



# NARRABRI SHIRE



## **Narrabri Shire Council Drought Management Plan**

**October 2023 - 2024**

**Reviewed:** WSM - DIS

**Approved:** November 2023

**Endorsed for Public Exhibition:** 19 December 2023 (MINUTE 347/2023)

## **Executive Summary Context**

This plan has been developed to provide a framework to assist in handling future droughts by both Council Staff and in consultation with the community..

This plan has been developed in accordance with the checklist provided in NSW Government Best-Practice Management of Water Supply and Sewerage (included in Appendix A).

### **Objectives**

The overall objective of this drought management plan is to ensure that at all times a basic water supply is available to all users.

Additionally, this plan also aims to:

- Allow for a timely and consistent response to future droughts.
- Identify groups that have different water requirements and ensure that these customers are considered. The most notable example is the unique need of the hospitals in our local government area.
- Outline methods for issuing drought information and education.
- Provide information regarding current water supply schemes.

## **Drought Preparation**

### **General Monitoring**

A large part of drought preparation is ensuring water demand is accurately and consistently monitored.

Monitoring is essential to predicting the impacts of drought. In Narrabri Shire the main issue with drought is the increased pressure placed upon the water distribution infrastructure. By monitoring data consistently, the Narrabri Shire Council can determine whether the Drought Triggers require amendments.

It is most important to ensure the chlorinated water output is always recorded as this will be the main indicator of the demand.

### **Drought Monitoring**

In accordance with the Best Practice Management of Water Supply and Sewerage Guidelines (2007), during a declared drought the following monitoring must be undertaken:

- Daily monitoring of demands.
- Daily monitoring of bores.
- Monitoring impact of restrictions on consumption.

- Monitoring the electrical conductivity, alkalinity, and algae levels in the potable water sources.

Daily drought monitoring is crucial, as it will allow for the drought management plan to be evaluated and adjusted for future droughts.

## Drought Activation Plan

### Drought Triggers

The drought management plan includes 5 different levels of restrictions. The level of restriction in place is based on certain demand events occurring within the system known as triggers.

Level	Trigger when:	Relax when:
1 Low	Permanent	Never
2 Moderate	a) Demand on water supply increases daily average production >15% increase for 5 consecutive days.	<ul style="list-style-type: none"> <li>• Demand on supply reduces to no more than &gt;10% average daily production for 7 consecutive days</li> </ul>
3 High	<ul style="list-style-type: none"> <li>• Declaration of drought over LGA</li> <li>• Demand on daily average water production is &gt;15% increase for 5 consecutive days.</li> </ul>	<ul style="list-style-type: none"> <li>• Drought declaration lifted.</li> <li>• Demand on supply reduces to no more than &gt;10% average daily production for 7 consecutive days</li> </ul>
4 Very High	<ul style="list-style-type: none"> <li>• Demand on daily average water production is &gt; 80% of extraction limit average for more than 7 days.</li> </ul>	<ul style="list-style-type: none"> <li>• Demand on daily average water production is &lt;70% of extraction limit average for 14 days</li> </ul>
5 Extreme	<ul style="list-style-type: none"> <li>• Demand trend on water allocation would see exceedance of allocation</li> </ul>	Demand on daily average water production is <80% of extraction limit average for 14 days

## Water Supply Systems

Water Supply System	Population Served	Average Demand (kL/day)	Raw Water Source	Current Problems
Narrabri	12703	3000 kL/day  Production Capacity: 5600 kL/day	Groundwater from 3 bores	During hot weather users of the network are not demonstrating sufficient restraint or sustainable practices in usage
Wee Waa	2000	1580 kL / day  Production Capacity: 5500 kL / per day	Groundwater from 2 bores	During hot weather users of the network are not demonstrating sufficient restraint or sustainable practices in usage. Demand during warm weather events averages close to allocation limits.
Boggabri	856	614 kL / per day  Production Capacity: 3500 kL / per day	Groundwater from 2 bores	During hot weather users of the network are not demonstrating sufficient restraint or sustainable practices in usage.
Bellata	349	63.8 kL / Per day  Production Capacity: 500 kL / per day	Groundwater from 1 bore	During hot weather users of the network are not demonstrating sufficient restraint or sustainable practices in usage.
Gwabegar	124	21.7 kL/ per day  Production Capacity: 250kL / per day.	Groundwater from 1 bore	During hot weather users of the network are not demonstrating sufficient restraint or sustainable practices in usage.
Pilliga	175	43 kL / per day  Production Capacity: 300kL /per day	Groundwater from 1 bore	During hot weather users of the network are not demonstrating sufficient restraint or sustainable practices in usage.

## Contents

Executive summary .....	ii
Context.....	ii
Objectives.....	ii
Drought Preparation .....	iii
General Monitoring.....	iii
Drought Monitoring.....	iii
Drought Activation Plan.....	iii
Drought Triggers .....	iv
1 Introduction.....	6
1.1 Context.....	6
1.2 Objectives of the DMP.....	6
1.3 Background .....	6
1.4 History of Past Droughts.....	6
1.4.1 Past Droughts .....	6
1.4.2 Previous Drought Restrictions .....	6
2 Drought Strategy Plan .....	7
2.1 Drought Preparation .....	7
2.1.1 General Monitoring.....	7
2.1.2 Drought Monitoring.....	7
2.2 Drought Activation Plan.....	7
2.2.1 Triggers.....	7
2.2.2 Restrictions.....	10
2.3 Drought Management Team.....	13
2.4 Communication .....	14
2.4.1 Public Engagement.....	14
2.4.2 Information for the Public .....	14
2.4.3 Government Agency Consultation.....	14
2.4.4 Contact List .....	15
2.5 Regulatory Framework .....	15
3. Water Supply Scheme.....	16
3.1 Existing Water Supply Schemes .....	16
3.2 Bore Information.....	17
3.3 Water Treatment Process .....	18

4 Water Demand .....	19
4.1 Water Pricing.....	19
4.2 Water Users .....	19
4.3 Potable Water Demand .....	19
4.4 Non-Potable Water Demand .....	21
4.6 Significant Water Users.....	22
4.7 Historic Water Demand .....	23
5 Climate Data.....	26
References .....	27
Appendix A.....	28

## **1 Introduction**

### **1.1 Context**

This plan has been developed to provide a framework to assist in handling future droughts by both Council Staff and the community.

This plan has been developed in accordance with the checklist provided in NSW Government Best-Practice Management of Water Supply and Sewerage (2007).

### **1.2 Objectives of the Drought Management Plan**

The overall objective of this Drought Management Plan (DMP) is to always ensure that a basic water supply is available to all users.

Additionally, this plan also aims to:

- Allow for a timely and consistent response to future droughts.
- Identify customers that have different water requirements.
- Outline methods for issuing drought information and education.
- Provide information regarding current water supply schemes.

### **1.3 Background**

Narrabri Shire is situated on the Northwestern Slopes Region of New South Wales along Namoi River Catchment and is approximately 172km north of Tamworth and 6 hours from Sydney. Narrabri is the commercial and social hub of the district with strong agricultural and livestock industries. It has excellent facilities and services and a close connection to the vibrant towns of Wee Waa, Boggabri and as well as the local communities of Pilliga, Bellata Gwabegar and Edgeroi. These communities comprise the Narrabri Shire and have a combined population of approximately 12703 (2021)

### **1.4 History of Past Droughts**

#### **1.4.1 Past Droughts**

Drought is a recurrent and regular feature of the Australian environment. Drought is defined in Australia by rainfall levels over a period of three months that are within the lowest 10<sup>th</sup> percentile for that region (Bureau of Meteorology, n.d). Australia has faced two major droughts in the 20<sup>th</sup> century, the Millennium Drought which peaked from 2001-2009 and another from late 2016 to late 2019.

