

# Drought Management Plan

2023



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***DROUGHT MANAGEMENT PLAN (2023) – DOCUMENT CONTROL TABLE***

<b><i>Revision</i></b>	<b><i>Revision Date (from when Revision Applies)</i></b>	<b><i>Resolved by Council (date of Council Meeting)</i></b>
<i>Draft Report (for public exhibition)</i>	28 April 2023	6 June 2023
<i>Final Report</i>	25 September 2023	10 October 2023



**Tamworth Regional Council**

This Drought Management Plan (2023) has been prepared with the support of Beca HunterH2O. This document is a controlled document and therefore subject to review and amendment from time to time.



# DROUGHT MANAGEMENT PLAN (2023) SUMMARY

## Overview

This Drought Management Plan (2023) outlines Tamworth Regional Council's (TRC) Water Restrictions Policy and Drought Management Action Plans, which are implemented during periods of extended drought and/or potential water shortage.

The fundamental objective of drought management is to minimise the risk to the community of running out of water and ensuring there is always sufficient water available to satisfy the basic needs of the community. The Water Restrictions Guide and the Drought Management Action Plans ensure that a structured and transparent approach is taken for the management of drought impacts on Council's town water supply systems, including consideration of both demand-side and supply-side measures.

This Drought Management Plan has been developed in association with a Demand Management Plan, which focuses on demand management and water efficiency measures that should always be employed, regardless of climate conditions. Consequently, during drought periods there is an overlap between the two plans.

## Context

The Drought Management Plan is applicable to the reticulated water supply systems (including raw water pipelines in some systems) that are owned and operated by TRC, as listed in Table 1.

**Table 1** Summary of TRC Water Supply Systems

Water Supply System	Approximate Population Served*	Number of Connections**	Average Daily Consumption (ML/d)	Average Annual Consumption (ML/yr)	Water Supply Source/s
Tamworth (incl. Moonbi/Kootingal)	50,000	19,500	25.2	9,200	Chaffey & Dungowan Dams
Manilla	2,110	1,200	1.0	355	Namoi River & Split Rock Dam
Barraba	1,125	780	0.67	240	Split Rock Dam
Nundle	310	230	0.12	45	Peel River & Groundwater
Attunga	330	150	0.15	55	Groundwater
Bendemeer	210	145	0.09	33	Macdonald River & Groundwater

Notes: \* Based on Census Data 2021

\*\* Based on Council connection data 2020/21

TRC serves a total regional population of around 63,000, with around 54,000 people having direct access to a reticulated water supply system operated by Council (see Table 1). There are several other villages and countless farms within the local government area (LGA) that do not have formal water supply systems and may seek assistance from Council during periods of extended and severe drought.

The TRC LGA lies almost wholly within the Namoi River catchment in Northwest NSW. The Namoi River catchment drains an area of 42,000 km<sup>2</sup> and is bounded by the Great Dividing Range in the east, the Liverpool and Warrumbungle Ranges in the south, and the Nandewar Ranges and Mt Kaputar to the North. Major tributaries of the Namoi River include Coxs Creek and the Mooki, Peel, Cockburn, Manilla, and Macdonald Rivers, all of which join the Namoi upstream of Boggabri.

The two major surface water catchments that cover the TRC LGA are:

- Peel Valley sub-catchment, which includes the Peel River, Cockburn River and Dungowan Creek, along with two major water storages – Chaffey Dam and Dungowan Dam.
- Upper Namoi / Manilla sub-catchment, which includes the Namoi (upper), Manilla and Macdonald Rivers, along with one major water storage – Split Rock Dam.

Alluvial groundwater and fractured rock groundwater sources are also present in the region and are used as supplementary supply sources for most water supply systems and as the primary supply source for Attunga.

Each of the surface water and groundwater supply sources are covered by Water Sharing Plans (administered by DPE Water), which set out the rules for how water is allocated and shared from each water source. The Water Sharing Plans make important provisions for basic landholder rights and the environment, as well as ensuring water is always available for town water supply purposes.

## Summary of Water Restrictions and Drought Management Actions

Drought Management Actions Plans (DMAP) set out the actions to be taken during each drought response level. There are five Drought Response Levels (Levels 1 to 5), with each level having a set of suggested actions to be undertaken during that phase of the drought, including an associated set of water restrictions.

Water restrictions corresponding to each Drought Response Level are summarised on the table below, with the full list of measures included in **Appendix A**. Water restrictions are generally based on a common set of measures adopted by the Councils associated with the Namoi Water Alliance. The adoption of a common set of water restrictions across the Namoi Region allows for a consistent and simplified communication process and reduces confusion in the community.

**Table 2** Summary of Water Restrictions and Drought Management Actions

Drought Response Level	Summary of Water Restrictions	Summary of Drought Management Actions
<b>Level 1</b>  <b>Low</b>  <b>250 L/p/d</b>	<ul style="list-style-type: none"> <li>• Limit the hours that sprinklers can be used (2 hrs per day)</li> <li>• First level of water restrictions, more focused on general awareness rather than trying to achieve significant reductions in usage.</li> <li>• Impact on residences and their gardens would be relatively minor.</li> </ul>	<ul style="list-style-type: none"> <li>• Actions are mainly preparatory measures that activate various Drought Management planning activities.</li> </ul>



Drought Response Level	Summary of Water Restrictions	Summary of Drought Management Actions
<b>Level 2</b> <b>Moderate</b> <b>225 L/p/d</b>	<ul style="list-style-type: none"> <li>Ban on sprinklers and a time limit for drippers and hoses (2 hrs per day).</li> <li>Focus is on reducing usage back below typical levels for that time of year.</li> <li>Measures likely to cause a moderate level of inconvenience without necessarily having significant impacts on most lawns and gardens.</li> </ul>	<ul style="list-style-type: none"> <li>Key actions include setting up more regular liaison with key government stakeholders and preparing supplementary supply sources.</li> </ul>
<b>Level 3</b> <b>High</b> <b>200 L/p/d</b>	<ul style="list-style-type: none"> <li>Ban on all forms of outdoor watering other than buckets for 2 hrs or one hose for 15 min per day (within same 2 hr window)</li> <li>Aim is to reduce usage well below typical levels while still allowing gardens to be maintained, albeit at a base level.</li> <li>More significant impact on lawns and gardens and significant inconvenience to most residences.</li> </ul>	<ul style="list-style-type: none"> <li>Key actions include more focus on issuing warning and fines for violation of restrictions, stepping up the awareness campaign, activating supplementary supply sources and, if necessary, investigate emergency supply options.</li> </ul>
<b>Level 4</b> <b>Very High</b> <b>175 L/p/d</b>	<ul style="list-style-type: none"> <li>Ban on all outdoor watering</li> <li>Aim to reduce usage to around winter levels</li> <li>Major impacts on lawns and gardens, including loss of gardens in many cases.</li> <li>Reestablishment of lawns and gardens after an extended period of severe restrictions would impose a relatively high cost on residences and therefore, the application of Level 4 restrictions or higher would only occur in very rare circumstances.</li> </ul>	<ul style="list-style-type: none"> <li>Key actions include the establishment of a drought taskforce, investigation / design of emergency supply options and stepping up issuing of fines for violation of restrictions.</li> </ul>
<b>Level 5</b> <b>Emergency</b> <b>150 L/p/d</b> <i>(reducing to 100 L/p/d)</i>	<ul style="list-style-type: none"> <li>All-out campaign to reduce usage to absolute minimum levels by eliminating all non-essential usage</li> <li>Major impact on nearly all residences and businesses.</li> <li>Residences may be asked to reduce shower times and limit washing machine loads. Business may be asked to restrict water usage to only essential services, with the possible shutting down of non-essential, water dependent services.</li> </ul>	<ul style="list-style-type: none"> <li>Key actions include implementing emergency response / supply options and an all-out community water reduction appeal.</li> </ul>

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<b>Appendix C</b>	<b>Tamworth Emergency Water Supply Plan (EWSP)</b>
<b>Appendix D</b>	<b>Water Restrictions Communication and Engagement Plan (CEP)</b>



# 1 INTRODUCTION

This Drought Management Plan has been prepared by Tamworth Regional Council (TRC) to ensure that a structured and transparent approach is taken for the management of drought impacts on Council's town water supply systems. The Plan outlines the various demand and supply side drought response actions that should be employed at various stages during an extended drought period. The Plan also outlines Council's water restrictions and documents various supplementary supply sources and emergency supply options.

This 2023 revision to the Drought Management Plan builds on the lessons learnt and the various decisions made by Council during the 2018 – 2020 drought period. Prior to the preparation of this revision to the Plan, a community survey was undertaken to better understand: behaviours and motivators during droughts; impacts of droughts on residents; attitudes to water conservation; awareness and effectiveness of communications; and perceptions of Council performance during drought. The outcomes of this community survey were considered in the preparation of the revised Drought Management Plan (2023).

The fundamental objective of preparing and adopting a Drought Management Plan is to minimise the risk of the community running out of water and ensuring there is always sufficient water available to satisfy the basic needs of the community. The Plan is only applicable to customers connected to the reticulated water supply systems and some raw water pipelines operated by TRC, which includes systems operated in the following towns and villages:

- Tamworth and Moonbi / Kootingal
- Manilla
- Barraba
- Nundle
- Attunga
- Bendemeer

Management of water supply in NSW is administered by the *Water Management Act 2000*, *Water Act 1912* and *Local Government Act 1993*. Compliance with water restrictions is enforced in accordance with the *Local Government Act 1993*, which specifies the maximum penalties that may be applied for the misuse of water from a public water supply.

This Plan contains the following sections:

*Section 2* contains a description of the water supply systems that are covered by the Plan, including a brief review of previous drought experience.

*Section 3* contains an overview of the operating environment for the Plan, including consideration of climatic conditions, water resources and potential downstream impacts.

*Section 4* contains a discussion on pre-drought planning measures, including consideration of demand management measures, system operating rules, data collection, long-term water security, *drought resilience* and community engagement.

*Section 5* contains the Drought Management Action Plans, which set out the actions to be taken during each drought response level, including the application of water restrictions.

*Section 6* outlines the post-drought actions that should be undertaken, including regular review and updating of the Plan.

## 2 WATER SUPPLY SYSTEMS

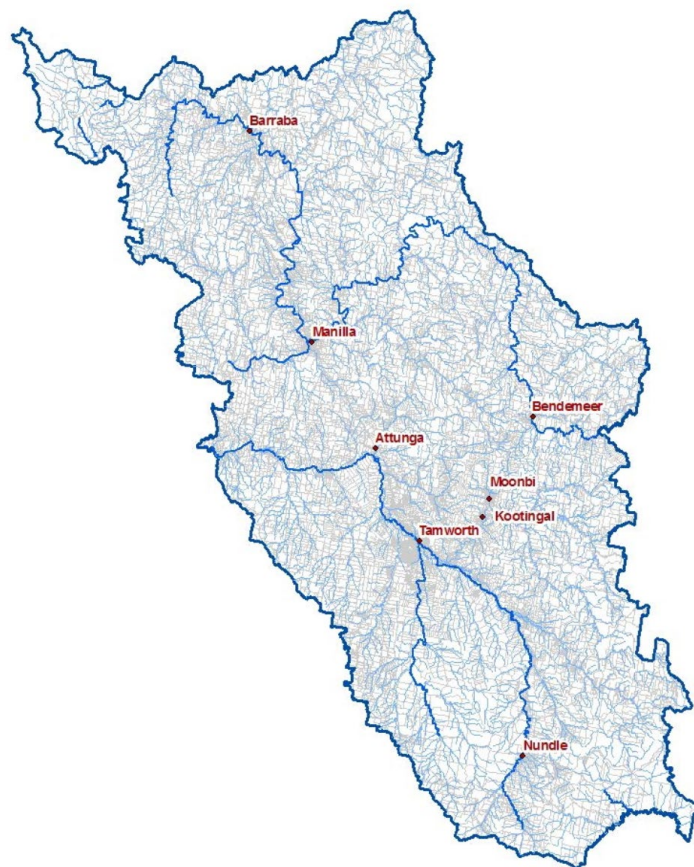
This Drought Management Plan is applicable to the reticulated water supply systems (including raw water pipelines in some systems) that are owned and operated by TRC, as listed in Table 2-1 and shown on Figure 2-1.

**Table 2-1 Summary of TRC Water Supply Systems**

Water Supply System	Approximate Population Served*	Number of Connections**	Average Daily Consumption (ML/d)	Average Annual Consumption (ML/yr)	Water Supply Source/s
Tamworth (incl. Moonbi/Kootingal)	50,000	19,500	25.2	9,200	Chaffey & Dungowan Dams
Manilla	2,110	1,200	1.0	355	Namoi River & Split Rock Dam
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Notes: \* Based on Census Data 2021

\*\* Based on Council connection data 2020/21



**Figure 2-1 Locality Plan – TRC Water Supply Systems**

## 2.1 System Descriptions

An overview of each of the water supply systems is included on Table 2-2, including brief details for primary and supplementary supply sources. Further details on the water supply systems are included in **Appendix B**.

**Table 2-2 Overview of TRC Water Supply Systems**

Water Supply Component	Description	Details
<b>TAMWORTH AND MOONBI / KOOTINGAL WATER SUPPLY SYSTEM*</b>		
Primary Sources	Chaffey Dam (102,000 ML)	<ul style="list-style-type: none"> <li>WaterNSW operated dam</li> <li>16,400 ML/a entitlement (<i>WAL20907</i>)</li> <li>Extraction from Peel River via intake pump station (80 ML/d)</li> <li>Extractions via Chaffey Pipeline during severe drought periods (45 ML/d)</li> </ul>
	Dungowan Dam (6,300 ML)	<ul style="list-style-type: none"> <li>TRC operated dam</li> <li>5,600 ML/a entitlement (<i>WAL20953</i>)</li> <li>Extraction from dam via Dungowan Pipeline (22 ML/d)</li> </ul>
Supplementary Source	Paradise Drift Wells	<ul style="list-style-type: none"> <li>6 wells with 10 ML/d total production capacity</li> <li>Wells 3,4,5 &amp; 6 have 10 ML high security &amp; 108 units general security entitlements (Peel Alluvium)</li> <li>Wells 1 &amp; 1A (located in bank of Peel River) able to extract 100 ML/mth or 1,200 ML/a with max daily pumping 5 ML/d using Chaffey Dam surface water license (local water utility)</li> <li>Raw water transferred to WTP via transfer pump station (10 ML/d)</li> </ul>
<b>MANILLA WATER SUPPLY SYSTEM</b>		
Primary Source	Manilla Weir (Namoi River)	<ul style="list-style-type: none"> <li>Typical weir capacity is estimated to be around 36 ML (due to siltation)</li> <li>Extraction from Namoi River via pump station at weir (3.9 ML/d)</li> <li>400 ML/a entitlement from Upper Namoi (<i>90SL004850</i>)</li> </ul>
Supplementary Source	Manilla River (Split Rock Dam)	<ul style="list-style-type: none"> <li>150 ML/a entitlement from Split Rock Dam (<i>WAL42904</i>), managed as a combined entitlement with Barraba</li> <li>Extraction from Manilla River via intake pump station (3.9 ML/d)</li> </ul>



Water Supply Component	Description	Details
<b>BARRABA WATER SUPPLY SYSTEM</b>		
Primary Source	Split Rock Dam	<ul style="list-style-type: none"> <li>WaterNSW operated dam</li> <li>365 ML/a entitlement from Split Rock Dam (WAL42904) managed as a combined entitlement with Manilla</li> <li>Extraction from dam via Split Rock pump station and pipeline (1 ML/d)</li> </ul>
Supplementary Source	Groundwater bores (James Street)	<ul style="list-style-type: none"> <li>180 ML/a entitlement (WAL28023)</li> <li>2 bores with combined capacity of 1 ML/d</li> </ul>
<b>NUNDLE WATER SUPPLY SYSTEM</b>		
Primary Source	Peel River	<ul style="list-style-type: none"> <li>100 ML/yr entitlement from Peel Fractured Rock Water Source (WAL30075)</li> <li>Extraction from Peel River via pumping well adjacent to river (9 L/s)</li> </ul>
Supplementary Source	Groundwater bores (Crawney Road)	<ul style="list-style-type: none"> <li>Capacity 11 L/s</li> </ul>
<b>ATTUNGA WATER SUPPLY SYSTEM</b>		
Primary Source	Groundwater bores	<ul style="list-style-type: none"> <li>2 bores (11 L/s total capacity)</li> <li>120 ML/yr entitlement from Peel Alluvium (WAL30057)</li> <li>Directly supplies reservoir</li> </ul>
<b>BENDEMEER WATER SUPPLY SYSTEM</b>		
Primary Source	Macdonald River	<ul style="list-style-type: none"> <li>84 ML/a entitlement from Mid Macdonald River Water Source (WAL32510)</li> <li>Extraction from Macdonald River via intake pump station (capacity 7 L/s)</li> </ul>
Supplementary Source	Groundwater bores (Airlie Road)	<ul style="list-style-type: none"> <li>10 ML/a entitlement (WAL31067)</li> <li>Capacity 3 L/s (but licence limits to 1.5 L/s)</li> </ul>

*Note: \*Consumers along the Dungowan Pipeline (Tamworth) should also comply with the Drought Management Plan's requirements for their local town water supply system.*

## 3 OPERATING ENVIRONMENT

The Drought Management Plan has been tailored to consider the prevailing operating environment conditions that are relevant to each individual water supply system. While there is a need to have some level of uniformity across the region for some drought response actions (e.g. specific rules associated with water restrictions), there is also a need to have tailored drought management strategies that are specific to the individual water supply system and the surrounding environment that it operates within (e.g. triggers for activating water restrictions).

