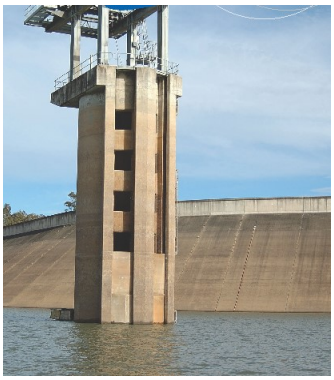
Singleton Council

Integrated Water Cycle Management Plan

Evaluation Study

VOLUME 1 – Report



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DLM Environmental Consultants Pty Ltd

Strategies for a Water Efficient Future

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Input provided by members of the Steering Committee and the Project Reference Group is also acknowledged.

EXECUTIVE SUMMARY

Integrated Water Cycle Management

Integrated Water Cycle Management (IWCM) is a structured process in which water supply, sewerage, stormwater and other relevant water resources are managed in an integrated manner.

The aims of IWCM are to ensure that the maximum value of the available water resources is realised, water is used optimally and environmental impacts are minimised, in ways which are consistent with broader catchment and river management objectives.

The overall Objectives of this Evaluation Study are:

- To clearly identify the relevant "catchment" context within which the urban water service is to be provided;
- To identify the targets of the LWU by considering all licences and management documents;
- To audit available data and information to confirm compliance with targets;
- To identify, describe and scope any additional data/information requirements; that is, any missing data, to confirm compliance with targets;
- To assess how well the water cycle management systems (water supply, sewerage and stormwater systems) in Singleton are performing against targets;
- To identify key water cycle issues in Singleton where there are non-compliances against targets;
- To identify and assess existing actions, programs and/or commitments which adequately address any issues raised (the Business as Usual (BaU) scenario);
- To assess likely main actions required and timing to determine if a simple or a detailed strategy is required.

Targets and Obligations

A number of plans, strategies, initiatives and legislative requirements which impose obligations, tasks and responsibilities on the water businesses of Singleton Council have been addressed, including:

- The Australian Drinking Water Guidelines
- The Hunter – Central Rivers Water Sharing Plan – water supply entitlements and allocations
- Licences – Singleton Sewage Treatment Plant
- A range of Acts and Regulations
- Council's Management, Business and Strategic Plans

Catchment & Water Resource Considerations

The evaluation has considered Singleton in the context of the catchment (the Hunter – Central Rivers Catchment).

Current Urban Water Systems

The Study has also addressed water availability, impacts of drought and land uses in the context of the existing water supply, sewerage and stormwater services provided by Council.

Methodology

The methodology employed for the Study, involved:

- establishment of a Project Steering Committee and a Project Reference Group;
- assembling relevant information and data from Council, Government Departments and the CMA.

Audit of Data to Identify Issues

Data was compiled and assessed for adequacy and suitability in determining Council's compliance with its targets and obligations.

Where insufficient or inadequate information and/or data was available to identify IWCM Issues, data gaps have been identified and recommended actions suggested to address them.

IWCM Issues

IWCM Issues are defined as failures of Council to meet its service obligations now and/or over the 30 year planning horizon of the Evaluation Study.

Issues were identified via a detailed review of Council's data and information, water demand analysis and community consultation through the Project Reference Group, involving stakeholders and community representatives. From this, a number of issues were identified as well as actions recommended to address them. These are discussed in Section 6 of this Report.

The Issues were analysed to assess whether they have been or are being addressed by formally resolved actions, contracts or committed capital works projects – the "Business as Usual" (BaU) Scenario.

For those Issues not addressed by BaU, the question as to whether a Simplified or Detailed IWCM Strategy is required was determined on the basis of whether significant capital works will be needed within the next 10 years.

The identified Issues are listed below:

a. IWCM ISSUES

	Issue	Recommended Actions/Comments	Required Strategy
1.	Catchment Perspective: Population Growth Increasing customer base resulting in increases in water consumption & wastewater generation over the next 30 years.	Extend planning beyond 30 years. Consider sensitivity scenarios	**Simplified**
2.	Geology & Soils Potential for urban salinity with potential impacts on water & sewerage infrastructure.	Survey & investigation required	**Simplified**
3.	Geology & Soils Potential for groundwater recharge and/or pollution from septic tank systems and leaking wastewater lagoons.		BaU
4.	Sewerage to Villages Four Villages (Broke, Jerrys Plains, Bulga & Camberwell are not sewered.	Studies complete – awaiting Council decision	**Simplified**
5.	Levels of Service Relevance of current Levels of Service (framed in 1998). Implementation of industry standard LOSs	Council to adopt new Levels of Service	**Simplified**
6.	Urban Water Systems Non-compliances with DECCW (EPA) STP Licence.	New STP to be constructed – approved by Council & budgeted for Non-compliances are insignificant	BaU
7.	Trade Waste Policy Current Trade Waste Policy not in accordance with revised (2009) Guidelines	Policy to be updated	**Simplified**
8.	Sewerage Asset Condition Condition of sewerage infrastructure	Financial management plan has been adopted by Council which addresses sewerage infrastructure replacement/refurbishment. Asset condition assessments	BaU

		completed. Council to provide appropriate budget.	
9.	Climate Change Aspects Council endorsed strategy for managing potential climate change impacts. Assessment of "secure yield" of existing water source (Glennies Creek Dam).	Ensure Drought Plan actions implemented and Demand management targets are met. Monitor "secure yield" studies	**Simplified**
10.	Water Quality Non-compliance with total coliforms and fluoride concentrations in the Singleton water supply.	Corrective actions taken – sampling methods enhanced	BaU
11.	Water Quality Non-compliances with lead concentrations in the Jerrys Plains water supply.	No longer an issue	BaU
12.	Water Quality Development of a Water Quality Management Plan in accordance with the Australian Water Quality Guidelines.	Water Quality Plan being drafted and planned completion by December 2010	BaU
13.	TBL Performance Reports Water Supply - customer interruption frequencies - average annual water supplied to customers - water losses - residential revenue from usage charges TBL Performance Reports Sewerage - average length of interruptions	Singleton applying a continuous improvement approach to performance	BaU

b. ISSUES RAISED BY PRG

	Issue	Recommended Action/Comments	Required Strategy
14.	Use of Town water supply by new/large industries	Council can & does require new industries to purchase water entitlements on the market	BaU
15.	Collection of Source Water • rain/stormwater • ground water - incentives by Council	Incentives are currently provided by Council to install rainwater tanks	BaU
16.	Aquifer recharge in Valley for wetlands.	To be considered when action plan developed under IWCM Strategy	**Simplified**
17.	Water restrictions – uniformity required & restrictions tied to water licences of other users	Drought Plan makes full provision for implementation of water restrictions	BaU

c. NON URBAN WATER SERVICING ISSUES

	Item	*Issue Description*	*Relevant Department/Agency for Referral*
1.	**Catchment Perspective**: Geology & Soils	Potential gully & stream erosion	Refer to CMA & Singleton Council
2.	**Catchment Perspective**: Land Use	• High current & future water consumption by the mining industry, with potential demand impacts on the water resource. • Non-compliances with Licences issued by DECCW under the Protection of the Environment Act, 1997.	Refer to State Government. Need to consider the impact of discharges to the River Refer to DECCW & Singleton Council
3.	**Catchment Perspective**: Geology Soils	Potential gully erosion	Singleton Council / Hunter-Central Rivers CMA
4.	**Catchment Perspective**: Land Use	Vegetation management processes and practices in Singleton LGA (Council issue)	Singleton Council / Hunter – Central Rivers CMA

The following were identified by the PRG as the major issues facing the Singleton LWU:

- Security of Water Supply in the face of potential impacts of climate change;
- Age & condition of existing sewerage infrastructure
- Potential servicing impacts of growth in the Shire.

Recommendations

1. That Council receive and endorse this Integrated Water Cycle Management Evaluation Study and refer it to the NSW Office of Water (Mr Ian Burton, Regional Manager, Water Utilities Branch) for approval;

2. That Council resolve to proceed to develop strategies to address the unresolved Issues identified in Table22 & 23 via a **Simplified Scenario Strategy.**

3. That Council resolve to complete all identified elements prior to the next IWCM review in 2016.

Contents

Tables

Figures

This Evaluation Study is presented in two Volumes

Volume 1: Evaluation Study Report

Volume 2: Appendices containing Technical and Supporting Information.

These Appendices represent detailed assessments of Singleton's Water Supply and Sewerage Services.

The Appendices are listed below:

Appendix A:	Urban Water Services in Singleton
Appendix B:	Singleton System Boundaries
Appendix C:	IWCM Related Targets, Obligations, Responsibilities and Requirements
Appendix D:	Demand Management and Projections
Appendix E:	Information and Data Assessment
Appendix F:	IWCM and Other Issues
Appendix G:	Project Reference Group – Minutes of Meeting
Appendix H:	Glossary and Abbreviations

1. INTRODUCTION

1.1 BACKGROUND AND GENERAL

Singleton is situated in the Upper Hunter region of New South Wales. The Shire is within the Hunter-Central Rivers catchment and covers an area of 4,893 square kilometres.

The Town of Singleton itself has a population of over 13,600 and is located 200 kilometres by road from Sydney. Some small towns and villages within the Shire are Broke, Jerrys Plains, Bulga, Ravensworth, Mount Olive, Belford and Branxton.

Water Supply

Council provides water supply services to a population of 17,919 (6,628 assessments; Source: 2008/09 Performance Report), with potable supplies to Singleton, Jerrys Plains, Broke, Mount Thorley and the Army Camp. Raw water is sourced from the Hunter River system via Glennies Creek Dam.

The Singleton potable water supply system comprises:

- Obanvale WTP: (Direct Filtration): (Capacity: 30 ML/d)

  The Water Treatment Plant was built in 1993
- 8 Service Reservoirs: (Capacity: 25 ML)
- 6 Pump Stations: (Capacity: 28.9 ML/d)
- 97.3 Kms of transfer and trunk supply mains
- 162.2 Kms of trunk reticulation mains.

Sewerage

Council provides sewerage services to a population of 15,009 (5,559 assessments; Source: 2008/09 Performance Report).

Council operates one sewage treatment plant, with the following characteristics:

- Intermittent Extended Aeration Activated Sludge Plant
- Built in 1985
- Capacity: 20,000 EP
- Discharge (under EPA Licence No. 3088) to Doughboy Hollow, adjacent to the Hunter River.

The overall sewerage system also comprises:

- 14 Pumping Stations (Capacity: 9.1 ML/d)
- 19 kms of Rising Mains
- 116 kms of Gravity Trunk Mains and Reticulation.

[Schematic Drawings of the Singleton Water Supply and Sewerage Systems are included as Appendices in **Volume 2: Attachment B**: System Boundaries].

Stormwater

Singleton has a fully functional stormwater drainage system.

Discharge of stormwater is typically to the Hunter River. A review of flood studies was carried out in 1998 and a Development Control Plan (CDP) prepared (Sinclair Knight Merz).

A Flood Inundation Plan was subsequently prepared (refer Figure A10 in **Volume 2: Appendix A**).

An updated Floodplain Management Plan is currently being developed.

1.2 BEST PRACTICE REQUIREMENTS

The NSW Office of Water has introduced a range of Best Practice Criteria which Local Water Utilities are required to comply with in order to pay a dividend from the surplus of the water supply and sewerage businesses and for financial assistance under the Country Towns Water Supply and Sewerage Program.

There are six (6) Criteria to be complied with, namely:-

- Strategic Business Planning
- Pricing (including Developer Charges, Liquid Trade Waste Policy and Approvals)
- Water Conservation
- Drought Management
- Performance Reporting
- Integrated Water Cycle Management.

Singleton Council has embraced the concept of Best Practice Management of its water supply and sewerage undertakings and, according to the 2008/09 NSW Performance Monitoring Report, has achieved 90% compliance for Water Supply and 100% compliance for Sewerage.

