Street Tree Guide 2020
Part Three: How we plant street trees
Street tree planting

Within the city new tree planting takes place across a range of different environments. Some are planted in soft green verge areas commonly found in more residential parts of the city (softscape planting). Others are installed in busy, hard paved pedestrian streets that characterise the center of the city (hardscape planting).

As part of its current infill street tree planting program the City is proactively planting new trees where there are gaps in existing street tree planting, in both hard and softscape environments. Wherever possible, new tree planting is also designed into all capital works projects including streetscape upgrades and revitalisation of public spaces.

New street trees may also be planted to replace existing street trees. These may have been damaged, or have reached the end of their useful life expectancy, requiring them to be removed in accordance with the City's standards for tree removal and replacement.

In general, the City adopts an opportunistic approach to new street tree planting in order to maximise canopy cover within the public realm. New trees will also be planted wherever suitable planting sites may emerge as part of new developments or changes to the layout and design of existing streets and spaces.

Carefully considered planning and design processes help ensure that new street tree planting makes a unique and valuable contribution to the quality and legibility of the public realm and maximises the potential for urban cooling.

Streets lined with mature trees, enclosed with interconnected canopies, are often considered amongst the most beautiful and memorable places within cities. The use of tree planting patterns and palettes, that reinforce a particular street's status within the city's urban structure, can improve legibility and help with pedestrian way finding. In addition, research shows that, in streets where tree placement promotes the development of high quality interconnected canopies, average day time temperatures can be up to ten degrees cooler than streets with no canopy cover.

A range of issues are considered and resolved when planning and designing new tree planting anywhere within the city. These include tree size, form and structure, species mix, planting patterns, tree placement and the implementation of best practice tree planting processes and procedures. These all have the potential to impact on both the visual quality of the public realm and how people experience streets and public spaces.

This part of the Street Tree Guide sets out the City's approach to the planning, design and planting of new street trees, including:

- the key urban design principles that underpin planning and design processes
- guidance on the placement of new trees within the street environment
- tree procurement processes; and
- best practice planting standards and procedures.
Key urban design principles

The planning and design of street tree planting is informed by the following urban design principles:

- Enhance City Legibility & Way Finding
- Reinforce Local Character and Sense of Place
- Support Urban Cooling
- Create Biodiversity Links
Enhance legibility and wayfinding

The City of Perth has its own distinctive urban structure created from a combination of the street grid, with its hierarchy of major and minor streets, topography, built form and landscape.

The urban structure helps to give a sense of order and purpose to the city’s various activity centres. The street hierarchy, gateways and landmarks can all provide visual cues that help people orientate themselves as they navigate their way through the city (see Figure 3).

New tree planting can be particularly effective in enhancing city legibility and wayfinding. The use of a single species, or a limited range of tree species with complementary qualities and attributes, can help to give city streets and spaces their own distinctive character and reflect their place and status within the city’s overall urban structure. Tree plantings in Las Ramblas in Barcelona and on the Champs Elysees in Paris are good examples.

Selecting a tree species with a size and form that is appropriate to the scale of the street in which it is planted can also help reflect a street’s place within the city’s street hierarchy and its role and function. This can also assist with wayfinding, helping pedestrians to differentiate between minor, local access streets and more major streets that link city neighbourhoods and activity centres within the city.

At present, many streets within the City of Perth are planted with a wide range of tree species of varying size, form and structure. This lack of co-ordination limits the ability of street trees to contribute to city legibility and way finding.

New street tree planting will use more limited planting palettes, selecting species with a form and structure appropriate to the spatial qualities, scale and function of key streets and spaces in which they will be planted. It will be generally based on extending the planting of existing dominant tree species where they meet the required selection criteria and are currently performing well within the street environment.

Distinctive tree planting, which considers features such as tree size, from, foliage and flowering will also be used to mark out key city gateways and landmarks.
Figure 3: Urban structure.
Reinforce local character and sense of place

The City of Perth has six neighbourhood areas, each with their own distinct identity. The use of distinctive street tree planting patterns and palettes can help to reinforce and strengthen the existing or desired neighbourhood identity, marking out key features or spaces that contribute to their overall character. This can also help to foster a sense of place and community attachment to a local area.

