



## **SERVICES POLICY COMMITTEE**

# **AGENDA**

**9 JULY 2024**

Notice is hereby given, in accordance with the provisions of the Local Government Act 1993 that a **SERVICES POLICY COMMITTEE MEETING of ORANGE CITY COUNCIL** will be held in the **COUNCIL CHAMBER, CIVIC CENTRE, BYNG STREET, ORANGE** on **Tuesday, 9 July 2024**.

David Waddell

**CHIEF EXECUTIVE OFFICER**

For apologies please contact Executive Support on 6393 8391.

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## AGENDA

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## **1 INTRODUCTION**

### **1.1 DECLARATION OF PECUNIARY INTERESTS, SIGNIFICANT NON-PECUNIARY INTERESTS AND LESS THAN SIGNIFICANT NON-PECUNIARY INTERESTS**

The provisions of Chapter 14 of the Local Government Act, 1993 (the Act) regulate the way in which Councillors and designated staff of Council conduct themselves to ensure that there is no conflict between their private interests and their public role.

The Act prescribes that where a member of Council (or a Committee of Council) has a direct or indirect financial (pecuniary) interest in a matter to be considered at a meeting of the Council (or Committee), that interest must be disclosed as soon as practicable after the start of the meeting and the reasons given for declaring such interest.

As members are aware, the provisions of the Local Government Act restrict any member who has declared a pecuniary interest in any matter from participating in the discussion or voting on that matter, and requires that member to vacate the Chamber.

Council's Code of Conduct provides that if members have a non-pecuniary conflict of interest, the nature of the conflict must be disclosed. The Code of Conduct also provides for a number of ways in which a member may manage non pecuniary conflicts of interest.

### **RECOMMENDATION**

It is recommended that Committee Members now disclose any conflicts of interest in matters under consideration by the Services Policy Committee at this meeting.





## 2 COMMITTEE MINUTES

### 2.1 MINUTES OF THE CULTURAL HERITAGE COMMUNITY COMMITTEE 17 JUNE 2024

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RECORD NUMBER: 2024/1025

AUTHOR: Alison Russell, Community Museum and Heritage Manager

#### EXECUTIVE SUMMARY

The Cultural Heritage Community Committee met on 17 June 2024. The Minutes of that meeting are tabled for the Council's attention.

#### LINK TO DELIVERY/OPERATIONAL PLAN

The recommendation in this report relates to the Delivery/Operational Plan strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".

#### FINANCIAL IMPLICATIONS

Nil

#### POLICY AND GOVERNANCE IMPLICATIONS

Nil

#### RECOMMENDATION

- 1 That Council acknowledge the reports presented to the Cultural Heritage Community Committee Meeting held on 17 June 2024.
- 2 That Council determine recommendations 3.1 and 4.1 from the minutes of the Cultural Heritage Community Committee meeting of 17 June 2024.
  - 3.1  
*That Council write to the Minister of Heath on the subject of the Centenary of Bloomfield Hospital to enquire if any events are planned and to seek funding and support to recognise the Centenary.*
  - 4.1  
*1. That Council staff determine a method to include additional information on the walking trail of Banjo Paterson Memorial Park and means for that information to be disseminated within available budget.*  
*4.1*  
*2. That Newman Park WWI Memorial Avenue of Trees be included in the Committee Action Plan.*
- 3 That the remainder of the minutes of the Cultural Heritage Community Committee from its meeting held on 17 June 2024 be adopted.

#### FURTHER CONSIDERATIONS

Consideration has been given to the recommendation's impact on Council's service delivery; image and reputation; political; environmental; health and safety; employees; stakeholders and project management; and no further implications or risks have been identified.

**SUPPORTING INFORMATION**

The Committee at item 4.1(1) resolved that:

**That the existing promotional brochure on Banjo Paterson be expanded to include a walking trail of Banjo Paterson Memorial Park with a QR to more information be available from the Orange Visitor Information Centre.**

As this recommendation of the committee involves the allocation of resources and operational actions, the staff recommended resolution removes these elements.

**ATTACHMENTS**

- 1 CHCC 17 June 2024 Minutes
- 2 CHCC 17 June 2024 Agenda, D24/63753 [↓](#)

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# ORANGE CITY COUNCIL

## MINUTES OF THE

## CULTURAL HERITAGE COMMUNITY COMMITTEE

HELD IN LIBRARY STAFF ROOM, LEVEL 1 ORANGE CITY LIBRARY, BYNG STREET, ORANGE

ON 17 JUNE 2024

COMMENCING AT 5.30PM

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### 1 INTRODUCTION

#### ATTENDANCE

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Cr G Power (Deputy Mayor) (Chairperson), Cr D Mallard, Cr J Whitton, Mr Stephen Nugent, Ms Alice Williams, Miss Elizabeth Griffin, Ms Alexandra Rezko, Mr Charles Everett, Mr William Tuck, Mr Reg Kidd, Ms Jennifer Lacey, Mr David Sykes, Uncle Neil Ingram Senior, Jordon Moore, Director Community, Recreation and Cultural Services, Manager Development Assessments, Senior Planner, Museum and Heritage Coordinator

#### 1.1 Apologies and Leave of Absence

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Nil.

#### 1.2 Acknowledgement of Country

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The Chairperson conducted an Acknowledgement of Country.

#### 1.3 Declaration of pecuniary interests, significant non-pecuniary interests and less than significant non-pecuniary interests

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Nil.

### 2 PREVIOUS MINUTES

#### RESOLVED

**Mrs E Griffin/Mr G Ingram**

That the Minutes of the Meeting of the Cultural Heritage Community Committee held on 18 March 2024 (copies of which were circulated to all members) be and are hereby confirmed as a true and accurate record of the proceedings of the Cultural Heritage Community Committee meeting held on 18 March 2024.

### 3 PRESENTATIONS

#### 3.1 DISCUSSION BY MR CHARLES EVERETT ON BLOOMFIELD HOSPITAL TURNING 100 YEARS OLD IN 2025.

TRIM REFERENCE: 2024/752

Mr Charles Everett spoke on the history of Bloomfield Hospital and advised the Committee that it will be 100 years in 2025 since the hospital opened on 6 November 1925. Mr Everett suggested that a way to recognise the Centenary would be to celebrate with a weekend or event for current and past staff of the hospital. In 1932 there were 1100 patients and 195 staff, this would have been a large population of the city employed at Bloomfield.

The railway line to Bloomfield played an important part in the history of the site. To commence the building of the hospital, approximately 80 (eighty) workers from Gladesville Mental Hospital were transported to Orange by train to assist with the work on the foundations and building of the hospital.

It was suggested that a committee would need to be established to assist with the organisation of an event discussion held with Bloomfield Hospital Management on a program of events. Mr Everett also enquired if the Department of Health is considering celebrating the 100 year of Bloomfield Hospital.

#### RECOMMENDATION

Mr C Everett/Mr R Kidd

That Council write to the Minister of Health on the subject of the Centenary of Bloomfield Hospital to enquire if any events are planned and to seek funding and support to recognise the Centenary.

#### 3.2 UPDATE FROM MEMBERS OF THE WORKING PARTY TO RECOGNISE SIGNIFICANT ABORIGINAL PEOPLE AND PLACES IN ORANGE

TRIM REFERENCE: 2024/753

The committee was advised by Council's Community Museum and Heritage Manager that the working party have been meeting with the Aboriginal Elders group since February 2024 to identify significant families names from the Aboriginal Resettlement Program. Council staff will continue to work with the Elders Group to develop a press release seeking wider community input to families and names.

#### RECOMMENDATION

Mr Uncle Neil Ingram Senior/Mr G Ingram

That the presentation by the Community Museum and Heritage Manager be acknowledged.

## 4 GENERAL REPORTS

### 4.1 CULTURAL HERITAGE COMMUNITY COMMITTEE ACTION PLAN - JUNE 2024

TRIM REFERENCE: 2024/754

**RECOMMENDATION****Mr S Nugent/Cr G Power**

1. That the existing promotional brochure on Banjo Paterson be expanded to include a walking trail of Banjo Paterson Memorial Park with a QR to more information be available from the Orange Visitor Information Centre.
2. That Newman Park WWI Memorial Avenue of Trees be included in the Committee Action Plan.

### 4.2 ESTABLISHMENT OF WORKING PARTY - 2025 CULTURAL HERITAGE AWARDS

TRIM REFERENCE: 2024/755

**RECOMMENDATION****Mr S Nugent/Mrs E Griffin**

That the report on the Establishment of a Working Party to assist with the 2025 Cultural Heritage Awards be acknowledged.

### 4.3 RECOGNITION - FORGOTTEN DIGGERS OF WWI - ORANGE GENERAL CEMETERY

TRIM REFERENCE: 2024/756

**RECOMMENDATION****Mr C Everett/Mrs E Griffin**

That the report on Program to recognise Forgotten Diggers of WWI located at Orange General Cemetery be acknowledged.

**RESOLVED****Cr G Power/Cr D Mallard**

The Chair thanked members of the Committee for their dedication and commitment to protecting and conserving the city's heritage during the past term of Council.

**THE MEETING CLOSED AT 6.35PM.**



## **CULTURAL HERITAGE COMMUNITY COMMITTEE**

# **AGENDA**

**17 JUNE 2024**

Notice is hereby given, in accordance with the provisions of the Local Government Act 1993 that a **CULTURAL HERITAGE COMMUNITY COMMITTEE MEETING of ORANGE CITY COUNCIL** will be held in the **LOCAL STUDIES ROOM, ORANGE CITY LIBRARY, BYNG STREET, ORANGE** on **Monday, 17 June 2024** commencing at **5.30PM**.

David Waddell

**CHIEF EXECUTIVE OFFICER**

For apologies please contact Alison Russell on 6393 8170.

AGENDA

EVACUATION PROCEDURE

In the event of an emergency, the building may be evacuated. You will be required to vacate the building. The Committee Clerk will now identify the emergency muster point.

Under no circumstances is anyone permitted to re-enter the building until the all clear has been given and the area deemed safe by authorised personnel.

In the event of an evacuation, a member of Council staff will assist any member of the public with a disability to vacate the building.

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**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024**

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**1 INTRODUCTION****MEMBERS**

Cr G Power (Deputy Mayor) (Chairperson), Cr D Mallard, Cr J Whitton, Mr Stephen Nugent, Ms Alice Williams, Miss Elizabeth Griffin, Ms Alexandra Rezko, Mr Charles Everett, Mr William Tuck, Mr Reg Kidd, Ms Jennifer Lacey, Mr David Sykes, Uncle Neil Ingram Senior, Jordon Moore, Director Community, Recreation and Cultural Services, Manager Development Assessments, Senior Planner, Museum and Heritage Coordinator

**1.1 APOLOGIES AND LEAVE OF ABSENCE****1.2 ACKNOWLEDGEMENT OF COUNTRY**

I would like to acknowledge the Traditional Custodians of the land on which we meet today, the people of the Wiradjuri Nation. I pay my respects to Elders past and present, and extend those respects to Aboriginal Peoples of Orange and surrounds, and Aboriginal people here with us today.

**1.3 DECLARATION OF PECUNIARY INTERESTS, SIGNIFICANT NON-PECUNIARY INTERESTS AND LESS THAN SIGNIFICANT NON-PECUNIARY INTERESTS**

The provisions of Chapter 14 of the Local Government Act, 1993 (the Act) regulate the way in which Councillors and designated staff of Council conduct themselves to ensure that there is no conflict between their private interests and their public role.

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As members are aware, the provisions of the Local Government Act restrict any member who has declared a pecuniary interest in any matter from participating in the discussion or voting on that matter, and requires that member to vacate the Chamber.

Council's Code of Conduct provides that if members have a non-pecuniary conflict of interest, the nature of the conflict must be disclosed. The Code of Conduct also provides for a number of ways in which a member may manage non pecuniary conflicts of interest.

**RECOMMENDATION**

It is recommended that Committee Members now disclose any conflicts of interest in matters under consideration by the Cultural Heritage Community Committee at this meeting.



**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024**

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**2 PREVIOUS MINUTES****RECOMMENDATION**

That the Minutes of the Meeting of the Cultural Heritage Community Committee held on 18 March 2024 (copies of which were circulated to all members) be and are hereby confirmed as a true and accurate records of the proceedings of the Cultural Heritage Community Committee meeting held on 18 March 2024.

**ATTACHMENTS**

- 1 Minutes of the Meeting of the Cultural Heritage Community Committee held on 18 March 2024

ORANGE CITY COUNCIL

MINUTES OF THE  
CULTURAL HERITAGE COMMUNITY COMMITTEE

HELD IN LIBRARY LOCAL STUDIES ROOM, GROUND FLOOR, ORANGE CITY LIBRARY, BYNG STREET, ORANGE  
ON 18 MARCH 2024  
COMMENCING AT 5.30PM

1 INTRODUCTION

ATTENDANCE

Cr G Power (Deputy Mayor) (Chairperson), Cr D Mallard, Cr J Whitton, Mr Stephen Nugent, Ms Alice Williams, Miss Elizabeth Griffin, Ms Alexandra Rezko, Mr Charles Everett, Ms Jennifer Lacey, Uncle Neil Ingram Senior, Mr Greg Ingram, Director Community, Recreation and Cultural Services, Community Museum and Heritage Manager.

1.1 Apologies and Leave of Absence

RESOLVED	Miss E Griffin/Mr S Nugent
That the apologies be accepted from Mr Reg Kidd and Mr David Sykes for the Cultural Heritage Community Committee meeting on 18 March 2024.	

1.2 Acknowledgement of Country

The Chairperson conducted an Acknowledgement of Country.

1.3 Declaration of pecuniary interests, significant non-pecuniary interests and less than significant non-pecuniary interests

Nil.

2 PREVIOUS MINUTES

RESOLVED	Mr C Everett/Miss E Griffin
That the Minutes of the Meeting of the Cultural Heritage Community Committee held on 20 November 2023 (copies of which were circulated to all members) be and are hereby confirmed as a true and accurate record of the proceedings of the Cultural Heritage Community Committee meeting held on 20 November 2023.	

**MINUTES OF CULTURAL HERITAGE COMMUNITY COMMITTEE****18 MARCH 2024****3 PRESENTATIONS****3.1 VERBAL REPORT ON PROGRESS OF WORKING PARTY TO RECOGNISE SIGNIFICANT ABORIGINAL PEOPLE AND PLACES IN ORANGE**

TRIM REFERENCE: 2024/306

Cr Power (Member of the Working Party) spoke on the progress of the Working Party and meetings attended with members of the Orange Aboriginal community and the Aboriginal Elders Group.

The meetings have brought up some ideas to move the project forward, this includes; a list of names of people who relocated to Orange as part of the Aboriginal Resettlement Scheme of the 1970s and 1980s, was identified as being of significant. The list when developed should become a living document. Also identified important Wiradjuri warriors, Windradyne and Yuranigh.

Members of the Working Party will be meeting with Wiradjuri Elders, and the Aboriginal Elders Group on 5 April 2024 to continue to identify significant Aboriginal people and places in Orange.

**RESOLVED****Mr C Everett/Cr G Power**

That the Working Party continue to work with the Aboriginal Elders Group and Wiradjuri Elders to progress the project.

**4 GENERAL REPORTS****4.1 RESIGNATION OF COMMITTEE MEMBER, MR WILLIAM TUCK**

TRIM REFERENCE: 2023/2274

**RESOLVED****Mr S Nugent/Miss E Griffin**

That the report on the Resignation of Committee Member, Mr William Tuck, be acknowledged.

**4.2 EXPRESSION OF INTEREST RECEIVED FOR REPRESENTATION ON CULTURAL HERITAGE COMMUNITY COMMITTEE**

TRIM REFERENCE: 2024/287

**RESOLVED****Mr S Nugent/Miss E Griffin**

That Uncle Neil Ingram, Mr Jordon Moore and Mr Greg Ingram be accepted as members of the Cultural Heritage Community Committee.

MINUTES OF CULTURAL HERITAGE COMMUNITY COMMITTEE

18 MARCH 2024

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4.3CULTURAL HERITAGE COMMUNITY COMMITTEE ACTION PLAN - MARCH 2024

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TRIM REFERENCE:2024/307

RESOLVED

Mr G Ingram/Mr S Nugent

That the Cultural Heritage Community Committee establish a Working Party to assist with the 2025 Cultural Heritage Awards at the next meeting of the Cultural Heritage Community Committee, 17 June 2024.

THE MEETING CLOSED AT 6.38PM.



**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024**

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**3 PRESENTATIONS****3.1 DISCUSSION BY MR CHARLES EVERETT ON BLOOMFIELD HOSPITAL TURNING 100 YEARS OLD IN 2025.**

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Mr Everett would like to discuss with the Committee a suggestion that a get together take place of all people connected to the hospital.

**3.2 UPDATE FROM MEMBERS OF THE WORKING PARTY TO RECOGNISE SIGNIFICANT ABORIGINAL PEOPLE AND PLACES IN ORANGE**

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Members of the Working Party will provide the Committee with an update of outcomes.

**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024**

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**4 GENERAL REPORTS****4.1 CULTURAL HERITAGE COMMUNITY COMMITTEE ACTION PLAN - JUNE 2024**

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RECORD NUMBER: 2024/754

AUTHOR: Alison Russell, Community Museum and Heritage Manager

**EXECUTIVE SUMMARY**

Council has noted the important role that the Community Committee play in providing feedback and input into Council's strategic planning. Committees can also offer ideas and suggestions to be considered as part of Council's Integrated Planning and Reporting framework and related annual budget.

As a means of recording ideas, suggestions and activities made by members, each Committee will develop and review an Action Plan on an ongoing basis.

This report provides the opportunity for the Committee to consider items to be added to the Action Plan, for review at the next meeting.

**LINK TO DELIVERY/OPERATIONAL PLAN**

The recommendation in this report relates to the Delivery/Operational Plan strategy "11.2. Preserve our diverse social and cultural heritage".

**FINANCIAL IMPLICATIONS**

Nil

**POLICY AND GOVERNANCE IMPLICATIONS**

Nil

**RECOMMENDATION**

**That the Cultural Heritage Community Committee Action Plan be reviewed by the Committee and that the Committee update the Action Plan at each meeting.**

**FURTHER CONSIDERATIONS**

Consideration has been given to the recommendation's impact on Council's service delivery; image and reputation; political; environmental; health and safety; employees; stakeholders and project management; and no further implications or risks have been identified.

**SUPPORTING INFORMATION**

An update of the Action Plan is a standard item on every agenda for discussion and review. The Committee identified items to be included in the Action Plan.

The Committee Clerk will ensure the Action Plan identifies possible budget and resourcing implications, and how an item links to Council's Delivery/Operational Plan or could be proposed for future Delivery/Operational Plans.

The Committee is requested to review and consider items to be included.

CULTURAL HERITAGE COMMUNITY COMMITTEE

17 JUNE 2024

4.1 Cultural Heritage Community Committee Action Plan - June 2024

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- ATTACHMENTS**
- 1Cultural Heritage Community Committee Action Plan - updated April 2024, D20/9801



CULTURAL HERITAGE COMMUNITY COMMITTEE  
Attachment 1 Cultural Heritage Community Committee Action Plan - updated April 2024

17 JUNE 2024

D20/9801

Cultural Heritage Community Committee  
Action Plan

	Action	Who	Delivery/Operational Plan reference	Cost implications	Resourcing implications	Start	End	Update/Completed
1	Establish a working party to interpret significant Aboriginal Heritage sites and people in Orange and installation of interpretive signage. including: Robertson Park, Yuranigh and Mitchell	CHCC Members	strategy “11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities”.			2024		Working party to be established in consultation with Aboriginal Cultural Group and other stakeholders
2	Continue Development of Banjo Paterson Park		strategy “11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities”.	Grant and Council funds		2021	2023	BPP upgraded with Amenities, second BBQ and Shelter, Walking Paths as per Cultural Heritage Landscape Plan. Establishment of a <i>Friends of Banjo Paterson Park</i>
3	Support to the Banjo Paterson Australian Poetry Festival annually.	CHCC Members	strategy “11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities	To be considered		1 Jan 2020	Ongoing	

Updated February 2024

## CULTURAL HERITAGE COMMUNITY COMMITTEE

17 JUNE 2024

Attachment 1 Cultural Heritage Community Committee Action Plan - updated April 2024

	Action	Who	Delivery/Operational Plan reference	Cost implications	Resourcing implications	Start	End	Update/Completed
4	Support the design, development and installation of a seat that includes a monument to Banjo Paterson in Summer Street, Orange	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities	Develop budget and seek funding support		1 January 2020	TBD	<ul style="list-style-type: none"> <li>Not a priority project of Council</li> <li>No budget allocation</li> </ul>
5	Establish a heritage program to be implemented during the off year of the Heritage Awards	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".			1.1.2024		
6	Investigate options for the construct of Grieving mother/widow sculpture/statue	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".			16.5.2022		<ul style="list-style-type: none"> <li>Council seeking community feedback and working with interested stakeholders</li> <li>Funding to be sought</li> </ul>
7	The Committee support a review of the Aboriginal Social Development Plan in consultation with the Wiradjuri Elders, Orange United Aboriginal Elders, Gaanha-bula action Group and Orange	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".			2024		<p>Council resolution at the Meeting of 6 September 2022 to support the review.</p> <p>Community consultation to review the plan to commence</p>

Updated February 2024

## CULTURAL HERITAGE COMMUNITY COMMITTEE

17 JUNE 2024

Attachment 1 Cultural Heritage Community Committee Action Plan - updated April 2024

	Action	Who	Delivery/Operational Plan reference	Cost implications	Resourcing implications	Start	End	Update/Completed
	Local Aboriginal Land Council.							
8	Support RSL to recognise service in prior wars <ul style="list-style-type: none"> <li>Anzac Day</li> <li>Boer War Day</li> <li>Remembrance Day</li> </ul>	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".			16.05.2022	Ongoing	RSL Project. Council providing support
9	Support Gnoo Blas to recognise Max Stewart racing car driver	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".			16.5.2022		Gnoo Blas Club project. Council resolution to support.
10	Support the restoration work at Duntryleague	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".			1 Jan 2020	ongoing	As required
11	Support the Orange City Council Heritage Awards held biannually.	CHCC Members	strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities".	Funding allocated in budget		1.1.2020	ongoing	To be held 2025 Working Party to be established

Updated February 2024

CULTURAL HERITAGE COMMUNITY COMMITTEE

Attachment 1Cultural Heritage Community Committee Action Plan - updated April 2024

17 JUNE 2024

	Action	Who	Delivery/Operational Plan reference	Cost implications	Resourcing implications	Start	End	Update/Completed
12	Support conduct of Orange Show in May each year.	CHCC Members	strategy “11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities”.			16.5.2022	May each year	As Required
13	That the committee support to raise the profile of Huntley and the railway line from Spring Hill to Orange	CHCC Members	strategy “11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities”.	Funding allocated in budget for an interpretative sign	Committee to determine actions	20 February 2024		Alex Rezko working on interpretative text for the history of Huntley and the Railway.

Updated February 2024



**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024**

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**4.2 ESTABLISHMENT OF WORKING PARTY - 2025 CULTURAL HERITAGE AWARDS**

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RECORD NUMBER: 2024/755

AUTHOR: Alison Russell, Community Museum and Heritage Manager

**EXECUTIVE SUMMARY**

At the Services Policy Meeting of the 2 April 2024, it was resolved that Cultural Heritage Community Committee establish a Working Party to assist with the 2025 Cultural Heritage Awards at the next meeting of the Cultural Heritage Community Committee, 17 June 2024.

This report outlines a process that the Working Party may be involved in implementing Orange City Councils Heritage Awards.

**LINK TO DELIVERY/OPERATIONAL PLAN**

The recommendation in this report relates to the Delivery/Operational Plan strategy “11.2. Preserve our diverse social and cultural heritage”.

**FINANCIAL IMPLICATIONS**

Nil

**POLICY AND GOVERNANCE IMPLICATIONS**

Nil

**RECOMMENDATION**

**That the report on the Establishment of a Working Party to assist with the 2025 Cultural Heritage Awards be acknowledged.**

**FURTHER CONSIDERATIONS**

Consideration has been given to the recommendation’s impact on Council’s service delivery; image and reputation; political; environmental; health and safety; employees; stakeholders and project management; and no further implications or risks have been identified.

**SUPPORTING INFORMATION**

Orange City Council’s Cultural Heritage Awards aim to recognise and encourage outstanding contributions to cultural heritage conservation, education, and interpretation within the Orange City Council area. The awards also seek to recognise the considerable effort that property owners make in maintaining and caring for older buildings. The awards serve to foster greater community interest, pride, and concern for the conservation of all heritage items within the city of Orange.

Introduced over two decades ago, these awards are held every two years.

Residents, owners and interested members of the community are invited to nominate buildings, places, conservation works, and groups and individuals who have made an outstanding contribution to the conservation, education, and interpretation of cultural heritage within the City of Orange over the past two years.

**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024****4.2 Establishment of Working Party - 2025 Cultural Heritage Awards**

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There are eight award categories and nominations will be judged by members of the committee when the nomination period has closed.

Following judging, an award presentation evening is held and high scoring nominations are honoured with an award at the Cultural Heritage Awards Ceremony. The venue for the ceremony is determined by consideration of the heritage significance of the place (venue), availability of catering and accessibility.

Many of the tasks involved in organising the awards are operational and undertaken by staff: this includes, marketing, promotion, purchasing, design of certificates and purchasing of plaques.

It is proposed that the Working Party may be involved in sharing Council's promotional material within their networks to raise the profile and awareness of the Awards and encourage broader community participation.

The Working Party would also lead the judging process for nominations, and delegate the presentation of the awards at the Ceremony.

A further report on the Orange City Council Cultural Heritage Awards 2025 will be brought back to the Cultural Heritage Community Committee after the Council Election on 14 September 2024.

**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024**

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**4.3 RECOGNITION - FORGOTTEN DIGGERS OF WWI - ORANGE GENERAL CEMETERY**

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RECORD NUMBER: 2024/756

AUTHOR: Alison Russell, Community Museum and Heritage Manager

**EXECUTIVE SUMMARY**

Funding has been provided from Saluting their Service Commemorative Grant Program, Cadia Newmont, Orange City Council, Orange Ex-Services Club, Orange Sub-Branch of the RSL and McMurtrie's Monumental Stonemasons to install headstones on 50 unmarked graves of returned World War I servicemen buried in in Orange General Cemetery.

**LINK TO DELIVERY/OPERATIONAL PLAN**

The recommendation in this report relates to the Delivery/Operational Plan strategy "11.3. Celebrate and conserve the diverse cultural heritage of the urban, village and rural communities."

**FINANCIAL IMPLICATIONS**

Nil

**POLICY AND GOVERNANCE IMPLICATIONS**

Nil

**RECOMMENDATION**

**That the report on Program to recognise Forgotten Diggers of WWI located at Orange General Cemetery be acknowledged.**

**FURTHER CONSIDERATIONS**

Consideration has been given to the recommendation's impact on Council's service delivery; image and reputation; political; environmental; health and safety; employees; stakeholders and project management; and no further implications or risks have been identified.

**SUPPORTING INFORMATION****Background**

Following on from the Centenary of World War I Program initiated by Orange City Council in 2013-2019, Orange Family History Group member Sharon Jamieson continued to research the district's WWI service personnel. Additional WWI service personnel were identified including those buried in unmarked graves in Orange General Cemetery.

Their names were cross-referenced with burial records and Bloomfield Mental Health Facility records. More than 100 service personnel were identified, and the location of their graves identified.



**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024****4.3 Recognition - Forgotten Diggers of WWI - Orange General Cemetery**

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The research indicated many of these men were admitted to Bloomfield Mental Health Facility in Orange. When they died, they were given a pauper's burial attended by a minister and two witnesses. Their names have not been recorded on any Honour Rolls in the district.

