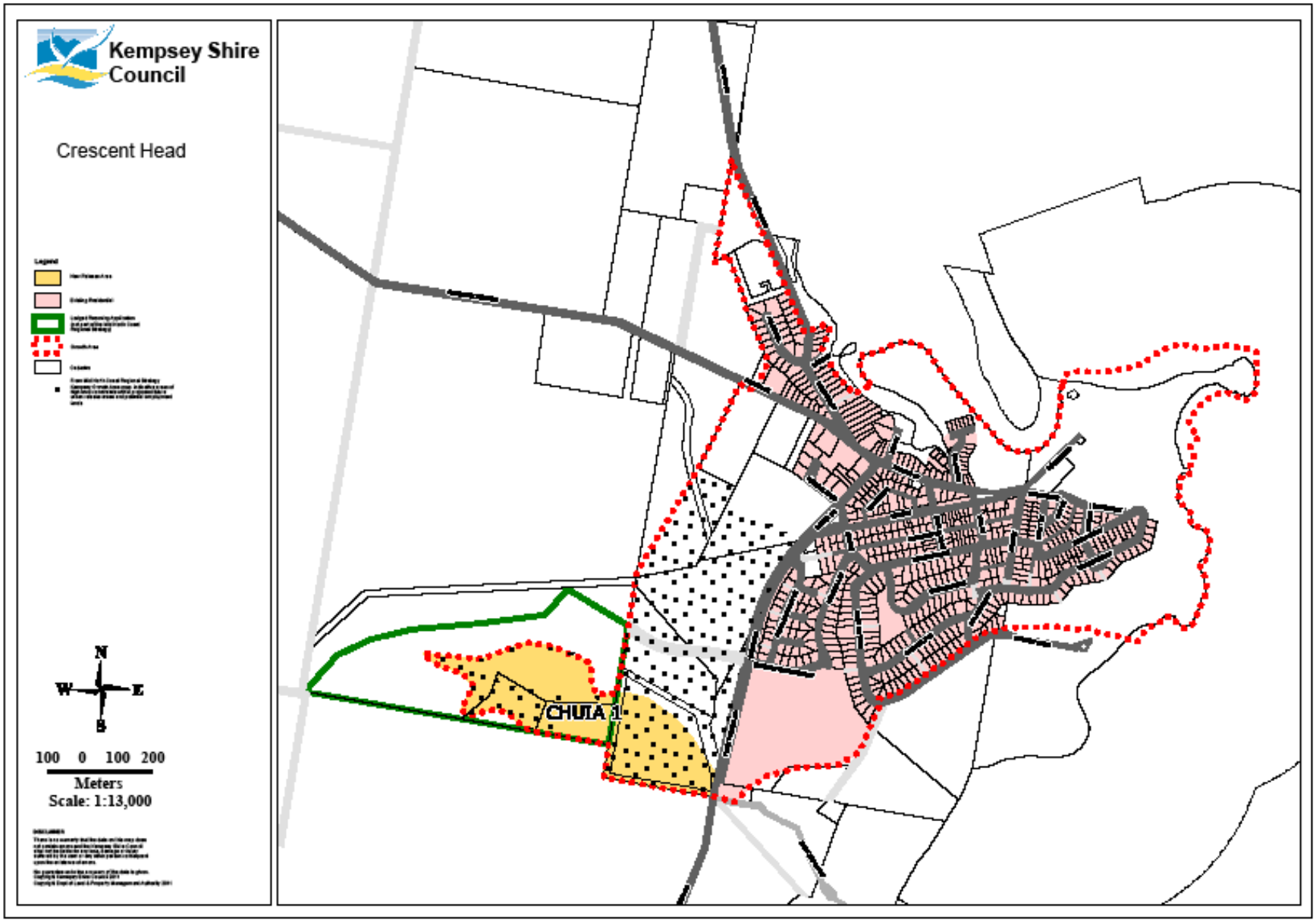
Kempsey Shire Council
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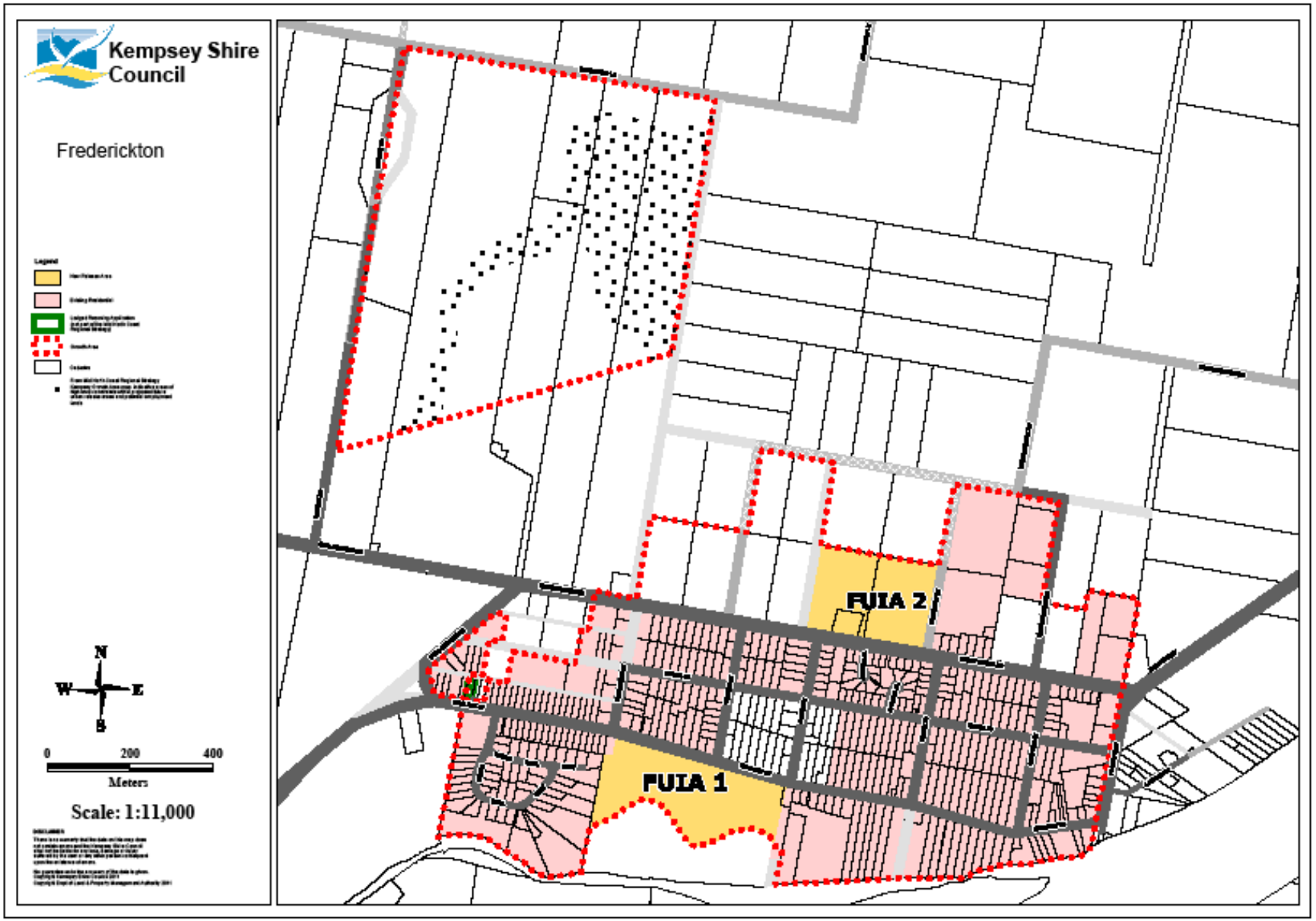
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Meters
Scale: 1:11,000
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FUIA 1

