Joint IWCM Evaluation Study

Job number A060

Section 4A

Technical Note 4A

Blayney Shire Council Data and System Mapping

This technical note describes the water cycle context of Blayney Shire Council (BSC). Central Tablelands Water's (CTW) operates water services within this Shire. The catchment, water resources, urban environment, sewerage scheme and stormwater systems are examined. The purpose of this technical note is to describe the study area context and identify data gaps and issues.

1 Blayney Shire Council Water Context

1.1 Overview

The Blayney Local Government Area (LGA) is bounded to the north by Orange City, to the northwest by Cabonne Shire, to the south and southwest by Cowra Shire and to the east and southeast by Bathurst Regional Council. The Blayney Shire covers an area of 1,618 km^2.

2 Catchment

2.1 Introduction

Virtually the whole of the Blayney LGA is drained by the upper reaches of the Belubula River and its tributaries. The headwaters are in undulating country to the north of the Council boundary, in a series of low hills generally along its eastern edge and in the Stringbark and bugs ridges to the south. Most of these headwaters are at elevations between 900 m and 1,100 m.

From above Blayney the Belubula flows in a south-westerly direction towards the Lachlan River, being joined below Carcoar by its major tributary within the Council area, Coombing Creek, which drains most of the south-eastern part of the Council's territory. The major tributaries in the west are Cowriga Creek, Flyers Creek and the Mandurama Ponds. In its upper reaches the Belubula during periods of high flows is largely confined to its stream channel, and its path takes it through undulating country interspersed with only limited areas of alluvial floodplain. Near Blayney the plain is about 500 m wide but it narrows again downstream of the town (BCO Land Use Strategy, 2006).

Blayney Township is situated approximately 13 km upstream of Carcoar Dam. The catchment for Carcoar Dam is 228 km^2 (21,607 ha). Carcoar Dam provides regular river flows to irrigators downstream and holds 36,400 ML of water.

2.2 Principal Landscape Characteristics

2.2.1 Land Form

The Soil Conservation Service of NSW has divided topographical classes into four classes as shown in Table 1.

Table 1: Topographical Classes

Topography	Slope Limits
Mostly flat	Less than 3 per cent
Undulating	3 to 10 per cent
Hilly	10 to 30 per cent
Rugged	Greater than 30 per cent

Source: Soil Conservation Service of NSW, 1976.

The Blayney district has a general altitude of 915 m, but falls to about 550 m in the southernmost region. The topography map as shown in Figure 10, in Appendix A, shows that about half of the district would be classed as undulating. About 5 per cent is mostly flat, and virtually all of this is in the Lyndhurst area. This northernmost section is influenced by the Orange Plateau, which has a general altitude of about 945 m. The plateau effect dissipates in a southerly direction and gives way to a series of folds and faults.

A band of rugged to mountainous country (greater than 30 per cent) occurs along a line running south from Beneree almost to Mandurama, and west to the district boundary and beyond. This area is largely unused and remains under natural timber.

The southern half of the district, in Bathurst Regional Council, is influenced by the Oberon Plateau on the eastern side. The slopes are roughly divided between the two classes, undulating and hilly.

The district is well-drained, with an extensive network of creeks and tributaries of the Belubula River in the north, and the Abercrombie and Campbell's Rivers in the south (Soil Conservation Service of NSW, 1976).

Sixty percent of the district has soils which are being eroded, most suffering moderate gully erosion, although two-thirds of the district is flat to undulating. Most of the remaining area is rolling to hilly terrain that has formed on granites and more particularly andesite. As this volcanic rock possessed a column joint pattern, it creates rugged upstanding topography evidenced at Coombing Gorge. Mount Macquarie (1,200 m) dominates this area as the country falls away to the lowest point in the Shire of 500 m at Burnt Yards (BSC SOE Report, 2005-06).

2.2.2 Soils

The Blayney district is located within a large geological province known as the Central and Southern Highlands Fold Belt. The geology of this fold belt has been made complex by a series of orogenies (the process of mountain formation, particularly by folding and thrusting), periods of granitic intrusion and a long history of volcanic activity.

At the risk of over-generalisation, red basalt soils tend to dominate the tops of the hills and lighter granite soils the valley floors. As the granite formed from lava that cooled slowly, it breaks up into a large grained soil, which is easily leached and holds little moisture in dry periods. Alternatively, the red basalt soils are more clayey and can become waterlogged. Both are slightly acidic and form solidic and podzolidic soils respectively. Lime is spread by farmers to neutralise the acidity and super phosphate utilised to replace leached nutrients (BSC SOE Report, 2005-06).

The dominant soil types in Blayney LGA are Red Earth and Red Brown Earths. Red Earths occur on well drained slopes and crests. They tend to have low to medium nutrient status and are used for native and improved pastures. Red Brown Earths have low chemical fertility, yet are successfully used for grazing and cropping with fertiliser application.

The northern section of the Blayney LGA is dominated by Krasnozems which are suitable for cultivation. The balance of the soils are Earth Sandy, Shallow Sands and Soloths that are relatively unattractive for cultivation by virtue of their inherent characteristics including low clay content, low fertility and acidic nature (BCO Land Use Strategy, 2006).

The soils map in Figure 12, in Appendix B shows the general distribution of soils within Blayney district in terms of the dominance of four great soil groups, four sub-groups and one soil complex. These soils and a description of their groundwater related properties are detailed in Table 27 in Appendix B (Soil Conservation Service of NSW, 1976).

2.2.3 Vegetation

Originally the Blayney district was timbered land occupied by eucalypt forests in the moister areas extending into woodlands of decreasing height and density westward towards Canowindra. Large areas have been cleared for farming and grazing, especially in the woodland areas of more favourable topography.

The native vegetation remaining is conserved, generally within private ownership. Typically, on the undulating and hilly grazing lands, eucalypts are left scattered in the landscape or occasionally left as small woodland formations. This gives the typically Australian character to the landscape. Windbreaks of exotic species or cultural planting around farmhouses modify this character occasionally (BSC SOE Report, 2005-06).

Blayney Shire is within two catchments, Lachlan and Central West catchments. In May 2006, the then Department of Environment and Conservation has undertaken a study in both catchments to identify the condition of native vegetation across the catchments.

The Lachlan catchment study estimated that around 40% of the Lachlan CMA was vegetated to some degree and 60% has been cleared. Cleared land is defined as 'an area of recent cultivation or development'. The Central West catchment study has estimated that around 38% of the Central West CMA was vegetated to some degree and 62% has been cleared (BCO Land Use Strategy 2006).

There are no National Parks in the Shire. The public reserves are confined to small areas such as Junction Reefs Reserve, commons and stock routes.

Mount Macquarie near Carcoar is covered with a plantation of *Pinus Radiata* and is classified as State Forest. The State Forests of Neville and Pennsylvania also bound the Shire's southern border.

The historical text and early photographs indicate that the area was covered by a medium to tall, open woodland of principally eucalypt trees, with native grasses and only a few under story shrubs.

The original species are believed to have included Ribbon Gum, Peppermint, Stringbark, Boxes, Red Gum, Snow Gum, Black Sally, Kurrajongs, Casuarina and Wattle.

At present the most common native species remaining include Blakely's Red Gum, Apple Box, Yellow Box, probably long leaf Box and Red Stringbark.

Much of the fertile land was cleared for wheat growing. The most severe loss of tree cover appears to have occurred from 1870, through a combination of farm clearing and mining (BSC SOE Report, 2005-06).

A map of the Shire vegetation is provided in Figure 11 in Appendix A. The vegetation map is from the 1976 Soil Conservation Service of NSW report and the needs to be updated.

Data gap: Up to date vegetation map

2.3 Main Population Centres

The principal town in the district is Blayney, situated some 37 km west of Bathurst and about 250 km by road from Sydney.

The number of towns and villages is more extensive in the Lyndhurst portion of the district than in the Abercrombie portion, principally due to geographical position and accessibility. Villages in the Abercrombie section are small in comparison with those in the Lyndhurst section.

Population data for towns and villages in the Blayney district is as shown in Table 2.

Table 2: Population

Towns and Villages	2001 Census	2008 Population data from CTW
Newbridge	NA	90
Barry	NA	40
Blayney	NA	3091
Carcoar	NA	218
Forest Reefs	NA	20
Hobbys Yards	NA	20
Lyndhurst	NA	258
Mandurama	NA	379
Millthorpe	705	725
Blayney LGA	6120	6593

Note 1: NA (not available)

2.4 Climate

Climate within the Blayney district is affected by its physical location within New South Wales and the varying altitude and topography of the area.

Rainfall results from the passage of one of two major rainfall influences across the area, or from localised convectional storms. The two major rainfall influences are rain associated with the passage of cold fronts across NSW or the passage inland of tropical cyclones or low pressure cells which have been located over the Pacific Ocean.

Generally, the driest months are February, March and April. However, the driest months in 2007 were September and October. The rainfall is generally uniformly spread throughout the year with a minor autumn trough. Winter rainfalls show the least variability while summer rains are most variable. Median annual rainfall varies from approximately 650 mm to in excess of 800 mm within the district. Rainfall generally increases with increasing altitude.

Temperature in the Blayney district is affected by elevation. Daily maximum temperatures decrease at a rate of about 0.9°C per 100m elevation in the summer and about 0.7°C per 100m in winter. Daytime temperatures in winter are about 17°C colder than those in summer, and range from 12 to 14°C near 450 m elevation, to 7 to 8°C at the higher elevations (1200 m).

The climate data presented in Figure 1 and Figure 2 is the same data used for the water demand modelling (refer to Technical Note 3). A summary of rainfall and maximum/minimum temperature at Blayney in 2007 is shown in Figure 1 (Soil Conservation Service of NSW, 1976).

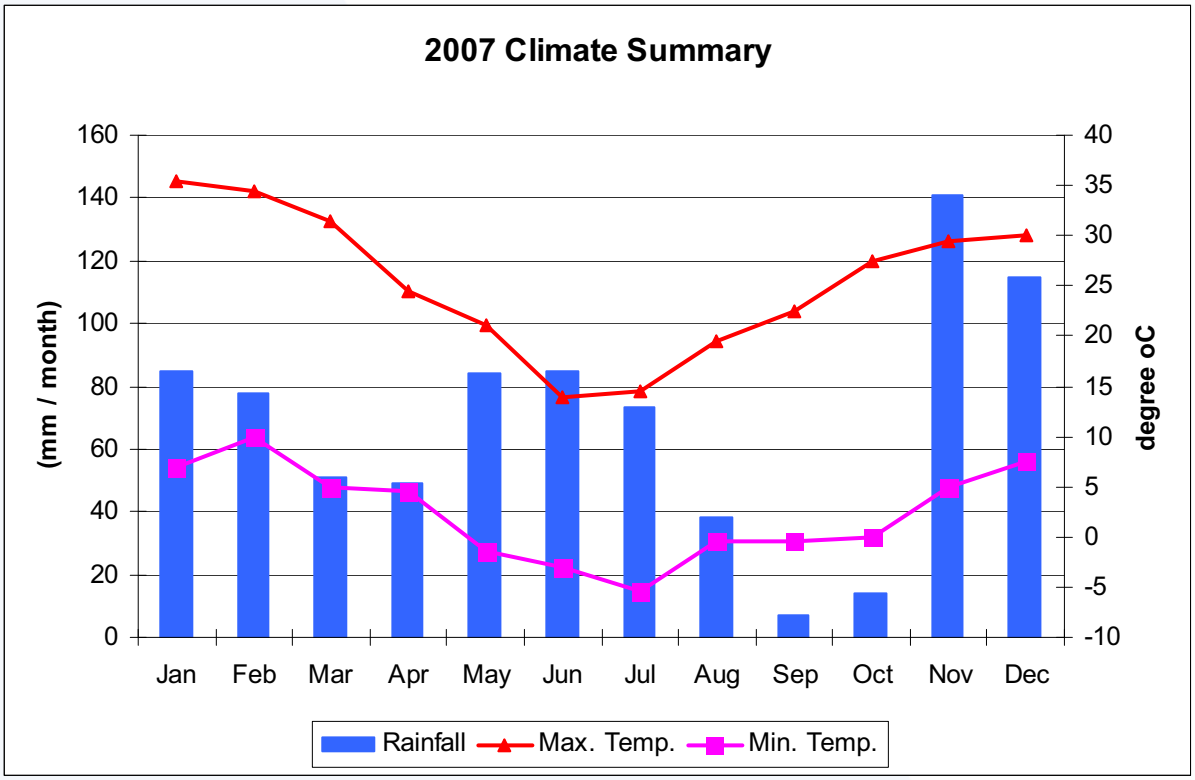


Figure 1: Central Tablelands Climate Data Summary. Source: SILO Data Drill, March 2008.

Evaporation varies from site to site as the hours of sunshine, temperature and wind vary. The evaporation in the Blayney District is usually very high (above 138 mm per month) from October to March when the maximum temperatures are usually above 25°C (see Figure 2).

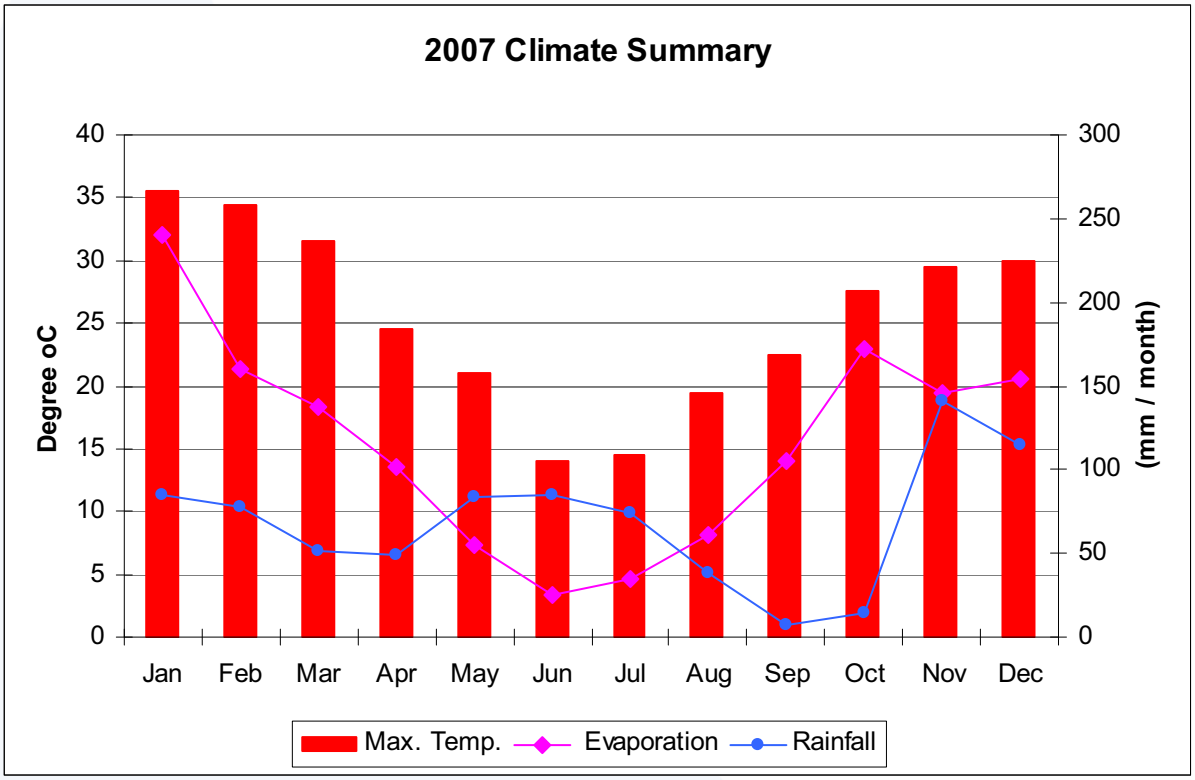


Figure 2: Central Tablelands Climate Data Summary. SILO Data Drill, March 2008.

2.5 Land Uses

2.5.1 Overview

Almost all of the catchment area is under improved pasture and used for grazing. A very small proportion of the catchment is used for potato growing, the cultivation of oats and more recently wheat. Only a very small portion of the catchment, some 89 ha (0.41%) remains relatively undisturbed (Soil Conservation Service of NSW 1976).

Blayney Township is the main urbanised area within the Carcoar Dam catchment. The land use within Blayney Township is presented in Table 3 (BSC SMP).

Table 3: Land Use within Blayney Township

Catchment	Urban (Residential)	Industrial	Rural	Forest/National Park
Blayney Township	2.74 km^2	1.4 km^2	NA	NA

In Lyndhurst portion, flatter terrain and more fertile soils, especially around Blayney; have allowed the more intensive development of rural industries. In the Abercrombie Shire sections, generally lower soil fertility and a more rugged topography has restricted land use to a more extensive pattern of agriculture.

