TAMWORTH REGIONAL COUNCIL

ANNEXURES
for
ORDINARY COUNCIL AGENDA

13 JULY 2021

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TAMWORTH REGIONAL HERITAGE WORKING GROUP MINUTES

Friday, 4 June 2021

Ray Walsh House, Level 4 Committee Room

Heritage Working Group Members:

Councillors

☑ Cr Juanita Wilson (Chair) ☑ Cr Jim Maxwell ☒ Cr Mark Rodda

TRC Heritage Advisor

☑ Clare James

Community Members

☑ Melinda Gill (Tamworth Historical Society)

☒ Daisy Cutmore (Tamworth LALC)

TRC Staff

☑ Sam Lobsey ☑ Gina Vereker ☑ Andrew Spicer

☑ Lisa Rennie

Guests: **Graeme King**

Minute Taker: Lisa Rennie

1. **Apologies**

   Cr Mark Rodda

   Daisy Cutmore (Tamworth LALC)

2. **Acceptance of Minutes of Previous Meetings – 30 April 2021**

   The Minutes of the previous meetings held 30 April 2021 are **ATTACHED**.

   12. Preservation of Wall ~~fence~~ at Oxley Lookout

   All references in Item 12 that refers to "fence" should read "wall".

14.1 Demolition of Property

Second paragraph should have read "It was agreed that any significant demolition proposals (including any listed heritage item/s or significant buildings), that Council is made aware of, would be notified to Councillors prior to approval of demolition".

RESOLUTION:

That the Minutes from the previous Heritage Working Group meeting dated 30 April 2021, be accepted as a true and correct record of these meetings, noting amendments.

Moved: Cr Jim Maxwell Seconded: Cr Juanita Wilson

3. Updated Terms of Reference

Gina presented to attendees a hard copy of the new Terms of Reference for their information and records.

Gina informed attendees that the Working Group have no delegations and all actions from the Working Group must be reported to Council for determination.

4. Heritage Assistance Fund

Attendees agreed that the Heritage Assistance Fund (HAF) would open early this year in an effort to receive more applications and also to give applicants more opportunity to obtain quotes.

The HAF is to open asap (pending discussion with Communications team) and close at end August, with Working Group to meet early October to review applications and with a report to go to the first Council meeting in October recommending the disbursement of grant funds.

All successful HAF recipients for 2020/21 and 2021/22 years will be automatically nominated for 2022 Heritage Awards.

5. Grant Funding Approval for the Preparation of a Register of Significant Cultural Heritage Sites

Council has received a grant of up to $50,000 (ex GST) with matching funding required (subject to the level of funding being confirmed by EDHNSW following receipt and review of at least two quotes for the work). The project would result in a register of significant sites for consideration of listing under the Tamworth Regional LEP 2010. Identification of sites will be based on a strategy developed in association with the Tamworth Local Aboriginal Lands Council and may including review of existing registers and archaeological assessments. An archaeological specialist team would undertake predictive modelling and recommend management strategies for areas of significance.

The register would inform developers and planning staff on future land release areas and development applications.

The register would also include a series of stories (pictorial, video and/or voice recorded interviews) told by local people about the most significant Aboriginal places.

This study will constitute the first Aboriginal Heritage Study to be undertaken by Tamworth Regional Council for the Tamworth Regional Local Government Area.

Sam advised that this will be a great opportunity to work closely with the Local Aboriginal Land Council (LALC) to produce a comprehensive and accurate resource. The funding is valid for a period of 12 months.

Recommendation – That Council note the grant funding approval and request ongoing updates on the progress of the project via the Heritage Working Group Meeting minutes.

Moved: Cr Jim Maxwell ***Seconded: Cr Juanita Wilson***

6. Expressions of Interest (EOI) – Additional Community Member

It was agreed as per Minute 136/21 at the Ordinary Meeting of Council on 25 May 2021 an EOI would be advertised to fill the vacancy of a third community member and discussions with Media/Communications teams of Council would take place to get this underway.

7. West Tamworth Railway Station

Sam to contact John Holland Heritage Architect to obtain an update and report back to the Working Group.

8. Railway Station Masters House update

Recommendation – Council to write to Transport for NSW and ULG (replacement for John Holland) seeking advice in relation to the next steps in regards to the West Tamworth Railway Station and Railway Station Master's House following the recent site inspection.

Moved: Cr Juanita Wilson ***Seconded: Cr Jim Maxwell***

9. Update of Heritage Listed Properties in Tamworth and towns

Graeme is reviewing the current schedule together with the heritage conservation areas as part of the LEP review.

It was agreed that this would be an ongoing Agenda item in order to obtain updates.

3.01pm Melinda Gill left the meeting

10. Listing of heritage drain systems in Tamworth and Villages. Should this include heritage guttering? (such as in White Street)

It was agreed that these systems need to be preserved as part of a register of heritage assets.

Recommendation –Workshop to be arranged in order to identify significant road infrastructure including gutters and drains within the Local Government Area and recording of such data in the register.

Moved: Cr Juanita Wilson ***Seconded: Cr Jim Maxwell***

11. Precinct areas in Tamworth

11.1 Consider value of reassessing existing boundaries in East and West Tamworth.

Previously discussed earlier in the meeting.

11.2 Need to assess the value of precincts for towns within the region.

Previously discussed earlier in the meeting.

11.3 Strategies to ensure the integrity of intended precinct outcome is achieved.

It was agreed that the precincts listed in the LEP will protect the legal integrity of heritage property and as part of the LEP review all relevant detail needs to be included.

11.4 How can TRC ensure the elements of precincts are communicated to relevant parties at the most effective time. (i.e., DAs. private certifiers, builders, property owner renovators, developers, Real Estate Agents etc.)

It was agreed that the community needs to be reminded and updated in regard to the elements that make up heritage significance.

As part of the LEP review consultation/engagement with the community will be arranged and it was suggested/agreed perhaps a brochure could be prepared in regards to heritage listed property.

It is proposed also to add images to the new Development Control Plan (DCP) chapters.

Sam and Gina would also be happy to attend the Real Estate breakfast meetings to refresh agents understanding of heritage property.

12. CBD

12.1 Actions needed to further identify and list significant buildings.

Previously discussed earlier in the meeting.

12.2 Preservation of significant facades and streetscape.

A study has previously been completed and will be incorporated in LEP.

12.3 DA changes that could facilitate reuse of some heritage properties.

Previously discussed earlier in this meeting

13. Lookout Stone Wall – Update. Grant funding potential.

Clare advised it is not a state significant structure so difficult to find suitable funding.

It was suggested that it was erected in approximately 1935 and that the Victoria Park Masterplan may need a future amendment to address on-going protection of the Wall.

It was agreed that this agenda item needs to remain ongoing to ensure preservation of the Wall.

14. General Business

14.1 Intended re-use of current Ambulance Station

Ambulance Station to be relocated. Discussions took place regarding the possibility of having an interim heritage Order to be placed on the building.

14.2 Review of the Heritage Act with submissions closing 27 June 2021

Clare advised that the *Heritage Act* has not been reviewed for a very long time and it was agreed that Clare/Graeme together would review and if needed would forward a submission by the deadline.

14.3 Manilla Viaduct

Meeting was held in early May with Frank Johnson from Manilla Historical Society in attendance and a good discussion occurred with Transport NSW.

It is likely the Manilla Viaduct will be heritage listed and it is proposed to seal the top for preservation and then a decision will be made what to do with the structure.

14.4 Hallsville School

Further to discussions at 30 April 2021 meeting regarding Hallsville School it was found that the building is owned by TRC and it was TRC who erected the fencing around the building. The building sits on Crown Land and the below options are being considered:-

- demolition of building
- demolition of other structures/playground equipment
- renovate building
- hand back to Crown (no costing required) OR
- sell (not Council's decision)

Further advice regarding the options should be received by the week ending 11 June and consultation with this Working Group will occur.

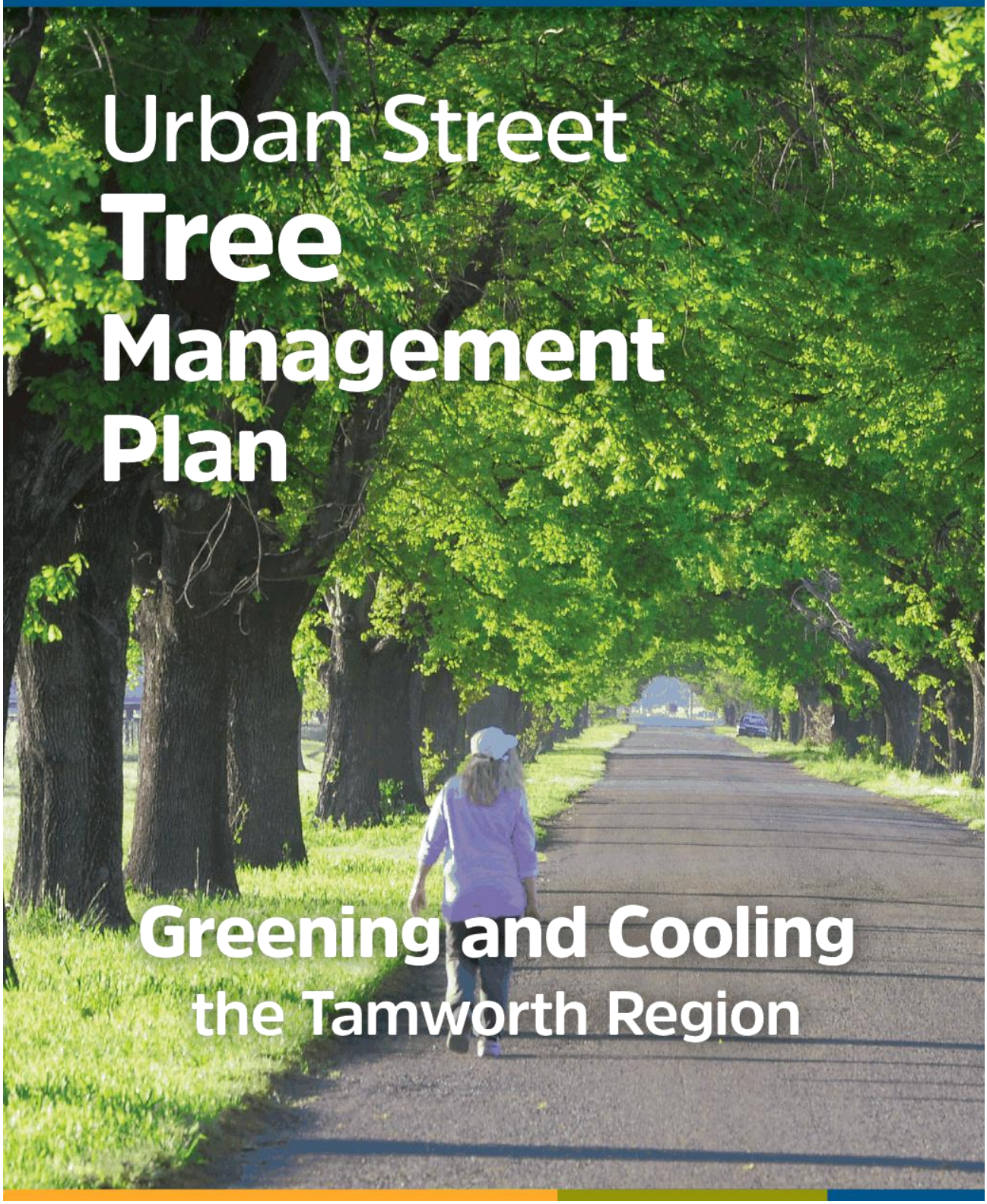
It was suggested that the School should be included on the Section 170 Register with the Department of Education.

15. Next Meeting

Thursday, 26 August 2021 at 4.00pm

16. Meeting Closed – 3.54pm

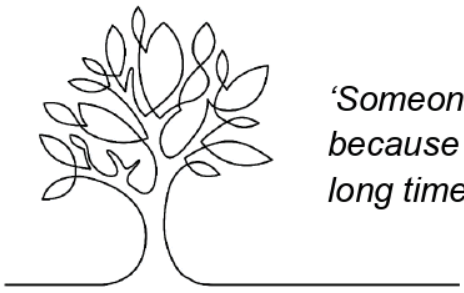
Tamworth REGIONAL COUNCIL



Urban Street Tree Management Plan

Greening and Cooling the Tamworth Region

Contents



'Someone is sitting in the shade today because someone planted a tree a long time ago'

Warren Buffet

Introduction

Together with our community, Tamworth Regional Council is committed to greening and cooling our region in a responsible and sustainable way.

We will aim to substantially increase the number of shade trees and implement sound maintenance practices to ensure that trees planted today will be there for the benefit of current and future generations.

Maintaining and increasing green spaces and streetscapes increases the appeal and liveability of urban spaces by decreasing temperatures during the summer months; providing habitat, health and well-being benefits.

*'The **Right Tree**, of the **Right Size**, planted at the **Right Time** of year, in the **Right Location**, leads to the **Right Result**.'*

The Urban Street Tree Management Plan has been developed with the assistance of the Urban Street Tree Advisory Group.

Together, we will green and cool the Tamworth region!

Blueprint 100

Tamworth Regional Council has embarked on a process to draw all its efforts toward a coordinated approach for future planning and infrastructure delivery. This has been coined Blueprint 100. It encompasses the Local Strategic Planning Statement, Growth Management Strategy and other council initiatives.

Blueprint 100 is a strategy to guide future use of land within the region towards a population of 100,000 people. For the Council area, it will ensure that there is sufficient infrastructure and opportunities for jobs growth and great places for people to live.

The Urban Street Tree Management Plan links to Blueprint 100 through the themes of design with nature, facilitate smart growth and housing choices. Through the provision of a more liveable environment creating an improved amenity for people to reside.


East Tamworth

Section 1: Street Tree Hierarchy

Tamworth Regional Council will use a street hierarchy to plan the way that street trees are managed across the region. This document will outline the hierarchy and the designs along with the levels of service for maintenance and development.

A street hierarchy is an urban planning tool for laying out road networks to guide vehicle movement throughout an urban environment. This type of design also allows for the creation of street tree avenues to create an inviting environment.

1.1 Street Hierarchy

The following types of streets and roads will create the structure for future street tree plantings.

Highways / Town Entrances	• These roads will be themed with tree avenues to provide a sense of arrival at towns and villages. • To provide a more aesthetically pleasing entrance these roads will have a High level of maintenance and inspection. • Due to the nature of these roads and the volume of traffic the planting of new trees will be carried out by Council. • A preference for a single species where possible.
Arterial roads & streets	• These roads / streets will be themed with tree avenues to provide a consistent themed tree avenue. • To provide a more aesthetically pleasing avenue these roads / streets will have a Medium level of maintenance and inspection. • Due to the nature of these roads / streets and the volume of traffic the planting of new trees can be undertaken in conjunction with Council. • A preference for a single species where possible.
Local streets	• These streets will have mixed tree species and the only restriction will be around overhead powerlines and street lights. • In new sub division Council will allow the developer to theme these streets as part of a beautification process. • These streets will have a low level of maintenance and inspection. • These streets will have a palate selected tree species by Council for the community to select from. The only requirement will be around overhead powerlines. This is to reduce the overall maintenance and prevent the heavy regular pruning currently being undertaken by Essential Energy. • As these streets have a lower level of risk around work being undertaken Council will let the residents plant the new trees. A guide to the location and how to plant a street tree will be provided when the new trees are given out to the resident.

1.2 Factors Affecting Street Trees

1.2.1 Service Networks

Road reserves are the main corridors for service networks. They accommodate electricity, telecommunications, water, sewerage and gas lines. However, historically these services have not coordinated, and conflicts between street trees and services occur.

1.2.2 Trees and Overhead Services

Overhead power lines are a significant problem in most areas. Overhead power lines can restrict the development of uniform avenues, may require the planting of different species on either side of the street, and increase the need for maintenance pruning where larger trees exist under the power lines.

Aerial bundled cabling has been installed in some areas of the Tamworth Region, this is aimed at reducing the extent of pruning required. However, pruning practices based on the clearance widths plus a significant width for regrowth has still resulted in holes in the canopies of street trees up to 4m. If the clearance area only was pruned, the hole around the cables only needs to be 1000mm wide, but would require more regular pruning.

1.2.3 Trees and under Powerlines

Trees appropriate for planting under powerlines have been listed in the Street Tree Species List. Trees safe to grow directly under powerlines need to be a maximum of 7m tall at maturity. The species shown with a Small in the TRC height Category lists in the Street Tree Species List have been proposed as being suitable for planting within the TRC area.

1.2.4 Footpaths

The installation of paved, concrete or bitumen footpaths reduces the space for street trees and if the wrong species is planted adjacent to a footpath the tree can slowly damage the path. This then creates a hazard for users of footpaths and puts a further burden on Council through maintenance to reduce or eliminate this hazard.

1.2.5 Street Types

Consideration of the type of street, dimensions, traffic volume and verge width will have a significant impact on the determination of suitable street tree plantings. For the purpose of this plan, the Region's streets have been divided into 3 types as listed below.

a. Highways / Town Entrances

b. Arterial Roads and Streets

c. Local Streets

The available space for trees in each of the above street types will determine the suitability of the tree for its application. Available space for roots and canopy is the most important criteria for selection of the street tree species.

The dimensions of a tree at maturity are important for the physical and visual contribution to the streetscape. Existing constraints within the street (verge width, extent of pavement, location of underground and overhead assets and building setbacks) may limit the size of the tree that can be supported.

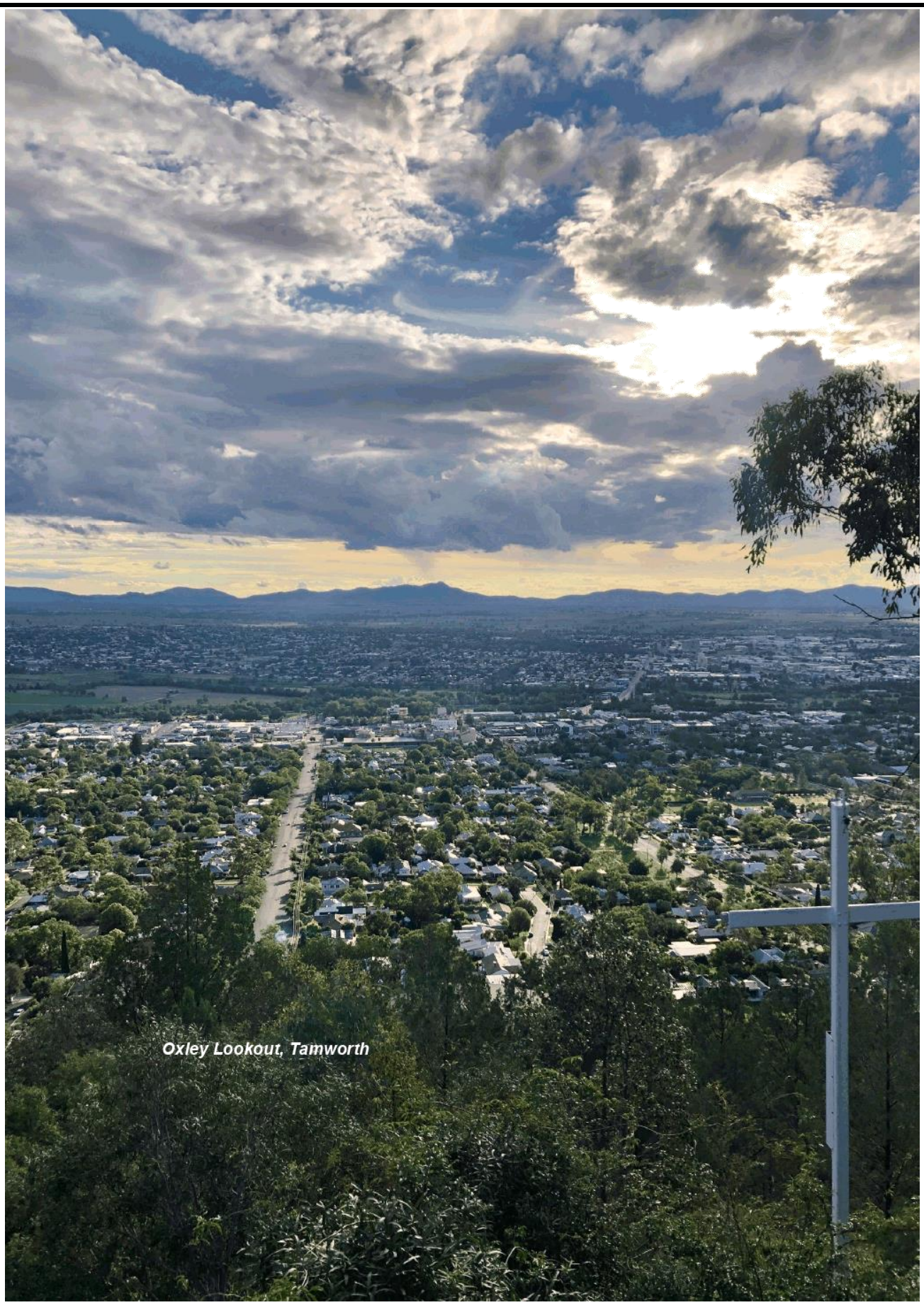
It is important the trees do not interfere with pedestrian and vehicular access, services or conflicts with paved surfaces and footings. The optimum size of the tree will be a balance between these elements.

Verge and median widths, building setback and proximity to overhead and underground assets will influence the selection of appropriate species in a street. Most streetscape verges within the Region are relatively wide.

1.3 Service Levels

Service levels relate to the inspection and maintenance which Council provides to the street trees in line with the street hierarchy.

High Service Level	• Visual Inspection of trees on an annual basis. • Directional pruning and uplifting carried out on an annual basis.
Medium Service Level	• Visual Inspection of trees undertaken over a four-year period. • Directional pruning and uplifting carried out over a four-year period.
Low Service Level	• Inspection and works carried out upon request using Council's Customer Request system.


Oxley Lookout, Tamworth

Section 2: Street Tree Selection Criteria

Street trees are living and growing assets that take time to reach maturity and offer increasing value (benefits) over time until they decline and die. A street tree may take 30-50 years to reach maturity and have a lifespan of 100-150 years, depending on species, environment and other factors. In Australia, we are experiencing a decline of some of our early, grand avenue plantings. It is likely that lifespans will reduce with drier and hotter environmental conditions. Please refer to Appendix A for the Recommended Street Tree Species List.

2.1 Street Tree Selection Criteria

Tree selection is based on a number of criteria, but of primary importance is a species suitability to individual street conditions. Other considerations include:

- Amenity
- Character
- Shade
- Biodiversity
- Maintenance requirements
- Seasonal interest
- Planting constraints imposed by the built environment
- Adaptability to a range of climatic conditions
- Existing species occurrence
- Is the street/road listed within the Street Tree Hierarchy by TRC

The fabric of the existing established urban forest needs to be taken into account when selecting new street tree plantings. For example, the suggested street tree plantings as per the Street Tree Hierarchy have generally been selected based on the existing tree species as a base. Many of the avenues and streets have a wide variety of established species occurring along their length with little consistency or regard to streetscape hierarchy or formal avenue plantings. The species listed are not intended as a short-term replacement strategy, but as long-term guidance for creating future consistency along these streets when trees are required to be removed or replaced.

2.1.1 Tree Form and Scale

Tree species will be selected so that the ultimate mature size of the tree canopy is appropriate to the particular street considering the site constraints, such as verge width, overhead power lines, building alignments and vehicle clearances. Council will use the largest appropriate species possible for the given location.

Selected species should have an appropriate and predictable form, usually with an upright trunk and stable branch structure. Street trees need to have a form that allows traffic and pedestrian movements easily around and under the tree.

2.1.2 Proposed Tree Type

The Street Tree Species List includes both evergreen and deciduous trees. Evergreen species provide year-round screening, greenery and shelter from winds. Deciduous trees provide seasonal interest whilst maximising summer shading and winter light. This is particularly relevant for buildings located on the southern side of a narrow street with small setbacks.

2.1.3 Local Conditions

Recommendations have been made for tree species for the key streets and avenues within each town and village. Generally, where two or more species have been recommended for one street or avenue, this is to provide a lower growing species for planting under wires and a taller species where no wires are present on the opposite side of the street/avenue.

In some cases, two or more species may be recommended to provide alternative choices. Other tree species can be selected from the Street Tree Species List to plant in the remainder of each town and village once site conditions have been considered. The species which occur on other land uses have been noted as a guide for what grows well in that locality.

2.1.4 Existing Soil Conditions

Soil types are based on broad scale mapping and are intended as a guide only. Local soil conditions may vary within towns.

2.1.5 Existing Species Occurrence

The Existing Street Tree Species (Appendix A) list is based on field investigations, experience and are not necessarily indicative of all species occurring in the towns and villages.

Existing species is one of the best ways to determine whether a plant should be listed on the street tree species list. Plants that cannot adapt to the local conditions usually die or are affected greatly and are less likely to be selected by residents and staff.

2.1.6 Growth Rate

The growth rate of a plant is important when selecting a species for the use as a street tree. Trees which are fast growing can have issues with strength and infrastructure damage. Alternatively, trees which are very slow growing will take too long to create the shade or the appearance within a street.

2.1.7 Maintenance Requirements

It is important to select species which have a low to moderate level of maintenance over the life of the tree. The lower the maintenance the more easily the tree is to manage and care for.

2.1.8 Weed Species Trees

Trees and shrubs which are known to be invasive or problematic will be removed or identified within the street tree list. Council has an obligation as the local authority to help prevent infestation by plants to land which it either owns or manages.

The street tree species list will be checked periodically against the state weeds list for the local area to prevent weed species trees and shrubs from being planted.

Any person wishing to plant a species which has been identified as a weed species will be informed and will need to select another species.

2.1.9 Fruit Trees

Whilst fruit trees can be highly desirable they are not typically appropriate for use as urban street trees due to a range of factors outlined below. It is better to accommodate the desire for edible fruit trees within individual private yards where there is greater freedom and their management obligations are clearly defined. The main implications in using fruit trees as street trees are:

- A fruit tree is usually small growing, and does not achieve the desired urban tree canopy outcomes. They also tend to be relatively short lived compared to many other tree species that would otherwise be utilised. Often a fruit tree only has a productive life for the production of fruit of 15 to 25 years before it is replaced in an orchard situation.
- Generally speaking, for a fruit tree to successfully grow and produce edible fruit they require very favourable growing environments. Typically, urban trees face a much harsher growing environment than is suited for a fruit tree to grow, thrive and produce good fruit.
- The level of maintenance required for a fruit tree is much greater than many other species of trees. Most fruit trees need regular and expert pruning and fruit thinning to succeed. The onus of cleaning up spoiled fruit, spraying for pests and diseases, etc. and the ultimate responsibility and liability regarding the fruit is also unclear, and can lead to numerous legal complications. Owners who may diligently tend to the tree initially may also move away, and maintenance falls back on the Council.
- The financial cost involved to manage and maintain a fruit tree would ultimately be greater and would fall back to Council, even if residents initially offer to maintain the trees.

Although Council does not typically support the use of fruit trees for street tree plantings, for the reasons outlined above, there may be some special circumstances when a fruit tree is planted. Ultimately the decision to plant a fruit tree will be determined by Council and permitted on a case-by-case basis, and only when the other overall objectives of the Urban Street Tree Management Plan are not compromised and canopy coverage in the street is already well catered.

2.2 Species Recommendations

Recommendations for selection of trees in each town are based on a combination of factors including:

- Observations of tree species already growing successfully in the towns and villages
- The prevalence of that species
- Which species are growing in other places outside the streetscape and appear to be healthy
- Selecting species that will provide a variety of types of canopy cover and structure, as well as differing landscape character to assist in creating a hierarchy of streets within towns and villages
- Improvement of the town and village centre amenity and shade
- Agreeance that those species currently occurring are likely to grow well there in short to medium term future and that these species should be used elsewhere in town if appropriate
- Review of which species currently have a broad geographical distribution and are therefore most likely to adapt to climate change
- Review with TRC officers of which species have performed well over time and those that have maintenance issues

2.3 Street Tree Selection Process

Diagram 1 outlines the process to be undertaken when determining which tree should be planted where within the Tamworth Regional Council area.

Diagram 1. Street Tree Selection Procedure

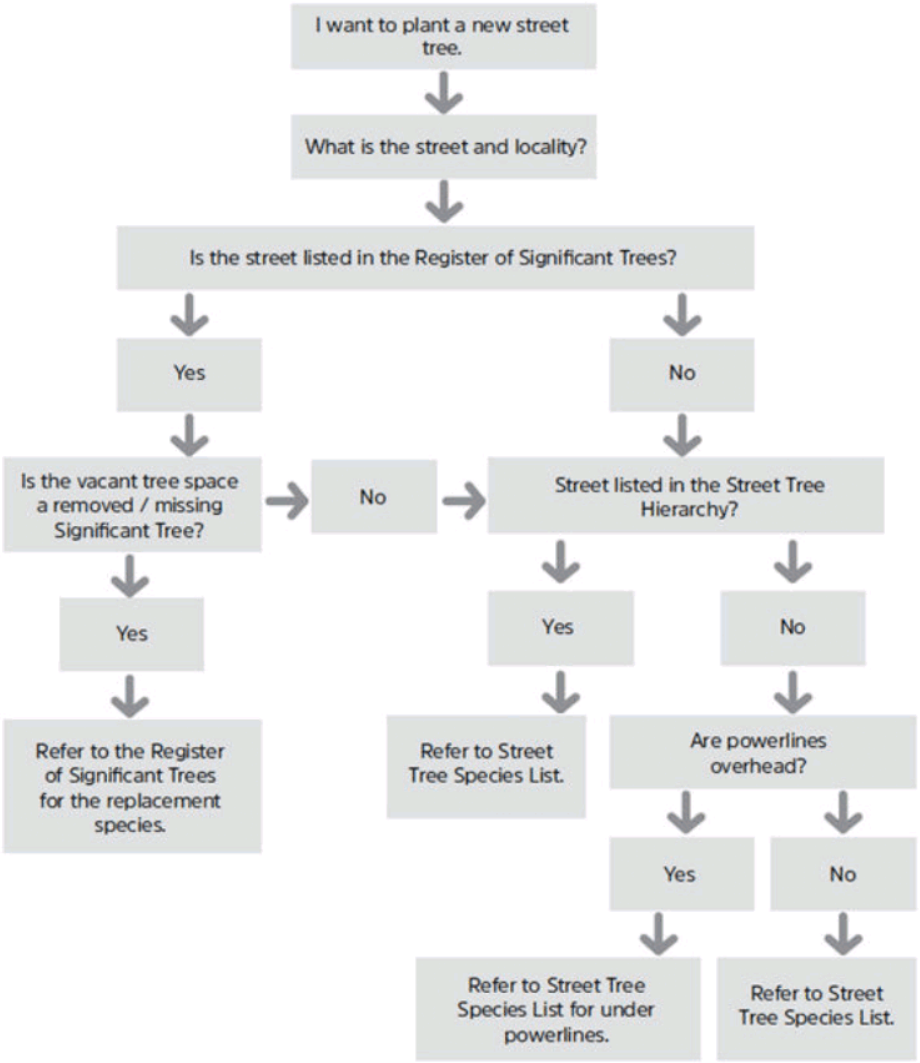



Photo credit: Anthony Hands

Section 3: Street Tree Removal Policy

OBJECTIVE: To preserve, enhance and develop attractive, streetscapes and public open space areas within the environments of Tamworth Regional Council, while minimising the risk to public safety and property.

POLICY:

Tamworth Regional Council is committed to managing the trees within its urban streetscapes and public open spaces to ensure the history and amenity of the region is preserved and enhanced for future generations.

In formulating this Policy Council recognises the significant contribution trees make to our scenic amenity and the important role trees play in providing:

- Aesthetics, shade and cooling;
- Health and well-being;
- Improve the environment;
- Habitat for local wildlife and corridors for wildlife movement;
- Consumption of carbon dioxide and production of oxygen;
- Wind reduction and noise abatement;
- Filter rainwater and reduce stormwater runoff;
- Improved property value;
- Tourist and event attraction; and
- A contribution to cultural history and local identity.

Council also recognises the risk trees pose to people and property. It is Council's intention to minimise these risks and the possible consequences.

This Policy provides clear guidelines for how and when trees located on Council controlled property will be removed and/or replaced. The following principles will apply:

a. Citizens will not be permitted to damage, remove or cause the removal of trees from Council controlled property and in such cases, Council may initiate legal action;

b. Council will receive requests from citizens for the removal of trees;

c. These requests will be registered as a Customer Request in Council's electronic Customer Request Management System (CRMS), as a point of reference and statistical data;

d. All requests for tree removal will be assessed by arboriculture qualified staff or arboriculture qualified contractors, using Council's Tree Hazard Assessment Form;

e. All requests for tree removal will be assessed against Council's Significant Tree Register;

f. Trees will only be removed if one or more of the following criteria is met:
   i. The structural condition of the tree poses a high risk to person or property and the cost of maintaining or remediating the risk to a low level is considered excessive;
   ii. The tree is dead or the health of the tree is in irreversible decline (except in a reserve where the tree is providing a nesting habitat);
   iii. The tree impinges on an approved development of Council land;
   iv. If the tree is causing damage to property and the damage caused by the tree cannot be reasonably abated or remedied through accepted arboricultural treatment or reasonable re-design;
   v. The tree is hazardous to motorists or pedestrians due to obstruction of sightlines causing an unsafe traffic or pedestrian environment in accordance with the Roads Act 1993;
   vi. The tree is affected by road works (e.g. new road, road widening, service location and/or re-location, etc.) and all other options to retain the tree have been deemed inappropriate;
   vii. The tree is contributing to a widespread environmental issue (e.g. fruit fly infestation); and
   viii. The tree is in danger of contact with overhead powerlines and selective pruning is not practical;
g. The following are not considered sufficient reasons for the removal of trees from Council controlled property:
   i. Improve views from private property;
   ii. The tree variety is disliked;
   iii. The tree is blocking the sun or solar access to a property;
   iv. The tree causes allergy or other health problems;
   v. The tree is causing leaf litter problems;
   vi. The tree is obscuring advertising billboards; and
   vii. The tree is in the way of a non-essential property access and/or verge paving option.
h. Where a tree, having met the above criteria, is removed from Council controlled property it will be replaced with a suitable species, if possible, in a location as close as possible to the original site.

DELEGATION

The Manager, Sport and Recreation along with the Horticulture and Arboriculture Specialist, through the Director Regional Services and the General Manager, has delegated authority to authorise the removal and replacement of trees under this Policy.

Section 4: Street Tree Planting Plan and Embellishment

Council's goal is to plant a minimum of one tree in front of every urban property throughout the region.

Council will use a number of initiatives to promote and assist with the greening of the towns and villages within the Tamworth Regional Council area.

4.1 Targeted Street Tree Planting Program / Adopt a Street Tree

The Street Tree Planting Program is a Council funded initiative that facilitates the involvement of local residents in the beautification of their local area. It is coordinated by the Sports and Recreation Division and provides a formalised mechanism through which Council offers guidance and funding while residents provide labour and ongoing maintenance.

All residents and owners of properties within an affected street shall be included in the consultation process. All residents and owners of properties nearby the street shall also be included; i.e. corner properties. Councillors shall receive a copy of information distributed to residents for reference.

The following components are deemed necessary in consulting adequately with property owners and residents:

- An introduction letter that provides a brief description defining the area to be planted and the reason for the planting.
- A list that indicates the existing vacant spaces for new trees to be planted.
- A survey with a list of tree species which can be selected. On Highway and Arterial roads Council will have a selected theme and, in these cases, this is the species which will be planted.

At least 21 days (including three weekends) shall be allowed for the return of surveys.

Included in the survey shall be cultural information, a photograph of each of the tree species and a site that an established specimen can be viewed.

The tree indicated on the surveys returned to Council, shall be the nominated street tree for each site.

Residents will be encouraged to assist with the planting of the new trees along with the care and maintenance of the tree till it has fully established itself.

During Water Restriction Periods Council will assist with the watering of trees.

4.2 Volunteer Groups

Council will encourage groups of volunteers to assist with street tree planting. These groups are usually made up of people who wish to make a difference and are willing to put an effort in to see a successful outcome for the community.

Council will assist these groups with the correct planting procedure, plants, planting supplies, alternate water source (if required) and guidance to use the most appropriate species for the location they have chosen.

Local volunteers planting trees in Tamworth. Credit: Anthony Hands

4.3 National Tree Day

National Tree Day is an annual event which Council currently participates in. Currently this program is only open to school and Council's 355 Committee's.