#### **1.4.2 Previous Drought Restrictions**

- There is no record of Narrabri Shire Council imposing water restrictions in recent times from the records that have been kept.

## **2 Drought Strategy Plan**

### **2.1 Drought Preparation**

#### **2.1.1 General Monitoring**

A large part of drought preparation is ensuring monitoring of water use is accurate and consistent. It is most important to ensure the potable water output is always recorded as this will be the main indicator of the level of demand.

Data will be used to determine future drought management plans. The data used for this plan has been included in Chapter 4.

#### **2.1.2 Drought Monitoring**

In accordance with the Best-Practice Management of Water Supply and Sewerage Guidelines (2007), during a declared drought the following monitoring must be undertaken:

- Daily Monitoring of demands.
- Daily Monitoring of bores.
- Monitoring impact of restrictions on consumption.
- Monitoring the electrical conductivity, alkalinity, and algae levels in the water sources.

Daily drought monitoring is crucial, as it will allow for the drought management plan to be evaluated and adjusted for future droughts.

### **2.2 Drought Activation Plan**

#### **2.2.1 Triggers**

Triggers are the events which activate different stages of the drought management plan. The Triggers listed in the following sections are specific to the Narrabri Shire as they are based on the water supply for the region.

During a drought, potable water is used more regularly for gardens and similar purposes which would otherwise receive water from rain. Therefore, the major implication of drought to the Narrabri Shire region is the potential for demands on the supply infrastructure and resource exceed their capacity. For this reason, the water demand has been set as a trigger for different levels of water restrictions.

The declaration of drought within the region will only be recognised through the information provided by NSW Department of Primary Industries.

[Department of Primary Industries - Enhanced Drought Information Systems Web Portal \(nsw.gov.au\)](http://www.nsw.gov.au/department-of-primary-industries/enhanced-drought-information-systems-web-portal)



For efficiency purposes Narrabri Shire Council may introduce drought restrictions for the entire region based on the Narrabri Triggers or introduce restrictions exclusively for all other towns using those figures from their extraction and use.

Table 2.2.1 Narrabri Water Supply - Drought Activation Plan Triggers

Level	Trigger when:	Relax when:
1 Low	Permanent	Never
2 Moderate	<ul style="list-style-type: none"> <li>Demand on water supply increases daily average production &gt;15% increase for 5 consecutive days.</li> </ul>	<ul style="list-style-type: none"> <li>Demand on supply reduces to no more than &gt;10% average daily production for 7 consecutive days</li> </ul>
3 High	<ul style="list-style-type: none"> <li>Declaration of drought over LGA</li> <li>Demand on daily average water production is &gt;15% increase for 5 consecutive days.</li> </ul>	<ul style="list-style-type: none"> <li>Drought declaration lifted.</li> <li>Demand on supply reduces to no more than &gt;10% average daily production for 7 consecutive days</li> </ul>
4 Very High	<ul style="list-style-type: none"> <li>Demand on daily average water production is &gt; 80% of extraction limit average for more than 7 days.</li> </ul>	<ul style="list-style-type: none"> <li>Demand on daily average water production is &lt;70% of extraction limit average for 14 days</li> </ul>
5 Extreme	<ul style="list-style-type: none"> <li>Demand trend on water allocation would see exceedance of allocation</li> </ul>	<ul style="list-style-type: none"> <li>Demand on daily average water production is &lt;80% of extraction limit average for 14 days</li> </ul>

Table 2.2.2 Water Restrictions – Residential

Residential Activity	1 Low	2 Moderate	3 High	4 Very High	5 Extreme
Lawns and Gardens	No restriction	Recommendation to water garden only between 7 pm and 7am	Watering garden only between 7 pm and 7 am	Handheld hoses only between 7 pm in 7 am	Bucket watering only between 7 am and 7 pm
Washing of buildings, footpaths, driveways etc.	No restriction	Recommendation to only between 7 pm and 7am	Only between 7 pm and 7 am	Not at all	Not at all
Filling of Private Pools, spas etc.	No restriction	Pools not to be filled without Council approval. Top ups permitted.	Pools not to be filled without Council approval. Top ups permitted.	Pools not to be filled without Council approval. Top ups permitted.	Pools not to be filled or topped up with reticulated water. New pools not to be filled without approval.
Vehicle Washing	No restriction	Permitted any time by handheld or pressure washer	Bucket Washing only	Not at all	Not at all

Table 2.2.3 Water Restrictions – Commercial

Commercial Activity	1 Low	2 Moderate	3 High	4 Very High	5 Extreme
Lawns and Gardens, including Racecourse, Bowling Club and Golf course	No restriction	Recommendation to water garden only between 7 pm and 7am	Watering garden only between 7 pm and 7 am	Recycled Water Only and handheld hoses	Recycled Water only
Schools and Health Care Services	No restriction	Recommendation to water garden only between 7 pm and 7am	Watering garden only between 7 pm and 7 am	Handheld hoses only between 7 pm in 7 am	Bucket watering only between 7 am and 7 pm
Washing of buildings, footpaths, driveways etc.	No restriction	Recommendation to only between 7 pm and 7am	Only between 7 pm and 7 am	Recycled Water Only	Recycled Water only
Washing of new or used cars for sale	No restriction	Recommendation to wash vehicle between 7 pm and 7am	Washing of vehicles only between 7pm and 7am	Bucket Washing only	Bucket Washing only
Emergency Services	Exempt	Exempt	Exempt	Exempt	Exempt

Note. Emergency Services are exempt in all levels of Water Restrictions. If required, preference will be provided to accommodating firefighting requirements.

Table 2.2.4 Water Restrictions – Council Parks and Gardens

Activity	1 Low	2 Moderate	3 High	4 Very High	5 Extreme
Public Parks and Gardens	No restriction	Fixed Hoses and Sprinklers banned except for 6hrs/day	Fixed Hoses and Sprinklers banned except for 3hrs/day	Fixed Hoses and Sprinklers banned. Handheld hoses only	Recycled Water only
Public Sports Grounds and Playing Fields	No restriction	Main Parks watered to be watered at night	Auto sprinklers 1hr/per line	Auto sprinklers 1hr/per line on every 2 <sup>nd</sup> night	Recycled Water only

## 2.3 Drought Management Team

It is critical to have a Drought Management Team (DMT) declared prior to a drought occurring. This will allow for a faster and coordinated approach to implementing the drought management plan.

The Drought Management Team is involved in setting restrictions for droughts which are level 2 and above.