This section provides a brief summary of the various operating environment factors that are considered in both the preparation and operation of the Drought Management Plan, including:

- Location & Climate
- Water Resources
- Additional Demands During Drought Periods
- Potential Downstream / Environmental Impacts

### 3.1 Location & Climate

TRC serves a population of just over 60,000 and covers an area of 9,893 km<sup>2</sup> stretching from the Nandewar Range north of Barraba, south-east to the Peel and Great Dividing Ranges. In addition to the towns and villages that have reticulated water supply systems (refer to Table 2.1) there are several other villages located within the local government area (LGA) that do not have formal water supply systems, including Dungowan, Woolomin, Duri, Somerton and Woolbrook. The nearest towns outside of the TRC LGA are Armidale (which is located around 115 km to the northeast of Tamworth) and Gunnedah (which is located around 80 km to the west).

The Tamworth Region experiences a dry sub-humid climate. Temperatures are warm to hot in summer with relatively low humidity, mild in autumn and spring and cool to mild in winter. Rainfall is generally lower over the autumn and winter months and highest in summer months due to a predominance of summer storms.

Median rainfall in Tamworth city is 628 mm per annum, however higher rainfall is experienced in more elevated areas (>800 mm pa in Nundle and Bendemeer). Average annual evaporation is 1,971 mm per annum, and average 3 pm relative humidity is 41%. Monthly climate statistics for Tamworth are included in Table 3-1.

**Table 3-1 Climate Statistics – Tamworth Airport (1992 – 2022)**

Climate Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Rainfall (mm)	61.2	73.9	57.2	25.3	30.4	53.4	40.9	39.5	42.9	55.2	82.3	80.4	638.5
10%ile Rainfall (mm)	14.1	17.0	8.7	0.4	1.5	12.5	8.8	3.4	9.6	13.3	32.2	34.9	390.8
Mean Evap. (mm)*	267	227	214	138	90	60	65	93	132	186	228	270	1971
Mean Max. Temp. (°C)	33.0	31.5	29.2	25.5	20.8	17.0	16.5	18.5	22.1	25.7	28.6	30.8	24.9

Notes \* The mean evaporation is based on data from 1973-1992 at weather station 55054

It is widely accepted that future climate changes could impact water supply systems through changing frequency and duration of rainfall, as well as an increase in evaporation. While estimating the impacts associated with future climate change is very difficult and is an evolving science, recent studies have started to provide some indication of the potential climate impacts. However, modelling to-date has focused more on changes in average monthly or annual statistics and less on the duration and frequency of extreme events, which is more critical for drought management.

A summary of the estimated impacts of future climate change on maximum temperatures and rainfall for the New England / North West region is shown on Table 3-2.

**Table 3-2 Max Temp and Rainfall Predictions for New England / North West Region (Near Future)<sup>1</sup>**

Season	Maximum Temperatures	Rainfall
Spring	0.5 to 1.2°C warmer	-11 to 19% increase
Summer	0.5 to 1.4°C warmer	-15 to 14% increase
Autumn	0.5 to 0.9°C warmer	-9 to 47% increase
Winter	0.3 to 0.6°C warmer	-26 to 15% increase

In general:

- Mean temperatures are projected to rise by around 0.7 °C by 2030 (and by 2.2 °C by 2070).
- Annual rainfall will not change much in the near future (less than 2% increase by 2030) and may actually increase in the far future (+8% by 2070). However, the distribution of rainfall is expected to change.

Estimated changes in surface runoff and recharge to groundwater are provided in a report by the NSW Government Office of Environment and Heritage<sup>2</sup>. On average, across the Namoi region, runoff is estimated to increase by around 4% in the near future (2030) and by around 25% in the far future (2070).

In the near future estimate, summer runoff is likely to decrease across much of NSW, especially in north-eastern areas. In contrast, autumn runoff is projected to increase across large areas of NSW. Winter runoff is projected to decrease around the New England / North-West region. Spring runoff is projected to increase, though not as much as the autumn estimates. The recharge to groundwater in the Namoi catchment is estimated to decrease by around 7% in the near future and increase by around 12% in the far future.

<sup>1</sup> NSW Government AdaptNSW, "NSW Climate Projections Map for 2020-2039," accessed August 19, 2021, <https://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/Interactive-map>

<sup>2</sup> OEH (2015), *Climate Change Impacts on Surface Runoff and Recharge to Groundwater*. Prepared by Mark Littleboy, John Young and Joel Rahman for the NSW Office of Environment and Heritage.



## 3.2 Water Resources

The TRC LGA lies almost wholly within the Namoi River catchment in North West NSW. The Namoi River catchment drains an area of 42,000 km<sup>2</sup> and is bounded by the Great Dividing Range in the east, the Liverpool and Warrumbungle Ranges in the south, and the Nandewar Ranges and Mt Kaputar to the North. Major tributaries of the Namoi River include Coxs Creek and the Mooki, Peel, Cockburn, Manilla, and Macdonald Rivers, all of which join the Namoi upstream of Boggabri.

The two major water catchments, which cover the TRC LGA, are the Peel Valley sub-catchment and the Namoi / Manilla sub-catchment (see Figure 3-1).

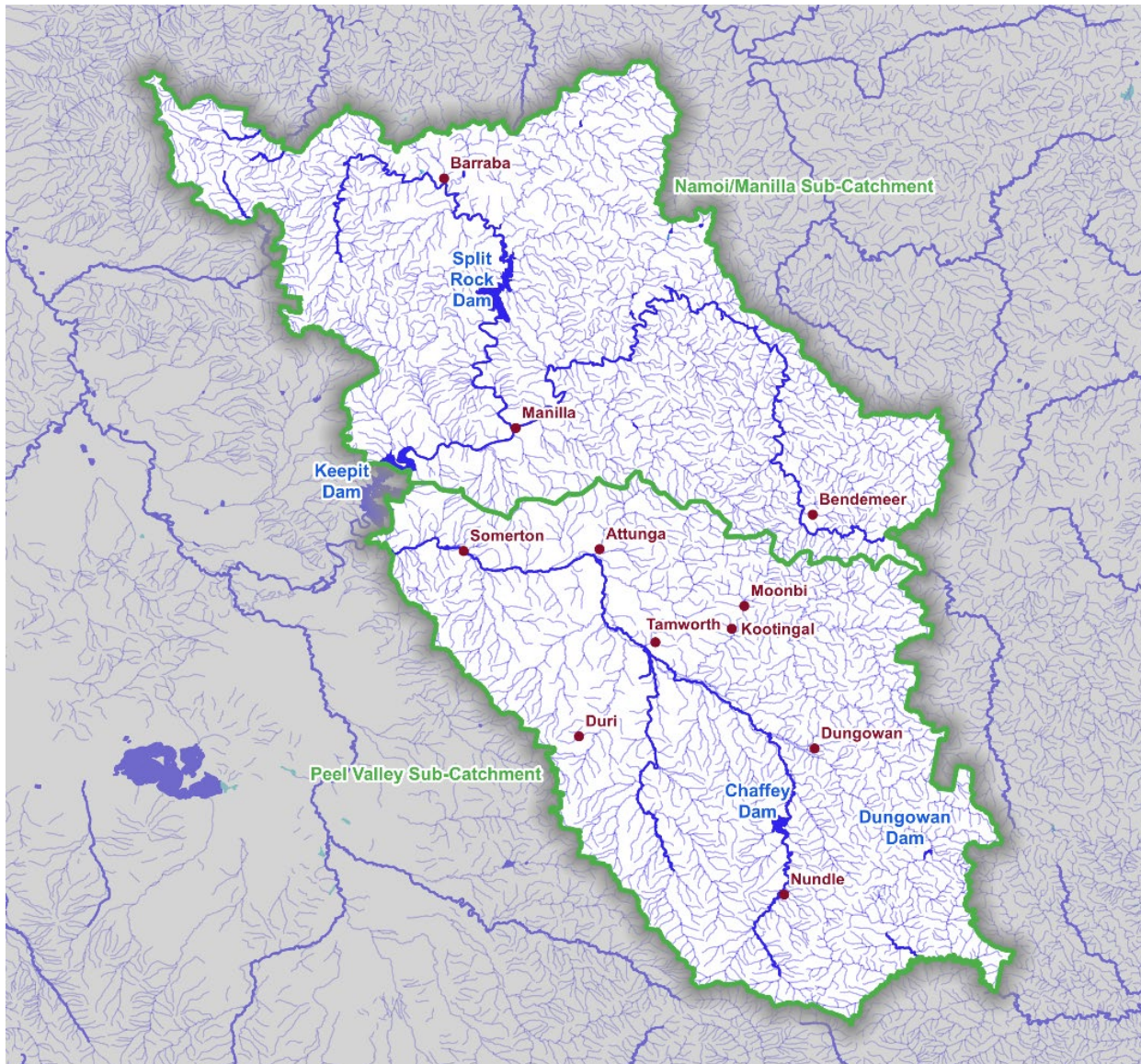


Figure 3-1 Major Water Catchments in the TRC Region

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There are five Water Sharing Plans (WSP) that impact the water resources that are available to town water supplies within the TRC LGA:

- *Water Sharing Plan for the Peel Regulated River Water Source 2022*<sup>3</sup>, which covers surface water extractions from regulated sources in the Peel Valley, including a water supply source for Tamworth and Moonbi/Kootingal (Chaffey Dam).
- *Water Sharing Plan for the Namoi and Peel Unregulated Rivers Water Sources 2012*<sup>4</sup>, which covers extractions from unregulated rivers in the Peel and Upper Namoi Valleys, including water supply sources for Tamworth and Moonbi/Kootingal (Dungowan Dam), Bendemeer (Macdonald River) and Manilla (Namoi River).
- *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016*<sup>5</sup>, which covers extractions from regulated sources in the Namoi Valley, including extractions from Split Rock Dam, which supplies water to Barraba and supplementary supply to Manilla.
- *Water Sharing Plan for the Namoi Alluvium Groundwater Sources 2020*<sup>6</sup>, which covers extractions from alluvium groundwater sources in the Peel and Namoi Valleys, including the water supply source for Attunga (Peel Alluvium).
- *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020*<sup>7</sup>, which covers fractured rock groundwater sources across the Murray Darling Basin, including the water supply source for Nundle (Peel Fractured Rock).

## Peel Valley Catchment

In the TRC LGA, the city of Tamworth, the towns of Kootingal and Nundle and the villages of Moonbi and Attunga all lie within the Peel Valley sub-catchment (see Figure 3-1). The total catchment area of the Peel Valley is around 4,700 km<sup>2</sup> and the key tributaries of the Peel River include: Duncans Creek, Dungowan Creek, Cockburn River, Goonoo Goonoo Creek, Moore Creek, Timbumburi Creek, Tangaratta Creek and Attunga Creek. In addition to the Peel River the Cockburn River, Goonoo Goonoo Creek and Dungowan Creek exhibit perennial flows in most years<sup>8</sup>.

The Peel Valley sub-catchment has two storages, Chaffey Dam and Dungowan Dam, which regulate water supplies in the Peel River Valley. Chaffey Dam is a major headwater storage located on the Peel River approximately 40 km upstream of Tamworth and Dungowan Dam is located on Dungowan Creek and is the second major water supply for Tamworth City.

The average annual discharge from the Peel River at Carroll Gap is around 180,000 ML, with a large variability between wet and dry years. Variability in streamflows also occurs between seasons (with predominate rainfall and irrigation in summer) and across the valley. The Cockburn River sub-catchment contributes around 40% of the average annual streamflows at Carroll Gap, with Goonoo Goonoo Creek and Dungowan Creek both contributing around 10% of streamflows<sup>8</sup>.

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<sup>3</sup> [https://www.industry.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0005/516902/peel-regulated-wsp.pdf](https://www.industry.nsw.gov.au/__data/assets/pdf_file/0005/516902/peel-regulated-wsp.pdf)

<sup>4</sup> <https://legislation.nsw.gov.au/view/html/inforce/current/si-2012-0493>

<sup>5</sup> <https://legislation.nsw.gov.au/view/html/inforce/current/si-2015-0631>

<sup>6</sup> <https://legislation.nsw.gov.au/view/html/inforce/current/si-2020-0346>

<sup>7</sup> [https://www.industry.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0020/500357/nsw-murray-darling-basin-fractured-rock-groundwater-sources-order-2020.pdf](https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/500357/nsw-murray-darling-basin-fractured-rock-groundwater-sources-order-2020.pdf)

<sup>8</sup> NSW Office of Water, 'Water Sharing Plan: Peel Valley Regulated, Unregulated, Alluvial and Fractured Rock Water Sources - Background Document', 2010.

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Chaffey Dam is the major in-stream structure in the Peel Valley, with a storage capacity of 102,000 ML (augmented from 62,000 ML in 2015/16) and a catchment area of around 420 km<sup>2</sup>. The dam is owned by WaterNSW and is a major source of water for both local irrigators and Tamworth, capturing water during times of high flow and releasing it during periods when downstream flows are insufficient to satisfy demands.

Dungowan Dam is a town water supply dam owned by TRC, with a storage capacity of 6,300 ML and a catchment area of around 125 km<sup>2</sup>. Although the dam is relatively small, it typically supplies around 40% of Tamworth's water supply. Dungowan Dam is operated by TRC according to licence conditions, which include maintaining a flow of 10 ML/day into Dungowan Creek when inflows exceed 10 ML/day, or passing all inflows as outflows when inflows are less than 10 ML/day.

Groundwater aquifers in the Peel Valley are primarily either fractured rock or alluvial – ie Peel Alluvial aquifer and Peel Fractured Rock aquifer. The alluvial aquifer is located adjacent to the Peel River and its major tributaries, predominately along the Peel Valley floor. The Peel Alluvium comprises unconsolidated sand, gravel and clay deposits, usually less than 1.5 km wide but ranging up to 3 km wide between Tamworth and Attunga. The thickness of the alluvial deposits is variable but is generally around 15 m, reaching 20 m near Tamworth. The Peel Alluvial is recharged by rainfall and streamflow and water quality is generally good, suitable for stock & domestic, irrigation and town water supply purposes.

The fractured rock aquifer is part of the bigger fractured rock aquifer system of the New England Fold Belt and comprises mainly shale, limestone, sandstone and mudstone rock formations. The fractured rock system contains water of variable yield and quality and is extensively developed for stock & domestic supplies, with some small scale commercial and irrigation development<sup>8</sup>.

The alluvial groundwater and surface water in the Peel River and its major tributaries are intricately linked, with the Peel River losing water to the Peel Alluvium along most of its length, but gaining water from groundwater at the lower end of the valley. The general flow of groundwater is initially away from the river and then down gradients parallel to the river<sup>8</sup>.

