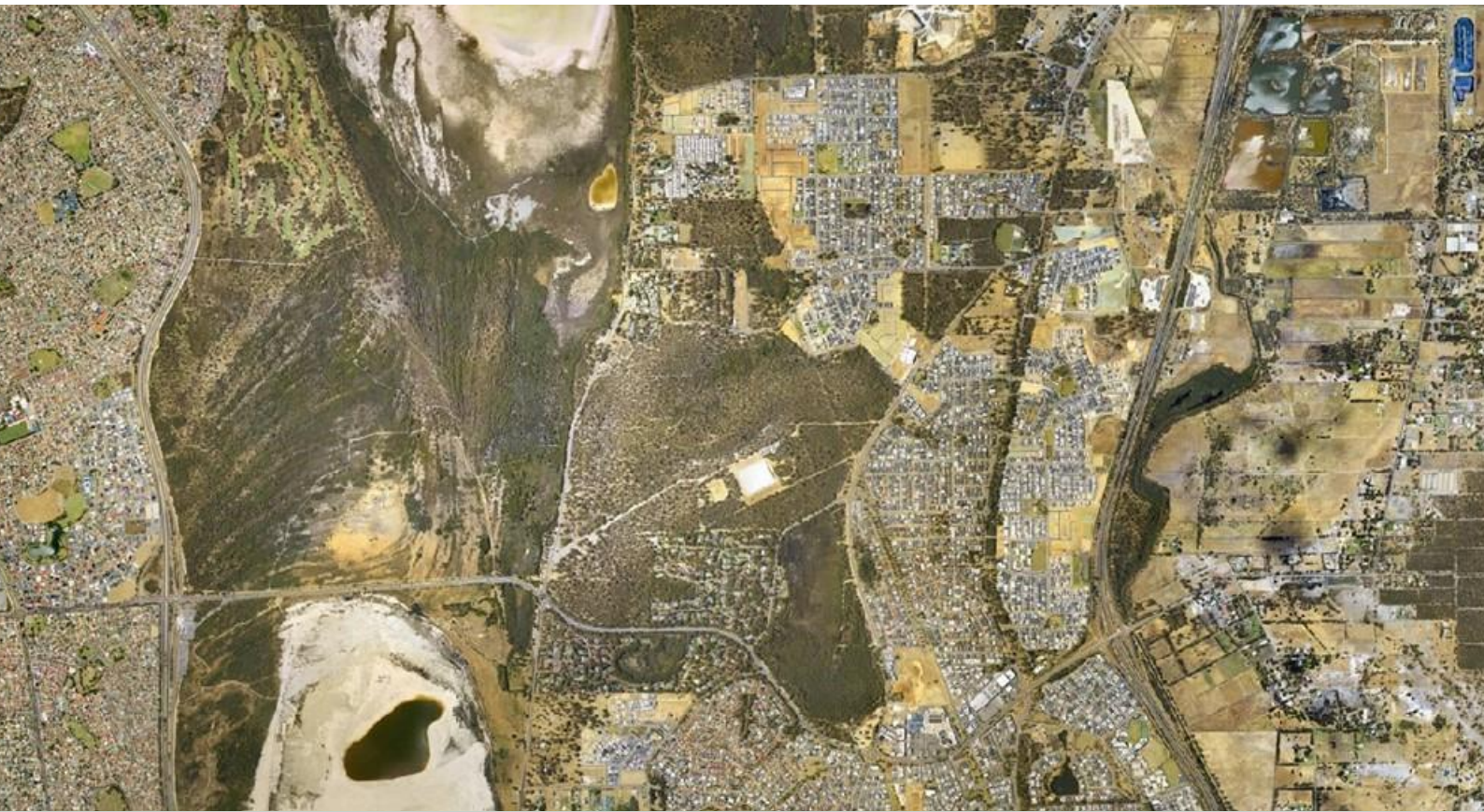




Street Tree Planting Plan

City of Rockingham

Job No. J23859

20 December 2024

Project Partner:



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DOCUMENT QUALITY ASSURANCE

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1 Introduction

The City of Rockingham's urban tree canopy is vital to the well-being of its residents and the overall environmental health of the region. This Street Tree Planting Plan aims to enhance Rockingham's urban canopy by carefully selecting tree species that thrive in the city's unique climate. By prioritising species diversity, the plan will enhance local biodiversity and ecosystem resilience, while also incorporating a mix of non-native species to ensure aesthetic appeal and functionality. Central to this approach is the principle of "the right tree for the right location," which ensures that each tree species is matched to specific site conditions, such as soil type, available space, sun and wind exposure, and nearby infrastructure.

This careful selection process maximises the benefits of urban trees, including improved air quality, urban cooling, and enhanced aesthetic value, while minimising potential issues such as root damage to pavements or interference with power lines. Through thoughtful species selection and placement, this plan seeks to foster a greener, more sustainable urban environment for current and future generations.

1.1 What is a Planting Plan and why do we need one?

What we plant today will influence the streets of the future. This Planting Plan details the proposed street tree planting principles and tree species for the whole of the City of Rockingham LGA area. It will be a key operational document for the city and influence the future visual and

functional aesthetic of streetscapes in the City. It will guide what to plant and where to plant it to ensure the right tree for the right location.

The City needs a Planting Plan to enable strategic, effective and proactive planting of street trees. The City holds a significant responsibility in the management of street trees and in the provision of their benefits. The main users of this Plan include City staff, urban planners, developers, community groups, and residents, all of whom will rely on it to guide decisions regarding tree selection in the area.

Trees are essential green infrastructure assets that are critical in creating healthy, liveable cities. Street trees in particular play an important role in creating liveable cities by cooling footpaths and roads through the provision of shade, making active transport such as walking and cycling bearable on hot days. Shade provides numerous health benefits and can help protect communities from the harmful effects of excessive ultraviolet (UV) radiation exposure and future skin cancer risk. These benefits can be described as 'ecosystem services', and include;

- Air and water filtration
- Shade and cooling,
- Habitat for animals,
- Stormwater management
- Oxygen production,
- Carbon sequestration
- Food and habitat for native fauna

1.2 Native vs. exotic

Maintaining native species in the urban forest is important for the ecological services they provide including food for fauna, habitat and biodiversity.

While, in some instances, native species may be suitable for local conditions, the growing conditions within the urban environment have often changed, resulting in highly disturbed soils, compaction, limited soil volumes, and altered drainage patterns. Consequently, native trees may not always be the most suitable street trees. Exotic trees play an important role in the urban forest as they include many deciduous trees, providing better solar access in the winter months. There are limited numbers of native deciduous species.

Native trees form an important part of the City's cultural identity and an essential part of the urban forest. There is currently a heavy reliance on species from the Myrtaceae family. While this is not preferred for species diversity and urban forest resilience, it is often unavoidable due to the majority of our native species coming from this family.

A healthy, diverse, and resilient urban forest is one that includes both native and exotic species. Both have a role to play and provide important ecosystem services, however the selection of native tree species in Rockingham should be given higher weighting due to their established visual amenity and greater contribution to the local native ecosystems.

The use of locally native vegetation in the area will allow for improved cultural connections for first nations people with traditional custodianship and ownership of the land. Expanding and enhancing the use of native trees as street trees presents a chance to reinforce cultural ties, by incorporating Noongar knowledge and collaboration in urban tree

management, and raising community understanding of the cultural significance of the urban forest.

1.3 Climate Change

Rockingham has a Mediterranean, hot summer climate, typically receives about 725 millimetres of precipitation per year and mean maximum temperature of 25°C (BoM, 2024).

The impacts of climate change are becoming increasingly evident in our urban environments. Due to climate change, Perth's average annual rainfall has reduced around 20% since the 1970s. It's not just the total volume of rain that's changed, it's the way that rain falls that's had an impact. Our rainy season starts later so we now have more sunny, winter days.

Projections indicate that, without global action to reduce emissions, the annual average number of days above 35°C in Perth could increase from the 28 currently experienced to up to 67 days by 2070 (DWER, 2021). Projections also indicate an increase in the intensity and frequency of bushfires.

Heat records continue to be shattered, February 2024 saw the most days above 40 degrees Celsius on record and included three heat waves. A heatwave is when the maximum and minimum temperatures are unusually hot over 3 days. This coincided with WA experiencing one of its driest summers on record.

The changing climate poses a significant threat to the liveability of our suburbs as many of the trees currently growing in the Rockingham area may not be suited to the future conditions we are likely to face.

There is a pressing need for a transition towards more resilient tree species that have proven to be better adapted to warmer climates, increased heatwave extremes, and drought conditions to futureproof the urban forest and canopy cover. Implementing adaptive measure to combat climate change is essential for managing our street trees in the future to ensure we can support resilient and sustainable communities.

