

CARLTON URBAN FOREST

PRECINCT PLAN

2013-2023



CITY OF MELBOURNE

CARLTON URBAN FOREST PRECINCT PLAN 2013 – 2023

A MESSAGE FROM THE CITY OF MELBOURNE

The City of Melbourne's urban forest comprises around 70,000 trees in streets and parks as well as approximately 20,000 trees located in the private realm, in addition to a growing number of green roofs and walls across the municipality.

The trees managed by the City of Melbourne in the public realm contribute significantly to the character and identity of Melbourne. An increasing body of evidence and research informs us that urban forests and green space are vital to supporting a healthy community as well as providing a means to adapting to climate change.

The *Urban Forest Strategy* completed in 2012 identified the need to generate a new legacy for Melbourne and create a forest for future generations. This urban forest is to be diverse, robust and resilient in the face of current and future challenges. The urban forest precinct plan documents are a key implementation tool of the *Urban Forest Strategy*, providing a framework for tree planting in streets that will meet the *Urban Forest Strategy* targets.

We have worked closely with the community and key stakeholders to generate this plan and are confident that it provides the basis for a street tree planting program that is consistent with neighbourhood character, the community's vision for the future urban forest, and the principles of the *Urban Forest Strategy*.



Robert Doyle
Lord Mayor



Cr Arron Wood
Chair Environmental
portfolio

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INTRODUCTION TO THE PRECINCT PLANS

Urban forest precinct plans guide tree planting and greening in City of Melbourne streets. Precinct plans are subsidiary documents to the City of Melbourne's 2012 *Urban Forest Strategy* and form a key component of the strategy's implementation. Melbourne is divided into 10 precincts.

Each precinct plan has been developed in collaboration with the community, and is grounded in the science underlying the *Urban Forest Strategy* and in sound urban design principles.

What is an urban forest?

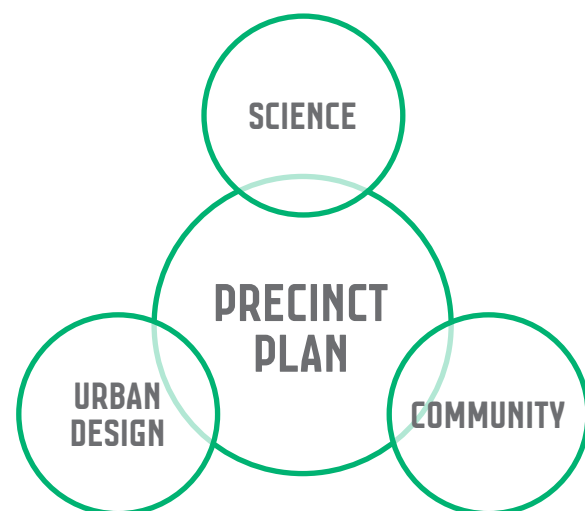
The urban forest comprises all of the trees and other vegetation – and the soil and water that supports it – within the municipality. It incorporates vegetation in streets, parks, gardens, plazas, campuses, river and creek embankments, wetlands, railway corridors, community gardens, green walls, balconies and roofs.

Why is the urban forest important?

The City of Melbourne is currently facing three significant challenges: climate change, urban heating and population growth. These will place significant pressure on the built fabric, services and people of the city.

A healthy urban forest will play a critical role in maintaining the health and liveability of Melbourne by:

- cooling the city
- improving and maintaining the health, well-being and happiness of urban dwellers
- improving social cohesion
- cleaning air and water
- sequestering and storing carbon
- attracting people to live, work and visit in Melbourne
- stimulating economic activity in retail and dining precincts
- providing habitat for native birds and pollinators



THE URBAN FOREST STRATEGY

PRINCIPLES:

- Mitigate and adapt to climate change
- Reduce the urban heat island effect
- Design for health and wellbeing
- Create healthier ecosystems
- Design for liveability and cultural integrity
- Become a water sensitive city
- Position Melbourne as a leader in urban forestry

THE TARGETS SET OUT IN THE URBAN FOREST STRATEGY ARE TO:

Increase canopy cover

The City of Melbourne's canopy cover will be 40% by 2040.

Increase urban forest diversity

The City of Melbourne's urban forest population will be composed of no more than 5% of one tree species, no more than 10% of one genus and no more than 20% of any one family.

Improve vegetation health

90% of the City of Melbourne's tree population will be healthy by 2040.

Improve soil moisture and water quality

Soil moisture levels will be maintained at levels to provide healthy growth of vegetation.

Improve urban ecology

Protect and enhance urban ecology and biodiversity to contribute to the delivery of healthy ecosystem services.

Inform and consult the community

The community will have a broader understanding of the importance of our urban forest, increase their connection to it and engage with its process of evolution.

INTRODUCTION TO THE PRECINCT PLANS CONTINUED

Why are we concerned about climate change, urban heat island and population growth?

Climate change impacts to human health and wellbeing are a significant concern for our municipality. Climate change science indicates that Melbourne is likely to experience an increase in the frequency and severity of extreme weather events such as heatwaves, drought and flooding. Heat waves kill more people in Australia each year than any other natural disasters. The average annual temperature is expected to increase by approximately

2.6 C° and the number of hot days each year is expected to increase from nine to 20 by 2070.

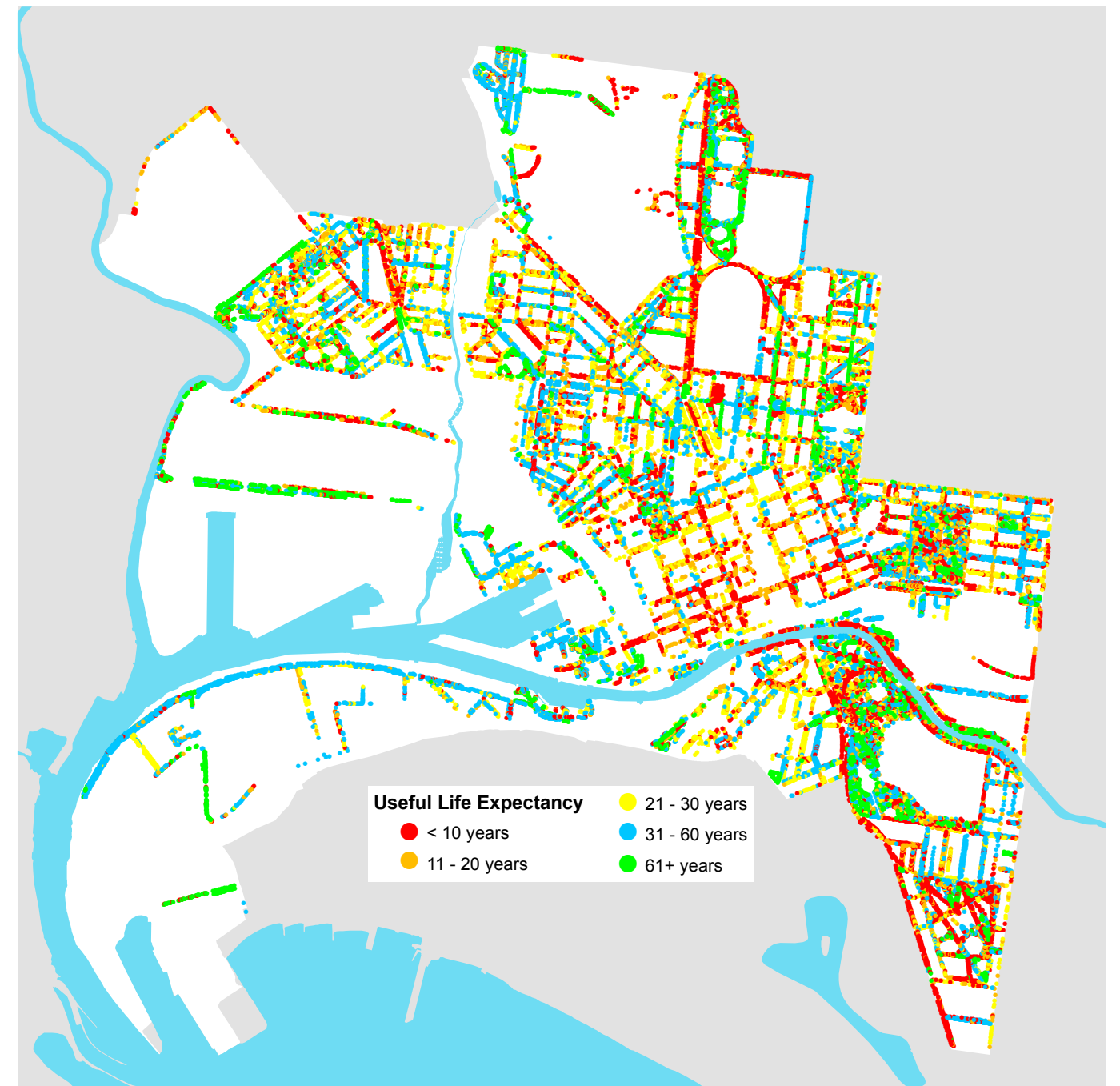
The urban heat island effect (whereby urban areas are several degrees hotter than surrounding rural areas) means that central Melbourne will reach threshold temperatures for heat related illness in vulnerable populations more often and for a longer duration

than surrounding suburban and rural areas. The urban heat island is primarily a result of impervious hard surfaces that absorb heat, human activity that generates heat and low vegetation cover that fails to provide adequate shade and natural cooling.

Anticipated population growth and increasing urban intensification means that more people will be at risk during extreme weather events



Thermal imaging of Melbourne, taken late at night, showing how paved, unshaded surfaces store heat from solar radiation and contribute to increased temperatures in urban areas.



Useful Life Expectancy mapped for City of Melbourne Trees.

and, as a result, there will be a greater demand on health services in the City of Melbourne. Urban intensification also places additional pressure on public realm open space as the private realm becomes increasingly built-up (for more information see Melbourne's *Open Space Strategy*). Access to open space is critical to people's physical and mental health and wellbeing.

What can the urban forest do?

Urban forests provide an array of environmental, economic and social benefits that contribute to creating resilient and sustainable cities that are enjoyable places for people to live and work. Some of the significant benefits that our tree canopy can provide to mitigate climate change impacts are shade, cooling and rainwater interception.

The urban forest and its associated benefits have been identified as one of the most cost-effective means of mitigating the potential impacts of climate change and heat on our city. The *Urban Forest Strategy* has established principles and targets for developing an urban forest that will meet Melbourne's needs and create a city within a forest.

HOW DOES MELBOURNE'S URBAN FOREST MEASURE UP?

In order to provide the benefits we need from our urban forest in a changing climate, our tree population needs to be healthy, diverse and resilient. To assess its current state we mapped the trees in our city to measure species/genus/family diversity, useful life expectancy and tree canopy.

Useful life expectancy

Useful life expectancy is an estimate of how long a tree is likely to remain in the landscape based on health, amenity, environmental services contribution and risk to the community. The recent period of drought and water restrictions triggered irreversible decline for many trees. This exaggerated the age-related decline of many significant elms and other trees. Modelling shows that within the next ten years, 23% of our current tree population will be at the end of their useful lives and within twenty years this figure will have reached 39%. Most dramatically, 55% of Melbourne's elms are in a state of severe decline and will likely need to be removed from the landscape within 10 years.

Tree diversity and vulnerability

At present, approximately 40% of our trees come from one family (Myrtaceae). Elm avenues line many Melbourne boulevards and plane trees dominate in many streets, particularly within the central city. Within streets 24% of trees are planes, 11% are elms and 8% are spotted gums. Reliance on a few species, and a lack of spatial diversity in species distribution, leaves the urban forest vulnerable to threats from pests, disease, and stress due to climate change.

Canopy cover

Increasing the provision of summer shade and biomass is important to combating the urban heat island effect, adapting to climate change and enhancing our streetscapes for the comfort of people. Canopy cover is a way of expressing, as a percentage, how much of any given area is shaded by trees. Currently, 77% of Melbourne's streets and parks are without natural shade, and the areas of the city with the highest population density have the lowest canopy cover. The City aims to double its canopy cover by 2040 and is currently planting 3,000 trees per year to achieve this target.