APPENDIX F – 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. (name of reports), 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 Appendix C

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

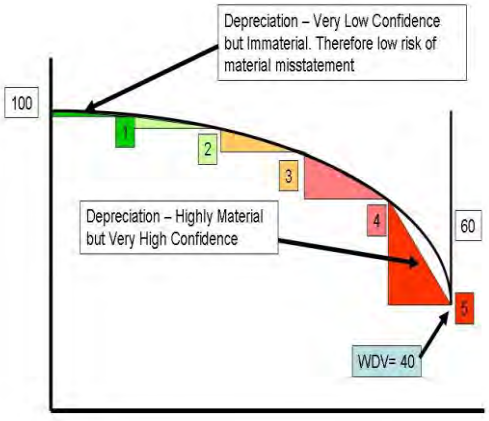
2. Please complete the details of the the reviewing officer and postion held in each tab

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	

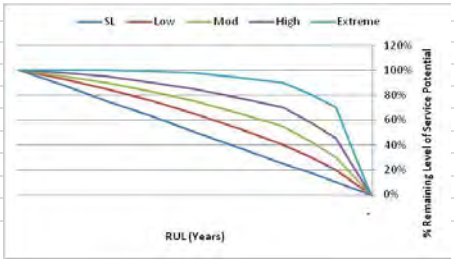
Having initially assed the "Lifecycle" phase the asset is current in, the rater must then assess whether the asset is in the High (H) end of the scale or Mid-way (M) to the next phase.

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 G – 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 H – CCTV SEWER PIPE SERVICE & STRUCTURAL CONDITION GRADING

APPENDIX E SCORING OF DEFECTS AND THE PRELIMINARY GRADING OF APPARENT CONDITION OF SEWERS

Responsible asset management takes account of many things other than the apparent condition of a sewer as determined by an internal visual inspection. Factors such as the criticality, hydraulic performance, structural condition and environmental circumstances of the sewer, as well as the economic and social circumstances of the asset owner/operator, must also be considered. There are a number of established asset management manuals that cover the situation fully, one particularly pertinent reference being the Sewerage Rehabilitation Manual 2001 published by WRc plc.

As a first step in the process Tables E1 to E5 set out a scoring and grading process that can be used as an initial indicator of likelihood of service or structural failure of the sewer.

The scores allocated to the service and structural defects are derived from ACCEM, codes from other countries and from the Australian experience. They are a relative measure of the likelihood of service or structural failure only. The scores apply to gravity sewers and sanitary drains. If applying the scores to other conduits such as stormwater drains, the asset manager should review the scores and make any necessary adjustments.

Scores, for all defects, are notionally applied to a one metre length of the sewer. Where defects are continuous, the score is applied to each metre of sewer within the length of the continuous feature.

If more than one defect occurs within that metre of sewer, the scores are added.

The peak score indicates the worst metre in terms of defects in the sewer between the nodes. It is the maximum of the summed scores for all defects that occur within a one metre length of the sewer.

The mean score is the total of all defect scores divided by the conduit length. The mean score is expressed as XX/metre and is used to give an indication of the overall condition of the sewer.

Peak and mean scores are determined separately for the service and structural condition of the sewer.

Structural scoring is applied differently for conduits of rigid materials, flexible materials and brick or masonry construction to reflect the different level of risk associated with a specific defect in sewers of that material/construction.