1.4 Pests and diseases

Effective management of pests and diseases is crucial for maintaining the health and vitality of the urban forest. Urban trees face numerous threats from pests and diseases, which can spread rapidly and cause significant damage if not properly managed. Diseases can be caused by a wide range of abiotic and biotic factors. Biotic factors include pathogens such as *Phytophthora* that are known to negatively impact Perth's urban forest (Barber *et al.* 2013), and one of the most concerning pests currently affecting urban forests globally is the Polyphagous shot-hole borer (PSHB), a highly invasive species known for its ability to attack a wide range of tree species.

Tree species identified in the compiled list have been selected based on their susceptibility to PSHB and other common pests and diseases. By prioritising species that are less prone to infestation and disease, we can create a more resilient urban forest that requires less intensive management and has a lower risk of significant tree loss. This approach not only protects the existing urban canopy but also ensures the long-term sustainability and diversity of the urban forest.

The management of pests and diseases in urban environments requires a proactive approach that includes monitoring, early detection, the selection of resistant tree species, and Integrated Pest Management. Routine

inspections of trees for signs of infestation or disease can help identify issues early, allowing for prompt intervention and treatment. IPM practices, which include biological control, cultural practices, mechanical control, and chemical treatments, should be employed to manage pest populations and minimise the impact on the urban forest.

In the case of PSHB, it is critical to implement stringent monitoring protocols and collaborate with local authorities and research institutions to stay informed about the latest developments and control methods. The species list in this plan includes trees that have shown resistance or lower susceptibility to PSHB, thereby reducing the likelihood of widespread infestation.

In addition to selecting resistant species, promoting tree health through proper planting techniques, adequate watering, and soil management is vital. Healthy trees are better equipped to withstand pest attacks and recover from infestations. Soil health is particularly important, as healthy, well-nourished trees are more resilient to stressors, including pests and diseases. Regular soil testing and amendments can help maintain optimal soil conditions for tree growth.

1.5 Diversity

A diverse selection of trees enhances ecological stability, providing varied habitats and food sources for local wildlife. Urban forest genus and species diversity are critical components of this planting plan, contributing to a resilient and sustainable urban canopy for the City of Rockingham. By incorporating a wide range of tree species from a broad range of genera, the plan aims to mitigate the risks associated with pests, pathogens, and climate change impacts, which can devastate monocultures. The plan prioritises native species to support local ecosystems while also including

non-native species that are well-suited to the urban environment and climate. This approach not only promotes biodiversity but also ensures year-round aesthetic appeal and functional benefits, such as shade and air purification. Careful consideration is given to each species' growth habits, environmental tolerances, and compatibility with existing urban infrastructure, guaranteeing that a rich variety of trees contributes to the health and beauty of Rockingham's urban landscape.

Santamour (1990) proposed the 10/20/30 benchmark, which sets a benchmark of no more than 10% of a single species, no more than 20% of a single genus, and no more than 30% of a single family. It is a useful rule of thumb, but should not be used as a mechanism to reduce the abundance of native species, where trees are primarily from the Myrtaceae family (Kendal et al. 2014).

2 Functional Requirements

2.1 Tree Selection Priorities

This Plan aims to identify the **right tree for the right location**, this section identifies how this will be achieved.

Trees are long life assets and can take many decades to become mature. Their benefits significantly increase with the tree's size. Therefore, it's essential to strive for the establishment of larger trees, considering the reasonable limits of surrounding infrastructure and resident tolerance.

Select the largest tree possible for each location

Trees will naturally grow, shedding leaves, bark, fruit, flowers, and even branches. Roots will extend, and trunks will broaden. Striking a balance involves selecting species that maximise benefits while minimising negative impacts. However, it's crucial to acknowledge that compromise is inevitable in the context of a busy and densely populated urban environment.

The following key practical considerations to be applied when selecting the right tree for the right location include;

- Mature size and habit of the tree (contribution to canopy)
- Impact on road safety (preserve sight lines)
- Suitability with site conditions (soils, compaction and water use)
- Influence on urban forest diversity
- Deciduous or evergreen (native vs exotic)
- Historic and cultural connections
- Life expectancy
- Resilience to climate change (water and heat stress)
- Susceptibility to pests and diseases
- Propensity to drop branches (risk profile)
- Pollution tolerance
- Maintenance requirements

- Season considerations (dropping bark, flowers, fruit, leaves)
- Nursery availability
- Weed potential
- Contribution to biodiversity and habitat outcomes
- Solar access (solar panels)
- Contribution to precinct character

2.1.1 Street orientation

Maintaining human thermal comfort is important for pedestrians, residents and business. Modification of street microclimates using tree canopy cover can provide important cooling and warming benefits through the day and seasons. The reduction in heat is greater for east–west streets than for north–south streets.

East–west orientated streets

The midday thermal benefits are restricted on E–W streets which are oriented in the same direction as the summer sun’s zenith. Therefore, it is important to create a fully closed tree canopy to maximise shade and thermal benefits. Using a mix of deciduous and evergreen trees on the north side of the street will provide thermal warming in winter. Planting evergreen trees on the south side of the street will maximise shade and thermal benefits all year round.

North–south orientated streets

For N–S streets air temperature, mean radiant temperature and solar radiation are greater on the east side in the early morning and greatest on the west side in the mid-afternoon. Planting small to medium deciduous trees on the east side of the street will take advantage of the thermal warming of winter morning sun. Planting large and small evergreen trees on the west side of the street will block the undesirable afternoon sun all year round.

Sunscald

Some species are prone to severe sunscald damage to their trunks on the western aspect due to the afternoon sun. Such damage is exacerbated by water-stress and prolonged exposure.

2.1.2 Existing Character

In areas where existing street trees contribute a strong, defined character that enhances the sense of place, species selection should respect and reinforce this established aesthetic. Choosing appropriate species in these locations ensures continuity in the streetscape, preserves the area’s unique identity, and maintains community appreciation for the local environment.

Match Existing Species: Where possible, select tree species that align with or match the dominant species in the area. This consistency will reinforce the character and visual harmony of the streetscape.

Complementary Species: If the existing species is unsuitable due to issues such as risk of exposure to pest and disease (ie.PSHB) or weed propensity,

choose species that complement the existing character in form, colour, and scale, ensuring they contribute to the established sense of place without disrupting it.

Native and Biodiversity Considerations: In areas with significant native plantings or areas adjacent to bushland, prioritise species that are native to the region to support local biodiversity. Native species help sustain wildlife, strengthen ecological connections, and enhance the resilience of the urban forest by promoting a diverse and adaptable tree population.

Seasonal Interest: Where applicable, align the seasonal characteristics (e.g., flowering or autumn foliage) of new trees with the existing palette to preserve the seasonal rhythm and visual appeal of the streetscape.

2.1.3 Locating Street Trees

The street is a highly contested space, and the placement of street trees often comes with many restrictions. When choosing final planting locations, it's crucial to consider the distance from infrastructure components, such as intersections, pedestrian crossings, light and power poles, stormwater inlets, underground service pits, and bus stops.

Position street trees to minimise interference with existing usage of the streets, such as:

- vehicular movement through the street;
- entries to buildings and businesses;
- clearance for pedestrians, vehicular traffic, light poles and other infrastructure/ services;

- vehicle, cycle and pedestrian sight lines;

Planting trees will typically always require an individual site assessment and the final planting location decided on an individual basis.

Table 1 outlines the minimum distances to be applied when determining a tree planting location. When it can be demonstrated that the tree placement will not jeopardise the safety or the long-term integrity of neighbouring infrastructure or sight lines, The City may modify these dimensions on a case-by-case basis. Existing established trees in the streetscape that have been planted within these distances will not be removed by The City unless the impacts of keeping the tree are deemed undesirable and cannot be otherwise addressed through suitable pruning.

Table 1: Proposed distances from street infrastructure for tree planting

Street Situation	Tree Planting Clearance
Street intersection - distance from projected line of the intersecting kerb line on approach side	10m
Street intersection - distance from projected line of the intersecting kerb line on non-approach side	7m
Street Light pole - distance of trunk away from centre of pole in plan view	5m
Stormwater inlet pit - distance from nearest edge of pit structure	2m
Driveway - distance from driveway edge on	5m

approach side	
Driveway - distance from driveway edge on non-approach side	3m
Traffic Lights - distance from signal pole on approach side	10m
Pedestrian crossings - distance from outer edge of crossing on either side	10m (on approach) 7m (on departure)
Street lighting pole - minimum distance from pole to centre of tree trunk (unless there are other light sources to consider)	3m
Cycle ways - clearance from edge of cycleway path to centre of tree trunk	0.5m

2.2 Typologies

Typologies are the situations in which trees have been identified for planting based on verge width and street classification. The available space and characteristics of a street significantly influence what species should be planted in that location. A small tree on a wide verge is a lost opportunity for a large shade tree that would greatly increase canopy cover and the associated tree benefits. Equally, a tree that is too big for the width of the footpath can become both an expensive maintenance burden and a hazard to pedestrians and public and private infrastructure.