Table 2.3.1 Drought Management Team

Role	Responsibilities
Chair: Director Infrastructure Delivery Communications: Manager Customer and Information Services  Levels 2-3: Manager Water Services Level 4: Director Infrastructure Delivery Level 5: General Manager	<ul style="list-style-type: none"> <li>• Coordinate the team.</li> <li>• Communicate with the General Manager and Council</li> <li>• Communicate with relevant government agencies when required</li> </ul>
Incident Management  <b>Incident Manager:</b>  Manager Water Services  <b>Incident Team:</b>  Headworks Engineer  Water Services Engineer  Manager Regulatory Services	<ul style="list-style-type: none"> <li>• Monitor and assess data.</li> <li>• Provide an assessment of the situation.</li> <li>• Brief the DMT Chair and GM</li> <li>• Allocate roles to team members.</li> <li>• Prioritize tasks and develop response actions.</li> <li>• Communicate with stakeholders, neighboring Councils, government agencies and major customers.</li> <li>• Hold regular team meetings.</li> <li>• Monitor effectiveness of DMP and DMT</li> <li>• Post-incident, coordinate review of incident and update of DMT</li> <li>• Determine the completion of the response phase and commence recovery</li> </ul>
Communication Manager  Manager Customer and Information Services	<ul style="list-style-type: none"> <li>• Support the DMT Chair and Incident Manager with communication.</li> <li>• Prepare communication material as appropriate.</li> <li>• Prepare media statements for distribution in accordance with Council's Media Policy</li> <li>• Monitor and manage social networks communication</li> </ul>
Administrative Support  ID Admin Team	<ul style="list-style-type: none"> <li>• Record keeping</li> <li>• Progress reports for DMT members</li> <li>• Administrative support</li> <li>• Attend and minute meetings</li> </ul>

## **2.4 Communication**

### **2.4.1 Community Engagement**

Engagement with the community is critical to ensuring that the drought management plan is implemented effectively. Effective engagement increases the likelihood of community acceptance and behavioral changes required to reduce water demand.

Narrabri Shire Council has the following tools available to update the public on the implementation of different stages of the drought management plan:

- Media releases.
- Council website or social media.
- Radio.
- Newspaper.
- Letter drops.
- Notice on water service bills.
- Town signs.
- Printed leaflets.
- Narrabri Shire Council Community Engagement Strategy ([community-engagement-strategy-adopted.pdf \(nsw.gov.au\)](#))

### **2.4.2 Information for the Community**

The content of messages to the public needs to be carefully considered to ensure the drought management plan is effectively communicated.

It is important that the tone of all communication with the public be carefully considered. The tone should reflect that increases in restriction levels are not reflective of a lack of effort from community. The tone should reinforce that, restrictions are in place to mitigate the impacts of drought.

Messages should include:

- Update and explanation of current restriction level.
- Background information justifying current restrictions.
- Efforts by Narrabri Shire Council.
- Contact details for additional information.
- Contact details for special cases or exemptions.

### **2.4.3 Government Agency Consultation**

The implementation of this drought management plan should coincide consultation with:

- Department of Planning and Environment.
- Environmental Protection Agency (in relation to reuse of any recycled water from Sewer Treatment Plant).
- Water NSW.

#### 2.4.4 Contact List

The following contact list includes:

- Government agencies that should be updated upon the implementation of this drought management plan.
- Media outlets which could update the public on restriction levels.
- Specific customers which might require individual updates on restrictions.

Organisation
Department Of Planning and Environment
Environment Protection Agency NSW
Water NSW
Radio 2 Max FM 91.3
Radio Local ABC
Narrabri Courier
Narrabri Hospital
Wee Waa Hospital
Boggabri Hospital
Civeo
Narrabri High School
Wee Waa High School

#### 2.5 Regulatory Framework

Narrabri Shire Council delivers water under the provisions of the NSW *Local Government Act 1993*.

Some aspects of the water business are carried out under the provisions of the NSW *Water Management Act 2000*.

Narrabri Shire Council is authorised to restrict water supply (i.e., by public notice published in a newspaper circulating within the LGA) under the *Local Government (General) Regulation 2005*.

The *Local Government Act 1993* Section 637 provides: “a person who willfully or negligently wastes or misuses water from a public water supply or causes any such water to be wasted is guilty of an offence”. The maximum penalty which can apply is:

- Maximum penalty: 20 penalty units.
- Current (as per 1 July 2023) penalty unit: \$313.

Consumers who are identified breaching water restrictions in place may have their supply cut off or restricted by Council in accordance with Clause 144 of the *Local Government (General) Regulation 2005*.

This plan is administered by the Narrabri Shire Council. During drought, this plan will be overseen by the Drought Management Team (Section 2.3). The implementation of this Drought Management Plan will be the responsibility of the Drought Incident Manager.

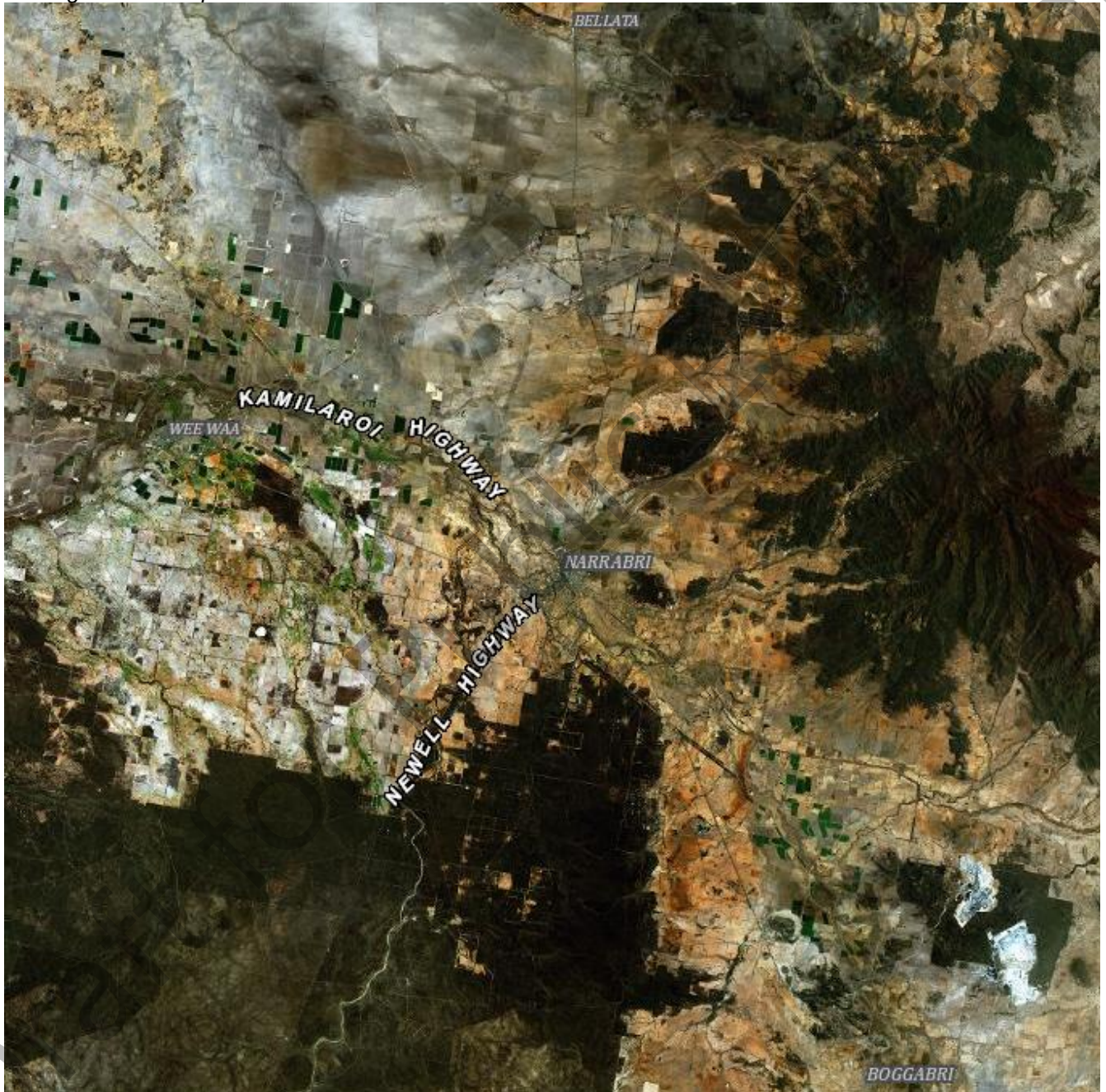


### 3. Water Supply Scheme

#### 3.1 Existing Water Supply Schemes

Narrabri, Wee Waa, Gwabegar, Bellata, Baan Baa and Boggabri are all served by their own water supply systems that use groundwater bores as the sole source of water.