4.4 Residents

Council will encourage and assist residents who take the initiative in planting new street trees in front of their property. This assistance will extend to the selection of the plant along with the planting location, procedure and maintenance requirements for the new plants.

This information is available on Council's website.

4.5 New Developments

The current Subdivision Guidelines allows for the planting of new street trees by Developers. This type of planting is set out in the Engineering Design Minimum Standards for Subdivisions and Developments.

4.6 Replacement Trees

Where Council removes a tree, it is a requirement that a new tree be planted to replace the removed tree. The replacement tree will need to be suitable for the location and planted in accordance with the Planting Procedure.

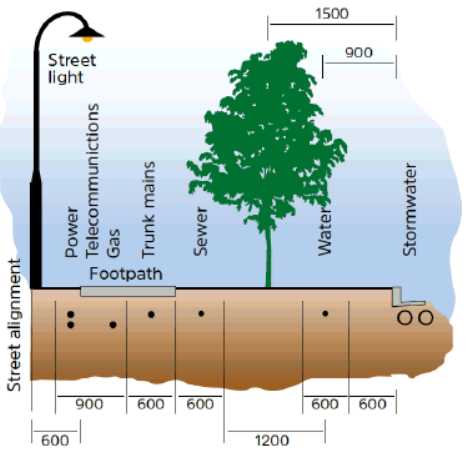
Residents will be given a list of plants (Please see Appendix A: Street Tree Species List) which are suitable as a replacement tree. The replacement tree should be planted in a timely manner after the removal has taken place.

4.7 Tree Planting Guidelines

4.7.1 Layout and Placement

There are many limitations to the positioning of street trees on road reserves immediately behind the kerb. Distances from infrastructure elements such as intersections, light and electricity poles, stormwater inlets, underground service pits and bus stops, are important in determining final planting locations.

Typically, this will require individual site assessment by Council staff and will be determined on a case by case basis.



4.7.2 Spacing of Street Trees

Considering clearance requirements, street trees are to be planted with appropriate spacing.

4.7.3 Wide Streets and Planting

Where the streets are significantly wide such as East Tamworth, Barraba then planting in the centre of the street can be looked at as an additional way of providing shade and a way to create avenues.

Underground services still need to be considered when planning, species selection and the final planting location.

Alternatively, planting trees in the parking area adjacent to the kerb instead of the footpath can be considered when the footpath doesn't allow the planting of trees due to concrete footpaths or overhead power lines.

4.7.4 Verge and Footpath Widths

The width of a verge and footpath is an essential consideration in the selection of a tree species and street tree planting details. A small tree in a wide verge free of obstructions is a lost opportunity for a large shade tree that would greatly add to the appearance of the streetscape and the canopy coverage. Conversely a tree with too large an ultimate size for the width of the footpath can become both an expensive maintenance burden, and a danger to pedestrians and public and private infrastructure.

4.7.5 In Road Planting

Many roads throughout the Tamworth Region have opportunities for additional and larger street tree planting, if the planting is located within the vehicular carriage way rather than the verge. This also allows trees to be planted in streets that have narrow grass strips or where overhead wires or awnings would otherwise present great challenges to achieving successful tree planting.

Any in-road street planting proposed will need to take into consideration the existing traffic and signage visibility, lot access and parking issues, underlying soil conditions and services. Council will aim to minimise disruptions to, or excessive removal, of parking spaces.


Barraba

The objective is to plant reasonable sized street trees that are away from overhead power lines and provide a more aesthetically pleasing street. This also allows trees to be planted further away from adjoining houses/shops, reducing any impact of street trees on adjoining properties. Many of these opportunities could be combined with rearrangement of parking and provisions of perpendicular or angled parking to minimise any parking loss.

4.7.6 Above and Below Ground Infrastructure

One of the greatest functional issues to consider with street tree selection is the presence of overhead power lines. One solution to this problem is to select very small tree species, which is viable for narrow streets, however with wide streets these small trees are often out of scale with the surrounding streetscape. The installation of Aerial Bundled Conductors (ABC) allows for reduced line clearance resulting in less pruning and in turn, less impact on the tree canopies. Where ABC has been installed, larger trees can be planted and the canopy extends into and past the wires.

High pressure gas mains, water mains, sewer mains and electricity easements sometimes prohibit establishment of trees due to the depth of the service and potential liabilities if the service is damaged. Similarly, underground structures, wall footings and the like may also limit the ability of a tree to be planted and successfully grow. These issues are often localised and do not affect the whole street. Each identified planting site will be assessed by Council on its merits to determine the feasibility of establishing the trees with consideration to underground services and structures.

4.7.7 General Solar Access

Street tree species should be selected to provide an appropriate level of solar access to dwellings. This applies most prominently to the more urban areas and where there are smaller dwellings on the southern side of the carriage ways.

This becomes less of a consideration where houses are on larger lots and are set back from the street. In these instances, the street trees typically have smaller influences and the residents have an opportunity to manage and consider their sunshine and shade requirements within their own gardens and open areas.

4.7.8 Tree Pit Dimensions

As an absolute minimum, an access width of 900mm is needed between the back of any tree pit and the building/ boundary line. Since the minimum practical width of any tree pits is usually 600mm, the minimum width of a footpath where a tree can be safely planted is 1500mm (600mm plus 900mm). This is also subject to the following other conditions:

- There are no obstructions overhanging the building line from the front yard of the adjacent property (eg. other trees, shrubs, vines, awnings) and;
- The lower branches of the tree can be pruned to a height of at least 2400mm.

Further problems occur on very narrow roads where parking is restricted to one side only. Larger vehicles may tend to ride up over the kerb onto the verge to avoid parked cars. In this case trees may only be planted on one side of the street even if the verge is sufficiently wide.

4.7.9 Water Restrictions

Water restrictions are another hurdle to planting new street trees. New trees require watering to increase their chance of survival in this hot dry environment.

Street tree planting will only occur when the water restrictions are below level 3. Tree planting when water restrictions are higher than level 2 in the towns or villages can occur if an alternate source of water is available such as bore water, recycled water or captured rainwater.

Other measures to assist with watering are the use of Greenwells, mulch and tree guards. Greenwell's help to hold a larger amount of water and direct it to the plant's roots. These can allow for a larger amount and faster delivery of water without the concern of runoff or erosion.

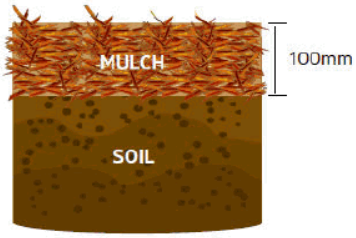
4.7.10 Tree Establishment

The importance of after-care tree maintenance requirements cannot be over stressed.

If undertaken correctly, this facet of the tree planting process can greatly increase the success of the planting.

Mulching is particularly important for successful tree establishment. Mulching reduces weed competition, enhances root growth, prevents soil compaction (improved aeration) and maintains a more constant moisture gradient by reducing evaporation.

- Mulch should be maintained at the base of each tree for a minimum two years after planting.
- Mulch should be no more than 100mm in depth and should cover a circular area of 600mm.
- Mulch should be of a type with large particle size.



A regular watering program is required to ensure tree establishment. Monitoring of watering is necessary to ascertain the plants need and watering frequency. Watering should continue for 12 months with one watering per month with ongoing monitoring.

This can be dependent on climatic and site conditions. Specific recommendations for watering are impractical due to the enormous variety of situations and tree requirements. A variation in watering requirements within the individual road sections of the towns and villages is expected.

During periods of water restrictions, recycled or collected rain water will be used upon all recently planted trees for the duration of the two-year tree establishment period.

A program of tree establishment and after-care maintenance that includes watering, mulching and weed control will extend for a minimum two years after planting. The period of after-care maintenance may be extended, depending upon seasonal conditions and tree establishment.

All trees will be formative pruned two years after planting to provide good branch structure, direct growth to a desired shape to accommodate site constraints and reduce encroachment on utilities, buildings, pedestrian and vehicular clearance spaces as the tree matures.

Formative pruning shall be carried out in accordance with clause 7.2.5 of AS 4373 - 2007, Pruning of amenity trees.

4.7.11 Functional Requirements

Species selected for street tree planting also need to fulfil certain functional criteria to ensure successful establishment and reduced ongoing maintenance and management issues. Some general functional criteria are outlined below.

4.7.12 Safety and Maintenance Considerations

The selected species must have a limited shedding of leaves and fruit for a street environment. Those with large or heavy seed pods, excessive leaf drop, or fleshy fruit or flowers which may lead to slip hazards will typically be avoided, particularly in heavily used paved environments.

Generally, trees preferred by Council will be those that require minimal maintenance after the initial establishment phase. Trees with excessive maintenance requirements or trees that need to be regularly treated for pest and diseases will not be selected. The selected species will not be prone to major limb shear. Limb loss occurs on an occasional basis for most trees, sometimes due to wind induced mechanical breakage and sometimes for self-regulated removal. This is a natural process and must be expected to occur from time to time. Some trees that are particularly renowned for having brittle branches and regular branch drop will typically be avoided for use as street trees.

Alternate footpath materials can be used to reduce possible damage

Species that are renowned for vigorous or particularly large root systems that have the potential to cause pavement uplift will be avoided. We must bear in mind that no guarantee can be given that a particular street tree species will not have an impact on nearby kerbs and pavements. The Council may also investigate the use of alternative footpath materials and planting pit designs to minimise tree root/paving interaction.

4.7.13 Tree Species Availability and Performance

Proven performance of the species under the environmental conditions of the locality is vitally important. New species should be trialled on smaller scales before implementing their more widespread use. Similarly, premature failure in one given situation should not necessarily rule out further trials being undertaken of particularly promising new species.

The selected plant species must be able to be commercially grown and available in a range of suitable sizes for street planting. Generally, the tree nursery stock used will be a minimum of 200mm pot to provide a cost-effective way of planting greater numbers of plants.

In high profile areas Council may choose to use larger plants for the initial impact and reduce vandalism to the street trees.

Many of the costs associated with the management of trees in the urban environment are at the early establishment period and over-maturity phases. Using species with a longer lifespan will help minimise tree management costs over time and lengthens the period where a tree requires minimal financial and resource inputs.

4.7.14 Consistency and Visual Uniformity on Main Streets

The intention of this principle is to establish a more uniform visual character for each of the main streets in the urban centres, creating a sense of identity or 'sense of place' that compliments the surrounding architectural forms and provides streets with a distinctive and recognisable character. Inconsistent street plantings with a large number of different species may be appropriate and can add interest to some special streetscapes. However, they are often more difficult for Council to manage and may not be appropriate in many locations.

In many cases the proposed species will be an extension or continuation of the dominant existing species, if that species has been deemed to be suitable in scale and growth habit.

4.7.15 Mixed Species

Council plans to allow residents who live in local streets as per the Street Tree Hierarchy List to choose from a palette of street trees. This will allow these areas to have a mixture of small, medium and large trees.

Highway and Arterial Roads as outlined by the Street Tree Hierarchy have been designed to have a small mixture of species however where possible a single species has been chosen. This may, for example, be in the form of one side of the street being a smaller species to fit under overhead wires and a larger species on the other side where absence of services and verge space permit. Issues such as tree supply, tree planting, tree maintenance and street cleaning frequency are all more difficult with highly mixed species streets.

Some streets may also benefit from a planned alternating mix of species. These are usually designed to cater for the continuation of a pre-existing street condition and importantly to balance the provision of native and exotic trees and/ or deciduous and evergreen trees. Attempts may be made to alternate the two (or more) species to provide for the designed intention of the mixed species street.

The selection of species to plant and the exact location within the street shall be at the sole discretion of the Council. Individual requests by adjoining residents for one or other of the species will typically not be accommodated unless it is in an area where a palette is provided.

4.7.16 Increased Canopy Coverage

Subject to verge width and constraints such as overhead power lines and building setbacks, larger growing street trees will be selected wherever possible. Too often small trees are currently planted on both sides of a street, when a larger growing tree could have been planted on the non-wire side of the street. A larger canopy tree contributes to the aesthetics of the street and overall environmental performance.

4.7.17 Planting Adjacent to Parks

Where parks have very prominent boundary tree canopies that often contribute or even extend over the adjoining streets the introduction of competing street trees along these streets is usually discouraged in order to avoid intrusive impacts on the park and minimise any future canopy conflicts. This also allows larger and more major trees along the park edges.

4.7.18 Entrances to Towns and Villages

Creating a sense of arrival for each town and village through consistent and distinct street tree planting rather than traditional gateway planting is recommended. Each experience should be unique and respond to the individual needs and character of that centre. The use of landmark trees at either end of a centre is less effective in creating a sense of arrival particularly in the Tamworth LGA where such planting would be lost in the complexity and scale of the existing trees and native vegetation. A carefully designed sign, sculpture or garden display may be more effective as an entry statement and in line with the character of the region.

4.7.19 Vegetation on Rural Road Corridors between Towns and Villages

Tree planting and vegetation beyond the urban boundaries should be distinct from the trees in the urban areas to create a visual separation between the urban centres. Typically, the planting should be native species that reinforce the rural or bushland setting.

4.7.20 WSUD

Water Sensitive Urban Design (WSUD) opportunities should be considered when designing in-road planting, subject to the constraints imposed by tree pits, drainage and normal rain garden parameters.


Peel Street, Tamworth

Section 5: Open Space Tree Planting Plan

The Open Space Tree Planting Plan sets out to provide shade along with improving the local ecosystem in the urban environment.

5.1 Volunteer Groups

Council will encourage and assist groups of volunteers with open space tree planting. These groups are usually made up of people who wish to make a difference and are willing to put an effort in to see a successful outcome for the community.

These groups will need to have permission from Council prior to commencement.

Council will assist these groups with plants, planting supplies, alternate water source and a planting guide along with expertise in the selection of the most appropriate species for the location they have chosen.

5.2 Community Planting Days

Staff will investigate and organise community planting days in the future (i.e.: spring and autumn).

5.3 National Tree Day

National Tree Day is a great opportunity to get the community involved in their local park to assist with tree planting to provide a sense of ownership and beautification of Council parks.

5.4 Tree Planting Guidelines

5.4.1 Layout and Placement

Unlike roads parks provide a great opportunity to plant large trees to create shade and structure to the facility. Distances from infrastructure are different as parks are usually free from many underground services.

There are still some limitations within parks and these revolve around the adjacent neighbours and some of the more recent types of infrastructure such as detention basins and levies.

5.4.2 Water Restrictions

Water restrictions are another hurdle to planting new trees. New trees require watering to increase their chance of survival in this hot dry environment.

Tree planting when water restrictions are higher than level 2 in the towns or villages can occur if an alternate source of water is available such as bore water, recycled water or captured rainwater.

Other measures to assist with watering are the use of Greenwells, mulch and tree guards. Greenwells help to hold a larger amount of water and direct it to the plant's roots. These can allow for a larger amount and faster delivery of water without the concern of runoff or erosion.

5.4.3 Tree Establishment

The importance of the correct planting technique along with after-care of the young tree cannot be over stressed.

If undertaken correctly, this facet of the tree planting process can greatly increase the success of the planting.

Preparation of the hole is important to assist tree roots to grow out and down. Ripping the hole and watering a week prior to the planting will help the tree establish and provide a deep water source.

Mulching is particularly important for successful tree establishment. Mulching reduces weed competition, enhances root growth, prevents soil compaction (improved aeration) and maintains a more constant moisture gradient by reducing evaporation.

- Mulch shall be maintained at the base of each tree for a minimum two years after planting.
- Mulch should be no more than 100mm in depth and should cover a circular area of 600mm.
- Mulch shall be of a type with large particle size.

A regular watering program is required to ensure tree establishment. Monitoring of watering requirements is necessary to ascertain plant needs and watering frequency. Watering will continue for 12 months with one watering per month with ongoing monitoring.

This can be dependent on climatic and site conditions. Specific recommendations for watering are impractical due to the enormous variety of situations and tree requirements. A variation in watering requirements within the individual road sections of the towns and villages is expected.

During periods of water restrictions, recycled or collected rain water will be used upon all recently planted trees for the duration of the two-year tree establishment period.

A program of tree establishment and after-care maintenance that includes watering, mulching and weed control will extend for a minimum two years after planting. The period of after-care maintenance may be extended, depending upon seasonal conditions and tree establishment. All trees will be formative pruned two years after planting to provide good branch structure, direct growth to a desired shape to vehicular clearance spaces as the tree matures.

Section 6: Minimum Standards for Street Tree Landscaping

Developers shall prepare a comprehensive Landscaping Plan, which shall be approved by the Director Planning and Compliance, prior to issue of the Construction Certificate.

6.1 Planting Details

At the pre-construction stage detailed planting information must be provided. A list of recommended species is listed in Appendix A and B. The plan shall show the location and species name of the proposed plants in a key format that relates back to a plant schedule, the plant schedule shall have at least the following information:

- Botanical and common name relating back to the key name given;
- Number of plants to be used;
- Size of plant container;
- Growth rate;
- Mature growth height;
- Mature growth spread; and
- The expected size of plant to be planted at the time of planting.

The developer is also required to submit details of proposed maintenance programs of all landscaping elements and undertake to maintain all landscaping in sound health and condition until the expiry of the maintenance bond period. Prior to acceptance Council will inspect the landscape works before signing off and accepting future maintenance responsibilities. During the maintenance period, horticultural best practices must be undertaken to ensure quality workmanship throughout the development before Council will accept the works.

6.2 Trees

The developer will be required to lodge with Council sufficient funds to permit the planting of one, or two on corner lots, approved street tree per standard residential lot. These funds will be utilised by Council to purchase, plant and maintain street trees when the subdivision reaches 75% occupied or at the end of two years, whichever occurs first. Alternatively, the developer may, with the approval of the Director Regional Services, plant one or two on corner lots, approved street tree/s per standard residential lot, such trees are to be located in the footway within the road reserve central to the lot and in accordance with the approved services locality plan.

New developments with larger blocks (over 1500m^2 with a street frontage of over 25m) will need to have more trees planted so as to provide an inviting street appeal. The following formula has been established for these larger properties. It should be noted that this is a minimum and if more trees are desired for the location then this will be permitted.

The formula for larger lot developments shall be one tree per 15m of road / street frontage.

Trees proposed for street planting shall be tree species from an accredited supplier, unless otherwise approved by the Director Regional Services.

The theme of trees to be planted shall be identified in the landscape plan and approved by Council based on criteria including suitability to site conditions, compatibility with existing vegetation and planting themes for the locality.

Clear zone requirements must be achieved for street trees in accordance with Table 1.

6.3 Location of Utilities

The provision of utilities within the road reserve shall be as per Standard Drawings 13645D – Footway Allocations. Utilities shall not be installed beneath the floor or batters of open channel drains or other drainage structures.

The minimum corridor widths and footway allocations for utilities and services are as per Table H – Utility and Service Corridors and Offsets.

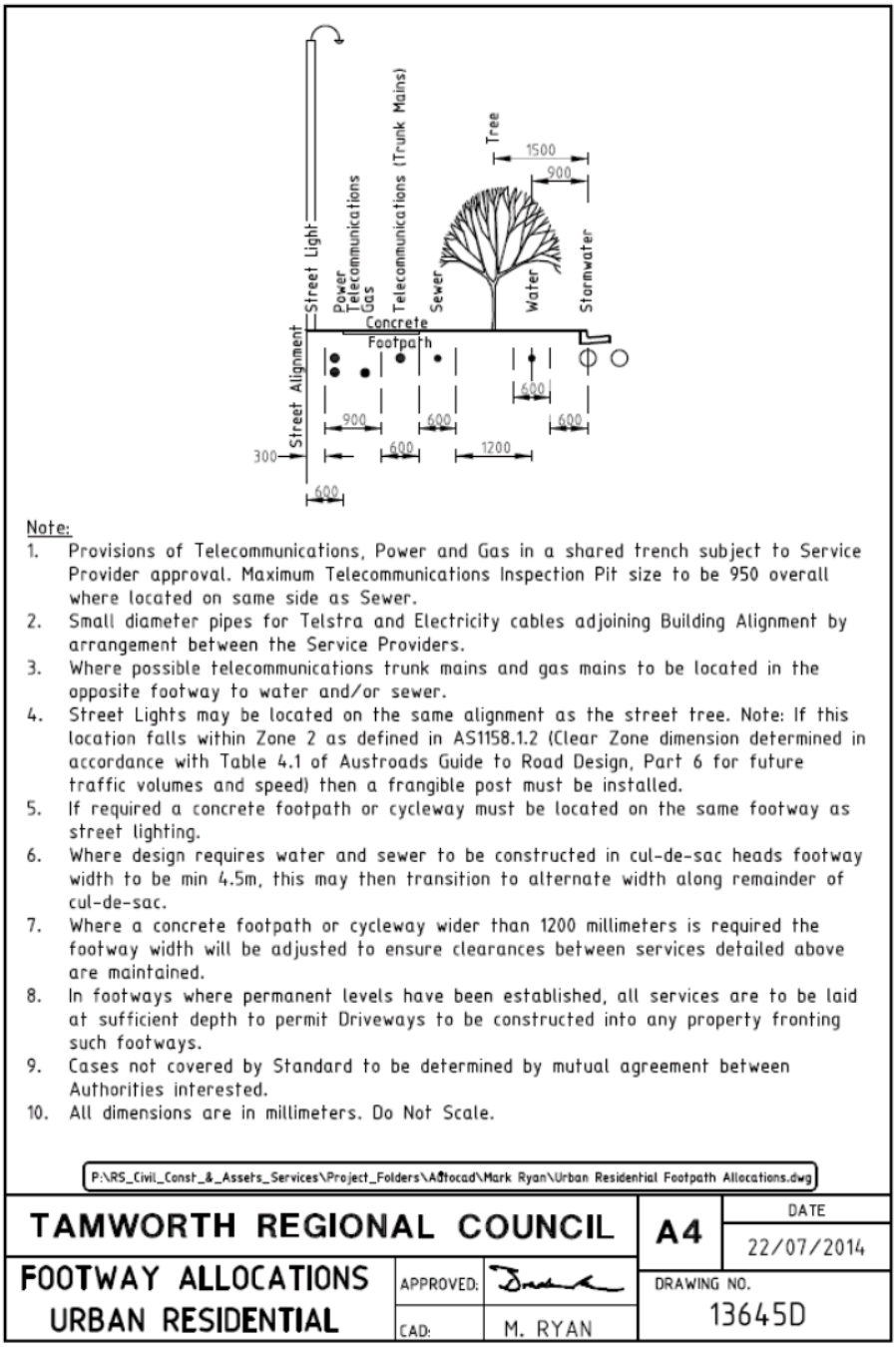
Tree limb impacting an overhead powerline in Gipps Street, Tamworth

Table 1. Utility and Service Corridors and Offsets

Utility or Service	Minimum Corridor Width (mm)	Corridor Offset From (mm)	Corridor Offset To (mm)
Street Lighting	300	Property Boundary	Property Boundary 300mm from
Electricity Distribution	900 *Note 2*	300mm from property boundary	1200mm from property boundary
Telecommunications	900 *Note 1*	300mm from property boundary	1200mm from property boundary
Natural Gas	900 *Note 1*	300mm from property boundary	1200mm from property boundary
Telecommunications trunk lines and NBN Co. Infrastructure	600	300mm from property boundary	1200mm from property boundary
Sewer	600	1800mm from property boundary	2400mm from Property boundary
Street Tree	1200 *Note 3*	Edge of street tree to be minimum 3500mm from edge of travel lane *Note 2*	
Water	600 *Note 4*	Centre of water main corridor to be 900mm from face of kerb	
Concrete footpath	1200	600mm from property boundary	1800mm from property boundary

- Note 1: The corridor width for electricity, telecommunications and natural gas is based on the use of shared trenching as per the provisions of the *NSW Streets Opening Conference Guide to Codes and Practises for Streets Opening*. Approval for shared trenching should be sought from the relevant utility providers prior to submission of the design drawings.
- Note 2: The clear zone for non-frangible objects in the road reserve shall be nominal 3500mm from the outside edge of the adjacent travel lane. Resulting in the tree line being 1500mm from face of kerb.
- Note 3: The separation distance of any utilities, services or other infrastructure from a street tree shall be no less than 600mm as measured from the centre of the tree.
- Note 4: Water main corridor overlaps street tree corridor by 300mm. Centre of water main corridor to be 900mm from face of kerb.

Figure 1 Footpath allocation Urban Residential



Note:

1. Provisions of Telecommunications, Power and Gas in a shared trench subject to Service Provider approval. Maximum Telecommunications Inspection Pit size to be 950 overall where located on same side as Sewer.
2. Small diameter pipes for Telstra and Electricity cables adjoining Building Alignment by arrangement between the Service Providers.
3. Where possible telecommunications trunk mains and gas mains to be located in the opposite footway to water and/or sewer.
4. Street Lights may be located on the same alignment as the street tree. Note: If this location falls within Zone 2 as defined in AS1158.1.2 (Clear Zone dimension determined in accordance with Table 4.1 of Austroads Guide to Road Design, Part 6 for future traffic volumes and speed) then a frangible post must be installed.
5. If required a concrete footpath or cycleway must be located on the same footway as street lighting.
6. Where design requires water and sewer to be constructed in cul-de-sac heads footway width to be min 4.5m, this may then transition to alternate width along remainder of cul-de-sac.
7. Where a concrete footpath or cycleway wider than 1200 millimeters is required the footway width will be adjusted to ensure clearances between services detailed above are maintained.
8. In footways where permanent levels have been established, all services are to be laid at sufficient depth to permit Driveways to be constructed into any property fronting such footways.
9. Cases not covered by Standard to be determined by mutual agreement between Authorities interested.
10. All dimensions are in millimeters. Do Not Scale.

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TAMWORTH REGIONAL COUNCIL		A4	DATE 22/07/2014
FOOTWAY ALLOCATIONS URBAN RESIDENTIAL	APPROVED:		DRAWING NO. 13645D
	CAD:	M. RYAN	

6.4 Road Verges

The following conditions shall be satisfied prior to notification of completion:

- The ground surface of all road verges, parks and public reserves shall be of uniform grade and generally consistent with no obvious depressions and be free of boulders, foreign material and debris;
- All areas shall be trimmed as per the design contours in accordance with AS1428, to facilitate easy and safe mowing;
- Entrance statements not to be placed on public reserves or road verges;
- Existing vegetation, both above and below ground, that is located on road verges is to be protected from damage resulting, or likely to result from, from subdivision development works; and
- Existing vegetation located on road reserves that are deemed by Council to be dead or dangerous is to be removed or made safe by the Developer prior to date of handover.

6.5 Topsoil

On construction disturbed sites, developers shall provide for topsoil to be stripped following the clearing of vegetation and stockpiled for re-use. Additional imported topsoil may be needed to establish vegetative cover on some hard or denuded sites.

The developer shall use topsoil stockpiled on site, where imported topsoil is required it shall comply with AS 4419 and shall:

i. Be of a friable, porous nature;
ii. Be free of weeds and weed seeds, bulbs, corms and vegetable propagules;
iii. Contain no refuse, contamination, or materials toxic to plant growth or human health;
iv. Contain no stumps, roots, clay lumps or stones larger than 50mm in size;
v. Have an organic content of at least 3 per cent by mass;
vi. Have a pH neither less than 5.5 nor more than 7.5;
vii. Have a soluble salt content not exceeding 0.06 per cent by mass; and
viii. The source of any imported topsoil shall be nominated and testing results shall be supply to Council.

Topsoil shall be uniformly applied to provide an average compacted thickness of 50mm with a minimum compacted thickness of 30mm at any location. The topsoiled area shall be cultivated to a depth of 50mm to provide a roughened surface with soil lumps not exceeding 50mm dimension.

6.6 Roundabouts and Median Landscaping

Roundabout and median strip landscape design must have due regard for plant siting and maintenance requirements. Planting in roundabouts and medians are to be set back from the inside kerb edge as follows:

6.6.1 Roundabouts

Turf grass is not a suitable landscape item for roundabouts and will not be approved by Council. The following is a guide for landscaping of roundabouts:

- 0.0m - 1.0m setback - appropriate pavement material;
- 1.0m - >3.0m setback - shrubs / native grasses /groundcovers only with a maximum mature unpruned height of 1m above the road pavement (not top of kerb);
- 3.0m - >3.0m setback - trees and shrubs/ground covers. Roundabouts of 6m in diameter in low speed zones of 50km/h or less, a small single trunked tree with a mature diameter of 100mm may be located in the centre of the roundabout, providing such achieves a clear trunk height at planting of 1.5m above the road pavement level.

Roundabout in South Tamworth

6.6.2 Median Islands

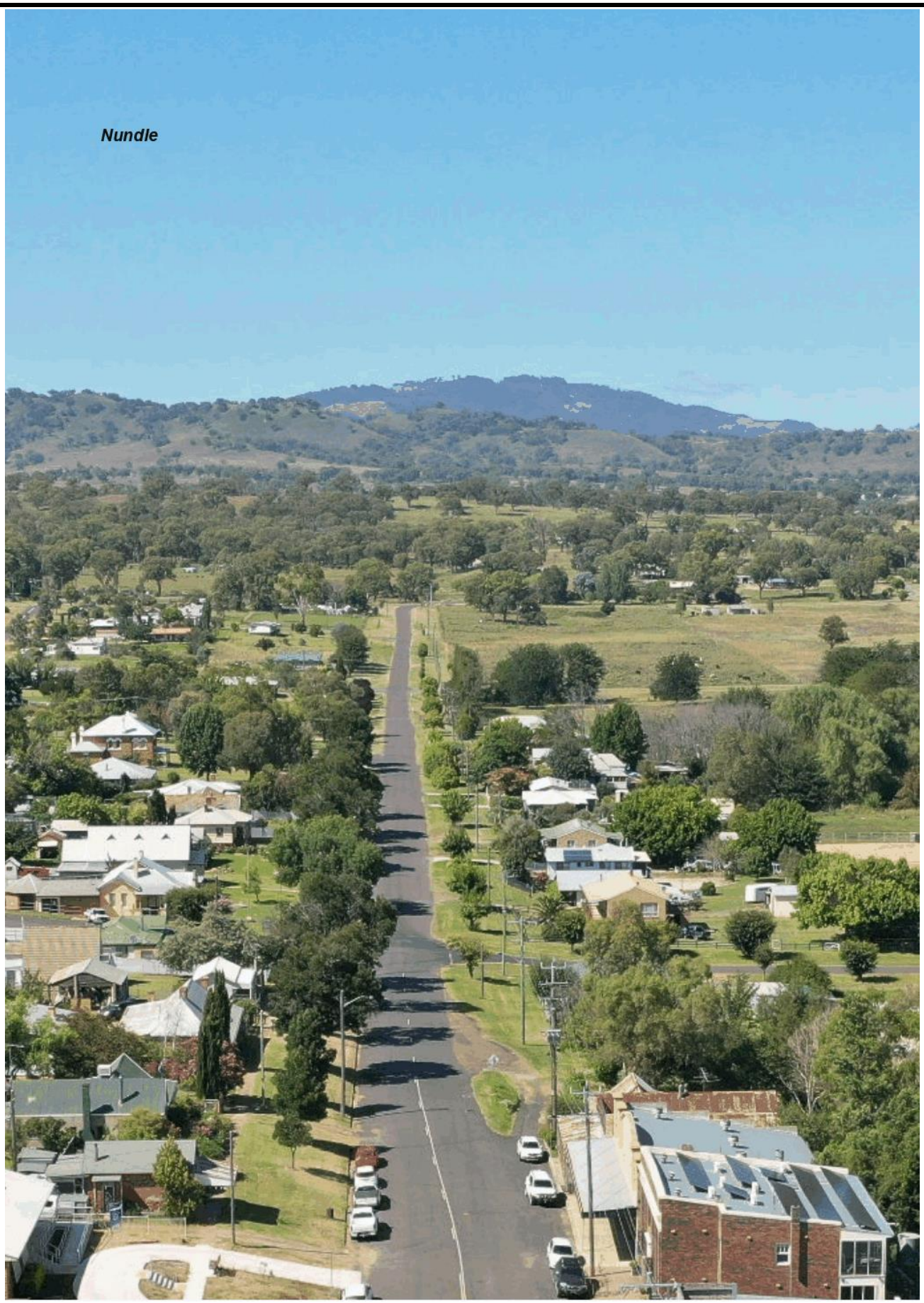
Turf grass is not a suitable landscape item for median islands and will not be approved by Council. The following is a guide for landscaping of median islands:

- 0.0m - 0.3m - appropriate pavement treatment;
- 0.0m - 1.0m setback - appropriate native grasses or ground covers, 200mm high, with minimal pruning requirements;
- 1.5m setback - shrubs / ground covers only. Shrubs and ground will have a maximum maintained mature height of 1m above the road pavement (not top of kerb);
- 1.5m setback - trees. Trees are to be primarily single trunked species. Tree species chosen will depend on the species spatial requirements and clearance from service elements and light poles;
- Trees will generally not be planted in medians with an internal width less than 3m;
- In median strips, three (3) metres or wider, trees may be located centrally or staggered provided such accords with traffic engineering visibility requirements. Tree species will be selected for appropriate canopy shape;
- Ends of median strips require special consideration and discussion with Council with regards to clear zones and safety requirements;
- Irrigation is to be placed in medians with subsoil drainage installed to adequately stop the ingress of water into the roadway. Irrigation shall be of such a design and quality of material and workmanship that the ingress of water into the pavement due to failure or damage is avoided;
- The root system of plants must not interfere with subsurface drainage and shall have root control system where necessary to protect Council services (water and sewer) from root damage;
- The design shall minimise the requirements for maintenance;
- Interfaces between grass and areas of chip mulch are to be avoided. Where grass does interface with chip mulch, a concrete mowing strip of 300mm wide must be provided.

The mature unpruned height of under plantings on road verges or in roundabouts, medians and splitter islands is not to exceed 1m above the road surfaces. This height, however, may be reduced at the discretion of the Director and may vary from site to site.

6.7 Driveways

The planting of street trees needs to take into count the location of driveways with a minimum offset of 3000mm to driveways. This offset allows for motorists to see vehicles exiting or entering driveways.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Section 7: Main Street Tree Replacement Plan

The Main Street Tree Replacement Plan provides guidance in how Council will plant and renew street trees within the main CBD streets for all towns and villages.

There are significant benefits to having an established street tree theme within the main CBD areas of the towns and villages. These benefits include the provision of shade, character and general wellbeing.

The following methods provide information in how the different methods can be utilised and how they differ from each other.

Manilla Street, Manilla

7.1 Method of Replacement

A number of options for block removal of trees and replacement can be used as illustrated in Figure 1. Each applicable street will need to be individually assessed to determine which approach will be most appropriate and have the least impact on the streetscape and be dependent on available funding.

An important aspect to the proposal for phased removal is the establishment of a programme of interplanting. This can occur where the existing tree spacing is significantly wider than the proposed planting interval or where a tree has been removed. By incorporating interplanting into the broader programme of tree removal, the effect is to copy nature by providing new trees to take over before old trees become senescent and die. By allowing new trees to grow between existing trees for 5-10 years, the visual impact of tree removal will be greatly reduced.

Where trees have been removed it is recommended that, where possible, replacement trees should be planted in approximately the same location as the removed tree, following excavation of roots and any necessary adjustments to the planting hole. Where existing trees have been known to interfere with utilities, access or lines of sight, the replacement tree should be located in the nearest appropriate location.

7.1.1 Staggered removal

Staggered removal and replacement, as shown in Figure 1 - Option 1, is advised where trees are aging or senescing at different rates but the overall population in the location or street have relatively moderate useful life expectancies, 15-20 years or so.

- Individual specimens are becoming hazardous, declining or succumbed to a single incidental affliction such as termites or mechanical damage.
- Individual specimens are disrupting utilities in a manner that cannot be addressed through maintenance or repair.

The selection of trees to be removed should be based on their condition and these should be carefully scrutinized for removal to satisfy the replacement pattern. The advantage of this method of replacement planting is that it varies the age class of trees and allows for their establishment prior to other specimens requiring removal, so a moderate degree of streetscape amenity is maintained. It also reduces the incidence of suppression that is often caused by more dominant trees. One of the drawbacks of this type of planting is that it does restrict complete improvement of the soil due to the necessity to avoid damaging the root system of trees being retained and competition with the roots for water and nutrients with existing trees.

7.1.2 Block Removal

Whole block removal and replacement, as shown in Figure 1 - Option 2, is advised and necessary where trees are either:

- Declining at the similar rates through environment stress factors.
- Have succumbed to a host specific pest or disease.
- Where the removal of one or several specimens amongst a block does not provide adequate area above and at ground level for replacement planting.

