GREATER SHEPPARTON

URBAN FOREST STRATEGY

2017-2037

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GREATER SHEPPARTON CITY COUNCIL'S URBAN FOREST STRATEGY

Prepared for

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EXECUTIVE SUMMARY

Greater Shepparton City Council manages around 37,000 street and park trees across its urban network which includes the towns of Shepparton, Mooroopna, Tatura, Dookie, Murchison, Kialla and Toolamba.

These public urban trees are a core component of Greater Shepparton's urban forest, which is the sum of all urban trees, both public and private. The urban forest offers natural shade, localised cooling, habitat for animals, air pollution reduction and lower stormwater flows across the whole Greater Shepparton region.

How Council manages this public portion of the urban forest is important for maximising these benefits, but also to demonstrate leadership to other regional landowners who are responsible for parts of the urban forest e.g. State Government, developers, business owners and the community.

This Urban Forest Strategy has been developed to set a vision, objectives, targets and a series of actions for Council to adopt and adhere to over the coming decades. It will provide the strategic framework for existing tree management policies, technical guidelines and precinct plans and links in with Council's existing strategic priorities such as community health and wellbeing, liveability, climate change and place making.

Through delivery of this Strategy, the City of Greater Shepparton will be an attractive, vibrant and liveable region with well-connected green spaces that are valued by the community.

Council will achieve its vision by:

1. Ensuring social equity across all towns through the equitable delivery of the urban forest program to those areas most in need
2. Engaging and collaborating with other landholders and the community
3. Adopting best practice urban forest management

By 2037, Council will achieve the following:

- Increase urban forest canopy cover in each town to 40%
- Reduce the number of vacant street tree sites to zero
- Improve urban forest diversity by age and useful life expectancy
- Increase the number of biodiversity links through each towns street and road network
- Include urban trees in all major Council infrastructure projects at planning, design and implementation phase
- Ensure best practice urban tree management is being delivered across all Council programs

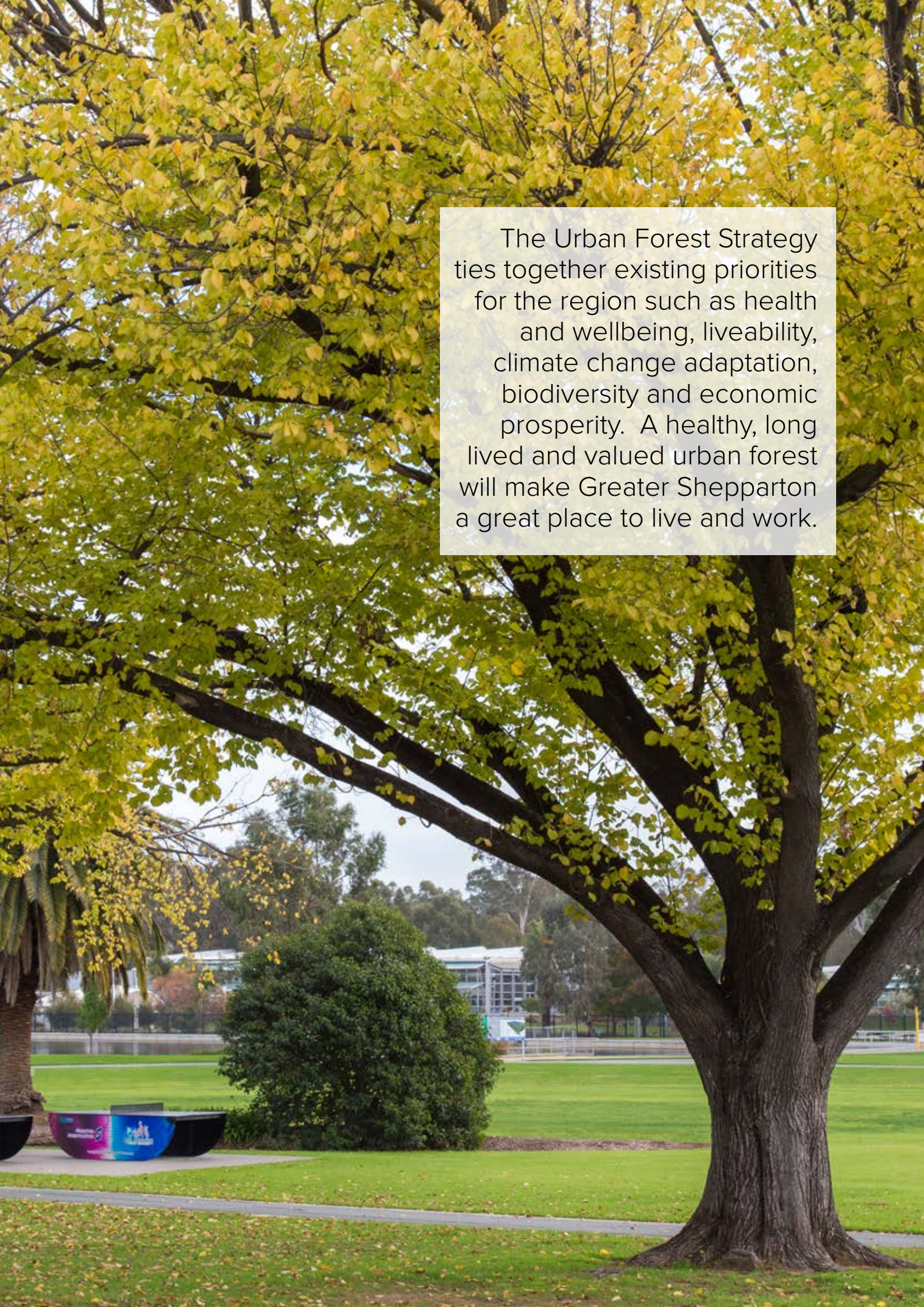
INTRODUCTION

Greater Shepparton - has a rich history of economic pursuits from being an early railway town to a thriving agricultural and manufacturing hub. The region also has a rich multicultural history. From the movements of the traditional owners who followed the Murray Goulburn river systems, to the post – war immigration influx bringing migrants from all over the world, Greater Shepparton today is home to a strong multicultural community.

The Greater Shepparton region also has a vast array of natural assets, including the Goulburn and Broken Rivers and surrounding orchards and farms. These natural assets are a key reason why people come to live in Shepparton. Another valuable and diverse natural asset, one that isn't quite so well known, is Greater Shepparton's urban forest. Greater Shepparton's urban forest is the sum of all urban trees: those in streets, parks and reserves, backyards and private gardens as well as those in other major landholdings e.g. carparks, dis-used industrial land, along railway lines. Greater Shepparton City Council manages around 37,000 urban street and park trees and together they form a natural green backdrop for streets, neighbourhoods and town centres.

These trees offer many benefits to the communities of Shepparton, Mooroopna, Tatura, Dookie, Murchison, Kialla and Toolamba. They provide much needed shade in summer, their leaves filter air pollution and their canopies filter rainfall and help to absorb stormwater. They also provide habitat to native birds and animals. Avenues of street trees form a neighbourhood sense of character and dappled shade in shopping strips encourages people to spend longer in commercial precincts. The urban forest is also an important measure in helping towns and cities adapt to climate change, especially to mitigate summertime heat.

The way these urban trees are managed directly influences the quality of these benefits. The healthier and longer lived an urban tree is, the more benefits it can provide. With that in mind, Greater Shepparton City Council has developed its first Urban Forest Strategy to guide the way in which it makes decisions for and manages its 37,000 public urban trees. A strong vision is underpinned by a series of objectives, guiding principles, targets and a list of actions. These ensure that Greater Shepparton Council is constantly improving the way it makes streetscape design decisions to pave the way towards a more liveable, climate adapted and greener region.



The Urban Forest Strategy ties together existing priorities for the region such as health and wellbeing, liveability, climate change adaptation, biodiversity and economic prosperity. A healthy, long lived and valued urban forest will make Greater Shepparton a great place to live and work.

VISION

Greater Shepparton will be an attractive, vibrant and liveable region with well-connected green spaces that are valued by the community.

KEY OBJECTIVES

This Strategy will:

1. Improve community health and wellbeing: by planting and maintaining shady welcoming streets encouraging people to walk and cycle
2. Assist the region to adapt to climate change: by providing shade, reducing stormwater flows and planting tree species that are resilient for the future
3. Create habitat corridors between townships and surrounding natural areas: by planting street tree species that support habitat movement through urban streets, thereby improving connectivity for biodiversity
4. Improve the attractiveness and economic prosperity of the CBD and commercial areas
5. Improve Greater Shepparton's overall liveability and streetscape amenity
6. Encourage the community to be involved in planting and caring for the urban forest

GUIDING PRINCIPLES

Council will abide by the following principles to ensure our Vision is met:

1. Ensure social equity across all towns through the equitable delivery of the urban forest program to those areas most in need
2. Engage and collaborate with other landholders and the community
3. Adopt and follow best practice urban forest management

The Urban Forest Strategy aims to improve Greater Shepparton's overall liveability through equitable best practice tree planting transforming residential streets from the above image to the below.

WHY IS AN URBAN FOREST IMPORTANT?

The prime purpose of the urban forest is to provide benefits to people: shade, public amenity and green spaces for people to enjoy. But it also has strong economic and environmental benefits that are worth considering.

Health and Wellbeing Benefits

The urban forest:

- Provides natural shade and shelter for pedestrians and cyclists: Shade trees reduce daytime temperatures between 5 and 20 degrees Celcius
- Improves the desirability of a neighbourhood and encourages people to spend time outdoors and interact with their community, particularly in areas of socio-economic disadvantage
- Improves amenity and aesthetic of public open space, particularly playgrounds, encouraging active play
- Encourages motorists to drive more slowly through the provision of uniform, avenue like plantings along streets creating safer streets
- Reduces air, water and soil pollution
- Is a significant component of a liveable city or town

Economic Benefits

The urban forest:

- Improves commercial vitality: shoppers spend longer and more money in shopping areas that are well treed and landscaped. Tree can improve retail activity by up to 20%.
- Increases house prices in Brisbane and Perth through the provision of healthy and well maintained street trees
- Reduces energy use in buildings: A 10% increase in deciduous tree cover can reduce heating and cooling costs in houses by 5-10%
- Greatly improves the brand, character and amenity of the region,
- Can provide a return on capital of up to five times e.g. New York's street trees return $5 for every $1 invested in street trees
- Is one of the most cost effective and efficient public assets for adapting urban areas to climate change through provision of shade, evapotranspiration and stormwater interception

Environmental Benefits

The urban forest:

- Significantly reduces stormwater flows and improves stormwater quality
- Connects biodiverse locations by creating a green corridor
- Is one of the most effective mechanisms for reducing the Urban Heat Island Effect (i.e. the build-up of heat in hard surfaces during periods of hot weather)

CONTEXT

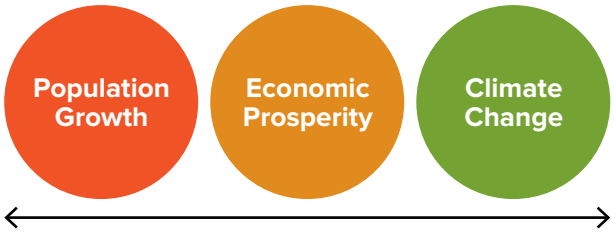
Council

Greater Shepparton City Council recognises the importance of its urban forest in contributing to the region's liveability, environmental sustainability and community health and wellbeing. Both directly and indirectly, the urban forest positively influences and supports many of the objectives stated in various strategic documents across Council including Greater Shepparton 2030. The urban forest helps shape the region's brand and identity, both as an agricultural hub and a growing regional city offering lifestyle benefits by showcasing tree lined streets, avenues and boulevards. The presence of shade trees along cycling and walking paths help reach health and wellbeing and movement aspirations for the community.

The Strategy also provides a decision making platform for the ongoing management of all public urban trees. All tree policies, technical guidelines and programs will finally be working towards a strategic vision: a healthy urban forest providing its myriad of benefits to the people of Greater Shepparton.

Regional

The Municipality faces some key future challenges such as population growth, economic growth and stability as well as climate change. Managing these challenges is a priority for the region and whilst seemingly indirect, the urban forest can play a quiet yet crucial role in enhancing liveability and resilience across the region.