The Forgotten Diggers applied to The Australian War Graves Commission to fund headstones for soldiers who died of war-related injuries. The names of a further 17 of the soldiers, while being buried in Orange General Cemetery in an unknown location, are now included in a memorial wall with the newly-installed flagpoles by the Orange Sub-Branch of the RSL.

The Orange Sub-Branch of the RSL, with the assistance from local businesses and schools crafted wooden crosses to mark the graves. However, the most fitting way to remember those who fought for Australia is with a permanent marker or headstone.

**The Program**

Of the remaining service personnel, approximately 50 are ineligible for a Commonwealth War Grave. They had no family or their family couldn't afford a headstone.

Orange Family History Group member, Sharon Jamieson, with the assistance from the Forgotten Diggers, applied for funding, which has been successful, from:

• Saluting Their Service Commemorative Grant Program	\$ 8,550.00
• Cadia Newmont, Cadia Cares Grant	\$13,200.00
• Orange City Council Local Heritage Assistant Grant	\$ 5,000.00
• Orange Ex-Services Club Grants	<u>\$ 5,000.00</u>
	<u>\$ 31,750.00</u>

Quotes were sought from local monumental masons, with McMurtrie Stonemason's being successful due to installing the 50 headstones for free (equating to \$5,000 in kind). The total cost of the program is \$36,750.00.

Local Eugowra granite and local trade skills will be used to manufacture the 50 headstones and plinths. The cost for each headstone is \$635.00 x 50 = \$31,750.00.

Letters of support were provided from: the 1<sup>st</sup>/19 Battalion, Royal NSW Regiment; The Honourable Philip Donato, State Member for Orange; Andrew Gee MP, Federal Member for Calare; Returned and Services' League of Australia City of Orange Sub-Branch; Orange City Council Heritage Adviser.

**Outcomes of the Program**

This program will ensure that 50 unmarked graves of World War I soldiers who fought for Australia are now recognised. Some of these soldiers have had no formal recognition of their war service. Their names and service information will be included on each monument.

Each headstone will be a permanent memorial to these men, ensuring that they are remembered and honoured by future generations.

At the conclusion of the Program, date to be determined, a blessing of the monuments and morning tea will be held to thank organisations and individuals involved in the Program.

**CULTURAL HERITAGE COMMUNITY COMMITTEE****17 JUNE 2024****4.3 Recognition - Forgotten Diggers of WWI - Orange General Cemetery**

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On completion of the Program all headstone details and personal information will be added to the Orange Cemetery Grave Register [Cemetery-Excel-Extract-20210715.xlsx \(live.com\)](#) ensuring that family history researchers and historians will be able to locate graves of individuals.

Recollect Central West <https://centralwest.recollect.net.au/> an online platform for sharing the history, heritage and stories of the Central West, provides a rich store of heritage material relating to the region. Monuments and stories of these 50 men will be added to Recollect, providing an easily accessible source of information to historians, young people, school students, researchers and the wider community.

An example of a previously forgotten soldier's story:

*Thomas Oswald Burgess*

*Thomas was born in Geeveston Tasmania 1 November 1896. He was the son of Joseph Burgess and Charlotte Lincoln. On his Enlistment Papers his father was given as his next-of-kin. Thomas was just 21 years of age.*

*In December 1917 he left on board HMAT A38 Ulysess and disembarked at Southampton. He then proceeded overseas to France marching into Rouelles on the 23 April 1918. While his military record is lacks records in this timeframe, this was where the worst of the fighting occurred in France i.e. Hazebrouck, Amiens, Mont St Quentin, Bullicourt and finally Montbrehain. Such battles resulted in the end of the war in Europe. As a young man Thomas must have been subjected to horrific conditions and sights.*

*He returned to Australia in 1919 at his own request. It is hard to follow what happened to Thomas but his war record did hold a letter he wrote in 1932 saying that he had lost his Discharge Papers. These were necessary to find a job after the war. Base records held his wallet and Discharge Certificate and returned it to him at Newcastle.*

*Thomas was found near the railway line at Kerr's Creek (just outside Orange). His throat had a gash across it and a rusty table knife was found under him. At this time he was still alive but when an ambulance finally arrived he had passed. An inquest was held in Orange and found that Thomas was in an unstable mental condition when he cut his own throat.*

*There was no support for returning soldiers during this time. Records show that those suffering "shell shock" were rested in hospital and then sent back into the Field. Thomas returned to a country that was in the throes of a Depression and was obviously wandering around looking for work. His only possessions when he was found were some old clothes and his Discharge Certificate.*

*A young man who served his country deserves to have a headstone on his grave marking his war service.*

The Program to recognise the Forgotten Diggers of WWI located at Orange General Cemetery will ensure the names of the 50 previously forgotten and unknown soldiers missing from our history will now be remembered and honoured.

**Lest We Forget**

### **3 GENERAL REPORTS**

#### **3.1 DRAFT GREENING ORANGE - OUR URBAN FOREST STRATEGY**

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RECORD NUMBER: 2024/1107

AUTHOR: Nigel Hobden, Manager City Presentation

#### **EXECUTIVE SUMMARY**

A draft Greening Orange – Our Urban Forest Strategy has been developed for the City to guide Council and the community with enhancing green infrastructure across the urban landscape.

It is proposed to put the draft strategy on public exhibition for broad community comment and input.

#### **LINK TO DELIVERY/OPERATIONAL PLAN**

The recommendation in this report relates to the Delivery/Operational Plan strategy “1.2. Improve access to shade throughout parks and open spaces”.

#### **FINANCIAL IMPLICATIONS**

Nil

#### **POLICY AND GOVERNANCE IMPLICATIONS**

Nil

#### **RECOMMENDATION**

**That the draft Greening Orange – Our Urban Forest Strategy be placed on public exhibition for 21 days with feedback sought from the community.**

#### **FURTHER CONSIDERATIONS**

Consideration has been given to the recommendation’s impact on Council’s service delivery; image and reputation; political; environmental; health and safety; employees; stakeholders and project management; and no further implications or risks have been identified.

#### **SUPPORTING INFORMATION**

Through workshops and consultation events the Parks, Trees and Waterways Community Committee and our community have contributed to the development of a draft Greening Orange – Our Urban Forest Strategy. The Strategy sets the strategic direction for sustaining, enriching and building all natural and cultivated tree and plant cover over our city until 2050 – our “Urban Forest”.

The strategic approach of this document will ensure tree planting and the provision of Greening Orange is focussed where needed most, often in low socio-economic areas, where shade is important for pedestrians along active transport routes.

It is proposed to place the draft Greening Orange – Our Urban Forest Strategy on public exhibition for a 21-day period to provide an opportunity for community feedback and input.

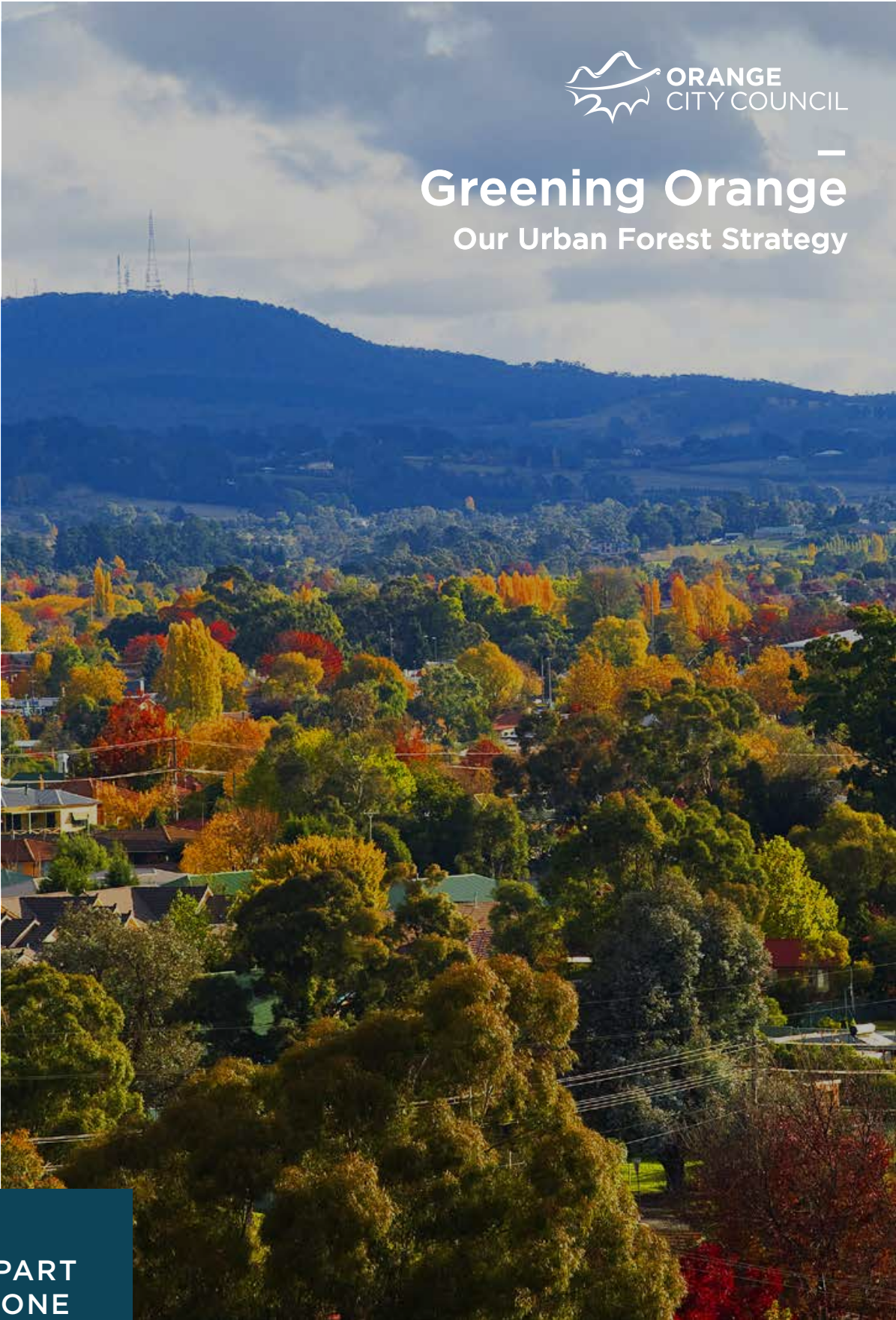
**3.1 Draft Greening Orange - Our Urban Forest Strategy**

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Following a review of submissions, the draft Greening Orange – Our Urban Forest Strategy will be reviewed, amended as required and referred to Council for adoption.

**ATTACHMENTS**

- 1 Urban Forest Strategy - Orange - Part 1, D24/67875 [↓](#)
- 2 Urban Forest Strategy - Orange - Part 2, D24/67876 [↓](#)



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**Greening Orange**  
Our Urban Forest Strategy

**PART  
ONE**





### Acknowledgement of Country

Orange City Council is situated within the traditional lands of the Wiradjuri Nation.

We acknowledge the traditional custodianship of these lands, and pay our respect to the Wiradjuri people for their care and stewardship of these lands for more than 40,000 years and to the Elders of the Wiradjuri Nation, past, present and emerging.



GREENING ORANGE

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## Executive Summary

The greatest contributor to the richness and vibrancy of Orange, the lifeblood of our 'Colour City', is our vast network of exotic, deciduous trees, and the brilliant show of colour they give us every autumn. The urban forest of Orange – the shrubs, grasses and climbing plants as well as the trees – is one of our region's greatest assets.

*Greening Orange – our Urban Forest Strategy* – sets the strategic direction for sustaining, enriching and building all natural and cultivated tree and plant cover over our entire city-region until 2050 – our “Urban Forest”.

Our warming climate, expansion and densification of our urban footprint, increasing heat absorbing impermeable surfaces, and the ongoing impacts of historical clearing, are key issues this strategy addresses. We need to provide more tree canopy cover for heat mitigation - the shade and cooling benefits of trees are necessary to sustain the health and well-being of our communities and liveability of our City-Region with the Vision:

*A healthy, diverse, expanding and valued urban forest that increases the liveability, colour city character and biodiversity of our city.*

In attaining this vision, we seek to move our present canopy cover (2022 benchmarks) in key areas to 2050 targets of:

- 17.3% to *20% canopy cover for Orange*
- 7.0% to *9% canopy cover for Lucknow; and*
- 4.9% to *7% canopy cover for Spring Hill*

We will achieve this through strategies and action plans across four main themes following the lead of our Community Strategic Plan themes – *Live, Preserve, Prosper and Collaborate*:

- Live: “A healthy, safe, inclusive and vibrant community”. We will *Green and Shade* our streets and parks to reduce heat, enhancing our region’s liveability across all measures through targeted programs for trees located in streets, parks and private property
- Preserve: “Balancing the natural and built environment”. We will *Sustain and Protect* our green amenity, cultivated landscape character and natural values
- Prosper: “A smart, innovative and resilient economy”. We will *Innovate and Enhance* to promote the health and expansion of our urban forest to maximise our benefits
- Collaborate: “Leading and partnering to support the community”. We will *Share and Collaborate* to grow and nurture our urban forest in partnership with the community

Our Urban Forest Strategy culminates in the presentation of a Prioritised Implementation Plan. This plan of action shows how plans, programs and local greening and shading initiatives can effectively deliver the outcomes of this strategy.

*Greening Orange – our Urban Forest Strategy* presents detailed strategy as well as rationale. The document reports on and explores all issues affecting our City-Region’s 2022 canopy cover baseline, and future urban forest. We highlight opportunities for preserving and growing canopy in our region so that we can, together, deliver our vision.

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## What’s an urban forest?

Urban forests are most frequently referred to in a Local Government Area (LGA) context. Orange Council’s urban forest comprises all trees, plants (including tussocks and turf grasses) and fungi growing within our LGA boundary - our collective urban forest. This includes vegetation growing on Council-controlled lands (our urban streetscapes, parks, nature and bushland reserves, and rural roadside reserves) as well as trees and plants growing in the LGA’s privately owned land parcels. The soil, water and microorganisms that support our plants and trees are also components of an urban forest.

## About this strategy

*Greening Orange – our Urban Forest Strategy* is our roadmap for the future of everything green in Orange. It sets the direction for growing our region’s urban canopy cover, and for enriching and enhancing our urban forest.

The strategies provided are intended for our whole urban forest to retain, reinvigorate, and grow our native vegetation and enhance biodiversity. Actions are targeted for operational activities for trees on Council-controlled lands only.

### Purpose

The key drivers prompting development of this strategy are urban heat, climate change and population growth, all of which significantly impact the integrity of our environment and liveability of our region.

Other key challenges surrounding our region’s vegetation cover that need to be strategically addressed include:

- The history and practice of Native vegetation removal, especially on private land
- Reduced succession and new tree and shrub plantings on private land
- Reduced planting of larger growing canopy trees on privately owned land
- The provision of soil volumes necessary for root growth of large trees to minimise infrastructure/built form conflicts
- Equity in tree planting to ensure an even local canopy cover distribution that does not discriminate against areas or demographics and seeks to provide shade to hot spot and activity areas.

### Strategy objectives

By setting the direction for the future, documenting our priorities and formulating realistic and deliverable solutions for the enhancement and benefit of the Urban Forest and socio-ecological system.

- Grow and expand the tree canopy to improve shading, summer cooling and all the socio-ecological factors

- Preserve and repair the region’s biodiversity
- Work with the community to assure pride in their ‘colour city’.

### Desired outcomes

The outcomes this strategy seeks to achieve are:

- Trees contributing to community health and well-being by providing relief from the impacts of solar radiation and urban heat, and reduction in cooling costs
- Shady spaces providing opportunity for longer periods of time spent outdoors socialising and passive or active recreation
- Tree shade encouraging active transport rather than vehicle use to reduce air pollution and carbon emissions
- Equitable canopy cover and greening benefits in our urban residential streets and shady connections between urban residential areas, community and recreational facilities and townships
- A population of trees and plants growing on Council-controlled land that is attractive, healthy, and resilient
- Increased extents of our native vegetation cover and biodiversity values
- A greater volume of tree canopy growing in private land allotments

### Our Canopy Cover Targets

To realise our vision, we aim to increase canopy cover in our urban townships by 2050 according to the following percentage canopy cover targets as listed in *Table 1: Canopy cover benchmarks and 2050 targets by urban area*.

Urban area	2022 Benchmark canopy cover		2050 Canopy cover target	
All	2,472 Ha	17.0%	2,863 Ha	19.7%
Orange	2,450 Ha	17.3%	2,833 Ha	20.0%
Lucknow	14.4 Ha	7.0%	18.5 Ha	9.0%
Spring Hill	8.5 Ha	4.9%	12.1 Ha	7.0%

Table 1: Canopy cover benchmarks and 2050 targets by urban area

### Measurement of success

Cyclic recapture of canopy cover and radiant heat data will allow for ongoing monitoring and measurement of our performance in delivering the strategy’s desired outcomes over time. This will allow for interrogation and refinement as required in a dynamic and evolving process. Our strategy will be considered a success when we have achieved our canopy cover targets.



## Document structure

Our Urban Forest Strategy contains detailed strategy as well as rationale. It is presented in two parts under the following sub-headings:

### Part 1: Greening Orange – our Urban Forest Strategy

In this part we present our Vision and targets for our urban forest and present our strategies according to four guiding principles/themes, aligning with the themes of our Community Strategic Plan.

### Part 2: Greening Orange – our Urban Forest Strategy Supplement

In the Supplement, we provide the detail behind the strategy using the sub-headings of Context, Background, Analysis, Opportunities and Challenges, and Plan of Implementation/ Action.

#### Context

Here we explain how our Urban Forest Strategy aligns with other Council documents. We describe the inter-play between Local, Regional and State Planning Frameworks and how these impact our management capabilities.

#### Background

In the document background we describe the value and role of urban forests. We detail the heat mitigating and other benefits of trees, and the various complexities around ensuring our plants and trees provide maximum summer shade and cooling benefits. We also provide a snapshot of the Orange LGA and describe the evolution of our natural and cultivated landscapes.

#### Analysis

In our analysis section, we detail our 2022 Urban Canopy Cover study and describe how we have used this evidence base to guide strategy development. We also consider the fragmented state of our natural vegetation extents and how we can devise effective strategy to grow and expand canopy cover over privately held lands.

#### Opportunities and Challenges

In this section of our strategy, we explore our urban forest challenges and examine how we can embrace opportunities to overcome them. We benchmark against local, national and international research, and determine our urban forest targets.

#### Plan of Implementation / Action

We present a prioritised plan of implementation, documenting the various actions we will take to achieve our vision for our urban forest and reach our 2050 canopy cover targets.

Note that trees are typically of high importance in any Urban Forest Strategy. Both technically and practically, much of this strategy document necessarily refers to trees directly and specifically. “Urban Forest” is defined above. Vegetation generally (including plants, tussocks and turf grasses) fungi, soil, water and microorganisms are acknowledged as components of an urban forest and referenced as appropriate throughout.

## Introduction

Orange is known throughout Australia as the ‘Colour City’ and this hallmark has come to represent the richness and vibrancy of our region in more ways than one.

With fertile and productive lands and a highly scenic landform, our region is rich in natural capital. With tens of thousands of years of care of country by the Wiradjuri Nation, followed by a rush for gold, then arrival of pastoralists, orchardists and, later, viticulturists, our region is rich in cultural heritage.

With a diverse and evolving community, a dynamic calendar of events and an array of sensory and culinary experiences on offer that continue to grow a lucrative tourist trade, we can all take pride in our region’s vibrant culture.

But the greatest contributor to the richness and vibrancy of Orange, the lifeblood of our ‘Colour City’, is our vast network of exotic, deciduous trees, and the brilliant show of colour they give us every autumn.

The urban forest of Orange which consists of all living greenery in the LGA – the shrubs, grasses and climbing plants as well as the trees – is one of our region’s greatest assets. Our city’s framework of exotic trees and green spaces is intrinsic to the character, comfort, and beauty of Orange. Our urban forest is not just our fabric; it is our heart and, arguably, our currency.

Our trees enliven the streets and parks of Orange as they mark our four distinct seasons. Our daily lives occur against a backdrop of seasonally changing trees providing spectacular colour in autumn, sunlight in winter, and valuable shade and cooling in the heat of summer. It is the greenery of Orange that is at the very essence of our region’s appeal. It’s what makes Orange such a great place to visit, and an even better place to live.

Our plants and trees don’t just make our places look good. They play an active role in regulating temperature and shading our region. As we move towards a warmer and more densely populated future, the heat mitigating benefits of our plants and trees will continue to grow in importance. If global emissions cannot be reduced in time to halt the rising temperatures forecast; the extents of our tree canopy cover, the quality of inter-connections, and the general health and vigour of our individual plants and trees will be key to the very liveability of our City-Region in the future.

Record heatwaves experienced in Europe in the Summer of 2023 underscored the realisation that climate change is upon us. Moreover, the forecast impact of the 2023 El Nino event (warmer and drier weather patterns) further highlight the criticality of temperature regulation and shade from our green assets, not just in the future, but right now.

*Greening Orange – our Urban Forest Strategy* is our blueprint for sustaining and growing Orange’s urban forest. In the context of a changing climate and rapidly expanding residential landscape, this holistic and forward-looking strategy considers the current state of play and examines all prospects for preserving and growing Orange’s greenery now, and into the future.

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## Our Strategy

### Our vision

Our vision for Greening Orange is:

*A healthy, diverse, expanding and valued urban forest that increases the liveability, colour city character and biodiversity of our city.*

### Our strategic themes

*Strategies for Greening Orange*, to guide our decision making and provide the framework for our plan of implementation, are presented according to 4 key themes aligned to the key themes of the Orange Strategic Community Plan 2022-2032 (Orange CSP).

#### 1. Live - *Green and Shade*

Live: “ A healthy, safe, inclusive and vibrant community”.

This strategy’s *Green and Shade* theme aligns to ‘Live’ by recognising the importance of increasing tree canopy to maintain the liveability of our warming region, and the wellbeing of our communities:

- Planting more trees in locations where we have identified the need to mitigate urban heat
- Shading and cooling our residential streets, pedestrian and cycle networks, and town centres
- Providing equitable canopy cover over our urban footprint

#### 2. Preserve - *Sustain and Protect*

Preserve: “Balancing the natural and built environment”.

This strategy’s *Sustain and Protect* theme aligns to ‘Preserve’ by recognising the importance of protecting and sustaining our character, our visual amenity, and our natural values:

- Reinforcing our natural and cultivated landscape character through canopy management
- Bolstering and connecting canopy in our parks and natural areas to repair and restore biodiversity
- Encouraging the preservation and renewal of trees on private land

#### 3. Prosper - *Innovate and Enhance*

Prosper: “A smart, innovative and resilient economy”.

The *Innovate and Enhance* theme aligns to ‘Prosper’ by recognising that our green assets need to be healthy and resilient if they are to provide us with maximum benefits; to support and improve our quality of life. It also recognises the need to find new ways of providing critical resources to our plants and trees, and building resilience in our urban forest as warming and the other impacts of climate change continue to manifest:

- Utilising innovative and sustainable ways to establish and care for our green assets
- Using evolving best management and arboriculture practices to enhance and build resilience in our urban forest

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- Using species selection to ensure the adaptability and sustainability of our landscapes

#### 4. Collaborate - *Share and Collaborate*

Collaborate: “Leading and partnering to support the community”.

The Share and Collaborate theme aligns to ‘Collaborate’ by recognising the need to work together with the entire community to promote, protect, preserve, support and grow our urban forest:

- Establishing strong internal and external partnerships with the community and all key stakeholders
- Sharing knowledge and resources to preserve, establish and care for our canopy
- Working together to promote the value of, and to celebrate, our trees and green assets

## Our strategy articulated

### Theme 1: Live - *Green and Shade*

We will Green and Shade our network of streets and parks, recognising the importance of increasing tree canopy to maintain the liveability of our warming region, and the wellbeing of our communities.

*We will prioritise tree preservation and planting in locations where we have identified the need to mitigate urban heat (heat sinks and hot spots), especially in areas of high density and use by:*

- Densifying, extending and connecting canopy cover in “hot spots” in our Town Centre and areas of high density living
- Prioritising planting in areas of high use where the greatest benefits can be delivered – key walkable routes between schools, community facilities, retirement facilities and shopping precincts
- Promoting active transport opportunities via strategically planted trees for shade and cooling along key pedestrian and cycle networks
- Promoting the planting of shade trees in commercial car parks and low canopy commercial activity areas to provide shady, cool and attractive settings for business
- Promoting the use of vertical and roof gardens and other WSUD treatments in our City Centre
- Irrigating turf to provide cooling in appropriate areas where cooling is needed (i.e. turf ed spaces in town centres where urban heat is greatest)

*We will provide new trees for shade, cooling and visual amenity in our parks, residential streets, pedestrian and cycle networks and town centres by:*

- Prioritising the planting of trees in open space areas with low tree canopy cover
- Shading and cooling our recreation open spaces to encourage outdoor activity (exercising, socialising, spending time with nature)





- Prioritising the shading of playground equipment, basketball courts and skate parks, park furniture and popular social settings, e.g. key picnic areas
- Shading and cooling walkable connections between recreational and amenity open space reserves, residential neighbourhoods and commercial activity centres

*We will provide equity of urban canopy cover for shade and cooling benefits by:*

- Prioritising planting in low canopy localities that coincide with the homes and activity spaces of our socially and heat-health vulnerable residents for the wellbeing of these communities
- Prioritising canopy cover building in the towns of Lucknow and Spring Hill for equity of benefits of urban canopy cover
- Prioritising planting for shade and cooling in residential areas of our townships with low tree canopy cover

**Theme 2: Preserve - Sustain and Protect**

We will Sustain and Protect through preserving our character, our visual amenity and our natural values by recognising the importance of protecting and sustaining our character, our visual amenity, and our natural values.

*We will retain the unique character and charm of our township environments by:*

- Preserving and reinforcing existing landscape themes in our towns and city precinct
- Ensuring appropriate representation of naturally occurring species where appropriate
- Providing landmark and character trees intra-regionally
- Locating new trees to preserve vistas and views of our wider landscape

*We will grow and enhance our township canopy for placemaking and visual amenity by:*

- Reinforcing town gateways and anchor points with tree plantings
- Reinforcing town lead-in plantings (along major boulevards) by infilling and extending avenues
- Adding new trees for placemaking in our townships (new feature plantings)
- Looking for opportunities to thread our ‘Colour City’ and natural character values through the region by planting feature trees in strategic locations (for example in roundabouts, town entry statements and other key planting nodes)
- Partnering with landowners to plant amenity (character or signature plantings, large growing trees where possible) in key cultural and commercial sites

*We will plant trees, shrubs and groundcovers for biodiversity benefits in our open spaces by:*

- Preparing a Biodiversity Management Plan for the region to guide program development and prioritisation
- Looking for opportunities to co-locate biodiversity and amenity tree plantings in amenity reserves
- Leveraging community planting programs and volunteer groups involved in revegetation

as a resource to help to increase tree canopy cover in areas with low cover and reduced biodiversity benefits

- ‘Rewilding’ under-utilised areas of our public open space network through mini forest or biodiversity island creation providing the additional benefits of reduced mowing extents and lowered maintenance needs in addition to carbon capture and storage as well as biodiversity benefits
- Reinvigorating existing stands of native vegetation with understory and soil improvement techniques to encourage biodiversity and sustain tree health
- Continuing to focus biodiversity planting efforts on bolstering and elevating biodiversity values where our existing tracts of valuable vegetation grow. Identifying fragmented canopy extents that can be connected or in-filled with new plantings
- Identifying, preserving, and rejuvenating key vegetation buffers to our townships

*We will seek to encourage preservation of trees on private land by:*

- Preparing a Tree offset policy and procedure reflecting the defined canopy valuation method
- Utilising a tree/canopy valuation method such as a Minimum Industry Standard (MIS506)
- Advocating for tighter planning control over private land tree preservation
- Developing incentives for retaining and growing trees on private land
- Preparing and making available a range of educational materials and programs focusing on the value of vegetation in agricultural landscapes

*We will seek to encourage canopy creation on private land by:*

- Working together to advocate for larger verge spaces in urban residential developments to support canopy creation and the use of larger growing trees
- Providing free tree programs for private landholders and opportunity for planting partnerships
- Exploring options for a system of bonding canopy creation
- Investigating policy or development control options that consider minimum requirements for canopy cover on private land and/or canopy re-establishment requirements
- Strengthening local planning policy to include best practice requirements for larger tree establishment including requirements for deep soil zones and permeable space in urban residential development
- Exploring ways to increase compliance and regulation activities
- Investigating partnerships with owners of open car parks and other hard spaces for opportunities to increase greening in these spaces





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### Theme 3: Prosper - *Innovate and Enhance*

Our green assets need to be healthy and resilient if they are to provide us with maximum benefits; to support and improve our quality of life. We will Innovate and Enhance to maintain and build resilience in our urban forest as warming and the other impacts of climate change continue to manifest.