How can permeability, availability of water and soil volume be improved?

The urban environment is highly modified, with harsher conditions for plant growth than in natural landscapes. Tree health and the ability to maintain shade and cooling benefits are primarily influenced by the conditions in which trees are growing.

Access to ample soil moisture enables trees to actively transpire and cool the surrounding air. Adequate soil moisture is critical for healthy vegetation. A number of active and passive approaches are currently undertaken to replenish soil moisture and ensure it is maintained at levels to provide healthy growth. Our *Total Watermark Strategy* is being updated to strategically manage Melbourne's water catchment. In the meantime, we have implemented numerous water sensitive urban design projects to capture and store

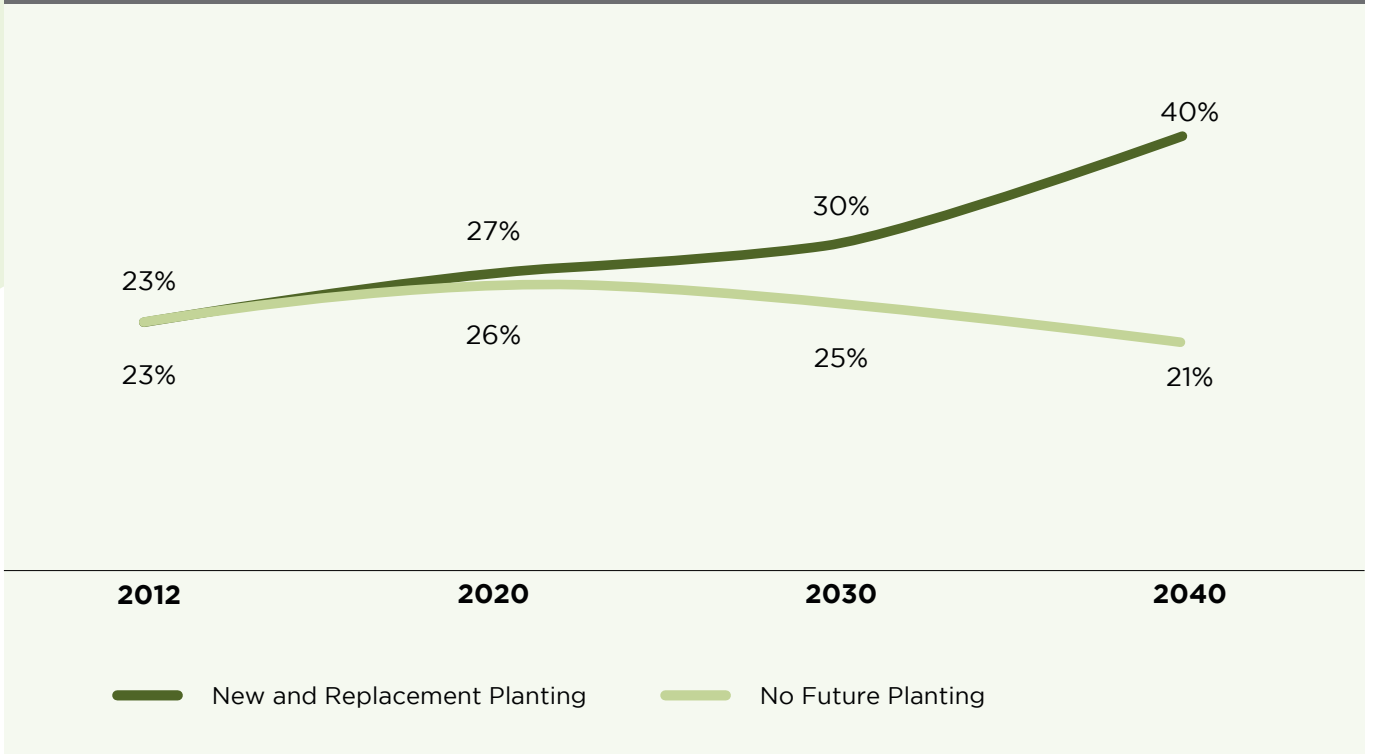
water that would otherwise go down the drain. This water is being used to water the vegetation in our urban landscapes.

Urban development has increased the connectedness of impervious surfaces resulting in:

- decreased vegetation cover and below ground growing space;
- decreased infiltration of water into the ground;
- increased pollutant runoff; and,
- increased hard surfaces which contribute to the urban heat island.

Fundamentally, the city has low levels of water permeability (50%) and water has little opportunity to infiltrate the soil. Ground surfaces need to allow rainfall to enter the soil, a huge reservoir that is ready-made to provide for a healthy forest. We are increasingly using methods to increase permeability through the use of permeable pavement, structural soil cells and peeling back asphalt where possible to provide better growing conditions for trees and vegetation, and a better cooling outcome.

MELBOURNE'S CANOPY GRAPHED WITH AND WITHOUT TREE PLANTING



The lower line represents what is projected to happen to our canopy cover if we stop planting trees. The line above shows what will happen if we replace trees as they are lost and plant new trees at a rate of approximately 3,000 trees per year to 2040.

WHAT WILL THE PRECINCT PLANS ACHIEVE?

The precinct plans will help to guide implementation of the urban forest strategy in Melbourne's streets. The information provided in the plans will direct the annual tree planting program to achieve urban forest strategy objectives, protect and enhance neighbourhood character, and to prioritise works and budgets within each precinct.

Within this document, specific direction is provided on the selection of appropriate trees for the precinct.

The plans are performance based in that they establish the desired outcomes for streets but do not prescribe specific species for each location. A set of high performance guidelines are being developed for Melbourne's urban landscapes and these will support the precinct plans with case studies and detailed guidance on how to achieve outcomes in streets that are consistent with the urban forest strategy. Park and significant

boulevard trees will be planted using existing master plans and site specific plans.

Policy context

The relationships between the precinct plans and City of Melbourne policy documents are outlined in the *Urban Forest Strategy*. Within Carlton the heritage overlays, Open Space Strategy and the City North Structure Plan strongly influence the future character of the precinct.



The City of Melbourne boundary is shown in grey and the Carlton precinct is highlighted in orange.

THE VISION FOR CARLTON'S URBAN FOREST

CARLTON'S URBAN FOREST WILL BE HEALTHY, DIVERSE AND RESILIENT, SUPPORTED BY AN INTEGRATED APPROACH TO MANAGING WATER, SOIL AND SPECIES SELECTION ACROSS THE LANDSCAPE.

THE URBAN FOREST WILL BE COLOURFUL AND CONNECTED, PROVIDING SHADE FOR PEOPLE AND HABITAT FOR NATIVE BIRDS AND POLLINATORS. IT WILL STRENGTHEN THE CHARACTER OF THE HERITAGE PRECINCTS AND CREATE A PUBLIC REALM THAT SUPPORTS THE PUBLIC LIFE OF CARLTON.



WHAT WILL THE PRECINCT PLANS ACHIEVE? CONTINUED

Complementary Strategies

The precinct plans address tree planting in Melbourne's streets but there are many ways in which the private and public realm can contribute to meeting urban forest objectives and creating a city resilient to climate change. These include:

- water sensitive urban design
- tree planting in parks
- private realm tree planting that contributes to urban forest canopy, diversity and connectivity
- planting vegetation that enhances urban biodiversity
- maximising permeable surfaces and growing space for trees
- building green roofs and walls
- greening balconies
- implementing innovative green technologies

The City of Melbourne is working with stakeholders in both the public and private realm to support these outcomes.

Opportunities exist to enhance canopy cover in the private realm. The projected canopy cover for the entire precinct has included a potential doubling of private realm canopy cover to 8% by 2040. In order for this to occur, private and institutional land owners, and developers would need to actively create space for and plant trees.

The City of Melbourne will support private residents to plant trees by providing materials that advise on suitable trees to plant in small yards and by seeking creative ways to encourage private land planting. We will also continue to educate residents on how they can contribute to the urban forest

through our ongoing community engagement work.

In and adjacent to the Carlton precinct, the Melbourne Cemetery and the University of Melbourne manage large areas of land that could potentially support greater canopy cover. The City of Melbourne will work with institutional and large holding land managers across the city to support and encourage the adoption of urban forest strategy principles on those lands. Similarly, the City of Melbourne will work with neighbouring municipalities to support and encourage the adoption of urban forest strategy principles in other jurisdictions.

Historical and existing tree plantings

Early tree planting was largely driven by the desire to create windbreaks and establish shade. The first significant street tree plantings in the Carlton precinct occurred in the 1850s when Royal Parade (then Sydney Road) was planted with fast growing blue gums and radiata pine, and, while the species have changes, Royal Parade has been continuously treed since that time. In response to calls from the public to beautify streets and plant for the health benefits of trees, Melbourne City Council initiated a program of systematic street tree planting in 1878; Swanston Street (Madeline St), Drummond Street and Sydney Road (Grattan to Brunswick Road) were budgeted for planting. An 1879 Argus letter to the editor calls for higher tree guards in Carlton due to horses and cows feeding on young elms. Historic photos indicate College Crescent (then Madeline St) was planted with elms in the 1880s or 1890s and that planting had occurred outside the Children's Hospital in Rathdowne Street around that time as well.

Further beautification of boulevards occurred in the lead up to the Royal visit in 1901 and records suggest that tree planting was occurring in streets from that period up until World War I. Other significant periods of street tree planting occurred in the 1930s when many tree islands and medians were constructed. Much of this work occurred in Carlton, with Neill Street, Kay Street, Rathdowne Street, Palmerston Street, Keppell Street and Drummond Street reportedly planted as part of this program. Another wave of planting occurred from the 1970s onward and this period saw a greater emphasis on the use of native trees.

Carlton character

Carlton is home to Lygon Street with its relaxed café and restaurant culture and a vibrant university community. When asked, the community characterised Carlton's urban forest as green, shady, big and beautiful. Important landscapes identified by the public include the Carlton Gardens and squares, Two Tree Hill, Royal Parade and College Crescent.

Carlton's urban forest is characterised by formal park and street tree plantings. These parks and avenues contain stately trees of both Australian and exotic origin. The Carlton Gardens contain an eclectic mix of evergreen natives, conifers, deciduous trees and palms arranged in either formal avenues or as informal specimen plantings. The squares tend to contain formal avenues or border plantings of large deciduous trees. Two Tree Hill is notable for the two stately lemon-scented gums planted on the expansive, grassy roundabout adjacent to the Melbourne Cemetery. Royal Parade and College Crescent are planted with a dense canopy of elms. These landscapes were planted in the late 1800s and early

1900s, and represent some of the founding plantings of Melbourne's urban forest. The core tree genera (groupings of species) that form Carlton's urban forest are elms, oaks, planes and corymbias (gums).

Carlton's urban intensity, arising largely from its dense subdivision pattern, stands in contrast to the four broad land uses in and adjacent to the precinct – Princes Park, Carlton Gardens, Melbourne Cemetery and the University. These large, open or relatively low density areas provide important opportunities for enhancing canopy cover for Carlton and surrounding precincts.

The Carlton precinct is distinguished by several inherent geometries in its streetscapes – a north-south oriented grid, strong diagonals, crescents, and notably the five formally laid out squares which form an integral part of the street system. Most streets in Carlton are 30 metres wide, with relatively narrow footpaths and no nature strips (Grattan Street being an exception). Centre medians, roundabouts and tree islands are present in the majority of streets. This configuration provides fantastic opportunities for planting large trees in streets.

In its built form, terraces and semi-detached dwellings with parapet facades and small setbacks lend consistency to many streetscapes within the residential and heritage areas of the precinct. The blocks to the south and east of the university are characterised by larger buildings and the height and density of the built form is expected to increase throughout this part of the precinct. Some densification is also occurring in the vicinity of the existing housing estates in Carlton. Beyond these areas of more significant change, the character of Carlton's built form and streetscapes is expected to remain consistent.