As the main economic centre of the Goulburn Valley and headquarters for the Goulburn Valley irrigation system, Greater Shepparton should maintain its status as a thriving and successful agricultural centre. Streetscape and park amenity are important factors in displaying a successful and thriving city, thereby making best practice tree planting an important future priority for investment. Greater Shepparton's commercial and retail centres are the centrepiece of the City's brand and should showcase leafy, welcoming spaces for customers and visitors to spend more time in.

Shepparton, Mooroopna, Tatura and other townships will support significant population growth over the next few decades and so the existing character, functionality and accessibility of public urban landscapes will therefore become increasingly important to provide for the needs of people, especially natural shade.

The region will also continue to build on existing programs for regional climate change adaptation. Healthy, diverse urban forests that provide shade, absorb air, water and soil pollution and soak up rainfall are one of the most efficient and cost effective mechanisms for adapting cities to climate change, particularly for reducing thermal heat and absorbing carbon.

Council now has the capacity to lead by example in addressing these priorities. A healthy public urban forest will pave the way for care and custodianship of the urban forest on private and other public land owned by other agencies. Council will need to continue on its path of enabling and empowering the community as well as advocating and collaborating with key stakeholders to make the region's urban areas greener, shadier and more resilient.

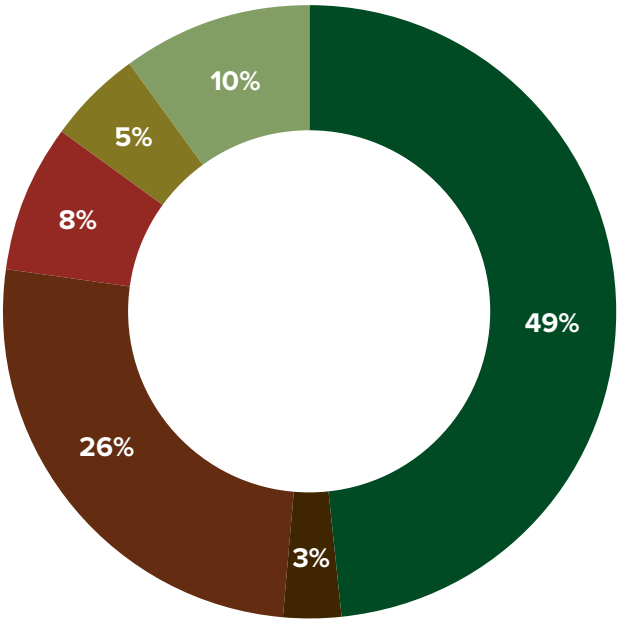
Community

Detailed public engagement conducted through the Community Environmental Survey was done in 2011. Shade provision, protection of trees and using street trees to enhance biodiversity corridors were some of the prominent issues raised by the community. A word cloud shows the key words that were mentioned by respondents, with the largest words having been mentioned most frequently.

A smaller on-line community survey was run in early 2016, exploring the various reasons why the urban forest is important for individuals as well as what issues and opportunities they saw in managing the urban forest.

The results of the survey show that the community recognise the importance of the urban forest for their community, especially within their local residential streets. Community members show concern for private tree protection, species selection and are keen to be more involved in decision making for urban trees.

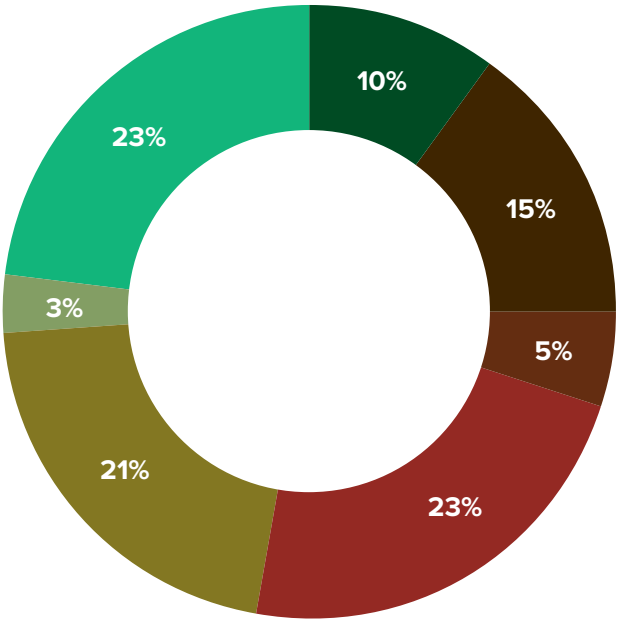
Why is the urban forest important for Shepparton?



- Building healthy communities (19)
- Non completed (1)
- Enhancing the environment (10)
- Improving the city's economic prosperity (3)
- Enhanacing the city brand (2)
- Adapting the city to climate change (4)

The majority of respondents felt that the urban forest was most important for building healthy communities.

What element of the Urban Forest should Council invest in?



- Road entrances and gateways to each town and city (4)
- Central Business District (CBD) (6)
- Non completed (2)
- Parks (9)
- Corridors linking areas of natural value (8)
- Playgounds (1)
- Neighbourhood streets (9)

The majority of respondents thought that Council should invest in enhancing the urban forest in neighbourhood streets, parks and corridors linking areas of natural value

PUBLIC URBAN FOREST

Greater Shepparton is home to around 37,000 public urban trees in streets, parks and reserves. Approximately 19,000 of these are in Shepparton, 6,000 are in Mooroopna, 4,000 in Tatura and 8,000 in other towns and locations. A recent tree audit, conducted by an independent qualified arborist surveyed around 24,000 of these trees to provide a clearer picture about the health, diversity and projected life span of the population. Data collected included information about tree species, age, structure, height and health.

At this point in time, very little is known about Greater Shepparton's private urban forest i.e. all of those trees in backyards, gardens and on privately owned land. These trees are equally as important as the public trees in providing holistic benefits to the people of Greater Shepparton such as shade, cooling and neighbourhood amenity.

Each individual tree, regardless of size or species, is an important component of the whole urban forest.