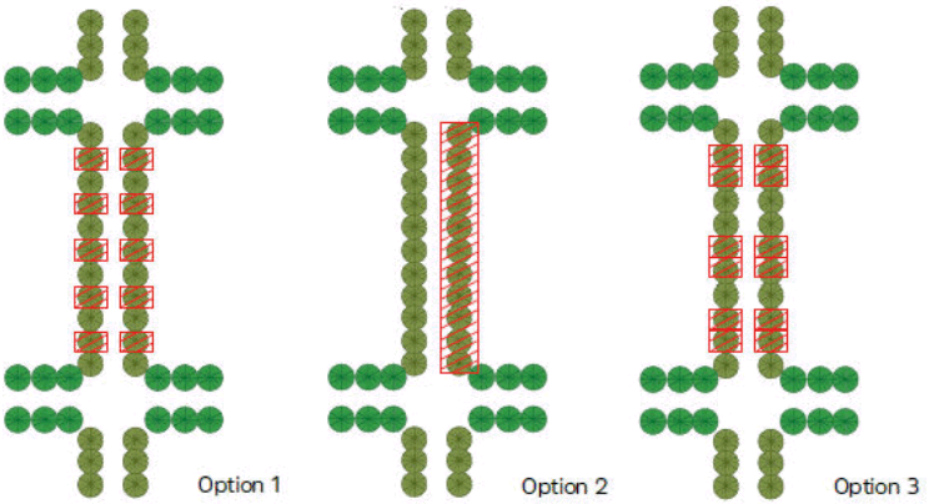
Block removal has several advantages over the selective and staggered removal and replacement plan option including:

- The ability to realign, repair and protect any utilities that may impede or conflict with the trees future growth.
- Easier maintenance and establishment, without conflict, suppression or competition with other trees.
- The ability to undertake soil modification and amelioration on a larger scale for faster establishment.
- Consistent and uniform growth rates and patterns can be achieved.

7.1.3 Block Removal - reduced density of planting

This removal option, as shown in Figure 1 - Option 3, may be applicable in streets where trees have been closely planted in the past (typically 5-6 metres). This would involve removing two mature trees and providing one tree midway as a replacement. By removing and replacing trees in this way a uniform avenue of trees can still be maintained.

Figure 1. Options for Street Tree Replacement.



7.2 Individual Replacement

Individual tree replacement is advised where only an individual specimen requires removal and applies where:

- All of the trees are of the same age class and relative maturity.
- There is space for the tree to become established, or space can be provided through selective pruning (refer AS 4373 - 2007 Section 7.5).
- There is a desire to introduce smaller species that will be more suitable in a particular instance than the existing street tree species.
- The opportunity and desire to provide for two compatible size classes of tree, dominant and under-storey.
- Where there is a need to remove a tree due to infrastructure damage.

7.3 Planting Systems

There are several ways to plant trees within these high pedestrian and vehicular areas. These include the use of:

- Stratavaults;
- Structural soils;
- Permeable pavements; and
- Root barriers

7.3.1 Stratavaults

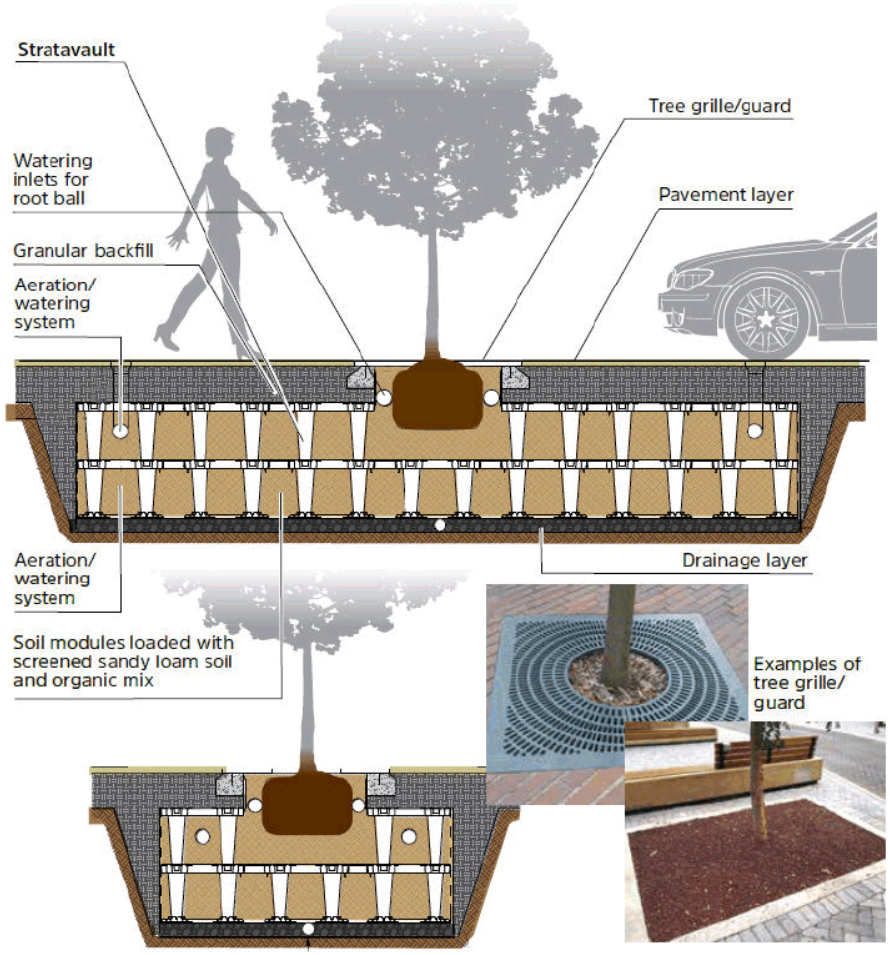
Stratavaults such as the ones manufactured by CityGreen provide a purpose-built area for the trees roots to grow and absorb water, nutrients and air.

A stratavault is a planting system which consists of a plastic modular interlocking system to create a structural underground cell for tree roots. This system also always the root zone area to be used as a car park or roadway without compacting the root zone of the tree.

These are the ultimate solution for planting trees with a barrier to prevent roots from growing out and causing damage. They are also rated for vehicles to drive over them without damaging footpaths or road surfaces.

These can also be used to filter stormwater prior to this water entering a stormwater system or river system.

Figure 2. Typical diagram of a CityGreen Stratavault.



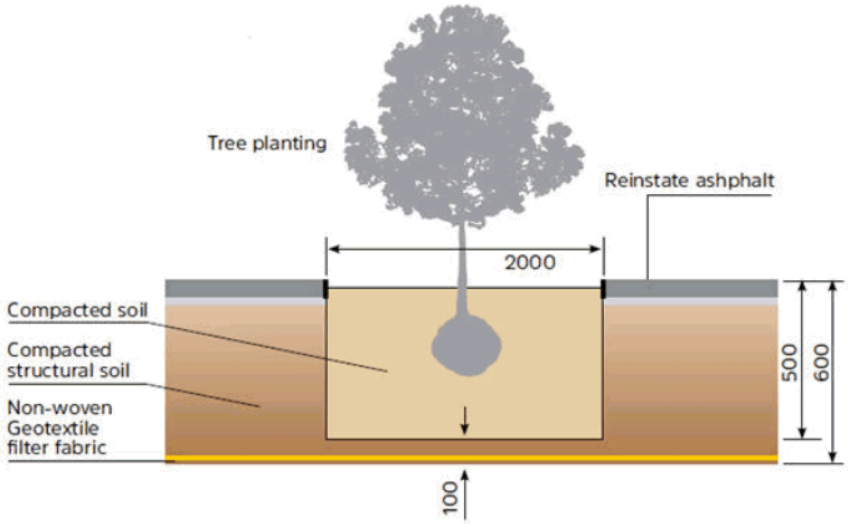
7.3.2 Structural Soils

Structural soil is a medium that can be compacted to pavement design while permitting root growth for trees. It is mainly a mixture of stone and soil.

This type of soil can be used as an alternative to a stratavault when planting trees in roads. The structural soils provide an area where the tree roots can growth and absorb water, nutrients and air.

Typical structural

Figure 3. Typical diagram of a structural soil tree pit.



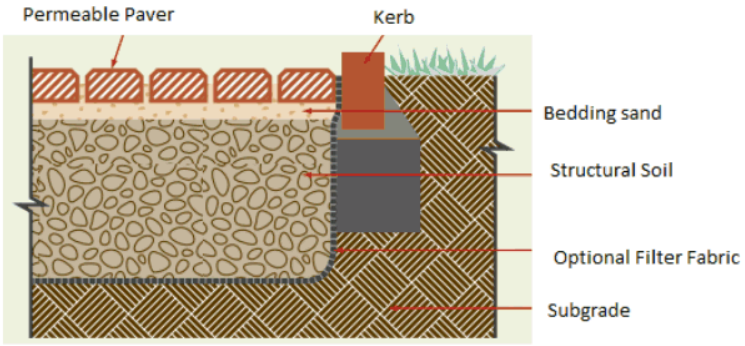
7.3.3 Permeable Pavements

Permeable pavements are pavements which allow water to pass through them to an underlying structure in this case either a stratavault or a structural soil to provide water for street trees.

There are several different types of products which can be used. These are as follows:

- Permeable pavers such as Hydropavers;
- Porous asphalt and
- No fines concrete.

Figure 4. Typical diagram of a permeable pavement.

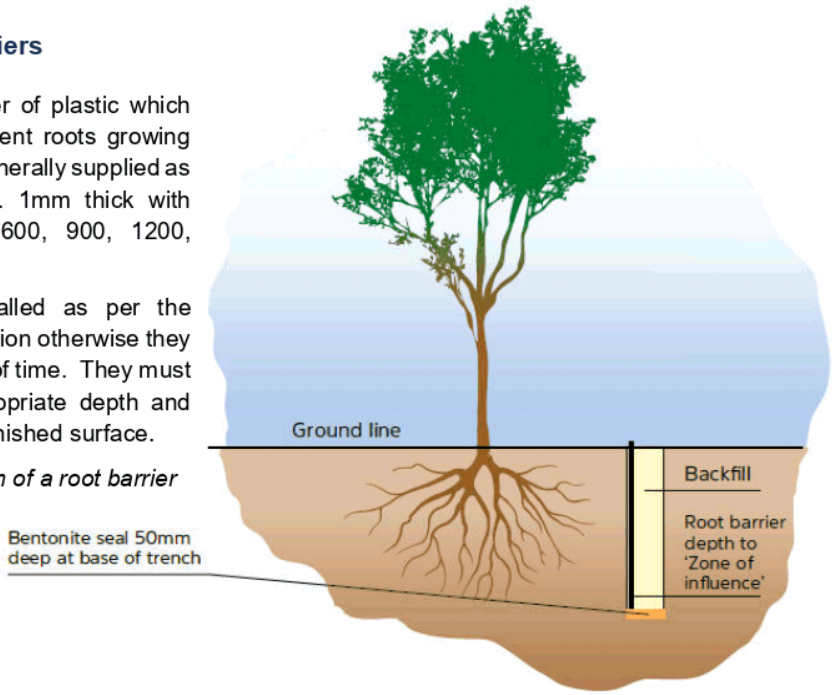


7.3.4 Root Barriers

Root barriers are a layer of plastic which can be installed to prevent roots growing into an area. They are generally supplied as a roll of plastic approx. 1mm thick with varying heights (450, 600, 900, 1200, 1500mm) and 30m long.

They need to be installed as per the manufacturer's specification otherwise they will fail in a short period of time. They must be installed to an appropriate depth and extend higher than the finished surface.

Figure 5. Typical diagram of a root barrier



7.3.5 Staking and Tree Guards

New tree plantings should have stakes and/or tree guards as they help to protect the trees against wind and human interaction. Stakes are generally hardwood with a minimum size of 38 x38 x 1500mm and the ties should be made from hessian tape and installed so they are loose enough to not damage the stem.

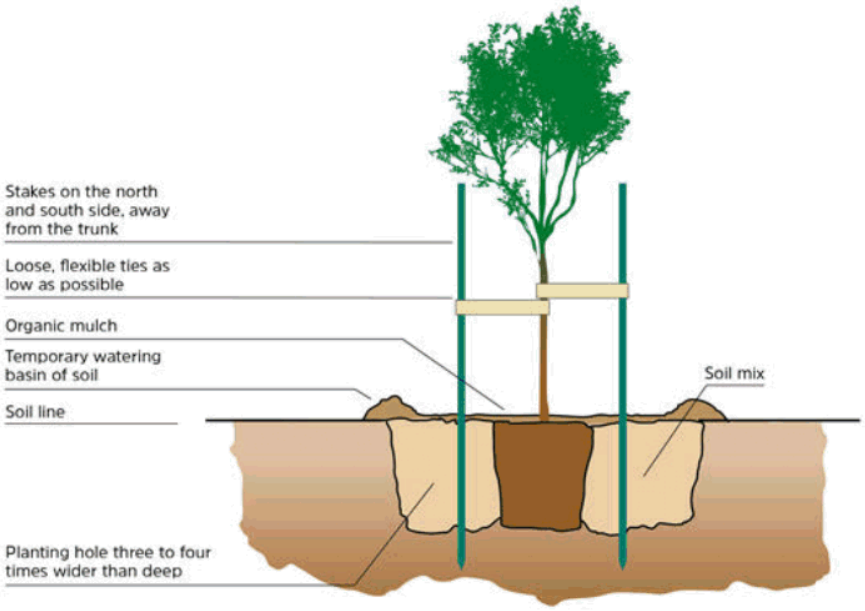


Figure 6. Typical diagram for staking a tree.

Mesh tree guard (Wilungra Tree guard from Aborgreen)

7.4 Tree Planting Constraints

7.4.1 Services

The road reserves are used as service corridors for private properties. This has an effect when it comes to planting street trees as these services can get in the way or the trees can damage them.

Services which are commonly seen in road reserves are:

- Electricity overhead and underground
- Water and sewer pipes
- Gas pipes
- Telephone lines overhead and underground
- Optic fibre cables overhead and underground
- Stormwater drains

Tree roots which enter sewer pipes can cause blockages which can affect large areas of the network. Due to the larger nutrient loaded water the trees will grow faster and larger than trees which do not have roots in these pipes.

7.4.2 Car Parking

Street trees are usually planted within the footpath to allow for car parking adjacent to the kerb. In some cases, trees have and can be planted in the road surface however this reduces car parking.

Some reasons for planting in the road surface are that buildings have awnings to the kerb, overhead power lines, wide streets and no room in the footpath due to paths.

7.4.3 Stormwater Drains

Stormwater drains can be a hindrance for planting street trees as they are usually large and can take up a large area where trees could be planted.

In the Tamworth CBD there are some specific stormwater drains which are different to the normal drains in most other areas. These are known as pressure tunnels and they are larger due to the volume of water they are designed to carry.

Stormwater drains if they are poorly installed or have aged badly can let tree roots into them causing them to be partially or completely blocked over time. Trees which have their roots in these lines are generally larger than the neighbouring trees.

7.4.4 Footpath Finish

Footpath finishes can interfere with or can be damaged by trees. Tree roots spread out from the trunk or main stem to support and feed the tree as it grows. Structural roots are generally larger as they need to support the tree.

A traditional grass footpath generally doesn't show the movement as the roots grow unless they come to the surface. Whereas concrete, paved and asphalt footpaths show the change relatively quickly and they will keep changing as the tree roots grow. Footpaths with hard impermeable surfaces do not let water through and the tree roots will keep growing.

Section 8: Notification Plan

Where a tree, having met the criteria in Item f of the Tree Removal Policy and is proposed to be removed from a highly visible public place (e.g. street tree) Council staff will follow the Communication Strategy.

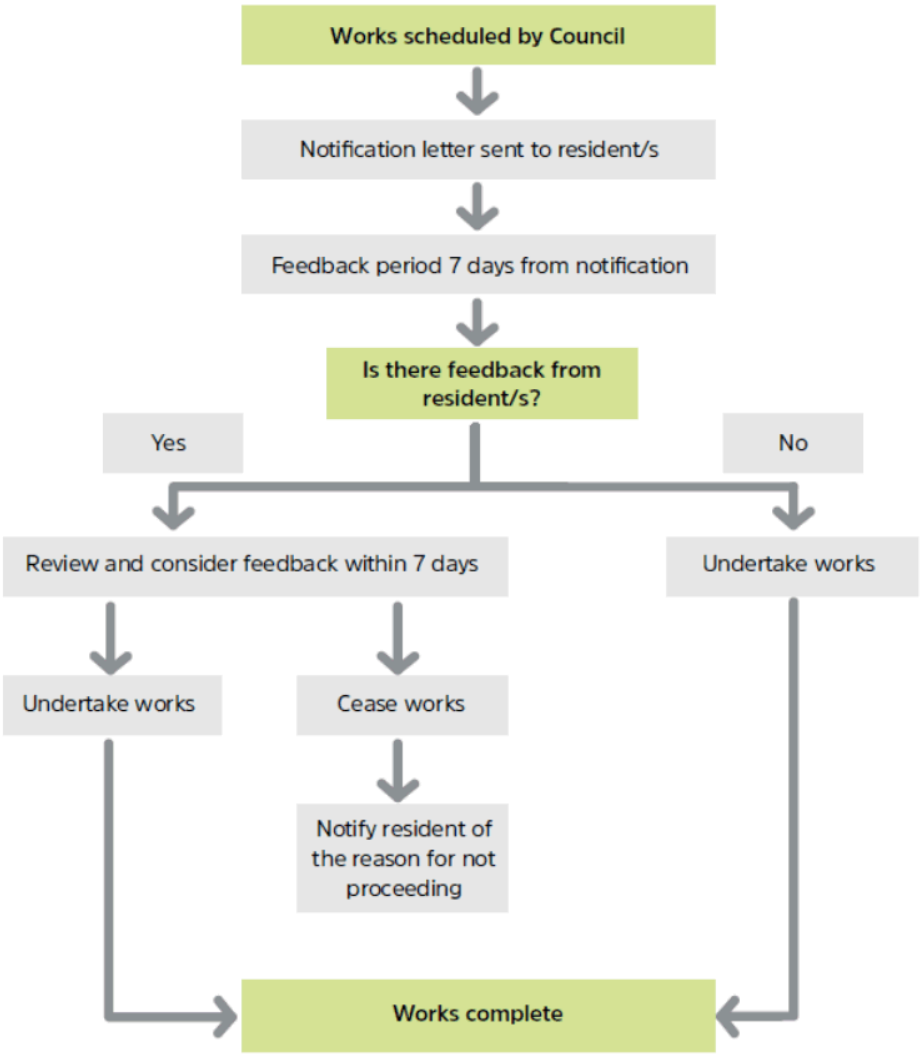
Communication Strategy

This strategy is to inform the various groups of the decision to remove a tree and outlines who will receive notification of the intended works.

The Tree Removal Communication Form (Appendix D) is to be completed for all tree removals.

- The Tree Location, Tree of Type and Type of Work are to be circled.
- The Communication column then provides the type of Communication required prior to the works.
- Should the Communication column show 2 different levels of Communication then the higher-level Communication shall be undertaken.
- **Communication Level 1** – Letter to residents in vicinity by the Supervisor of the Tree Team.
- **Communication Level 2** – Send an email to **trccomms@tamworth.nsw.gov.au** with a reason why the tree is being pruned or removed and a scheduled removal date for the works. Communications will determine whether the media is notified of the works.
- **Communication Levels 3** – To be completed and signed by the Horticulture & Arboriculture Specialist or the Manager Sports & Recreation. An email shall be sent to the Manager Sports & Recreation regarding the works including the reason and scheduled removal date. The Manager Sports & Recreation shall then forward the email to the Director and the Councillor's.
- This completed form shall be attached to the CRM.

Communication flowchart



Section 9: Tree Risk Management

This manual seeks to emphasise that councils must be aware of their actual responsibility concerning the management of Trees and Tree Roots. Some of these responsibilities are written in relevant legislation such as the Local Government Act 1993 and the Environmental Planning Act 1979, Trees (Disputes between Neighbours) Act 2006 and their corresponding Regulations.

The Tree Risk Management Plan sets out how Council will identify, assess and manage risk in relation to street and park trees. This plan follows the guidance outlined in Statewide Mutual Best Practice Manual Trees and Tree Roots recognising the importance of managing risks associated with urban forests.

Interactions between trees and the built environment are complex and not well understood. These potential interactions must be given consideration when designing for new construction as well as new trees and when developing strategies to manage and maintain existing trees.

Urban forests are recognised as significant community assets worthy of retention, protection and expansion. The enormous benefits that accrue from urban forests are only achieved when the density of the tree canopy is appropriate and when each individual tree is properly selected and maintained.

The management of the urban forest should aim for sustainability, built in resilience and intergenerational equity.

9.1 Basic Risk Management Definitions

Risk	Effect of uncertainty on objectives
Hazard	Anything with potential to harm health, life or property
Risk management	Coordinated activities to direct and control with regard to risk
Risk assessment	The overall process for risk identification, risk analysis and risk evaluation

In determining risk, the following matters should be taken into consideration:

- The magnitude of the risk,
- The degree of probability of its occurrence,
- The expense, difficulty and inconvenience of taking alleviating action, and
- Any other conflicting responsibilities.

It is essential to know the quantity and quality of the urban forest for which you are responsible. In order to understand Councils tree assets, Council proposes to inspect and document the characteristics and hazards associated with trees in the urban forest based on the likelihood of an incident occurring. This is based on the pedestrian traffic assessed where trees grow.

This is the common means of gathering information relevant to determining your level of risk and priority for tree management. The tree survey forms the basis for establishment of an urban street tree management plan.

All documentation relating to inspections of trees will be kept within council's electronic document management system (State Records Act 1998).

Table 1. outlines the inspection regime to gather initial information relating to tree assets and their risk levels.

Table 1. Inspection Regime

Category	Inspection time frame
• Schools, preschools and hospital areas • CBD / shopping areas • Regional and district parks	1 Year
• Cemeteries • Local parks	2 Years
• Neighbourhood parks	3 Years

Once the initial inspection information has been collected a schedule for an inspection programme will be developed for these trees, and the starting date of these scheduled inspections.

Table 2. shows the intervals between inspections for trees relating to their risk rating level.

Table 2. Risk Level Inspection Time Frames

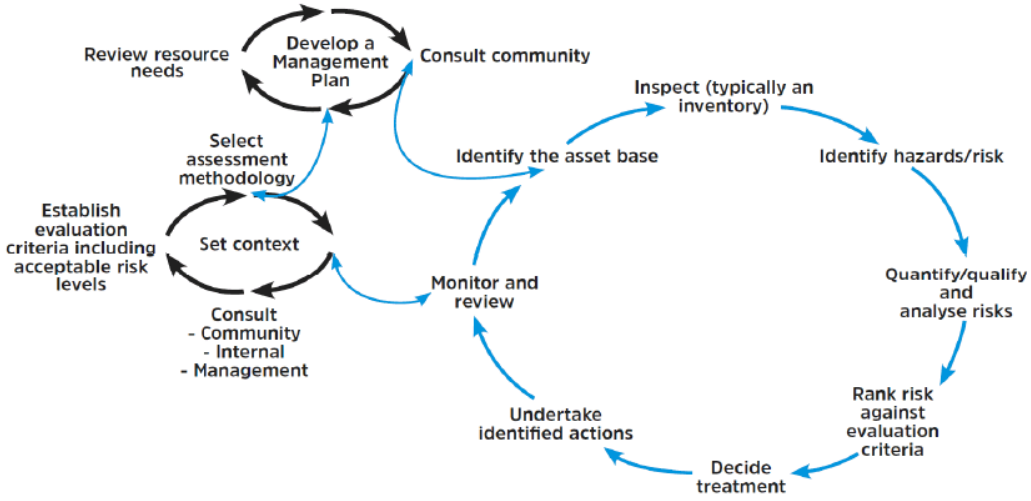
Risk level	Inspection time frame
• Low	24 months
• Medium	12 months
• High	6 months
• Extreme	1 month

Tree fallen over after storm, Oxley Vale

9.2 Implementing Councils Risk Management Strategy for Existing Trees

Council proposes to systematically assess each tree under Councils control in order to determine an appropriate risk management strategy subject to available resources. Figure 1, shows the method for making such assessments. Due to limited resources, Council will focus attention on trees in areas of greatest potential risk e.g. schools, hospitals, central business districts, shopping precincts, major roads public open space and cemeteries.

Figure 1. Urban Tree Risk Management



Many aspects of this process require specialist arboriculture knowledge. Appendix C shows the Arboriculture Australia's Tree Hazard Assessment Qualification (TRAQ) checklist which council will use to assess trees. This is used in conjunction with Table 6 - Risk Management and Hazard Abatement Strategies.

The risk management strategies are those that appear in Table 7. These strategies have been generally adopted by the Australian amenity tree industry as remedies for risk reduction whilst preserving appropriate trees.

When assessing the financial risk of tree retention, Council must consider three matters:

- Damage to Council property - this information can be obtained from maintenance records, replacement costs and the like held by Council;
- Damage to third party property - this includes damage to fences, paths and driveways, services, motor vehicles and homes; and
- Injury to third party - slips, trips and falls as a result of damage attributed to trees and tree roots amount for about 30% of all claims received by Councils insurance Mutual (approximate). Council must be confident that its action in planting the tree does not increase its exposure.

9.2.1 Tree Inspection

In assessing a tree, it is necessary for an appropriately skilled and experienced person to systematically inspect the tree(s). A Tree Risk Assessment should be kept of the inspection.

Tree Risk Assessments shall be conducted by a suitably qualified arborist and Council will have staff trained in the Tree Risk Assessment Qualification (TRAQ) through Arboriculture Australia. Table 3 provides the minimum AQF level for the different inspection levels.

Table 3: Inspection Levels and AQF Levels

Inspection Type	Minimum AQF Level
Level 1 – Visual Assessment	**3**
Level 2 – Basic Assessment	**5**
Level 3 – Advanced Assessment	**5**

The Tree Risk Assessment should be used as a guide only; additional information may be required to make a reasonable assessment. It may be necessary for an above and/or underground inspection to be performed to gain a complete picture of a tree's health and risk. Accessing the tree must comply with the New South Wales WorkCover Code of Practice for the Amenity Tree Industry along with the Australian Standard AS4970-2009 Protecting Trees on Development Sites.

- A Level 1 Visual Assessment is an evaluation of trees either from a vehicle or walking down a path / street. Limited detail is recorded during this type of inspection.
- A Level 2 Basic Assessment is an evaluation of a tree using probes, mallet or binoculars to inspect a trees structure or health. A form (Appendix C) is usually completed for each tree.
- A Level 3 Advanced Assessment is an evaluation of a tree using climbing /EWP and includes investigation of the root system using of resistance drilling or the use of compressed air tools. A detailed written report of the tree including photos and test results including mitigation, maintenance or removal recommendations.

9.2.2 Risk Assessment

A Tree Risk Assessment, Appendix C is a systematic process for determining the potential for a tree or one of its parts, to fail and in so doing, injure people or damage property. Since trees are living, dynamic (i.e. constantly growing) organisms they do have the potential to cause damage or injury if a mechanical failure occurs.

The degree of risk or hazard will vary with the size of the tree, type and location of defect, tree species and the nature of the target.

Tree hazard assessment involves three components:

- A tree with the potential to fail or cause injury;
- An environment that may contribute to that failure or injury; and
- A person or asset that would be injured or damaged (i.e. the target).

Each of these components and their interactions must be considered. Tree Risk assessments are categorised in 3 levels and must be carried out by appropriately trained and experienced arborists with a minimum of an AQF Level 3 for Level 1 inspections and AQF level 5 or higher for Level 2 and 3 inspections. It must be understood that assessing whether or not to keep a tree which is dangerous is largely dependent on context.

9.2.3 Tree Risk Matrix

The risk rating for trees is a calculation of the likelihood of a failure and the impact in relation to the consequence. Table 4 details an industry accepted risk rating matrix.

Table 4: Risk Rating Matrix

Likelihood of failure & impact	Consequences of failure			
	Negligible	**Minor**	**Significant**	**Severe**
Very likely	Low	Moderate	High	Very High
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Once a risk rating has been calculated an intervention level can be established. Table 5, details the intervention timeframes which Council intends to use to remediate the risk. Intervention timeframes will be followed in line with Councils resources.

Table 5: Intervention Timeframes

Risk rating	Time frame
Low	Within 4 months
Moderate	1 month
High	14 days
Very High	7 days

9.2.4 Hazard Abatement

Once a basic risk assessment has been performed, the appropriate risk management strategy should be determined. Table 6 lists risk management options for existing trees. These options should be reviewed in consultation with the inspecting arborist.

Table 6. Risk Management for Existing Trees

Strategy	Description
Monitor trip points	Where no other practical method can be employed to prevent this occurring, a regular trip point inspection program should be instigated and pavement replaced or repaired as necessary or the implementation of a no-go zone through fencing.
Flexible pathways	Use of flexible material such as bitumen, paving, or rubber compounds for footpaths and tree surrounds, will reduce the occurrence of trip points and may be less expensive and easier than concrete to maintain or replace when necessary.
Re-direct pathways	Where space allows, pathways should be re-directed away from trees/tree roots. It may also be beneficial to reduce the newly directed pathway width.
Bridging Footpaths	Self-supporting construction methods, such as pier and beam could be used to raise pathways above the roots, allowing for root expansion without damaging the pavement. Timber bridges are an effective option
Root pruning	Non-structural roots could be pruned on a predetermined basis under the guidance of a qualified arborist (AQF Level 5). This practice could be combined with installation of root barriers where appropriate.
Root barriers	In some circumstances root barriers may be useful in deflecting roots away from pavement or services.
Tree Root System Protection	The use of AS4970-2009 - Tree Root Protection on Construction Sites using the Tree Protection Zones and Structural Root Zones are an effective method to preserve trees which could be impacted through construction.
Directional or Horizontal boring for services	Directional boring rather than open trenching for underground services will greatly reduce public risk as well reducing injury to tree roots. If located deeply, root contact with the pipeline may be minimised as the majority of roots of most species will remain within the top 1 metre of soil (based on a soil with medium texture).
PVC welded piping	Replacement of old porous clay pipe mains with PVC or polyurethane mainlines will significantly reduce the potential for tree root entry.
Preventative tree maintenance	Trees in public areas should be regularly inspected and maintenance, such as dead-wooding and developmental pruning carried out as prescribed. Pruning should always be specified and undertaken in accordance with AS4373-2007 - Pruning of Amenity Trees by an AQF Level 3 or higher.
Raising pathways	Where appropriate, pathways could be raised to reduce direct root pressure on the pavement. Care must be taken not to build up soil against the trunk of a tree. Aeration piping, in conjunction with geo-textile fabric and gravel should be installed between root zone and new pavement to aid with gas exchange to roots. Care should be taken to shape the new surface to drain water away from the trunk of the tree.

Strategy	Description
Insulated (ABC) cabling	Replacement of uninsulated overhead power lines with insulated & bundled cables will reduce both the clearance needed and the pruning costs and severity.
Underground power & Communications cables	The initially high cost of installing power underground may in fact be a practical option when compared with the projected cost of repeated pruning, the risk that this work involves to operators, the negative impact on trees, loss of public amenity and of urban forest economic contributions.
Diverting services	Services could be diverted along roadways, rather than in the nature strip where a valuable stand of trees is present. To make this option more attractive to service providers, Councils may wish to consider waiving road opening fees.
Diverting kerb/gutter	When possible, kerb/gutter could be diverted around tree roots or further away from the trunk, creating an island around the tree.
Enlarging root zone	Where space allows, a designated area above the root zone of the tree should be enlarged/created to accommodate surface roots. Rather than turf, this area could be formed into a garden bed, mulched or covered with a suitable tree grate.
Formative pruning	Early pruning will reduce the development of structural weaknesses in older trees. Refer to AS4373-2007 *Pruning of Amenity Trees.*
Remove target	In some situations, it is preferable to remove a potential target, such as a seat rather than to remove a tree in order to abate a hazard.
Remove the defect	This could include pruning of live or dead branches, roots or the removal of co-dominant stems.
Tree engineering	In some cases, cabling may be used to support tree structure or to control the direction of a possible failure. This is highly specialised work.
Tree removal	In some situations, it may be preferable to remove a tree and replace with a more suitable species, perhaps in an alternative location. In all cases of tree removal, it is necessary to ensure that the removal is mitigated in order to ensure the future integrity of the urban forest.

9.2.5 Risk Management Control Strategies for New Tree Planting

Table 7, provides a range of risk management controls that may be implemented to ensure new tree plantings are compatible with the site and circumstances. These strategies can reduce the negative interaction between trees and infrastructure.

Table 7. Risk Management for New Trees

Control Strategy	Description
Root barriers	Installation of root barriers to manufacturer's specification at the time of planting may assist tree roots to develop away from services, pavements and other structures. NOTE OF CAUTION Root barriers are not applicable for all circumstances due to: • Tree root barriers do require periodic monitoring as roots deflected downwards will return to the surface if soil oxygen levels are not sufficient to support growth at depth. • Roots can also grow over or around the barrier in some situations. • The barriers may prevent trees from establishing a stabilising root system.
Soil compaction	Proper compaction of the soil when back filling trenches or around utility easements and house footings will direct tree roots away from these areas. By achieving and maintaining compaction to 95% root growth can be inhibited through the depravation of oxygen.
Pseudo street trees	Residents could be encouraged to plant trees within their boundaries in preference to street tree planting. This might allow larger species to be used, and reduce pressure on pavements and services.
Provision of aeration and irrigation	Where there is to be continuous paving around a tree, the installation of an aeration and irrigation system is essential. Where irrigation is installed and properly operating, a tree root system will be proportionally smaller than without irrigation.
Design of new roads and pathways	The design of new roads and footpaths should be undertaken with consideration for tree planting on the nature strip or in the road pavement to ensure appropriate allocation of space.
Pavement Openings	Pavement openings at the base of the tree should be as large as possible to reduce the future impact of buttressing roots on pavements. Position of the tree should be a good distance (e.g. 1 m) from the kerb line to reduce the likelihood of future cracking.
Root Vaults	In high value precincts (e.g. heritage, retail, and the like) the use of load bearing sub grade vault systems will provide root volume for the selected species at maturity. Examples include the use of structural soil, plastic cell systems and concrete beam structures that allow a trafficable hard surface without compromising tree root development. The cost of vault systems should be seen as a long term investment in tree growth and the avoidance of negative costly tree root interactions. Partial vault systems may be used at a lesser cost whilst still reducing the risk of interaction within the primary zone of influence around the tree.

9.3 Tree Roots and Infrastructure

A trees growth is strongly influenced by below-ground conditions. Tree root growth is opportunistic and will proliferate wherever moisture, aeration, nutrition and soil structure are favourable. Tree root growth in the urban environment is highly modified and is not governed by property boundaries.

There are a number of common conflicts with tree roots in the built environment.

9.3.1 Direct Damage

Direct damage is the distortion of built structures as the growing tree root exerts pressure. Direct damage by tree roots is usually limited to light-built structures such as pavements and low walls and can also be witnessed in buildings of sub-standard footings.

9.3.2 Indirect Damage

Indirect damage is the distortion of built structures as the growing tree root takes up soil moisture. Often there are multiple factors contributing to foundation movement and are seldom associated with tree root growth alone. For this reason, claims of indirect tree root damage must be accurately investigated.

Leaking pipes (as a result of poor construction, old earthenware, cracked and faulty joints and degradation) can create a moisture gradient that encourages tree root growth in the direction of the pipe.

The property owner is responsible for the maintenance, repair and replacement from the legal point of discharge, usually near the property boundary kerb. Council should always be given the opportunity to inspect the pipes and offending tree roots prior to the property owner undertaking repair works.

Council will seek to resolve tree root conflicts in the following manner:

- All claims of direct tree root damage from public trees will be investigated;
- Council will seek practical solutions to reduce the risk of damage to infrastructure from public trees;
- Tree removal will only be considered if no practical or cost effective arboriculturally sound solution can be found;
- Every effort will be taken to ensure that replacement and future public trees will not themselves result in similar damage to structures;
- Claims of indirect tree root damage to structures will be investigated if a geotechnical or structural engineering report implicates tree root damage;
- Should tree root growth cause foundation movement the Council will seek a viable arboriculturally sound solution to rectify the situation and to retain the public tree; and
- The removal of public trees for indirect property damage will only be considered if a geotechnical or structural engineer's report attributes the damage to tree root growth and if no practical alternative arboriculture solution can be obtained. Potential for soil heave as a result of tree removal must also be considered.