View of the cemetery showing planting on College Crescent occurred in the 1880s or 1890s [State Library of Victoria]



An unidentified street in Carlton in the 1940s showing roadside tree planting and island plots [State Library of Victoria]

COMMUNITY PRIORITIES

Carlton's Urban Forest Precinct Plan has been developed in collaboration with the community, which is reflected in the character, vision, planting plan and priorities defined for Carlton's urban forest.

Community consultation with Carlton residents, workers and visitors indicated that there are important landscapes in Carlton where the urban forest, and how it changes over time, should be managed in ways that are sensitive to heritage and existing uses. Carlton's urban forest is highly valued and the community wants to see it thoughtfully managed and enhanced, using approaches that meet community needs while improving urban forest health and diversity.

Our consultation with the Carlton community indicated a preference for trees that would provide large, arching canopies over streets. The community also preferred trees that provide colour and seasonal interest.

COLOUR



Desired future states defined by the community:

- High canopy cover that provides shade and dappled light.
- Visual diversity in terms of colour, shape, seasonal change and contrasts, and understorey planting.
- Use of both native and exotic species in the right locations to deliver the benefits that different trees provide.
- Species selection that results in mature trees that are in scale and harmony with the streetscape and its uses.
- A healthy, lush and vigorous urban forest of big, beautiful, green trees.

Urban forest benefits highlighted through community consultation:

- Shade.
- Biodiversity.
- Water capture and storage.
- Economic benefits to small business.
- Mental wellbeing.
- Food production.
- Aesthetic beauty.
- Opportunities for play.

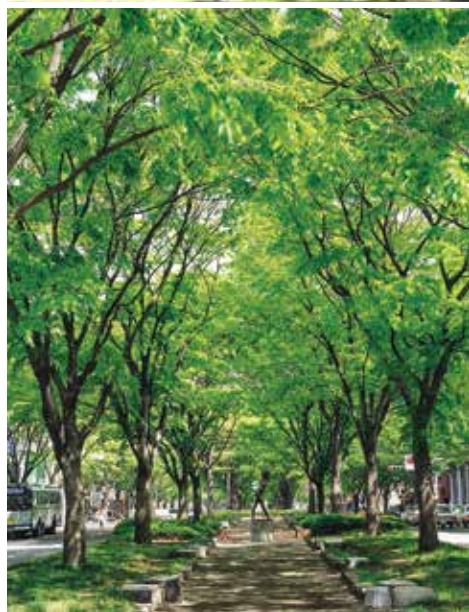
SHAPE



Images selected as representing a preferred future for Carlton's urban forest that includes colour, canopy, shade, seasonal change and shape.

**COMMUNITY PRIORITIES
CONTINUED**

STREETScape

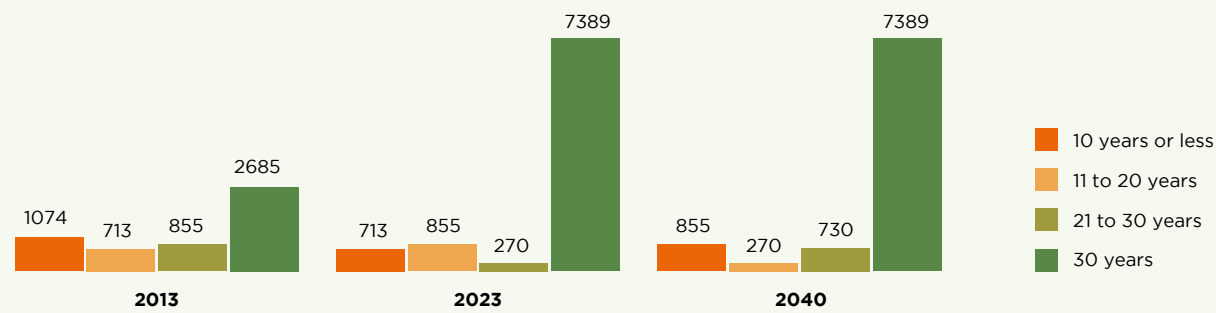


Carlton community members developing priorities for planting in the precinct. (opposite)



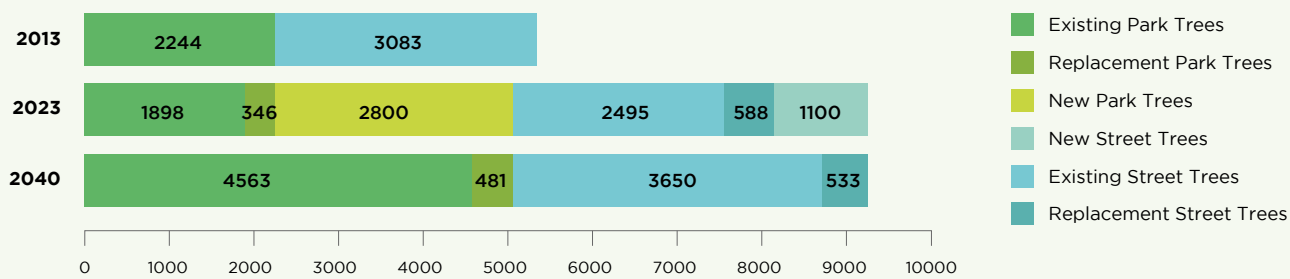
CARLTON'S URBAN FOREST IN 2013 AND ITS PROJECTED FUTURE

TREE HEALTH (ULE) - PUBLIC REALM



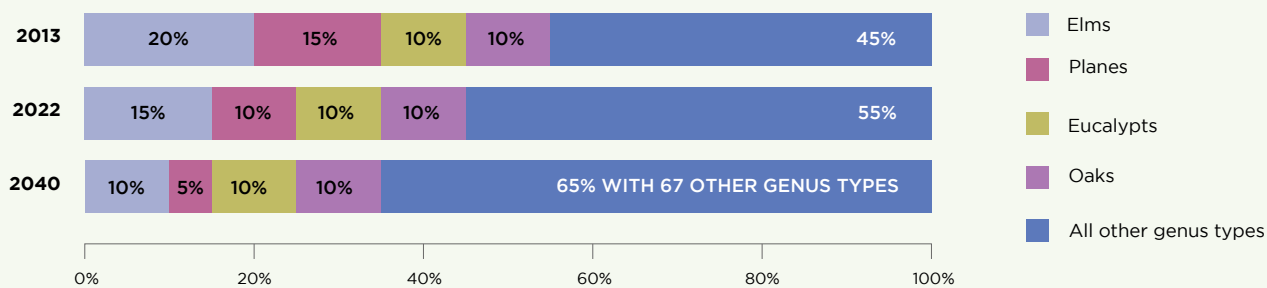
Tree counts for Carlton, categorised by useful life time expectancy (ule) in years

TREES - PUBLIC REALM



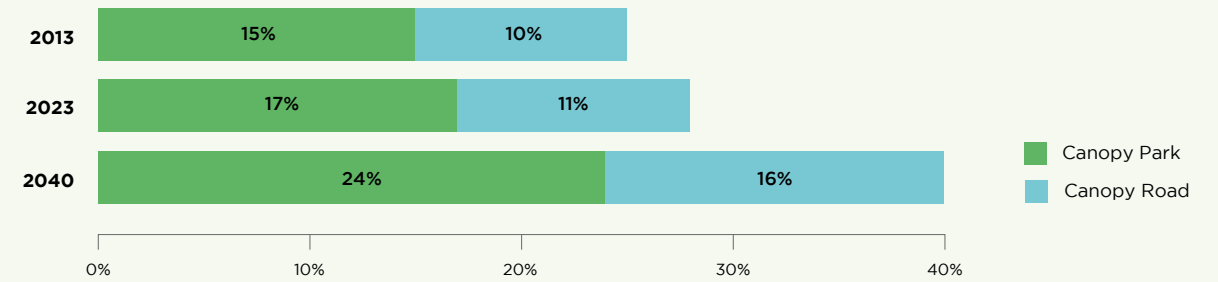
Tree counts and planting by City of Melbourne in Carlton

DIVERSITY (BY GENUS) - PUBLIC REALM



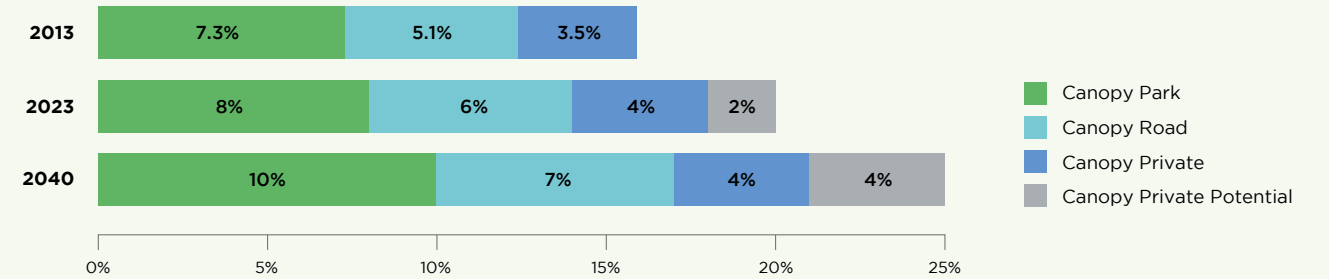
Main genus types for Carlton

CANOPY - PUBLIC REALM



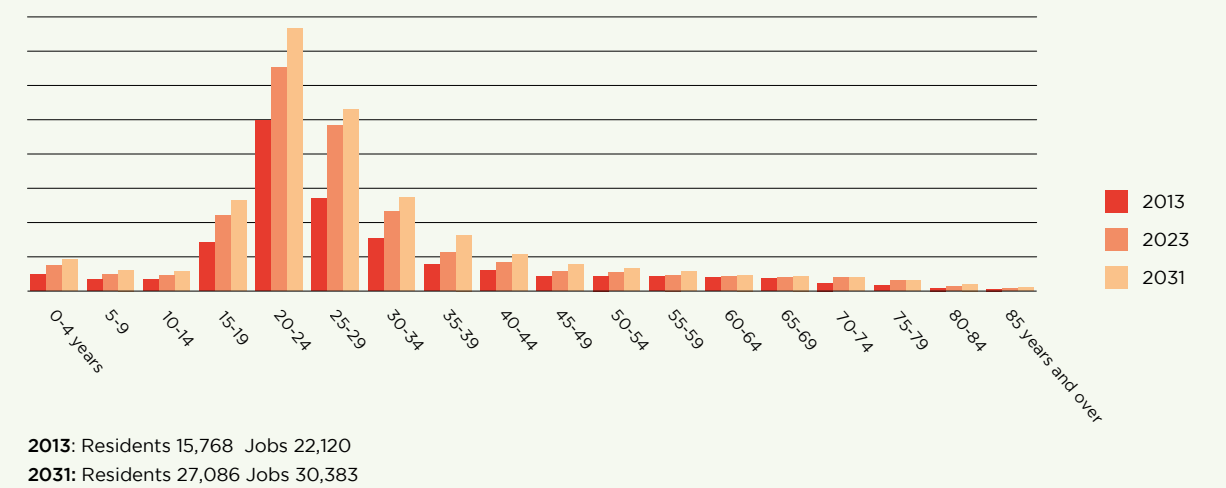
Tree canopy and locations for Carlton

CANOPY - ENTIRE PRECINCT



Tree canopy and locations for Carlton

PRECINCT POPULATION DISTRIBUTION - RESIDENTS



Projected resident population by age for Carlton

PRIORITISING TREE PLANTING IN STREETS

1. Streets with opportunities for planting or replacements



2. High density (>20) of vulnerable residents (<5 or >74 yo)



3. Community identified priority for greening



4. Hot and very hot streets



5. Tree replacements required in next 10 years



6. Canopy Cover <20%



Map 1: Planting priorities

City of Melbourne has prioritised the work in different streets by using varied criteria and the timing is provisional only. The schedule for some streets may be brought forward or delayed by capital works, renewal projects or developments that affect tree planting or survival. Unforeseen opportunities for streetscape improvement may also alter scheduled planting.