The Lyndhurst portion, although relatively small in area (1600 km^2), is one of the State's well-recognised wool, fat lamb and cattle-producing areas. Pastoral and agricultural development is quite intensive. In addition to grazing, a production and prosperity by mixing farming involving wheat, oats, peas, potatoes; and orchards producing pears, apples, cherries and peaches. (Soil Conservation Service of NSW, 1976).

Mining has been an important feature in the history of the Blayney District. The Blayney area has had more mines opened and worked than most regions in Australia, although no centre today could be said to have owed its lifeblood to the existence of a particular mineral. The lack of long

term production was due to the highly folded and faulted geology of the area, as the vein would often cut out as increased investment in plant had been made.

Gold was discovered on Blayney Township's western boundary in 1882, not long after mines had been established at Browns Creek and King Plains. The new Cadia Mine is now operating and in 1999 extensions to incorporate Ridgeway Underground Gold Mine were approved extending the mines life expectancy a further 5 – 10 years. The mine has a life expectancy of 13-20 years. Further gold discoveries have been made and the future for mining in the Shire looks very promising. With the use of modern technology, mining has become the major resource extraction industry within the Shire.

Council staff has advised that Cadia Mine has recently submitted a development application for extension of the mine operations. It is assumed that Cadia will be operating in the next 10 years. Therefore it is expected that the effluent from the STP would be used by Cadia mine during that period.

Blayney LGA is almost completely covered by current mining leases and mining exploration licences. The granting of mining leases or mining exploration licences does not create any additional environmental impacts. However, any changes in the number of such permits being issued should be noted, particularly with respect to potential for future development. (BSC SOE Report, 2005-06).

Potential Issue: Number of permits being issued which may affect environment and water demand

2.5.2 Land Use Planning

The Blayney Local Environmental Plan (LEP) 1998 no longer permits concessional lot subdivisions in the rural areas and has increased the minimum area for subdivision for the purposes of dwelling houses, to 100 ha. Subdivisions with lot sizes of less than 100 ha can still be carried out, but certain conditions must be complied with.

The 1998 LEP also introduced two Rural Small Holding Zones 1(c) that extend to the west of Blayney Township, along the Browns Creek Road, and south west of Millthorpe along the Forest Reefs Road. These two areas will adequately cater for the rural residential lot demand in the Blayney Shire for many years.

The introduction of these zones in planned areas allows for controlled rural development and prevents further fragmentation of large prime agricultural holdings into unviable parcels of land. It also reduces any future potential land use conflicts between rural residential and agricultural use.

There are provisions in the LEP to create lots of less than 100 ha, being the development of a 'retirement lot' or lots developed in accordance with a farm management plan which has been approved by NSW Agriculture.

The LEP also introduced two environmental protection zones, 7 (a) Environmental Protection (Scenic) and 7 (c) Environmental Protection (Water Catchment). These zones also have the 100 ha minimum on subdivision, as well as provisions that help maintain the scenic amenity of a locality and protect water catchments, in which Lake Rowlands and Suma Park Reservoirs exist and which are used for town water supply to Blayney and Orange City respectively.

Potential Issue: Impact of subdivisions on Lake Rowlands catchment

The LEP also introduced controls on development on flood liable lands, land subject to bushfire and potential archaeological sites (BSC SOE Report, 2005-06).

The town of Blayney does not have a separate industrial zone under the Blayney LEP 1998. However, the Blayney DCP No. 1 identifies parts of North Blayney for industrial purposes. There

are no industrial zones in the other villages throughout Blayney Shire (BCO Land Use Strategy, 2006). Maps of sections of Blayney LEP are provided in Figure 13 in Appendix C.

Data gap: whole Blayney zoning map

A breakdown of Blayney area of land use for various purposes is provided in Table 4.

Table 4: Land Use in Blayney Area (1993 and 2004). Source: BCO Land Use Strategy (2006)

	Blayney Area (ha)		
Description	**1993**	**2004**	**Change**
Conservation Area		220	
Cropping	9,938	2,215	- 7,723 ha
Pasture / Grazing	139,010	138,839	
Horticulture	224	495	+ 271 ha
Intensive Animal Production		140	
Mining & Quarrying	63	3,041	+ 2,978 ha
Not Mapped	11		
Power Generation		256	
River & Drainage System		527	
State Forest / National Park		472	
Transport & Other Corridors		1,361	
Timber / Tree Cover	2,302	3,305	+ 1,003 ha
Urban	555	842	+ 287 ha
Water Body	418	707	+ 289 ha
Wetland		2	
Total	**152,521**	**152,422**	

2.5.3 Significant Industries within the Local Area

The main significant existing industries in Blayney Shire and their respective water consumption are as show in Table 5.

Table 5: Industries water consumption

Industry	Water consumption
Cadia Mine	2 ML/d
Sealink Ltd	8 ML/a
Nestle Purina Pet Care	43 ML/a
Western White Linen (Source: Council staff)	26 ML/a
Australian Native Landscapes, from Browns Creek Mine (Source: BSC SOE Report, 2005-06)	80 ML/a

Source: CTW staff

Since 5 September 2008 Cadia Mine have had access to 2 ML per day from CTW's potable supply in Blayney. This has been possible due to Lake Rowlands being 100% full since 5 September 2008 and discharging down the Coombing Creek at an average of 94 ML per day during the period 5 September 2008 to 30 September 2008 (2,344 ML discharged from Lake Rowlands Dam during that period). Cadia are paying the excess of 450 kL rate of $2.19 per kL. Cadia Mine is fully aware that, when Lake Rowlands drops from 100%, no further supply will be available to them.

Australian Native Landscapes has a licence (issued by DWE) to extract 80 ML/a from the abandoned Browns Creek Mine (8-10kms from Blayney) for use in dust suppression.

2.6 Sensitive Areas

2.6.1 Introduction

Changes in the land use and management, combined with landholder education, have modified the erosion hazard. In the 1940s much of the district was subjected to gullying of lowlands and sheet erosion of the uplands. In those times areas of no appreciable erosion were very small in comparison to the situation in 1976. This change was largely brought about by the adoption of pasture improvement practices following World War II. Eradication of the enormous rabbit population in the area, through myxomatosis in the early 1950s and poison around 1975/76, has also lessened erosion occurrence on grazing land (Soil Conservation Service of NSW 1976).

2.6.2 Natural Hazards - Flooding

The flood plain above and below Blayney is well defined, with steeply rising ground at its extremities. Active flows generally occur across the whole floodplain and there are few areas of dead water which contribute to temporary flood storage only. As a result the distinction between floodplains and flood prone areas on the flood plain is not as significant as it is in the lower reaches and it is reasonable to consider the whole floodplain as a floodway.

Carcoar Dam, which is located above the town of Carcoar, has a limited capacity to mitigate the impacts of flooding on the lower reaches of the Belubula within the Council area.

Flooding within the Blayney Council area is limited to rural areas along the Belubula River and its tributaries and to the town of Blayney and the villages of Carcoar and Mandurama (BCO Land Use Strategy, 2006). Areas adjacent to the mid Western Highway, the rail station area and 1 km upstream of the Belubula River have experienced major and minor flooding in the past. The highest flood recorded in the town was 858.7 m AHD (Australian Height Datum), at the Barry Road Bridge, 500 m South of Blayney Sewerage Treatment Plant (STP).

The STP is located in a flood prone area, however all structures with the exception of the wetlands are located above the maximum recorded flood height of 858.7 m AHD. BSC has not adopted any policy to restrict the development of the land because of the likelihood of flooding (Blayney and Millthorpe REF 2001).

In major floods, a total of about seven buildings including houses and commercial premises in Blayney are affected by flood waters in a major flood event. Most of these buildings are located in the vicinity of Henry Street between Church and burns Streets. The flood prone land along Abattoir Creek, which is inundated largely by backwaters from the Belubula River, is largely undeveloped and in rural uses.

The southern edge of Carcoar and the northern edge of Mandurama are also subject to small-scale inundation. Carcoar's flooding is usually by high-velocity flood waters. The main bridge in the town, if destroyed or otherwise rendered unusable in a very serious floods, could isolate some 20 homes (BCO Land Use Strategy, 2006).

2.6.3 Land Contamination

The 2005/06 State of Environment Report states that Council has not been advised of any new areas of potential land contamination during the reporting period. Development applications considered by Council are assessed in terms of the likelihood of existing contamination on the site, and also for their potential to cause contamination, with appropriate conditions of consent included.

The old Mobile station in Adelaide Street, Blayney, has had its fuel tanks removed and the site has been remediated.

Table 6 shows a list of known contaminated sites within the Blayney LGA.

Table 6: Contaminated Sites

Contaminated Sites	Location
Barry tip (closed)	Lot 3 Section 8, Marsden Street, Barry
Blayney tip (closed)	Mid Western Highway, Blayney
Carcoar tip (closed)	
Hobbys Yard tip (closed)	
Mandurama tip (closed)	Cooper Street
Millthorpe tip (closed)	
Neville tip (closed)	Teasdale Street
Newbridge tip (closed)	Portion 127

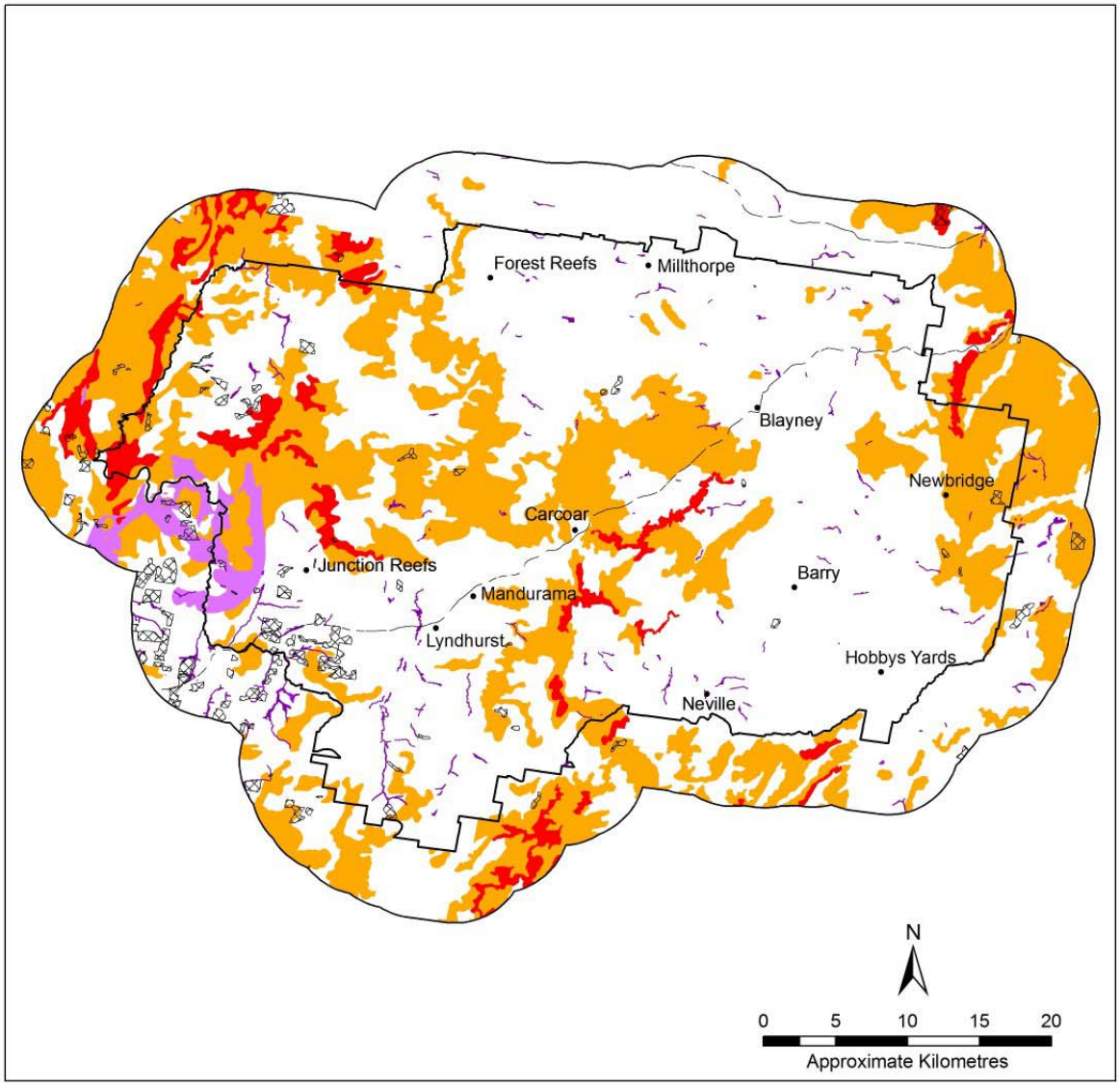
Source: BCO Land Use Strategy, 2006.

Council has no specific data with respect to other potential and known land contamination sites. A new project in this area could investigate the compilation of a contaminated land register (BCO Land Use Strategy, 2006).

2.6.4 Environmentally Sensitive Areas

The Department of Water and Energy (DWE) and the Department of Environment and Climate Change (DECC) have recently prepared maps of Blayney LGA which identify environmentally sensitive areas within Blayney Shire. These maps show the location of sensitive areas related to land and water resources/capability and biodiversity and native vegetation. See maps in Figure 3, Figure 4 and Figure 5.

Data gap: Do these environmentally sensitive areas impact LWU ability to meet levels of service now and in the future? Is there any planned development in these areas that might impact water resources and quality?



BLAYNEY LGA

Environmentally Sensitive Areas - Sensitive Land Resources

This land use decision making tool is based on information produced by the Department's of Water and Energy, Environment and Climate Change and Primary Industries and does not represent other NSW Government agency information.

This information should be used as a guide only and scale must be taken in consideration when used with cadastral information.

Environmentally Sensitive Areas Land Overlay Data

Data Source	Data Codes
Land Capability-Unsuitable for development	Classes 7,8
Land Capability-Development Capability will vary	Classes 5,6
NSW Erosion Mapping-Salting	45
Dryland Salinity Mapping 2004	Salinity_C
NSW Erosion Mapping-Severe to extreme sheet and rill erosion hazard	23,24,43,44
Soil Regolith Mapping	R4
Karst Extent North West CCEPG	

Legend

- Local Government Boundary
- Local Government Area 5km buffer
- Severe to Extreme Sheet & Rill Erosion
- Salt Affected Land - unsuitable for intensive development, maintain and/or restore groundcover with salt tolerant vegetation
- Land Capability Class V & VI Development capability of these areas will vary.
- Land Capability Class VII & VIII Development of these areas would not be considered appropriate.
- Karst Extent
- Soil Regolith R4 - Development of these areas would not be considered appropriate
- NSW Highway
- Town

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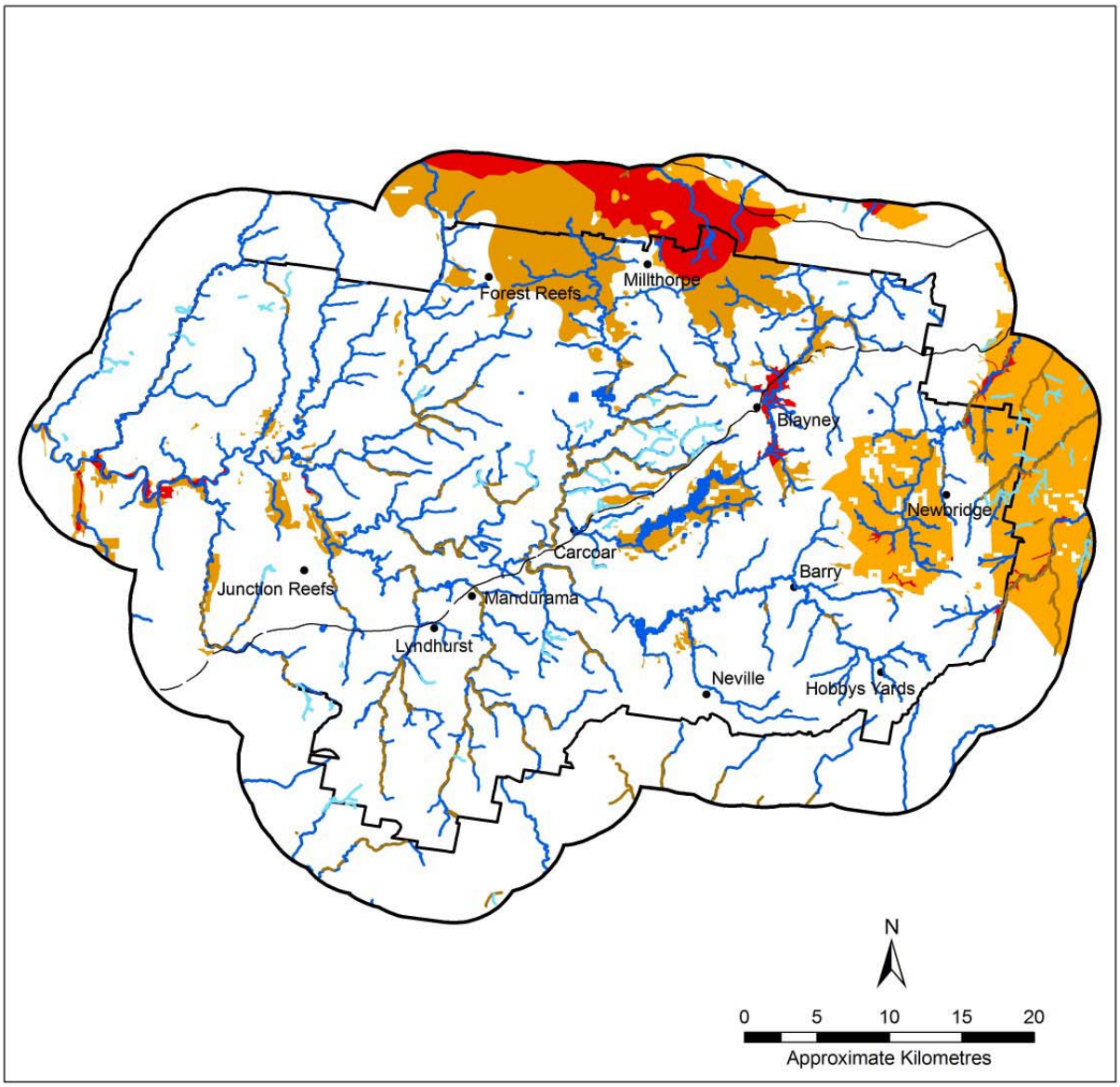
Figure 3: Sensitive Land Resources. Source: DWE staff.