## **Namoi / Manilla Catchment**

In the TRC LGA, the towns of Manilla and Barraba and the village of Bendemeer lie within the Namoi / Manilla catchment (see Figure 3-1). The total catchment area of the Namoi / Manilla sub-catchment (upstream of Keepit Dam) is around 5,700 km<sup>2</sup>.

The headwaters of the Namoi River is the Macdonald River, which begins in the Great Dividing Range at an elevation of approximately 1,200 m above mean sea level. The river flows in a predominately westerly direction and drops quickly in elevation to 340 m near Manilla, some 200 river kilometres downstream. The river valley in this section is heavily constrained and has a small valley floor width. The river therefore has a high gradient as it flows through a gorge zone until it reaches Manilla where it joins with the Manilla River. From here, the river continues to flow in a westerly direction into Keepit Dam, a major storage just outside the TRC LGA.

The Manilla River drains a portion of the hill country on the western side of the New England highlands and the southern slopes of the Nandewar Range, including the Barraba district. It flows generally to the south and joins the Namoi River at the town of Manilla. There are a number of tributaries that contribute to the Namoi/Manilla River system including Barraba Creek, Ironbark Creek, Eumur Creek, Oakey Creek, Borah Creek, Warrabah and Watson's Creek as well as a number of other smaller tributaries. The Namoi/Manilla sub-catchment has one major storage, Split Rock Dam which regulates water supplies in the Manilla River, located approximately 28 km upstream of Manilla.



The long-term average annual discharge from the Namoi River at Manilla (30 km upstream of Keepit Dam) is around 350,000 ML/yr, although this would have reduced somewhat since the construction of Split Rock Dam in 1988. The Macdonald River sub-catchment (including the Namoi River upstream of confluence with Manilla River) contributes around 70% of the average annual streamflows for the catchment.

Split Rock Dam, located on the Manilla River, is the major in-stream structure in the Namoi/Manilla catchment, with a storage capacity of 397,000 ML and a catchment area of around 1,650 km<sup>2</sup>. The main use of water supply from the dam is for irrigation in the Lower Namoi. Split Rock Dam was constructed in order to meet irrigation demands for cotton crops in the Narrabri – Wee Waa area and to a lesser extent for the irrigation of other crops within the Namoi and Manilla valleys. The dam was constructed in 1988 to augment the supply to Keepit Dam (located 50km downstream) by an average of 53,000 ML per year. It also supplies water to users along the Manilla River.

There are limited groundwater supplies available in the Barraba and Manilla regions. Groundwater is generally absent as the drainage systems are entrenched and the development of alluvium is restricted in both depth and width. Small supplies of groundwater in the Barraba and Manilla regions are found in fractured rocks and in unconsolidated alluvium along the Namoi and Manilla Rivers, Barraba Creek and their tributaries.

### 3.3 Additional Demands during Drought Periods

Villages that may seek water during drought periods are listed on Table 3-3, along with an estimate of the potential demands during drought periods based on water carting.

**Table 3-3 Villages with no Reticulated Water Supply**

Village	Approx. Population*	Potential Demand During Drought ** (kL/d)
Somerton	550	44
Duri	500	40
Woolomin	300	24
Woolbrook	250	20
Piallamore	200	16

Notes: \* Based on most recent Census Data

\*\* Based on 80 L/person/day

In addition to the above villages, there are also sections within existing towns that do not have access to reticulated water supply, including:

- Properties on the Back Kootingal Road, Kootingal
- Moore Creek (village located 13 km north of Tamworth and currently on a community bore supply)
- Numerous private water supplies in the Daruka / Moore Creek area where grounds water is supplied by community bores
- Loomberah (rural community located south-east of Tamworth off Calala Lane)
- Properties in Dungowan not connected to raw water supply
- Properties on the Nundle Road
- Other farms in the region

### 3.4 Potential Downstream / Environmental Impacts

It is important that Council liaises with relevant government agencies and other large users (e.g. local irrigators) during drought periods to ensure that water resources are effectively managed at a whole of catchment level. Potential downstream impacts for each water supply system are included on Table 3-4.

**Table 3-4 Potential Downstream Impacts during Drought Periods**

Water Supply System	Potential Downstream Impacts
Tamworth and Moonbi/Kootingal	<ul style="list-style-type: none"> <li>• Potential impacts associated with temporary in-stream works at the Peel intake during low flow periods, which is discussed with NSW Fisheries prior to work being undertaken.</li> <li>• Extended use of the Paradise Drift Wells has the potential to impact other groundwater users. Nearby monitoring bores should be checked regularly in association with DPE Water to assess potential impacts.</li> <li>• <i>Regulation of the Peel River downstream of Chaffey Dam (including environmental flow requirements) is controlled by WaterNSW.</i></li> </ul>
Manilla	<ul style="list-style-type: none"> <li>• Negligible impacts as the primary extraction point on the Namoi River is close to the junction of Manilla River and the supplementary extraction point is on the Manilla River, which is regulated by WaterNSW between Split Rock Dam and Keepit Dam.</li> </ul>
Barraba	<ul style="list-style-type: none"> <li>• <i>Regulation of the Manilla River downstream of Split Rock Dam (including environmental flow requirements) is controlled by WaterNSW</i></li> </ul>
Nundle	<ul style="list-style-type: none"> <li>• Extractions from the Peel River are relatively minor due to the small size of this system. Any impacts would only affect a small section of river between Nundle and Chaffey Dam.</li> </ul>
Attunga	<ul style="list-style-type: none"> <li>• Negligible impacts as relatively minor extractions are sourced from a large aquifer adjacent to the Peel River.</li> </ul>
Bendemeer	<ul style="list-style-type: none"> <li>• Relatively minor extractions from the Macdonald River. Flows are not disrupted, as there is no weir or storage structure at the extraction point.</li> <li>• River can run dry during severe drought periods and supplementary source (groundwater) is utilised.</li> </ul>

## 4 PRE-DROUGHT PLANNING

While this Drought Management Plan focuses primarily on the response actions to be undertaken during a drought, the extent of the various impacts of drought (including economic, social and environmental impacts) will be driven in part by the effectiveness of a range of pre-drought planning and management activities.

This section provides a brief summary of the key activities and strategies that should be in place prior to any drought period, including:

- Implementation of demand management measures to ensure efficient management of water
- Adoption of appropriate system operating rules to ensure efficient operation of the system
- Regular system monitoring to provide baseline data for comparison during drought periods
- Preparation of long-term water security plans to ensure systems are capable of supplying future demands
- Regional drought resilience planning
- A funding strategy to assist in management of the costs associated with drought periods

Each of these pre-drought planning activities is discussed further in the following sections.

### 4.1 Demand Management Program

TRC has had a formal Demand Management Program in place since 2007 and the overarching Demand Management Plan was recently subject to review and update<sup>9</sup>. The Demand Management Program includes the following key measures:

1. Community Awareness Program
2. Water Rebates
3. Larger User Water Efficiency Assessments
4. Everyday Waterwise Guidelines
5. Regulation and Planning Controls
6. Water Loss Management
7. Water Recycling and Potable Substitution

The Demand Management Program includes everyday waterwise guidelines (previously referred to as Permanent Water Conservation Measures), which encourage common sense water use practices. The waterwise guidelines reinforce other demand management measures by developing a culture of water efficiency and lay the platform for the application of temporary water restrictions. The guidelines will generally be publicised when temporary water restrictions are not in force.

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<sup>9</sup> TRC Demand Management Plan 2023  
<https://www.tamworth.nsw.gov.au/live/environment-and-sustainability/water-sustainability>

## 4.2 System Operating Rules

Efficient operation of water supply systems, particularly systems with either surface or groundwater storages, is an important pre-emptive strategy for managing droughts. Due to the difficulty in predicting future drought conditions, it is important that system storages are not drawn down excessively during non-drought periods as a result of inefficient operation of the system, as this would reduce the security of a supply system in the event of a drought and consequently worsen the impacts of drought.

The most critical operating rules that impact TRC water supplies are associated with Chaffey Dam and Dungowan Dam. Chaffey Dam is owned and operated by WaterNSW and as such, TRC has limited ability to influence operation of the dam, particularly during non-drought periods. However, TRC should liaise with WaterNSW and DPE Water prior to the commencement of each water year to ensure that sufficient allocation (including carry over reserve) is made for town water supplies for the water year ahead. In addition, regular consultation with WaterNSW and DPE Water should occur once Chaffey Pipeline is in use for transfers between Chaffey Dam and Tamworth (once Chaffey Dam reduces below 20% storage) to ensure the remaining water stored in Chaffey Dam is not unnecessarily or inefficiently released.

Dungowan Dam is owned and operated by TRC and is generally used as the preferred supply source during non-drought periods. However, a key system operating rule is to stop extracting water from Dungowan Dam once the storage drops to around 50%. This storage is then maintained as an emergency backup in case water cannot be extracted from the Peel River for any reason.

## 4.3 System Monitoring

Regular monitoring of water supply sources, extractions, production, consumption and climate is critical to understanding how well a water supply system is operating and whether there are any problems or potential future problems. Regular data collection becomes even more critical during drought periods as supply sources are stressed and the water supply situation can deteriorate quickly due to the drought condition. Table 4-1 includes a list of key monitoring sites and the minimum (or normal) data collection requirements.

**Table 4-1 Minimum Monitoring Requirements (Normal Operation)**

Monitoring Type	Data Type/s	Frequency of Monitoring	Responsibility
Dams (WaterNSW)	- Water Level - Spills & Releases	Continuous	WaterNSW / DPE Water
Dams (TRC)	- Water Level - Spills & Releases	Continuous	TRC
Major Rivers	- Streamflows	Daily	DPE Water
Groundwater Bores	- Groundwater levels - Groundwater extractions	Daily	TRC
Intake Pump Stations	- Extractions	Daily	TRC
Water Treatment Plants (WTP)	- WTP Production	Daily	TRC
Customers	- Consumption (metered)	Quarterly*	TRC
Climate	- Rainfall & evaporation	Daily	BOM

*Note: \*Smart water meters and automatic meter reading (AMR) will be implemented across TRC LGA over 2023 and 2024*

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## 4.4 Long-Term Water Security

All water supply systems should be designed to cope with at least a repeat of the worst drought on record. Larger systems (>1,000 people) should be designed to cope with more severe drought conditions than the worst on record, on the basis that it is reasonably expected that we could face in the future a more severe drought than the worst on record and these larger systems are very difficult – or in the case of Tamworth Water Supply System probably impossible – to support via emergency water carting from a nearby larger system.

Concerns with Tamworth (and Moonbi / Kootingal) water security have been subject to much publicity following the 2018 and 2019 severe drought event, which resulted in Chaffey Dam falling to below 15% and emergency water restrictions being applied for an extended period for the second time in 15 years. While the state government is proposing to build a new, larger Dungowan Dam to improve long-term water security, TRC has commenced the preparation of a long-term Water Security Plan for Tamworth. The Water Security Plan will be prepared over a two to three year period, commencing in early 2023, and will outline a staged and balanced approach (including both supply and demand side components) to improving town water security and drought resilience for the Tamworth and Moonbi / Kootingal communities.

Water security for the remaining town water supply systems has recently been considered as part of the Namoi Regional Town Water Strategy (RTWS) project. Those towns that are either reliant on groundwater or have a reliable supplementary groundwater supply (including Barraba, Nundle, Attunga and Bendemeer) are all considered to have an acceptable level of water security. Manilla currently does not have access to a supplementary groundwater source and further work needs to be undertaken to better understand the level of water security provided by existing surface water supply sources.

## 4.5 Regional Drought Resilience Planning

In 2022, TRC and Walcha Council received joint funding through the Regional Drought Resilience Planning Program (a pilot program co-funded by the Commonwealth and NSW governments) to support the preparation of a Regional Drought Resilience Plan. The drought resilience plan is designed to strengthen the capacities of residents, communities, institutions, businesses, and systems to better withstand the impacts of drought.

Key community stakeholders from both local government areas were engaged through this process. This resulted in the development of 17 objectives and 22 actions. The flagship actions are recommendations to be implemented, subject to action facilitators securing resources, funding and further community support.

The overarching objective of drought resilience planning is to ensure the region is better prepared for drought, which also improves the resilience of the region, enabling it to better respond from an environmental, economic and social perspective post drought. The drought resilience plan will compliment Council's Drought Management Plan and plays a key role within the Environmental Sustainability Strategy.



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## 4.6 Resource and Funding Strategy

The costs associated with managing drought can have a significant impact on Council's finances, due to a variety of factors, including:

- Reduced revenue due to water consumption reductions associated with enforcing restrictions, particularly in the mid to late stages of the drought. This would be partly offset by revenue from higher than average water consumption levels in the lead-up to the drought and in the early stages of the drought.
- Additional costs associated with Council activities, including running an ongoing community awareness campaign, increased frequency of supply and demand monitoring, liaison with government agencies and other stakeholders and policing of restrictions.
- Increased capital and operating expenditure associated with investigation, implementation and running of supplementary and emergency supply options.

When preparing budgets for the year ahead, TRC will need to ensure that if drought conditions are expected and/or existent, sufficient funds are set aside for drought management activities. In addition, all costs associated with managing the drought should be tracked and be available to report to Council, government regulators, DPE Water and the community (if required). These costs can then be used as a justification for further investment in long-term supply strategies and other drought management planning initiatives. Drought emergency funding may also be available through DPE Water to manage depleted supplies, investigate and implement emergency capital works or to cart water.

## 5 DROUGHT MANAGEMENT ACTION PLANS

Drought Management Actions Plans (DMAP) set out the actions to be taken during each drought response level (sometimes referred to as 'level of restrictions'). There are five drought response levels (Levels 1 to 5), with each level having a set of actions that should be undertaken during that phase of the drought, including an associated set of water restrictions.

### 5.1 Overview

The key drought management actions included in the DMAPs are discussed below, including:

- Drought response levels and the application of water restrictions
- Community awareness campaign, including liaison with non-residential large water users
- Liaison with authorities and local irrigators
- Monitoring of water supply sources and town water demands
- Use of supplementary water sources and review / implementation of emergency supply options

#### Drought Response Levels

A general description of the five drought response levels is shown in Table 5-1. More details on the various actions and water restrictions that are relevant to each level are included in Sections 5.2 and 5.3.

**Table 5-1 General Description of Drought Response Levels**

Drought Response Level	Description
<b>Level 1</b> <b>Low</b>	This is the first level of water restrictions and is more focused on general awareness rather than trying to achieve significant reductions in usage. The key measure is to limit the hours that sprinklers can be used and generally the impact on residences and their gardens would be relatively minor. Actions are mainly preparatory measures that activate the Drought Management Plan and its various components.
<b>Level 2</b> <b>Moderate</b>	This level includes a ban on sprinklers and a time limit for drippers and hoses. The focus is on reducing usage back below typical levels for that time of year and the measures are likely to cause a moderate level of inconvenience to the community, without necessarily having significant impacts on most lawns and gardens. Key actions include setting up more regular liaison with key government stakeholders and preparing supplementary supply sources.
<b>Level 3</b> <b>High</b>	This level includes banning all forms of outdoor watering, other than buckets for 2 hours or a hose for 15 minutes per day (within the same 2 hour window), and will have a more significant impact on lawns and gardens and cause a significant inconvenience to most residences. The aim is to reduce usage well below typical levels while still allowing gardens to be maintained, albeit at a base level. Key actions include more focus on issuing warning and fines for violation of restrictions, stepping up the community awareness campaign, activating supplementary supply sources and if necessary, investigating emergency supply options.

<p><b>Level 4</b></p> <p><b>Very High</b></p>	<p>This severe level of water restrictions includes banning all outdoor watering to reduce usage to around winter levels and would have a major impact on lawns and gardens, including loss of gardens in many cases. The re-establishment of lawns and gardens after an extended period of severe restrictions could impose a relatively high cost on residences and therefore, the application of Level 4 restrictions or higher would only occur in very rare circumstances. Key actions include the activation of a drought taskforce, investigation / design of emergency supply options and stepping up issuing of fines for violation of restrictions.</p>
<p><b>Level 5</b></p> <p><b>Emergency</b></p>	<p>This extreme level of restrictions would involve an all-out campaign to reduce usage to absolute minimum levels by eliminating all non-essential usage and would have a major impact on nearly all residences and businesses. Residences may be asked to reduce shower times and limit washing machine loads. Business may be asked to restrict water usage to only essential services, with the possible shutting down of non-essential, water dependent services. Key actions include implementing emergency response / supply options and an all-out community water reduction appeal.</p>

## Triggers and Water Consumption Targets

The DMAPs for each of the water supply systems include primary triggers for initiating each drought response level, as well as total system water consumption targets for those levels. Secondary triggers such as water quality incidents and failure to achieve water consumption targets are also suggested. Water consumption targets are average annual consumptions and should be adjusted for seasonal patterns (where appropriate). In considering the easing of water restrictions, TRC will take into consideration water supply demand, projected demand, level and security of bulk water sources, catchment parameters, seasonal conditions, and seasonal outlook.