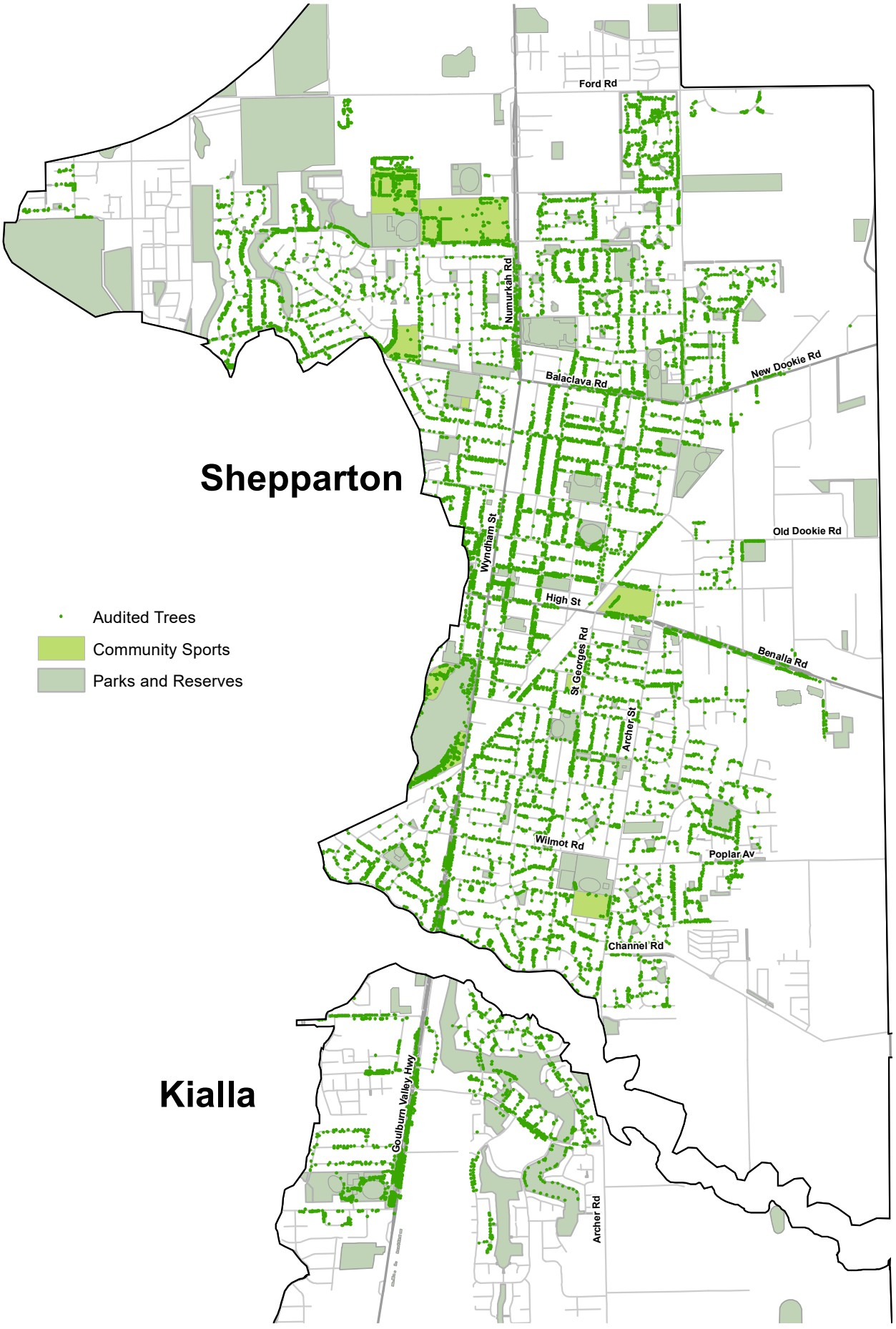


Figure 1: Distribution of audited trees in Shepparton and Kialla

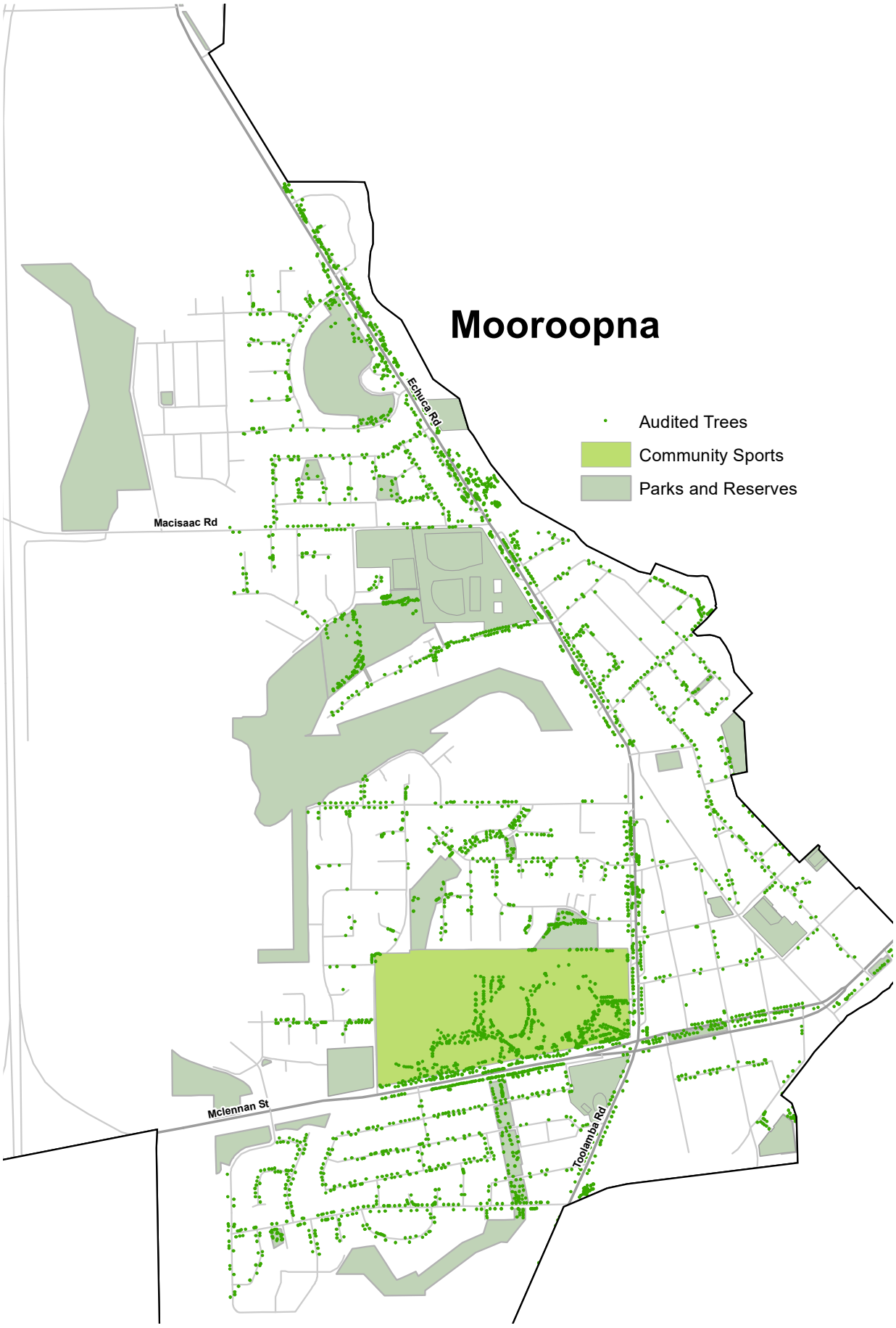


Figure 2: Distribution of audited trees in Mooroopna

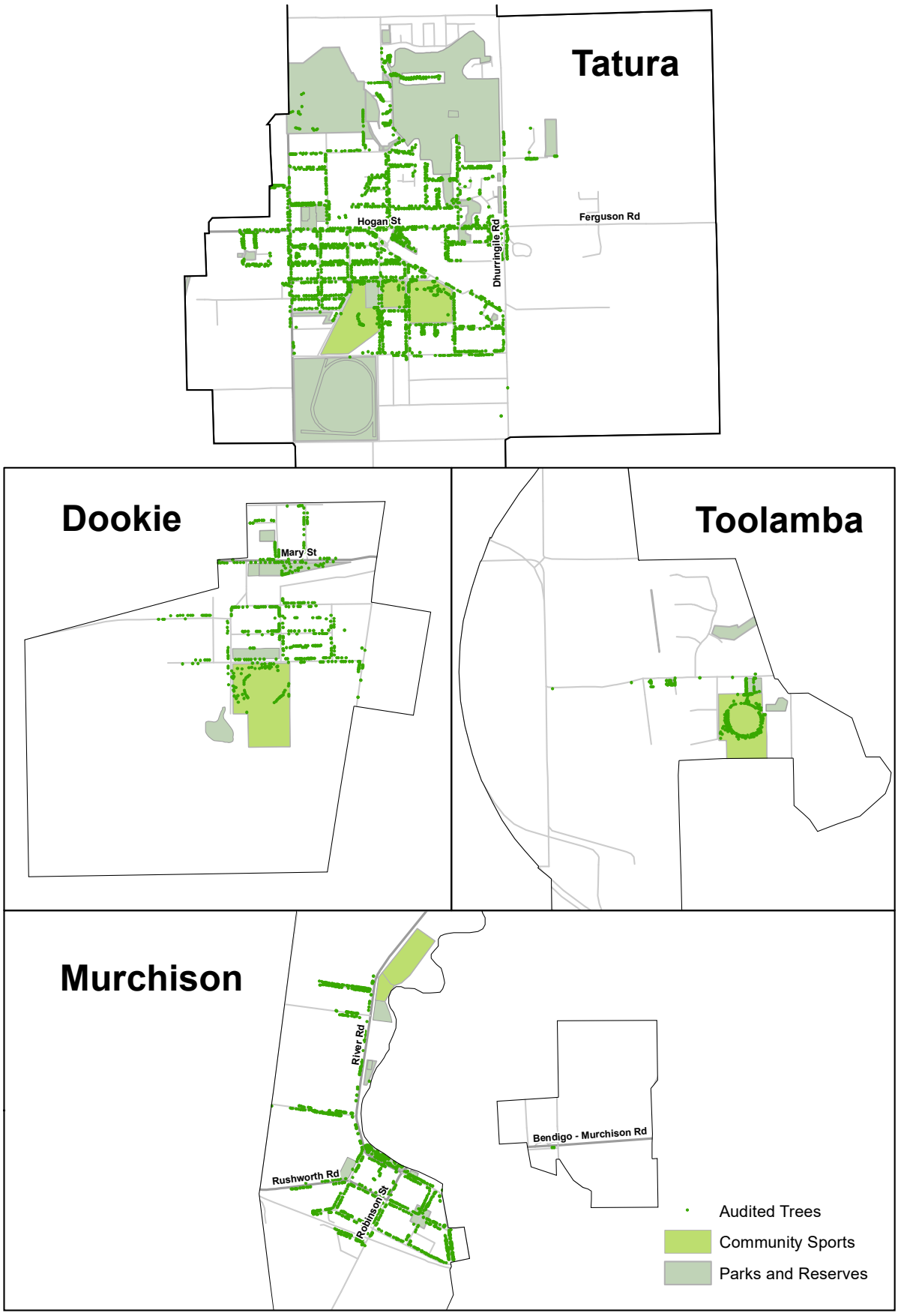


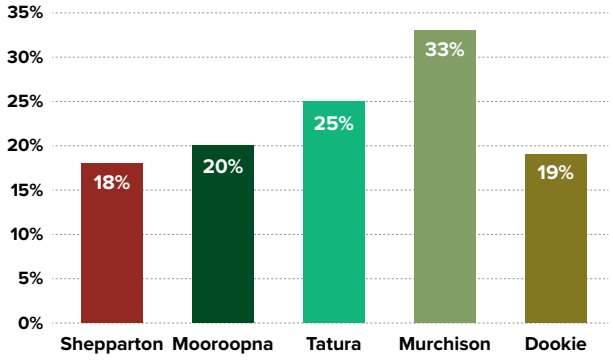
Figure 3: Distribution of audited public trees in Tatura, Dookie, Toolamba and Murchison

Tree Canopy Cover

Tree canopy cover is the amount of urban area covered by the canopies of urban trees. Canopy cover is calculated to provide a better understanding of the true benefits that each urban tree provides e.g. the amount of shade provided or the total amount of carbon dioxide stored and sequestered by the urban forest.

It is a more meaningful measure of the urban forest than numbers of trees as it provides qualitative information about the tree population. One large tree can provide 60-70 times more benefits than a small one so knowing how much tree canopy cover Greater Shepparton has is important for understanding what the current benefits are and more importantly, where more is needed. Canopy cover was calculated for each township within Greater Shepparton using a tool called I-Tree Canopy (www.itreetools.org/). Canopy cover was only calculated for the urban areas of each town. A boundary was placed around the built up areas of each town which did not include surrounding farmland or state or national parks.

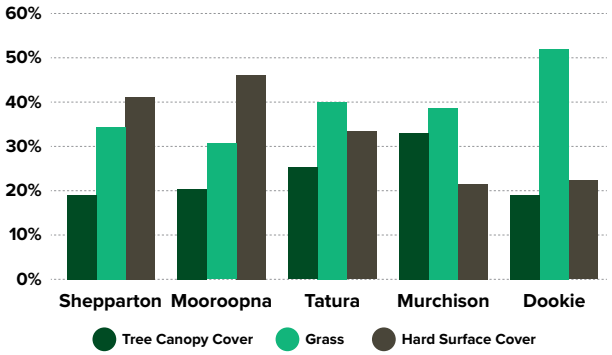
Tree Canopy Cover in Greater Shepparton



Tatura and Murchison have a higher urban tree canopy cover due to the presence of mature large canopied trees and wider streets that have the ability to house large trees.

There is no global benchmark for optimal tree canopy cover. Of more sense and which is used around the world, is benchmarking a figure that represents what the public and private realm can optimally support. A canopy cover over 30% for any Australian town or city is above the Australian average (UTS, 2013) but there are now aspirations to reach ambitious yet achievable canopy cover targets such as 40% (City of Melbourne, 2012).

Surface Cover in Greater Shepparton



The canopy cover analysis also looked at the amount of urban area covered by grass and hard surfaces as well as tree canopy.

Shepparton and Mooroopna have over 40% of their area covered in hard surfaces. This includes roofs, roads, footpaths, driveways, dirt (particularly new developments). Waterways were counted as hard surfaces but they were minimal. Recent research by NASA shows that when hard surfaces make up more than 35% of an area, there are significant environmental and human wellbeing consequences (ref). The most significant of these consequences to the Greater Shepparton region are increased stormwater flows into waterways and the build-up of urban heat, which is called the urban heat island effect.

Whilst Shepparton and Mooroopna each have a higher percentage of impervious surfaces, they house more of the municipality's population and are more developed, so the results are to be expected. These two towns also have lower grass coverage and tree canopy cover. Dookie has the highest grass coverage reflecting larger urban lot sizes and proximity to agricultural land.

Species Diversity

Top 10 Urban Park and Street Tree Species across Greater Shepparton

SCIENTIFIC NAME	COMMON NAME	% OF POPULATION
Callistemon viminalis	Weeping Bottlebrush	7.7%
Pyrus calleryana	Ornamental Pear	6.7%
Eucalyptus camaldulensis	River Red Gum	6.4%
Melaleuca styphelioides	Prickly Paperbark	4.7%
Lophostemon confertus	Queensland Brushbox	3.8%
Corymbia citriodora	Lemon-scented Gum	3.7%
Corymbia maculata	Spotted Gum	3.6%
Melaleuca linariifolia	Narrow leaved Paperbark	3.4%
Platanus X acerifolia	Plane Tree	3.4%
Eucalytpus leucoxylon	Yellow Gum	3.1%

The top ten species constitute 46.3% of the assessed urban tree population. The remaining 63.7% is made up of around 140 other tree species, both native and exotic, deciduous and evergreen.

The most common species found in across the entire urban area network of Greater Shepparton is the Weeping Bottlebrush. Bottlebrush have been planted across Australian cities and towns for decades due to their quick growing nature, profuse show of flowers and small stature. They are however not long lived and their mature canopy cover is inadequate for shade provision.

The second most populous species is the Ornamental Pear. This tree has been planted frequently across cities and towns in Victoria for its hardiness, resistance to extreme heat, as well as its show of flowers in late summer. It is a small to medium sized tree that can be easily planted in many urban locations however, it's mature canopy is small providing minimal shade, particularly on streets.

The River Red Gums are the third most populous urban tree, which is to be expected given the proximity of the urban areas to the Goulburn River and associated river flats, where River Red Gum is the dominant indigenous species. Many of these Red Gums are in fact located in parkland with only 407 of these being street trees. A distribution map is shown in Figure 1. Red Gums have large but sparsely spread canopies and due to their nature are not suitable shade trees for urban streets.

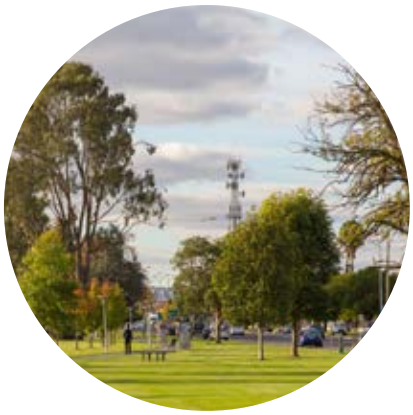
Eight of the top ten species are native with only the River Red Gum endemic to the region. Two out of the top ten are exotic species, the Ornamental Pear and the Plane Tree which are deciduous species. Like the Ornamental Pear, the Plane Tree is a favoured urban tree due to its capacity to grow in harsh urban conditions but it can also provide broad dense canopy for shade and amenity.

All urban tree populations should contain enough species diversity to minimise the risk of mass tree loss in the event of a fatal pest or disease attack. Best practice dictates that no one species should be more the 10% of the population and Greater Shepparton's tree population meets this benchmark both as a municipality and also within each town.