BLAYNEY LGA

Environmentally Sensitive Areas - Sensitive Water Resources

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Environmentally Sensitive Areas
Water Overlay Data

Data Source	Data Codes
Vulnerable Riparian Areas	All codes + 40m buffer either side of high bank
Groundwater Vulnerability	High and Moderately High
Drainage Polygon	Reservoirs
Gully Streambank Erosion 1995	81,82,83,84,85,102,103,104

Legend

- Local Government Boundary
- Local Government Area 5km buffer
- Major freshwater habitats (40m buffer either side for bed & bank stability; protection of riparian vegetation & connectivity of habitat) These areas should be excluded from development.
- Very severe streambank erosion
- Very severe gully erosion
- Reservoir
- Moderately High Groundwater Vulnerability. Developments with the potential for significant contamination of groundwater sources (such as intensive animal agriculture) would not be considered appropriate in these locations.
- High Groundwater Vulnerability Developments with the potential for significant contamination of groundwater sources (such as intensive animal agriculture) would not be considered appropriate in these locations.
- NSW Highway
- Town

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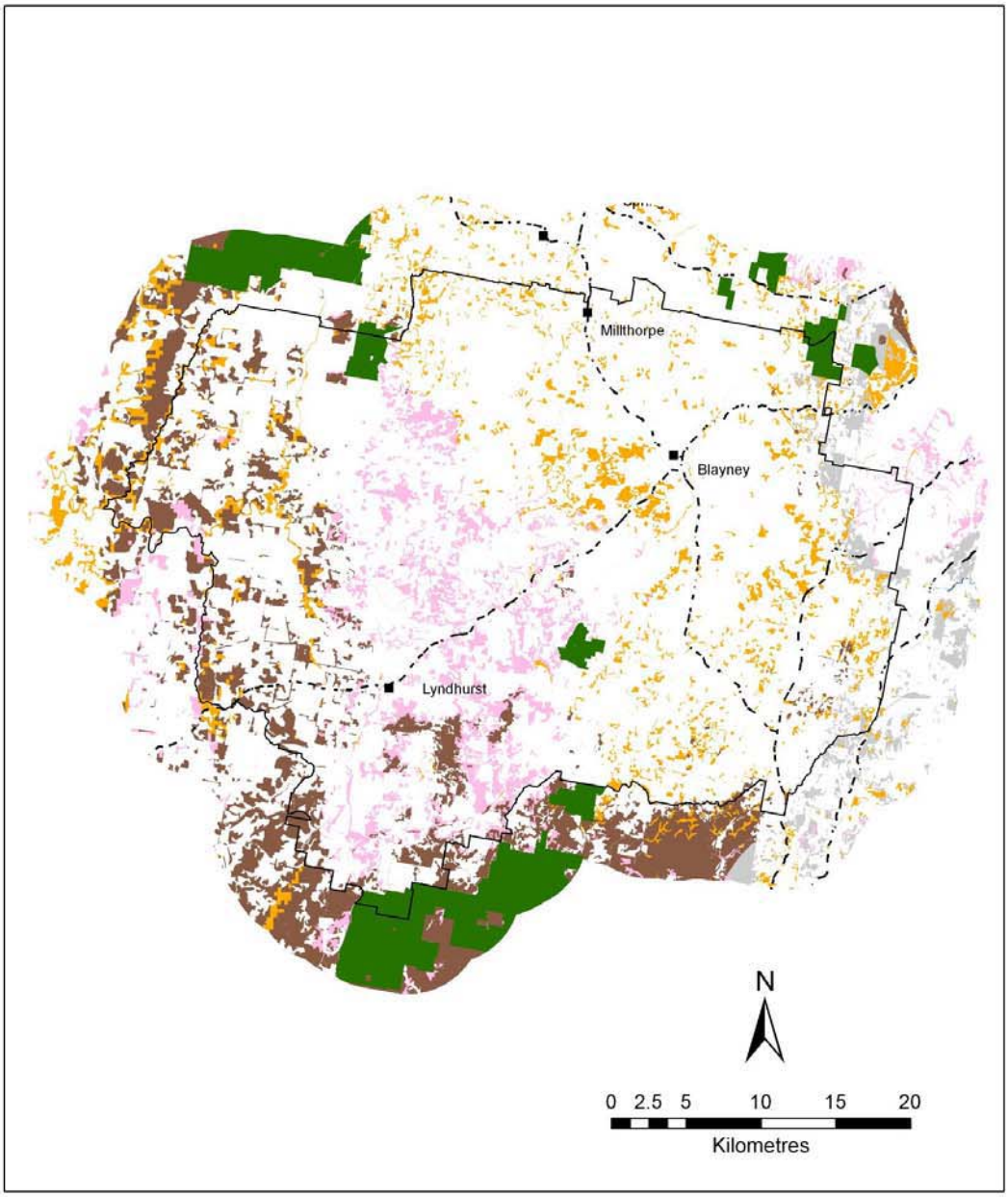

BLAYNEY LGA

Environmentally Sensitive Areas
- Biodiversity and Native Vegetation

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Environmentally Sensitive Areas
Biodiversity and native vegetation

Data Source	Data Codes
Native vegetation mapping	DECC data
Wetlands	DECC data

Legend
- Wetland
- NSW Highway
- EEC
- <30% Remaining
- <1000 ha Remaining
- Vegetation on Overcleared Landscapes
- Riparian Vegetation
- Vegetation within 100m of a National Park
- Other Native Vegetation
- Local Government Boundary
- NSW Highway
- Town
- DECC Estate
- Forests NSW

Figure 5: Biodiversity and Native Vegetation. Source: DWE staff.

2.7 Regional Catchment Plans

Data gap: Is there any regional catchment plan?

3 Water Resources

3.1 Overview

The Blayney Shire consists of a natural drainage basin of approximately 1,600 km^2 bisected down the north/south axis by the Belubula River, which is a headwater stream for the Lachlan River water catchment. The Lachlan Valley has a total area of 84,700 km^2 and a population of 100,000.

High nutrients occur in both Carcoar storage and in its main feeder stream, the Belubula River. These result in poor water quality in both the river and storage, culminating in blooms of potentially toxic blue-green algae in Carcoar storage during summer and autumn, which have caused stock deaths in past years (see section 6).

Additional water quality problems include de-oxygenated water, offensive tastes and odours, and a poor appearance of both the Belubula River and Carcoar Reservoir. Catchment activities that may have influenced this poor water quality in the past include an abattoir in the township of Blayney and the establishment of the Blayney sewage treatment plant, as well as agricultural activities such as grazing. Since 1990, Council has been undertaking an intensive program of phosphorous removal from sewerage effluent.

The problems are being researched, documented and addressed by the Carcoar Dam Catchment Management Committee, Blayney Shire Council and the local schools.

The catchment of Belubula River covers primarily agricultural land in the Blayney, Millthorpe, Neville and Mandurama area. There are three water storage areas within the Belubula River catchment; those are listed in Table 7 (BSC SOE Report, 2005-06).

Table 7: Water Resources within BSC

Water Storage	Capacity	Usage	Comments
Lake Rowlands Dam	4,500 ML	Used for urban reticulation, rural domestic and stock supplies	Currently used by CTW. The dam secure yield is approximately 1,900 ML/a
Carcoar Dam	36,400 ML	Provides regular river flows to irrigators downstream	It is not used by CTW as a water resource. The dam current capacity is 8% (July 08)
Belubula Dam	Unknown	It used to be a source of water for the early mining activities at Junction Reefs	The dam is almost silted up, with negligible storage remaining

Blayney Well is a stand-by source that is not normally used but must still be maintained in operating condition. It is used as back up for urban water supply and its capacity is 0.6 ML/d.

Council staff has advised about the Browns Creek Mine which is an underground gold mine that was flooded when an aquifer was struck resulting in the mine being abandoned after the pit

was flooded with a continuous flow of water. The pit is estimated to hold 4,500 ML and is overflowing into Browns Creek at an estimated 0.5 to 1 ML/day. Central Tablelands Water was considering accessing this supply for use during an emergency drought situation and received approval for a 50% State Government subsidy of $2.5 million to construct a pipeline from Browns Creek to Council's filtration plant at Carcoar. This work has not proceeded as there have been complications with land access and subsidence concerns within the pit if it was drawn down. CTW prefers the option of the enlargement of Lake Rowlands to provide future water security.

Council staff have stated that the future enlargement of Lake Rowlands from 4,500 ML to 26,500 ML is being considered as Council considers it crucial to the long term viability of mining in the Central West area and water security for the growth of Orange City Council.

Data gap: Updated information about Belubula Dam

3.2 Water Sharing Plans

Within the Lachlan catchment there are three plans that cover all surface water sources:

- Water Sharing Plan for the Lachlan Regulated River Water Source (DIPNR, 2004a)
- Water Sharing Plan for the Mandagery Creek Water Source (Department of Infrastructure Planning and Natural Resources, 2004c)
- Macro Plan currently being finalised (DNR, in press) (Lachlan CMA, 2008).

The northeast section of Blayney Shire is within the Central West catchment. The Central West catchment has the following plans:

- Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers (Macquarie-Cudgegong River Management Committee, 2004) - outlines a range of operational flow rules to remedy some of the impacts of river regulation
- All other streams within the catchment are regarded as — unregulated"
- Water Sharing Plan for the unregulated section of the Castlereagh River above Binnaway (Central West Unregulated Streams Management Committee (CWUSMC), 2004) - to provide a balance between extraction and the maintenance of in stream environmental values (CW CMA, 2008)

It is unknown which of these plans are applied in the Blayney Shire area.

3.3 Environmental Impacts

Data gap: Central West CMA specific Water Sharing plans for Blayney Shire

3.3.1 Introduction

The main impact on water systems both ground water and free flowing in stream and rivers are increased nutrients from human activities. The type and extent of the impact on water resources differ depending on the situation being examined. In village areas the types of pollution are different to those of rural farming areas. In the village, pollution such as urban run-off is a contributing factor to poor water quality. With urban run-off come increased nutrients, oils, sediment, and gross pollution such as rubbish. In farming areas nutrient enrichment is a problem with run-off from fertilizers, and stock effluent. The following section outlines trends that can be seen with regard to pollution of different water resources within Blayney Shire and projects that are being undertaken to reduce the extent of the impact (BSC SOE Report, 2005-06).

3.3.2 Belubula River

The Belubula River runs southwards through Blayney into Carcoar Dam, then westwards forming part of the Lachlan River catchment. Much of the environmental impact with respect to the

Belubula River in Blayney Shire occurs upstream of Carcoar Dam and particularly around the town of Blayney. It should be noted that while the impacts such as rural development, urban and industrial development as well as the sewerage treatment plant have not been enacted solely during the current reporting period, but rather are on-going problems.

A number of projects were commenced in 2005/06 with respect to rectifying these problems.

The Carcoar Dam Management Committee, formed in 1990, has been responsible for a number of actions including increasing community awareness of the issues relating to water quality, continued monitoring and the construction of three wetlands up stream of Carcoar Dam to reduce the levels of pollutants reaching the dam itself.

Data gap: Has Carcoar Dam water quality improved?

The Council was involved in a number of projects that should see benefits in respect of the water quality of the Belubula River, particularly in terms of the urban and industrial source of pollution shown above. These include:

- The construction of wetlands to filter urban stormwater before it enters the river system. These wetlands are situated below Heritage Park in Blayney
- The construction of reticulated sewerage system to the Blayney Industrial Estate
- Implementation of a stormwater management plan for Blayney in accordance with EPA guidelines
- Council is a member of the Lachlan-Macquarie Phosphorus Action Committee which is actively involved in education programs to increase public awareness of stormwater and water quality issues
- Negotiations for, and implementation of infrastructure for the supply of treated water from the Blayney STP for re-use at Cadia gold mine (BSC SOE Report, 2005-06)

3.3.3 Millthorpe Groundwater

The installation of a sewerage system for the village was completed in January 2004 and has been running successfully since installation. Many of the residents have connected to the system with 175 properties connected up to June 2006, which equates to approximately 70% (BSC SOE Report, 2005-06).

3.4 Climate Change

The drought that Australia has been experiencing for three years has negatively affected the water sources of the Blayney Shire Council area. Drought is part of the natural Australia climatic cycle. It accompanies the El Niño-Southern oscillation phenomenon. This phenomenon usually affects the other, less watered areas of inland Australia. Even though drought is part of Australia's normal climatic cycle, not all of Australia is affected at the same time. The recent drought has affected large areas of Australia. The recent low levels in the local dams have been directly caused by the drought (BSC SOE Report, 2005-06).

2007 and 2008 climate impacts (climate change, El Niño or other) on dam yields in other parts of the Murray Darling Basin (Murray and Murrumbidgee) have led to suspension of water sharing plans and 50% reductions in town water allocations. Such reductions in yield may be attributed to reductions and increased variability in annual rainfall and runoff.

Further to this, CSIRO and the Australian Bureau of Meteorology (BOM) long term climate change projections are presented below.

Key findings from: CSIRO, Australian Bureau of Meteorology. 2007. *Climate change in Australia: technical report 2007*.

"The key findings of this report include that by 2030, temperatures will rise by about 1°C over Australia – a little less in coastal areas, and a little more inland - later in the century, warming depends on the extent of greenhouse gas emissions. If emissions are low, warming of between 1°C and 2.5°C is likely by around 2070, with a best estimate of 1.8°C. Under a high emission scenario, the best estimate warming is 3.4°C, with a range of 2.2°C to 5°C.

Further, the report indicates that there will be changes in temperature extremes, with fewer frosts and substantially more days over 35°C. It also predicts that decreases in annual average rainfall are likely in southern Australia - rainfall is likely to decrease in southern areas during winter, in southern and eastern areas during spring, and along the west coast during autumn. For 2030, there will be little annual rainfall change in the far north.

As with temperature, the report indicates that rainfall projections for later in the century are more dependent on greenhouse gas emissions. Under a low emission scenario in 2070, the best estimate of rainfall decrease is 7.5 per cent. Under a high emission scenario the best estimate is a decrease of 10 per cent.

The report indicates that although there will be more dry days, when it does rain, rainfall is likely to be more intense.

Other findings include:

- Droughts are likely to become more frequent, particularly in the south-west
- Evaporation rates are likely to increase, particularly in the north and east
- High-fire-danger weather is likely to increase in the south-east
- Tropical cyclones are likely to become more intense
- Sea levels will continue to rise"

Such uncertainty about future climatic conditions indicates the need for water supply planners to take a precautionary approach.

4 Urban Environment

4.1 Local Communities

Main towns and villages are listed in section 2.3, as well population data. Information regarding population within the Blayney Shire has been obtained from the Australian Bureau of Statistics Census data. This information is used to assess demand on the sewer infrastructure resulting from population.

The Australian Bureau of Statistics 2006 Census QuickStats Blayney LGA estimates the resident population at 25 October 2007 as 6,593 as shown in Table 8.

Table 8: Age demographics in BSC

Age	Numbers	% of total persons in Blayney	% of total persons in Australia
0 - 4	457	6.9%	6.3%

Age	Numbers	% of total persons in Blayney	% of total persons in Australia
5 - 14	1,025	15.5%	13.5%
15 - 24	732	11.1%	13.6%
25 - 54	2,547	38.6%	42.2%
55 - 64	816	12.4%	11.0%
65 plus	1,016	15.4%	13.3%
Total	**6,593**	**100%**	**100%**

The proportions of total employment in Blayney Shire are presented in Table 9.

Table 9: Employment by Industry, 2001.