1.3 INTEGRATED WATER CYCLE MANAGEMENT: DEFINITIONS AND PROCESS

Traditionally, local authorities have managed water supply, sewerage and stormwater drainage systems as separate entities.

Integrated Water Cycle Management (IWCM) is a structured process in which water supply, sewerage, stormwater and other relevant water resources are managed in an integrated manner using a whole – of – water cycle approach.

The aim is to ensure that the maximum value of available water resources is realised, water is used optimally and environmental impacts are minimised in ways which are consistent with broader catchment and river management objectives.

The IWCM approach adopted involves the following five basic principles (as defined in the DEUS (now the Department of Water and Energy) IWCM Guidelines).

1. Consideration of all water sources (including treated effluent, rainwater, stormwater and groundwater) in water resource planning;
2. The sustainable and equitable use of all water resources;
3. Consideration of all water users;
4. Integration of urban water use and natural water processes; and
5. A whole of catchment integration of natural resource use and management.

These principals require the effective and efficient delivery of water services as well as the implementation of sustainable water conservation and water demand practices.

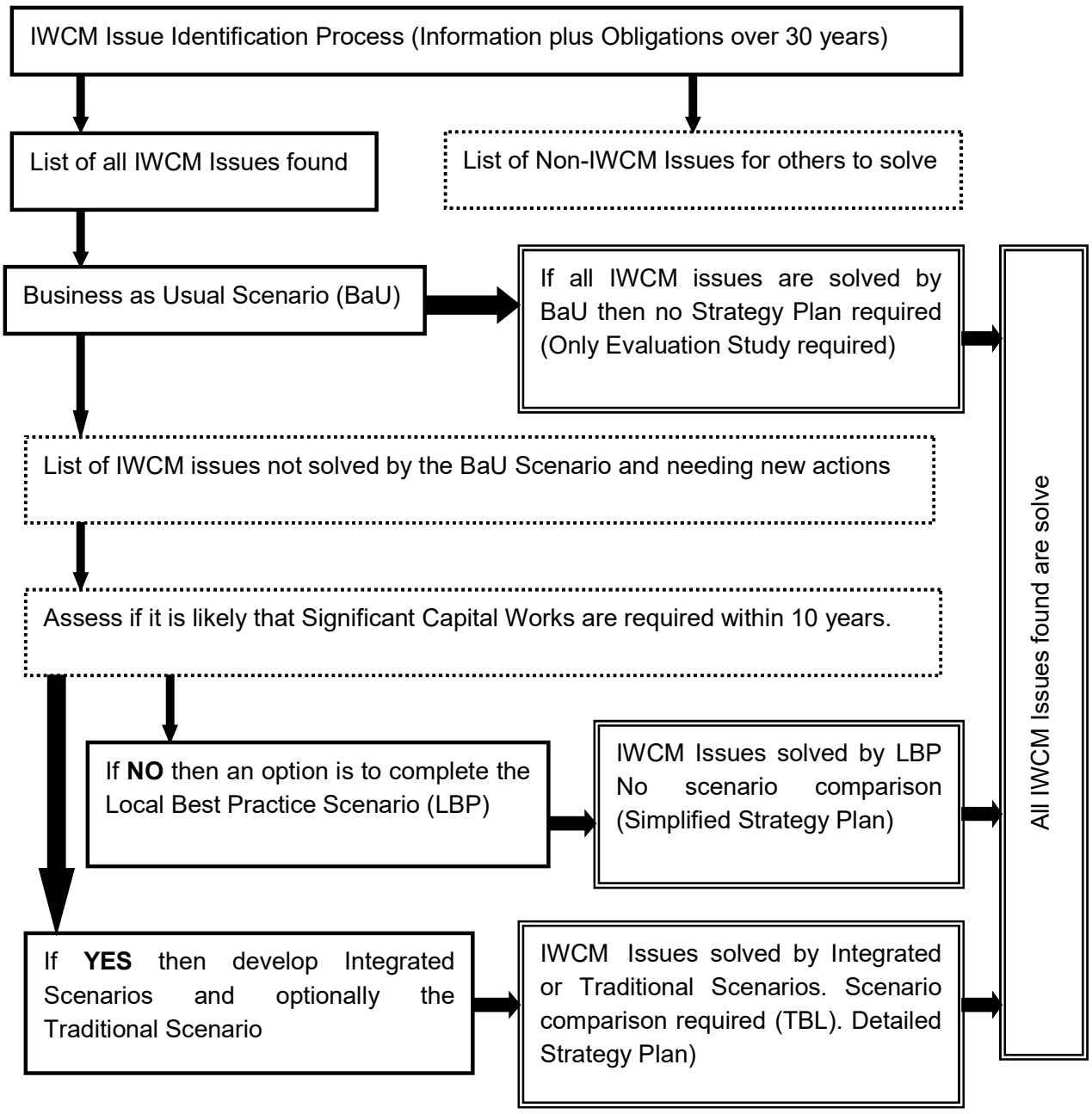
IWCM provides a framework to assist in identifying water management issues and concerns/problems and to address these by determining appropriate management responses so that Triple Bottom Line (TBL) objectives (social, environmental and economic) are met.

It aims to minimise the potential for poor or ill informed decisions in planning water delivery services; to ensure optimal use of water resources; to improve business management and to enhance water resource management.

Development of the IWCM Strategy essentially involves two steps:

- Step 1 Evaluation Study
- Step 2 Strategy Plan (If IWCM issues are not solved by existing actions).
  - Simplified (No significant capital works within 10 years)
  - Detailed (Significant capital works within 10 years).

The process involves the identification of issues and development of solutions. The following chart shows how IWCM issues are managed.



(Source: DWE, Integrated Water Cycle Management, Generic Scope of Works, August 2007)

There are four (4) specific reference Documents which are pivotal to this IWCM, namely:

i) Best Practice Management of Water Supply and Sewerage Guidelines, August 2007, DWE

ii) Integrated Water Cycle Management Guidelines for NSW Local Water Utilities, October 2004, DEUS.

iii) Information Sheets 1 – 7, DWE, December 2008.

iv) Council's Scope of Works for Preparation of an Integrated Water Cycle Management Strategy, dated November 2009 (based on DWE's "IWCM Scope of Works", August 2007)

1.4 STAGE 1 OF THE IWCM: THE EVALUATION STUDY

The Evaluation Study is the foundation document of the IWCM process. It describes the urban water service obligations of Singleton Council, sets the circumstances of the area within which Council operates, lists all related information and data, defines any IWCM issues, considers all existing Council actions and commitments by developing the Business as Usual (BaU) Scenario and defines the remaining IWCM issues which the BaU Scenario does not solve.

The assessment of IWCM issues considers a 30 year planning period.

This Evaluation Study will be used to determine the relevant IWCM process to solve any remaining issues.

1.5 OVERALL OBJECTIVES OF THIS EVALUATION STUDY

The overall Objectives of this Evaluation Study are:

- To clearly identify the relevant "catchment" context within which the urban water service is to be provided
- To identify the targets of the LWU by considering all licences and management documents
- To review available data and information to confirm compliance with targets
- To identify, describe and scope any additional data/information requirements, that is, any missing data to confirm compliance with targets
- To assess how well the water cycle management systems (water supply, sewerage and stormwater systems) in Singleton are performing against targets
- To identify key water cycle issues in Singleton where there are non-compliances against targets
- To identify and assess existing actions, programs and/or commitments which adequately address any issues raised.(the Business as Usual (BaU) scenario)
- To assess likely main actions required and timing to determine if a simple or detailed strategy is likely.

1.6 PROCESSES

The processes utilised in the development of this Evaluation Study involved:

- Compiling and assessing the relevance and completeness of Council's data base and related catchment and water resources information;
- Determining system boundaries (service boundaries; administrative boundaries and physical boundaries)
- Assessing the adequacy of existing water supply, sewerage, trade waste and stormwater facilities and operations to meet statutory requirements and provide a community acceptable level of service;
- Reviewing and assessing the Council's future planning strategies (including 30 year Capital Works Programs and Financial Management Plans) in terms of capacity to maintain acceptable levels of service and ability to adapt to growth, changes in statutory requirements, sustainability etc;
- Determining Council's requirements, obligations and objectives;
- Identifying and addressing any gaps in the data base and forward planning strategies;
- Determining the community's expectations and needs and identifying and assessing the "issues";
- Determining with Council and the Project Reference Group if the identified issues can be addressed by existing actions (the Business-as-Usual scenario);
- Determining how any remaining IWCM issues can be addressed (Simplified or Detailed Strategy).

2. METHODOLOGY

2.1 PROJECT INCEPTION

A Steering Committee (or Project Team) was initially assembled, comprising representatives of Council and the NSW Office of Water.

Potential members of the Project Reference Group (PRG) were identified and invited to become members.

Representatives were sought from business groups, industry, indigenous groups and the general community.

A Project Inception Meeting was held in Singleton on 1 December 2009. A joint Steering Committee Meeting was also held with the Upper Hunter Water Alliance on 12 May 2010.

2.2 INFORMATION & DATA ACQUISITION & REVIEW

Data required for the evaluation was obtained from Council, DECCW, NSW Health, NSW Office of Water, and the Hunter Central-Rivers CMA.

Much of the data was also accessed from various State and Commonwealth Government web sites.

2.3 DATA REVIEW

Data was collected, recorded and reviewed.

A range of documents was produced (which are presented as **Volume 2** – Technical and Supporting Information) and these were provided for comment and feedback to members of the Steering Committee and the PRG.

2.4 DATA ASSESSMENT & UTILISATION

The data was compiled, collated and assessed under the following category headings:

i) Urban Water Services and Demand Management **(Appendices A and D: Volume 2)**

The existing water supply and sewerage services in Singleton were assessed, including an analysis of historical water demand, demand management measures (for Council to consider implementing) and 30 year water demand projections (based on a range of demand management measures). Council has been concurrently developing a Demand Management Strategy (which has not yet been adopted by Council).

This Section also incorporated information about, and assessment of, catchment and water resource aspects.

ii) System boundaries (**Appendix B: Volume 2**)

The boundaries applying to Singleton LWU were defined in terms of service boundaries, administration boundaries and physical boundaries.

iii) Targets, Obligations, Responsibilities and Requirements (**Appendix C**: **Volume 2**)

The key, relevant, water business, catchment and legislative targets, obligations, responsibilities and requirements applicable to Singleton were collated, reviewed and summarised.

This review was used to generate data gaps and potential IWCM Issues.

2.5 IDENTIFICATION OF ISSUES

IWCM Issues are defined as failures by the LWU to meet targets and service obligations.

Current and potential issues were identified, discussed with Council & the Steering Committee and presented to the PRG.

A subsequent meeting of the PRG (along with representatives of the Steering Committee) was held in Singleton on 3 June 2010. [Refer **Volume 2**: **Appendix G -** Minutes of PRG Meeting].

The IWCM process was outlined and issues were presented and discussed. The PRG raised additional community issues for discussion and contributed suggested options for addressing outstanding issues.

The list of issues was modified and finalised as a result of the meeting.

These issues were separated into two categories; IWCM Urban Issues and Non-Urban Issues.

They were then documented and presented in **Appendix F: Volume 2: IWCM & Other Issues**.

2.6 DATA GAPS

Identification of data gaps and defining strategies to address them are important aspects of the evaluation process.

Gaps were identified where there was no data, insufficient data or unsuitable data to confirm compliance with the identified targets.

The identified data gaps have been listed in **Appendix E: Volume 2: Information and Data Assessment,** along with a priority assessment and an action plan to address them.