**Historic character:** A particular tree species or planting pattern may be selected to reflect and reinforce what has been done historically within a particular city location.

In some instances, specific species and plantings may be listed for protection, such as the *Ficus macrophylla* (Moreton Bay Fig) planted on Murray Street.

**Cultural character:** New tree planting can help to acknowledge areas of cultural heritage significance to Aboriginal and Non Aboriginal communities, particularly where it is informed by, and responds, to specific associations with place.

The use of a special tree species can support the development of a unique identity for particular city streets and spaces. Mount Street is a good example where large *Jacaranda mimosifolia* (Jacaranda) trees transform the street into a distinctive sea of purple as they reach their flowering period each spring.

**Natural character:** The character of a street or space may be determined by a strong association with the city’s natural physical environment. This may be a specific landform, such as the river front, or a predominance of native vegetation. New tree planting will be designed to reflect this setting.
Support urban cooling

One of the main benefits of street trees is their ability to help cool the city and reduce temperature ‘hot-spots’. Research indicates that the design of new street tree planting can influence the level of cooling delivered. To achieve the largest air temperature reductions and improve outdoor thermal comfort for pedestrians planning and design processes should consider the following:

**Areas of low canopy cover:** Dense urban environments with little or low levels of canopy cover, or other vegetation, should be prioritised for new tree planting.

This is particularly the case where these areas coincide with high use pedestrian areas, major gathering spots, public transport networks or populations that may be particularly vulnerable to heatwaves (i.e. the elderly, very young or low socio-economic groups).

**Regular distribution:** Streets make up nearly 80 percent of the public realm. As a tree’s cooling effect is generally limited to its immediate area new street trees should be planted as regularly as possible across the city’s street network. This can be a more effective strategy for promoting urban cooling than relying on large green parks scattered at irregular intervals across the landscape.

**Street orientation:** Wide open streets with an east-west orientation should be targeted for new tree planting, particularly on their southern side as this is where the effects of solar radiation are concentrated. The eastern side of north-south orientated streets should be targeted for similar reasons.

Create biodiversity links

New tree planting will also draw on local endemic tree species, where possible, to support the development of primary and secondary biodiversity links within the city (see Figure 4). These links will help create a green infrastructure network that can support habitat creation and improve biodiversity within the city.

Primary biodiversity links are defined as corridors that include significant and diverse GI assets such as large green spaces, parks and gardens - for example, the Swan River Foreshore, Kings Park and Bush Forever areas at J H Abrahams. These links support and encourage fauna movement. They also provide habitat and a safe place to breed. The species diversity within these links is classified as high in terms of both flora and fauna.

Secondary biodiversity links are defined as smaller GI assets such as verges, medians, laneways, pedestrian accessways and pocket parks that interconnect with primary links. They may be located along city streets within the CBD, as well as residential precincts with a more suburban character, such as Crawley/Nedlands.

Streets that currently have a high proportion of soft verge treatments, significant trees and canopy coverage or have greater potential to increase canopy cover and understorey planting can help link the primary links to an interconnected, diverse GI network. Secondary links serve as corridors for movement of birds and, in limited instances, smaller animals such as lizards.

Some secondary biodiversity links are planted with non-native species that have been shown to have some biodiversity value. For example, both *Liquidambar styraciflua* (Liquidambar) and *Jacaranda mimosifolia* (Jacaranda) have been identified as providing foraging opportunities for native bird life.

Other secondary biodiversity links planted with non-native trees have the potential to provide biodiversity value through improved low level planting of native plant species in existing wide green median spaces. Examples include Mounts Bay Road and Stirling Street in Northbridge.
Tree placement

A number of key issues are considered when deciding where to place new trees within a street. These include:

- existing and desired planting patterns
- maximising canopy cover over streets and spaces
- managing competition for space with other street infrastructure.

New street trees will generally be placed along the outside edge of the street. They will be planted near to the back of the kerbline located between the edge of the pedestrian pavement and the adjacent roadway.

Wherever practicable, the placement of new street trees will reinforce existing planting patterns. However, in some instances existing trees may be poorly located. Where this is having a negative impact on levels of access, or the functioning of other street infrastructure, an alternative planting pattern may be required.

