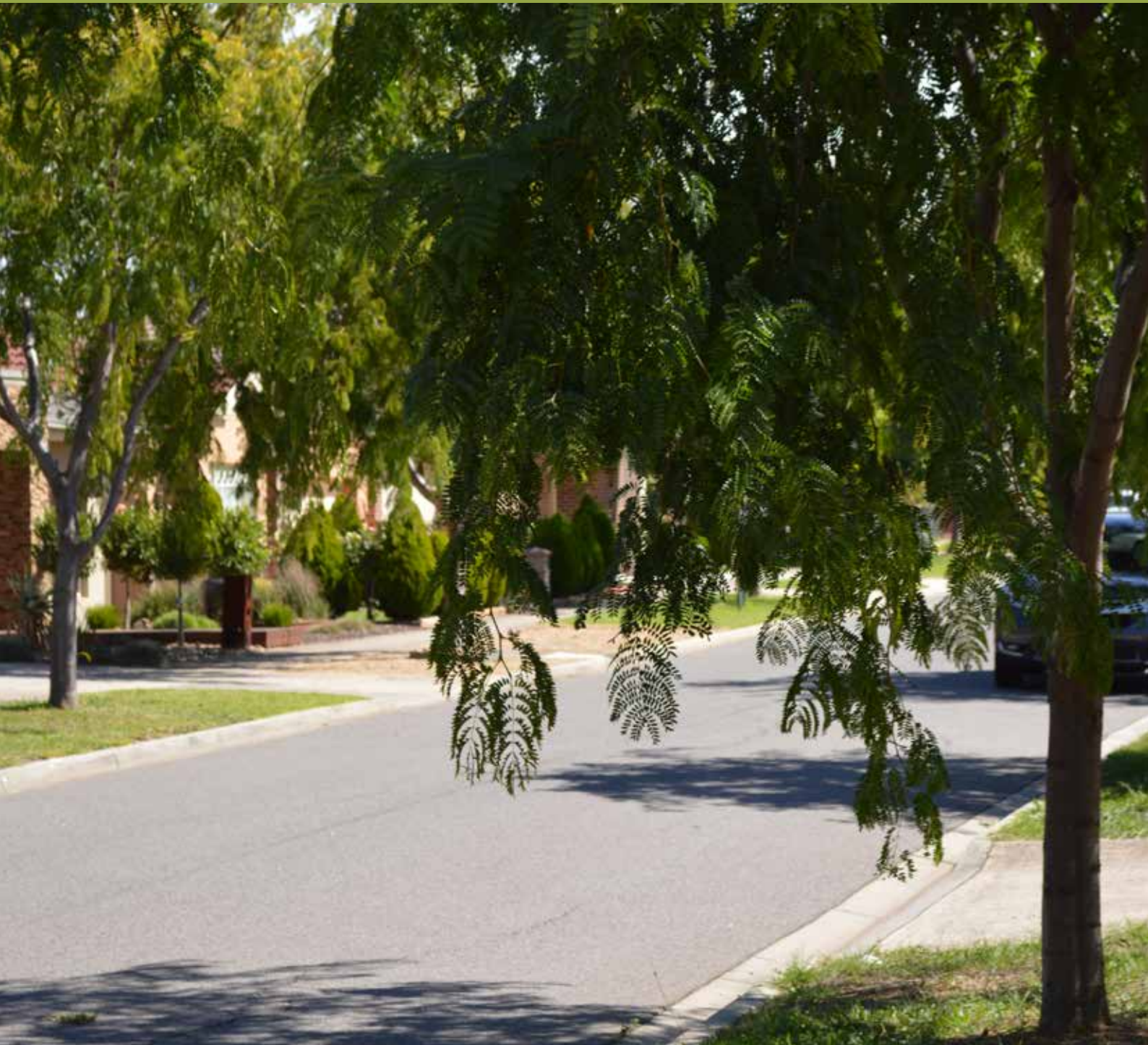


Greening Our Streets **Street Tree Management Plan** 2019 - 2029



“The right tree, in the right place,
the right way and at the right time”



**City of
Whittlesea**

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Welcome to Wurundjeri Land

Wominjeka Wurundjeri Bik

The City of Whittlesea recognises the rich Aboriginal heritage of this country and acknowledges the Wurundjeri Willum Clan as the traditional owners of this place.

Executive summary

Our vision for the municipality is that healthy, well managed street trees will be a defining feature of the City's attractive streetscapes and liveable neighbourhoods.

The social, environmental and economic benefits of street trees make them an inherently valuable asset requiring far less investment than other elements of civic infrastructure.

As outlined in the Whittlesea 2040 and Environmental Sustainability Strategy, street trees are an important community asset playing a vital role in the City's functionality and sustainability.

The City's street trees line the streets across each suburb, quietly improving the City's liveability.

They provide a vast wealth of benefits to the community including much-needed shade in urban areas and habitat for native wildlife. They contribute significantly to neighbourhood character and positively impact streetscape amenity. They are one of the most efficient and cost-effective tools for reducing air pollution and stormwater flows, mitigating the urban heat island effect and adapting the City to climate change.

Street trees also play a critical role in place-making, creating a unique sense of place down each street, boulevard and main road, as well as enhancing the unique brand of liveability for the municipality.

The majority of the municipality's existing street trees are healthy, relatively young and include a diverse array of species. They make the City of Whittlesea a better place to live, work and visit.

Street trees require considerable care, planning and maintenance to ensure that they provide the maximum benefits to the community. To help guide an ongoing commitment to street trees Council has developed Greening Our Streets, the City of Whittlesea's Street Tree Management Plan.

Our guiding principles

-  1 Enhance the community's sense of place through the provision of attractive tree-lined streets.
-  2 Ensure safe and functional streetscapes through the implementation of best practice street tree management.
-  3 Ensure social equity through the equitable delivery of the street tree planting programs across all suburbs.
-  4 Retain street trees through appropriate management.
-  5 Engage the community and raise awareness of the importance of street trees in influencing positive public health and wellbeing outcomes.
-  6 Improve the liveability of suburbs by working together across Council, with the community and developers to ensure street trees are adaptable to future changes in climate and maximise the benefits of street trees to the community.

We will achieve our vision by:

- planting the right tree, in the right place, in the right way, and at the right time
- achieving a minimum canopy cover of 30% across the urban streetscape
- ensuring all urban streets within the City will be lined with uniform tree planting by 2026
- improving the diversity of our street trees, with no individual species or age of tree being over-represented
- coordinating a multi-year street tree renewal program to fill the approx. 11,000 unconstrained vacant tree sites
- working with developers to improve the type, number, health and quality of trees being handed to Council in new developments and ensure they meet or exceed the appropriate standards
- only undertaking street tree removals in line with this Street Tree Management Plan and as a last resort.

The Greening Our Streets, City of Whittlesea's Street Tree Management Plan and the technical documents will enable the City of Whittlesea to implement best

practice management of its street tree population, ensuring a resilient urban forest now and for future generations. Its implementation will drive the greening of all residential streets, create beautiful boulevards and provide dappled shade around shopping centres and welcoming gateways into the municipality.

A series of evidence-based, comprehensive, technical documents support the plan. They include:

- a Street Tree Renewal Program Plan
- Technical Guidelines for street tree management which includes a comprehensive set of policies, standards and protocols for tree planting, maintenance, risk management, protection, removal and valuation. These documents are reviewed annually and updated where required in accordance with legislation and tree management best practice.
- Tree species palette which is reviewed annually to ensure adherence with changing climate conditions, tree stock availability and to meet the Street Tree Management Plan vision of planting "the right tree, in the right place, in the right way, and at the right time"

Benefits of the City of Whittlesea's street trees

Many Councils are recognising the benefits from the shade provided by street trees in reducing the urban heat island effect.

The City of Whittlesea's street trees are very important for the community and the environment. They:

- provide shade and shelter for pedestrians and cyclists
- improve the desirability of neighbourhoods and encourage people to spend time outdoors and interact with their community
- provide green, open space which is vital to community health and wellbeing, particularly as urbanisation and densification continues
- increase economic benefits such as higher property values and improved commercial vitality
- connect biodiverse locations by creating a green corridor
- greatly improve the character and liveability of the City
- significantly reduce stormwater flows and improve stormwater quality
- can provide a return on capital of up to five times
- deliver a multitude of well-documented health and wellbeing benefits, from the provision of shady corridors encouraging cool environments for walking and social interactions, to the psychological stress reducing benefits of interacting with and being in nature
- are one of the most cost-effective and efficient assets for adapting urban areas to climate change
- are the best mechanism for reducing the urban heat island effect (i.e. the build-up of heat in hard surfaces during periods of hot weather).

The urban heat island effect is the absorption of daytime heat into hard urban surfaces and its release at night-time. It significantly increases night-time minimum temperatures (Infrastructure.org.au, 2015). It is heightened in Melbourne, whereby heatwaves in summer are exacerbated by the urban heat island effect and impacting on human health and wellbeing. Many councils are recognising the benefits from the shade provided by street trees in reducing the urban heat island effect, e.g. City of Melbourne's Economic Assessment of the Urban Heat Island Effect (2012), and City of Moreland's Urban Heat Island Action Plan (2016).

Pop up tree facts:



Street trees can improve retail activity in commercial areas by 20%.¹



House prices in Brisbane and Perth are higher in streets with street trees.²



A 10% increase in tree cover can reduce heating and cooling needs by 5-10%.¹



Shade trees reduce daytime temperatures between 5 and 20C.¹



Motorists will drive more slowly along treed streets.¹

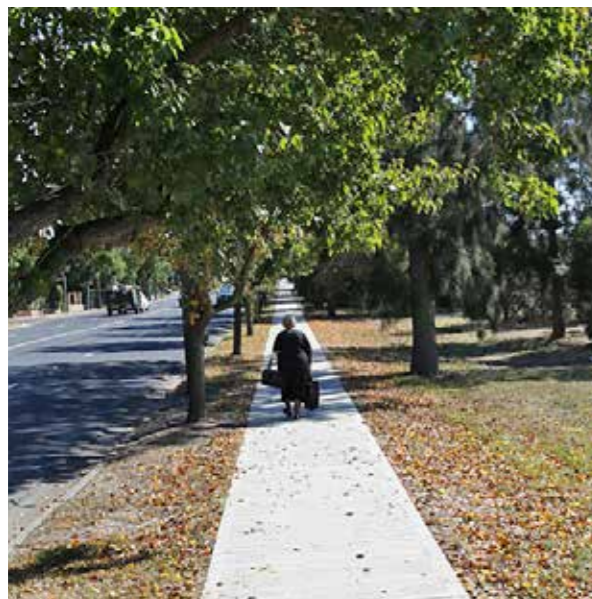


Improved street amenity encourages pedestrian activity, especially in areas of socio-economic disadvantage.³



Large healthy trees absorb 60-70 times more air pollution than smaller trees.⁴

1. (Mullaney, Lucke & Trueman, 2015)
2. (Dunn, 2016) (Pandit, Polyakov, Tapsuwan & Moran, 2013).
3. (Van Dillen et al, 2012).
4. (McPherson et al, 1997).



Due to their wide-ranging benefits, the City of Whittlesea's street trees contribute positively to the following Council priorities which are outlined in the Whittlesea 2040 and Environmental Sustainability Strategy:





Introduction

The majority of the municipality's street trees are healthy, relatively young and include a diverse mix of native and exotic trees and a wide array of species. The City of Whittlesea manages almost 79,624 street trees across a diverse range of neighbourhood types, including established, rural and growth areas.

Attractive tree-lined streets are valued by the community and are an important part of the City's liveability.

Street trees provide a wealth of benefits to the community including shade, amenity, habitat for wildlife, and streetscape beautification.

They also reduce air pollution and stormwater flows, and the amount of heat that radiates from buildings, footpaths and roads on hot days.

More importantly, street trees are an important element of place-making, creating a unique sense of place, as well as a unique brand of liveability for the municipality.

In the City of Whittlesea, street trees provide the backdrop for urban and neighbourhood character, especially in town centres such as Epping, Lalor and Whittlesea. Their form, colouring and canopy spread contribute directly to streetscape amenity.

The majority of the municipality's street trees are healthy, relatively young and include a diverse array of species. They make the City of Whittlesea a better place to live, work and visit, and help the City become better adapted to coping with climate change.