TABLE E1

STRUCTURAL DEFECT SCORES—PIPE SEWERS—RIGID MATERIALS

Defect	Code	Ch1	Ch2	Q1	Q2	Score
Displaced joint	JD	L (Longitudinal)		10 – 20 mm		0.5
				21 – 30 mm		2
				>30 mm		5
	JD	R (Radial)		5 – 10 mm		2
				11 – 20 mm		5
				>20 mm		15
Cracking	C	Any	S (Surface)			0.1
		C (Circumferential)	W (Wall)			1
		L (Longitudinal)	W (Wall)			2
		M (Multiple)	W (Wall)			5

Defect	Code	Ch1	Ch2	Q1	Q2	Score
		S (Simple)	W (Wall)			1
Fracturing	F	C (Circumferential)				8
		L (Longitudinal)				15
		M (Multiple)				40
		S (Simple)				8
Surface damage	S	W (Roughened)				2
		S (Spalling)				20
		AV (Aggregate visible)				2
		AP (Aggregate projects)				10
		AM (Aggregate missing)				40
		WS (Staining)				5
		CP (Visible build-up)				20
		T (Tuberculation)		<5%		5
				5-20%		30
				21-50%		40
				51-75%		50
				>75%		60
		RC (Reinforcement bar exp + corrosion)				80
		H (Holes)				100
Protective lining failure	L	B (Blisters)		<5%		5
				5-20%		30
				21-50%		40
		BU (Bulge)		51-75%		50
		W (Wrinkle)		>75%		60
		WD (Defective weld)				40
		SU (Spiral joints)				40
		D (Detach/missing)				80
Breaking	B	D (Displaced)				50
		M (Missing)				60
		E (Exceptional)				50
Deformation	D	Any		<5%		1
				5-10%		10
				11-15%		30
				16-20%		90
				21-25%		125
Collapse	X					165
Soil visible	SV	} These features are normally associated with some other defect. Score at this location to be the score arising from that/those other defects, or 60, whichever is the greater				
Void visible	VV					
Soil ingress	ING					

Defect	Code	Ch1	Ch2	Q1	Q2	Score
Joint intrusion	JI	R				NA
		Z				NA
Weld defect	W	C (Circumferential)				8
		L (Longitudinal)				15
		H (Helical)				8

NOTES:

1 Scores indicated are per occurrence or per m in the case of continuous defects.

2 NA – not applicable

TABLE E2

STRUCTURAL DEFECT SCORES—PIPE SEWERS—FLEXIBLE MATERIALS

Defect	Code	Ch1	Ch2	Q1	Q2	Score
Displaced joint	JD	L (Longitudinal)		10 -20 mm		0.5
				21 – 30 mm		2
				> 30 mm		5
	JD	R (Radial)		5 – 10 mm		2
				11 – 20 mm		5
				> 20 mm		15
Cracking	C	Any	S (Surface)			5
		Any	W (Wall)			40
Fracturing	F	Any				80
Protective lining failure	L	B (Blisters)		<5%		5
				5-20%		30
				21-50%		40
		BU (Bulge)		51-75%		50
		W (Wrinkle)		>75%		60
		WD (Defective weld)				40
		SU (Spiral joints)				40
		D (Detach/missing)				80
Deformation ABS PE PP PVC (see Note)	D	Pipe installed for 2 years		<5%		1
				5-10%		30
				11-15%		90
				16-20%		125
				21-25%		165
		Pipe installed for 10 years		<5%		0.1
				5-10%		10
				11-15%		30
				16-20%		90
				21-25%		125
		Pipe installed for 50 years		<5%		0.1
				5-10%		1
				11-15%		10
				16-20%		30
				21-25%		90

Defect	Code	Ch1	Ch2	Q1	Q2	Score
Deformation GRP (see Note)	D	Pipe installed for 2 years		<5%		1
				5-10%		30
				11-15%		90
				16-20%		125
				21-25%		185
		Pipe installed for 10 years		<5%		0.1
				5-10%		10
				11-15%		30
				16-20%		90
				21-25%		125
		Pipe installed for 50 years		<5%		0.1
				5-10%		1
				11-15%		10
				16-20%		30
				21-25%		90
Collapse	X					185
Soil visible	SV	} These features are normally associated with some other defect. Score at this location to be the score arising from that/those other defects, or 60, whichever is the greater				
Void visible	VV					
Soil ingress	ING					
Joint intrusion	JI	R				NA
		Z				NA

NOTES:

1 Where the date of installation is not known, assume the pipe has been installed for 10 years

2 NA = not applicable

TABLE E3

STRUCTURAL DEFECT SCORES—BRICK SEWERS

Defect	Code	Ch1	Ch2	Q1	Q2	Score
Cracking	C	C (Circumferential)				5
		L (Longitudinal)				5
		M (Multiple)				5
Fracturing	F	C (Circumferential)				50
		L (Longitudinal)				50
		M (Multiple)				50
Deformation	D			<5%		1
				5-10%		10
				11-15%		30
				16-20%		80
				21-25%		125
Dropped invert	DI					60
Collapse	XB					165

Defect	Code	Ch1	Q1	Score: Radial extent of defects (hours of clock reference)						
				Single point	1	2	3	4	5	6
Surface damage	S	S			0	0	2	2	5	5
		W			0	0	0	0	1	1
Mortar missing	MM		Surface	0	0	0	0	0	0	
			Medium	0	2	4	6	8	10	10
			Total	0	5	10	15	20	25	25
Brick separation	BS		<10 mm	0	2	4	6	8	10	10
			10 – 20 mm	1	5	10	15	20	25	25
			>20 mm	2	10	15	20	30	40	50
Displaced bricks	DB			10	20	35	50	75	100	125
Missing bricks	MB			15	25	40	55	85	125	165
Render missing	PL	RM		0	0	0	0	0	1	1