Claims of property damage from tree roots must comply with Council guidelines for submitting a claim. The Council will not remove public trees for unjustified claims of pipe or sewer damage from tree root activity.

9.4 Interactions between trees and structures

Interactions between trees and structures are complex and there are likely to be other factors contributing to any given situation. It is therefore not beneficial to focus concern entirely onto a tree or tree species when developing a tree risk management strategy.

Factors that commonly contribute to negative interactions between trees and structures include:

- The soil type; its structure and depth;
- The tree species and its genetic disposition;
- The design of the structure;
- The construction materials and methods adopted;
- The age of the structure (as with trees, structures have a 'useful life span' and have to be maintained and then replaced within a set timeframe); and
- The type of previous land use e.g. industrial sites where soil contamination and/or layers of fill can impede normal biological processes.

Typical interactions leading to conflict involve trees and power lines (e.g. causing fires and loss of power) trees and poles, trees and footpaths (e.g. tripping points), trees and pipes, repair of footpaths and trees, installation of underground services near trees.

Tree root damaging stormwater drain

Appendix A – Recommended Street Tree Species List

The Tamworth Region has a unique harsh climatic variation that makes tree establishment extremely challenging. With a range of -4 to 44 degrees Celsius our tree selection has to be hardy to thrive in these conditions. The following lists provided a broad selection of native and exotic trees that once established, can tolerate these variations. Greening success is not only dependent on species selection but also correct planting timing. It is also proven that healthier, robust trees are a result of planting smaller stock, which as young trees are more adaptable and likely to thrive. Tubestock is commonly used with native trees to attain superior results. Native species are best planted in Autumn or Spring, depending on the frost tolerance of the respective species. Deciduous trees come either bare rooted or potted up. The best time to plant bare rooted stock in our region is in July, while potted deciduous trees are best planted in Autumn. If the above considerations are followed, along with the correct tree selection, you give your tree the absolute best start and opportunity to be a beautiful long term asset in our hot summers and cold winters.

Common Name/s	Genus	Species	Variety	Tree Size	Growth Rate	Frost Rating	Type	Habit / Form	Powerlines	Origin	Signature Tree	Major Avenue	Local Streets	Planting Time
Bottlebrush	Callistemon	sp		Small	Medium	Hardy	Evergreen	CN	Yes	Native			Yes	Spring, Autumn
Coral Gum	Eucalyptus	torquata		Small	Medium	Moderate, Tender when Young	Evergreen	CR	Yes	Native			Yes	Spring
Crepe Mrytle	Lagerstoemia	indica		Small	Medium	Deciduous	Deciduous	CU	Yes	Exotic			Yes	Autumn, July
Euky Dwarf	Eucalyptus	leucoxylon	Euky Dwarf	Small	Medium	Hardy	Evergreen	RS	Yes	Native		Yes	Yes	Spring, Autumn
Flowering Plum	Prunus	cerasifera	Nigra	Small	Fast	Deciduous	Deciduous	CU	Yes	Exotic			Yes	Autumn, July
Melaleuca	Melaleuca	sp		Small	Fast	Hardy	Evergreen	CU	Yes	Native			Yes	Spring, Autumn
Australian Willow	Geijera	parviflora		Medium	Slow	Light	Evergreen	CR	No	Local Native			Yes	Autumn
Carob Tree	Ceratonia	siliqua		Medium	Medium	Hardy	Evergreen	CS	No	Exotic		Yes	Yes	Spring, Autumn
Chinese Pistache	Pistacia	chinensis		Medium	Medium	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Autumn, July
Chinese Tallow Tree	Triadica	sebifera		Medium	Fast	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Autumn, July
Flowering Ash	Fraxinus	ornus		Medium	Medium	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Spring
Golden Rain Tree	Koelreuteria	paniculata		Medium	Fast	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Autumn, July
Holly Oak	Quercus	ilex		Medium	Medium	Hardy	Evergreen	CR	No	Exotic	Yes			Spring
Manchurian Pear	Pyrus	ussuriensis		Medium	Medium	Deciduous	Deciduous	CN	No	Exotic		Yes	Yes	Autumn, July
Ornamental Pear	Pyrus	sp		Medium	Medium	Deciduous	Deciduous	CN	No	Exotic		Yes	Yes	Autumn, July
Queensland Bottle Tree	Brachychiton	rupestris		Medium	Slow	Hardy, Tender when Young	Evergreen	CR	No	Native	Yes	Yes		Spring
Velvet Ash	Fraxinus	velutina		Medium	Fast	Deciduous	Deciduous	NC	Yes	Exotic		Yes	Yes	Autumn, July
Weeping Myall	Acacia	pendula		Medium	Medium	Hardy	Evergreen	CU	No	Local Native			Yes	Spring, Autumn
Bimble Box	Eucalyptus	populnea		Large	Fast	Hardy	Evergreen	OS	No	Native		Yes		Spring, Autumn
Blakely's Red Gum	Eucalyptus	blakelyi		Large	Fast	Hardy	Evergreen	OS	No	Local Native	Yes	Yes		Spring, Autumn
Bradford Pear	Pyrus	calleryana	Bradford	Large	Medium	Deciduous	Deciduous	CN	No	Exotic		Yes	Yes	Autumn, July
Cadaghi	Corymbia	torelliana		Large	Fast	Moderate, Tender when Young	Evergreen	CS	No	Native		Yes		Spring
Chinchilla White Gum	Eucalyptus	argophloia		Large	Fast	Hardy	Evergreen	OS	No	Native		Yes	Yes	Spring, Autumn
Chinese Elm	Ulmus	parvifolia		Large	Fast	Semi-Deciduous	Semi-Deciduous	OS	No	Exotic		Yes	Yes	Autumn
Desert Ash	Fraxinus	augustifolia		Large	Medium	Deciduous	Deciduous	CS	No	Exotic		Yes	Yes	Spring
Grey Box	Eucalyptus	moluccana		Large	Fast	Moderate	Evergreen	OS	No	Native	Yes	Yes		Spring, Autumn
Jacaranda	Jacaranda	mimosifolia		Large	Medium	Deciduous, Tender when Young	Deciduous	OS	No	Exotic		Yes	Yes	Spring
Kurrajong Tree	Brachychiton	populneus		Large	Slow	Very Hardy, Tender when Young	Evergreen	CR	No	Local Native		Yes	Yes	Spring
Mugga Ironbark	Eucalyptus	sideroxylon		Large	Fast	Hardy	Evergreen	OS	No	Local Native		Yes		Spring, Autumn
Narrow Leaf Iron Bark	Eucalyptus	crebra		Large	Fast	Hardy	Evergreen	OS	No	Local Native	Yes	Yes		Spring, Autumn
Pin Oak	Quercus	palustris		Large	Slow	Deciduous	Deciduous	OR	No	Exotic	Yes	Yes		Autumn, July
Silky Oak	Grevillea	robusta		Large	Medium	Tender when young	Evergreen	ON	No	Native	Yes	Yes	Yes	Spring
Spotted Gum	Corymbia	maculata		Large	Slow	Moderate, Tender when Young	Evergreen	OS	No	Native	Yes	Yes		Spring
White Box	Eucalyptus	albens		Large	Fast	Hardy	Evergreen	OS	No	Local Native				Spring, Autumn
Yellow Box	Eucalyptus	melliodora		Large	Fast	Hardy	Evergreen	OS	No	Local Native				Spring, Autumn

Habit/Form	
C	Compact/dense foilage
O	Open crown/canopy
U	Upright
R	Rounded
S	Spreading
N	Narrow/columnar or pyramidal

Tree size	
Small	<7m
Medium	7-15m
Large	>15m

Appendix B – Feature Tree Park List

Common Name/s	Genus	Species	Variety	Tree Size	Growth Rate	Frost Rating	Type	Habit/Form	Powerlines	Origin	Signature Tree	Major Avenue	Local Streets	Planting Time
Red Maple	Acer	rubrum	Varieties	Small	Slow	Deciduous	Deciduous	CU	Yes	Exotic		Yes	Yes	Spring
Red Flowering Gum	Corymbia	ficifolia		Small	Medium	Moderate	Evergreen	CR	Yes	Native			Yes	
Euky Dwarf	Eucalyptus	leucoxylon	Euky Dwarf	Small	Medium	Hardy	Evergreen	RS	Yes	Native		Yes	Yes	
Coral Gum	Eucalyptus	torquata		Small	Medium	Moderate, Tender when Young	Evergreen	CR	Yes	Native			Yes	
Crepe Mrytle	Lagerstoemia	indica		Small	Medium	Deciduous	Deciduous	CU	Yes	Exotic			Yes	Autumn, July
Flowering Plum	Prunus	cerasifera	Nigra	Small	Fast	Deciduous	Deciduous	CU	Yes	Exotic			Yes	Autumn, July
Queensland Bottle Tree	Brachychiton	rupestris		Medium	Slow	Hardy, Tender when Young	Evergreen	CR	No	Native	Yes	Yes		Spring
Cape Chestnut	Calodendrum	capense		Medium	slow	Tender when young	Evergreen	CR	Yes	Exotic		Yes		Spring
Australian Willow	Geijera	parviflora		Medium	Slow	Light	Evergreen	CR	No	Local Native			Yes	
Plum Pine	Podocarpus	elatus		Medium	Slow	Tender when young	Evergreen	CN	No	Exotic		Yes	Yes	Spring
Mulga	Acacia	aneura		Medium	Medium	Hardy	Evergreen	U	Yes	Native			Yes	Spring, Autumn
Weeping Myall	Acacia	pendula		Medium	Medium	Hardy	Evergreen	CU	No	Local Native			Yes	Spring, Autumn
Bottlebrush	Callistemon	sp		Medium	Medium	Hardy	Evergreen	CN	Yes	Native			Yes	Spring, Autumn
Carob Tree	Ceratonia	siliqua		Medium	Medium	Hardy	Evergreen	CS	No	Exotic		Yes	Yes	Spring, Autumn
Flowering Ash	Fraxinus	ornus		Medium	Medium	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Spring
Magnolia Little Gem	Magnolia	grandiflora	Little Gem	Medium	Medium	Hardy	Evergreen	CU	Yes	Exotic		Yes	Yes	Spring, Autumn
Chinese Pistache	Pistacia	chinensis		Medium	Medium	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Autumn, July
Butterbush	Pittosporum	angustifolium		Medium	Medium	Hardy	Evergreen	CU	Yes	Local Native			Yes	Spring, Autumn
Wild Lemon	Psydrax	odorata		Medium	Medium	Hardy	Evergreen	CU	Yes	Native			Yes	Spring, Autumn
Ornamental Pear	Pyrus	sp		Medium	Medium	Deciduous	Deciduous	CN	No	Exotic		Yes	Yes	Autumn, July
Manchurian Pear	Pyrus	ussuriensis		Medium	Medium	Deciduous	Deciduous	CN	No	Exotic		Yes	Yes	Autumn, July
Holly Oak	Quercus	ilex		Medium	Medium	Hardy	Evergreen	CR	No	Exotic	Yes			Spring
Tuckeroo	Cupaniopsis	anacardioides		Medium	Fast	Hardy	Evergreen	CR	Yes	Native			Yes	Spring, Autumn
Silver Princess	Eucalyptus	caesia		Medium	Fast	Moderate	Evergreen	OS	Yes	Native			Yes	Spring
Velvet Ash	Fraxinus	velutina		Medium	Fast	Deciduous	Deciduous	NC	Yes	Exotic		Yes	Yes	Autumn, July
Golden Rain Tree	Koelreuteria	paniculata		Medium	Fast	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Autumn, July
Chinese Tallow Tree	Triadica	sebifera		Medium	Fast	Deciduous	Deciduous	CR	Yes	Exotic		Yes	Yes	Autumn, July
Kurrajong Tree	Brachychiton	populneus		Large	Slow	Very Hardy, Tender when Young	Evergreen	CR	No	Local Native		Yes	Yes	Spring
She-Oak	Casuarina	cunninghamiana		Large	Slow	Hardy	Evergreen	OU	No	Local Native		Yes	Yes	Spring, Autumn
Spotted Gum	Corymbia	maculata		Large	Slow	Moderate, Tender when Young	Evergreen	OS	No	Native	Yes	Yes		Spring
Pin Oak	Quercus	palustris		Large	Slow	Deciduous	Deciduous	OR	No	Exotic	Yes	Yes		Autumn, July
Illawarra Flame Tree	Brachychiton	acerifolius		Large	Medium	Moderate	Evergreen	UN	No	Native	Yes	Yes		Spring
Belah	Casuarina	cristata		Large	Medium	Hardy	Evergreen	OU	No	Local Native			Yes	Spring, Autumn
Desert Ash	Fraxinus	augustifolia		Large	Medium	Deciduous	Deciduous	CS	No	Exotic		Yes	Yes	Spring
Claret Ash	Fraxinus	augustifolia	Raywood	Large	Medium	Deciduous	Deciduous	CR	No	Exotic		Yes	Yes	Spring
Evergreen Ash	Fraxinus	griffithii		Large	Medium	Tender when young	Evergreen	CR	Yes	Exotic		Yes	Yes	Spring
Green Ash	Fraxinus	pennsylvanica		Large	Medium	Deciduous	Deciduous	CU	Yes	Exotic		Yes	Yes	Spring
Silky Oak	Grevillea	robusta		Large	Medium	Tender when young	Evergreen	ON	No	Native	Yes	Yes	Yes	Spring
Native Frangipani	Hymenosporum	flavum		Large	Medium	Tender when young	Evergreen	OU	Yes	Native			Yes	Spring
Jacaranda	Jacaranda	mimosifolia		Large	Medium	Deciduous, Tender when Young	Deciduous	OS	No	Exotic		Yes	Yes	Spring
Liquidamber	Liquidamber	styraciflua		Large	Medium	Deciduous	Deciduous	ON	No	Exotic		Yes	Yes	Spring
London Plane Tree	Platanus	xacerifolia		Large	Medium	Deciduous	Deciduous	OS	No	Exotic	Yes			Spring
Bradford Pear	Pyrus	calleryana	Bradford	Large	Medium	Deciduous	Deciduous	CN	No	Exotic		Yes	Yes	Autumn, July
English Oak	Quercus	robur		Large	Medium	Deciduous	Deciduous	OS	No	Exotic	Yes	Yes		Spring
Cadaghi	Corymbia	torelliana		Large	Fast	Moderate, Tender when Young	Evergreen	CS	No	Native		Yes		Spring
White Box	Eucalyptus	albens		Large	Fast	Hardy	Evergreen	OS	No	Local Native				Spring, Autumn
Chinchilla White Gum	Eucalyptus	argophloia		Large	Fast	Hardy	Evergreen	OS	No	Native		Yes	Yes	Spring, Autumn

Common Name/s	Genus	Species	Variety	Tree Size	Growth Rate	Frost Rating	Type	Habit/Form	Powerlines	Origin	Signature Tree	Major Avenue	Local Streets	Planting Time
Blakely's Red Gum	Eucalyptus	blakelyi		Large	Fast	Hardy	Evergreen	OS	No	Local Native	Yes	Yes		Spring, Autumn
Narrow Leaf Iron Bark	Eucalyptus	crebra		Large	Fast	Hardy	Evergreen	OS	No	Local Native	Yes	Yes		Spring, Autumn
Yellow Box	Eucalyptus	melliodora		Large	Fast	Hardy	Evergreen	OS	No	Local Native				Spring, Autumn
Grey Box	Eucalyptus	moluccana		Large	Fast	Moderate	Evergreen	OS	No	Native	Yes	Yes		Spring
Bimble Box	Eucalyptus	populnea		Large	Fast	Hardy	Evergreen	OS	No	Native		Yes		Spring, Autumn
Mugga Ironbark	Eucalyptus	sideroxylon		Large	Fast	Hardy	Evergreen	OS	No	Local Native		Yes		Spring, Autumn
Chinese Elm	Ulmus	parvifolia		Large	Fast	Semi-Deciduous	Semi-Deciduous	OS	No	Exotic		Yes	Yes	Autumn
Melaleuca	Melaleuca	sp			Fast	Hardy	Evergreen	CU	Yes	Native			Yes	

Habit/Form	
C	Compact/dense foliage
O	Open crown/canopy
U	Upright
R	Rounded
S	Spreading
N	Narrow/columnar or pyramidal

Tree size	
Small	<7m
Medium	7-15m
Large	>15m

Appendix C – Tree Risk Assessment Form

Please see the following page.

ISA Basic Tree Risk Assessment Form

Client _____ Date _____ Time _____
Address/Tree location _____ Tree no. _____ Sheet _____ of _____
Tree species _____ dbh _____ Height _____ Crown spread dia. _____
Assessor(s) _____ Tools used _____ **Time frame** _____

Target Assessment

Target number	Target description	Target protection	Target zone: Target within drip line	Target zone: Target within 1x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1 – rare, 2 – occasional, 3 – frequent, 4 – constant)	Practical to move target?	Restriction practical?
1								
2								
3								
4								

Site Factors

History of failures _____ **Topography** Flat ☐ Slope ☐ _____% **Aspect** _____
Site changes None ☐ Grade change ☐ Site clearing ☐ Changed soil hydrology ☐ Root cuts ☐ Describe _____
Soil conditions Limited volume ☐ Saturated ☐ Shallow ☐ Compacted ☐ Pavement over roots ☐ _____% Describe _____
Prevailing wind direction _____ **Common weather** Strong winds ☐ Ice ☐ Snow ☐ Heavy rain ☐ Describe _____

Tree Health and Species Profile

Vigor Low ☐ Normal ☐ High ☐ **Foliage** None (seasonal) ☐ None (dead) ☐ Normal _____% Chlorotic _____% Necrotic _____%
Pests/Biotic _____ **Abiotic** _____
Species failure profile Branches ☐ Trunk ☐ Roots ☐ Describe _____

Load Factors

Wind exposure Protected ☐ Partial ☐ Full ☐ Wind funneling ☐ _____ **Relative crown size** Small ☐ Medium ☐ Large ☐
Crown density Sparse ☐ Normal ☐ Dense ☐ **Interior branches** Few ☐ Normal ☐ Dense ☐ **Vines/Mistletoe/Moss** ☐ _____
Recent or expected change in load factors _____

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown ☐ LCR _____%
Dead twigs/branches ☐ _____% overall Max. dia. _____
Broken/Hangers Number _____ Max. dia. _____
Over-extended branches ☐
Pruning history
Crown cleaned ☐ Thinned ☐ Raised ☐
Reduced ☐ Topped ☐ Lion-tailed ☐
Flush cuts ☐ Other _____

Cracks ☐ _____ Lightning damage ☐
Codominant ☐ _____ Included bark ☐
Weak attachments ☐ _____ Cavity/Nest hole ___% circ.
Previous branch failures ☐ _____ Similar branches present ☐
Dead/Missing bark ☐ Cankers/Galls/Burls ☐ Sapwood damage/decay ☐
Conks ☐ Heartwood decay ☐ _____
Response growth _____

_____ Condition(s) of concern _____

Part Size _____ Fall Distance _____
Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐
Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

Part Size _____ Fall Distance _____
Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐
Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

— Trunk —

Dead/Missing bark ☐ Abnormal bark texture/color ☐
Codominant stems ☐ Included bark ☐ Cracks ☐
Sapwood damage/decay ☐ Cankers/Galls/Burls ☐ Sap ooze ☐
Lightning damage ☐ Heartwood decay ☐ Conks/Mushrooms ☐
Cavity/Nest hole _____% circ. Depth _____ Poor taper ☐
Lean _____° Corrected? _____
Response growth _____
Condition(s) of concern _____
Part Size _____ Fall Distance _____
Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐
Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

— Roots and Root Collar —

Collar buried/Not visible ☐ Depth _____ Stem girdling ☐
Dead ☐ Decay ☐ Conks/Mushrooms ☐
Ooze ☐ Cavity ☐ _____% circ.
Cracks ☐ Cut/Damaged roots ☐ Distance from trunk _____
Root plate lifting ☐ Soil weakness ☐
Response growth _____
Condition(s) of concern _____
Part Size _____ Fall Distance _____
Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐
Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

v

Risk Categorization

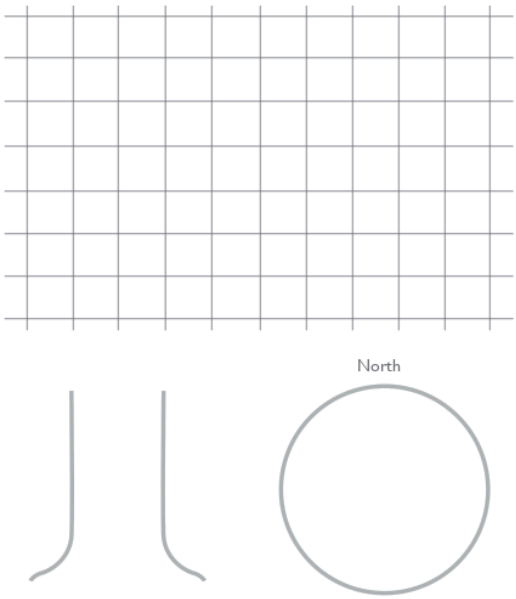
Target *(Target number or description)*	Tree part	Condition(s) of concern	Likelihood												Consequences				Risk rating *(from Matrix 2)*
			Failure				Impact				Failure & Impact *(from Matrix 1)*								
			Improbable	Possible	Probable	Imminent	Very low	Low	Medium	High	Unlikely	Somewhat	Likely	Very likely	Negligible	Minor	Significant	Severe	

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impact			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low



Notes, explanations, descriptions

_____
_____
_____
_____
_____

Mitigation options

1. _____ **Residual risk** _____
2. _____ **Residual risk** _____
3. _____ **Residual risk** _____
4. _____ **Residual risk** _____

Overall tree risk rating Low ☐ Moderate ☐ High ☐ Extreme ☐

Overall residual risk None ☐ Low ☐ Moderate ☐ High ☐ Extreme ☐ **Recommended inspection interval** _____

Data ☐Final ☐Preliminary **Advanced assessment needed** ☐No ☐Yes-Type/Reason _____

Inspection limitations ☐None ☐Visibility ☐Access ☐Vines ☐Root collar buried Describe _____

This datasheet was produced by the International Society of Arboriculture (ISA) — 2017

Appendix D - Tree Pruning and Removal Communication Form

Address	
Resident Name	
Contact Phone Number	
CRM Number	

Tree Location

Local / Rural Road	Communication 1	Yes	No
Main Road / Highway	Communication 1,2	Yes	No
Local / Neighbour Park	Communication 1,2	Yes	No
Regional / District Park	Communication 2,3	Yes	No

Type of Tree

Street Shrub (less than 4m)	Communication 1	Yes	No
Street Tree (larger than 4m)	Communication 1,2	Yes	No
Park Tree (larger than 4m)	Communication 2,3	Yes	No
Significant Tree	Communication 1,2,3	Yes	No

Type of Work

Pruning of a Significant Tree	Communication 1,2,3	Yes	No
Removal of a Shrub	Communication 1	Yes	No
Removal of a Tree	Communication 1,2	Yes	No
Removal of a Significant Tree	Communication 1,2,3	Yes	No

Communication

1	Have the near by residents been notified?	Yes	No
2	Have you sent an email to Corporate Communications?	Yes	No
3	Have the Manager, Director and Councillors been advised via email?	Yes	No

Completed by (*circle below*)

Supervisor / Horticulture & Arboriculture Specialist

Name	**Date**

These works have been approved by (*circle below*)

Supervisor / Horticulture & Arboriculture Specialist / Manager Sports & Recreation

Name	**Date**

Works Completed

Name	**Date**

References

- AS 4373-2007 - Pruning Amenity Trees Pruning Types, Classes And Suitability
- AS4970-2009 - Tree Root Protection on Construction Sites
- Environment Act 1979
- State Archives and Records Authority GA39 Local Government Records
- Local Government Act 1993
- State Records Act 1998
- Civil Liability Act 2002
- Trees (Dispute between Neighbours) Act 2006

SMEC
Member of the Surbana Jurong Group

SMEC INTERNAL REF: 30013060

Tamworth Weir Feasibility Assessment

Reference No. 30013060
Prepared for Hunter H2O
28 June 2021

Document Control

Document	30013060 - Tamworth weir feasibility assessment-Final
File Location	\\filer.nasuni.local\smecanz\Projects\30013\30013060 - Tamworth weir feasibility assessment\100 Concept-Feasibility\07 Documents\03 Outgoing\ 30013060 - Tamworth weir feasibility assessment_02_Final_updated.doc
Project Name	Tamworth Weir Feasibility Assessment
Project Number	30013060
Revision Number	B

Revision History

Revision No.	Date	Prepared By	Reviewed By	Approved for Issue By
A	14/05/2021	Ian Varley, Gus Naghib, Stephen Anderson, Cara Jacques	Mathew Box Craig Wiltshire	Mathew Box
B	28/06/2021	Ian Varley, Gus Naghib	Mathew Box	Mathew Box

Issue Register

Distribution List	Date Issued	Number of Copies
Hunter H2O	28 June 2021	1

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Signature			

Document Control

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Hunter H2O and SMEC

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1 Introduction

Tamworth Regional Council are looking to improve the water security of Tamworth by providing a weir on the Peel River to capture stormwater and Peel River flows, as well as supporting recharge of local aquifers accessed by Council.

This report provides the results of a desktop study undertaken to assess the weir option, which addressed the following:

- The preferred weir location taking into account a range of actors (flooding impacts, aesthetics, storage volume, aquifer recharge).
- Fishway options
- Potential flooding impacts
- Environmental approvals
- High level cost estimate

2 Background

Tamworth is located in the north western region of NSW on the Peel River. It has a population of approximately 51,000 people and an annual water consumption of approximately 10,000 ML/year or 28.5 ML/day. The primary water source for Tamworth is Chaffey Dam, which is located on the Peel River approximately 35 km upstream and has a storage capacity of 100,000 ML, refer to Figure 1. Dungowan Dam, which is located approximately 40 km upstream on the Dungowan Creek, has a capacity of 6,300 ML and is a supplementary water source. A small portion of the town water supply is provided by Paradise Wells, which are located adjacent to the Peel River within the town, refer to Figure 2. These wells extract water from an alluvial aquifer associated with the Peel River. Design investigations to enlarge Dungowan Dam are currently underway. Tamworth Regional Council has high security licences to use 16,400 ML/year from Chaffey Dam and 5,600 ML/year from Dungowan Dam. The Water Sharing Plan for the Peel Regulated River Water Source controls access the water. It specifies the entitlements or licences held by different users, provides rules for the taking of water and includes provisions for environmental water.

The Peel River flows through the middle of town in a northerly direction. Cockburn River, which is a significant tributary joins the Peel River just upstream of Tamworth. Goonoo Goonoo Creek joins the Peel River at Tamworth from the west. Urban development encroaches close the eastern bank of the Peel River, but on the western floodplain of the Peel River and Goonoo Goonoo Creek, development is located 250-600 m away from the bank. The area between development and the west bank includes a racecourse but is mainly agricultural land. The area located between Goonoo Goonoo Creek and the Peel River is primarily agricultural land, but there is a pocket of development on high land, refer to Figure 2.

Three potential weir sites have been considered with the locations shown in Figure 2. Weir location 1 is adjacent to Kable Avenue upstream of the Goonoo Goonoo Creek junction. Weir location 2 is upstream of the Oxley Highway crossing, whilst Weir location 3 is adjacent to Darling Street. Weirs 2 and 3 are located downstream of the Goonoo Goonoo Creek junction. A long section of the Peel River channel is provided in Figure 3, which shows the location of each weir, whilst the location of the weirs is shown in relation to the bore field in

Figure 4[1]. The pond formed by each of the proposed weirs will enhance aquifer recharge.

Two basic configurations have been considered for the proposed weir, namely:

- Fixed Spillway: Concrete structure with a fixed concrete spillway
- Gated spillway: Concrete structure with gates

Either weir configuration would fit within the main channel of the Peel River with the maximum operating water level being below the top of banks, so that the lake formed by the weir would be entirely contained within the main channel. A gated structure has the advantage that the maximum operating level could be close to the top of bank, which would maximise the available storage. During flood events the gates could be opened to pass flow without creating a flooding impact. The spillway for the fixed spillway structure and corresponding maximum operating level would need to be some distance below the top of the banks to ensure that flood flows can pass without creating a flooding impact. Thus, the fixed spillway structure would have a lower storage volume. The gated structure will incur higher construction and operating costs.

[1] The bore field capture zone for the dry period (scenario 2) was taken from the Tamworth Groundwater Supply study (Jacobs, 2019) report.

Background

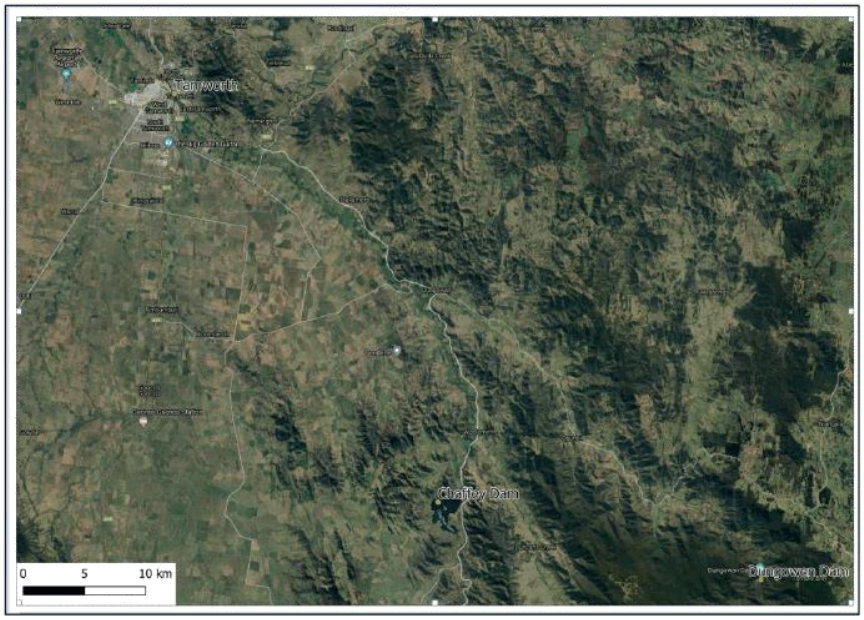

Figure 1: Locality Map

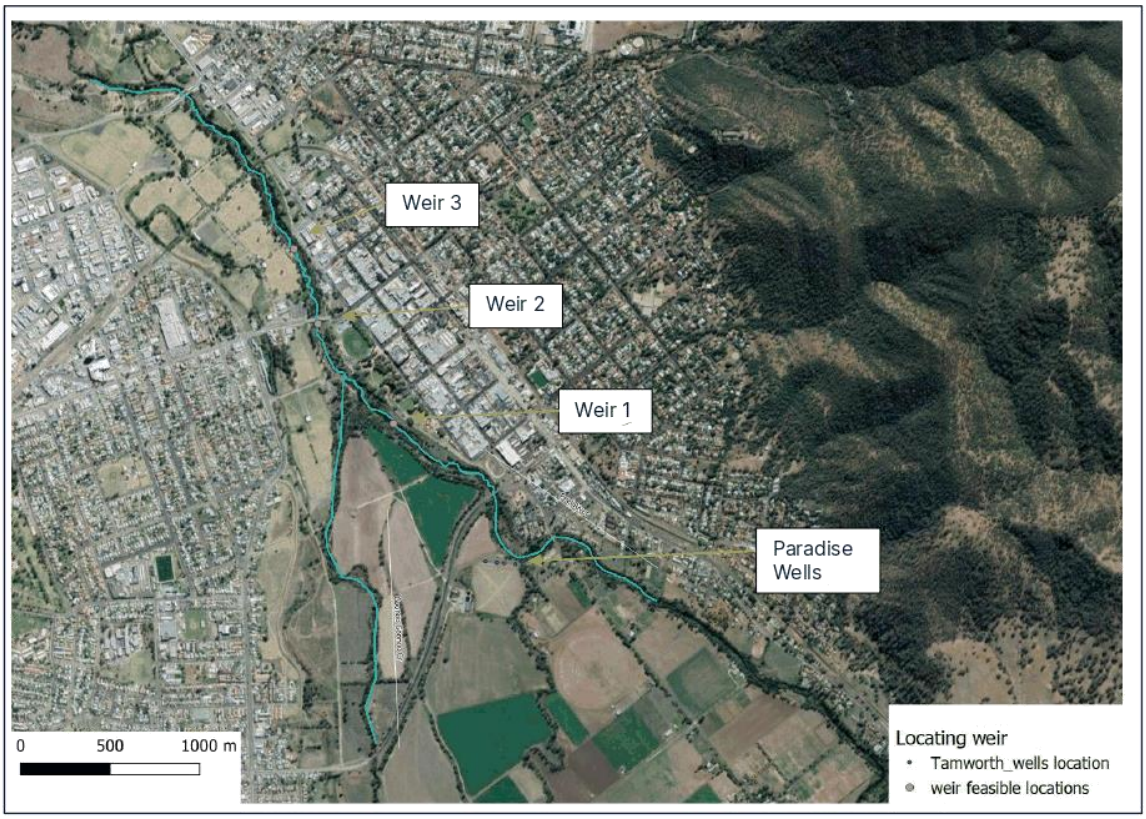

Figure 2: Site Map Peel River at Tamworth

Figure 3. Proposed weir locations on longitudinal profile of the Peel River

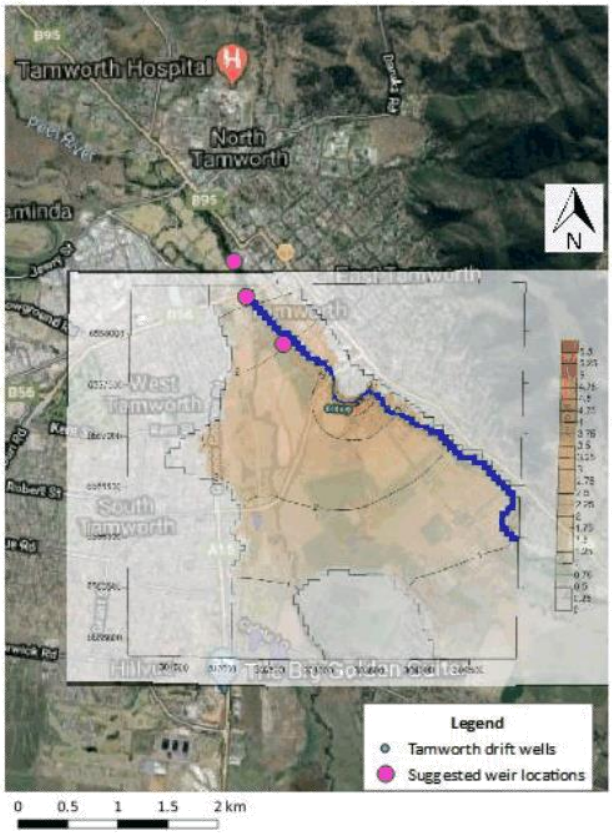

Figure 4. Weir locations with respect to bore field capture zone taken from Tamworth Groundwater Supply study by Jacobs (2019)

3 Weir Configuration

3.1 Assumptions

The following assumptions were made for the configuration of the weir. There is very little information available for the proposed weir sites and therefore some of these assumptions may be proven to be false. The adopted assumptions were realistic, while maintaining conservativism, so that the cost estimate would likely reduce in the future as the design is refined based on additional investigations. These assumptions include:

- The foundation is assumed to be deep alluvial sandy clays thus the most appropriate foundation is a rafted foundation with sheet piles 10m deep.
- At this stage no detailed hydraulics of the weir has been undertaken, therefore, a type I USBR stilling basin with a nominal length of 20m has been assumed (flat slab), as it is the most fish friendly and from experience, is the only stilling basin that is preferred by fisheries.
- Without a detailed hydraulic study, an ogee crest shape has been assumed for costing purposes (as this is the most expensive option).
- The fishway has been nominally sized and may change substantially in future design iterations, the cost is not expected to change substantially.
- The use of gates would reduce the likelihood of surrounding flood impacts. However, the gates option has not been costed. A fixed spillway option has been selected as it has lower construction, operational and maintenance costs.
- It has been assumed that the consequence category for the weir is High C for the feasibility assessment, in accordance with ANCOLD (2000). However, no dam break/safety analysis has been undertaken. This selection has been made on the basis that a weir in an urban environment, is high risk and needs to be engineered accordingly. It is expected that the weir will be a declared dam.
- Typically, with weirs, PMF storm event is not the most critical flood as the entire weir during this flood would become drowned and the flow velocities would be low and thus erosion and scour would not likely occur during this flood.
- The critical floods are the frequent floods from the 50%AEP to the 1% AEP. If the more frequent floods overtop the abutments, the river could erode the abutments and eventually reroute itself around the weir. Frequent floods must therefore remain in the river channel and the weir height was determined based on this criterion. The frequent floods would also typically load the weir the most and therefore determine the structural design of the weir. At this stage, no structural analysis has been made.
- The other consideration is change in frequency of flooding to surrounding landowners. This is typically associated with the 1% AEP; however, it is also important to not inundate landowners more frequently than they would otherwise have occurred without the weir. This is difficult to achieve in an urban environment; however, flood modelling has shown negligible flooding impact, which is reported elsewhere in this report. Therefore, land purchase has not been costed.
  Earthquake has not been considered at this time. However, if future investigations show that the foundation is liquefiable, consideration would need to be made on the viability of the foundation.