2.7 ADDRESSING THE IDENTIFIED ISSUES

The evaluation process requires a determination of which actions fall within a “Business-as-Usual” (BaU) scenario. If issues are not resolved by BaU, the requirements of the next IWCM stage need to be recommended – that is, preparation of a Simplified Strategy or a Detailed Strategy.

i) Business as Usual Approach

The Business as Usual Approach (BaU) applies when the LWU has committed to an action that will resolve the issue. Examples of such firm commitments are where significant preliminary elements have been completed, for example:

- ❒ Formal regulatory requirements have been sought and approved;
- ❒ A draft options report has been completed;

- ❒ Council has formally resolved to adopt the option.

NSW Office of Water has advised that statements of intention to proceed (as maybe included in a management plan or strategic business plan) or listing of expenditure in a capital works plan do not satisfy BaU requirements.

If any of the IWCM issues cannot be addressed by BaU, then a further "second stage" IWCM strategy study is required. The IWCM Evaluation Study then recommends that a simplified or detailed strategy be developed.

ii) Simplified IWCM Strategy

Issues not addressed by BaU are examined to identify whether a simplified scenario will address them.

A Simplified Strategy should be implemented when there is some confidence the issues can be addressed by:

- ❒ some additional locally suitable best practice actions;
- ❒ some minor capital works within the next ten years;
- ❒ or significant capital works that can take place ten years or more in the future.

If the simplified scenarios solve all remaining IWCM issues then the evaluation process is completed by the development of a simplified strategy plan and no comparison of multiple scenarios using Triple Bottom Line Analysis is required.

iii) Detailed IWCM Strategy

If issues remain that cannot be addressed under the BaU or a Simplified Strategy then a detailed strategy plan is required. This is required where significant capital works are required within the next ten years. A detailed strategy plan develops full scenarios including a traditional (stand alone) and integrated scenarios. These scenarios are groupings of options that have been identified by the LWU to address the issues. Details of this approach are provided in NSW Office of Water's "IWCM Generic Scope of Work Evaluation and Strategy" Guidelines.

3. PROVISION OF URBAN WATER SERVICES IN SINGLETON

3.1 GENERAL

Singleton Council provides water supply, sewerage and stormwater to the following towns:-

Potable Water Supply:

- Singleton (Population supplied: 17,919; 6,628 connected properties
- Mount Thorley Industrial Area

  (90 industrial customers. Interconnection pipeline with Singleton system feeding to a major reservoir in the industrial area)
- Army Camp – Abattoir

  (supplied by extended trunk main from Singleton to local balance tank)
- Broke Village

  (supply to 110 houses in the Village) via connection to the Singleton – Mount Thorley supply main)
- Jerrys Plains Village

  (supply to 90 houses (120 lots in Village), sourced from Naegan – Bayswater Power Station)

  Raw water is sourced from Glennies Creek Dam.

Sewerage: Singleton (5,340 connections)

Maison Dieu (pressure sewer system – not all properties connected)

Stormwater: Singleton only

Villages have standard, semi-rural, table drain systems

Maps and details of the water supply, sewerage and stormwater systems are appended in Attachment B1 of **Appendix B**.

A full description of the Singleton water supply, sewerage and storm water services is provided in **Volume 2, Appendix A**.

3.2 SYSTEM BOUNDARIES

There are essentially three boundaries which apply to a Local Government Owned Water Utility (LWU), namely:

- Service Boundaries
- Administrative Boundaries and
- Physical Boundaries

a. Service Boundaries

Council is responsible for the provision of water supply, sewerage and stormwater services within Singleton Shire.

b. Administrative Boundaries

Singleton Council is responsible for planning, operation and management of all water supply, sewerage and stormwater services within the Local Government Area (LGA), subject to the regulatory functions of a number of NSW State Government Departments, namely:-

* NSW Office of Water
* NSW Health
* Department of Environment, Climate Change and Water (DECCW)

Other Agencies relevant to the operation and management of Singleton's water supply, sewerage and stormwater services include:-

* State Water, Newcastle; in relation to water allocations from the Hunter River.
* NSW Department of Primary Industries.
* NSW Department of Lands.
* NSW Roads & Traffic Authority.

c. Physical Boundaries

Singleton is located in the Hunter Local Government region of New South Wales, is within the Hunter – Central Rivers catchment and is surrounded by Upper Hunter, Dungog, Maitland, Cessnock, Hawkesbury & Mid Western Regional Councils

Figure 1 below shows Singleton in relation to the surrounding Shires.

Figure 1: Hunter Local Government Boundaries

(Source: NSW Department of Local Government)

3.3 CATCHMENT PERSPECTIVE

3.3.1 General

A detailed discussion of Singleton in relation to its catchment is contained in **Volume 2: Appendix A.**

The following is a general summary of the catchment aspects which relate to consideration of IWCM issues.

3.3.2 Location

Singleton is located in the Hunter-Central Rivers Catchment area and relies on Glennies Creek Dam for its water supply. The Singleton Local Government Area (LGA) is shown in Figure 2.

Figure 2: Singleton LGA

The principal catchment elements are shown in Figure 3 below:

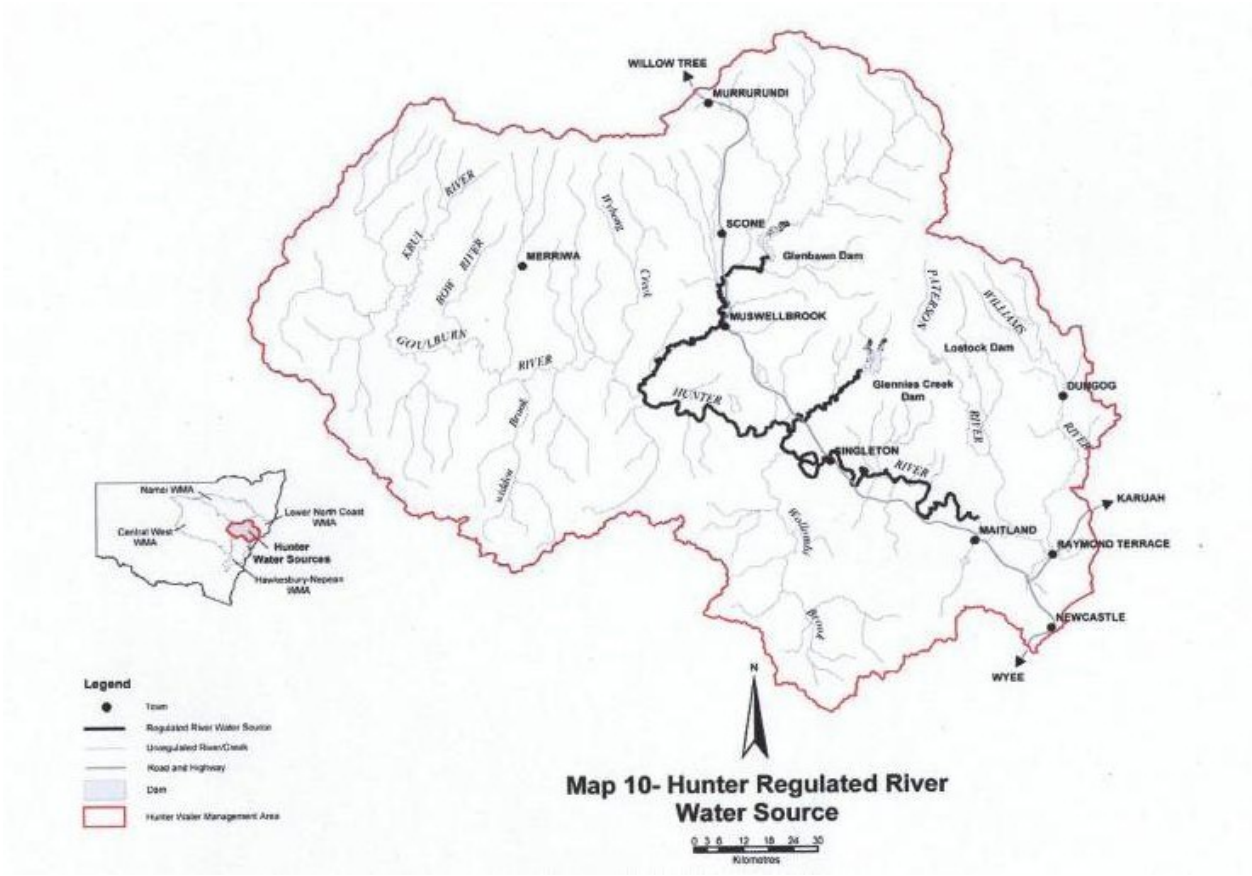


Figure 3: Hunter Regulated River Source – Catchment Elements

3.3.3 Climate

Key climate characteristics for Singleton are summarised in Table A1 of **Appendix A: Volume 2**.

Generally temperatures vary from a maximum of 31.7 ºc in summer to 17.4 ºc in winter (average maximum).

Rainfall is relatively low at 641 mm/annum (average for the period 1884 to 2009).

3.3.4 Population Growth & Development

The total population of the Shire, as reported by the 2006 Census, was 21,936, an increase of 7.6% (1551 people) since the 2001 Census (Refer Table 7 below).

The Town of Singleton itself had a population of 13,664, compared with 12,530 in 2001 – a growth of 9.1% (or 1.75% pa on average). This population growth is well above the national

growth rate of 1.3% pa over the last 10 years. Growth in dwellings has grown more rapidly than population growth. Between 2001 and 2006, an additional 507 dwellings were constructed in Singleton. This represents a growth rate of 2% pa.

From the point of view of a water utility, this implies an increasing customer base (number of assessments) and, potentially increasing water consumption and wastewater generation.

Table 1: Singleton Population

Location:	Population 2001 Census:	Population 2006 Census
Singleton LGA	20,385	21,936
Singleton Town	12,530	13,664

Source: ABS 2009.

The estimated population in the Shire in 2008 was 23,458 (Source: ABS)

Typically, the ABS projections are for a growth rate of 0.9% pa. The Hunter Valley Research Foundation has, however, predicted a "medium" growth rate of 1.19% pa.

In discussions with Council (Brian Carter, pers.comm); growth rates of 0.8% for population and 1.0% pa for dwellings have been adopted for the 2010 Developer Servicing Plans. Population projections, then, are based on Council's projections and are presented in Table 7 below.

Table 2: Population Projections for Singleton

Location	2006 Census	2008 Estimate	2010	2015	2020	2025	2030	2035	2040
Singleton LGA	21,936	23,458	23,835	24,804	25,812	26,861	27,953	29,089	30,270
Singleton Town	13,664	14,160	14,387	14,736	15,334	15,958	16,606	17,281	17,984

3.3.5 Topography

The topography is generally described as undulating to hilly cleared lands graduating to flatter areas, with some areas of remnant vegetation. The most significant topographical feature is the Hunter River.

Singleton is largely characterised as rich alluvial floodplains.

3.3.6 Geology and Soils

- Geology

The Hunter Region is a transitional area between the Early Permian and middle Triassic rocks of the Sydney Basin (in the south), and the Palaeozoic rocks of the New England Fold Belt (to the north). These two major geological areas are separated by a fault line, the Hunter-Mooki Thrust Fault.

The Permian-age rocks, located in the central and south-eastern areas of the Region, are part of the Sydney Basin. They form the main part of the Hunter Valley and feature numerous coal seams of varying thicknesses and depths. These Permian rocks were formed in shallow marine and estuarine environments and therefore contain salt. This salt content has a direct influence on the level of salinity of many streams found on the central valley floor.

- Soils

Soil types are very dependant on the parent rock and the locations in the landscape. Floodplain soils (which are predominant in Singleton Shire) include alluvials, podzolics and some “cracking” clays.

Given that the geology of the area derives form marine and estuarine environments, the soils generally contain salt.

Soil management issues in Singleton Shire, therefore, include management of land salinity, erosion, and sulphate soils and soil structure decline.