New and more formal planting patterns may also be used in the upgrade of major city streets and spaces to reflect their status in the city’s urban structure.

Wherever possible new trees will be spaced to facilitate the development of continuous and connected canopy over city streets. The City will also generally give priority to new tree planting when allocating space within streets and spaces for other elements of city infrastructure such as seating, lighting and bins.
Planting patterns

Planting pattern is a primary consideration in the design of new tree planting. Existing configurations, spatial constraints and the character and function of individual streets and spaces are all taken into account to determine the most appropriate pattern for each individual street. A number of different tree planting patterns are currently evident throughout the city.

**Avenue effect:** Tree avenues are often considered some of the most beautiful and memorable places within a city. The magnificent *Platanus x acerifolia* (London Plane) that provide a cathedral like ‘roof’ to Victoria Avenue in Central Perth provide a good example of this.

An avenue effect is best achieved through the planting of a single tree species on both sides of a street. Large canopies interconnect and reach over the footpath and roadway to provide a protective ‘cover’ and human scale (particularly important for streets flanked by high rise buildings).

Avenue planting can be formal (with symmetrically spaced trees of a single species) or informal (where a single species of tree is planted in an asymmetrical pattern).

**Double row of street trees:** Planting double rows of trees can be a particularly effective strategy for creating ‘spaces’ with higher levels of pedestrian amenity within streets. The use of a special tree species can also help to highlight these areas.

The double row of *Ulmus parvifolia* (Chinese Elms) planted on the southern side of Railway Street in West Perth provide a good example of this, helping to create a pedestrian node close to City West Station and the CAT bus route.

Double row planting will only occur where footpath widths allow. This planting pattern may not be implemented along the entire length of the street, but can be done in particular sections where the footpath is wider.

**Alternative configurations:** The ability to plant street trees with an even spacing or predetermined set pattern is often difficult due to the location of other city infrastructure or the presence of existing mature street trees.

This can result in a more informal and irregular planting pattern within a street or space, however, the use of a single tree species can help to counteract this.
**Planting patterns**

**Feature trees:** Special or unique trees can be selected for planting at strategic locations within individual streets or spaces to emphasise a particular function or city feature - for example a gateway, node, landmark or heritage building. The *Ficus macrophylla* (Moreton Bay Fig) planted on Murray Street in Central Perth is a good example of this. Feature trees are generally chosen because of their contrasting form, scale or distinctive seasonal features, including colour variations in foliage, flowers or bark. The selection of an appropriate feature tree depends very much on location and the particular effect that is required.

**Traffic calming:** New tree planting can play an important role in helping to slow traffic in city streets improving pedestrian perception of safety. Planting trees closely together, along the back of kerb can provide a physical buffer that separates pedestrians from moving vehicles. A planting pattern that creates interconnected canopies can help enclose the street and create a visual narrowing effect which can encourage drivers to drive more slowly. Planting trees in extended kerb build outs, located at street intersections or along a particular street, can achieve a similar effect.

**Tree clusters:** Where there is adequate space available within a street, new trees may be clustered together into groups. This can support the development of connected canopy cover, maximising shade and delivering greater reductions in air temperature. Grouping trees in this way also allows them to protect each other from the effects of high heat and subsequent water stress.

Planting plans should also allow for intermittent breaks in continuous canopy cover. This will enable any heat trapped under the canopy during very hot days to escape at night, helping to reduce night time temperatures in the city.

Tree spacing

In general, a minimum spacing distance of six metres is applied between street trees. This provides adequate space for healthy canopy growth while also encouraging the development of interconnected canopies over city streets.

Canopy size and shape varies depending on tree species. Larger trees may require additional spacing to allow for healthy canopy growth at maturity.

It is important to note that the harsh growing environment in city streets means trees often do not reach their maximum size. Many trees species can be planted closer together in city streets than would be required in a more natural setting.

The final decision on tree spacing within a particular street takes all of these factors into account.