3.2 Layout

The general arrangement is similar for each weir site and is set out to provide:

- Two abutments to build between;
- A fishway on the left (or right abutment);
- An outlet for dewatering and maintenance;
- A central ogee crest spillway; and
- Upstream and downstream erosion protection.

The general arrangement is shown in Figure 5. All dimensions are nominal and will be checked in the next phase of design.

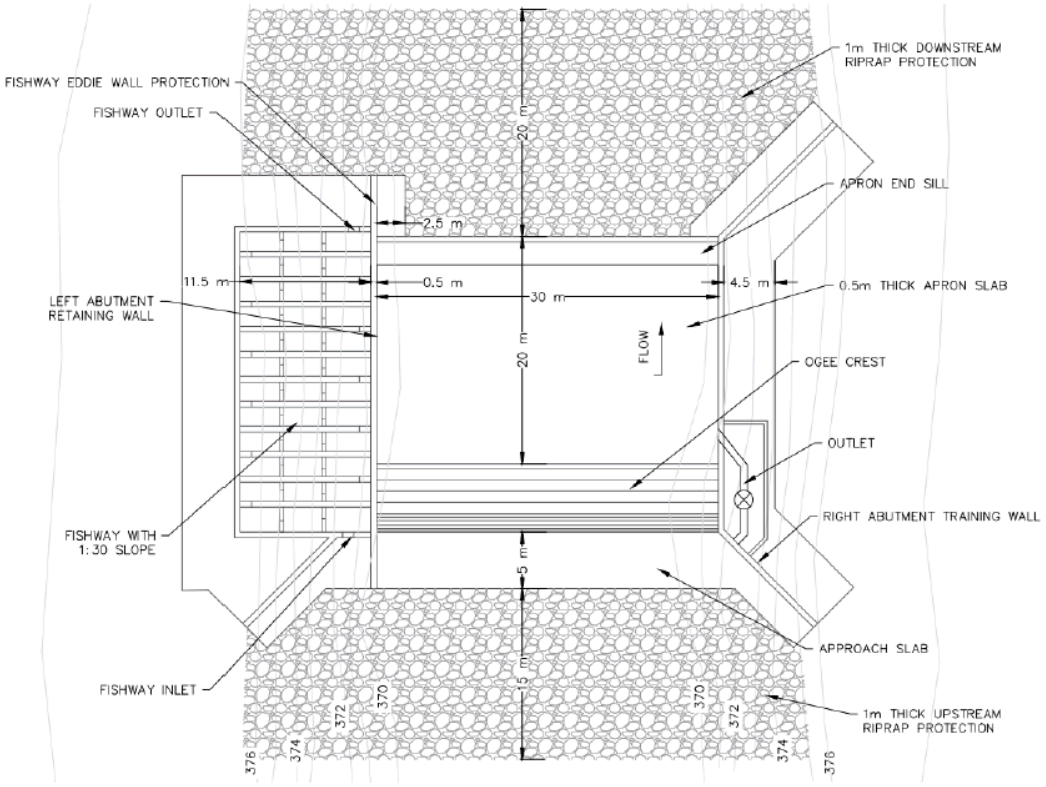

Figure 5: Typical Layout of Weir Options

3.3 Fishway Passage

Further assessment of fish passage options will be required during subsequent design phases to determine the most appropriate design; however, the most suitable option is likely to be one of the following:

- Pool type - the vertical slot fishway has been used successfully on weirs in NSW and has been shown to work for native fish. The slope of these fishways varies from 1:18 to 1:30 depending on the site and the size of the slots required should be determined with consideration of the fish species present.
- Bypass - low-gradient (less than 1:30) earthen or rocky channels that mimic the structure of natural streams. None have been built in Australia to date, but they are common in Europe. Where space at the site allows, this may provide a cheaper alternative and could provide attraction of interest to the community.

The most appropriate fish passage design will be determined by the dimensions of the preferred weir design, the gradient and space available at the selected site, the composition of the fish community in the Peel River, and hydraulic conditions. Most fishway options are unlikely to operate effectively under low flow conditions.

Weirs typically result in changes to the hydrology of a river and consequently consideration will also need to be given to environmental flow requirements. In accordance with the NSW Weir Policy, future design phases should consider the requirement to install an outlet to permit the release of environmental flows or to operate the weir to achieve water level variations. In this instance the weirs will be spilling most of the time and will have very little impact on the flow regime and these provisions may not be required.

If the bypass fishway option is adopted land purchase would be required. This option is therefore subject to suitable land being available. Considering the lack of information available about the sites, the vertical slot fishway has been assumed.

3.4 Cost Estimate

3.4.1 General

This cost estimate is for indicative purposes only. The cost of the weir at each proposed site is assumed to be the same. The cost includes direct costs based on previous project experience only. These costs are not to be relied on for actual project costs. These costs do not include other substantial project costs such as:

- diversion works (for construction),
- environmental and heritage offsets (if required),
- procurement,
- additional design work,
- contractor profit and land purchase.

The cost estimate has been based on the assumed configuration which was based on little to no information about site conditions such as geology, detailed hydrology, dam failure consequence category. There is no contingency or other multipliers added to the cost.

3.4.2 Costing of Proposed Weir

The direct costs for a weir at any of the proposed sites are provided in Table 1.

Table 1: Assumed Rates and Costs

Item	Quantity	Unit	Rate	Cost
Concrete	3,500	m^3	$2,000	$7,000,000
Earthworks	Nominal including cut and fill volumes, clearing and grubbing	No.	$1,500,000	$1,500,000
Riprap	2,100	m^3	$75	$157,500
Outlet	Nominal including trash rack, valves, pipes and joints	No.	$50,000	$50,000
Stainless Steel Grating over Fishway and Outlet	380	m^2	$500	$190,000
Handrails and Walkways	Nominal	No.	$80,000	$80,000
Sheet Piles	2,000	m^2	$1,000	2,000,000
Total (Rounded)				**$11,000,000**

4 Hydraulic Assessment

A hydraulic assessment was undertaken to determine the impact that the proposed weirs would have on flooding and to inform the weir design concept. Specifically, an objective of the weir design was that they would not increase the flooding hazard to adjoining properties.

4.1 Hydraulic Model

This study adopted an existing two dimensional (2D) hydraulic model of the Peel River provided by Tamworth Council to undertake the hydraulic analysis. The model, which uses the TUFLOW software, was established for the Tamworth City-Wide Flooding Investigation (Lyall & Associates, 2019). The model that was supplied included flows for the 1% and 5% AEP flood events for storm durations of 6 hours and 30 hours. The 6 hour storm is the critical duration (provides the maximum flows) for Goonoo Goonoo Creek whereas the 30 hour storm is the critical duration for the Peel River. Thus the 6 hour storm gives the maximum flood level and extent for Goonoo Goonoo Creek whilst the 30 hour storm gives the maximum flood level and extent for the Peel River. The model was run for both storm durations and results were combined.

For this study we were interested in investigating other storm durations including the 50%, 20%, 10% and 2% AEP events. It was therefore necessary to develop estimates of the design hydrographs for these events. The approach adopted is described below:

i. Undertake flood frequency analysis (FFA) to estimate design peak flood discharges at Paradise Weir stream flow gauging station.
ii. Determine to ratio between the 5% AEP peak flood discharge and the 50%, 20%, 10% and 2% AEP peak flood discharge from the FFA.
iii. Use the ratios from step 2 to adjust the design flood hydrographs from the TUFLOW model for 5% AEP event to determine the hydrographs for the 50%, 20%, 10% and 2% AEP events.

The Paradise Weir stream flow gauging station has 47 years of stream flow data. The Bureau of Meteorology has undertaken a FFA at this site by fitting a Log 3 Pearson distribution to the annual maximum flows. For expediency, these results were adopted for this study. The flood frequency curve is provide in Figure 6 whilst the design discharges are provided in Table 2.

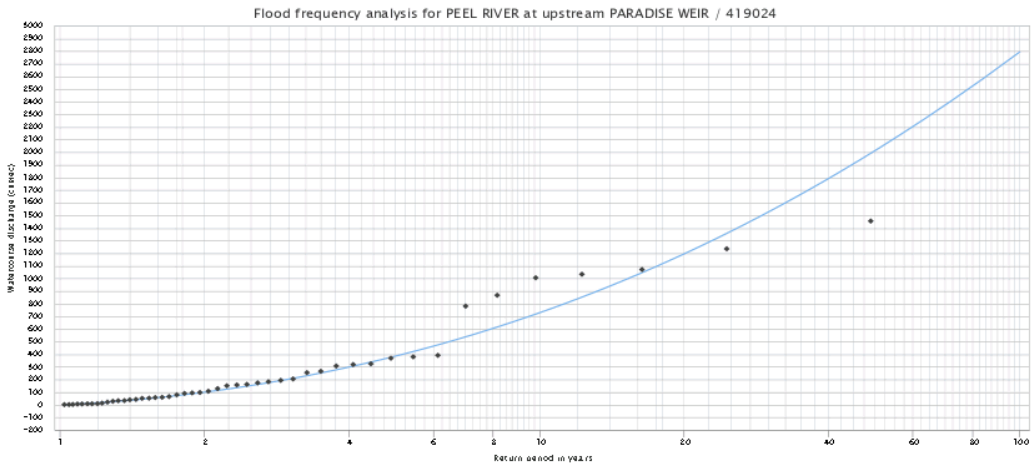

Figure 6: Flood Frequency Curve Paradise Weir Stream Flow Gauging Station

Table 2: Peak Discharge Estimates from FFA - Paradise Weir

Storm Event	Estimated Flow (m^3/s)	Flow Ratio
2% AEP	2,031	1.69
5% AEP	1,200	-
10% AEP	735	0.61
20% AEP	386	0.32
50% AEP	100	0.08

The hydraulic model was run to investigate flooding behaviour for the following scenarios:

- Existing Conditions
- Option 1: Weir 1 – fixed spillway
- Option 2: Weir 2 – fixed spillway
- Option 3: Weir 3 – fixed spillway

The model runs for existing conditions established the baseline flooding behaviour, against which the weir options would be assessed. The weir options all assumed a fixed spillway, as the gated spillway option produces the same flooding conditions as the existing scenario. For each weir option a range of spillway crest levels were investigated in order to determine the spillway crest level (and width) required to pass the various floods without adverse flooding impacts. For these investigations the spillway was assumed to be a broad crested weir with a discharge coefficient of 1.7. The adopted weir configurations are provided in Table 3 and Figure 7.

Table 3: Adopted Fixed Spillway Weir Configurations

Weir Option	Weir Abutment Level (m AHD)	Spillway Crest Level (m AHD)	Spillway Width (m)	Channel Depth at Weir (m)
Weir 1	377.00	374.00	30	3.75
Weir 2	376.00	372.70	35	2.59
Weir 3	375.75	372.00	32	2.24

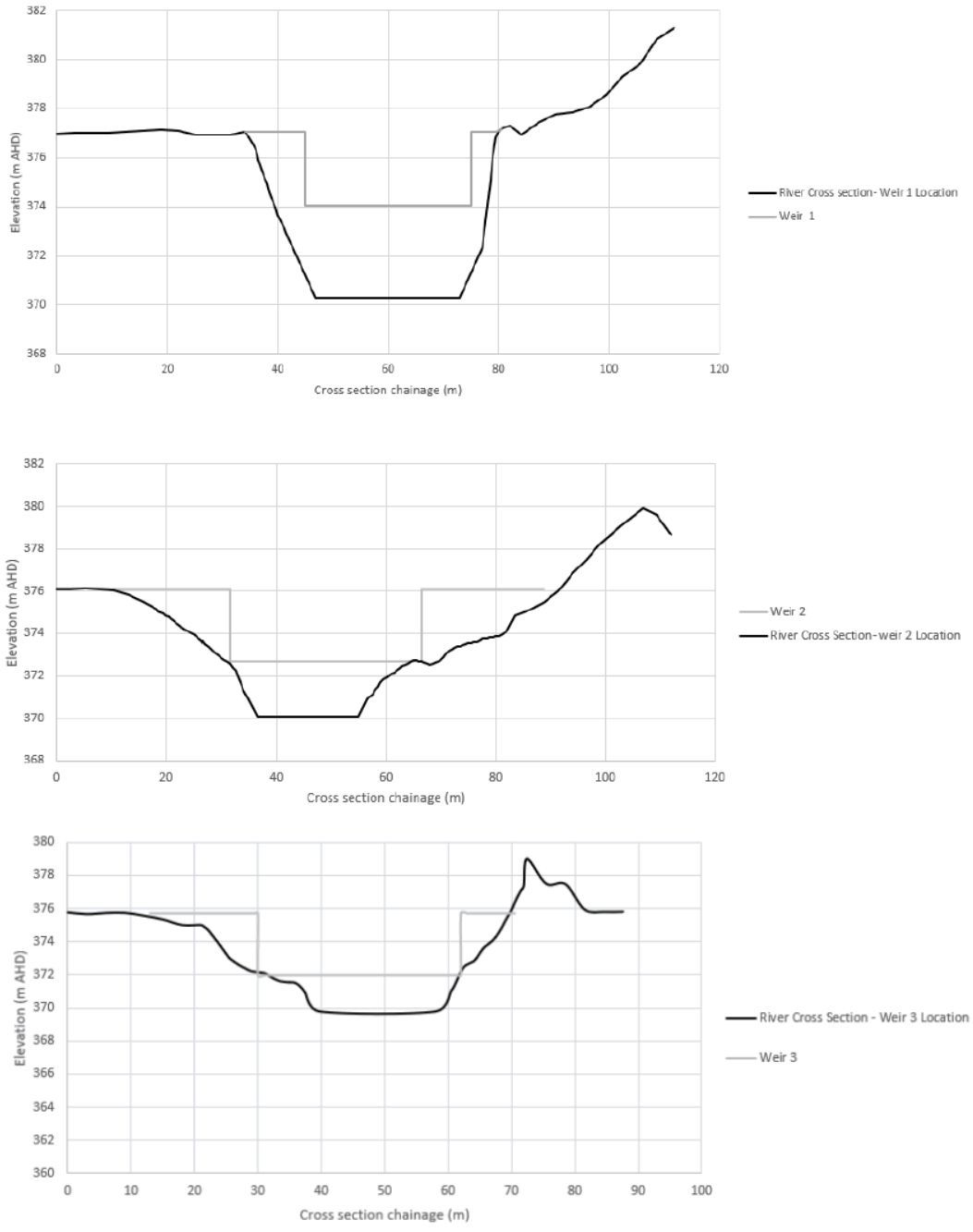

Figure 7: Fixed Spillway Weir Configurations

4.2 Model Results

4.2.1 Baseline Flooding

The hydraulic model was run for existing conditions for the 50%, 20%, 5% and 1% AEP flood events and flood inundation maps were produced, which are provided in Appendix A, Exhibits A0.1-A0.4. These maps show that the 50% AEP flood stays entirely within the Peel River and Goonoo Goonoo Creek channels. The 20% AEP event begins to inundate the area adjacent to and between the Peel River and Goonoo Goonoo Creek, with more extensive inundation in the 5% and 1% AEP events. However, residential and commercial districts are not generally flooded in these events.

4.2.2 Flooding with Weir

General Flooding

The hydraulic model was run for the three weir options for the 50%, 20%, 5% and 1% AEP flood events and flood inundation maps were produced, which are provided in Appendix A, Exhibits A1.1-A1.4, A2.1-A2.4 and A3.1-A3.4. Flood difference maps were also produced, which are provided in Appendix A, Exhibits A4.1-A4.4, A5.1-A5.4, A6.1-A6.4. These maps show the difference in flood level between existing conditions and the weir option. They also show any areas that are inundated under the weir option that were dry under existing conditions.

For example, Exhibit A6.2 shows the difference map for the 20% AEP flood for Option 3. The areas that are shaded red experience flooding that is 100-200 mm greater than under existing conditions. Whilst those shaded in yellow experience flooding that is 50-100 mm greater than under existing conditions. These areas are primarily located immediately upstream of Weir 3 with some affected areas downstream on the left floodplain (looking downstream). The dark blue shading shows the areas that are inundated with the weir in place which are dry under existing conditions. It can be seen that only a very small area of additional land is inundated, and no residential or commercial properties appear to be affected. Exhibit A6.4 shows the difference map for the 1% AEP flood for Option 3. This map shows that the area upstream of the weir experiences additional flooding depths. A very small area immediately upstream of the weir experiences flood depth increases of between 100 and 200 mm, but most of the affected area experiences increases of less than 100 mm. There are no additional areas inundated that were not previously inundated under existing conditions. The other weir options produce similar inundation results.

Details of discharges at the weirs are provided in Table 4, Table 5 and Table 6. These tables show the flows that pass through the weir spillway and the flows that pass overland around the weir. The weir has been designed so that overland bypassing flows only commence when the channel is relatively full, which reduces potential scour at the abutments.

Table 7, Table 8, and Table 9 provide flood levels at the weirs for existing and proposed conditions. This indicates the increase in water level (afflux) due to the proposed weir immediately upstream. As indicated by the flood difference maps, the afflux reduces with distance upstream and becomes negligible approximately 400 m upstream.

In conclusion, hydraulic modelling shows that the proposed weirs will produce minor increases in flood levels for large storm events (for example 1% AEP storm), but will have a negligible impact on the flood extent. The flood impacts are therefore assessed to be negligible.

Impact at Bridges

Details of deck levels for the Paradise and Bridge Street bridges are provided in Table 10, Table 11, Table 12 and Table 13. The 1% and 5% AEP flood levels are also provided. Under existing conditions, the 1% AEP flood level is above the soffit of Paradise Bridge, but below the deck level, whilst the 5% AEP flood is below the soffit. The 1% AEP flood is just above the deck level (by 0.09 m) at Bridge Street, whilst the 5% AEP flood is below the soffit. Construction of the weirs increases flood levels in the 1% AEP event at Paradise by 0.04 m, 0.24 m and 0.03 m for Weirs 1, 2 and 3 respectively. Similarly, the flood levels at Bridge Street in the 1% AEP event are increased by 0.01 m, -0.10 m and 0.10 m for Weirs 1, 2 and 3. It can be concluded that construction of the weirs will not materially affect the flood immunity of the bridges.

Table 4: Peak Weir Discharges - Existing and Option 1

Storm Event	Flow Rate (m^3/s) Existing Conditions		Flow Rate (m^3/s) Proposed Conditions	
	Within 1D Channel	Overland flow	Weir Flow (m^3/s)	Overland flow
50% AEP	36	1	36	1
20% AEP	345	8.8	344	9.8
5% AEP	650	730	479	901
1% AEP	892	2032	681	2243

Table 5: Peak Weir Discharges - Existing and Option 2

Storm Event	Flow Rate (m^3/s) Existing Conditions		Flow Rate (m^3/s) Proposed Conditions	
	Within 1D Channel	Overland flow	Weir Flow (m^3/s)	Overland flow
50% AEP	61	1	61	1
20% AEP	455	25	430	50
5% AEP	1025	460	945	540
1% AEP	1805	1468	1600	1673

Table 6: Peak Weir Discharges - Existing and Option 3

Storm Event	Flow Rate (m^3/s) Existing Conditions		Flow Rate (m^3/s) Proposed Conditions	
	Within 1D Channel	Overland flow	Weir Flow (m^3/s)	Overland flow
50% AEP	61	0	61	0
20% AEP	460	30	415	75

5% AEP	940	874	666	1148
1% AEP	1600	2470	1000	3070

Table 7. Peak water level for Weir Option 1 for existing and proposed conditions

Storm Event	Water Level (m AHD) Existing Conditions		Water Level (m AHD) Proposed Conditions		Afflux(m)	
	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
50% AEP	373.11	373.10	376.33	373.11	3.22	0.01
20% AEP	376.71	376.69	377.39	376.69	0.68	0
5% AEP	378.48	378.45	378.63	378.41	0.15	-0.04
1% AEP	380.28	380.25	380.37	380.20	0.09	-0.05

Table 8. Peak water level for Weir Option 2 for existing and proposed conditions

Storm Event	Water Level (m AHD) Existing Conditions		Water Level (m AHD) Proposed Conditions		Afflux(m)	
	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
50% AEP	372.69	372.64	374.40	372.64	1.71	0
20% AEP	376.29	376.24	376.52	376.21	0.23	-0.03
5% AEP	377.92	377.83	378.27	377.73	0.35	-0.1
1% AEP	379.64	379.53	380.13	379.41	0.49	-0.12

Table 9. Peak water level for Weir Option 3 for existing and proposed conditions

Storm Event	Water Level (m AHD) Existing Conditions		Water Level (m AHD) Proposed Conditions		Afflux(m)	
	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
50% AEP	372.48	372.46	374.40	372.46	1.92	0

20% AEP	375.87	375.82	376.10	375.76	0.23	-0.06
5% AEP	377.05	376.98	377.29	376.87	0.24	-0.11
1% AEP	378`.41	11	378.66	378.17	0.25	-0.16

Table 10. Bridge specification and bridge immunity for existing conditions

Bridge name	Bridge Specification		Water Level (m AHD) Existing Conditions		Deck Immunity (m)	
	Soffit Level (m AHD)	Deck RL (m AHD)	1% AEP	5% AEP	1% AEP	5% AEP
Paradise Bridge	380.4	381.1	380.61	379.07	0.49	2.03
Bridge St Crossing	378.6	379.4	379.49	377.8	-0.09	1.6

Table 11. Bridge immunity for the Weir Option 1

Bridge name	Bridge Specification		Water Level (m AHD) Weir Option 1 -Proposed Conditions		Deck Immunity (m)	
	Soffit Level (m AHD)	Deck RL (m AHD)	1% AEP	5% AEP	1% AEP	5% AEP
Paradise Bridge	380.4	381.1	380.65	379.13	0.45	1.97
Bridge St Crossing	378.6	379.4	379.5	377.81	-0.1	1.59

Table 12. Bridge immunity for the Weir Option 2

Bridge name	Bridge Specification		Water Level (m AHD) Weir Option 2 -Proposed Conditions		Deck Immunity (m)	
	Soffit Level (m AHD)	Deck RL (m AHD)	1% AEP	5% AEP	1% AEP	5% AEP
Paradise Bridge	380.4	381.1	380.85	379.16	0.25	1.94
Bridge St Crossing	378.6	379.4	379.39	377.71	0.01	1.69

Table 13. Bridge immunity for the Weir Option 3

Bridge name	Bridge Specification		Water Level (m AHD) Weir Option 3-Proposed Conditions		Deck Immunity (m)	
	Soffit Level (m AHD)	Deck RL (m AHD)	1% AEP	5% AEP	1% AEP	5% AEP
Paradise Bridge	380.4	381.1	380.64	379.09	0.46	2.01
Bridge St Crossing	378.6	379.4	379.59	377.91	-0.19	1.49

5 Water Balance Modelling

5.1 General

A spreadsheet based daily water balance model was established for each of the proposed weir sites. The water balance model operates at a daily time step and includes the following elements:

- Inflows to the weir from the Peel River
- Losses from the weir due to evaporation
- Rainfall on the weir storage
- Spills when the weir overtops
- Changes in daily water level and storage volume
- Any extractions taken for water supply

The water balance model was used to:

- Provide information required to assess the potential increase in aquifer recharge
- Assess potential surface water extractions
- Assess the behaviour of the weir including: typical operating storage levels, the rate that the storage empties during drought, reliability of supply

5.2 Inflows and Climate data

5.2.1 Inflows

There are four of streamflow gauging stations on the Peel River that are located near Tamworth which have long records. Details of the stations are provided in Table 14. The Paradise Weir gauging station is located 1.2 km upstream of the proposed site for Weir 1. The Tamworth gauging station is located at the Oxley Highway crossing, at the location of Weir 2. The Tamworth WS station is located 6.6 km upstream of Weir 1, whilst the Carroll's Gap station is located 56 km downstream of Tamworth. Paradise Weir gauging station has 48 years of data and provides flow data relevant to Weir 1, as both sites are upstream of the Goonoo Goonoo Creek junction. Tamworth gauging station has 28 years of record and provides flow data relevant to weirs 2 and 3, which are downstream of the Goonoo Goonoo Creek junction.

The Paradise Weir gauging station has periods of missing data which were infilled using flow data recorded at other stream flow gauging stations. This was achieved by plotting the daily flows from the Paradise Weir station against the daily flows recorded at each of the other stations to produce scatter plots. Trend lines were then fitted to the data and regression equations established which relate the flow at the adjoining station to flow at Paradise Weir. Similarly, missing data at the Tamworth gauging station was infilled using data from the other stations. This included extending the flow record at the Tamworth gauging station to 1974 to provide 48 years of flow record.

The flow relationships developed for each station and their correlation coefficients are:

Q_{PW}	=	$0.574\ Q_{CG}$	$R^2 = 0.75$
Q_{PW}	=	$0.718\ Q_{T}$	$R^2 = 0.95$
Q_{PW}	=	$0.0167\ Q^2_{TWS} + 1.94\ Q_{TWS}$	$R^2 = 0.82$
Q_{T}	=	$1.325\ Q_{PW}$	$R^2 = 0.95$
Q_{T}	=	$0.747\ Q_{T}$	$R^2 = 0.72$
Q_{T}	=	$0.0297\ Q^2_{TWS} + 2.172\ Q_{TWS}$	$R^2 = 0.81$

Where: Q_{PW} = Flow at Paradise Weir

Q_{CG} = Flow at Carroll's Gap

Q_T = Flow at Tamworth

Q_{TWS} = Flow at Tamworth water treatment plant

Some key flow statistics for the Peel River at the Paradise Weir and Tamworth streamflow gauging stations are provided in Table 15. Key statistics for each weir are provided in Table 16. A flow exceedance curve is provided in Figure 8, the data for which is provided in Table 17. The median flow at Paradise Weir (which corresponds to Weir 1) is 0.85 m^3/s or 374 ML/d, whilst the median flow at the Tamworth gauging station (weir 2, 3) is 1.04 m^3/s or 899 ML/d. Thus, the flow at Weirs 2 and 3 is approximately 22% higher than the flow at Weir 1.

Table 14: Stream Flow Gauging Stations

Number	Name	River	Commenced	End	Years Data
419006	Carrolls Gap	Peel	22/2/73	Open	49
419009	Tamworth	Peel	20/7/93	Open	28
419024	Paradise Weir	Peel	22/1/74	Open	48
419070	Tamworth WS	Peel	25/6/82	Open	29

Table 15: Daily Flow Statistics of the Peel River

Statistic	Paradise Weir Gauging Station		Tamworth Gauging Station	
	(m^3/s)	(ML/d)	(m^3/s)	(ML/d)
Mean Daily Flow	4.51	390	5.61	485
Median Daily Flow	0.85	73.4	1.04	89.9
Maximum Daily Flow	839	72,490	1,108	95,730
Minimum Daily Flow	0	0	0	0
Standard deviation daily flow	19.86	1,715	25.21	2,178

Table 16: Weir Statistics – fixed spillway

Statistic	Weir 1	Weir 2	Weir 3
Full Supply Level/Spillway Crest	374.0	372.7	372
Invert Level	370.28	370.11	369.76
Maximum storage volume (m^3)	68,100	72,170	50,570
Maximum storage volume (ML)	68.1	72.2	50.6

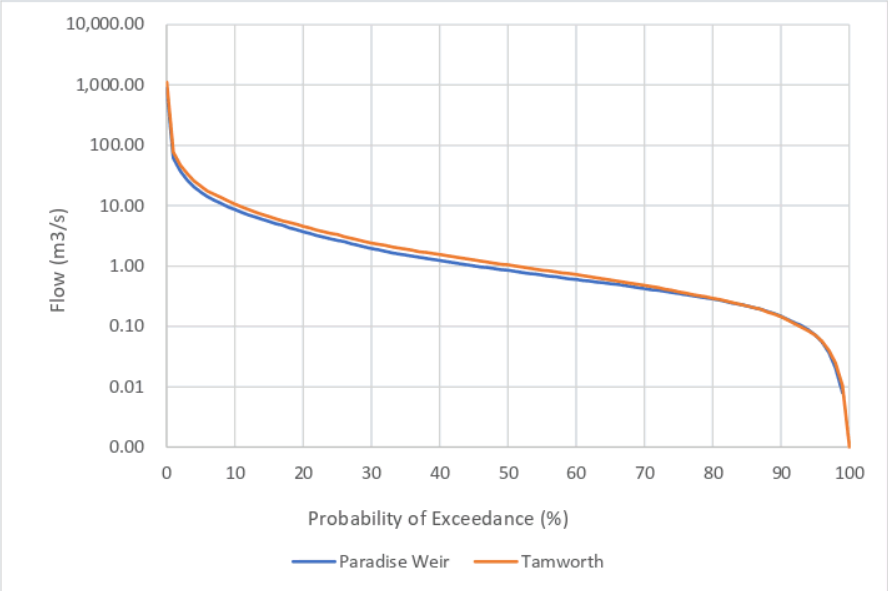

Figure 8: Flow Exceedance Curves

Table 17: Flow Exceedance Curves

Probability of Exceedance (%)#	Paradise Weir Gauging Station (Weir 1)		Tamworth Gauging Station (Weir 2, 3)	
	Flow (m3/s)	Flow (ML/d)	Flow (m3/s)	Flow (ML/d)
0	839	72,490	1,108	95,759
5	16.58	1,432	20.67	1,786
10	8.64	746.51	10.59	914.73
15	5.51	475.87	6.52	563.14
20	3.69	319.02	4.57	394.63
25	2.67	231.03	3.29	284.62
30	1.96	169.08	2.41	208.21
35	1.52	131.50	1.90	164.47
40	1.22	105.67	1.54	133.22
45	1.00	86.66	1.25	108.43
50	0.85	73.01	1.04	89.71
55	0.71	61.17	0.86	73.96
60	0.60	51.58	0.72	62.30
65	0.51	44.06	0.59	50.90
70	0.42	36.63	0.47	40.95
75	0.35	30.50	0.38	32.41
80	0.28	24.54	0.29	25.32
85	0.22	18.84	0.22	18.92
90	0.15	12.67	0.14	12.44
95	0.07	6.22	0.07	6.16
100	0.00	0.00	0.00	0.09

 # This represents the percentage of days that exceed the nominated flow value. Hence at Paradise Weir a flow of 24.54 ML/d is exceeded on 80% of days.

5.2.2 Climate Data

Daily rainfall and evaporation for Tamworth was required as input to the water balance model for the period from 1974 to 2021. This data was obtained from the SILO database. SILO is a database maintained by the Queensland Government which provides daily Australian climate data for the period from 1889 to the present. Information contained in the database includes rainfall, evaporation, temperature, solar radiation. It also includes measured pan evaporation and various derived evaporation estimates based on climate data. The data base includes measured data at gauging stations and interpolated data at intermediate locations. For this study, the Morton shallow lake evaporation was adopted.

The mean annual rainfall for Tamworth is 1,820 mm, whilst the mean annual evaporation (Morton shallow lake) is 3,910 mm.

5.3 Model Results

The water balance model was established to investigate the potential to augment the water supply by providing surface water extractions and or enhancing the groundwater recharge which would increase the potential yield from the Paradise drift wells. The analysis undertaken examines the ability of the weirs to supply different levels of demand and the reliability of the supply, without being concerned with constraints imposed by the water sharing plan. Large extractions (such as 28 Ml/d) will not be permitted. This study has not established what level of extraction if any would be permitted.

5.3.1 Surface Water Extractions

As noted in Section 2 the annual water demand for Tamworth is approximately 10,000 ML, which is equivalent to 28.5 ML/d. It can be seen from Table 16 that weirs 1, 2 and 3 have storage capacities of 68 ML, 72 ML and 51 ML, respectively. This means that the weirs have a storage capacity equal to approximately two to three days of the full demand and will not be able to provide a reliable supply when there is almost no flow in the Peel River. On the other hand, the Peel River has a large flow relative to the demand. The mean flow at Weir 1 (corresponds to the Paradise Weir gauging station) is 390 ML/d and the median flow is 73 ML/d. From the flow exceedance curve (Table 17) it can be seen that the Peel River flow exceeds the daily demand on 77% of days (existing conditions). In other words, the river has sufficient flow to meet the full demand on 77% of days in existing conditions (no weir)[2]. However, the weirs have very little storage and would be emptied within days during drought periods if the demand were 28.5 ML/d.

To demonstrate the weir behaviour the water balance model was run for Option 1 (Weir 1) with daily demands of 1, 5 and 28.5 ML/d. Key statistics that demonstrate the weir behaviour under different demands are provided in Table 18, whilst water level traces are provided for each scenario in Figure 9, Figure 10 and Figure 11. It can be seen that with a demand of 28.5 ML/d the weir is able the provide the full demand 83%[3] of days. Approximately 6.6% of the total weir inflows are extracted and the weir spills 73% of days. The storage level trace shows that the weir is drawn down regularly to empty or close the empty. When the demand reduced to 5 ML/d the full demand is met 99% of days and the weir is full most of the time with a few instances where the weir is almost emptied. A demand of 1 ML/d is met 100% of the time and the weir is mostly full. On the occasions when the weir level is drawn down it does not go close to emptying. In conclusion the weirs are able to reliably supply a demand of 1-5 ML/d from surface water extractions.

[2] Such a high extraction would not be permitted with water reserved for other users, including the environment.

[3] Without the weir river flows can supply the full demand 77% of days.

Table 18: Weir behaviour statistics

Statistic	Demand		
	28.5 ML/d	5 ML/d	1 ML/d
Percentage of days full demand met	83%	99.2%	100%
Percentage of inflow extracted	6.6%	1.3%	0.3%
Percentage of spill days	73%	95%	98%

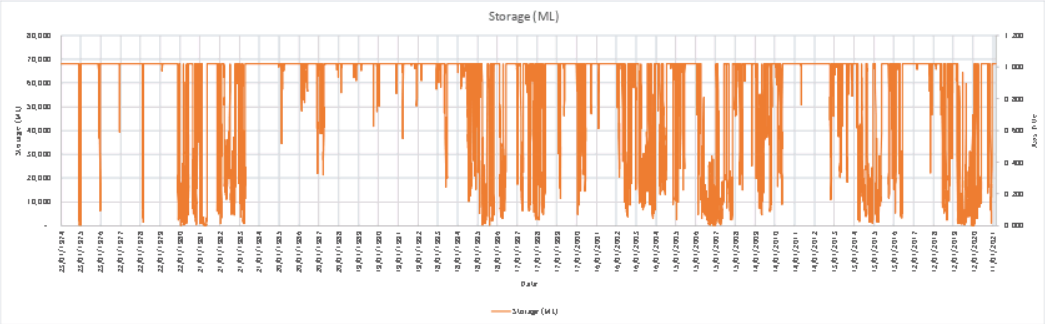

Figure 9: Water Level Trace Weir 1 - Demand 28.5 ML/d

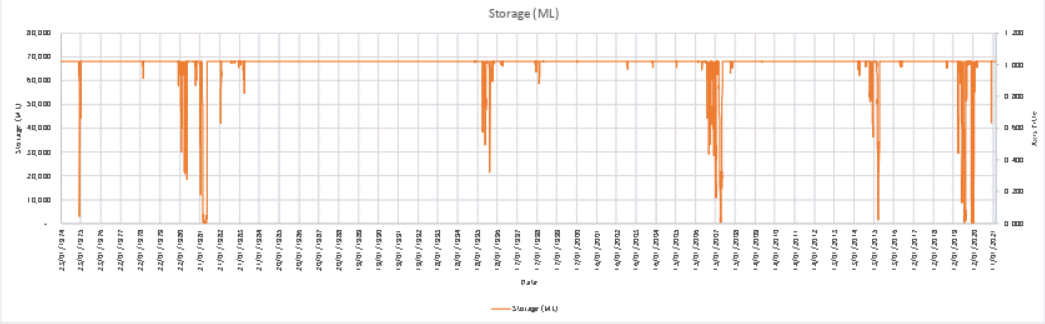

Figure 10: Water Level Trace Weir 1 - Demand 5 ML/d

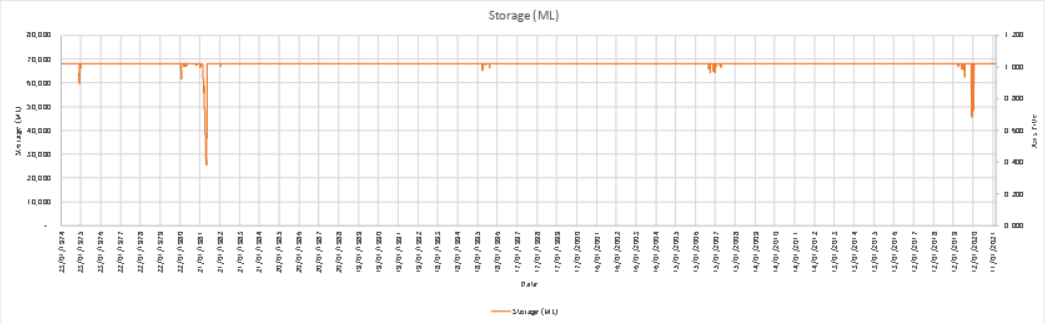

Figure 11: Water Level Trace Weir 1 - Demand 1 ML/d

5.3.2 Groundwater Recharge

The water balance model was run to assess the water levels in the Peel River following construction of the weirs. The storage traces show that the weirs would be full or close to full most of the time. This information informs the ground water assessment which is provided in a later section of the report.