The easing of water restrictions will generally not be implemented where it is likely that the revised restrictions will not be sustained for more than four weeks before tighter restrictions need to be re-imposed. Suggested timings for easing restrictions are included in the DMAPs.

## Communication

A key aspect in ensuring the successful implementation of the Drought Management Plan is community engagement. A community awareness campaign is vital for ensuring the community is made aware of actions that directly impact them, such as water restrictions and any associated fines and exemptions, and the activation of supplementary or emergency supply sources and any associated changes in water quality.

The community also needs to be given advice on how to minimise the impact of various water restrictions (including options for household recycling of water) and advice on saving water around the home in general. It is important that the community is kept up-to-date with the status of water supply sources (including river flows and dam storage volumes) and have some understanding of the consequences of not achieving target reductions in water consumption.

Liaison with key government agencies is another important component of the communication strategy. Key agencies include DPE Water, DPE Environment and Heritage, NSW EPA, NSW Health, North West Local Land Services and WaterNSW. It is particularly important that the relevant agencies be informed when significant impacts on the community, the environment or other stakeholders are expected as a result of actions arising from implementation of the plan.

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In most systems, liaison with local irrigators is also important, to ensure they are aware of any impacts they may be having on the town water supplies and conversely, to make sure they are aware of the potential impacts that Council's actions, arising from the implementation of the Plan, may have on them.

A drought taskforce should be established immediately prior to moving into Level 4 restrictions to assist with internal and external communications during periods of severe restrictions and major water shortage. The taskforce should meet regularly (monthly at first) and should include representatives from: Council; government regulators (including DPE Water); dam operators (WaterNSW); emergency services; major town water users; and other industry groups. Further details on the drought taskforce, including guidelines and terms of reference are included in a Water Restrictions Communication and Engagement Plan (see Executive Summary in **Appendix D**), which was prepared during the 2018 – 2020 drought. The Communication and Engagement Plan (referred to as CEP) is particularly focused on community engagement during severe water restrictions (particularly Levels 4 and 5).

## **Monitoring**

Regular monitoring of streamflows, dam / weir levels, groundwater bore levels, water extractions, water production and monitoring of actual water consumption compared to target are critical during drought periods. The data obtained from this monitoring provides important feedback on the effectiveness of the various drought response levels and will generally be the basis for moving between drought response levels. More frequent monitoring will generally be required as the drought progresses and the water supply situation deteriorates.

## **Supplementary Supply Sources and Emergency Supply Options**

Where supplementary supply sources are available, DMAPs will generally nominate when these sources should be activated (if they haven't already been activated). After each of the water supply system DMAPs, emergency supply sources are listed in order of preference. Additional details on emergency supply options are included in the **Appendix B**.

## 5.2 Action Plans

The Drought Management Action Plans (DMAPs) for 'All Systems' is included in Table 5-2, followed by more specific DMAPs for each individual water supply system.

**Table 5-2 Drought Management Action Plan (All Systems)**

Drought Response Level	Actions
<b>1 Low</b>	<ul style="list-style-type: none"> <li>• Activation of Drought Management Plan</li> <li>• Implement Level 1 Water Restrictions</li> <li>• Review DMAP to ensure it is up-to-date, including a review of supplementary and emergency supply sources</li> <li>• Prepare community awareness campaign (media advertising, internet &amp; appropriate signage at town entrances)</li> <li>• Establish Drought Action Group (internal stakeholders) and meet regularly for duration of drought</li> <li>• Processing of applications for Water Management Plans (see Section 5.3)</li> <li>• Weekly review of streamflows, dam levels, weir levels, groundwater bore levels, water extractions, WTP production, and monitoring of actual water consumption compared to target (monitor where applicable)</li> </ul>
<b>2 Moderate</b>	<ul style="list-style-type: none"> <li>• Implement Level 2 Water Restrictions</li> <li>• Implement community awareness campaign</li> <li>• Commence issuing warnings and fines for violation of restrictions</li> <li>• Track ongoing drought management costs</li> <li>• Weekly review of streamflows, dam levels, weir levels, groundwater bore levels, water extractions, WTP production, and monitoring of actual water consumption compared to target (monitor where applicable)</li> <li>• Review all existing Water Management Plans and update where necessary</li> </ul>
<b>3 High</b>	<ul style="list-style-type: none"> <li>• Implement Level 3 Water Restrictions</li> <li>• Apply more resources to the issuing of warnings and fines for violation of restrictions</li> <li>• Step-up community awareness campaign</li> <li>• Initiate regular liaison with key government agencies (DPE Water, WaterNSW) and local irrigators (where appropriate). To support ongoing liaison, request that the state government appoints a drought coordinator (similar to former NSW Regional Town Water Supply Coordinator).</li> <li>• Twice-weekly review of streamflows, dam levels, weir levels, groundwater bore levels, water extractions, WTP production, and monitoring of actual water consumption compared to target (monitor where applicable)</li> <li>• Notify DPE Water of intention to investigate emergency supply options and seek drought assistance</li> <li>• Suspend all Water Management Plans</li> <li>• Prepare to establish drought taskforce by the time Level 4 restrictions are in place (refer to CEP, <b>Appendix D</b>).</li> </ul>
<b>4 Very High</b>	<ul style="list-style-type: none"> <li>• Implement Level 4 Water Restrictions</li> <li>• Step-up the issuing of warnings and fines for violation of restrictions</li> <li>• Establish drought taskforce and implement CEP (see <b>Appendix D</b>)</li> <li>• Step-up community awareness campaign, including non-residential water reduction appeal</li> <li>• Daily review of streamflows, dam levels, weir levels, groundwater bore levels, water extractions, WTP production, and monitoring of actual water consumption compared to target (monitor where applicable)</li> <li>• Regular liaison with key government agencies and local irrigators (where appropriate)</li> <li>• Use of smart water meter data to identify and investigate high residential water users</li> </ul>
<b>5 Emergency</b>	<ul style="list-style-type: none"> <li>• Implement Level 5 Water Restrictions</li> <li>• Staged implementation of emergency response / supply options</li> <li>• Strict issuing of warnings and fines for violation of restrictions</li> <li>• All-out community water reduction appeal – minimum essential usage only</li> <li>• Regular (fortnightly) meetings with large water users to discuss ongoing water reduction options</li> <li>• Consider temporary closure of non-essential, high water dependant services</li> <li>• Daily review of streamflows, dam levels, weir levels, groundwater bore levels, water extractions, WTP production, and monitoring of actual water consumption compared to target (monitor where applicable)</li> <li>• Regular liaison with key government agencies and local irrigators (where appropriate), including liaising with DPE Water re: emergency response options</li> <li>• Use of smart water meter data to identify and investigate high residential water users</li> </ul>



## Tamworth and Moonbi/Kootingal Water Supply System

Table 5-3 Drought Management Action Plan – Tamworth and Moonbi / Kootingal

Drought Response Level	Primary Trigger*		Water Usage Target** (ML/d)	Additional Actions
	Falling	Rising		
Restrictions Lifted	n/a	50%	n/a	
<b>1 Low</b>	40%	40%	24	<ul style="list-style-type: none"> <li>Target 250 L/p/d residential usage</li> <li>Maintain Dungowan Dam storage volume at around 50% (to provide ongoing supply to Dungowan pipeline users and emergency backup storage) with remainder of supply from Chaffey Dam</li> <li>Use Paradise drift wells 1 &amp; 1A to supplement primary supplies (up to 100 ML/mth)</li> </ul>
<b>2 Moderate</b>	35%	35%	22	<ul style="list-style-type: none"> <li>Target 225 L/p/d residential usage</li> <li>Undertake a review of previous large user Water Efficiency Assessments in association with community awareness campaign (target 10% non-residential usage reduction)</li> </ul>
<b>3 High</b>	30%	30%	20	<ul style="list-style-type: none"> <li>Target 200 L/p/d residential usage</li> <li>Target 15% non-residential usage reduction</li> <li>Review and update Tamworth Emergency Water Supply Plan</li> </ul>
<b>4 Very High</b>	25%	25%	18	<ul style="list-style-type: none"> <li>Target 175 L/p/d residential usage</li> <li>Target 20% non-residential usage reduction</li> <li>Liaise with WaterNSW regarding recommissioning Chaffey Pipeline to ensure pipeline is ready before Level 5 restrictions.</li> <li>Commence early design work and approvals (if needed) for emergency supply sources (see <b>Appendix C</b>)</li> </ul>
<b>5 Emergency</b>	20%	n/a	16.5	<ul style="list-style-type: none"> <li>Target 150 L/p/d residential usage (reducing to 100 L/p/d)</li> <li>Target 25% non-residential usage reduction</li> <li>Commence using Chaffey Pipeline for transfers from Chaffey Dam &amp; discuss other efficiency options (pulse releases from dam and reductions in environmental releases) with WaterNSW</li> <li>Implementation of emergency supply sources (see <b>Appendix C</b>) and efficient use of any remaining storage in Chaffey Dam and Dungowan Dam</li> </ul>
<b>Supplementary Supply Options</b>				
1. Paradise Drift Wells (note: limited local water utility entitlement volume)				
<b>Emergency Supply Options (See Emergency Water Supply Plan – Appendix C)</b>				
1. Maximise use of Drift Wells (and investigate extending borefield by taking over private bores) 2. Temporary block-bank at Paradise Weir (to harvest more flows from the Peel River) 3. Pipeline to Keepit Dam and/or Lower Peel / Upper Namoi groundwater 4. Use of Reclaimed Effluent (to substitute non-residential water usage)				

Notes: \* Secondary triggers include failure to achieve consumption targets & major water quality incidents for tightening restrictions and forecast climatic conditions and announced general security irrigation allocation for easing restrictions

\*\* Usage targets are average annual consumptions and should be adjusted for seasonal patterns

## Manilla Water Supply System

Table 5-4 Drought Management Action Plan - Manilla

Drought Response Level	Primary Trigger* (Manilla Weir**)		Water Usage Target*** (ML/d)	Additional Actions
	Falling	Rising		
Restrictions Lifted	n/a	Manilla Weir flow > 600 ML/mth (20 ML/d)	n/a	
1 Low	Manilla Weir flow < 300 ML/mth (10 ML/d)	Manilla Weir flow > 300 ML/mth (10 ML/d)	0.95	<ul style="list-style-type: none"> <li>All water requirements continue to be extracted from Manilla Weir (Namoi River)</li> </ul>
2 Moderate	Manilla Weir flow < 30 ML/mth (1 ML/d)	100% of supply sourced from Namoi River	0.90	<ul style="list-style-type: none"> <li>All water requirements continue to be extracted from Manilla Weir (Namoi River)</li> <li>Manilla River supply pumping station and rising main to be tested / prepared for use</li> </ul>
3 High	Manilla Weir level 100 mm below crest level	50% of supply sourced from Namoi River	0.80	<ul style="list-style-type: none"> <li>Activate Manilla River pumping station – maintain Manilla Weir level at 100 mm below crest level and provide remainder of supply from Manilla River pumping station</li> <li>There is an informal agreement with irrigators immediately upstream of the weir to cease irrigating when flow over the weir has ceased</li> </ul>
4 Very High	Manilla Weir level 200 mm below crest level & volume in Split Rock Dam for town water supply is limited	Supplementary supply from Split Rock Dam unrestricted	0.70	<ul style="list-style-type: none"> <li>Manilla River pumping station is primary supply with supplementary supply from Manilla Weir (Namoi River)</li> <li>If sufficient supply cannot be guaranteed from Split Rock Dam, undertake investigation / field testing of potential groundwater bore locations</li> </ul>
5 Emergency	Namoi River failed & supply from Split Rock Dam is restricted	n/a	0.65	<ul style="list-style-type: none"> <li>Fit out viable emergency bore/s and connect to WTP.</li> <li>Manilla River pumping station is primary supply (if water is still available from Split Rock Dam) and local emergency groundwater bores and/or carting from nearby system can be implemented as emergency supply options.</li> </ul>
Supplementary Supply Options				
1. Manilla River Pumping Station (licence from Split Rock Dam)				
Emergency Supply Options				
1. Temporary licence/transfer from Split Rock Dam 2. Temporary groundwater bores 3. Water carting from nearby system (Barraba or Tamworth)				

Notes: \* In the instance where flow over the Manilla Weir is temporarily reduced (e.g. during a hot, dry summer) and Split Rock Dam levels (and associated allocations) are high, Council may be able to balance the combined water entitlement across both Barraba and Manilla and temporarily avoid restrictions. Secondary triggers include failure to achieve consumption targets & major water quality incidents.

\*\* Based on Namoi River @ North Cuerindi streamflow gauge

\*\*\* Usage targets are average annual consumptions and should be adjusted for seasonal patterns

## Barraba Water Supply System

Table 5-5 Drought Management Action Plan - Barraba

Drought Response Level	Primary Trigger* (Split Rock Dam drought stage <sup>10</sup> )		Water Usage Target** (ML/d)	Additional Actions
	Falling	Rising		
Restrictions Lifted	n/a	Split Rock Dam moves to Stage 1 (normal management)	n/a	
<b>1 Low</b>	Split Rock Dam moves to Stage 2 (emerging drought / water shortage)	Split Rock Dam (Stage 2)	0.65	<ul style="list-style-type: none"> <li>All water requirements continue to be extracted from Split Rock Dam</li> </ul>
<b>2 Moderate</b>	Split Rock Dam moves to Stage 3 (severe drought / water shortage)	Split Rock Dam (Stage 3)	0.60	<ul style="list-style-type: none"> <li>All water requirements continue to be extracted from Split Rock Dam</li> <li>Prepare James Street Bores for future use</li> </ul>
<b>3 High</b>	Split Rock Dam moves to Stage 4 (critical drought / water shortage)	Split Rock Dam supply restored (Stage 4)	0.55	<ul style="list-style-type: none"> <li>Activate James Street bores and use as supplementary supply if needed (if supply from Split Rock Dam is restricted)</li> </ul>
<b>4 Very High</b>	Split Rock Dam supply failed	James Street bores have recovered & can provide supply requirements	0.50	<ul style="list-style-type: none"> <li>Continue to use James Street bores</li> <li>If sufficient supply cannot be guaranteed from James Street Bores, undertake investigation / field testing of potential additional groundwater bore locations</li> </ul>
<b>5 Emergency</b>	Groundwater supplies restricted	n/a	0.45	<ul style="list-style-type: none"> <li>Continue to utilise James Street bores (if still available) and local emergency groundwater bores and/or carting from nearby system should be implemented as emergency supply options.</li> </ul>
<b>Supplementary Supply Options</b>				
1. James Street groundwater bores				
<b>Emergency Supply Options</b>				
1. Temporary groundwater bores				
2. Water carting from nearby system (Manilla or Tamworth)				

Notes: \* The entitlement to water from Split Rock Dam is a combined entitlement with Manilla. Therefore, restrictions in Barraba should also take into consideration the water supply situation in Manilla. Secondary triggers include failure to achieve consumption targets & major water quality incidents

\*\* Usage targets are average annual consumptions and should be adjusted for seasonal patterns

<sup>10</sup> See NSW Extreme Events Policy  
<https://www.industry.nsw.gov.au/water/what-we-do/legislation-policies/eep>