Figure 5: Tree spacing and canopy cover.
Avenue planting in Murray Street Mall, Central Perth
Street trees with seasonal colour on Murray Street, Central Perth
Other street infrastructure

City streets are busy, multifunctional places. Trees must compete for space against other city infrastructure including street furniture, lighting and public art, and functions such as pedestrian, cyclist and vehicle movement.

When allocating space within streets the City’s primary objective is to ensure that they are open, welcoming and safe for all, to support active and diverse city life.

Pedestrians are given priority and should have an unobstructed path of travel to allow them to move directly and comfortably along city streets, regardless of ability. A consistent pedestrian clearance zone should be provided against the building line. Its width will vary depending on street function and where it ranks in the street hierarchy.

Public realm infrastructure, including street trees, is located within a public realm infrastructure zone. This is located between the back of kerb and the edge of the pedestrian clearance zone (see Figure 6).

Ideally new tree pits should be placed at least 400mm from the back of kerb. Strict adherence to this, and other clearances, can restrict the City’s ability to get much needed street trees in at key locations. Each situation is reviewed on a case by case basis, with the City endeavoring to plant a tree wherever this can be practically achieved. Trees will only be installed where a pedestrian clearance zone with a minimum continuous width of 1.5m can be maintained from the edge of each tree pit.

Figure 6: Cross section showing the street zones and space allocation.
COMPETITION FOR SPACE

The final decision on where to place a new street tree is based on a detailed assessment of each planting site. While every attempt is made to ensure that appropriate clearances and distances are maintained between all the different elements of street infrastructure, it is not always possible to meet every requirement.

The City recognises the need to take an even and realistic approach to managing potential conflicts as different elements of infrastructure compete for space within the public realm infrastructure zone. Priority will generally be given to new tree planting on the following basis:

- Trees have the potential to deliver a greater range of community benefits compared to other infrastructure.
- Due to their long life span trees can be expected to remain in the street and deliver these benefits for much longer compared to other infrastructure.
- As the level of community benefits delivered is dependent on the level of quality canopy cover provided it is important to fit as many trees as possible into city streets.
- The nature of trees means that their position and location is relatively fixed, whereas other street infrastructure can move more easily and at less expense. Wherever practicable other infrastructure will be repositioned to facilitate new street tree planting and maximise healthy canopy growth.

STREET LIGHTING

A common concern expressed with regard to new tree planting is that tree canopy may block street lighting. This can result in lower levels of public lighting which can affect people’s perceptions of personal safety after dark.

This issue is addressed in detail in the City of Perth Public Lighting Framework 2019-2029. The framework proposes a number of measures to reduce any potentially negative impacts of both existing and new tree planting on the performance of public lighting, as follows:

- New lighting designs must address the impact of existing and new street tree canopy on levels of public lighting.
- The placement of new lighting poles should minimise any conflict with street trees.
- Light fittings should be selected and placed carefully in relation to existing and proposed tree canopy. This can include the use of shorter light poles and or longer bracket arms to place the luminaire outside the tree canopy.

Other measures include the use of supplementary street lighting and the adoption of new lighting technologies and innovative design solutions, such as lighting the tree itself, to help improve overall lighting levels within tree lined streets.
Tree procurement

Wherever possible, the City uses contract growing to procure its street trees. Under this process advance orders are placed for the required tree species, numbers and sizes.

Contract growing has advantages for both the City and tree suppliers. For the City it can help secure the quantity and quality of tree stock required for each planting season in line with planting project timeframes. It can also help ensure the availability of new tree species for trialling, which would otherwise not be widely available.

Tree suppliers are provided with certainty on the species, size, quality and numbers of tree stock that will be required. This allows them to invest and forward plan for the production of high quality stock, and to source less commonly available species for trialling in a timely manner.

The City will seek to procure trees across a number of different accredited nurseries and suppliers, where it is not possible to contract grow due to project delivery constraints.

Where new native trees are to be planted in city streets that interface with Kings Park the City will seek to collaborate with the Botanic Gardens and Parks Authority (Kings Park) to source tree stock directly from them. This will help maintain quality and match the genetic integrity of the native tree population within the Park with trees planted in the immediate vicinity.

What do we look for?