6 Groundwater Assessment

The hydrogeology of the Tamworth region is divided into two dominant aquifer types, the alluvial aquifers and the fractured rock aquifers. Alluvial aquifers occur along valley floors and are associate with the rivers and creeks with Tertiary to Quaternary aged sediments that overly the fractured rock aquifers, forming the valley slopes, hills and ranges. At Tamworth, the Peel Alluvium comprises unconsolidated sand, gravel and clay deposits which are usually less than 1.5km wide but can range up to 3km wide. The alluvial aquifer consists of low permeability sediments overlying high permeability sands and gravels.

Town water supply for Tamworth is supplemented from large diameter wells in the Peel Alluvium adjacent to Scott Road which are known as the drift wells of the Paradise bore field. The depth to groundwater is generally less than 5m, with the average groundwater level around 375 m AHD. The transmissivity range is from 40-1200 m^2/day with porosity of around 0.2 (Jacobs 2019) with the yields of alluvial bores limited by available drawdown. Yields for bores in the region typically range from 5 L/sec to 15 L/sec from bores generally constructed in the 1950's and 1960s, with several irrigation bores producing yields over 20 L/sec.

The Paradise bore field consists of six wells, 4m in diameter and around 10m deep. Modelling shows that each individual well currently has a sustainable yield of 0.2 ML/day to 1.8 ML/day when the Peel River is flowing (Jacobs 2019), which is 95% of days from the present study (section 5). When there is water in Peel River, the total bore field yield will reach 6.8 ML/day.

The bore field is in direct hydraulic connection with the river when the river is in flow. Wells further away from the river have lower yields. When the river is not flowing, groundwater extraction is limited by the available drawdown and wells have a sustainable combined yield of between 0.05 ML/day to 0.4 ML/day for around two years of supply (Jacobs 2019).

Drawdown from pumping extends both upstream and downstream in the Peel River and Goonoo Goonoo Creek, with a maximum drawdown at the bore field of around 5.5m. Construction of a weir on the Peel River would increase the driving head of water on the river bed and increase infiltration to the groundwater aquifer resulting in a localised increase in groundwater level. The groundwater level increase would decrease with distance from the weir, as the geometry of the aquifer is relatively flat and broad.

The interaction of the weir and surface water recharge into the bore field and its impact on borefield yield and water supply/security requires a separate three dimensional (3D) numerical groundwater assessment. Also, the optimal weir position for maximising aquifer recharge can be assessed using a numerical groundwater model. The option to install a new bore field to exploit the weir would need to consider the aquifer geometry, such as saturated thickness and thickness of higher permeability material. This could be explored using a combination of geophysical field investigation methods, such as electrical resistivity and seismic refraction and drilling with aquifer pumping tests. The depth to bedrock in this area is poorly defined from limited drilling transects and if an area were found to have more than 10m of alluvial material the available drawdown would be greatly increased as would storage and yield.

An analytical assessment was undertaken using steady state inflow into a pit (from Marinelli and Noiccoli, 2000) was undertaken to provide an assessment of the potential increase in yield gained from construction of the weir. Two hydraulic zones were included to represent the lower permeability upper portion of the aquifer and the high permeability of the lower portion of the aquifer. The groundwater level was initially set to 5m below ground level for the pre weir inflow and then set to 2 m below ground level for assessment of a 3 m rise in head. The average sustainable yield per well increases by about 30% to 50% due to ponding induced by the weir. This would increase the total sustainable yield from 6.8 ML/day to around 9.5 ML/day, an increase of approximately 2.7 ML/day.

It is noted that the proposed weirs provide storages ranging from 50-72 ML. If the aquifer is operated at an extraction rate of 6.8 ML/d, then the weirs would be emptied in 1-2 weeks following cessation of flow. In essence, the weirs would allow higher extraction rates most of the time but will empty quickly on cessation of flow.

7 Environmental Planning and Assessment

A desktop assessment was carried out to outline the environmental assessment and approval requirements that may be required to undertake for each of the proposed weir options. Figure 2 shows the location of the proposed Tamworth Weirs, whilst Table 19 outlines the environmental constraints, assessments and approvals likely required for each proposed option.

Table 19: Environmental and Planning

Environmental Aspect	Environmental Constraint / Impact
Landform, Geology and Soils	No recorded presence of acid sulfate soils. Australian Soil Classification Type; Dermosols. A desktop assessment will be carried out to determine impacts of the proposed weir relating to landform, geology and soils during construction and operation.
Water Quality and Hydrology	The weir is located in an area that is prone to flooding. A flooding and water quality assessment will be carried out to determine impacts of the proposed weir during construction and operation, including periods of normal flow and flooding events including up to 1 in 100 year.
Biodiversity	The weir is likely to impact biodiversity during construction and operation, including periods of normal flow. A terrestrial and aquatic ecology assessment will be prepared to determine the impacts. Ecology offsets and permits may be required. Liaison with the Department of Industry (Fisheries) will be required to obtain a Fisheries permit.
Noise and vibration	The nearest sensitive receivers are located approximately 430m south-west of the proposed weir 1, 3700 m west of weir 2 and 540 south west of weir 3. Pending construction staging and methodology high noise impact work is likely to be required as well as night-time works. The works may cause some vibration to surrounding infrastructure. Human vibration comfort is unlikely to be an issue for the works but will be considered as part of the noise and vibration assessment. If works are proposed during daytime hours only and noise impacts are considered minor in impact, a desktop assessment for noise and vibration impacts may be prepared.
Aboriginal Heritage	A basic AHIMS search was carried out 19 April 2021. There are no recorded Aboriginal sites or places surrounding the proposed weir. A heritage assessment would not likely be required. Standard mitigation measures would be implemented during construction including an expected finds procedure.
European Heritage	Weir 2 and 3: No recorded local heritage present. A heritage assessment would likely not be required. Standard mitigation measures would be implemented during construction including an expected finds procedure. Weir 1: proposed weir may indirectly impact the State heritage listed King George V Avenue of Memorial English Oaks during flooding events. A heritage impact assessment and permit may be required. The proposed weir may indirectly impact the following local heritage listed item during flooding events: • Tobacco kiln, Scott Road (Lot 35, DP 826572), Item No. I476 • Wells and Pumping Station off Peel River, King George V Avenue and Scott Road, south bank of Peel River (Lot 1, DP 152642; Lot 1, DP 755334; Lot 229, DP 755334, Old Scott Road—Road Reserve), Item No. I412 • House, King George V Avenue (Lot A, DP 161615), Item No. I407 • House, King George V Avenue (Lot 8, DP 755334), Item No. I408 • House, 2–24 King George V Avenue (Lots 21 and 22, DP 557775), Item No. I409 Flood modelling would confirm the extent of impact. A heritage impact assessment and permit may be required.
Contaminated Land and	Weir 2 and 3: There are no contaminated sites listed under the EPA, within proximity of the proposed weir. Standard mitigation measures will be implemented during construction including an unexpected finds procedure.

Hazardous Materials	Weir 1: 210 Goonoo Goonoo Road Tamworth is a former Service Station and listed as a contaminated site under the EPA. The Service Station may be impacted during flooding events. No permits are required. Standard mitigation measures will also be implemented during construction including an unexpected finds procedure.
Visual Aesthetics and Urban Design	A desktop assessment will be carried out to determine visual aesthetic and urban design impacts of the proposed weir during construction and operation.
Socio-Economic	A desktop assessment will be carried out, and standard mitigation measures applied to determine the impact of the proposed weir during construction and operation.
Traffic and Access	Weir 1 and 3: A desktop assessment would determine traffic impacts of the proposed weir during construction. Weir 2: Due to the proximity of the proposed weir to Oxley Highway and Bridge Street, a traffic impact assessment and management plan may be required to determine the impact of the proposed weir during construction and flooding events.
Planning Approvals	**Weir 1** Weir located in Land Zoned as RU4 – Primary Production Small Lots. As outlined below, the works would be permitted with consent. The planning approval pathway will require a Review of environmental factors (REF) to be carried out under Part 5 of the *Environmental Planning & Assessment Act 1979*. The REF would include technical specialist assessments as identified in this table and confirmed with Council. **Objectives of zone** • To enable sustainable primary industry and other compatible land uses. • To encourage and promote diversity and employment opportunities in relation to primary industry enterprises, particularly those that require smaller lots or that are more intensive in nature. • To minimise conflict between land uses within this zone and land uses within adjoining zones. **Permitted without consent** Environmental protection works; Extensive agriculture; Home-based childcare; Home occupations; Moorings; Roads. **Permitted with consent** Agricultural produce industries; Aquaculture; Cellar door premises; Dual occupancies (attached); Dwelling houses; Farm buildings; Intensive plant agriculture; Kiosks; Landscaping material supplies; Light industries; Markets; Plant nurseries; Roadside stalls; Rural workers' dwellings; Any other development not specified in item 2 or 4. **Prohibited** Amusement centres; Backpackers' accommodation; Cemeteries; Centre-based child care facilities; Commercial premises; Crematoria; Eco-tourist facilities; Entertainment facilities; Exhibition villages; Heavy industrial storage establishments; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Industries; Intensive livestock agriculture; Mortuaries; Recreation facilities (major); Registered clubs; Residential accommodation; Respite day care centres; Restricted premises; Rural industries; Service stations; Serviced apartments; Sex services premises; Storage premises; Vehicle body repair workshops; Vehicle repair stations; Wharf or boating facilities; Wholesale supplies **Weir 2 and 3** Weir located in Land Zoned as RE1 – Public Recreation. As outlined below, the works would be permitted with consent. The planning approval pathway will require a Review of environmental factors (REF) to be carried out under Part 5 of the *Environmental Planning & Assessment Act 1979*. The REF would include technical specialist assessments as identified in this table and confirmed with Council.

Objectives of zone

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.

Permitted without consent

Environmental protection works; Moorings; Roads.

Permitted with consent

Aquaculture; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Car parks; Caravan parks; Charter and tourism boating facilities; Centre-based child care facilities; Community facilities; Crematoria; Electricity generating works; Entertainment facilities; Environmental facilities; Function centres; Helipads; Information and education facilities; Kiosks; Markets; Medical centres; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Respite day care centres; Restaurants or cafes; Sewage treatment plants; Shops; Waste or resource management facilities; Water recreation structures; Water supply systems.

Prohibited

Commercial premises; Neighbourhood shops; Any development not specified in item 2 or 3.

8 Conclusions

This report investigated the feasibility of constructing a weir on the Peel River within Tamworth in order to improve the water security of Tamworth by facilitating capture of stormwater or Peel River flows and by enhancing recharge of the Peel River aquifer. The investigations for this report were based on limited background information and did not include critical information, such as geotechnical site investigations. Should Council wish to proceed further then additional investigations and studies will be required to refine the design and cost estimate. Three locations were considered for the location of the weirs.

Key findings of the study are:

- The preferred weir configuration consists of a concrete structure with a fixed spillway on a raft foundation supported by 10 m deep piles.
- A fishway will be required with a vertical slot fishway being the preferred option.
- A USBR type 1 stilling basin has been assumed as this is the most fish friendly option.
- The hazard rating of the weir (declared as a dam) has been assumed to be High C for this feasibility assessment.
- The cost estimate is based on available data, and the construction costs are estimated to be almost the same for each weir option. The construction cost for each weir is estimated to be in a range of 10-12 million dollars. These costs do not include other substantial project costs such as: diversion works (for construction), environmental and heritage offsets (if required), procurement, additional design work, contractor profit and land purchase.
- The weir will include a central fixed level concrete crest spillway 30 to 35 m wide.
- The spillway crest has been set at a level sufficient to pass flood flows with minimal flood impact. Depending on the adopted weir location the spillway will be set 2-4 m below the abutment and provide a pool depth of 2.25-3.75 m.
- The proposed weirs have storage volumes ranging from 50-72 ML.
- Weir Option 1 aesthetically will be the preferred option as it provides a greater ponding depth compared to the two other options.
- Flood modelling, based on available data, showed that Weir Option 1 and Weir Option 2 would have less flood impacts compared to the Weir Option 3 on the immunity of adjacent road crossings. The considered weir configurations generated an afflux of approximately 200 mm immediately upstream of the weir for flood events between 20% AEP and 1% AEP, but the afflux becomes negligible 400-500 m upstream. The afflux for more frequent flood event is expected to be greater and can reach to approximately 3m (for Weir Option 1) in 50% AEP storm. There were only negligible local increases (mainly in agricultural areas) in the extent of inundation, which does not appear to extend into the developed area. Hence, the assessed weirs will produce a negligible impact on the flood extent and flood level for 1% AEP storm and no residential or commercial properties appear to be affected. The flood impacts are therefore assessed to be negligible.
- Tamworth has an average water demand of 28.5 ML/d and the flows in the Peel River exceed this amount on 77% of days for existing conditions (without a weir).
- Water balance modelling shows that the weirs would be able to supply a demand of 1-5 ML/d. However, there may be difficulties in obtaining approvals to extract additional surface water from the Peel River at these locations.
- The Paradise Borefield consists of six wells, 4m in diameter and around 10m deep. Previous study (Jacobs 2019) shows each individual well currently has a sustainable yield of 0.2 ML/day to 1.8 ML/day and the total bore field yield of 6.8 ML/day when the Peel River is flowing which will be 95% of days based on current study.
- The increased head generated by the weirs when full will increase the yield to around 9.5 ML/d (an increase of approximately 2.7 ML/day). Since the weir storages range from 50-72 ML, the weirs would be emptied in 1-2 weeks following cessation of flow if the aquifer is operated at an extraction rate of 6.8 ML/d. In essence, the weirs would allow higher extraction rates when the weirs are full which will be most of the time.
- Environmental and planning matters are summarised in Table 18. As it can be seen all weir design options will have similar environmental requirements except for the Weir Option 1 that may require a heritage impact assessment and permit.

Conclusions

In conclusion, all the weir design options will have negligible flood impacts on adjacent residential and commercial properties for 1% AEP storm while weir Option 1 and 2 will have less flood impacts on immunity of adjacent road crossings. In terms of surface water extraction, Weir Option 2 and weir Option 3 provide slightly more benefit. Whilst Weir Option 1 will generate a greater head to groundwater level and provide the greatest benefit associated with aquifer recharge and Paradise borefiled yield. All three weir options will be expected to have similar construction costs. Weir Option 1 provides greater ponding depth which may improve aesthetics. Hence, Weir Option 1 is the preferred option.

Appendix A **Flood Maps**

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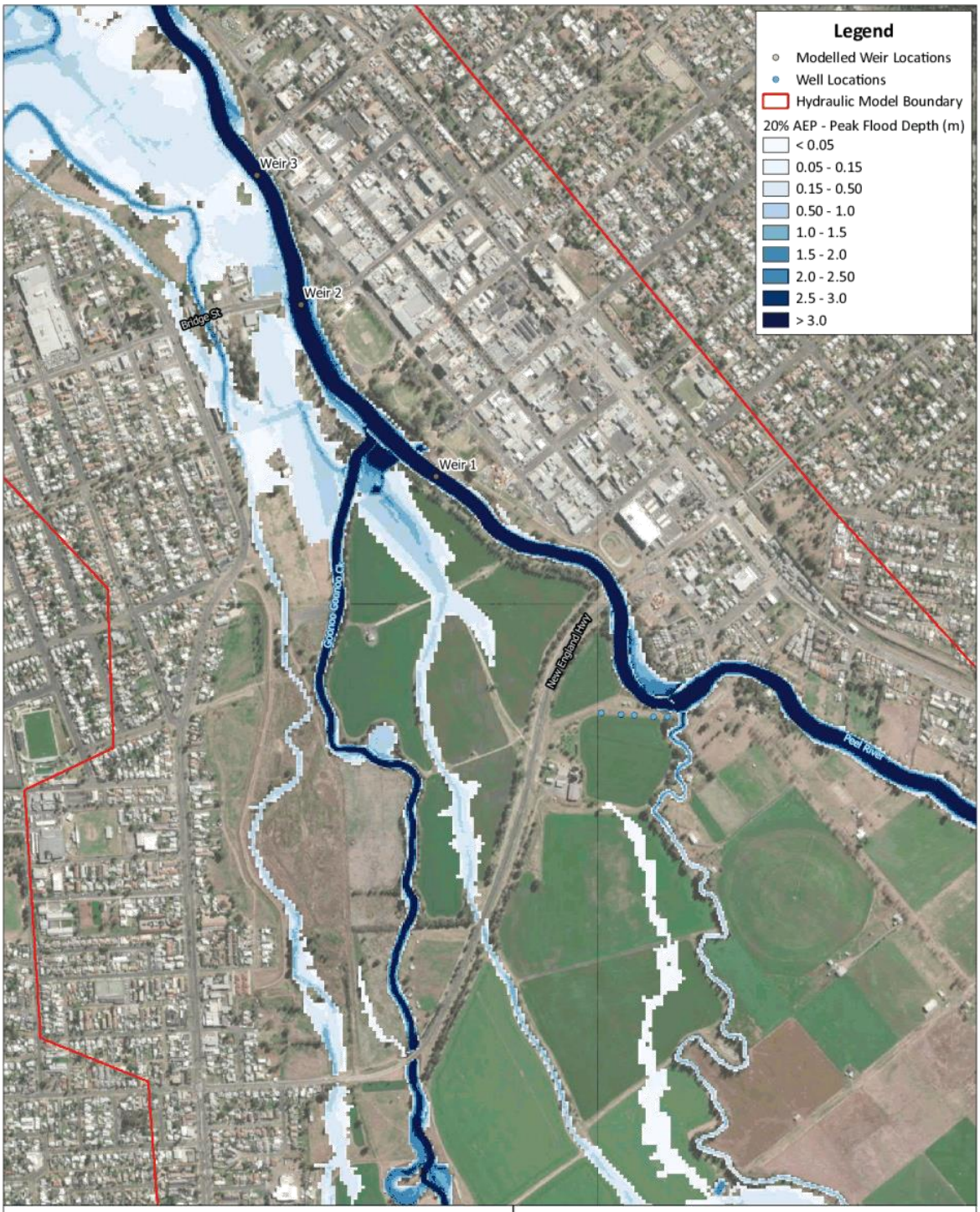

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PROJECT NO.	30013060	PROJECT TITLE	Tamworth Weir Feasibility Assessment
CREATED BY	G.NAGHIB O.GLIXMAN	SOURCES	ESRI (PROJ: GDA1994 MGA Zone 56)

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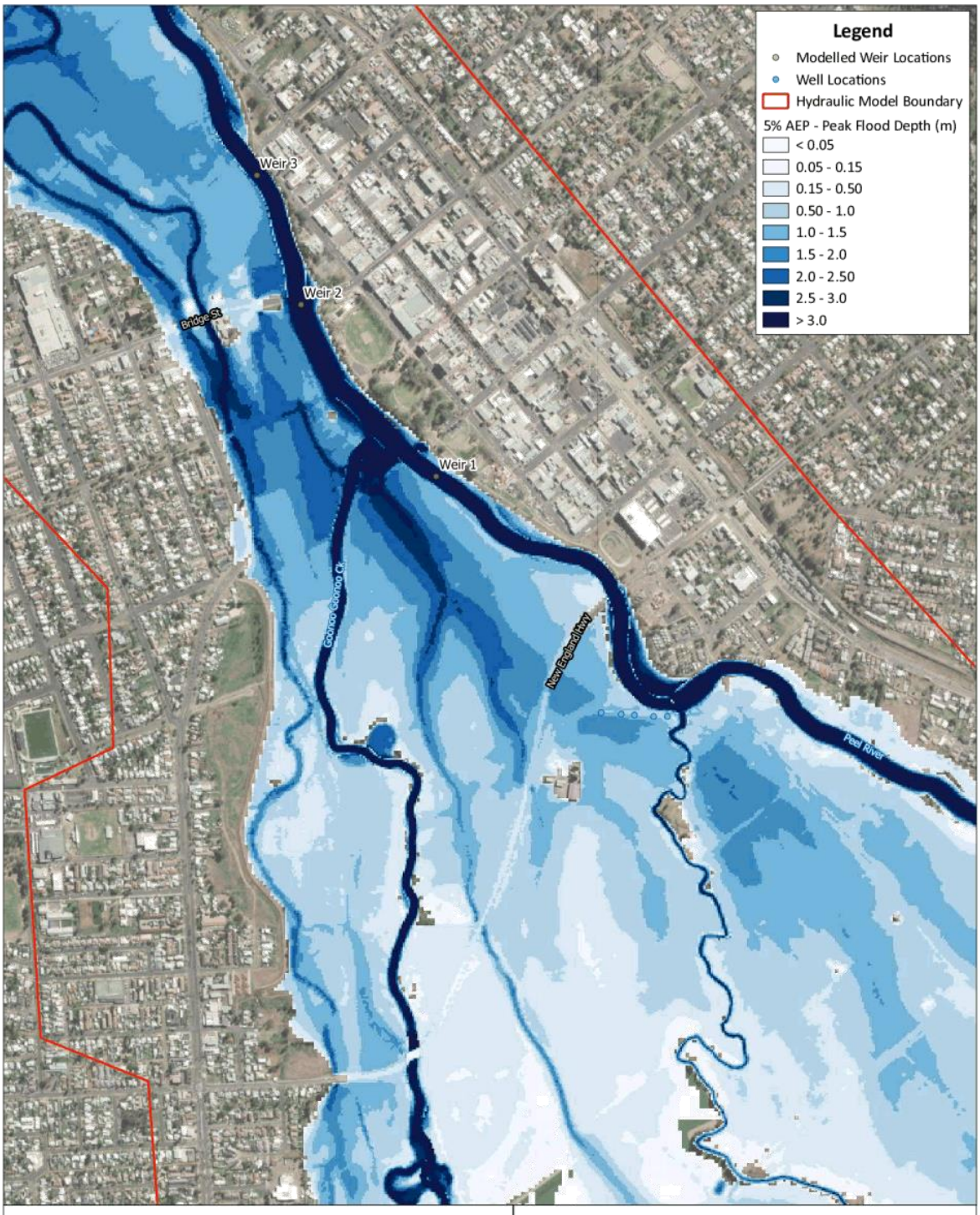

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CREATED BY	G.NAGHIB O.GLIXMAN	SOURCES	ESRI (PROJ: GDA1994 MGA Zone 56)

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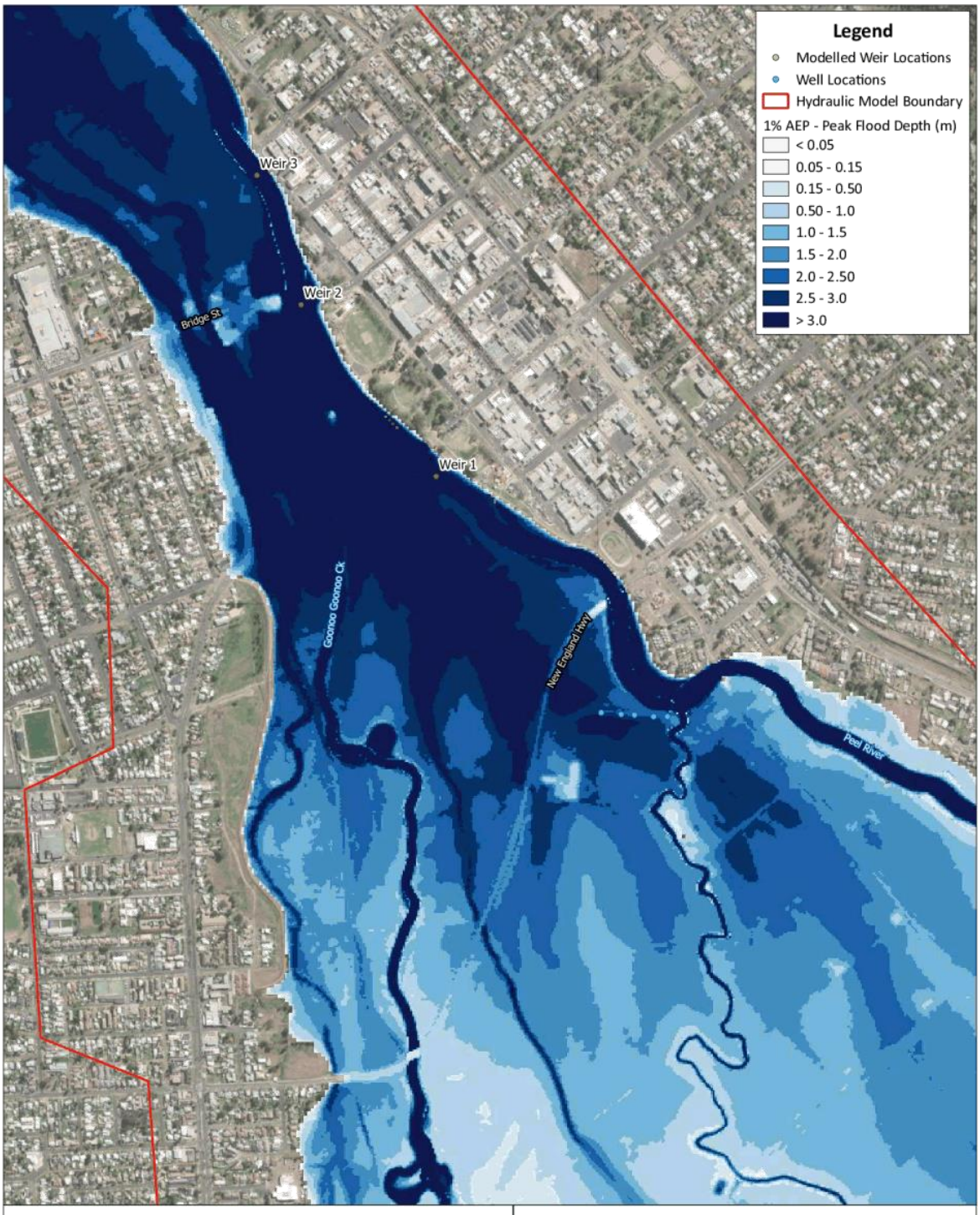

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FIGURE TITLE	Peak Water Depth - 50% AEP Design Flood - Weir Option 1	DATE	10-05-2021
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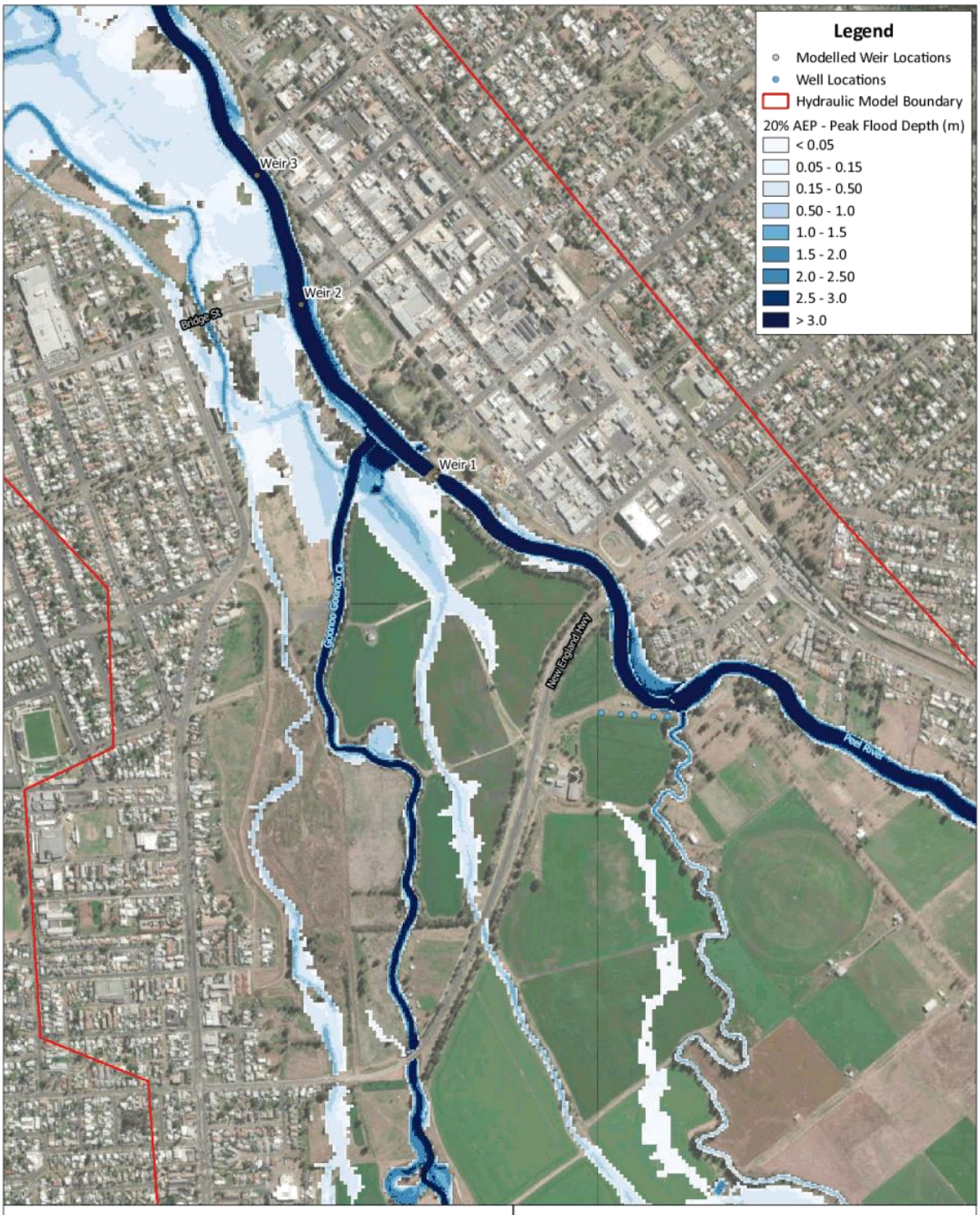

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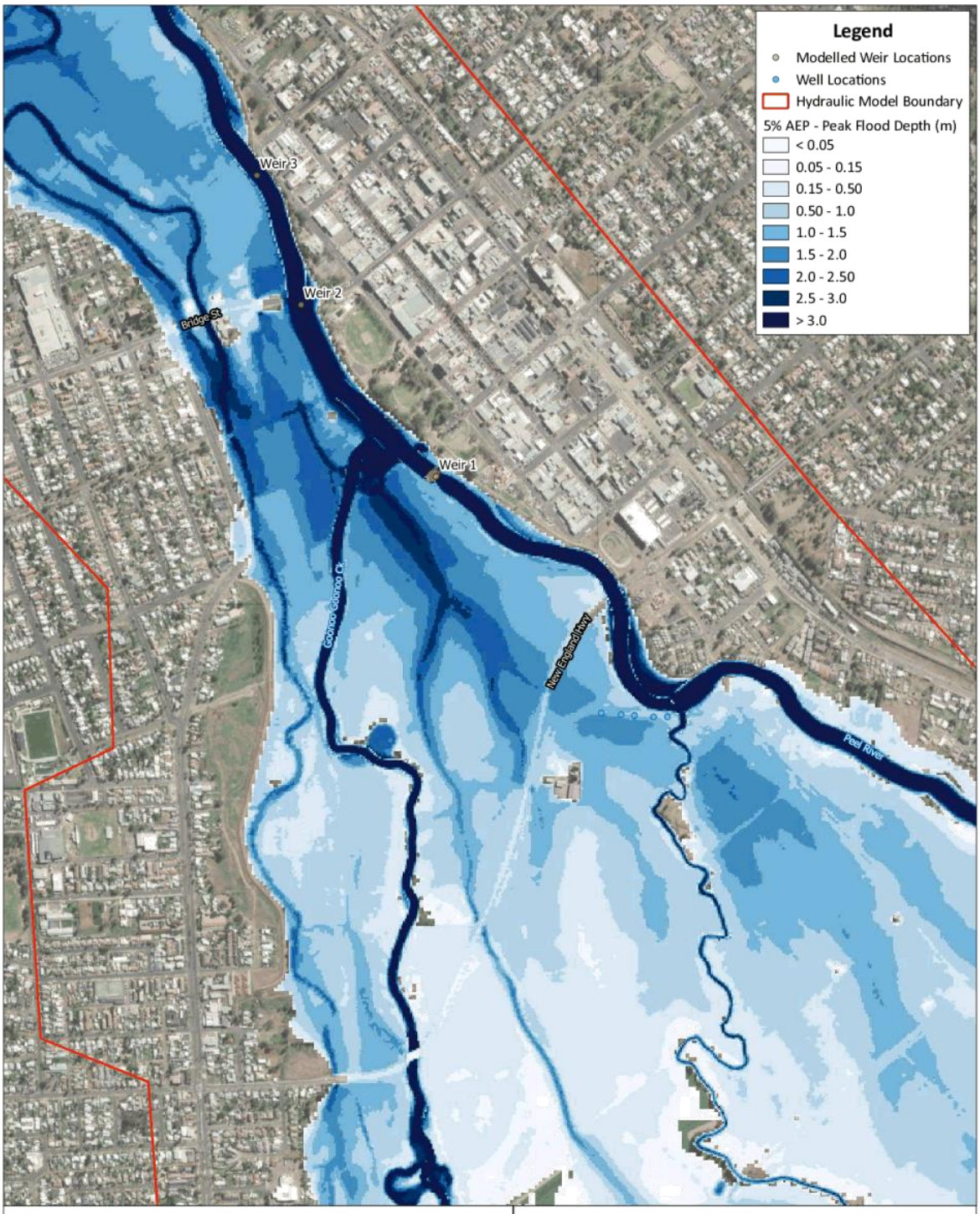