*We will use innovative and sustainable ways to efficiently promote the health and longevity of our existing and new trees by:*

- Using best practice tree planting and maintenance techniques that are in tune with our changing climate
- Integrating and embedding Green Infrastructure (GI) as an essential part of our urban design, and urban stormwater and runoff management
- Increasing the supply of water to trees through active and passive irrigation
- Mimicking the natural water cycle and provide greater areas of permeable space for the health and vigour of our trees
- Creating permeable spaces in our urban hot spots for existing and new trees (for example, in all capital works projects)
- Incorporating WSUD and other GI innovations, treatments and engineering solutions in tree planting projects
- Ensuring adequate soil volumes are provided for large shade tree plantings
- Exploring opportunity for the creation of verge gardens, vertical gardens, green roofs and community orchards (as an expansion of community gardens) through internal and external partnership
- Investigating residential estates of low canopy cover to determine why meaningful canopy has yet to establish, and what can be done to establish new trees or improve the health and performance of existing cover

*We will Increase capacity to deliver and maintain more trees in our townships by*

- Planting a minimum of an additional 500 trees annually
- Managing tree maintenance (specifically to mitigate drought) proactively
- Identifying high value trees allowing for closer maintenance and management of these

*We will monitor and track our progress by:*

- Improving systems of data storage and capture to best practice level
- Upgrading the existing tree database to a centralised system interfacing with Council GIS
- Maintaining an up-to-date tree inventory/database
- Forecasting maintenance and renewal requirements
- Advocating for inclusion of Council-controlled trees in Council's Asset Management system
- Undertaking cyclic re-capture of canopy cover statistics

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*We will build resilience in our existing and future network of green assets by:*

- Staying abreast of the latest research for species heat tolerance
- Continuing to plant a diversity of tree types in our region
- Ensuring resilience and adaptation potential of the species we are using
- Trialling new trees

### Theme 4: Collaborate - *Share and Collaborate*

Forming partnerships to sustain and grow our tree and plant cover; working together with the entire community to promote, protect, preserve, support and grow our urban forest.

*We will foster and nurture internal partnerships to help care for our green assets by:*

- Seeking to embed canopy considerations into all Council decision making processes
- Finding opportunities for new trees to be incorporated into capital projects and create a culture of co-locating trees with other critical infrastructure for shading, amenity and providing additional function and benefits
- Reducing tree-infrastructure conflicts through tree selection and intensified planting site preparations to encourage tree roots to proliferate and grow in desired directions
- Extending the use of design principles such as WSUD's and engineering solutions such as structural cells to reduce infrastructure and green asset maintenance costs

*We will provide new opportunities for partnering with the community in the establishment and care of our green assets by:*

- Engaging with community groups and attracting new volunteers to assist Council to plant new plants and trees through wider development and promotion of programs
- As an outcome of community uptake, developing programs such as "Adopt a Street Tree"
- Exploring opportunities to deliver plantings as part of Planet Ark's National Tree Day, World Environment Day, One Tree Planted's Plant a Tree Day, and other nationwide community planting events
- Partnering with landholders to establish native vegetation on private land. This may include the nomination of appropriate areas of land for the establishment of "mini forests" or the creation of strategic links within, or extension of, biodiversity corridors (co-located with other benefits for the land holder for example: screening, wind breaks, soil health improvement and shade for livestock)
- Providing free shade trees to encourage canopy creation on private land or similar

*We will provide information, sharing our knowledge about the importance of canopy preservation and the establishment and care of trees and plant cover:*

- Through Council strategies, policies, plans, frameworks and standards
- Council's website and web page tools such as the Orange Significant Landscapes web page tool
- Other educational and promotional opportunities





*We will promote and celebrate our trees by:*

- Promoting the value of the region's green assets and importance of their preservation in seasonal campaigns
- Providing accessible and quality information to help residents select, care for, and appreciate our trees
- Preparing special events and using other opportunities to celebrate of our trees

This concludes *Greening Orange – Our Urban Forest Strategy*, Part 1.

The detail behind and supporting our Urban Forest Strategy can be found in part 2, the *Greening Orange – our Urban Forest Strategy Supplement*.

GREENING ORANGE







#### Enquiries

For information about the  
Greening Orange – Our Urban Forest Strategy, contact:  
**Orange City Council**  
**[council@orange.nsw.gov.au](mailto:council@orange.nsw.gov.au)**

Published by  
Orange City Council  
PO Box 35, 135 Byng Street,  
Orange NSW 2800  
Phone: 02 6393 8000 Fax: 02 6393 8199  
[council@orange.nsw.gov.au](mailto:council@orange.nsw.gov.au)  
[orange.nsw.gov.au](http://orange.nsw.gov.au)



# Greening Orange

## Our Urban Forest Strategy Supplement



PART  
TWO



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## Context

### Strategic alignment

State, Regional and Local Planning Policies affect how we maintain and grow tree canopy cover in our region.

Trees on public land are generally controlled by Council through our local strategies, policies and plans. Tree canopy on private land is protected via the *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 reformed as the State Environment Planning Policy (SEPP) - Biodiversity and Conservation 2020* (administered by Council). Our local canopy cover is also impacted by State Planning Frameworks guiding, and Local Planning Instruments controlling, assessable development in the region.

State, Regional and Local Planning frameworks are designed to work together. The relationship between the three is shown in Figure 1: State and Local Government Strategic Planning Framework.

*Greening Orange - Our Urban Forest Strategy* aligns with documents available from State and Federal Government where they outline the future of the natural environment, built environment, and liveability of urban spaces. Examples include the *Government Architect New South Wales Urban Design for Regional NSW* and *Greener Places* documents.







Figure 1: State and Local Government Strategic Planning Framework

Local (Council) strategies, policies and plans

Greening Orange – Our Urban Forest Strategy – has been developed in alignment with Council's existing strategies, policies and plans. The relationship between this strategy and others is shown in Figure 2: Orange Council Strategic Document Hierarchy showing the relationship between our Greening Orange Strategy and other strategic Council documents.



Figure 2: Orange Council Strategic Document Hierarchy showing the relationship between our Greening Orange Strategy and other strategic Council documents.

Along with the Orange Strategic Community Plan 2022-2032 (CSP), a number of additional Council strategies, policies, plans, frameworks, standards and web tools have also provided context, and guidance for development of this strategy as detailed below.

Orange Strategic Community Plan

The Orange Strategic Community Plan 2022-2032 (CSP) is the overarching strategy document for the Orange LGA and the higher power to this strategy. The CSP is based on the social justice principles of equity, access, participation and rights. It documents the values and priorities of the Orange Community that will shape the region over a 10-year time frame. Visions and Objectives of the CSP are presented under the four themes of Live, Preserve, Prosper and Partner. Key objectives of Greening Orange – Our Urban Forest Strategy that align with the CSP are:

Live

Objective 1: A liveable city that is connected through open spaces.

- 1.1. Develop and maintain parks and open spaces within the city, that meet the needs of the community.
- 1.2. Improve access to shade throughout parks and open spaces.

Preserve

Objective 8: Sustainable growth and respectful planning that values the natural environment.

- 8.1. Plan for growth and development that balances liveability.

Objective 9: Managing our resources wisely.

- 9.2. Develop and promote initiatives to reduce water, energy and waste in consultation with the community.

Prosper

Objective 12: Sustainable tourism, events and visitor experiences.

- 12.1. Capitalise on the character and lifestyle of Orange to remain a destination of choice.

Partner

Objective 16: Leaders in our community.

- 16.2. Support community organisations and groups to deliver services and programs.

Climate Change Strategic Policy 2021

Outlines Council's commitment to managing, mitigating and adapting to the impacts of climate change.

Climate Change Management Plan 2021

Focuses on the operations of Council stating the drivers and actions that Orange City Council will take to reduce emissions and address the expected effects of climate change on Council over the next 5 years.





**Orange Street Tree Master Plan**

Developed in 2012 this plan provides strategic direction for tree species to be planted, strategies for preservation and planting of more street trees, desirable maintenance practices, and tree care in general for the city-region's street tree population. This strategy is to supersede the Street Tree Master Plan with key outcomes that remain relevant incorporated into this strategy document.

**Orange Destination Management Plan**

Provides strategic and unified direction for the development of a visitor economy in the Orange Region (City of Orange, Cabone and Blayney Shires) from 2022-2026

**Orange Active Travel Plan (Part A Implementation)**

Provides strategies for the community to engaging in active forms of travel (walking and cycling) in the region. “Deliver an appropriate level of pedestrian and cyclist amenity that is fit for purpose”.

**Orange City Council Stormwater Management Plan**

Managing stormwater loads, pathways and catchments in the Local Government Area.

**Orange Region Destination Management Plan**

Reinforcing and strengthening the Orange Region brand through marketing, positioning and placemaking.

**Communications and Community Engagement Strategy**

Fostering opportunities for community engagement to help shape Council plans and strategies.

**Orange Council Workforce Management Strategy**

Designed to ensure resource availability for strategy implementation is both considered and budgeted for.

**Plan of Management for Local and Neighbourhood Parks (2023)**

Describes service levels and KPIs including tree planting for Orange's local parks.

**Plan of Management for Rural Parks within the City of Orange**

A plan of management applying largely to community land created as bridle paths within Ammerdown and Clifton Grove and various creek-side (riparian) parks in Summer Hill Creek and Ploughmans Creek respectively.

**Orange Botanic Gardens Master Plan**

Philosophies and principles of this plan apply to all cultivated landscapes in Orange and specific reference to the potential impact of residential development in surrounding areas are incorporated.

**Orange City Council Survey of Roadsides**

Recommendations for preservation management and roadside reserves.

**Orange Significant Landscapes web page tool**

This web page provides detail on vegetation associated with heritage values of the region and identifies vegetation and landscapes that are culturally important to the community.

**Ploughmans Valley Catchment Wetland Management Plan**

A staff manual for maintenance of wetland systems and their feeding tributaries. Provides clarity as to service levels for riparian environments throughout the catahcemnt.

**Regional Planning Frameworks**

Regional planning frameworks ensure that there is cohesive strategic direction between surrounding LGAs on issues that affect the greater regional area – the Central West Tablelands – that Orange forms a key part of.

**Central West and Orana Regional Plan 2041**

The Central West and Orana Regional Plan guides land use planning and decision making for the broader region and the collective of LGAs that comprise the Central West and Orana Regions. The plan presents opportunities for regional growth and development and continued liveability addressing future needs for housing, jobs, infrastructure, a healthy environment, access to green spaces and connected communities.

**Central Tablelands Regional Strategic Weed Management Plan 2017-2022**

Weed management strategy has been prepared on a whole of Central Tablelands Region level considering the size and impacts of issues, and partnering necessary, to realistically manage the issue. The mission of the Resilient Central Tablelands Local Land Services is resilient communities in productive healthy landscapes.

**Australian Standards**

Australian Standards guiding the care and management of our trees, climate change adaptation, and Urban Green Infrastructure form key reference materials for this plan. These consist of:

- AS 4970 (2009) Protection of trees on development sites
- AS 4373 (2007) Pruning of amenity trees
- AS 2303 (2019) Tree stock for landscape use
- AS 5334 (2013) Climate change adaptation for settlements
- SA HB 214 (2023) Urban Green Infrastructure – Planning and decision framework



## State legislation, programs and policy

### Tree Protection and regulation

There are no blanket laws for tree protection on private land in Australia. While Federal, State and Local Governments may all be involved, it is usually the State Governments and Territories who define requirements through land use planning, development laws and planning schemes/local environmental plans (NSW Government 2023).

Local Governments act as planning authorities, applying the state provisions as well as setting and applying local provisions (Local Environmental Plans, Development Control Plans and Local Laws) specific to the region.

#### State Planning Framework - Land Management and Biodiversity Reform Framework

Clearing of native vegetation in urban areas and land zoned for environmental protection in NSW is governed by the Biodiversity Conservation Act 2016 and Local Land Services Act 2013 which were developed to ensure a balanced approach to rural land management and biodiversity conservation in NSW. The Department of Planning, Industry and Environment, Local Land Services, Local Government, and the Biodiversity Conservation Trust are all responsible for administering the various components of the Acts that address vegetation clearing and preservation on private land.

The SEPP - State Environmental Planning Policy – Biodiversity and Conservation 2021 controls the clearing of native vegetation in NSW on land zoned for urban and environmental purposes that is not linked to a development application. Under this legislation, all trees in Orange greater than 300mm in diameter (measured as 1.4m from the ground) are subject to Tree Preservation Orders and pruning or removal works require permits. In addition to this, for all Eucalypt (Eucalyptus sp) species belonging to threatened ecological communities of the region regardless of size (nine species in total) are also protected by Tree Preservation Orders.

### Local Planning Instruments

Local Environment Plans (LEPs) are the key planning tools for ensuring communities are shaped as intended when they are developed. They are prepared by Council according to State Government Planning requirements – namely State Environmental Planning Policies (SEPPs) – and provide the framework that guides planning decisions according to land use zoning and development controls. Guidance for planning assessment applies in the form of acceptable outcomes.

#### Orange Local Environmental Plan 2011

The Orange Local Environmental Plan 2011 (the LEP) provides planning controls that regulate land use by defining what is permitted in the various zones. Vegetation can be identified on overlays within Local Environment Plans that trigger rules for development that may impart various levels of protection.

Vegetation can also be subject to development controls (rules) listed against land use zoning of the location, or other assessment criteria affecting how developments should be designed (cultural heritage, draining/flooding etc).

Our Local Environment Plan provides strategic direction and guidance for assessable

development most relevant to this strategy in the matters of vegetation management, scenic areas, landscaping in urban areas and flora and fauna management.

The LEP also provides a range of development standard such as minimum lot sizes, building height and floor space requirements, outlining the range of matters to be appropriately incorporated in development design.

#### Development Control Plans (DCP)

While Local Environment Plans provide the framework for decision making, Development Control Plans (DCP)s provide the detailed design requirements (i.e. what must be preserved/ supplied) and offer the flexibility to address issues in a local or regional context.

Development Control Plan (DCP) provides specific, comprehensive guidelines for certain types of development, or area-specific requirements for localities.

The Orange DCP covers a wide range of issues including:

- Protection of natural resources and ecological values
- Landscaping for aesthetic, ecological and climate benefits
- Identifying and preserving neighbourhood character

#### Orange Local Strategic Planning Statement 2020

The State Government now requires a Local Environmental Strategic Planning Statement to ensure expressed community values and wishes as stated in local government Community plans/strategies (for example the Orange CSP) are reflected in the LGA's Local Environmental Plan.

The Orange Local Strategic Planning Statement 2020 statement helps to maintain a clear line of sight relationship between state, regional and local policies and plans. Statements highlighting our over-arching cultural, environmental, and built environment goals are contained within the document. Examples of these relevant to this strategy include:

- Landscaping will assist in moderating temperature variations
- Tree coverage will be enhanced to mitigate the heat island effect and maintain the landscape amenity of Orange
- Mature urban trees will be valued not only for their scenic contribution but also in terms of water and air quality and reducing the urban heat island effect

A series of planning priorities are also provided. Planning priority 13 with an outcome to Protect, conserve and enhance Orange's urban tree canopy, landform, waterways, and bushland seeks to maximise the benefits of trees and provision of ecosystem services in the region through direct management of the public realm and appropriate planning requirements for new developments.

Actions of Planning Priority 13 specific to this strategy are to:

- Review and update the Orange Street Tree Master Plan by 2023
- Council seeks to preserve and enhance the urban tree canopy throughout Orange and establish a target canopy coverage rate
- for the urban areas accompanied by a replacement planting ratio within the DCP 6





***“Over the next 20 years as Orange grows and changes to meet community needs, a key priority for Council will be to maintain the high levels of environmental amenity, liveability and landscape quality that characterises Orange”***  
(Orange Local Strategic Planning Statement 2020).

## Community values and views

Council worked with the Orange Community in the formation of the vision and objectives of our strategy for Greening Orange. Informal drop-in sessions were held at the Orange Botanic Gardens in May 2023, and an on-line survey was available for submission over a four-week period from May to June of 2023. Key concerns and priorities were raised and discussed, with several fundamental themes emerging.

Concerns over the changing landscape of Orange were expressed with the direct impact of residential development on our natural systems and natural capital (landform) highlighted. Our community told us they were concerned about Council’s perceived inadequate development compliance processes and wishes for a better resourced and controlled systems of compliance. Shopping centre car parks were given as an example of recently approved developments with poor tree establishment outcomes. The need for tighter control over private certifications were also raised with possible solutions including bonding development conditions. Concerns over this issue extended to permissible tree clearing and the need for Council to cross-check outcomes with permit approvals and conditions.

There was a general feeling that communications between departments assessing development and those protecting or promoting the character and natural values of Orange could improve. Feedback suggested decision making and actions needed to be more cohesive and better aligned to our Community Strategic Plan. A holistic approach to development assessment that affects our tree cover was suggested, with planning and operational officers of Council working together more closely.

The need for increased funding for the street tree planting program was raised. Issues such as succession for declining trees with greater emphasis on these being delivered proactively were highlighted. Suggestions about where to plant larger growing canopy or shade trees were made including local pocket parks or unused Council land parcels. Numerous suggestions for specific locations were also made with poor canopy creation outcomes in newer developments emphasised. Sports precincts were suggested for investigation of the potential for establishment of larger growing trees to positively impact canopy cover extents. The reinforcement of shady pedestrian routes for community to access our recreational spaces were also recommended.

Using our biodiversity values mapping was discussed as the most effective way of identifying and addressing priorities for greening for biodiversity outcomes. The importance of retention and new plantings of hollow developing trees, greater use of nesting boxes, and the need for weed eradication programs in conjunction with tree canopy creation and expansion were made. Discussion of the potential for “mini forest” establishment occurred, with large, mowed areas of public open space highlighted as potential locations for native trees to be established. Easements were suggested as other areas for further investigation and, regarding biodiversity corridor improvements, opportunities for planting along drainage lines.

Urban heat sinks, how to mitigate these, and how to provide equity of benefits was another topic of discussion raised. The potential for green roofs and vertical planting to car park walls were discussed and concluded with agreement that an integrated approach to enhanced greening of commercial precincts would be beneficial. The multiple benefits of car park plantings in terms of providing safe passage for pedestrians and the benefits of co-location of trees with shade structures was also a topic of discussion.

A diverse range of opinions were evident on the topic of exotic trees versus naturally occurring vegetation. Sharper focus on our natural values was requested with perceptions of our ‘Colour City’ theming and heritage precinct of Orange over-shadowing our natural values.

Suggestions were made that Council’s website could have a greater education and informative function. Examples given included the types of trees that should be planted, upcoming tree planting and removal projects, and general information for residents wanting trees planted outside their homes or wanting to be more involved in tree establishment and care. Similarly greater engagement with the community and promotion of community planting days were also recommended.

Community nominated locations for future tree establishment, as well as nomination of our most treasured trees, has provided Council with invaluable guidance for program development. Investigations of all Community suggestions and appraisal of the trees and landscapes we value the most, will help ensure we plant, protect and nurture our trees and canopy cover in accordance with Community wishes and expectations.





## Background Orange snapshot

### Topography and soils

Situated 862m above sea level, Orange exhibits an attractive and variable landform consisting of valleys, flats, slopes, foothills, and plateaus. The largest peak in the immediate area is that of Mt Canobolas which sits at 1397m above sea level and overlooks the town from the south-west.

Two major soil types exist. To the south, the “Towac” and “Spring Hill” soil types - fertile Kraznozems over basalt flows, predominate. The North Orange Red Earths are the major soil types to the north and east of the Orange urban area. Soils are fertile and relatively friable.

### Climate

Orange is in a cool climate location with frequent frosts on account of its elevation. Summers are warm (but relatively cool compared to lower lying areas of the state) and dry. Winters are cool and wet with an average annual rainfall of 895mm. Winters are wetter than the localities of Bathurst and Lithgow to the east as an outcome of Orange’s windward position on the western side of the adjacent ranges.

### Population and residential development

Orange is one of the smallest local government areas (LGA) in regional NSW, measuring 284 km2 in area. The urban footprint of the LGA consist of the regional city of Orange, and the small villages of Lucknow to the southeast and Spring Hill to the south.

In the year of 2023 there were more than 42,503 residents in the LGA. By 2036 the population is expected to swell to 50,400 people, as an outcome of migration as well as through natural population growth. However, as the largest city in the Central West Tablelands region, key facilities in Orange also support the surrounding towns of Bathurst, Dubbo, Parkes, Forbes and a wider population of over 100,000.

ABS data suggests that 1 in 5 of our 2036 population forecast will be people over the age of 65 which, when compared the rest of the state, shows Orange has a slightly larger proportion of aging community members than other places. Orange also has a higher-than-average number of young community members than other LGAs in NSW. Children under the age of 14 comprised 21.2% of the Orange population in 2019 (Department Primary Industries and Environment Population).

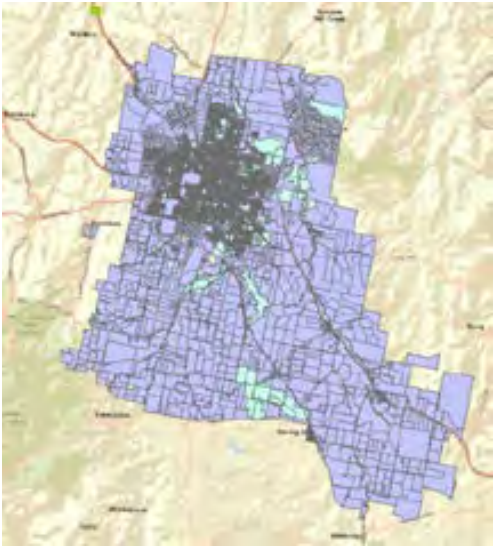


Figure 3: Land ownership in the Orange LGA (privately owned land shown in purple and Council-controlled and Crown lands shown in blue).

### Land use

As a rural city-region, Orange contains urban, peri-urban, rural residential and rural landscapes.

72.6% of lands in the LGA comprise rural or agricultural land use. Open space and recreation accounts for 3.3%, industrial land occupies 1.7%, with 0.9% for commercial, 7.1% infrastructure (major roads, airport, water storages etc). Around 14% of land is zoned for residential use (ABS 2023). See Figure 3.

### Cultural heritage

The traditional custodians of the lands of the Orange region are the Wiradjuri Nation, who presided over the Central Plains and Central West Slopes of NSW for tens of thousands of years before European settlers arrived. The Wiradjuri were the largest First Nations clan at the time of European occupation. The Wiradjuri peoples lived and moved through what was known as the land of the three rivers, the Wambuul (Macquarie), the Galarl (Lachlan) and Marrambidya (Murrumbidgee), west of the Blue Mountains. The Wiradjuri were hunter-fisher-gatherers and moved in family groups or small clans but came together for ceremonies and when disputes needed to be resolved. The local Wiradjuri clan who lived on country now annexed as the Orange LGA, occupied local creek and river valleys (Summer Hill and Cadiangullong Creek for example) and as water was available year-round, these were likely to have been permanent camps.

The Wiradjuri managed the landscape with fire. Reports of a “park like’ appearance of the land in some areas, as opposed to being thickly wooded in others, indicate this technique was used to promote grassland and encourage stocks of emus and kangaroos for hunting. “*Different types of fires were used to create different environments and encourage different plants and animals. An unfortunate consequence of the fire regime is that it created grasslands which were ideal for grazing cattle and sheep*” (NTSCORP 2012).

## Why trees and plants are important to Orange

### Plants and trees make places

The cultivated landscape and scenic beauty of Orange is intrinsically linked to our region’s sense of place. The treed ridgelines and distant mountain views set a stunning backdrop for our daily lives, with the trees and gardens of our town centres and heritage precinct forming the fabric of our ‘Colour City’ character. These form Orange’s Urban Forest and part of what science describes today socio-ecological systems.

Socio-ecological systems are defined as a complex, integrated system including both social (human) components and ecological (biophysical) components interacting with each other. Such systems regularly interact in a resilient, sustained manner; they are defined at several spatial, temporal, and organisational scales, which may be hierarchically linked; constitute a set of critical resources (natural, socio-economic, and cultural) whose flow and use is regulated by a combination of ecological and social systems; and they are perpetually dynamic with continuous adaptation, where changes in one part of the system can have profound effects on the others ([Socio-ecological system - Wikipedia](#)).





Examples of Urban Forest socio-ecological interactions include:

1. Environmental – Trees playing a critical ecological role within urban and rural landscapes in contributing to the local climate regulation, improved air quality, provide habitats for wildlife, sequester carbon, and manage water runoff among other ecosystem services.
2. Social – Creating identity in aesthetics (i.e. the “Colour City”), improve mental health and well-being, provide recreational spaces, enhance property values, can have cultural significance and contribute to a sense of place for communities.
3. Economic Benefit – Such as reducing energy costs through shade in the summer and windbreaks in the winter and supporting industries like tourism.
4. Health Benefits – Contact with nature and trees has been shown to have significant health benefits for the public including reduces stress, encouraged physical activity and reduced rates of certain health issues such as asthma (by improving air quality) and heat related morbidity/mortality.

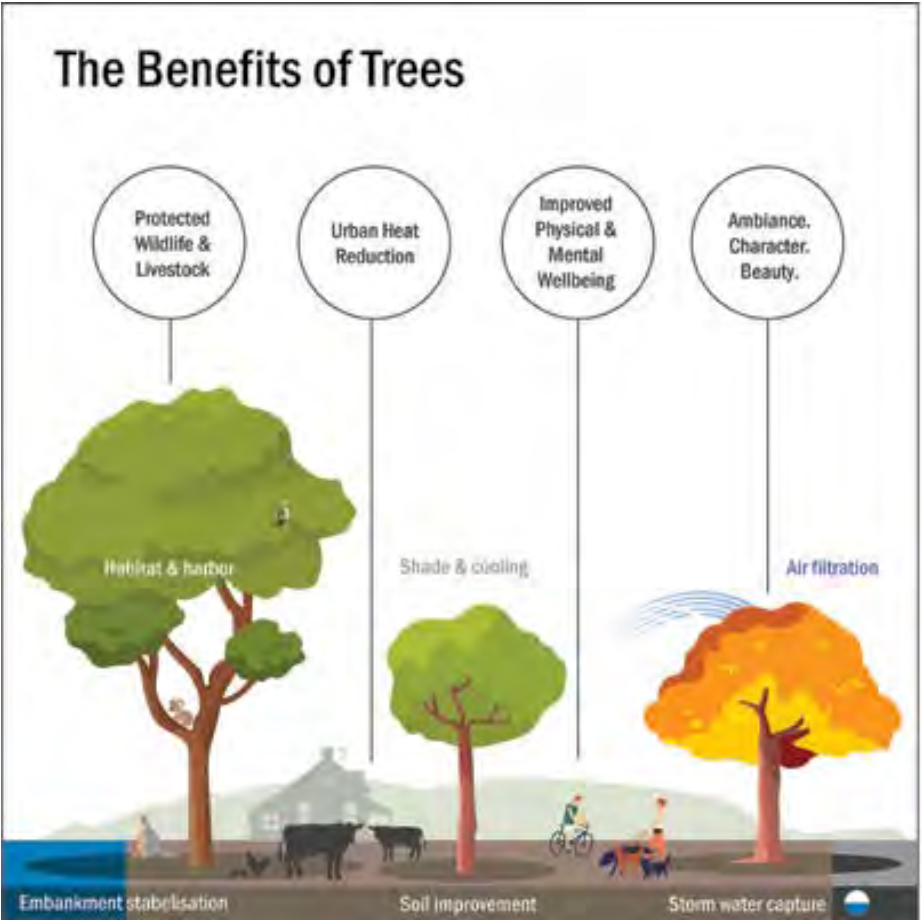


Figure 4: Pictorial representation of the benefits of trees

5. Urban Planning – Required for the integration of trees into urban landscapes as urban forestry and as a key component of sustainable city planning and equality to residents.
6. Policy and Regulation – In the creation of Local Laws and policies that protect trees, manage public lands and regulate private land use which can include incentives for tree planting and requirements for green space in new developments.
7. Community Engagement – In providing a focal point for community engagement and education (e.g. tree planting, maintenance, citizen scientist) to foster a sense of stewardship and community involvement.
8. Adaptation and Resilience – By contributing to a city's climate change resilience with shade, reduced urban heat island effect and flood mitigation.
9. Biodiversity – The support of biodiversity in providing habitats and food for a wide variety of species.