All tree stock supplied to the City is required to be of high quality and grown in accordance with Australian Standard AS 2303:2015

Before making its final selection the City undertakes a visual inspection of each tree to check it against key requirements. In the case of contract growing, the City undertakes periodic visual inspections of each tree at key growing stages. This allows any issues that may be affecting the quality of tree stock to be identified and addressed early in the growing process, well in advance of their eventual supply to the City.

TRUE TO TYPE

Trees selected must be exactly as specified in terms of genera, species, variety (for a recognised cultivar) and species provenance (i.e. identified source of production material) particularly with the supply of native trees.

TREE HABIT

In general trees should have a uniform habit and be self-supporting with an appropriate balance between the root ball and canopy. Self-supporting trees can be successfully planted within the streetscape without the use of stakes, which is the City’s preferred method of planting.

Each tree’s crown, trunk and root system is examined for damage, flaws and other defects that will make it difficult for the tree to establish and thrive once planted.

CROWN

The tree’s crown is checked to ensure that it:

• is proportionate to the tree trunk and root ball size
• is well balanced either side of the stem axis. Any imbalance should not exceed 60/40
• has a clearly defined central leader with an intact and active apical bud. This can reduce the risk of stem failure in the longer term
• has healthy leaves of an appropriate size, texture and colour consistent with healthy specimens of each species
• is free of pests, diseases, chlorosis or necrosis
• has not been unnecessarily pruned to remove low branches. Wherever possible, as much canopy as possible is to be retained.

TRUNK

Trees selected for planting in streets should have a straight, vertical single trunk that is located roughly in the centre of the tree compared to crown and root ball diameter. The trunk should also be:

• centrally located within the planting container
• proportionate to total height, dependent on species
• undamaged and free of deformities
• free of branches for at least 1.8m where possible. Where this is not possible, trees with the potential to achieve this clear stem height with the successful removal of branches may be acceptable
• exhibiting sound stem junction at branch level.
Trees should also have a good stem taper. This is a measurement of the degree to which the width of the tree’s trunk decreases along its length, in proportion to height. Appropriate standards, based on tree size, are:

<table>
<thead>
<tr>
<th>Tree size</th>
<th>Width of tree trunk</th>
<th>Length</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>100lt tree</td>
<td>min 50mm</td>
<td>1m &amp; 60mm</td>
<td>300mm</td>
</tr>
<tr>
<td>200lt tree</td>
<td>60-75mm</td>
<td>1m &amp; 80-85mm</td>
<td>300mm</td>
</tr>
<tr>
<td>400lt tree</td>
<td>100-125mm</td>
<td>1m &amp; 150mm</td>
<td>300mm</td>
</tr>
</tbody>
</table>

ROOTS
Trees supplied for planting should be root balled or containerised. Bare rooted trees are generally not acceptable. The tree’s root system is also checked to ensure the following:

- roots are white in appearance and healthy
- the root crown is at the surface of the rootball
- roots are well distributed throughout the container and grow in an outwards or downwards direction. There is to be no indication of circling or girdled roots
- at least 90 percent of the soil volume around the root ball should remain intact when the tree is handled or removed from the growing container.

CROWN:
- Proportionate to trunk and root ball
- Well balanced
- Clearly defined central leader
- Healthy leaves
- Free of pests and diseases
- Pruned appropriately

TRUNK:
- Centrally placed
- Proportionate to tree height
- Free of deformities
- Sound stem junctions
- Min 1.8m clear stem

ROOTS:
- Root crown at surface of rootball
- Well distributed – no circling or girdling
- White and healthy
- Soil volume intact when removed from growing container

TREE SIZE
In general trees that are suitable for street planting must be at least 100lt in size but can range up to 500lt for significant streetscapes.
Nursery practices

The way that trees are grown and managed in the nursery setting can have an important impact on their overall quality. The City only sources trees from accredited nurseries that demonstrate compliance with the requirements of Australian Standard AS 2303:2015.

In general, the City takes the following factors into account in the tree selection process:

- appropriate handling between the nursery, holding sites and the planting site to avoid damage to the tree
- root system management and individual production tasks such as pruning, potting and picking out
- hardening off tree stock within adequate timeframes to allow their successful transition from the relatively protected nursery environment into more challenging street environments
- biosecurity measures to ensure that threats posed by pathogens and pests are minimised.