Figure 3.1.1 Map of Narrabri Shire





### 3.2 Narrabri Bore Information

Currently, Narrabri is serviced by 3 water bores and a holding and distribution reservoir designed to reduce levels of iron and manganese through a settlement and detention process.

Table 3.2.1 Bore information.

Bore Name	Casing size	Pumping Rate (2019) (L/s)
Narrabri - Killarney Street	330mm	75 L/s
Narrabri - Tibbereena St	350mm	80 L/s
Narrabri – Elizabeth Street	360mm	60 L/s



Figure 3.2.2 Narrabri Bores

## 4 Water Demand

### 4.1 Water Pricing

A recent Water review of water consumption across the local government area has determined that the quantity of nonrevenue water is high. Nonrevenue water accounted for as much as 40 percent of produced water.

It has been recommended further analysis into determining the impacts of leakage, theft and usage by unmetered customers on the nonrevenue water.

Establishing and reducing causes (specifically theft and leakage) of nonrevenue water will allow for the water demands of the LGA to be more accurately determined and ultimately reduce the demand.

### 4.2 Water Users

The following statistics show the historic customer demand across the supply scheme from 2017 - 2021.

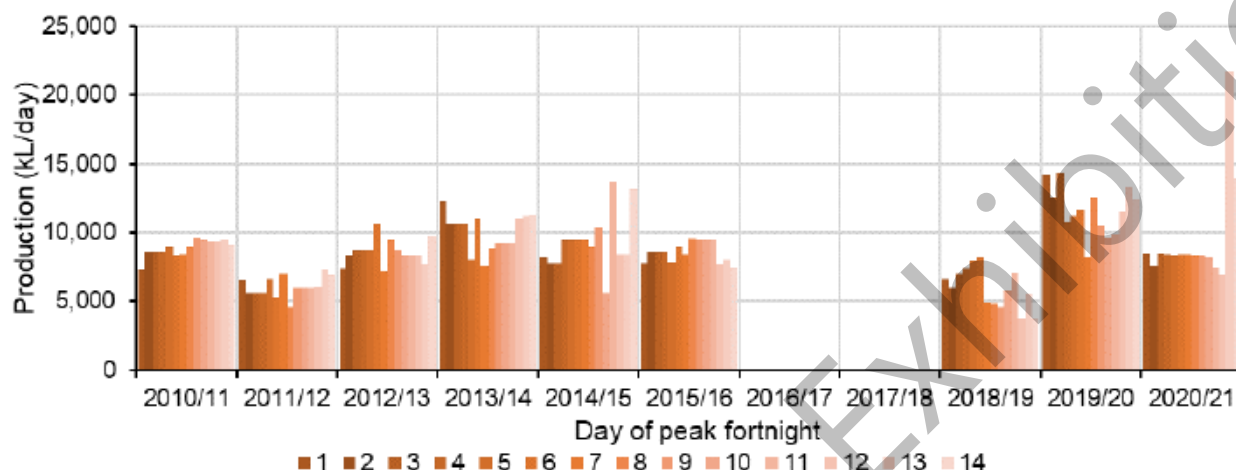
Table 4.2.1 Water Business – Connected Properties Statistics – in Megaliters

	2017/18	2018/19	2019/20	2020/21
Caravan Park	10	18	15	11
Childcare	1	1	2	2
Commercial	9	20	16	29
Commercial and Industrial	22	44	39	36
Community	4	8	5	4
Council general	4	6	3	4
Depot	1	4	2	1
Education	15	30	23	11
Government	2	3	3	2
Healthcare	6	13	12	12
Hotel/motel/Service Apartments	7	14	15	14
Industrial	29	14	3	14
Nursing Home	8	15	14	5
Pool	2	2	5	4
Pub with accommodation	2	4	3	4
Public Parks and Gardens	8	6	10	6
Racecourse	1	1	0	0
Residential	664	1,162	1,041	812
Rural	17	27	25	20
Sewage	4	3	4	0
Showground	2	4	4	8
Vacant	1	1	1	1
Water Supply	0	0	0	0
Worker accommodation	18	30	26	20
<b>Total</b>	<b>835*</b>	<b>1,430</b>	<b>1,268</b>	<b>1,019</b>

### 4.3 Potable Water Demand

The recent IWCMS issues paper produced by Public Works Advisory show consumption and demand data trends.

Table 4.3.1 Narrabri fortnight Potable Water Demands (2010 - 2021)

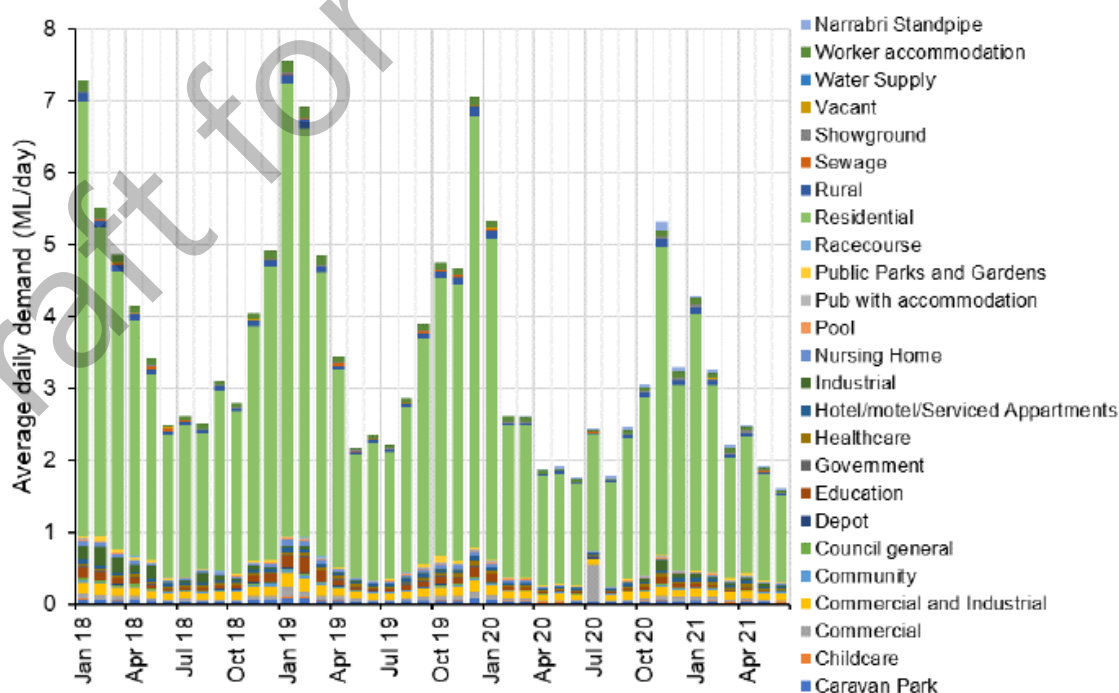


Note that the Tibbereena Bore flow meter malfunctioned in 2016/17 and 2017/18.