It can therefore be demonstrated that trees within the urban forest are not just a part of the natural landscape, but also a vital component of the socio-ecological system that supports human well-being, environmental health, and economic prosperity. Figure 4 *Pictorial representation of the benefits of trees*, overleaf, provides a visual summary of the many benefits of trees.

## Canopy cover and heat mitigation

### Tree shade

We all experience relief from heat on a hot summer's day when we pass through areas of tree shade. We picnic and nap at the base of shady trees in parks in the peak of summertime and select shady outdoor spaces at cafes to meet our friends. We're attracted to shopping precincts with shady walkways and spend more time and money in these places than tree-free shopping precincts. We insist on shade for our playgrounds (natural or artificial) and are grateful when we find a car park that is shaded by a tree knowing what a difference it can make.

There's a direct correlation between areas of tree canopy cover and lower radiant temperatures. Tree canopies absorb and reflect solar radiation, reducing the amount of radiant heat that reaches surfaces beneath or adjacent. Shading hard surfaces and preventing high levels of heat absorption in our built-up areas is one of the most cost-effective ways to modify temperature on a local scale. Tree shade has been found to cool the surface temperatures\* of buildings and roads by 10-25°C (DELPW 2019).

\*Land surface temperatures are not the same as air temperatures. Land surface temperature is a measure of the thermal heat stored in a ground or building surface. For further reading see "The most problematic variable in the course of human-biometeorological comfort assessment - the mean radiant temperature." (Kántor et al. 2011).





### Tree cooling

Trees provide local cooling via the process of evapotranspiration. Evapotranspiration, alone or in combination with shading, can help reduce peak summer temperatures by 1-5°C (Kurn, Huang and Arbari 1994). Trees release water as vapor through openings on the surface of their leaves as they draw water from the soil and use it to drive photosynthesis. The moisture cools the surrounding air as it evaporates, causing the air temperature to drop.

Trees provide optimum levels of cooling when there is an adequate area of soil to draw moisture from, and an adequate level of moisture within the soil. Where water is limited, so too is the amount of water vapor released from tree leaves.

Trees with a large surface area of foliage or leaves provide greater amounts of evaporative cooling than those with smaller surface areas. Trees with dense canopies (which is an outcome of tree health as well as tree type) and/or broad leaves provide greater cooling benefits than trees with small or modified leaves. Additionally, plants that are higher water users by nature, provide more cooling than lower water users. In a study analysing urban trees as heat island mitigation tools in Mexico City (Barradas 2016) it was determined that 63 mature Eucalyptus camaldulensis (River red gum) trees would be required to produce the same cooling effect as 24 Liquidambar styraciflua (Sweet gum) trees.

Trees in clusters or high-density plantings provide more benefit than individual tree plantings. Similarly, multi layered greenspaces with increased surface area for the provision of cooling offer a way to maximise cooling provided by our garden bed plantings.

## Urban heat islands

The Urban Heat Island (UHI) effect is a phenomenon whereby temperatures in towns and cities are hotter than open or lower density landscapes due to the amount of heat trapped in their network of hard and impermeable surfaces.

A relatively high level of heat is absorbed during the day in buildings, footpaths and roads and slowly released overnight, preventing opportunity for natural cooling of these hard surfaces (which also occurs at night-time). With no, or limited, natural surface cooling, relatively high radiant temperatures are the consequence.

In addition to this, the high proportion of sealed to open ground in built-up urban spaces results in most rainfall being directed to sealed storm water networks, as opposed to infiltrating and cooling soils. Limited areas of permeable ground, and limited natural flow of water to these areas, also reduces the cooling potential of vegetation that grows in these places.

Cities and towns are generally 1 to 3°C hotter than peri-urban landscapes and rural areas (NSW Government 2023), but it is in the heat of summer when the presence or absence of vegetation in urban places really comes to the fore. A 2018 study (DELWP 2018) measuring summertime UHI impacts in all metropolitan Melbourne LGAs found average land surfaces temperatures for all but three of the LGAs to be 7.0°C higher than non-urban areas on their hottest days. Shading hard surfaces to prevent high levels of heat absorption in our built-up areas is one of the most cost-effective ways we can reduce urban heat.

In urban centres, the impacts of heat are the greatest where high density living and/or commercial office blocks combine with a high ratio of non-permeable to permeable ground surfaces. The production of heat from vehicles, air conditioners and air pollutants further contribute to the urban heat island effect and, moreover, lack of breezes where taller buildings exist.

Neighbourhood developments with a high ratio of man-made to natural elements, and limited areas of permeable space, can also act as heat sinks. Modern residential developments especially, which typically have large building footprints compared to the lot size and less space for trees, gardens or open expanses of turf, create urban heat islands.

### Using vegetation for urban heat mitigation

Using canopy for mitigation of heat is most effective when trees are planted in strategic locations. Planting trees along footpaths, between car parks, or in groups around buildings, for example, are some of the most effective ways to use trees for cooling benefits.

Targeting areas where canopy can be bolstered (for example adjacent to established clusters of trees to increase cooling potential of these plantings, or between gaps in avenue plantings) is another effective strategy for enhancing the cooling potential of existing vegetation.

Larger trees with moderate to fast growth rates will provide more cooling benefits than small or slow growing trees. For large growing trees to reach their full potential, and provide maximum shade and cooling benefits, ample permeable space must also be available in and around the planting site.

### Permeable space – the vital ingredient

Providing trees for shade and cooling is one of the most cost-effective ways to reduce ambient air temperature in urban places. Adding tree canopy to our towns and cities can help to moderate UHI impacts but, importantly, adequate permeable space for these trees - to draw water from soils and evaporatively cool the surrounding air – is also necessary.

Limited areas of permeable surfaces and limited natural flow of water to these areas reduces the cooling potential of vegetation that grows in these places. Permeable surface treatments, by facilitating water infiltration, contribute to the cooling effects of plants. Permeable spaces also keep soils cool, as opposed to hard surfaces which trap and store heat and transfer it to the soil underneath.

Continuous strips of garden bed, or open grassy verges providing good access to water and ample space for root development, are the best types of planting environments for reducing urban heat. Creating continuous garden beds by removing sections of hard surfaces between existing trees may be possible in some urban hot spots where sufficient space for pedestrian movement can continue to be provided. Where there is not enough room for pedestrians and vegetation to be co-located in urban road reserve, permeable or pervious surface treatments can be used.

Permeable surface treatments with supporting soils (also referred to as structural soils) for tree growth beneath can be highly beneficial where only small planting spaces can be made available. A range of permeable surface treatments currently exist including no-fines products such as porous concrete or porous asphalt, permeable pavers or regular pavers





with permeable grout and/or resin-bonded aggregate products. Elevated walkways (decking for example) provide air and moisture to tree roots beneath are ideal but these are expensive and can only be used in special situations.

Permeable surfaces are often used in conjunction with specially designed under-ground infrastructure that extends the amount of space available for tree root growth beath the surface. These load-bearing products consist of a vaulted matrix of cells, specially sized rocks or recycled hard surface materials filled with growing media that can support tree roots. The permeable surface layer allows for air and water to the reach the tree roots beneath. Again, these treatments are costly but provide opportunity for the establishment of valuable canopy in typically constrained urban spaces.

Other types of plants for urban cooling

Shrubs and smaller plants, as well as irrigated patches of turf, also provide cooling benefits and can both supplement tree plantings and provide useful heat mitigation independently.

Cooling potentials of vegetation can be increased by supplying water to plants and trees outside of rain periods (in the summertime for example) to drive higher rates of evapotranspiration.

Urban Green Infrastructure (UGI)

We can also directly embellish our buildings with greenery for cooling and visual benefits. Growing climbing plants on or against building facades and walls (vertical gardens) and creating roof gardens are additional ways for us to use smaller plants for urban greening and reducing city surface heat.

Climbing plants and vines are especially useful for screening and greening bare or unsightly city facades and walls. Green facades can cool the surface of the façade by 8°C (Hopkins et al. 2012).

Climbing plants or vines and can be planted in the ground or grown in pots, trailing up walls, or cascading down. Trellis systems (cables or mesh) are typically used as support. Passive irrigation can also be supplied to plants via down pipes. Containerised plantings need ample water but, otherwise, green façades offer a simple and affordable urban greening solution. There’s wide application potential for vertical gardens in Orange.

Green walls are engineered vertical planting treatments that are attached to a wall. The vertical structure contains the planting media, as well as plants. Green walls can be constructed from pre-vegetated panels that hold growing media to support the plant material or planted blankets exhibiting planting pockets filled with plants and growing media. These also require ample irrigation as they dry out quickly. Usually highly attractive, maintenance requirements are also extremely high and due to their bulk. Research has shown a green wall can reduce the surface of the wall temperature by 9°C and air temperature by 4-5°C (Hopkins and Goodwin 2011).

Whilst the application potential by Council in Orange is not high, we can green the walls of Council-owned buildings and facilities (where architecture allows) with green façade plantings. We can also partner with commercial property owners and our business community to encourage and/or assist with the delivery or maintenance of green walls and facades in high visibility use areas, where community benefits will be greatest.

Roof gardens are another type of green infrastructure that reduces radiant heat absorption and provides transpiration cooling and harvest rainwater for use. These sophisticated systems of green infrastructure require layers of protection and drainage beneath planting substrates. They are more costly to install and more difficult to maintain than green facades and walls. Moreover, most of their benefits are provided directly to the building occupants. Research conducted in Adelaide showed that a 300mm vegetated profile reduces roof surface temperature by 41% in summer (Hopkins and Goodwin 2012).

Our Australian Standard for UGI - SA HB 214:2013 Urban Green Infrastructure – Planning and decision framework and the NSW Urban Green Cover Technical Guidelines (OEH, 2015) provides best practice applications of urban green cover to minimise urban heat impacts.

Irrigated turf

Irrigated urban parks provide oasis-like relief in the extremes of heat. Notable cooling benefits have been measured 200m down-wind in calm conditions (Sugawara et al. 2016). In a study analysing over 1500 sports fields and large parks in South Australia, Victoria and NSW, irrigated turf was found to provide 4.9°C cooling above baseline surface temperatures (Siebentritt 2020). Non-irrigated turf in the same study provided variable cooling - averaging 1.3°C.

Broadbent et al. (2017) found, during a heat wave in Adelaide, that the air temperature above an irrigated surface was up to 2.3°C cooler than the air temperature above an unirrigated surface. Gao et al. (2020) concluded that a daily irrigation scheme can provide a maximum daily temperature drop of approximately 1.3°C and an average daily air temperature decrease close to 0.5°C. Their study also found that irrigation induced cooling effects tend to be higher in urban areas where the soil is drier before irrigation, or where the ambient temperature is higher.

Trees and Water

Water security, and using our water resources wisely, is a strategic imperative. As our climate becomes drier, we must plan for an increase of water supply to our landscape plantings. Not only will our trees and gardens need to be actively watered in extended periods of reduced rainfall, but they will also need more frequent applications of water. Transitioning to the use of drought tolerant plants (drawing distinction between these and tree types that are perhaps more adaptable to drought, or resistant to the relative impacts) is not the sole answer. Drought tolerant plants provide less cooling, less canopy, and less shade. Plants that are lower water users than others are often thin or straggly, their rates of growth slower, and their mature sizes constrained by their slow growth rates.

Trees that can respond to heat stress temporarily, often respond by dropping leaves. Other trees will respond through decreased vitality in general, which is pronounced through decreased foliage development, resulting in thinner canopies and morphological changes to foliage (yellowing leaves and/or reduced in size) which impact the visual as well as environmental benefits provided.

Water not only helps plants and trees to provide us with more shading and cooling benefits, it’s also a basic requirement of tree growth and, ultimately, survival. Strategies for general decreases in water use must ensure we are not leaving our trees and plants high and dry as our green infrastructure is exposed to a greater frequency and/or more prolonged periods of drought.



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Orange has committed to actively managing the impacts of climate change and adapting our practices to suit future climate scenarios (Orange Climate Change Management Plan). With greater levels of heat and lower levels of rainfall forecast, water use for vegetation management must be increased as opposed to decreased over-time. Moreover, if we are to receive maximum benefits from our township trees, increased supply of water to our trees and plants (manual or automated) will be an absolute necessity in our warmer and drier future. Water management planning for our region needs to clearly reflect this.

Orange has been connecting both potable and non-potable water sources to our urban dwellings in Ploughmans Valley and North Orange since 2005 in our “dual pipe” system. Further advancements in the use of non-potable water for irrigation of trees on Council-controlled lands could lead to significant decreases in urban heat and increased liveability of our region.

Canopy cover and social vulnerability

Cities and towns, where our urban populations are concentrated, are the places where most of us go about our daily lives. These are the types of environments where we are most vulnerable to the impacts of urban heat. These are also the types of places where our most heat-vulnerable residents are likely to live. Socially vulnerable communities are more likely to live in localities with below-average tree canopy cover.

It is a responsibility of Council to ensure that those in the community most vulnerable to the primary, local impacts of climate change – increased heat and increased costs of cooling – are considered. Using trees for shade and cooling in places where our vulnerable community members go about their daily lives (shading the route to Orange Village Seniors Hub, for example) is key to this. Ensuring there is environmental justice and equity of tree canopy cover is a key objective of this strategy.

Heat and human health impacts

The oldest and youngest members of our community are the most vulnerable to the impacts of heat. Cancer causing sun damage is of greatest risk to the youngest members of our community. Australia has one of the highest rates of skin cancer in the world and two in three Australians will develop some form of skin cancer before 70 years of age (Cancer Council 2020). Sun exposure during the first 18 years of a person's life is the most critical for cancer causing skin damage (Kimlin and Guo 2012). Sun exposure during the first 10 years of life more than doubles the chance of developing melanoma as an adult (Cancer Institute NSW 2022). It is therefore vital that we ensure tree shade is provided to spaces where our children are most likely to be impacted by summertime sun and heat.

Heat stress and heat stroke are generally associated with the elderly, or community members with specific health conditions, although anyone can be impacted during heatwaves (long spells of very hot weather). Heat stroke occurs when the body is no longer able to cool itself and is linked to ‘wet bulb’ temperature which is a product of both temperature and humidity. With a record heatwave in Europe in 2023, the year of development of this strategy, and 60,000 heat-related deaths in Europe alone in 2022 (Gramling & Ogasa 2023), actions to address urban heat must be planned.

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Air pollution vulnerability

Other members of the community are vulnerable to the impacts of air pollution, which contributes to the deaths of up to 5,000 people in Australia every year. Air pollution is linked to cancer, heart disease, stroke, dementia, and respiratory ailments like asthma. In the year 2020, smoke generated by bushfires impacted areas hundreds of kilometres away from the fire zones and was responsible for an estimated 445 fatalities (CCAN 2020).

Of special concern is the heightened vulnerability of children, as their exposure to pollution at an early age can result in enduring and irreversible adverse effects on respiratory function. Moreover, pollution has been connected to developmental issues in children, as well as premature labour and low birth weights.

Trees are very effective at trapping air borne pollutants, filtering oxides of nitrogen, ground-level ozone, ammonia, and volatile organic compounds (VOC's) as well as general particulate matter that pollutes our urban areas. These same pollutants in sufficient quantities emitted from vehicles, industry and wood and coal fires, create smog. Climate change will reduce our air quality. Modelling has shown that significant increases in summertime smog will be experienced from 2030 if emissions are not reduced (CCAN 2020). Moreover, particulate pollution is also expected to rise as an outcome of other climate change impacts including bushfires and wind-blown dust storms.

Air pollution and tree species

While trees are shown to be effective at trapping air borne pollutants, rates of pollution interception are dependent on the types of trees planted. Some trees generate ozone – a component of smog - and, therefore, counteract benefits. How effective a tree species is at trapping pollutants is dependent on the size of the canopy, the size of leaves and features of the leaf itself. Large canopy trees can trap more particulate matter than small canopies. Trees with larger leaves and those with hairy or coarse leaf surfaces are the most effective at capturing particulate matter – for example, London Plane trees.

Trees and climate change

Key impacts of climate change that we are already experiencing include global temperature increases, lower rainfall, a higher incidence of storms and storm surges, and increased occurrence of natural disasters such as bush fire and flooding.

The outlook for our region is one of continued warming. The warming is projected to be, on average, about 0.7°C in the near future (2020–2039), increasing to about 2.1°C in the far future (2060–2079) (Orange Climate Change Management Plan 2021). The number of hot days is projected to increase, and the number of cold nights is projected to decrease.

Figure 5: Near and far future changes in days above 35 demonstrates the increases in the number of hot days (over 35°C) we are likely to experience annually in both the near and far future.

In addition to shade and cooling to mitigate our warmer temperatures on a global level, trees have the potential to reduce the severity of climate change and place us in best case as opposed to worst case future climate scenarios. The role of trees and forests in sequestering carbon is recognised as one of the most practical and affordable methods to combat climate change.





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The increasing levels of CO2 in our atmosphere (an outcome of emissions) directly correlate to our changing, warming climate. On a global scale, trees help to manage atmospheric CO2. Trees absorb CO2 from the air releasing oxygen back into the atmosphere and storing the carbon in their wood for their lifetimes. While shrubs and smaller plants, turf grasses and even soils also sequester carbon, trees are far more effective at this, especially on a whole-of-urban-forest level.

Healthier trees sequester relatively more carbon as they are denser and grow more vigorously than trees in poor health. *Figure 6: Example infographic showing the natural carbon cycle demonstrates this below.*

Figure 5: Near and far future changes in days above 35°C. (Orange Climate Change Management Plan 2021)

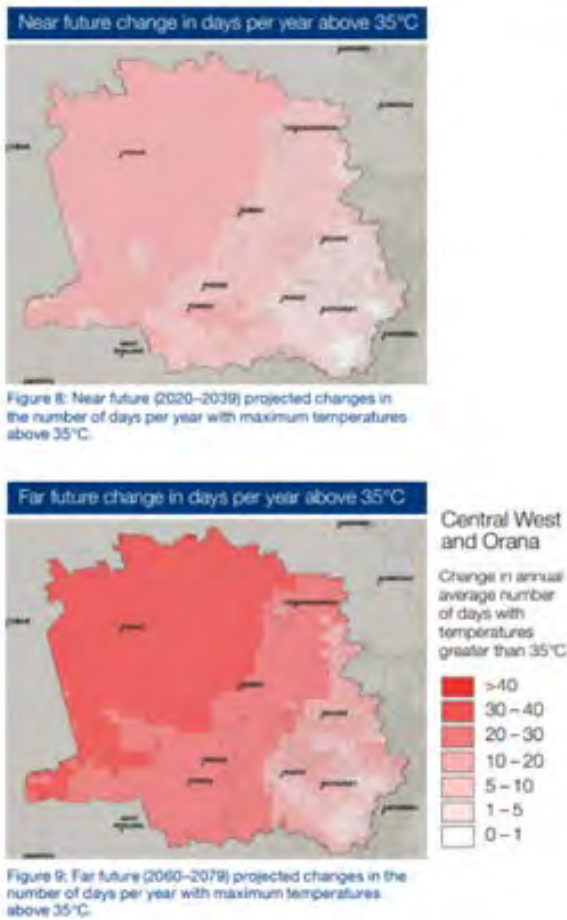


Figure 6: Example infographic showing the natural carbon cycle (source Orange Council Climate Change Management Plan 2021).

Orange City Council is committed to managing, mitigating and adapting to climate change in the region and through sharing of its approach, wishes to set an example in demonstrating what is possible. The continual planting of new trees which sequester (store and capture) carbon, as well as the retention of existing mature trees with significant amounts of carbon already stored, are some of the actions we have committed to in our Climate Change Management Plan (2021). Strategies for trapping more CO2 locally include planting faster growing trees, maintaining trees for longer while they are establishing, and ensuring we are keeping our trees in optimum health.

### Trees for carbon sequestration

#### Mini forests for carbon sequestration, biodiversity enhancement and cooling

Creating new forests – “mini forests” - is a strategy successfully used in the northern hemisphere for creating biomass for carbon sequestration and measurable cooling where the land area and percentage cover is large enough for meaningful mitigation of heat. Other benefits of the creation of “mini forests” include biodiversity, flood mitigation and air quality benefits. The idea is an extension of work by the famous Japanese botanist Akira Miyawaki to help create biodiversity in urban areas. More than 3,000 forests have been planted worldwide using Miyawaki’s methodology including in Paris, France and North Bangalore, India.

A mini forest can be established on an area of vacant space as small as a tennis or basketball court. Minimum sizes for mini forests are given as 200m2 (e.g. 14m x 14m) with benefits growing further for areas greater than 1000m2 (e.g. 36m x 36m).

Saplings are recommended for planting in densities of 3 per m2 which is higher density than a normal forest but still able to support tree growth. For the best biodiversity impacts, a large range of species is recommended. Ideally, these should be locally occurring species, replicating all layers of the natural vegetation system best suited to the site.

Mini forests can also be used to enhance biodiversity, flood mitigation and air quality. The creation of mini forests in parks to connect larger tracts of bushland can create additional benefits such as fauna corridors.

#### Return of stored carbon to the atmosphere when trees die

Natural forests slowly release carbon back into the soil as they die and break down over a long period of time. Soils then produce carbon emissions as the organic matter is broken down further, again through a slow decomposition process.

When trees are cleared and then mulched or burnt, i.e. not allowed to break-down slowly, trees release their carbon rapidly (through combustion or accelerated decomposition respectively).

Providing opportunity for slow break down and release of carbon from felled trees (or repurposing wood for timber) also offers potential to slow the carbon cycle when trees reach the end of their useful lives or are removed prematurely. Whilst this may have only a small impact at a global scale, as emissions are diluted into the entire atmosphere, all carbon sinks contribute and have value. Every LGA has a responsibility to use trees to capture and continue to store carbon for as long as possible.

One opportunity for the slow, natural breakdown of logs on the fringes of our waterways and storm water detention basins where they can provide biodiversity hot spots. Placed

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within areas of long grass they provide valuable harbor for reptiles and other ground dwellers that can use slowly decomposing woody debris as habitat, and the woody debris, a critical source of food for our natural decomposers, fungi. Such logs can even provide habitat marine animals in suitable waterways.

Trees and energy savings

Using trees to shade and cool our buildings and homes to reduce energy consumption, and cooling the places we are most likely to spend time in, is one, indirect strategy to create energy savings and reduce emissions.

Using vegetation and water to shade and cool our urban heat sinks, such as the impermeable surfaces of our urban infrastructure, can further help reduce our reliance on generation of cooling via energy-expensive systems, especially as our climate continues to warm. Using vegetation to directly contribute to cooling, reducing our CO2 emissions rather than combatting them once emitted, is a more efficient and effective approach in mitigating the local impacts of climate change.

An effective way of achieving this type of mitigation in summertime is when trees provide 30% canopy cover to the west and north sides of residential streets. Canopy cover can provide direct energy savings of 13% when strategically located around buildings.

Trees to support active transport in our region

Planting trees strategically for thermal comfort can make our region easier to walk and cycle around, which can reduce our reliance on cars and reduce the emissions we produce. Our Climate Change Management Plan (2021) reports that the NSW transport sector contributes 21% of NSW’s greenhouse gases with 84% of this road-based transport. The plan discusses the benefits of a sustainable transport future for Orange in addition to emission reductions. These include increased mobility and health of our communities, improved air quality, increased road safety for cyclists and pedestrians and less isolation with improved connections to be an outcome of our active transport goals.

With the likelihood of reaching our optimal emissions reduction targets low (per the Paris Agreement), the role of our plants and trees in helping us to manage climate change impacts will only increase in importance.

Work is already underway in the region to increase opportunities for passive and active recreation, and trees can provide an additional level of comfort for users, especially where unbroken shade can be provided. Trees also offer the added benefit of visual amenity which helps elevate the appeal of walking or cycling.

The implications of climate change for vegetation

Significant outcomes of climate change include a greater incidence of natural disasters. These range from bushfires and a greater incidence of more severe and extended periods of drought to increased storm-damage, and flooding events from more frequent and intense rainfall.

Further, increased average temperatures means more days of extreme temperature. These are a significant threat to natural plant communities in temporal areas. Species that have a

side natural distribution are more adaptable to significant changes in climate and rainfall.

Species that exist in niche areas only are likely to have evolved in conjunction with the specific environmental conditions of the locality. These are considered vulnerable to climate change outcomes that affect local climate and, as such, the growing conditions of their natural environments. Some of our plants and trees are not expected to survive even small increments of rising temperatures.

How to build resilience in tree populations

Resilient urban forests are both healthy and diverse. Urban forests with limited species diversity are vulnerable to our changing climate as well as potential pest or disease outbreaks. Urban forest sustainability is best achieved by ensuring a wide range of species are represented and maintaining trees to the highest standards possible.

The capacity for Orange’s trees to play their part in mitigating urban heat in the future will depend on their resilience and adaptation potential. Adaptability is an evolutionary outcome with species showing a wide natural distribution with the “fittest” and more likely to tolerate and adapt to change. Native and exotic trees with proven adaptability to locations outside of their natural range are also more likely to adapt to change than local species that may, for example, naturally occupy a discrete area only.

Naturally occurring species of a defined area may not be sufficiently adaptable to our warming and drying climate in worst case scenarios. Mass loss of trees of the same species is a significant threat of climate change. In worst case climate change scenarios, we are likely to see significant change in the composition of plants in our natural environments with some species moving in, and some moving out, of specific ecosystems. We are already seeing southern migration of species on the east coast of Australia with the natural range of some species moving southward as warming impacts their original habitable range.

The philosophy of achieving resilience as an outcome of diversity can also extend to genetic diversity of seed and stock which is dictated by the provenance of plant material (mother stock) sourced. Where species with a large natural range are involved, diversity of ecotypes (denoting the geographical location of the source) may provide further resilience and future proofing potential. While local sources of tree seed and stock have been traditionally preferred for local species, selecting ecotypes from the northern-most extent of the species natural range (where relevant) may result in improved heat adaptation potential.

In a seminal and well cited work, Santamour (1990) presented rule of thumb ratios to guide tree population diversity. Under this system, no more than 10% of a tree population should represent one species (for example, Eucalyptus camaldulensis – River Red gum), no more than 20% one genus (the parent grouping for example a River Red gum belongs to the genus Eucalyptus), and no more than 30% one family (all Eucalypts, Paperbarks, Callistemons for example all belong to the same family – Myrtaceae). Kendal et al (2014) propose home-grown species diversity targets based on existing variation and specific population vulnerabilities. This is recommended for Orange.

Ensuring we know which species are most at risk enables us to provide greater intervention when needed and, potentially, reduce use. We can further reduce risk by using a wide palette of species for amenity plantings. This will assist in averting amenity tree population crises in the future.