TABLE E4

SERVICE DEFECT SCORES—ALL SEWERS

Defect	Codes	Ch1	Q1	Q2	Score[1]	Severity factor[2]
Surface damage (corrosion products, tuberculation etc)	S	CP, T	<5%		5	
			5 – 20%		30	
			21 – 50%		40	
			51 – 75%		50	
			>75%		60	
Debris (fouling, grease, silt etc)	DE	F, G, E, W S, R, C, Z	<5%		5	
			5 – 20%		30	
			21 – 50%		40	
			51 – 75%		50	
			>75%		60	
Obstruction	OB	B, M, Z, I, J, C, P, S	<5%		5	
			5 – 20%		30	
			21 – 50%		40	
			51 – 75%		50	
			>75%		60	
				Hazard	80	
Roots	R	T			10	
		F			1	
		M	<5%		5	
			5 – 20%		30	
			21 – 50%		40	
			51 – 75%		50	
			>75%		60	
		RT			5	
		RF			1	
		RB			10	
Joint intrusion	JI	R			20	
		Z			1	
Infiltration	I	Sweating			0	
		Dripping			1	
		Running			2	
		Gushing			10	
Exfiltration	EX				50	
Intruding connection	CI		<5%		5	
			5 – 20%		30	
			21 – 50%		40	
			51 – 75%		50	
			>75%		60	

Defect	Codes	Ch1	Q1	Q2	Score[1]	Severity factor[2]
Defective connection (or connecting conduit) where owned and/or it is the responsibility of the utility service provider	CX	Blockage Some Roots	<5%		5	
			5 – 20%		30	
			21 – 50%		40	
			51 – 75%		50	
			>75%		60	
		Damaged connecting conduit			30	
		Soil Entering			50	
Defective junction (or connecting conduit) where owned and/or it is the responsibility of the utility service provider	JX	Blockage Some Roots	<5%		5	
			5 – 20%		30	
			21 – 50%		40	
			51 – 75%		50	
			>75%		60	
		Damaged connecting conduit			30	
		Soil Entering			50	
Vermin	VR	Single 1	1		2	
		Few 2-5, a possible infestation	2 – 5		20	
		Many >5, an OH&S issue	>5		80	

NOTES:

1 Scores indicated are per occurrence or per linear m in the case of continuous defects.

2 A severity factor may be nominated by the asset owner or utility service provider to apply to particular defects to take account of the impact on serviceability and its consequences with respect to an operating licence and/or customer contract. While the default severity factor is 1, where, for example, a sewer system is licensed for no dry weather overflows the severity factor for the defect roots may be increased to say 1.5.

3 The scores associated with defects in junctions and connections that do not impact on the main conduit should be reported separately and not added into the condition statistics for the main conduit inspected.

TABLE E5

STRUCTURAL GRADING THRESHOLDS—ALL SEWERS

Grading	Description	Appropriate response in normal circumstances [1]	Peak score [2]	Mean score
1	Insignificant deterioration of the sewer has occurred. Appears to be in good condition	No immediate action required—Standard programmed condition assessment	<5	0 – 0.5
2	Minor deterioration of the sewer has occurred. Minor defects are present	No immediate action required—Standard programmed condition assessment	5 – 9	>0.5 – 1.0
3	Moderate deterioration of the sewer has occurred. Developed defects are present but not affecting short term structural integrity	Monitor with programmed condition assessment for rehabilitation and/or renewal in medium term	10 – 39	>1 – 2.0
4	Serious deterioration of the sewer has occurred. Significant defects are present affecting structural integrity	Take immediate action as appropriate to the defects e.g. temporary supports Immediately undertake risk assesament and further investigate as required. As appropriate to outcomes of above, schedule appropriate action which may include rehabilitation and/or renewal in the short term	40 – 59	>2 – 5.0
5	Failure of the sewer has occurred or is imminent	Take immediate action as appropriate e.g. temporary support Immediately undertake risk assessment and further investigation, and, as, take appropriate action which may include immediate rehabilitation and/or renewal	≥60	>5

NOTES:

1 The actual action to be taken for any sewer system will depend on the asset management policies and procedures of the asset owner/operator.

2 Rounded to the nearest whole number.

TABLE E6

SERVICE GRADING THRESHOLD—ALL SEWERS

Grading	Description	Appropriate response in normal circumstances[1]	Peak score[2]	Mean score
1	No or insignificant loss of hydraulic performance has occurred. Appears to be in good condition and there is little likelihood of sewer surcharge or overflow	No immediate action required—Standard programmed condition assessment	<5	0 – 1.0
2	Minor defects are present causing minor loss of hydraulic performance and/or minor likelihood of sewer discharge	No immediate action required—Standard programmed condition assessment	5 – 9	>1.0 – 3.0
3	Developed defects are present causing moderate loss of hydraulic performance and/or moderate likelihood of sewer surcharge and possible overflow	Take immediate action as appropriate e.g. cleaning, root cutting Monitor with programmed condition assessment for rehabilitation and/or renewal in medium term	10 – 39	>3 – 5.0
4	Significant defects are present causing serious loss of hydraulic performance and/or significant likelihood of sewer surcharge and overflow	Take immediate action as appropriate to the defect e.g. root cutting, point repairs, vermin treatment Immediately undertake risk assessment and further investigate as required. As appropriate to outcomes of above, schedule appropriate action which may include rehabilitation and/or renewal in the short term	40 – 59	>5 – 7.0
5	Failure of the sewer has occurred or is imminent	Take immediate action as appropriate e.g. temporary support Immediately undertake risk assessment and further investigation, and, as, take appropriate action which may include immediate rehabilitation and/or renewal	≥60	>7

NOTES:

1 The actual action to be taken for any sewer system will depend on the asset management policies and procedures of the asset owner or utility service provider.