Average widths of verges have been estimated based on site inspections and measurements across the different street types in the LGA. Suitable street tree species will be assigned to one of the four classifications in table 2.

The verge is defined as being from the edge of the adjoining footpath to the back of the kerb.

Each typology will have a species nominated for a powerline side and a non-powerline side. Where possible The City should seek to work with the power utilities to upgrade powerlines to underground or Aerial Bundle Cabling and/or road space reallocation that reduces the carriage way and expands the verge width to allow for tree planting.

The overall objectives for allocating species to these typologies is to align with the Functional Requirements but also to nominate trees with a mature size that aligns with the available space to prevent damage to footpaths, roads, and underground utilities, ensuring long-term stability and pedestrian/ vehicular movement and safety. Additionally, maximising canopy size within these constraints to provide the various functional benefits including shade provision, air quality improvement, and urban heat island mitigation. Carefully selecting tree species with a balanced approach to size, the Planting Plan will achieve the dual key objectives of minimising infrastructure conflicts while maximising the positive impact of the urban forest.

Table 2: Descriptions of typologies and planting scenarios

Verge Width	Description
Small <1m verge	Verge widths under 1m. These streets will be assessed on a case-by-case basis for planting due to their small size. The heights of trees selected for these locations will generally range between 3m and 6m.
Small-medium 1 to 2m verge	Verge widths between 1m and 2m. Trees selected for these locations will generally have heights ranging from 4 to 12m.
Medium-large 2m to 4m verge	Verge widths between 2m and 4m. The trees selected for these locations will generally range between 8 to 18m in height.
Large >4m verge	Verge widths greater than 4m. Trees selected for this category will be large tree species that generally range between 14m and 20m in height.
Road Reserves	These locations will be assessed on a case-by-case basis for planting and may include more than one row of trees on each verge. Trees selected for this category will range between 14m and 25m in height.
Tree pits	These are planting areas surrounded by pavement. Trees selected for this category will generally range between 6 and 12m depending on the size of the tree pit.
In road/ median/ roundabout	Trees in these locations must be amenable to crown lifting to allow for sight lines, ensuring safety for motorists and pedestrians.

Rain garden/ drainage areas	Trees selected for rain gardens or drainage areas must be tolerant of both wet and dry conditions, helping to manage stormwater runoff and improve water quality.
Coastal area	Coastal areas require trees that can withstand salt spray, sandy soils, and high winds. Trees chosen must be hardy and adaptable to these challenging conditions.
Bushfire prone area	Trees for bushfire-prone areas selected for their low flammability and ability to withstand fire. Suitable species will help reduce the spread of fire.
Under Powerlines	Trees suitable for verge locations with overhead power lines. Smaller trees will be selected for these locations to avoid impacts with wires.

2.2.1 Street Tree Spacing

Tree spacing distances when planting trees is fundamentally important in the streetscape. Final mature canopy size must be considered when planting new trees to avoid conflicts and maximise canopy potential. Trees planted too close together will be competing for soil volume and above ground space. Street trees should be planted as follows:

- **Small trees** (3-5m height) – spaced at a minimum of 5 to 10 metre intervals
- **Medium trees** (6-11m height) – spaced at a minimum of 10 to 15 metre intervals

- **Large trees** (12m+ height) – spaced at a minimum of 15 to 20 metre intervals

2.2.2 Tree Species Trials

Trialling new tree species in the streetscape is important as it can provide empirical data on the performance and adaptability of various tree species under local conditions, including soil types, climate, and urban stresses. By monitoring these trials, we can gather insights into growth rates, resistance to pests and diseases, and overall health and viability of the species in an urban setting.

The results from these trials will inform future planting plans, allowing for adjustments and improvements in species selection to ensure the continued success and resilience of the urban forest. Incorporating trial outcomes into future strategies will help to refine the selection process, promoting a dynamic and adaptive approach that responds to environmental changes and emerging challenges. This evidence-based methodology will ensure that Rockingham's urban canopy remains diverse, healthy, and sustainable for years to come.

2.2.3 Stock availability

Stock availability is a critical factor in the successful implementation of the Street Tree Planting Plan. Ensuring that the selected tree species are readily available from reputable tree suppliers is essential to maintaining the momentum and efficiency of planting initiatives. Most species included in the species list have been chosen based on their good availability from local nurseries and tree suppliers. This strategic selection helps to

streamline the procurement process, reduce delays, and ensure that planting schedules can be adhered to without significant interruptions.

However, it is also recognised that some species on the list, despite their suitability for Rockingham's urban environment, may not be as readily available in the quantities required. For these species, forward procurement contracts will be necessary to secure a reliable supply. Engaging in forward procurement involves establishing agreements with tree suppliers well in advance of planting seasons to ensure that the desired species are grown and available when needed. This approach not only guarantees stock availability but also allows for better planning, quality and coordination of programs.

Forward procurement contracts provide several benefits. They enable tree suppliers to allocate resources and space for growing specific species, ensuring that high-quality stock is available for future planting projects. Additionally, these contracts can help to stabilise prices and secure better rates, as suppliers can plan their production schedules more efficiently. For the City, forward procurement reduces the risk of stock shortages and ensures that the planting plan can be executed as intended, contributing to the overall success of the Urban Forest Strategy.

Furthermore, forward procurement supports the development of a stronger relationship between the City and local nurseries, fostering collaboration and mutual understanding of the goals and requirements of the Urban Forest Strategy. By working closely with suppliers, the City can provide input on the desired characteristics of the trees, such as size, form, and health, ensuring that the stock meets the specific needs of the planting sites.

In conclusion, stock availability is a fundamental consideration in the Street Tree Planting Plan. While most species have been selected for their good availability, forward procurement contracts will be employed for those that require longer lead times. This proactive approach ensures that the City can secure the necessary stock to achieve its planting objectives, thereby supporting the growth and sustainability of Perth's urban forest.

2.2.4 Stock Quality

Trees are long lived assets and are long term investments, and as such procuring high-quality stock is paramount to the success of any planting program. Quality tree stock ensures that newly planted trees have the best possible start, which significantly influences their long-term health, growth, and resilience. Poor quality stock can lead to numerous problems, including poor establishment, increased susceptibility to pests and diseases, and higher maintenance costs. Therefore, it is essential that all tree stock used in the Street Tree Planting Plan adheres to rigorous quality standards.

To ensure the highest standards are met, tree stock should conform to the 'Australian Standard AS2303 – Tree Stock for Landscape Use'. This standard provides clear guidelines on the quality specifications for tree stock, including criteria for root health, structural integrity, and overall vigour. By adhering to these standards, the City can guarantee that the trees planted in the urban forest are robust, healthy, and well-suited to their environment.

Key Components of Australian Standard AS2303

1. Root Health:

Trees must have a well-developed, healthy root system with no signs of disease or pests. The roots should be free from defects such as girdling or circling, which can impede the tree's growth and stability.

2. Structural Integrity:

Trees should have a strong, central leader with well-spaced branches. The trunk should be straight and free from wounds or deformities.

3. Overall Vigour:

Trees must exhibit signs of vigorous growth, with healthy foliage and no signs of nutrient deficiencies or stress. The stock should be free from any damage or stress that could compromise its establishment and growth.

Implementing Quality Assurance

To ensure compliance with AS2303, the City will conduct thorough inspections of tree stock before planting. These inspections will involve assessing the root systems, checking for structural defects, and evaluating the overall health of the trees. By selecting only those trees that meet the stringent criteria set out in AS2303, the City can significantly reduce the risks associated with planting substandard stock.

Additionally, the City will work closely with tree suppliers to communicate the importance of adhering to these standards. Suppliers will be required to provide certification or documentation confirming that their stock meets AS2303 requirements. This collaborative approach helps to build a strong supply chain of high-quality tree stock, ensuring the long-term success of the urban forest. It may be beneficial for some destructive sampling to be undertaken to obtain a better understanding of root health. In our experience, sub-optimal root health and the presence of pathogens, particularly *Phytophthora* species, in supplied stock have played a major role in the decline and death of stock throughout Perth's urban landscape. As such, we encourage the City to obtain assistance from a qualified forest pathologist to undertake pathogen testing of the roots of a sub-sample of supplied stock.

2.2.5 Tree Establishment

To ensure the long-term success and health of new street trees, a structured approach to tree establishment is essential. The following requirements outline the critical practices for effective establishment, promoting robust growth, resilience, and environmental benefits.

Soil Preparation and Planting

Soil Assessment: Conduct soil testing prior to planting to determine soil health, pH, and nutrient levels. Amend soil as needed to enhance fertility and water retention, particularly in areas with sandy or compacted soils.

