CITY OF MONASH

Monash Urban Landscape and Canopy Vegetation Strategy

June 2017

Prepared for the City of Monash by

THOMPSON BERRILL LANDSCAPE DESIGN

in association with:

Environment & Land Management Pty Ltd

Arboriculture Pty Ltd

Date	Revision	Amendment
25.11.16	Draft V1	For internal Council Officer comment only
28.02.17	Draft V2	Incorporating Council Officer comment for final review prior to Councillor consultation
05.06.17	Draft V3	For consultation

Table of contents

Attachments

Drawings

Strategy Vision

Monash 2021

The *Monash 2021 Strategy – a thriving community* was developed by the City of Monash in 2010 in consultation with the community. The purpose was to set out a long term vision and priorities of the City of Monash over the coming 10 years.

Monash 2021 Vision is:

A thriving community now and in the future

The following diagram is taken from the Monash 2021 and illustrates the four areas of the primary focus being:

- *A fair and healthy community*
- *A planned and connected city*
- *An inclusive and safe community*
- *A green and naturally rich city*

Monash Vision 2017

The Monash website accessed in February 2017 includes an updated Vision for Monash and Key Directions as follows:

Vision on the Monash City Council Website 2017:

An inviting city, diverse and alive with activity, designed for a bright future

Key directions

- *Ensuring our city has inviting places and spaces*
- *Achieving a healthy and active Monash*
- *Fostering confident connected communities*
- *Taking action for our future*

Strategy Vision

The vision has been developed from reviewing the Monash 2021 document, particularly the sections titled 'What the community says it values', combined with the preferred landscape character types in this Draft Strategy.

Creek corridors, that are teeming with **birdlife** and native fauna amongst the **bushland** and **wetlands**, flow through the **leafy** treed suburbs. The **tree lined** streets and the **parks** are **vibrant** and alive with people walking, cycling, socialising and enjoying the ambience of the **green** *Garden City Character* with **fresh air** and plenty of **shade**. In the Monash National Employment and Innovation Cluster, the landscaped setbacks with **tall trees** are bustling with **people** walking and cycling to and from their **workplace** or **relaxing** and socialising during lunch in the **dappled shade** and after work in one of the adjoining cafes that spill out onto the green **landscaped** setbacks.

Strategy Objectives/Aims

- Protect and enhance the green *Garden City Character* within the contemporary context of climate change and forecast urban growth and change.
- Increase urban greening to create a more resilient landscape that contributes to community health and wellbeing now and in the future.
- Increase canopy tree cover across public and private land from 22% to 30% by 2040 to create a more liveable, sustainable and resilient city.
- Strengthen the biodiversity values along the waterway corridors by increasing the presence of indigenous vegetation on both public and private land.
- Maximise the retention of existing healthy mature large canopy trees on public and private land to support liveability and cultural heritage values.
- Increase the presence of large canopy trees and greening in high density precincts including activity centres and the Monash National Employment and Innovation Cluster.
- Council to provide a leadership role with best practice tree planting and management on public land.
- Promote the health and wellbeing and environmental benefits of trees in the community particularly in the context of creating a more resilient and sustainable urban environment for future generations.
- Develop a cohesive vision for the landscape character across the public and private land and update the relevant regulatory controls and planning scheme to give effect to the vision.

Preferred landscape character types

The overall design intent with the preferred character types is to:

- Strengthen the habitat corridors and indigenous landscape character along the waterways.
- Strengthen both the indigenous and native landscape character and values in the creek environs adjoining the waterway corridors.
- Strengthen and expand the leafy, green and treed character of the hilly and gently undulating established suburban areas away from the waterway corridors.
- Protect the early 1900s exotic garden style associated with the older established areas of Hughesdale and Oakleigh.
- Protect and expand the native garden commercial and industrial precincts and business parks to create a point of difference in the future Monash Employment and Innovation Cluster.
- Enhance urban greening in the older style urban industrial precincts in Oakleigh South.

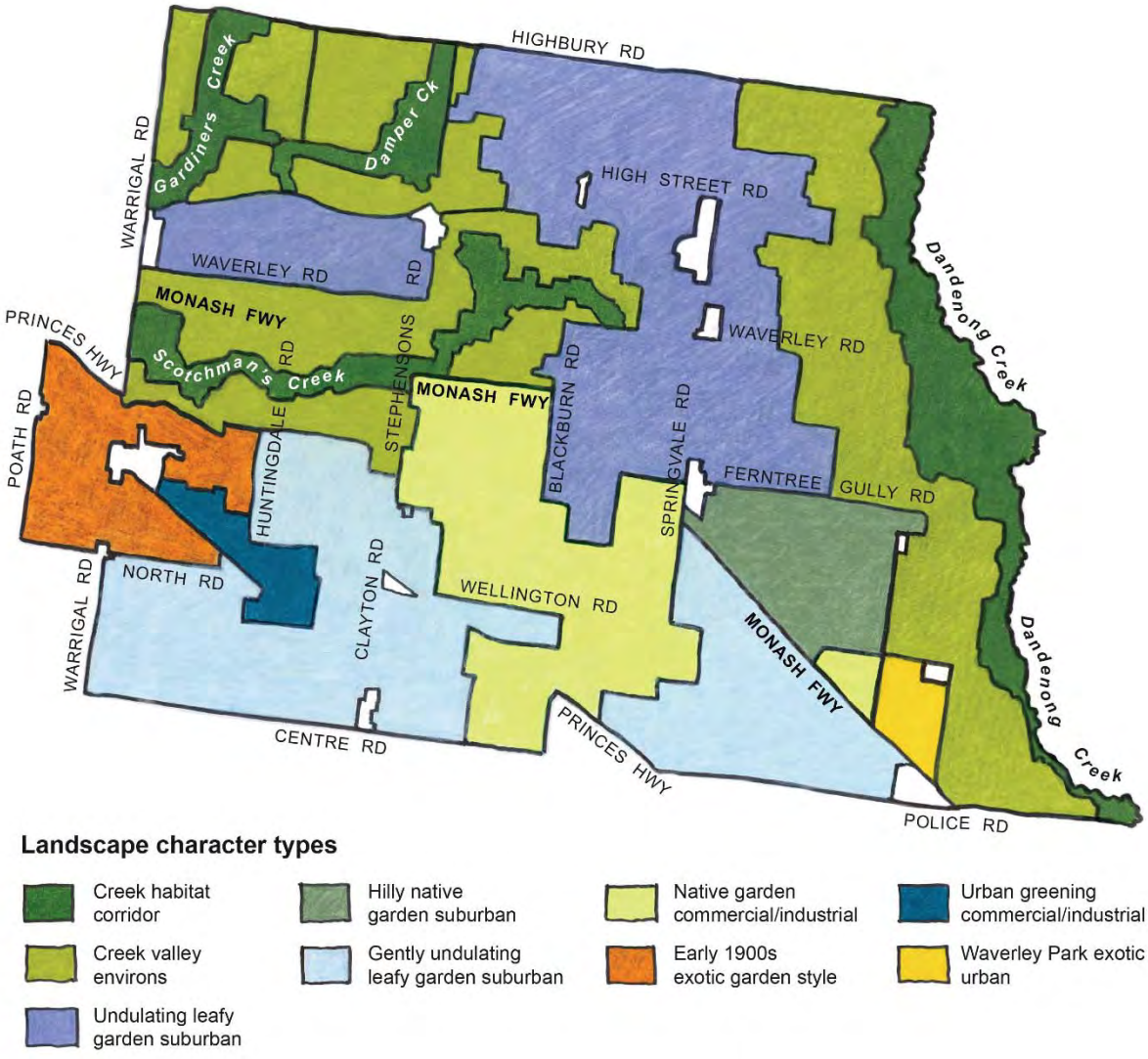


Figure 1A *Preferred landscape character types for the City of Monash*

As shown in Figure 1A there are nine different preferred landscape character types following across the municipality that are summarised below.

Residential land use:

- **Creek habitat corridor**
  Strengthen the biodiversity values and indigenous landscape character in both the private and public land along the waterway corridors.

- **Creek valley environs**
  Strengthen the presence of emergent canopy trees with a preference for tall native trees in the creek valleys that overlook the creek corridors.

- **Undulating leafy garden suburban**
  Strengthen the liveability and protect the suburban character of our interwar residential areas with an emphasis on increasing the exotic canopy vegetation and greening to continue the suburban garden context as intensification of built form increases.

- **Gently undulating leafy garden suburban**
  Strengthen the liveability and protect the suburban character of the interwar and 1960s onward residential areas with an emphasis on increasing exotic canopy vegetation and greening to continue the suburban garden context as intensification of built form increases.

- **Hilly native garden suburban**
  Strengthen the liveability and protect the suburban native landscape character of the post 1965 curvilinear suburban areas with an emphasis on increasing presence of emergent native canopy trees as intensification of built form increases in the longer term.

- **Early 1900s exotic garden style**
  Strengthen the heritage exotic garden style by strengthening the presence of alternating evergreen and deciduous street tree avenues and increasing the presence of large exotic canopy trees and vegetation on private land.

- **Waverley Park exotic urban**
  Continue to maintain the exotic streetscape canopy vegetation and planting character and strengthen the presence of exotic canopy vegetation on private land.

Commercial/industrial land use:

- **Native garden commercial/industrial**
  Create a distinctive native garden commercial/industrial landscape character in the Monash National Employment and Innovation Cluster by activating the landscape setbacks and strengthening the tall native tree cover and urban greening.

- **Urban greening commercial/industrial**
  Increase greening and evergreen canopy vegetation in the urban industrial precincts in the Oakleigh area to improve resilience and create a more comfortable and sustainable employment area.

1. Introduction

1.1 Project purpose

The main purpose of the Monash Urban Landscape Character and Canopy Vegetation Strategy (MULCVS) is to provide a clear direction to achieve the preferred future landscape character and tree canopy cover as the municipality develops to accommodate the forecast population growth and development. The Strategy covers both public and private land.

The key aim of the Strategy is to protect the *Garden City Character* of the City of Monash as described in the Municipal Strategic Statement, an extract of which is below:

> *'..... a general feeling of "greenness" created by significant tree canopy cover contained within large, vegetated set backs and areas of open space.'*

The *Garden City Character* changes across the municipality from an exotic landscape character with a dominance of deciduous trees and lush green mown grass to the native bushland associated with the waterway corridors. The greenness is created by a combination of emergent tree canopy that breaks up the visual dominance of roof lines and built form on the skyline to medium and smaller trees, shrubs, garden beds and grass.

Interruptions to the *Garden City Character* occur when built form and paved surfaces are visually dominant and the greening forms an insignificant component of the setting.
The overall aim of the Strategy as described in the project brief is:

> *To establish clear and achievable understanding and expectations for canopy tree and landscape quality into the future for development across the City of Monash. This landscape will contribute to the maintenance and enhancement of the garden character of Monash.*

Example of native landscape character with tall Eucalypt style emergent tree canopy

Example of an exotic landscape character with large canopy deciduous street trees

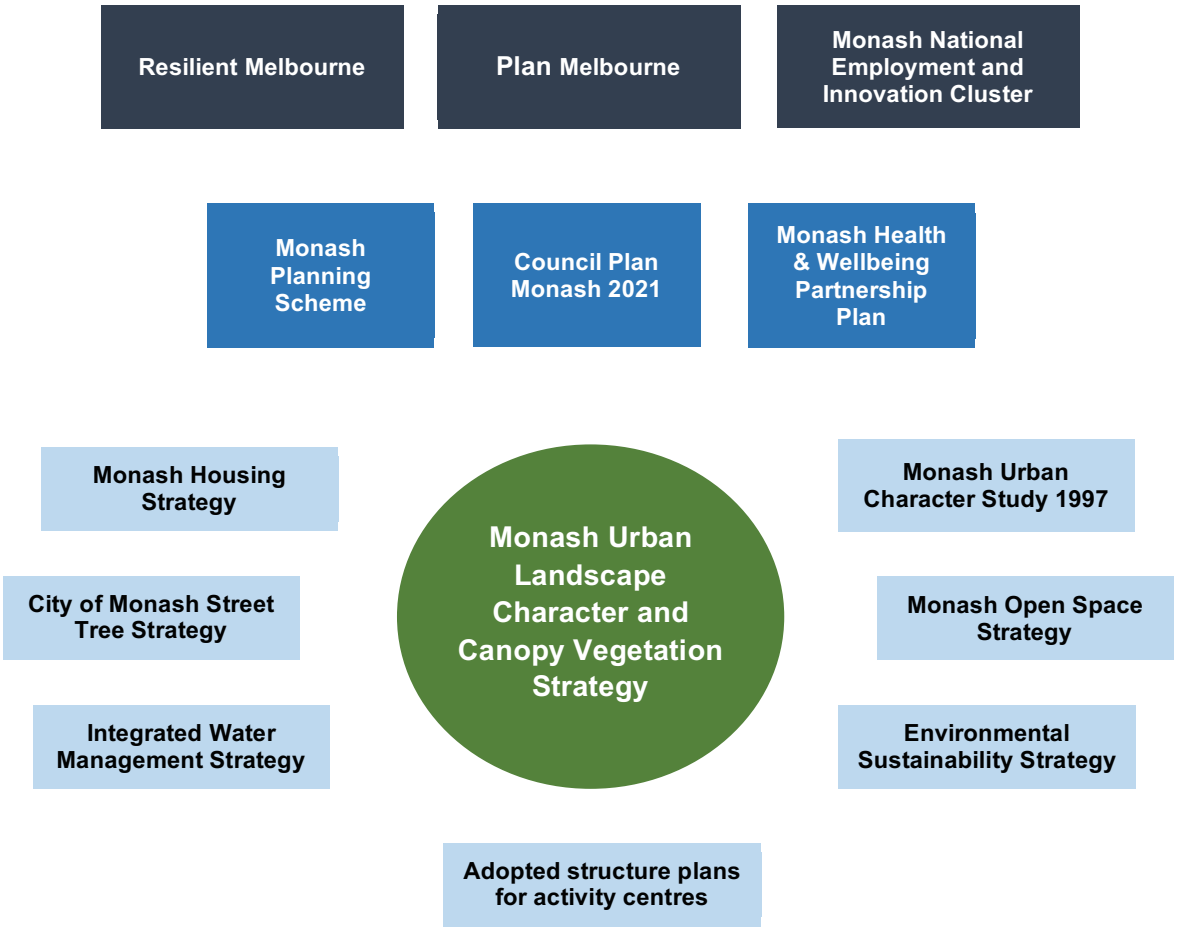
1.2 Project scope

Key outcomes of the Strategy are to:

- *Establish and articulate a clear understanding of the current landscape character of the City of Monash,*
- *Determine those elements of the landscape character that are valued by the community,*
- *In consultation with the community, develop and articulate a preferred landscape character for each of the different landscape character areas across the City of Monash, and*
- *Identify and describe a range of mechanisms to maintain and enhance the valued and/or preferred landscape character of Monash into the future.*

1.3 Strategic context

A range of state and local government policies and strategies inform and are relevant to this Strategy.



2. Importance of the *Garden City Character*

2.1 *Garden City Character* in the Municipal Strategic Statement

2.1.1 Summary of existing description

The *Garden City Character* is defined in the Municipal Strategic Statement (MSS) as:

> *It is characterised by a general feeling of 'greenness' created by significant tree canopy cover contained within large, vegetated set backs and areas of open space.*

The MSS notes the *Garden City Character* is a legacy of earlier planners in Monash and is a defining feature in the municipality. The policy of large front setbacks is noted to contribute to the retention of canopy tree cover which softens built form and provides shade. It goes on to describe that the presence of the trees and 'greenery' is visually appealing and benefits the environment in terms of air quality and water balance. The MSS acknowledges that the erosion to the *Garden City Character* has occurred through vegetation and tree canopy loss because of inappropriate residential and industrial development. While the MSS goes on to describe that retention of the *Garden City Character* is a key influence on planning decision making in Monash, there is a key issue that the canopy vegetation loss has continued to occur within the context of the existing planning controls in place including the Vegetation Protection Overlay.

2.1.2 Contemporary context for *Garden City Character*

The importance of natural features and greenness to community health and wellbeing has been the subject of research over the past decade, since the original definition of *Garden City Character* was included in the MSS. Research identifies a quantifiable and tangible link between peoples physical and mental health and wellbeing and greenness. The Final Report on the *Inquiry into Environmental Design and Public Health in Victoria (May 2012)* notes that there is compelling evidence linking public health challenges to the

planning and design of our urban environments. Deakin University in their comprehensive study *Beyond Blue to Green*: *The Health Benefits of Contact with Nature in the Park Context - Literature Review, 2010* describes the growing evidence that access to the natural environment improves health and wellbeing, prevents disease and helps people recover from illness. People who visit green open space experience a range of psychological benefits including improved mood, lower levels of anxiety, lower stress levels, lower levels of depression and increased physical activity. There is also evidence in the study *Healthy parks, healthy people (Deakin University, 2008)* that people recover more quickly from surgery and illness if they are looking out on a natural scene in contrast to an urban scene, suggesting '....*that natural settings elicit a response that includes a component of the parasympathetic nervous system associated with the restoration of physical energy*'.

Additional to the health and wellbeing benefits above, the unsealed surfaces such as grass, garden beds and wetlands absorb moisture in our urban environments. This assists to mitigate urban heat island effect (the build up of heat during the day which does not fully dissipate overnight) through evapotranspiration when the right balance is achieved between built form and natural features and surfaces. With forecast growth and change, urban densities and built form is anticipated to increase, resulting in more people living in medium and high density housing and activity centres. The future planning for these high density precincts will need to prioritise canopy cover and moisture absorbing surfaces as an inherent part of their design.

In this time of climate change, severe weather events including extended droughts are forecast to increase which makes our urban landscapes more vulnerable to damage. This is exacerbated by the recent trend that has been measured as part of the research undertaken for this Strategy which concludes that over the past 23 years an approximate 10 per cent increase in sealed surfaces has occurred and a corresponding 10 per cent decrease in permeable, moisture absorbing surfaces in both the private and public realm.

Private and public open space that is designed with appropriate green infrastructure to encourage permeable surfaces that hold moisture allows effective evapotranspiration in the evening. This cools the local microclimate, and this will assist to mitigate the effects of urban heat and contribute to a more liveable city. This is particularly important during extended periods of heat such as experienced in Melbourne in early 2009 and in early 2014. Designing cooler public and private open spaces, particularly in urban centres, with increased shade from canopy trees, has the added benefit of providing the public places for the community to use during hot weather, particularly the vulnerable, the frail and the elderly in our community who do not have access to cooling in their homes.

Other benefits of a green *Garden City Character* is increased biodiversity values by expanding opportunities for habitat with increased permeable surfaces and tree canopy cover. The benefits of improved visual appearance and desirability of leafy green neighbourhoods with an established character in the context of the focus on new and establishing suburbs in the expanding growth corridors should also be acknowledged.

2.1.3 Changes to the *Garden City Character*

The *Garden City Character* is in the process of change, mainly due to a combination of increased site coverage with built form and increasing urban densities. The recent growth and development has resulted in an increase in built form and loss of greenness on private land to accommodate the additional population. This includes schools, higher education land and some public open space with sports facilities. The Victorian Government supports the direction for the middle ring suburbs to accommodate population growth, particularly around activity centres and transport hubs. The City of Monash is in the process of determining how best to accommodate the increase, which is articulated in the Monash Housing Strategy (2014) and by rezoning land for residential use.

This Strategy is a key tool for Council to reduce further vegetation loss during the forecast growth and urban development. This is to be achieved by documenting the existing landscape character types, the preferred character types and recommended actions to achieve preferred character types in the future within the context of forecast growth and change.