Industry	Number	%
Agriculture, forestry, fishing	455	21
Mining	110	5.1
Manufacturing	503	23.2
Electricity, gas, water supply	18	0.8
Construction	137	6.3
Wholesale trade	85	3.9
Retail trade	149	6.9
Accommodation, cafes, restaurants	96	4.4
Transport and storage	67	3.1
Communication services	14	0.6
Finance and insurance	27	1.2
Property, business services	79	3.6
Government administration defence	65	3
Education	133	6.1

Industry	Number	%
Health, community services	117	5.4
Cultural, recreational services	23	1.1
Personal other services	65	3
Not classified	13	0.6
Not stated	11	0.5
Total	**2,167**	

Source: BCO Land Use Strategy, 2006.

Table 10: Dwellings Characteristics

Private dwellings	Number	% of total occupied private dwellings in Blayney LGA
Total private dwellings (includes unoccupied dwellings)	2,858	
Separate house	2,294	93.7
Semi-detached, row or terrace house, Townhouse etc	47	1.9
Flat, unit or apartment	77	3.1
Other dwellings	29	1.2
Not stated	0	0.0
Occupied private dwellings **(total)**	**2,447**	**100**

Source: 2006 Census Quickstats

Data gap: Infill and new development predictions

4.2 Water Service Infrastructure

This is addressed in Technical Note 3.

4.3 Water Service Customers

Development within Blayney LGA from 2003 to 2006 reporting periods is summarised in Table 11 (BSC SOE Report, 2005-06).

Table 11: Blayney Land Development Type.

Type of development	2003/04	2004/05	2005/06
Dwellings	63	79	50
Minor buildings / additions	120	133	126
Industrial / commercial	12	21	14
Subdivision	34	26	20
Other (e.g. pool, sign)	37	15	12
Total	**264**	**274**	**225**

Source: BSC SOE Report, 2005-06.

Data gap: 2006/07 and 2007/08 figures

One of the major impacts with regard to subdivisions being experienced both in Blayney and throughout NSW is the increasing fragmentation of rural land from urban sprawl and increasing rural-residential subdivision. A significant component of Blayney LEP 1998 was the introduction of new subdivision controls, particularly in rural areas. This change was brought about as a result of policy direction by NSW Agriculture and the Department of Urban Affairs and Planning (now DIPNR).

In summary, Blayney LEP 1998 has increased the minimum area for rural subdivision from 40 ha to 100ha. Furthermore, specific zones for rural-residential type development were identified (1 (c) Zone) to minimise the ad-hoc subdivision of rural land into smaller parcels. The minimum subdivision lot size is 2ha for the purposes of a dwelling. As a result the shire has seen growth in the development of rural / residential subdivisions in the 1 (c) zones to provide for the ever growing demand for rural / residential, small holding land. This result reflects the decreasing number of subdivisions in the last few years.

Following is a summary of the number and type of subdivision applications received by Council:

Table 12: Type of Subdivisions.

	No. of applications (lots created)		
Type of subdivision	**2003/04**	**2004/05**	**2005/06**
Zone 2 (v) *	18 (150)	14 (111)	8 (33)
Zone 1 (a)	7 (15)	6 (15)	6 (38)
Zone 1 (c) rural	5 (39)	1 (5)	1 (21)
Boundary adjustment	2	5	4
Zone 7 (c)	1 (2)	1 (6)	-

*** Includes residential, commercial and industrial subdivisions**

Source: BSC SOE Report, 2005-06.

Data gap: 2006/07 and 2007/08 figures

From the figures presented in Table 12 it can be seen that the 1 (c) zone began to experience small lot rural residential subdivision, therefore achieving the aims of the LEP in reducing the fragmentation of rural land and concentrating rural residential development in specific areas. Substantial subdivision activity was proposed to the period of 2006/07 financial year within Millthorpe 1 (c) zone and within the Blayney urban area (BSC SOE Report, 2005-06).

Blayney has community land which contributes to water demand from CTW water services. BSC has 21 parcels classified as community land, under the Blayney Council Land Register. These are mainly in the form of Public recreation areas such as parks, sporting ovals and gardens. The Shire's community land is provided in Table 13.

Table 13: Community Land

Community Land	Number
Sports ground	10
Parks / Public Recreation	35
General Community Use	3
Public Utility	3

Further to the community lands mentioned above there are the Redmond Oval in Millthorpe and a recreation area in Carcoar Dam area, adjacent to the Wind farm viewing platform.

4.4 Water Service Management

There are a number of Landcare groups operating in the Blayney area. Landcare groups within the Blayney LGA are incorporated under Orange / Bathurst Distinct Landcare. Collectively, this district represents 53 separate groups managing an area of over 180,000 hectares of land.

Landcare projects in the region target major land and water conservation issues, such as control of soil erosion, improving water quality, addressing soil acidity and dryland salinity, weed control and the restoration of regional biodiversity through revegetation and protection of areas of remnant bush.

The Landcare groups operating in Blayney include:

- Blayney – Carcoar Landcare Group
- Lake Rowlands Catchment
- Carcoar – Mandurama Landcare Group
- Upper Belubula Landcare Group
- Panuara / Four Mile Creek Landcare Group
- Gallymont Landcare Group
- Garland Landcare Group (BSC SOE Report, 2005-06)

4.5 LWU Best- Practice Management Status

DWE has six criteria for best-practice management of water and wastewater services. CTW owns and operates the water supply services in Blayney, therefore some of the documents listed below are CTW's documents. The status of each of these practices in the BSC is detailed in Table 14.

Table 14: BSC Best-Practise Management Status

Criteria	Status
Integrated Water Cycle Management	In progress (this document)
Strategic Business Plan (SBP) and Financial Plan	▪ BSC SBP for Sewerage Services – February 2008 ▪ CTW SBP for Water Supply – 2005
Pricing	▪ BSC Draft Development Servicing Plan No.1 Millthorpe Sewer System – February 2004 ▪ BSC Development Servicing Plan No.2 Blayney Sewer System – date not indicated in the document ▪ CTW Development Servicing Plan for Water Supply Lake Rowlands & Quandialla – August 2004 ▪ CTW is fully compliant with water pricing guidelines ▪ BSC compliance with pricing guidelines - unknown
Water Conservation (Demand Management Plan)	CTW does not have a Demand Management Plan but does have a Demand Management Policy in place. It is intended to engage Consultants in early 2009 to prepare a Demand Management Plan.
Drought Management Plan	CTW Drought Management Plan – November 2006
Annual Performance Reporting	▪ BSC TBL sewerage performance report - 2005/06 ▪ CTW TBL water performance report - 2005/06

Data gap: BSC Development Servicing Plan No.2 Blayney Sewer System date

5 Sewerage Scheme

5.1 Introduction

This sewerage scheme section was prepared based on four main documents provided by Council, as follows:

- BSC SBP (2008) – This is the most recent approved document and the main source of data for this technical note. Sewerage scheme data provided in this section will be from this document, otherwise it will be referenced.

- BSC SOIR (2007) – This document provides relevant information on the upgrade of Blayney STP. However, there are data conflict comparing with the SBP mentioned above that needs to be clarified,
- Blayney and Millthorpe REF (2001) – This is a signed off document. However, some data might not be up to date due the Blayney STP upgrade in 2003.
- BSC draft AMP – This document hasn't been signed off. Therefore there are uncertainties about the data.

Council provides sewerage services to the township of Blayney and Millthorpe village. Other villages including Carcoar, Barry, Neville, Mandurama, Lyndhurst and Newbridge are serviced by septic tanks.

5.2 Sewerage Reticulation System

Blayney reticulation system consists of 51 km of AC and uPVC mains and 8 pumping stations. The original reticulation system in Blayney was constructed in the late 1960s with considerable augmentation in the 1970s, 80s and 90s. The latest augmentation took place in 2003. The sewerage reticulation servicing the township of Blayney can be divided into three main catchment areas:

- North of the main western railway - Sewage from this catchment is collected at Pumping Station No. 2 and pumped across the railway line into the central town area gravity system.
- Central town area - Sewage from this catchment is collected at Pumping Station No. 1 and pumped directly to the sewage treatment facility.
- Area south of Martha Street - Sewage gravitates from this area back into the central town system. An exception to this is the development along Barry Road. Sewage from this area gravitates to Pumping Station No.3. This pumping Station pumps sewage directly to the Sewage treatment facility via an interconnection to the major rising main.

Millthorpe sewerage system services about 600 people in the village of Millthorpe. The sewer reticulation was commissioned in 2003. The system consists of 9.7 km of uPVC gravity sewer mains and one pumping station. Collected sewage is pumped to the balance tank of Blayney STP for treatment.

A map of the sewerage reticulation system for Blayney and Millthorpe is in Appendix D.

5.3 Pumping Stations

The BSC SBP does not provide description on the sewage pumping stations. This section is based on the BSC SOIR (2007) document.

The Blayney sewerage reticulation system consists of 8 pumping stations with Millthorpe having a single pumping station. Pumping stations PS1, PS3 and Millthorpe PS pump directly to the Blayney STP while all the other pumping stations pump either to PS1 or to its catchment. Descriptions and locations for these pumping stations are shown in Table 28, Appendix D. A schematic diagram of the system is presented in Figure 6 (BSC SOIR, 2007).

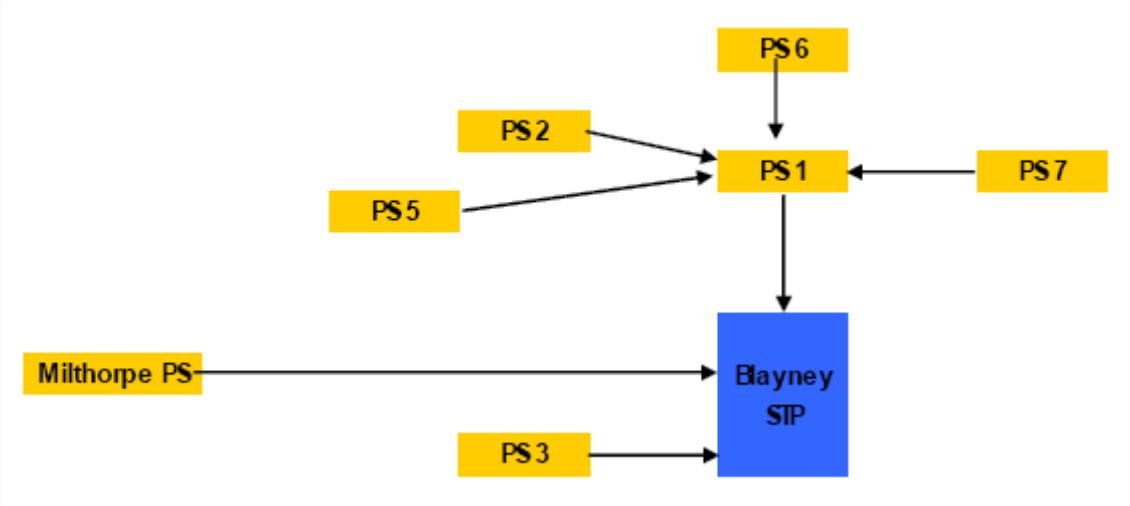


Figure 6: Schematic Diagram of the Blayney Pumping Stations Scheme. Source: BSC SOIR, 2007.

Data gap: Cadia Mine PS and King George Oval PS are not included in the diagram above

5.4 Sewage Treatment Plant

5.4.1 Blayney Sewage Treatment Plant Description

The Blayney Sewage Treatment Plant (STP) is located on the south eastern outskirts of town on the north side of Hobbys Yards Road.

The original works, constructed in 1966, consisted of a biological filter (trickling filter) with a capacity of 2100 equivalent population (EP). In 1989, the original treatment works was replaced by an intermittently decanted extended aeration (IDEA) activated sludge treatment plant with a design capacity of 4000 EP.

In 2003, the STP was upgrade to a current capacity of 7000 EP. The present STP and effluent management system consists of the following:

- A balance tank which restricts flow to the plant to 80 L/s and includes a mechanical step screen, storm overflow weir and a flow divider (storm flow bypass leading to effluent ponds)
- A deodorisation bed chamber (to address odour problems that may arise due to septic Millthorpe sewage)
- An IDEA reactor with a 7,000 EP capacity
- Alum dosing and storing facilities
- A catch pond
- Four sludge lagoons
- Sludge drying beds
- An under-drainage pumping station
- Effluent ponds
- Effluent pumping station and chlorination facility that transfers effluent to the Cadia Mine Ore concentration plant
- Constructed wetlands
- River discharge main from wetland to the Belubula River

- An amenities building and a laboratory

The balance tank receives sewage pumped from Blayney and Millthorpe through the inlet works and to the IDEA plant. IDEA plant is chemically dosed with alum to remove phosphorus and improve settling characteristics. Effluent from this plant is discharged to the catch pond and then to the effluent ponds for maturation.

The BSC SBP (2008) provides capacity figures for the IDEA plant only. Information on the STP units' capacities was provided by Council staff.

A map of the Blayney STP components is provided in Appendix D. Blayney treatment units' capacities are presented in Table 15.

Table 15: Blayney STP Capacity.

Treatment Unit	Total Capacity
Inlet Works	Storm Bypass: Flow in excess of 80 L/s
IDEA Tank	7000 EP
Sludge Lagoons	7000 EP
Catch Pond	1 day detention @ 7000 EP
Effluent Ponds	15 days detention @ 7000 EP
Effluent Reuse Pumping (Cadia)	22 L/s

Source: Council staff

The BSC draft AMP provides information on the STP operation system as follows. The STP is monitored using telemetry, regular inspections, complaints and legislative compliance. In 2006 Council installed a telemetry system in order to accurately monitor the operation of the sewerage treatment works. Since then, sampling of final effluent has been undertaken monthly. All results for the reporting period satisfied the licence limits. Final effluent sampling results are in the 2007/08 BSC Annual Performance Report.

Data gap: Current sewage characteristics based on types of users

5.4.2 Effluent Management

Effluent disinfection is achieved in effluent ponds and is pumped to Cadia Mine after chlorination. Cadia Mine currently takes all Blayney STP's treated effluent. Any effluent that is not pumped to Cadia Mine due to operational issues is released to the wetland, which then overflows to the Belubula River. The wetland has been provided as a supplementary structure to impart additional effluent polishing treatment. Flows to the wetland have been limited to wet weather events. The STP is adequate to cater for current peak flow of 80 L/s and for wet weather flow of 120 L/s (for further information on hydraulic load see section 5.8).

Sludge from sludge lagoons is dried in drying beds while supernatant is gravitated back to the IDEA plant.

Council staff has advised that BSC owns the pump station downstream the effluent pond but Cadia Mine pays for the maintenance and running cost. The Ore concentration plant is owned

by Cadia mine located adjacent to Blayney Railway Station. It is unknown weather the plant has any licence requirements.

Current schematic of Blayney STP operation and effluent management systems is shown in Figure 7.

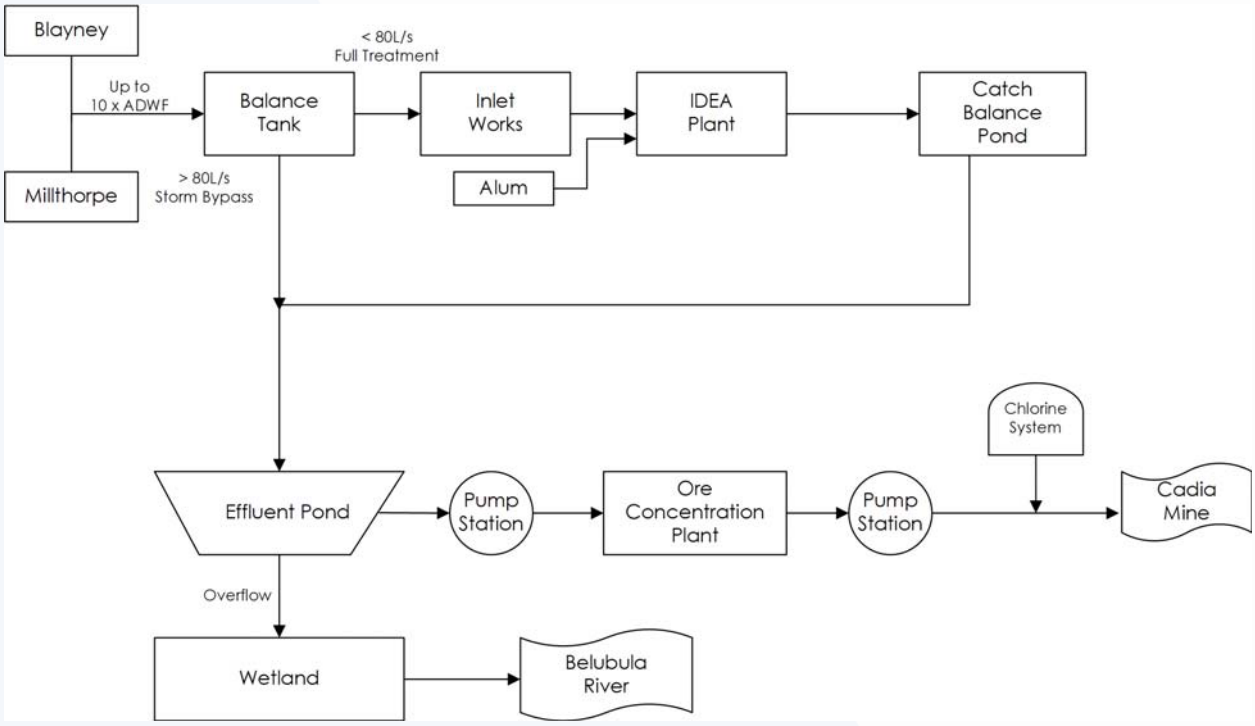


Figure 7: Schematic of Blayney STP operation and Effluent Management. Source: Millthorpe SS Report, 1999.