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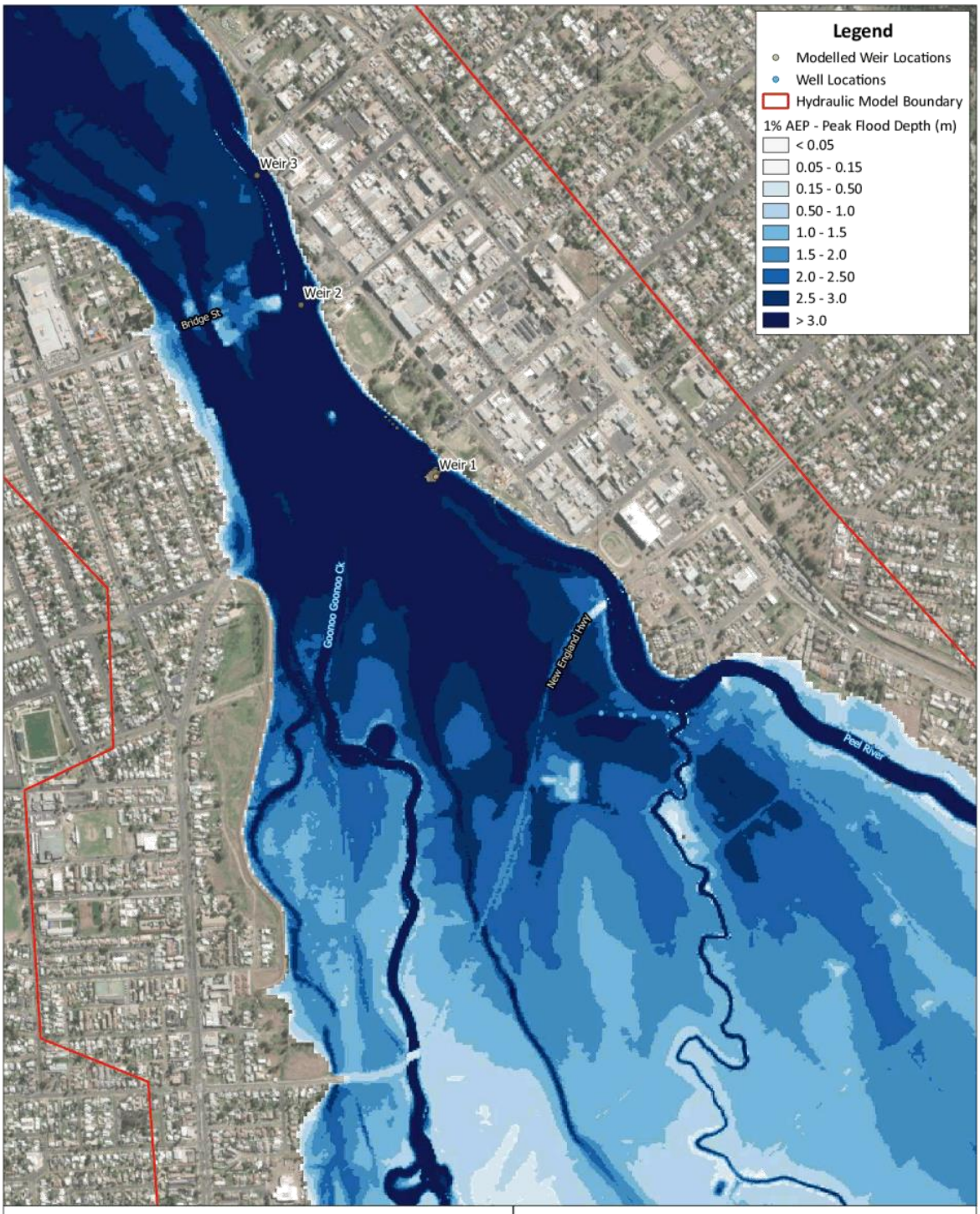

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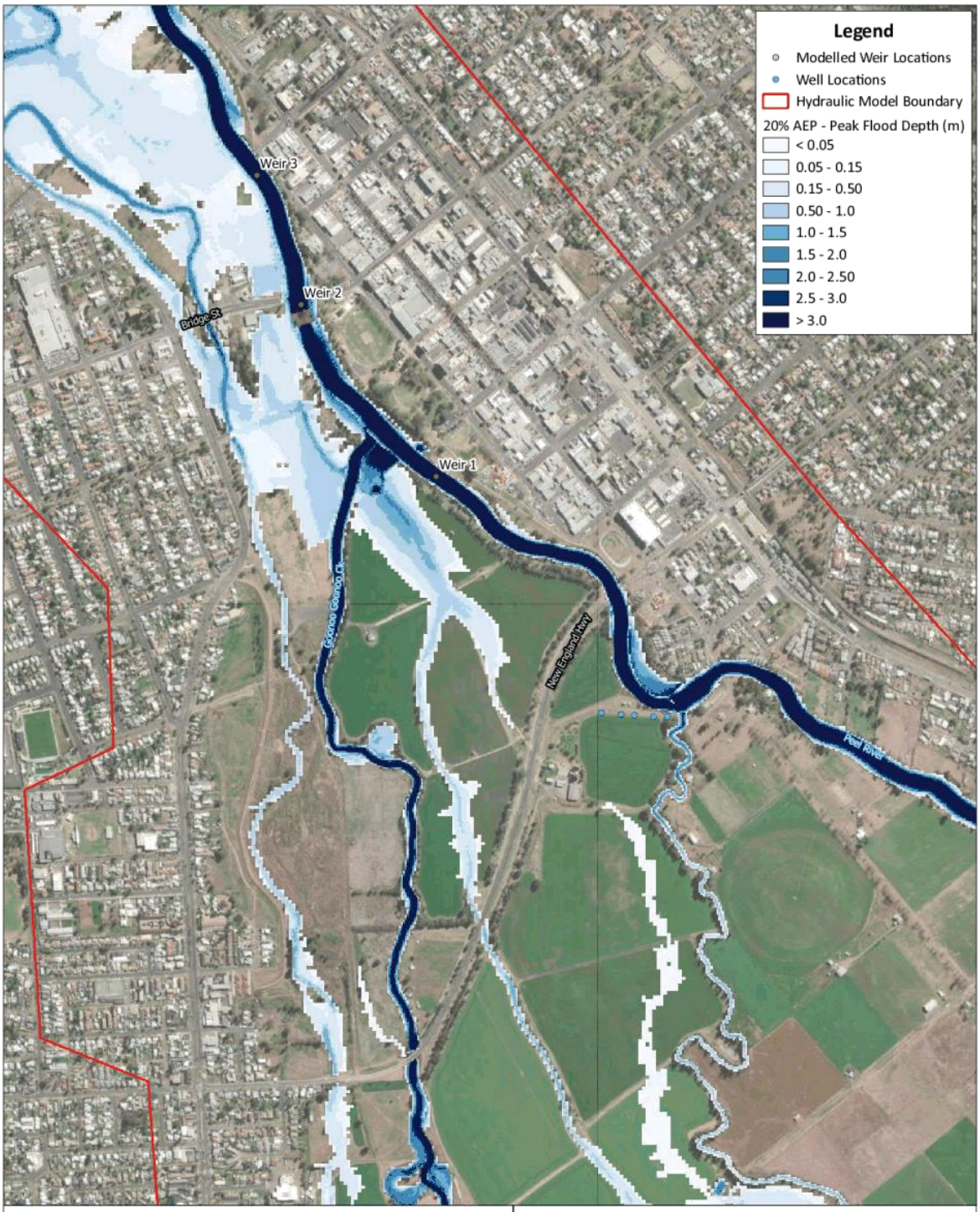

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PROJECT NO.	30013060	PROJECT TITLE	Tamworth Weir Feasibility Assessment
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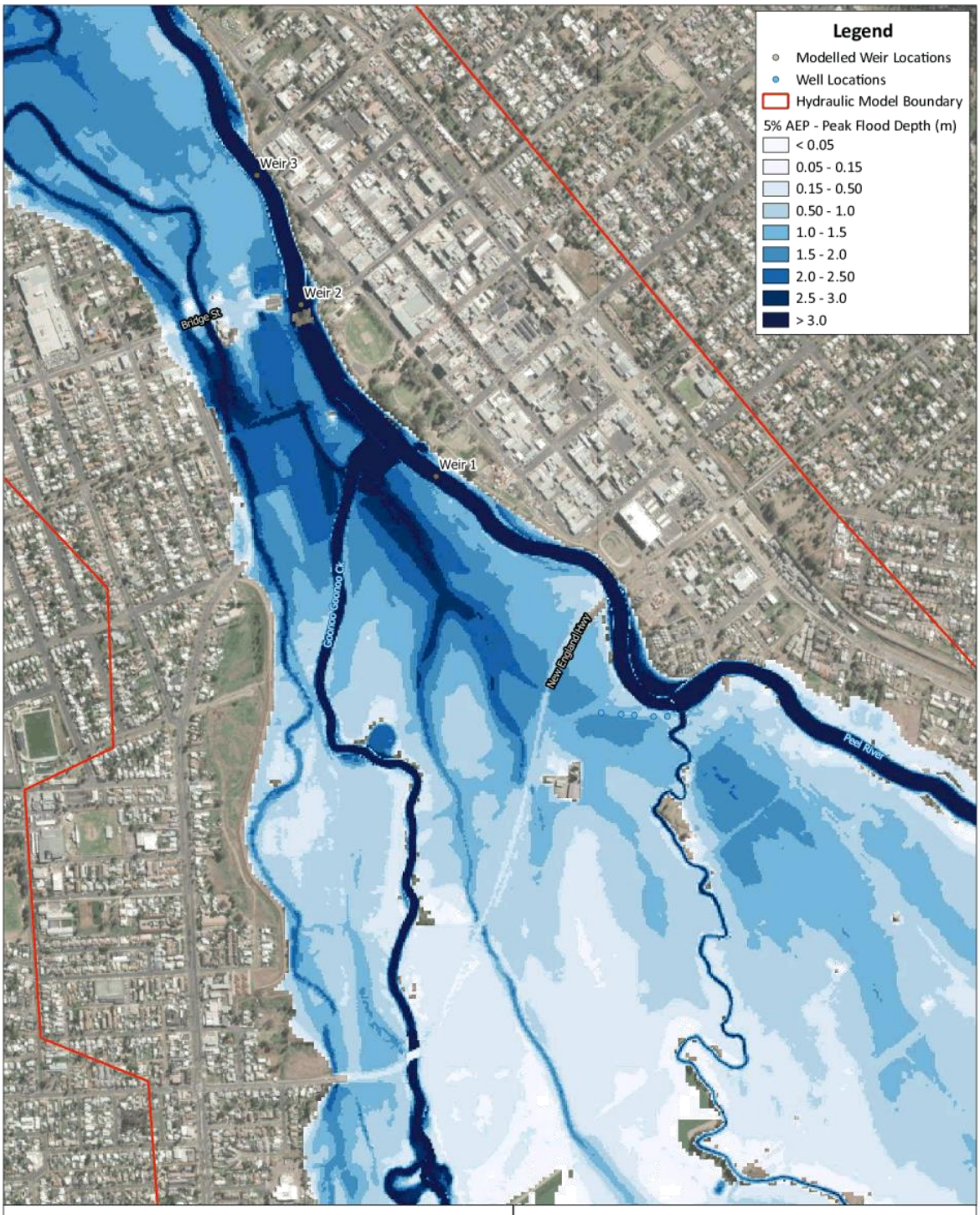

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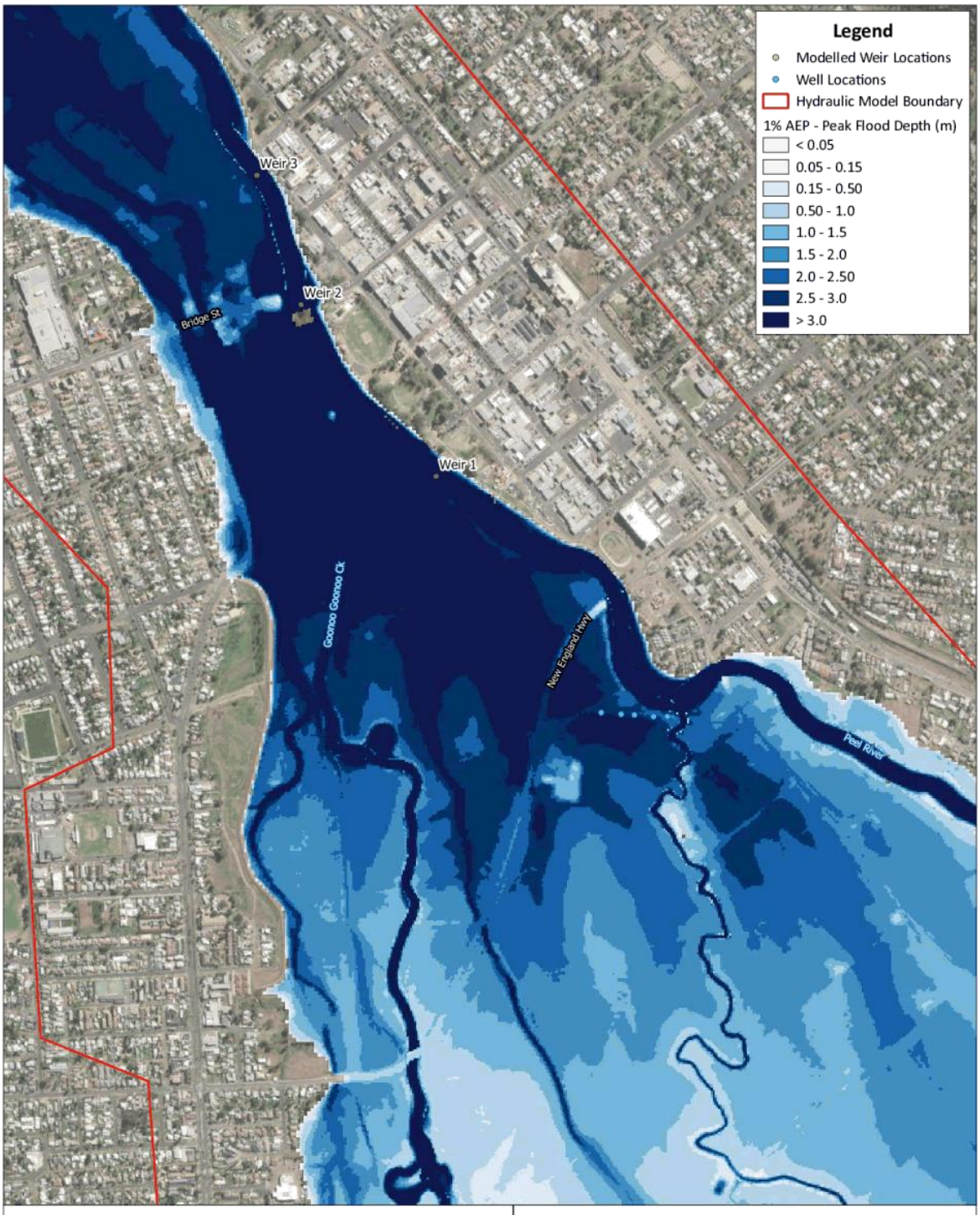

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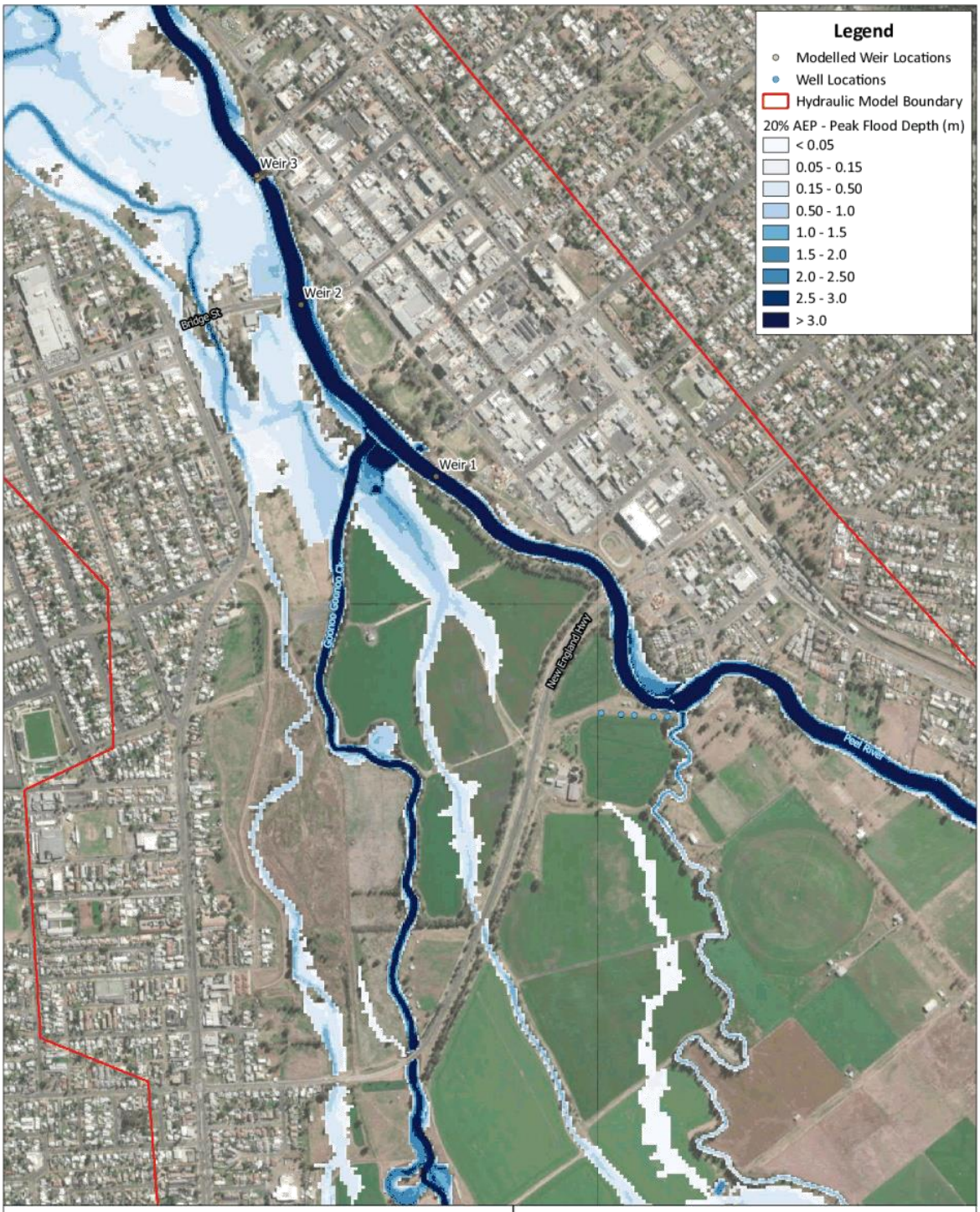

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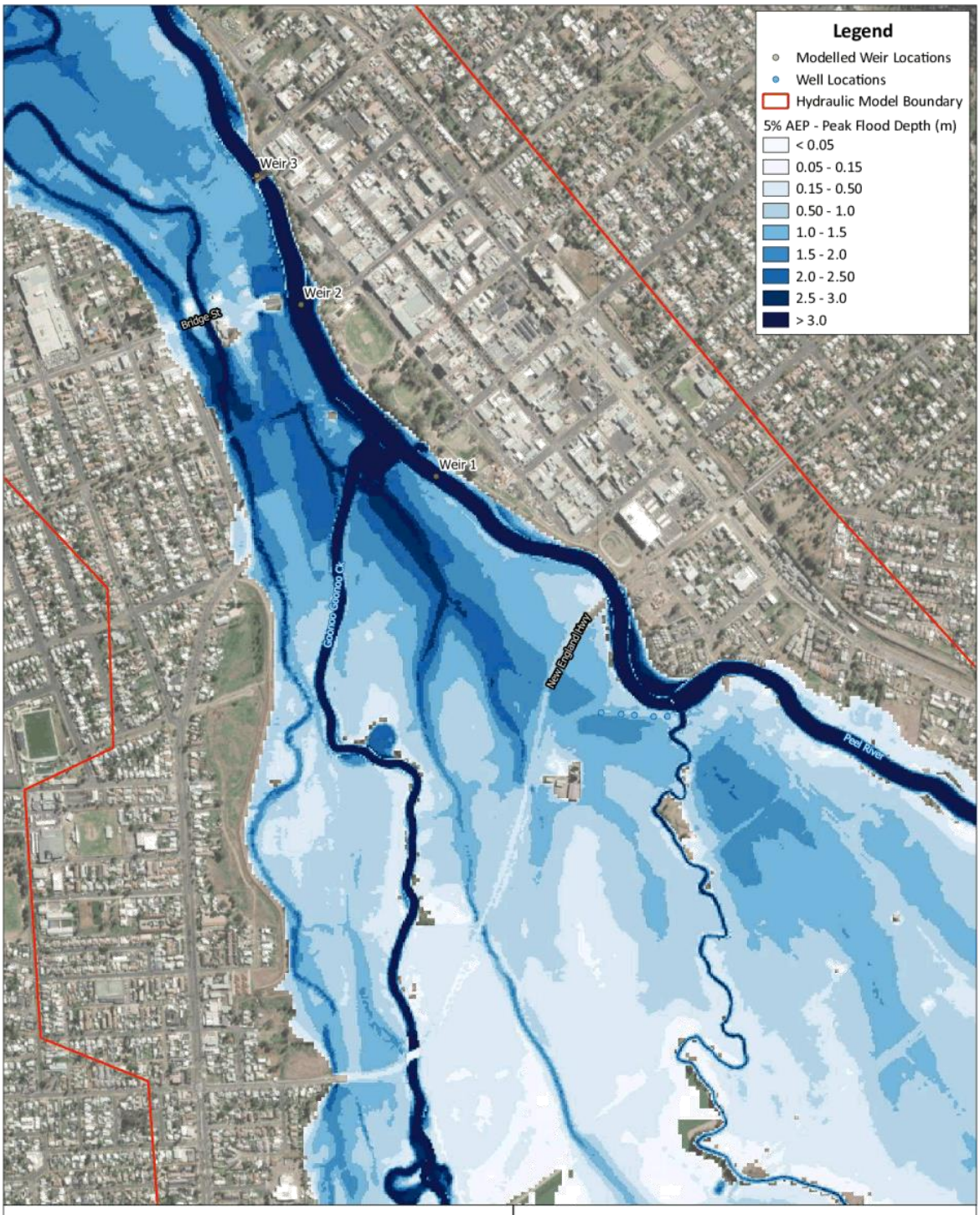

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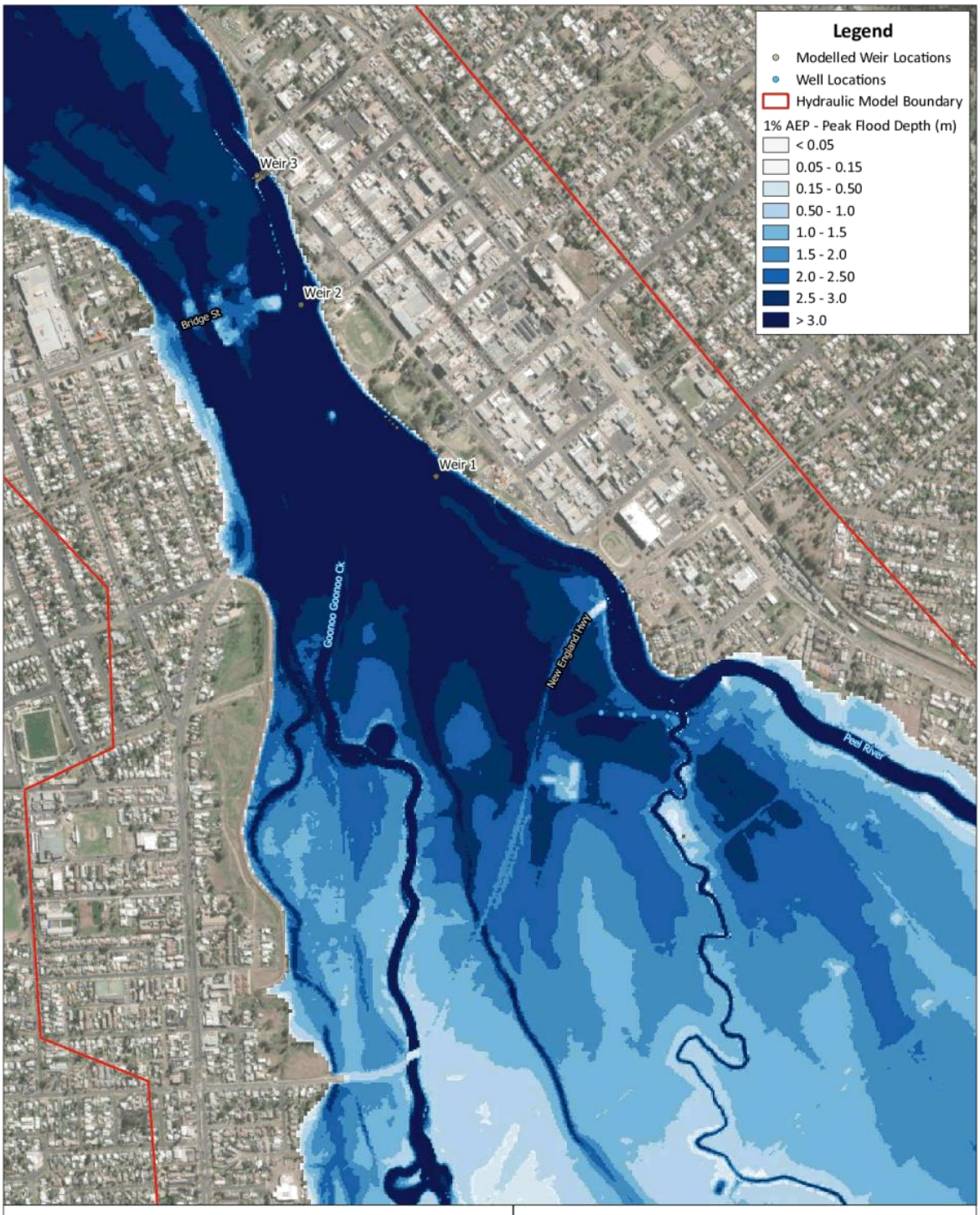

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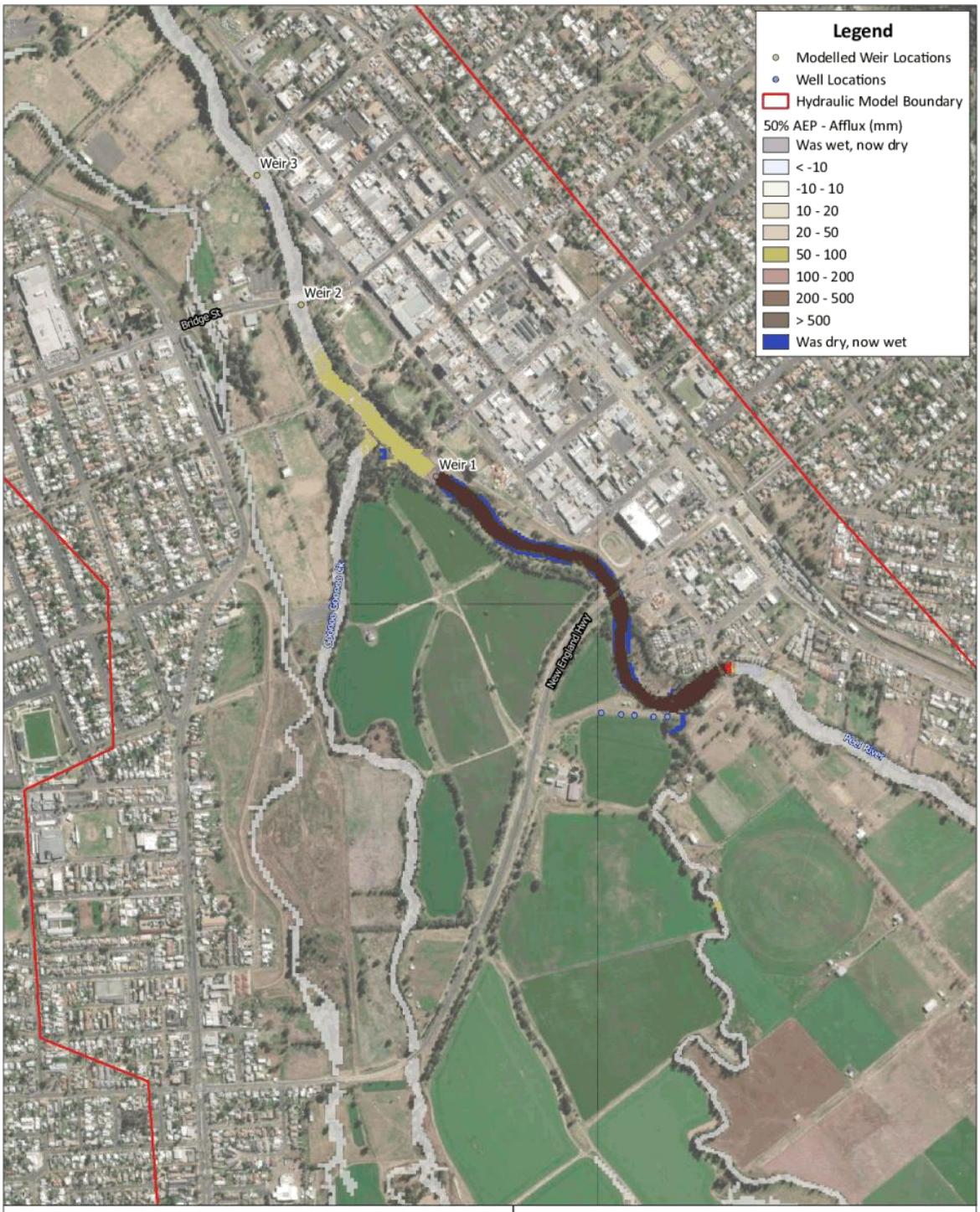

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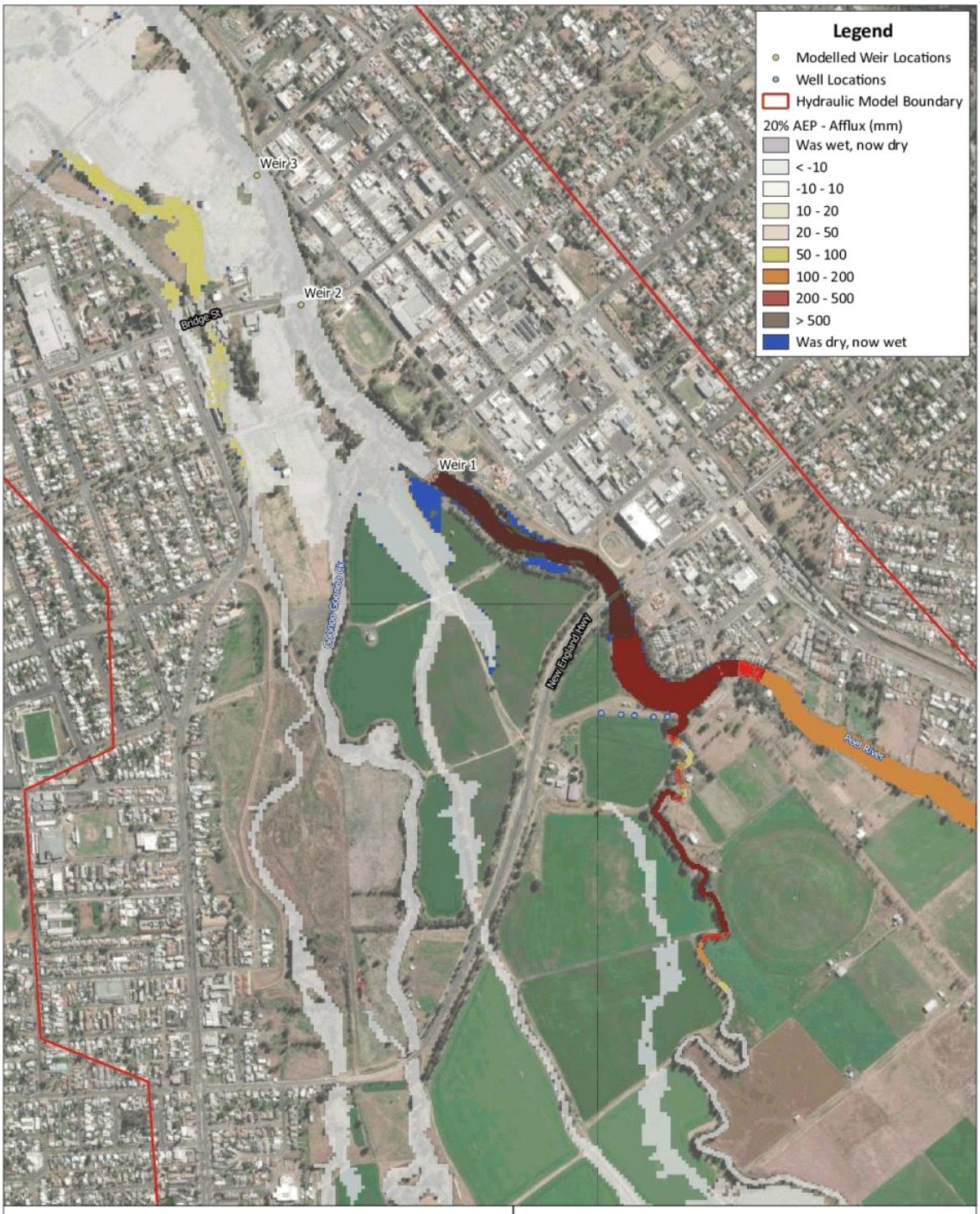

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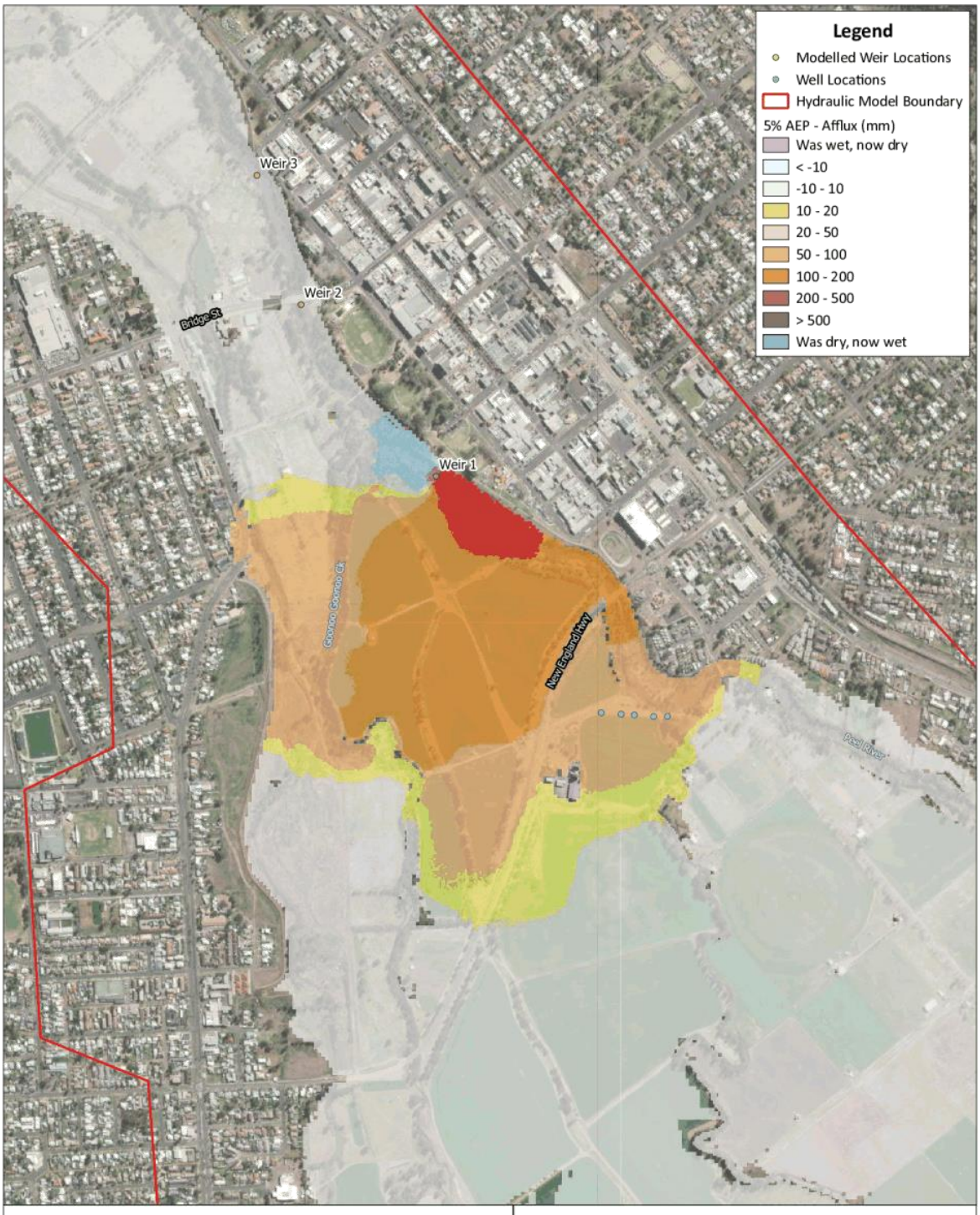