3.3.7 Areas of Significance, Wetlands, Aboriginal and Vegetation

Areas of significance/conservation value, wetlands, aboriginal heritage and vegetation are discussed in **Appendix A: Volume 2.**

3.3.8 Water Storage – Glennies Creek Dam

Glennies Creek sub-catchment is located in the centre of the Hunter Catchment.

Glennies Creek Dam is located about 25 kilometres to the north of Singleton, 39 kilometres upstream of the junction of Glennies Creek with the Hunter River. The body of water behind the dam is Lake St Clair.

Relevant storage details are:

- Catchment area: 233 km^2
- Surface area: 1,540 ha

- FSL: 186 m above sea level
- FSL Capacity: 283,000 ML

The Dam was constructed in 1983 and operates in conjunction with **Glenbawn Dam**. Together, the two dams supply nearly 250,000 ML of water per year for:

- town supplies (**Singleton**, Aberdeen and Scone);
- stock and domestic;
- industry (particularly coal mining);
- agriculture and horticulture (sheep and cattle);
- pastures and vineyards;
- recreation and tourism.

There are 1,405 licences within the Glennies Creek Dam and Glenbawn Dam system with 247,350 ML combined entitlement.

- High security/industry entitlements 21,700 ML
- General security entitlements 128,500 ML
- Stock and domestic requirements 1,850 ML
- Town water supplies 10,800 ML
- Major Utility Power Generation 36,000 ML
- Supplementary water entitlements 48,500 ML

Water users hold access licenses which determine their share component. Share components specify how much of the valley's resource is available for each licence holder to use.

Storage in the Dam has recovered from the low of 48% in January 2008 to a current (25 January 2010) capacity of 72%. Refer Graph in Figure A5 below.

It should be noted that Town entitlements amount to **only 4.4%** of the total entitlements from Glennies Creek Dam.

3.3.9 Land Use

The Hunter Valley is an area of economic importance to New South Wales, particularly with respect to coal mining, power generation and agriculture.

Nearly 100 million tonnes of coal is exported every year. (Source: Hunter Valley Research Foundation).

The principal land uses in Singleton Shire include;

- coal mining;

- power generation;
- agriculture (particularly vineyards);
- manufacturing;
- support industries and commercial enterprises.

3.3.10 Flooding and Stormwater Management

Singleton was subjected to a major flooding event in 1955, which brought on the subsequent construction of the Town levee in 1963.

The 1955 Flood was adopted by Council as the flood standard for building and development controls.

In 1988, Council undertook a review of flood studies and reports for the Singleton area and prepared a Development Control Plan (DCP).

The DCP recommended the preparation of a Floodplain Management Plan.

Council completed its Urban Stormwater Management Plan in 2003.

The Flood Inundation Plan for Singleton is included as Figure A10 in **Appendix A: Volume 2**.

3.3.11 Hunter – Central Rivers Catchment Action Plan

The area and location of the Hunter-Central Rivers CMA are shown in Figure A11 in **Volume 2: Appendix A.**

The CMA published its "Action Plan" in 2006, addressing a range of Catchment and Management Targets, including:

- biodiversity and nature vegetation
- water and aquatic ecosystems
- land management.

The CMA's "Targets" are outlined in Table A7: **Appendix A: Volume 2**.

3.4 WATER RESOURCES CONTEXT

3.4.1 Hunter Regulated River Water Sharing Plan

The Hunter Regulated River water Source comprises:

a) the bed and banks of all rivers, from the upstream limit of Glenbawn Dam water storage downstream to the estuary of the Hunter River, and from the upstream limit of Glennies Creek Dam water storage downstream to the junction with the Hunter River, and
b) the unconsolidated alluvial sediments underlying the waterfront of all rivers which have been declared by the Minister to be regulated rivers, except those unconsolidated alluvial sediments within one metre of works taking water pursuant to licenses issued under Part V of the *Water Act 1912* of their equivalent aquifer access licenses issued under the *Water Management Act 2000*.

The regulated rivers included in the Water Sharing Plan include (inter alia):

- Glennies Creek from the upper limit of the Glennies Creek Dam water storage, including all tributaries to the storage (named and unnamed) up to high water mark of the storage, downstream to the confluence of Glennies Creek with the Hunter River;
- Hunter River from the upper limit of Glenbawn Dam water storage, including all tributaries to the storage (named and unnamed) up to high water mark of the storage, downstream to a point adjacent to the eastern boundary of Lot 2, DP 1012258. Parish of Maitland, County of Northumberland on the southern bank of the River and adjacent to a point 150 m downstream of the western boundary of Lot 1, DP 856702, Parish of Middelhope, County of Durham on the northern bank of the River, 1400 metres upstream of Oakhampton rail bridge.

Glennies Creek Dam is the source of Singleton's water supply. The categories and share components of access licenses under this Water Sharing Plan are shown in Table 8.

Table 3: Water Access Licence Categories and Locations

Access Licence Category	Total Share Component
Major utility	36,000 megalitres per year
Local water utility	10,832 megalitres per year
Domestic and stock	1,738 megalitres per year
High security	22,159 unit shares
General security	128,163 unit shares
Supplementary water	49,000 unit shares

Singleton Council has a Town entitlement of 5,000 ML in the Local Water Utilities category, which represents 2.0 % of total allocations.

[Council also holds Groundwater entitlements of 4,050 Ml (which have not been accessed to date)]

The Water Sharing Plan was suspended in December 2006, since the extremely dry conditions were threatening the security of water supplies to Macquarie Generation.

Overall the Plan establishes a long term average annual extraction limit estimated as 217, 000 ML per year (out of an annual natural average flow estimated at 1,042,000 ML) and identifies water above this limit (approximately 80 % of flows) as planned environmental water.

Historically, water use in the Hunter Regulated River system has been substantially lower than the limit set by the Plan; as not all of the entitlement available under existing licenses is fully used. Since the Plan was implemented in 2004, the maximum regulated system water use has been 157,000 ML in 2005-2006.

3.4.2 Water Quality Objectives

Catchment water quality and river flow objectives were established by the Environment Protection Authority (EPA), now within the Department of Environment, Climate Change and Water (DEECW).

Water quality data for the Hunter River at Singleton is presented in Table 4 below.

Based on these results and the specified water quality objectives, the Hunter River is not suitable for aquatic ecosystems (nutrients and chlorophyll-a), primary contact recreation (turbidity, faecal coliforms), livestock (faecal coliforms), drinking water or homestead supplies.

Table 4: Water Quality Data

		Hunter River											
		At Glenbawn				At Aberdeen				At Edinglassie			
Parameter	**Units**	**Sample Period**	**Ave**	**Max**	**Min**	**Sample Period**	**Ave**	**Max**	**Min**	**Sample Period**	**Ave**	**Max**	**Min**
Bluegreen algae	Cells/mL	1999-'02	1126	3986	0	'99-'03	631	5336	0	-	-	-	-
Total Alkalinity	mg/L	1999	92	223	0	'99	193	235	159	-	-	-	-
Ammonia N	mg/L	'99-'01	0.14	10.0	0.01	'99-'03	0.01	0.06	0.01	-	-	-	-
Chlorophyll a	µg/L	'99-'02	3.4	7.0	1.0	'99	2.67	8.0	1.0	-	-	-	-
EC	µS/cm	1999	300	361	226	'00-'03	285	371	110	'02-'06	387	566	260
NO_x	mg/L	'99-'02	0.31	0.46	12.0	'99-'03	0.09	0.46	0.01	'04-'06	1.69	11.75	0.08
Nitrate N	mg/L	1999	0.014	0.016	0.012	'99-'02	-	-	-	2002	0.23	0.30	0.20
Total N	mg/L	'99-'02	0.33	1.10	0.19	'99-'02	0.31	0.85	0.13	-	-	-	-
Ortho P	mg/L	'99-'02	0.02	0.32	0.01	'99-'02	0.02	0.18	0.01	-	-	-	-
Total P	mg/L	'99-'02	0.04	2.10	0.02	'99-'02	0.03	0.06	0.02	'04-'06	0.43	2.40	0.01
Turbidity	NTU	1999	23.7	25.0	4.4	'01-'03	6.7	39.0	0.9	'04-'06	22.4	159.0	5.7
pH	units	1999	8.5	8.8	8.3	'01-'03	8.3	9.2	7.5	'02-'06	8.3	9.1	7.8
Total coliforms	CFU/mL	-	-	-	-	-	-	-	-	'02-'06	2007	2419	22
Faecal coliforms	CFU/mL	-	-	-	-	-	-	-	-	'02-'06	236	2419	10
Hardness as $CaCO_3$	mg/L	-	-	-	-	-	-	-	-	'02-'06	166.3	223.0	128.0
TDS	mg/L	-	-	-	-	-	-	-	-	'04-'06	179.2	250.0	124.0

3.5 URBAN WATER SYSTEMS

3.5.1 Levels of Service

The Levels of Service applying in Singleton are documented in Tables 16 (Water Supply) and 17 (Sewerage) in Section 4.5.

3.5.2 Land Uses in Singleton and Associated Licensed Activities

The principal sources of economic growth and development in the Singleton LGA include:

- Coal Mining;
- Power Generation;
- Abattoir;
- Agricultural production;
- Agricultural produce processing;
- Manufacturing;
- Light engineering;
- Small business enterprises;
- Support industries and commercial enterprises.

A total of 35 Licenses have been issued by DECCW, under the Protection of the Environment Operations Act, 1997 (POEO) in the Singleton Local Government Area. Of these, only four (4) are located in the Town of Singleton.

The four (4) Licenses issued in Singleton itself are presented in Table 10.

Table 5: Licences Issued by POEO in Singleton

Licence Number	*Name*	*Address*	*Status*	*Non-compliances*
11279	Shellden Pty Ltd (Abattoir)	Old Northern Road, Cnr New England & Golden Highways WHITTINGHAM 2330	Issued	Yes, 2002 (Failure to monitor)
12728	Singleton Council (Animal accom.)	Gresford Road SINGLETON 2330	Issued	No
3088	Singleton Council (STP)	Army Camp Road SINGLETON 2330	Issued	Yes, 1999, 2000, 01, 02, 03, 04, 06 & 07
5927	Singleton Council (Waste Disposal)	Dyrring Road SINGLETON 2330	Issues	Yes, 2000, 02,03, 05, 06, 07 & 08

All Licenses issued within the Shire are presented in Table A17, **Volume 2: Appendix A**.

The non-compliances relevant to this IWCM Evaluation Study relate to the Sewage Treatment Works and these are outlined and discussed more fully in Appendix C: IWCM Related Obligations, Responsibilities and Requirements.

DECCW advises that there are currently no contaminated sites listed for Singleton.

All the above licensed activities for the **Town of Singleton** are subject to a Trade Waste Agreement with Singleton Shire Council.

3.5.3 Current Water Supply Services

The Water Supply, Treatment and Distribution systems for Singleton are discussed in detail in **Appendix B: System Boundaries**.

Key aspects of the water supply services provided by Council are presented below.

Table 6: Summary of Water Supply Service

Water Sources:	• **Glennies Creek Dam** • **(Hunter River Regulated source)**	
Entitlements:	• Town Entitlement	5,000 ML/yr
	• High Security (Mine allocation plus Mt. Thorley & Jerrys Plains)	1939 ML/yr
	• High Security	81 ML/yr
	• General Security (Parks, Mt. Thorley)	24 ML/yr
	• Groundwater entitlement	4,050 ML/yr
	Total	**11,094 ML**
Rainwater Tanks		600 No.
Populations:	LGA (2006) Census	21,936
	Singleton	13,664
	Population supplied with water supply services (2008/09 Performance Return)	17,919
	Population supplied with sewerage services (2008/09 Performance Return)	15,009
Metered Customers: **(2008/09)**	Residential	5,839
	Non-Residential	789
	Total	6,628
Total Water Extracted:		2,476 ML

(2008/09)		
Authorised Annual Consumption: **(2008/09)**		2,414 ML (all potable supply)
Unaccounted for Water: (2008/09)		62 ML (2.6%)
Treated (Potable) Water: Quality Compliance (Performance Report 2008/09)	Total System : Compliance E.coli	100%

Water Consumption

Details of water consumption, by user category, are summarised in Table 12 below:-

Table 7: Water Consumption Profile

Consumptions by User Category (2008/09) [based on water extracted from all sources]			
Residential		1,490 ML	(61.7%)
Commercial		428 ML	(17.7%)
Industrial		286 ML	(11.8%)
Rural		41 ML	(1.7%)
Institutional		169 ML	(7.0%)
Public Parks & Open Space		- ML	(0%)
Bulk Sales		- ML	(0%)
Unbilled authorised		- ML	(0%)
	Total	**2,414 ML**	

The Demand management modelling carried out as part of this study (Refer Appendix D) indicates that at current rates of consumption, the Water Treatment Plant has surplus capacity beyond the 30 planning horizon of this Evaluation Study.