## Nundle Water Supply System

Table 5-6 Drought Management Action Plan - Nundle

Drought Response Level	Primary Trigger* (Peel River @ Taroona)		Water Usage Target** (ML/d)	Additional Actions
	Falling	Rising		
<b>Restrictions Lifted</b>	n/a	Peel River > 150 ML/mth (5 ML/d)	n/a	
<b>1 Low</b>	Peel River < 60 ML/mth (2 ML/d)	Peel River > 60 ML/mth (2 ML/d)	0.12	<ul style="list-style-type: none"> <li>All water requirements extracted from Peel River</li> </ul>
<b>2 Moderate</b>	Peel River < 30 ML/mth (1 ML/d)	Peel River > 30 ML/mth (1 ML/d)	0.11	<ul style="list-style-type: none"> <li>All water requirements extracted from Peel River</li> <li>Prepare / test Crawney Rd bore supplementary supply system, including any required remediation works</li> </ul>
<b>3 High</b>	Peel River < 15 ML/mth (0.5 ML/d)	Peel River > 15 ML/mth (0.5 ML/d)	0.10	<ul style="list-style-type: none"> <li>Activate Crawney Rd bore supplementary supply system (supplementary only)</li> <li>Review / assess emergency supply options, including potential additional groundwater bore locations</li> </ul>
<b>4 Very High</b>	Peel River failed	Crawney Rd bore has recovered & can provide supply requirements	0.09	<ul style="list-style-type: none"> <li>Use of Crawney Rd bore as primary supply (supplement from Peel River when available)</li> <li>Investigation / field testing of potential groundwater bore locations, including Oakenville bore (if required)</li> </ul>
<b>5 Emergency</b>	Supplementary supply restricted	n/a	0.08	<ul style="list-style-type: none"> <li>Continue to use Crawney Rd bore (if available) and activation of local emergency groundwater bores and/or carting from nearby system should be implemented as emergency supply options.</li> </ul>
<b>Supplementary Supply Options</b>				
1. Crawney Rd Bore				
<b>Emergency Supply Options</b>				
1. Temporary groundwater bores				
2. Water carting from nearby system (Chaffey Dam Pipeline or Tamworth)				

Notes: \* Secondary triggers include failure to achieve consumption targets & major water quality incidents

\*\* Usage targets are average annual consumptions and should be adjusted for seasonal patterns

## Attunga Water Supply System

Table 5-7 Drought Management Action Plan - Attunga

Drought Response Level	Primary Trigger* (Depth to Groundwater)		Water Usage Target** (ML/d)	Additional Actions
	Falling	Rising		
Restrictions Lifted	n/a	< 5.0m	n/a	
<b>1 Low</b>	> 5.2m	< 5.2m	0.14	<ul style="list-style-type: none"> <li>All water requirements to be extracted from Bores 1 &amp; 2 near Peel River (when Bore 2 draws down impose tighter restrictions – Bore 2 operates at a lower level than Bore 1).</li> </ul>
<b>2 Moderate</b>	> 5.4m	< 5.4m	0.13	<ul style="list-style-type: none"> <li>Liaison with Mine to discuss future water requirements and alternative supply options (other than town water) – request a reduction in town water usage</li> <li>Reduce pumping rate to try and maintain aquifer level</li> </ul>
<b>3 High</b>	Both bores not recovering overnight	Both bores recovering overnight	0.12	<ul style="list-style-type: none"> <li>Review / assess emergency supply options, including assessing potential additional groundwater bore locations.</li> <li>Liaison with Mine to request that they minimise usage of town water to assist with achieving overall water usage target</li> </ul>
<b>4 Very High</b>	Bore pumps & reservoir unable to meet demand	Bores operational but not recovering overnight	0.11	<ul style="list-style-type: none"> <li>Restrict supply of town water to Mine for domestic use only</li> <li>Field testing of potential groundwater bore locations, including testing for water quality and yields.</li> </ul>
<b>5 Emergency</b>	Bores failed	n/a	0.10	<ul style="list-style-type: none"> <li>Use any viable groundwater bores as primary source, supplemented by carting</li> </ul>
<b>Supplementary Supply Options</b>				
1. None				
<b>Emergency Supply Options</b>				
1. Temporary groundwater bores				
2. Water carting from nearby system (Tamworth, Manilla or Barraba)				

Notes: \* Secondary triggers include failure to achieve consumption targets & major water quality incidents

\*\* Usage targets are average annual consumptions and should be adjusted for seasonal patterns



## Bendemeer Water Supply System

Table 5-8 Drought Management Action Plan - Bendemeer

Drought Response Level	Primary Trigger* (MacDonald River)		Water Usage Target** (ML/d)	Additional Actions
	Falling	Rising		
Restrictions Lifted	n/a	Macdonald R > 150 ML/mth (5 ML/d)	n/a	
<b>1 Low</b>	Macdonald R < 60 ML/mth (2 ML/d)	Macdonald R > 60 ML/mth (2 ML/d)	0.085	<ul style="list-style-type: none"> <li>All water requirements extracted from Macdonald River</li> </ul>
<b>2 Moderate</b>	Macdonald R < 30 ML/mth (1 ML/d)	Macdonald R > 30 ML/mth (1 ML/d)	0.080	<ul style="list-style-type: none"> <li>All water requirements extracted from Macdonald River</li> <li>Prepare / test Airlie Rd bore supplementary supply system, including any required remediation works</li> </ul>
<b>3 High</b>	Macdonald R < 15 ML/mth (0.5 ML/d)	Macdonald R > 15 ML/mth (0.5 ML/d)	0.070	<ul style="list-style-type: none"> <li>Activate Airlie Rd bore supplementary supply system (supplementary only)</li> <li>Review / assess emergency supply options, including potential additional groundwater bore locations</li> </ul>
<b>4 Very High</b>	Macdonald R failed	Supplementary supply bore has recovered & can provide supply requirements	0.065	<ul style="list-style-type: none"> <li>Use of Airlie Rd bore as primary supply (supplement from Macdonald River when available)</li> <li>Investigation / field testing of potential groundwater bore locations (if required)</li> </ul>
<b>5 Emergency</b>	Supplementary supply restricted	n/a	0.060	<ul style="list-style-type: none"> <li>Continue to use Airlie Rd bore (if available) and activation of local emergency groundwater bores and/or carting from nearby system should be implemented as emergency supply options.</li> </ul>
<b>Supplementary Supply Options</b>				
1. Airlie Rd bore				
<b>Emergency Supply Options</b>				
1. Temporary groundwater bore/s				
2. Water carting from nearby system (Tamworth, Manilla or Barraba)				

Notes: \* Secondary triggers include failure to achieve consumption targets & major water quality incidents

\*\* Usage targets are average annual consumptions and should be adjusted for seasonal patterns

## 5.3 Water Restrictions

Water restrictions corresponding to each Drought Response Level are summarised in Table 5-9, with the full list of measures included in **Appendix A**. Each drought response level also has an associated residential usage target, starting at 250 L/p/d at Level 1 and reducing to 150 L/p/d at the commencement of Level 5, and eventually 100 L/p/d if severe drought conditions continue.

Water restrictions are generally based on a common set of measures adopted by the councils associated with the Namoi Unlimited. The adoption of a common set of water restrictions across the Namoi Region allows for a consistent and simplified communication process and reduces confusion in the community.

**Table 5-9 Summary of Water Restrictions**

Category	<b>1 Low</b>	<b>2 Moderate</b>	<b>3 High</b>	<b>4 Very High</b>	<b>5 Emergency</b>
Residential Gardens & Lawns Watering	Sprinklers restricted to 2 hrs per day.	No sprinklers. Drippers & hoses restricted to 2 hrs per day.	No sprinklers or drippers. Buckets restricted to 2 hrs per day or one hose for 15 min.	No watering at any time.	No watering at any time.
Washing Down (including vehicles)	Wash down hard / paved surfaces with high pressure hose only.	Hoses restricted to 2 hrs per day.	No hoses. Buckets restricted to 2 hrs per day.	No washing down at any time.	No washing down at any time.
Swimming Pools & Spas	Filling and topping up of pools permitted	Filling and topping up of pools permitted	Topping up during 15 minutes of handheld hosing within 2-hour window	No filling or topping up pools.	No filling or topping up pools.
<b>Residential Usage Target (L/p/d)</b>	<b>250</b>	<b>225</b>	<b>200</b>	<b>175</b>	<b>150</b> (reducing to 100)

During Level 1 and 2 water restrictions (only), an application for a Water Management Plan (WMP) can be submitted to Council, seeking to vary standard watering hours or allow the watering of newly laid turf. Applications for WMPs is subject to a fee and WMPs expire after 12 months (for Standard Watering Hours plans) or 6 weeks (for New Turf plans). Under Level 3 to 5 restrictions, all WMPs become inactive until such times as Level 1 or 2 restrictions apply again (or the WMP expires).

### Compliance with Water Restrictions

Periods of water restrictions and use of appliances in accordance with water restrictions in place will be policed by Council officers.

Under the Local Government Act 1993 the maximum penalty that may be applied for a breach of imposed water restrictions is \$2,200 for corporations and \$220 for individuals.

## 5.4 Emergency Response Measures

In the event of a severe water shortage that has resulted in primary and supplementary supply sources failing or approaching failure, emergency response measures will need to be implemented. These measures may include supply side measures (emergency supplies) and/or demand side measures (emergency demand management) and they would be implemented in association with Level 5 Emergency Water Restrictions.

### Emergency Supplies (Tamworth and Moonbi/Kootingal)

In 2019/2020, TRC prepared the Tamworth Emergency Water Supply Plan (EWSP), which specifically covers the emergency response measures for the Tamworth and Moonbi / Kootingal town water supply system (Executive Summary included in **Appendix C**). The EWSP should be reviewed and updated prior to the commencement of the Level 5 drought response level.

Due to the size of the population serviced by the Tamworth Water Supply System – and the associated businesses, industries and institutions – emergency supply options for Tamworth are more complex and will take some time to implement. It is estimated that at the commencement of Level 5 restrictions (when the Tamworth EWSP would be activated), Chaffey and Dungowan Dams would have the equivalent of around 24 months of restricted demands in storage, assuming ongoing severe drought conditions. Construction of emergency supply options would ideally commence when there is around 18 months of remaining storage. Further details are contained in the Tamworth EWSP (see **Appendix C**).

### Emergency Supplies (towns and villages)

Key emergency supply options for the towns and villages have been identified for each town water supply system and are listed on the Drought Management Action Plans in Section 5.2, with further details included in **Appendix B**. Emergency supply options typically include groundwater bores and water carting.

Emergency supply options generally need to be implemented very quickly and any pre-construction planning and design work should generally be undertaken prior to reaching the Level 5 drought response level to ensure the emergency supply source can be activated expeditiously.

For all towns / village systems, water carting would be the last resort emergency supply option and due to the high costs involved, would only be implemented if all other emergency response measures failed (see below).

### Water Carting (towns and villages)

Carting of water to towns and villages may be necessary to provide basic town water needs during an emergency – in the event that all other emergency supply measures have failed. It is anticipated that such arrangements would only be required for a short period in conjunction with water rationing to allow the local water source to recover. For the larger towns (> 2,000 people), it would be impractical to rely indefinitely upon carted water as an emergency water supply source due to the enormous costs associated with water carting. Water cartage is generally not considered to be a viable emergency supply options for very large towns / cities (> 10,000 people) and therefore is not a viable option for Tamworth.

It is anticipated that water carting to Nundle, Attunga and Bendemeer could be achieved using a single truck (eg milk tanker), however Barraba and Manilla may require several large trucks or semi-trailers. An estimate of the quantities of water that may need to be carted is included in the following section on Table 5.10. Supplies would generally be sourced from the nearest water supply system that has sufficient spare capacity.

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Government assistance towards the cost of water cartage has historically been available from the NSW Government via DPE Water, but is subject to quantities and cartage arrangements being agreed with DPE Water. If the security of a town supply appears to be threatened, the regional staff of DPE Water can assist Council with undertaking an initial assessment of the system and advise on the best cartage arrangements; however, Council will be required to seek quotations from contractors for the carting.

An application to the DPE Water should contain the following:

- A copy of a technical report prepared by Council/DPE Water following the initial assessment
- Details of any consideration given to, or steps taken towards, establishing an emergency supply from another source
- The location of the new source of water to be used, the method of cartage proposed, the number of loads and frequency
- The cost of purchase and transportation of water
- Copies of all correspondence with transport contractors on the subject of cartage

### **Emergency Demand Management**

In the event of severe water shortage, external residential water use would be stopped altogether by way of restrictions and indoor water use would need to be reduced through persuasive advertising and community education campaigns. Emergency response strategies should only be considered when all other options have been exhausted and should be applied in conjunction with Level 5 water restrictions.

Once Level 5 water restrictions are introduced, Council will consider a range of actions for implementation, including the following emergency response measures:

- It is envisaged that a residential usage target of around 150 L/person/day would initially be implemented and this could be reduced to as low as 100 L/person/day in the event of a severe water shortage.
- The above measures would be implemented in conjunction with a major publicity campaign urging reductions in residential internal water use, with a focus on shorter showers, washing machines only being used for full loads and reduced operation of evaporative air conditioners. The campaign could also include mailing out shower timers to all residential properties in the affected area to encourage residents to reduce the period of time spent showering.
- Investigation of properties that are consistently exceeding usage targets and not showing a significant reduction in water usage over time.
- Introduce investigation of properties claiming the use of recycled or alternate sources of supply and, if the claims are valid, provide a Council approved sign at no cost to the property owner verifying the inspection and alternate use.
- Non-essential business asked to reduce consumption initially by 30% and then by 50% in the event of a severe water shortage.

Further details are contained in the Water Restrictions Communications and Engagement Plan (see Executive Summary in **Appendix D**).

## Rationing

In the event that Level 5 Water Restrictions do not sufficiently reduce system demands to sustainable levels (based on the prevailing drought conditions), water rationing will need to be considered. The key objective of rationing would be to reduce water consumption to minimum essential supply requirements only. For residential properties, a minimum essential supply requirement of 100 L/p/day may be achievable. For non-residential properties, most businesses and industries would be required to reduce water consumption to minimum essential usage only and in the case of a severe water shortage, non-essential businesses may be asked to temporarily cease operations until drought conditions improve.

An estimate of the minimum essential supply requirements for each water supply system is included in Table 5-10. While the estimates included in the table are considered useful for initial emergency planning purposes, a more accurate assessment of minimum essential supply requirements should be undertaken as Council approaches Drought Response Level 5 based on the prevailing climatic conditions, achievements to-date with reducing water consumption and a reassessment of essential businesses and industries.

**Table 5-10 Minimum Essential Supply Requirements**

Water Supply System	Population Served	Residential Essential Supply Requirement (L/p/day)	Residential Essential Supply Requirement (ML/d)	Non-Residential Essential Supply Requirement* (ML/d)	MINIMUM ESSENTIAL SUPPLY REQUIREMENT (ML/d)
Tamworth and Moonbi/Kootingal**	50,000	100	5.0	7.0	12.0
Manilla	2,110	100	0.21	0.18	0.39
Barraba	1,125	100	0.11	0.17	0.28
Nundle	310	100	0.03	0.03	0.06
Attunga	330	100	0.03	0.03	0.06
Bendemeer	210	100	0.02	0.02	0.04

Notes: \* Non-residential essential supply requirement assumed to be around 65% of average requirements for Tamworth (which has large industrial users) and 50% of average requirements for other towns / villages.

\*\*Refer to Tamworth Emergency Water Supply Plan for more details (see Appendix C)



## 6 POST-DROUGHT ACTIONS

### 6.1 Post-Drought Evaluation & Revision

Once the drought has broken and water supply systems return to normal operating conditions, a review needs to be undertaken of the effectiveness of the Drought Management Plan. The post-drought evaluation should include:

- A review of both supply side and demand side actions, including their effectiveness and timing, should be undertaken for each system and documented
- An assessment should be made of the impact of drought management actions (including water restrictions) on various stakeholders, including the community
- An assessment of the impact of drought management actions on Council should also be undertaken
- Community response to the imposition of various restrictions should be sought, including feedback on the effectiveness of communications and engagement, how they managed the impacts of drought and any suggested changes / modifications to water restrictions
- Feedback should also be sought from various government agencies and other stakeholders, including local irrigators

Based on this review of the previous drought and any feedback received, the Drought Management Plan will need to be revised to include issues that were not previously considered and potentially modified to improve the future management of droughts.