### Population age diversity

The resilience of trees reduces as they mature. Young trees can bounce back from a stress inducing event more readily than an older tree. Over-mature trees (nearing the end of their useful lives) are generally very low in vigour and vitality and, with little in the way of energy reserves, they are less likely to tolerate change. Maintaining a mixed-aged tree population is, therefore, another way to reduce the risk of mass tree loss in our uncertain future. Ongoing, programmed planting of new trees will continue to bolster tree population diversity and help to future proof our urban forest.

## The evolution of Orange’s landscapes

European exploration and settlement in the Orange area began in the early 19th century. Early European settlers were pastoralists and attracted to our region’s grassy plains and rich basalt soils. Early farms were established on the outskirts of Blackmans Swamp Creek that would be officially proclaimed as the township of Orange in 1846. The discovery of gold in the 1850s brought a wave of gold prospectors to the region leading to the establishment of mining settlements such as Lucknow and Ophir.

Plant community type
Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands, South Eastern Highlands Bioregion
Broad leaved-peppermint- Brittle gum-Red Stringybark grassy open forest on undulating hills: South Eastern Highlands Bioregion
Burgan-tea tree – Fringe Myrtle dry heathland on rocky outcrops, South Eastern Highlands bioregion
Dorwood grassland of the South Eastern Highlands Bioregion and South East Como Bioregion
Long-leaved box – Red Box – Red Stringybark mixed open forest on hills and hillslopes in the NSW South Wales Western Slopes Bioregion
Red Stringybark -Inland Scribbly Gum open forest on steep hills in the Mudgee northern section of the NSW South Western Slope
Ribbon Gum – Snow Gum grassy open forest on flats and undulating hills of the eastern tablelands; South Eastern Highlands Bioregion
Yellow Box – Blakely’s Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

Table 2: Central Tablelands Plant Community Types for the Orange LGA  
(source The environmental factor)

The fertile lands around Orange were ideal for agriculture with the most productive soils selected and large areas of native vegetation cleared to make way for pastures and cropping. The region quickly became known for its orchards, vineyards and pastoral activities. Agriculture has shaped the landscape of Orange significantly and historical clearing has had a lasting impact.

### Pre-clear vegetation cover

Natural plant communities of the region consisted largely of Grasslands and Western Slopes Grassy Woodlands with Sclerophyll Woodland occurring in the region’s higher reaches. Terrestrial diversity mapping updated for the region in 2020 (TEF 2020) identifies our natural vegetation communities and sites of highest biodiversity value in the region today. One of our plant communities - the *Eucalyptus melliodora/Eucalyptus blakelyi/Eucalyptus bridgesiana* complex (Yellow Box – Blakely Red Gum grassy woodland on the Tablelands, South Eastern Highlands Bioregion) - is listed as an endangered ecological community. Our natural plant communities are listed in *Table 2: Central Tablelands Plant Community Types for the Orange LGA*.

Little documentation detailing the breadth of tree and vegetation cover in our pre-clear landscape exists, so the structure of our forests and woodlands and proportions of land with light or heavier tree cover are not entirely understood. This is especially the case with fire, a likely technique of First Nations land management, potentially changing the natural structure of plant communities on our lower slopes from woodlands to open and grassy plains (NTSCORP 2012).

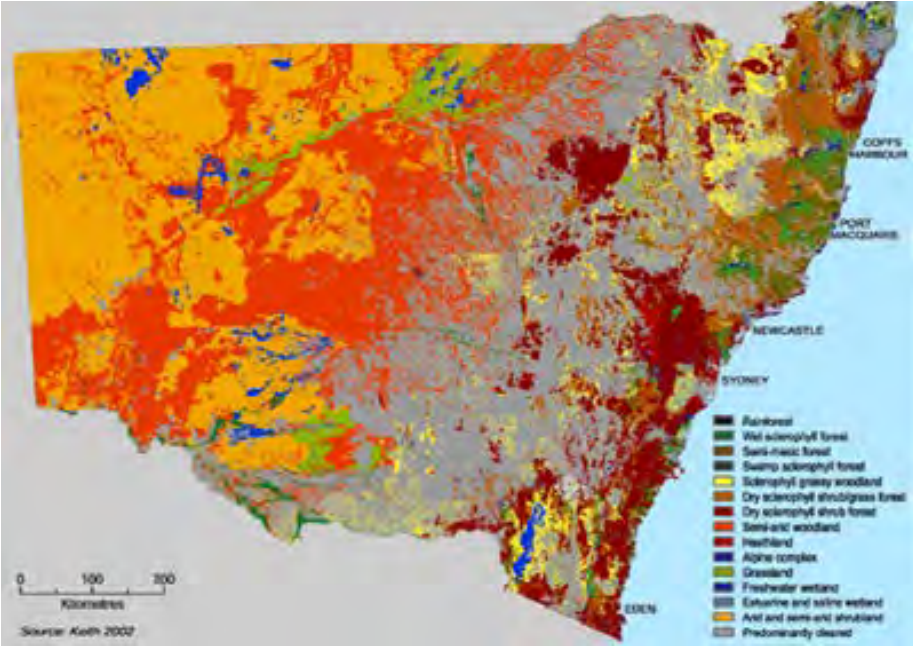


Figure 7: NSW National Parks and Wildlife mapping of native vegetation communities in NSW (Keith 2002). Note: The data used to prepare this map only records losses in the extent of native vegetation cover through land clearing and does not indicate degradation or losses of vegetation or ecosystem diversity due to other processes, such as overgrazing and inappropriate fire regimes.





Natural vegetation cover in our region today

Native forest and woodlands are estimated to have covered around 65% of NSW at the time of European settlement. This compares with only 30% cover within the State now (Keith 2002). Figures derived from NPWS mapping of remnant vegetation show that native vegetation comprises less than 9% of the LGA of which the majority (8.3%) is recognised to comprise disturbed regrowth forest (Orange Development Control Plan).

With widespread historical clearing having reduced our region’s native vegetation to fragments, our landscape is recorded in State registers and mapping systems as cleared or non-native. Figure 7: *NSW National Parks and Wildlife mapping of native vegetation communities in NSW* (Keith 2002) shows the tablelands, western slopes and plains in the central division of NSW, including Orange, as predominately cleared.

Tracts of native vegetation remaining in our LGA today are highly fragmented. Pockets of native vegetation mostly occur adjacent to cleared rural lands as well as in our rural roadside reserves. In eastern catchment areas roadsides are steeper and, therefore, more vegetation has been preserved in these locations. Large roadside remnants can be found in March for example and on hills or knolls within adjacent private land allotments.

Our isolated areas of native vegetation still provide value. Even areas that have been degraded can play a role in preserving biodiversity by providing, for example, corridors, refuges or stepping-stones for the migration of flora and fauna. Significant patches of vegetation within the LGA and connect to larger conservation areas outside the LGA to the east (Kinross State Forest), north-east (Mullion/Clergate State Forest and the Mullion Range State Conservation Area) and west (Canobolas State Forest).

Expansion of terrestrial biodiversity mapping for the Orange LGA (as demonstrated in Figure 8: *Terrestrial biodiversity mapping for the Orange LGA as updated in 2020*) occurred in 2020 to ensure all values were appropriately documented for Council’s Local Environment Plan revision of 2020.

This allows for better integration of biodiversity conservation into land use planning instruments and the development assessment process, as well as opportunity to target our biodiversity areas for program development.



Figure 8: Terrestrial biodiversity mapping for the Orange LGA as updated in 2020.

Our amenity landscapes

The township of Orange was developed on a square mile layout of wide streets set in a grid pattern complete with formal parks, churches and corner stores (Orange CSP). The early streetscapes of Orange generally comprise the Central Orange Conservation Area which, today, includes the Central Business District and surrounding residential areas.

The planting of municipal trees commenced following installation of utilities and water beyond the established town area in 1927 (Orange Street Tree Master Plan 2012). Exotic deciduous trees were planted in avenues throughout the streets of Orange, reflecting our cool climate and complementing our period architecture. Characterised by single species avenue plantings in wide streets, the Oaks, Planes, Liquidambar, Linden and Maple trees that line the residential streets of Orange’s historic precinct are one of the city-region’s greatest assets. Sampson Street, National Avenue, Byng and Hill Streets contain some of our most prized avenues of trees.

The pattern of use of exotic species for street tree planting has continued and extended into newer residential areas of Orange’s urban footprint (see

*Figure 9: Avenue planting of Liquidambar (Sweet gum) in a residential streetscape in the Orange centre.* Avenues of exotic trees are also found within our formal parks systems, one of the most significant being the Blackman’s Swamp Creek park system which forms a significant green belt and recreational spaces within Orange City.

Shelter belts, wind breaks and hedges in our privately held rural landscapes are largely made up of exotic-deciduous trees. The framework of trees in gardens surrounding homesteads are also typically exotic-deciduous in nature. The Orange Significant Landscapes study and web tool (Andrews.Neil in association with Artscape 2008) details culturally significant vegetation within the Orange Region, predominately trees of exotic origin.



Figure 9: Avenue planting of Liquidambar (Sweet gum) in a residential streetscape in the Orange centre.





Our informal open space reserves contain a mix of native and exotic vegetation with exotic trees common in the vicinity of creeks and waterways. Native vegetation that grows on our network of Council-controlled roads is mostly contained to the road corridor (or rural roadside reserves). Native vegetation that has been retained and used for streetscaping in the locality of Bletchington, however, provides contrast to the exotic-deciduous treed character of Central Orange.

Similarly, the landscape character of our smaller urban areas – the townships of Lucknow and Spring Hill – significantly contrasts with the formal exotic landscape of the Orange City centre and surrounds. The landscape characters of these towns reflect their wider rural landscape settings with Lucknow’s tree canopy cover reflecting its heritage as a mining settlement where trees would likely have been removed for mining props and fuel. Still, mature Eucalypts have a much greater presence in these townships forming streetside avenues (albeit eroded) and key landscape features (despite poor planting site occupancy and lower amenity tree numbers in these localities in 2022).

*Figure 10: The bluestone church in Spring Hill and associated remnant roadside Eucalypts* (Source: 2008 Andrews.Neil in association with Artscape demonstrates the natural leanings of landscape character in Spring Hill. With a greater mix of native and exotic trees in the central area of Lucknow, the natural landscape character is an outcome of the town’s wider landscape setting and borrowed views of native vegetation covering the rolling hills nearby. More generally, native plantings provide the main framework of tree cover within the town.



Entering the village of Spring Hill

*Figure 10: The bluestone church in Spring Hill and associated remnant roadside Eucalypts* (Source: 2008 Andrews.Neil in association with Artscape).

### Managing our urban forest - current practice

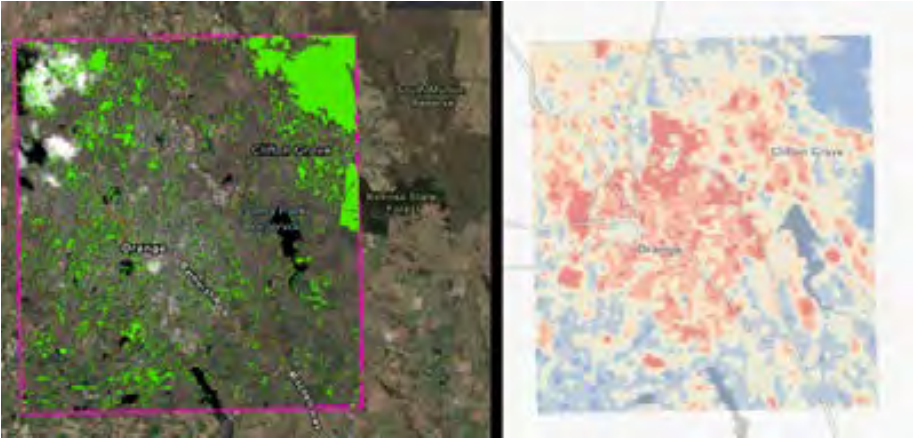
Our City Presentation team manages the health and maintenance needs of some 15,000 street trees within the Central Orange district as well as trees in the towns of Lucknow and Spring Hill (where locations and numbers are not yet recorded). The team also manages our rural roadside trees and all of the trees in Council managed parks, gardens, natural areas, bushland and sporting/recreational reserves.

Current amenity tree management operations focus on maintaining the quality and presentation of our regional centre (Orange city), the surrounding streets and neighbourhoods. Council plants approximately 400 new amenity trees every year. An estimated 200 trees died or suffered significant dieback during the extremely dry conditions experienced in the region between 2018 and 2020. Council expanded its 2020 street tree planting program in response, planting approximately 600 new street trees. This was to not only to replace the trees lost but to increase the number of street trees around the city. A dedicated young tree establishment and early maintenance team continues to operate.

Current management and plant establishment efforts in our informal system of parks and reserves seek to restore and reconnect stands of native vegetation. Approximately 3000 trees and plants of various sizes are planted in our parks and reserves annually. Planting works are largely carried out by community volunteers in partnership with Council.

### Analysis Orange’s Urban Canopy Cover

A project measuring tree canopy cover over the Orange LGA was undertaken in 2022 focusing on the extent of tree cover over our region’s most densely populated localities - Orange, Lucknow and Spring Hill. The study found that Orange has 17.3% canopy cover, Lucknow 7% canopy cover and Spring Hill 4.9% canopy cover.



*Figure 11: Canopy cover for Orange shown in high resolution satellite imagery to the left correlated with a radiant temperature map for the same area to the right. (Radiant heat legend below).*





In a pioneering and innovative approach to urban greening management, the work applied the latest technologies to measure and visualise tree canopy as well as associated radiant temperature effects. The high-resolution satellite imagery produced in the study was geo-located (correlated) with radiant heat mapping acquired for the region showing the corresponding temperature range. This is demonstrated in Figure 11: *Canopy cover for Orange shown in high resolution satellite imagery to the left correlated with a radiant temperature map for the same area to the right.*

Results of the study show and reiterate the undeniable link between vegetation – mainly tree canopy and irrigated grasses – and lower radiant temperatures.

The greatest deviations from the radiant temperature baseline (set to 0 for this study), generally 4.5°C or higher and shown in red in the associated mapping, directly correlate with areas of lowest canopy cover. Where thermal imagery shows temperatures are the greatest (in most cases, these consist of areas of open ground), imagery also suggests that heat is carried over into adjacent, lightly treed areas. Similarly, the effects of large and dense areas of tree canopy (cooling) also appear to carry over into adjacent, lightly treed or bare areas, supporting the of research of others such as Dr Sebastian Pfautsch, Western Sydney University (WSU).

Urban heat and canopy cooling

The dataset provides critical information on our township and region-wide canopy shortfalls, while visually demonstrating the direct impact of low canopy cover – increased urban heat. Clear correlation of canopy cover to radiant temperature across the region has provided Council with critical “hot spot” data showing where we need to direct operational programs of tree establishment and tree health management for shade and cooling benefits. Results also show that larger areas of connected canopy provide the best heat mitigating benefits. This is demonstrated in Figure 12: *Canopy cover south of Orange showing large areas of cooling associated with Bloomfield Park and the Orange Health Precinct “hot spot”.*

Our urban parks and gardens provide substantial cooling, which is correlated to canopy cover. Data show that the larger the area of continuous canopy, the greater the immediate

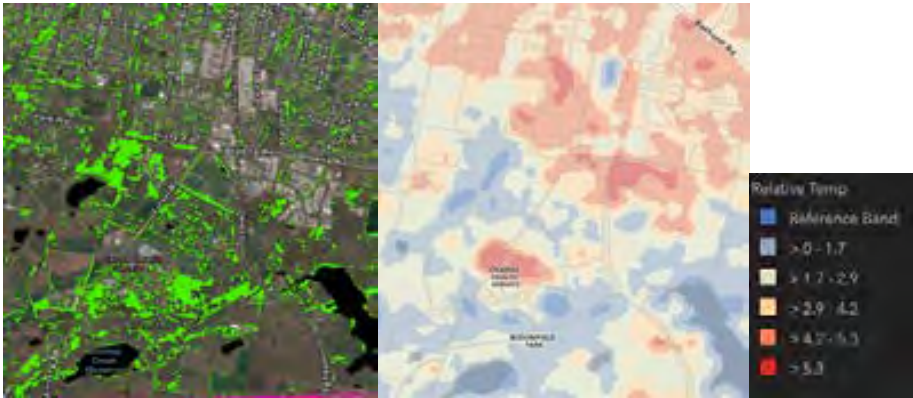
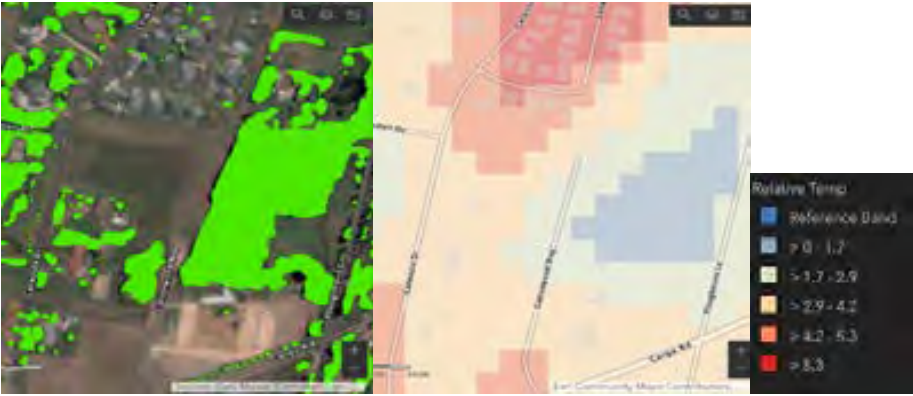


Figure 12: Canopy cover south of Orange showing large areas of cooling associated with Bloomfield Park and the Orange Health Precinct “hot spot”.

and downwind cooling effect. Our water bodies also contribute to this form of urban cooling. Figure 13: *Canopy visualisation showing large areas of canopy providing the greatest cooling benefits demonstrates this below.*



Our tree canopy and thermal heat correlations study of 2022 shows the urban residential area to the north of the Northern Distributor Road is a significant heat sink with relative temperature in the highest reference band. This is demonstrated in Figure 14: *Imagery showing canopy cover and associated heat north and south of the Northern Distributor Road below.*

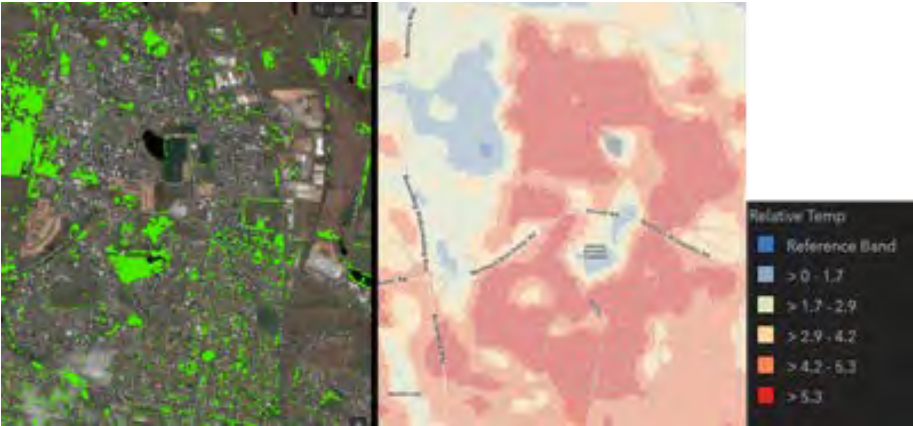


Figure 14: Imagery showing canopy cover and associated heat north and south of the Northern Distributor Road.

The recently built development to the north of the major distributor, however, is populated with young to semi-mature street trees and meaningful canopy has not yet established. Similarly, street tree occupation is good to the south of, and surrounding, the Orange Botanic Gardens. While trees are older and larger in this more established residential area (in the range of 8-12 years), canopy cover is still not extensive enough to significantly impact urban heat temperature bands. This demonstrates the influence of tree maturity on meaningful heat mitigation.

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In contrast, heat mapping shows that, with 100% canopy cover, the Orange Botanic Gardens is cool and shady and registers on the lowest relative temperature reference band. What the imagery also shows us here is the extended cooling impact of large tracts of connected canopy, reducing urban heat in the adjoining residential streets to the south. Even where there may not be room or favourable conditions for the planting of trees to form significant canopy cover, there may be opportunity for cooling of hot spots by protecting, bolstering or rejuvenating tree canopy in nearby locations.

Tree planting on private land

Our urban canopy cover study, as well as in-field observations, shows there is a significant lack of mature tree canopy in our newer residential landscapes. Figure 15: A typical urban residential area of North Orange visually depicts the outcome of low cover in dense urban residential landscapes. This is typical example of an estate that has been wholly or largely cleared in land reserved for private lots, as well as one where new street trees are likely present but are so young that they do not register on visual imagery. What the image shows, in the context of this discussion, is the reducing areas of space we are reserving for canopy in our urban residential environments and the many situational conflicts for trees in modern urban residential neighbourhood design.



Figure 15: A typical urban residential area of North Orange.

When correlated with land ownership data for our urban footprint, Figure 16: Orange % land type by owner (below left) shows that more than 78% of our urban footprint and canopy study area consists of privately owned land. By contrast, the percentage of our total urban canopy cover over these lands is under 14% (see Figure 17: Orange % canopy cover by land type, below right)

Low levels of urban canopy growing within our private land allotments is perhaps the most compelling finding of our Urban Canopy Cover study.



Figure 16: Orange % land type by owner

Figure 17: Orange % canopy cover by land type

Future directions – our urban forest management priorities

With baseline metrics for urban canopy cover ascertained, all-important benchmarks for Orange for monitoring canopy gain or loss going forward have been established. Council now has a strong evidence base in the visual representation of where canopy does and doesn't exist across our three urban localities. Our radiant temperature mapping data shows "hot spots" where we need to do more to provide adequate tree canopy cover for urban cooling in our residential areas, as well as clearly demonstrating the level of heat in urban areas with low tree canopy cover.

We can now use this evidence base to form programs of tree establishment where equity of canopy cover can be improved, where strategic placement of vegetation can provide the greatest benefit. We need to focus attention on planting a higher number of trees on Council-controlled land in low canopy cover locations. We also need to be planting a greater number of trees annually if we are to realise the canopy targets we have set for the future.

Equity of tree canopy cover across our urban townships

There are clear inequities in urban canopy cover across and within our three urban townships. The 2022 baseline canopy cover percentages of the towns of Spring Hill and Lucknow (as well as the on-the-ground visual presentation of these towns) show that prioritisation of tree planting in these localities is needed. Future programs focusing on these towns will help to provide the equity of canopy cover our region needs to maintain its liveability in the future.

Investigations show good potential for reinforcing a natural landscape character as we grow canopy cover in Lucknow and Spring Hill. The use of natural character/native species are recommended for use as amenity trees in these localities. Township master plans are recommended for development for these satellite townships to define the intended landscape character for these areas.

In Lucknow especially we will need to work closely with our local community to determine how trees can be of the greatest benefit. Heritage facades, overhead power, high road occupancy and limited areas of verge are the major constraints to tree planting there.

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Opportunities, however, may be present on approaches to the township from further afar, or there may be opportunities for nodal or town entry point plantings en route to these townships. This would provide focal points and visual amenity for visitors as well as local enjoyment. For Lucknow in particular we can continue to “bring the wider landscape in” and potentially enhance borrowed landscapes for their contribution to town amenity.

### Equity of tree canopy cover within our urban townships and vulnerable communities

Within the urban footprint of Orange, low canopy cover/hot spots in our areas of residential living are priorities for further investigation. We can identify these locations based on urban density and thermal mapping. Within these areas, we can prioritise, for investigation, locations frequented by our most heat-vulnerable members of the community, the young and the elderly.

We should seek to prioritise tree canopy cover in residential streets where our communities are most vulnerable; to reduce heat, provide natural cooling, and lower the cost of artificial cooling. We can determine where we need to focus our efforts in the delivery of equitable tree canopy cover across our region by correlating areas of low canopy with areas of heightened social vulnerability.

These include areas of social housing, areas where residents are likely to rent, or where single or low-income families with higher household densities exist. These examples represent areas that may benefit the most from the cost savings of natural tree cooling.

Ground-truthing can confirm where trees exist but are stunted, have been damaged or are performing poorly in general. These should be prioritised for replacement. With tree outcomes traditionally inconsistent in newly developed housing estates, inspection of all urban residential developments that have come into Council management within the past 5 years is recommended. Attending to streetscapes while trees remain young offers the potential to replace any poorly performing trees before significant maintenance costs are incurred.

In some places we may not be able to directly build or improve the quality and extents of local tree canopy. However, we can seek to provide benefits in other ways including borrowing distant landscape views for visual amenity and bolstering nearby canopy to extend cooling benefits into the subject neighbourhood area thus still bringing greening and shading benefits to those places.

### Heat sinks in our City Precinct

In addition to identifying where our socially vulnerable community members live, we can also identify locations where our community members most vulnerable to heat health impacts (including the young and the elderly) go about their daily lives. Further, we can identify locations where UHI impacts are likely to be significant based on urban density and thermal mapping. These locations should be prioritised for canopy cover building for shade and cooling.

Where opportunities are limited in our City Precinct, we can plant trees around public buildings and facilities and look to new ways of greening with other types of Urban Green Infrastructure (UGI). We can also embellish our green spaces with the addition of lower story

plants to enhance the visual and cooling benefits of plants and gardens in our town centre.

We should ensure that traditional locations for trees are always provided as a base standard in urban residential and larger city designs. Roundabouts, for example, should never be devoid of trees but often are, especially in lower socio-economic area streets and neighbourhoods. We should, for example, design and engineer our roundabouts with the soils and drainage necessary to support canopy trees, understory and ground plantings. Intersection corners are other spaces that we have yet to capitalise on. These should be considered of high potential for tree establishment in Orange.

### Our parks and recreational spaces

In our parks and recreational reserves we should seek to prioritise planting locations that offer the most benefit and the greatest diversity of benefits to deliver equity of canopy. We must continue to shade our play and recreation spaces, aiming for 100% canopy cover over our playgrounds.

Plantings to provide dense canopy for shade also double as carbon sinks and we should continue to plan to connect areas of canopy for greater cooling as well as achieving biodiversity benefits.

### Tree planting on private land

Combating the impact of reducing spaces for canopy on private land is an ongoing issue. While Council attempts to compensate for loss of canopy through planting regimes on land it controls, this alone will not be enough to sustain our urban forest into the future, let alone achieve targets for increased canopy. Council-led replanting programs will continue but these cannot offset historical and continuing vegetation loss from private lands. Imperatives to encourage the planting of vegetation on private land allotments are necessary.

Private landowners will need to help Council reach our canopy cover target by preserving existing canopy and growing more trees on their properties – all private properties – from our small suburban backyards to our homestead gardens, and within and surrounding our farmlands.

Partnerships can also help us to grow our canopy cover over private land. For example, there is poor tree cover in privately held commercial land in the Orange City Centre. There is significant opportunity for the delivery of greening initiatives in partnership with these landowners to provide mutually beneficial outcomes; for car park users as well as our wider urban forest, for example. *Figure 18: Locations of car parks in our civic precinct for potential investigation of greening partnerships* shows car park lots in our civic precinct for potential investigation.



Figure 18: Locations of car parks in our civic precinct for potential investigation of greening partnerships.





### The heat adaptation potential of tree and plant species in Orange

In 2012, a Street Tree Master Plan was developed for the Orange City LGA. The plan describes Orange as an important LGA botanically, with over 160 species represented when the study was undertaken. Analysis of tree species data collected for some 12,000 trees comprising the LGA's street tree population formed the evidence base of the plan.

In the 2010 tree population, over 94% of our urban street tree species were found to be of exotic origin and 90% were deciduous trees. Twenty-one species accounted for 75% of the population at the time. The plan reviewed species and reduced the list of suitable species for use by half and a palette of approximately sixty-five species were recommended for continued use.