2 Rounded to the nearest whole number.

APPENDIX I – SEWER PUMP WELL MAINTENANCE CHECK SHEET & SCHEDULES

SEWER PUMP WELL MAINTENANCE CHECK SHEET

LOCATION: _____

- ☐ **Toolbox filled out all SWMS**
- ☐ **Visual check fences (if any)**
- ☐ **Check for signage on cabinet's & fences,(change if needed)**
- ☐ **Visually check condition of compound (mow & poison)**
- ☐ **Open cabinet and check pump's amps if running.**
- ☐ **If low amps call fitters possible choke or air lock**
- ☐ **Visual for vermin in cabinet & wells (bait)**
- ☐ **Run pumps manually**
- ☐ **Check for any effluent stirring or run back (non returns faulty)**
- ☐ **Change duty regularly**
- ☐ **Visually check condition of pump guides (rust) and rising mains**
- ☐ **Platform & supports, ladders. If damaged report to technicians**
- ☐ **Hose and scrape walls inside pump well**
- ☐ **Clean probes or bulls balls, check cables, ball heights, clamps, brackets, chains.**
- ☐ **Check for sludge build up in the bottom (remove)**
- ☐ **Check RPZ valve (not dumping) report to maintenance**
- ☐ **Remove all cleaning equipment onto vehicle**
- ☐ **Check pumps are on auto**
- ☐ **Close & lock cabinet**
- ☐ **All grates are in place close & lock pump well lids**
- ☐ **Close & lock gates**
- ☐ **Ensure all is secure**
- ☐ **# If required to enter the pump well 2 person job**

PUMPWELLS AREA 1

No.	LOCATION	Probe	Sprinklers	Davit point	Operators
K 2	NANCY ELLIS (Shot Guns)	NO	NO	YES	MICHAEL
K 3	LEITH ST	YES	YES	YES	KIM
K4	LITTLE COCHRANE	YES	YES	YES	KIM
K4	OXYGEN INJECTION PLANT	inspect		NO	KIM
K 5	BIG COCHRANE	YES	NO	YES	MICHAEL / KIM
K 6A,B,C	THOMPSON ST	YES	NO	YES 2	MICHAEL / KIM
K 7	SMITH ST (BP)	NO	NO	NO	KIM
K 8	SMITH ST (Moon River)	NO	NO	YES	KIM
K9	VICTORIA ST	YES	YES	YES	MICHAEL
K 10	WASHINGTON ST	YES	YES	NO	MICHAEL
K11	WHARF ST	YES	YES	YES	KALE
K11a	WHARF ST	NO	NO	NO	KALE
K12	CEMETRY EAST	YES	YES	YES	KALE
K13	ANGUS McNEIL	YES	YES	YES	KALE
K14	BLOOMFIELD ST	YES	YES	YES 2	KALE
K15	VERNON ST	YES	YES	YES	KALE
K16	WEST ST	YES	YES	NO	KALE
K17	HARRY BOYES AV	YES	YES	NO	KALE
K18	FUR WELL	NO	NO	YES	KALE
K19	CRAIG ST	YES	YES	YES	KALE
K20	WEBSTER ST (SWANS)	NO	NO	NO	KIM
K21	NORTH ST	NO	NO	YES	MICHAEL
K23	AKUBRA PL	NO	NO	NO	KALE
K24	SPRINGFIELD ESTATE	YES	NO	NO	MICHAEL
K25	NEW BURNT BRIDGE	NO	NO	NO	MICHAEL
K26	NEW BURNT BRIDGE	NO	NO	NO	MICHAEL
K27	SK STW	NO	NO	NO	KALE
K28	GAOL	YES	NO	YES	MICHAEL
K29	MARAMHMAH	NO	NO	YES	MICHAEL
K30	ALVERTON	NO	NO	YES	MICHAEL
K31	GAOL ODOUR WELL		NO	YES	KIM
K32	KEMP ST WELL	YES	YES	NO	KIM
G1	POOL	YES	YES	YES	MICK / PETER
G2	FIRE SHED	YES	YES	YES	MICK / PETER
G3	DARK WATER ST	YES	YES	YES	MICK / PETER
C1	LAKE ST	YES	YES	YES	DARYL
C2	WILLOW ST	YES	YES	YES	DARYL
C3	BAKER DR	YES	YES	YES	DARYL
C4	LOFTUS RD	YES	YES	NO	DARYL
C5	LOFTUS RD	NO	NO	NO	DARYL

	STP'S				
	SOUTH KEMPSEY STP				KALE / MICHAEL
	NORTH ST STP			YES	KIM / MICHAEL
	GLADSTONE STP				PETER
	CRESCENT HEAD STP				DARYL
	SHERWOOD ENVIRO PLANT				KALE / MICHAEL
	THUNGUTTI				KALE / MICHAEL