Planting Depth and Techniques: Ensure trees are planted at the correct depth, with the root flare at or slightly above ground level to promote healthy root development and prevent sinking and collar rot.

Mulching: Apply a minimum 10 cm layer of organic mulch around the base of each tree, extending to the drip line, to help retain moisture, regulate soil temperature, and reduce weed competition.

Watering Schedule

Initial Watering: Water thoroughly at planting to remove air pockets and settle soil around roots.

Establishment Period (first 2 years): New trees require consistent watering during the establishment phase, particularly in the first two growing seasons. Trees should be watered deeply once or twice weekly, depending on weather and soil conditions.

Drought Conditions: During periods of low rainfall or drought, increase watering frequency to prevent stress and ensure survival.

Staking and Support

Staking: Stake trees only when necessary, using flexible ties to prevent trunk damage and allow for gentle movement of the trunk. Remove stakes after establishment to allow natural root anchorage and support stronger growth.

Protection: In areas with high pedestrian or vehicular traffic, consider protective guards to prevent mechanical damage.

Pruning and Maintenance

Structural Pruning: Perform light pruning to correct structural issues in the first few years, focusing on removing damaged or crossing branches to establish a healthy framework.

Inspection: Regularly inspect new trees for signs of pests, disease, or damage. Address issues promptly to promote healthy establishment.

Monitoring and Reporting

Ongoing Monitoring: Monitor tree health, growth rates, and overall condition throughout the establishment period, documenting any issues or necessary interventions.

Performance Reporting: Maintain records of establishment success rates and any recurring issues to improve future planting practices and refine establishment techniques.

3 Street Tree Planting Prioritisation

Within Rockingham, there is a substantial variation across street tree canopy cover. While the more established areas have large trees with closed canopies over the street, more recently developed areas often have lower density and size of trees, with a corresponding reduction in shading, amenity and other benefits.

A **street tree planting prioritisation framework** has been developed to create a more equitable distribution of canopy cover within the City and maximise the benefits of future investment in street tree planting. The Strategic Centre was not included in the framework, as planting of this area will be captured as part of the Rockingham Strategic Centre Precinct Structure Plan. Keralup and Peron were also excluded as they do not contain streets under the control of the City.

Each street within the LGA was assigned a priority score based on the:

- Current canopy over the street corridor (2024 aerial ArborCam data),
- Proportion of available planting space (APS) (2024 aerial ArborCam data),
- Mean land surface temperature (LST) of the street section (2024 aerial ArborCam data),
- Socioeconomic disadvantage using the Index of Relative Socio-Economic Disadvantage (IRSD; ABS) for each street, and
- Location of urban heat islands (as identified in Section 4 of the Urban Greening Plan, Urban Heat Island Analysis)

Streets were ranked on each criteria and split into quantiles. A priority score was assigned to each street, depending on its ranking:

- Streets with low canopy cover were given a low score (high priority),
- Streets with a high proportion of APS were given a low score (high priority),
- Streets with a high mean LST were given a low score (high priority),
- Streets located in a SA1 statistical area with high socioeconomic disadvantage were given a low score (high priority), and
- Streets location within an urban heat island were given a low score (high priority).

The priority score for each criteria of each street was summed to create the combined priority score for each street ranging from 1 to 20. The lower the score, the higher the priority for planting. E.g. 1 = highest priority, 20 = lowest priority.

The outcome is a Planting Prioritisation plan for streets, ranking each street. A close up of the map and top 10 streets for prioritised planting are shown adjacent.

For operational purposes, the available planting space for each street has been converted into additional tree planting capacity based on the number of mature trees that can spatially fit in the available planting space. This is presented in the Plan as 'additional tree capacity'. If a street was identified as having high priority for planting based on the criteria outlined above, but has no available planting space at the time of acquisition, it was removed from the planting prioritisation plan.

A map of each suburb is presented in the following pages, along with the top 10 streets per suburb for prioritised planting.