The highest production (not due to operational issues) occurred on 19 December 2019, where the production was 14.3 ML. The maximum temperatures surrounding this date ranged from 36 to 43°C.

The average daily production over the peak week (ADPW) and peak fortnight (ADPF) was 12,136 kL/day and 11,601 kL/day respectively.

Table 4.3.2 Narrabri Average Daily Demand - (shows major consumer is residential)





#### 4.4 Non-Potable Water Demand

In addition to the potable water demand, there is also a non-potable water demand which is water supplied from the final lagoon of the Narrabri Sewage Treatment plant. It is used to supply Federation Farm Storage Lagoons



Figure 4.4.1 Narrabri STP UV Ponds.

Effluent from Narrabri STP is either reused at the Federation Farm or it is discharged to Narrabri Creek. According to the 'Federation Farm Effluent Reuse Review' in 2019 (conducted by HunterH2O), there are six established cropping areas which equate to a total of 133.1 Ha. Most common crops grown at the farm are cotton and wheat, however, there have been times where alternative winter crops (chickpeas, sorghum, soyabean, fabacean, or mung bean) were grown.

The Effluent Reuse Review assessed the treatment and end uses against the Australian Recycle Water Guidelines (AGWR) and the NSW Recycled Water Management System (RWMS) Guidelines. A water balance model was also performed to assess the hydraulic and nutrient loading of the reuse scheme. The summary of the findings are as follows:

- For Log reduction value requirements (based on NSW Guidelines for RWMS and the AGWR):
  - Non-food crops – The current treatment levels meet the requirements for non-food crops with excess log credits available in all three areas of Virus, Bacteria and Protozoa. In addition to this, the effluent quality objectives as provided in the AGWR are met.
  - Food crops – The log reduction requirements for Viruses are not met. Issue. Furthermore, the effluent quality (for suspended solids and biological oxygen demand)

exceeds the AGWR values. However, the high TSS and BOD may be associated with algal growth in the ponds, not due to the impaired treatment at Narrabri STP.

- For the water balance model:
  - Sustainable reuse – the analysis estimates that the irrigation area provides sufficient area to achieve >99% of reuse with no overtopping impacts or run off.
  - Nutrient (nitrogen) balance – the scheme operates at a nitrogen deficit which is expected. Additional fertiliser is needed to supplement crop growth. Minimal leaching of nitrogen is expected based on the analysis.
  - Nutrient (phosphorus) balance – There is sufficient phosphorous which in the most part is bound by the soil. Minimal leaching of phosphorus is expected based on the analysis.
  - The review concludes that based on the current available and irrigation practices at Federation farm, there is minimal impact to the local environment.

The Effluent Reuse Review indicates that ongoing review, audit and checks by Council may be required to assure that appropriate crops are grown, sold, and processed.

## 4.6 Significant Water Users

The most significant water users in Narrabri are (based on data from meter reads 2018 – 2021):

Civeo Narrabri is a village for the accommodation of extractive industry workers, transient workers and has a yearly average water consumption of 28,667 kilolitres. Narrabri Hospital and the second highest average consumer with 12,260 kilolitres. Councils' highest consumer of potable water is Narrabri Sewer Treatment Plant with an average 2388 kilolitres per year.

Wee Waa highest consumer is Councils parks and Depot.

Boggabri has Civeo accommodation village as the largest average user of water and Councils Jubilee Park.

Table 4.6.1 Significant Water Users 2108 - 2021

Narrabri

	Average year (kL)	Hot/dry/ peak year (kL)
02 CIVEO Narrabri	28,677	30,596
03 Narrabri Hospital	12,260	13,138
01 Viterra silos and grain processing*	10,696	13,048
04 Cargill Narrabri	1,542	4,622
05 House	8,469	8,637
06 Whiddon Narrabri	8,753	10,734
07 Retail	5,037	15,059
08 Highway Tourist Village	5,574	7,482
09 STP	2,388	3,620
10 Narrabri West Public School	4,011	5,598
11 Narrabri Pool	3,820	4,720
12 Narrabri High School	7,576	12,458
13 Narrabri Public School	6,200	8,248
14 Showgrounds	3,992	5,736
15 Jessie Hunt Nursing Home	3,581	4,345

Wee Waa

	Average year (kL)	Hot/dry/ peak year (kL)
01 Park	25,764	32,542
02 Shire works depot	13,415	24,290
03 Dangar Park	6,242	11,345
04 Wee Waa Public School	7,329	9,867
05 Whiddon Wee Waa (aged care)	8,332	8,975
06 Wee Waa Hospital	6,365	8,497
07 High School	5,990	11,051
08 CGS (Cotton Growers Services)	4,374	4,720
09 Showground and oval	3,093	5,406
10 House	2,695	4,770

Boggabri

	Average year (kL)	Hot/dry/ peak year (kL)
01_Civeo	38,715	39,312
02_Jubilee Park	16,432	19,741
03_17 Chelmsford/62 Caxton	4,471	5,844
04_Pool	5,986	7,835
05_STP	7,414	9,800
06_Boggabri Multi Purpose Service	6,384	8,912
07_House	3,730	10,155
08_Rural Property	2,470	3,105
09_Boggabri Town Apartments	2,023	4,310
10_Showground	2,059	2,406

Baan Baa

	2017/18	2018/19	2019/20	2020/21
Commercial	1	1	1	1
Commercial and Industrial	4	4	4	4
Community	3	3	3	3
Industrial	4	4	4	4
Public Parks and Gardens	2	2	2	2
Residential	86	86	86	87
Rural	3	3	3	3
Vacant	3	4	4	4
<b>Total</b>	<b>106</b>	<b>107</b>	<b>107</b>	<b>108</b>

Bellata

	Average year (kL)	Hot/dry/ peak year (kL)
01_Tennis Courts	1,281	1,700
02_Roadhouse	1,401	1,964
03_Vacant lot	2,012	2,669
04_House	1,030	2,780
05_Rural Property	630	769
06_Trucks and farming equipment	728	947
07_Lot with shed	650	911
08_Rows Auto Repairs	630	867
09_Vacant lot	501	717
10_Vacant lot	661	843
11_House	495	656
12_Vacant lot	343	704
13_Grain store	424	1,075
14_Rural Property	202	489

## 4.7 Historic Water Demand

A graph of the total water production in Narrabri over 3 years has been included. The impact of the 2019 – 2020 drought period is reflected in the production data for Narrabri.