PUMPWELLS AREA 2

No.	LOCATION	Probe	Sprinkler	working	Davit	Operators
R1	SIMPSON ST EAST	yes	yes	yes	yes	BEN
R2	CURRAWONG CRES	no	yes	yes	yes	BEN
R3	ROY SANDERS	no	yes	yes	yes	ELI
R4	BRIGHTON PARK	no	yes	yes	yes	BEN
R5	HORSE SHOE BAY	no	no	no	yes	BEN
R6	GILBERT COREY	no	yes	yes	yes	ELI
R7	OCEAN ST (concrete driveway)	no	yes	yes	yes	ELI
R8	FIGTREE ESTATE	no	yes	yes	no	BEN
R9	PHILLIP DRIVE	no	yes	yes	yes	BEN
R10	WILSON ST ARAKOON	no	yes	yes	yes	BEN
R11	GREY ST	no	yes	yes	no	BEN
R12	SIMPSON ST WEST	no	yes	yes	yes	BEN
R13	WIAIANBAR	yes	yes	?	yes	BEN
R14	SPENCERVILLE(behind house)	yes	yes	yes	yes	ELI
R15	GILBERT COREY(front yard)	sensor	yes	no	no	ELI
R17	RUSSELL ST ARAKOON	yes	yes	yes	no	BEN
R18	NATIONAL PARKS (SRA)	yes	?	?	no	BEN
R19	BELLE O'CONNOR (near STP)	yes	yes	?	yes	ELI
R20	MARLIN DR	yes	yes	yes	yes	ELI
R21	SPENCERVILLE(Industrial Estate)	yes	yes	yes	no	ELI
R22	SPENCER CREEK RD	sensor	yes	yes	no	ELI
R23	GREGORY ST SPENCERVILLE	sensor	yes	yes	yes	ELI
R25	SURF CLUB	no	no	no	no	BEN
R26	NAVAL CADETS	no	no	no	no	ELI
R27	ENTRANCE (boat ramp)	yes	no	no	yes	ELI
R28	TRIAL BAY CARAVAN PARK	sensor	yes	yes	no	BEN
F1	LAWSON ST	No	no	no	yes	DARYL
F2	CREEK ST	No	no	no	yes	DARYL
F3	GREAT NORTH RD	No	yes	yes	yes	DARYL
F4	FREDO CEMETRY	No	no	no	no	DARYL
G4	SMITHTOWN OVAL	No	yes	yes	yes	PETER/ MICK
G5	CROAD ESP (under bridge)	No	yes	yes	yes	PETER/ MICK
G6	JEFFERY ST (Nestles)	No	yes	yes	yes	PETER/ MICK
G7	BELMORE ST (leaning tower)	No	no	no	yes	PETER/ MICK
G8	LITTLE RAWSON ST	No	no	no	no	PETER/ MICK
	SWR OUTFALL					ELI / BEN
	SWR STP				no	ELI / BEN
	HAT HEAD OUT FALL				no	PETER/ MICK
	HAT HEAD STP					PETER/ MICK
	HAT HEAD P/S				yes	PETER/ MICK
	FREDO STP					DARYL

APPENDIX J– SEWER PUMP STATION RENEWAL PROGRAM

Link to Sewer Scheme	Asset Name	Year Constn	No of Pumps	Environmental Risk (0-5)	Public Health Risk (0-5)	Breakdown History (0-5)	Storage Capacity (0-5)	Flood Risk (L/M/H)	Other Operational deficiencies	Overall Priority Scoring	Nominated Year for Upgrade
Crescent Head	C1 PUMP STATION	*1976*	*2*							0	
Crescent Head	C2 PUMP STATION	*1976*	*2*	4	3	3	2	Low		12	????
Crescent Head	C3 PUMP STATION	*1992*	*2*	2	4	3	3	Low	Nominated for SCB upgrade only	12	2014
Crescent Head	C4 PUMP STATION	*2000*	*2*							0	
Crescent Head	C5 PUMP STATION	*2000*	*2*	2	4	5	1	Low	Regular choking but variable depending on occupancy. Site currently single phase	12	Inspect
Crescent Head	C6 PUMP STATION	*2000*	*1*							0	
Frederickton	F1PUMP STATION	*1981*	*2*							0	
Frederickton	F2 PUMP STATION	*1981*	*2*	2	1	5	0	Low	SCB leaks water into SCA.	8	
Frederickton	F3 PUMP STATION	*1981*	*2*	1	2	5	3	Low	Original pumps installed 1981.Regular choking.	11	2012
Frederickton	C1 PUMP STATION	2004	*1*							0	
Frederickton	C2 PUMP STATION	2007	*1*							0	
Gladstone	G1 PUMP STATION	*1982*	*2*	2	4	2	2	Moderate	Close to school and private residence	10	2014
Gladstone	G2 PUMP STATION	*1982*	*2*							0	
Gladstone	G3 PUMP STATION	*1982*	*2*							0	
Gladstone	G4 PUMP STATION	*1982*	*2*							0	
Gladstone	G5 PUMP STATION	*1982*	*2*							0	
Gladstone	G6 PUMP STATION	*1982*	*2*							0	
Gladstone	G7 PUMP STATION	*1982*	*2*	2	4	5	1	High	Regular choking	12	2012
Gladstone	G8 PUMP STATION	*1982*	*1*	2	4	3	0	Low	Single Pump well but > 40hrs storage	9	2014
Hat Head	H1 PUMP STATION	2003	*4*							0	
Hat Head	H2 PUMP STATION	2003	*2*							0	
West Kempsey	K2 PUMP STATION	*1986*	*2*	1	1	5	1	Low	Chokes increasing as pumps deteriorate Both pumps faulting requiring AH callouts.	8	2012
West Kempsey	K3 PUMP STATION	*1965*	*2*							0	