4 Species Selection Matrix

See attached

ROCKINGHAM TREE PLANTING MASTER LIST

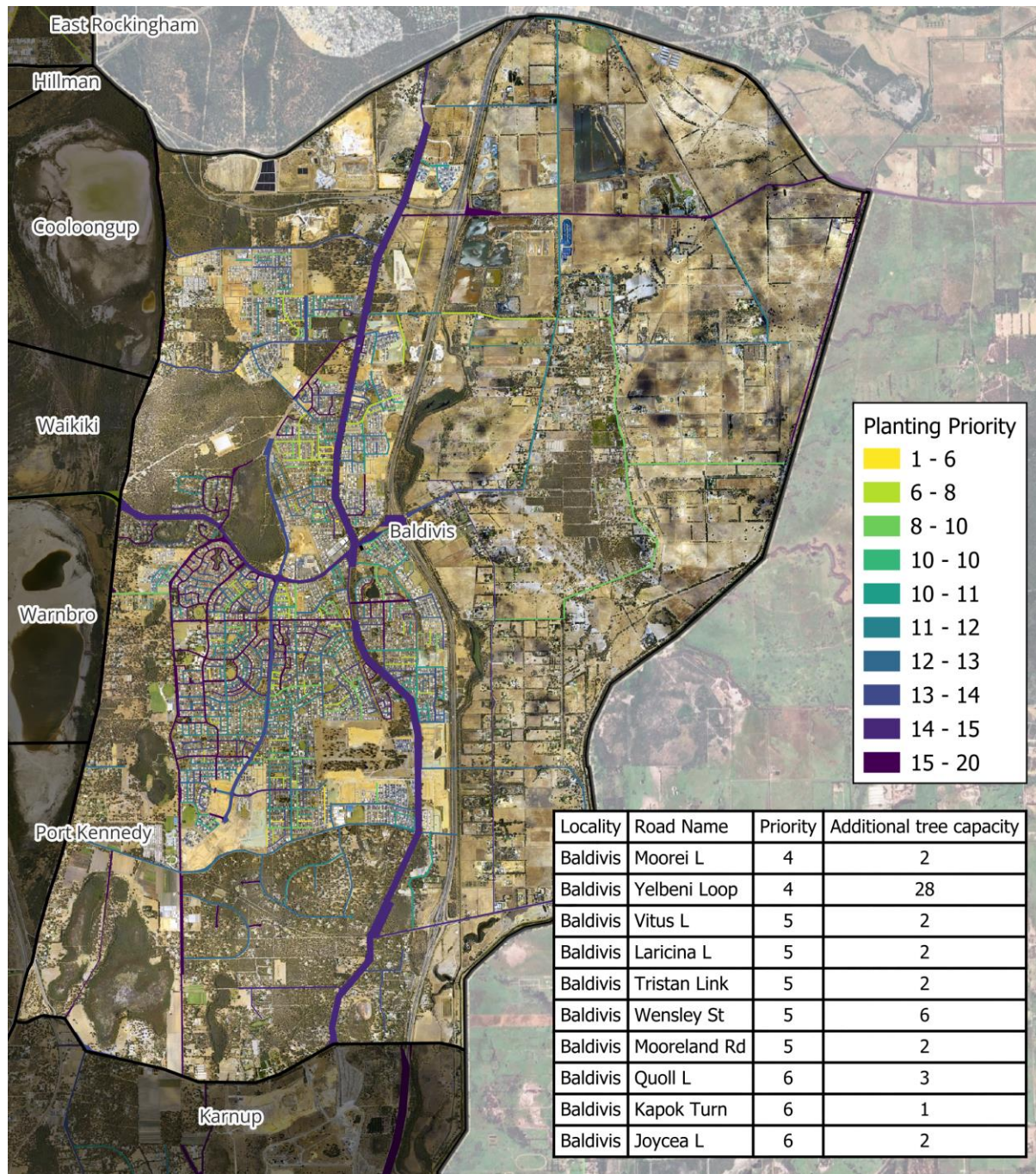
Botanical name	Common name	Family	Origin	Height	Width	Leaf type	Trial species	Small Verge <1m verge	Small/ Medium Verge 1 to 2m verge	Medium/ Large Verge 2 to 4m verge	Large Verge >4m verge	Road Reserve/ Rural Verge	Tree pit in concrete	In road/ median/ round about	Rain garden/ drainage areas	Coastal Area	FireWise	Under wires	Wild life foraging species	Suitable for POS
Acacia binervia	Coastal Myall	Mimosaceae	Native	8-12m	5-8m	Evergreen	✔			✔	✔					✔				✔
Acacia cyclops	Red-eyed wattle	Fabaceae	WA	3m	3-5m	Evergreen		✔				✔				✔		✔		
Acacia rostellifera	Summer-scented wattle	Fabaceae	WA	1-6m	3-7m	Evergreen			✔							✔				
Agonis flexuosa	Willow Myrtle	Myrtaceae	WA	8-12m	6-10m	Evergreen				✔	✔					✔			✔	
Agonis flexuosa 'Burgundy'	Burgundy Weeping Peppermint	Myrtaceae	WA	4-8m	4-6m	Evergreen			✔	✔						✔				
Albizzia lebbeck	Lebbeck	Fabaceae	WA	18-30m	10-15m	Deciduous						✔								✔
Allocasuarina fraseriana	Common Sheoak	Casuarinaceae	WA	10-15m	6-10m	Evergreen					✔	✔						✔		
Angophora costata	Sydney Red Gum	Myrtaceae	Native	10-18m	12-14m	Evergreen					✔	✔		✔						✔
Angophora hispida	Dwarf Apple Gum	Myrtaceae	Native	4-8m	4-8m	Evergreen	✔	✔	✔									✔		
Angophora floribunda	Rough barked apple	Myrtaceae	Native	20-25m	10-15m	Evergreen					✔	✔		✔						✔
Araucaria heterophylla	Norfolk Island Pine	Araucariaceae	Native	20-30m	10-15m	Evergreen					✔	✔		✔		✔				✔
Arbutus unedo	Irish Strawberry Tree	Ericaceae	Exotic	5-7m	2-5m	Evergreen		✔	✔											
Banksia attenuata	Candle or Slender Banksia	Myrtaceae	WA	2-4m	2-4m	Evergreen		✔					✔					✔	✔	
Banksia grandis	Bull banksia	Proteaceae	WA	6-10m	4-8m	Evergreen				✔		✔						✔	✔	✔
Banksia littoralis	Swamp Banksia	Myrtaceae	WA	8-12m	5-8m	Evergreen				✔						✔			✔	✔
Banksia illiicifolia	Holly-leaf banksia	Proteaceae	WA	8-12m	6-10m	Evergreen		✔	✔			✔						✔	✔	✔
Banksia integrifolia	Coastal Banksia	Myrtaceae	Native	8-14m	6-10m	Evergreen				✔						✔			✔	✔
Banksia menziesii**	Firewood Banksia	Myrtaceae	WA	7-12m	6-8m	Evergreen				✔						✔			✔	✔
Banksia prionotes	Acorn Banksia	Proteaceae	WA	8-12m	6-10m	Evergreen			✔			✔				✔		✔	✔	✔
Bauhinia blakeana**	Hong Kong Orchid Tree	Fabaceae	Exotic	6-10m	6-10m	Semi-deciduous					✔			✔						
Brachychiton acerifolius	Illawarra Flame Tree	Malvaceae	Native	10-16m	6-10m	Evergreen				✔	✔				✔					✔
Brachychiton discolor	Lacebark	Malvaceae	Native	10-16m	6-10m	Evergreen	✔			✔	✔									✔
Brachychiton populneus (inc cultivars)	Kurrajong Tree	Malvaceae	Native	6-15m	6-10m	Evergreen			✔	✔	✔		✔							✔
Brachychiton rupestris	Queensland Bottle Tree	Malvaceae	Native	6-15m	2-12m	Evergreen	✔			✔				✔						✔
Calodendrum capense	Cape Chestnut	Rutaceae	Exotic	15-20m	13-18m	Deciduous					✔									✔
Callistemon 'Kings Park Special'	Bottlebrush	Myrtaceae	Native	3-5m	3-4m	Evergreen		✔	✔									✔		
Callistemon salignus	Willow Bottlebrush	Myrtaceae	Native	6-10m	4-6m	Evergreen	✔		✔						✔					
Callistemon viminalis**	Weeping Bottlebrush	Myrtaceae	Native	6-10m	4-6m	Evergreen			✔										✔	
Casuarina cunninghamiana	River Sheoak	Myrtaceae	Native	12-20m	6-10m	Evergreen				✔	✔					✔			✔	✔
Casuarina equisetifolia**	Horsetail Sheoak	Casuarinaceae	Native	12-16m	6-10m	Evergreen				✔										✔
Casuarina obesa	Swamp oak	Casuarinaceae	WA	2-10m	5-Aug	Evergreen					✔	✔				✔				✔
Ceratonia siliqua** (sterile cultivar)	Carob Tree	Fabaceae	Exotic	10-15m	6-10m	Evergreen	✔			✔	✔					✔	✔			✔
Cercis canadensis 'Forest Pansy'	Forest Pansy	Fabaceae	Exotic	3-8m	3-5m	Deciduous	✔						✔							
Cercis canadensis ' Oklahoma'	Oklahoma	Fabaceae	Exotic	3-8m	3-5m	Deciduous	✔	✔					✔							
Cercis siliquastrum	Judas Tree	Fabaceae	Exotic	10-12m	8-10m	Deciduous					✔									✔
Corymbia eximia	Yellow Bloodwood	Myrtaceae	Native	12-18m	10-14m	Evergreen			✔				✔							✔
Corymbia eximia 'nanna'	Dwarf Yellow Bloodwood	Myrtaceae	Native	6-8m	4-6m	Evergreen		✔					✔					✔		
Corymbia ficifolia (non grafted var.)	Red Flowering Gum	Myrtaceae	WA	10-15m	6-10m	Evergreen				✔	✔								✔	✔
Corymbia maculata	Spotted Gum	Myrtaceae	Native	6-22m	8-14m	Evergreen				✔	✔	✔	✔	✔			✔			✔
Corymbia citriodora**	Lemon Scented Gum	Myrtaceae	Native	12-18m	8-14m	Evergreen				✔	✔	✔	✔						✔	✔
Corymbia calophylla	Marri	Myrtaceae	WA	16-20m	8-14m	Evergreen					✔	✔							✔	✔
Corymbia ptycocarpa	Swamp Bloodwood	Myrtaceae	WA	15-20m	13-18m	Evergreen						✔								✔
Cupaniopsis anacardioides	Tuckeroo	Sapindaceae	Native	8-12m	7-9m	Evergreen				✔		✔		✔		✔		✔		
Delonix regia**	Poinciana	Fabaceae	Exotic	10-15m	6-12m	Semi-deciduous			✔	✔								✔		✔
Eucalyptus caesia	Silver princess	Myrtaceae	WA	6-8m	2-5m	Evergreen			✔					✔						✔
Eucalyptus caesia subsp magna	Silver princess	Myrtaceae	WA	6-8m	2-5m	Evergreen			✔					✔						✔
Eucalyptus camaldulensis	River Red Gum	Myrtaceae	Native	18-22m	8-12m	Evergreen	✔				✔									✔
Eucalyptus cladocalyx nana	Dwarf Bushy Sugar Gum	Myrtaceae	Native	8-10m	4-6m	Evergreen			✔	✔		✔								✔
Eucalyptus conferruminata	Bald Island Marlock	Myrtaceae	WA	8-10m	4-8m	Evergreen			✔	✔										✔
Eucalyptus decipiens	Limestone Marlock	Myrtaceae	WA	8-10m	3-5m	Evergreen			✔											✔
Eucalyptus erythrocorys	Illyarrie	Myrtaceae	WA	6-8m	4-7m	Evergreen					✔	✔				✔			✔	✔
Eucalyptus foecunda	Narrow leaved Red Mallee	Myrtaceae	WA	4-6m	3-5m	Evergreen														✔
Eucalyptus gomphocephala	Tuart	Myrtaceae	WA	18-22m	8-12m	Evergreen				✔	✔									✔
Eucalyptus laelliae	Darling Range ghost gum	Myrtaceae	WA	15-20m	8-15m	Evergreen					✔									✔
Eucalyptus leucoxylon 'Euky Dwarf'	Dwarf Yellow Gum	Myrtaceae	Native	6-8m	4-6m	Evergreen		✔	✔									✔		
Eucalyptus leucoxylon ssp. megalocarpa	Large fruited yellow gum	Myrtaceae	Native	12-17m	8-15m	Evergreen					✔							✔		✔
Eucalyptus leucoxylon ssp. rosea	Red flowered yellow gum	Myrtaceae	Native	12-17m	8-15m	Evergreen					✔							✔		✔
Eucalyptus loxophleba	York Gum	Myrtaceae	WA	12-16m	8-12m	Evergreen				✔	✔									✔
Eucalyptus macandra	River yate	Myrtaceae	WA	6-8m	4-7m	Evergreen			✔			✔				✔		✔		✔
Eucalyptus marginata	Jarraah	Myrtaceae	WA	20-40m	15-30m	Evergreen					✔									✔
Eucalyptus microtheca	Coolibah	Myrtaceae	WA	15-20m	6-10m	Evergreen				✔	✔	✔								✔
Eucalyptus patens	Blackbutt	Myrtaceae	WA	20-40m	18-30m	Evergreen										✔				✔
Eucalyptus platypus	Round-leaved Moort	Myrtaceae	WA	5-8m	4-6m	Evergreen			✔	✔									✔	✔
Eucalyptus preissiana	Bell-fruited mallee	Myrtaceae	WA	5-8m	3-6m	Evergreen			✔									✔		✔
Eucalyptus rudis	Flooded Gum	Myrtaceae	WA	16-20m	8-12m	Evergreen				✔	✔	✔								✔
Eucalyptus salmonophlioia	Salmon Gum	Myrtaceae	WA	15-20m	8-15m	Evergreen					✔	✔								✔
Eucalyptus salubris	Gimlet Gum	Myrtaceae	WA	12-16m	8-12m	Evergreen				✔	✔	✔								✔
Eucalyptus sargentii	Salt river gum	Myrtaceae	WA	6 - 12m	8 - 12m	Evergreen				✔										✔