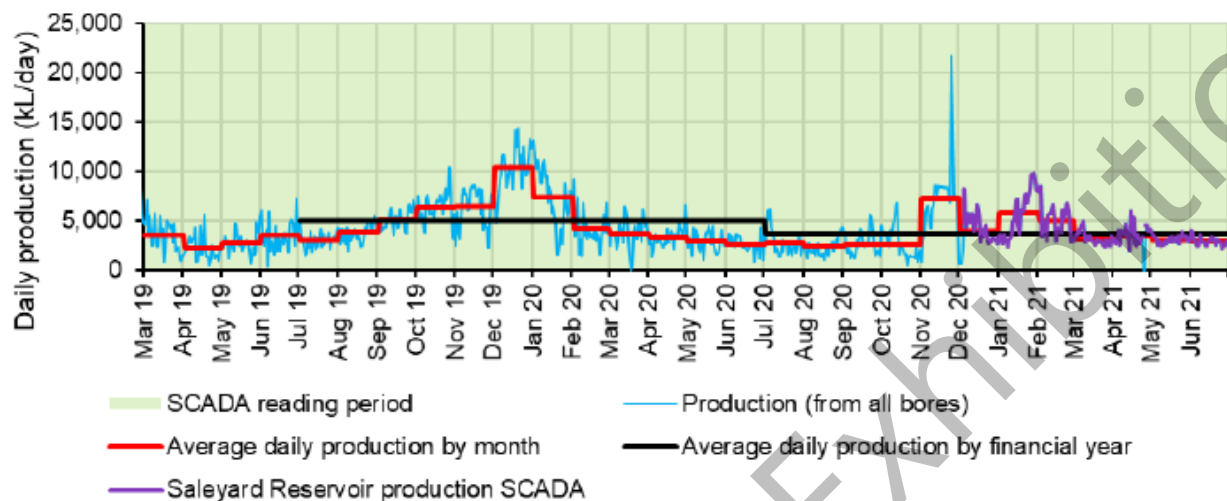
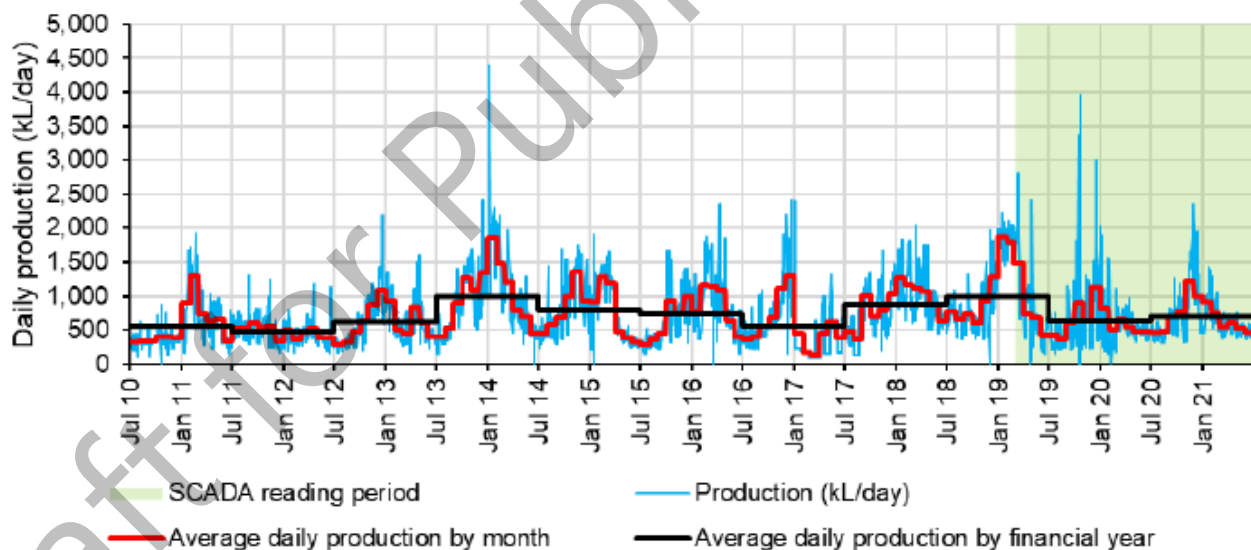


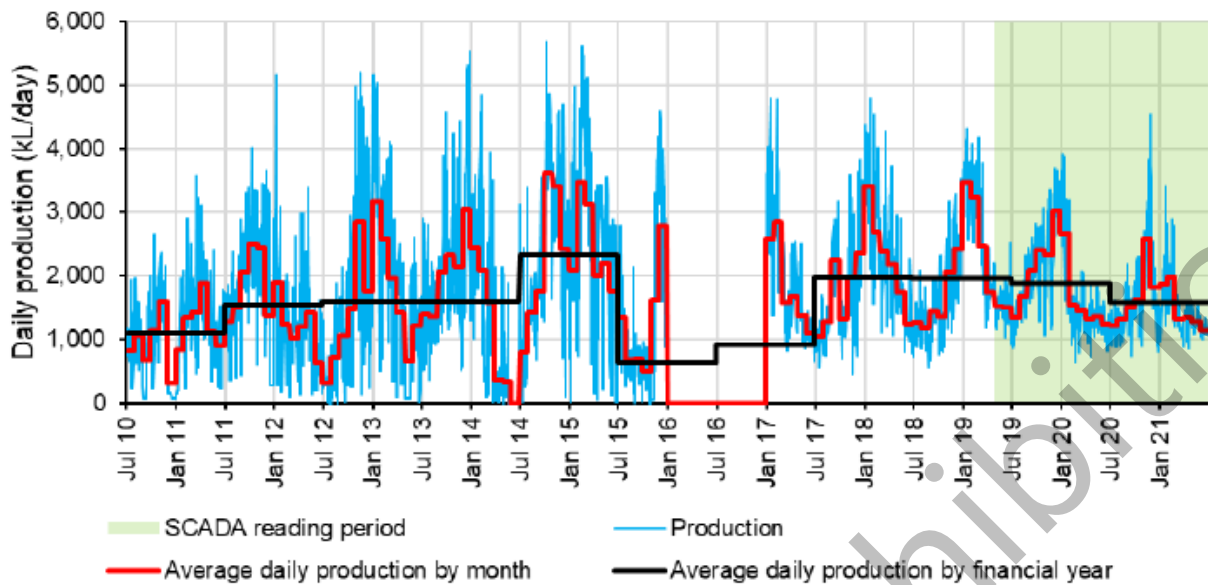
Figure 4.7.1 Narrabri Water Production



Extended periods of water restriction have not been implemented in Boggabri (there have been short periods in response to operational issues).