Top 5 Tree Species for each town

Shepparton

Pyrus calleryana	Ornamental Pear	8%
Melaleuca styphelioides	Prickly leaf Paperbark	6%
Callistemon viminalis	Weeping Bottlebrush	6%
Eucalyptus camaldulensis	River Red Gum	5%
Platanus X acerifolia	London Plane Tree	4%



Mooroopna

Eucalyptus camaldulensis	River Red Gum	17%
Corymbia maculata	Spotted Gum	7%
Corymbia citriodora	Lemon Scented Gum	4%
Fraxinus angustifolia subsp.	Desert Ash	4%
Melaleuca styphelioides	Prickly leaf Paperbark	4%

Tatura

Platanus X acerifolia	London Plane Tree	10%
Melaleuca armillaris	Bracelet Honey Myrtle	7%
Ulmus parviflora	Chinese Elm	5%
Callistemon salignus	White bottlebrush	4%
Cinnamomum camphora	Camphor Laurel	4%

Murchison

Melaleuca linariifolia	Narrow leafed Paperbark	9%
Eucalyptus melliodora	Yellow Box	7%
Fraxinus angustifolia subsp	Desert Ash	6%
Acacia decurrens	Early Black Wattle	6%
Prunus Cerasifera 'Nigra'	Purple leafed Cherry Plum	5%

Top 5 Tree Species for each town (continued)

Dookie

Fraxinus angustifolia subsp	Desert Ash	8%
Schinus molle	Peppercorn	7%
Callistemon citrinus	Crimson Bottlebrush	6%
Melaleuca styphelioides	Prickly leaf Paperbark	5%
Melaleuca linariifolia	Flax leaf Paperbark	4%

Kialla

Pyrus Calleryana	Ornamental Pear	9%
Eucalyptus Microcarpa	Grey Box	6%
Lophostemon confertus	Queensland brushbox	5%
Eucalyptus camaldulensis	River Red Gum	5%
Corymbia maculata	Spotted Gum	5%

Toolamba

Platanus X Acerifolia	London Plane Tree	9%
Melaleuca Armillaris	Bracelet Honey Myrtle	7%
Ulmus Parviflora	Chinese Elm	5%
Callistemon Salignus	White Bottlebrush	4%
Cinnamomum Camphora	Camphor Laurel	4%

Mooroopna's most common species is the River Red Gum at 17%. The majority of these however are in parkland that adjoins river reserves and are indigenous to the area. Given the ecological importance of this species to the local area, this figure is not a management concern.

Deciduous exotics are the most common tree species in all towns except Mooroopna and Murchison.

Figure 4: River Red Gums are an important ecological species for the region. Only 407 are located in streets.

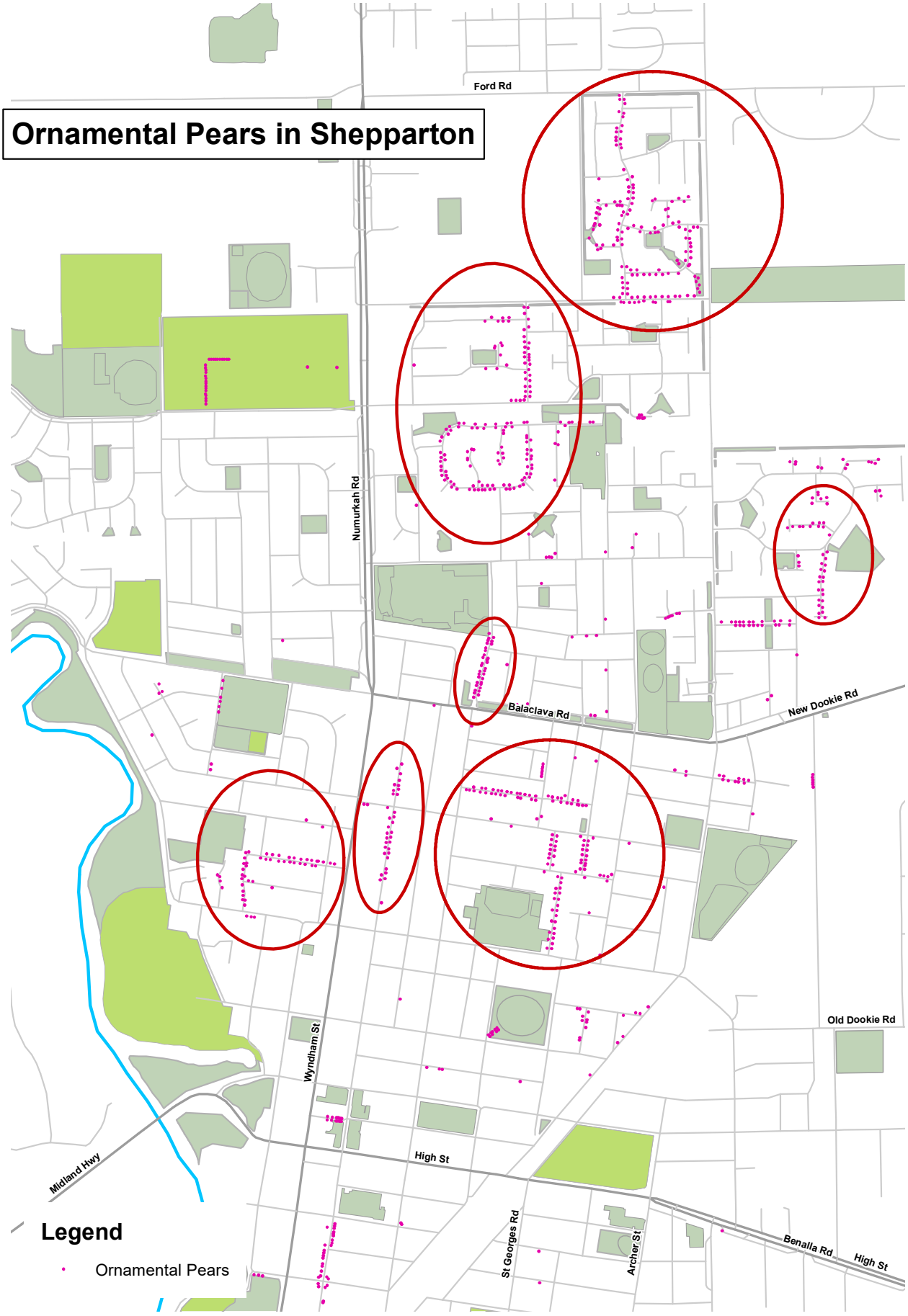
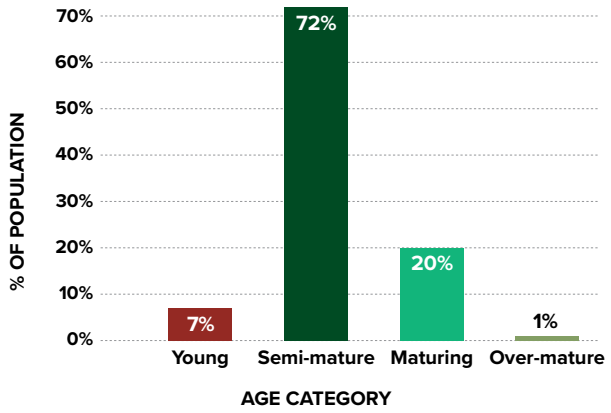


Figure 5: Ornamental Pears are a common street tree used in the region. Ornamental Pears are a commonly planted street tree due to their ability to cope in harsh environments. They are also only a medium sized tree, unlikely to grow too big in residential streets. There are concentrated populations of them in residential estates in Shepparton and there are none planted in parks.

Age distribution of Greater Shepparton's urban tree population



Trees, like people have a finite life span and once they become over mature, they require close monitoring and maintenance before their eventual removal. Urban trees tend to have a smaller life span that those within a natural forest environment due to the adverse conditions in which they grow: smaller root growing space, poor soil conditions including low soil moisture, canopy conflicts with buildings and powerlines, and exposure to more air and water pollution.

Like species diversity, good management practice dictates that there is a good mix of young, semi mature and maturing trees within the tree population. This ensures that tree removal and tree renewal programs are more evenly spaced across the years.

The overly high representation of trees that are semi-mature, that is those that have almost reached their growing potential presents a possible future management concern. When all of those trees progress in decades to come to an over mature state and require removal, the impact on the landscape could be significant.

The best way to overcome this potential loss is to conduct a consistent and progressive tree planting program over the coming two decades to ensure a better spread of age diversity.

Useful Life Expectancy

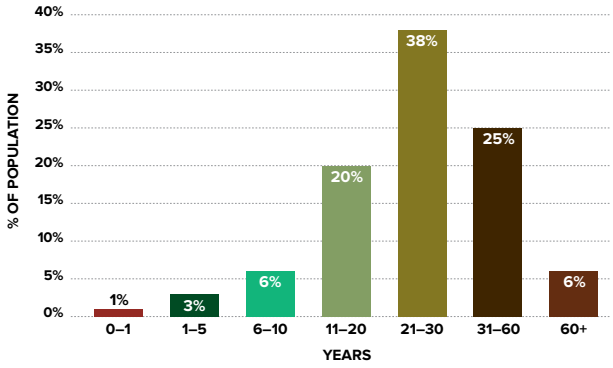


Figure 6: Useful life expectancy of Greater Shepparton's urban tree population

Useful life expectancy (ULE) is a measure of how long a tree will remain in the landscape before it is required to be removed. ULE considers a trees age, its health, structure and appropriateness for its location and allocates a period of time in which it will continue to provide benefits to the landscape. ULE values can change over time depending on climatic conditions, in particular drought, which can reduce a trees useful life.

Like age and species, a healthy tree population should have a good spread of trees with different ULE's to ensure that there is no significant loss of the tree population in a condensed period of time.

Ideally, an urban tree population would look to be renewing 10% of its population every decade and the results of the Greater Shepparton tree audit show that this will be the case for the next two decades. However, the decade between 2037 and 2047 could see a 38% loss of its tree population which is significant and will require additional planning and resources to manage.

A consistent and equitable tree planting program over the next ten to twenty years will ensure a greater number of trees are within the 60+ ULE bracket.

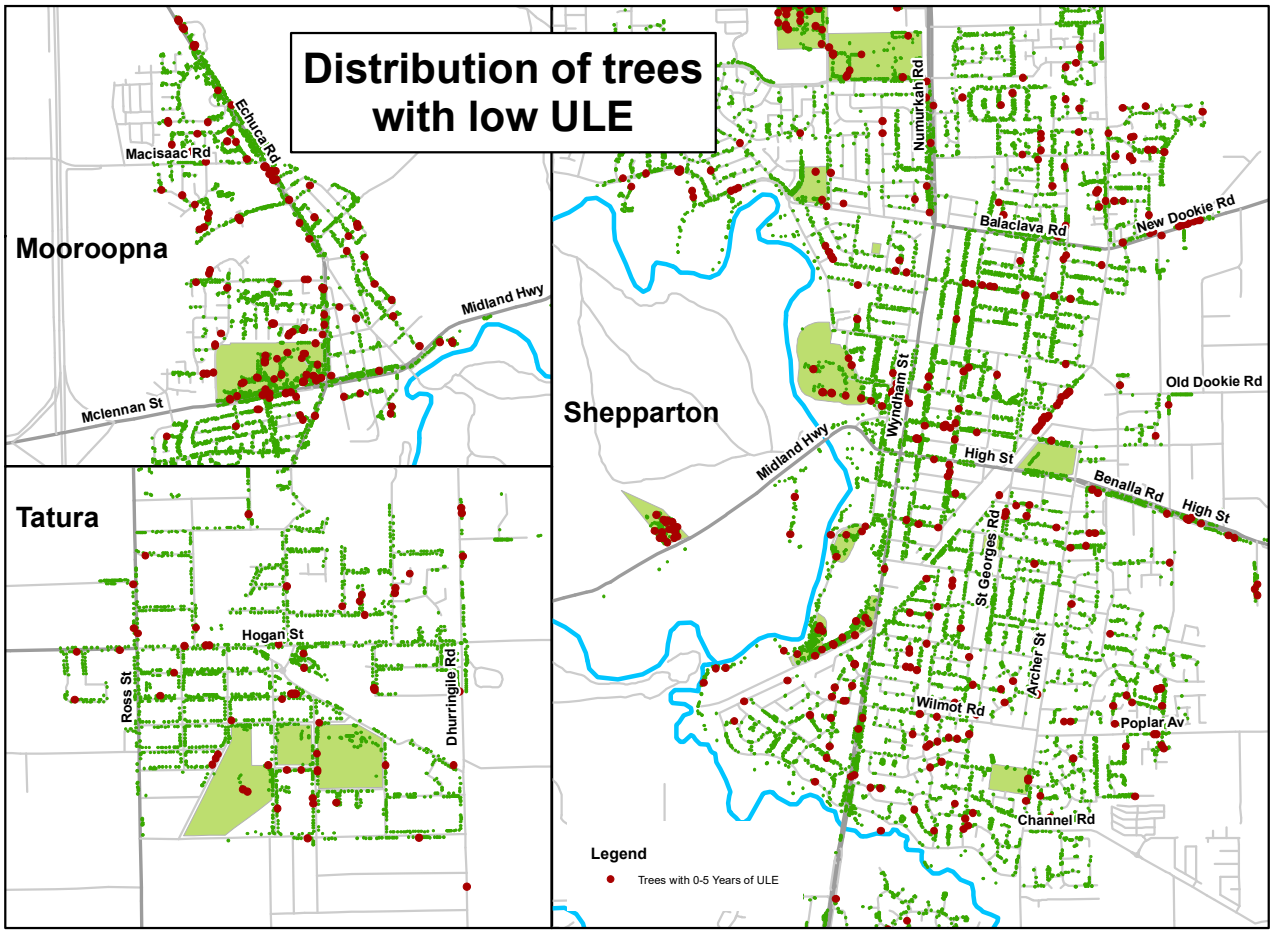


Figure 7: The distribution of trees with a ULE less than 5 years across Shepparton, Mooroopna and Tatura