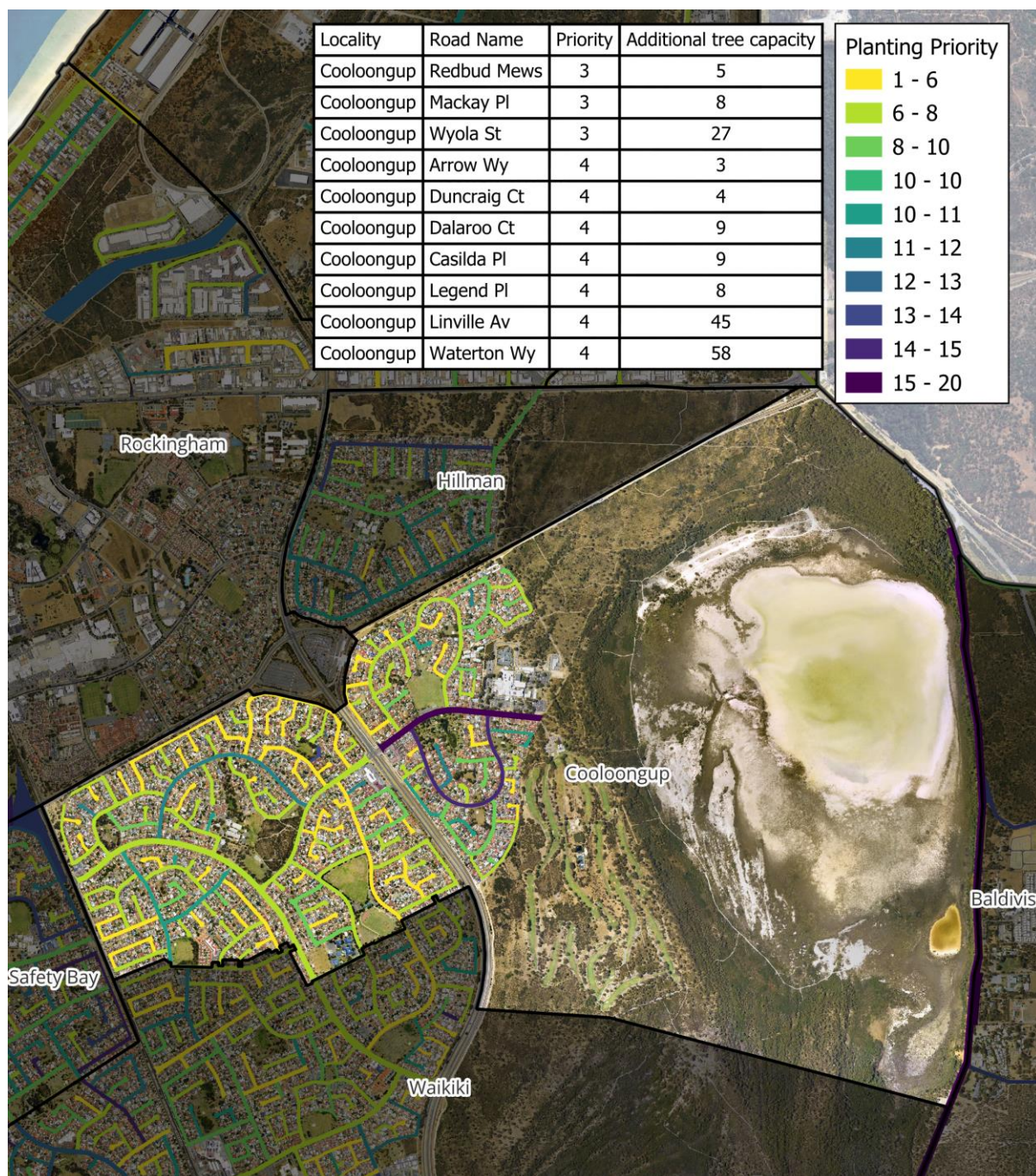
Eucalyptus sideroxylon rosea	Mugga Ironbark	Myrtaceae	Native	15-20m	8-15m	Evergreen				✓	✓	✓								✓
Eucalyptus spathulata	Swamp Mallet	Myrtaceae	Native	6-12m	6-10m	Evergreen			✓	✓							✓			✓
Eucalyptus todtiana	Coastal Blackbutt	Myrtaceae	WA	6-12m	4-10m	Evergreen			✓	✓										✓
Eucalyptus torquata	Coolgardie Gum	Myrtaceae	WA	6-8m	3-6m	Evergreen		✓	✓	✓										
Eucalyptus victrix	Coolibah	Myrtaceae	WA	10-14m	8-12m	Evergreen						✓								✓
Ficus microcarpa hillii	Hills Weeping Fig	Moraceae	Native	18-25m	15-20m	Evergreen					✓	✓		✓					✓	✓
Fraxinus pennsylvanica** 'Urbdel'	Urbanite Ash	Fraxinaceae	Exotic	12-16m	6-8m	Deciduous			✓	✓			✓							
Geijera parviflora	Australian Willow/ Wilga	Rutaceae	Native	8-12m	6-10m	Evergreen	✓			✓	✓									✓
Hakea laurina**	Pin-Cushion Hakea	Myrtaceae	WA	6-8m	4-6m	Evergreen		✓	✓			✓						✓	✓	
Hakea petiolaris	Sea Urchin Hakea	Myrtaceae	WA	8-12m	6-10m	Evergreen			✓									✓		
Jacaranda mimosifolia**	Jacaranda	Bignoniaceae	Exotic	12-18m	8-12m	Deciduous			✓	✓			✓						✓	✓
Koelreuteria bipinnata**	Chinese Flame Tree	Sapindaceae	Exotic	12-16m	8-12m	Deciduous			✓	✓			✓							
Koelreuteria paniculata**	Golden Rain Tree	Sapindaceae	Exotic	8-12m	6-10m	Deciduous			✓	✓			✓							
Lagerstroemia indica** (+ cultivars)	Crepe Myrtle	Lythraceae	Exotic	6-8m	4-6m	Deciduous		✓	✓				✓					✓		
Leptospermum petersonii	Lemon Scented Teatree	Myrtaceae	Native	4-6m	3-4m	Evergreen		✓					✓					✓		
Libidibia ferrea	Lepoard Tree	Caesalpiniaceae	Exotic	10-15m	6-10m	Semi-deciduous			✓				✓							
Macadamia integrifolia	Macadamia	Proteaceae	Native	12-17m	8-15m	Evergreen													✓	
Melaleuca lanceolata	Rottnest Island Tea-Tree	Myrtaceae	WA	4-8m	4-6m	Evergreen		✓	✓				✓			✓	✓			✓
Melaleuca linariifolia (+ cultivars)	Snow in Summer	Myrtaceae	Native	6-10m	4-6m	Evergreen		✓	✓		✓									✓
Melaleuca leucadendra	Weeping paperbark	Myrtaceae	Native	15-20m	8-13m	Evergreen														✓
Melaleuca preissiana	Stout Paperbark	Myrtaceae	WA	8-12m	6-8m	Evergreen			✓											✓
Melaleuca raphiophylla	Swamp Paperbark	Myrtaceae	WA	8-14m	6-10m	Evergreen			✓					✓				✓		✓
Melaleuca viridiflora	Red Flowering Broadleaved P	Myrtaceae	Native	8-14m	6-10m	Evergreen				✓										✓
Melia azedarach** (fruitless cultivar)	White Cedar	Meliaceae	Native	6-15m	6-8m	Semi-deciduous				✓				✓						
Pistacia chinensis	Chinese Pistachio	Anacardiaceae	Exotic	8-12m	6-8m	Deciduous				✓			✓							
Pittosporum angustifolium	Native Apricot	Pittosporaceae	Native	6-10m	2-5m	Evergreen	✓	✓		✓							✓			
Platanus x acerifolia*	London Plane Tree	Platanaceae	Exotic	18-25m	16-20m	Deciduous				✓	✓		✓							
Plumeria spp.**	Frangipani	Apocynaceae	Exotic	4-12m	4-12m	Deciduous	✓	✓	✓											
Quercus ilex	Evergreen Oak, Holm Oak	Fagaceae	Exotic	16-22m	16-20m	Evergreen				✓	✓									✓
Quercus virginiana	Live Oak	Fagaceae	Exotic	15-18m	6-8m	Deciduous				✓	✓									✓
Santalum acuminatum	Quandong	Santalaceae	WA	5-8m	4-6m	Evergreen					✓	✓	✓						✓	✓
Schinus molle	Peppercorn Tree	Anacardiaceae	Exotic	12-15m	8-12m	Evergreen		✓		✓	✓									✓
Tabebuia impetiginosa	Pink Trumpet Tree	Bignoniaceae	Exotic	15-25m	10-15m	Deciduous					✓									✓
Tipuana tipu**	Pride of Bolivia	Fabaceae	Exotic	10-12m	6-10m	Semi-deciduous														
Ulmus parvifolia	Chinese Elm	Ulmaceae	Exotic	12-18m	8-15m	Semi-deciduous					✓									✓
Zelkova serrata 'Green Vase'	Japanese Zelkova	Ulmaceae	Exotic	12-20m	10-16m	Deciduous			✓	✓			✓							✓