Streets prioritised for work in Years 1 - 4 (2013 - 2016) include those:

1. Already scheduled for work in the current planting season; or,
2. Having a high number of vulnerable people with two or more occurrences of: community priority, very low canopy cover, temperature hot spot or replacements required.

Streets prioritised for work in Years 5 - 7 (2017 - 2019) include those:

1. Having a high number of vulnerable people with one occurrence of: community priority, very low canopy cover, temperature hot spot or replacements required.

Streets prioritised for work in Years 8 - 10 (2020 - 2023) include those with only:

1. High number of vulnerable people; or a combination of,
2. Community priority;
3. Very low canopy cover;
4. Temperature hot spot; or
5. Replacements required.

Prioritising tree planting in streets

When prioritising where to plant, it is important to focus resources in the locations that need it most. This includes consideration of where we have opportunities to plant new trees or replace trees, where the highest density of vulnerable people reside, which streets are the

hottest in summer, and areas where there is a very low canopy cover. Replacements are only identified for streets where the useful life expectancy of multiple trees is rated at less than 10 years. We used census and mapping data to spatially define streets with these conditions. We defined these on the maps overleaf.

HOW THE PRECINCT PLAN GUIDES ANNUAL PLANTING



Set annual planting program

Priorities (Map 1)
Streets Undergoing Unforesee Change (Eg. Infrastructure Project or Development)
Annual Budget



Define objectives for streetscape

Review guiding principles and considerations for tree planting (Map 2-7)



Define planting strategy

Maps 8-10



Select species

Review Streetscape objectives
Review What should change (Map 7)
Review Planting plans (Map 8, 9 & 10)
Review species palette



Implement planting

Produce streetscape design options
Consult with residents
Plant

MAP 1: PLANTING PRIORITIES



GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING

Planting in streets presents a variety of challenges, and there are important principles to use in responding to those challenges that will help to meet the *Urban Forest Strategy* targets. These principles are expanded on in the *Urban Forest Diversity Guidelines*, which you should refer to when designing or planting any streetscape; although Carlton specific principles are outlined below.

Planting types and locations: Preference large canopy trees

A single large canopy tree provides greater benefits in terms of cooling, rainwater interception and other ecosystem services than multiple small trees totalling the same canopy extent. City of Melbourne prioritises large canopy trees,

with larger trees planted preferentially in centre medians or tree islands, then in the roadway and then the footpath. In wide medians, consider planting in two staggered rows to maximise canopy spread over hard surfaces.

Kerb outstands should be considered as opportunities to plant species drawn from a wider palette that are unique for that location or intersection and provide visual interest. Roundabouts and closed road ends should be considered as opportunities to plant large canopy trees and create landmark feature landscapes (e.g. the gums on Two Tree Hill). Consider extending the character of the parks, gardens and squares into the surrounding streetscapes to create linkages between open spaces.

Low voltage overhead wires are present in many Carlton streets and are generally continuous on one side of Nicholson, Canning, Rathdowne, Drummond and Cardigan streets. Where medians exist for large canopy tree planting, select small to medium trees on the side with overhead constraints. In streets where footpath trees provide the only canopy, select medium to large trees that can be effectively pruned around power lines. Always consider opportunities to bundle or underground power lines.

Outcomes that improve the pedestrian and outdoor dining environment should always be prioritised.



Using kerb outstands as opportunities to plant species drawn from a wider palette that are unique for the location and provide visual interest. In addition, considering extending the character of the parks, gardens and squares into the surrounding streetscapes to create linkages between open spaces.

GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING **CONTINUED**

Planting patterns and species choice: adopt planting patterns that increase diversity

In heritage areas, deciduous trees should be given preference so that building facades are exposed over winter. Deciduous trees should generally be given preference in roadsides except where built form already obstructs solar access or where parks or setbacks create open space adjacent to the footpath. In north-south streets in heritage areas, maintain deciduous plantings in the centre in response to the extensive oak plantings in those streets. In east-west streets, give preference to evergreen plantings in the medians in order to create opportunities for native trees and conifers.

The convention of planting avenues, or consistent lines of a single species, can limit species diversity. However, avenue plantings are important to local character in many streets and open spaces in Melbourne. To balance these two

conflicting pressures, it is important to identify ways to minimise the extent of homogenous avenue planting while maintaining a strong design outcome. The following strategies can be used.

- Establish a hierarchy of streets/paths most important to plant with continuous avenues and limit use elsewhere.
- Identify breaks in avenues at logical points along the length of streets, where species may change.
- Use asymmetrical treatments along some streets (e.g., local streets where there are power lines on one side only so large trees may fit on one side and small ones on the other).
- Use mixed avenues of two or more species of similar form and character where appropriate
- Use informal mixes of species where acceptable (e.g., perimeters of parks and gardens, streets where most trees senescent but

important established specimens remain, streets where vegetation from private gardens occasionally overhangs into street space, etc.).

Select 'shorter-lived' (~50 years) species in approximately 10% of each sub-precinct to better balance future age distribution across Carlton. These selections should be focused in areas or planting positions where losses will have a lower impact on shade provision (e.g., where there large, long-lived trees in medians or on one side of the street, or in landmark/biodiversity plantings).

Use a balance of proven and trial species to increase diversity but limit the use of trial species in streets to less than 10% of the precinct tree population. Use of unproven species should generally be restricted to short streets, streets where frontages are limited or where strong centre plantings provide continuity and canopy cover for the street.



Use informal mixes of species where acceptable

Soil and moisture conditions: Improve soil moisture conditions and select species appropriate to the site conditions

Always consider opportunities to undertake soil volume improvement in planting areas and to increase permeability or water infiltration where needed. Assessment for these interventions is particularly necessary at sites where trees are being replaced because they failed to thrive. Interventions to consider include:

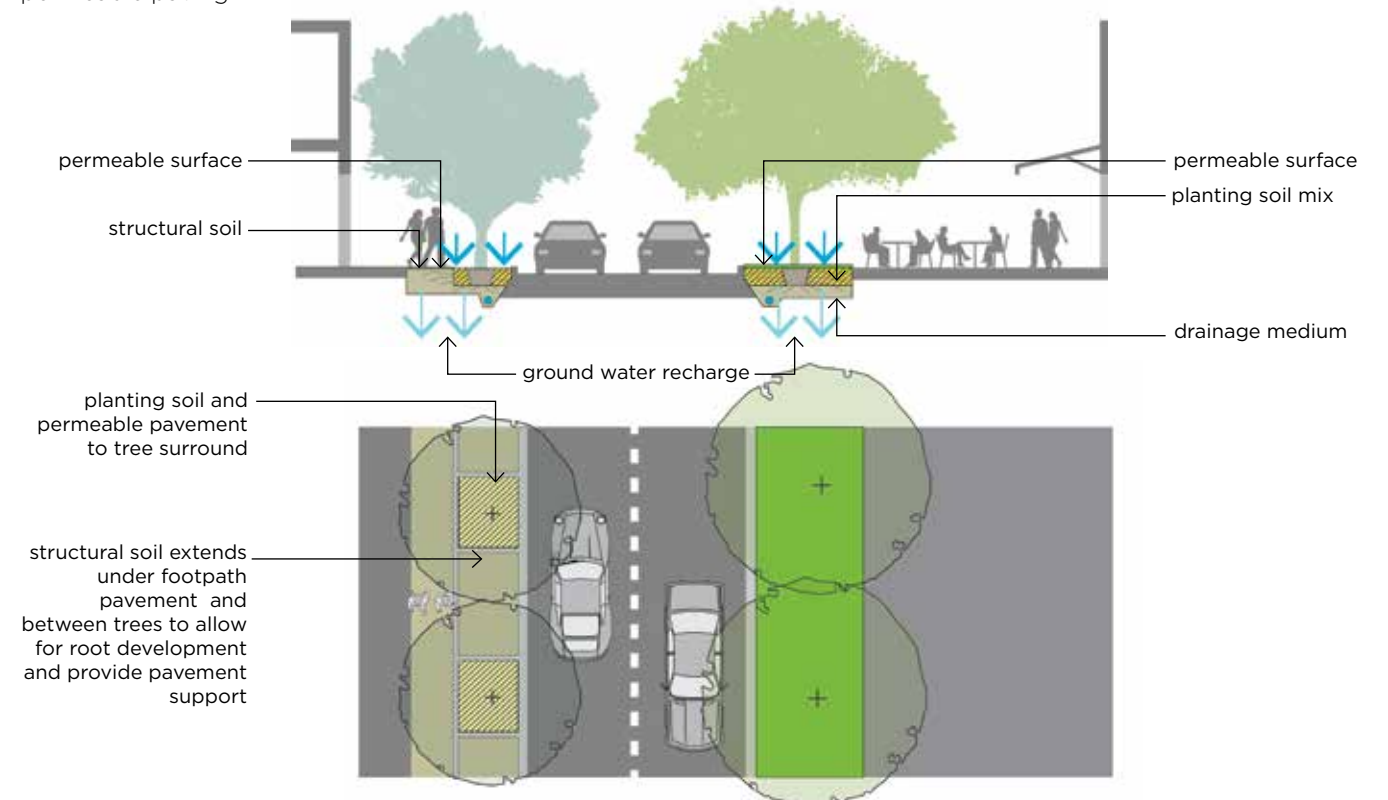
- systematic trenching in landscaped areas, in medians, between tree plots and centre of road parking zones
- structural soils below permeable paving

- increasing soil volume
- WSUD tree pits or infiltration pits
- Stormwater harvesting

The native soils in Carlton tend to consist of a layer of grey silt-clay to about 30 cm and then a layer of yellow mottled heavy-textured clay on top of the bedrock. These clay soils are associated with more difficult conditions for tree growth including poor drainage and compaction. A perched water table has also been encountered in parts of Carlton. Either consider soil improvements or select species that do well in clay where these soils are found.

Periodic water logging of soils can be expected in northeast Carlton in the vicinity of Princes St, Niel St, Nicholson St and Station St. Similar conditions are expected in south-west Carlton in the vicinity of Bouverie St, Victoria St and Elizabeth St. Both of these areas are moisture receiving low-points that historically drained to wetlands.

Select species tolerant of periodic waterlogging in these locations and increase permeability and water capture at higher elevations in the catchment.



Improving below ground growing conditions for trees in streets

GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING **CONTINUED**

This map indicates locations where overhead constraints or tramlines have been identified and may impact tree selection and the maximum canopy cover that can be achieved. Low voltage overhead wires associated with electricity distribution and tram lines have minimum clearance distances from vegetation that must be maintained. When selecting which species to plant beneath overhead wires, make sure that the species chosen can be formatively pruned to create a pleasing canopy shape, or is at a mature height that it is a safe distance from overhead wires.