Tree Heights

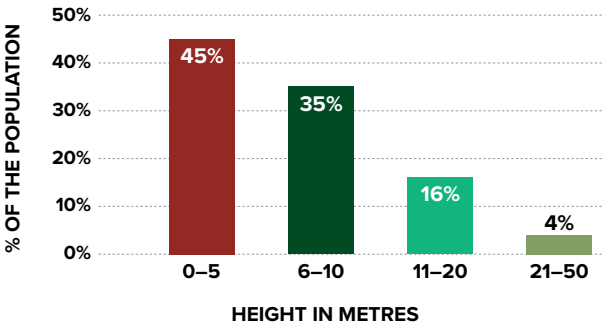


Figure 8: Tree heights of the Greater Shepparton urban tree population

A tree below 5m in height is considered a small tree, between 10 and 20m is a medium tree and over 20 metres in height is a large tree. This doesn't consider tree canopy spread which can differ from species to species.

Interestingly, 80% of Greater Shepparton's urban tree population would be considered small and small to medium. Only 4% of tree population are large trees and 16% are medium. Given that large trees provide much greater environmental and health and wellbeing benefits, there is a clear opportunity to seek out appropriate locations to plant larger trees for the future.

Figure 9: This street has a range of different sized trees. With no powerlines and medium sized nature strip, larger trees could be housed along this street, providing greater amenity and shade

CURRENT TREE MANAGEMENT

Greater Shepparton City Council currently uses the Greater Shepparton Tree Technical Manual for urban tree management which was last revised in October 2009. This Manual is supported by a Tree Management Policy which was adopted on 18 May 2010 and a Street Tree Strategy, which was reviewed in 2012.

The objectives of the tree policy are to ensure:

- appropriate siting and species selections for all new trees
- appropriate protection, maintenance and management of trees
- co-ordination of council policy and strategy documents
- sufficient resources be allocated to allow for best practice tree management
- promotion of trees for urban landscape enhancement and for their contribution to mitigation against greenhouse gas emission and;
- effective risk management.

Policy Positions

The following are the existing policy positions for each component of urban tree management:

1. **Tree Planting:**

   All new tree plantings shall be in accordance with the **Greater Shepparton *Approved Tree List*** and ***Greater Shepparton Tree Precinct List***.

2. **Tree Pruning:**

   Council shall be responsible for undertaking tree pruning of all trees as required that are owned and maintained by the city.

3. **Tree removals**

   Trees shall be assessed for removal by appropriately trained Council staff or an independent arborist on a 'case by case' basis

4. **Tree Planting and Maintenance in New Subdivision Developments**

   Council will take contributions towards tree planting and establishment period for all tree plantings associated with landscape plans approved for all new developments through the planning permit process where the developer is required to plant trees or as otherwise agreed in writing.

5. **Significant Tree Management**

   Significant trees within Greater Shepparton shall be identified, appropriately managed and protected.

6. **Tree Protection**

   In order to protect the Council's tree assets, a zero tolerance approach will be assumed for any acts of willful damage to trees and unauthorised removals. This will include the issuing of infringements as applicable under the Councils' Local Laws.

7. **Tree Inspection**

   Council shall continue to develop and implement a Tree Inspection Program in accordance with the ***Greater Shepparton Tree Management Manual*** guidelines.

8. **Resource allocation**

   It is acknowledged that scarce resources restrict the capacity of the Council to inspect and maintain all trees to the same level at all times. It is the Council's intention however to ensure that an appropriate and duly diligent proportion of each annual tree management budget be allocated to high risk tree inspection and maintenance issues.

The relevant Australian Standards and policies that Council currently adheres to are:

- AS 2303-2015 Tree stock for landscape use
- AS 4373 – 2007 Pruning of amenity trees
- AS 4970-2009 Protection of trees on development sites
- AS 2870 – 2011 Residential slabs and footings
- AS 4454-2012 Composts, soil conditioners and mulches
- VicRoads Tree Planting Policy February 2015
- The Electricity Safety (Electric Line Clearance) Regulations.

The Street Tree Strategy contains a list of precincts with preferred species for planting. This list is still currently adhered to.

Council also maintains a Tree Management Group which oversees and coordinates a whole of Council approach to tree management. This group provides advice and direction on Council tree management policy, strategy and technical operations. The Tree Management Group also provides the internal sign-off for all developer and internal landscape plans.

Tree planting and maintenance

Current maintenance and risk assessments of urban trees are managed by the Arboriculture Group. Current works include species selection, tree planting, routine maintenance, formative pruning, powerline clearance, removal and renewal. An independent review has been conducted on the current management guidelines and recommendations have been made for bringing the programs into line with best practice. These recommendations will be incorporated into an updated set of guidelines as set in the action list.

Council currently removes around 500 street or park trees per year and plants around 700. Whilst more trees are being planted than removed each year, there is likely to be significant canopy loss as larger trees are being replaced with new, smaller trees. Trees can take as long as 50 years to reach their optimal size. As of 2016, budgets were tripled to allow for more trees to be planted each year.

Figure 10: Around 700 new trees are planted each year by Council

Vacant Tree Sites

There are approximately 6,000 vacant tree sites across Shepparton, Mooroopna, Tatura, Murchison and Dookie. These are the sites that could accommodate a new street tree and where existing infrastructure allows the space.