Policies, Technical Guidelines and a Street Tree Renewal Program Plan have been developed specifically to meet the needs and demands of the City of Whittlesea now and for the future.

The Street Tree Management Plan outlines Council's commitment to the establishment of attractive streets and suburbs in urban areas through extensive street tree planting and newly considered street tree management.

The Plan:

- includes an evaluation of the state of the current street tree assets
- highlights opportunities and challenges for the City's street trees
- details transparent and accountable processes and principles that will be consistently applied when Council makes decisions about street tree management, maintenance and planting
- addresses the key management tasks associated with street trees
- sets a series of guiding principles to ensure all tree management work contributes positively towards a shared vision.

Current state of street trees within the City of Whittlesea

The City of Whittlesea's Street Tree Inventory, as at December 2018, shows that Council has 79,624 urban street trees under its management. Council removes around 1,600 street trees each year because they are dead, dying or dangerous. Council at this time plants around 2,620 street trees each year as part of the street tree planting program. Due to the large amount of urban growth in the municipality, Council also receives approximately 5,500 extra trees per year that were previously managed by developers.

Some quick facts:

- The two most common street trees species are *Eucalyptus scoparia* (Wallangarra White Gum) and *Eucalyptus leucoxylon* (Yellow Gum). Both represent only around 6% each of the total street tree population.
- Nine of the top 10 species are natives.
- *Prunus cerasifera* (Flowering plums) are the most common exotic tree.
- There are 275 remnant or protected street trees, most of which are indigenous River Red Gums.
- 60% of all street trees are under 5 metres tall.
- 87% of all street trees have a useful life expectancy over 41 years.
- 88% of all street trees are semi-mature or younger.
- 93% of all street trees are planted in grass verges.
- As at 2018 there are approximately 17,616 vacant tree planting sites along streets in total (this includes sites where planting may be constrained).
- Council strives for a 90% success rate of all the street trees it plants.

Tree species diversity

	TREE SPECIES	TOTAL NUMBER	PERCENTAGE OF POPULATION	AVERAGE HEIGHT
1.	<i>Eucalyptus scoparia</i> (Wallangarra White Gum)	4,601	5.8%	15m
2.	<i>Eucalyptus leucoxylon</i> (Yellow Gum)	4,557	5.7%	10-18m
3.	<i>Angophora costata</i> (Smooth-barked Apple Myrtle)	3,879	4.9%	18-20m
4.	<i>Prunus cerasifera</i> 'Nigra' (Purple-leafed Cherry Plum)	3,286	4.1%	5-6m
5.	<i>Corymbia ficifolia</i> (Flowering Gum)	3,059	3.8%	5-6m
6.	<i>Corymbia maculata</i> (Spotted Gum)	2,780	3.5%	18-20m
7.	<i>Corymbia citriodora</i> (Lemon-scented Gum)	2,550	3.2%	20-25m
8.	<i>Eucalyptus mannifera</i> (Brittle Gum)	2,141	2.7%	15-18m
9.	<i>Melia azedarach</i> (White Cedar)	1,955	2.5%	10-12m
10.	<i>Melaleuca styphelioides</i> (Prickly Paperbark)	1,724	2.2%	15-18m

Table 1: Top 10 street tree species in the City of Whittlesea by number as at 2018.

There are some general rules of thumb dictating resilient and sustainable species diversity within an urban forest population. It is accepted best practice that:

- no more than 30% of any one family, 20% of any one genus, or 10% of one species in an urban tree population (Santamour, 1990)
- "liberal use" of a species should not exceed 10% (Miller and Miller, 1991)
- species lists should achieve a 5-10% ceiling on any one tree species (Jaenson et al, 1992).

The City of Whittlesea's street tree population is currently managed to be adaptable to environmental pressures. This management ensures the City's urban forest is inherently resilient and meets or exceeds the best practice of these guidelines, whilst providing functional and aesthetic benefits as well as ecological advantages.

Street tree species rarely occur as a monoculture (i.e. a single crop in a given area) to the extent found in agricultural crops or forest plantations; nor are monocultures logical over the range of street conditions encountered over a municipality. Most urban tree populations around the world are dominated by relatively few species that have proven adaptable and useful under challenging urban growing conditions. The use of too few species may heighten the vulnerability of the tree population; conversely the use of too many species may diminish the perceived landscape continuity and preclude species better suited to some site conditions. A simple approach is to make a conscious effort to prevent an over-reliance on a few species.

Species diversity in the City of Whittlesea will evolve over the program of street tree removal and replacement works. These program works will consider developments in species availability, changing environmental conditions, differences in planting sites and changes to community expectations. Species diversity will be further influenced by Precinct Structure Planning, Local Area Plans and the implementation of the Street Tree Management Plan.

Useful life expectancy

Useful life expectancy (ULE) is a measure of the expected number of years that a tree will be able to remain in the landscape before it will need to be removed and/or managed for decline due to environmental stresses. As presented in Figure 1 below, Council's street tree inventory data reflects that only 13% of all street trees will be nearing the end of their useful lives within 40 years and suggests that Council will not need to invest heavily in tree renewal of declining trees for a few decades to come.

USEFUL LIFE EXPECTANCY

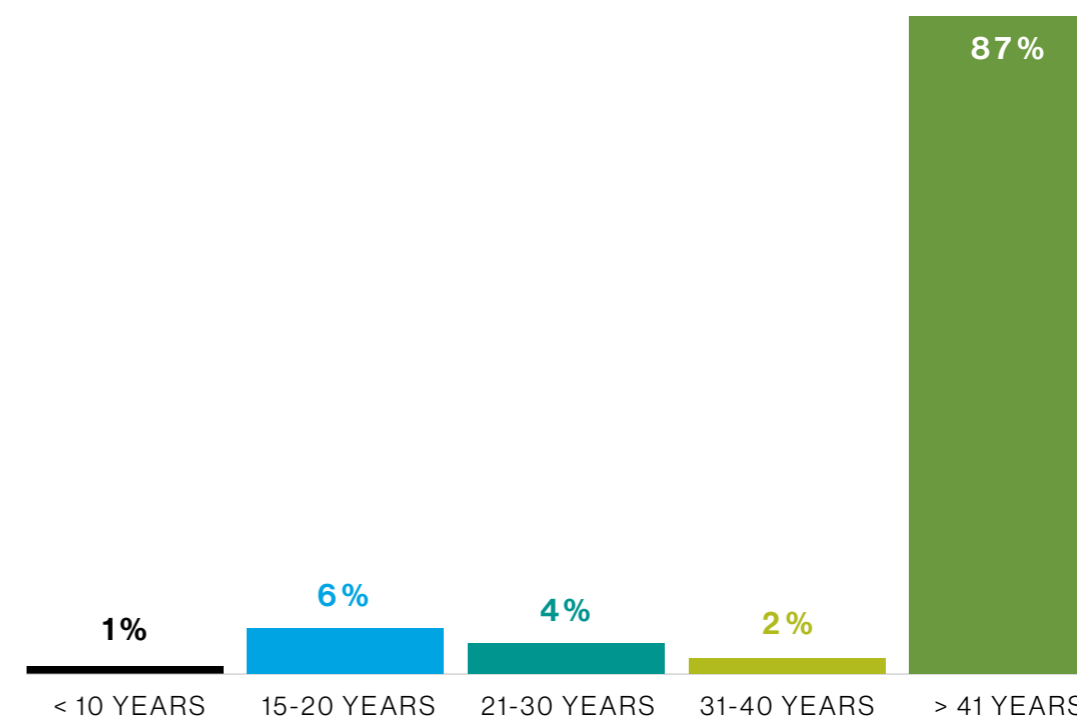


Figure 1: Graph showing distribution of useful life expectancy across the street tree population

Whilst there is a small percentage of low ULE trees, there are three distinct areas in the City of Whittlesea that have a higher concentration of low ULE trees. These are highlighted in Figure 2 below. The older established suburbs of Epping, Lalor and Mill Park have streets that will need to be prioritised for a tree renewal program in the near future. The trees highlighted in Mill Park are predominantly *Eucalyptus leucoxylon* (Yellow Gum), *Prunus cerasifera* 'Nigra' (Purple-leafed Cherry Plum) and various other native species such as *Melaleucas* and *Hakeas*.



Figure 2: Map showing concentrated areas where street trees have a useful life expectancy lower than 10 years.

Tree size

The tree inventory also highlights that the majority of the City of Whittlesea's street tree population is small in canopy width and height. Figure 3 shows that 91% of street trees have a canopy width under 5 metres; Figure 4 shows that 60% are under 5 metres in height, which is representative of a small tree. However, not all of these smaller trees are young in age. Figure 5 shows that whilst 51% of trees under 5 metres in height are either new or juvenile, 45% are in fact semi-mature, meaning half of these trees have almost reached their mature height.

CANOPY SPREAD

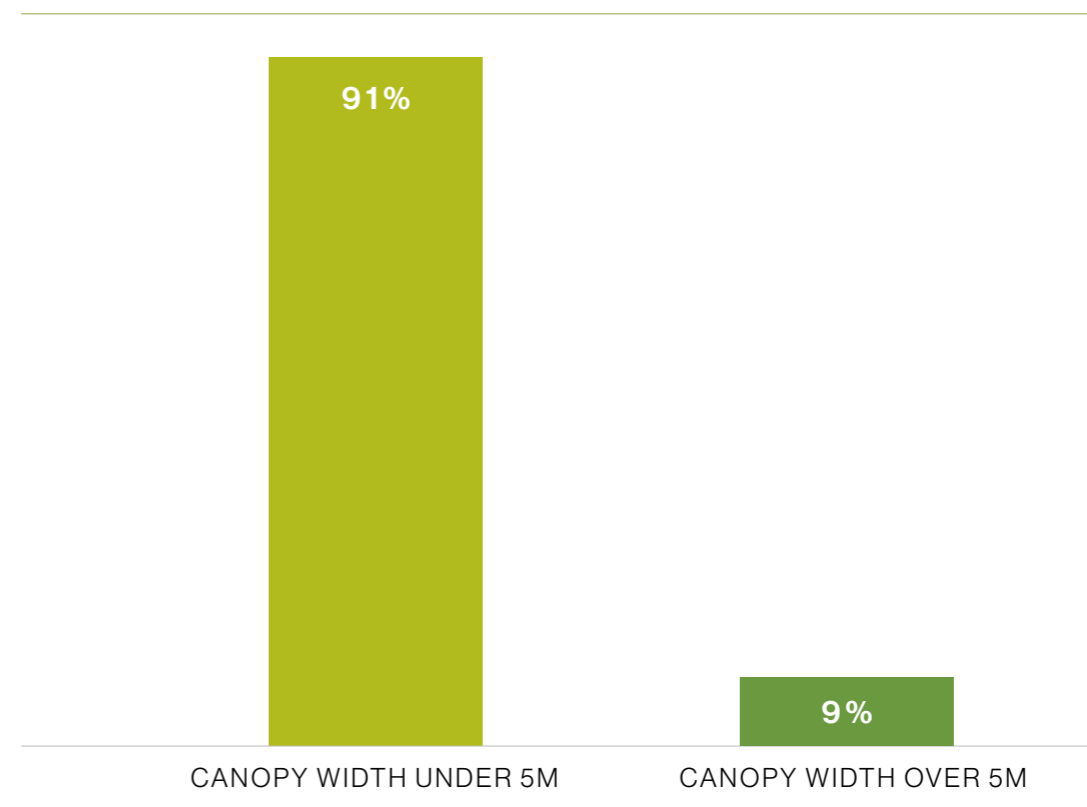


Figure 3: Graph showing distribution of tree canopy size across the street tree population

TREE HEIGHT

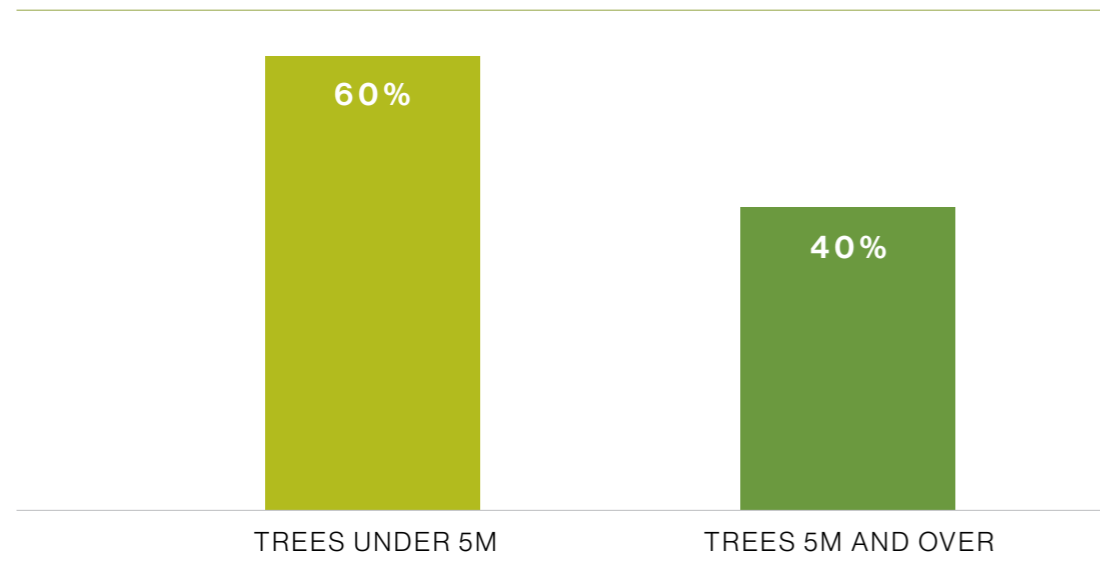


Figure 4: Graph showing distribution of tree height across the street tree population.