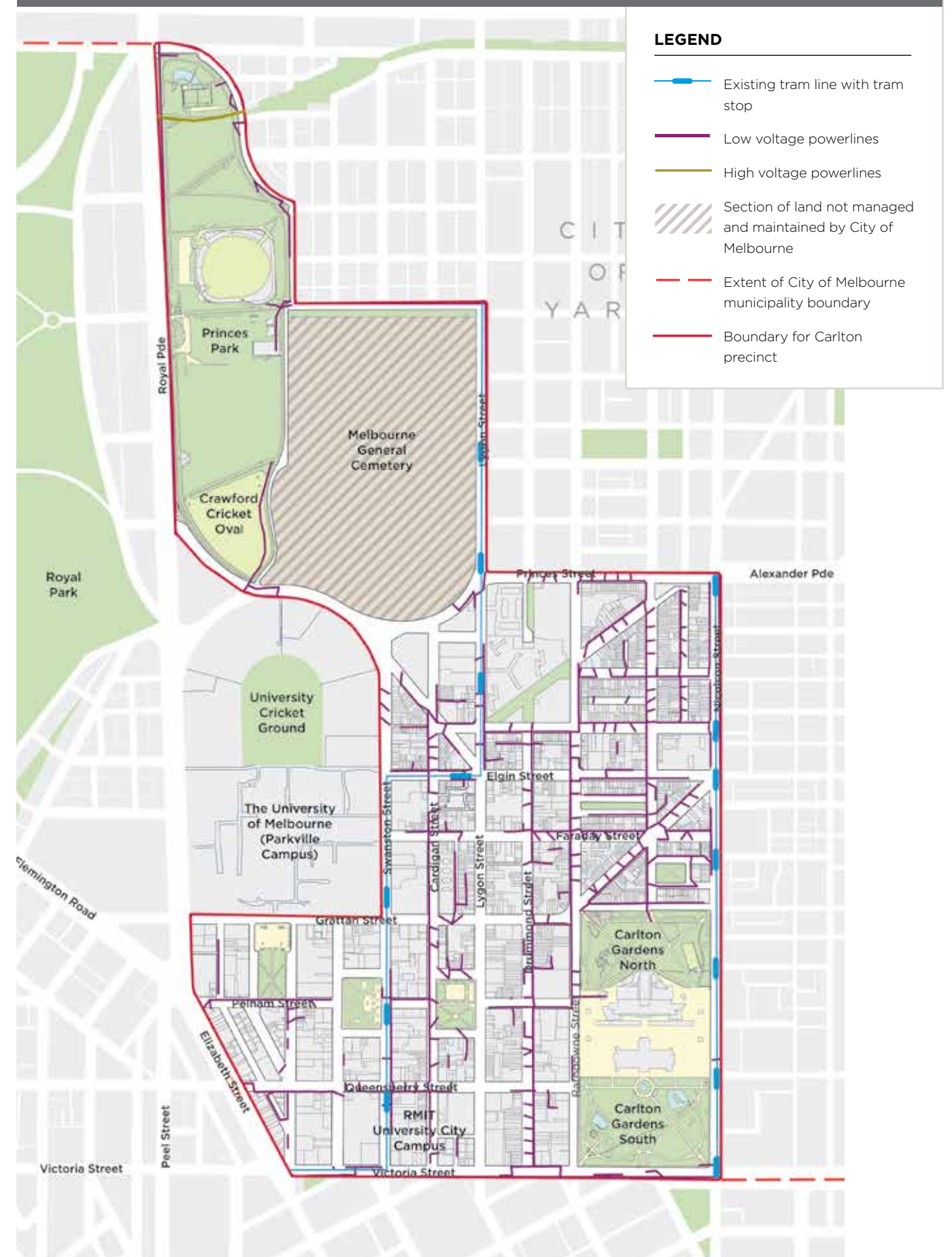


Small tree under powerlines



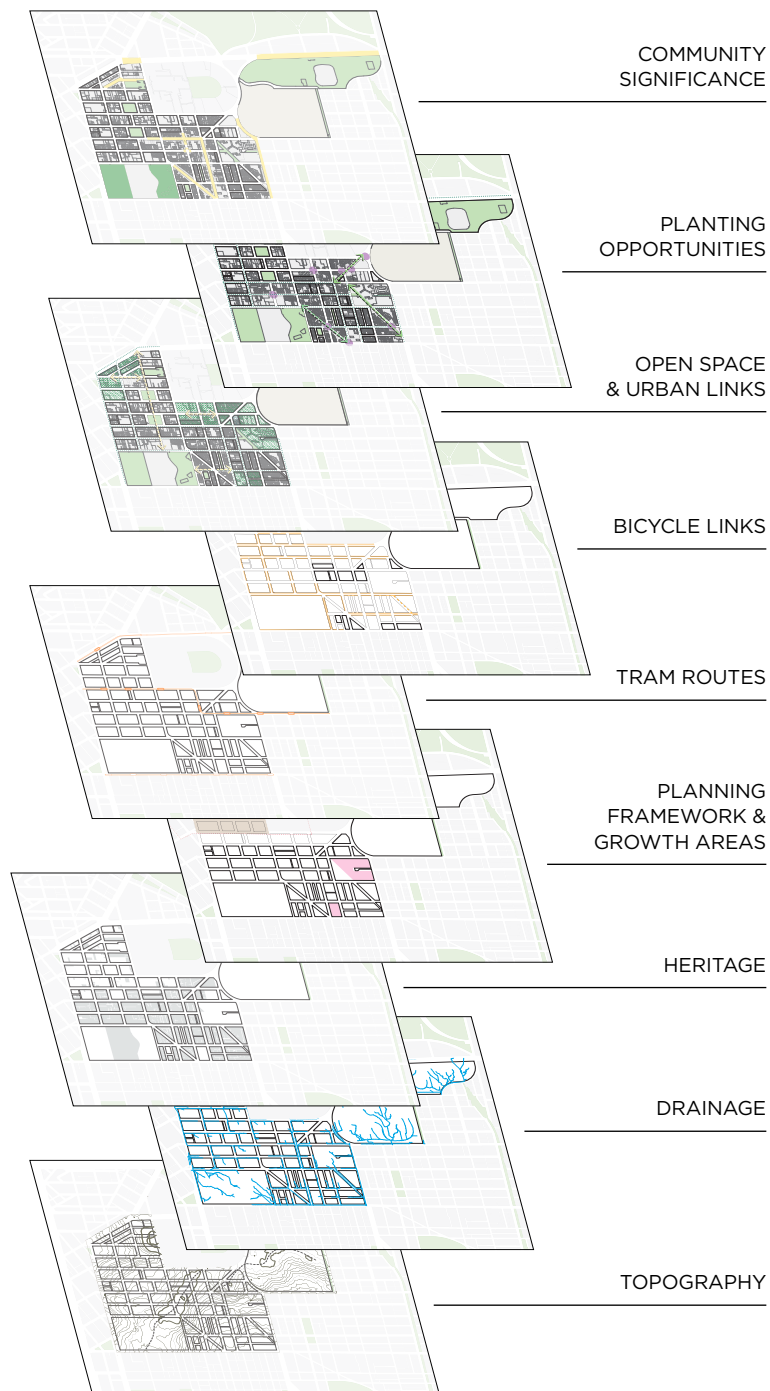
Tree trimmed under powerlines

MAP 2: KEY PLANTING CONSTRAINTS



GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING **CONTINUED**

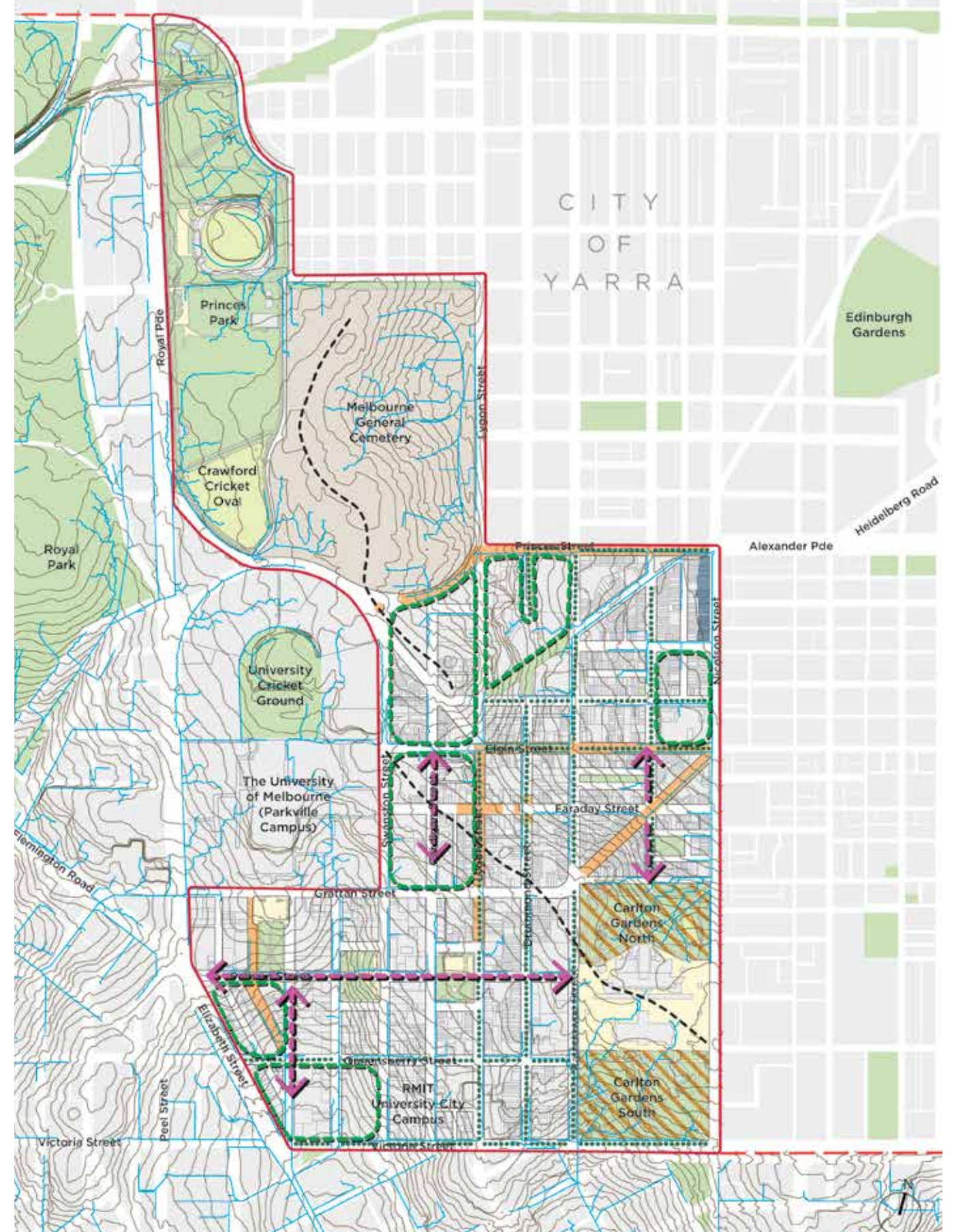
The following maps show some of the many layers of information that influence the opportunities and objectives for tree planting in Carlton Streets.



LEGEND - MAP 3



















- Existing open space
- Significant open space identified by the community
- Significant section of street identified by the community
- Special building overlay (buildings subject to flood Victorian Planning Scheme)
- Area for proposed open space defined in CoM open space strategy
- Significant no. 2 Eucalyptus trees
- Existing ridge line
- Proposed open space links horizontal / vertical
- Median / centre road
- Existing contours 1m
- Existing drainage line
- Extent of City of Melbourne boundary
- Boundary for Carlton precinct