Discharge of industrial waste to the sewerage system from Western White Linnen is 80 KL/day.

5.4.3 Performance Requirements

The 2001 Millthorpe and Blayney REF report states that while Cadia mine does not guarantee that any given volume of treated effluent would be reused, past experience has seen more than 90% of all treated effluent pumped to the mine. It is stated that while the effluent ponds at Blayney STP would be capable of disinfecting to general waters standard on a 90 percentile basis, the ponds would not reliably disinfect to sensitive waters standard (200 fc/100 mL on a 90 percentile basis).

Sensitive Waters and *General Waters* effluent quality requirements are given in Table 16, as well current DECC requirements.

Council has advised that in accordance with the DECC (EPA) Licence (1648) for the treatment works volume limit of 950 KL/day is allowed to meet the General Waters Standard. The average inflow at the treatment works for the month of July 2008 was 755 kL/day. As such Council does not have to meet the Sensitive Waters Standard even if Cadia takes less than 90% of effluent.

Council has allowed $3 million in 2022/23 for augment works at Blayney STP to meet the Sensitive Water Standards if the need arises. The capital works schedule for sewerage is provided in Appendix E.

Table 16: DECC (EPA) Standards for Effluent Treatment.

Parameter	General Waters (source 1)	Sensitive Waters (source 1)	Current (2007) Licence Conditions (source 2)
	90th Percentile		100th Percentile
pH (mg/L)	6.5 – 8.5	6.5 – 8.5	6.5 – 8.5
BOD (mg/L)	15	10	30
Suspended solids (mg/L)	20	15	30
NH_3-N (mg/L)	5	2	2
Total N (mg/L)	15	10	15
Total P (mg/L)	1	0.3	1
Faecal Coliforms (cl/100mL)	-	200	600
Oil and grease (mg/L)	10	2	10

Source 1: Blayney and Millthorpe REF 2001. Source 2: DECC Environment Protection Licence for Blayney Sewage Treatment Plant.

According to 2006/07 BSC Annual Performance Report all results for the Blayney STP reporting period satisfied the EPA licence limits.

BSC is committed to an ongoing Pollution Reduction Program (PRP) and is continually monitoring and reviewing various aspects of the program in an attempt to minimise the number of pollution events associated with the STP and the reticulation system. The PRP is provided in the BSC Annual Performance Report (2007-08).

The results of the DECC STP licence compliances are publicly listed in the database at DECC website. The statuses of these licences are shown in Table 17.

Table 17: DECC Licence Non-Compliances

Annual Return Information	Licence Condition Number	Type of Non-Compliance	No. of Incidents
01 April 2007 to 31 March 2008	Complied		
01 April 2006 to 31 March 2007	L3	pH concentration limit exceeded	6
	L3	Phosphorus concentration limit exceeded	3

Annual Return Information	Licence Condition Number	Type of Non-Compliance	No. of Incidents
01 April 2005 to 31 March 2006	M2 Complied	No sampling carried out at Licence Point 2.	1
01 April 2004 to 31 March 2005	Complied		
01 April 2003 to 31 March 2004	Complied		

Potential Issue: Although there was full compliance with the DECC STP licence for 2007/8 Blayney STP licence reported non-compliance: 2006/07 for pH, P and no sampling. Blayney also complied fully in 2003/4, 2004/5 and 2005/6.

5.4.4 BSC Sewerage Performance Report

The BSC 2005/06 DWE TBL sewerage performance report figures are shown in Table 18.

Table 18: 2005/06 DWE TBL Performance Report

TBL Performance Indicators	BSC Result	Ranking (All LWUs)
Volume of sewage collected (ML)	320	4
Urban properties without reticulated sewerage service (%)	30.8	5
Service complaints per 1000 properties	11	3
Volume of sewage treated per property (kL)	209	2
Percentage effluent reclaimed for recycling	70	1
Compliance with BOD in licence (%)	100	1
Compliance with SS in licence (%)	100	1
Sewer main chokes and collapses per 100km of main	27	2
Sewer overflows to the environment per 100 km of main	-	-

TBL Performance Indicators	BSC Result	Ranking (All LWUs)
Categories 1, 2 and 3 environmental incidents per 1000 properties	0	1

Note 2: Ranking of 1 indicates that BSC is in the top 20% of LWUs; ranking of 5 indicates it is the bottom 20%

Data gap: Current DWE TBL performance report

The detailed capital works schedule for sewerage shows that Council has four years of capital works program to provide sewerage services to the villages of Carcoar and Mandurama in 2015/16. Council also plan to provide a provisional sewerage scheme for Lyndhurst in 2019/20 (see section 0).

5.5 Assets Summary

BSC has prepared an Asset Register and the locations of all major assets have been recorded. No detailed condition audit of underground assets has been carried out as yet so Council does not really know the cost or timing of the real replacement needs.

The 'Detailed Recurrent Cost Schedule for Sewerage' provided in the 2008 BSC SBP shows that Council has allowed $80 K to be spent during 2008/09 and 2009/10 for CCTV inspections of underground assets. Furthermore the 'Detailed Capital Works Program for Sewerage', also provided in the 2008 BSC SBP, shows that Council has allowed from 2009/10, $50 K per year of the capital works program period to lining and replacement of sewer mains, if needed.

A summary of the Blayney sewerage scheme assets is shown in Table 19.

Table 19: Condition of Council Major Assets.

Asset	No./ Capacity/ Length	Year of Construction	Condition 1 – Poor 10– Perfect
Gravity Reticulation Mains			
- Blayney	41.5 Km	1966 – 2003	6
- Millthorpe	9.7 Km	2003	9
Manholes			
- Blayney	702	1966 - 2003	8
- Millthorpe	147		9
Pumping Stations			
- Blayney	8	1966 – 2003	8
- Millthorpe	1	2003	9
Rising Mains			
- Blayney	8.51 Km	1966 – 2003	8
- Millthorpe	14.8 Km	2003	9
Blayney STP	7000 EP	1989	9

Source: BSC SBP, 2008.

Table 19 shows that the condition of Blayney reticulation mains is just above average. The detailed capital works schedule for sewerage shows that Council has allowed approximately $1.4 M for lining and replacement of sewer mains. Council plans to spend $50 K per year for 28 years from 2009/10.

5.6 Areas Serviced

Table 20 summarises the details of current (2008) and future (30-years) sewerage service areas within BSC. As indicated by the table, Council plans to extend sewerage services to the villages of Carcoar and Mandurama depending on economic feasibility of these schemes.

Rural-smallholding and rural subdivisions (lot sizes greater than 1 ha and 10 ha respectively) are not required to be sewered under current planning requirements. Lot sizes are considered large enough for the proper operation of septic tanks or aerated treatment systems and are not considered to pose any health related problems.

Council's intentions in the provision of services for the next thirty years are shown in Table 20. The capital works program shows that BSC plans to provide reticulated sewerage for Lyndhurst. However Table 20 shows that this sewerage service is provisional, which means it may be pushed back according to Council budget and service needs for that area.

Table 20: Current and Future Service Provided

Towns/ Villages	Current Service Provided		Future Service Provided (30 years)	
	Equivalent Tenements	Sewerage Service	Equivalent Tenements	Sewerage Service
Blayney	1300	Reticulated sewerage	1700	Reticulated sewerage
Millthorpe	370	Reticulated sewerage	500	Reticulated sewerage
Carcoar	112	Septic tanks	130	Reticulated sewerage
Lyndhurst (including Somers and Garland)	152	Septic tanks	175	Reticulated sewerage for Lyndhurst (Provisional)
Mandurama	95	Septic tanks	100	Reticulated sewerage
Barry, Neville and Newbridge villages	143	Septic tanks	160	Septic tanks

Source: BSC SBP, 2008.

5.7 Growth Projections

BSC has had compounding growth rate of 0.6% p.a. during the 15-year period between 1991 and 2006 (*Source:* ABS, *Estimated Residential Population Local Government Areas – NSW 1996 – 2006, ref 3218.0)*.

The ABS Census data and the NSW Planning forecasts are shown graphically in Figure 8. Both these forecasts indicate increasing population growth for the Council. Council has adopted a 0.6% growth rate for future planning and is optimistic with its predictions believing that the economic development strategies it has in place should result in maintaining the present population over the next thirty years with a likely net increase. This growth rate has been

adopted in the Strategic Business Plan and for financial modelling for the financial projections during the 30-year forecast period.

The projected number of sewerage assessments for financial modelling purposes is based on the 1737 (Residential: 1500; Non-residential: 237) assessments in June 2007 *(Reference: Blayney Shire Council Special Schedule 5 for the year 2006/07)* and factored up on a pro-rata basis in line with the forecasts in Figure 8.

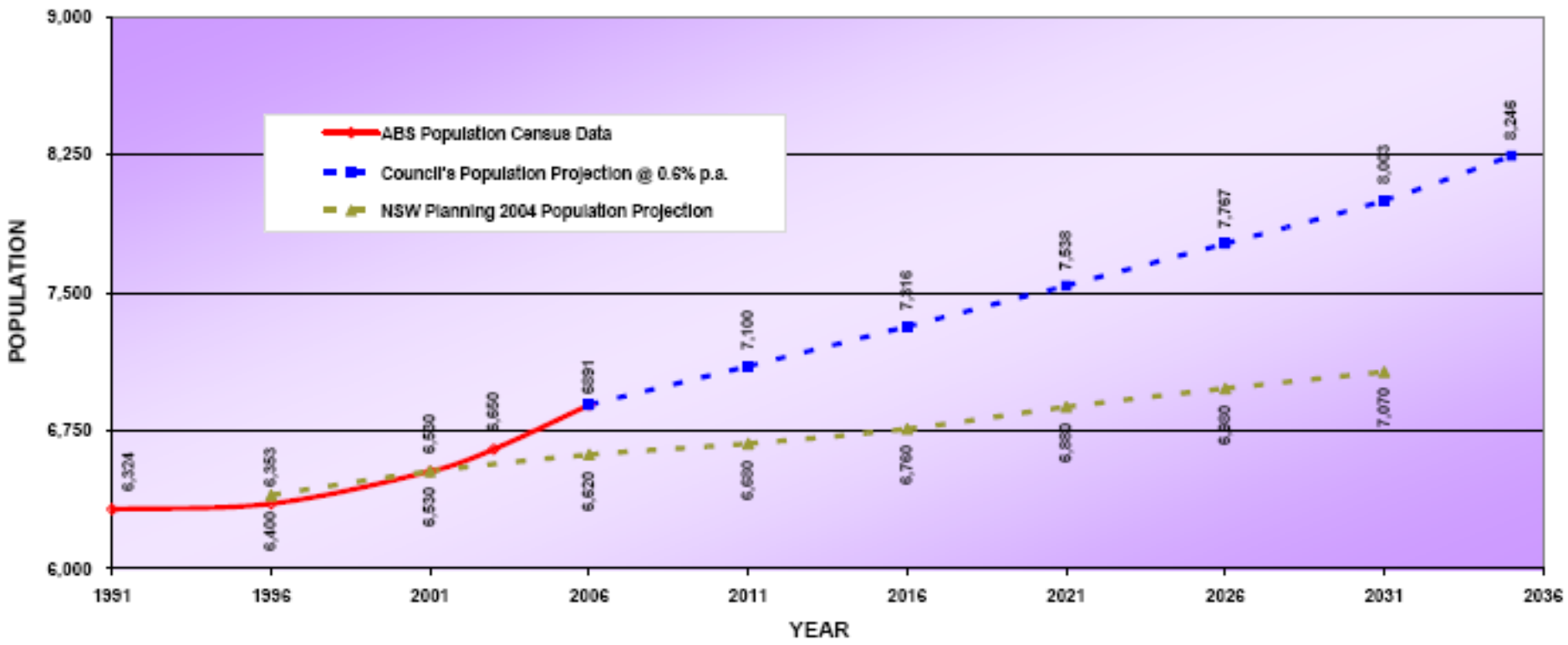


Figure 8: Population Growth Projections. Source: BSC SBP, 2008.

5.8 Hydraulic Loading

The Blayney sewerage scheme hydraulic loading assessment was completed in 2007. The outputs of this assessment are presented in the BSC SOIR report and it is summarized below. Council staff has advised to recalculate EP projections to reflect the current Council's growth rate.

Hydraulic design of a sewage scheme is based on the contributing equivalent population (EP). One person in a residential house is counted as being one EP and the amount of waste or sewage generated by other sources are converted to the relevant number of EP's in comparison to this benchmark. The hydraulic load per EP is based on a unit-loading rate of 210 L/EP/d. This has been used in lieu of the standard long term average unit hydraulic loadings of 240 L/EP/d due to the reduced water consumption due to prevailing drought conditions.

Current EP loads were calculated by dividing the daily pump discharge rate for each catchment by the hydraulic unit-loading rate per EP. Calculated EP numbers were compared to Councils population count to check for accuracy of this assessment.

BSC is responsible for sewerage services to approximately 1670 equivalent tenements (ET) (see section 0). Council staff has advised that BSC's occupancy rate is 2.5 EP per ET. Thus, the current sewage loading at Blayney STP based on ET figures is estimated in 4174 EP. Table 21 shows that this figure is the same as the current total EP in the BSC SOIR (2007) report.

Table 21 presents the current EP and future EP projections for the Blayney sewerage scheme based on a growth rate of 0.6% (see section 5.7).

Table 21: Equivalent Population Projections

	Equivalent Population (EP) Projections	
Area	**2007 (BSC SOIR, 2007)**	**2037**
Millthorpe	600	718
Blayney Residential	3130	3745
Blayney Industrial *	444	531
Total	**4174**	**4994**

Note 3: * excluding tannery

Council expects the current growth rate to be sustained. Thus, BSC's future growth projections indicate that the current STP available capacity of 7000 EP is sufficient to meet any likely demand for sewerage services for the next 30 years.

The hydraulic loading has been calculated for the whole system. Average Dry Weather Flow (ADWF) was based on calculated EP and standard 210 L/EP/d allowance. Peak Wet Weather Flow (PWWF) was calculated for residential areas based on a storm allowance of 0.058 L/EP/d.

Council plans to extend sewerage services to the villages of Carcoar and Mandurama and provisional service to Lyndhurst including Somers and Garland villages. Council plans to carry out a feasibility study to sewer these villages. Council's 2008 capital works program shows approximately $5 M (2014/15 and 2015/16) to provide sewerage services to Carcoar and Mandurama and $2 M (2019/20) to provide provisional sewerage services to Lyndhurst (see section 5.6).

Table 22 shows the current and predicted Blayney STP hydraulic loading.

Table 22: Hydraulic Loading.

Loading Type	2007	2021
ADWF (ML/d)	0.88	1.1
ADWF (L/s)	10.1	13.1
PDWF (L/s)	18.3	23.6
PWWF (L/s)	44.7	57.5

Source: BSC SOIR, 2007.

5.9 Likelihood of Sewerage Overflows

The information in this section is obtained from the BSC SOIR (2007) report.

The majority of the sewerage system was classified as having a "rare" likelihood of overflow which means an overflow event may occur only in exceptional circumstances. Additionally this classification means that overflows either have not been recorded or the overflow rate is well below the benchmark average.

The potential impacts have been assessed for the Blayney Sewerage Scheme. The potential impacts are from overflows of untreated effluent to local creeks and into Belubula River and on public health. The assessed potential environmental impact is minor or insignificant due to the small volumes likely and the already disturbed state of the local waterways. It is considered unlikely that any significant impact on the aquatic environment would result. The assessed public health impact is also rated as either insignificant or minor for all system components. This classification means that there is little chance of public exposure from overflows within the maximum Council response time to abnormal operating conditions. Most pumping stations are located away from residential areas and those that are in residential areas have overflow paths away from public areas.

The overall level of risk for the scheme is low to moderate reflecting the low likelihood of overflows and the potential impacts being either insignificant or minor. The resulting risk matrix showing the assessed level of risk for the Blayney sewerage scheme is presented in Table 23.

Table 23: Level of Risk of Overflows at Blayney.