AGE OF TREES UNDER 5M

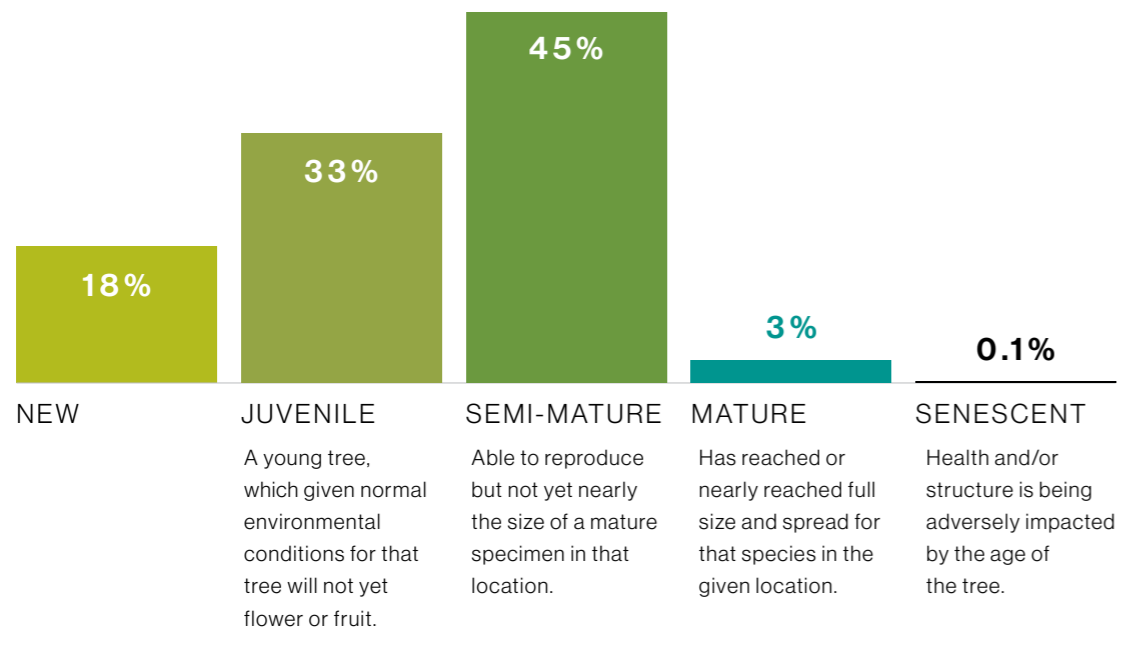


Figure 5: Age distribution of trees under 5 metres in height

There are only 138 street trees which are 20 metres or over in height across the municipality. The majority of these are in Mill Park as highlighted in Figure 6. Along Mill Park Drive and Childs Road, there are tall *Corymbia maculata* (Spotted Gums) which are all in good health with relatively long useful life expectancies. These are in similar locations to a concentration of low ULE *Eucalypts* and *Prunus*.

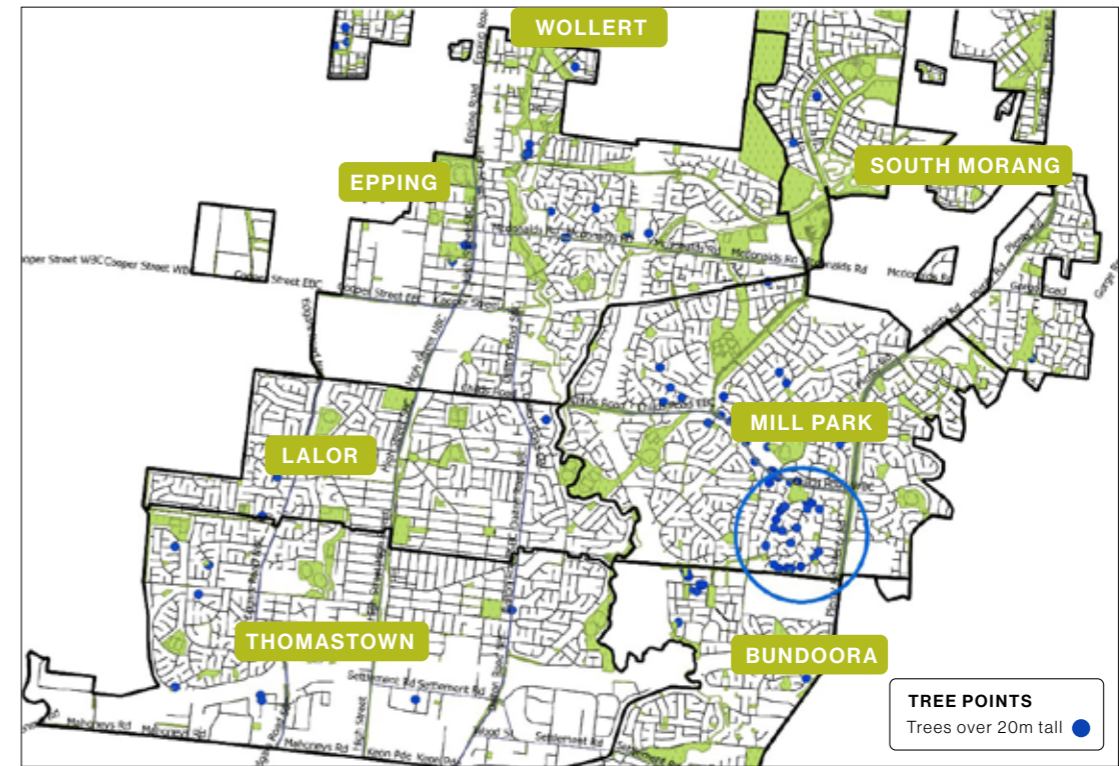


Figure 6: Map showing distribution of trees 20 metres or over in height across the established urban area of the City of Whittlesea. A small concentration of tall trees exists in Mill Park Drive.



Figure 7: The tall spotted gums in Mill Park Drive providing significant streetscape amenity.

Tree age

The tree age data shown below in Figure 8 supports the ULE results. Those trees that are older and moving into senescence (old age) have a lower ULE as expected.

88% of street trees are either semi-mature or younger and have a life expectancy greater than 41 years.

In the short term, this is a good result as long as Council continues to keep these trees healthy and functional in the landscape. Best practice recommends a good diversity of ages spread across the tree population to ensure dynamic succession. It is recommended that, when combined, the trees categorised as new or juvenile in age should represent about 40% of the population, semi-mature 30%, mature 20% and senescent (ageing or deteriorating) 10%.

The majority of the City of Whittlesea's street tree population is categorised as being semi-mature in age, with a ULE of greater than 41 years. This is because of the relatively new development within the municipality and is not deemed to be a short to medium term management issue because semi-mature trees generally require less maintenance input.

A constant tree planting program, implemented over the next 10-20 years, will however ensure a better spread of age diversity.

TREES AGE

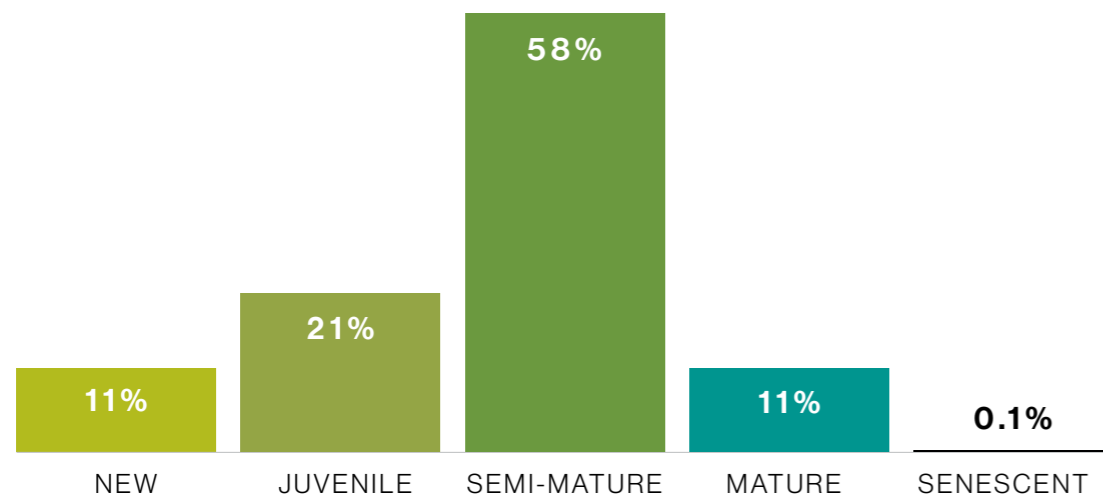


Figure 8: Graph showing distribution of tree ages across the street tree population.

Whilst the number of senescent ageing trees is small (364 trees in total), there appears to be a small concentration in Lalor, as highlighted in Figure 9, that will require active management as they decline, followed by renewal.

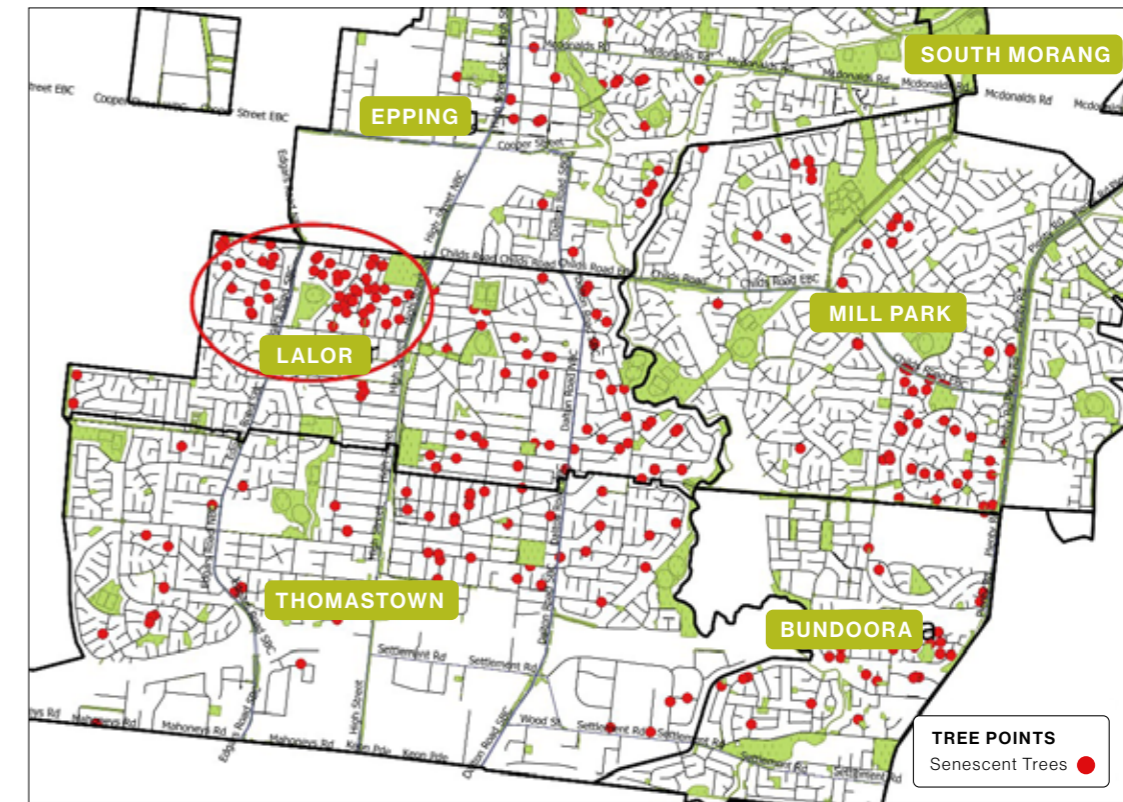


Figure 9: Map showing distribution of senescent trees across the established urban area, showing their concentration in Lalor.