MAP 3: NATURAL AND OPEN SPACE CONTEXT

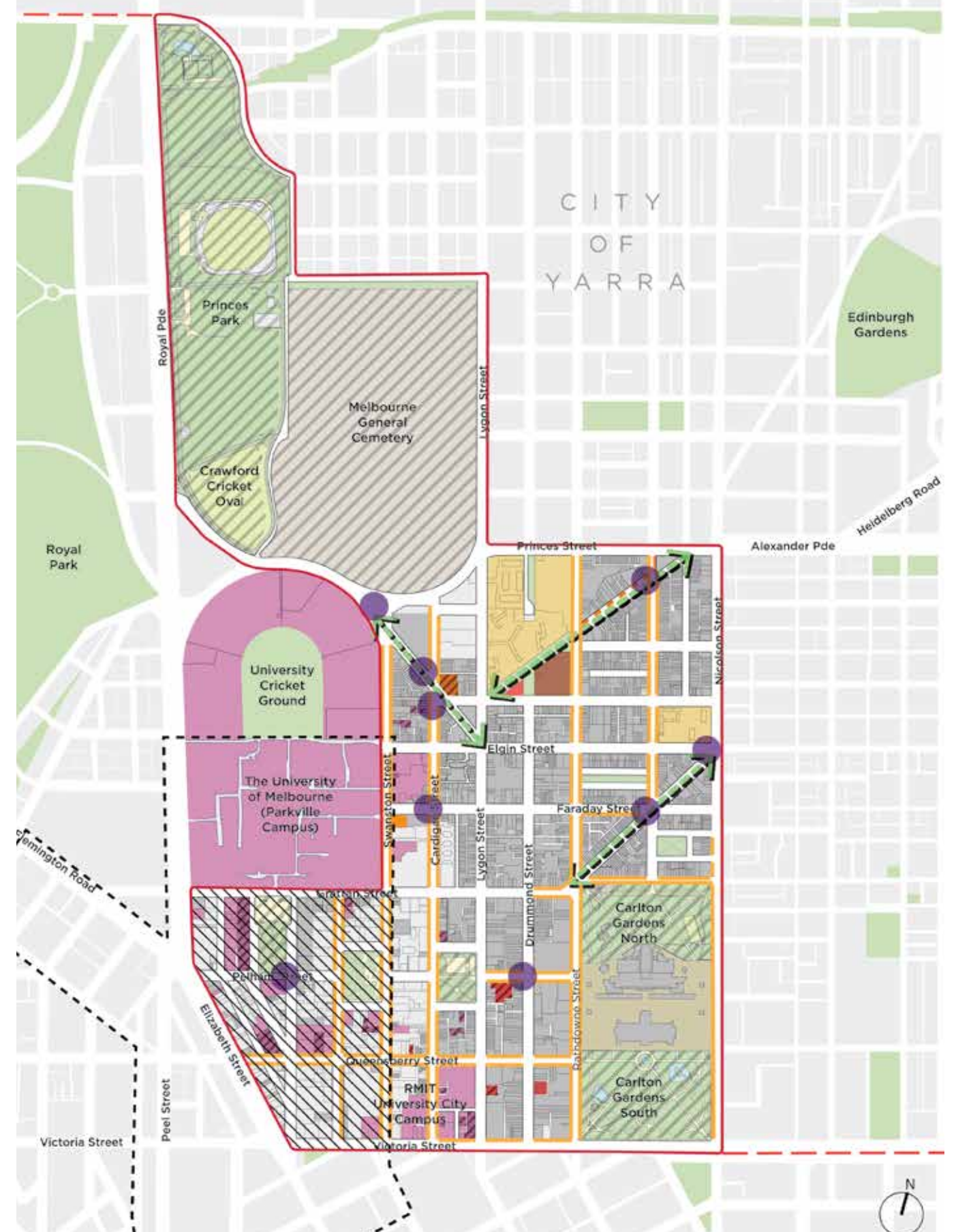


GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING
PLANTING CONTINUED

LEGEND - MAP 4

-  Public housing estate
-  Existing open space
-  Heritage listed open space
-  Heritage listed property
-  University building
-  Heritage listed university building
-  Existing school
-  Existing church
-  Heritage listed church
-  Existing hospital
-  Heritage listed hospital
-  City north structure plan area within carlton boundary
-  Existing bike lane
-  Proposed bike lane
-  Proposed urban links
-  Existing roundabout
-  Boundary for Carlton precinct
-  Extent of City of Melbourne municipality boundary

MAP 4: STRATEGIC CONTEXT



GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING **CONTINUED**

City north growth area

This precinct will undergo a greater degree of change than other areas of Carlton. Increased building height and density will create a varied microclimate at street level with the public realm design and planting needing to respond to issues of wind, building shade and providing pedestrian amenity and comfort. Enhancing the precinct's formal squares and providing a strong east west connector along Pelham Street will increase the permeability and open space amenity within this precinct.

Central Campus precinct

Between Swanston & Cardigan Streets, this precinct is defined by its larger lot and building sizes, and its high concentration of university buildings throughout the precinct and its cross connections to Lygon Street. The selection of trees and streetscape design in this precinct will respond to the building scale and pedestrian activity in this area. The open space strategy also identifies the need for a new small open space in the north end of this precinct.

Lygon Street precinct

Lygon Street and its cross streets are a focus for outdoor dining and retail trade in Carlton. The urban forest in this precinct needs to provide appropriate microclimate for outdoor dining, and enhance the character of this destination precinct.

East Gardens & Squares precinct

This area is defined by its heritage terraces which are of a grander scale to the finer grained residential precinct to the north. The interfaces with the squares and with world heritage Carlton Gardens provide the opportunity for the streetscapes to reflect the botanic character and stately avenue formality of the heritage parks.

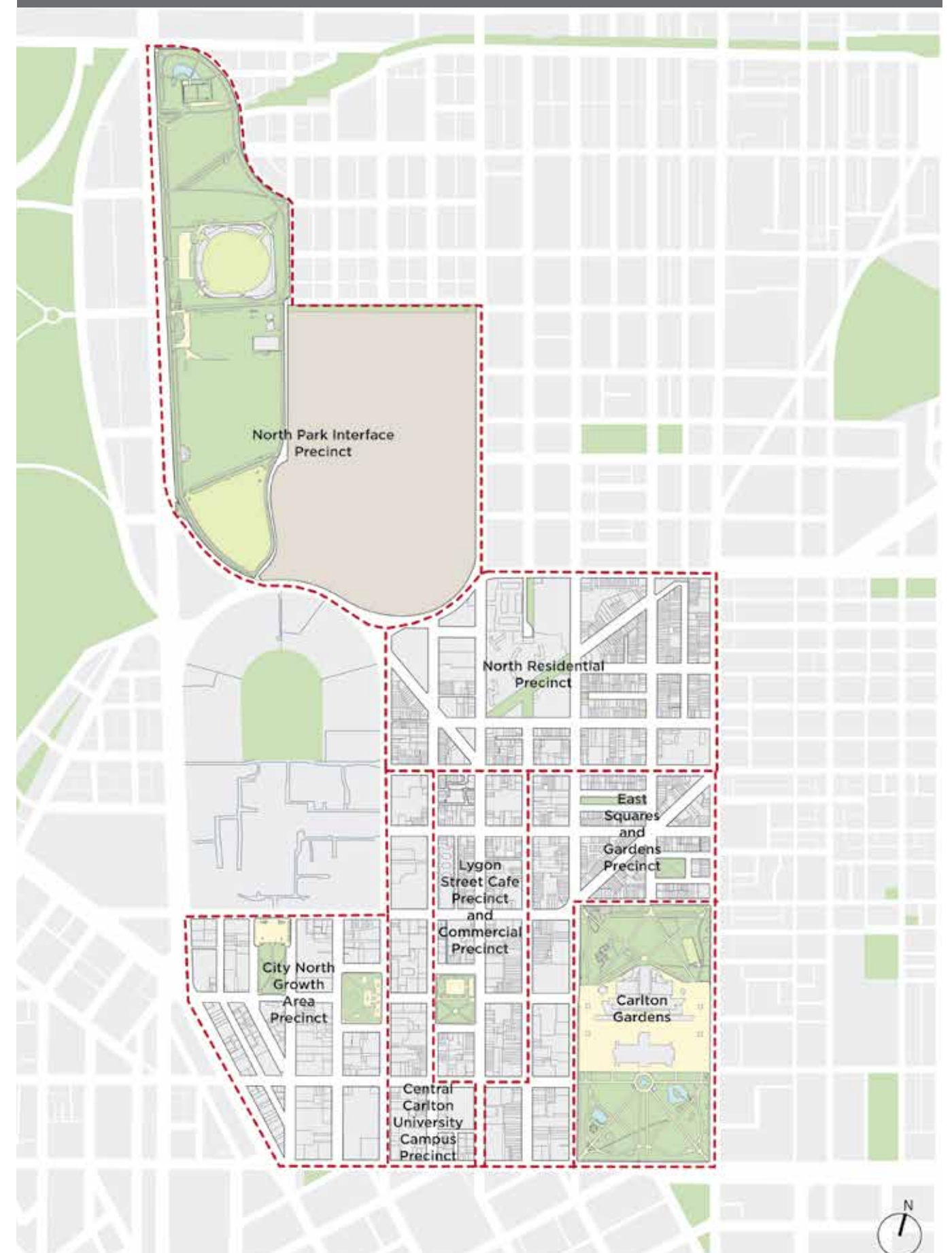
North Residential precinct

Predominantly low rise heritage residential. This precinct also includes the large public housing estates. There are opportunities to integrate the public housing through open space, improve open space connections and reinforce the diagonals. The *Open Space Strategy* identifies the need for some new smaller open spaces in this precinct.

North Park interface

This precinct includes significant streetscapes of Royal Parade and College Crescent, and is dominated by Princes Park. The opportunities include working with City of Yarra and the Melbourne Cemetery to provide increased canopy cover both within the cemetery and to the interfaces at the City of Melbourne boundary.

MAP 5: PLANTING SUB-PRECINCTS



GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING **CONTINUED**






Canopy cover

Anticipated canopy cover at maturity is represented as shading in streets on the map. In some streets the maximum canopy cover is limited due to constraints such as tram routes. Planting configuration should seek to maximise canopy cover in all cases.

Biodiversity

Pelham Street has been identified as a connector between open space with the potential to manage more specifically for biodiversity and pedestrian amenity. Opportunities to enhance biodiversity would include selecting bird and pollinator attracting species and adding layers of vegetation to provide structural diversity. Other streets may also provide opportunities for understorey planting.

LEGEND - MAP 6


-  Minimum canopy cover of 40%
-  Minimum canopy cover of 20% - 40%
-  Minimum canopy cover of 20%
-  Biodiversity corridor
-  Adjoining biodiversity corridor

MAP 6: CANOPY COVER AND BIODIVERSITY OUTCOMES



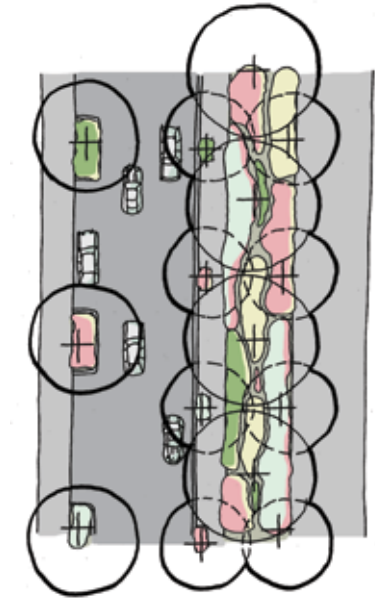
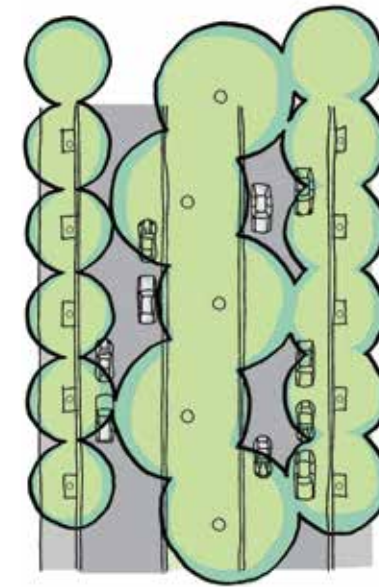
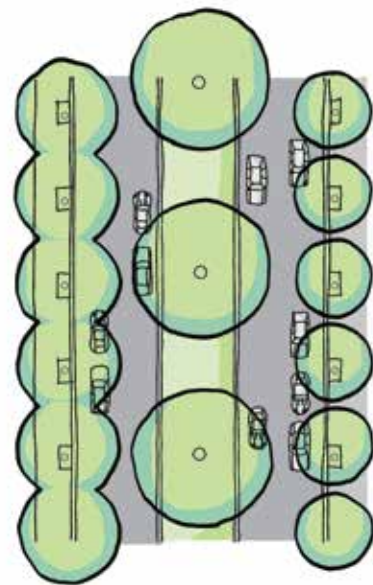
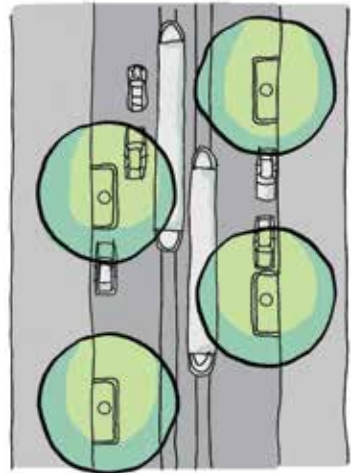
GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING **CONTINUED**

 Minimum canopy cover of 20%

 Minimum canopy cover of 20 - 40%

 Minimum canopy cover of 40%

 Biodiversity objective maximise canopy




GUIDING PRINCIPLES AND CONSIDERATIONS FOR TREE PLANTING **CONTINUED**

What should stay and what should change?