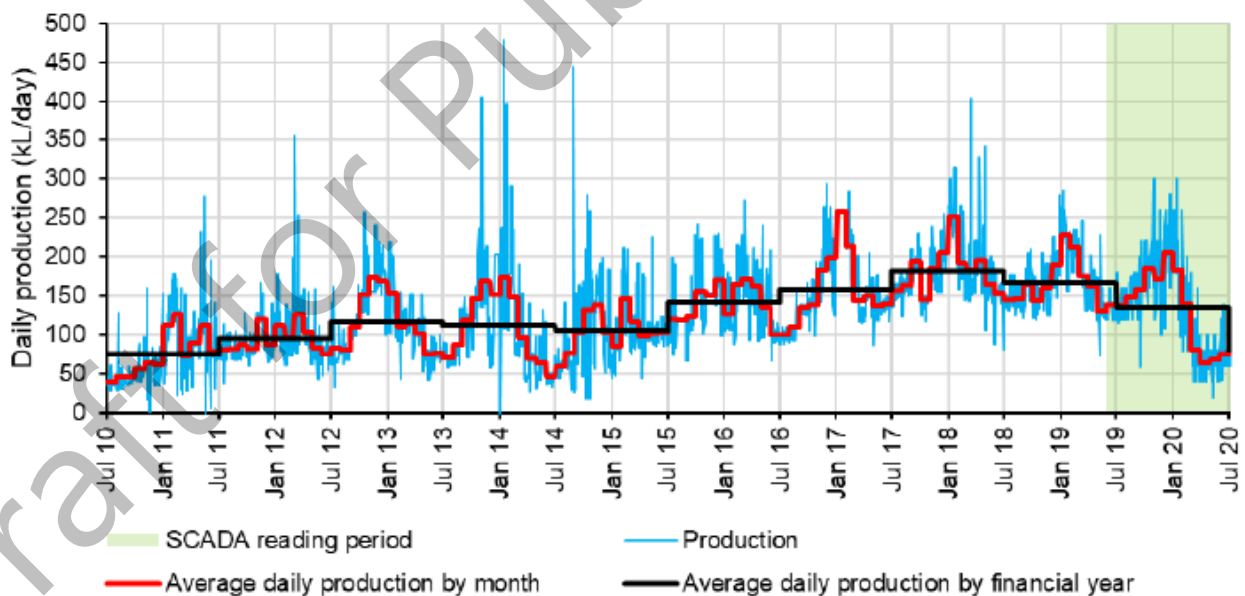
Figure 4.7.2 Boggabri Water Production





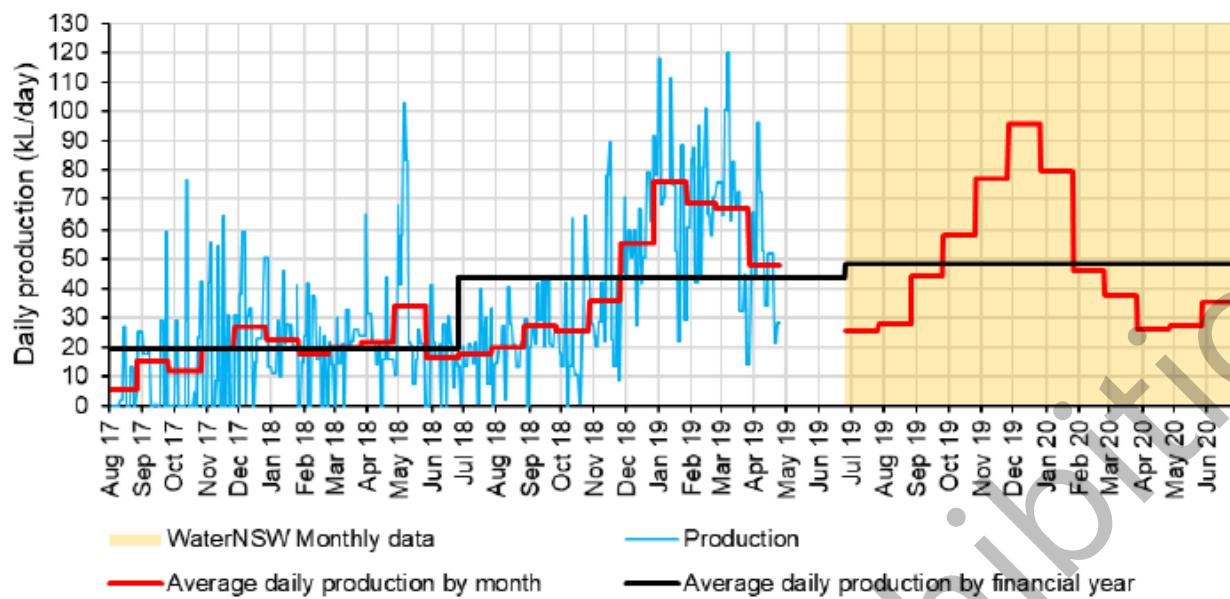
The impact of water restrictions on water demand in Wee Waa has not been assessed as restrictions have only been implemented for very short periods in response to operational issues (rather than the extended periods of drought related restrictions implemented elsewhere).

Figure 4.7.3 Wee Waa Water Production



Water restriction was not implemented in Bellata.

Figure 4.7.4 Bellata Water Production



Water restriction was not implemented in Baan Baa.

Figure 4.7.5 Baan Baa Water Production

## 5 Climate Data

The Climate Data in Figures 5.1.1 and 5.1.2 represent the average minimum and maximum temperatures as well as average monthly rainfall using data gathered at the Narrabri Airport for the period 1997-2020. The information was gathered from the Bureau of Meteorology (BOM, 2020).