STREET TREE NUMBERS BY SUBURB



Figure 10: Graph showing distribution of tree numbers across the suburbs of the City of Whittlesea.

TREE 10M AND OVER IN HEIGHT BY SUBURB



Figure 11: Graph showing distribution of trees 10m and over in height by suburb.



Key objectives of the Street Tree Management Plan

The Street Tree Management Plan will aim for the following:

- 1 To ensure the right tree is planted in the right place, in the right way, at the right time
- 2 To implement best practice tree management in the City of Whittlesea
- 3 To minimise the challenges with street trees
- 4 To set appropriate benchmarks for the management of street trees
- 5 To establish a robust tree management and decision-making framework.

Guiding principles for street tree management

All planning, management and decision-making regarding the City of Whittlesea's street trees will be guided by the following principles:

- 1 Enhance sense of place: through the provision of attractive tree-lined streets
- 2 Ensure safe and functional streetscapes: through the implementation of best practice street tree management
- 3 Ensure social equity: through the equitable delivery of the street tree planting programs across all suburbs
- 4 Retain street trees: through appropriate management
- 5 Engage the community and raise awareness of the importance of street trees in influencing positive public health and wellbeing outcomes
- 6 Improve the liveability of suburbs: by working together across Council, with the community, partners and developers to ensure street tree benefits are maximised for the community and street trees are adaptable to future changes in climate.

Opportunities for street trees in the City of Whittlesea

Significant opportunities for street tree management in the City of Whittlesea have been identified to implement the vision. These include:

OPPORTUNITY	OUR APPROACH
Utilise street trees to enhance the look and feel of the City	Prioritise the planting of seasonal colour around retail and shopping precincts through the delivery of township master plans.
Align the benefits of street trees into existing Council policy for health and wellbeing, stormwater management, integrated transport, biodiversity, environmental sustainability, climate change and heatwave management	Ensure the benefits of street trees are incorporated into the preparation and revision of relevant Council documents.
Ensure all future plantings are best fit for each site	Adhere to the right tree, in the right place, in the right way, at the right time.
Ensure attractive presentation and entry into the City through suitable future tree planting along main roads	Work with VicRoads to implement VicRoads Tree Planting Policy. Develop a main roads planting program. Commit to the development of attractive tree boulevards along all future main roads, working with VicRoads. Investigate road safety measures to reduce the constraints placed on the establishment of effective main road planting.
Continue to renew street trees in existing suburbs	Implement the Street Tree Renewal Program Plan.
Fill the estimated 11,000 unconstrained vacant tree sites	Continue to implement annual Street Tree Renewal and Whole Street Tree Planting Programs.
Ensure that streets in new areas have appropriate and healthy street trees when developed and handed over to Council	Adhere to technical guidelines and ensure developers of new estates are working with the Guidelines for Urban Development. Negotiate the possibility of a longer establishment period before handover to Council. Promote planting of large tree stock along collector roads and high-profile areas coupled with increased establishment periods.
Mitigate the urban heat island effect	Ensure shade provision through the planting of broad canopied trees in suitable areas.

Challenges for street trees in the City of Whittlesea

The City of Whittlesea's street trees face a unique set of challenges that correlate with being a growth municipality. Geography, soil type, the rapid pace of urban development, transport networks, community lifestyles and the natural environment all pose various challenges for the planning, planting and ongoing care of street trees.

CHALLENGES	OUR APPROACH
The need to raise the community's appreciation and value of street trees acknowledging how they improve the City of Whittlesea's liveability	Education and community engagement.
Existing large street trees which still have a long useful life expectancy	Retain trees and manage issues through the development and implementation of a specific large trees management program. Incorporate increased street tree inspections, increased street sweeping frequency, increased road and footpath repair. Consider widening verges to allow larger trees more space.
Poor streetscapes in older suburbs caused by age of trees or quality of species planted	Implement Street Tree Renewal Program. Implement a program which will rejuvenate inconsistent streetscapes with homogenous avenues of high quality street trees.
Reactive clay soils which pose contraction and expansion issues, increasing the risk of ground movement around infrastructure and buildings	Implement Street Tree Management Plan and Technical Guidelines.

CHALLENGES	OUR APPROACH
Provision of attractive streetscapes under and around power lines	<p>Continue to plant appropriate street trees under and around power lines.</p> <p>Increased power lines for telcos and changes to the Electrical Line Clearance Regulations since 2010 have had implications on the visual amenity of street trees under power lines. Council has completed an investigation which identified a number of street trees under power lines that would be better managed if they were pruned more frequently. The additional resources required to implement this change have been considered and could be accommodated through a variation to existing Council contracts.</p> <p>Council will also carefully select trees which can be pruned around power lines and advocate for reduced power line clearance requirements and undergrounding of electricity where appropriate.</p>
Trees which drop excessive debris including leaves	<p>Identify potentially challenging street tree species and tailor the frequency and timing of street sweeping to address debris and leaf litter build up.</p> <p>Implement targeted footpath sweeping in streets where existing street trees drop excessive debris and this is deemed as a safety risk.</p>

Street tree management in the City of Whittlesea

Policy position

Street trees are a critically important asset for the City of Whittlesea's future liveability and will be valued and managed to enhance their benefits.

Benchmarks

A series of targets have been set for the management of the City of Whittlesea's street trees:

- Canopy cover: City of Whittlesea will have a minimum urban tree canopy cover of 30% within 10 years
- Boulevards in all streets: all urban streets within the City will be lined with uniform tree planting within 10 years
- Species diversity: the street tree population will remain healthy and diverse, with no one species or age category being over-represented
- Reduce vacant sites: vacant planting sites will be systematically restocked through Council's street tree planting programs
- Improve quality and number of complete plantings in developer handovers which will meet criteria and specifications set out in the Guidelines for Urban Development.

These benchmarks, the guiding principles and the vision will be met through the implementation of a set of Technical Guidelines, the Street Tree Management Plan and an ambitious annual planting program.

General urban tree management

Street trees are vital for enhancing neighbourhood amenity, particularly in the City of Whittlesea. Therefore, their management is critical to maximise the benefits that trees provide. As part of Council's street tree management arborists proactively inspect and assess every street tree in the city at least once every two years.

The goal of tree management is based on an understanding of:

- the dynamic nature of the street tree population
- the aesthetic contribution of street trees to the urban landscape
- tree risks to public safety
- public attitudes and perceptions
- the need to sustain well-presented neighbourhoods and the natural environment
- the importance of engaging and working with the community.

Sustainable arboriculture comprises management and practices that are sustaining environmental quality, resource conservation, economic development, psychological health, wildlife habitat and social wellbeing (Clark *et al*, 1997).

Council recognises that as trees age they require increasing management to maintain them in a low risk, but aesthetically acceptable, condition. Similarly, trees have a finite lifespan and at some point in time some trees will need to be removed and replaced because they are either dead, dying, dangerous or have reached the end of their ULE.

The City of Whittlesea's Street Tree Management policy is:

Public safety is a priority.

Retain healthy trees unless specific tree removal conditions have been met.

Property damage from trees is a valid risk and trees must be managed to minimise this risk.

Achieve a sustainable street tree population taking into consideration ecological principles, the dynamic nature of trees in the urban landscape, community expectations and the built environment.

Implement and manage appropriate tree removal/ replacement programs that ensure the tree resource is continually renewed thereby ensuring a biological diverse and sustainable street tree population.

Implement tree management in line with relevant legislative requirements, strategic policies and accepted tree care practices. Any operation that is known to be detrimental to long-term tree health is not appropriate.

Engage and educate the community on the benefits of trees and their management requirements and assist community participation.

Sensitively acknowledge and address the concerns of the community in relation to street tree management.

Relevant Australian Standards and policies relating to the Street Tree Management Plan and the Technical Guidelines are as follows:

AS 2303:2018 *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 2017

The Electricity Safety (Electric Line Clearance) Regulations.

City of Whittlesea's tree managers will undertake the following as part of their daily work:

- Maintain and enhance the existing tree population by preserving tree health, biological diversity, aesthetic appearance and amenity value to ensure a quality asset will be inherited by future generations.
- Maintain high standards of tree management to meet current best practice and recognised standards and provide adequate resources to ensure effective tree management.
- Utilise a program of systematic tree assessment and implement best practice tree management approaches to mitigate tree risk for residents and visitors to the City.
- Remove hazardous trees to ensure public safety and plant replacement trees in order that the City's streetscapes are reinvigorated.
- Investigate street trees where concern has been expressed in relation to their appropriateness e.g. condition, size, level of risk, or damage they may be causing.
- Select tree species for planting based on their suitability to the site, climatic conditions, biological diversity, performance, and potential to contribute to the landscape. Tree selection, placement and planting of trees will be undertaken to mitigate potential conflicts with infrastructure and to reduce long-term risk.
- Arrange planting programs to ensure that street tree planting in established areas is a priority.
- Arrange street tree planting within nature strips where tree planting opportunities have been identified to facilitate a yearly net increase of street trees across the City.
- Protect Council street trees from development and other activities that threaten their health and viability by minimising the conflict between trees and infrastructure wherever possible.

- Foster communal pride in street trees to mitigate the incidence of vandalism.
- Consult with the community when street tree renewal is proposed for specific streetscapes.
- Maintain accurate and current documentation on the management of Council's street tree assets by ensuring the street tree inventory is continually updated.
- Undertake performance monitoring and ongoing review of the street tree population to ensure that tree management techniques employed are relevant and facilitate adaptation of the population to changes in the climate, technologies, resource allocations and community expectations.
- Ensure that street trees are recognised as a valuable Council asset through inclusion in all relevant Council documents.



Key tree management tasks for the City of Whittlesea

There are six key tree management functions that take place within the municipality:

- 1 Tree selection and planting: **Council will undertake the planting of trees along streets and roadsides using the right tree, in the right place.**
- 2 Tree risk management: **Council will systematically assess all street trees located on Council-managed land. Following assessment, the implementation of works will be prioritised based on tree hazard and assessed risk.**
- 3 Tree maintenance programs: **Council will implement proactive and reactive tree maintenance programs to ensure that street trees are well managed.**
- 4 Tree protection: **Council will protect all existing street trees within the municipality where possible.**
- 5 Tree removals: **Council will only remove trees that meet the tree removal criteria as set out in Section 5: Tree removals.**
- 6 Tree value: **Council will attribute a dollar value to street trees, charge appropriate cost recovery fees and acknowledge that their value appreciates over time.**

1

Tree planting

The City of Whittlesea will proactively carry out street tree planting in a programmed manner to meet a range of priorities including preserving neighbourhood character and to increase the number of street trees planted.

Street tree planting will meet the following priorities:

To preserve and enhance the local character of the distinct areas within the City.

To increase the number of street trees and aim for full street tree plantings.

To increase tree canopy cover across the municipality.

Select tree species for their suitability to the site, biological diversity, performance and potential to contribute to the landscape without onerous management implications.

To reinforce habitat, pedestrian and cycling links and to enhance the pedestrian experience.

Set and maintain high tree planting and establishment standards.

Consult and inform the community about all major projects involving tree planting.