Elms, planes, oaks and eucalypts are core genera within Carlton's urban forest today. That is not proposed to change; but their dominance will be reduced by using alternatives for new plantings and, in the locations defined on this map, by breaking up spatial continuity. Interrupting spatial continuity is necessary to reduce vulnerability within the urban forest tree population and aids diversity targets by providing an opportunity to change species.

The use of elms and planes will be limited to replacements in locations where they are already planted. New plantings of oaks, except as feature trees, should generally be limited to those streets where they are completing an avenue. Use of species within the Myrtaceae family should be targeted at streets where they can provide connecting corridors between open space for native birds, however it is preferable that different genera and species be planted in segments or as mixed plantings to increase diversity.

LEGEND - MAP 7

-  Existing open space
-  Proposed genus change
-  Section of land not managed or maintained by City of Melbourne
-  Street with majority plane tree (*Platanus*) population
-  Street with plane tree (*Platanus*) integrated with other tree species
-  Street with majority elm tree (*Ulmus*) population
-  Street with elm tree (*Ulmus*) integrated with other tree species
-  Street with majority oak tree (*Quercus*) population
-  Street with oak tree (*Quercus*) integrated with other tree species
-  Street with majority *Eucalyptus* population
-  Street with *Eucalyptus* integrated with other tree species

Change from elms:

-      

Change from planes in roadside:

-   

Change from planes:

- 

Change from planes in centre (retain in roadside):

- 

MAP 7: WHAT SHOULD STAY AND WHAT SHOULD CHANGE?



PLANTING STRATEGIES

Long-term Planting Strategy

This strategy provides the long-term direction for planting in the precinct. The selection of tree species for each street should respond to criteria including optimal size and other characteristics that relate to the street typology and its relationship to the major planting sub-precincts. Values of existing vegetation are also a factor in species selection.

Overarching principles affecting the planting plan include the following.

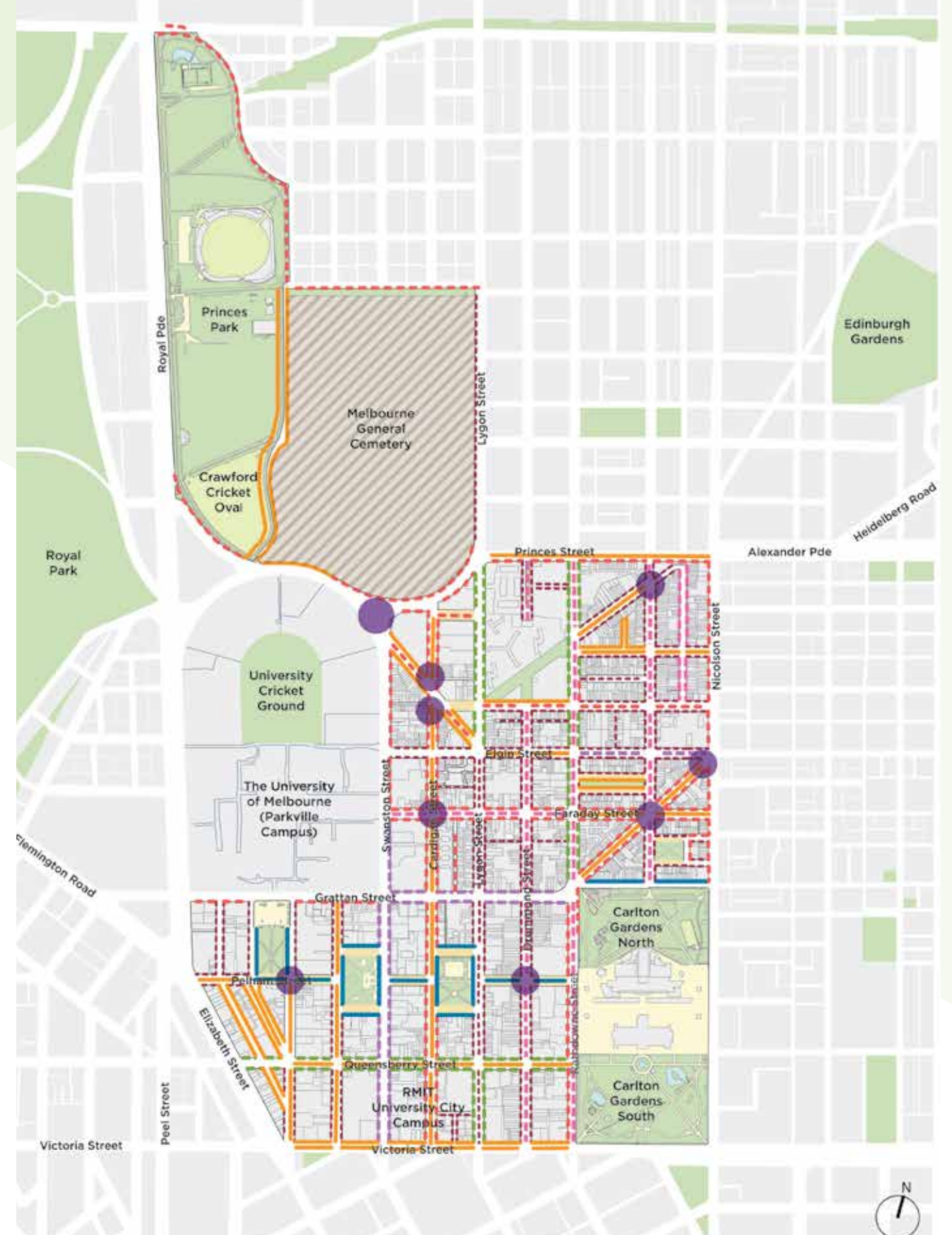
- In streets with tramways, the principle tree plantings will be in the footpaths.
- Where large canopy trees in central medians are possible, smaller ornamental trees may be appropriate in the footpath if not precluded by verandas or other features.
- Where trees are in footpaths, deciduous trees should be favoured while trees in medians may be evergreens.
- Long north-south tree avenues should have consistent form and character in centre and roadside plantings with species changing at sub-precinct boundaries and at the ridgeline that cuts across the centre of Carlton.

- East-west street blocks should contain species with a consistent canopy form and can be varied from block to block.
- Landmark specimen trees at key roundabouts and intersections should provide wayfinding and diversity.
- Green park connector streets should include a diversity of tree and understorey plantings. These streets will provide connections between Carlton's open spaces, highlight the diagonal streets and reinforce the botanical nature of Carlton's squares and gardens.
- Incorporate colour and seasonal change into species selections.

LEGEND - MAP 8

- Plane trees
- Elm trees
- Oak trees
- Large deciduous species
- Medium deciduous species
- Large evergreen species
- Other contrasting species
- Street redesign opportunity
- Section of land not managed or maintained by City of Melbourne
- Existing roundabout / proposed landmark specimen trees

MAP 8: LONG-TERM PLANTING STRATEGY
















PLANTING STRATEGIES CONTINUED

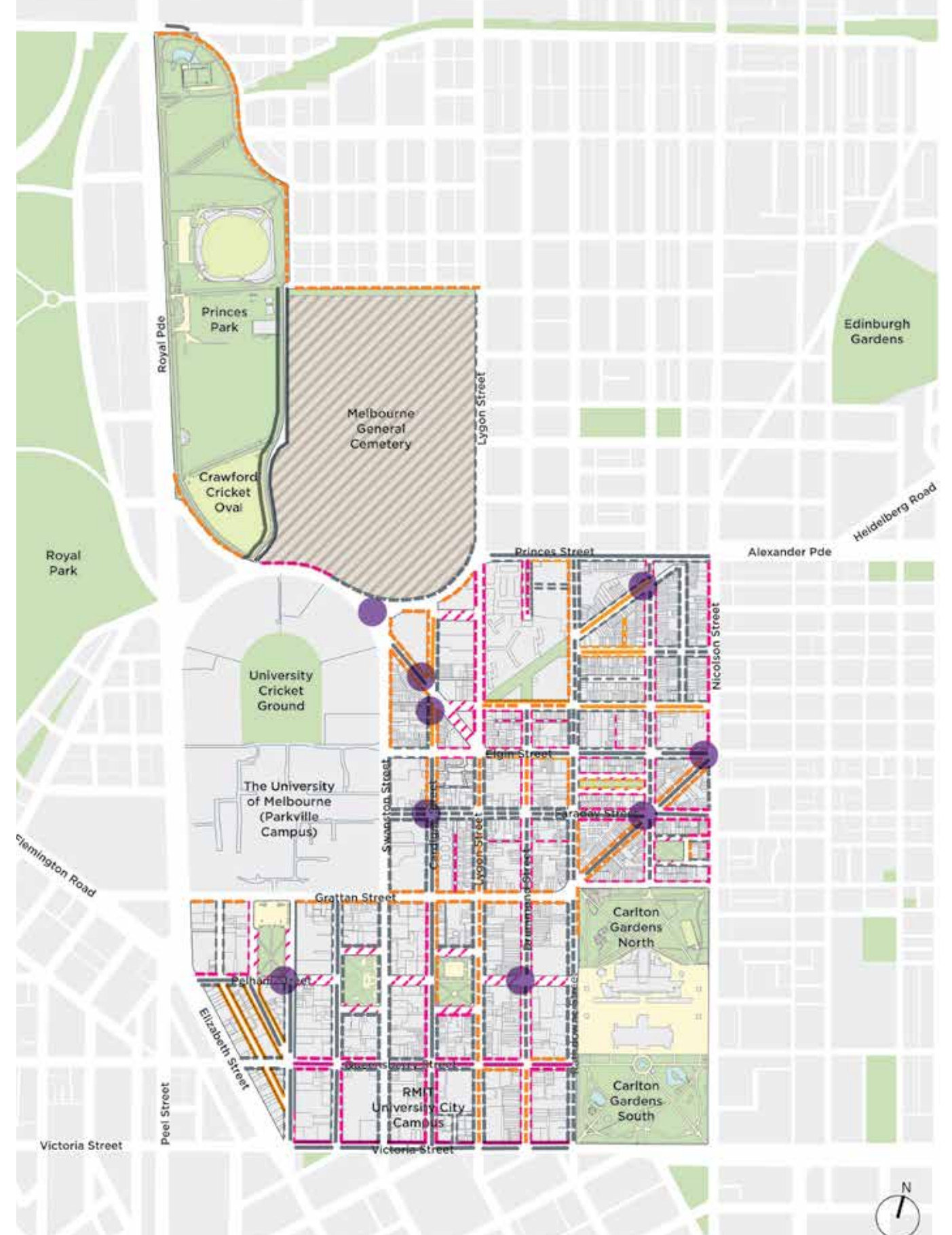
10-year Planting Plan

This plan provides direction on where new and replacement planting is to occur across Carlton. The size and evergreen/deciduous nature of the species to be used is also defined as a solid or dashed line (in the case of replacements this may be different to what is planted in that location currently). Species selection is left somewhat open; however, Map 7 and Map 8 advise where spatial diversity should be created and where core species should be retained. Streets with opportunities for re-design represent streets where permeability could be improved through interventions such as park expansions or new medians.