### 6.2 Regular Review & Update of the Plan

In addition to evaluation and revision after each period of drought, regular reviews of the Drought Management Plan (and associated EWSP and CEP) should be undertaken at least every 5 years. Plans should be updated with the latest information on water supply systems, including any augmentations that have occurred, changes to operating rules and up-to-date water consumption data and flow / level monitoring data for water sources. Plans should also be updated after any major changes / augmentations to water supply systems.

## **APPENDIX A**

### **TRC WATER RESTRICTIONS GUIDE**

Tamworth Regional Council Drought Management Plan: Water Restrictions Guide (2023 Revision)

✓	Allowed at all times
✗	Banned at all times
⌚	Restricted use only

CATEGORY	ACTIVITY	LEVEL 1 LOW	LEVEL 2 MODERATE	LEVEL 3 HIGH	LEVEL 4 VERY HIGH	LEVEL 5 EMERGENCY
General Watering of Lawns & Gardens	Hand Held Hoses (with trigger nozzle)	⌚ Not during heat of the day	⌚ 2 hours	⌚ 15 minutes of one handheld hose per property within 2 hour window	✗	✗
	Sprinkle / Micro Sprays / Fixed Hoses	⌚ 2 hours	✗	✗	✗	✗
	Water Efficient Drip Irrigation	⌚ Not during heat of the day	⌚ 2 hours	✗	✗	✗
	Watering of New Turf	⌚ Not during the heat of the day (unless with an approved Water Management Plan)	⌚ Sprinklers for 2 hrs with an approved Water Management Plan	✗ All Water Management Plans suspended	✗	✗
	Buckets / Cans	✓	✓	⌚ 2 hours (as an alternative to 15 minutes of hoses)	✗ Greywater only	✗ Greywater only
Public Parks, Gardens & Facilities	Watering of Public Parkes, Gardens & Facilities	⌚ Refer to TRC Open Space Management Guide	⌚ Refer to TRC Open Space Management Guide (target 30% consumption reduction)	⌚ Refer to TRC Open Space Management Guide (target 50% consumption reduction)	⌚ All irrigation ceases unless access to groundwater	✗ All irrigation ceases unless access to groundwater
Vehicle Washing	Buckets	✓	✓	⌚ Not during heat of the day	✗ Clean windows & number plates only	✗ Clean windows & number plates only
	Hand Held Hoses (with trigger nozzle)	⌚ Not during heat of the day (Pressure cleaner any time)	⌚ 2 hours (Pressure cleaner any time)	✗	✗	✗
Washing Down of Hard Surfaces	High Pressure Cleaner (limited to 9 L/min)	✓ Includes vehicles	✓ Includes vehicles	✗	✗	✗
	Hand Held Hoses (with trigger nozzle)	✗	✗	✗	✗	✗
Private Swimming Pools (including residential & institutions)	Filling	✓	✓	✗	✗	✗
	Topping Up	✓	✓	⌚ 15 minutes of one handheld hose per property within 2 hour window	✗	✗
Motel & Guest House Swimming Pools	Filling	✓	✓	✓	✗	✗
	Topping Up	✓	✓	✓	✗	✗
Council Swimming Pools		⌚ Grass areas watered in accordance with Level 1 Restrictions. No other restrictions.	⌚ Grass areas watered in accordance with Level 2 Restrictions. No other restrictions.	⌚ Grass areas watered in accordance with Level 3 Restrictions. No other restrictions.	⌚ Barraba, Manilla, Kootingal, Nundle & South Tamworth (see note below). <u>Tamworth Olympic Pool closed</u>	✗ Pools only open if filled/topped up with alternative water supply
Hydrotherapy Pools		✓ No restrictions to health facilities	✓ No restrictions to health facilities	✓ No restrictions to health facilities	✓ No restrictions to health facilities	✓ No restrictions to health facilities
Evaporative Coolers	Use of Water Cooling	✓	✓	✓	✓	✓ Summer community education campaign to limit use through optimised efficiency
Bulk Water Stations & Water Cartage	Carting water for stock and domestic consumption	✓	✓	⌚ Internal domestic use only with Council Permit	⌚ Internal domestic use only with Council Permit	⌚ Internal domestic use only with Council Permit
	Carting water for all other uses	✓	✓	✗	✗	✗
	Bulk Filling Stations	✓ Access only restricted if demand is compromising local water supplies	✓ Access only restricted if demand is compromising local water supplies	⌚ Internal domestic use only with Council Permit	⌚ Internal domestic use only with Council Permit	⌚ Internal domestic use only with Council Permit
Commercial, Institutions and Industrial Use	General Use, excluding lawns and gardens	✓	✓	⌚ Target 15% reduction in water use	⌚ Target 20% reduction in water use	⌚ Target 25% reduction in water use
	Landscaping, including Lawns & Gardens	⌚ Not during the heat of the day (or with an approved Water Management Plan)	✓ Hand Held hoses only for 2 hours including within approved Water Management Plan	✗ All Water Management Plans suspended	✗	✗
	Irrigation of Sports Areas (including school sporting areas)	⌚ Water for 2 hours during heat of the day with approved Water Management Plan	⌚ Water for 2 hours during heat of the day with approved Water Management Plan	⌚ Review Water Management Plans and allow if 50% reduction can be demonstrated for use in heat of the day	✗	✗
Sporting Precinct Recycled Water Scheme	Backwash Water Supplied for Irrigation & Other Activities	✓	✓	✓	✗ Backwash water to be returned to head of the water treatment plant	✗ Backwash water to be returned to head of the water treatment plant

**NOTES:**

1. Restrictions apply to the use of treated water only, including bulk raw water supplied from the Dungowan Dam Pipeline.

2. Water restrictions should NOT compromise health, hygiene and safety. Cleaning outdoors for these reasons is allowed as long as water is used conservatively.

3. Greywater can continue to be used anytime and rainwater can be used anytime, providing rainwater tanks are not topped up or cross-connected to the treated water supply (NB Certain health regulations apply to the use of grey water - please contact Council or NSW Health for further details)

4. Water Management Plans (for Special Watering Hours or 6 Week New Turf Watering) may be issued to allow the use of hoses or fixed sprinklers outside the nominated hours or conditions during Level 1 and Level 2 in particular circumstances.

5. Vehicles and hard surfaces may be washed down at any time for health and safety reasons using a high pressure, low-volume cleaner.

6. Any reference to 2 hours of restricted watering means between the hours of 6pm – 8pm during Daylight Saving and 5pm – 7pm at all other times.

7. During Level 4 restrictions the surrounds of Council Swimming Pools that remain open may be watered by handheld hoses only once per week between 6pm and 9pm. All pools closed during shoulder seasons under Level 4 Restrictions.

8. Periods of water restrictions will be policed by Council Officers. The maximum penalty under the Local Government Act 1993, to apply for a breach of imposed restrictions is \$2,200 for corporations and \$220 for individuals.

9. Not during the heat of the day means not between 10am and 4pm.

## Appendix A – TRC Water Restrictions Guide

### Definitions

**Alternate Water Source:** water from a bore, dam, stream, rainwater tank that is not connected to the Council reticulated water supply, or recycled water.

**Approved Alternate Water Source:** an approved alternate water source approved by Council.

**Domestic Purposes:** for internal household use.

**Hand held hose:** a hose fitted with a trigger nozzle that is only held by hand.

**Fixed Sprinkler:** sprinklers, micros rays, or misters fitted to a hose or pipe.

**Drip irrigation system:** an irrigation system that complies with the following requirements -

- Drippers must have a manufacturer's discharge rating of not greater than 8 L/hour at a water pressure of 100 kPa
- The maximum rate of the complete irrigation system per property is 5 L/minute
- The following devices must be those approved by Council and fitted at the appropriate locations in a drip irrigation system:
  1. Backflow prevention device
  2. Automatic timer; and
  3. 100 kPa pressure reduction valve.

**Use of Bucket or Can (when permitted under water restrictions):** a bucket or can is to be of no more than 20 L capacity, is to be filled directly from a tap (or a length of hose of not exceeding one metre in length connected directly to a tap) during the allocated watering time. The bucket or can must only be decanted by way of tipping directly onto the garden, lawn, pool or motor vehicle, and must not be decanted into another vessel or storage vessel prior to use. A limit of only one bucket or can may be used during the allocated hours of watering at each property or tenement (unit, villa or strata unit).

**Water Restrictions:** regulations introduced by Council to enforce restrictions of water consumption to ensure that water supply can be maintained at levels consistent with good management practices, considering volume.

**Water Management Plan:** a plan approved by Council for the approved hours and method of on-site water use. The approved plan relates to a specific property and a sign provide by Council must be displayed at the site for the duration of the plan.

**Council Approved Sign:** a sign approved and supplied by Council.

## **APPENDIX B**

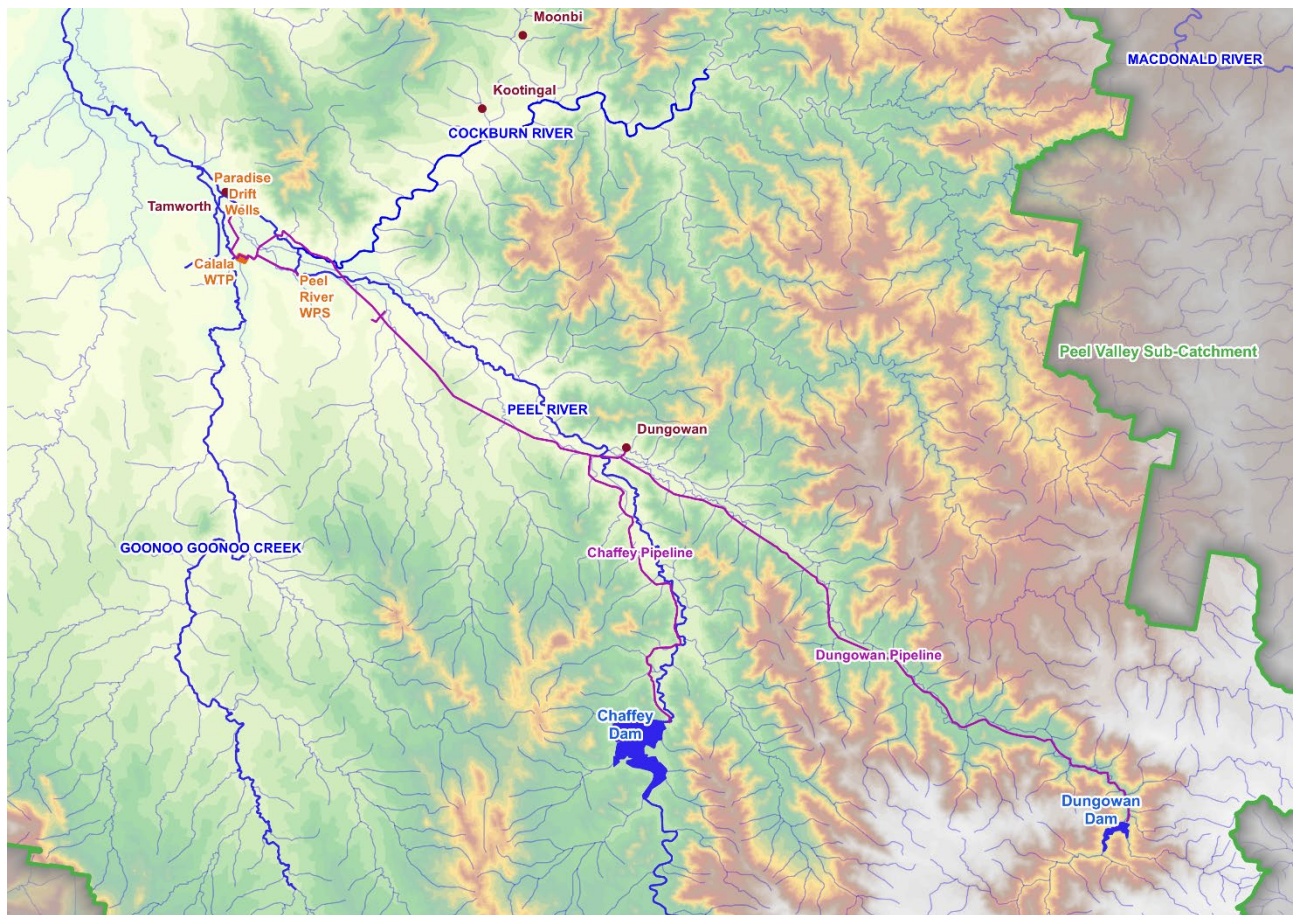
### **WATER SUPPLY SYSTEMS DETAILS (INCLUDING EMERGENCY SUPPLY OPTIONS)**

## Appendix B – Water Supply Systems Details (Including Emergency Supply Options)

### Tamworth Water Supply System

Bulk water for Tamworth and Moonbi/Kootingal is primarily sourced from two major storages within the Peel Valley; Chaffey Dam on the Peel River and Dungowan Dam on Dungowan Creek. A supplementary supply is also available via groundwater bores (known as the Paradise Drift Wells) that access water contained within an alluvial groundwater aquifer that is adjacent to, and interconnected with, the Peel River.

An overview of the bulk water supply system is provided in Figure A-1.



**Figure A-1 Tamworth Bulk Water Supply System Overview**

A general description of the water resources within the Peel Valley is contained below, followed by further details on the key bulk supply components for Tamworth.

Dungowan Dam is a dedicated Tamworth water supply dam that is owned and operated by TRC, with a storage capacity of 6.3 GL and a catchment area of around 125 km<sup>2</sup>. Although the dam is relatively small, it typically supplies around 40% of Tamworth's bulk water supply needs. Dungowan Dam is operated according to licence conditions, which include maintaining a flow of 10 ML/day into Dungowan Creek when inflows exceed 10 ML/day, or passing all inflows as outflows when inflows are less than 10 ML/day. TRC holds a water licence for the extraction of water from Dungowan Dam of 5,600 ML/a.

Bulk water from the dam is supplied to Tamworth via the Dungowan Pipeline, a 54 km long DN500/375 gravity main that runs from the dam to Calala WTP, via a route which generally follows Dungowan Creek and then the Peel River downstream of the confluence of the two streams. The pipeline has a capacity of around 22 ML/day and is chlorinated to minimise slime growth and provide some form of disinfection for the rural customers who use the pipeline for stock and non-potable uses.



## Appendix B – Water Supply Systems Details (Including Emergency Supply Options)

The WaterNSW owned and operated Chaffey Dam is the major in-stream structure in the Peel Valley, with a storage capacity of 100 GL and a catchment area of around 420 km<sup>2</sup>. The dam is a major source of water for both local irrigators and Tamworth, capturing water during times of high flow and releasing it during periods when downstream flows are insufficient to satisfy demands.

All releases from the dam to satisfy downstream irrigation and town water demands are undertaken by WaterNSW in accordance with rules set by the NSW Department of Planning and Environment (DPE). Releases are made directly to the Peel River downstream of the dam and bulk water for Tamworth is extracted from the river via the Peel River Intake Works, which is located on the eastern outskirts of Tamworth. The dam typically supplies around 60% of Tamworth's bulk water supply needs. TRC has a local water utility access licence for 16,400 ML/a from Chaffey Dam.

During severe drought periods up to 50% of the water released from Chaffey Dam for town water supply purposes (to be extracted via the Peel River Intake Works) is lost, mostly to groundwater. As minimum groundwater allocations in the Peel Valley are 51%, significant groundwater extractions continue to occur during severe drought periods, including extractions from the Peel Alluvium between Chaffey Dam and Tamworth. This results in major transmission losses from the Peel River between the dam and Tamworth, particularly during severe drought periods. Even when water is not required to be released for irrigation, other high security licence holders or town water supply purposes, water continues to be released (operational flows) during drought periods to satisfy domestic and stock watering requirements between the dam and the confluence with the Namoi River, which further contributes to water losses. A pipeline connecting Chaffey Dam to Tamworth was constructed in June 2020 as a result of the 2017-2020 drought. The objective of the pipeline is to ease the pressure on Chaffey Dam, during severe drought, by supplying water directly to TRC and minimizing the transmission losses.