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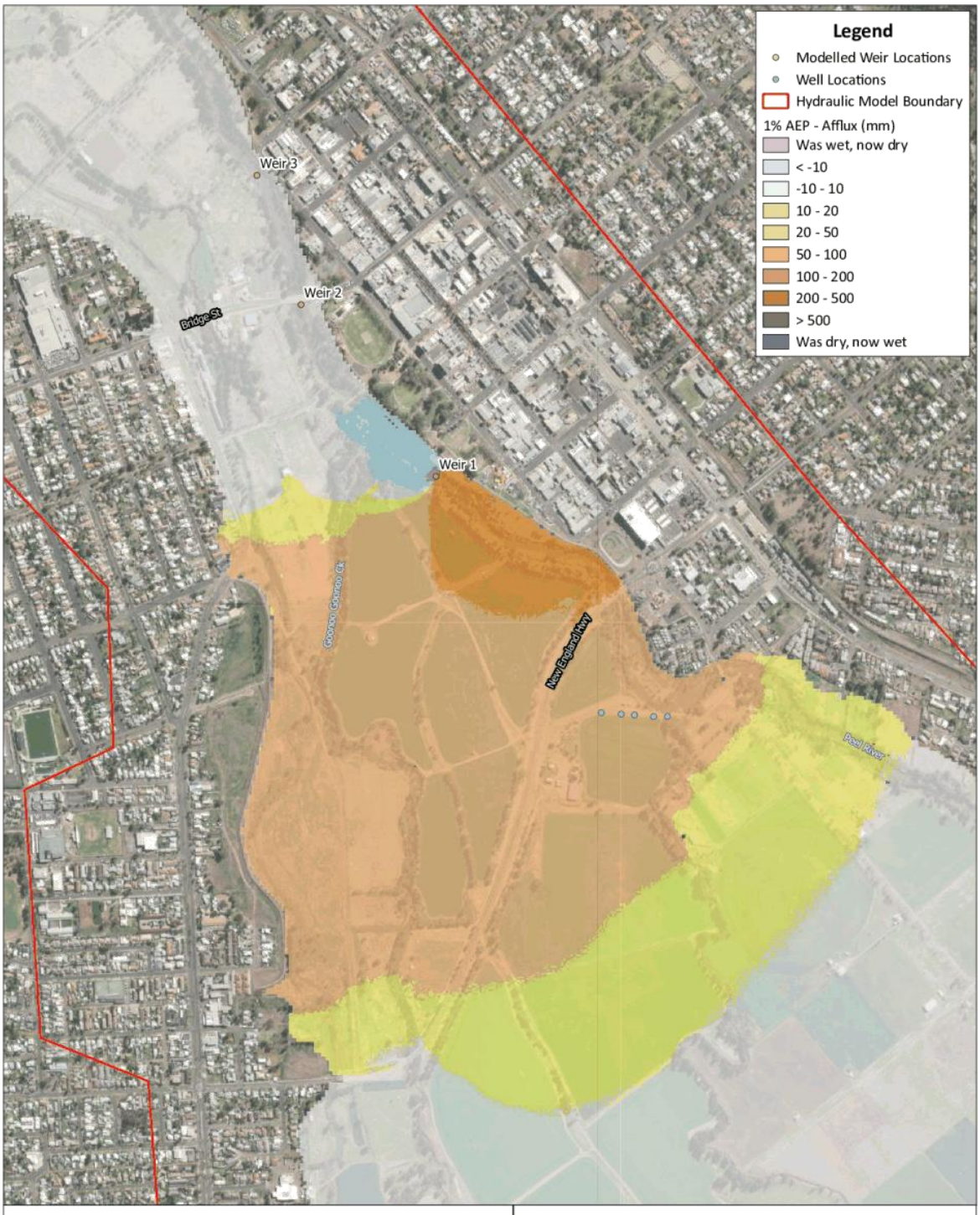

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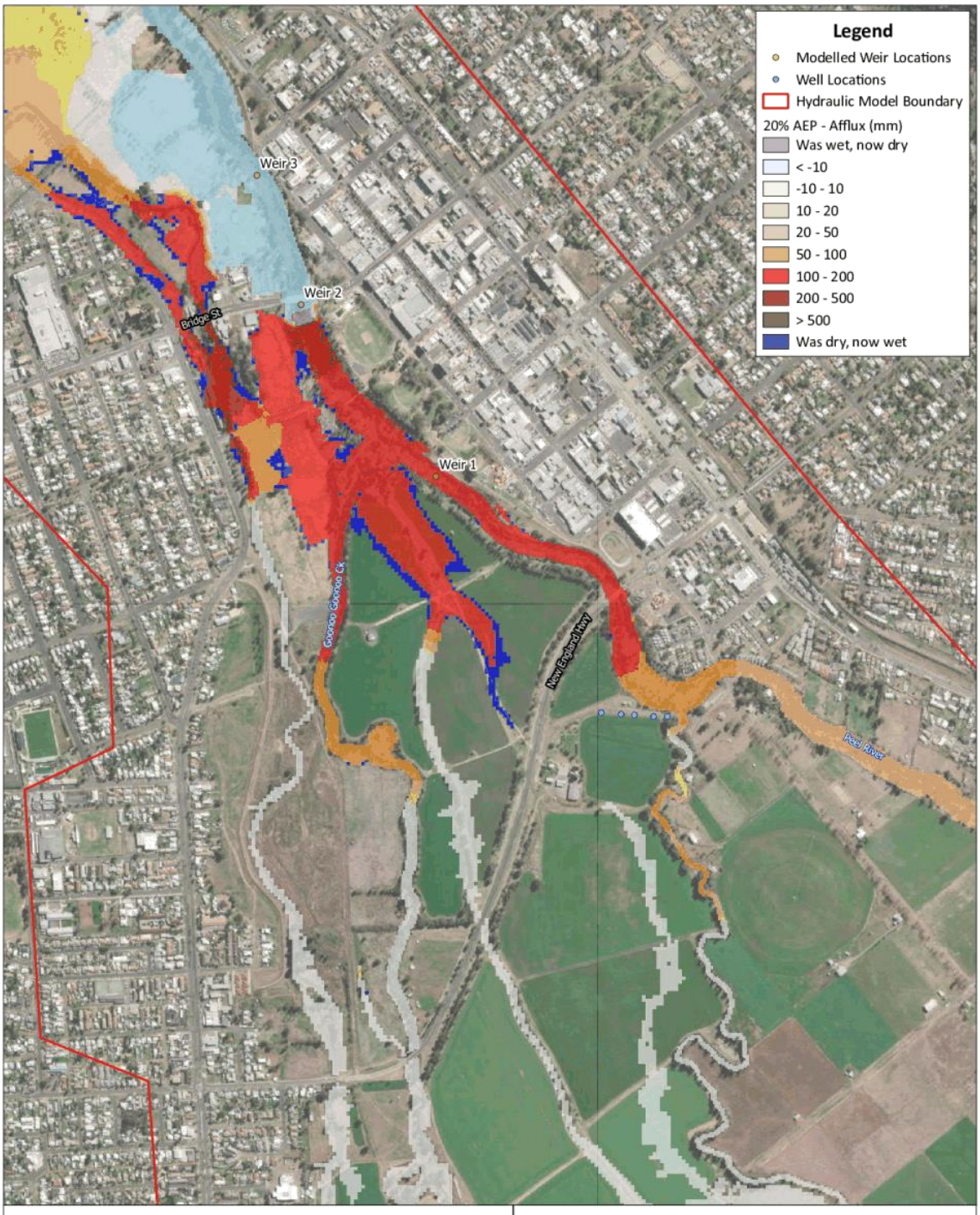

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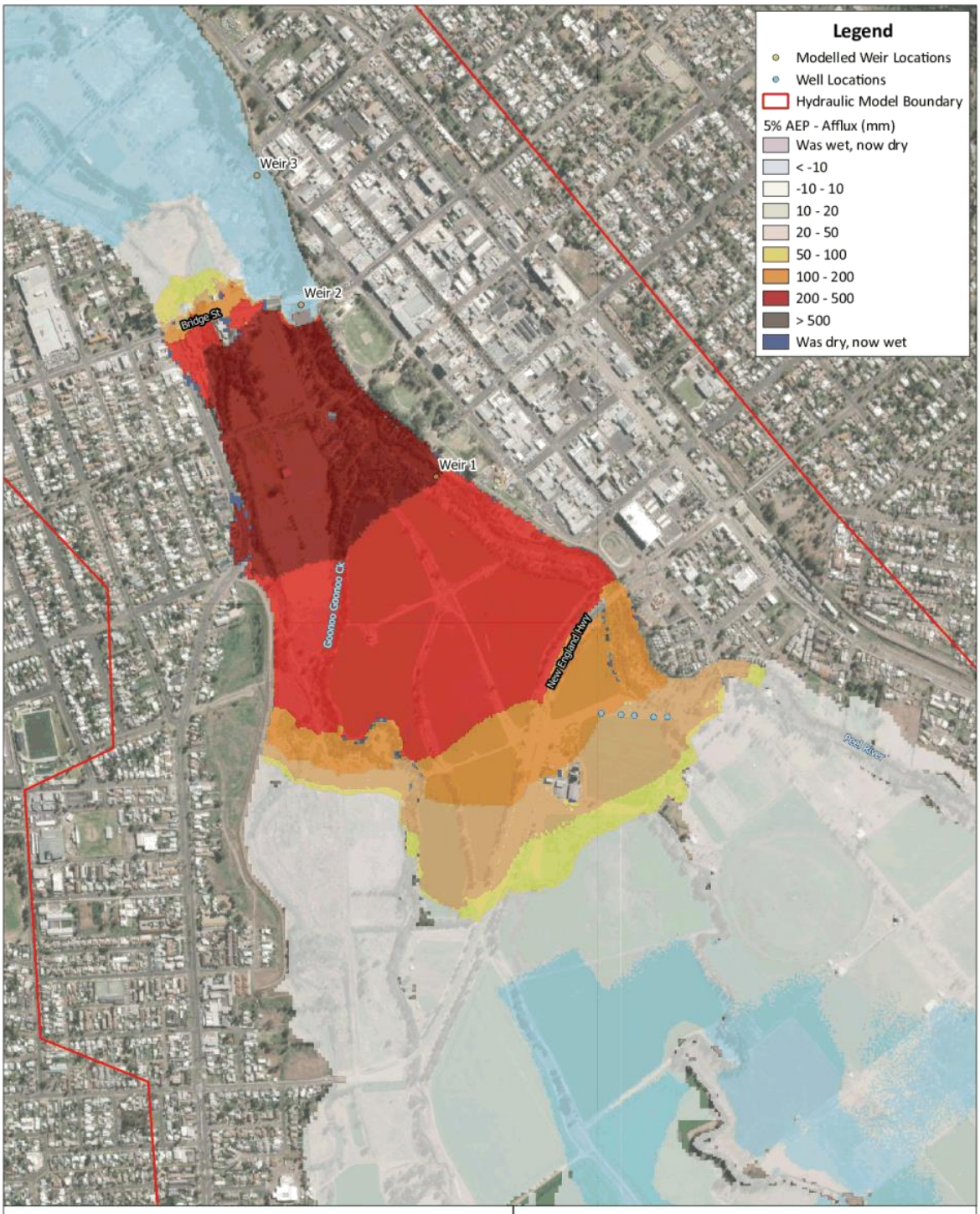

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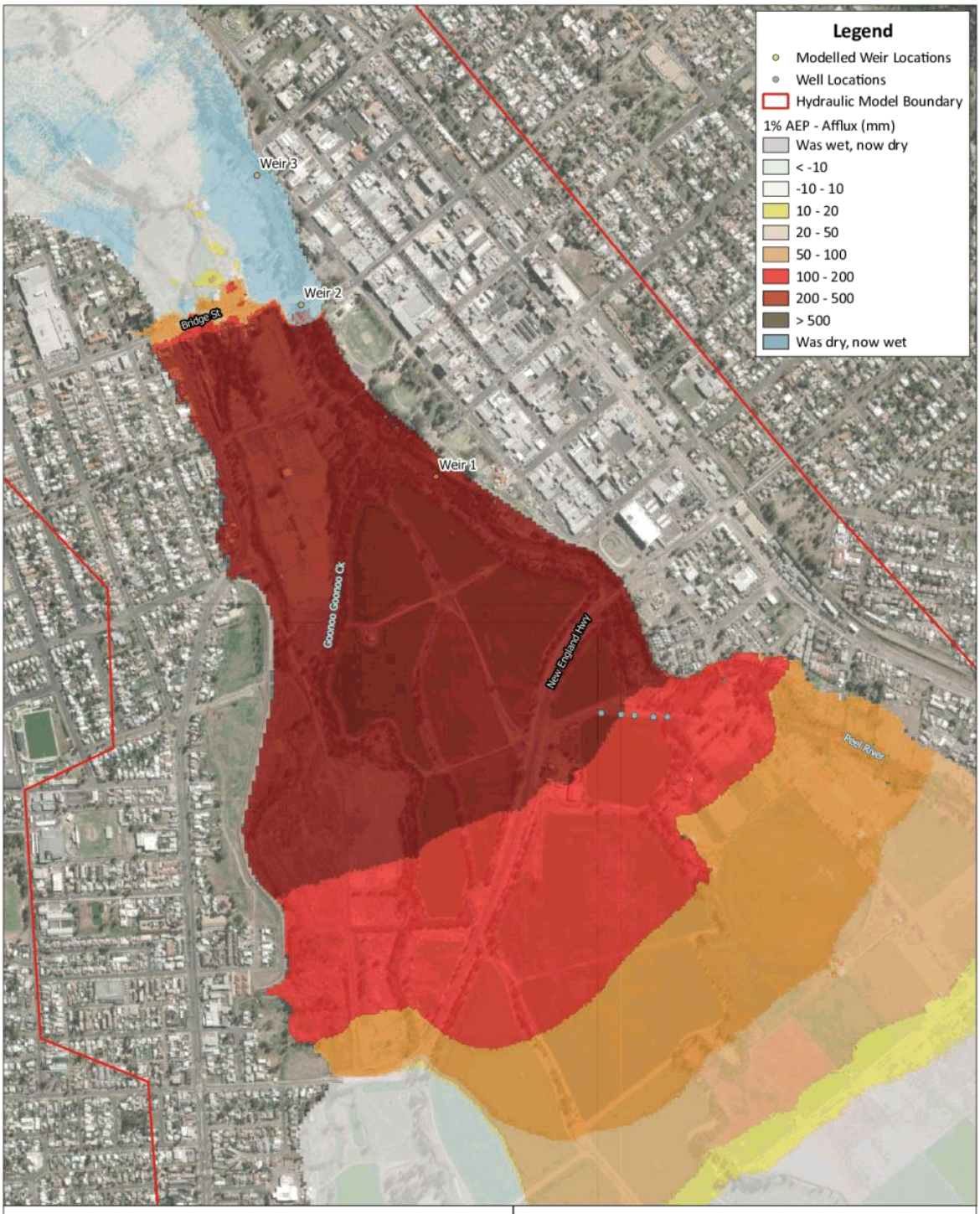

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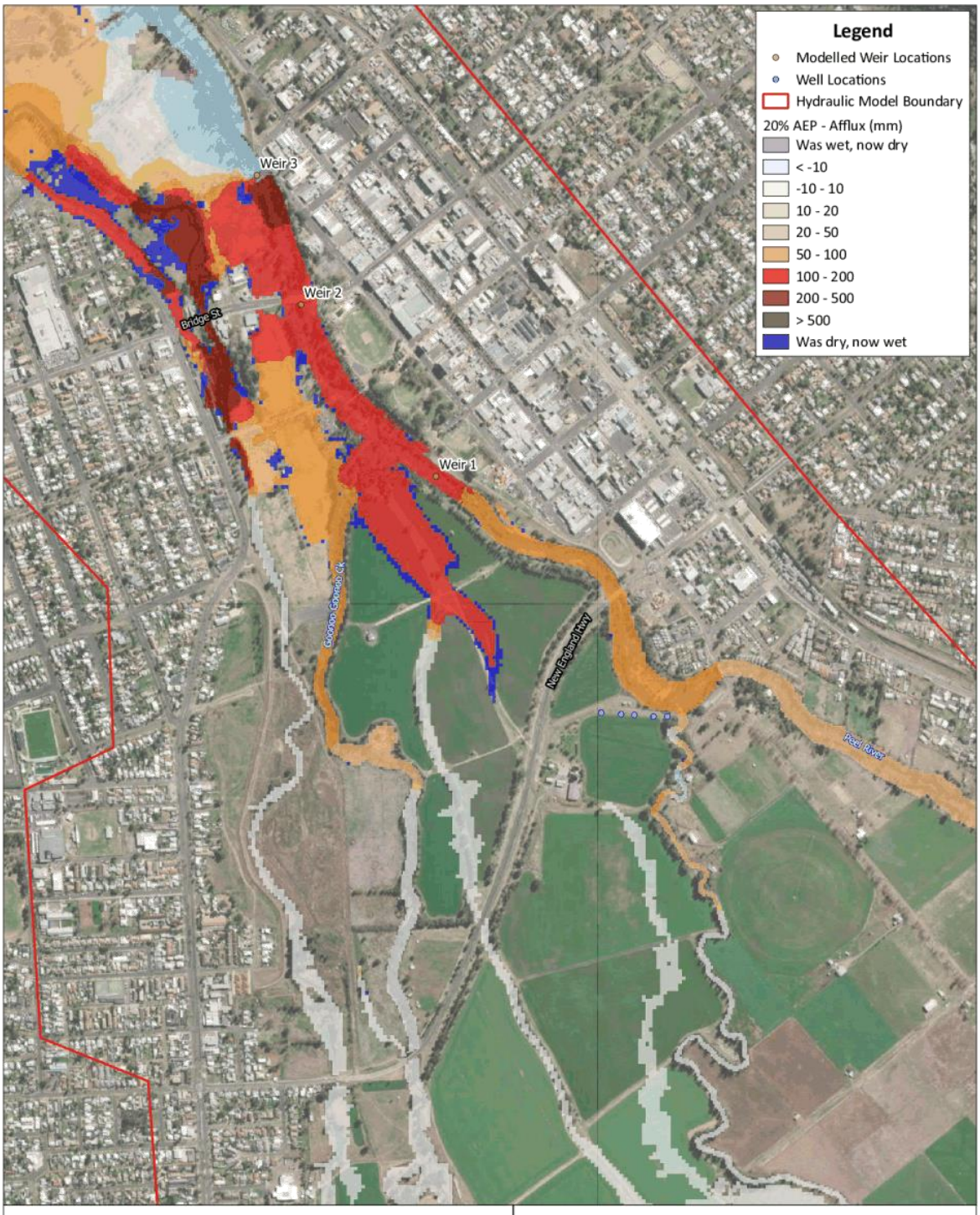

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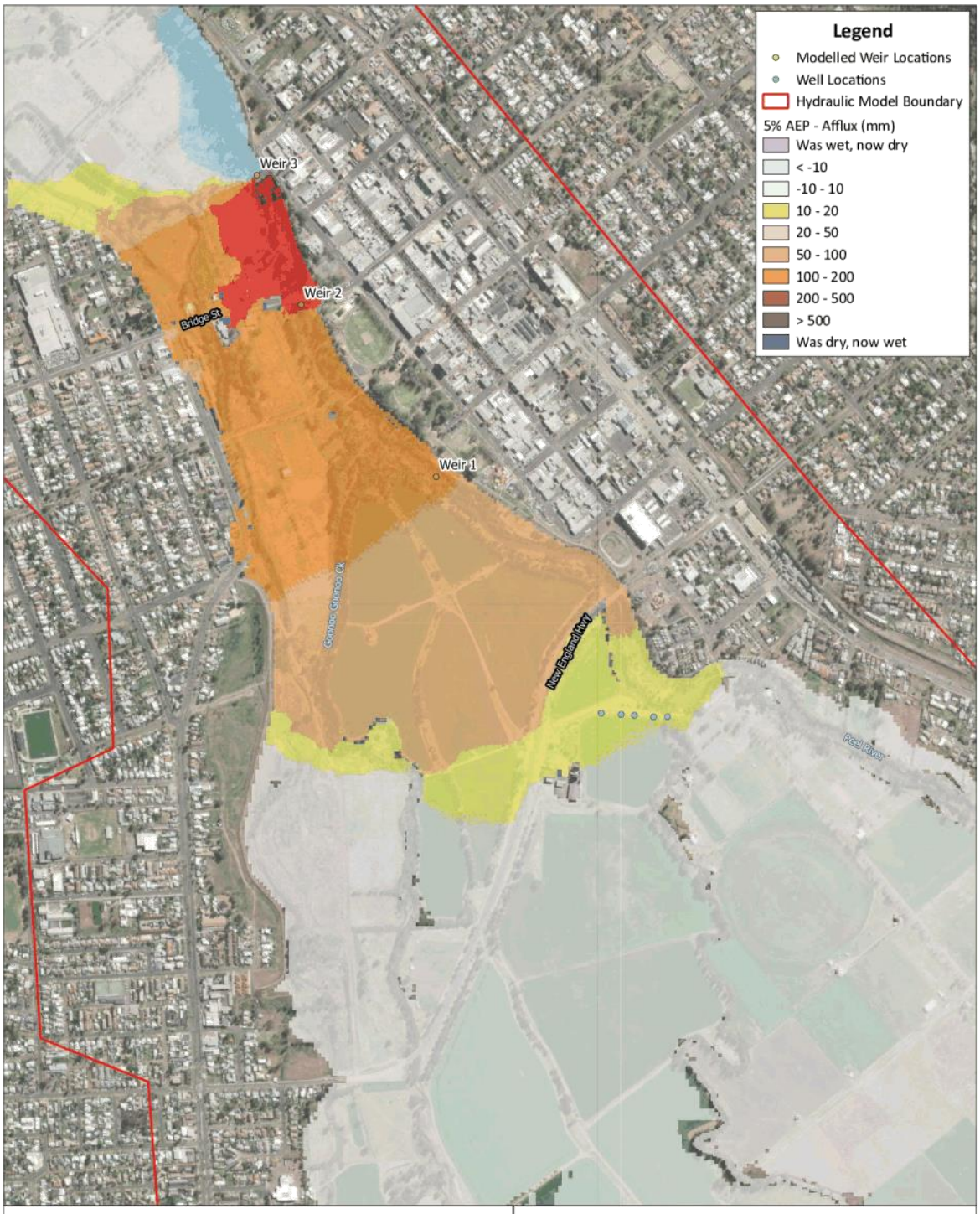

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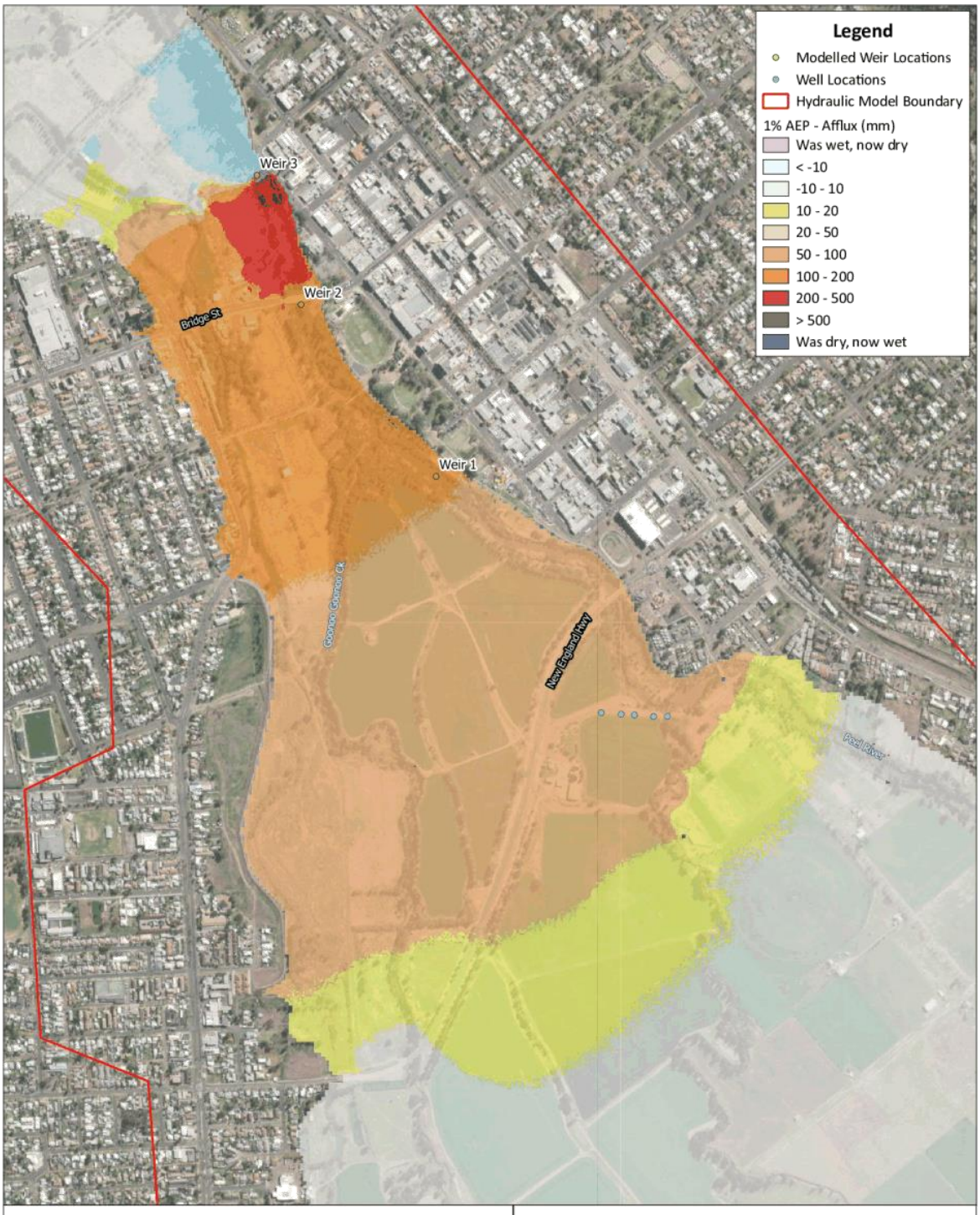

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MINUTES

Tamworth Region Arts Advisory Committee (TRAAC)

Thursday, 27 May 2021

5:00pm, Tamworth City Library

Committee Members	Representative	Attendance
Councillor	Cr Glenn Inglis (Chair)	Present
Mayor – Councillor	Mayor Cr Col Murray	Apology
Councillor	Cr Juanita Wilson	Present
Councillor	Cr Charles Impey	Apology
Arts North West	Caroline Downer	Present
Community	Paul Singh	Present
Community	Megan Trousdale	Present
Community	Lyniece Keogh	Present
Community	Frances Rodger	Present
Community	Daniel Gillett	Present
Community	Ellie Sampson	Present
TRC Staff		
Manager Cultural and Community Services	Kay Delahunt	Present
Director, Tamworth Regional Gallery and Museums	Bridget Guthrie	Present Via telephone for Public Art Update
Director, Growth & Prosperity	Jacqueline O'Neill	Apology
Manager, Entertainment Venues	Peter Ross	Present
Invited Guests		
Film Industry	Luke Oldknow	Present
Tamworth Songwriters Association	Wendy Wood	Present
Nundle Public Art	Karen Balsar	Present

1. Administration / Action

1.1. Welcome – Acknowledgment of Country

Meeting opened: 5:09pm

Cr Glenn Inglis, as Chair opened the meeting with an Acknowledgement to Country and welcomed all those in attendance.

1.2. Introductions and Apologies

Cr Inglis welcomed and introduced the guest speakers Wendy Wood - Tamworth Songwriters Association, Karen Balsar – Public Art Work for Nundle and Luke Oldknow – Electric Light Films.

Apologies were called:

Apologies were received from Mayor Cr Col Murray, Cr Charles Impey, Jacqueline O'Neill.

Moved: Daniel Gillett **Seconded:** Ellie Sampson **CARRIED**

1.3. Confirmation of Previous Minutes

11 March 2021 – Minutes accepted as read.

Resolution:

That the Minutes of the previous Tamworth Region Arts Advisory Committee (TRAAC) meeting dated 11 March, 2021 be accepted as a true and accurate record.

Moved: Megan Trousdale **Seconded:** Paul Singh **CARRIED**

1.4. Business arising from previous meeting

Action list update, from previous meeting, 11 March 2021.

Action: Jacqui to talk with Communications team about making the Your Voice Link more visible to the public on the Council webpage. https://yourvoice.tamworth.nsw.gov.au/tamworth-performing-arts-centre-and-cultural-precinct

All other actions noted as completed.

1.5. Correspondence In / Out

IN – No incoming correspondence received.

OUT – No outgoing correspondence sent.

2. Invited Guest Speakers

2.1. Electric Light Films - Luke Oldknow

www.electriclightfilms.com.au

Luke thanked the committee for inviting him to speak. Luke runs a small film production company in Tamworth, Electric Light Films, which was established in 2018. He has 20 years' experience in this industry and previously worked at NBN, PRIME to name a few.

Luke is currently focussing on trying to promote his company and our region to the bigger film production companies.

Our region has a lot to offer and Tamworth itself has a lot to offer. We are in prime position, close to major cities, coastal regions, we have beautiful diverse landscapes.

An example of a film that has been filmed regionally is, The Dry. The Dry was filmed in Victorian town Beulah. With the production of this film it engaged 120 locals and injected $1 million into the regional economy during production phase.

A good example of two Councils that promote film production through the Council website is Broken Hill and the Gold Coast.

Broken Hill, have had a number of films produced in Broken Hill and surrounding areas such as, Mad Max 2, A Town like Alice to name a few. Broken Hill Council have developed a stream lined process for permits and film policy to be accessible on their website.

The Gold Coast Council has developed a financial incentive package, to attract film production companies to film on the Gold Coast.

Luke believes Tamworth Council can help promote and attract these bigger production companies to Tamworth and the region.

Cr Inglis, opened questions and discussion to the committee.

Action: Luke Oldknow and Caroline Downer to discuss what Arts North West currently has available on its website, and consult with Peter Ross and Tamworth Regional Council Film Liaison Officer to scope the project further.

Action: Peter Ross to continue liaising with Paul Singh and Luke Oldknow and report back to the Committee on suggestions to promote and encourage film productions in the Tamworth region.

Moved: Lyniece Keogh **Seconded:** Frances Rodger **CARRIED**

2.2. Tamworth Songwriters Association - Wendy Wood

www.tsaonline.com.au

Wendy thanked the committee for inviting her to speak. The Tamworth Songwriters Association was established in 1978 and the songwriter's competition has been running since 1984. This is a not-for-profit organisation operated by volunteers. Their aim is to help promote songwriters in developing their craft through workshops and also to showcase their talent through competitions.

The orientation is to Country music; however, we recognise other genres and welcome writers of all fields.

The songwriters 2021 competition opens 1 August 2021 through to 30 September 2021. There are 16 sections in the competition. We are currently searching for sponsorship.

Cost of entry to the competition is $25 for non-members and $15 for members.

Cr Inglis opened questions and discussion to the committee.

Action: Frances Rodger is organising a meeting with Head of School UNE, Professor, Alistair Noble and will invite Wendy Wood to the meeting to discuss potential opportunities.

Action: Peter Ross will speak internally with Karlee Cole, from Communications, and discuss potentially organising something with the Conservatorium of Music and discuss further with Wendy Wood.

Moved: Frances Rodger **Seconded:** Paul Singh **CARRIED**

For notation: Daniel Gillett had to leave the meeting early.

2.3. Public Artwork for Nundle - Karen Balsar

Sculpture – "The Strength Within" Proposed Locations

The sculpture "The Strength Within" was inspired by a personal journey of a close family member's illness. The sculptures took inspiration from the delicate lantern plant as it fades, symbolizing life within death.

Potential locations for the art work to be displayed, were discussed.

Motion: Committee approve in principle the "Strength Within" public art sculpture subject to all engineering approvals and for Bridget to report to the next meeting on proposed locations.

Moved: Caroline Downer **Seconded:** Lyniece Keogh **CARRIED**

3. General Discussion

3.1. Public Art Work Update – Bridget Guthrie

Sculpture - Agree with the proposal for "Balancing the Books" to be displayed at the new Kootingal Library.

Moved: Paul Singh **Seconded:** Caroline Downer **CARRIED**

Skywhales – The display was not available on the dates of the 2021 Fiesta Fusion. Agree with the proposed dates provided that Tamworth could host "Skywhales" 22, 23, 24 April 2022.

Moved: Cr Juanita Wilson **Seconded:** Paul Singh **CARRIED**

3.2. Performing Arts Centre Update – Peter Ross

Peter provided a summary of current activities including proposed meetings with government representatives on funding opportunities.

Seeking the architect – still a work in progress, a lot of interest from architects.

3.3. Committee Suggestions

1. Tamworth Short Film Festival – Paul Singh

Paul has been liaising with Luke Oldknow to get things happening with this festival, Luke is on board with the idea and will allocate more responsibilities to Leonie to assist with the organising.

This year we will be doing a smaller festival which will be held at Forum 6 Cinemas.

Going forward as we look at promoting and advertising in advance I do believe that we will outgrow the Forum 6 Cinema and be looking at holding the festival in a park. If this does happen we would look at holding it earlier in the evening and for this to happen we would require to run the films off a LED screen. As a Committee, we could start to look at where we could seek sponsorship from.

Action: Peter Ross to continue liaising with Paul Singh and Luke Oldknow and report back to the Committee.

Moved: Megan Trousdale **Seconded:** Lyniece Keogh **CARRIED**

2. Film Production Attraction

Reference is made to the agreed actions at Item 2.1 to take this matter forward.

3. Creative Industries Film Promo – Paul Singh

Committee viewed the Film promo and congratulated Paul on the quality of the content. Further discussions to be undertaken on potential uses.

4. Annual Arts Festival – Cr Inglis

The Tamworth Region needs a dedicated Arts Weekend.

The aim is to provide an inclusive, exciting and diverse range of artistic events including, theatre, music, visual arts, crafts, dance, literature, film, comedy and children's events.

The festival would showcase new and established artists from the Tamworth regions wide and talented creative pool.

The festival will grow and evolve over time, and contribute to the social and cultural footprint of the Tamworth region.

A suggested model is a community committee (e.g. not-for-profit) comprised of a cross section of the arts community working in partnership with the Council to organise and run the weekend. The committee could be structured around artistic events and include PR and social media, finance, volunteers, venues and so forth.

An annual festival poster would be designed by a local artist. The poster would form the cover page for the festive program and be available to purchase as a framed/unframed print.

Sponsors would be sourced.

A free weekend in Spring could be identified and a suggested start date would be 2022.

These are all ideas and to be discussed and scoped out further.

5. Song Writers Competition

Defer this Item to next meeting.

6. Let's Grow Our Creative and Cultural Industries (Blueprint look)

Defer this Item to next meeting.

7. Recovery of our Arts and Cultural sector from Covid-19

Defer this Item to next meeting.

Committee Processes

Frances Rodger asked the Chair for clarification around if in between Committee meetings would it be ok for members to be emailing and being in contact with each other?

Cr Inglis in response encouraged active communication between members and noted that sending emails to Committee members between meetings is ok and that all members have been provided with each other's email addresses.

Lyniece noted that she found Frances's question of clarity timely and sort further advice on exactly what is the role of members, particularly as relating to making decisions.

Cr Inglis noted, that as a committee member, you would have read the Committee Charter and be familiar with the role of the Committee. We are here to make recommendations to Council, sometimes we will be requesting support, sometimes we will be putting forward specific recommendations to the Council who will make the final decision. In summary, we are an Advisory Committee only and have no delegated authority to make final decisions that bind the Council.

4. Standing Reports

4.1. Tamworth Gallery and Museum Report – Provided by Bridget Guthrie

Motion: That the Tamworth Gallery and Museum Report be received and noted.

Moved: Paul Singh **Seconded:** Lyniece Keogh **CARRIED**

4.2. Entertainment Venues Report – Presented by Peter Ross

Dine & Discover vouchers expire 30 June 2021. Entertainment venues are offering you the option to use your voucher to purchase a gift card voucher for future use.

Motion: That Entertainment Venues Report be received and noted.

Moved: Paul Singh **Seconded:** Megan Trousdale **CARRIED**

5. General Business

5.1 Nundle Artwork

Megan brought in a vintage inspired poster designed by local artist, Natasha Soonchild. Natasha was commissioned to design a piece of artwork to capture the natural beauty of the landmark rock outcrop, The Hanging Rock. The Prints are available for purchase in A3 Prints and Postcards and can be purchased online from Natasha Soonchild and in local Nundle stores, Exchangestores Nundle and Sacs on Jenkins, Nundle.

5.2 Reconciliation Day

Kay noted that it is Reconciliation Day and the Library is giving away "Old Man" Saltbush plants and encouraged everyone to take a plant home.

Cr Inglis thanked everyone for attending the meeting.

Meeting Closed: 7:23pm