Link to Sewer Scheme	Asset Name	Year Constn	No of Pumps	Environmental Risk (0-5)	Public Health Risk (0-5)	Breakdown History (0-5)	Storage Capacity (0-5)	Flood Risk (L/M/H)	Other Operational deficiencies	Overall Priority Scoring	Nominated Year for Upgrade
West Kempsey	K4 PUMP STATION	*1965*	*2*							0	
West Kempsey	K5 PUMP STATION	*1936*	*2*							0	
West Kempsey	K6A PUMP STATION	*1936*	*2*							0	
West Kempsey	K6B PUMP STATION	*1989*	*2*							0	
Pumps to River	K6C PUMP STATION	*1989*	*2*							0	
West Kempsey	K7 PUMP STATION	*1985*	*1*	1	3	3	4	Low	One pump only	11	2014
West Kempsey	K8 PUMP STATION	*1991*	*1*	1	2	1	3	Low	One pump only, difficult to access during wet weather	7	2015
South Kempsey	K9 PUMP STATION	*1965*	*2*							0	
South Kempsey	K10 PUMP STATION	*1965*	*2*							0	
South Kempsey	K11B PUMP STATION	*1988*	*2*							0	
South Kempsey	K11C PUMP STATION	*2001*	*1*							0	
South Kempsey	K12 PUMP STATION	*1965*	*2*		3	5	0	Low	Pumps failing due to rocks coming into well. CCTV mains?	8	2012
South Kempsey	K13A PUMP STATION	*1965*	*2*							0	
South Kempsey	K13B PUMP STATION	*1985*	*1*							0	
South Kempsey	K14 PUMP STATION	*1963*	*2*	3	3	4	2	High	Discrepancies between pump flow rates.SPS will require upgrade if South sewer in diverted to North	12	2012/2015
South Kempsey	K15PUMP STATION	*1992*	*2*							0	
South Kempsey	K16 PUMP STATION	*1993*	*2*	2	2	4	1	Low	SCB upgrade only	9	2013
South Kempsey	K17 PUMP STATION	*1989*	*3*	4	2	4	3	Low	One pump missing from well. SPS will require upgrade if South sewer in diverted to North	13	2012/2015
South Kempsey	K18 PUMP STATION	*1997*	*2*	2	2	3	2	Moderate		9	2017
South Kempsey	K19 PUMP STATION	*1991*	*2*							0	
West Kempsey	K20 PUMP STATION	*1982*	*1*							0	
West Kempsey	K21 PUMP STATION	*1987*	*2*							0	
South Kempsey	K23 PUMP STATION	*1992*	*2*							0	
West Kempsey	K24 PUMP STATION	*1994*	*2*	2	2	4	0	0	Robot Pumps. Spares difficult to obtain.	8	2012

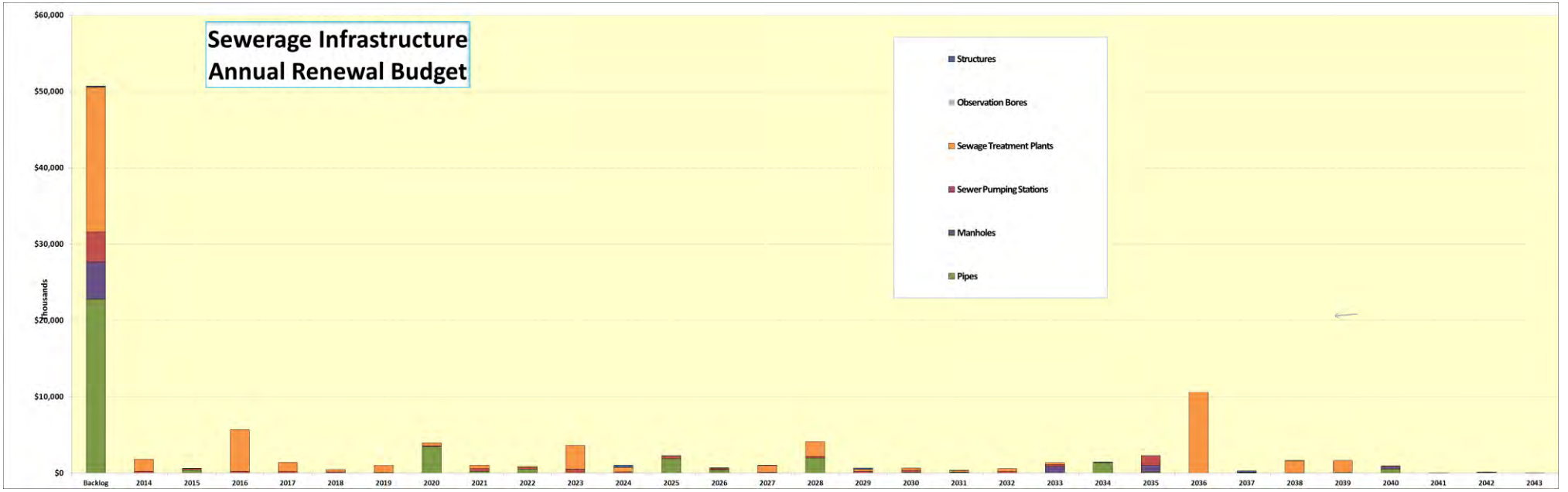
Link to Sewer Scheme	Asset Name	Year Constn	No of Pumps	Environmental Risk (0-5)	Public Health Risk (0-5)	Breakdown History (0-5)	Storage Capacity (0-5)	Flood Risk (L/M/H)	Other Operational deficiencies	Overall Priority Scoring	Nominated Year for Upgrade
South Kempsey	K25 PUMP STATION	*1996*	*4*							0	
South Kempsey	K26 PUMP STATION	*1996*	*3*							0	
South Kempsey	K27 PUMP STATION	*1989*	*2*							0	
West Kempsey	K28 PUMP STATION	*2003*	*4*							0	
West Kempsey	K29 PUMP STATION	*1986*	*2*							0	
West Kempsey	K30 PUMP STATION	*1986*	*2*							0	
West Kempsey	K31 PUMP STATION	*2003*	*2*							0	
West Kempsey	K32 PUMP STATION	*2008*	*2*							0	
South West Rocks	R1 PUMP STATION	*1985*	*3*	3	3	2	2	Low	PLC due for upgrade. Conflicts for existing pumps flow rates?	10	2013
South West Rocks	R2 PUMP STATION	*1985*	*2*	1	1	5	0	Moderate	??	7	2012
South West Rocks	R3 PUMP STATION	*1985*	*2*							0	
South West Rocks	R4 PUMP STATION	*1985*	*2*							0	
South West Rocks	R5 PUMP STATION	*1985*	*2*							0	
South West Rocks	R6 PUMP STATION	*1985*	*2*	3	3	3	3	Moderate	Storage for 3.19 hrs - address with pump capacity	12	2013
South West Rocks	R7 PUMP STATION	*1985*	*2*							0	
South West Rocks	R8 PUMP STATION	*1985*	*2*							0	
South West Rocks	R9 PUMP STATION	*1985*	*2*							0	
South West Rocks	R10 PUMP STATION	*1985*	*2*	3	2	3	1	Moderate		9	2013
South West Rocks	R11 PUMP STATION	*1985*	*2*	3	3	3	1	High	Consider raising well.	10	2014
South West Rocks	R12 PUMP STATION	*1985*	*2*							0	
South West Rocks	R13 PUMP STATION	*1999*	*2*							0	
South West Rocks	R14 PUMP STATION	*1985*	*2*							0	
South West Rocks	R15 PUMP STATION	*1985*	*2*							0	
South West Rocks	R17 PUMP STATION	*1993*	*2*							0	
South West Rocks	R18 PUMP STATION	*1995*	*2*	2	2	4	1	Low		9	2015