2.2 Contribution of canopy vegetation to *Garden City Character*

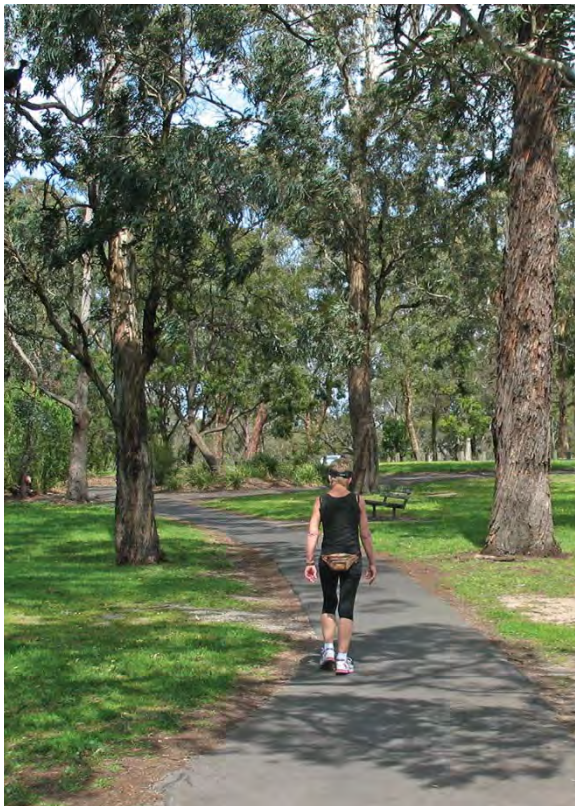
2.2.1 Benefits of canopy trees

Canopy trees in the public and private open space contribute to the liveability and inherent qualities, identity and character of a place. Research identifies that trees are valued at many different levels for:

- Shade and cooling reducing energy use and improving thermal comfort, mitigating the effects of climate change.
- Improved air quality.
- Contribution to biodiversity with habitat for native flora and fauna.
- The aesthetic values of the canopy trees in the urban environment including their contribution to a sense of place and the landscape character.
- Improving the mental health and wellbeing of the community through the benefit that trees have on the naturalness and leafy green character that can reduce stress levels, improve air quality and the create a more comfortable and liveable urban landscape.

- Economic improvement to property values located in leafy streets, particularly boulevards.
- The contrast canopy trees provide to built form in the urban environment.
- Cultural heritage values associated with remnant indigenous trees and vegetation.
- Historical values associated with mature exotic trees.
- Increasing the appeal and comfort of public spaces, which encourages people into the public realm thereby improving the social connectedness and the physical health and wellbeing of the community.
- Carbon sequestration.

2.2.2 Supporting research on benefits of canopy trees



Research in Toronto, Canada indicates that mature trees with a 75cm trunk diameter intercepts ten times more air pollution, can store up to 90 times more carbon and contributes up to 100 times more leaf area to the city's tree canopy than a tree with a 15cm trunk diameter.

Large, long-lived healthy trees provide the greatest contribution to the structural and functional values provided by trees in the urban environment. Retention of the large, long-lived healthy trees in our urban environments is a priority, particularly during this time of climate change.

Much of the research into managing trees in the urban environment comes from the United States and Canada. Recent research (Kardan, 2015) indicates that people who live in neighbourhoods with a higher density of trees (defined as 10 or more trees in a city block) on their streets report improved health compared to people living in streets with fewer than 10 street trees per city block. Translated to Australian conditions, this effectively means that street trees planted on both sides of the street at approximately 20 metre spacings have measurable benefits to community health and wellbeing over streets with one tree every 40 metres.

This research was undertaken specifically to identify how much a tree in a street or a nearby neighbourhood park could improve our health. Results from the study undertaken in Toronto Canada, suggest that people who live in areas with higher street tree density report better health perception and fewer cardio-metabolic conditions compared with their peers living in areas with lower street tree density. This study focussed on the street trees as they are more visually and physically accessible to people compared with trees in parks and on private land.

2.2.3 Benefits of other canopy vegetation

The presence of shrubs contributes to the Green *Garden City Character* through the increased presence of naturalness, selective screening and softening of built form, increased biodiversity and habitat value. Shrubs are bird attracting as they provide dense foliage and flowers which are popular for avifauna nesting and foraging. Shrubs are often preferred forms of greening directly adjacent to buildings and in tight spaces due to their less vigorous root systems and reduced height.

Example of the contribution of shrubs in the urban landscape

Example of the impact of lack of any planting including shrubs in the urban landscape

2.2.4 Issues with canopy trees in urban landscapes

While the values of canopy trees are many, it is recognised that there can be issues associated with managing trees in urban settings. Trees are living and dynamic that grow and change and can impact on the built infrastructure. Common issues occur when:

- Trees are planted in inappropriate locations for their anticipated growth habit and size.
- The flowers, seeds and leaves from a limited range of trees can cause allergies to people living nearby.
- Inappropriate management and maintenance of trees which can lead to issues such as poor form and structural integrity.

While it is recognised there can be issues associated with canopy trees in urban settings, their benefits certainly outweigh the issues. Therefore, this Strategy is focussed on providing clear direction for maximising the retention of appropriately planted and healthy mature canopy trees and providing a clear set of criteria to guide future tree planting to achieve a sustainable canopy vegetation framework in the city in the future.

2.2.5 Size of trees

This Strategy refers to three sizes of trees (including palms), and the mature sizes for large, medium and small trees in Table 2-1.

Table 2-1 Definitions of tree size and age

Size	Height	Trunk cal. dia.	Age
Large	Minimum of 12 metres	>60 cm	>80 years
Medium	6.1 to 11.9 metres	>35 cm	>50 years
Small	Up to 6 metres	>20 cm*	>30 years

** This may include multiple stemmed species such as Lagerstroemia sp. and Callistemon sp.*

Large mature canopy trees are referred to specifically in the Strategy, and there are different recommendations for the protection of these, as distinct from protection of medium and small canopy tress. The reason for making the distinction in the controls is that the research reviewed for this Strategy highlights that mature large trees make a significantly greater contribution to the urban landscape than new or recently planted trees, or the medium and small trees. The medium and small trees are valued including for their contribution to the landscape character, however the large trees, where feasible, will be preferred due to their greater range of benefits they can make in the long term.

3. Existing landscape character

3.1 Attributes of the landscape character

3.1.1 Overview

The landscape character of Monash is the interplay of the inherent natural physical characteristics and human influences.

The inherent natural physical characteristics include:

- Topography
- Geology and soils
- Vegetation
- Biodiversity
- Waterway corridors

The human influences include:

- Land use
- The era of urban development including built form and settlement pattern
- Cultural heritage
- Land ownership and management (public and private land)

The following features influence the sense of greenness and character including:

- Street layout including the nature strip width and street tree planting.
- Front setbacks and the proportion of the setback which is planted with grass or garden bed and trees.
- Side and rear setbacks.
- Front fences including their height, material and style.
- Garden design trends.
- The distribution, design and quality of reserves and parklands (public open space).

- The presence of distinctive natural features within the urban setting including waterways, remnant bushland areas, historical features such as large exotic trees and garden areas.
- Open space associated with other private and public land uses including:
  - golf courses
  - school grounds
  - university and TAFE college grounds
  - large front setbacks for industrial and business uses
  - the land associated with major roads and freeways.

3.1.2 Natural physical characteristics

3.1.2a Topography

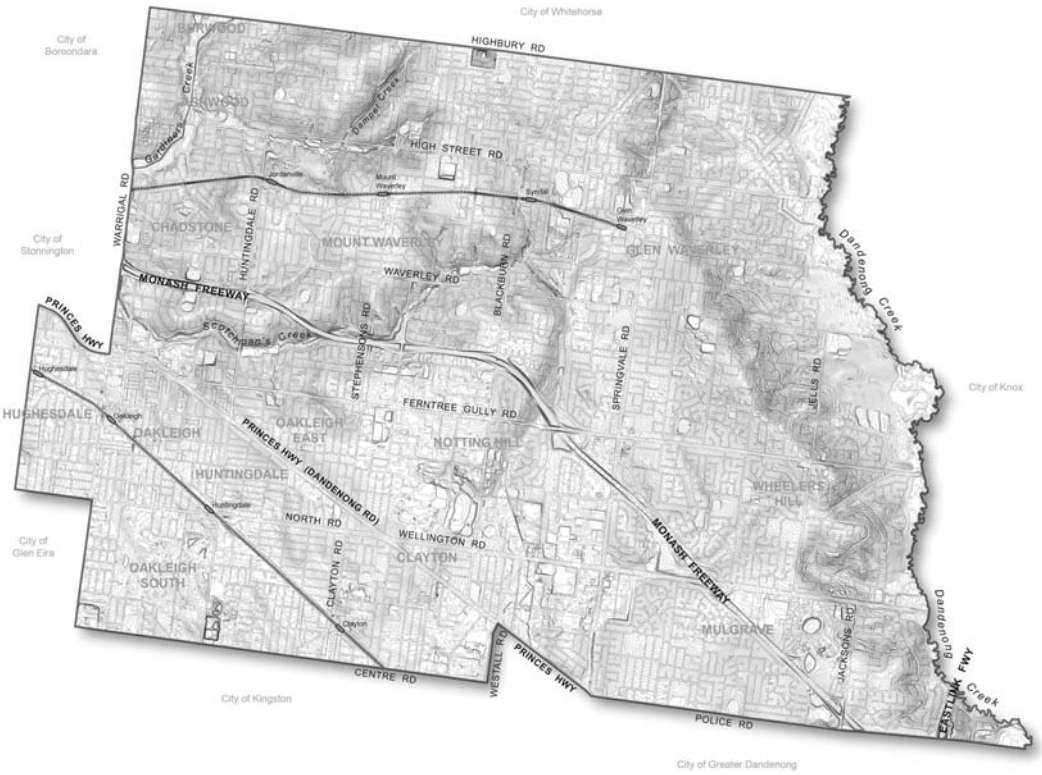


Figure 3A Topography – Extract from Drawing MLAVS-01

The topographic map in Figure 3A shows the distinctly undulating topography in the north changes to the gently undulating topography in the south through Hughesdale, Oakleigh, Huntingdale, Clayton and Mulgrave. In the gently undulating topography, the landscape character is focussed on the built form, planted and streetscape character nearby, in contrast to the longer vistas and views in the north and east in the undulating and steeply undulating topography. There are a variety of views from the steeply undulating topography including towards the CBD to the east, the Great Dividing Range to the north, the Dandenong Ranges to the east and towards the Police Academy to the south.

The waterway catchments are defined on the topographic map with the distinct ridgeline running north-- south in the eastern part of the municipality offering extensive views over the Dandenong Creek valley and floodplain and further east to the Dandenong Ranges.

3.1.2b Geology and soils

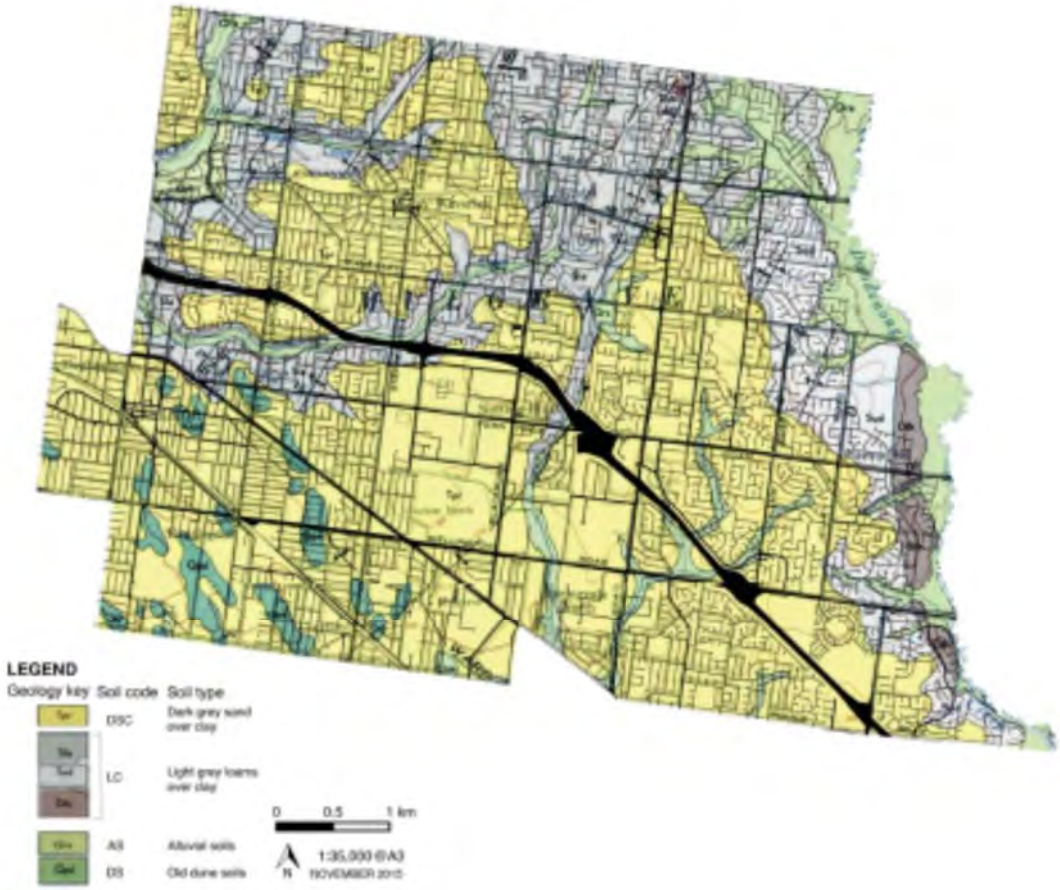


Figure 3B Geology and Soils (Source: City of Monash Street Tree Strategy)

On the northern and eastern slopes of the City of Monash the surface geology is Silurian Derived Sedimentary Hills (shown in grey in Figure 3B), while the majority of the municipality is Tertiary Sands (shown in yellow in Figure 3B). Over the Silurian Derived Sedimentary Hills the soils are described as Light grey loams over clay, while the remainder of the city has predominantly Dark grey sand over clay. Along the waterway corridors, Alluvial soils are present, while in the south west, Old dune soils are present, as shown in the darker green on Figure 3B.

The changes in geology is linked to the topography and the soils. This informs the inherent vegetation characteristics of the municipality, which influences land use and the landscape character. For example, the old dune sands and sand soils in the south west parts of the municipality have influenced the establishment and Huntingdale and Metropolitan Golf Courses. The changes in geology and soils also influences the growth characteristics and type of trees and vegetation across the municipality.

Combined with the changes in soil type, the more undulating parts of the municipality in the north have remnant indigenous vegetation including Grassy Woodland and Valley

Heathy Forest. The sandy soils to the south supported the Grassy Woodland and Heathy Woodland forests, and change the range of tree species and characteristics.

3.1.2c Biodiversity values

The City of Monash Environmental Sustainability Strategy 2016–2026 identifies the following as Monash's most significant natural environmental areas:

- Valley Reserve
- Dandenong Creek Riparian Corridor
- Gardiners Creek
- Scotchmans Creek
- Damper Creek.

Additional to those identified above, there are a number of reserves with remnant or mature planted indigenous vegetation that provides a framework to strengthen the biodiversity values. These include:

- Bogong Reserve
- Brickmakers Park
- Electra Reserve
- Essex Heights Reserve
- Hinkler Reserve
- Federal Reserve
- Reg Harris Reserve
- Whalley Drive Reserve

151 species of flora and fauna of national, state and regional significance have been recorded in the Municipality including Dwarf Galaxias, Australasian Bittern, Southern Bell Frog, Grey-headed Flying-fox, Powerful Owl, Peregrine Falcon, Pointed Flat-sedge, Yarra Gum, Muttonwood and Manna Gum. The Monash ESS is proactively working with other land and waterway management authorities and community groups to improve environmental outcomes.

The strengthening of canopy vegetation in the City of Monash has the potential to improve the habitat and biodiversity values, particularly along the waterway corridors. This includes consideration of tree species on both private and public land along with shrubs and ground layer species.

3.1.2d Pre 1750 Vegetation types

The soils and topography inform the original (Pre 1750) vegetation types in the City of Monash. To the north and east Grassy Woodland (shown as brown colour on Figure 3C) was present on the higher areas with Valley Heathy Forest (shown as bright green on Figure 3C). The Floodplain Riparian Woodland the Swampy Riparian complex occupied the lower elevations towards and along the waterways.

In the central and southern areas of the municipality (shown as brown colour on Figure 3C), the vegetation was predominantly Grassy Woodland. On the old dune soils in the south western areas of the municipality (shown as light brown on Figure 3C) Heathy Woodland is noted as being the original Ecological Vegetation Class (EVC), with a diverse range of species.

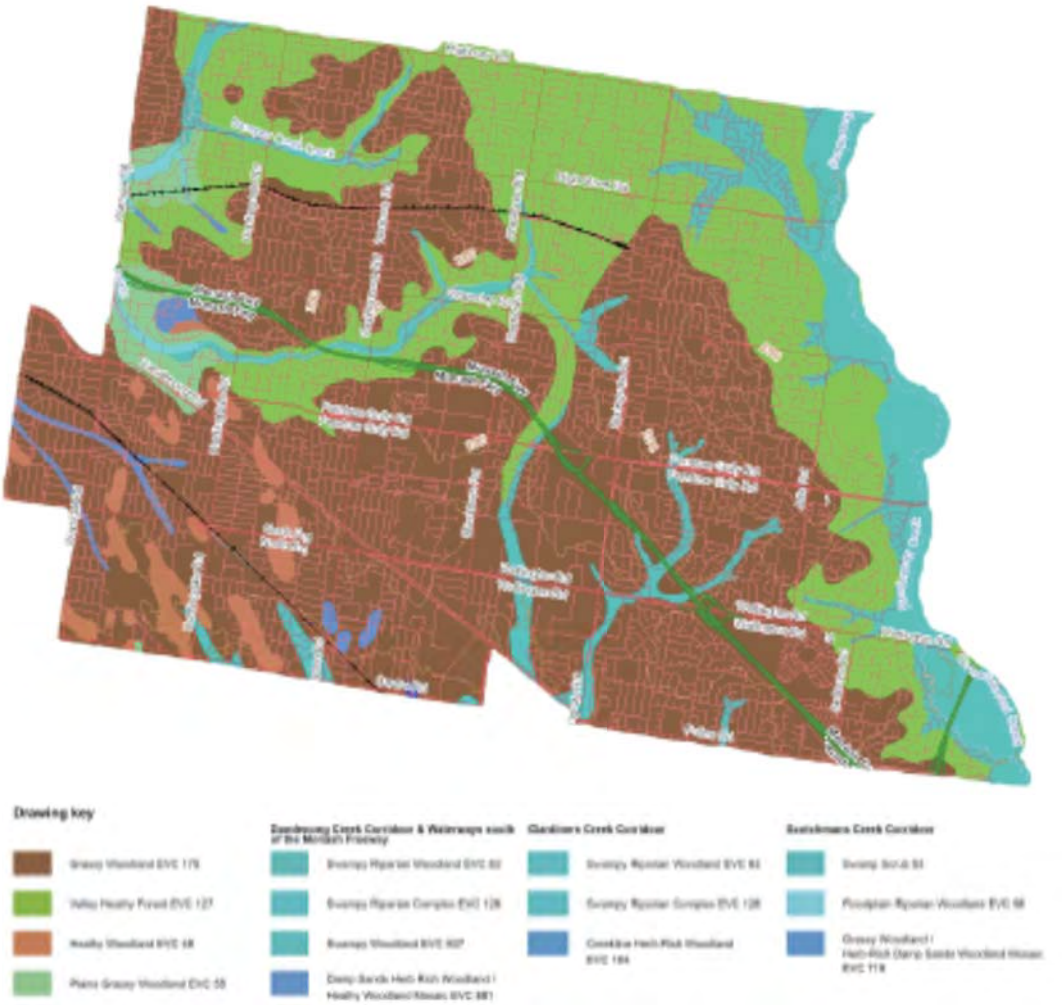


Figure 3C City of Monash Pre 1750 EVC (Source: https://nvim.delwp.vic.gov.au/Map#/)

Overall, the dominant canopy trees in the original vegetation types include:

- **Grassy Woodland** EVC 175 – Narrow-leaf Peppermint *Eucalyptus radiata* and Drooping Sheoak *Allocasuarina verticillata*. Smaller trees include Black Wattle *Acacia mearnsii*, Black Sheoak *Allocasuarina* littoralis and Cherry Ballart *Exocarpus cupressiformis.*
- **Valley Heathy Forest** EVC 127 – Yellow Box *E. melliodora*, Bundy *E. goniocalyx,* Silverleaf Stringbark *E. cephalocarpa* and Messmate Stringybark *E. obliqua.* Smaller trees include Cherry Ballart *Exocarpus cupressiformis*.
- **Swampy Riparian Woodland** EVC 83 – Swamp Gum *E. ovata* and Narrow-leaf Peppermint *E. radiata*. Smaller trees include Blackwood *Acacia melanxoylon* and Swamp Paperbark *Melaleuca ericifolia*.
- **Heathy Woodland** EVC 48 – Jimmy's Shining Peppermint *E. willsii*, Messmate Stringybark *E. obliqua*, Narrow-leaf Peppermint *E. radiata*, Rough-barked Messmate *E.viminalis* ssp. *pryoriana* and Saw Banksia *Banksia serrata*.

Remnant vegetation in the City of Monash is primarily located along the waterway corridors with some individual remnant trees on other areas of public land away from the waterway corridors. Today, the original vegetation communities form a component of the landscape character mainly in precincts adjacent to the waterways. Away from these

precincts, the vegetation has been substantially removed with exotic gardens and a mix of native and exotic street trees. The planted vegetation is described below.