Each tree should also be clearly labeled with its species and appropriate numbering system which will allow tree stock to be tracked to ensure quality control. In the case of contract grown trees each should be labeled as being allocated to the City of Perth. All labels should be placed on the tree itself rather than on the planting container.

Each planting container should clearly indicate the north point to ensure that trees are planted in the same orientation in both the nursery and at the planting site. This helps to shelter the bark from excessive sun exposure which can cause sunscald and damage the tree. This is particularly important for trees greater than 100lt.

Non-conforming trees

Trees which do not conform to the City’s standards are rejected. However, it is important to remember that trees are natural and living things. Unlike other manufactured streetscape elements, such as street lighting or furniture, they are likely to vary from set standards.

As such, the City’s selection requirements are intended as a general guide, designed to help maximise the consistent selection of healthy and sustainable tree stock.
Tree planting

The process of planting new trees within city streets is guided by an agreed scope of works and a range of relevant procedures, standards and technical guidance.

Typical scope of works

The typical scope of works for new tree planting includes six main stages.

1. **STAGE 1: PLANNING**
   - Initial site selection

2. **STAGE 2: PRIORITISING**
   - Priority setting

3. **STAGE 3: PREPARATION**
   - Final site selection

4. **STAGE 4: PROCUREMENT**
   - Order
   - Engage
   - Inspect
   - Deliver

5. **STAGE 5: PLANTING**
   - Site preparation
   - Tree planting

6. **STAGE 6: AFTER CARE AND MAINTENANCE**
   - Post planting inspection
   - Data capture
   - Management
   - Quarterly inspections

Quarterly inspections
STAGE 1: PLANNING
Initial site selection: An initial visual inspection is carried out to identify where gaps in existing street tree planting may create an opportunity for new trees to be installed.

STAGE 2: PRIORITISING
Priority setting: Opportunity sites are then mapped and prioritised for planting.

Streets with softscape areas are generally planted first. This allows additional time for more detailed site investigation and preparation work that is required before planting in hardscape areas.

Where possible planting sites are also assessed against a range of criteria including:

- location of temperature ‘hot-spots’
- areas with high levels of pedestrian activity
- presence of vulnerable populations, including young children and older people
- location of proposed green infrastructure networks
- the City’s capital works program.

STAGE 3: PREPARATION
Final site selection: Given the complexity of the street environment new tree planting can be a lengthy and costly process, requiring the co-ordination of a range of activities.

‘Dial before you dig’ and trenching investigations are undertaken to identify the location of underground utility service pipes and cables. Soil testing may also be carried out to see if any soil modifications are needed to help promote tree establishment and growth.

The outcomes from these investigations allow a final decision to be made on tree species, numbers and size along with planting site locations and tree pit design. This information is generally captured in individual neighbourhood planting plans.

New street trees are generally planted into the City’s standard tree pit. Where opportunities for stormwater harvesting exist, appropriate infrastructure will also be installed to facilitate this.

Below ground structural cells may be used in areas where there are high levels of pedestrian activity but poor underground planting conditions due to the location of services or poor soils. Improving the growing environment in this way will help support healthy canopy growth in those parts of the city that need it the most.

Engage: Before the start of each tree planting program the City engages with the community to provide information on tree planting locations, the species chosen and the proposed timeframe for the work.

STAGE 4: PROCUREMENT
Order: Once the neighbourhood planting plans have been finalised new trees are placed on the City’s grow order.

Inspect: The City undertakes regular inspections of new tree stock, as they are being grown, to ensure procurement standards are being met and new tree stock is healthy and of high quality.

Deliver: Each new tree is given a final inspection before being approved for delivery to the City. Delivery is staged to meet new tree planting programs. Where necessary, trees can be temporarily held and cared for at City depot sites.
STAGE 5: PLANTING

Site preparation: Each planting site is fenced off and any paving is removed to accommodate the tree pit. The pit is then excavated by hand to the required depth and width. Where possible this is done the day before planting to improve soil aeration.