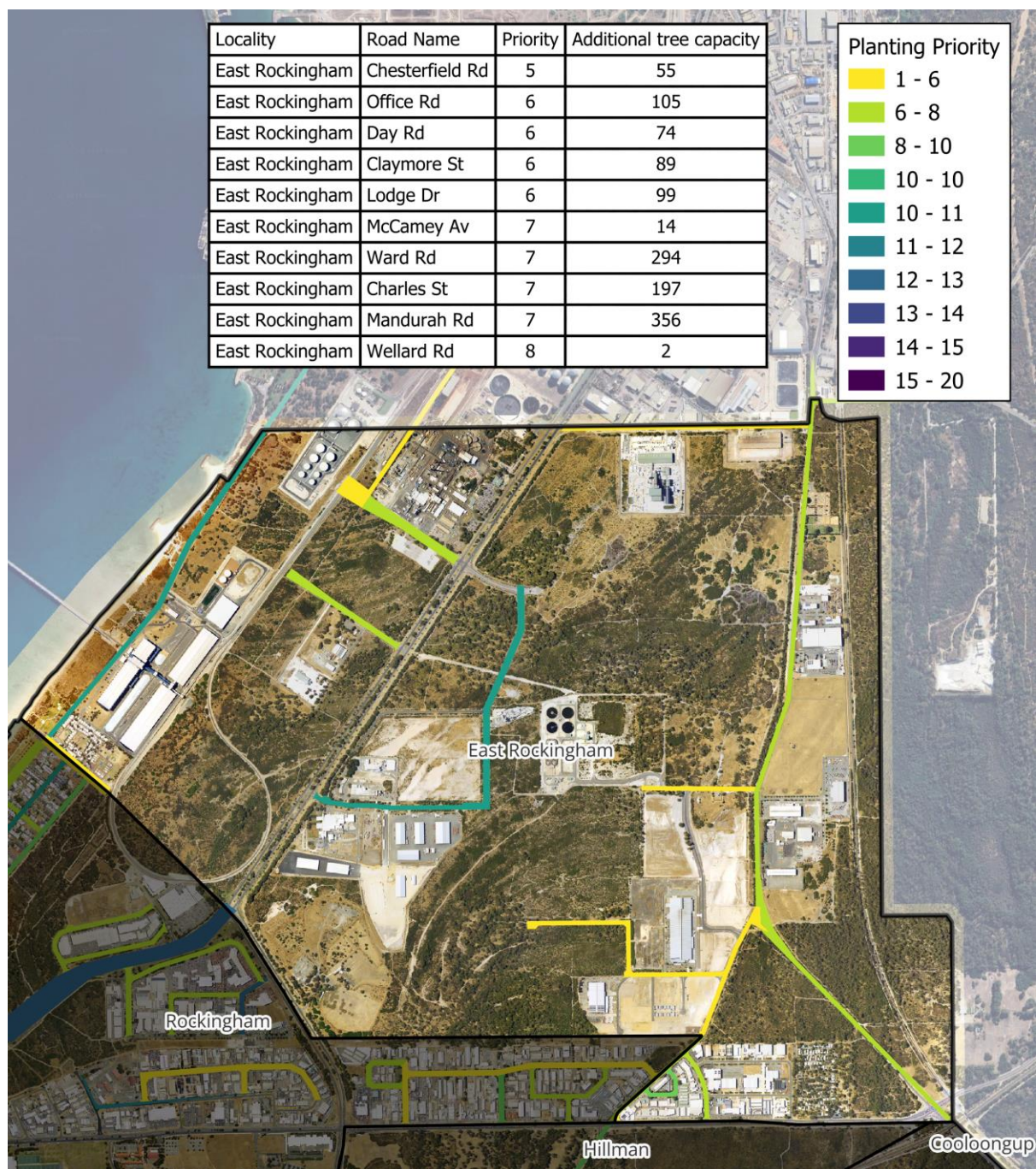
*Only to be planted when replacing an existing tree of this species or to continue a row planting of this species

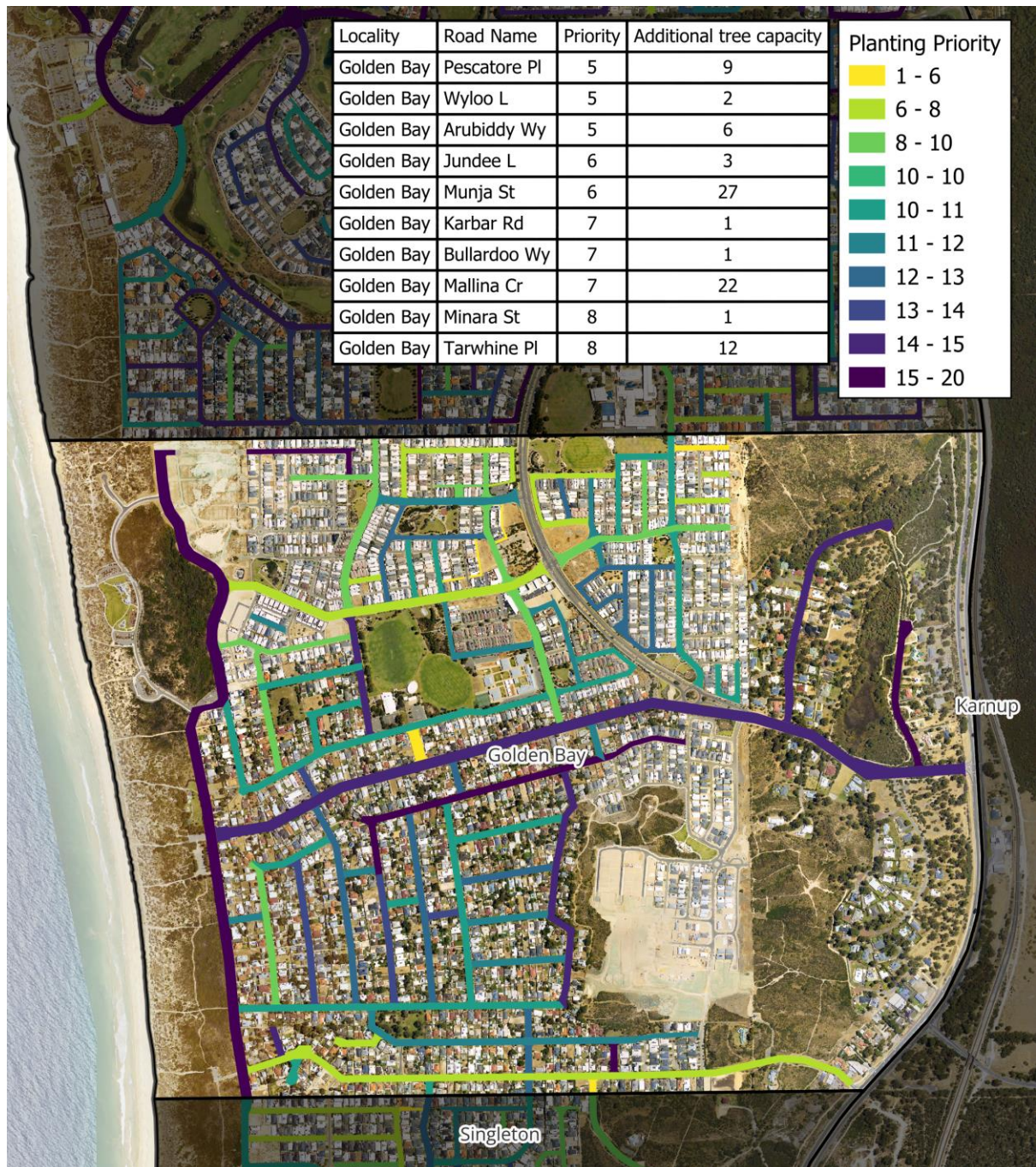
** Climate suitable according to Which Plant Where