Component	Dry Weather Risk	Wet Weather Risk
Reticulation System		
Blayney 1	Moderate	Low
Blayney 2	Low	Low
Blayney 3	Low	Low
Blayney 5	Low	Low
Blayney 6	Low	Low
Blayney 7	Low	Low
Millthorpe	Low	Low
Millthorpe RM/PGM	Moderate	Moderate
Pumping Stations		
PS 1	Low	Low
PS 2	Low	Low
PS 3	Low	Low
PS 5	Low	Low
PS 6	Low	Low
PS 7	Low	Low
Millthorpe PS	Low	Low
Sewage Treatment Plant		
Blayney STP	Low	Low

Source: BSC SOIR, 2007.

5.10 Likelihood of Reticulation System Overflows

5.10.1 Dry Weather

The BSC SOIR report states that occurrence of overflows during dry weather is mainly attributed to blockages in the pipelines, cracked/broken pipelines/maintenance holes and external pressures and excavation. Blockages in reticulation mains occur infrequently. The main cause is tree root intrusions but can also occur due to foreign objects lodging in the pipelines. As per the past records kept by Council, apart from minor seepages due to blockages in pipelines in Catchment 1, no major overflow events have occurred in the reticulation system the recent past.

5.10.2 Wet Weather

The BSC SOIR report states that unusual excessive inflows, greater than the design peak wet weather flow (PWWF), may occur during extreme flood events if reticulation manholes become inundated and the inflow is greater than the pumping station capacity. Other possibilities for overflows include illegal connection of storm water pipes, low lying gullies and boundary traps.

The records kept by Council do not indicate any overflows due to wet weather in the recent past. As per council records overflows had occurred in PS 5 and its rising main (near PS) in 2004. Although the overflows occurred during a wet weather event, the cause was blockage of the main.

Minor overflows had occurred from the standpipe provided in the rising main from Millthorpe PS. Wet weather infiltration is low due to the Millthorpe Scheme being only 4 years old. Small

overflow volumes are involved even in wet weather and occur typically when sustained pumping occurs (a few seconds of flow per pump cycle).

For the reasons above, BSC plans to augment pumping stations storage capacity in Blayney and Millthorpe. The 2008 capital works program includes new works for emergency sewerage pumping stations storage capacity at both towns. This capital works program allows $30 K for an emergency sewerage pumping station storage for Blayney scheme in 2008/09 and $30 K for Millthorpe scheme in 2009/10.

5.11 Current Developments

Council expects possible growth and expansion in agro-processing industries and in mining and manufacturing sector. Cadia Gold mine is expanding and new mines are expected as mineral deposits are being discovered in the region. Also a private regional sale yard is under development near Carcoar.

The BSC draft AMP report lists a number of current developments:

- There is one major urban subdivision underway which will contain 61 lots when completed. Stage 1 has been complete which contains 34 lots.
- A 23 lot residential subdivision off Plumb St. in Blayney is completed.
- There are also numerous rural/residential subdivisions currently being constructed, including a proposal for over 100 lots at Millthorpe.
- The Shire is undertaking a rural lands strategy, including rural/residential and industrial development, which will address issues such as the changes in land use (see section 2.5.2) and the increase in commuter residents. Council is actively promoting development in an effort to increase business growth.
- Large scale re-zoning and subdivision of land in the Millthorpe village vicinity. It is anticipated that demand for these blocks will be solid in view of the village lifestyle but with close proximity to the city of Orange. Due to the proximity of this subdivision to Millthorpe it is expected that a condition of consent will be connection to the existing sewer infrastructure.

Data gaps:

- **Impacts of current developments on the existing sewerage system**
- **Current and future potential reuse markets**

5.12 Blayney Sewerage Scheme Main Issues

BSC has identified that the current sewerage services are generally satisfactory. There are however, some issues, which need to be addressed.

Potential Issue:

- **Meeting DWE Best Practice Management Guidelines (LOS)**
- **Wet weather inflow including illegal connections (excessive inflow)**
- **Reducing sewer chokes and blockages (LOS)**
- **Maintaining an up to date asset register including asset condition and rating**
- **Risk assessment of issues identified by Overflows Investigation Report**
- **Managing and funding future replacement/ renewal of assets.**
- **Environmental sensitivity of Carcoar Dam (LOS)**

The issues listed above were identified by Council. Some of them have been addressed in the current capital works program and might no longer be considered an issue.

6 Stormwater System

6.1 Description of the System

Description of Blayney stormwater system is not available.

Data gap: Description of the stormwater system

6.2 Stormwater Flows

The BSC Stormwater Management Plan (SMP) has determined stormwater quality management which envisage undertaking event-based sampling of stormwater quality using simple 'stage' samplers which collect samples of stormwater flows once flow depth reaches given levels. This approach was expected to provide greater consistency in sample collection than grab sampling of flow events, which may occur at any point in the storm hydrograph. Stormwater flow figures are not available.

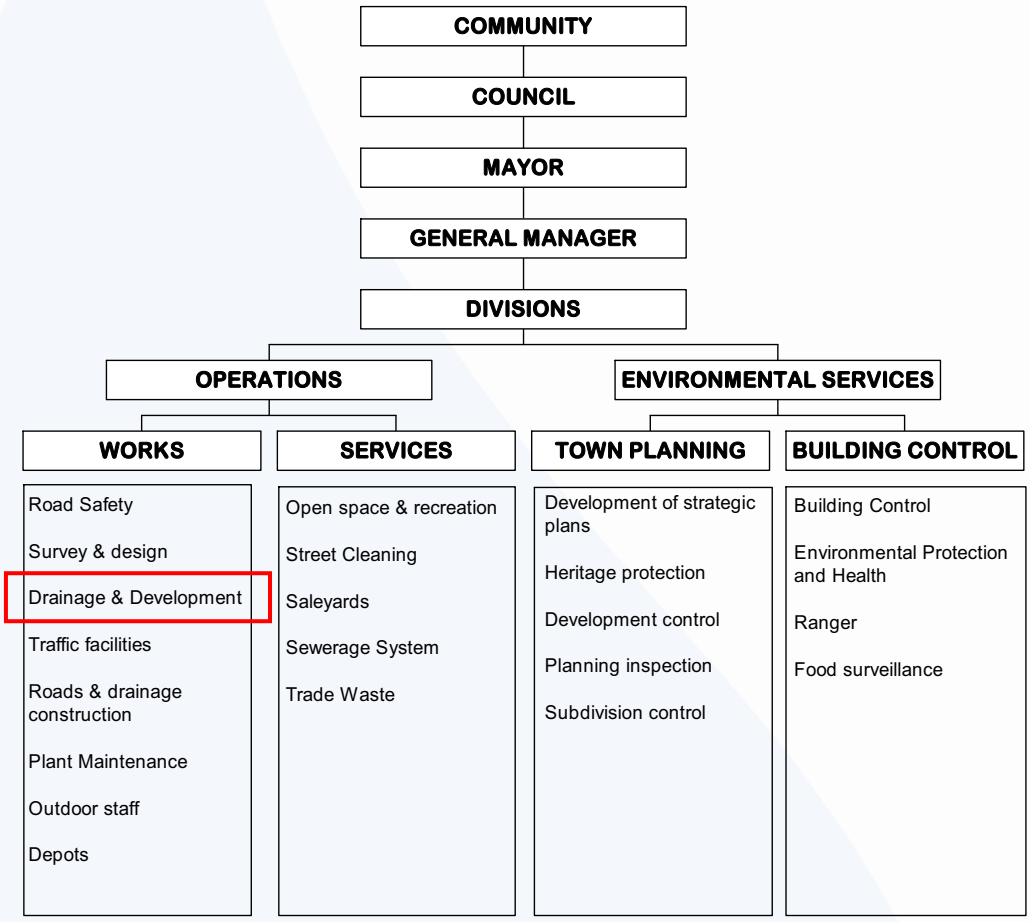
Data gap: Stormwater flows

6.3 Stormwater Management Responsibilities

Within Blayney Town the BSC is primarily responsible for stormwater management plan. The Roads and Traffic Authority has no stormwater management responsibility within the Blayney urban area.

Within Blayney Council, there are a number of groups who have responsibility for stormwater management within the urban areas. The following Council structure identifies each section and subsection having responsibility for stormwater management.

Figure 9: BSC Stormwater Management Responsibilities and Structure



Blayney stormwater system is shown in Appendix F.

6.4 Source of Pollution within Stormwater Catchment

6.4.1 Introduction

As a result of the diverse range of activities conducted within the catchment (see section 2.5), there are a variety of pollution sources. The BSC SMP covers the points and diffuse sources of pollution within Blayney Township.

6.4.2 Point Sources of Pollution

Point sources of pollution and type of pollution are as show in Appendix G.

6.4.3 Diffused Sources

- Private Residential. Within the Township of Blayney the residential zones contribute a substantial portion of the pollutants into the stormwater. The actions of any one resident are minor. However, the accumulative effects of residences are substantial.
- Central Business District. Pollutants from the CBD may include street litter from shoppers, grit and oils from traffic, food scraps dropped by shoppers, dirt and litter washed/swept into gutters by shop owners and overfilled garbage bins. Since Blayney's CBD is on the Mid Western Highway there is a potential for spills of a variety of pollutants.
- Rural Runoff. The proportion of rural land within the stormwater catchment is small. While the runoff from rural areas is not considered to contribute a major portion of the flow within the stormwater system, it should not be disregarded. Nutrients from over fertilising and animal faeces form the typical types of pollutants.

- The Industrial Estate. The sewer has recently been constructed and this has stopped septic overflow and reduced septic pollutants entering into the stormwater system.
- Domestic Building. Erosion and sedimentation due to disturbed soil at construction site. There are a number of industries in the industrial estate that are controlled through trade waste agreements by the EPA and therefore they will be exempt from this analysis. However, transporting of chemicals and waste to and from these places of business pose a risk to the stormwater quality of the area.

6.5 Estimate Pollution Loading from Sources

6.5.1 Pollution Load

The estimated pollution load from the abattoir sewage treatment plant and the urban and industrial zones are in Appendix C of the BSC Stormwater Management Plan.

Industry specific testing has occurred for those sites under DECC (EPA) pollution control licensing agreement which is external to this study.

The estimates of severity of the pollution sources are indicative and established by site visits and stakeholders experience. Further rigorous testing for pollutants was not considered financially viable at that stage. However, this may change in the future.

6.5.2 Point Source Estimate

The BSC SMP provides a list of point source pollution within Blayney Shire. The list has been updated by Council staff and it is show in Table 24. Shading denounces that the respective industry is under an agreement with the DECC (EPA) for waste minimisation.

Table 24: Point Source Pollution

Point Source	Low	Med	High
Abattoirs			*
Shire Depot			*
Friskies	*		
Timber Mill	*		
Solid Waste Landfill Site		*	
Accidental spills			*
Pool filter backwash			*
Domestic Building			*

Source: BSC SMP

6.5.3 Diffuse Source Estimate

Most of the polluting industries within the industrial estate are under DECC (EPA) control. However, saturated groundwater conditions coupled with the septic tank sewering should be addressed.

Table 25: Diffused Source Estimate.

Diffused Source Estimate	Low	Med	High
The Industrial Estate			*
Private Residential		*	
Rural Runoff	*		
CBD		*	

Source: BSC SMP

6.6 Infrastructure Capacity

Information on the ability of the current infrastructure to meet future needs, including collection, treatment and disposal of stormwater has not been identified.

Data gap: Stormwater infrastructure capacity

6.7 Summary of Findings of the Stormwater Management Plan

Degradation of water quality in the Belubula River and Carcoar Dam has been apparent with increases in the frequency and duration of algal blooms which have a wide range of impacts on the catchment.

The main cause of these algal blooms has been the dramatic increase in nutrient concentration within the Belubula River catchment as a result of urbanisation, industrialisation as well as primary production. The SMP has determined the point and diffuse sources of pollutants and analysed all possible mitigating or abatement techniques.

Extensive management options have been outlined in SMP. The greatest potential for improving the quality of the water entering the Belubula River and Carcoar Dam is through increasing community awareness. Other beneficial proposals include water purifying units that are awaiting joint funding / approval from the DECC (EPA) and BSC. There are many techniques included that can be applied on a daily basis by Council and the community.

Ranks have been designated by local stakeholders on all known pollution sources to differentiate between the worst situations and those requiring less immediate attention. These rankings have been used to evaluate management options. Table 26 is a summary of the key issues in the Council stormwater system and the highest rated management options identified to address those issues.

Table 26: Stormwater System issues and Management Options

Key Issues	Management Options
Degradation of water quality in the Belubula River and Carcoar Dam	▪ Educate community by installing stormwater stencils ▪ Increase community awareness about the environmentally responsible techniques for everyday activities
Water pollution	▪ Public education ▪ Constructed Wetlands ▪ Grease and Oil Removal ▪ CDS Gross Pollutant trap

Council and other stakeholders have formed a stormwater steering committee which endeavours to address all known diffuse and point pollution sources effecting the Belubula River and Carcoar Dam. It is the intent of this stormwater steering committee that a process of stormwater quality auditing will be adopted by all interested and effected parties. It is the ambition of the stormwater steering committee that findings from this report will be communicated to the greater community and used to generate a greater awareness of both local and general water quality issues.

6.8 Flood Study

Information on flooding issues and costs are not available.

Data gap: Flood study

6.9 Potential Areas for WSUD

Data gap: Potential areas that could be utilised for Water Sensitive Urban Design schemes such as stormwater harvesting

7 References

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Appendix A

Blayney Shire Maps

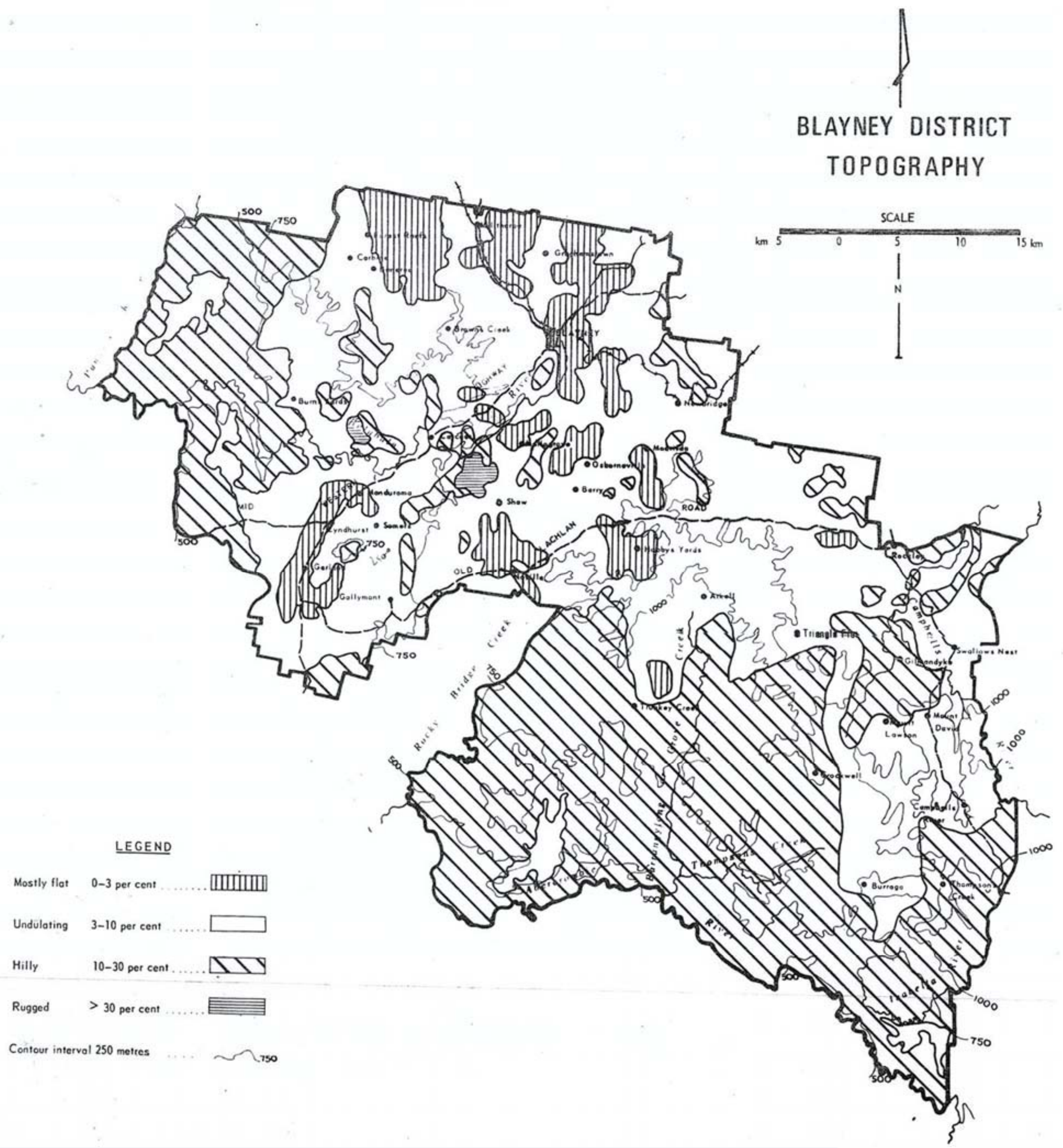

Figure 10: Blayney District Topography Map. Source: Soil Conservation Service of NSW, 1976.