Water Treatment:-

Singleton operates 1 Water Treatment Plant, namely:-

- Direct Filtration Plant
- Total Capacity: 30 ML/d
- Peak Day Demand: 26.4 ML/d (April 1998)

(Since 1998)

The peak day demand has been steadily declining since 1998, which will significantly extend the life of the Water Treatment Plant.

The current 2008/09 Peak Day Demand for Singleton Water Treatment Plant (17.2 ML/d) is approximately 51%of the total plant capacity.

Currently, commercial/industrial use accounts for only 29.5% of total consumption.

Water Quality

Water quality produced by Singleton's Water Treatment Plant is typically of high quality. In the period, 2006/07 to 2008/09, the Treatment Plants met all Australian Drinking Water Quality Guidelines for physical, chemical and microbiological criteria (as per TBL Annual Performance Reports) as shown in Table 13 below.

Table 8: Water Quality Compliance Results

Criteria	2006/07	2007/08	2008/09
Physical	100%	100%	100%
Chemical	100%	100%	100%
Microbiological			
• E.coli	100%	100%	100%
• Total coliforms	100%	100%	100%

(Source: DWE Performance Reports; 2006/07; 2007/08 & 2008/09)

Water Use Profile

Singleton Council does not have any information on residential household and external use profiles. External use can be deduced from the daily water consumption figures (ie. summer use – winter use). This equates to 60% residential use for external purposes (gardens, lawns and swimming pools) in peak consumption months (with no restrictions applying) and 20% of total consumption over a full year.

The twenty (20) top water users in Singleton in 2008/09 are presented in **Appendix A: Volume 2** (Page A47).

The biggest water users in 2008/09 were two motels (10.7 & 10.2 ML/year respectively), whereas in 2007/08 the biggest user was the Mall (17.0 ML/year). The Mall's usage in 2008/09 was reduced significantly to 8.6 ML/year.

There are no major industrial users (the mine used 7.7 ML/year in 2008/09 and wasn't in the top 20 users in 2007/08).

Areas where Council could have some beneficial influence in reducing water consumption are:

- Water audits for motels and the caravan park
- Audits and actions to reduce usage at Council facilities (like the ovals & swimming pool)
- Education/awareness campaigns at all schools.

Assets & Asset Management

Singleton has a comprehensive Asset Management Plan, including a Water Supply Asset Register, which lists the following information:-

- WTP's and Pump Stations
- Reservoirs
- Filtered Water Mains
- Filtered Water Fittings
- Raw Water Mains
- Raw Water Fittings.

Council has also recently completed a *100 Year Asset Renewal Plan for Water Supply and Sewerage Services, February 2009.*

Details of Council's Water Supply Assets are shown in Table 14 below:

Table 9: Details of Water and Sewerage Assets

Business	Assets	Fair Valuation $'000	Accumulated Depreciation & Impairment $'000	Asset Condition (1)
Water Supply	Treatment Plants	18,016	9,671	2
	Reticulation Mains	38,101	15,271	3
	Trunk Mains	15,213	6,114	3
	Reservoirs	6,153	2,400	3
	Pump Stations	572	312	2
	Sub total	**78,055**	**33,768**	
Sewerage	Pump Stations	5,709	3,561	3
	Reticulation Mains	33,162	16,093	4
	Manholes	5,283	2,588	4
	Treatment Works	7,882	4,196	3
	Sub total	**52,036**	**26,438**	

Note: (1) Condition 1 = Near Perfect (Ranges from New to Good)
Condition 2 = Superficial Deterioration (Ranges from Good to Fair)
Condition 3 = Deterioration Evident (Ranges from Fair to Marginal)
Condition 4 = Requires Major Reconstruction (Ranges from Poor to Critical)

Table 15 indicates that Water Supply Assets are in fair to good condition, but are aging and that a program of asset replacement / renewal is necessary (which Council has in place under its 30 Year Forward Capital Works Program).

Councils Asset Register indicates that a high percentage of distribution and reticulation pipework is at or older than 30 years.

Council also recognises that it has a high percentage of AC pipes which will need to be replaced over the next 30 years.

A copy of Council's Forward Capital Works program is presented as an **Attachment to Appendix C: Volume 2.**

3.5.4 Current Sewerage Works

Singleton Council provides sewerage services to a population of 15,009. Onsite septic tank systems (both within the Town and in the villages and rural areas) are administered in accordance with the provisions of the Local Government Act.

Sewerage Services Summary

Key aspects of the sewerage services in Singleton LGA are summarised in Table 15 below:-

Table 10: Summary of Sewerage Services

		2007/08	**2008/09**
Population Serviced: (TBL performance Reports)	Permanent	14,926	15,009
Connected Properties:	Residential Non- Residential	5,077 451	5,115 444
Unsewered Urban Premises (No.)		200	316
Unsewered Urban Premises (%)		4%	6.2%
No. of on-site systems (within LGA)		4,357	4,951(Mostly in the Villages)
Volume of Sewage treated (ML/d)		1,278	1,353
Volume of Sewage treated (kL/property)		643	636
Volume Recycled		33.3% (426 ML)	33.3% (451 ML)
Biosolids Re-used (On site uses)		0%	0%
Infiltration (assessed)	Not measured		
EPA Licences:	Licence No. 3088 Licence to discharge to Doughboy Hollow		
Public Health Incidents		0	0
Environmental Incidents (Cat. 1) (Cat. 2/3)		0 0	0 0
Odour Complaints		2	1
Service Complaints		13	20

Source: DWE Performance Reports 2007/08; 2008/09

Sewerage Systems

Principal aspects of Council's sewerage infrastructure include:-

- Treatment Works: Intermitted Extended Aeration Activated Sludge Plant (20,000 EP Capacity)
- Pumping Stations: 14 No.
- Pumping Capacity: 9.1 ML/d
- Length of Mains: Gravity Reticulation: 117 kms
  Pumping (Rising)Mains: 19 kms
- Total Length of Mains 136 kms

Sewage Treatment:-

The Singleton Sewage Treatment Plant, which discharges into the Hunter River via Doughboy Hollow is licensed by DECCW (EPA) under Licence No 3088. The Licensed discharge point is at the outlet pit, downstream of the maturation pond.

Flow data at the Treatment Plant is summarised in Table 16 below:

Table 11: Annual Flows at Sewage Treatment Plant

Capacity	**20,000 EP**
Flow Categorisation	
-Annual Residential Inflow	1,353 ML/yr
-Annual Non-Residential Inflow	Not separately measured or recorded
Total	**1,353 ML**
-Trade Waste	Not recorded
-Infiltration	0
Average Dry Weather Flow	46.7 L/s
Peak Dry Weather Flow:	91.7 L/s
Peak Wet Weather Flow	12.0 ML/d

Effluent Quality:

Effluent analysis results (mean values) for the Singleton Plant, as presented in Council's 2008/09 Performance Report are shown in Table 17 below.

Table 12: Analysis Results for Singleton (2008 EPA Licence Periods)

Parameter	Singleton STP		
	90%ile limit	100%ile limit	**% Compliant**
pH (units)	-	6.5-8.5	**-**
BOD (mg/L)	10	15	**100**
TSS (mg/L)	15	20	**100**
Ammonia (mg/L)	2	5	**100**
Total N (mg/L)	10	15	**100**
Faecal coliforms (per 100 ml)	200	600	**100**
Oil & Grease (mg/L)	10	15	**100**
Total P (mg/L)	0.3	0.5	**100**

These are very good treatment results.

However, there have been a number of non-compliances recorded by DECCW against the Singleton STP over the last five (5) years and these are detailed in Table **C7: Appendix C: Volume 2.**

The record of non-compliance indicates a requirement for Council to improve the management of the STP, particularly in relation to BOD, TSS & Oil and Grease compliance.

Council is currently (2010) finalising Tenders for the augmentation of the Sewage Treatment Plant. (Therefore, this is not an IWCM Issue).

Trade Waste Management

Council updated its Trade Waste Policy in 2005.

Council also has in place a Community Service Obligation Policy with respect to Liquid Trade Waste Services.

Assets and Asset Management

Council maintains an excellent Asset Management Plan, including an up-to-date Asset Register, which lists the following information:-

- Sewer Pump Stations
- Sewer Rising Mains
- Gravity Sewers
- Sewer Manholes.

The assets are listed with the Water Assets in Table 14 above.

Table 14 indicates that the Sewerage Assets are in fairly poor condition, are aging, but sufficient annual expenditure appears to be directed to renewals and maintenance.

Council's 100 Year Asset Renewal Plan details the works required to bring the sewerage asset base up to good condition.

3.5.5 Current Stormwater Services

Singleton has a fully functional stormwater drainage system. Stormwater discharge is typically to the Hunter River.

Consultants, Sinclair Knight Merz (SKM), were commissioned in 1998 to carryout a review of existing flood studies and to prepare a Development Control Plan (DCP). A pivotal recommendation of SKM's report was that a Flood Plain Management Plan be prepared. This has not been completed.

Council does have a Stormwater Management Plan (2003) which deals primarily with stormwater quality management and environmental aspects.

A "Flood Safe" brochure is also posted on Council's website which advises residents about flooding incidents, the risks involved and some measures which can be implemented to minimise risk. This information brochure is sponsored by the Singleton SES.

Stormwater Levels of Service

Council does not have Levels of Service in place for stormwater services.

Stormwater quality data is also not available - there is no monitoring program in place.

3.6 DEMAND MANAGEMENT

Demand management modelling was carried out as part of this study (utilising the Demand Management software developed by the former Department of Water and Energy).

The modelling is presented in **Appendix D: Volume 2** to this Evaluation Study and includes:

- modelling of a range of demand management measures relevant to the water consumption patterns in Singleton;
- determination of potential water savings which could result from implementation of a range of measures.