With good performance of exotic trees in our region in general, only a few changes have occurred in the species we use for street tree planting since this time. Council has also reduced the use of Elms as street trees in the LGA in response to the heightened presence and impacts of Elm Leaf Beetle populations in recent years. Now, the significance of this pest issue for our region is no longer as great.

Silver birches (*Betula pendula*) responded poorly to our millennium drought when their heat vulnerabilities were exposed. The pure species is no longer planted in the region for this reason although cut-leaf Birch trees (*Betula pendula* 'Dalecarlica') are reported to be more resilient and the opportunity to trial these exists.

Plane (*Platanus sp*) trees have also been found to be heat-vulnerable and Council has responded by planting these only as infill plantings to sustain existing single species avenues of trees in our conservation area. With larger leaves and higher water use than our indigenous suite of plants, our much-loved exotic trees provide greater rates of cooling (when water is not limited). With larger leaves and higher water usage than our indigenous plants and trees, our exotic trees are also more vulnerable to the impacts of heat.

Recent species introduced or expanded for trial include *Magnolia* "Teddy Bear", *Malus* sp (Ornamental apple trees), *Pyrus* "Cleaveland Select" (Cleaveland selection Ornamental pear), *Tristaniospis laurina* (Water gum), *Acer rubrens* (Red oak). Also, the use of *Grevillea robusta* (Silky oak) plantings for more evergreen corridors has been extended.

The Orange Street Tree Master Plan (2012) provides comprehensive treatment of species selection issues for our region and ongoing quality guidance for tree species selection for our operational program. Our operational teams have also confirmed support for continued alignment of programs with the outcomes and recommendations of the plan. The plan continues to provide relevant guidance for street tree establishment, as well as the overall care and management of street trees in our region.

Minor review of this plan is, however, recommended due primarily to its age (more than 10 years old) and the increased knowledge base now available, particularly around climate change. Current species in the Orange street tree planting palette have been reviewed for heat vulnerability risk, with trees listed in *Table 3: Heat vulnerable species in cultivation in Orange* flagged as key species that may not be able to tolerate future climate conditions. These species are recommended for monitoring of performance over-time to better determine response to heat.

In addition to the heat-vulnerable species identified in our region, a number of our native trees and plants have also been identified as vulnerable elsewhere. Of significance is their listing in nation-wide (Kendal et al 2017) as well as local research into heat-vulnerability indexes of trees. Their vulnerability has been noted in local datasets created for locations including Melbourne, Ballarat, Launceston, the City of Greater Shepparton, Canberra and Sydney. Species include *Eucalyptus pauciflora* (Snow gum), *Eucalyptus melliodora* (Yellow box), *Eucalyptus macorrhyncha* (Red stringy-bark) and *Eucalyptus bridgesiana*.

Additional species identified for heat-risk include Pinus sp. (species of Pine trees), *Acer freemanii*, *Liriodendron tulipera* (Linden tree), *Quercus coccinea*, (Turkey oak) and fortuitously, *Cratageous mologna* (Hawthorn).

With regards to the vulnerability of major weeds of the region, expected climate change impacts on plant communities may provide us with some benefits. Some of our existing weed species (for example Pine and Hawthorn trees as identified above) will cease to cause the degree of disturbance they currently present. On the other hand, we can expect that new weed species may emerge, especially in areas of native vegetation decline.

### Next steps for species selection

Contingencies should be planned for and enacted as our "heat risk" species are monitored. These include using species for infill planting only and not introducing these for use in new avenue plantings.

Other initiatives may include increasing the diversity of surrounding plants where "heat risk" species dominate. Further examples include the introduction of alternate varieties for use

Species-Common name of heat vulnerable species used in our region
Acer platanoides Norway Maple
Acer rubrum 'October Glory' Red Maple
Aesculus hippocastanum Horse chestnut
Agathis australis Kauri
Banksia marginata Silver Banksia
Betula pendula Silver birch
Cedrus atlantica Atlas Cedar
Fraxinus excelsior Aurea European Ash
Fraxinus excelsior European Ash
Ginkgo biloba Maidenhair Tree
Populus alba Silver Poplar
Populus nigra 'Italica' Lombardy Poplar
Populus x canadensis Canadian Poplar
Populus yunnanensis Chinese Poplar
Prunus cerasifera 'Nigra' Purple-Leaf Cherry Plum
Prunus cerasifera Cherry Plum
Pyrus communis European Pear
Pyrus ussuriensis Manchurian Pear
Quercus robur European Oak
Ulmus glabra 'Lutescens' Golden Elm
Ulmus glabra Scots Elm

Table 3: Heat vulnerable species in cultivation in Orange





in avenues, creating a new row planting of another species adjacent to heat-vulnerable row plantings, and trialling new or under-utilised species.

The Orange Botanic Gardens and Arboretum site provide us with ample space and opportunity for the trialling of new trees.

## Opportunities and Challenges

### Our opportunities

Growing awareness of the role of tree canopy in buffering urban heat and direct air-cooling presents an increasing rationale for us to, not just sustain, but grow and enrich our urban canopy and native vegetation cover. As Orange moves into a warmer future, coinciding with the region's increasing living densities, the imperative for protecting our existing canopy and planting new canopy to help us to manage the impacts of urban heat will continue to grow.

### Canopy cover evidence base

Our 2022 evidence base helps visualise our tree planting, as well as tree preservation priorities, and provides clear direction for where we can target programs and resources for the greatest community benefit. We understand how critical tree canopy cover is in supporting our vulnerable community members. Our canopy mapping outcomes show us where canopy is lacking and provides opportunity for us to redress the balance in canopy cover over our urban footprint – particularly in lower socio-economic residential areas in our region. Identifying where our low canopy cover areas intersect with vulnerable community locations will help ensure we are targeting the right locations for mitigation of heat for human health benefits, as well mitigating the rising costs of cooling.

### Community support for tree planting and preservation

Our Community Strategic Plan and community engagement in the development of this plan confirm the high value we place on our urban forest and the high priority we have placed on township greening. Our trees foster community pride and a sense of belonging, we are aware of their contribution to the presentation and comfort of our City-Region. We wish to retain our character and the general beauty of our region, and we understand the impacts our 'Colour City' and scenic landform on our visitor economy.

The growing awareness of the importance of trees presents further opportunity to capitalise on our engaged and passionate community. The preparation of this document provides opportunity for wider educational reach, opportunities to strengthen and expand programs of partnership, and to celebrate our trees as part of Council's Arts and Cultural program.

### Community resources and tree care partnerships

Our successful programs and partnerships for establishing native vegetation in our parks and reserves with community volunteers demonstrates our community's grass-roots dedication to sustaining and enhancing canopy cover in our region.

This strategy presents a call to arms, inviting our engaged community to partner with Council in our tree planting and preservation efforts. Community custodians can water nature strip

trees and take ownership of our local park and community garden tree assets. We can also work together to help establish trees in our amenity, sports and recreational reserves in the same way as we do in our natural areas and bushland reserves.

Maintenance agreements with business owners provide potential for partnerships to provide a higher level of landscape presentation and cooling in identified areas of heat in our city centre, for mutually beneficial (community and commercial) outcomes.

### The potential for greater integration of tree cover in other Council programs

This strategy presents opportunity for greater alignment of programs and practices, and more cohesive decision making around our tree canopy cover that directly impacts our region's liveability. Placemaking and Capital works projects and programs of infrastructure renewal present a myriad of opportunities for integration of a higher volume of trees, and the use of innovate treatments to support tree growth. These include green infrastructure treatments that see storm water directed to trees and the creation of below hardscape spaces for tree roots to grow).

Our Capital works program presents opportunity for co-location of trees with new and upgraded infrastructure and placemaking upgrades in our commercial centres (for example streetscaping of Lords Place). Our footpath prioritisation program, for example, provides opportunity for alignment of operational programs and collaborations, such as between City Presentation and Civil Asset Maintenance teams, to provide new and upgraded footpaths accommodating tree shade.

### Opportunities to partner and demonstrate best practice

Lack of space for trees in our private landscapes, especially our growing urban residential footprint, is generally seen as a constraint to tree establishment. However, there is an opportunity for widening our use of evolving technologies and demonstrating best practice technologies in urban streetscape design.

Good opportunity exists for implementation of a demonstration project at a neighbourhood block level within our LGA, in partnership with local developers, to show how we can successfully mitigate heat with sufficient tree canopy cover and good management of canopy health. A range of Green Infrastructure (GI) treatments could be incorporated for trial and comparison of cost-effectiveness and, more importantly, treatment performance as indicated by tree health and vigour.

Other treatment outcome comparisons include the cooling impacts on streets and homes of: smaller versus larger trees, exotic versus native trees, planting lay-outs and densities, soil volume and moisture. Additional metrics might include energy savings and resident survey results. Learnings can then be used to inform capital and operational Council programs and future Development Control Plans. Example outcomes might be minimum canopy requirements for urban residential developments (by area/region) and the best performing and more cost-effective GI treatments for passive delivery of water to our trees.

Such projects could also occur in partnership with Charles Sturt University. They might





comprise a series of linked, formal research activities completed as part of senior year research projects, honours research and/or postgraduate work. Results could be published and presented to Council, developers and the community at large.

Creating an Active Transport Culture in Orange

Our goal of making our towns more pedestrian friendly by solidifying and expanding our active travel networks present many opportunities for canopy building. Planting trees strategically for thermal comfort can make our region easier to walk and cycle around in the heat of summer. It can also reduce our reliance on cars, helping us to reduce emissions.

Work is already underway in the region to increase opportunities for passive and active recreation. The focus on becoming more pedestrian-friendly, for example, is a key element of our Orange Future City project, delivering placemaking upgrades to our CBD.

Council's focus on providing more opportunity for cycling and walking in our region presents significant opportunity for co-locating trees across these networks through internal collaboration. Trees go hand in hand with active transport, as well as active recreation. Active travel networks are more likely to be used where tree-shade is provided. Tree plantings that provide unbroken shade act as cool green corridors with the value addition of beauty and visual amenity. The denser the trees in a walkable location, the greater the likelihood of walking to local destinations and the distances we are prepared to walk.

Destination Orange – our visitation economy

As a major regional city and the key commercial centre for the wider Central Tablelands region, the presentation of our city centre needs to be in-line with our civic standard, with high quality trees and high impact landscapes both justified and necessary. A high level of presentation is both necessary and justified to enhance our visitor economy.

Our Orange Region Destination Management Plan (2020), which reflects the value of our civic and scenic landscapes to regional tourism, supports preservation of our landscape character (as a visitor economy foundation) and tree canopy building for regional beautification. The plan provides specific refence to the need for an ongoing program of investment in streetscaping in our smaller towns as well as our city precinct stating “...there is a need for further enhancement of towns and villages to create attractive and high amenity destinations. This includes addressing streetscaping, landscaping, enhancement of amenity infrastructure, placemaking and road improvements.”

The plan, as well as other projects - Think Orange and Orange 360 - give rise to opportunities for creating new or reinforcing existing landmarks, town entrance statements and entry-way avenue plantings. Plans and initiatives for attracting visitors to our region also present opportunity and impetus for the development of programs allowing for further embellishment of our city landscapes - enrichment, rejuvenation and enhancement of the benefits of our city's gardens, for example.

Our destination economy also provides impetus for further greening measures for our city precinct, including the establishment of vertical gardens to soften and cool the walls of our municipal buildings and commercial places and spaces (car parks for example) in partnership with commercial property owners.

Development of a program of vertical greening for our civic centre could include incentives for participation such as Council-funded and community supported installation of vertical gardens or assistance in maintaining these. Orange Region Destination Management Plan (2020) also provides the evidence and support for protecting and preserving our natural and scenic landscapes. These provide the setting for so many of our visitor experiences including our paddock-to-plate restaurants, wineries, breweries and distilleries.

Our vibrant arts and culture scene, with impressive events calendar, provides ongoing opportunity for promoting the value of and celebrating our urban forest. Our plants and trees continue to provide the framework, supporting elements or background setting for art installations and cultural events. Opportunity for development of programs to specifically honour and celebrate our trees and, as such, elevate awareness of their importance and the contribution they make to the identity and liveability of Orange.

Sharing our knowledge

Our GIS (geospatial information system) offers significant potential for sharing of knowledge and cross-collaborations within Council. Combining datasets mapping our values, risks and priorities would enable more comprehensive decision making at operational and capital, as well as planning, levels. Collaborations to improve the breadth and detail of captured assets available for use for programs of maintenance and capital upgrades are ways for us to improve canopy outcomes and ensure our values are presented, respected, reinforced and promoted. Other opportunities, such as developer handovers, could occur in a spatial environment and save Council time in mapping the assets.

Sharing capital works priorities, infrastructure installation and repair priorities (programs of kerb and channel repair, for example) can value-add to the development of programs for urban forest management and assist with deliver of this strategy. Mapping of our high-quality scenic views and vistas, for example, could provide guidance for operational programs of canopy creation (helping City Presentation teams to appropriately locate vegetation in response) and may also provide additional tools for development assessment. Mapping our footpath program priorities, and active travel network datasets alongside social and community health datasets as well as those relating to our general demographics, opens up a raft of potential and opportunity for Greening Orange program direction.

Similarly, sharing our canopy data also allows for greater implementation of the values and objectives of this strategy into wider strategy, policy-making and programs. Collaborations may also illicit opportunity to strengthen development assessment criteria for the future review of planning and assessment frameworks. There are opportunities for working group creation – WSUD and Tree offsets, for example - to further our knowledge.

Systems that directly relate to our urban forest should, ideally, integrate with other Council systems. These include those that directly manage other natural and land resources, those involved in the design and delivery of infrastructure, capital works, social and community planning, and programs that relate to our liveability. Strategic planning, governance, local laws, asset management are other areas that indirectly relate to, and may also impact, our urban forests.

With an integrated data management system, we can actively and passively monitor the success of internal programs of tree establishment and maintenance, the success of





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developer delivered and maintained landscapes. We can also monitor species performance for adaption to our warmer climate.

We can use our spatial datasets to better inform, and apply more rigour in, our decision-making. For example, developing matrices of benefit-needs in locations identified for heat mitigation, allowing prioritisation of canopy programs with the greatest number of likely benefits.

Council also has opportunity to share our urban forest knowledge with our wider community. Such sharing would promote awareness and educate on trees and tree canopy benefits. Orange provides climate resilient building information for residents, including information around designing homes for passive solar access also stating *“Landscape and garden design play a huge role in an energy efficient home. Generous open spaces create healthier communities, support the local ecology and add to the attractiveness of our neighbourhoods.”* Great potential for the development of a range of additional educational materials for residents to help enhance our urban forest exists. Potential also exists to share more information around day-to-day management of our urban forest, and our decision making processes.

This would allow our community to be more involved in, or aware of, Council decision-making which may also encourage social awareness and activism. A web page as part of Council's website dedicated to tree happenings and issues in the region, for example, could not just facilitate transparency of processes but provide opportunity for our community to champion solutions.

A tree loss-gain balance sheet could be included on such a web page, with current updates on programs and happenings. “Heat” or “Greening and Cooling” maps or dashboards could visually present our targets and track strategy implementation.

### Building and growing our knowledge

Maintaining an up-to-date database of geo-located trees, with reporting capability, will allow us to plan for maintenance, loss and renewal of our urban forest. Planning for end of life and ensuring succession planting occurs helps secure the resilience and sustainability of our urban forest. Utilizing tree condition and ULE (Useful Life Expectancy) metrics, we can help ensure succession planting occurs, ideally before removal of existing tree. This also promotes positive risk management by reducing potential tree failures.

Systems allowing for ease of recording and retrieval of tree data (reporting capabilities) provide many benefits for urban forest management. The best systems are centralised, have reporting capability and can interface with Council's GIS (Geographic Information System) and, potentially, customer relationship management system. Dashboards, real time data capture and storage environments (live geo-spatial data environments) allow for instant visualisation of performance in relation to targets and promote ease in progress tracking. Licenced systems offer opportunity to integrate entire Tree Management Practice, adding both scheduling and forecasting potentials to systems.

Ways we can use advanced systems of record keeping for best sustainable practice include:

- Assessing and recording tree risk
- Recording and tracking tree maintenance works

- Forecasting maintenance requirements and works scheduling
- Identifying high value trees allowing for closer management and elevated protection
- Tree values for use in bonds or removal compensation
- Tracking performance and suitability of evolving technologies
- Monitoring tree response to stress
- Monitoring trees for risk in high target locations
- Tracking outcomes of health management initiatives and adjusting actions to suit
- Tree asset management

Our City Presentation team – our main users – suggest a “one stop shop” with to-the-point interfacing and functionality. This includes ease of entering and searching data (with an emphasis on intuitive and streamlined methods leading to time efficiencies).

To this end, a pre-tested, refereed and widely used tree data capture and asset management system that can be integrated into our existing asset management system is recommended. Alternatively, tree and green asset managers should be key stakeholders in planning and design of new systems of green asset data capture and management and provide close support in system testing. Systems that have been designed with the end user in mind, that can record, analyse and report the key metrics measuring the outcomes of this strategy, will provide the best solution.

### Treating trees as assets

Exploring the potential for trees to be included in asset management systems presents further opportunity for managing our trees, including managing tree risk. A “green” or “natural” assets register could include high biodiversity value areas of vegetation, high value or significant trees and high value landscape scenes/scenic vistas.

Such systems enable tree monitoring as well as scheduled maintenance and renewal. They can also assist in tracking funding and investment in the whole of life management of a tree. Incorporating trees/green assets into Council's asset management recording systems and processes will also help us facilitate a more proactive style of tree management and, through typical asset management planning and forecasting processes, we can manage our trees more sustainably.

Systematic green/natural asset management is made more complicated due to methods determining dollar values of living assets being limited in availability, complex or ill-defined. Resolving a methodology for valuing our green assets will be required as part of investigations.

### Our challenges

Our key challenges revolve around changing climate and capacity to adapt practices to suit. Water security issues and uncertainty around future conditions for tree growth present examples of the challenges we face in this space. Regional growth and development, and the continued and necessary use of lands for agriculture, present further challenges for

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sustaining and further growing our urban forest. Finding ways to encourage canopy creation or reinforcement on private lands and finding ways to secure ample space for urban tree growth in our new urban residential developments, are the other important challenges.

Some of our specific challenges are an outcome of the many stakeholders involved and various competing priorities. Solutions can be found, however, through collaboration (within Council, to ensure decisions are based on shared values and objectives) and investing in community effort that may champion our urban forest cause.

The creation of an Urban Forest Strategy for Orange allows us to establish and communicate our urban forest targets and priorities and explore and promote mechanisms addressing these challenges.

### Regional growth and development

Orange is juxtaposed between a desire to retain our natural landscape amenity and the need to facilitate population growth. We wish to retain our natural, rural and scenic values yet satisfy the need to provide more housing as our population swells.

#### Limited space and tree-infrastructure conflicts

One of the most significant constraints to planting and preserving trees in our region is space.

Competition for space, particularly in the traditional street tree location of the road reserve, presents many challenges for preserving our existing trees and establishing new ones.

In addition to targeted expansion of our urban footprint, with residential development occurring rapidly on the north, south and west sides of Orange, we are also seeing greater densifications within our urban residential developments including larger dwellings on smaller lots with limited garden areas. Infill development is further reducing our available private green space as standard residential lots are converted into dual occupancies and multi-dwelling developments.

Smaller blocks also see less space for lateral growth of trees (in horizontal alignment with road edges and footpaths) whereas traditional, larger blocks allowed for adequate spread of roots to support larger trees. In new developments with smaller blocks, reduced lengths of nature strip between driveway crossovers and reduced volumes of permeable space needed to support tree growth exacerbate the challenges. This can be magnified by narrower road corridors (street widths) and less green verge space for the planting of street trees.

Issues around creating sufficient space for growing large and shady networks of urban canopy cover in our newer neighbourhoods are further amplified by infrastructure competition challenges. This includes corridors for essential services (water, power, streetlights and communications), street infrastructure (footpaths, light poles, service access pits, pad mounts and bin slabs), property stormwater pipes and stormwater lintels. We must partner with our external service providers in the planning and design of critical infrastructure to better acknowledge, value and accommodate of our tree assets. We must lobby for shared conduits, the undergrounding of existing overhead electrical infrastructure, and select sympathetic service locations and installations, all to better preserve existing canopy and facilitate new canopy in conjunction with new and existing infrastructure.

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With modern maximum lot yield expectations of our developers unlikely to change in the near future, and a state planning framework designed to facilitate population growth and housing, we must find ways to better use the limited spaces we have for trees. Examples include making our pathways permeable or engineering pathways for tree roots to travel into alternative or larger areas of supporting soils so that trees, especially larger trees can be co-located alongside these assets.

We need to preserve the quality of our planting sites by better protecting soil horizons and soil structure as new residential streets and dwellings are constructed. This includes actively managing the microbial health and fertility (soil nutrients, organic content and rates of decomposition) as well as moisture content. Other opportunities include the use of passive irrigation through infrastructure design. We can also raise biodiversity values in urban planting sites by using all strata of plant cover.

This strategy encourages and supports holistic planning to enhance tree canopy cover in our urban residential areas. These include:

- Tighter planning controls to improve new street tree outcomes in our younger urban developments
- Stricter controls around minimum soil volume requirements for street trees
- Requirements for higher proportions of permeable to non-permeable spaces in newly developed urban residential areas
- Elevated use of green infrastructure and other multi-benefit planting treatments
- Minimum canopy establishment requirements.

### The impacts of natural vegetation decline and loss

The impacts of poor extents of natural vegetation in our region are far-reaching. Threats to native vegetation include *“the decline of biodiversity and reduced ecosystem functioning, reduced water quality, increased erosion and salinity, increased greenhouse gas emissions, reduced productivity and impacts on cultural and spiritual identity (Orange Council Climate Change Management Plan 2021).”*

Orange must find solutions for reducing private land tree losses and redressing our fragmented native vegetation extents. We should aim to bolster and reconnect canopy wherever possible, as well as repairing or enriching soils, and re-establish understory shrubs and ground cover which are especially depleted. The presence and vitality of all ecological components of our natural ecosystems not only significantly impact the health and growth of the trees but significantly influence the health and natural functioning of other components of our land systems. Lower order plants and soil microflora, for example, impact water quality, soil erosion, flooding and the health and, ultimately, the productivity of our farmlands.

#### Loss of biodiversity

Ecosystem diversity is often correlated with the number, identity, condition and area of native vegetation types (Saunders et al. 1998). Healthy ecosystems contain an array of vegetation types. Degraded ecosystems provide reduced ecosystem services (for example air and water filtration, nutrient recycling and food for wildlife). The loss of ecosystems and their services also contributes to broader environmental issues such as dryland salinity and land





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degradation (EPA 2018). Climate change, for example, is expected to see a combination of more intense storms, especially in summer and spring. An associated, overall reduction in vegetative ground cover (possibly exacerbated by changes to bushfire regimes) is likely to lead to more sheet erosion and increased gully erosion if overland runoff increases. Wind erosion could also increase in the region due to the loss of protective vegetation, especially grasses and other ground-cover plants (EPA 2021).

Increased edge effects

Localised clearing which fragments vegetation can also cause an increase in “edge effects”. For example, the condition of vegetation on the edge of a stand commonly suffers pest and weed invasion and greater exposure. These edge effects can often extend hundreds of metres into a patch of vegetation, significantly reducing the total area of vegetation in good condition in fragmented areas. Small patches and thin corridors of vegetation are also more vulnerable to the impacts of disease, fire, inappropriate clearing and other forces, and tend to be less genetically diverse. Fragments of natural vegetation are also often accompanied by a highly disturbed ground story.

Reduced carrying capacity of vegetation

The rate of loss of vegetation in NSW due to clearing has steadily increased since 2015 (EPA 2023).

Following the Black Summer bushfires of 2019/2020, it is estimated that 31% of the ecological carrying capacity of native vegetation in NSW remains, compared to pre-European settlement (EPA 2023). Figure 19: Ecological connectivity of terrestrial habitat in NSW (EPA 2013)shows ecological condition of terrestrial habitat (compared to natural state) in the NSW south-western Slopes is 0-20% only.

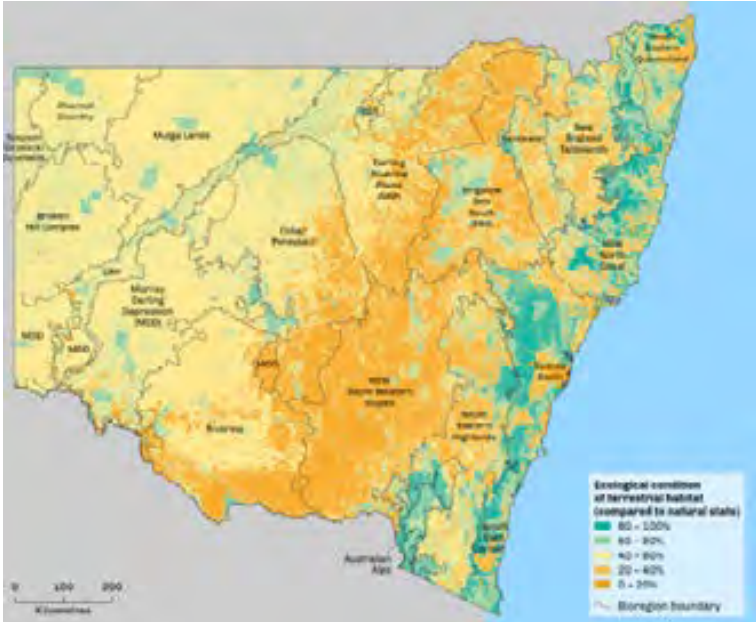


Figure 19: Ecological connectivity of terrestrial habitat in NSW (EPA 2013)

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Our biodiversity values mapping, Significant landscapes web tool and Roadside Vegetation Management Plan (2016-2021), identify specific threats to our natural vegetation cover and provide actions for preservation and regeneration of natural vegetation in our region going forward. This greening strategy seeks to support these key directions for management of our natural areas and biodiversity at large and to play an active role in promoting tree preservation and renewal on private land.

Increasing our focus on natural vegetation plantings in appropriate areas of our parks and reserve network will help to support our biodiversity. Design of programs to promote native vegetation protection should place greater emphasis on identification and explanation of the function of understorey species. Many programs have traditionally emphasised the importance of trees. The role of grasses, shrubs and herbs in wildlife habitat and protection of soil and water resources requires greater attention. We can also buffer and protect our natural stands of vegetation with tree planting in road reserve spaces, especially on the peripheries of our townships.

Good opportunity exists for the development of a Biodiversity Management Plan for our LGA, using our biodiversity mapping as the evidence base for program prioritisation. A plan dedicated to biodiversity could address our local biodiversity issues more specifically.

Rewilding our parks and reserves

Operational programs should continue to focus on the re-wilding of appropriate areas of our parks and reserve network and augmenting existing native vegetation in-line with our plans of management for parks and reserves (Plan of Management for Rural Parks in the City of Orange 2022; Plan of Management for Local and Neighbourhood Parks within the City of Orange, 2022). Biodiversity swathes in under-activated areas of turf grasses provide significant opportunity for both increasing biodiversity and reducing the mowing needs of these spaces. In under-activated areas of public open space, creation of biodiversity islands may also be useful for this purpose.

By using our suite of indigenous plants, we can create mini forests or high functioning ecosystems by incorporating all plant strata (trees, shrubs, plants, ground covers and grasses) and planting these at higher densities. High density planting beds will also help to supress weed growth. Weed management will continue to be a significant requirement and such impacts are likely to escalate as temperatures rise in our region.

We should continue to identify ways we can provide multiple benefits in our open spaces. For example, providing new plantings for biodiversity benefits can also screen our urban form. Significant cost savings may be found through collaborative efforts (for example between our City Presentation and Biodiversity/Natural Area teams) to simultaneously deliver trees and plants for biodiversity benefits as well as amenity benefits in our parks and reserves. Larger program initiatives offer good potential for attracting community resources to help Council deliver plantings and, through beautifying and enhancing the value of these spaces, we can encourage ongoing community investment in the care of vegetation (stewardship) in these places.