The remnant indigenous vegetation, particularly the dominant tree species informs the existing and preferred landscape character types. Some of the international research, into determining target percentage canopy tree cover for areas links this to the original vegetation types. For example, naturally forested areas are typically able to support a higher percentage of tree canopy cover than an area that was formerly an open grassland. A range of different woodland and forest types were present across the whole municipality, all of which would have originally supported varying types of tree canopy cover prior to European settlement, and this influences the percentage canopy cover target in this Strategy of 30 per cent.

3.1.2e Planted canopy vegetation (outside of bushland areas)

Due to urban development, outside of the waterway corridors and remnant bushland, the majority of canopy vegetation is planted. The planted character is largely influenced by changing trends in urban development. During the interwar period the planted canopy vegetation is a mixture of exotic and native species, but with a dominance of exotic, particularly in relation to residential gardens including the ornamental shrubs and small trees.

From the 1960s through to 2000 there is a combination of the tall Eucalypt style character along with the manicured exotic evergreen gardens with conifers, cypress and fruit trees. Post 2000 there is a noticeable decrease in canopy vegetation cover on private land and an increase in focus on the canopy vegetation on public land.

There are some very large signature stands of canopy trees in the city in addition to the bushland. This includes rows of Cypress trees and other trees that formed windrows to rural properties, along with large scattered trees including Oak Trees contained in open space reserves and on private land. Many of the large canopy trees are from earlier times prior to urban development, when agriculture was the dominant land use. The large canopy trees are located on a combination of public and private land, some of which are protected via Heritage Overlays.

Significant trees

Monash City Council does not have a Significant Tree Study, however a number of trees or groups of trees are listed in Schedule 1 to the Heritage Overlay in the Monash Planning Scheme.

The criteria for determining significant trees is more extensive than just size or maturity, and can include more recently planted trees where they have an association with an important event or are of scientific interest. The criteria for significant trees includes:

- Aesthetic, being notable for the visual quality and contribution to the landscape setting. This may include a tree that is outstanding for its size and canopy spread.
- Historic, including a tree that is particularly old, and associated with a memorial or historical event.
- Scientific, of horticultural or genetic value, including being rare, outstanding features, unusual features, of limited distribution, exotic, indigenous or being important for propagation purposes.
- §§ Social/spiritual, including being associated with a notable historical figure or cultural group or identity.

A search of the Victorian Heritage Register and the National Trust Significant Tree Register has found only two individual trees and one other group of trees listed as being of State significance, including:

- Flowering Gum *Corymbia ficifolia* in the Metropolitan Golf Course, approximately 150 years old, 12m tall.
- Bats Wing Coral Tree *Erythrina vespertilio* located at Monash University listed as the best specimen of its kind in Melbourne.
- VHR H1667 Clayton Station, the Statement of Significance notes there are some mature plantings of Oak and Peppercorn trees on the site.

The canopy vegetation including the large mature trees and bushland areas are an important influence on the landscape character of Monash.

3.1.2f Waterways and wetlands

Damper Creek forms the strongest influence in terms of natural bushland character due to the close proximity of the properties and intimacy and steepness of the creek valley relative to surrounding streets and properties. Similarly, the upper reaches of Scotchmans Creek also have this intimacy, which informs the landscape character of the adjoining areas.

Gardiners Creek corridor has a strong influence on the landscape character, however the more gently undulating topography and established exotic gardens in the valley means that its influence is not as pronounced Damper Creek.

By comparison, the Dandenong Creek corridor has a wide expansive floodplain with the streets and urban development set back from the waterway corridor. In some reaches there are large mown fire breaks and grassed ovals and open space between the urban area and Dandenong Creek. Other reaches around Jells Park includes large areas of extensive remnant woodland that influences the adjoining urban character. The creek valley rises steeply to the west of the creek meaning there are expansive views over the creek valley and beyond to the Dandenong Ranges.

The Dandenong Ranges are a key natural feature that influences the landscape character of the municipality. Many streets and neighbourhoods directly overlook the Dandong Creek valley with the Dandenong Ranges in the background. This generally means there are small and trimmed canopy trees and shrubs on private land so that people can retain their expansive views without tree canopies interrupting them.

A key influence on the changes in landscape character through the municipality is the presence of waterways. This includes the presence of biodiversity values associated with the waterway corridors along with the potential to strengthen these values in the future. One of the key challenges will be planting new large canopy trees in streetscapes and encouraging this on private land in the context of people retaining views of the Dandenong Ranges.

Gardiners Creek corridor, Ashwood

3.1.2g Public open space

Figure 3D *Open space and waterway corridors in the City of Monash*

Existing areas of open space also contribute to the landscape character at both the neighbourhood and local level. This is typically where the urban layout of streets and properties are oriented to overlook an open space and includes Bogong Reserve in Glen Waverley, Glen Waverley North Reserve and Sherwood Road Reserve in Mount Waverley. A large number of open space reserves in the municipality are not highly visible from the streets as they are enclosed by residential properties or other land use with small frontages directly adjoining the street. While the open space may not be visible, the canopy trees in the public open space provide a framework of canopy trees that contributes the landscape character of the adjoining urban areas. The presence of public open space influences the landscape character and presence of canopy trees.

3.1.3 Human influences

3.1.3a Land use

Residential

This is the dominant land use in Monash with detached single and double storey dwellings in residential lots of varying sizes. In more recent times, the urban character of residential land use is changing and built form has a greater influence on the character. This includes the trend towards larger dwellings on single lots that replace the modest detached dwellings, combined with increased intensity of use on existing properties with 2 lot and greater subdivisions of the residential use.

There is an increasing presence of two storey dwellings in what were standard single storey dwelling areas, which increases the visual prominence of built form and roofs. This is often coupled with increased built form footprint with no or minimal side boundary setbacks. Front setbacks have been retained in the majority of areas, however there is an increased paved surface to these front setbacks due mainly to changes in space allocated for car access and parking. Older style dwellings typically had 3 metre wide driveways for a single vehicle to a car park or garage. Increasingly new dwellings have 6 metre wide driveways, with larger garages for two or more vehicles, and vehicle drop off at the front of the dwelling. This increased hard surfaces to the front of the dwellings reduces the overall sense of green and garden character in the streetscape. The visual impact of the increased hard surfaces impacts on the landscape character where they occur more than occasionally in the streetscape (i.e., several rather than one or two).

Typical residential land use in the City of Monash

Typical increase to site coverage in residential land use in the City of Monash

Medium density residential

This land use type includes townhouses and other developments including semi-detached and attached dwellings. It is still a small component of the overall residential character and make up of the City of Monash. It primarily occurs in discrete areas that are either located near activity centres or strategic sites converting former land use such as industrial and mixed use to residential use. In many of these sites, underground power means that large canopy street trees have been planted in consistent avenue style plantings that will ensure in the longer term there is a reasonable canopy cover, despite reduced building setbacks and the lack of canopy trees on private land. Examples include the Sienna development in Mount Waverley, and the Scenic Drive Development in Ashwood.

Typical medium density residential in the City of Monash

High density precincts

This land use type includes apartment buildings and mixed use developments. There are some areas of this land use type in the municipality, including adjacent to Monash University and in Burwood. As with medium density residential, the underground power has enabled large canopy street trees to be planted in consistent avenue style plantings

and close to buildings to achieve a reasonable canopy cover, despite reduced building setbacks and a lack of canopy trees on private land.

Example of high density residential, Notting Hill

Retirement living

As with the medium density land use, retirement villages are discrete land uses located throughout the residential neighbourhoods. The older style villages contain single storey semi- detached dwellings set within landscaped surrounds, some with reasonable canopy tree cover, as per the photograph below. More recent examples include medium to high density living without established tree canopy cover. There are implications for community health and wellbeing, particularly through lack of shade in these areas, given there are higher concentrations of the frail and elderly who are more vulnerable to urban heat island effect.

Cumberland View Retirement Village, Wheelers Hill

The landscape character associated with this land use type varies from a highly urban landscape without trees or any green space to the streets with large 20 metre plus landscape setbacks with large well established Eucalypts providing a native landscape character. Compared with the residential land use, the commercial/industrial areas contain large roof and hard stand areas meaning they have less green space and trees,

however where the large landscaped setbacks exist the overall effect from the public streetscape is shaded and green character.

Typical urban commercial/industrial precinct, Oakleigh

Typical garden commercial/industrial precinct, Mulgrave

Public open space

Sporting fields and large native overstorey trees characterise many of the large open space reserves in Monash. Additionally, there are some key reserves with remnant indigenous vegetation including Valley Reserve, Larpent Reserve and the open spaces along Damper Creek, Scotchmans Creek, Gardiners Creek and Dandong Creek. From the site assessment work it appears there are opportunities to increase the presence of canopy trees in public open space, particularly to the perimeter of sports fields and through unstructured recreational facilities, for example around picnic areas and playgrounds.

The character of the public open spaces influences the overall landscape character of the precincts particularly where the urban layout faces the open space. The presence of canopy trees in the public open space provides a framework and setting for the built form in many neighbourhoods. Refer to Figure 4D.

Indigenous landscape character of Federal Reserve, Mount Waverley

Exotic and native landscape character of Colombia Park Drive Reserve, Wheelers Hill

Education

This includes public primary and secondary schools, Holmesglen Institute of TAFE and Monash University. Generally, the school grounds contribute to the canopy tree cover and the overall landscape character of the neighbourhood. Particularly notable are the large Eucalypt species providing an overstorey canopy framework and context to residential dwellings. Combined with public open space some school grounds have remnant indigenous overstorey trees. The Victorian Department of Education and Early Childhood Development (DEECD) is responsible for all Victorian public schools and while the trees on this public land contribute to the landscape character and canopy cover, Council is not directly responsible for their ongoing protection in the future.

Monash University campus in Clayton is recognised for the Australian landscape character and has ten gardens within the grounds. The campus was established in the 1960s on predominantly open grazed paddocks and now has well established gardens with mainly planted Eucalypts, and also one significant remnant Red Gum.

Other educational institutions include private schools including Wesley College Waverley Campus, Caulfield Grammar Wheelers Hill Campus, adjoining the Dandenong Creek corridor and Salesian College, Chadstone. These sites have open sports fields (both natural and synthetic) and canopy trees mainly to the perimeter of the sites.

Local retail centres

The small local retail centres located throughout the residential neighbourhoods in the commonly have a consistent style street tree plantings that signify these retail precincts in the residential streets. The topiary style of street tree is commonly referred to as 'Mop Top' which is a grafted variety of tree with dense branching and foliage on a vigorous main stem which have a topiary appearance without a normal vase shaped branching habit. Increasing shade in these local retail centres, many of which have small local open spaces will be a priority into the future.

Typical local and retail centre with small trees that provide minimal shade and greening

Activity centres

The large commercial centres that form part of the activity centres have not been individually assessed as part of this work as these typically have Structure Plans to guide their future change. Given the activity centres will increasingly include high density housing, the provision of adequate urban greening will be a key outcome from this Strategy to inform the urban design and structure planning for these centres in the future.

Golf courses

The four privately owned golf courses in Monash contain mature overstorey trees that define the greens and fairways, with an unbuilt and manicured landscape character. Fencing to the perimeter of the golf courses does impact on their contribution to the landscape character as the fence forms a visual barrier to the green and open space character and partially obscures the canopy trees.

Major roads and freeways

With VicRoads as the responsible agency for the major arterial roads, Council has limited influence over the selection and canopy trees along the major arterials including Princes Highway, the South East Arterial and Springvale Road. The large Eucalypt style plantings through Clayton contribute to the landscape character and setback for the large scale commercial/industrial, education and business land uses. Canopy vegetation along the South East Arterial easement partially screens the freeway sound walls and softens the adjoining residential use in some locations.

Railway land

The railway easements vary in width, and in some precincts there is a significant presence of canopy vegetation that contributes to the landscape character. As with roads, education land and service easements, the canopy trees can be removed to provide space for transport or service provision and risk, and therefore there is no certainty of their retention.

Service easements

Easements for the transmission lines and water supply traverse through the municipality, however due to their service provision they do not have any substantial canopy vegetation present in them.

Victorian Government owned land

The Police Academy site and the Melbourne Water Reservoirs are located on high points in the Glen Waverly area they contain mature canopy trees which are highly visible and contribute to the canopy tree cover.

Long views towards the Police Academy site in undulating topography

3.1.3b Built form and settlement pattern

The extent of built form and development relative to the landscape, or unbuilt areas has a key influence on the urban landscape character of precincts. This includes the building height, density, form, setback from front and side boundaries, fence styles and materials. The settlement pattern includes: the overall subdivision pattern and its responsiveness to the underlying topography;; road pavement widths relative to the overall street width;; nature strip widths that influence the type and size of street trees;; the presence and location of overhead powerlines;; and the location and accessibility of public open space.

The MULCVS relies on the built form character described in the Monash Neighbourhood Character Study 1997 along with the updates in the Draft Neighbourhood Character Review in 2014. The MULCVS refers to the built form and settlement pattern where it forms a key component of or has a major influence over the landscape character.

3.1.3c Cultural landscape heritage

The following description has been taken from the Council's website:

Pre-European settlement

Prior to the arrival of Europeans, the ***Woi wurrung*** occupied an area which extended from inland of the Werribee River in the south west, Mount Macedon in the north west, Mount William in the Great Divide to the north and across to Mount Baw Baw in the east (Clark 1990). Their southern boundary was the watershed of the Great Divide and Bunurong clans. This group of people had common language and social practices, and at the time of contact, was thought to have comprised seven clans, each with their own clan estate. At the time of European settlement, Dandenong Creek north of Dandenong appears to have been the approximate boundary between ***Woi wurrung*** and ***Boon wurrung.***

The specific clans likely to have traditional rights and obligations in the City of Monash area are the Ngaruk willam of the ***Boon wurrung*** and the ***Bulug willam*** patriline of the ***Wurundjeri-Balluk*** clan (***Woi wurrung***).

The ***Bulug willam*** clan belonged to the Waa (or crow) moiety and the moiety of the ***Ngaruk willam*** was ***Bunjil*** (or eaglehawk). The meaning of ***Bulug willam*** is given as "Swamp dwellers" and ***Ngaruk*** meant stones or rocky. The ***Bulug willam*** clan head at the time of European contact was Mooney Mooney/Old Murray who is claimed to have guided Batman's June 1835 party to a winter camp where the "Treaty" was negotiated. Mooney's son, Bolete who was a member of the Native Police Corps. Tukulneen or Old George the King, was retired due to old age as head of the ***Ngaruk willam*** when Europeans arrived in this area, but was recognised as second in command to Billibellary (Jika Jika).

De Villiers identified the Native Police Reserve at Narre Narre Warren as being within the territory of the Bulug willam clan. Members of ***Woi wurrung*** who first chose the site for the Aboriginal Protectorate Station, described the area as 'Nerre Nerre Warren where all black fellows sit down'. Thomas stated that 'the Western Port tribe's (Boon wurrung) visits to Narre Narre Warren are but transient ... they feel no way satisfied with the location' which was within ***Woi wurrungland***.

One of the first Europeans to investigate Dandenong Creek and the Dandenong Ranges during the initial period of contact was Botanist Daniel Bunce (1859). In approximately 1840 when the first squatting runs such as James Clows' were already established, Bunce made a journey to Mount Dandenong. Accompanying Bunce on this short journey was Derrimut (from Werribee District), Yammabook and Benbow. These Aboriginals were from different clans than those who traditionally occupied the Dandenongs, however they still had strong cultural links to the area. During this journey, [the principal aim of which was to collect botanical specimens], a number of local Aboriginals were encountered. In a detailed account of the journey Bunce described the construction of camps, hunting and gathering methods, game preparation and consumption, social practices, including the differing roles of men and women and various types of bark removal. Bunce's short journey serves to highlight the wealth of resources available to Aboriginal people in the Dandenong Ranges, and the exceptional knowledge they had of the landform and its resources.

European Settlement

The Contact period in the Melbourne region was one of upheaval. The Kulin tribes, particularly the Woi wurrung and the Boon wurrung that occupied the Melbourne area, and the European squatters and settlers had relationships that were filled with violent conflict, cross cultural misunderstanding and on occasion a mutual respect. The implementation of Aboriginal missions, the Native Police Corps, the Aboriginal Protectorate and the later Aboriginal Reserves, all shaped the fate of the Woi wurrung and Boon wurrung during the contact period.

The landscape was extensively modified since the early 1800s, firstly being largely cleared for grazing, market gardens and in some locations for quarrying activities including for brick making and sand. The area around Hughesdale and Oakleigh was settled first with dairy farms, orchards and market gardens being the dominant land use in around the turn of the century. Market gardens were particularly important around Clayton. The electrification of the Oakleigh line in 1922 and the opening of the Darling to Glen Waverley line in 1930 further opened up housing developments and caused the gradual retreat of the market gardens. Residential and commercial/industrial development boomed after WWII in Clayton, Mulgrave and Mount Waverley. In 1949, the Housing Commission became a major contributor to housing construction in the Jordanvile area. Monash University was established in Clayton in 1961 and Waverley Park premier football ground was established in 1968.

3.1.3d Cultural landscape character

Today, the original natural landscape character of the city is evident along the key waterway corridors. Evidence of the agricultural is present in the municipality, mainly through surviving large exotic trees that remain in open space reserves and on private land. The landscape character is influenced by a combination of the street trees, open space character, subdivision layout, built form and private gardens. Across the different precincts, original private gardens that represent the late 1940s and 1950s subdivision are notable, however many of these are changing as the buildings are replaced or renovated to contemporary dwellings.

Established remnant Oak Tree from the former rural land use in the area

3.1.3e Street trees

The dominant street tree planting style in the City of Monash is scattered mixed species evergreen trees with a combination of large and small trees. In many streetscapes, the scattered planting arrangement and small size of street trees means that the residential gardens are more prominent and visible in the streetscape than the street trees. Where consistent avenue style street tree plantings exist, these significantly contribute to the overall landscape character of the precincts. Without a strong framework of street trees, changes to the private landscapes and built form, particularly the visual prominence of 2+ storey dwellings have a greater impact on the precinct landscape character.

In Hughesdale and the Oakleigh area the older avenue style street tree plantings make a significant contribution to the landscape character including the distinctive alternating evergreen and deciduous avenues.

The *Monash Street Tree Strategy* identifies opportunities to increase the canopy tree cover in the streetscapes, and the MULCVS can strengthen the need for this to occur, particularly given the loss of canopy trees on private land. The MULCVS also provides an opportunity to consider updating the criteria used to determine priorities for street tree removals and street tree planting, particularly in the context of mitigating urban heat island effect.

3.2 Overall landscape character

The *Garden City Character* varies across the City of Monash and is influenced by the factors listed in 3.2.1. In summary, the greatest influences on the existing landscape character in Monash include the presence of canopy vegetation, particularly large canopy trees; the waterway corridors; the era of development; land use; and changes in the topography.

Hughesdale and Oakleigh contain the earliest subdivisions, generally with wider naturestrips and a greater number of large mature avenues of deciduous and evergreen trees, complemented by exotic gardens and early 1900s architecture. The topography is relatively flat and gently undulating.

Ashwood, Burwood, Chadstone and Mount Waverley are characterised by steeply undulating topography with the presence of the waterway corridors including Gardiners and Scotchmans Creek, contrasting with well established suburban gardens that are predominantly pre-1965.

Glen Waverley and Wheelers Hill are elevated and steeply undulating topography that affords views over the Dandenong Creek valley to the east, and to the Dandenong Ranges beyond. The long vistas and views contribute to the sense of scale and context of the urban settlement in a natural treed and bushland setting. These precincts also have the upper catchments of Scotchmans and Damper Creeks with these waterway corridors influencing the natural and native character of the areas adjoining them. The eastern extents of Glen Waverley and Wheelers Hill are characterised by post 1965 development patterns with curvilinear streets, detached one and two storey dwellings on quarter acre lots and underground power. This includes a dominance of manicured garden style with trimmed conifers and occasional emergent tall canopy trees.

Oakleigh South is characterised by the presence of the large private golf courses with the established native tall Eucalypt style canopy framework influencing the residential precincts. Clayton, Mulgrave and Notting Hill are characterised by the relatively flat topography and established exotic suburban neighbourhoods. These contrast with the predominantly native landscape character and style associated with Monash University campus and the large scale commercial, business and industrial land use types in this precinct. Cultural influences are evident in the garden styles and character of these precincts with compact productive gardens distributed through Oakleigh, Oakleigh South, Oakleigh East and Clayton.