The principal conclusions of the modelling are:

- Water consumption over the past 6 years has varied from a high of 2,798 ML/y in 2005/06 to a low of 1940 ML/y in 2007/08, with an average over that time of 2,369 ML/y.
- The average annual water production (water treated) since 1991/92, has been 2,981 ML;
- Unaccounted for water (UFW) since 2003/04 has averaged 8.0%. System losses in 2008/09 were approximately 6.7%. This is a reasonable water loss and reflects the good condition of the supply system. It would be reasonable to aim to reduce this water loss to less than 5% by the implementation of an effective water loss reduction program
- Residential water consumption is relatively high by national standards at 793 L/per residential property per day or 255 L/person/d (2007/08). Approximately 40% of this water is used outside the home (lawns, gardens, pools etc)
- The peak to average day usage ratio is 2.4 (2008/09), which is similar to similarly sized cities throughout NSW

- Council's water usage charges are based on an inclining block tariff, with the first 450 kL provided at $0.89/kL. Thereafter, the charge is $1.66/kL (2009/10 charges).
- These charges are low in comparison with other regional cities and towns in NSW. The State wide median consumption charge in 2007/08 was $1.30/kL

The demand management modelling has indicated that:

i) BASIX fixture efficiency with dual reticulation, BASIX fixture efficiency with rainwater use, conservation pricing for residential users and dual reticulation (that is a potable supply and a recycled water supply) for all new residential developments have the greatest benefits in terms of **water savings**.
BASIX fixture efficiency with dual reticulation is shown to yield the highest annual water saving, but the highest utility and community benefit to cost ratios are for conservation pricing for residential customers. Permanent (low level) water saving measures for residential customers also demonstrates high B/C ratios.

ii) Full uptake of the demand management initiatives modelled may deliver significant water savings – up to 590 Ml/year (or a 19.8% reduction) for Scenario 4 initiatives, or 315 Ml/year (or a 10.6% reduction) for Scenario 3 initiatives.

iii) The results indicate that the Water Treatment Plant will have sufficient capacity beyond 2040, even under the "do nothing" Baseline case.

iv) The Sewage Treatment Plant has effectively reached capacity. Council has resolved to augment the Plant's capacity in 2010/11 (from the existing nominal capacity of 20,000 EP to 27,500 EP) Implementation of Scenarios 3 or 4 demand management initiatives is expected to extend the life of the plant (in terms of capacity) beyond 2032/33.

Council has a commitment to water conservation and has implemented some initiatives which, based on the general reduction in water consumption since 2003/04, have been quite successful.

Preliminary water use targets have been developed (in accordance with adoption and implementation of modelled Option 3 initiatives), specifically:

	Year				
	2015 (ML)	2020 (ML)	2025 (ML)	2030 (ML)	2035 (ML)
Target Savings	**150/yr**	**243/yr**	**311/yr**	**404/yr**	**480/yr**
Target Demands	2953	2986	3033	3092	3159

3.7 CLIMATE CHANGE ASPECTS – SECURE YIELD

A 2008 Report on NSW climate change impacts, *Future Climate and Runoff Projections (to 2030) for New South Wales and Australian Capital Territory,* provides the first detailed projections of the impacts of climate change on runoff and water availability across New South Wales.

The Report concludes:

- There is considerable uncertainty in the modelling of rainfall response to global warming in NSW and ACT
- 9 out of 15 of the global climate models (GCM's) show a decrease in the mean annual rainfall
- Winter rainfalls are likely to be lower across the entire State
- There is less likelihood of reductions in future summer rainfalls (only 5 out of 15 GCM's indicate a reduction)
- The median (or best) estimate indicates that mean future rainfall in NSW in 2030 relative to 1990 will be lower by 0 to 20% in the southern parts
- Averaged across all regions, the median estimate is a 5% decrease in mean annual rainfall.

Impacts Specific to Singleton

The Tom Farrell Institute for the Environment has undertaken climate change modelling specific to the Hunter, Lower North Coast and Central Coast regions (utilising the CSIRO GCM predictions for NSW). (*Source: Hunter & Central Coast Regional Environmental Management Strategy).*

For Singleton the projections indicate:

- very little change in rainfall patterns, except for a statistically significant increase in autumn rainfall;
- an increase in extreme heat days;
- general increases in mean daily temperatures, with autumn and winter increases the most significant;
- a significant increase in the average minimum temperature of approximately 4.2◦C in the western zone (including Singleton Shire) for the period 2020-2080;
- minimal changes in average summer maximum temperatures.

Table 18 shows the CSIRO's modelled predictions for the Hunter-Central Rivers catchment.

Council will need to consider these possible predictions in planning the future needs for both water supply and sewerage.

It is understood that Council will be required to assess the "secure yield" of its water source (Glennies Creek Dam) in the next year or two (pers.comm: Brian Carter).

Table 13: Current and Projected Climate Change in the Hunter-Central Rivers Catchment

	Present (1990)	Projected Change	
		2030	2070
Temperature			
Average	Paterson: 17-32 ^{0}C Scone: 17-29 ^{0}C Williamtown:18-29 ^{0}C	+ 0.2 +1.6 ^{0}C	+0.7-+4.8 ^{0}C
No. Days below O ^{0}C	Scone: 5	Scone: 1-4	Scone: 0-2
No. Days above 35◦C	Scone: 17	Scone: 19-32	Scone: 24-78
No. Days above 40◦C	Scone: 1	Scone: 1-4	Scone: 2-23
Rainfall			
Annual Average	Paterson: 928 mm Scone: 647 mm Williamtown: 1,120 mm	-7-+7%	-20-+20%
Extreme Rainfall		-10-+12%	-7-+10%
Evaporation		+1-+13%	+2-+40%
No. Droughts per decade	3	1-5	1-9
Extreme Winds		-5-+8%	-16-+24%
No. Fire Days	Williamtown: 16	Williamtown: 17-19	Williamtown: 18-24

(Source: CSIRO – Climate Change in the Hunter-Central Rivers Catchment)

4. IWCM TARGETS, OBLIGATIONS, RESPONSIBILITIES AND REQUIREMENTS

There are a number of targets, obligations, responsibilities and requirements which a Local Water Utility is required to meet.

Targets are requirements that must be met by the utility, either for health, levels of service or environmental reasons and non-compliances are assigned as IWCM Issues which need to be addressed.

A detailed discussion of all such requirements is provided in **Volume 2: Appendix C**.

The externalities presented in Appendix C include:

- Australian Drinking Water Guidelines
- Water Entitlements
- Licences
- Contract Obligations
- Levels of Service
- Legislative Requirements
- Performance Reporting and Best Practice Compliance
- Management and Business Plans, and
- Other Compliance Aspects.

A summary is provided below and the resulting IWCM Issues are discussed in Section 6.

4.1 DRINKING WATER QUALITY

The Australian Drinking Water Guidelines (ADWG 2004) provide the generally accepted criteria for drinking water quality standards for LWUs.

Singleton Council has adopted the ADWG for its water quality standards, to ensure that the water reaching all consumers is safe to drink.

NSW Health analysis results for Singleton (575 distinct samples) and Jerrys Plains (112 samples) for the period 1 July 2005 to 30 June 2009 are summarised in Table 14 below:

Table 14: NSW Health Analysis Results

Period	Parameter	Compliance (Meeting Guideline Values)	
		Singleton	**Jerrys Plains**
July 2005 – June 2009	Total Coliforms	96%	99%
	E. coli	100%	100%
	pH	100%	100%
	Turbidity	100%	100%
	TDS	100%	100%
	Chemical	100%	100%
	Except		
	Lead	-	75%
	Fluoride (daily)	86%	NA
	Fluoride (weekly)	91%	NA
	Fluoride (Field Result)	NA	NA

(Source: NSW Health Drinking Water Database)

In terms of overall performance over the four (4) years, the following are the non-compliances recorded:

Singleton:	Total Coliforms:	23 exceptions
	Fluoride daily:	142 exceptions
	Fluoride weekly:	39 exceptions
Jerrys Plains:	Total coliforms:	1 exception
	Lead:	2 exceptions

The non-compliances for Singleton related to minor problems with sampling techniques for fluoride, which have now been corrected.

The Drinking Water Guidelines have recently been revised to now incorporate a risk based framework for the Management of Drinking Water Quality.

It is expected that this will become the standard for LWUs to implement in the future.

A key requirement of the Framework is the preparation of a Drinking Water Quality Management Plan. Singleton Shire is planning to develop a Management Plan in 2011.

The non-compliances for Singleton have been confirmed as relating to minor problems with sampling techniques, which have since been corrected.

4.2 WATER ENTITLEMENTS

Glennies Creek Dam is the source of Singleton's water supply. The Dam is located 25 kilometres to the north of Singleton, 39 kilometres upstream of the junction of Glennies Creek with the Hunter River.

The full supply level capacity of the Dam is 283 GL. There are 1405 licenses in the Glennies/Glenbawn Dam system, totalling 247.35 GL in entitlements. Council holds entitlements of:

- Town supply: 5,032 ML/a
- High security: 1,988 ML/a
- General security: 24 ML/a

The town entitlements amount to 2.8% of the existing total entitlements.

Council also holds 4,050 ML/a in unused groundwater entitlements, with a total of 9,131 ML/a (excluding the Mt Thorley Mine Allocation and the Mushroom Composting Licence).

The Town Entitlements total 5,032 ML/year (5,000 ML/yr for Singleton)

Mt Thorley water has been built-up over the years from a number of sources - 24 ML of General Security was transferred from existing town Parks usage along with 25 ML of High Security Water.

5 ML of High Security Domestic and Stock water was purchased when the industrial land was bought in 1980.

The 1988 ML High Security allocation is an aggregation of the Mt Thorley Water Supply Joint Venture partnership allocations, including Council, but the MT industrial area reticulation is now supplied from town and not from the Joint Venture. This is the principal licence Council uses.

Potable water consumption in Singleton (under the Town water entitlement) has averaged 2,705 ML/year over the past five (5) years and 2,842 ML/year over the past ten (10) years. Potable consumption in 2008 was 2,349 ML/year.

There has been a general reduction in water consumption over the last ten (10) years, despite population growth in excess of 1.3% pa over the same period.

Council is currently using less than half its annual entitlement.

Peak Town usage over the past 5 years has been 2,800 ML/a. Even with a 50% reduction in allocations, Council holds sufficient entitlements for the predicted consumption in 30 years time (modelled consumption in 2040 varies from 2852 ML/a to 3786 ML/s, depending on the success of water use reduction initiatives).

In summary, Council holds entitlements of 5,032 ML/a as Town Supply Entitlements, 1, 988 ML/a of High Security Entitlements and 24 ML/a of General Security Entitlements.

There are currently no reduced (drought induced) allocations of the Town supply entitlements.

4.3 LICENCE COMPLIANCE

The **Singleton Sewage Treatment Plant** (located at Army Camp Road, Singleton) is required to operate in accordance with DECCW (EPA) Licence No. 3088.

The Licence Discharge Point is at the outlet pit downstream of the Maturation Pond, discharging to Doughboy Hollow.

Details of the Licence conditions are presented in **Volume 2: Appendix C**, Section 4C.

There have been a number of non-compliances recorded by DECCW against the Singleton STP over the last five (5) years and these are detailed below:

Table 15: STP Non-compliances

Year	Non-compliant	Details	Comments
2008	BOD: Load limit	Exceeded limit: once	
	TSS: 50%ile limit	Exceeded limit: twice	Due to algae in Maturation Lagoon
	BOD:50%ile, 90%ile(?), 100%ile limits	Exceeded limit: once	Not unusual for STP's, where sampling is grab sample once per month
	Oil and Grease: 80%ile & 100%ile limits	Exceeded limit: once	Not unusual for STP's, where sampling is grab sample once per month
	Total N; 80%ile and 100% limits	Exceeded limit: once	Not unusual for STP's, where sampling is grab sample once per month
2007	Total P: Load limit	Exceeded limit: once	
	Total P: 80%ile limit	Exceeded limit: five times	There are no facilities (ie. No chemical dosing)
	TSS: 100%ile limit	Exceeded limit: once	
2005	Oil and Grease: 100%ile limit	Exceeded limit: once	
	Total P: 80%ile limit	Exceeded limit: three times	Council's existing STP does not have

Year	Non-compliant	Details	Comments
			P removal capability. This will be addressed with the new Plant which is being designed for P removal.
	Sample Collection	Exceeded 4 week frequency for samples: once	
2004	Oil and Grease: 100%ile limit	Exceeded limit: once	
	PRP:	Requirements not completed by due date	The PRP no longer applies. Necessary works implemented

The record of non-compliance indicates a requirement for Council to improve the management of the STP, particularly in relation to compliance with BOD, TSS & Oil and Grease limits.

Council is currently (2010) finalising Tenders for the augmentation of the Sewage Treatment Plant (Therefore, this is not an IWCM Issue.)