LEGEND - MAP 9

-  Existing open space
 -  Street re-design opportunities
 -  Section of land not managed or maintained by City of Melbourne
 -  Existing roundabout / proposed landmark specimen trees
- EXISTING**
-  Large evergreen tree
 -  Large deciduous tree
 -  Medium - small deciduous tree
- REPLACEMENT**
-  Large evergreen tree
 -  Large deciduous tree
 -  Medium - small deciduous tree
- NEW**
-  Large evergreen tree
 -  Large deciduous tree
 -  Medium - small deciduous tree

MAP 9: 10-YEAR PLANTING PLAN



PLANTING STRATEGIES CONTINUED

Guide to species change

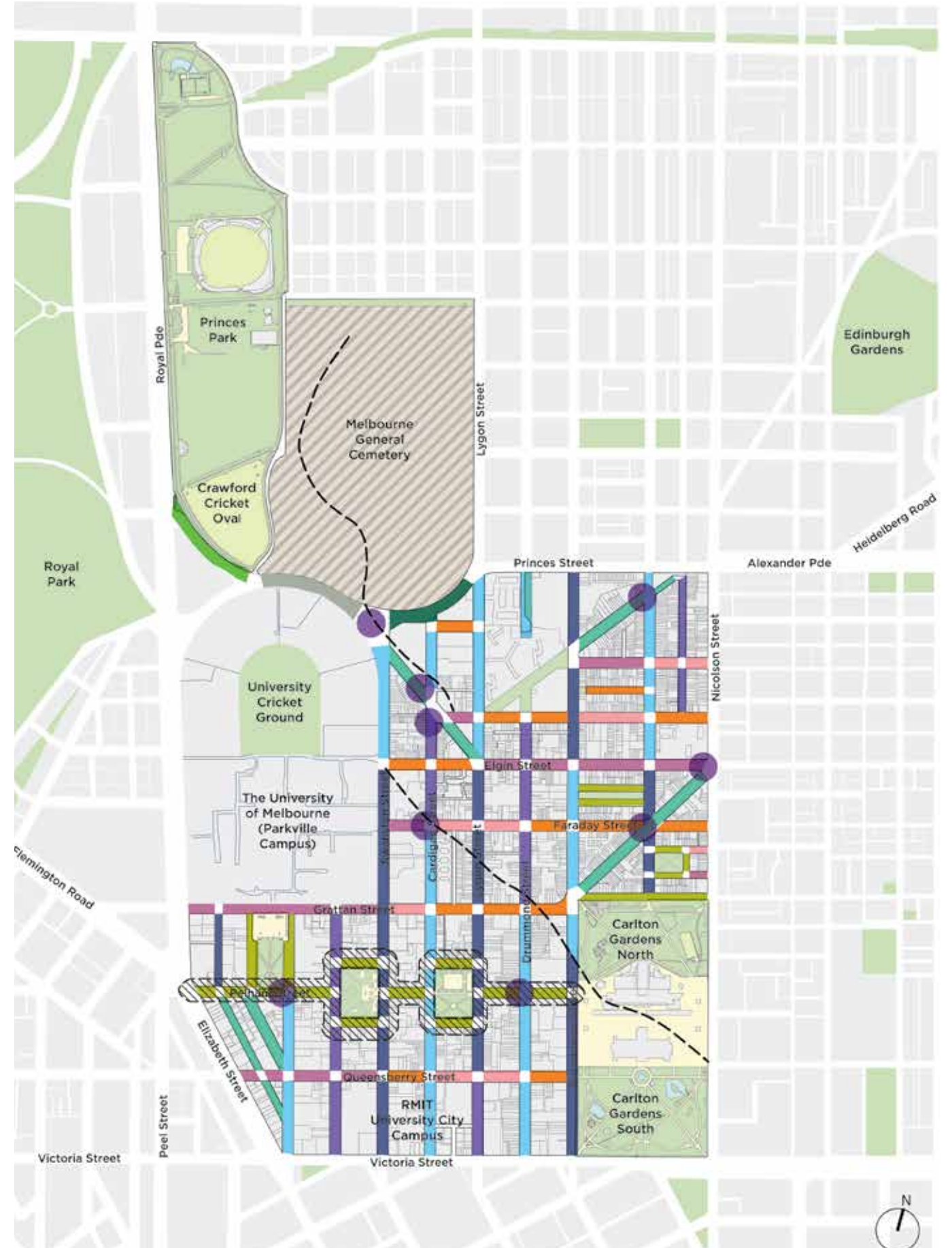
This map indicates locations along streets where a change in species is logical based on sub-precinct boundaries, topographic factors or objectives defined for streets within this plan. The colours do not indicate species distribution or specific species. Rather, they represent points of species change, with similar colours along a street indicating use of a range of species that will achieve a consistent character for that street.

Select or match species to form, colour and seasonal themes for streets to unify character even where species are varied. Introduce greater diversity in short east-west blocks, kerb outstands, roundabouts and road ends. Long north south tree avenues should have consistent form in centre and roadside plantings with species changing at sub-precinct boundaries and at the ridgeline that cuts across the centre of Carlton. In long streets with roadside plantings, use a single species for multiple segments then change between sub-precinct or topographic boundaries, or consider the use of two alternating species of similar form, scale and colour. In narrow streets and where there are power lines on one side only use asymmetrical plantings of different species on each side of the street. When appropriate, use informal mixes of species along perimeters of parks and gardens or where vegetation from private gardens overhangs the streets.

LEGEND - MAP 10

-  Existing roundabout / proposed landmark specimen trees
-  North south avenues - consistent character with various species
-  East West Streets - consistent character with various species
-  City entry boulevards- new sections of avenue with character species
-  Avenue - perpetuation of existing avenues
-  Open space link - extending park character to the streetscape - mixture of species
-  Section of land not managed or maintained by City of Melbourne
-  Biodiversity corridor
-  Ridge Line

MAP 10: GUIDE TO SPECIES CHANGE



SPECIES PALETTE

The following species are provided for guidance only and do not preclude the use of other trees that are consistent with the character of Carlton, Guiding Principles and Planting Plan. Elms, planes, oaks and Corymbias are key genera within Carlton, forming an important part of the character of its urban

Core Carlton Trees (Limited New Plantings)

Evergreen

Corymbia sp., Gum

Deciduous

Platanus sp., Plane

Quercus sp., Oak

Ulmus sp., Elm

Large Trees for Streets

Evergreen

Angophora costata,

Smooth-barked apple

Araucaria sp.

Cedrus sp., Cedars

Ficus rubiginosa, Port Jackson fig

Flindersia australis, Crow's ash

Deciduous

Acer x freemanii, Freeman maple

Acer rubrum, Red maple

Celtis australis, European nettle tree

Fraxinus americana, White ash

Fraxinus pennsylvanica, Green ash

Ginkgo biloba (male), Ginkgo

Lirodendron tulipifera, Tulip tree

Liquidambar styraciflua, Liquidambar

Populus simonii, Simonii poplar

Tilia sp.

Toona ciliata(trial), Australian red cedar

Zelkova serrata, Japanese zelkova

Medium to Small Trees for Streets

Evergreen

Afrocarpus falcatus (trial),

forest. While this character will be maintained, species from many different genera will also be planted to increase diversity and reduce vulnerability within Carlton's urban forest population. Feature trees refer to trees that might be used in roundabouts, kerb outstands, road ends or that could add structure

Sickle-leaved yellowwood

Brachychiton sp.

Callodendrum capense, Cape chestnut

Cupaniopsis anarcardiodes, Tuckeroo

Eucalyptus leucoxylon subsp.

megalocarpa, Red flowering gum

Geijera parviflora, Wilga

Lithocarpus densiflorus (trial), Tanoak

Magnolia grandiflora, Southern magnolia

Podocarpus elatus, Plum pine

Tristaniopsis laurina, Kanooka

Waterhousea floribunda,

Weeping lilly-pilly

Deciduous

Acer campestre, Hedge maple

Albizia julibrissin (trial), Persian silk-tree

Brachychiton sp.

Catalpa bignonioides, Catalpa

Cercis siliquastrum, Judas tree

Corylus colurna, Turkish hazel

Jacaranda mimosifolia, Jacaranda

Koelreuteria sp.

Melia azedarach, Australian white cedar

Pistacia chinensis, Chinese pistachio

Phellodendron amurense (trial), Amur cork tree

Sapium sebiferum, Chinese tallow tree

Stenocarpus sinuatus, Firewheel tree

Styphlonobium japonica, Pagoda tree

Tipuana tipu, Rosewood

Nyssa sylvatica, Tupelo

Large Feature Trees

Angophora floribunda, Rough-barked apple

Araucaria sp.

Cedrus sp.

for biodiversity enhancement in locations with adequate space. Productive trees or edible landscapes may be considered in locations such as medians or feature landscapes where they conform to City of Melbourne policy and the community actively provide support for the project.

Eucalyptus tricarpa, Red ironbark

Ficus macrophylla, Moreton Bay fig

Livistonia australis, Cabbage tree palm

Phoenix canariensis, Canary Island date palm

Pinus sp., Pines

Quercus virginiana, Californian live oak

Washingtonia robusta, Mexican fan palm

Medium to Small Feature Trees

Acacia implexa, Lightwood

Acacia melanoxylon, Blackwood

Banksia sp

Brachychiton sp.

Callitris glaucophylla, White cypress pine

Callistemon viminalis,

Weeping bottlebrush

Casuarina sp./Allocasuarina sp.

Cupressus sempervirens,

Mediterranean cypress

Davidia involucrata, Dove tree

Dracenea draco, Dragon blood tree

Eucalyptus forrestiana, Fuchsia gum

Eucalyptus platypus,

Round-leaved moort

Ficus rubiginosa, Rusty fig

Grevillia hilliana, White silky oak

Hakea sp.

Leptospermum petersonii, Lemon

scented tea tree

Maclura pomifera, Osage-orange

Olea europea, olive

Parrotia persica, Persian Iron wood

Washingtonia filifera, Desert fan palm

FREQUENTLY ASKED QUESTIONS

Where can I find out more information about Melbourne's urban forest?

A wide range of information about Melbourne's urban forest can be explored at melbourne.vic.gov.au/urbanforest

What can I do to contribute to Melbourne's urban forest?

If you have a garden or room for a tree, you can contribute by planting in your own yard. If you own or manage a building, development, or institution you can contribute by planting in the grounds or by greening walls, roofs or balconies.

You can also contribute by staying informed about the urban forest and by talking to others about the benefits of having trees in our urban areas. City of Melbourne will continue to provide opportunities for the community to volunteer their time and ideas to help achieve urban forest objectives. If you would like to be added to our mailing list, or would like to become a Citizen Forester, please email your details to urbanforest@melbourne.vic.gov.au

I have seen a sick or damaged tree, or an empty tree plot. How can I tell Council about it?

Please email the location and a description of the issue to urbanforest@melbourne.vic.gov.au

Can I plant a tree in a public space?

Trees can only be planted on public land with council authorisation or through a sanctioned public planting activity. However, if there is a location where you would like to see a tree planted then you can send a request for tree planting to urbanforest@melbourne.vic.gov.au

Can I make a garden in a public space?

Please refer to the City of Melbourne's *Street Garden Guidelines*, which can be found at melbourne.vic.gov.au

How to contact us

Online: melbourne.vic.gov.au

In person:

Melbourne Town Hall - Administration Building
120 Swanston Street, Melbourne
7.30am to 5pm, Monday to Friday
(Public holidays excluded)

Telephone: 03 9658 9658
7.30am to 6pm, Monday to Friday
(Public holidays excluded)

In writing:

City of Melbourne
GPO Box 1603
Melbourne VIC 3001
Australia

Fax: 03 9654 4854

Translation services:

03 9280 0716	አማርኛ
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03 9280 0719	Bahasa Indonesia
03 9280 0720	Italiano
03 9280 0721	國語
03 9280 0722	Soomaali
03 9280 0723	Español
03 9280 0724	Türkçe
03 9280 0725	Việt Ngữ
03 9280 0726	All other languages

National Relay Service: If you are deaf, hearing impaired or speech-impaired, call us via the National Relay Service: Teletypewriter (TTY) users phone 1300 555 727 then ask for 03 9658 9658 9am to 5pm, Monday to Friday (Public holidays excluded)