The following two tables describe the existing landscape character types, with Table 3-1 describing the residential landscape character types and Table 3-2 describing the commercial/industrial landscape character types. Opportunities to change these character types are included in the right hand column, and this has informed the preferred landscape character types which are included in Section 5.5.

Table 3-1 Residential landscape character types

Distinctive features	Opportunities for future change
Native tall Eucalypt landscape character type	
• The loss of large canopy trees from Strong presence of native tall Eucalypt style trees that influence the overall character. • Are generally a combination of scattered emergent trees through residential gardens, reinforced by more substantial stands of tall Eucalypts in the public open space and in many locations as street trees as well. • Street trees can vary with both tall Eucalypt style and others. • Typically the tall Eucalypts are planted in public open space, on school grounds and in private land. • Diversity of architectural styles. • Variety of fencing styles. • Diversity of topography, with a higher proportion in the creek valley and creek corridor types.	• Retain and encourage additional planting of tall Eucalypt style trees on private land when sites redevelop. • Encourage adequate space and footing designs in proposed built form to maximise the use of new tall Eucalypt style trees in development sites. • Improve tree canopy cover through careful review and establishing additional avenues of Eucalypt style species in streets that are in proximity to remnant bushland and waterway corridors. This may include options to review the planting location outside the overhead powerlines in order to achieve good form and structural integrity to the street trees. • Promote planting of additional tall Eucalypts on public land including streetscapes, public open space, educational facilities and other land including service easements where feasible. • Promote planting of additional tall Eucalypts on existing private land through community education and initiatives. • Encourage low or no front fencing to minimise built elements and maximise integration between the private and public realm.

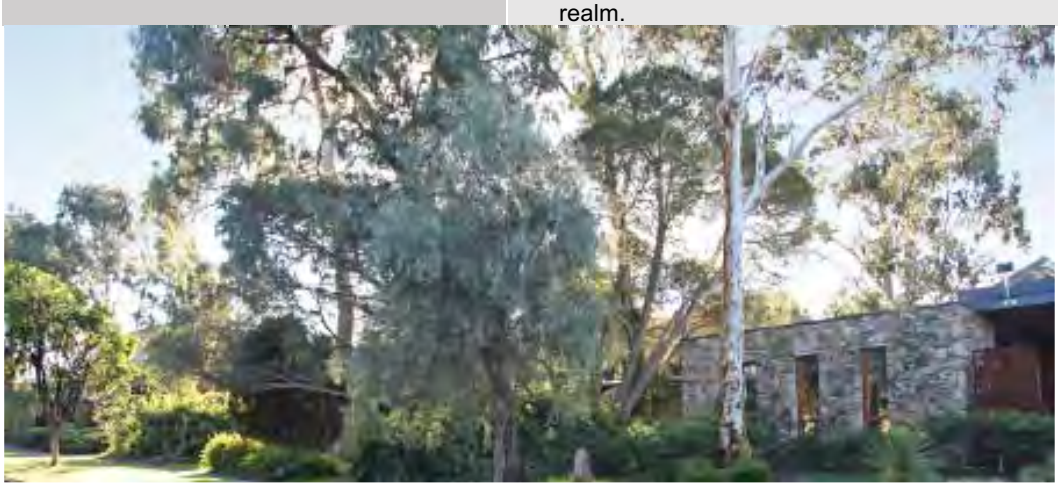


Table 3-1 Residential landscape character types *continued...*

Distinctive features	Opportunities for future change
Exotic suburban landscape character	
• Predominantly non-native canopy trees and vegetation, with a combination of deciduous and non-native evergreen trees. • Predominantly detached single and double storey dwellings with a diversity of architectural styles. • •Exotic street tree species, typically mixed evergreen and deciduous exotic species. • Variety of fencing styles. • Diversity of topography including steeply and gently undulating. • Mainly located in the central and southern parts of the Municipality.	• Retain exotic canopy trees on private land when sites redevelop. • Prioritise retention of long-lived large canopy trees in future redevelopment sites where a requirement to retain all existing trees would potentially prevent the reasonable development and use of the site. • Promote the use of large canopy deciduous and non-native evergreen trees on both the public and private land where space permits. • •Exotic street tree species to be selected for future replacement and infill street tree planting. • Encourage low or no front fencing to minimise built elements and maximise integration between the private and public realm
	
Exotic suburban 'garden' landscape character type	
• Strong presence of exotic canopy trees and vegetation in residential gardens. • Street trees are scattered and have a minimal contribution to the character. • Gardens are the dominant feature. • Mainly detached dwellings with varied front and side setbacks. • Diversity of architectural styles. • Predominantly low or no front fencing making front gardens visible in the streetscape.	• Retain exotic canopy trees on private land when sites redevelop. • Strengthen the street tree planting to complement the exotic garden character, particularly with large deciduous trees where appropriate. • Retain the predominance of low or no fencing. • Allow space for new large canopy trees in development sites. • Fencing as per previous.
	

Table 3-1 Residential landscape character types *continued....*

Distinctive features	Opportunities for future change
Evergreen landscape character type	
• Dominance of evergreen canopy trees and vegetation. This includes native and exotic evergreen species, without a dominance of tall Eucalypt style trees. • Variety of architectural styles. • Varied urban densities and building setbacks. • Variety of fencing styles and heights. • Varied topography • Streetscapes typically include a mix of evergreen species in each street, rather than single species avenue style planting.	• Continue to strengthen this character type, particularly where there is no conflict with overshadowing and sunlight access. • Retain and plant new large canopy trees on both the public and private land where space permits. • Prioritise to retain large canopy trees on private land when sites redevelop. • Allow space for new large canopy trees in future redevelopment sites. • Strengthen avenue style street tree planting through progressive infill with evergreen trees. • Encourage low or no front fencing.
	
Evergreen suburban garden landscape character type	
• Predominantly residential land use. • Varied urban densities and building setbacks. • Variety of fencing styles, predominantly low height or no fencing. • The landscape character is mainly influenced by the dominance of evergreen native trees and vegetation on private land. • The street trees are either absent, scattered or recently planted and make a minimal contribution.	• Retain large canopy trees on private land when sites redevelop. • Prioritise street tree planting so that it complements the evergreen garden character and canopy vegetation on public land. • Retain the predominance of low or no fencing. • Consider addition of deciduous trees where sunlight access is required.
	

Table 3-1 Residential landscape character types *continued....*

Distinctive features	Opportunities for future change
Deciduous and evergreen suburban landscape character type	
• Where the landscape character is influenced by the combination of both deciduous and evergreen trees in private and public land, and can include both native and exotic species. • Variety of architectural styles. • Varied urban densities and building setbacks. • Variety of fencing styles and heights. • Varied topography. • Streetscapes typically include a mix of evergreen and deciduous species in each street, rather than single species avenue style planting.	• Retain large canopy trees on private land when sites redevelop. • Strengthen the mix of deciduous and evergreen vegetation, particularly with consideration of sunlight access. • Increase the presence of alternating avenues of street trees to achieve sunlight access and shading, particularly in east-- west oriented streets. • Encourage low or no front fencing.

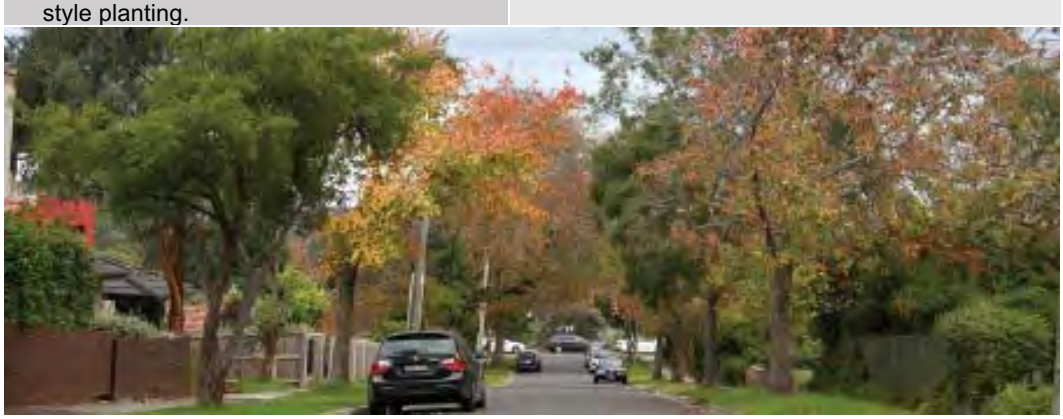


Table 3-2 Variable elements to add to the existing residential landscape character types

Variable element	Distinctive features	Opportunities for future change
Compact	Canopy trees are predominantly less than 6 metres high, providing a sense of greening for single storey built form, however too low to effectively provide greening to 2-storey and higher built form. 	• Plant taller canopy trees to provide more effective greening and shading to precincts in which 2-storey and higher dwellings are likely to increase in the future • This character type will not be included in the preferred future Landscape Character types to support the overall objectives of planting canopy trees that emerge above the roofline.

Table 3-2 Variable elements to add to the existing residential landscape character types *continued.....*

Variable element	Distinctive features	Opportunities for future change
Creek valley	Elevated areas that overlook waterway corridors 	• Strengthen the biodiversity values of waterway corridors by increasing the presence of large canopy trees, including native and indigenous species on both private and public land. • Investigate suitable guidelines to introduce canopy trees into these areas, while retaining some selected views. • Emphasise the importance of side setbacks to retain views between buildings, along with planting of shrubs in the side setbacks to promote greenness, without impacting on views.
Creek corridor	Areas directly adjoining the waterway within the creek valley form 	• Strengthen the biodiversity values of waterway corridors by increasing the presence of large canopy trees, particularly native and indigenous species on private land through appropriate planning control. • Strengthen biodiversity values by increasing the presence of native and indigenous large canopy trees in public open space and streetscapes. • Determine suitable planning controls to protect existing canopy trees on private and public land during redevelopment along the waterways. • Promote the use of native and indigenous plants in private landscaping where properties directly adjoin the waterway.
Early 1900s	• Where the period heritage style architecture, gardens, street trees and open space styles influence the landscape character. • Building setbacks vary. • Residential garden styles typically match the building form and character. • Mainly low fencing styles complement the architectural character. 	• Review the controls in the Heritage overlay areas to confirm whether any additional controls are required for fencing styles or garden character and street trees. • Protect and enhance the alternating street tree planting style as the species senesce and require replacement. Reinstate the alternating planting style where it has been modified. • Protect the exotic garden character that is consistent with period architectural style.

Table 3-2 Variable elements to add to the existing residential landscape character types *continued.....*

Variable element	Distinctive features	Opportunities for future change
Suburban	• Typically detached single and 2 storey dwellings with space around the building to establish a garden setting that clearly separates it from the next building. • Space between built form allows room for canopy trees, shrubs, climbers and garden beds. In the undulating and valley precincts, this allows for vistas between the buildings. • Typically canopy trees are visible in the rear gardens. • Typically built form is viewed through vegetation. 	• Identify best examples of the suburban detached dwelling style landscape character as part of this Strategy to protect them with appropriate planning controls to prevent them from being changed by incremental redevelopment of single lots. For example, recognise and define new heritage precincts to protect this style. • Emphasise the importance of greenness surrounding the building so it is within a landscaped setting.
Modified suburban	• A combination of the post WWII suburban character noted above with contemporary dwellings interspersed through precinct. • Typically, the contemporary dwellings have a larger built form footprint than the traditional suburban house, and occupy a larger proportion of the block. This means there is less garden area around the built form. 	• Prepare and introduce soft landscape guidelines into the development process where increased site coverage with built form is proposed. • Improve the guidelines for retention of existing canopy trees on site as part of the development process. • Improve guidelines for the protection of existing trees on adjoining properties and in the streetscape during the construction process. This would be applied to all preferred character types.

Table 3-2 Variable elements to add to the existing residential landscape character types *continued.....*

Variable element	Distinctive features	Opportunities for future change
Post 2000 Redevelop-ment area	• Refers to infill development, generally post 2000. • Underground power. • Footpaths to one side only, or no footpaths. • Road pavement widths and kerb treatments vary. • Avenue style planting generally with single species. • Reduced building setbacks and many without any canopy trees in the front gardens. 	• Develop clear guidelines for footpath/pedestrian access to both sides of the street for future infill development sites. • Review the minimum building set back in relation to provision of large canopy trees across the sites to achieve adequate shade and greening in the longer term. • Review the presence of canopy trees in the back gardens of this style of development to achieve improved canopy cover across the precinct.
Urban	Medium to high-density urban development that is located primarily in activity and neighbourhood centres and in other location such as the Monash Employment Precinct 	• Ensure that future design applications for these areas provide space to plant large canopy trees. • Include consideration of both tall Eucalypt style and broad spreading deciduous and evergreen trees, subject to aspect and space. • Review minimum building set backs in order to provide adequate space to accommodate large canopy trees.

Table 3-3 Commercial/industrial landscape character types

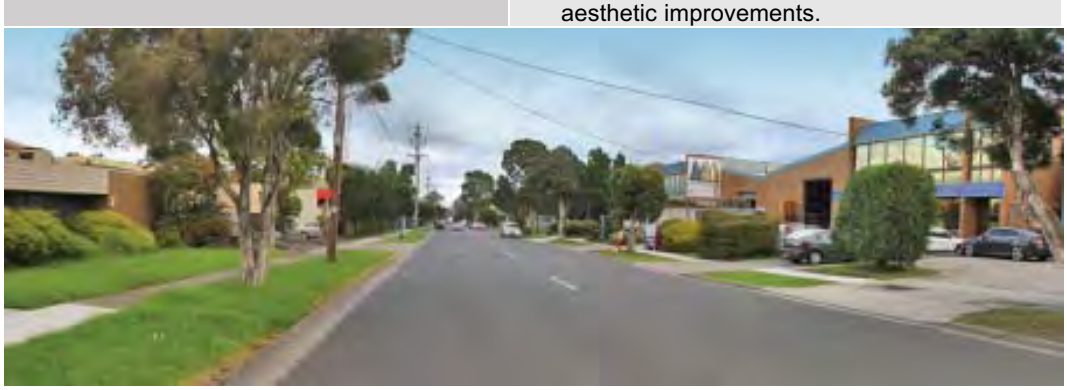
Distinctive features	Opportunities for future change
Urban industrial landscape character	
• Small scale industrial use, predominantly single storey. • No building setback. • Minimal or no nature strip present. • Minimal or no street trees.	• Potential to greatly improve the landscape character and environmental sustainability through planting street trees in the road pavement cut-outs with WSUD.
	
Suburban commercial/industrial landscape character	
• Medium scale industrial use, predominantly single and 2-- storey. • Varied building setbacks between 0 and 20m. • Hardscape treatments to the property frontage including car parking and driveways. • Some fenced interface treatments. • Nature strip present with street trees.	• Potential to improve the landscape character and environmental sustainability through increased density of street tree planting, either in existing nature strips or in the road pavement cut-outs with WSUD. Road pavement cut-outs will allow for tree canopies to form where they are not directly under the powerlines. • Encouraged increased building setbacks when the sites redevelop. • Additional trees for shade to be planted in the landscape setback and through the car parking areas. This includes car parking to the rear of the building to provide better distribution of shade across the site and provide a tree canopy framework/setting for the built form. This will achieve improved health and wellbeing outcomes as well as aesthetic improvements.
	

Table 3-3 Commercial/industrial landscape character types *continued....*

Distinctive features	Opportunities for future change
Garden commercial/industrial landscape character	
• Large scale commercial/industrial use, predominantly 2 to 3 storey buildings. • Up to 20 metre building setback. • Landscaped settings with established overstorey trees, well maintained garden beds and grassed areas. • Some scattered mixed species and some avenue plantings. • Predominantly native landscape character with large Eucalypts.	• Potential to improve the landscape character and environmental sustainability through planting additional large canopy trees in the streets and private land. • Potential to introduce additional canopy shade trees to shade internal and external car parks to assist mitigate urban heat build up and improve the amenity values for workers and people living nearby. • Consider inclusion of deciduous trees where they will provide winter sunlight access and summer shade to outdoor spaces that are used by workers.

3.3 Landscape character precincts

A detailed site assessment has been undertaken to document the existing landscape character in the City of Monash. The assessment has been undertaken consistent the urban character sub-precincts from the Monash Urban Character Study 1997. The precincts in the urban character study varied in size and were not related to the suburb/place names. For ease of reference, this Strategy describes the landscape character types by aggregated precincts that are defined either by major roads or major changes in landscape and urban character. The precincts adopt the dominant suburb name for individual precincts names as shown in Figure 3E.

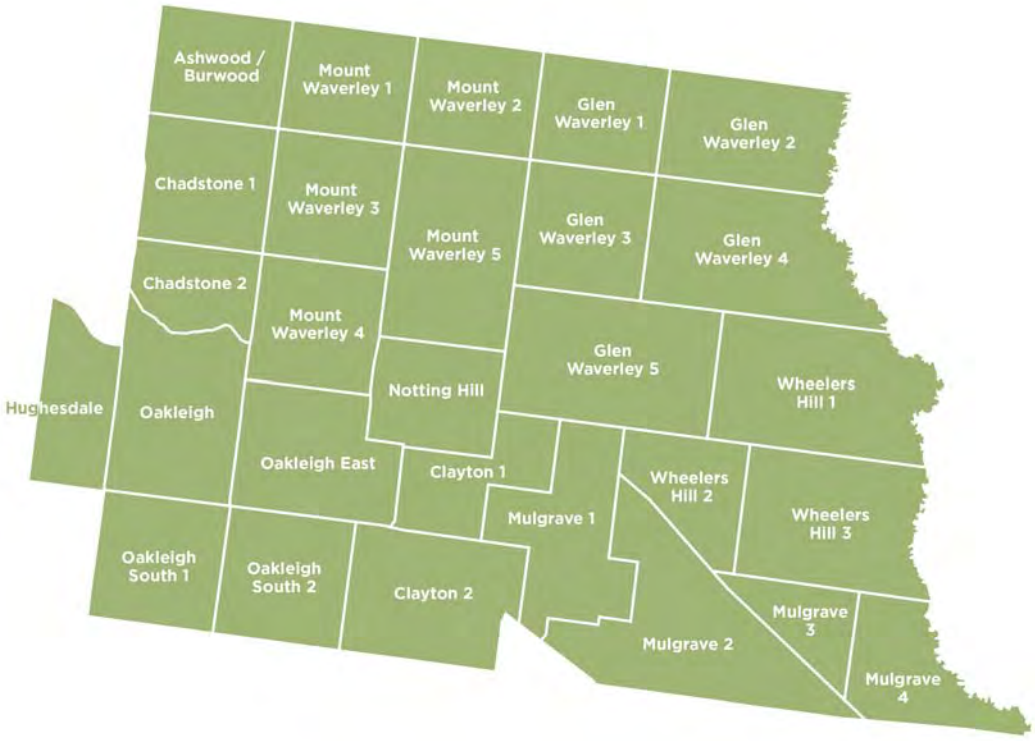
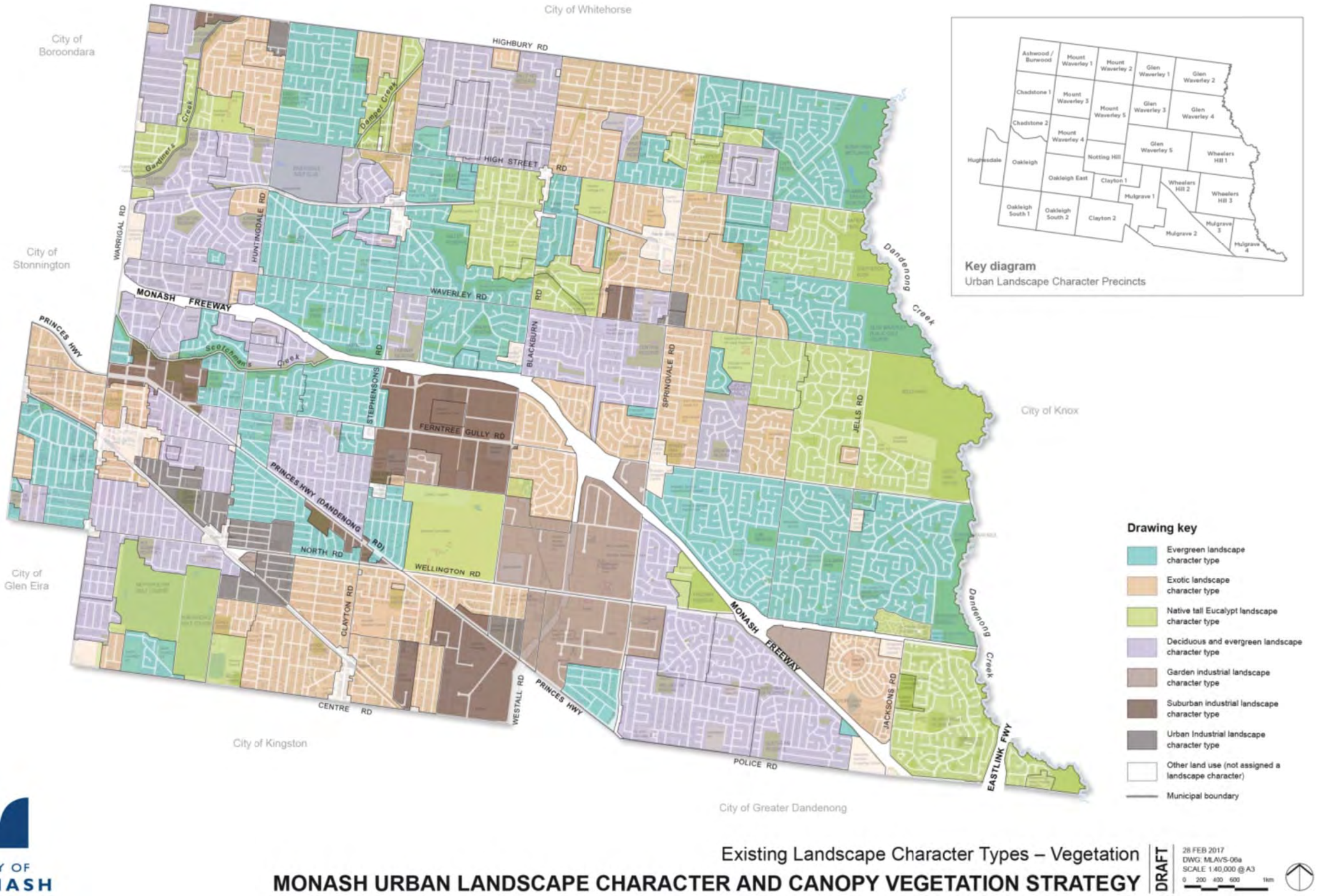


Figure 3E *Landscape Character Precincts*

The site assessment work has considered all the elements of the landscape character as described in Tables 3-1, 3-2 and 3-3, and applied these to develop landscape character types across the municipality. They are divided into two main land use types, being residential and the commercial/industrial land use.