Trade Waste

There are no issues with Trade Waste Management. Council's Trade Waste Policy has been fully and successfully implemented.

4.4 CONTRACTS

The Contract obligations Council have are:

- Water supply to Jerrys Plains Village is sourced separately from the Macgen – Bayswater Power Station. Council's obligation is to manage the supply to Jerrys Plains, including water quality monitoring as required by NSW Health.
- Singleton Army Camp: Bulk water supply and sewage treatment (Pay for Service Contract).
- Mount Thorley Joint Venture: Contract to manage a river water pumping scheme for three (3) open cut coal mines.
- Abattoir: Contract to supply water.

Council also takes the responsibility for quality compliance in relation to various mines via water carting contracts.

All the above Contract Obligations are being met.

Given that Council is currently assessing Tenders for augmentation of the STP, the subsequent Contract will become a Contract Obligation in 2010 and beyond.

4.5 LEVELS OF SERVICE

The current Levels of Service (LOS) are somewhat dated, as they were developed as part of the 1998/99 Strategic Business Planning Process.

These LOS are being reviewed and updated by Council as part of a review of the dated Strategic Business Plans. It is anticipated that the revised SBPs will be available by mid 2010.The existing LOS are reproduced below because they are the current service commitments by Council to its customers.

The Singleton Strategic Business Plan for Water Supply and Sewerage (1998/99) details the agreed Levels of Service. These Levels of Service are presented in Tables 4 and 5 below.

Table 16: Water Supply: Levels of Service

Description	Unit	1998/99 Target Levels of Service	Achievement/Comments
Availability of Supply			
Normal Quantity Available			
Domestic Peak day	Litres/tenement/day	4,000	Yes – currently 1900L/tenement/day
Domestic Annual	Kilolitres/tenement/year	250-350 (60%) 500 (Average)	Yes – domestic annual usage: 290 kL/tenement /year
Peak to Average consumption ratio	-	3.9	
Fire Fighting			
Compliance with Building Code of Australia and NSW Fire Brigade requirements	% area served	95% Target: Increased standard in CBD ie. 2x22L/s	98% achieved
Pressure			
Minimum pressure when conveying 0.15 L/s/tenement	Metres head	12m absolute 20m desirable	100%
Maximum static pressure	Metres head	120	100%

Description	Unit	1998/99 Target Levels of Service	Achievement/Comments
Consumption Restrictions in Droughts			
In accordance with Council's Drought Management Plan	% normal usage	In accordance with targets set in Drought Plan	1 occurrence in last 12 years
Supply Interruptions to Consumers			
Temporary supplies during planned interruptions			
Planned:			
- Notice given to domestic customers	days	>1	95%
- Notice given to commercial customers	days	>1	95%
Notice given to industrial customers	days	>1	95%
-Maximum duration of interruption	hours	<6	100%
-Number of interruptions	number per customer per year	<1 (excl. system break downs or system development (eg connecting new subdivisions etc)	Estimated at 90% achievement (due to subdivisional activity)
Unplanned:			
Target is for less than 30 houses to be affected per failure.			
- Maximum duration	hours	4	NA
- Maximum number per two years	times	4	NA
Total number of interruptions	number per year per 1000 connections	10	NA

Description	Unit	1998/99 Target Levels of Service	Achievement/Comments
Response Times			
(Defined as maximum time to have staff onsite or to investigate problem or answer inquiry)			
Supply Failure			
During working hours	minutes	30	100%
Out of working hours	minutes	30	100%
Minor Problems and general Inquiries			
Oral inquiry		30 minutes to 1 day	90% (estimate)
Written inquiry		10 days	95% (estimate)
Note: Times apply for 95% of occasions			
Service Provided			
Time to provide an individual connection to water supply serviced area (90% of times)	working days	5	85%
Water Quality			
Microbiological Quality			
Coliforms	number per 100 mL	0	96% (2005 – 2009)
Faecal Coliforms	number per 100 mL	0	100%
Current long term microbiological compliance (thermo tolerant coliforms)	% complying	100	98%
Note: In accordance with the 1996 NHMRC guidelines			
Physical Results			
pH	-	6.5-8.5	Yes
Colour	True Colour Units	<5	Yes

Turbidity	Nephelometric Turbidity Units	<0.2	95%
Taste and Odour	Complaints per 1000 customers per year	5	NA
Dirty Water	Complaints per 1000 customers per year	5	NA
Aesthetics, Disinfection			
Chemical – Inorganic Results			
Iron	mg/L	<0.03	100%
Manganese	mg/L	<0.01	75%

Table 17: Sewerage: Levels of Service

Description	**Unit**	**1998/99 Target Levels of Service**	**Achievement/Comments**
Availability of Service			
Extent of area serviced	serviced area	Target is to provide appropriate sewer services to the maximum extent possible	Extensions to services being allowed for in new SBP
Frequency of System Failures			
Category One			
Failure due to rainfall and deficient capacity	number/year	<2 per year	100% compliance
Category Two			
Failures due to pump or other breakdown include power failure	number/year	<2 per year	100% compliance
Category Three			
Failures due to blockages	number/year	150 per year	90% compliance (estimate)
Response Times to System Failure			
(Defined as the maximum time to have staff onsite to commence rectification after notification)			

Description	Unit	1998/99 Target Levels of Service	Achievement/Comments
Priority One			
(Major spill, significant environmental or health impact, or affecting large number of consumers i.e. a major main)			
- Response time during working hours:	minutes	30	100% compliance
- Response time after hours:	minutes	30	100% compliance
Priority Two			
(Moderate spill, some environmental or health impact, or affecting small number of consumers i.e. other mains)			
- Response time during working hours:	minutes	30	100% compliance
- Response time after hours:	minutes	30	100% compliance
Priority Three:			
(Minor spill, little environmental health impact, or affecting a couple of consumers)			
-Response time during working hours:	minutes	30	60% compliance
- Response time after hours:	minutes	60+ (depending on nature of problem)	60% compliance
Response Times to General or Minor Customer Complaints and Inquiries (1)			
- Written complaints	day	10	95% (estimate)
- Oral complaints	day	30 minutes to 1 day (depending on nature)	90% (estimate)
Note: Times for 95% of complaints			
Odour Complaints			
- Treatment Works	number/year	<4	100% compliance

- Pumping Stations	number/year	<12				100% compliance
Discharge Licence Conditions	(Percentiles)	*50%*	*80%*	*90%*	*100%*	
-Quantity	kL/day				6,000	100% compliance
- Biochemical Oxygen Demand	mg/L	20	-	30	35	98% (2004 – 2008)
- Non Filterable Residue	mg/L	20	-	30	35	94% (2004 – 2008)
- Oil and Grease	mg/L				10	94% (2004 – 2008)
- pH					6-9	100% (2004 – 2008)
- Phosphorus	mg/L				10	-
- Total Nitrogen	mg/L	-	15	-	-	98% (2004 – 2008)
- Faecal Coliforms (geometric mean)	No./100 ML				No limit	-

Council is generally complying with these Levels of Service.

It should be noted that Council is currently updating its Strategic Business Plan for Water Supply and Sewerage. The new SBP will be presented to Council in the second half of 2010.

Council does not have Levels of Service for Stormwater Services.

Council has in place:

- An *Urban Stormwater Management Plan* (2003);
- The *Singleton Floodplain Management Development Control Plan* (DCP) which incorporates a plan of areas affected by flooding and recommends that Council prepare an actual Floodplain Management Plan, which has not been completed.
- A community education program on Stormwater Quality which in 2008/09 involved:
    - program at three local schools
    - stencilling of drains throughout Singleton with " a drain is just for rain";
    - distribution of educational posters, brochures and leaflets to the community;
    - exhibitions in shopping centres;
    - local media campaigns.

4.6 PERFORMANCE

Performance results and comparisons with state wide median performances, for 2007/08 and 2008/09 are presented in Tables 20 and 21 below.

Table 18: Overall Water Supply System Performance

Item	2007/08	2008/09	2008/09 State Median
Number of connected properties	6,250	6,300	-
Residential assessments (%)	89	88	92
Renewals expenditure (% of current replacement cost)	0	0.1	0.1
Residential Water usage charge (c/kL)	83	89	130
Residential access charge per assessment ($)	180	180	150
Typical residential bill per assessment ($)	355	419	430
Urban population without reticulated water supply (%)	2.9%	2.9%	0.8%
Water quality complaints per 1,000 properties	2	1	3
Water service complaints per 1,000 properties	30	6	6
Average duration of service interruption (min)	120	120	167
Number of water main breaks per 100 km of water main	12	12	10
Average annual residential water supplied (Inland) kL/property)	211	269	150
Real losses/Leakage (L/connection/d)	120	70	60
Energy consumption per ML (kW hr)	-	-	640
Residential revenue from usage charges (% of residential bill)	49	57	73
OMA per 100 km of main ($'000)	815	1,050	1,070
OMA per property ($)	371	432	330
OMA per kilolitre (cents)	100	101	111
Management cost per property ($)	109	135	127
Treatment cost per property ($)	95	130	35
Pumping cost per property ($)	52	56	29
Energy cost per property ($)	12	11	13
Capital expenditure per property ($)	213	130	266

Table 19: Overall Sewerage System Performance

Item	*2007/08*	*2008/09*	*2008/09 State Median*
Number of connected properties	5,310	5,340	-
Non residential & trade waste (% of total volume)	-	-	16
Volume of sewage collected (ML)	1,280	1,360	-
Volume of sewage treated (kL per property)	241	254	230
Urban properties without reticulated sewerage (%)	6.3	3.4	3.9
Typical Residential Bill ($ per assessment)	373	387	470
Operating cost ($ per property)	247	275	340
Management cost ($ per property)	80	85	123
Treatment cost ($ per property)	77	67	108
Recycled water (% of effluent recycled)	33	33	10
Biosolids reuse (%)	-	-	100
Sewer Chokes/Collapses (per 100km of main)	18	41	53
Sewer Overflows (per 100km of main)	10	10	12
Odour Complaints (per 1000 properties)	0.4	0.2	0.4
Service Complaints (per 1000 properties)	9	13	12
Sewage treated that was compliant with Licence (%)	100	100	100
Capital expenditure per property ($)	180	130	248
Energy cost per property ($)	14	16	20

Although performance has been generally good on a State wide basis, there are a number of areas which require improvement and these are listed as Issues in Section 6.

4.7 RECYCLING/REUSE

There is no recycling of reclaimed water within the Town, although approximately 33% is reused by farmers around the discharge to Doughboy Hollow.

Council intends to develop a Water Recycling Policy by mid 2012.

4.8 BIOLSOLIDS REUSE

Currently all sludge from the Sewage Treatment Plant (STP) is stabilised in lagoons, dried and disposed to landfill.

A Report by Parsons Brinckerhoff Australia (2009) has recommended that, as part of the planned STP augmentation, sludge handling facilities be developed to achieve EPA Grade B standard - to enable reuse of biosolids on land. Council is currently planning the augmentation works for commencement in 2011.

5. DATA GAPS

Data gaps are identified where there is no data; insufficient data; or unreliable data, to the extent that an assessment of Council's compliance with Targets and/or Obligations is not possible.

A number of data gaps have been identified as part of this Evaluation Study.

These are listed below along with an assessment of their importance (High (H), Medium (M) and Low (L)) and recommendations for Council to implement to address them.