Trees are the dominant component in landscapes and street tree planting is one of the simplest and most effective ways of improving the image and landscape character of a city.

The urban landscape bears little resemblance to the natural environment on which trees originally thrived. The further threat of changing climatic conditions means that a firm understanding of the environmental and management needs of street trees is required for them to flourish.

Council will implement a planned approach to tree planting within the municipality taking into consideration available funding, landscape requirements, environmental constraints, site and seasonal conditions, availability of stock and community expectations. As a result, Council will 'plant the right tree, in the right place, in the right way and at the right time'.

Tree planting will be programmed through the following avenues:

the Street Tree Renewal Program Plan

the annual Street Tree Planting Program

coordination with infrastructure improvement works program, for example road redevelopment, town centre improvement program

major community facility developments

community requests.

Council will ensure it is supplied with high quality tree stock and allocates adequate resources to the supervision of tree planting activities and levels of after-care maintenance.

TREE PLANTING PROGRAMS

Street tree renewal program plan

A Street Tree Renewal Program Plan has been developed based on assessments of streets within the urban areas of the municipality. The assessment was conducted based on the following criteria:

- condition of existing trees
- assessment of necessity of new street tree planting
- percentage of vacant tree sites
- road hierarchy e.g. major roads, arterials and suburban streets
- design considerations e.g. proximity to open space, walking or cycling route, existing private tree canopy cover, street typology.

The objective of this program is to replace poor streetscapes and develop significant avenues throughout the municipality.

The program will be efficient and effective in developing significant avenues by providing continuity of species type and size, focus of resources and standardisation of management practices. The impact that the trees have upon the landscape once established will be consistent with the City of Whittlesea's vision for streetscape amenity.

The program can result in the sudden change of visual amenity of the streetscape and may create community discontent. Consequently, rigorous community consultation is required.

The Street Tree Renewal Program Plan is considered within existing budgets and looking at existing opportunities. If the annual budgets were to increase, this program would be expanded to include the renewal of low quality streetscapes e.g. streets with trees that have not proven successful, have diminished amenity value and could benefit from a whole-of-street tree renewal program. The program would involve tree removal and replacement with a single species to enhance the appearance and consistency of the street.

Annual street tree planting program

The objective of the annual street tree planting program is to create or reinforce an existing consistent street tree theme within a street or main road.

When determining the suitability of the existing street tree theme, consideration will be given to the site limitations that exist within the street and the appropriateness of continuing with this theme. If the existing theme is inappropriate and an alternative tree species can satisfactorily maintain the street's character, it shall be planted as the preferred street tree species. In most cases species selection will be derived from the street tree species palette.

Individual street tree plantings occur throughout the municipality for the following reasons:

a replacement for a tree removed as part of normal maintenance.

a resident request to have an individual tree planted outside their property where sufficient space permits.

Council officer or resident request to plant available sites within a street to complete the avenue.

Street trees that are removed shall be replaced unless site restrictions deem the planting of a tree to be inappropriate; these are included in Technical Guidelines Section 1.7.2. Existing street features restrictions.

Council is responsible for the planting and maintenance of street trees and seeks to develop uniform streetscapes that complement landscape and neighbourhood character, meet design standards and are not onerous to maintain. To ensure Council can meet these requirements residents are not permitted to plant trees within the nature strip or other sites within the road reserve without Council approval. This is outlined in Council's General Municipal Law (Local Law) and the Urban Nature Strip Guidelines. Council may remove such plantings and no compensation will be available to residents for the removal of these trees or shrubs (the Urban Nature Strip Guidelines provide for nature strip planting by residents if plants do not exceed 300 millimetres in height).

Council encourages residents to nominate a street, or section of street, to be included in Council's annual planting programs. The community will be able to lodge their requests for additional street tree planting via Council's website, by writing in or by calling Council directly.

PLACEMENT OF TREES

Council will aim to plant trees at regular intervals and at a density that will provide a sense of continuity and scale to the streetscape. Where reasonable, one tree will be planted in front of each property within residential urban streets of the City or alternatively at approximately 15-metre spacing. The growth characteristics of the tree and the capacity of the street will also determine spacing.

Other street tree placement considerations include:

private or other vegetation that exists on or close to the road reserve precluding the growth of a street tree

if the tree species are small, there may be potential to plant two trees in front of a property

established planting theme or available space (long nature strip or corner allotment) allow for more than one tree per property

location of infrastructure, such as underground services, street lights, power poles or fire hydrants.

There are many different styles of street tree planting that could be utilised within the City. The ultimate style will be dependent on the existing street tree character, street type, dominant land use and planting space.

When planting trees on declared VicRoads roads consideration is to be given to the VicRoads Tree Planting Policy 2017.

The avenue effect of uniform species is the preferred planting style within the City where appropriate.

Commercial/retail areas and industrial areas may require specific design input and site modification to reduce the limitations to plant growth.

Council will also investigate initiatives to incorporate water sensitive urban design features, passive water filtration or other stormwater harvesting techniques into tree planting systems where appropriate.

Wherever possible, large canopied trees should be planted within the streets of the City of Whittlesea. This may require the development of specialised planting systems to accommodate larger trees such as underground structural cells to allow better root growth, or replacement of soil with better growing media or water sensitive urban design to allow for more water filtration to tree root zones.

TREE SIZE

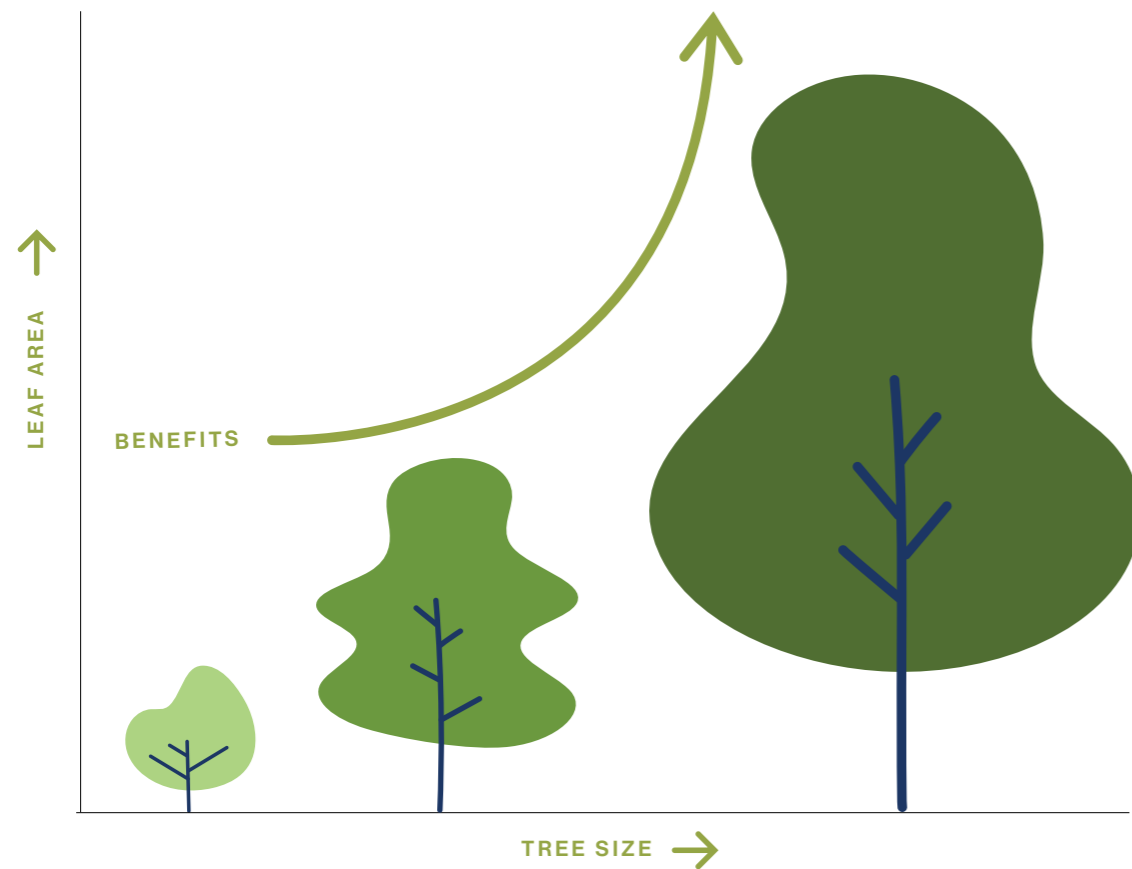


Figure 12: The larger the tree the greater the benefits (www.urbantreealliance.org/resources/why-trees/)

SPECIES SELECTION

To ensure the right tree is planted a Street Tree Species List has been developed and is reviewed annually to ensure it is relevant, meets legislation, current species knowledge on performance, and meets best arboriculture practice. The list includes small, medium and large trees representing native, exotic, evergreen and deciduous species that are deemed to be appropriate for planting within the City.

Of the top 10 existing tree species (2016), some have not been included on the revised species list. E.g. *Melaleuca styphelioides* (Prickly Paperbark) has not been listed as it is deemed inappropriate for use as a street tree. Street trees identified as inappropriate will not be replanted once they have been removed. Other species, such as *Melia azedarach* (White Cedar), will be replaced with more suitable cultivars that grow to a smaller height or produce less fruit and leaf litter.

Though the list of tree species is not definitive, the species listed should be considered the 'signature' species that will contribute to the pervading landscape character of the City's streets, provide ongoing amenity and assist Council and the community to respond to the pressures of climate change.

The Parks and Urban Design Department will conduct annual reviews of the species list and investigate new tree species in line with aesthetic, functional, climatic and environmental requirements.

Species selection will:

- be based on existing street species, availability of stock, suitability of species to climate, future climatic change, and site conditions and constraints.
- aim to mitigate impacts on adjacent infrastructure and reduce onerous management requirements.
- consider a tree's ability to be pruned to meet the above ground site constraints presented by the City.
- will endeavour to utilise tree size and form (shape of the canopy) in order to reduce pruning requirements.
- aim to avoid the use of trees that drop excessive litter, particularly fruit, which can cause trip hazards.

The Street Tree Species List will be reviewed as needed, modified and incorporated into other relevant Council documents for distribution to developers and other third parties planting street trees where required.

TREE ESTABLISHMENT

Along with appropriate species selection and selecting quality tree stock, planting, if done correctly, will have a lasting influence on future tree development.

Trees will be planted properly and an after-care maintenance program implemented to achieve a successful tree establishment rate of greater than 90%. Council will implement a minimum two-year establishment maintenance program.

Typically, Council uses containerised stock for planting within the City and all tree stock supplied should conform to AS 2303:2015 *Tree stock for landscape use*. AS 2303 will also be included in future tree planting contracts and information for developers.



2

Tree risk management

The City of Whittlesea will seek to maintain public safety and reduce the risk of property damage through the use of best practice tree assessment and treatment approaches.

Council will:

Utilise a program of systematic tree assessment and best practice tree management to mitigate street tree risk to residents and visitors to the City.

Maintain accurate and current documentation on the management of Council's tree assets.

Ensure selection, placement and planting of trees is undertaken with due consideration of the associated long-term risk.

Maintain high standards of tree management to meet current best practice and recognised standards.

Provide adequate resources to ensure appropriate tree management to mitigate risk potential.

The City of Whittlesea manages vast numbers of trees over a large area and within many varied landscape contexts. The management of these trees takes place in a complex operating environment with many variables and subjective views.

Risk from trees, even in 'natural' urban landscapes, is typically very low and in most instances, is no more than a recognised risk of everyday life, which most people accept without question (National Tree Safety Group (UK), 2011). Consequently, planning decisions about the management of trees in general should proceed on a rational, cost-effective basis. Public safety, though paramount, is not the only concern when deciding how to manage trees. Other broader concerns, such as ecological, landscape and aesthetic value, are also taken into consideration.

Council recognises that some community members may be exposed to an increased risk due to their age, disability or health condition. In some cases, these risks may be associated with Council trees and the leaves, flowers, fruit and other objects that naturally fall from them.

There can also be risks associated with conflicts such as tree roots and infrastructure, soil heave or shrinkage, and blockages to underground surfaces. Other risks associated with trees include debris drop, pest and diseases, sight and overhead electric line clearances and the possibility of fire.