The landscape character type descriptions draw first from the topography, followed by the natural features, built character and vegetation.

The spatial distribution of the existing landscape character areas are shown on Figure 3F on the following page, and the detailed character descriptions which are on A3 sheets form Appendix A to this Strategy.



THOMPSON BERRILL LANDSCAPE DESIGN in association with Environment & Land Management | Arboriculture Pty Ltd.

CITY OF MONASH

Existing Landscape Character Types – Vegetation

MONASH URBAN LANDSCAPE CHARACTER AND CANOPY VEGETATION STRATEGY

DRAFT

28 FEB 2017
DWG: MLAVS-06a
SCALE 1:40,000 @ A3
0 200 400 600 1km

Figure 3F *Existing landscape character types - vegetation*

4. Existing canopy vegetation cover

4.1 Overview

There has been a loss in tree canopy cover between 1992 and 2015, declining from 26 to 22 per cent cover.

This project has measured the canopy vegetation cover for the City of Monash in 2015 and in 1992 (which represents the approximate time the Vegetation Protection Overlay was introduced into the Monash Planning Scheme). The canopy vegetation is made up of trees and then smaller shrubs and ground layer vegetation. The tree canopy cover has been measured in two ways:

- The percentage of tree canopy cover.
- Spatial mapping of the tree canopy cover.

Percentage tree canopy cover

The project has used the industry recognised i-Tree Canopy free-use software. This was selected so that the results can be benchmarked against adjoining municipalities and the international examples. Refer to Appendix A for further information about this method. The i-Tree Canopy software also measures other types of surfaces and features that make up the city. This project measured the 'greenness' of the city along with the tree canopy cover.

Spatial mapping of tree canopy cover

The spatial mapping is based on the 2015 and 1992 aerial photographs. By mapping the tree canopy cover only over the two time periods, it allows a visual comparison of where changes to the canopy cover have occurred.

4.2 Tree canopy cover in the City of Monash

The 2015 tree canopy cover in the City of Monash has been measured at 22 per cent. This is 4 per cent lower than the tree canopy cover in 1992, which is measured at 26 per cent.

In order to identify where the changes have occurred in tree canopy cover between 1992 and 2015, this project spatially mapped the tree canopy cover on a municipal wide basis. The results of this mapping are shown in Figures 4a and 4b.

As a result of the canopy vegetation cover mapping for this project the following key changes have occurred over the past approximately 23 years in the City of Monash:

- There has been an increase in tree canopy cover on public land along the waterway corridors and in public open space. For example, Figure 4B shows a clear increase in tree canopy cover along the Gardiners Creek open space corridor, Dampier Creek open space corridor, Scotchmans Creek open space corridor, Valley Reserve and the Dandenong Creek floodplain when compared to the same areas in Figure 4A.
- A loss of tree canopy cover on private land and in the streetscapes particularly west of Blackburn and Clayton Roads. This includes through the suburbs of Oakleigh, Oakleigh East, Chadstone and Mount Waverley.
- An increase in tree canopy cover in the south eastern areas of the municipality including in parts of Wheelers Hill (south of Wellington Road and east of Monash Freeway) and Mulgrave. This is mainly due to the completion of urban development during this period on former agricultural land and the subsequent planting of trees on private land, in public open space and in the streetscapes.
- In relation to the loss of tree canopy cover within and outside the Vegetation Protection Overlay (VPO) Figures 4A and 4B illustrates:
  - Tree canopy cover loss has occurred inside the VPO in the western and northern parts of the municipality at a similar rate to the areas without the VPO.
  - There has been an increase in tree canopy cover in the south eastern area of the municipality within the VPO at a similar rate to similar areas outside the VPO.

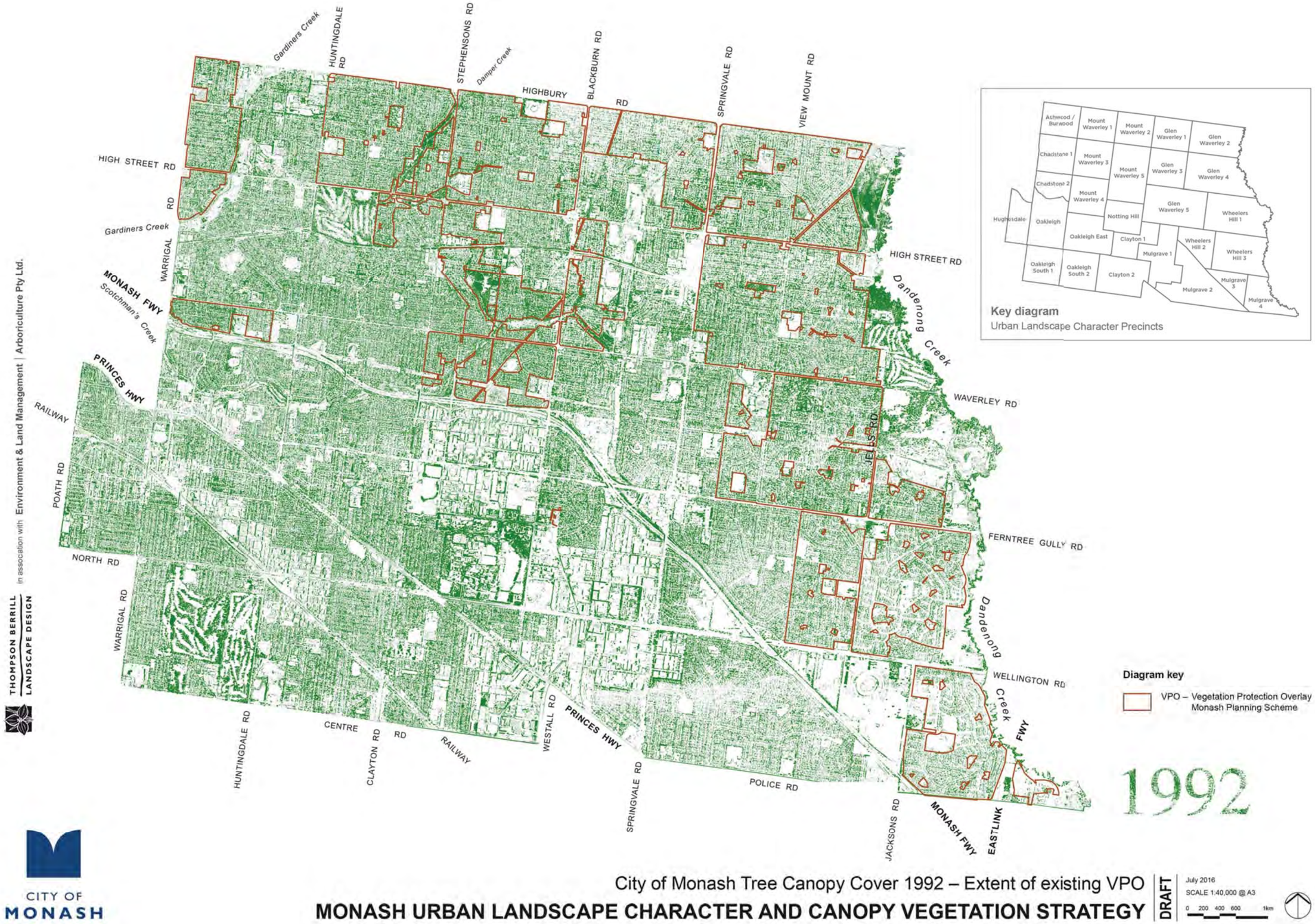


Figure 4A *City of Monash Tree Canopy Cover 1992 – Extent of existing VPO*

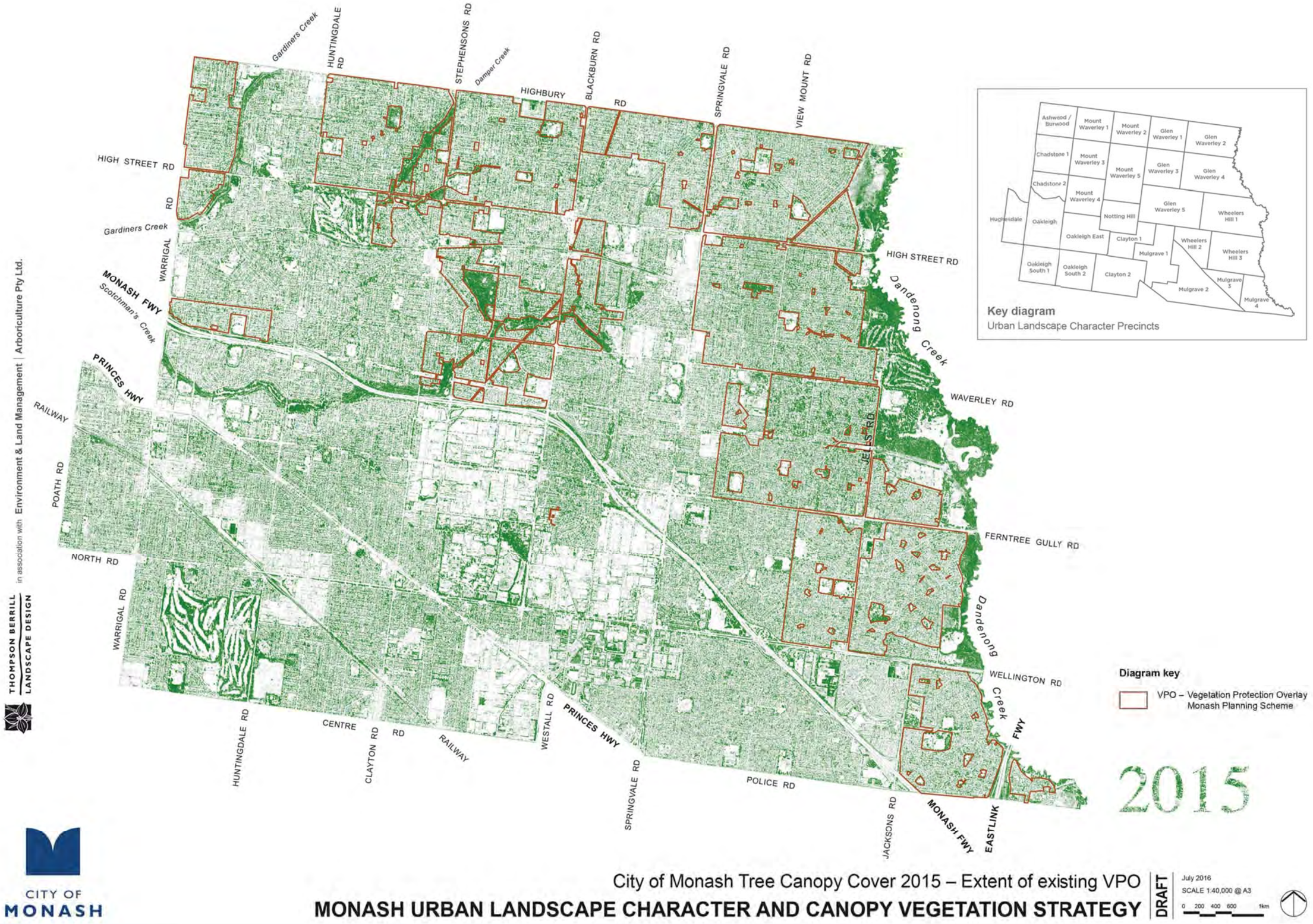


Figure 4B *City of Monash Tree Canopy Cover 2015 – Extent of existing VPO*

4.3 Measuring 'greenness'

The i-Tree software measures the percentage coverage of other types of surfaces including differentiating between green areas and built or paved surfaces.
For this project the greenness has been measured on a municipal wide basis, with a comparison between 1992 and 2015. Six of the landscape precincts have also been measured to identify the changes to greenness across different land use types in the city.

4.3.1 Municipal wide greenness

Built form including hard paved surfaces comprise 52% of the total municipal area, while unsealed surfaces (including grass, gravel, garden beds and water) comprise 48% of the remaining area. There has been an increase of 10% of built form including hard paved surfaces coverage when compared with the 1992 aerial as shown in Table 4-1.

Table 4-1 Comparison of tree canopy cover between 1992 and 2015

Features	Monash 1992	Monash 2015	Difference 1992/2015
Trees	26%	22%	**-4%**
Grass, garden bed & unsealed	33%	25%	**-8%**
Water	1%	1%	**Same**
Roofs	20%	25%	**+5%**
Concrete	9%	15%	**+6%**
Asphalt	11%	12%	**+1%**

Please note, that using the 1,000 point accuracy that is available in i-Tree, there is a statistical error in the results in the order of 2.0 per cent.

Table 4-1 confirms that the overall the City of Monash has lost tree canopy cover and has also experienced a reduction in the grass, garden bed and unsealed surfaces. During the same period, the City of has experienced an increase in hard surfaces mainly associated with an increase in roof and concrete surfaces.

Based on the preliminary assessment of the dwelling and population forecasts current planning indicates that by 2036 there will be more people living and working in Monash. The additional population is forecast to create a demand for 14% more dwellings over and above the current levels. This is slightly smaller than the 22% proportional increase in dwellings experienced over the past 20 years in Monash. Based on this forecast, if there is no proactive strategy to protect green space and canopy trees, both will continue to decline, affecting a range of issues including:

- Community health and wellbeing in relation to human comfort and aesthetic values.
- Biodiversity values through the loss of canopy trees and natural features and areas.
- Increase in urban heat island effect through a reduction in canopy trees and reduction in moisture absorbing surfaces.
- Environmental implications of greater reliance on heating and cooling.

Therefore, in order for the City of Monash to retain its Garden City identity and liveability, the Strategy focuses the recommendations on protecting the existing trees, encouraging planting of additional canopy trees and increasing the presence of permeable natural grass and garden bed surfaces.

4.3.2 Changes in canopy cover in representative individual precincts

Chadstone 1

Chadstone 1 precinct is representative of similar characteristics in two other precincts being Ashwood/Burwood and Chadstone 2. This precinct type currently contains more greenness than the municipal wide average. The key distinguishing characteristics include:

- Predominantly residential land use combined with a waterway corridor.
- Post WWII development (1945 to 1965)
- Public open space along the waterway along with other distributed open space.
- Compared with the 2015 Municipal wide results, this precinct has **3% more** tree canopy cover and **4% less** built form/paved surfaces.

Table 4-2
Comparison of tree canopy cover between 1992 and 2016 in Chadstone 1

Features	Chadstone 1 1992	Chadstone 1 2016	Difference 1992/2016
Trees	22%	25%	**+ 3%**
Grass & garden bed	36%	25%	**- 11%**
Unsealed	3%	2%	**- 1%**
Water	0%	0%	**Same**
Roofs	18%	24%	**+ 6%**
Concrete	10%	14%	**+ 4%**
Asphalt	11%	10%	**- 1%**

Compared to the 1992 data, there is a 3% increase in tree canopy cover, an 11% decrease in grass/garden bed cover, a 4% increase in concrete surfaces and 6% increase in the roof surface cover. The reason for an increase in canopy cover in this precinct is due to the increase in trees along Gardiners Creek open space corridor and in Electra Reserve and Jordan Reserve. The tree canopy mapping identifies there has been a loss of tree canopy across the urban areas outside of open space during this period.

While the tree canopy cover has increased, the overall decline in garden bed and grass and increase in roof and concrete surfaces areas has changed the landscape character. This correlates with the site assessment work in this precinct where there has been an increase in unit developments and larger single dwellings with a higher proportion of paved surfaces within the front set back, particularly larger driveways and correspondingly a decline in the green and natural character.

Glen Waverley 3

Glen Waverley 3 precinct is representative of similar characteristics in six other precincts being Clayton 1, Mulgrave 2 and Glen Waverley 1 to 4 (excluding the Dandenong Creek open space corridor). This precinct type currently contains less greenness than the municipal wide average. The key distinguishing characteristics include:

- Diversity of land use types including residential, small scale industrial, retail, mixed use, education and open space.
- Post WWII development (1945 to 1965)
- Compared with the 2015 Municipal wide results, this precinct has **3% less** tree canopy cover and **5% more** built form/paved surfaces.

Table 4-3
Comparison of tree canopy cover between 1992 and 2016 in Glen Waverley 3

Features	Glen Waverley 3 1992	Glen Waverley 3 2016	Difference 1992/2016
Trees	22%	19%	**- 3%**
Grass & garden bed	23%	18%	**- 5%**
Unsealed	4%	5%	**+ 1%**
Water	1%	1%	**Same**
Roofs	26%	31%	**+ 5%**
Concrete	10%	12%	**+ 2%**
Asphalt	14%	14%	**Same**

Compared to the 1992 data, there is a 3% decrease in tree cover, a 5% decrease in grass/garden bed cover, a 2% increase in concrete surfaces and 5% increase in the roof surface cover. This indicates there has been an increase in built form along with some increase in paved surfaces, and a corresponding decrease in grass and garden beds. The tree canopy mapping comparison reveals that there has been some increase in tree canopy cover along Scotchmans Creek and in Bogong Reserve and reduced canopy cover in the urban areas.

This precinct includes the Glen Waverley Activity Centre, and these comparative results indicate that without proactive change, there will continue to be a decline in tree canopy and grass/garden bed areas. This Strategy recommends including planting new canopy trees and also grass and garden bed areas as a priority in future design guidelines for the activity centres and precincts where increased residential densities are encouraged.

Hughesdale

Hughesdale precinct is representative of similar characteristics in five other precincts being Glen Waverley 5, Oakleigh, Oakleigh East, Oakleigh South 1 and 2 (excluding the Golf Courses). This precinct type currently contains less greenness than the municipal wide average. The key distinguishing characteristics include:

- Predominantly residential land use with a minor component of education and open space.
- Pre WWI and interwar grid subdivision development pattern.
- Compared with the 2015 Municipal wide results, this precinct has **3% less** tree canopy cover and **7% more** built form/paved surfaces.

Table 4-4
Comparison of Tree Canopy Cover between 1992 and 2016 in Hughesdale

Features	Hughesdale 1992	Hughesdale 2016	Difference 1992/2016
Trees	22%	19%	**- 3%**
Grass & garden bed	21%	18%	**- 3%**
Unsealed	3%	3%	**Same**
Water	0%	0%	**Same**
Roofs	33%	34%	**+ 1%**
Concrete	12%	15%	**+ 3%**
Asphalt	9%	10%	**+ 1%**

Compared to the 1992 data, there is a 3% decrease in tree cover, a 3% decrease in grass/garden bed cover, a 3% increase in concrete surfaces, a 1% increase in asphalt and 1% increase in the roof surface cover. The results indicate that the key change has been the increase in paved surfaces in place of grass, garden beds and trees over the 23 year period. The comparison between the canopy tree mapping reveals an overall loss of canopy tree cover from the urban residential areas and an increase in canopy tree cover in Galbally Reserve.