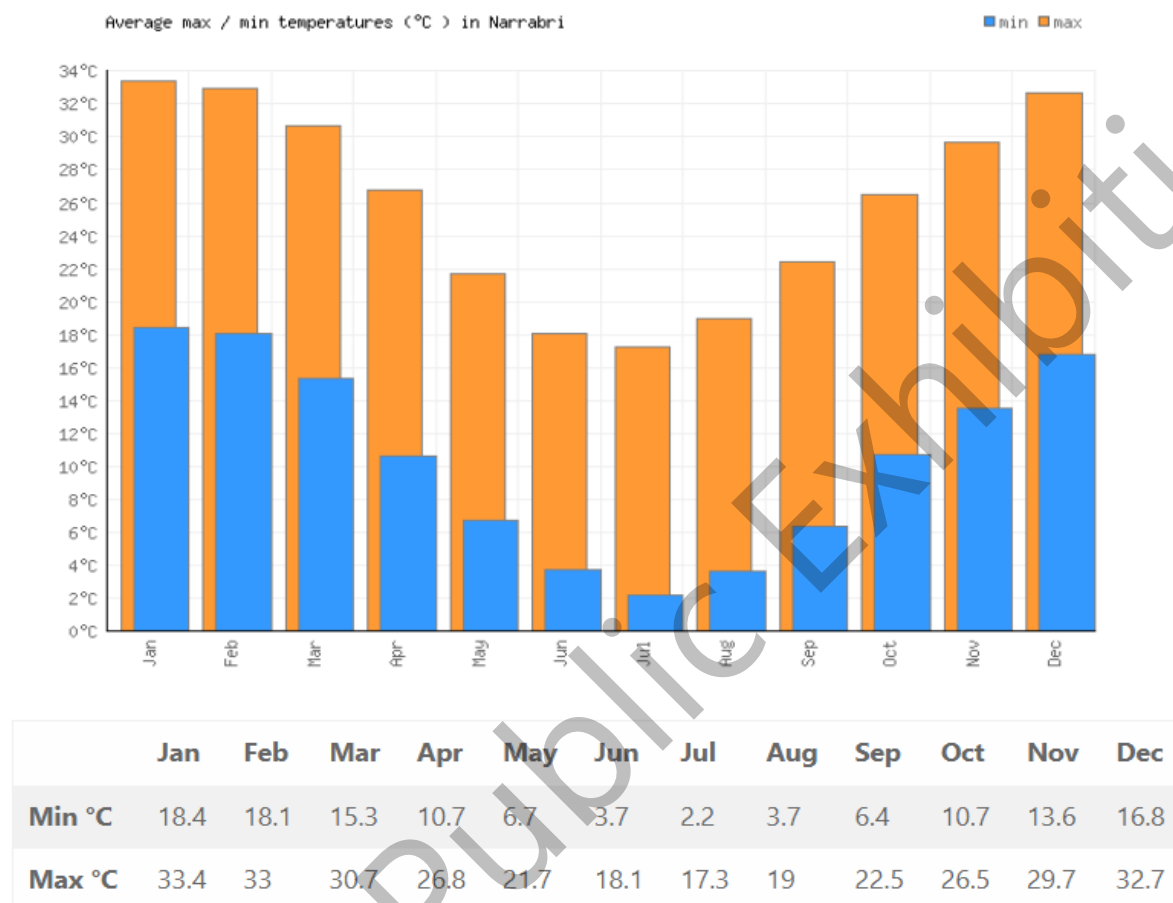


Figure 5.1.1 Average monthly minimum and maximum Narrabri

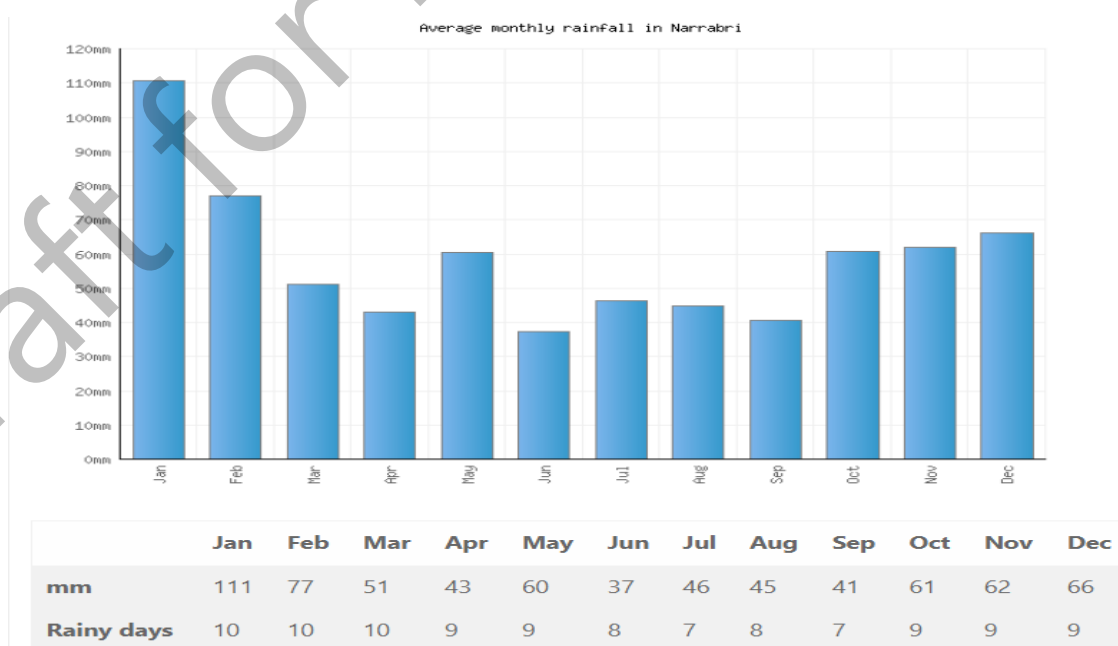


Figure 5.1.2 Average monthly rainfall at Narrabri

## References

BOM Website

IWCM issues Report Narrabri June 2022

NSW Government, Department of Water and Energy. (2007). *Best-Practice Management of Water Supply and Sewerage*.

Draft for Public Exhibition

## Appendix A

### NSW Government Best-Practice Management of Water Supply and Sewerage (2007) – Drought Management Checklist

#### Appendix D - Drought Management

##### Check List – August 2007

A comprehensive drought management plan details the demand and supply issues to be addressed during drought conditions and includes adoption of a schedule of trigger points for the timely implementation of appropriate water restrictions. Appropriate drought management planning will ensure that town water supplies with significant storage do not fail in times of drought.

Drought management planning includes documenting basic data on water demands, rainfall, evaporation, records of past droughts, the existing water supply system, and its water resources, and strategies to achieve the objective of having sufficient water to satisfy the basic needs of the community.

This check list is essentially a road map to assist LWUs to quickly implement sound drought management planning. LWUs should have a sound drought management plan in place and be ready to implement their plan when drought conditions arise.

#### Drought Management – Check List

Topic	Outcome Achieved
1. Executive Summary	<input type="checkbox"/> Covers all major issues, objectives, planning, strategies and monitoring for existing essential supplies of water to the service area(s). <input type="checkbox"/> Includes a summary of the drought management plan and an adopted schedule of trigger points for timely implementation of appropriate water restrictions.
2. Background	A. <input type="checkbox"/> Includes the existing water supply system(s) in the service area(s) and a locality map. B. <input type="checkbox"/> Includes history of past droughts. C. <input type="checkbox"/> Includes information on the impact of past droughts on water services, eg. restrictions, effect of restrictions on demands, any emergency sources identified, etc.
3. Objectives	A. <input type="checkbox"/> Identifies key objectives required to maintain a basic/restricted supply to all users. There is a need to consider social and environmental impacts. B. <input type="checkbox"/> Tailor strategies relevant to the service areas. C. <input type="checkbox"/> Endorse and implement a plan that minimises the risk of the community running out of water.

## Drought Management – Check List

Topic	Outcome Achieved
4. Data	<p>A. <input type="checkbox"/> Identification of all communities served by the LWU's reticulated water supply, those with private reticulated water services and those with no reticulated water services within the service area(s).</p> <p>B. <input type="checkbox"/> Identification of any properties, businesses, other LWUs etc. that may seek water in times of drought.</p> <p>C. <input type="checkbox"/> Identification of all water requirements. Identify the normal and minimum potable and non-potable water requirements.</p> <p>D. <input type="checkbox"/> Identify water dependent industry/businesses, any fire fighting requirements and opportunities for recycled water use.</p> <p>E. <input type="checkbox"/> Includes a description and plan of all water supply schemes in the service area(s).</p> <p>F. <input type="checkbox"/> Includes height/storage volume and height/surface area graphs for all water supply dams and weirs.</p> <p>G. <input type="checkbox"/> Historical performance of rivers, dams, weirs and bores in previous droughts.</p> <p>H. <input type="checkbox"/> Includes the average rainfall figures and evaporation rates.</p>
<b>Note:</b> All data to be specified on a daily basis.	
5. Plan	<p>A. <input type="checkbox"/> Demand management options.</p> <p>B. <input type="checkbox"/> Restriction strategies including means and methods for the enforcement of restrictions and the expected results of imposing restrictions.</p> <p>C. <input type="checkbox"/> Adopted schedule of trigger points for the timely implementation of appropriate water restrictions in order to minimise the risk of failure in times of drought.</p> <p>D. <input type="checkbox"/> Availability of alternative water sources (including estimated costs and times to implement).</p> <p>E. <input type="checkbox"/> Water cartage options.</p> <p>F. <input type="checkbox"/> Identify legislation, local laws and council policies affecting the contingency arrangements.</p> <p>G. <input type="checkbox"/> Links to water sharing plans/committees, water management plans/committees, irrigators, etc.</p>



## Drought Management – Check List

Topic	Outcome Achieved
	<p>H. <input type="checkbox"/> Impact of extraction on downstream stakeholders.</p> <p>I. <input type="checkbox"/> Impact of reduced flows in watercourses.</p> <p>J. <input type="checkbox"/> Level of prediction and intervention.</p> <p>K. <input type="checkbox"/> Identify human resource requirements.</p>
6. Monitoring During Drought	<p>A. <input type="checkbox"/> Daily monitoring of demands.</p> <p>B. <input type="checkbox"/> Daily monitoring of water supply sources (dams, bores and streams).</p> <p>C. <input type="checkbox"/> Monitoring impact of restrictions on consumption</p> <p>D. <input type="checkbox"/> Monitoring the electrical conductivity, alkalinity and algae levels in the water sources.</p>
7. Consultation	<p><input type="checkbox"/> Comprehensive media strategy and public consultation.</p> <p><input type="checkbox"/> Regular consultation with appropriate government agencies (DWE, DECC, NSW Health etc).</p>
8. Operation of Drought Management Plan (DMP)	<p>A. <input type="checkbox"/> DMP should discuss, analyse and identify any impact on other regions and localities ie. upstream, downstream or conjunctive water users.</p> <p>B. <input type="checkbox"/> DMP should demonstrate a sustainable strategy that considers all other stakeholders.</p> <p>C. <input type="checkbox"/> DMP documents an agreed procedure for progressive implementation of water restrictions.</p>

## REFERENCE

*Drought Management Guidelines*, NSW Local Government Water Directorate, December 2003.

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