We should seek to use more volunteers and programs of stewardship for delivering new trees in general – “Adopt a street tree programs”, for example – and natural extensions of these into commercial and recreational spaces, local parks and community gardens.







Figure 20: An example of multi-benefit canopy plantings in a local park with amenity tree in the foreground and biodiversity plantings which will double as screening of urban form to fencelines

Our rural roadside management plan recommendations that remain a priority in the context of this strategy are to:

- Build on existing work, to ensure that all land parcels under Council's care and control on which remnant vegetation is located have been identified, surveyed, and prioritised for on-ground works (including reserves, unmade road reserves and roadside marker sites). Surveys will need to be staged over time in accordance with available resources
- Continually improve the capacity of Council's GIS system to record and map data about the presence, condition and management of biodiversity on Council land
- Develop and begin to implement a landscape scale vision for buffering and connecting high priority biodiversity assets within the region, by undertaking works on Council land

The Biodiversity Conservation Act (Section 1.3c) recommends the inclusion of local and Aboriginal knowledge about flora and vegetation communities of significance to Aboriginal people, and to include this in monitoring how the species are faring and ways to care for them and their habitats. The EPA Aboriginal Knowledge Group has also identified a need for management authorities to learn more and apply how Aboriginal cultures and practices improve the care, protection and management of species, their habitats and the overall environment.

### Native vegetation and agriculture

We have a continuing need for productive lands for agriculture in our region. For these landholders, attitudes towards trees can present barriers to preserving and building all-important canopy connections in these places. Finding a balance between agriculture, urban development, and environmental conservation is an ongoing endeavour for land managers, policymakers, and the community of Orange. Collaborative efforts among stakeholders, informed decision-making and a commitment to ecological stewardship will be instrumental in achieving this delicate balance, helping to ensure we are protecting and restoring or replacing our native vegetation assets.

There are significant benefits to maintaining and establishing vegetation in our farmlands. Providing educational opportunities to demonstrate the benefits to soil structure and fertility, run off and erosion and the benefits of shade for mitigating heat for livestock may all help to engage landholders and encourage canopy creation on private land. Educational programs to reduce land clearing in the private realm should focus on the association between biological diversity, farm health and productivity. Education can help demonstrate the characteristics and costs of species-poor landscapes, exemplified by heavily grazed remnant native vegetation. Visualisation of our canopy and associated radiant temperature mapping provides solid evidence of the heat generated by open paddocks offers another way to open discussions around the benefits of tree preservation and renewal in private landscapes.

Our biodiversity mapping shows where we can plant trees to enhance ecosystems and wildlife corridors. Opportunities for residents adjoining these areas to help Council connect fragmented areas of canopy exist. Such efforts would in turn allow landowners to help improve the structure and nutrition of their own soils as well as reduce erosion. This strategy provides us with the impetus to investigate suitable mechanisms for promoting and incentivising protection and planting of trees on private land. We must work together to find the right balance of promotion, incentivisation and planning controls. We also require resources for critical compliance support to monitor and regulate outcomes.

### Tree offsetting and mechanisms to compensate for losses

Opportunity exists for development of a Council-wide tree offset policy to discourage tree clearing by way of financial disincentives. Offset policies encourage developers and designers to think "outside the box" to save money. Where tree loss is unavoidable, ensuring offset funds (or direct delivery of offsets) are obtained will help ensure we receive the best possible compensation outcomes where infrastructure requires trees to be sacrificed. This strategy recommends establishing a Tree Offsets Working group to explore this issue in depth.

### Views and Vistas

Trees can provide context to, and help frame, views and vistas. Careful selection of plants and set-out of new planting locations, in co-ordination with all stakeholders, can provide mutually beneficial outcomes – for individuals and the community at large. On account of our spectacular landform, we have many significant view lines within our region that require protection and may be seen as a constraint to canopy creation. It is important that street or park tree planting does not impact existing views, especially to the distant mountain range of Mt Canobolas – Gaanha Bula – and rolling hills between significant landscape views and vistas. We can target planting efforts in our wider landscapes to buffer screen and protect (shade and cool) built form yet keep distant vistas and views to attractive natural features open.

Our Significant Landscapes web tools detail our significant view lines. Providing spatial mapping of these locations (as well as the locations of our significant trees) will help to enhance the usability of this information. It will also help to guide our decision makers in determining where we can and can't plant new trees when our scenic landscapes take precedence.



Trees along our ridgelines provide important terminal points to our vistas when looking outward from the urban landscape to the peri urban and rural surrounds. Protection of appropriate species of trees and groups of trees that make up these vistas is valuable.

### Ground water harvesting catchments

Orange Council pioneered a storm water harvesting system following the millennium drought when water stored in dams hit a record low. An integrated water management strategy or plan for our region would help ensure we can maintain the right balance of tree health and water re-use requirements. While water uptake by trees reduces flows in water harvesting catchments, it is not considered a substantial risk at present but should be considered in the future.

### Vandalism and tree damage

Uncontrolled removal of trees from private land threatens existing canopy cover extents in our urban, peri-urban and rural landscapes. Recent incidents of illegal tree clearing and poisoning events show that loss of tree canopy via such activity continues to be a risk in the Orange Council areas.

Local media and engagements during the preparation of this strategy demonstrate that our community has an aversion to illegal clearing and intentional damage of vegetation. We wish to know about it when it occurs and to know what punitive measures were applied to wilful acts of tree and vegetation vandalism. This presents opportunity for formalising our system of investigation and response, which should be designed in such a way that leads to lowered incidences of damage causing events and less impact to our canopy cover.

Overall, we need a strong policy and regulatory position on private land clearing, intentional tree damage and tree material theft as well as operating procedures for dealing with incidents.

### The ongoing management of tree health in a warming climate

Conditions for tree growth will become more difficult as we move further into the future. Sustainable management of our urban forest will need to integrate and reflect the principles of evolving best evolving. Scheduled maintenance of trees to sustain general health will help ensure our trees maintain vigour and vitality throughout their lives, can adapt and respond to change, and can continue to demonstrate the health and vigour required to provide us with the benefits we need.

### Proactive management of high-value or vulnerable mature trees

Proactive programs of maintenance serve to increase vitality, longevity and the visual amenity of our trees. Programmed maintenance also lowers maintenance costs over the life cycle of a tree.

Our older trees are more vulnerable to the impacts of heat and drought. The millennium drought, as well as our more recent drought events in the region, saw the loss of hundreds

of our mature trees. We need to ensure we reduce the risk of recurrence by understanding where our most vulnerable urban trees grow and proactively managing the health of these valuable specimens.

Proactive management of trees allows tree managers to plan for and avert potential stress in trees before it is visually indicated. Appropriate intervention allows trees to recover quickly. Proactive management techniques include mulching, composting and fertilising soils, encouraging microorganism activity in the soil via the application of soil stimulating tonics, and watering mature trees during extended periods of drought. The use of water barriers for slow release of water, the installation of drip irrigation systems or manually watering trees with carted water, are techniques we must use to promote the health and viability of our valuable, mature trees.

This strategy supports the ongoing management of health in our mature trees to enable them to provide us with ongoing benefits. We need to identify key urban trees and gardens that we wish to protect, as well as our more vulnerable urban trees, plants and gardens; and develop operational programs of proactive care to promote their health and longevity.

### Continuing to actively provide water to our trees for health, survival and cooling benefits

Water not only helps plants and trees to provide us with more shading and cooling benefits, it is also a basic requirement of tree growth and survival. We can't afford to down-play the importance of continuing to actively water trees and plants and continuing to seek efficient and effective solutions for passively irrigating our trees, especially solutions that can store and reticulate as well as capture urban runoff.

We must consider all tools available in the provision of integrated systems of soil moisture management. This includes increasing the use of mulch and targeted use of additional soil moisture conserving and soil quality enhancing materials and techniques on our higher value or vulnerable trees. We can also consider the use of high-quality compost we create as part of Orange's innovative resource recovery program, or wider use of biochar as a soil additive for moisture and carbon conservation.

This strategy seeks to promote and trigger development of an Integrated Water Management Strategy to tie all our water collection, storage and use strategies together, and provide over-arching guidance for plan and program development.

### Trees and integrated water management

Managing the application of water, and ensuring soils stay moist for as long as possible, especially on our hotter days, requires a multi-faceted approach.

The cost-benefit of installing "smart" irrigation systems and water sensitive design treatments for urban landscape plantings are now at the forefront of urban greening strategies. Technology continues to evolve. A range of treatment options for directing storm water flows to street and urban park trees, as opposed to piped stormwater networks, currently exist. Further advancements in storage and reticulation of passively collected water will enhance functionality and broaden the application potential of treatments. Presently, passive irrigation remains limited by natural or engineered road grades and associated flow paths; as well as





occurrence of rain in the first instance.

Where sites are suitable for installation of passive design treatments (design and or/ natural function allows), the passive delivery of water can be highly beneficial. However, we must accept and acknowledge that direct methods of water delivery will remain necessary as we seek to find greater efficiencies in this space.

The advent of smart irrigation systems that monitor soil moisture and irrigate accordingly, allow for more efficient use of our water resources. These systems are, however fit for purpose, costly. Where cost-benefit can be justified (i.e. high use and/or high impact locations) there is great potential for irrigating key plantings for increased rates of cooling (as well as sustained health and vigour).

### Managing the application of water and retention of soil moisture in our landscapes

#### Mulch

One of the most effective tools for conserving water that is readily at our disposal is mulch. With water security such a significant issue for our region, ensuring that any water we actively supply to our township trees (or any landscape plantings) is not wasted through evaporation is critical. Mulch not only prevents evaporative loss of moisture from the soil, it also supresses the growth of weeds and, if of organic origin, helps to improve soil nutrition and fertility as it decomposes over time.

#### Water saving additives

Water saving granules or crystals serve to retain soil moisture (or moist pockets of soil) for as long as possible. Care in use is required to ensure these enhance rather than hinder natural growth processes. Biochar is a natural product that is increasing in use, not just for its soil water holding capacity but also for its ability to keep carbon sequestered. Installations to convert Council tree waste into biochar are in place overseas and the first has recently been introduced into Australia.

#### Soil structure, aeration and decompaction

Ensuring a structurally sound soil environment is key to supporting new tree growth as well as providing ongoing access to water and nutrients for existing trees. Aerating soils to ensure water does not “run off “or pool on a hard surface before evaporating is another critical requirement that may be necessary for some soils to ensure water use is not only efficient, but also effective. Good soil porosity is strongly linked to tree health and vigour and allows precious water to thoroughly infiltrate. Compacted soils often involve smaller soil particles as well as less space between particles. Sometimes, further amendment of soils may be required for de-compaction.

#### Compost

Applying high quality compost to soil surfaces, in liquid form as “compost teas” or via vertical application techniques (incorporating cores or plugs of compost directly driven into the soil profile) are other effective forms of soil improvement in certain circumstances. We make our own compost in Orange.

Orange’s state of the art composting facility at the Euchareena Road Resource Recovery

Centre (ERRRC) produces organically certified mulch. It presents a significant opportunity for ongoing nutrient enrichment and improvement of the soils surrounding our most valuable urban and natural character trees which will lead to improvements in their health and potentially extend their useful lives.

#### Soil flora (microorganism)

Maintaining the health of the beneficial microorganisms (soil bacteria and fungi) that work in symbiosis with plants is also essential to the good use of water by plants. These microscopic organisms, amongst other functions, can increase the water up-take area of a tree by attaching to tiny root hairs and acting as water conduits. Soil microflora presence is dependent on soil nutrition and pH, soil structure and soil moisture. While low counts may be a natural feature of a soil type, soil biota is often stimulated through the use of simple soil tonics (seaweed extract, work farm extracts, fish emulsion) which provide organics to the soil. Soil biota also respond well to the incorporation of ground cover plantings, as well as mulch.

#### Soil nutrition and general fertility

While soil biota significantly contributes to soil fertility and enhance access to nutrients in the soil, ensuring soil nutrients are present in an available form may also be required. Improving soils through the use of compost and mulch, and fertilising plants in low nutrient soils, may be required as ongoing activities to supplement soil nutrition.

### Direct Irrigation

#### Water cartage

The manual supply of irrigation – via water cartage – is a good option for reactive tree watering, especially on an as needs basis in times of increased drought stress. It is also the most effective way to proactively irrigate trees (residential street trees, for example) that grow in locations that are unsuitable for piped irrigation systems or other methods of water delivery. Carting water directly to trees allows for a large number of trees to be watered via the one set-up (vehicle or trailer mounted tank). An added benefit is the potential use of water additives such as seaweed solution, fish emulsion, other soil stimulating tonics or fertiliser treatments. Water cartage also allows for use of lower grade sources of water not suitable for drinking.

#### Water barriers

Water-filled barriers (heavy plastic road barriers filled with water and a dripper hose attached) are effective for delivering water to single mature tree specimens. This can ensure the required rate of water (e.g. 100L for a large tree) is delivered slowly, allowing for deep and effective infiltration. Other strategies such as soil aeration may also be necessary to ensure adequate infiltration of water where soils are compacted or hydrophobic.

#### Line (piped) irrigation

Piped irrigation, usually delivered through a drip system allow for less water use and less run-off. Sub-mulch irrigation is the most efficient way of applying water to the soil and keeping it there. Where automated, which is usually the case, supply of water to vegetation via surface irrigation can be timed to occur at night when evaporative losses are lowest.



Smart irrigation systems, incorporating soil moisture sensors, are even more efficient ensuring that water is supplied on an as needs basis only (for example in the absence of rain). Our Orange Future City project, which is planning for the future of our city, includes consideration of smart technologies for energy efficiencies. Embedding existing or future technologies for water efficiencies will also help us to become a “Smart City”.

### Indirect Irrigation and Water Sensitive Urban Design (WSUD)

Directing excess storm water or urban run off towards trees (as opposed to systems that quickly drain water away into the stormwater network) is another source of water for our urban trees. WSUD treatments are now commonplace in townscapes and modern urban residential developments. Technologies in this space continue to evolve and include kerb inlets, rain gardens and ‘bio basins’.

Originally intended for stormwater cleaning and storm-water load management, these systems have evolved to not just provide the added benefit of watering trees (as well as the smaller plants traditionally used within) but to systems designed specifically for providing irrigation to trees passively.

Treatment use is constrained by natural ground levels and falls and is restricted to locations where excess road water will naturally gravitate towards the system (or road grading can be specifically engineered to direct sheet flow of excess road water towards trees). Treatments are, therefore, easier to install in new landscape settings than to retro fit around existing trees. The selection of trees that can tolerate extremes in soil wetting and drying is important. Considerations to watering of trees, especially in the critical establishment phase of a new tree’s life, also need to be made as passive irrigation relies on the occurrence of natural rainfall.

#### Bioretention systems

Bioretention basins are generally the larger, end of pipe systems found in parks and reserves but can also act as at source sites for capturing overland flow. They contain plantings growing within a biologically active sand and loam filter that capture run off (trapping larger polluting matter and filtering smaller particulates in the uptake of water) and slow storm water flow. Water slowly percolates through the storm water pond and the filtered stormwater then released to the associated drainage system. Water Sensitive Urban Design systems in parks can serve to increase areas of green space for wildlife and also offer the benefits of reduced areas for maintenance.

#### Biofiltration beds

Biofiltration beds or bio pods are streetside, at source systems that receive storm water runoff from streets through overland flow. These basin-like structures open to a roadside or may exist in the form of a traffic build-out and allow for ponding and slow percolation of storm water. Where located in areas of high flow during rain events, downstream outlets can manage issues of overflow. Bioretention systems in private land allotments are usually termed rain gardens. They are generally shallower than other systems and capture surface run off or run off delivered via a piped system.

#### Bioretention street trees

Bioretention street trees consist of in-footpath or in-road tree pit plantings that sit flush with or below road surface and are covered with a grate. Sheet flow of storm water directs water to the tree pits including purpose deigned filter media to perform the functions of storm water filtering and the trapping of waste materials per the methods described above.

#### Passively irrigated trees

Passively irrigated street trees receive storm water via kerb inlets or cut outs designed to passively deliver water to roadside tree plantings in periods of storm water flow. Designs include those with under-drainage and those without infiltration trenches. Gravel filled infiltration trenches with slotted ag pipe are also known as dry wells. Installing these adjacent to street tree plantings, with water also supplied through kerb inlets, is another way to provide passive irrigation in turfed verges. These designs, which are suitable for retrofitting around existing trees, slowly release the captured water for adjacent trees to use.

#### Swales

Swales (broad, gently sloped channels of grass or vegetation) have a long history in providing natural drainage solutions and can suit many streetscape applications; for example, in larger sections of road median where flush kerbs can be incorporated. Overland flow of water to trees planted at the base of the swale invert is taken up and cleaned by the trees before it naturally drains through the system.

#### Permeable Surface Treatments

Permeable surface treatments are also important components of Water Sensitive Urban Design, allowing infiltration of water to soils from a larger area surrounding a tree in situations where, traditionally, hardscaping of the road reserve is required for pedestrian use. Porous or permeable concrete, semi-permeable block pavers, open graded asphalt and resin bonded aggregate are some examples of permeable surface treatments. The use of porous grouts and elevated surfaces (decks) are other approaches.

Evolving systems of passive irrigation look to facilitate water storage and purpose designed reticulation of excess of water. Water storage is an added feature of saturated zone bioretention systems that incorporate a wet sump within the drainage profile. These allow water to be stored and accessed during dry periods. Similarly, a saturated water storage zone (wicking layer) can be integrated within street tree systems to assist in dry periods. A range of trials exist across the country, looking for the most effective design treatments for tree health as well as storm water benefits.

#### Wicking beds

Wicking beds allow for water detention when incorporated in green infrastructure treatments. The water reservoirs within act as a water supply beyond the period of storm water flow or natural rain event. Stored water is accessed via the capillary action of the wicking which draws stored water reserves up to the rhizosphere (tree soil and root zone). The benefits of wicking beds in the passive irrigation of trees include the ability to plant trees at the natural surface level (as opposed to lowered planting sites that have received mixed reviews when used in residential areas). Turf wicking beds offer potential for re-use of non-potable water and, where large areas can be secured, additional cooling potential.





Roof harvesting of rainwater

Rainwater harvesting and re-use of roof water for tree irrigation (i.e. roof water gutter diversions) are other examples of water sensitive urban design. While collection of harvested water can occur easily, storage and the associated pumps and pipes required to deliver water in traditional systems restrict broad scale use of water harvesting. In some situations, down pipes augmented to directly feed into bioretention systems may be a suitable treatment.

Harvesting of atmospheric water as well as fog and dew are just some of the water management technologies currently under exploration that may be available for future use. In the meantime, an integrated approach to delivering water to trees and conserving soil moisture levels remains the most appropriate course of action for the Orange Council region.

Early establishment maintenance

Good early care of trees, especially the frequency of watering and length of time plants receive irrigation, will have an impact over the entire life a plant. Trees that receive limited care while they are establishing (the period of time between being planted and becoming entirely self-sufficient) often struggle through life with sub-optimal vitality and, therefore, have poor resilience in overcoming stress when it arises. Ensuring a sufficient maintenance program is applied to all trees post-planting will increase survival rates and may reduce necessity for additional watering in extreme conditions as they mature.

Tree care partnerships

We can work together with the community to ensure our trees receive adequate water. Community custodians can water nature strip trees and take responsibility for local park and community garden assets. The community is the eyes and ears on the ground and can passively monitor our trees flagging issues with Council as they arise. We can use excess potable water to help manage our trees and embrace grey water cleaning or use technologies as they are presented.

Impermeable urban spaces

The volume of hard surfaces in our town environments serves as a constraint to canopy creation. However, the benefits of reducing the amount of hard and hot surfaces in our townships to facilitate tree planting presents an opportunity for both reducing stored surface heat (of the hard surface) and increasing the shade and cooling (through the tree and plant canopy).

The issue of stored heat in our region's network of hard surfaces is one of the greatest incentives we have for widening tree use. Using nature-based solutions (vegetation and water) to shade and cool our urban hot spots more efficiently will also help to reduce our reliance on generation of cooling via energy intensive, manufactured systems.

The need to ensure we are facilitating natural infiltration of water into soils for tree health and survival presents additional opportunities for the filtering of water pollutants and reducing storm-water system loads through greater use of trees for this purpose. Managing storm water with green, as opposed to grey, infrastructure and treating water at the source rather than at end of line allows potential cost savings, or at least compensation for front end costs with end-of-line cost-savings. Moreover, adapting practices to better mimic the natural water cycle wherever possible will be a huge step forward transitioning to a culture of sustainable living for our region.

An objective of this strategy is to reduce the degree of impermeable surfaces in our town and urban residential environments. A challenge of our continuing development is the competition for space. This means we must keep abreast of technological developments, trial new innovations and invest in them as appropriate.

Operational funding and resource limitations

Tree establishment costs are often seen as a barrier, especially when incorporation of innovative treatments also proposed. Short cuts - typically lack of planting site preparation and/or watering for the first one to two years - in the tree establishment process often leads to tree failure and wasted investment. Ensuring we are adequately resourced to follow the actions of this strategy will be critical.

Transitioning to proactive from reactive maintenance programs and upholding the principles of best practice management takes time and budgetary practice. Greater internal cohesion (to add trees to funded and scheduled projects as well as programs) and involving our community in programs of tree establishment and care are some of the ways we can resource management of our urban forest.

Orange City Council has current capacity for the planting 400 trees in our streetscapes and 2500 in our parks and reserves annually, and the maintenance of these trees for 12 months. If we are to proactively plant a higher number of trees, additional resources will be required.

Encouraging tree canopy creation and retention on private land

This section of our strategy document explores legislation and planning control options to both promote and encourage canopy creation and reduce loss.

Our State Government Planning Framework (NSW Government) manages vegetation clearing in our region via permit requirements. Permit controls (which are administered by Council) for the removal of vegetation require approval of clearing for all vegetation greater than 300mm in diameter (measured at 1.4m from ground level). This permit system, which annexes many of our trees into this regulated environment, continues to deliver good tree retention outcomes for our region and serves to minimise broad-scale losses.

The majority of land in our LGA is zoned for private use. Canopy cover over privately held land parcels is low as a direct outcome of European settlement. So extensive was land razing for crop and pasture development at the time of settlement that there has been no recovery from the historical vegetation losses. Whilst development continues, we are also seeing fewer landowners electing to plant shade trees (larger growing trees) in their gardens. This reticence to voluntarily build canopy cover is exacerbated by the lack of space for large trees in modern urban residential blocks and a preference for lawn over trees in our smaller backyard spaces.

In this section of our strategy, we also explore the various carrot and stick mechanisms that may improve canopy outcomes in a local context. We look at the initiatives and relative success of other municipalities (in Australia and world-wide) and devise strategy options and recommendations for the right mix of these for Orange. We table our findings for the





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best options to explore further and recommend the methods considered most suitable for application in our local context. Specific recommendations for our DCP Plan, considering all the issues this strategy has explored, are provided in a supplementary document.

Key outcomes of these investigations culminate in the minimum canopy establishment requirements for new residential developments that this strategy proposes. Creation of a tree offset policy and procedure and, potentially, a new local law to help regulate is also proposed. Better resourcing our compliance activities will be key to both regulating the proposed initiatives and monitoring and measuring their outcomes.

Here in Orange, our trees – private and public – are valued and strong support for preserving all of the values and their benefits exist. Local media provides ongoing evidence of this. Council investigated these community values further in an engagement program for this strategy and our collective community voice was loud on the issue of private tree protection, highlighting the need for attention to issues around compliance, better publicising of investigations of, and penalties for, breaches. Strong interest in active involvement, both in grassroots canopy creation and local championing of the cause, has also been demonstrated by our community.

This strategy aims to support existing community values around tree protection on private land. It does this by seeking to elevate the importance of tree protection inside Council, both in governance and decision-making processes. It also aims to promote the value and benefits of our tree canopy cover to land productivity and associated prosperity to our rural landholders as well as and the benefits to our region’s liveability for the community at large.

Regulation, Planning Frameworks and Development Control in Orange

We have no by-laws that govern tree clearing in Orange. Instead, we regulate private tree removal through State Government permit requirements. As part of State Environmental Planning Policies (SEPPs), approval is required for the removal of all trees measuring 300mm diameter or more (measured at 1.4m from ground level). With compliance and enforcement, this process is effective for managing the retention and preservation of tree cover in private landscapes outside of assessable development. However, simply sustaining existing extents of canopy cover on private land (with natural attrition an ongoing factor that contributes to canopy loss) is not occurring, let alone compensating for our historical canopy losses.

We have the mechanisms for protecting vegetation in Orange – especially mature native trees – but compliance has been identified as a key area of weakness. Compliance effectiveness is limited by the capacity and resourcing of the regulatory organisation, both on how and when permits are given and in the enforcement of penalties for breaches (non-compliance) of regulations. Our regulations come with penalties for non-compliance and we invest resources in investigating reports of illegal tree removal, as well as fine the proponents when identified. However, anecdotal evidence suggests that we may be under-resourced and with insufficient capacity to monitor development approval outcomes – especially in relation to development approval conditions for preserving, replacing, or establishing new canopy.

Moreover, while we have sound development controls (our DCP) for retaining existing vegetation, competing priorities have the potential to trump vegetation matters as part of the development assessment process, so community priorities for vegetation may not always

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be achievable. Ensuring there is good understanding of the connection between sustaining vegetation and retaining regional character (and pride of place that we all feel which is largely and outcome of setting, scenery and our famed exotic-deciduous trees) is important. We need to ensure that the shared values of the Orange City Council and Community in this space, which are stated in our strategic documents, are reflected in our planning and decision-making.

Furthermore, our planning framework is set by the State, both as an outcome of legislation that governs how we assess development and as the higher power presiding over our local planning instruments and controls. The State Government, therefore, ultimately constrains how local initiatives for raising the bar on canopy retention and replacement requirements can be applied.

Elevated tree canopy creation requirements may be possible through State legislation. As a LGA, we should lobby for elevated canopy creation outcomes set by the State that affect our local amenity and biodiversity (our liveability). NSW is at the forefront of canopy planning and continues to invest significant funding with metropolitan LGAs for canopy cover planning and delivery. With the 1 million trees program continuing to be rolled-out over the Greater Sydney region, the State is amassing a range of data on the true cost-benefit of canopy establishment (it is still too early to measure outcomes but monitoring has commenced). This evidence base and others that are also developing or may follow – NSW SEED map innovations, for example – could help to justify stronger canopy cover requirements and the setting of new requirements for future urban canopy building in State Government Planning Frameworks. Data should at least provide impetus for rigorous review of the efficacy of current planning approval requirements and practices and, based on what is possible, consideration for activities that might be mandated in the future.

The State Government of WA has recently made such changes to their state planning legislation. To increase canopy cover in WA, where canopy cover is lower than any other State in Australia, the WA State Government has introduced new Planning laws for residential areas aimed at infilling and increasing density of tree canopy cover. The new medium density codes include minimum tree requirements.

These requirements are based on a defined neighbourhood block area, the size of the block, and the number of houses on the block. The greater the number of houses on a block, the greater number and/or size of trees required. In addition to this, 15% of a site must be allocated to “soft landscaping”. As an incentive, that area is reduced to 10 per cent if a significant tree is retained.

The ACT has introduced new site coverage requirement for single dwellings and multi-unit development in residential areas which require at least 20% tree canopy coverage for multi-unit development in higher density developments. These new “DV369” requirements include at least a 15% tree canopy coverage planted for multi-unit development in RZ1-2 zones, a minimum of 20% canopy cover for multi-unit development in RZ3-5 zones and requirements for minimum tree canopy cover percentages on single dwelling blocks. The City of Sydney and the City of Ashfield are other NSW municipalities with minimum canopy cover requirements. The South Australian Government extends requirements further with developers required to pay into an offset fund where tree planting requirements cannot be met (Plan SA).