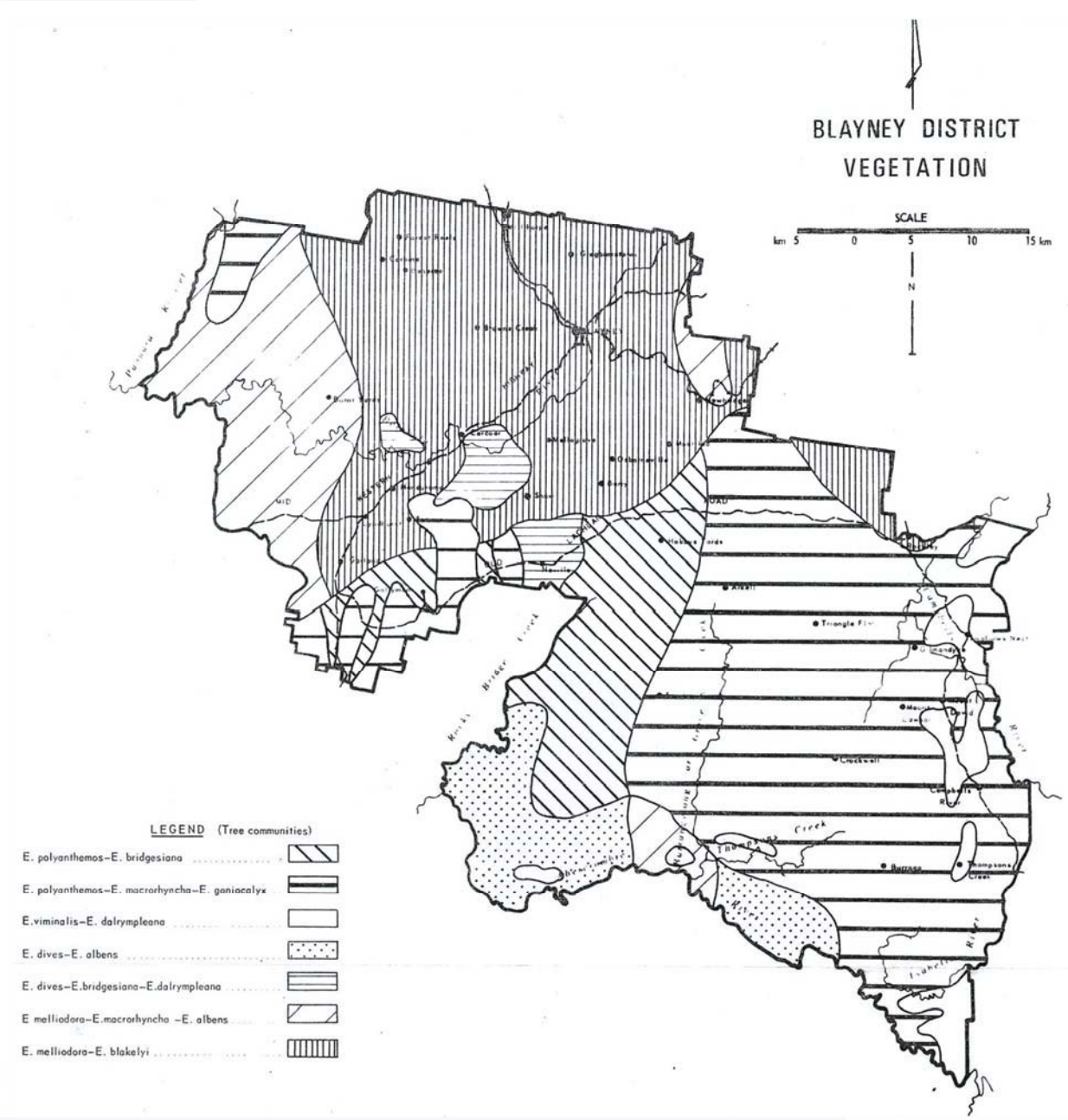

Figure 11: Blayney District Vegetation Map. Source: Soil Conservation Service of NSW, 1976.

Appendix B

Blayney Soil Types

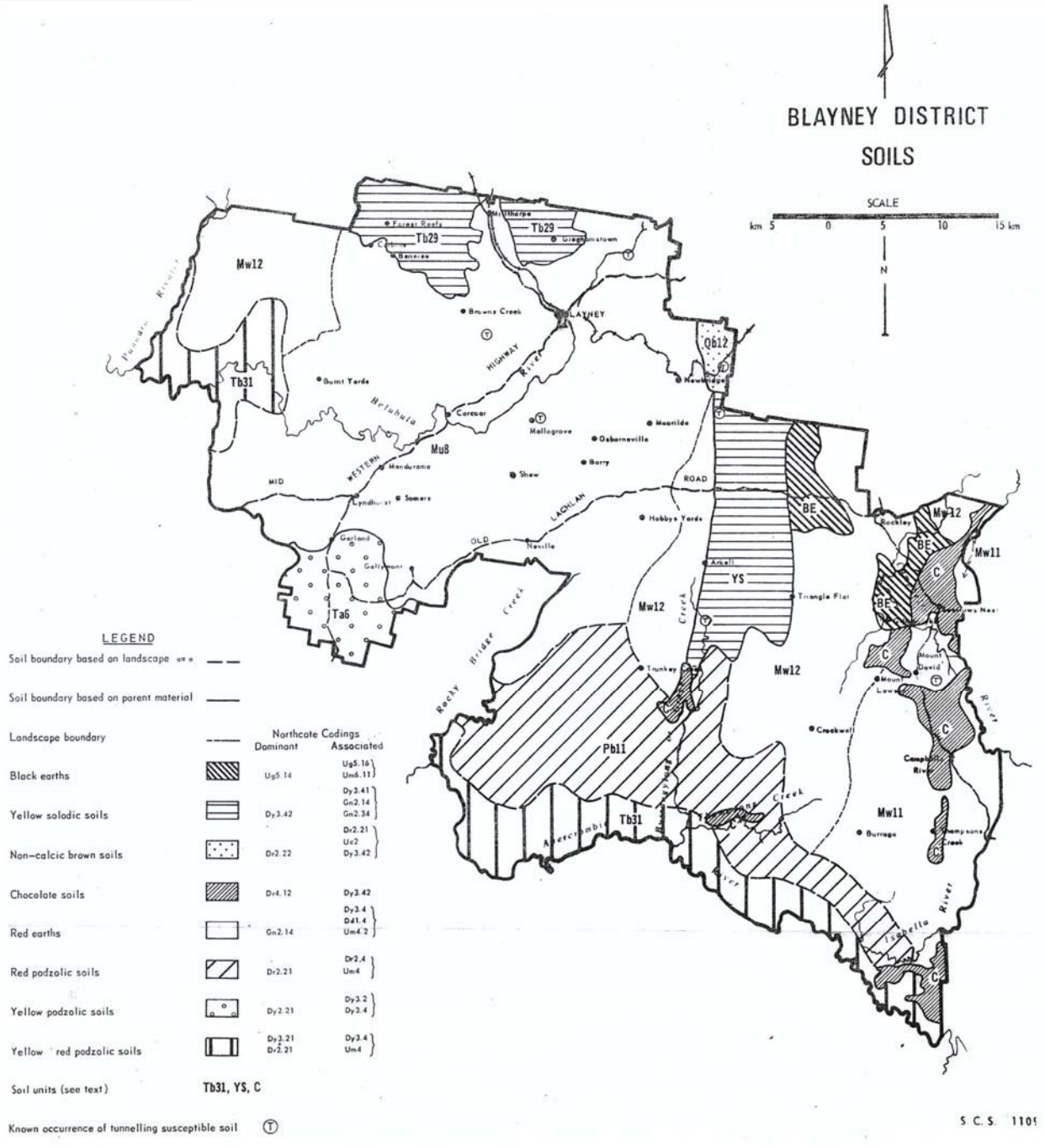

Figure 12: Blayney District Soils Map

Table 27: Soils Description

	Soil	Morphology and Chemical Status	Soil erosion and conservation
Great Soil Group	Black Earth	▪ The upper 30 cm is generally neutral to alkaline with an alkaline pH at depth ▪ When dry, they develop closely-spaced wide, deep cracks and a hard consistence ▪ When moist or wet they are very plastic or extremely sticky	▪ Although this soil is generally high erodible, they are generally not subject to serious erosion in the Blayney district ▪ Subject to desiccation cracking and care should be taken when constructing earthworks
	Non-calcic Brown Soils	▪ They are morphologically similar to red podzolic soils and red-brown earths ▪ Major deficiencies are nitrogen and phosphorus ▪ Acid topsoils are common and calcium and molybdenum can be deficient	▪ Although they are generally permeable and well-drained, they are also quite erodible because of their sandy texture and weak surface structure ▪ They are not dispersible, but they are associated with solodic soils on the lower slopes and drainage lines which occasionally are dispersible
	Chocolate Soils	▪ Moderate chemical fertility ▪ Major deficiencies are nitrogen and phosphorus	▪ The surface soil has a high content of plant remains and has a good crumb structure ▪ Well drained profile ▪ Because these soils occur on knolls with often rather steep slopes, they are used only for native pastures
	Red Earth	▪ These soils in the Blayney district are relatively shallow, varying from 0.5-1.2m ▪ Low chemical fertility ▪ Major deficiencies are nitrogen and phosphorus	▪ In general these soils are permeable and well-drained ▪ Where the organic matter content of the A1 horizon is low, the soils are quite erodible but are particularly stable when the organic matter content is high
Sub-group	Yellow Solodic	▪ Low fertility ▪ Main deficiencies are phosphorus, nitrogen, calcium and molybdenum ▪ The pH of the top soils are often low (5.0 - 5.5)	▪ Where leaching has removed soluble salts then the soils are dispersible and susceptible to tunnelling failure
	Red Podzolic	▪ Low fertility	▪ Because of their location on

	Soil	Morphology and Chemical Status	Soil erosion and conservation
	Yellow Podzolic	▪ Main deficiencies are phosphorus, nitrogen, calcium and molybdenum	steep slopes and their shallow profiles, the soils are subject to erosion ▪ None of these soils examined on the survey were dispersible

Source: Soil Conservation Service of NSW, 1976.

Appendix C

Blayney LEP Maps

The zones shown in maps in Figure 13and Figure 14 are specified below:
Zone 1 (a) (Rural) – General Rural Zone
Zone 1 (c) (Rural) – Rural Small Holdings Zone
Zone 2 (v) (Residential) – Village or Urban Zone

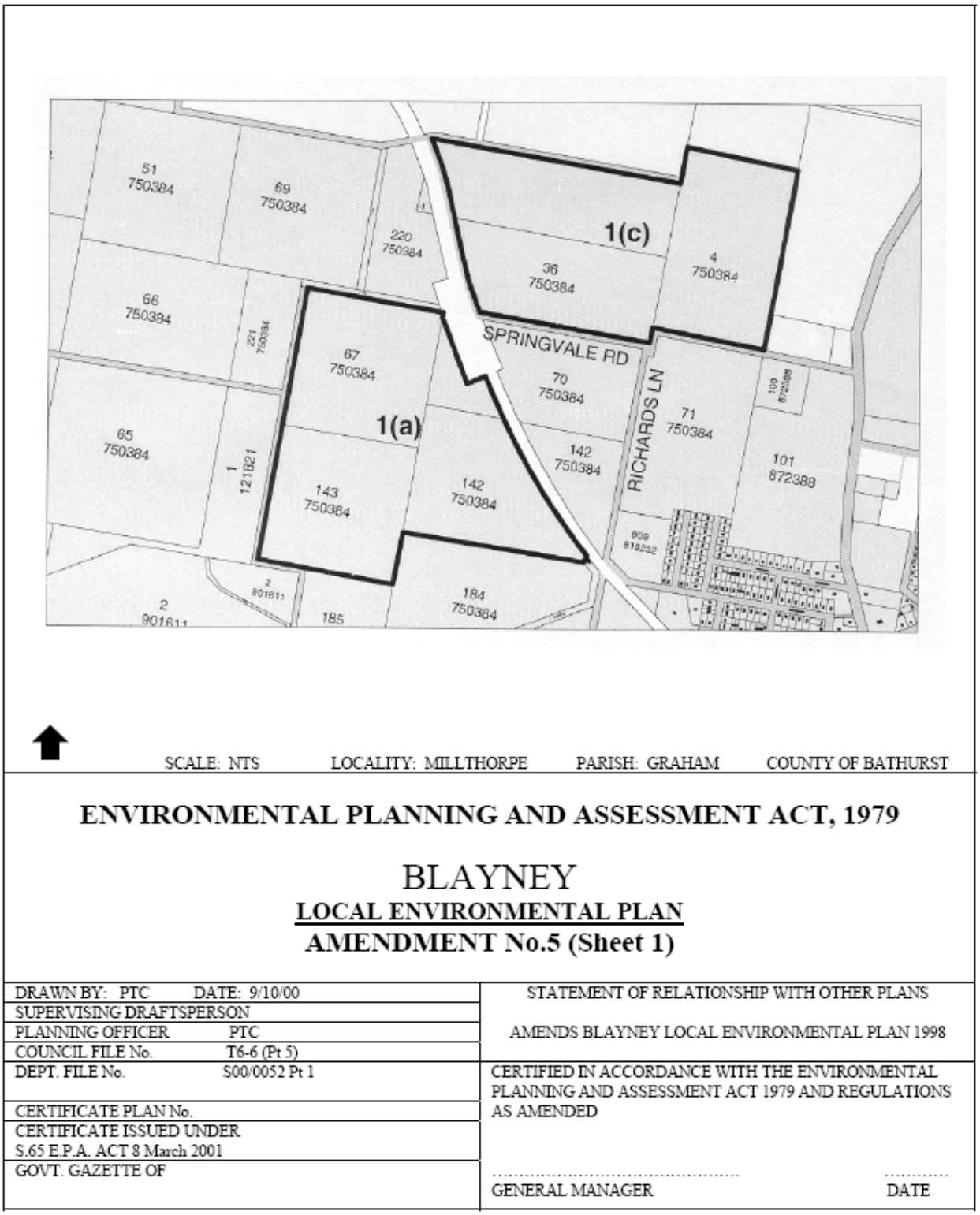

Figure 13: Blayney LEP 1998, Amendment No 5 (sheet 1)

NOTE: Dimensions are approximate and will be subject to survey

SCALE: NTS LOCALITY: MILLTHORPE PARISH: GRAHAM COUNTY OF BATHURST

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

BLAYNEY

LOCAL ENVIRONMENTAL PLAN

AMENDMENT No.5 (Sheet 2)

DRAWN BY: PTC DATE: 9/10/00	STATEMENT OF RELATIONSHIP WITH OTHER PLANS
SUPERVISING DRAFTSPERSON	
PLANNING OFFICER PTC	AMENDS BLAYNEY LOCAL ENVIRONMENTAL PLAN 1998
COUNCIL FILE No. T6-6 (Pt 5)	
DEPT. FILE No. S00/0052 Pt 1	CERTIFIED IN ACCORDANCE WITH THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 AND REGULATIONS AS AMENDED
CERTIFICATE PLAN No.	
CERTIFICATE ISSUED UNDER S.65 E.P.A. ACT 8 March 2001	
GOVT. GAZETTE OF	..... GENERAL MANAGER ..... DATE

Figure 14: Blayney LEP 1998, Amendment No 5 (Sheet 2)