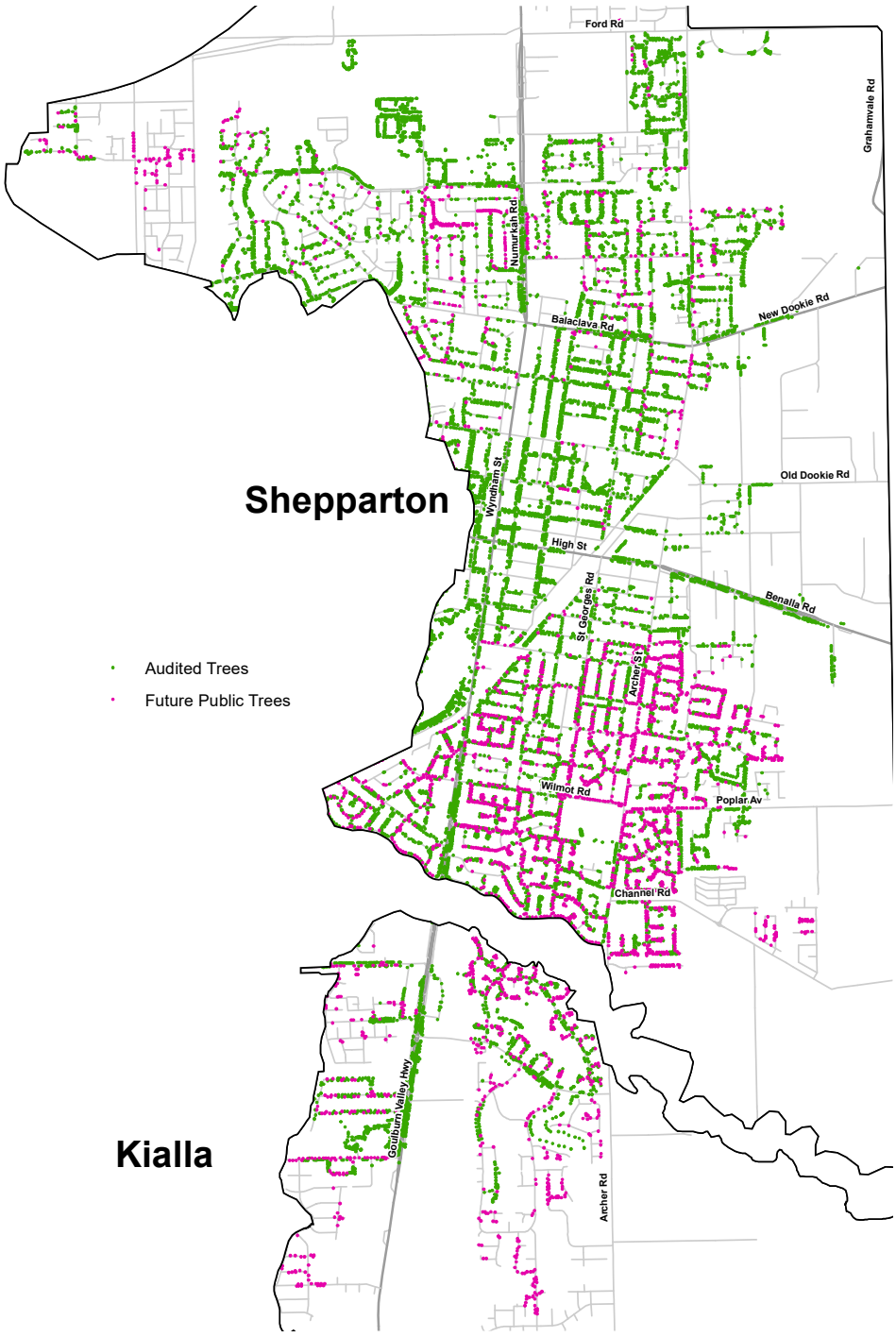


Figure 11: Vacant street tree sites across Shepparton and Kialla

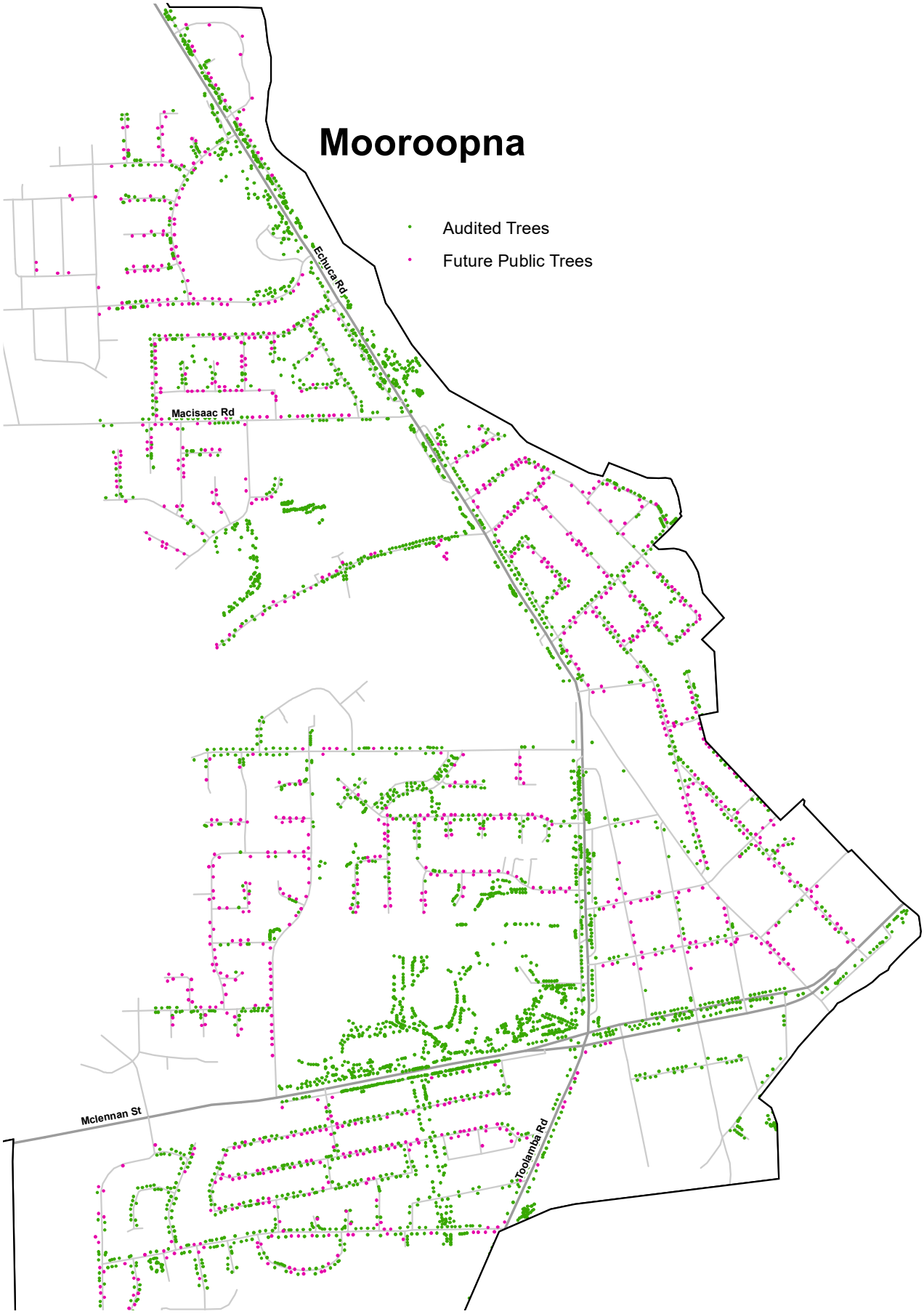


Figure 12: Vacant street tree sites across Mooroopna

Issues and Conflicts

There is no perfect tree. All trees will shed their leaves, some their bark and will do it either quickly in autumn or over a year long period e.g. Eucalypts. Trees, like all living organisms are opportunistic. Their roots will seek out nutrients and moisture to keep themselves alive, where possible. As a result, conflicts with hard infrastructure can occur. In order to minimise this damage and allow for trees and hard infrastructure to coexist in the urban environment, particular care and planning is required. Damage can be minimised by making sure that:

1. The right tree is planted in the right location in the right way (this includes the right species)
2. The tree is well maintained and healthy i.e. has easy access to nutrients and moisture
3. Surrounding infrastructure can be easily maintained without compromising the tree

If adequate growing conditions for trees are allocated in initial streetscape planning stages, then future conflicts with infrastructure can be minimised. These growing conditions include both underground and aboveground spaces. Trees need adequate soil volume inclusive of nutrients. They also need canopy space to allow their branches to spread. Overhead powerlines and building setbacks that are within this future growing space will require trees to be pruned. Whilst this isn't necessarily destructive of the tree, regular pruning reduces the amount of healthy canopy that provides shade and other benefits.

OPPORTUNITIES FOR THE REGIONAL URBAN FOREST

Planting in areas of most need

Whilst there are 6,000 vacant sites across the Greater Shepparton region, it is possible to prioritise these sites based on areas of greatest need. Areas of need include those where canopy cover is low, where vacant site concentrations are high but also where socially vulnerable populations of people live. These are people who are more adversely affected by extreme weather events, particularly heatwaves. By providing natural shade and areas of cool respite, the urban forest can help to reduce the impacts of these weather events on such populations.

Research conducted by Monash and Melbourne Universities has identified those members of the population who would benefit most from increased urban tree canopy cover to provide shade and cooling. Very young children, older people who live on their own and those who live in areas of highest socio-economic disadvantage are most at risk during heatwaves (VCCCAR, 2013). As a result, data from the 2011 Census has been used to identify areas within Greater Shepparton where there are concentrations of these vulnerable community groups. These are the areas where street tree planting should be made a priority.

The maps on the following pages detail the following:

- Highest concentrations of young children (blue)
- Highest concentrations of older people living alone (orange)
- Highest concentrations of socio-economic disadvantage (yellow)
- Playgrounds, childcare and family centres (i.e. facilities that young children would frequent) (black).

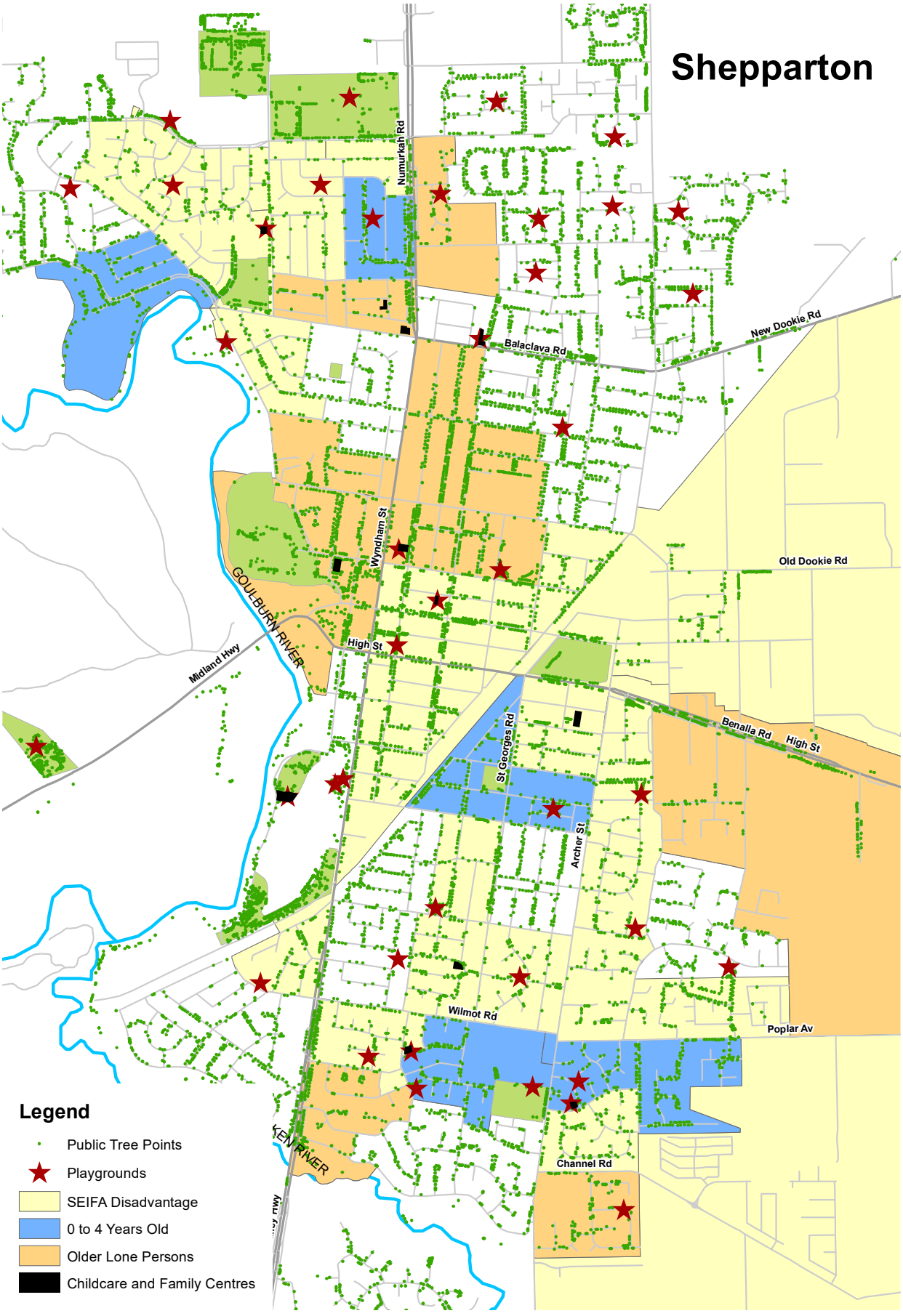


Figure 13: Areas of social vulnerability in Shepparton

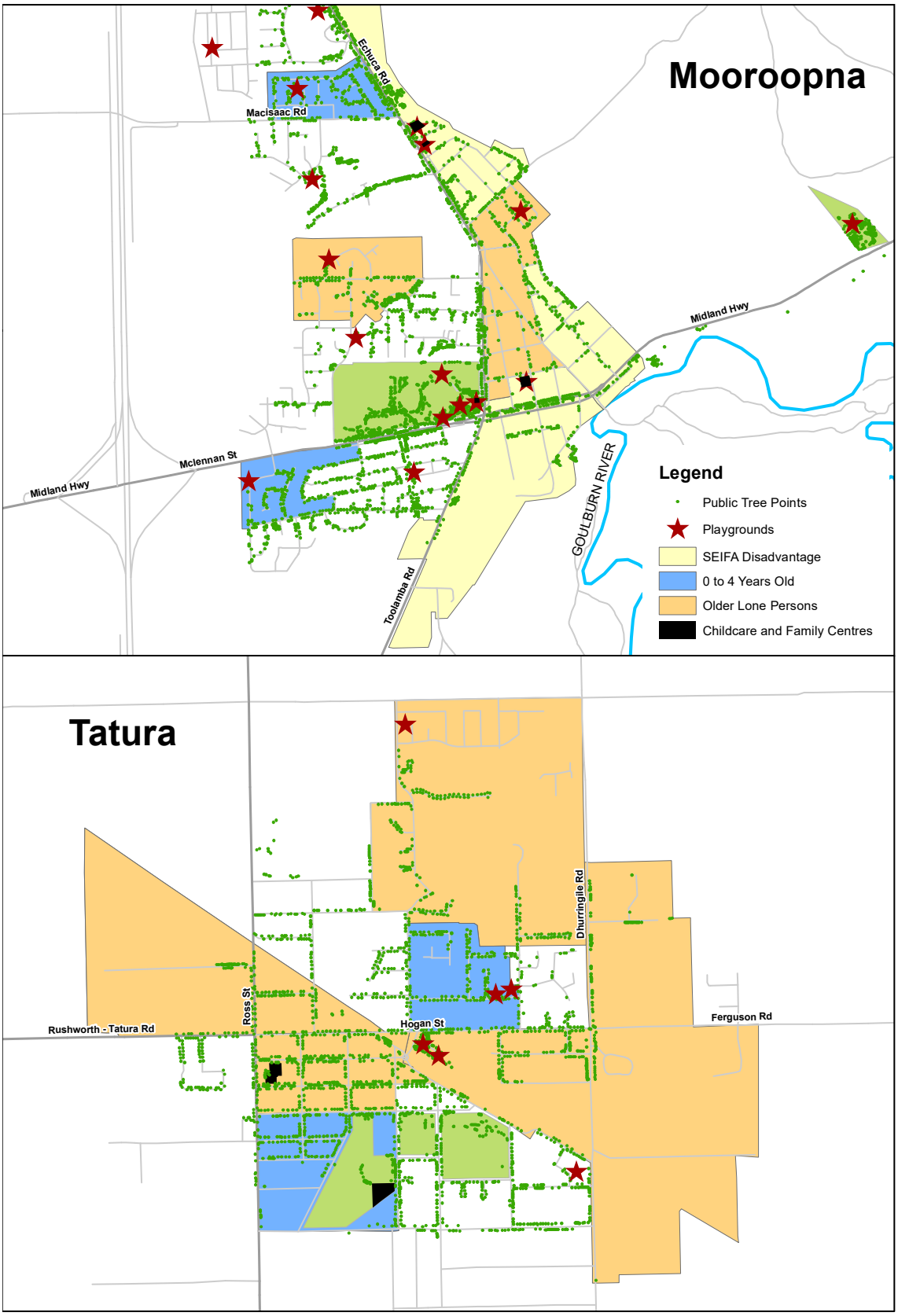


Figure 14: Areas of social vulnerability in Mooroopna and Tatura

A 10 year street tree planting program has the capacity then to focus on areas of social vulnerability that also have a significant number of vacant tree sites. South Shepparton is one such area that would benefit from a prioritised tree planting program.