This is followed by the installation of the agreed tree pit design. Dependent on the quality of below ground conditions, existing soil within each tree pit will be totally or partially replaced in accordance with the City's soil specification. Once the tree has been planted a tree grate is installed, where necessary, and paving is reinstated.

Tree planting: To maximise a tree's chances of becoming established it is important that appropriate care is taken during the planting process. This includes:

- avoiding damage to the root ball when the tree is removed from its growing container
- pruning roots to make sure all circling roots are either cut off or aligned radially into the surrounding soil
- centering each tree in the planting hole
- backfilling appropriate soil mix around the root ball and tamping lightly to eliminate air pockets. The top of the root ball should be free of soil and located approximately 85mm below paved level to allow installation of the tree grate, where required
- watering in stages during backfilling
- applying fertiliser, or other required soil amendments, to each tree once planting is completed.

STAGE 6: AFTER CARE AND MAINTENANCE

Post planting inspections: Once planted, each new street tree is inspected to ensure it has been planted in accordance with the City's standards and practices.

Data capture: Once a new tree has passed its post planting inspection it is given a unique ID number and captured within the City's central tree database. This database records the location and performance of each tree against a range of key performance indicators. The database is an important tool for the strategic management of the urban forest and the on-going care and maintenance of each street tree.

Management: Every new street tree is given additional care and maintenance for an initial three year establishment period to help it adapt and thrive in its new environment.

During this time new trees are watered once to twice a week during the spring, summer and autumn months. This is important to ensure a tree's on-going health and resilience and maximise its chances of survival.

Watering is currently carried out by water truck. However, the City also promotes a sustainable water management approach including investigating more efficient and targeted irrigation practices and promoting water sensitive urban design (WSUD) initiatives.

Beyond the initial three year establishment period, trees are generally expected to thrive on minimal maintenance in terms of watering, fertilising, pest control and pruning.

Quarterly tree inspections: Juvenile trees are regularly inspected as part of the City's quarterly tree inspection process to monitor and address any problems that may become evident as they work towards becoming established. This includes inspection for any signs of pests or diseases or damage caused by vandalism or poor maintenance practices. Young trees are also pruned, mulched and fertilised as required.
Replacement planting

Street trees are significant community assets that can live for up to 80 years. They can exist for several generations of residents and deliver a significant level of benefits to the community across their lifespan. These long term interests outweigh any short term preferences of individuals when it comes to the removal and replacement of trees.

The removal and replacement of an existing street tree is generally limited to trees that are:

- dead - except where they are creating habitat in more natural landscapes
- diseased - except where cost effective rehabilitation treatments are available
- damaged or vandalised, particularly where they have become hazardous

UNDER PERFORMING TREES

Sometimes a particular tree species may fail to thrive in the street environment despite being given additional care and maintenance. This often results in undersized trees with poor canopy. The *Brachychiton acerifolius* (Illawarra Flame) currently planted along Hay Street in Central Perth are an example.

Keeping these trees has a negative impact on the City’s goal to increase canopy cover. Valuable time is lost that could be better used to grow an alternative species that has a proven ability to develop healthy and vigorous canopy in the street environment.

When underperforming trees fail to respond to appropriate treatments to improve their growth and vigor a case can be made for their staged replacement. This is particularly the case for streets with high levels of pedestrian use and activity where trees play a vital role in supporting pedestrian comfort and amenity.

AGING TREES

Useful life expectancy (ULE) is a measure of how long a tree can be expected to remain in a street. It takes a range of factors into account including typical life span for a tree, species, climate change, land use, pests, diseases, soil quality and volume.

Problems can arise where large number of street trees are expected to reach the end of their useful life expectancy at the same time. Replacing them all at once can create significant gaps in canopy cover and have a negative impact on street quality and amenity.

To help avoid this situation the City engages arborists to review the health and condition of trees identified as having a ULE of 5 years or less. Where appropriate, these trees may be given additional care to help extend their ULE. If this fails the City plans proactively for a program of staged tree replacement. New trees will be planted in spaces between existing trees. Once they are successfully established and providing acceptable levels of canopy cover the original trees will be removed. Tree replacement programmes will also be co-ordinated with capital works projects wherever possible.
Standards and technical guidance

The City’s Design and Construction (D&C) notes provide a range of technical guidance covering tree pit design and WSUD elements, along with typical tree planting and soil specifications for hard and softscape environments.