Another component of a risk management program is the need to ensure that the procedures implemented for inspecting, identifying and addressing tree risks are clearly and properly documented. This is because not all tree defects are observable and not all the potential structural concerns associated with trees can be eliminated. Trees as biological organisms will always pose a residual risk, even after mitigation works are completed.

The City of Whittlesea's existing risk management system includes:

A clear documented procedure for inspection of street trees with information on location, species, size, health and structure.

A documented system of logging complaints or notification of problems with respect to street trees.

A documented system for assessing the risk posed by street trees and prioritising the risk posed by such trees.

A documented maintenance system for abating the identified risks.

The process Council has adopted for assessing risk associated with street trees where a non-council requestor has requested is:

1. A Council arborist assesses tree condition using industry-endorsed methodologies.
2. Requestor notified of assessed tree condition and advised of proposed action to minimise perceived risk.
3. Remedial work undertaken if required.
4. If requestor is still concerned, a second peer-review Council arborist assessment reassessing the tree condition.
5. If requestor is still concerned, level of tree risk will be assessed using industry-endorsed tree risk assessment methodologies and may include an aerial inspection only if deemed necessary.
6. Requestor notified of assessed level of tree risk and advised of proposed actions to minimise risk. Comparison of residual risk to other life situations will also be provided.
7. If requestor is still concerned (per Municipal Association of Victoria (MAV) guidance obtained in 2015) an independent risk assessment by suitably qualified arborist with tree risk assessment qualifications will be arranged.
8. Requestor notified of independently assessed level of tree risk and advised of any proposed action to further reduce risk. Comparison of residual risk to other life situations will also be provided.

This process can be amended and current process will be updated on Council website.

The following tasks are included in Council's comprehensive tree risk management program:

Pruning: well-maintained trees develop fewer hazardous defects and pose less risk to public safety. Any street tree pruning undertaken will comply with industry standards and best practice, which includes formative pruning to enhance the form and improve the structure of young trees.

Select appropriate species suitable for site conditions and constraints. Allow space for trees to attain expected mature size.

Select good quality nursery stock (refer to AS 2303:2015 *Tree stock for landscape use*). Plant and implement post-planting maintenance of trees to match site conditions and industry best standard.

Establish level of risk assessment appropriate for tree resource and location.

Implement scheduled tree inspections by qualified, experienced arborist(s) based on risk.

Recommend inspection of individual trees in high target areas after severe storm events and when impacted by construction or maintenance activities.

Implement appropriate tree protection during construction activities. Refer to AS 4970:2009 *Protection of trees on development sites*, for guidelines.

Maintain documentation on tree inspection and maintenance activities.

Employ techniques such as root barrier installation, aerial cable bundling and other innovative approaches to mitigate risk.

In line with AS/NZS ISO 31000:2009 *Risk Management*, ongoing review is essential to ensure that tree risk management remains relevant. Factors that affect the likelihood of inspection activities may change, for example, severe drought may cause rapid tree decline prompting the need for more frequent inspections. Similarly, knowledge gained through experience and implementation of tree management could provide beneficial insights and allow refinement of tree risk management approaches.

As a component of Council's continual improvement approach and to ensure the process is effective in managing tree risk, the risk assessment process will be reviewed annually.

The expected outcomes from reviewing and developing this systematic approach to managing tree risk are:

reduced tree-related risk over time

improved tree health

reduced liability claims

accelerated response following significant storm events, resulting in faster clean-up of debris and restoration of services.

TREE PLANTING PROGRAMS

Street tree renewal program plan

A Street Tree Renewal Program Plan has been developed based on assessments of streets within the urban areas of the municipality. The assessment was conducted based on the following criteria:

- condition of existing trees
- assessment of necessity of new street tree planting
- percentage of vacant tree sites
- road hierarchy e.g. major roads, arterials and suburban streets
- design considerations e.g. proximity to open space, walking or cycling route, existing private tree canopy cover, street typology.

The objective of this program is to replace poor streetscapes and develop significant avenues throughout the municipality.

The program will be efficient and effective in developing significant avenues by providing continuity of species type and size, focus of resources and standardisation of management practices. The impact that the trees have upon the landscape once established will be consistent with the City of Whittlesea's vision for streetscape amenity.

The program can result in the sudden change of visual amenity of the streetscape and may create community discontent. Consequently, rigorous community consultation is required.

The Street Tree Renewal Program Plan is considered within existing budgets and looking at existing opportunities. If the annual budgets were to increase, this program would be expanded to include the renewal of low quality streetscapes e.g. streets with trees that have not proven successful, have diminished amenity value and could benefit from a whole-of-street tree renewal program. The program would involve tree removal and replacement with a single species to enhance the appearance and consistency of the street.

Tree maintenance programs

The City of Whittlesea will provide adequate resources to carry out proactive tree maintenance on trees in streets to meet the following objectives:

Undertake tree inspection and maintenance works as required to protect, enhance and preserve existing trees to a high standard.

Undertake tree pruning to comply with relevant legislative requirements, strategic policies and accepted tree care practices.

Integrate latest technology to ensure tree maintenance programs continue to meet best tree care practices.

Well maintained trees meet landscape aspirations and community expectations, develop fewer hazardous defects and pose less risk to public safety and property damage.

Council implements a proactive, routine street tree inspection and pruning program. Through this program Council aims to meet its obligations to manage public risk and provide adequate road, pedestrian, visibility and electrical line clearance requirements. Council also undertakes reactive street tree inspections and pruning to address failed or damaged trees and respond to various requests from the community. Other tree maintenance works include management of tree root conflicts, management of pests/diseases and other arboricultural works as required.

Visual tree risk assessments and any subsequent pruning on the City's street trees are undertaken at least once every two years as part of the urban area street tree inspection and pruning program. Visual tree risk assessments are also undertaken as a result of resident requests or after storm events.

The proactive urban area street tree inspection and pruning program, and updating of Council's tree inventory database, form the basis of the visual tree assessment and risk management process applied for the majority of street trees within the municipality.

However, some street trees may require an annual assessment to determine any risk potential and identify if remedial work needs to be undertaken. Typically, these trees will be of high environmental/aesthetic value or will be older or larger in stature. To manage the debris shed by these larger, older trees, increases in street sweeping activities may also be required.

Council will implement a large tree management program which includes:

increasing proactive inspections towards an annual program for trees which are large, older or under electrical power lines

widening verges to create more space for existing larger trees where appropriate.

Similarly, annual inspection may also be required where the combination of tree species and electrical or other assets necessitate a more frequent attendance. This inspection will enable Council to identify any pruning necessary to ensure compliance with relevant Electricity Safety (Electrical Line Clearance) Regulations. To best manage the interaction between these street trees and overhead electrical lines, increases in the frequency of tree pruning activities may also be required to reduce the impact on tree health and the aesthetics of the associated streetscape.

To summarise, Council undertakes inspection and pruning programs on publicly managed trees to:

reduce the risk to public safety

decrease potential damage to property

provide clearances for pedestrians, vehicles and sight lines

provide clearances around services and electric power lines

manage tree health and aesthetics

formatively shape young trees.

Any pruning that is required must be carried out in accordance with AS 4373:2007 *Pruning of amenity trees* by trained and competent arborists who have a thorough knowledge of tree physiology.

Annual street tree planting program

The objective of the annual street tree planting program is to create or reinforce an existing consistent street tree theme within a street or main road.

When determining the suitability of the existing street tree theme, consideration will be given to the site limitations that exist within the street and the appropriateness of continuing with this theme. If the existing theme is inappropriate and an alternative tree species can satisfactorily maintain the street's character, it shall be planted as the preferred street tree species. In most cases species selection will be derived from the street tree species palette.

Individual street tree plantings occur throughout the municipality for the following reasons:

a replacement for a tree removed as part of normal maintenance.

a resident request to have an individual tree planted outside their property where sufficient space permits.

Council officer or resident request to plant available sites within a street to complete the avenue.

Street trees that are removed shall be replaced unless site restrictions deem the planting of a tree to be inappropriate; these are included in Technical Guidelines Section 1.7.2. Existing street features restrictions.

Council is responsible for the planting and maintenance of street trees and seeks to develop uniform streetscapes that complement landscape and neighbourhood character, meet design standards and are not onerous to maintain. To ensure Council can meet these requirements residents are not permitted to plant trees within the nature strip or other sites within the road reserve without Council approval. This is outlined in Council's General Municipal Law (Local Law) and the Urban Nature Strip Guidelines. Council may remove such plantings and no compensation will be available to residents for the removal of these trees or shrubs (the Urban Nature Strip Guidelines provide for nature strip planting by residents if plants do not exceed 300 millimetres in height).

TREE CLEARANCE REQUIREMENTS

Council is not responsible for the clearance of vegetation around non-electrical aerial conductors.

Council will maintain clearances around overhead electric lines in compliance with the Electricity Safety (Electric Line Clearance) Regulations 2015; S.R. No. 67/2015, or subsequent updates, which prescribe the Code of Practice for Electric Line Clearance and City of Whittlesea Electric Line Clearance Management Plan.

Clearance from trees over roads and footpaths are outlined in Council's Road Management Plan.

Table 2 below provides a practical guide to the crown clearances that Council will aim to achieve when conducting pruning work within the municipality.

Council will also advocate to reduce conservative clearance requirements in urban areas and undergrounding of electricity where possible.

ACCESS TYPE AND CLEARANCE LOCATION	CLEARANCE
Electric line clearances (HV and LV) and service wires	Maintain the clearances as per the Electrical Line Clearance Plan
Vehicular/over roadways	
Local roads	4.0m Rural roadsides as required (1m behind back of kerb)
Main roads	4.3m
Driveways	3.5m
Pedestrian	
Over footpaths, walkways, nature strips	2.5m
Motorist/pedestrian visibility	2.5m
Approved road signage, lines of sight and traffic control devices	Allow for driver and pedestrian visibility in accordance with VicRoads/Council sight clearance standards
Buildings on private property	Maintain a minimum 2.0m clearance from tree canopy to built structures (excluding fences) through annual or biennial pruning cycle

Table 2: Tree crown clearance requirements for street tree pruning

TREE ROOT MANAGEMENT

Root systems are vital to the health and longevity of trees. However, in urban areas where there is competition for available space, tree roots are often associated with situations that cause damage to structures, footpaths, and underground services. There can be dichotomy between sustaining a healthy urban tree population with all of the associated benefits, while endeavouring to mitigate the negative impacts that these trees can have on adjacent infrastructure. Although tree roots are often blamed for the cracking and lifting of concrete, it is worth noting that these structures can also fail because they have not been properly engineered to function in a landscape that contains growing trees and their root systems.

It is not possible to avoid or eliminate all conflicts between tree roots and hard surfaces or pavements within urban landscapes. Given that trees are vital to the urban landscape it is accepted that trees come with assumed levels of risk as do all public assets such as roads and buildings. In this regard Council accepts that there are some increased costs associated with the repairing of roads and pavements damaged by tree roots as a trade-off for having tree lined streets.

A multidisciplinary approach to reducing the risk of root damage to infrastructure within the City is required. This involves a coordinated approach from various departments and professionals involved with the management of the City's assets. It is not possible to remove all risk associated with trees and infrastructure, but strategies for addressing conflict can be preventative, to reduce the risk of damage occurring, or remedial, to correct damage or avoid further damage (Costello & Jones, 2003).

Key aspects of City of Whittlesea's tree root management program:

- The property owner is responsible for inspecting and maintaining all built structures on their land including services and that run through or adjoin private and public land.
- Certain tree root treatment work, including root pruning and root barrier/deflector installation, is sometimes required for risk management, to maintain public safety and to contain tree root growth.
- Root pruning is the practice of removing a portion of a tree's root system to mitigate potential property damage or as otherwise required. The circumstances necessitating root pruning vary, but the key is to ensure it does not impact on the health, stability or longevity of the affected tree. To meet this aim, root pruning of Council-managed street trees will always be undertaken in accordance with AS 4373:2007 *Pruning of amenity trees*.
- All root pruning and root barrier installations shall be recorded.
- Aspects of tree root management may also be influenced by street tree protection requirements and underground services.
- Under its duty of care, Council will adopt a proactive approach to planting the right tree in the right place in the right way. This includes design solutions to mitigate potential root impacts if it is deemed that the 'right tree' is a large tree (i.e. has the potential to reach over 20 metres in height).