The results correlate with the site assessment work in this precinct where there has been an increase in unit developments and larger single dwellings with a higher proportion of paved surfaces within the front set back, particularly the larger driveways. Introducing effective landscape guidelines that support the retention of and increase in canopy trees within the established urban areas will be addressed by the Strategy.

Mount Waverley 1

Mount Waverley 1 precinct is representative of similar characteristics for the remainder of Mount Waverley precincts 2 to 5. This precinct type currently contains slightly more greenness than the municipal wide average. The key distinguishing characteristics include:

- Predominantly residential land use located with in the Vegetation Protection Overlay.
- Post WWII development (1945 to 1965).
- Includes waterway corridors.
- Compared with the 2015 Municipal wide results, this precinct has **2% more** tree canopy cover and **2% less** built form/paved surfaces.

Table 4-5
Comparison of tree canopy cover between 1992 and 2016 in Mount Waverley 1

Features	Mount Waverley 1 1992	Mount Waverley 1 2016	Difference 1992/2016
Trees	34%	24%	**- 10%**
Grass & garden bed	20%	24%	**+ 4%**
Unsealed	1%	2%	**+ 1%**
Water	0%	0%	**Same**
Roofs	28%	31%	**+ 3%**
Concrete	8%	9%	**+ 1%**
Asphalt	9%	10%	**+ 1%**

Compared to the 1992 data, there is a 10% decrease in tree cover, a 4% increase in grass/garden bed cover, a 1% increase in both asphalt and concrete, and a 3% increase in the roof surface cover. The significant change in this precinct is the 10% decrease in tree canopy cover, which is the largest of all the precincts. This is of particular concern given that this precinct is entirely located within a VPO. The canopy tree mapping reveals that there is a substantial increase in canopy tree cover along the Gardiners Creek Corridor along with other open space reserves in the precinct. Correspondingly there has been in a decrease in canopy cover across the established urban areas.

The results for this precinct correlate with the site assessment work in this precinct where there has been an increase in unit developments and larger single dwellings with a higher proportion of paved surfaces within the front set back, particularly the larger driveways. Introducing effective landscape guidelines that support the retention of and increase in canopy trees within the established urban areas will be addressed by the Strategy.

Notting Hill

Notting Hill precinct is representative of similar characteristics of Clayton 2 and Mulgrave 1. This precinct type currently contains significantly less greenness than the municipal wide average. The key distinguishing characteristics include:

- Predominantly contemporary commercial/industrial land use with small pockets of Post WWII residential use.
- Compared with the 2015 Municipal wide results, this precinct has **11% less** tree canopy cover and **19% more** built form/paved surfaces.

Table 4-6

Comparison of tree canopy cover between 1992 and 2016 in Notting Hill

Features	Notting Hill 1992	Notting Hill 2016	Difference 1992/2016
Trees	10%	11%	**+1**
Grass & garden bed	18%	12%	**-6**
Unsealed	8%	8%	**Same**
Water	0%	0%	**Same**
Roofs	30%	31%	**+1**
Concrete	14%	15%	**+1**
Asphalt	19%	26%	**+ 7%**

There has been a 6% decrease in garden bed and grassed areas and a 7% increase in asphalt between 1992 and 2016 in this precinct. Other minor changes is a slight increase in roofs and concrete surfaces and also a minor increase in tree canopy cover. The overall increase asphalt and decrease in grass is largely due to redevelopment of commercial/industrial sites within this precinct, including the expansion of sealed car parks and hardstand areas.

While the results indicate there was no decline in the tree canopy cover, there is potential to increase the tree canopy cover and green areas in these precincts to improve community health and wellbeing objectives. Opportunities to achieve this will be identified in both the public and private realm. This may include education programs and raising the awareness of improved liveability outcomes through incentives and partnerships with the larger commercial/industrial estates, in addition to improvements to the landscape guidelines in the planning controls.

Wheelers Hill 3

Wheelers Hill 3 precinct is representative of similar characteristics for Mulgrave 4 and Wheelers Hill 1 (excluding the Dandenong Creek Corridor). This precinct type currently contains slightly more greenness than the municipal wide average. The key distinguishing characteristics include:

- Predominantly residential land use located with in the Vegetation Protection Overlay.
- Post WWII development (1945 to 1965).
- Includes waterway corridors.
- Compared with the 2015 Municipal wide results, this precinct **has the same** tree canopy cover and **2% less** built form/paved surfaces.

Table 4-7

Comparison of tree canopy cover between 1992 and 2016 in Wheelers Hill 3

Features	Wheelers Hill 3 1992	Wheelers Hill 3 2016	Difference 1992/2016
Trees	19%	22%	**+ 3%**
Grass & garden bed	38%	27%	**- 11%**
Unsealed	1%	2%	**+ 1%**
Water	0%	1%	**+ 1%**
Roofs	22%	26%	**+ 4%**
Concrete	12%	14%	**+ 2%**
Asphalt	8%	10%	**+ 2%**

Compared to the 1992 data, there is a 3% increase in tree cover, an 11% decrease in grass/garden bed cover, a 2% increase in both asphalt and concrete, and a 4% increase in the roof surface cover. This is the only precinct where this is a change of the percentage of water and there is a substantial decrease in the grass and garden bed area. In 1992 this precinct was still being developed so there were a number of lots that had not been built on in 1992. This accounts for the substantial decrease in the grass and garden bed area. The increase in tree cover has come from both tree canopy growth and additional tree planting as can be seen on the tree canopy mapping.

This precinct is entirely within a VPO, however the comparative tree canopy cover indicates that there has been tree canopy loss in this precinct as part of both unit development and single dwelling redevelopments. The overall increase in canopy cover is mainly due to a combination of tree growth and some additional tree planting in open space.

4.4 Benchmarking

4.4.1 Comparison of the City of Monash to adjoining LGAs

The following results are extracted from the *Benchmarking Australia's Urban Tree Canopy Report* (May 2014). This report used the i-Tree Canopy free-use software tool, using the 1000-point random sample method used to classify the landscape features within 139 Local Government Areas (LGA) throughout Australia based on 2013 aerial photographs. This study was prepared as part of the 202020 Vision project funded by Horticulture Australia Limited.

Below is an extract from that report of the LGAs that directly adjoin Monash for benchmarking purposes and these are listed in the table below in alphabetical order below Monash.

Please note that the i-Tree Canopy tree cover results in the 2014 report differ from the i-Tree Canopy tree cover results undertaken as part of the MULCVS project. The 2014 report separated shrubs from trees, whereas the i-Tree analysis undertaken for the MULCVS quantified garden beds and grass as these are more easily distinguished than shrubs and small trees which likely accounts for the difference. If we add 50% of the shrubs to trees, the results are similar. Given the discrepancy, we have used the 2014 results below for Monash so that it compares like with like.

Table 4-8 Benchmarking of tree canopy cover in Monash with adjoining LGAs

Local Government Area	Tree %	Shrub %	Grass* %	Hard%
Monash	**19.4**	**6.3**	**25.0**	**49.3**
Boroondara	28.1	8.0	15.5	48.4
Stonnington	25.0	6.8	11.0	57.2
Knox	24.2	6.2	33.1	36.5
Whitehorse	22.9	7.5	21.9	47.8
Glen Eira	20.0	6.5	15.0	58.5
Kingston	14.2	4.6	35.6	45.6
Greater Dandenong	8.2	2.6	49.8	39.4

Tree canopy cover

Of all the adjoining LGAs, the City of Boroondara has the highest percentage of canopy tree cover, followed by the City of Stonnington and City of Knox. City of Greater Dandenong has the lowest, which may in part be due to presence of agricultural land and large commercial/industrial precincts. The other factors measured in the i-Tree Canopy analysis are indicators of different land use types and relative urban densities present within each of the LGA's. It is therefore more useful to benchmark the City of Monash with. Refer to Figure 4C, which graphically illustrates the proportion of hard surfaces compared with permeable surfaces.

Greenness

In considering the proportion of hard and permeable surfaces, the City of Monash is most similar to the Cities of Boroondara and Whitehorse. Both the Cites of Stonnington and Glen Eira have a higher proportion of hard surfaces when compared with the City of Monash, while the Cities of Kingston, Greater Dandenong and Knox have higher proportions of permeable surfaces.

The major land use types across the Cities of Monash, Boroondara and Whitehorse are similar. They are predominantly residential with a range of activity centres, commercial/industrial precincts, education precincts and public open space. Detached dwellings make up the dominant dwelling type with smaller precincts of medium to high density urban development.

At 19 per cent, the City of Monash has the lowest proportion of tree canopy cover compared with 28 per cent for the City of Boroondara and 23 per cent of tree canopy cover in the City of Whitehorse. Overall these three municipalities have similar topography, rainfall, geology and original vegetation types. In viewing the aerial photos of all three municipalities, the key difference is more extensive commercial/industrial and non-residential land use areas in both Monash and Whitehorse which lack canopy cover.

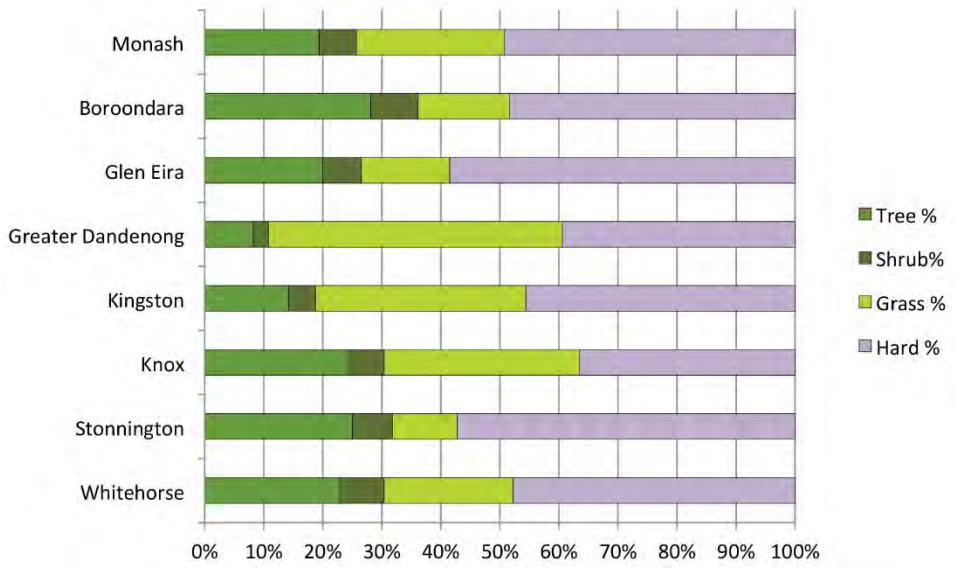


Figure 4C *Benchmarking of greenness in Monash with adjoining LGAs*

Implications for this Strategy

- There is an opportunity for Monash to increase tree canopy cover given that more than 30 per cent of the total municipal area currently comprises grass/bare ground or garden beds.
- There are similarities between overall land use types, topography, rainfall, geology and original vegetation types between Boroondara, Whitehorse and Monash and these two municipalities provide a useful comparison for tree canopy cover.
- Planting additional trees on the non-residential land will be an important factor in the future redevelopment of the Monash National Employment and Innovation Cluster. Increasing tree canopy cover in this cluster will have many benefits in relation to liveability and environmental values.

4.4.2 National Benchmarking

City of Melbourne

The City of Melbourne Urban Forest Strategy (2012), sets a target of 40% canopy cover by 2040, increasing from 22% at present. The Strategy notes that a recent study on urban heat island effect in Melbourne recommends that one of the most cost efficient and effective mitigation strategies is to ensure a minimum canopy cover of 30% with a leaf area index (a measure of shade density) of 5.3 within the municipality.

City of Sydney

The City of Sydney Urban Forest Strategy (2013) has differentiated the percentage canopy cover goals across three different land use types including:

- Central Business District and Industrial Areas – 15%
- Urban Residential and Light Commercial Areas – 25%
- Suburban Residential – 50%

Combined, the target canopy cover for the City of Sydney is 22.3%, raising it from the existing average 15.5% cover by 2030.

Implications for this Strategy

The Cities of Sydney and Melbourne aim to increase tree canopy cover within the context of forecast future population growth and development and increasing urban densities. The historical pattern of mature canopy trees being removed in the City of Monash as site coverage and urban densities needs to be reversed so that tree canopy cover increases as urban development continues.

4.4.3 International Benchmarking

Based on the research undertaken for this Strategy there is currently no international standard for setting benchmarks for tree canopy cover. The United States Department of Forestry is well respected in the industry regarding this subject matter. This Department sets target canopy cover by a combination of assessing the existing tree canopy cover, the potential tree canopy cover and then making an assessment of how much of the Potential Tree Canopy Cover area is feasible to plant. Some of the target tree canopy cover provided for cities in the United States is:

Los Angeles

- Existing average Tree Canopy Cover of 25%
- Target Canopy Cover for suburban areas is 35%
- Target Canopy Cover for urban residential is 18%
- Target Canopy Cover for commercial land use is 9%

New York City

- Existing Tree Canopy Cover of 23%
- Target Canopy Cover of 30%

Baltimore

- Existing Tree Canopy Cover of 20%
- Target Canopy Cover of 46%

Implications for this Strategy

The United States and Canada have been managing trees in urban environments for hundreds of years. They have undertaken extensive studies and research into the benefits of canopy trees to community health and wellbeing, and have a range of urban forest strategies that support increasing tree canopy cover in their cities. While the make up of each of these cities will be different from Monash, the key message to take from this is that they are all aiming for target increases in tree canopy cover within an urban environment.

5. Issues and strategy response

5.1 Canopy vegetation cover on private land and its influence on landscape character

5.1.1 Overview

The research undertaken for this Strategy to date has identified there has been a 4 per cent loss of canopy trees cover since 1992 and an incremental loss of overall canopy vegetation and greenness in the city. The loss has primarily occurred on private land, while in many cases there has been an increase in canopy tree cover on public land, particularly in public open space. Tree canopy cover loss is also occurring on land reserved for education purposes including public and private schools. This is due to a combination of the expansion of school buildings and facilities, and the sale of former school sites in response to increased urban densities and changing demographics.

The loss of all types of vegetation on private land impacts on the landscape character of the precincts. The loss of the vegetation, including small and large canopy trees, shrubs and green grass has in some precincts changed the greenness and *Garden City Character* referred to in the Municipal Strategic Statement to a more built and urban character. This is most evident where there is a lack of avenue style street tree planting or where the street trees are too small for the scale of the street. In these locations there is a greater reliance on private landscaping and gardens to generate the precinct landscape character. A key issue is the decrease in green and natural surfaces and an increase in urban built form which reduces the opportunities for achieving greening particularly for additional large canopy trees.

5.1.2 Issues and strategy response

Residential land

Incremental loss of canopy vegetation, permeable surfaces and the green and leafy garden character on private land. Detached dwellings are being replaced with unit developments and single dwellings that have a larger building footprint. The original suburban character, where the dwellings are clearly separated from each other by vegetation including trees, significantly contributes to the *Garden City Character*. The increasing coverage of lots with built form and paved surfaces erodes the *Garden City Character*. This is demonstrated in the following figures.

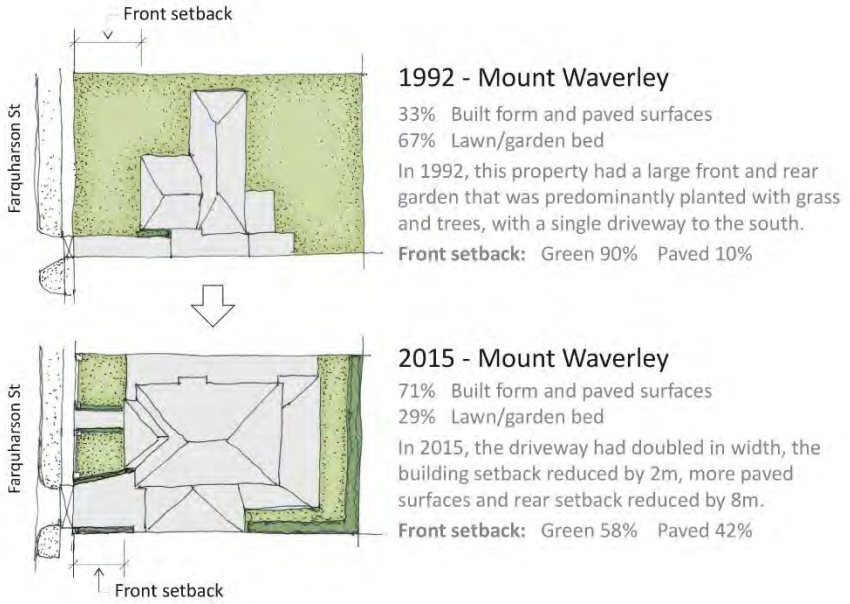


Figure 5A *Example of the change to single dwelling site coverage from 1992 to 2015*

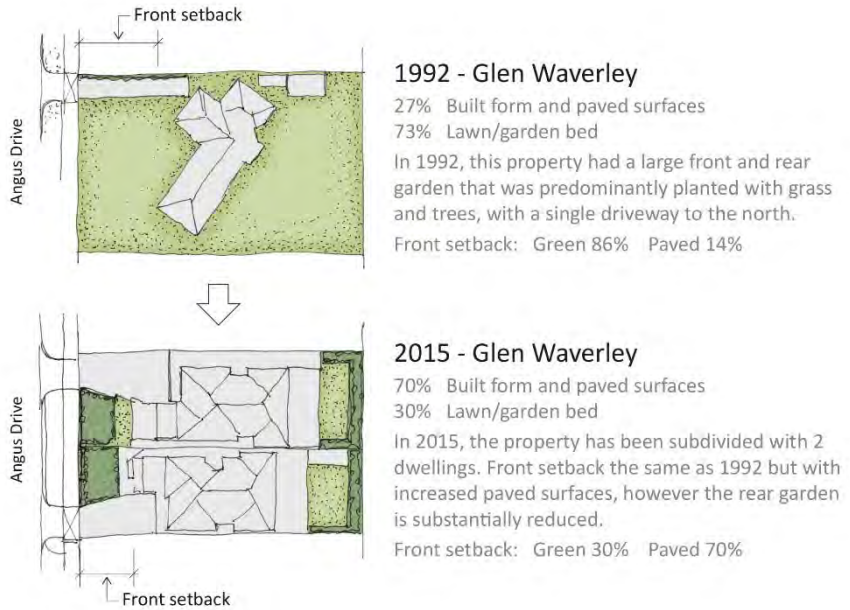
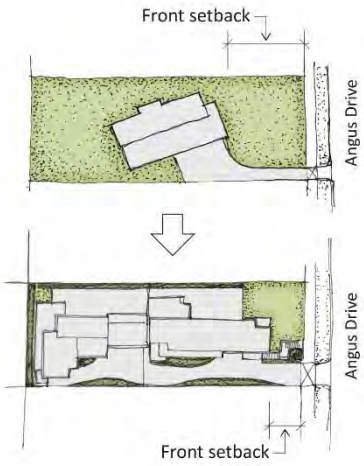


Figure 5B *Example of the change to 2 lot subdivision site coverage from 1992 to 2015*



1992 - Glen Waverley

27% Built form and paved surfaces
73% Lawn/garden bed

In 1992, this property had a large front and rear garden that was predominantly planted with grass and trees, with a single driveway to the south.

Front setback: Green 80% Paved 20%

2015 - Glen Waverley

70% Built form and paved surfaces
30% Lawn/garden bed

In 2015, the property has been subdivided with 2 dwellings. Front setback contains garden and grass with mature tree which provides some urban greenness.