The D&C notes are updated regularly to reflect best practice. They should be used by City contractors and developers to help ensure that all new street tree planting is carried out to a consistently high quality.

The City also relies on a range of Australian Standards to help promote best practice in tree selection, planting, after care and maintenance including:

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<th>Year</th>
<th>Description</th>
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<tbody>
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<td>AS 4970</td>
<td>2009</td>
<td>Protection of trees on development sites</td>
</tr>
<tr>
<td>AS 2303</td>
<td>2015</td>
<td>Tree stock for landscape use</td>
</tr>
<tr>
<td>AS 4419</td>
<td>2003</td>
<td>Soils for landscaping use</td>
</tr>
</tbody>
</table>

ROOT BARRIERS

The City does generally not support the use of root barriers. Where they have been used in the past roots have managed to escape the confines of the barrier system. Where they have remained within the root barrier this has often had a negative effect on the in-ground stability of these trees.

An exception to this approach is where trees are to be planted near high pressure gas lines. In all other areas, the City’s preferred approach to minimising the potential damage that can be caused by tree roots is to focus on the creation of adequate soil volume and soil quality at planting sites.

TREE STAKES

The City generally does not support the use of tree stakes, particularly where trees are planted within dense urban areas with high levels of activity. Past experience has shown that tree stakes are commonly vandalised as they can be relatively easy to remove. At times they have been used to damage surrounding properties and other elements of public infrastructure.

TREE GRATES

The City generally limits the use of tree grates to areas with high levels of pedestrian activity to help provide a safe and comfortable walking environment. Grates may also be used in very narrow streets to maximise the width of footpaths after new trees have been installed.

Where tree grates are not used granitic sand or a layer of mulch is used instead. These treatments are better for tree health as they protect the tree base and help to retain moisture in the soil.

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Who plants our trees?

Most new street trees are planted by external contractors as part of the City’s tree supply and installation contracts developed to support the implementation of the Urban Forest Plan.

EXTERNAL AGENCIES

All new tree planting undertaken by external agencies (other than City appointed contractors) should follow the guidance set out in this document. Where an existing city street is being upgraded or extended as part of a new development, or new street trees are being planted adjacent to a new development, the species should be selected in accordance with the street tree matrix. This ensures that there is consistency and continuity of the streetscape, and that the desired local character is not compromised.

If an alternative species is proposed, the selection must be justified with sound rationale in accordance with the City’s tree selection criteria. Where appropriate, a different species may be used for emphasis to help create a distinctive character or sense of place at strategic city location or improve city legibility.

Selection of tree species for public areas other than streets should also consider the City’s tree selection criteria, along with the needs and local character of the area.

When external agencies are planning to plant new trees in the public realm, it is strongly advised that the City is involved in the early phases of project planning. This will promote a shared understanding of the issues, challenges and requirements for successful street tree planting and the development of an attractive city and healthy urban forest.

When do we plant?

The level of care that is taken in planting a new street tree can have a major impact on its ability to become established and thrive in the longer term.

Perth’s climate is characterised by hot summer months with low level, irregular rainfall. Such conditions can place significant pressure on newly planted street trees as they make the transition from relatively protected nursery conditions and adapt to the urban environment.

To maximise a tree’s success, planting will generally take place between the cooler months of April and October each year. Planting during autumn months can be particularly advantageous. This gives new trees access to higher levels of water, when rainfall levels are at their maximum, allowing them the most time to become established and maximise the development of their root system prior to the arrival of hotter summer weather.

Where project timeframes allow, this approach will also apply for new trees being planted as part of the City’s program of capital works.

Community requests for new street trees

The City encourages new street tree planting wherever adequate space is available and a new tree can make a positive contribution to street quality, character and function.

The community is encouraged to make suggestions or submit requests for new street tree planting adjacent to their property. Each community request will be assessed by the City’s arborist and a new tree will be planted where the proposed site is considered appropriate.

It should be noted that the species selected for planting will be in accordance with that nominated in the street tree matrix. Individual requests for specific species will generally not be accommodated.