The Paradise Drift Wells (also known as Scott Road Drift Wells) are used as a supplementary supply. The Paradise wellfield is located downstream of the confluence of the Cockburn and Peel Rivers and can effectively source surface water from the Peel River as well as groundwater from the Cockburn and Peel alluviums. There are two wells located within the bed of the Peel River, which are connected to TRC's Peel River surface water licence. These wells can deliver up to 5 ML/d but are limited to 100 ML/month over 12 months based on current licence conditions. A further four wells are located within the adjacent Peel River floodplain and are connected to a separate groundwater licence which nominally has 10 ML of high security water and 108 units of general security water. A 10 ML/d transfer pumping station delivers all water produced by the drift wells directly to Calala WTP via a 3.6 km long DN300 rising main.

### Emergency Supply Options

Emergency supply options for Tamworth are discussed in the Tamworth Emergency Water Supply Plan (see Executive Summary in **Appendix C**).

### Manilla Water Supply System

There are two water sources for the township of Manilla. The main water source is the Namoi River, with the supplementary supply source being the Manilla River.

The primary water supply for Manilla is a weir on the Namoi River (Manilla Weir). Water is pumped via a rising main (3.9 ML/d) to the Manilla WTP. The Manilla Weir has limited storage (typically around 40 ML, depending on siltation) and is prone to failure during extended drought periods (as occurred in 2019).

The supplementary water supply for Manilla is extracted from the Manilla River via a river intake and pumping station (3.9 ML/d). The Manilla River intake and pumping station were replaced in 2021/22, in association with the construction of the new Manilla WTP. The old intake and pumping station were prone to operational issues, but these should have been addressed by the new Manilla River intake works.

TRC has a high security licence for the release of flow from Split Rock Dam into the Manilla River of 150 ML/a for town water supply. A condition of the water licence is that Council contact WaterNSW in advance to order releases from Split Rock Dam to the Manilla River. These releases are then extracted at the Manilla River Intake.

Previous drought experience (particularly in late 2019) has shown that very high losses can occur between Split Rock Dam and the Manilla River intake, particularly if other releases from Split Rock Dam have ceased. TRC worked closely with WaterNSW to minimise these losses by employing pulse high-flow releases rather than constant low-flow releases.

### Emergency Supply Options

#### 1. *Temporary licence/transfer from Split Rock Dam*

Manilla already uses the Manilla River as a supplementary supply source and has an entitlement to 150 ML/a from Split Rock Dam. If this entitlement volume is not sufficient to satisfy town water demands, TRC may need to seek additional entitlements or emergency releases (if water is available in Split Rock Dam) or transfer water entitlements from Barraba (if available).

#### 2. *Temporary groundwater bores*

Temporary groundwater bores have previously been investigated in Manilla and TRC has a 60 ML/a entitlement for groundwater from Manilla Alluvium (90TP981281). However, these bores are only test bores and were never connected in to the water supply system. The bores would need to be subject to further investigation and testing prior to equipping for town water supply purposes.

#### 3. *Water carting from nearby system (Barraba or Tamworth)*

While water carting is considered very unlikely for Manilla, water could be transported from either Barraba or Tamworth in the event of a total water failure in Manilla. Note that if Split Rock Dam has failed, Barraba is unlikely to have sufficient spare capacity to supply water to Manilla.

### Barraba Water Supply System

In 2013/14, TRC constructed a pipeline from Split Rock Dam to Barraba to provide long-term water supply security for the town. The transfer system consists of a 28 km pipeline (DN225), transfer pump station (located at the dam) and 1.5 ML break-pressure tank, and is capable of transferring up to 1 ML/d to Barraba WTP.

In 2008, two emergency bores were commissioned in James Street. These bores were licensed to operate during periods of severe restrictions and are connected directly to the WTP (each has a maximum pumping rate of 5.5 L/s).

### Emergency Supply Options

#### 1. *Temporary groundwater bores*

Temporary bores have previously been investigated for Barraba and during the drought period in the mid-2000s, two bores were commissioned in James St for supplementary supply purposes. If Barraba was to be dependent on groundwater again during a drought period, additional bores could be investigated if the James St bores were not sufficient. Reference could be made to the investigations that were undertaken to identify the James St bore site.

#### 2. *Reinstate Previous Supply Source (Manilla River and Barraba Creek)*

Prior to the construction of the pipeline from Split Rock Dam, the primary source for Barraba was extractions from the Manilla River and Barraba Creek. TRC still has an entitlement of 421 ML/a (WAL37242) for these sources and if sufficient water was available, reinstatement of these sources could be considered.

#### 3. *Water carting from nearby system (Manilla or Tamworth)*

While water carting is considered very unlikely for Barraba, water could be transported from either Manilla or Tamworth in the event of a total water failure in Barraba. Note that if Split Rock Dam has failed, Manilla is unlikely to have sufficient spare capacity to supply water to Barraba.

## Appendix B – Water Supply Systems Details (Including Emergency Supply Options)

### Nundle Water Supply System

Nundle is located on the Peel River upstream from Chaffey Dam and receives its water supply from two sources. Water supply is sourced primarily from the Peel River; however, there is a supplementary supply available from the Crawney Road bore, which replaced the previous supplementary supply bore known as Oakenville Bore.

The existing water supply is extracted from an intake on the Peel River and is pumped at 9 L/s to the Nundle WTP, which has a capacity of 0.9 ML/day.

The current primary supply source (Peel River) has very limited raw water storage within the riverbed and is prone to failure during extended drought periods. The supplementary supply source (groundwater bore) was most recently used in 2019 and 2020 and appears to be a reliable supplementary supply source. The estimated bore yield is around 5 – 6 L/s.

### Emergency Supply Options

1. *Oakenville Bore*

The Oakenville bore was a previous supplementary supply source for Nundle before it was replaced by the Crawney Road bores due to water quality concerns. While the bore is no longer the preferred supplementary supply source for Nundle, the bore could still be used for emergency supply purposes, subject to water quality.

2. *Temporary groundwater bores*

Additional groundwater bores could be investigated and tested if both the Crawney Rd and Oakenville bores were unavailable. Reference could be made to the investigations that were undertaken to identify the Crawney Rd bore site.

3. *Water carting from nearby system (Chaffey Pipeline or Tamworth)*

In the event of a total water failure in Nundle, raw water could be carted from Chaffey Pipeline or the raw water storage at Calala WTP, or treated water could be carted from Tamworth.

## Appendix B – Water Supply Systems Details (Including Emergency Supply Options)

### Attunga Water Supply System

The Attunga water supply system is served by two bores that are located in close proximity to the Peel River. Each pump is capable of delivering 5.5 L/s and the quality of this water is quite hard. The water is pumped from the bores via a rising main to a single reservoir (0.7 ML) where disinfection with sodium hypochlorite occurs.

The limestone mine at Attunga uses this water supply to supplement their own groundwater supplies during drought periods. The limestone mine at times can use a significant proportion of the town's water supply in this situation.

Many of the residential properties within Attunga have rainwater tanks to supplement their supply.

The local mine at Attunga generally relies on its own groundwater supplies, but sometimes sources additional water from the Attunga town water supply, placing additional demand on the groundwater bores. There have been occasional peak periods when the combined demands from Attunga and the local mine have exceeded the capacity of the current bore pumps, resulting in the need to reduce supply to the mine to protect the town water supply.

### Emergency Supply Options

#### 1. *Temporary groundwater bores*

Additional groundwater bores could be investigated and tested if the existing town water supply bores were unavailable. Council has previously investigated other bore sites and drilled test bores; however, the location of these previous test bores is unknown.

#### 2. *Water carting from nearby system (Tamworth, Manilla or Barraba)*

In the event of a total water failure in Attunga, water could be carted from Tamworth, Manilla or Barraba.

## Appendix B – Water Supply Systems Details (Including Emergency Supply Options)

### Bendemeer Water Supply System

Bendemeer's primary water supply source is the Macdonald River, which flows through the village of Bendemeer. The water supply system consists of an extraction weir pool created by naturally occurring rocks in the riverbed, connected by a pipeline to the village pumping station, which pumps the water to Bendemeer WTP.

Bendemeer town water supply is primarily reliant on run-of-river flows in the Macdonald River, with only very limited raw water storage available in a river pool adjacent to the river intake works. While the Macdonald River generally provides a reliable source of water most years, the river flows in extended drought periods can fall below town water demands.

A supplementary groundwater supply source is available and is required during periods of severe drought. The bore is located off Airlie Road and has an estimated yield of 3 L/s; however, licence conditions limit extractions to 1.5 L/s. The bore was used extensively in 2019 and in early 2020 as the flow in the MacDonald River was inadequate (mostly zero flows).

### Emergency Supply Options

1. *Temporary groundwater bore/s*

Temporary bores have previously been investigated for Bendemeer and during the drought period in the mid-2000s, a bore was commissioned in Airlie Rd for supplementary supply purposes. If Bendemeer was to be dependent on groundwater again during a drought period, additional bores could be investigated if the Airlie Rd bore was not sufficient. Reference should be made to the investigations that were undertaken to identify the Airlie Rd bore site.

2. *Water carting from nearby system (Tamworth, Manilla or Barraba)*

In the event of a total water failure in Nundle, water could be carted from Tamworth or Manilla.



## **APPENDIX C**

# **TAMWORTH EMERGENCY WATER SUPPLY PLAN (EWSP)**



# Tamworth Emergency Water Supply Plan (Executive Summary)

Tamworth Regional Council

JUNE 2020

ABN 16 602 201 552



## Report Details

<b>Report Title</b>	Tamworth Emergency Water Supply Plan
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## Document History and Status

Revision	Report Status	Prepared by	Reviewed by	Approved by	Issue Date
A	Prelim. Draft	Cameron Smith, Angela Dwyer, Naomi Schipanski	N/A	N/A	3 June 2020
B	Draft	Cameron Smith, Angela Dwyer, Naomi Schipanski	Nicole Holmes	Nicole Holmes	16 June 2020
C	Final	Unchanged from Draft Report	N/A	Nicole Holmes	24 June 2020

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# Executive Summary

## Overview

The Tamworth Emergency Water Supply Plan has been prepared by Hunter H2O in association with Tamworth Regional Council (TRC) to assist Council with the ongoing management of limited water supplies in the severe drought conditions that are being experienced in the Peel Valley. Tamworth's primary water security storage, Chaffey Dam, has fallen to critical levels and Level 5 emergency water restrictions have been in place since September 2019. While Council's Drought Management Plan has been the guiding policy document since water restrictions were first implemented in January 2019, an Emergency Water Supply Plan is now needed to further guide Council through this most critical stage of the drought and to help plan for the potential worst-case scenario of Chaffey Dam reaching zero storage. The Plan outlines a staged action plan, for both demand and supply based measures, to extend existing supplies and avoid running out of water.

## Background

The Namoi Region experienced unprecedented drought conditions in 2018 and 2019, with record low rainfall and streamflows. This led to town water supply systems facing severe stress and having to implement severe water restrictions, as well as major dams in the region dropping to record low storage levels. With Chaffey Dam now below 15% and Level 5 water restrictions in place, the Tamworth water supply is under severe stress and works have been recently undertaken to minimise water losses between Chaffey Dam and Tamworth in order to extend the remaining supplies as long as possible. With a temporary block-bank weir on the Peel River at Dungowan installed in December 2019 and the Chaffey Dam to Dungowan pipeline completed in May 2020, water losses between the dam and Tamworth are now mostly eliminated.

Without these drought contingency works, it was estimated that Chaffey Dam could have reached day zero by around August 2020 (assuming a continuation of the 2019 drought conditions). With these works now in place and taking into consideration the more favourable climatic conditions since the start of 2020, the remaining storage in Chaffey Dam now likely exceeds 18 months of supply. However, with Chaffey Dam storage levels still critical, Council needs to start considering further drought contingency and emergency supply measures to ensure Tamworth and Moonbi / Kootingal don't run out of water. It is important that TRC starts planning for emergency supply measures now, to ensure there is sufficient time to implement these measures.

## Demands

Existing town water demands are around 16.8 megalitres per day (ML/d), which comprises:

- 7.3 ML/d residential demand, or just over 150 litres per person per day (L/p/d)
- 7.5 ML/d non-residential demand
- 2.0 ML/d estimated water losses

As shown in Figure 1, evaporative coolers make up a significant proportion of average residential usage (0.7 ML/d, or around 10% of residential demand) and this increases to around 1.4 ML/d (17.5%) on average during the warmer months between October and March and peaks as high as 4 – 5 ML/d on very hot summer days. TRC has estimated that there are around 8,000 evaporative cooler units installed in Tamworth (including Moonbi/Kootingal), with the typical water usage of each unit being between 10 and 40 litres per hour (L/hr). It is estimated that older, poorly maintained units could use up to 70 L/hr on very hot days.

In early 2020, TRC introduced further water efficiency rebates to help reduce the impact of evaporative coolers on town water usage. The rebates include 50% (up to \$50 each) of the cost of ceiling fans permanently installed in an indoor room that has an evaporative cooler / duct and 50% (up to \$200) of the cost of servicing and/or replacing filters in evaporative cooler units. Further water saving measures / rebates related to evaporative coolers that could be considered include: a rebate towards the cost of replacing an old and/or inefficient evaporative cooling unit with a new, efficient evaporative cooling unit or reverse cycle air conditioning; the installation of smart water meters to provide real-time access to water consumption data; and restrictions on the hours of use of evaporative coolers (if the water supply situation becomes critical) with special exemptions for vulnerable people.

Despite the impact of evaporative coolers on the residential water usage, it is estimated the current residential usage is just over 150 L/p/d, which is in line with the current residential usage target. This target was established by the Water Restrictions Communication and Engagement Plan (CEP), endorsed by Council in mid-2019. The CEP assists TRC with the development and implementation of an expanded community awareness campaign. The CEP has also set a future residential usage target of 100 L/p/d, which will be applied if supplies become more critical.

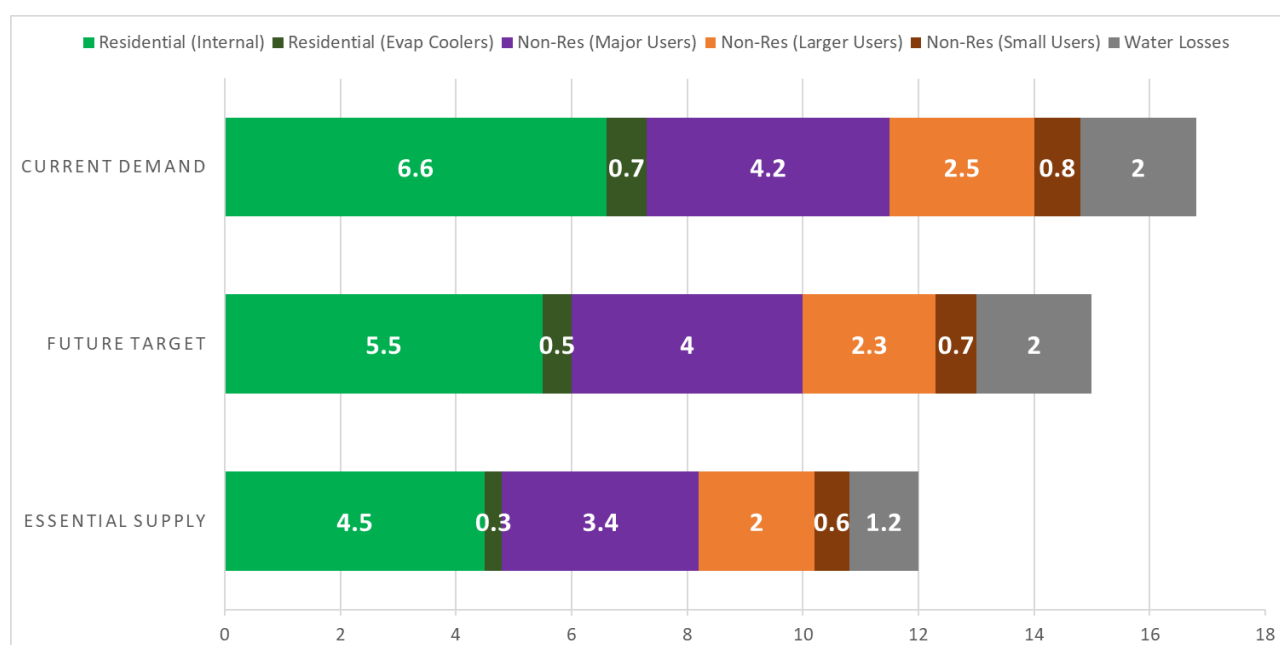


Figure 1 Current Demands and Future Demand Targets (by Category)

As shown on Figure 1, 4.2 ML/d of the estimated 7.5 ML/d of current non-residential water usage can be attributed to the top four major users (all related to the meat processing industry). Due to the nature of these businesses and the previous establishment of water efficient processes, the major users have been unable to further significantly reduce their water usage to-date. The remaining water users – categorised as either large users (top 150) or small users, depending on their water usage – currently use around 3.3 ML/d and have significantly reduced their water usage over the last 12 months (around 35% reduction compared to 2018/19).