TYPES OF DAMAGE

Tree roots and buildings

Roots from large trees can sometimes damage buildings, but these are just one of many reasons a building may start to show signs of damage. It is important to have expert advice to establish the cause of a problem, who is responsible and how it can be resolved.

The assertion that tree roots have taken water from a clay soil causing it to shrink and the foundations to subside resulting in structural damage is an oversimplification.

It is well known that the presence of trees can contribute significantly towards the problem of subsidence, especially in clay soil areas where the soil shrinks and swells according to its moisture content. A common feature of the problem is that there is often no obvious or direct relationship between the tree and the damage to a building and there are usually a number of non-biological factors involved as well, including how the structure was constructed and whether it considered the site conditions.

AS 2870:2011 *Residential Slabs and Footings* acknowledges that minor foundation movements occur on nearly all sites and that it is impracticable to design a footing system that will protect the building from movement under all circumstances.

The best way to prevent root damage to new buildings or other structures is to ensure they are built to the relevant industry code. If a new building will be close to existing trees, particularly on a reactive clay soil, the standard design and construction methods may need to be altered to account for these factors.

Similarly, properties may have leaking or disconnected stormwater or sewerage pipes that allow excess water to waterlog the soil close to a building. This can cause subsidence and may encourage tree roots to grow in that area. Fixing these types of problems can prevent future damage occurring.

Inadequate compaction during construction or excess moisture in foundation soils can also cause subsidence and movement in buildings.

The problem is therefore very complex in nature. The damage is often many metres distant from trees and usually involves a variety of arboricultural, spatial, geotechnical, climatic, engineering and utility issues acting at the same time.

Large or wide cracks (wider than 5 millimetres) in the structural supporting walls of a building may indicate movement in the foundations of a building or other structural weakness.

Steps in an investigation of tree root damage:

- 1 Residents/property owners should notify Council if they think that Council trees are contributing to the damage. Upon notification, Council will apply a consistent process based on MAV guidelines to assess the extent to which its trees may be contributing to the damage reported.

Should the results of this assessment show that Council's street trees are not contributing to the damage, the resident/property owner may be asked to provide further information which may include a report by a suitably qualified engineer.

- 2 The property owner needs to undertake an investigation into the damage and document the reasons or evidence that clearly show why they believe the Council-owned tree is contributing to the damage. This may involve root sympathetic excavations within the property to locate and photograph roots and their proximity to the building or structure. If the investigation or repair works require an excavation on a Council road or footpath, they will need to obtain a Works in Road Reserve Permit from the City of Whittlesea.

- 3 For a claim to be considered, where tree roots are exposed at or under the footings and foundation of the building or structure, these roots would need to be identified as being those from the Council-managed tree. Claimants may need to engage an arborist to verify the origin of the roots at their own cost.

- 4 If an engineer is engaged to assist in the investigation, the engineer must base their assessment on evidence and show that the footings and/or foundations were constructed to appropriate standards. The engineer should have valid professional indemnity insurance and formally sign off on the report.

Reimbursement of costs associated with obtaining the engineer's reports may also be considered at the time a claim is accepted.

TREE ROOTS AND DRAINS

Tree roots can sometimes inadvertently impact sewer and stormwater pipes. It is important to establish the cause of the problem and who is responsible for rectifying it.

A property owner is responsible for the services to their property. This includes sewer and stormwater pipes and services that run through or adjoin private and public land until they reach infrastructure drainage points such as City of Whittlesea sewer mains, street gutters or stormwater pits.

The most common cause of pipe leakage is from old terracotta pipes. Movements in the surrounding soil cause joint failure or cracking causing moisture and nutrients to leak into the soil. Failure of joints between PVC and terracotta pipes is also common. PVC pipe systems have fewer joins and rarely fail.

It is important for the property owner to consider repairing or replacing old infrastructure especially when undertaking renovations and especially on all pipes across the property boundary into Council pits and gutters.

Roots do not actively search for water, they tend to follow water gradients (if oxygen is also present) in the soil. If these lead to a leaking pipe then roots will tend to grow along lines of least resistance such as are likely to be found around cracked, poorly installed or leaking pipework. While cracked or leaking pipework may often be to blame, other factors affect how roots interact with underground water pipes, including

sewers. When intact drains and other service pipes are cooler than the surrounding soil, water may condense on the outer surface and root growth may develop along the moisture gradient developed in the soil (Cutler, 1995; Coder, 1998). This can give a false impression that roots are enveloping the drain (Brennan, Patch & Stevens, 1997), but equally it can attract roots towards potentially vulnerable joints in the pipework. The cultivation of soil through the installation of services by open trenching also provides ideal conditions for root growth adjacent to underground services.

Tree roots will usually enter pipes that have a fault, which allows the tree to access the available water, nutrients and oxygen.

Tree roots can enter services via leaking joints and blocked pipes, through deteriorated seals, where the joint has failed or been dislodged or through previous damage. It is rare for a tree root to crack into a properly installed and well-maintained pipe.

Once a pipe has deteriorated or is damaged, roots from all different types of trees, plants and even grasses can grow into the pipe.

The most efficient way to prevent root damage to your services is to replace the old terracotta pipes with new PVC or UPVC ones and use pressure seals. Other methods include the type and compaction of the backfill around these services, which help prevent root growth in these areas. Mechanical forms of plumbing equipment can help control root development in pipes, however this is only a short-term solution.

What do residents/property owners do if they suspect Council-managed trees contribute to damaged pipes?

Where possible the resident or property owner should carry out the repairs and ask Council to investigate. If it can be proved that Council-owned trees have caused the damage, the resident or property owner may be able to claim for the cost of the repairs. In any event, it is best if the resident or property owner undertakes the following:

- 1 If the works require an excavation on a Council road or footpath, the resident/property owner will need to obtain a Works in Road Reserve Permit from the City.
- 2 Carry out any necessary repair work to avoid any further damage and/or reduce the hazard. This does not mean that Council has accepted any liability for damages. It is the property owner's decision to carry out repairs.
- 3 Most importantly, notify the Council of the scheduled works so that Council can arrange for an appropriate City Officer to inspect the exposed pipe during the works. This will enable all parties to confirm if Council tree roots have caused the problem or if the pipe has been damaged for some other reason.
- 4 While on site, the Council officer will take photos to keep on record. The resident/property owner should also keep their own records of the damage and repairs.

If the above investigations reveal the damage has been caused by Council-owned trees, the resident/property owner can make a formal claim for the cost of repairs. Council will assess liability and decide as to whether Council can assist the resident/property owner with the cost of the repairs.

This approach is required for insurance and governance purposes because the works relate to a private asset and may involve spending public funds on the repair. It is important to have clear evidence for any insurance claim, particularly if there is a chance the initial damage may have been the result of other causes. The clearer the evidence provided, the greater the likelihood of a positive result in any claim.

PEST AND DISEASE MANAGEMENT

Pest and diseases are a component of the urban landscape and Council recognises that control measures will be required at times to maintain healthy and aesthetically pleasing landscapes.

Council will adopt the principles of Plant Health Care to address pest and disease management with a focus on problem prevention through appropriate tree selection, planting and tree maintenance.

When selecting tree species for the City of Whittlesea's streets, priority will be given to species that are known to be pest and disease resistant. However, there will be situations where the existing street tree species may be under threat but its ongoing use is imperative considering its strong contribution to landscape character or cultural importance.

Pest and disease management will be approached in the following ways:

Tree managers will have a thorough understanding of the biology of the plants and key pests in relation to the ecosystems they are managing. Ongoing training and education will occur for the staff to maintain current best practice approach to pest management.

Council will support research into biological controls for pests and diseases that pose a threat.

If a pest outbreak is identified and damage thresholds exceed accepted levels and other trees are at risk, all possible action will be taken to effectively decrease the risk to other trees from the pest outbreak.

An integrated approach to pest management will be adopted that employs methods and materials that preserve and augment the ecosystem while facilitating permanent control of the pest.

Advice and management programs will be sought from other agencies or pest control regulator, for example Department of Environment, Land, Water and Planning, to ensure the best approach is being adopted for any pest outbreak.

Trees will be removed when they are infected with an epidemic insect or disease where the recommended control is not applicable and removal is the recommended practice to prevent transmission.

Species of tree will be selected that are known to be pest and disease resistant.

Monitoring systems will be developed to check pests and tree health regularly.

Trees that are recognised woody weed species will be removed when opportunities are presented through the normal management of the City of Whittlesea tree population.

If stakeholders suspect nearby Council trees of harbouring termites that can damage their homes, they will need to provide Council with written documentation outlining the species of termite observed and detailing the extent of the damage caused. Requests for termite treatment of street trees will be considered on a case-by-case basis and may be referred to Council's principle contractor who will undertake the assessment and carry out all treatments as required.

To better protect newly constructed dwellings in the municipality from termite damage Council will continue to investigate the benefits of declaring the municipality (or sections of it) as 'termite prone'.

TREE INVENTORY

The foundation of an effective street tree management and maintenance program is a detailed tree inventory. Council will maintain a dynamic inventory of the street tree resource wherein proactive tree management activities are recorded.

The inventory provides a current record of the street tree population. It allows planning, scheduling, budgeting and monitoring of maintenance activities and contains vital data to facilitate long-term assessment projections and analysis of the condition of the street tree population.

The tree inventory will be utilised for asset value determination and insurance purposes.

The tree inventory will be integrated into Council's Geographic Information System (GIS). It will provide Council the ability to conduct spatial analysis and strategic placement of the street tree population, which will become more important as the impacts of population growth and climate change are felt in the City of Whittlesea.

CANOPY COVER

Council will also establish a methodology for calculating the municipality's urban street tree canopy cover. This will allow Council to easily benchmark its progress in providing adequate tree cover for areas of need in the City of Whittlesea e.g. areas of high socio-economic disadvantage, retail and commercial areas. This can be calculated through a number of methods available to Council:

- i-Tree Canopy tool
- LiDAR and NDVI cover which will need to be undertaken by the GIS team
- canopy width measurements taken as part of tree inventory;
- Or other industry recognised methodology

Canopy cover is to be measured, at a minimum, every five years to determine progress, commencing in 2016. This is a more valuable tool than simply calculating tree numbers as it can determine the overall benefit provided by trees such as shading, air pollution reduction and stormwater interception.

Tree protection

Street trees shall be protected at all times, to the negative impacts of construction and other activities such as maintenance that threaten tree condition, safety or amenity.

Street trees are subject to a variety of pressures, conflicts, changes to land-use and public requests. These pressures lead to damaged trees which may affect their function and viability in the landscape. The primary goal of tree protection is the long-term survival and viability of a tree.

Protecting street trees is a multi-departmental, community-wide endeavour. Protecting and maintaining healthy, safe and aesthetically pleasing street trees is vital to Council achieving its desired landscape, social and environmental objectives for the City.

AS 4970:2009 *Protection of trees on development sites* is used as a guide in the allocation of tree protection zones for trees.

Considering the unpredictability of tree root growth in urban landscapes, it is impractical to prescribe a symmetrical tree protection zone to street trees. Tree protection measures, as outlined in the Technical Guidelines and Appendix 1, will be implemented for street trees threatened by construction impacts. To eliminate the possibility of construction work undertaken around street trees threatening public safety, a minimum distance, the structural root zone (SRZ), as outlined in AS 4970, shall be maintained for street trees at all times.

Maintaining the structural integrity of Council-managed trees is paramount in the risk management process.

Major root pruning will not be permitted without the approval of the Parks and Open Space Department. All proposed construction/excavation works within the root zones of Council-managed trees should be approved by the Parks and Open Space Department.

PROTECTION OF RIVER RED GUMS

Mature River Red Gums, *Eucalyptus camaldulensis*, in an open plains grassland environment are generally recognised as the most important visual and environmental feature of the City. Remnant River Red Gums are protected by the City of Whittlesea Planning Scheme, specifically, Clause 22.10. This clause has enabled the City of Whittlesea to retain as many River Red Gums as possible. The specific tree protection guideline applicable to River Red Gums, endorsed by the Department of Environment, Land, Water and Planning, has proven effective in protecting these trees throughout the subdivision development of the City.