Front setback: Green 66% Paved 34%

Figure 5C *Example of the change to 2 lot subdivision site coverage from 1992 to 2015*

Table 5-1 Issues and strategy response for residential land

Issue	Strategy response
a) The loss of large canopy trees from private land as part of the redevelopment process for units and larger houses. This has decreased the overall tree canopy cover and distributed shading through the suburbs, which is an important factor in mitigating urban heat island effect. Research reviewed as part of this study indicates that large canopy trees are more effective at improving air quality, shade, evapotranspiration, carbon sequestration and habitat provision than smaller trees. Based on the substantial benefits there is a need to promote the retention of large canopy trees particularly as part of creating a more resilient environment in the context of climate change	• Develop suitable guidelines that prioritise retention of existing mature canopy trees on private land over removal. Where some removal is required, prioritise the retention of large, long-lived canopy trees. Refer to Guideline 4, in Section 6.5. • Investigate the potential to prepare a Significant Tree Study for the City of Monash. Refer to Recommendation 7.4.8. • Increase the presence of large canopy trees on private land by developing design guidelines and planning controls that differentiate and emphasise the need to retain large canopy trees and also plant new large canopy trees where feasible. Within the MULCVS, this would include the key performance criteria and suggested potential species palette's suitable in each of the preferred landscape character types. Refer to Guidelines in Section 6. • Protect and retain mature medium and small canopy trees on private land. Refer to Guideline 4 in Section 6.5. • Proposed new canopy vegetation in medium and high density areas is to include large canopy trees to soften and address the scale of the built form, recognising that any building over 16 metres in height is unlikely to have emergent canopy trees above the roofline. Refer to Guidelines in Section 6.3.2.
b) Reduction in permeable surfaces including grassed areas and garden beds. This corresponds in many precincts with an increase in built and paved surfaces. The presence of permeable surfaces that retain	• Develop and update guidelines that maximise the establishment of natural permeable surfaces on private land. This includes promoting the inclusion of garden bed and lawn areas in preference to large undifferentiated paved surfaces. Where natural permeable surfaces are not feasible, encourage canopy shade trees of proposed hard paved

Issue	Strategy response
moisture improves evapotranspiration, which is essential for localised cooling of our neighbourhoods during summer. Reducing the permeable surfaces impacts on the microclimate and liveability of our neighbourhoods.	surfaces to promote the *Garden City Character*. Maximising these will improve the liveability, community health and wellbeing and resilience to climate change. Refer to Guidelines in Section 6.2.
c) The comparative loss of canopy vegetation and greenness within and outside the existing VPO areas between 1992 and 2016, demonstrates that the VPO has not been effective at minimising canopy vegetation loss.	• Review the set of planning controls and consider the introduction of a Local Law to protect canopy trees across the municipality, rather than only within selected overlay areas. Refer to Recommendation 7.3. • Consider removal of the VPO and replacement with an overlay control that promotes planting of appropriate trees and vegetation. Refer to Recommendation 7.1.
d) The limited space in side set backs between the new buildings and side boundary fence and the increased proportion of the side boundary occupied by built form, reduces the opportunity to establish canopy vegetation around and between dwellings. In the original established suburban landscapes side setbacks varied with a smaller proportion of the side boundary occupied by built form. The result of the increased presence of built form along the side boundaries reduces the shading and amount of geenery between and around each dwelling, thereby impacting on this key attribute, i.e. that each dwelling is set in its own garden or landscape setting.	• Develop suitable guidelines that maximise the establishment of green infrastructure and features between dwellings. Preferably this would include space for trees with emergent canopies. As a minimum, design guidelines would require vertical green climbers and shading to boundary fencings and walls. Refer to Guidelines in Section 6.2. • Proposed new canopy vegetation is to be of a suitable size and height which emerges above the roofline of existing and proposed built form of up to 3 storey dwellings. Refer to Guidelines in Section 6.2.
e) While front garden setbacks are retained in many of the single dwelling redevelopments, the front gardens are changing to provide larger hardstand areas for vehicle access and turn around, and in some instances replacement with paved low maintenance courtyards.	• Develop suitable guidelines that maximise the establishment of green surfaces within the front setbacks. This includes promoting the inclusion of garden bed and lawn areas in preference to large paved surfaces. Where natural permeable surfaces are not feasible, encourage use of permeable pavements and canopy trees that shade paved surfaces to promote the *Garden City Character*. Refer to Guidelines in Section 6.2.
f) A key influence on the landscape character is the presence and type of fencing.	• The preferred landscape character types include a planted or low fence treatment so there is excellent integration and visual access between the public and private realm. Refer to Guidelines 1.6 in Section 6.2.
g) Another key influence is the position of the built form on the site. .	• The design guidelines in this Strategy will aim to achieve a minimum of 60 per cent planting/greening to the front setback, and some greening at least to

Issue	Strategy response
	the boundary fences to the side setbacks in order to maintain the garden setting as a core feature of all landscape character types. Refer to Guideline 1.5 in Section 6.2.
h) Incremental change over time has led to only small areas remaining of the original post WWII detached suburban garden style dwellings with the traditional gardens.	• Identify the best remaining examples of the garden suburban detached dwelling style and protect these with appropriate heritage controls to ensure that some examples of this style remain in the longer term. Refer to Recommendation 7.4.9.

Non-residential

Commercial/industrial

There are essentially three types of commercial/industrial land use on private land including:

- Urban commercial/industrial, characterised by the presence of none or very little vegetation on private land or in the streetscapes.
- Suburban commercial/industrial, characterised by narrow landscaped setbacks generally consistent with the required 7.6 metres.
- Garden commercial/industrial, characterised by large landscaped setbacks greater than 7.6 metres and up to 20 metres in width.

Table 5-2 Issues and strategy response for commercial/industrial land use

Issue	Strategy response
a) Urban commercial/industrial precincts have none or very few street trees on public land and no trees on private land. This does not support the health and wellbeing of the worker community, as it creates an uninviting outdoor environment for people to walk and exercise during breaks from work. For the City of Monash to continue to attract industry and business to the municipality, improvements to strengthen and reinforce the greenness and treed character will create a point of difference form the inner urban areas of Melbourne.	• Increase the presence of large canopy street trees and other greening where feasible in the existing urban commercial/industrial precincts. There is an opportunity to incorporate water sensitive urban design into the future street tree planting. • Develop preferred setback landscape guidelines, including promoting greening and moisture absorbing surfaces in these areas for amenity and human comfort, including mitigating urban heat. • Refer to Guidelines in Section 6.3.3.
b) Suburban commercial/industrial precincts have a prevalence of sealed car parking and vehicle turning space within the narrow front setbacks between built form and streetscape.	• Develop landscape guidelines for the minimum 7.6 metre setbacks, including promoting greening and moisture absorbing surfaces in these areas for amenity and human comfort, including mitigating urban heat. • Reduce visible and exposed hardstand areas on private land and increase greening, particularly to the perimeter of the sites adjoining the streetscapes

Issue	Strategy response
	to promote and support the *Garden City Character*. This includes planting canopy trees to shade exposed hardstand areas where feasible. Refer to Guidelines in Section 6.3.2.
c) In the Garden commercial/ industrial precincts the large landscaped setbacks have a focus on visual amenity and are uninviting for the employment community to use them during breaks from work. Forecast growth and change in the Garden commercial/industrial precincts will require proactive guidelines to protect and encourage large canopy trees and associated landscaping on private land to provide suitable shading and canopy vegetation	• Develop guidelines that promote the activation and use of these large landscaped setbacks as the Garden commercial/industrial precincts redevelop in the future. This includes protecting and planting large canopy trees for shade and encouraging an activated frontage with commercial use on the ground floor adjoining the landscape setbacks. Refer to Guidelines in Section 6.3.1

Retail

Retail land use is distributed through the activity centres and local shopping centres throughout the neighbourhoods. The landscape character of the activity centres are typically assessed as part of individual structure plans for the centres, and have therefore not been assessed as part of this Strategy. This Strategy includes guidelines and recommendations that apply across the activity centres to achieve the objectives of promoting a green, resilient and liveable city. The majority of the local shopping centres distributed through the neighbourhoods have a similar landscape character with either none or small standard street trees. As with the activity centres, the Strategy has not assessed these centres individually and incudes overall guidelines that apply to all the centres.

Table 5-3 Issues and strategy response for retail land use

Issue	Strategy response
a) Forecast growth and increased urban densities in activity centres and will require proactive guidelines to protect and encourage large canopy trees and associated landscaping on private land to provide suitable shading and canopy vegetation.	• Develop guidelines that set aside adequate road widths and front setbacks where feasible to allow space to plant large canopy trees to promote increased shade and cooling in the high density precincts. Refer to Guidelines in Section 6.3.4.
b) The majority of smaller retail centres throughout the municipality have been planted with small 'mop top' style trees, which provide limited shade and greening of these retail centres	• Increase the opportunity to improve the shade, character and greening in the small retail strips and centres through the neighbourhoods, in keeping with the preferred landscape character type in the precinct. This includes encouraging greening on private land, whether these are front setbacks, or courtyards etc. Refer to Guidelines in Section 6.3.5.

5.2 Canopy vegetation cover on public land

5.2.1 Street trees

Table 5-4 Issues and strategy response for street trees

Issue	Strategy response
a) Inconsistent street tree planting styles, with a predominance of scattered mixed species do not contribute to the landscape character types or shading and urban greening.	• Opportunity to strengthen the landscape character of precincts by aligning the street tree infill planting species selection with the preferred landscape character precincts in this Strategy. Refer to Guidelines in Section 6.6.3.
b) Small sized street trees planted in wide streets where there is space for larger trees. The small street trees do not provide good shade and canopy cover to the road pavement	• Potential to plant additional medium and large canopy street trees in streets with 2m or greater nature strips to improve canopy cover and reduce the ongoing loss of canopy trees consistent with the *Monash Street Tree Strategy*. Refer to Guidelines in Section 6.6.3.
c) Small sized trees are planted in streets with underground power and at least 2.5m wide nature strips, which could easily support larger trees.	• Opportunity for the street tree infill planting program to promote the use of larger street trees where feasible and space permits. This is a priority where opportunities to plant trees on private land are limited. Refer to Recommendations in Section 7.4.5.
d) Tall Eucalypt style trees are planted directly under overhead powerlines, causing ongoing maintenance costs, along with poor visual and shade outcomes	• Identify opportunities to retain mature trees prior to removal through the implementation of an assessment program that prioritises remedial action over tree removal. Refer to Recommendations in Section 7.4.5.
e) Streets with small or scattered street tree plantings are ineffective at contributing to a leafy, green *Garden City Character*	• Promote planting of new medium and large street trees where appropriate to provide a leadership role in increasing canopy vegetation cover in the city. Refer to Recommendations in Section 7.4.5. • Encourage selection of species that are consistent with the landscape character precincts as described in Section 6.4 of this Strategy.
f) Damage to or removal of street trees tree loss adjacent to sites with major building activity	• Guidelines for appropriate controls to protect street trees during development to prevent incremental loss and damage to trees. Refer to Recommendations in Section 7.4.1.
g) The *Monash Street Tree Strategy* (2016) identifies a long term staged tree removal and replacement program.	• Consider adding the criteria of the presence of canopy tree cover on adjoining private land to the criteria for prioritising street tree renewals. Refer to Recommendations in Section 7.4.5.
h) The *Monash Street Tree Strategy* refers to the potential for alternative infrastructure such as green walls, facades and roofs where space does not allow for street trees in activity centres. This contradicts need to increase distributed canopy tree cover in higher density precincts	• Identify the importance of retaining existing and planting new large canopy shade trees in medium to high density precincts including activity centres and the Monash National Employment and Innovation Cluster. Refer to Guidelines in Sections 6.5 and 6.6.

Issue	Strategy response
i) The current approach in the implementation of the Street Tree Strategy to promote asymmetrical street tree in Council will limit opportunities for large canopy trees in the streetscapes. This combined with the reduction in large canopy trees across the private land will potentially impact on the *Garden City Character* and liveability in Monash.	• This Strategy identifies the opportunity to promote planting of medium and large street trees where feasible to improve shading and strengthen the green leafy garden character. Refer to Guidelines in Sections 6.5 and 6.6
j) Alternating deciduous and evergreen street trees are part of the distinctive landscape character of the early 1900s and some of the gently undulating precincts around Hughesdale and Oakleigh.	• Strengthen the older style alternating deciduous and evergreen street tree avenues in the Hughesdale and Oakleigh areas. The benefit of this planting style is to retain sunlight access during winter to properties on the south side of east west streets, while maximising the presence of large canopy trees in the streetscapes. Additionally, identify opportunities to introduce this alternating avenue style planting into other precincts where there is a predominance of east west streets. Refer to Guidelines in Section 6.4.4.
k) There are a mix of street tree species present in the streetscapes adjoining waterway corridors.	• Strengthen the preferred indigenous landscape character and biodiversity values adjacent to waterway corridors and bushland reserves by planting large canopy native and indigenous trees, consistent with the objectives of the *Monash Street Tree Strategy*. Refer to Guidelines in Section 6.4.1.
l) A predominance of streetscapes are made up of mixed species which do not positively contribute to the landscape character of some precincts, as identified and described in the Existing and Preferred landscape character types in Appendix A of this Strategy.	• In future street tree species selection for the infill and renewal program, refer to the Preferred landscape character precinct descriptions in Appendix A of this Strategy.

5.2.2 Public open space

Table 5-5 Issues and strategy response for public open space

Issue	Strategy response
a) Lack of large canopy trees in areas of open space where additional trees could benefit the recreational use and strengthening the preferred landscape character of the area. For example, trees to the perimeter of a sports field can provide welcome shade for spectators and players during summer	• Continue to maintain existing mature canopy trees in public open space and maximise their retention as part of any future upgrades to the open space. Refer to Guidelines in Section 6.2.2. • Potential to increase canopy vegetation cover in selected areas of open space, ensuring that the existing and future recreational use of open space is retained and improved with the additional trees. Refer to Guidelines in Section 6.2.2. • To reinforce and strengthen the preferred landscape character type through appropriate species selection for new canopy vegetation, shrub and ground layer planting. Refer to Guidelines in Section 6.4. • Potential to maintain and increase bushland areas where appropriate. Refer to Guidelines in Section 6.2.2. • Encourage other public land management agencies including Melbourne Water and Parks Victoria to increase canopy vegetation where appropriate on their land. Refer to Recommendation 7.4.6.

5.2.3 Other public land

Table 5-6 Issues and strategy response for other public land

Issue	Strategy response
a) Potential loss of canopy trees on other public land, for example Monash University, the DEECD may remove canopy trees for the purposes of expanding the built infrastructure and hard stand areas for education purposes on school land.	• Encourage other public land management agencies to increase canopy vegetation where appropriate on their land. This includes Melbourne Water, DEECD, DHS, Monash University, VicRoads and Public Transport Victoria. Refer to Recommendation 7.4.6.

5.3 Redevelopment sites and areas

5.3.1 Residential use

The City of Monash id Forecasts estimate an additional 22,727 will be living in the City by 2036, meaning that the population is forecast to increase by approximately 12 per cent. Over the corresponding period the change in dwelling numbers is forecast to increase by 14 per cent, or an additional 10,024 dwellings. As a comparison, over the past 20 years there has been a 22 per cent increase in dwelling numbers.

The locations for forecast change have been set out in the *Monash Housing Strategy* (2014) and shown on the Proposed New Zones included in Figure 5D below that form part of the Amendment C125 process. The extent of the proposed new zones in Figure 5D is awaiting approval by the Minister for Planning.

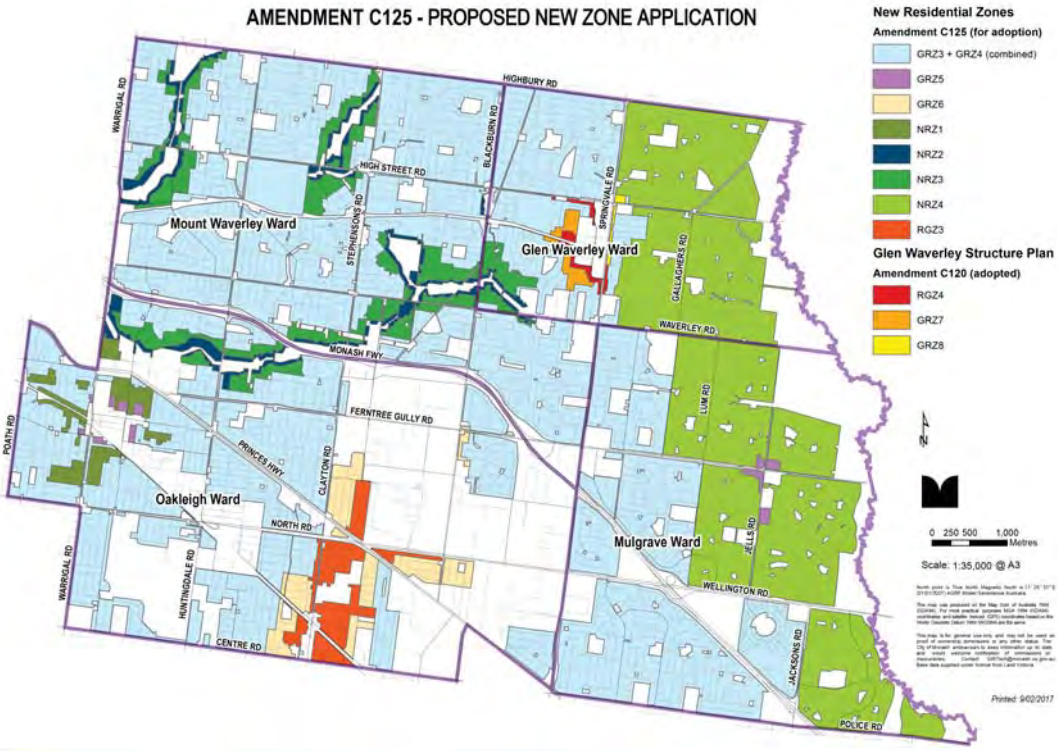


Figure 5D *Proposed Zones, Amendment C125, Awaiting Ministerial Approval dated 28/2/17*

Table 5-7 Issues and strategy response for residential redevelopment sites and areas

Issue	Strategy response
a) The forecast growth and increased urban density will likely impact on the landscape character of precincts that receive the greatest proportion of change. The .id Forecast site illustrates this change to be greatest in Oakleigh, Notting Hill, Clayton, Oakleigh South and	• The Appendix to the Strategy contains descriptions of the preferred character at a sub-precinct level in all precincts across the City. These will provide direction to achieve the preferred future character outcomes in areas where increased urban density is forecast to occur.

Issue	Strategy response
Chadstone. Figure 5d is generally consistent with this.	
b) Substantial redevelopment and change to urban density is likely within the Clayton Activity Centre which forms part of the Monash National Employment and Innovation Cluster.	• The Strategy highlights the importance of tree canopy cover and greening in future high density mixed use and residential precincts. Guidelines will highlight that retention of large canopy trees on public and private land will be a priority in the early stages of future infrastructure and precinct design. Refer to Guidelines in Sections 6.5 and 6.6. • The Guidelines address the importance of urban greening including the inclusion garden beds and grassing along with canopy trees as an essential component of site design.
c) With future incremental change and redevelopment through the residential neighbourhoods there is potential to strengthen the preferred landscape character types through the implementation of the guidelines included in the Strategy.	• The Guidelines include recommended criteria for vegetation types for each of the preferred landscape character types. Adherence to these for future landscape works

5.3.2 Monash National Employment and Innovation Cluster

This is a strategic redevelopment area in the southern part of the municipality that takes in the business and industrial areas around Huntingdale, Clayton, Clayton South, Monash University, Mulgrave, Notting Hill and Springvale (which is located outside the City of Monash). The intent is to build on many innovative world-class institutions which are already located in the Cluster including Monash University, Monash Medical Centre, the CSIRO and the Australian Synchrotron. The Victorian Planning Authority is working with Monash City Council on developing a vision and framework for this area and ultimately planning zones and other controls. The main intent of the precinct is to increase opportunities for jobs growth in the health, education, professional services, retail trade, advanced manufacturing and culture and entertainment. The level crossing removal project and resultant increase in rail capacity to this precinct is identified as a key facilitator of growth by the Victorian Planning Authority.

Table 5-8 Issues and strategy response for the Monash National Employment and Innovation Cluster

Issue	Strategy response
a) The Monash National Employment and Innovation Cluster is forecast to substantially redevelop and accommodate an increased employment and resident population. Council will advocate to promote a garden city setting for the future Monash National Employment and Innovation Cluster.	• This Strategy supports the activation of the landscape setback areas in the commercial/industrial precincts where appropriate, particularly where they are 10.6 metres or more. Activation means to include recreation facilities that can be used by workers during their breaks. This may include a network of paths that are set within the landscape setback (rather than adjacent to the road) to encourage people to use them during breaks. Other facilities that could encourage greater levels of activity include fitness stations, seats, picnic areas, multipurpose courts designed for a range of uses including tennis, basketball, netball

Issue	Strategy response
	and futsal. Additionally, activation encourages the provision of a diverse range of uses in the buildings that directly adjoin the landscape setbacks, such as cafes, restaurants, retail use and cultural event spaces. The landscape setback is to be designed as part of the setting for these uses. Refer to Guidelines in Section 6.3.1 and Recommendation 7.2.1. • Proactively develop or update guidelines and preferred outcomes for landscape character and tree canopy cover in this precinct and present these to the Victorian Planning Authority. Refer to Recommendation 7.2.2.
b) The importance of the native garden commercial/industrial landscape character type to the creating a point of difference between large business and industrial parks in the City of Monash and other adjoining municipalities. The ability for workers to exercise during breaks in a green landscaped setting contributes to a range of improved health and wellbeing outcomes	• The aim is to recognise and make better use of the public realm in the large commercial/industrial precincts, particularly in the context of encouraging sense of place, walkability and personal safety within these areas. Allowing and proactively encouraging diversity of uses so that people who work there do not need to drive during their lunch time, but are encouraged to exercise or relax and unwind during their lunchtime near their workplace. There are examples of this activation already occurring within the commercial/industrial precincts and these recommendations are to promote and encourage this diversification. Refer to Guidelines in Section 6.3.1 and Recommendations in 7.2.1. • Continue to strengthen the preferred native landscape character through appropriate species selection in accordance with the Guidelines in Section 6.4 of this Strategy.