Current water losses are assumed to be 2 ML/d, based on the difference between water production and metered usage. Further analysis is needed to better understand the true extent of existing water losses.

Further reductions in non-residential water usage will need to be achieved as the water supply situation deteriorates, as shown on Figure 1. A non-residential usage target of 7.0 ML/d is proposed once Chaffey Dam falls to 10%, with the total town water consumption target reducing to 15 ML/d. If the water supply situation becomes more critical, town water demands may need to be reduced to minimum essential supply requirements, which is estimated to be around 12 ML/d, including 6 ML/d for non-residential usage and 4.8 ML/d for residential usage (based on 100 L/p/d).

## Emergency Supply Options

A range of emergency water supply options have been considered and include local and regional surface water options, local and regional groundwater options and local reclaimed effluent options. The key emergency supply options considered in the Plan are summarised in Table 1.

*Table 1 Tamworth Emergency Water Supply Options*

Surface Water	Groundwater	Reclaimed Effluent
<b>Local</b> <ul style="list-style-type: none"> <li>Optimising storage in Chaffey and Dungowan Dams</li> <li>Temporary block-bank (and pump station) on Peel River near Paradise Weir</li> </ul> <b>Regional</b> <ul style="list-style-type: none"> <li>Pipeline from Keepit Dam</li> <li>Pipeline from Split Rock Dam</li> <li>Pipeline from Copeton Dam</li> </ul>	<b>Local</b> <ul style="list-style-type: none"> <li>Maximise use of existing Paradise Drift Wells</li> <li>Expand the Paradise wellfield</li> <li>New wellfield in Peel Alluvium (around Appleby)</li> <li>New wellfield in Peel Fractured Rock source</li> </ul> <b>Regional</b> <ul style="list-style-type: none"> <li>New wellfield in Upper Namoi Alluvium (around Carroll)</li> </ul>	<b>Local</b> <ul style="list-style-type: none"> <li>Temporary industrial reuse (potable substitution) to large users around Westdale STP</li> <li>Temporary direct potable reuse (DPR) via Calala WTP</li> </ul>

Train-based water carting is not considered to be a viable option due to the uncertainties and complexities associated with carting water to Tamworth from the Hunter Valley via rail. However, truck-based water carting is considered technically feasible, with Keepit Dam and/or Copeton Dam being the most likely supply sources. Full water carting for Tamworth is not considered to be viable and would, at best, only contribute 25% to 33% of the minimum essential supply requirement – i.e. potentially 3 – 4 ML/d via truck-based carting from two different sources, compared to 12 ML/d minimum essential supply requirements.

## Emergency Water Supply Action Plan

It is estimated that there may only be 19 months of remaining storage in Chaffey Dam, assuming the dam is used as the sole source for Tamworth and assuming a return to zero inflows (as experienced across most of 2018 and 2019). The months to failure estimates could increase by a further 3 months if TRC is able to maximise the use of the Paradise Drift Wells and a further 2 months if the likely remaining storage in Dungowan Dam is taken into account.

**Therefore, for the purposes of this Plan, it is estimated that there is around 24 months to the potential failure of the combined water supplies, assuming zero inflows to Chaffey Dam.**

With the return to more typical rainfall conditions across the first half of 2020 – resulting in Chaffey Dam storage levels maintaining at around 14% for the past 6 months – and a forecast wetter than average winter, it is important that a staged approach be adopted for the actions proposed in this Plan. A key outcome of this approach will be delaying any decisions on major infrastructure options for at least 6 months (if possible) and only proceeding with these options if the Chaffey Dam storage volume starts falling again and/or the months to failure estimate (for the combined water supplies) reduces to around 18 months. After this point, implementation of a major emergency water supply source option/s will need to commence and proceed quickly to ensure completion within the remaining 18-month timeframe and to avoid the possibility of Tamworth and Moonbi / Kootingal running out of water.

A two-phased approach to demand-side and supply-side actions is outlined in Table 2.



Table 2 Emergency Water Supply Action Plan

ACTIONS	DETAILS
<b>Phase 1: Immediate Actions</b> <ul style="list-style-type: none"> <li>Phase 1 commences immediately and continues until remaining storage reduces to 18 months</li> <li>Supply-side focus is on short-term water efficiency gains and incremental improvements to existing supply sources (to avoid or at least further delay Phase 2)</li> <li>Demand-side focus is on actions to support future water savings (under Phase 2)</li> <li>Emergency supply options will require the necessary approvals from DPIE and other NSW government agencies and their assistance to help preserve water for critical human needs</li> </ul>	
1. Maximise the use of the existing Paradise Drift Wells	<ul style="list-style-type: none"> <li>Requires DPIE/NRAR to provide a temporary increase in LWU entitlements to better utilise a critical backup supply source</li> <li>May require reducing or pulsing flows from Chaffey Dam</li> </ul>
2. Limit environmental flows from Chaffey Dam and Dungowan Dam	<ul style="list-style-type: none"> <li>TRC needs to work with DPIE and WaterNSW to preserve water in both dams for critical human needs, as much as possible</li> <li>May require a temporary suspension of the Water Sharing Plan</li> </ul>
3. Consider options to install a temporary block-bank on the Peel River near Paradise Weir	<ul style="list-style-type: none"> <li>The block-bank weir (and associated pumping system) will facilitate the harvesting of more flows from the Peel River</li> <li>May require a temporary suspension of the Water Sharing Plan</li> </ul>
4. Consider options to expand the Paradise wellfield	<ul style="list-style-type: none"> <li>Increase local groundwater extractions by negotiating with and compensating existing licence owners to allow Council to access and utilise their bores (either temporarily or permanently)</li> </ul>
5. Consider whether fractured rock groundwater is worth pursuing	<ul style="list-style-type: none"> <li>The risks associated with utilising fractured rock groundwater are significantly higher than other groundwater sources, but further investigation may be warranted before dismissing entirely.</li> </ul>
6. Further investigation and preliminary planning for a major emergency water supply source	<ul style="list-style-type: none"> <li>Preferred option must be able to supply 15 – 17 ML/d (for up to 24 months) and must be delivered within 12 – 18 months</li> <li>Preferred options include: a pipeline from Keepit Dam; a new groundwater wellfield in Lower Peel alluvium; or a new groundwater wellfield in Upper Namoi alluvium.</li> <li>Need to assess planning approval requirements and the ability to fast-track approvals, as allowed under the <i>Water Supply (Critical Needs) Act 2019</i></li> </ul>
7. Fast-track implementation of Automated Meter Reading (AMR)	<ul style="list-style-type: none"> <li>Smart meters could be installed in Tamworth in 6 months and would assist with achieving residential usage targets, driving further large user reductions and assist water loss management</li> </ul>
8. Review non-residential large user water efficiency measures	<ul style="list-style-type: none"> <li>Investigate the potential costs and timing to implement up to 1.75 ML/d of previously identified water efficiency measures</li> </ul>
9. Investigate viability of non-residential potable substitution with reclaimed effluent	<ul style="list-style-type: none"> <li>Consultation with major and large users to assess the viability of using reclaimed effluent to substitute potable water requirements</li> <li>Need to consider likely planning approval requirements, timing and cost effectiveness</li> </ul>
10. Maintain average town water consumption below 17 ML/d	<ul style="list-style-type: none"> <li>Maintain current residential usage target of 150 L/p/d and non-residential usage target of 25% reduction</li> </ul>

ACTIONS	DETAILS
<b>Phase 2: 18 Months to Day Zero</b> <ul style="list-style-type: none"> <li><i>Phase 2 should commence once remaining storage reduces to 18 months</i></li> <li><i>Supply-side focus is on the implementation of a major emergency water supply source</i></li> <li><i>Demand-side focus is on achieving further water savings, including implementing some measures that may only have a short-term benefit</i></li> <li><i>Emergency supply options will require the necessary approvals from DPIE and other NSW government agencies and ongoing assistance to help preserve water for critical human needs</i></li> </ul>	
11. Implement major emergency water supply source	<ul style="list-style-type: none"> <li>Subject to the outcomes of Action 6, the implementation of the major emergency supply source would be undertaken in two stages: <ul style="list-style-type: none"> <li><u>Stage 1</u> would involve detailed design and planning approvals for the major emergency supply source and would take around 6 months (with fast-track approvals)</li> <li><u>Stage 2</u> would involve construction of the major emergency supply source (within 12 months) and would only proceed if the remaining storage reduced to around 12 months</li> </ul> </li> </ul>
12. Use of Reclaimed Effluent to substitute up to 2.5 ML/d of non-residential water usage	<ul style="list-style-type: none"> <li>Subject to the outcomes of Action 9, implement a temporary reclaimed effluent scheme to support non-residential customers achieving usage reduction targets</li> </ul>
13. Maximise use of the expanded Drift Wells and/or extractions from the block-bank at Paradise Weir	<ul style="list-style-type: none"> <li>Need to continue maximising the use of local surface water and groundwater resources (subject to ongoing availability) to maximise the time available to design and then construct the major emergency supply source (or potentially avoid construction)</li> </ul>
14. Reduce average town water consumption to 15 ML/d or less	<ul style="list-style-type: none"> <li>Further reduction in residential demand target (from 150 to 100 L/p/d) and non-residential demand target (from 25% reduction to 30% reduction)</li> <li>The use of AMR will allow real-time usage data to be provided to customers to help drive revised water targets</li> </ul>
15. Implement non-residential large user water efficiency measures	<ul style="list-style-type: none"> <li>Council to work in collaboration with non-residential customers to implement measures, where cost effective, including considering the co-funding of some measures (subject to a business case)</li> </ul>
16. Ramp-up water loss management (utilising AMR data)	<ul style="list-style-type: none"> <li>AMR data will allow water losses to be more easily detected (both customer-side losses and network losses)</li> <li>Assisted by night-time flow analysis and active leak detection</li> </ul>
17. Consider shutting down non-essential businesses and limiting the use of evaporative coolers	<ul style="list-style-type: none"> <li><b>WILL ONLY BE CONSIDERED IF DEMAND TARGETS CANNOT BE ACHIEVED AND SUPPLIES ARE CRITICAL</b></li> </ul>
18. If supplies become critical, commence carting up to 2 ML/d from Keepit Dam and/or 2 ML/d from Copeton Dam	<ul style="list-style-type: none"> <li><b>CARTING WILL ONLY BE REQUIRED IF LOCAL WATER SUPPLIES START TO FAIL BEFORE THE MAJOR EMERGENCY SUPPLY SOURCE IS COMPLETED</b></li> <li>Emergency works will be required at the dams and the WTP / Drift Wells to enable carting of up to 2 ML/d from each source (4 ML/d in total)</li> </ul>

## **APPENDIX D**

### **WATER RESTRICTIONS COMMUNICATION AND ENGAGEMENT PLAN (CEP)**



# Tamworth Regional Council

## Drought Management Response:

## Water Restrictions

## Communication and Engagement Plan

August 2019



# Executive Summary

Like other NSW regional towns, Tamworth is subject to regular and often significant drought impacts. This Communication and Engagement Plan (CEP) is a guidance framework to assist Council prepare its residential and non-residential stakeholders who rely on town water supply, to adopt stronger water saving measures during drought and the introduction of water restrictions.

The purpose of the document is to provide the philosophy and approach to the communications and engagement for the leadership, communication and long-term water planning and management within the Council Local Government Area during periods of water restrictions.

Water restrictions are guided by Council's Drought Management Plan (2015) and apply from Level 1 through to Level 5 based on trigger points at the different water sources throughout the region. For the Tamworth, Moonbi and Kootingal town supply Level 1 is triggered when Chaffey Dam water levels reach 60%, through to Level 5 triggered by Chaffey Dam water levels reaching 20%. The CEP recommends further trigger points are introduced for the Tamworth, Moonbi and Kootingal town supply within Level 5 to guide tougher water saving measures as water in Chaffey Dam continues diminishing from 20%. If water levels drop to 5% this is likely to trigger more extreme measures to protect remaining water supply for vulnerable community members and emergency services only.

Water restrictions are a vital intervention to protect Tamworth's vibrant and resilient community until the next major rain event. Residents, businesses, community, irrigators, industry and key government stakeholders all need to take responsibility for aggressive water conservation measures at Level 5 to extend Tamworth's water supply for as long as possible.

The primary objective of implementing the CEP is to enable these aggressive water conservation measures by minimising the use of treated water. The specific strategies recommending less water use focus on elevating awareness and educating the community and key stakeholders on how to:

- maximise water use efficiencies
- innovate to be a smarter water user and advocate for leadership within the community
- eliminate losses through leakage and wastage
- substitute lower grade sources of water where it is still fit for purpose (rain water, stormwater, recycled wastewater, treated greywater and effluent)
- guide community members / stakeholders to reach out for support to implement the above measures.

## Strategies and recommendations of this CEP include

### 1. Aligning Council and community values around water use

#### Recommendations:

- conduct an online survey on liveability attributes, their values towards water, limitations to behaviour change (i.e.vulnerable community members), and opinions about future water security options;*
- implement actions from Council's facilities audit in a timely manner;*
- create a water supply Taskforce with adequate community representation helping to lead community change in water conservation.*

(The key feature of this water supply Taskforce would assist Council by discussing technical constraints and challenges with Council providing greater transparency and shared ownership around the tough decisions that need taking to prolong water supply to the region).

## 2. Increasing understanding of the water cycle and raising awareness of water use

### Recommendations:

- i) *develop a water cycle education program for Kindergartens, Primary and High Schools;*
- ii) *encourage innovations through smart water users business awards;*
- iii) *educate the community on alternative sources of water and ensure that new development is going beyond BASIX and is planned using a risk based decision making framework*

## 3. Establishing targets and pursue a collaborative approach

### Recommendations:

- i) *establish baseline data and fill critical data gaps (eg metering data);*
- ii) *develop clear and measurable targets (eg, what does 5% and 10% look like and what do we need to know to avoid this);*
- iii) *create opportunities for competition/innovation within the regions or between towns (eg, identify who is leading the way and who are being the outliers in the community that need to be targeted further)*

## 4. Targeting large/medium water users and all households to change behaviour

### Recommendations:

- i) *evaluate water use and necessity for operations within businesses and categorise them accordingly (ie, the most vulnerable industries);*
- ii) *develop and support targeted programs for businesses;*
- iii) *encourage and incentivise change*

## 5. Significant media campaign and pulse at each trigger point

### Recommendation:

*Create advertisements in the lead up to implementing Level 5 restrictions. At each subsequent trigger level produce the next set of advertisements, reducing the total spend on production and ensure that when required the advertisements will be current.*

To assist implementing this CEP, eight (8) separate communication and engagement plans (Plan on a Page) for each water level restriction guides specific actions.

### Planning for water running dry via traditional water utilities

In the event that water supply diminishes to a crisis point (to be determined by Council as recommended by the Water Supply Taskforce, suggested by the CEP at 5% of water remaining), an Local Emergency Management Plan may be required to assist with the response to provide emergency water to Tamworth, Moonbi and Kootingal. This requires close liaison with the Local Emergency Management Committee (LEMC). The LEMC comprises members of the local emergency responses teams including State Emergency Services, NSW Police, Fire & Rescue, Ambulance, NSW Rural Fire Service, RMS, Department of Primary Industry, Local Land Services, and Tamworth Regional Council. If an emergency is declared (i.e. no drinking water available through existing water utility), the Emergency Management Office may assume control of the town emergency water supply.

### Community recovery post drought breaking rain event

The approach to community resilience and recovery is an ongoing and adaptive process. It will be important for Council to support the community and in particular businesses in the recovery after a crisis. The process of recovery takes time, and for some parts of the community or some businesses, it may take longer than for others. A framework around post-crisis recovery should be developed and implemented to increase the social capital of the region and overall community wellbeing.





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