Appendix D

Blayney Sewerage Systems

Figure 15: Blayney Reticulation System

Figure 16: Millthorpe Reticulation System

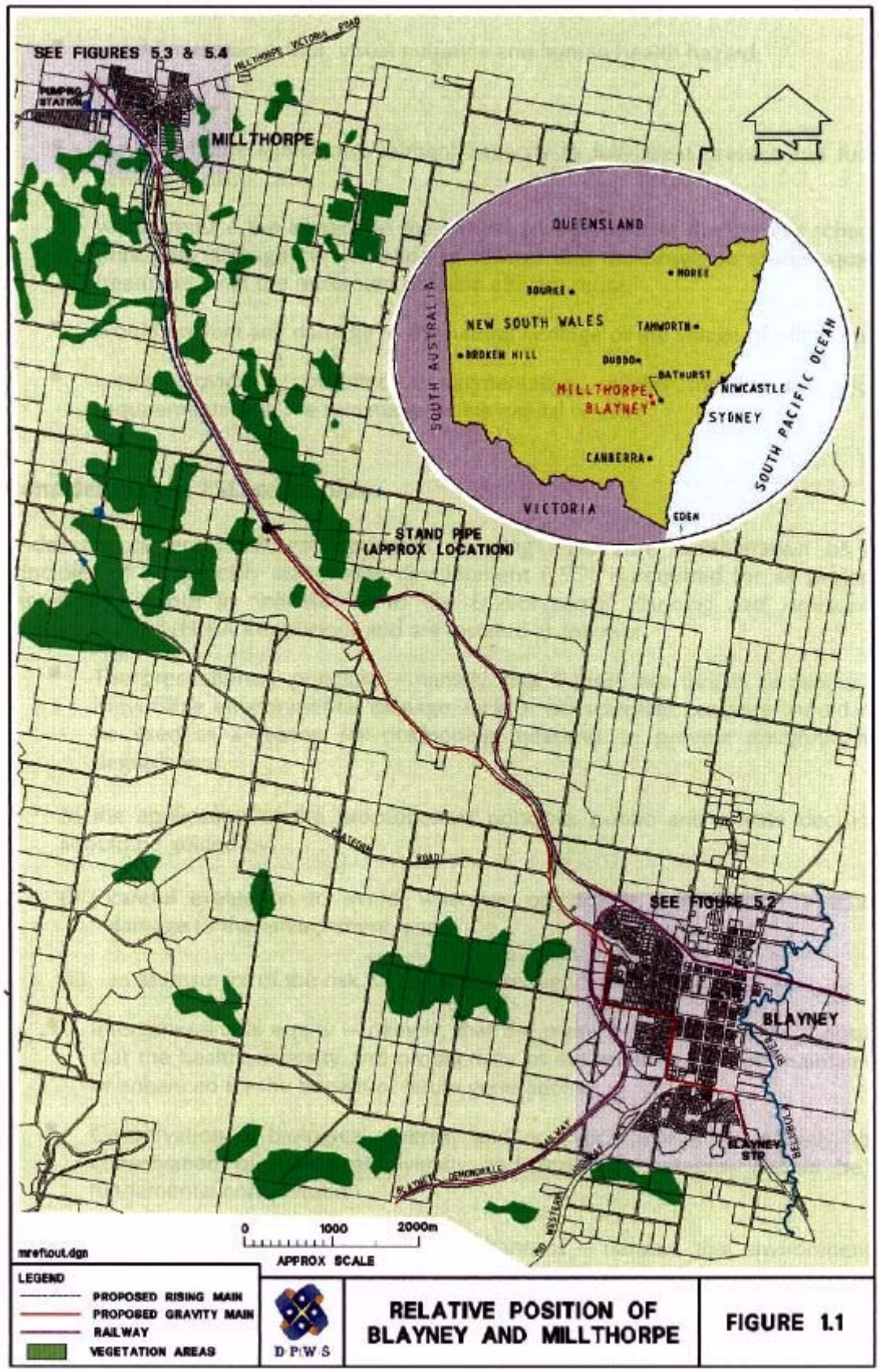

Figure 17: Proposed Sewerage Reticulation System Source: Blayney and Millthorpe REF, 2001.

Data gap: updated map of the sewerage reticulation system

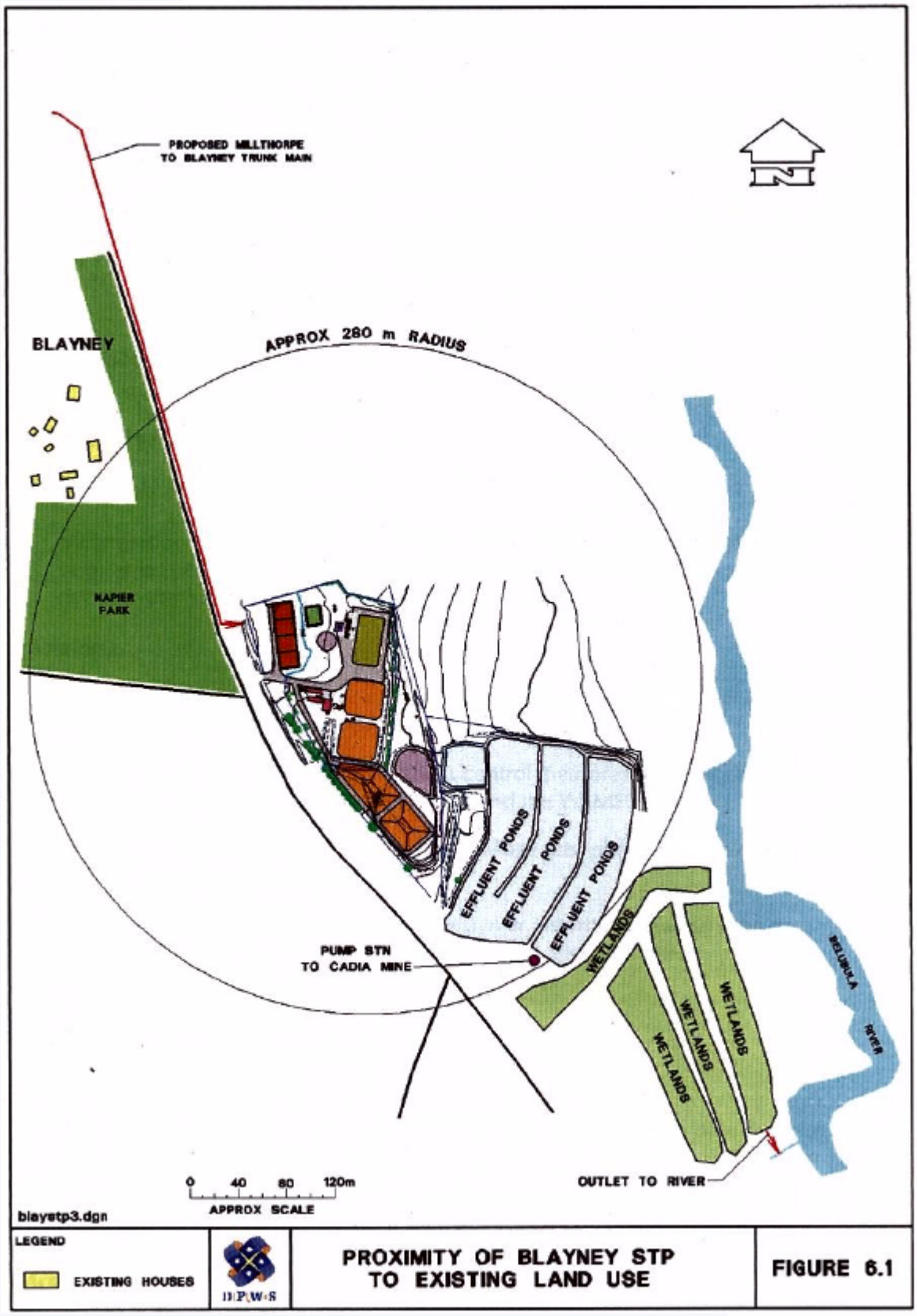

Figure 18: Blayney STP Components

Table 28: Blayney Pumping Station Location and Descriptions.

Name	Location	Description
PS1	Henry Street, Blayney	The largest pumping station in the Scheme. Receives flows from pumping stations PS2, PS5, PS6, and PS7. Discharges sewage to Blayney STP. Originally constructed as wet well / dry well type pumping station and since augmented to a wet well type pumping station.
PS2	Adelaide Street, Blayney	Discharges catchments sewage to PS 1. A wet well type pumping station.
PS3	Farm Street, Blayney	Discharges catchments sewage directly to Blayney STP. A wet well type pumping station.
PS5	Palmer Street, Blayney	Discharges catchments sewage to PS 1. A wet well type pumping station.
PS6	Mid Western Highway, Blayney	Serves the Blayney Industrial Area. Discharges catchments wastewater to PS 1. A wet well type pumping station.
PS7	New Bridge Road, Blayney	Serves the Blayney Sea Link Company. The PS is a private installation; but now operated and maintained by Council. Discharges catchments wastewater to PS 1. A wet well type pumping station.
Cadia Mine PS **(Source 1)**	Blayney STP	Currently this PS pumps 80% of treated sewerage from Blayney STP to Cadia Dewatering Plant in Blayney.
King George Oval PS **(Source 1)**	King George Oval, Blayney	Discharges sewerage from the oval, directly to the Blayney STP. This is a small single PS that operates only when the oval is used.
Millthorpe PS	Forest Reefs Road, Millthorpe	Discharges catchments sewage directly to Blayney STP via a rising /pressure gravity main. A wet well type pumping station.

Source: BSC SOIR, 2007. Source 1: Council staff

Appendix E

Blayney Sewerage Capital Works Program

SEWERAGE - CAPITAL WORKS PROGRAM (2007/08 $000)

	30 YEAR TOTAL	2007 : 2006/07	0	1 2007/08	2 2008/09	3 2009/10	4 2010/11	5 2011/12	6 2012/13	7 2013/14	8 2014/15	9 2015/16	10 2016/17	11 2017/18	12 2018/19	13 2019/20	14 2020/21	15 2021/22
Subsidised Scheme (for improved levels of service)																		
Augment Blayney STP for sensitive waters standards	3,800																	
Sewerage scheme for Canowar and Manildurana (not includes	5,250								50	200	3,000	2,000						
Sewerage scheme for Lyndhurst (Provisional)	2,800															2,000		
	0																	
Total Subsidised Scheme	11,850	0	0	0	0	0	0	0	50	200	3,000	2,000	0	0	0	2,000	0	0
Other New System Assets																		
New Works - Growth																		
STP - Lab and Amenities Building	400				100	300												
Minor New Works																		
Septic tank discharge bay	35			35														
Raising/sealing manholes near river	15				15													
Trunk sewer / Central Works	0																	
Emergency SPS storage capacity Millthorpe	30					30												
Emergency SPS storage capacity Blayney	30				30													
Millthorpe Transfer Main Investigation and Augmentation	450				50		200	200										
	0																	
Total Other New System Assets	960	104	0	35	195	330	200	200	0	0	0	0	0	0	0	0	0	0
Renewals																		
Telemetry upgrade								30					30					30
Lining/ Replacement of sewer mains	1,800					50	50	50	50	50	50	50	50	50	50	50	50	50
Replacement of pumps in SPS	150						25					25					25	
P&E replacement	25			25														
Electrical replacements	120												40					
Millthorpe - Pump replacement	40																	20
	0																	
Total Renewals	1,915	0	0	25	0	50	75	80	50	50	50	75	120	50	50	50	75	100
TOTAL CAPITAL WORKS	13,125	104	0	60	195	380	275	280	100	250	3,050	2,075	120	50	50	2,050	75	100
Expected Grant For Acquisition of Assets																		
Total Grant for Acquisition of Assets	0	0	0	0	0	0	0	0										

	16 2022/23	17 2023/24	18 2024/25	19 2025/26	20 2026/27	21 2027/28	22 2028/29	23 2029/30	24 2030/31	25 2031/32	26 2032/33	27 2033/34	28 2034/35	29 2035/36	30 2036/37
Subsidised Scheme (for improved levels of service)															
Augment Blayney STP for sensitive waters standards	3,800														
Sewerage scheme for Canowar and Manildurana (not includes															
Sewerage scheme for Lyndhurst (Provisional)															
Total Subsidised Scheme	3,800	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other New System Assets															
New Works - Growth															
STP - Lab and Amenities Building															
Minor New Works															
Septic tank discharge bay															
Raising/sealing manholes near river															
Trunk sewer / Central Works															
Emergency SPS storage capacity Millthorpe															
Emergency SPS storage capacity Blayney															
Millthorpe Transfer Main Investigation and Augmentation															
Total Other New System Assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewals															
Telemetry upgrade					30					30					30
Lining/ Replacement of sewer mains	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Replacement of pumps in SPS				25					25					25	
P&E replacement															
Electrical replacements					40										40
Millthorpe - Pump replacement															20
Total Renewals	50	50	50	75	120	50	50	50	75	80	50	50	50	75	140
TOTAL CAPITAL WORKS	3,850	50	50	75	120	50	50	50	75	80	50	50	50	75	140
Expected Grant For Acquisition of Assets															
Total Grant for Acquisition of Assets															

Figure 19: BSC Sewerage 30 years Capital Works Program. Source: BSC SBP, 2008.

Appendix F

Blayney Stormwater System

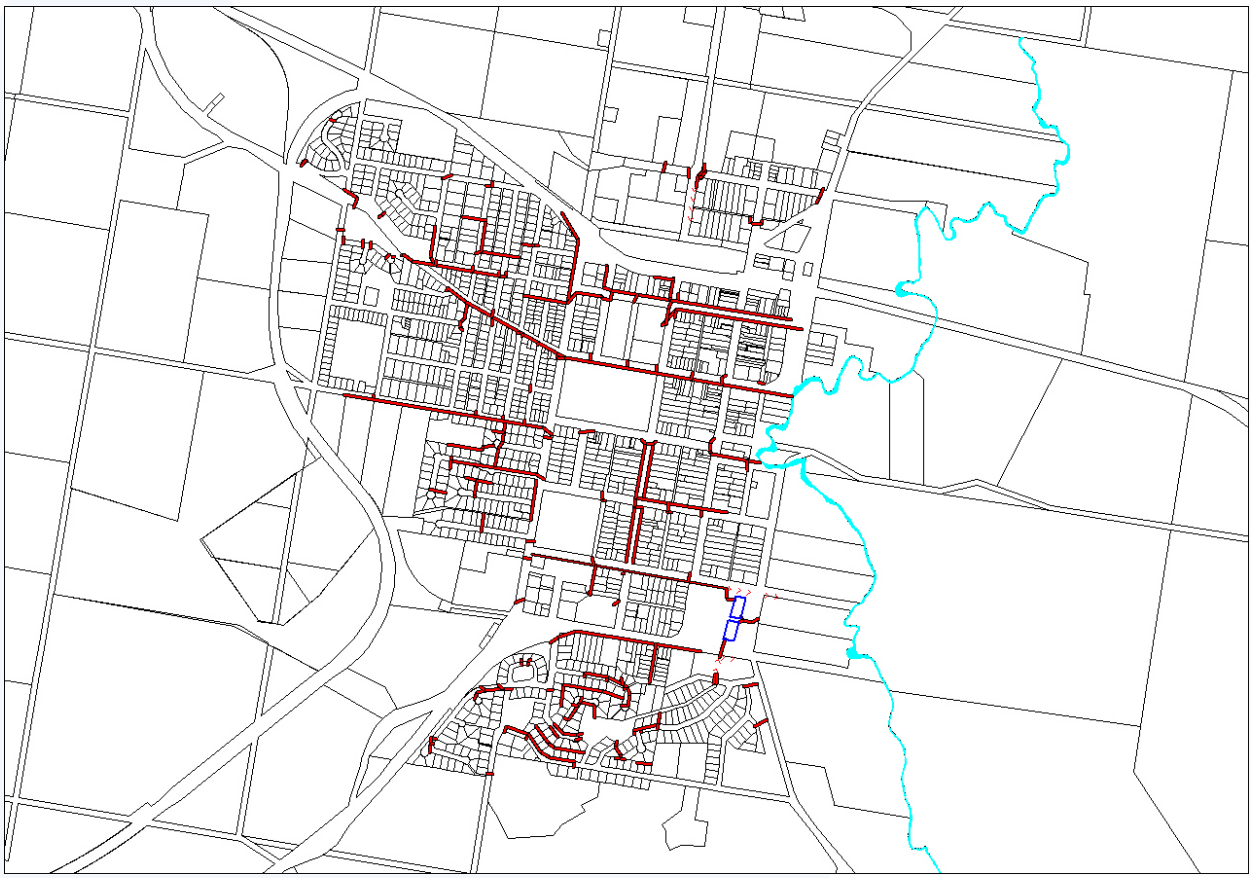

Figure 20: Blayney Stormwater System

Appendix G

Point Sources and Type of Pollutions

Table 29: Point Sources and Type of Pollutants

	Point Sources								
Type of Pollutants	Tannery	Saleyards & Associated Truck Wash	Abattoirs	Shire Depot	Friskies	Timber Mill	Solid Waste Landfill Site	Pool Filter backwash	Sewage Treatment Plant
Heavy Metals	✓					✓			✓
Salts	✓								
Animal Fats	✓								
Soaps & Detergents	✓	✓	✓		✓				
Oils & Grease		✓		✓			✓		
Nutrients		✓	✓		✓				✓
Pathogens		✓					✓		✓
Transportation of Weeds		✓							
Organic Matter		✓	✓						✓
Incineration emissions			✓		✓				
Emulsion tank leaks				✓					
Sediment from truck washing				✓					
Sediment from internal vehicular movements				✓					
Litter				✓	✓	✓			
Smoke from diesel heater				✓					

	Point Sources								
Type of Pollutants	Tannery	Saleyards & Associated Truck Wash	Abattoirs	Shire Depot	Friskies	Timber Mill	Solid Waste Landfill Site	Pool Filter backwash	Sewage Treatment Plant
Washing of concreting tools				✓					
Fertilisers storage				✓					
Animal Faeces					✓				
Sawdust						✓			
Sediment from heavy vehicle movements						✓			
Leachate							✓		
Wind blow litter							✓		
Chlorine (oxidant)								✓	
Micro organisms									✓

Document Control					
Revision	Author	Reviewer	Approved for Issue		
			Name	Signature	Date
2	ARA	AFR	Andrew Fraser	Andrew Fra	11th November 2008