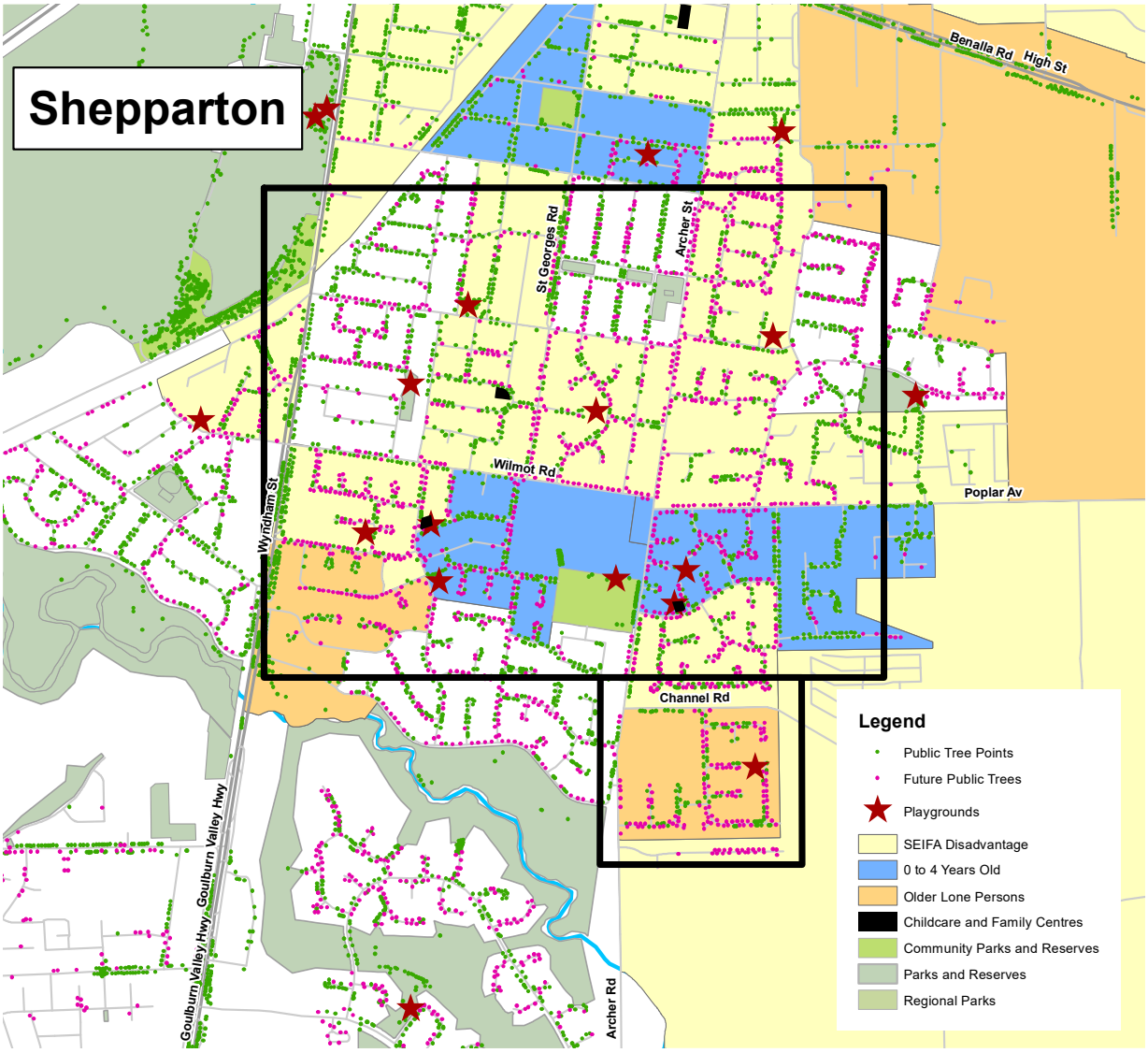


Figure 15: Areas of potential tree planting in South Shepparton where social vulnerability and vacant tree sites intersect

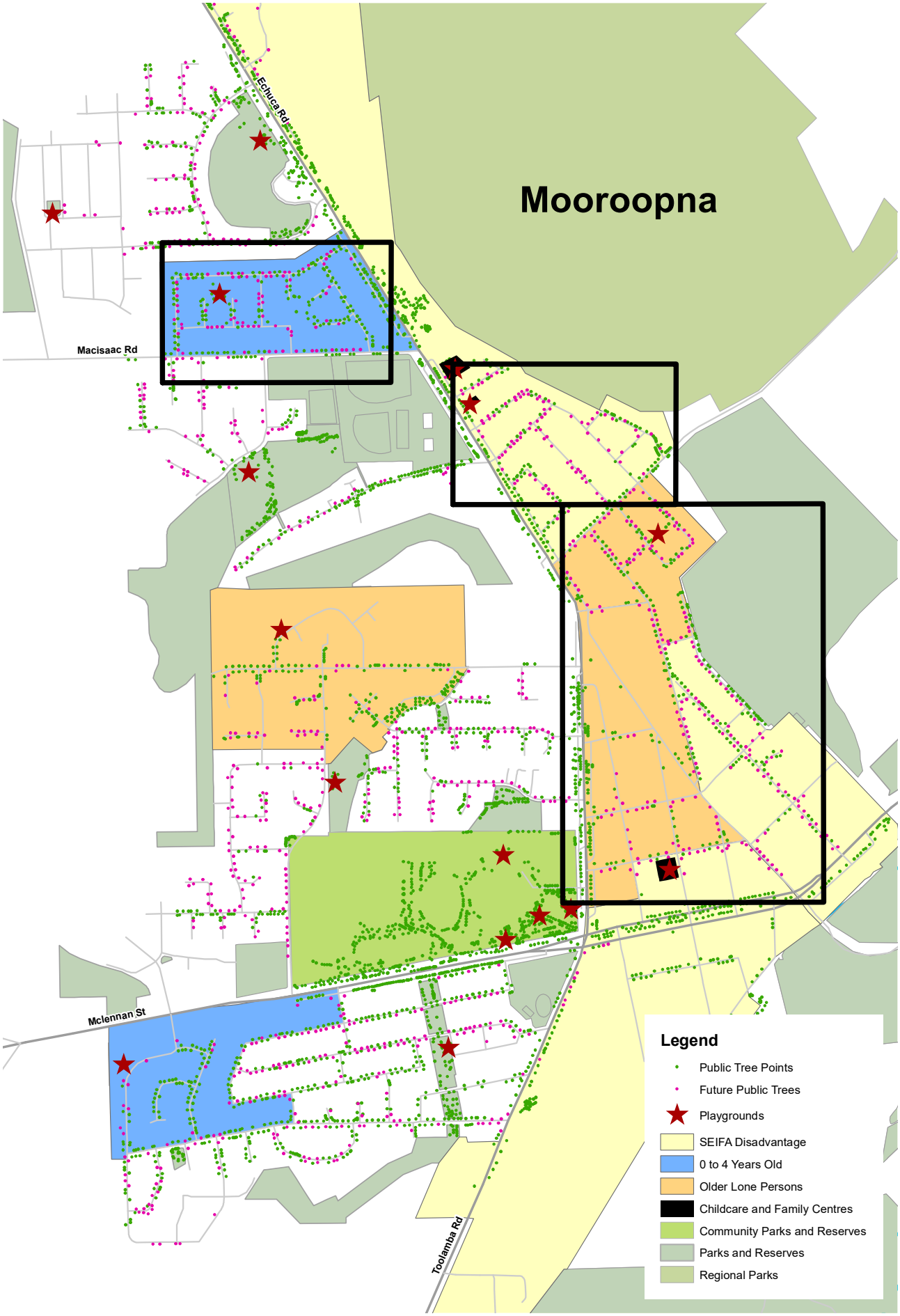


Figure 16: Areas of potential prioritised tree planting in Mooroopna where social vulnerability and vacant tree sites intersect

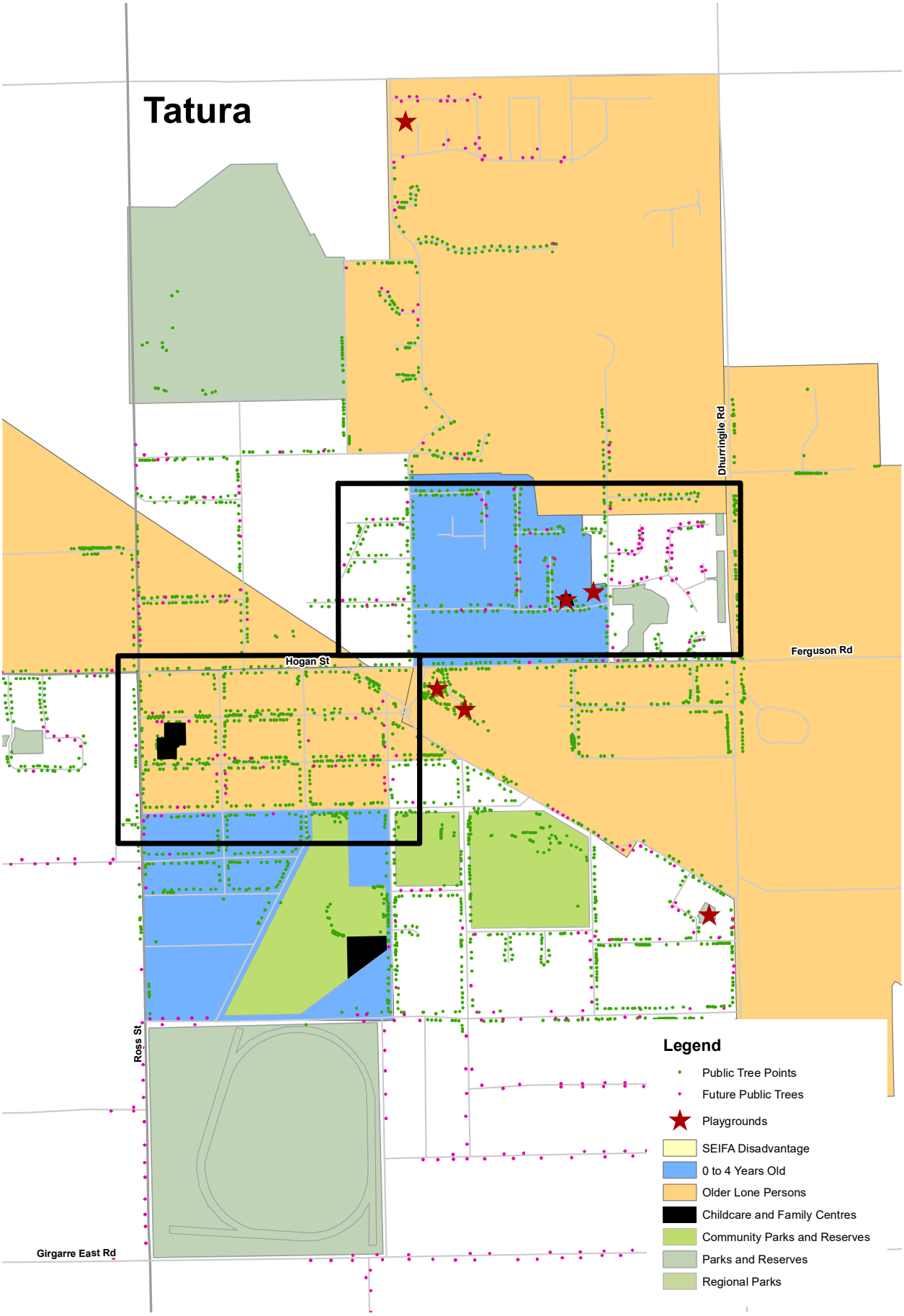


Figure 17: Areas of potential prioritised tree planting in Tatura where social vulnerability and vacant tree sites intersect

Other Opportunities

1. Central Business District

Council has endorsed a CBD Activation Strategy which provides the vision for the 2014 CBD Revitalisation Project. Trees could be a key component of this planning and revitalisation for their ability to provide much needed shade, improve streetscape amenity and integrate with surrounding natural landscapes. Shepparton's CBD could be more liveable, more inviting for visitors and reflective of a prospering and innovative city.