VANDALISED TREES

The act of wilfully vandalising or poisoning trees breaches Council's General Municipal Law (Local Law) and undermines all of Council's efforts to sustain trees in the public realm in a safe and aesthetically pleasing manner. The Local Law states that "unless with the written approval of Council, a person must not in any way interfere with roadside or park land trees; or plant trees or shrubs on roadsides".

The illegal action of tree vandalism has led to the destruction of many valuable public trees and requires intensive management regimes that impact on Council's time and resources. The management of the urban green space to ensure it is of a high standard can help to reduce the prevalence of crime and vandalism.

To address the wider issue of tree vandalism, Council will take the following steps:

- Educate the public and improve public perceptions of trees, including:
 - encouraging people to report vandalism when seen
 - reminding people that it is against the law to vandalise a Council tree.
- Where street trees are suspected of vandalism, erect signs to inform the public as to what has happened to the tree and reinforce Council's commitment to trees.
- Replace vandalised trees, particularly younger trees, as soon as is practicable to reinforce Council's commitment to trees.
- Vandalism is a significant cause of young tree mortality. Trees damaged or vandalised to the point that their replacement is required shall be removed, the site reinstated to grass and the vacant site noted for subsequent planting programs.
- Larger tree stock shall be used in areas known to be prone to vandalism.



5

Tree removals

The City of Whittlesea will investigate all tree management options before recommending tree removal. Council will consider the contribution each street tree makes to neighbourhood character, liveability, wildlife habitat and the tree's role in adaptation to climate change when making all tree management and removal decisions.

Street trees provide significant benefits to the community by way of improved amenity and reduction in the urban heat island effect, therefore Council will not support individual requests to have trees removed, or subjected to additional pruning, in order to:

- reduce or eliminate leaf litter or tree debris
- improve private amenity
- increase car park numbers
- reduce overshadowing and/or preservation of solar access
- preserve lines of sight to advertising boards.

There are circumstances in which tree removal is an acceptable management option for public trees. In this regard, tree removal may be required:

- when trees pose an unacceptable risk to human health and safety or infrastructure
- when trees pose an unacceptable risk to private and/or public infrastructure.

To assess and validate these risks, Council will apply the process outlined in Section 2.

Tree removal may also be required to:

- facilitate Council-approved development and infrastructure improvements
- maintain a healthy urban tree population and/or control epidemic pest/disease outbreaks
- eliminate environmental woody weeds.

Generally, removal of dead and dangerous trees is undertaken during the proactive urban area street tree inspection and pruning program.

Tree removal will also occur in response to emergency, such as a burst water main or storm events. In emergency situations notification to affected residents may not be possible prior to removal.

Tree removal and replacement programs will also be instigated based on the low useful life expectancy trees identified in the tree inventory and within the 10-year Street Tree Renewal Program Plan.

Council will consult with the community about all major projects involving tree removal.

Requests for tree removal will be subject to the tree removal request assessment procedure and will only be accommodated when one or more of the following criteria are met:

The tree is dead or in severe decline.

The tree or tree group poses a very high potential risk that cannot be corrected by pruning, transplanting or other contemporary arboricultural treatments. In this case, the MAV tree risk assessment tool used by Council's arborists must identify that the tree or tree group pose an unacceptable level of risk.

The tree severely interferes with a neighbouring tree to the extent that neither tree can develop to its full potential. In this case, the more desirable tree will be preserved.

The aesthetic values of the tree or tree group are so low that the site is visually enhanced by the removal of the tree or tree group.

All efforts to develop a technical solution to preserve the tree or tree group are considered and implementation of the technical alternative will not be cost-effective.

The tree is found to be contributing to damage to public or private property and no other viable means are available to rectify the situation.

The tree or tree group is infected with an epidemic insect or disease where the recommended control is not applicable and removal is the recommended practice to prevent transmission.

The tree or tree group is recognised as an environmental woody weed species.

The tree or group of trees is included in Council's street tree renewal program.

Council acknowledges that all trees will shed debris, leaves, bark, flowers, or fruit at some time during a given growing season. Tree selection will aim to avoid the use of trees that drop excessive debris, particularly fruit, which can cause trip hazards. Debris alone will not be the sole criteria for the removal of a street tree.

Similarly, some street trees may be considered as contributors to seasonal allergies or hay fever. However, street trees will not be automatically removed if they are reported as a potential allergen. Residents reporting trees as a cause of allergic symptoms must provide a medical statement from a specialist in the relevant field supporting their claim. The certificate should certify that the specific tree a person identifies as causing a specific allergenic problem is significantly diminishing the quality of life that person enjoys.

Decisions on tree hazard and associated risk rating will be made after the tree has been inspected and assessed by a suitably qualified person.

6

Tree value

Street trees will be financially valued proportionate with the many benefits that they provide to the community. Council will charge a cost recovery fee to ensure the community are compensated for the loss of street trees as a result of development.

When a stakeholder makes a request to modify Council land which results in the removal of a Council street tree asset, a cost recovery fee will be charged by Council.

The fee is charged to enable Council to recover the value associated with removing any existing street trees as a result of development. It ensures the community are compensated for the loss of the trees and also allows Council to replant new trees as required, along the same frontage where possible, and maintain the replacement trees for a period of two summers.

The fee structure is outlined below and is structured such that small trees – i.e. those less than 5 metres in height – currently attract a cost recovery fee of \$500 inclusive of GST. Cost recovery fees applicable to Council trees over this size, however, are calculated using the following formula:

Revised Burnley Method (ATV) + Purchase + Planting (BASE VALUE) + 2 Summers' Establishment.

STREET TREES	CURRENT COST INC. GST FY 18/19
Cost Recovery and Replacement Fee (New or juvenile); 5m in height or less	\$500
Cost Recovery and Replacement Fee (Other)	(ATV) + Purchase + Planting + 2 Summers' Establishment = ATV + 145 + 78 + 271

Table 3: Cost recovery fee structure associated with street tree replacement

This fee is subject to change based on approval from the Finance Department.



Community engagement

Council will engage thoroughly with residents about street tree planting and management in their local areas.

An improved understanding of street trees and urban greenery will be provided through:

- A** Regular articles in local papers and Council newsletters on trends relating to urban greenery covering a range of related topics such as health and wellbeing, the importance of green in growing cities, innovative ways to bring nature into the City, nature's role in shaping perceptions of neighbourhood satisfaction.

- B** Website content dedicated to information about the City of Whittlesea's urban street trees:
 - i. benefits of trees including Q&As specifically about benefits of street trees to the municipality
 - ii. myths about trees
 - iii. contact Council about a street tree
 - iv. Street Tree Management Plan
 - v. community activities
 - vi. information about the proactive urban street tree inspection and pruning program.

- C** Consultation about tree selection for the street tree renewal program will be undertaken with residents where street tree planting and renewal will occur through written correspondence.

- D** Advice on tree removal where appropriate.

Actions for ongoing street tree management

Street trees are an important Council asset.

The following actions have been developed to ensure that street trees remain an important Council asset. It is imperative that their management processes are regularly reviewed and that street tree information is regularly communicated to the community.

Council will undertake the following actions over the course of this Street Tree Management Plan which will run for 10 years to the year 2026. At this time, the Policy, the Technical Guidelines, the 10-year Planting Renewal Program Plan, and the species selection palette should all continue to be reviewed and updated where appropriate. The species selection palette should be removed from the Plan and maintained as a separate list.

Council will:

- 1 Actively promote the benefits of street trees, current works and relevant information through a range of communication tools e.g. Council website, social media, local news outlets.
- 2 Include diagrams on the website on best practice street tree management that is relevant to residents e.g. how to plant a tree, planting in hard paved areas, species selection based on site analysis.
- 3 Integrate street tree benefits and outcomes into the following documents as and when reviews arise:
 - i) Council Plan
 - ii) Environment Sustainability Strategy
 - iii) Open Space Strategy
 - iv) Road Management Plan: incorporate effects of trees on traffic calming
 - v) Stormwater Management Plan
 - vi) Climate Change Adaptation Plan
 - vii) Green Wedge Management Plan
 - viii) Playspace Planning
 - ix) Whittlesea Township Strategy
 - x) Integrated Transport Strategy/summary
 - xi) all master plans and structure plans
 - xii) City of Whittlesea Community Plan
 - xiii) Municipal Public Health and Wellbeing Planning and Climate Change
 - xiv) Neighbourhood Character Study (when commenced).
- 4 Continue to consult local residents on street tree planting program.

- 5 Update the Developer Guidelines to reflect best practice street tree management as per this Plan.
- 6 Conduct information seminars for all contractors and relevant internal staff on various aspects of best practice street tree management e.g. quality control, tree planting, pruning etc.
- 7 Print and distribute fact sheets for all relevant contractors and staff on best practice street tree management. Also to be handed out at pre-commencement meetings for developer works.
- 8 Develop a Street Tree Communications Plan to map out activities and target audiences for improving information sharing between Council and the community.
- 9 Advocate to include the tree inventory in Council's asset management system.
- 10 Measure canopy cover and set methodology so it can be measured easily every five years.
- 11 Build regional relationships advocating principles and objectives of STMP: developers, NAGA, conferences, MPA, other growth area councils. Ask NAGA to be a conduit for this discussion.
- 12 Review best practice biannually and ensure technical manuals, standards and guidelines are updated.
- 13 Strengthen planning permit conditions around the protection and retention of street trees.
- 14 Coordinate the street tree renewal program with the road rehabilitation program.
- 15 Investigate increasing street sweeping frequency where tree debris is excessive due to species type.
- 16 Implement a large tree management program which includes:
 - increasing proactive inspections towards an annual program for trees which are large, older or under electrical power lines
 - widening verges to create more space for existing larger trees where appropriate.
- 17 Develop and implement tree removal request and tree root damage assessment procedures.
- 18 Develop fact sheets for tree removal request and tree root damage assessment procedures.
- 19 Develop a drought response plan which includes:
 - Street tree renewal and annual street tree planting programs may be placed on hold subject to water availability
 - Street tree renewal funds will be diverted to maintain existing tree health where required
 - once the drought has broken, street tree renewal and annual street tree planting programs will resume to ensure gaps in streets are filled and dead trees removed and replaced as required
 - a community engagement strategy to tell the community what we are doing in response to the drought.



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Appendix 1

TPZ REQUIREMENTS

Tree protection fencing

Street tree protection fencing used must:

allow for free and clear passage of pedestrians on the footpath and adjacent portion of the street

provide for clear visibility of fire hydrants, driveway access, crosswalks, etc (mesh fencing should be used).

AS 4687:2007 *Temporary fencing and hoardings* provides guidelines for temporary fencing. The TPZ fencing must be secured to restrict access. Existing perimeter fencing can be incorporated into the protective fencing. Signs identifying the TPZ are to be placed on the fencing.

Tree fencing shall be erected before demolition or construction begins and remain in place until final inspection. No advertising material is to be placed/ displayed on the TPZ fencing at any time.

Groups of trees can be incorporated into one fenced area using linear fencing to encapsulate the group.

An example of signage for TPZ includes a black sign with the words 'Tree Protection Zone – No Access'.

An example of appropriate TPZ fencing around a street tree is an image of a street tree on a nature strip. Surrounding the tree is a temporary fence, made of wire, secured by concrete feet, measuring about six feet high.

No fencing

If no fencing can be installed around a street tree to protect it during development then the street trees will require trunk and branch protection. The trunks are to be loosely wrapped in hessian to approximately 50 millimetres thick to act as padding. This could be secured with some form of tape while 45 millimetre-thick wooden slats are placed around the trunk and firmly secured. Caution shall be used to avoid damaging any bark or branches. Major scaffold limbs may also require this treatment (dependent on any scaffolding or gantries installed). To finish off, para webbing is to be wrapped around the timber slats to improve visibility and reduce public risk.



Appendix 2

This report was produced by Tree Logic and Urban Forest Consulting in conjunction with officers, Councillors, residents and stakeholders of the City of Whittlesea in 2015/2016. A further review of the Street Tree Management Plan was undertaken in consultation with Council, amendments made and the Street Tree Management Plan 2019 adopted by Council

Tree Logic is an arboricultural consultancy providing professional advice about trees and street tree management, as well as engagement and community education programs relating to the essential role that trees play in cities and towns.

Urban Forest Consulting provides strategic and technical advice to help green cities a cross Australia.





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