Link to Sewer Scheme	Asset Name	Year Constn	No of Pumps	Environmental Risk (0-5)	Public Health Risk (0-5)	Breakdown History (0-5)	Storage Capacity (0-5)	Flood Risk (L/M/H)	Other Operational deficiencies	Overall Priority Scoring	Nominated Year for Upgrade
South West Rocks	R19 PUMP STATION	*1998*	*2*							0	
South West Rocks	R20 PUMP STATION	*1996*	*2*							0	
South West Rocks	R21 PUMP STATION	*2001*	*2*							0	
South West Rocks	R22 PUMP STATION	*2002*	*2*							0	
South West Rocks	R23 PUMP STATION	*2002*	*2*							0	
South West Rocks	R25 PUMP STATION	*1998*	*2*							0	
South West Rocks	R26 PUMP STATION	*2000*	*2*							0	
South West Rocks	R27 PUMP STATION	*2001*	*2*							0	
South West Rocks	R28 PUMP STATION	*2007*	*2*							0	
South West Rocks	R29 PUMP STATION	*2010*	*1*							0	
South West Rocks	R30 PUMP STATION	*2010*	*1*							0	

APPENDIX K – WASTEWATER ASSETS ANNUAL RENEWAL PROGRAM

Sewer Infrastructure Annual Renewal Budget - Original

No.				This Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Year		total	Backlog	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
TOTAL		$198,104,331	$50,734,391	$1,815,960	$607,273	$5,669,216	$1,420,050	$447,081	$1,013,694	$3,967,933	$1,051,942	$882,510	$3,616,995	$1,052,455	$2,230,218	$718,121	$1,008,053	$4,128,628	$652,205	$685,730	$357,612	$589,707	$1,384,705
Asset Type																							
Pipes		$81,103,105	$22,790,402	$0	$371,729	$0	$0	$15,007	$0	$3,465,634	$257,073	$560,765	$0	$0	$1,918,720	$361,874	$0	$1,981,417	$20,190	$150,006	$110,055	$0	$2,659
Manholes		$18,275,173	$4,900,833	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$882,406
Sewer Pumping Stations		$22,562,740	$3,923,044	$266,980	$207,420	$246,740	$198,250	$176,990	$78,180	$112,400	$342,020	$136,220	$558,800	$186,100	$292,320	$198,560	$148,614	$196,380	$240,390	$224,860	$36,800	$198,519	$250,058
Sewage Treatment Plants		$72,554,314	$18,957,929	$1,548,980	$28,124	$5,422,476	$1,221,800	$255,084	$935,514	$389,899	$452,849	$185,525	$3,058,195	$557,805	$19,178	$54,838	$850,089	$1,950,831	$232,675	$310,864	$201,407	$391,188	$249,582
Structures		$2,692,699	$31,283	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Observation Bores		$916,300	$130,900	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$308,550	$0	$102,850	$9,350	$0	$158,950	$0	$9,350	$0	$0
Pipe sub-categories																							
Gravity Mains		$56,872,456	$22,157,037	$0	$371,729	$0	$0	$0	$0	$2,775,724	$13,534	$0	$0	$0	$1,839,674	$361,874	$0	$0	$20,190	$14,822	$110,055	$0	$2,659
Rising Mains		$16,455,789	$633,365	$0	$0	$0	$0	$15,007	$0	$0	$243,539	$0	$0	$0	$79,046	$0	$0	$1,981,417	$0	$0	$0	$0	$0
Effluent Mains		$7,774,860	$0	$0	$0	$0	$0	$0	$0	$689,910	$0	$560,765	$0	$0	$0	$0	$0	$0	$0	$135,184	$0	$0	$0



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