2. Themes of Diversity

Diversity is a unique brand for Greater Shepparton. The indigenous community is a core component of the region's diversity as are all of the refugees and migrants that call the region home. This diversity could be reflected into the design of urban streetscapes through a consideration of a diversity of species.

3. Council program integration

There are a range of existing Council technical guidelines and designs for streetscapes including the Infrastructure Design Manual that could incorporate best practice growing conditions for urban trees e.g. permeable surface treatments, water sensitive urban design, structural cells, swales and high performance soils.

4. Engaging with Developers

Council works with many developers already, but there is scope for improving the quality and quantity of tree planting on private developments.

5. Linking urban streets with the Rivers

The City has the opportunity to use its streetscape network to better connect with the Goulburn and Broken Rivers. Street tree planting along streets that connect areas of ecological value can enhance the regions biodiversity and encourage people to explore into areas of natural value.

6. Cycling and Walking Paths

The urban forest could be a key delivery mechanism for Council's Movement and Place Strategy. By providing natural shade along the pathways, the urban forest can encourage people to walk and cycle. Priority pathways for shade could be identified and included in a 10 year tree planting program.

7. Learn from new and existing projects

New and existing projects such as the Eastbank Lake Precinct and the RiverConnect projects have a large amount of skill and knowledge applied in their design and implementation phases. Bringing this knowledge together to inform future Council urban forest projects will result in smarter design and better streetscapes.

WHAT WILL COUNCIL DO

Clear targets that can be evaluated on a temporal basis have been set to measure both

a) The growth and quality of the urban forest

b) The successful implementation of the Strategy

Targets

By 2037, The City of Greater Shepparton will:

- **Increase urban forest canopy cover** in each town to 40%
- **Reduce the number of vacant street** tree sites to zero
- **Improve urban forest diversity** by age and useful life expectancy
- **Increase the number of biodiversity links** through each towns street and road network
- **Include urban trees in all major Council infrastructure projects** at planning, design and implementation phase
- **Deliver best practice urban tree management** across all Council programs

Actions for ongoing Urban Forest Management

These actions will be undertaken primarily by the Parks, Sport and Recreation department but will also rely on support from other internal departments, other government agencies, community groups and the general

Actions

	Action	Timeframe	Responsibility
1. Planning			
1.1	Identify all potential streets as habitat corridors to link areas of ecological value	Year 1	Parks, Sport & Recreation. Sustainability & Environment
1.2	Identify all pedestrian and cycle paths as part of the Movement and Place Strategy that should be prioritised for tree planting in conjunction with the planning team	Year 1	Parks, Sport & Recreation. Planning & Building
1.3	Develop an equitable 10 year street and park tree planting program targeting areas of need	Year 2	Parks, Sport & Recreation.
1.4	As part of the CBD Activation Strategy and Revitalisation Project develop a CBD specific tree planting and renewal program	Year 2	Parks, Sport & Recreation.
1.5	Develop tree design guidelines for the CBD including structural soils and cells, water sensitive urban design and soil health	Year 2	Projects
1.6	Develop a planned and proactive tree renewal program based on audit data	Year 1	Parks, Sport & Recreation.
1.7	Review and update existing Precinct Plans and preferred species list as part of 10 year street tree planting	Year 1	Parks, Sport & Recreation.
1.8	Update Council's tree management guidelines to reflect best practice and latest research including design guidelines for passive irrigation of trees from stormwater	Year 1	Parks, Sport & Recreation. Projects
1.9	Continue to integrate water sensitive urban design with design of all tree plots	Ongoing	Parks, Sport & Recreation. Projects
1.10	Tree protection on private property: local laws	Year 3	Parks, Sport & Recreation in conjunction with Local Laws
1.11	Attribute a dollar value to Council owned urban trees, include in asset management system	Year 2	Parks, Sport & Recreation. Strategic assets and Finance
1.12	Align with the future Greening Shepparton Strategy, and future iterations of Council Plan	Ongoing	Parks, Sport & Recreation.
1.13	Investigate greater private tree protection measures. Review local laws regarding private trees to ascertain best possible protection.	Year 3	Parks, Sport & Recreation.
1.14	Investigate the use of dollar bonds to protect trees during construction works.	Year 2	Parks, Sport & Recreation. Planning & Building

	Action	Timeframe	Responsibility
2. Operational			
2.1	Work with all relevant internal Council teams to collaborate and provide input into all streetscape operational programs	Ongoing	Parks, Sport & Recreation.
2.2	Update the Infrastructure Design Manual to include appropriate typologies for tree growth.		Projects & Parks, Sport & Recreation.
2.3	Support innovation in streetscape materials selection and design to accommodate larger trees in the landscape	Ongoing	Parks, Sport & Recreation. Projects
2.4	Increase the size of tree species used in streets to achieve greater service benefits, such as shading. Aim for an increase in 10-12 m tall tree species (medium size).	Ongoing	Parks, Sport & Recreation.
2.5	Reduce Callistemon spp. numbers and manage the ongoing planting of Pyrus carefully	Ongoing	Parks, Sport & Recreation.
2.6	Continue to prioritise the maintenance and protection of the existing tree population in order to maximise the benefits already received from this asset.	Ongoing	Parks, Sport & Recreation.
2.7	Provide training and workshops to build internal capacity for innovation around best practice streetscape design e.g. tree pits, structural cells, wsud, median street tree planting etc	Ongoing	Parks, Sport & Recreation.
2.8	Continue to maintain a dynamic inventory of the tree asset that will provide up-to date tree status information. Update the inventory every five years.	Ongoing	Parks, Sport & Recreation.

	Action	Timeframe	Responsibility
3. Community and Collaboration			
3.1	Engage with and educate the community on the benefits of trees, their management requirements and Council's role in managing them. Council will continue to raise awareness of the value and need to protect, enhance, expand and restore the urban forest.	Year 1 – Ongoing	Parks, Sport & Recreation. Sustainability and Environment?
3.2	Develop a series of annual events to encourage the community to consider their perceptions of the urban forest e.g. design and story competitions, "ask the arborist sessions", workshops on planting trees, species selection for a natural environment	Ongoing	Parks, Sport & Recreation. Marketing & Communications
3.3	Engage with schools to discuss the role that children can play in the planning, design and management of the urban forest	Ongoing	Parks, Sport & Recreation. Sustainability and Environment?
3.4	Update the urban forest webpage on Council's website	Ongoing	Parks, Sport & Recreation in conjunction with Marketing and Communications
3.5	Run engagement sessions in each town to discuss their desired neighbourhood characters and how the 10 year tree planting plan will influence them	Year 1-3	Parks, Sport & Recreation. In conjunction with Neighbourhoods
3.6	Continue running National Tree Planting days	Ongoing	Sustainability & Environment
3.7	Work together with RiverConnect to improve biodiversity links from the river to suburban streets	Year 1-3	Sustainability & Environment
3.8	Work alongside Powercor and Goulburn Valley Water to ensure their programs of works support urban forest outcomes	Ongoing	Parks, Sport & Recreation.
3.9	Continue to work closely with Powercor around powerline clearance requirements.	Ongoing	Parks, Sport & Recreation.
3.10	Work together with VicRoads to plant boulevards and gateway entries in each town of Greater Shepparton	Ongoing	Parks, Sport & Recreation.
3.11	Work together with DELWP's Good Neighbour program to encourage community members to take care of and advocate for the urban forest	Ongoing	Parks, Sport & Recreation.
3.13	Encourage the community to plant more trees on their own private land	Ongoing	Sustainability & Environment
3.14	Work together with the One Child One Tree program to help plant trees in areas of need	Year 1-3	Sustainability & Environment

	Action	Timeframe	Responsibility
4. Developers			
4.1	Preferred tree species lists to be given to all Developers at planning stage	Ongoing	Projects
4.2	During planning approval for all new developments, plans for all pieces of infrastructure e.g. footpaths, roads, underground services and trees are to be considered together to ensure there conflicts are minimised.	Ongoing	Parks, Sport & Recreation. Projects
4.3	Implement an updates Street Works Code of Practice that includes tree planting requirements in best practice streetscape typologies.	Year 1	Parks, Sport & Recreation. Projects
4.4	Site handovers to Council are to be audited and if tree quality and quantity does not match plans, developer must replant or pay a fee for Council to complete the work.	Ongoing	Parks, Sport & Recreation. Projects

Potential Partners

There are a range of other land holders in the region who can and do influence outcomes for the urban forest and associated natural assets. Council will continue to work alongside these agencies and groups to advocate for better urban forest outcomes.

Goulburn Broken Catchment Management Authority

The GBCMA runs the RiverConnect program which is an initiative of the Shepparton-Mooroopna communities to acknowledge the Goulburn and Broken River as the heart and soul of the community. It covers the areas of the each river that are adjacent to the Shepparton and Mooroopna urban zones. Programs include installing interpretive signage, tree planting, rubbish clearing, the development of the Australian Botanic Gardens Shepparton as well as community activities such as walks and canoe trips. The project has collaborated with a huge array of partners including Parks Victoria, Landcare, Yorta Yorta Nation Aboriginal Corporation and Rumbalara Aboriginal Corporation.

The Urban Forest Strategy aligns with the objectives as set out in the RiverConnect Strategic Plan and the RiverConnect Paths Master Plan by encouraging the planting of biodiversity corridors through streets that could potentially act as pathways for biodiversity. More information on RiverConnect can be found at: http://www.riverconnect.com.au/

VicRoads

VicRoads own and manage some of the larger and busier carriageways and arterials throughout the region. They are also responsible for some tree management along these roadways. Their revised Tree Planting Policy 2015 ”supports greener healthier environments and facilitates a safe and efficient road network, by enabling tree planting in the road reserve under certain conditions” (VicRoads, 2015). Council and VicRoads are now working together to plan for boulevards and gateway plantings into each township.

Powercor

Powercor is responsible for the design, installation and maintenance of the electricity supply network across the region. This includes ensuring that tree canopies are at a safe distance from electricity lines by pruning and removing trees. Many of these trees are Council assets and agreements have been formed to allow Council to prune their own trees within the ELC guidelines. Powercor recognises the importance of trees for the region and works around them where possible, however it will be important for Council to maintain a good relationship with Powercor to ensure good outcomes for both trees and electrical wires.

The Committee for Greater Shepparton

The Committee for Greater Shepparton support strategies and actions that ensure the municipality remains vital, inclusive, progressive and sustainable in the long-term. The Committee supports the role that the urban forest plays in building a liveable city and in establishing a unique character for the region, particularly in the commercial and business districts. Council will work together with the Committee to manage and renew the urban forest within the CBD.

Community Groups

Greater Shepparton is home to many groups of informed and active community members, whose contribution to the region is enormously valuable. Some play a vital role in helping Council to plant trees, care for the natural landscapes and advocate for better environmental outcomes. From Friends Of groups, to Scouts and church groups, these community groups are a critical support network for Council in advocating and caring for the urban forest. Council will engage with various groups during the implementation phase of the Strategy, particularly during the preparation of a 10 year street tree planting plan.

The Community

The general community of Greater Shepparton is diverse. Some have in-depth knowledge of the urban forest, others have never heard the term. Council will need to engage with a broad cross section of the community to raise awareness levels on the importance of the urban forest and to encourage the general public to get involved in planting days and to develop a sense of pride for the regions urban forest. The community will be invited to participate in the development of the 10 year planting plan.

Other Major Landholders

There are other major landholders in urban Greater Shepparton who can influence the quality of the urban forest and Council should establish some clear platforms for each to strive towards in terms of improving the urban forest. Examples of these landholders include large supermarkets, developers, industrial companies and Vic Trak land. Developers in particular have a large role to play in the development of future landscapes, including the future urban forest. Council can help guide developers to ensure appropriate space and growing conditions are provided for trees in new developments.

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