“Carrot and stick” mechanisms for sustaining private land canopy cover

Many cities around the world have mechanisms to protect trees on private lands but successful implementation is largely an outcome of community support. Aversion to risky, unpopular decisions related to tree retentions or tree removals is also common (Ordóñez et al., 2020). However, if regulations are rarely enforced, the public respect for and compliance with these regulations will be weakened.

A key research study into the various models, methods and practices of planning control, local law regulation and incentivisation for sustaining private canopy in Australia concluded that: “Support inside local government organisations in terms of governance and resourcing, and the values, preferences and level of trust of the community, are critical to the success of private tree protections”.

The paper provides useful discussion around these so called “carrot” and “stick” mechanisms for facilitating better canopy outcomes in the privately landholder component of our urban forests. Planning rules, regulation, and control mechanisms for encouraging better tree canopy outcomes are known as ‘sticks’ while mechanisms that seek to incentivise canopy preservation and creation are known as ‘carrots’ (Horticulture Innovation Australia 2020(b)). Carrot mechanisms are mostly incentivisation schemes such as cost/benefits to participants and strategies to encourage wider cultural shifts

The most progressive municipalities use a combination of private tree protection mechanisms - combining policies, planning schemes, local laws and financial rebate programs (Horticulture Innovation Australia 2020(b)). Despite this, many local governments that have implemented carrot and stick mechanisms do not have frameworks for monitoring the outcomes. Therefore, the effectiveness of their mechanisms impacting the quality of their urban forests, and specifically canopy cover baseline and targets, is unclear (Juhola 2018). It is understood that development outcome compliance in Orange is currently under-resourced.

If we are to increase our percentage canopy cover in line with our target, additionally funding for compliance monitoring and enforcement will be required. This strategy has been devised with acknowledgement of the need for more funding in this area, as carrot and stick mechanisms have no chance of success if we cannot ensure compliance. Furthermore, we will not know if our “stick” and “carrot “mechanisms are successful or require rethinking unless we can monitor the outcomes.

Planning rules, regulations and controls for tree canopy creation and protection

Protecting trees on private land needs to be multi-faceted. It should consist of a mix of the right planning policy and regulatory positions, monitoring and compliance of these, as well as incentives for developers and landholders for retaining and protecting trees.

A range of control mechanisms for creating bigger backyards and more green spaces in our urban residential developments exist and the most relevant of these to Orange are listed in *Table 4: Rules, regulations, controls for sustaining canopy on private lands* overleaf.

Rules, regulations, controls for sustaining canopy on private lands
Establish clear minimum standards for canopy creation in urban residential developments
Provide canopy credits for preserving individual trees (such as heritage trees) or stands of trees to meet landscaping requirements in urban residential developments
Establish clear minimum standards for areas of deep soil and building setbacks to allow for sufficient canopy creation
Establish clear minimum standards for Green Infrastructure (GI) and ratio or permeable to non-permeable space in urban residential developments. Provide credits for reduced storm water release. Develop a specific Green Infrastructure code encouraging more shade and tree canopy coverage in all urban residential developments
Establish clear minimum standards for canopy creation to shade urban car parking lots
Reduce the required setback area for a dwelling in exchange for the preservation of existing vegetation or an increase in the tree save area (total canopy to be retained on a development site) that goes beyond a required standard
Provide greening requirements in urban residential development assessments based on the calculated potential greening of a new development area
Include advanced tree protection and best practice standards for new tree treatments planting treatments in urban residential developments
Develop a tree offset policy and procedure applicable to all Council and private land clearing
Provide rebates for retaining or planting trees in newly developed or re-developed sites and private residences
Bond canopy creation or protection creation conditions of development approval - where a payment is required prior to a development commencing and released on assessment of outcomes and how they meet the condition applied
Apply biodiversity or natural resources taxes for poor canopy and land outcomes in urban residential \or private development
Spatially locate Council’s Significant Trees and create a mapping overlay to help guide development assessment (as part of Council’s suite of development assessment tools)
Create a scenic or special landscapes planning overlay for Orange to help guide development assessments
Establish an Urban Tree Canopy Overlay or Priority Urban Canopy overlay for Orange
Strengthen and enforce local planning policy to require best practice tree planting and landscaping in non-residential car parks
Reduce the amount of required parking in exchange for the preservation of existing vegetation or an increase in the tree save area (minimum area of land reserved for existing or new trees) goes beyond a required standard
Apply levies to development approvals to fund new street trees
Establish a Tree Trust Fund scheme that proponents of privately certified or non-assessable development works must pay into (for example to fund tree planting to meet local and community priorities)
Apply tree planting levies for Council to undertake planting works in new residential developments to ensure; Council will have direct control over the selection of tree stock, better control of site preparation and quality of work and better maintenance control to ensure strong healthy establishment
Fast track assessments for ‘standard’ development applications that retain significant trees

Table 4: Rules, regulations, controls for sustaining canopy on private lands



### Incentivising tree preservation and planting on private land

Mechanisms to incentivise tree retention and canopy creation outside of assessable development and local law regulations in the LGA are recommended for further investigation. Outside of assessable development, a visual overview of canopy cover over private land in the LGA suggests a lack of interest or impetus for creating canopy cover in private land areas, especially where it is critically needed for the passage of wildlife and general ecosystem health.

Incentives for tree preservation and canopy creation may be in the form of grants, rebates, awards and other recognition, or in-kind support such as provision of information or professional arboricultural advice and design services (provided by Council). The best incentives are not necessarily bound by legislative or other stakeholder requirements, thus allowing for ease of application and, ultimately, earlier enjoyment of urban forest benefits. Whilst these types of incentives, carrot mechanisms, may not be as effective as monetary incentivisation, monetary incentivisation schemes are more likely to require additional checks and balances. These include general policy and process around applying fees and charges, holding bonds and other financial or administrative matters. Some of these may require wider endorsement and approval before use. *Table 5: Incentives for creating and retaining canopy on private land* provides some examples of these.

Incentives for sustaining canopy on private lands
Provide funding to assist landowners to maintain significant trees
Provide grant and land management support to maintain our strategically important local and regional habitat corridors
Facilitate carbon credit programs of planting trees on private land where the landowner receives the financial (and biodiversity) benefits
Map key corridor creation zones and incentivise tree planting in these areas through free trees or Council funding, or carbon credit schemes
Apply differential Council rates based on land use, green infrastructure and tree canopy
Provide free trees to landowners
Incentivise tree adoption schemes through gifts and rewards, for example reduced Council rates
Incentivise tree preservation through gifts (for example free firewood to retain dead stumps)
Provide assistance to commercial landowners (in city car parks for example) for greening by funding planting and/or maintenance works

Table 5: Incentives for creating and retaining canopy on private land

### Other initiatives to encourage tree canopy creation and preservation

For rural landholders, the primary value of rural landscapes is their production value. Economic arguments and incentives are likely to be more effective at changing attitudes among rural landholders than are ecological arguments. Preparing a suite of education materials targeted at the end user and enhancing opportunities for collaboration are other options for Council-led canopy initiatives. *Table 6: Other initiatives for preserving and growing canopy cover* presents some of these.

Other Council-led initiatives
Establish steering communities or working groups on urban tree decisions. Allow for public input on trees to be removed or altered by new development projects
Develop Adopt-a-tree/greenway programs for streets, sports and recreation reserves (cool my Sportsground), local businesses and schools
Provide targeted engagement to promote the values of trees to farmlands (i.e. shelter and heat protection for livestock, erosion and flood run off control, improved soil health). <ul style="list-style-type: none"><li>Provide an educational fact sheet showing all of the ways wildlife can use trees including dead trees to help to demonstrate the importance of tree retention</li><li>Develop a list of alternatives to tree removal for promotion to private land holders - pruning, props, health care treatment, cabling, exclusion through garden bed creation beneath protection with bolster plantings around the tree</li></ul>
Support local activism programs or activities (e.g. tree retention activities)
Support and encourage citizen-science led programs of tree planting. Provide material and resource support to local tree champions (i.e. local neighbourhood greening leaders)
Provide educational programs and local information workshops
Partner with University and TAFE students to help to plant new trees

Table 6: Other initiatives for preserving and growing canopy cover





Recommendations for planning rules and greening incentives

Valuing our assets

Placing dollar values on trees has long been discussed yet a standard method of valuing trees has only recently been developed. A newly published MIS (Minimum Industry Standard), published by Australia's national body for arboriculture – Arboriculture Australia - presents a peer reviewed, integrated methodology that can now inform in this area. It can utilise existing tree inventory data to articulate values providing a “no cost” way of establishing tree values for regulatory application purposes.

Formally valuing our trees allows for the proper recognition of trees in decision-making processes. A number of Victorian LGA's utilise the City of Melbourne tree valuation method to value and charge for Council trees where developers wish to remove them. Funds received are utilised to replace the canopy loss. Dubbo Regional Council has implemented a similar approach reported, anecdotally, to have reduced the actioning of requested removals by over 90%.

With a valuation mechanism, we can, for example, mandate canopy retention via bonding to disincentivise loss. We can mandate canopy creation and incentivise against poor establishment of new canopy. We can, alternatively or additionally, incentivise good practice by providing rate rebates or lower charges in the return of for achieving higher rates of canopy cover establishment in assessable development and in general private land tree matters.

To best manage our tree canopy effectively across the entire LGA, we need to be able to assess it in a quantifiable and measurable way at scale as well as on the ground. Technologies to measure canopy and canopy loss are advancing rapidly. As geospatial information and asset management systems and capabilities advance, we can develop management tools and reference materials which represent data in a mapped format. We can use this data to develop ways to manage, measure, control and incentivise canopy building and enriching activities.

**Offsetting canopy loss**

Good opportunity exists for development of a Council-wide tree offset policy to discourage tree clearing as an outcome of financial disincentives. Our local planning instruments could incorporate Council Offsetting Policy and Procedures. As well as integration of an Offsetting Policy and Procedure into Council operational practices, a local law could be developed to also see Council policy for offsetting trees applied to private land. An Offsetting Policy and Procedure could also be mandated for use in our Development Control Plan (DCP) and embedded in the guidelines of our Local Environment Planning Policy.

**Bonding protection of our green assets**

A monetary bonding system is recommended to be assigned to street and private land tree preservation and creation, using an acceptable and agreed amenity tree or canopy valuation methodology. In bonding canopy cover creation, 3 years is the recommended minimum period for the holding of funds in bond to sufficiently measure the early success of tree and canopy establishment. 5 years or longer is the optimal time period for this.

Canopy establishment, green space and Green Infrastructure requirements for new developments

Local and international benchmarking has shown that the most innovative planning policies and controls include:

- Minimum tree canopy creation requirements
- Reservation of space for greening
- Credit for storm water load reductions through the requirements for increased use of green infrastructure
- A higher proportion of permeable spaces to be delivered in new neighbourhoods

Such mechanisms offer the best potential for ensuring, in our new urban developments at least, that we will have the right mix of trees and water management to facilitate establishment of sufficient canopy to provide amenity, cooling and other liveability benefits.

**Elevating compliance**

Our planning controls for tree replacement or canopy creation in assessable developments lack strength in the context of this strategy's targets.

Not only are replacement requirements insufficient by comparison with other LGAs operating proactively in this space but we are not seeing the right types of trees planted. Current landholder preferences for modern “designer” trees that either don't reach the required dimensions for meaningful impact or do not contain the right features to substantially contribute to local biodiversity, are a challenge.

We need to find mechanisms to allow us to better control and to promote the use of the right types of trees, ones that will provide the best liveability and biodiversity benefits for our City-Region. Options include:

- Regulating and monitoring through the existing Regulations Services and Compliance team structures with additional funding to support; or
- Establishment of a new Development Compliance unit





## Creating a target canopy cover % for Orange

### Benchmarking canopy cover % targets

There is currently no standard benchmark for urban forest canopy cover in Australia. National and international research suggests that a 30% canopy cover is optimal. A large UK study (Doick et al 2017) suggests setting a benchmark of 20% and recommends areas with less than 20% cover should commit to increasing extents by a minimum of 5% within 10-20 years.

In areas that have both rural landscapes and urban living such as ours, canopy cover is generally low with vegetation cover impacted by land use – namely agriculture. There has been little focus on developing urban forest strategies and setting canopy targets in regional areas in the past, but this is growing.

To help benchmark Orange's current canopy cover percentage, comparable canopy cover percentages were investigated via the NSW Government SEED portal where maps providing average canopy cover visualisations and data for all LGAs in NSW are provided. Exploration of canopy cover figures for the LGAs surrounding Orange found that Orange compares favourably with Forbes, Cowra, Oberon, Blayney and Bathurst which all exhibit less than 10% canopy cover, according to the portal.

An Urban and Rural Forest Strategy (2018-2028) for the Shire of Serpentine-Jarrahdale, an LGA 45km from Perth, broke the region down into urban, peri-urban and the rural landscape. However, the canopy goals they set were to maintain current extents via no net loss only (urban 16%, peri-urban 21% and rural 12.5%). The City of Whittlesea's UFS has targets broken down into public landscape and private landscape. The City is currently on 19.7% overall and has a target of increasing cover by 20% by 2040; but focuses mostly on established and growth suburbs with a target of increasing rural land canopy cover by 3% only.

An agreed approach to increasing tree cover between the City of Melbourne and an array of Councils in the Greater Melbourne area was made in 2019. The document suggested that targets in rural areas should be ambitious (20-30%), at 30% tree and understory cover, there are significant benefits for biodiversity. It also recommended that in regional areas at least 30% of canopy increases should occur in the private landscape.

Large cities have more ambitious targets based on the significance of their Urban Heat Islands. Many references show that 40% urban canopy cover is required for significant reductions in urban heat. The City of Sydney has a target to achieve 27% canopy cover by 2050 from a 15 per cent baseline in 2008. The City of Melbourne has a 40% target. However, a recent study found that there was insufficient space in the city's limits to plant the required number of trees to achieve that and that removal of existing hard spaces would need to occur to facilitate enough planting to reach the target (Croeser et al 2022).

### The risk of setting ambitious targets

The great risk in setting targets for tree canopy cover is insufficient "how to deliver" strategy with realistic Council programs, timings and budgets. The risk and challenges are even greater when it comes to setting Council targets for private landholder-controlled canopy with the necessary forming of strategies and mechanisms for tree preservation and encouraging new tree planting.

Examples of LGAs improving canopy cover in Council-controlled areas yet suffering reduced canopy overall due to losses on private land exist. Many Councils report canopy extent decreases from baselines as an outcome of private land clearing. The City of Charles Sturt is one such LGA reporting that tree canopy cover decreased from 15.5% in 2008 to 13.8% in 2020, concluding that this is primarily due to the loss of trees on private property from infill development. Stirling Council in WA reported a similar outcome. Council planted 130 hectares of trees on city-owned land over seven years but it wasn't enough to make up for the number of trees lost to development over that time – 135 of hectares of clearing.

There have been mixed outcomes for our tree canopy on a national scale between 2016 and 2020 with both significant growth and decline of tree canopy extents over the featured LGAs recorded (Greener Spaces Better Places 2020). Figure 21: Change in green cover between 2016 and 2020 in various Australian LGA's demonstrates this below.

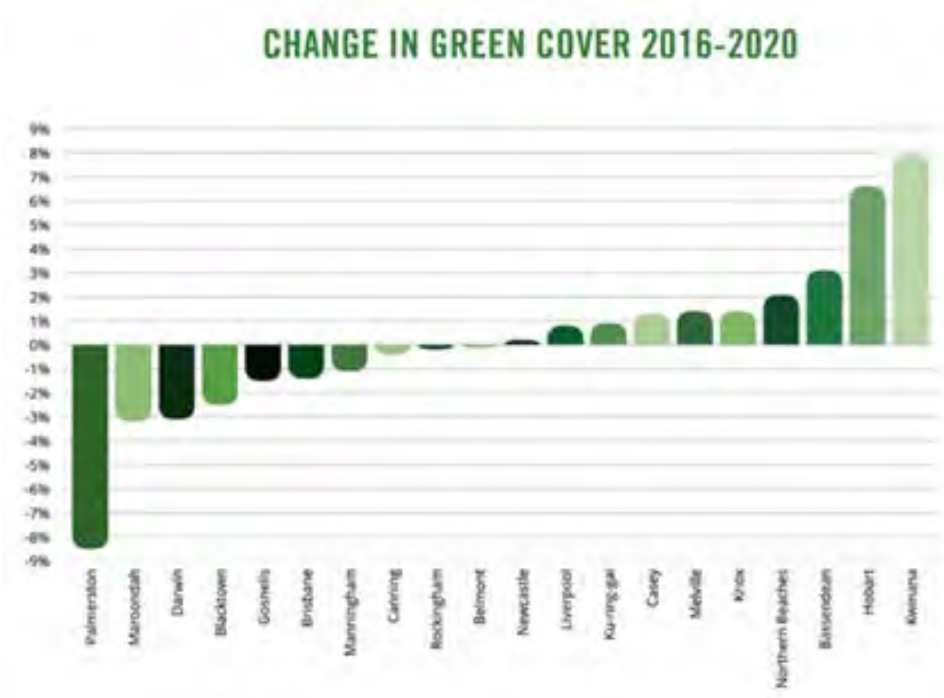


Figure 21: Change in green cover between 2016 and 2020 in various Australian LGA's (Greener Spaces Better Places 2020)

Setting a canopy cover target is critical to measure our success. In setting our target, we have considered historical depletion of natural vegetation, the makeup of land ownership in our region and our major land use (agriculture). We have also considered our urbanisation and the need to continue to provide housing for our growing community. Setting a target of 40%, or even 30%, canopy cover for Orange is not realistic. Our canopy cover target needs to be achievable. We have instead committed to a target of achieving 20% canopy cover over our key urban area – the Orange township - by 2050. We have also committed to increasing canopy cover in the townships of Lucknow and Spring Hill to 9% and 7% respectively.

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Priorities coming from the strategy for Council and community to consider and develop into detailed plans

Timeframe Short 0-5 years Medium 6-10 years Long 11-20 years

High priority actions

Theme	Action	Priority	Impacted Land	Timeframe
Collaborate	Develop an “Adopt a street” tree program for the LGA	1	Council	Ongoing
Prosper	Upgrade systems for capturing, storing and retrieving tree data, and managing tree assets	1	Council	Ongoing
Preserve	Commence a program of proactive plant health care (including irrigation in dry conditions) for significant and “high value” township trees to enhance health and extend longevity	1	Council	Ongoing
Live	Include priority shade tree plantings to park infrastructure and furniture in future local park designs. Create an inventory of sites for shade creation including adjacent to playgrounds, exercise equipment, basketball courts and skate parks. Also include seats and picnic settings	1	Council	Ongoing
Preserve	Incorporate biodiversity vegetation and amenity tree plantings in all applicable reserves including the identification of locations for creation of legacy tree canopy (can be slower growing trees and focus on biodiversity benefits) as well as mini forests.	1	Council	Ongoing
Prosper	Stay abreast of new research and innovation in tree planting and tree care treatments via membership of national and local industry bodies (Arboriculture Australia and Treenet, for example), establishing networks with surrounding LGAs for benchmarking and information sharing and keeping qualifications of staff up to date.	1	Council & Private	Ongoing
Collaborate	Facilitate connection between residents and volunteer / community groups that plant and help care for plants and trees in the region via publishing of information on Council’s website.	1	Council	Ongoing

Theme	Action	Priority	Impacted Land	Timeframe
Preserve	Explore partnership opportunities with commercial developments to increase trees within private open carparks commercial and industrial zones	1	Private	Ongoing
Collaborate	Work together across Council to reduce tree-infrastructure conflicts through better tree selection and ground preparation prior to planting. For example, loosening soil to create pathways for tree roots to travel the path of least resistance and direct roots away from infrastructure.	1	Council	Ongoing
Collaborate	Reinforce internal partnerships to encourage retention of existing trees and supply of new trees in capital and operational programs (for example to promote incorporation of new tree plantings in all capital and renewal projects especially those with unavoidable tree removal requirements).	1	Council	Ongoing
Collaborate	Incorporate ‘Tree sensitive design’ into Council’s capital works program ensuring place making, centres and major road upgrade projects include permeable planting treatments and other methods of extending space for tree roots as well as passive irrigation treatments for new trees.	1	Council	Ongoing
Prosper	Review current list of species used for tree planting in OCC and vet for adaptation potential and inclusion of additional species for future proofing.	1	Council	Ongoing
Preserve	Identify high profile sites for key signature plantings in regional landmark locations to celebrate trees and reinforce regional treed character. Investigate the potential to plant these feature trees in roundabouts, regional gateways, other vacant and highly visible sites. Engage with external stakeholders to secure use of verge spaces outside the control of Council or privately owned land parcels.	1	Council	Ongoing
Preserve and Prosper	Protect existing endemic and native vegetation occurring within our riparian zones and enhance these zones with appropriate revegetation for biodiversity benefits.	1	Council	Ongoing
Prosper	Highlighting the need for proactive irrigation of key tree plantings in Orange’s townships through passive WSUD	1	Council	Short
Live	Identify residential streets where social vulnerability and heat impacts are high. Prioritise these for operational planting programs.	1	Council	Short

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Theme	Action	Priority	Impacted Land	Timeframe
Preserve	Document methods of embedding tree retention and replacement planting requirements into development assessment and planning controls Examples (i.e. to require rules around open space, setbacks, deep soil zones and canopy trees on private property, consider a tree bond scheme, draft new or more tightly controlled tree removal or pruning permit requirements	1	Private	Short
Live	Identify high-use footpaths in our low canopy locations. Target key walkable routes near schools, retirement facilities community and sports facilities, local parks and reserves, and shopping precincts. Prioritise these for operational program development.	1	Council	Short
Preserve	Work with the region's First Nations people to identify key vegetation of cultural significance and to enable development of a framework for protection.	1	Council	Short
Preserve	Prepare a Biodiversity Management Plan for the LGA	1	Council	Medium
Preserve	Prepare a spatial visualisation of our Significant Tree register. Expand the register to include nomination of "high value" township trees as well as culturally significant trees by definition.	1	Council	Medium
Preserve	Prepare a Tree Bonding Policy and Procedure for Orange and Define a Tree Valuation Model and process for use in the region.	1	Council	Medium
Prosper	Prepare a report to Council with a cost benefit analysis demonstrating the potential for long-term savings and the other benefits of formally registering all Council-controlled trees as Council assets.	1	Council	Medium
Preserve	Investigate a free trees program to encourage planting on private land.	1	Private	Medium
Preserve	Develop a tree preservation campaign, promoting the importance of trees and the need for preservation. Target rural landholders directly as well as all residents via local print media and radio, on social media platforms as well as Council's website. Invite rural landholders to form greening partnerships with Council. Programs may include the planting or reinforcement of wildlife corridors on private land, mini forest creation on private land. Bolstering of natural buffers between townships and rural landscapes	1	Council	Medium

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Theme	Action	Priority	Impacted Land	Timeframe
Live	Prepare a business case for the allocation of additional resources (staff and plant) to increase Council's capacity for programs of tree planting and young tree maintenance.	1	Council	Medium
Preserve	Investigate policy options for minimum canopy cover requirements on private land or to incentivise increases in canopy cover on private land. Incentivise tree retention for private landholders (programs include land for wildlife, grant schemes, eat my carbon type programs).	1	Private	Long





Medium priority actions

Theme	Action	Priority	Impacted Land	Timeframe
Preserve	Secure a site for piloting a woody debris natural breakdown program where logs from removed trees are allowed to naturally and slowly break down to avoid immediate return of the stored carbon to the atmosphere. Develop a “user pays” system whereby proponents or beneficiaries of tree clearing (developers, project owners, landholders) either provide spaces for natural breakdown of debris within privately owned land or transport it to Council’s storage/natural break-down facility.	2	Council	Ongoing
Live	Engage with existing community and volunteer groups to help with on the ground delivery of new tree plantings. Develop a campaign calling additional volunteers and wildlife lovers to arms for the “habitat and corridor connections in local parks” program.	2	Council	Ongoing
Collaborate	Develop a permit process for residents to plant and care for new trees or verge gardens on their nature strips.	2	Council	Ongoing
Collaborate	Commence a shade ways program to co-locate new street trees with all priority footpath networks.	2	Council	Ongoing
Live	Develop a WSUD demonstration project for implementation at an appropriate urban residential development, in conjunction with local developers and university students.	2	Council	Short
Live	Identify locations inside local parks or within Council’s portfolio of land parcels (vacant unused sites that may provide a link in a key wildlife corridor for example) for establishment of a mini forest test case. Land parcels in heat sinks should also be considered for the pilot project as a way of providing hot spot cooling.	2	Council	Medium
Prosper	Develop a vertical gardens demonstration project for implementation at an appropriate Council facility. Include heat sensors or other appropriate smart technologies to measure and record heat and ambient temperature.	2	Council	Long
Live	Identify locations for removal of impermeable surfaces in hot spot data for the region for development of a tree planting demonstration/trial removing hard impermeable surfaces around tree plantings to demonstrate tree growth and cooling outcomes. Monitor the trial with smart sensors or a manual process.	2	Council	Long

Low priority actions

Theme	Action	Priority	Impacted Land	Timeframe
Prosper	Review species performance in operational programs for patterns, high risk and poor performing species	3	Council	Ongoing
Preserve	Identify key intersections for gateway plantings and town lead-in avenue plantings and present to Council for funding of a “gateway and placemaking tree planting project” or program. Include in assessment the identification of locations where the benefits of fast canopy creation can be realised.	3	Council	Short
Prosper	Re-capture canopy cover statistics in 5 years’ time and review strategy objectives and priorities	3	Council	Short
Prosper	Identify suitable sites for kerb inlet installations in low canopy cover areas of the City and townships and commence a trial of passive irrigation treatments including water storage.	3	Council	Short
Live	Prepare a budget case for a Councillor-led, shade hungry footpath planting to provide a program of tree shade delivery focused on distribution of funds equally between townships/divisional areas	3	Council	Medium
Live	Partner with the business sector and/or large commercial landholders to plant large growing trees within key cultural or commercial sites (including car parks) for shade and cooling, carbon capture and storage or general amenity. Incentivise through free trees or the provision of early maintenance for allowing Council to install trees in privately owned land.	3	Council	Medium
Prosper	Prepare a succession plan for replacement of key “high value” trees with low remaining useful life expectancies and present to Council for funding of a succession tree planting program.	3	Council	Medium





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Theme	Action	Priority	Impacted Land	Timeframe
Collaborate	Design and deliver an interpretation project for a key park (i.e. tree trail, interpretation signage and tree ID plaques) with internal designers	3	Council	Medium
Collaborate	Prepare fact sheets describing native and adaptable species for planting as a resource for residents.	3	Council	Medium
Collaborate	Prepare fact sheets for residents including a tree selection guide for property owners. Also, materials detailing the benefits of retaining trees. For example, the benefits of trees to farmlands - protecting livestock from heat stress, improving soil structure and fertility, preventing run off and erosion	3	Council	Medium
Collaborate	Prepare a calendar of tree appreciation campaigns for competitions and giveaways to promote trees. Examples: Spring into Spring, free mulch, light up my town tree, yarn bombed trees, and other arts and cultural events with trees front and centre. My favourite tree photographic, art and / or story-telling competition, shade my pool, sportsground, café, footpath, bike path, community facility.	3	Council	Long
Prosper	Transition to a proactive tree inspection program to enable identification of tree issues early and opportunity for improving tree condition and longevity instead of trees needing to be removed because problems are advanced.	3	Council	Long
Preserve	Prepare how to care for your street tree fact sheets.	3	Council	Completed

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#### **Enquiries**

For information about the  
Greening Orange – Our Urban Forest Strategy, contact:  
**Orange City Council**  
**[council@orange.nsw.gov.au](mailto:council@orange.nsw.gov.au)**

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[orange.nsw.gov.au](http://orange.nsw.gov.au)