	Reference	Data Gap	Ranking (H, M or L)	Recommended Action
1.	Page A38	Outdated Strategic Business Plan (1998)	H	Council is currently updating the SBP. Completion & sign off by Council late 2010
2.	Page A43	Quantified Water losses have not been assessed	M	Investigation & report on locations & extent of water losses, leading to a planned rectification program
3.	Page A44	Peak demands by user category are not known	M	Investigate & develop a data base to capture information
4.	Page A44	Water usage on public parks and open space areas has not been recorded	M	Investigate & report on strategy to reduce usage
5.	Page A48	Assessment details of sewerage system infiltration are not available	H	Investigate and develop a rectification program of sewer replacement or relining
6.	Page A50	Update required of 2005 Trade Waste Policy in accordance with the revised Guidelines issued by the NSW Office of Water (2009)	L	To be completed in 2011/12
7.	Page A51	Details of trade waste discharges to the sewerage system have not been assessed	M	Develop data base to capture information
8.	Page A51	Update of the 2003 Stormwater Management Plan is required	M	To be completed in 2011/12 – not a LWU responsibility. Refer this matter to Council
9.	Page A52	Floodplain Management Plan has	M	To be completed in 2011/12 – not a

	Reference	Data Gap	Ranking (H, M or L)	Recommended Action
		not been completed		LWU responsibility. Refer this matter to Council
10.	Page A52	No Council endorsed Levels of Service for stormwater.	M	Refer to Council for attention
11.	Page C12	Current updated Levels of Service for water supply and sewerage	M	As above, Council has committed to a review and update of the Strategic Business Plan in 2010
12.	Page C25	Performance Report gaps relating to: <u>Sewerage</u> - Biosolids reuse - energy consumption per ML - renewable energy consumption - net greenhouse gas emissions - loan payments per property	M	Council has committed to report on these items for 2009/10
13.	Page C27	Performance Report gaps relating to: <u>Water Supply</u> - energy consumption per ML - renewable energy consumption - net greenhouse gas emissions	M	Council has committed to report on these items for 2009/10

6. CONSIDERATION OF ISSUES

6.1 GENERAL

The principal elements of the IWCM Evaluation Study are the identification and consideration of targets/obligations and information/data gaps leading to the determination of key water cycle issues, which are then reviewed against Council's existing actions, programs and / or commitments [under the Business as Usual scenario].

The identification of Issues has been discussed in Sections 1 and 2 (as well as in the Appendices in Volume 2) and the Issues have been verified and reviewed by the Project Reference Group (PRG), and the Project Steering Committee.

The key aspect of the IWCM process is to identify solutions to urban water servicing problems or Issues.

Issues are defined as any non-compliance with a utility's urban water service targets, both now and within the 30 year planning horizon.

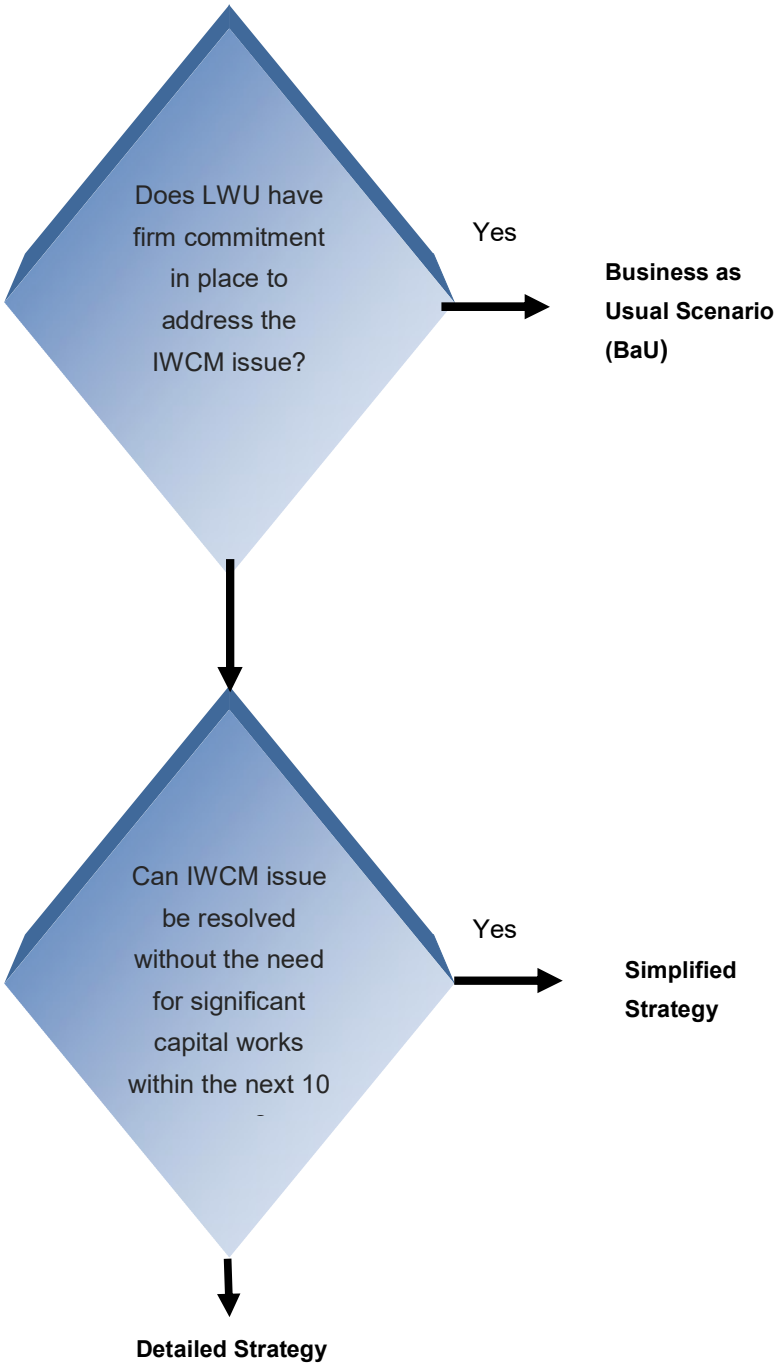
During the processes of defining targets, assessing compliance and identifying issues, two categories of ISSUES typically arise – namely, specific IWCM Issues and also, non-urban Water Service Issues.

The IWCM is interested specifically in the IWCM Urban Issues.

Other, non-urban Issues need to be referred to the relevant authorities and agencies for their consideration.

For completeness, the non-urban Issues identified during the Singleton IWCM Evaluation Study are also listed here with the Department / Agency to which they should be referred.

The diagram below represents the methodology undertaken to determine the IWCM Evaluation actions/recommendations.



6.2 REFERENCE GROUP CONSIDERATION OF ISSUES

To assist in verification of the Issues, and to discuss development of possible solutions and/or actions, Council formed a Project Reference Group (PRG), involving relevant Council staff, Councillors and the community. This Group was formed in addition to the Steering Committee.

A PRG Workshop was held in Singleton on 3 June 2010, at which the issues listed in this Report were presented and discussed.

The Minutes of the PRG Meeting are appended as **Appendix G in volume 1.**

The issues were categorised by the Group as being either IWCM Issues or Non-IWCM Issues (that is, outside the IWCM processes and, therefore, to be addressed by other sections of Council (not the water and sewerage section) and/or external agencies).

Each of the Issues relevant to the IWCM process was also considered in terms of the Business as Usual scenario.

6.3 SUMMARY OF ISSUES

The Issues identified by the Study and verified by the PRG and the Steering Committee are presented in Table 22 below.

Table 20: IWCM Issues

	Issue	**Recommended Actions/Comments**	**Required Strategy**
1.	Catchment Perspective: Population Growth Increasing customer base resulting in increases in water consumption & wastewater generation over the next 30 years.	Extend planning beyond 30 years. Consider sensitivity scenarios	Simplified
2.	Geology & Soils Potential for urban salinity with potential impacts on water & sewerage infrastructure.	Survey & investigation required	Simplified
3.	Geology & Soils Potential for groundwater recharge and/or pollution from septic tank systems and leaking wastewater lagoons.		BaU
4.	Sewerage to Villages Four Villages (Broke, Jerrys Plains, Bulga & Camberwell are not sewered.	Studies complete – awaiting Council decision	Simplified
5.	Levels of Service Relevance of current Levels of Service (framed in 1998). Implementation of industry standard LOSs	Council to adopt new Levels of Service	Simplified

6.	Urban Water Systems Non-compliances with DECCW (EPA) STP Licence.	New STP to be constructed – approved by Council & budgeted for Non-compliances are insignificant	BaU
7.	Trade Waste Policy Current Trade Waste Policy not in accordance with revised (2009) Guidelines	Policy to be updated	Simplified
8.	Sewerage Asset Condition Condition of sewerage infrastructure	Financial management plan has been adopted by Council which addresses sewerage infrastructure replacement/refurbishment. Asset condition assessments completed. Council to provide appropriate budget.	BaU
9.	Climate Change Aspects Council endorsed strategy for managing potential climate change impacts. Assessment of "secure yield" of existing water source (Glennies Creek Dam).	Ensure Drought Plan actions implemented and Demand management targets are met. Monitor "secure yield" studies	Simplified
10.	Water Quality Non-compliance with total coliforms and fluoride concentrations in the Singleton water supply.	Corrective actions taken – sampling methods enhanced	BaU
11.	Water Quality Non-compliances with lead concentrations in the Jerrys Plains water supply.	No longer an issue	BaU
12.	Water Quality Development of a Water Quality Management Plan in accordance with the Australian Water Quality Guidelines.	Water Quality Plan being drafted and planned completion by December 2010	BaU
13.	TBL Performance Reports Water Supply	Singleton applying a continuous improvement approach to performance	BaU

	- customer interruption frequencies - average annual water supplied to customers - water losses - residential revenue from usage charges TBL Performance Reports <u>Sewerage</u> - average length interruptions		

Table 21: Issues Raised by PRG

	Issue	**Recommended Action/Comments**	**Required Strategy**
14.	Use of Town water supply by new/large industries	Council can & does require new industries to purchase water entitlements on the market	BaU
15.	Collection of Source Water • rain/stormwater • ground water - incentives by Council	Incentives are currently provided by Council to install rainwater tanks	BaU
16.	Aquifer recharge in Valley for wetlands.	To be considered when action plan developed under IWCM Strategy	Simplified
17.	Water restrictions – uniformity required & restrictions tied to water licences of other users	Drought Plan makes full provision for implementation of water restrictions	BaU

Table 22: Non Urban Water Servicing Issues

	Item	*Issue Description*	*Relevant Department/Agency for Referral*
1.	**Catchment Perspective**: Geology & Soils	Potential gully & stream erosion	Refer to CMA & Singleton Council
2.	**Catchment Perspective**: Land Use	• High current & future water consumption by the mining industry, with potential demand impacts on the water resource. • Non-compliances with Licences issued by DECCW under the Protection of the Environment Act, 1997.	Refer to State Government. Need to consider the impact of discharges to the River Refer to DECCW & Singleton Council
3.	**Catchment Perspective**: Geology Soils	Potential gully erosion	Singleton Council / Hunter-Central Rivers CMA
4.	**Catchment Perspective**: Land Use	Vegetation management processes and practices in Singleton LGA (Council issue)	Singleton Council / Hunter – Central Rivers CMA

The following were identified by the PRG as the major issues facing the Singleton LWU:

- Security of Water Supply in the face of potential impacts of climate change;
- Age & condition of existing sewerage infrastructure
- Potential servicing impacts of growth in the Shire.

6.4 RECOMMENDED ACTIONS

Seventeen (17) IWCM Urban Issues have been identified, of which ten (10) have been assessed as being addressed as part of Business as Usual (BaU).

Nine (9) of the issues will require Simplified Scenario strategies.

Four (4) non-urban Water Related Issues have been identified for referral to the Council, State Government and Hunter-Central Rivers CMA.

7. RECOMMENDATIONS

4. That Council receive and endorse this Integrated Water Cycle Management Evaluation Study and refer it to the NSW Office of Water (Mr Ian Burton, Regional Manager, Water Utilities Branch) for approval;

5. That Council resolve to proceed to develop strategies to address the unresolved Issues identified in Table 22 & 23 via a **Simplified Scenario Strategy.**

6. That Council resolve to complete all identified elements prior to the next IWCM review in 2016.