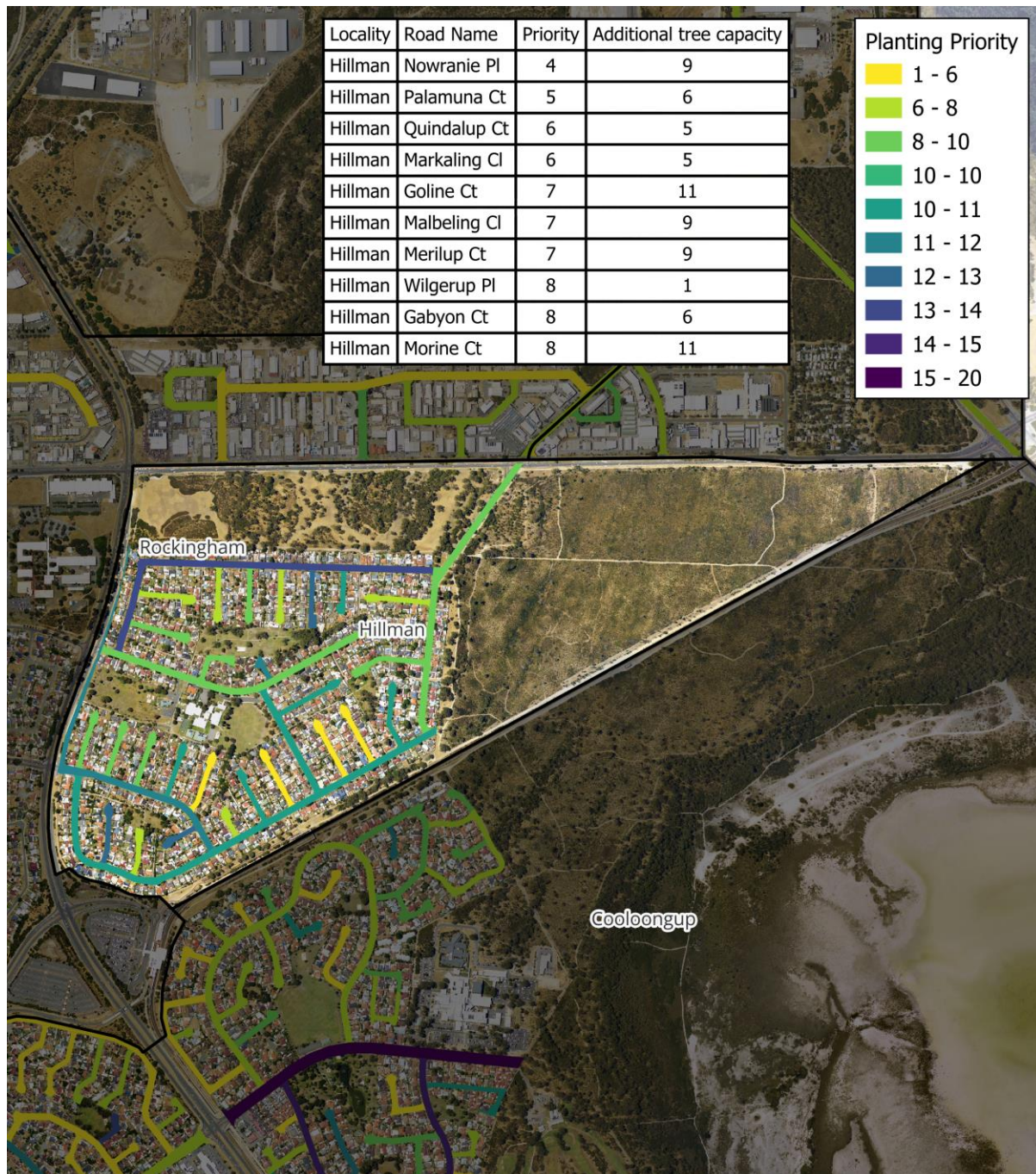
5 Planting Prioritisation Plans per Suburb

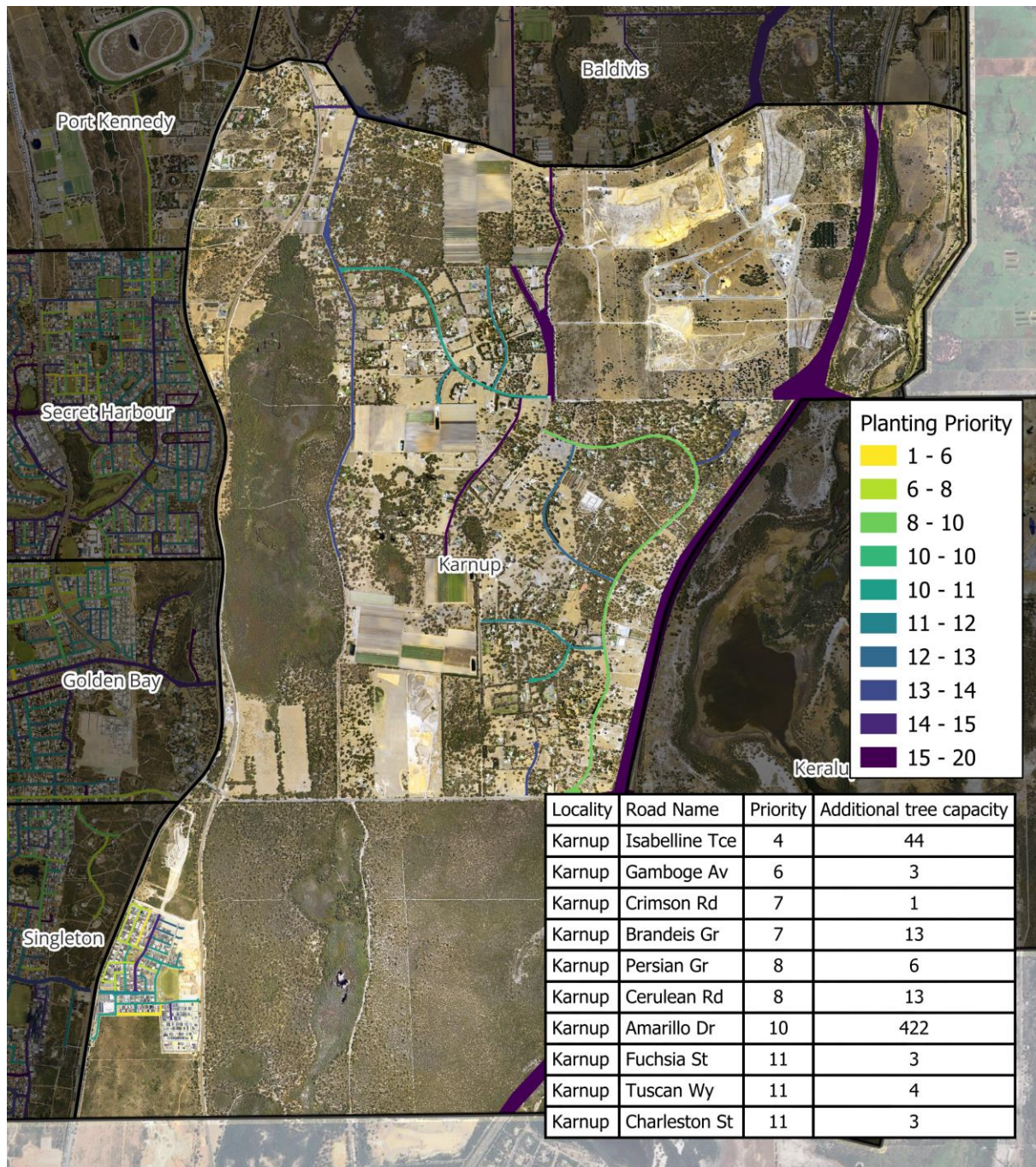












Locality	Road Name	Priority	Additional tree capacity	Planting Priority
Port Kennedy	Toynbee Wy	2	7	1 - 6
Port Kennedy	Bessemer Rd	2	6	6 - 8
Port Kennedy	Fielden Wy	3	43	8 - 10
Port Kennedy	Bakewell Dr	3	119	10 - 10
Port Kennedy	Canterbury Mews	4	4	10 - 11
Port Kennedy	Cook Ct	4	6	11 - 12
Port Kennedy	Stockton Rd	4	23	12 - 13
Port Kennedy	Sunlight Dr	4	75	13 - 14
Port Kennedy	Blackburn Dr	4	36	14 - 15
Port Kennedy	Ski Ct	5	6	15 - 20