5.4 Resilience to climate change

5.4.1 Severe weather events

Resilient Melbourne (2016) and the *Spatial Vulnerability Analysis (2013)* forecast an increased frequency and more severe weather events. These events will impact on the canopy vegetation and the natural character through issues such as tree health during extended periods of drought, tolerance of trees to withstand storm events including increased wind speeds and changes in rainfall events. These changes have potential to negatively impact on key natural areas that make up the landscape character of the city including public open space, waterways, street trees and private gardens. This can be through physical damage as a result of storm damage or changes made in anticipation of perceived and actual risk.

Table 5-9 Issues and strategy response for resilience to climate change

Issue	Strategy response
a) Landscapes that are made more drought tolerant may not contribute as well to mitigating urban heat island effect and overall liveability outcomes given that evapotranspiration is an important element of effective cooling.	• The Strategy to include a diversity of tree species and vegetation types, including those that require some summer watering to promote passive cooling and evapotranspiration. Refer to Guidelines in Section 6.4.
b) Measures to increase resilience without reverting to the use of drought tolerant species may require higher capital installation costs. For example, redirecting stormwater runoff to passively irrigate street trees is an excellent example of improving resilience and addressing urban heat mitigation, however the costs to install this are a limitation.	• The Strategy to include a diversity of tree species and vegetation types, including those that require some summer watering to promote passive cooling and evapotranspiration. Refer to Guidelines in Section 6.4.
c) Impact of bushfires has resulted in greater controls on the proximity of buildings to natural areas including the waterway corridors (refer to Biodiversity issues in Section 5.5).	• Refer to response in Table 5-11, item (c).
d) Extreme weather events including increased wind, rainfall and dry conditions puts greater stress on the health and structural integrity of existing mature trees, potentially leading to increased loss of canopy cover	• Potential for this Strategy to support measures to develop performance criteria for future canopy trees that have an increased resilience to extreme weather events. Refer to Guidelines in Section 6.6.

5.4.2 Mitigating impacts of urban heat island effect

Monash is vulnerable to urban heat island effect due to a range of factors including ageing population, population growth, increased urban densities and a decline in tree canopy cover. Vegetation cover and presence of moisture absorbing grass and garden bed areas can assist to build resilience to climate change and mitigate urban heat along with other beneficial effects including:

- Reduce urban stormwater runoff with moisture absorbing surfaces.
- Community health and wellbeing benefits.
- Liveability.

The measurements of tree canopy cover undertaken as part of this Strategy not only identified canopy tree loss but also a decline in vegetation cover. On a municipal wide level there has been an 8 per cent decline in grass, garden bed and unsealed surfaces, with a 12 per cent increase in hard surfaces (roofs, concrete and roads).

Table 5-10 Issues and strategy response for mitigating impacts of urban heat island effect

Issue	Strategy response
a) Activity centres and higher density precincts will experience the effects of urban heat build up more strongly that residential areas. Adequate space for canopy trees and evapotranspiration to assist mitigate urban heat island effect will be required	• The Strategy includes guidelines that recommend setting aside adequate space for large canopy trees in higher density precincts on both public and private land. Refer to Guidelines in Section 6.3.
b) Historical loss of canopy vegetation cover in the municipality with a corresponding increase in built form and sealed surfaces.	• Develop guidelines to protect existing mature canopy trees on private and public land and require planting of new canopy trees and canopy vegetation. Refer to Guidelines in Sections 6.2, 6.4 and 6.5.
c) Increased site coverage in residential areas means there are fewer areas in which to plant new large canopy trees, and also to sustainably retain the existing large canopy trees.	• Develop preferred landscape character outcomes and promote urban greening in this Strategy. Refer to Guidelines in Section 6.2.
d) Scattered and poor quality street trees do not support Council initiatives to require additional canopy trees on private land.	• Include a recommendation that highlights the opportunity for Council to take a leadership role regarding best practice tree selection, planting and maintenance of street trees to demonstrate improvement to tree canopy cover in the public realm. Refer to Guidelines in Section 6.6.3.
e) Increased urban densities in activity centres will result in greater concentrations of people living and working in these centres. This will increase the vulnerability of the population to urban heat island effect and means that it is very important that the future activity centres are designed with adequate space and road reserve widths to	• Develop specific guidelines in the Strategy to promote greening including garden bed areas, grassed areas and canopy trees in future higher density precincts including retirement living and activity centres to create more liveable and resilient landscapes in the future. Refer to Guidelines in Section 6.3.4.

Issue	Strategy response
accommodate large canopy trees now and in the future.	
f) Selected recently constructed and older style retirement living facilities have limited canopy trees and green open space.	• Develop specific guidelines in the Strategy to promote greening including garden bed areas, grassed areas and canopy trees in future higher density precincts including retirement living and activity centres to create more liveable and resilient landscapes in the future. Refer to Guidelines in Section 6.3.4.

5.5 Biodiversity values

5.5.1 Overview

The *Environmental Sustainability Strategy* identifies the waterway corridors as the most significant natural environmental areas including the Dandenong Creek Riparian Corridor, Damper Creek, Gardiners Creek, Scotchmans Creek and Valley Reserve. The canopy tree mapping undertaken for this project identifies there has been significant areas of revegetation established along the waterway corridors between 1992 and 2015. The waterway corridors are a key influence on the existing and preferred landscape character types.

A number of open space reserves outside of the waterway corridors have remnant or mature planted indigenous vegetation that strengthens the biodiversity values of the City of Monash including:

- Bogong Reserve, Glen Waverley
- Brickmakers Park, Oakleigh
- Essex Heights Reserve, Mount Waverley
- Hinkler Reserve, Glen Waverley
- Federal Reserve, Mount Waverley
- Reg Harris Reserve, Oakleigh East
- Whalley Drive Reserve, Wheelers Hill

Table 5-11 Issues and strategy response for biodiversity values

Issue	Strategy response
a) Development on adjoining properties potentially impacts on the biodiversity values of the corridor through increased presence of built form and impacts of noise, light spill and vegetation removal. .	• This Strategy defines the preferred character areas inclusive of the properties directly adjoining the waterways to support and improve the biodiversity values of the corridor. This includes encouraging the use of indigenous vegetation and retaining and planting new canopy trees to expand the habitat corridor beyond the public open space, and building setbacks that allow adequate space between built form and the adjoining open space to minimise impacts on the habitat value. Refer to Guidelines in Section 6.4.1.

Issue	Strategy response
b) The waterway corridors significantly influence the landscape character of Monash.	• The preferred landscape character types will protect and improve the function of these including the biodiversity corridor values. Refer to Guidelines in Section 6.4.
c) Bushfire regulations have the potential to impact on landscape character with the requirements for cleared zones between conservation reserves and urban development.	• Consider the need for adequate building setbacks from conservation reserves and waterway corridors to avoid the need to further clear bushland vegetation in the conservation reserves where feasible. Refer to Guidelines in Section 6.4.
d) Minimise the impact of invasive exotic species from adjoining gardens on the conservation reserves and waterway corridors. .	• Preferred landscape character design guidelines for urban development directly adjoining waterway corridors and bushland reserves encourages the use of indigenous and native plants. Refer to Guidelines in Section 6.4.1.

5.6 Cultural landscape heritage values

5.6.1 Overview

Prior to the arrival of Europeans, the *Woi wurrung* occupied an area which extended from inland of the Werribee River in the south west, Mount Macedon in the north west, Mount William in the Great Divide to the north and across to Mount Baw Baw in the east (Clark 1990). Their southern boundary was the watershed of the Great Divide and Bunurong clans. This group of people had common language and social practices, and at the time of contact, was thought to have comprised seven clans, each with their own clan estate. At the time of European settlement, Dandenong Creek north of Dandenong appears to have been the approximate boundary between *Woi wurrung* and *Boon wurrung*

Today, the original natural landscape character of the city is evident along the main waterway corridors, the largest of which is the Dandenong Creek, and the other waterways including Gardiners Creek, Scotchmans Creek and Damper Creek. Evidence of the agricultural history is present in the municipality, mainly through surviving large exotic trees that remain in open space reserves and on private land.

The landscape character is influenced by a combination of the subdivision layout, built form, private gardens, street trees and open space character. Across the different precincts, private gardens vary with the different eras of urban development. The restoration of the natural bushland character of the open space and waterways has a significant influence on the landscape character in the north of the municipality combined with the different eras of exotic and native planting styles in private gardens, street trees and the open space reserves.

There are still many examples of private gardens that represent the late 1940s and 1950s subdivision, however these are progressively changing as the buildings are replaced or renovated to contemporary dwellings. There are some other unique garden styles within the city including the compact manicured style, with neatly trimmed and shaped Conifers, along with productive gardens with fruit trees including citrus.

Table 5-12 Issues and strategy response for cultural landscape heritage values

Issue	Strategy response
a) Incremental change across the garden suburban precincts will potentially lead to the loss of the traditional suburban garden character. .	• Protect and promote examples of the different garden styles to represent the different eras of settlement in Monash, within the context of increased urban densities, changing lifestyles and trends towards low maintenance gardens and climate change. Refer to Appendix A and Guidelines in Section 6.4. • Implement the preferred landscape character precincts included in this Strategy, which has considered the cultural landscape heritage values.
b) The lack of a significant tree register leading to the loss of mature canopy trees as a result of incremental development and change.	• The Strategy includes guidelines to place a higher level of importance regarding the protection of mature canopy trees where feasible. Refer to Guidelines in Section 6.5. • In the longer term support the preparation of a Significant Tree Study or similar for the City of Monash, to assist to protect the cultural heritage values associated with significant trees including as examples of historical land use. Refer to Recommendation 7.4.8.

6. Guidelines

6.1 Overview

The purpose of these guidelines is to promote the Garden City concept in the City of Monash, to retain and enhance the landscape qualities of the municipality, to provide for an appropriate balance between built form and planted areas, and to support a substantive canopy vegetation cover.

The *Garden City Character* is referred to in a contemporary context of achieving future liveability, community health and wellbeing, and resilience by providing for:

- Increasing the presence of trees and overall greenness to improve the liveability of the city. This includes increasing summer shade and improving the microclimate relief from urban heat, which will increase with climate change.
- Maintain and strengthen the greenness in the context of forecast growth and increased urban densities.
- Strengthen the sense of identity and point of difference compared to other parts of Melbourne, particularly in the Monash National Employment and Innovation Cluster.
- Visual relief from built form by ensuring there continues to be a presence of natural features and greenness in the city. This includes canopy trees, garden beds, shrubs, climbers and grassed surfaces, which becomes especially important as urban redevelopment occurs at a more intense scale.
- Biodiversity and habitat for local flora and fauna.
- Protection of the cultural landscape heritage values of the city.

These Guidelines are to be read as a whole. They include the Existing and Preferred landscape character types for each Landscape Character Precinct in Appendix A. The guidelines are applicable to public and private land and will be used by public and private land owners.

6.1.1 Strategy objectives

a) Protect and enhance the green *Garden City Character* within the contemporary context of climate change and forecast urban growth and change.

b) Increase urban greening to create a more resilient landscape that contributes to community health and wellbeing now and in the future.

c) Increase canopy tree cover across public and private land from 22% to 30% by 2040 to create a more liveable, sustainable and resilient city.

d) Strengthen the biodiversity values along the waterway corridors by increasing the presence of indigenous vegetation on both public and private land.

e) Maximise the retention of existing healthy mature large canopy trees on public and private land to support liveability and cultural heritage values.

f) Increase the presence of large canopy trees and greening in high density precincts including activity centres and the Monash National Employment and Innovation Cluster.

g) Council to provide a leadership role with best practice tree planting and management on public land.

h) Develop a cohesive vision for the landscape character across the public and private land and update the relevant regulatory controls and planning scheme to give effect to the vision.

6.2 Guideline 1
Achieve an appropriate balance between built form and planted areas

6.2.1 Private land

Guideline 1.1

Maximise planted surfaces to improve liveability, community health and wellbeing, and resilience to climate change. Use planted and grassed areas for open space areas in setbacks and between buildings where space permits.

Guideline 1.2

Where paved surfaces are required position trees and built form to ensure these are at least partially shaded during Summer. Encourage the use of permeable paving surfaces where feasible to assist with overall soil moisture content.

Guideline 1.3

Canopy vegetation is to be of a suitable size and height which emerges above the roofline of existing and proposed built form in the residential areas. This will provide shading and greening to the built form including the roof form, which achieves an urban heat mitigation and visual improvement. Refer to the guidelines in Table 6-6 and Figure 6A.

Figure 6A *Preferred front setback with minimum 60 per cent grassed and planted surfaces*

Guideline 1.4

Encourage passive irrigation to assist tree health and growth and also with overall cooling via evapotranspiration.

Guideline 1.5

For residential use, the front setback is to have grassed and planted areas comprising a minimum of 60 per cent of the total area, with a preference for 70 per cent where feasible. This can include a combination of garden beds, grassing and/or native revegetation and excludes any porous or permeable paving and synthetic grass/painted paved surfaces as part of the minimum 60 per cent.

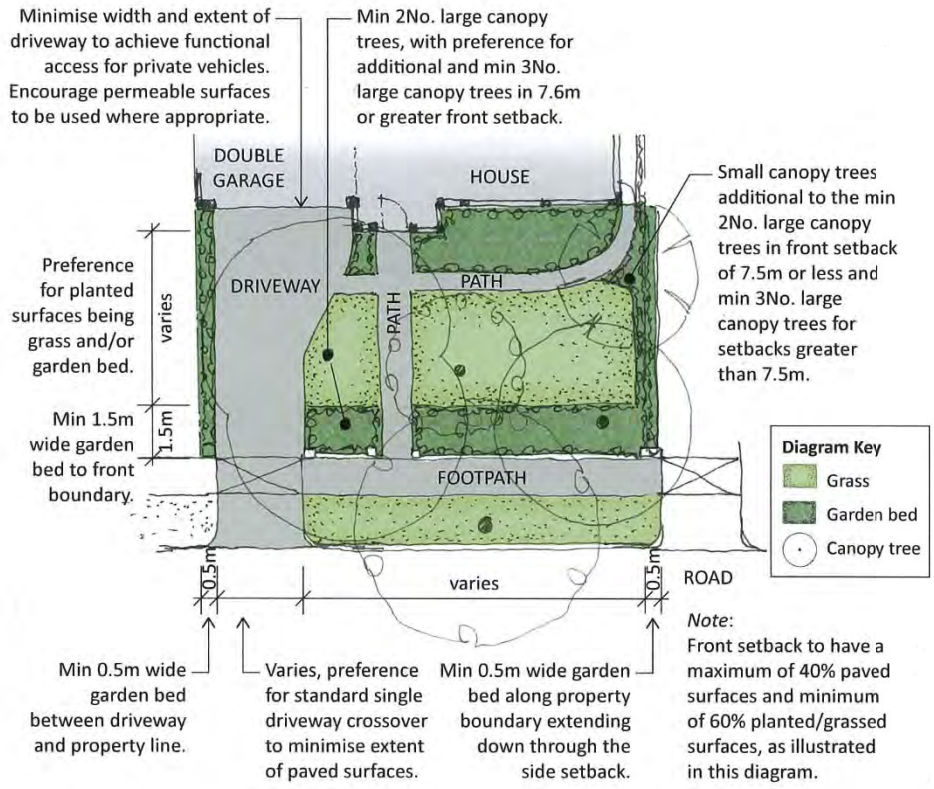


Figure 6B *Preferred front setback with minimum 60 per cent grassed and planted surfaces*

Guideline 1.6

For residential use, low or no front fencing is preferred to maximise the contribution of private gardens to the urban greening and *Garden City Character*. As shown in Figure 6B, a garden bed with a minimum of 1.5 metre width to the front boundary of properties is preferred. The garden beds are to include a range of canopy vegetation including ground covers, shrubs and trees.

Guideline 1.7

For residential sites, the side setback is to have some vertical greening to create the effect of the buildings sitting in a landscaped setting. This will preferably include trees, however where trees are not feasible, as a minimum shrubs or climbers on fences/walls are to reach a minimum of 1.8 metres high. Refer to Figures 6C for side setbacks.

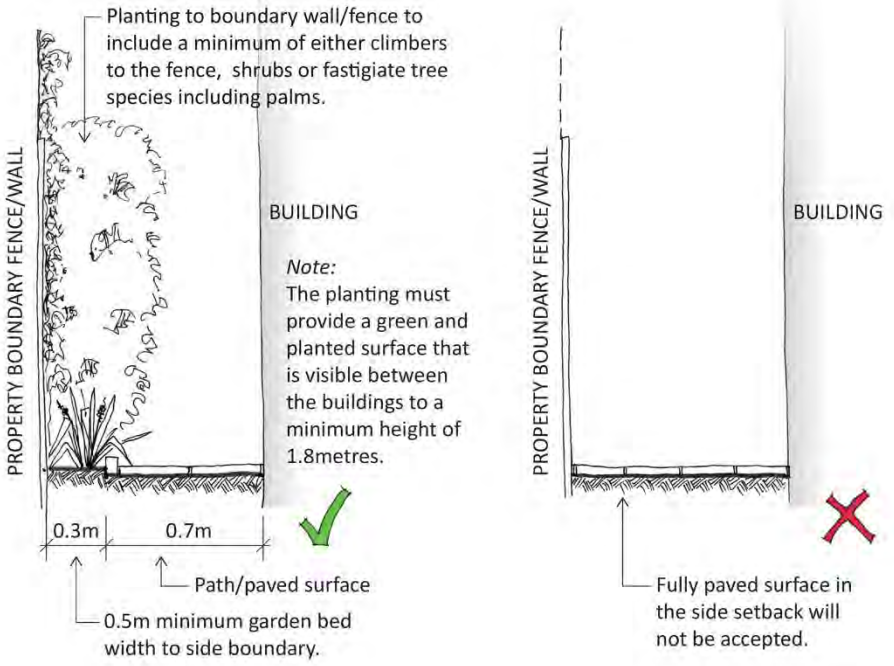


Figure 6C *Side setback guidelines*

6.2.2 Public open space

Guideline 1.7

When designing public open space:

- Retain existing and plant new long-lived large canopy trees. New tree species selection is to meet the criteria and guidelines listed in Table 6-6.
- Maximise natural green surfaces – being grass, garden beds and revegetation areas in addition to canopy trees.
- Select garden bed plant species that tolerate urban and drought conditions, without the need for excessive water use and complement the Preferred landscape character type precinct description.
- Propose indigenous species to improve biodiversity values where the open space is located in an Indigenous Tall Eucalypt Landscape Character Type precinct,
- Maximise the use of permeable paving treatments where these are required in the open space. This is to increase the overall moisture content of the soil that is available for the healthy establishment of trees and for effective evapotranspiration.
- Incorporate sustainable water use principles into open space design, with a focus on passive irrigation for trees and garden beds.

- Where new built features and car parking is proposed, demonstrate that Environmentally Sustainable Design principals have been applied and minimise the built and paved footprint within the green open space.
- Where synthetic sports surfaces are proposed, off set the decrease in natural planted surfaces by maximising opportunities for canopy tree planting to achieve some shading of these surfaces.

6.3 Guideline 2
Urban greening in activity centres, commercial/industrial precincts and the Monash National Employment and Innovation Cluster

6.3.1 Monash National Employment and Innovation Cluster and Garden commercial/industrial landscape character precincts

Guideline 2.1

Maximise the retention of existing large canopy trees on public and private land and promote urban greening to assist with resilience to climate change and impacts of urban heat island effect.

Guideline 2.2

As redevelopment occurs, the front landscape setbacks are to be designed as follows:

- Spaces that encourage people outdoors to socialise and exercise before, during and/or after work. This includes provision of facilities that will be publicly accessible such as seating, fitness equipment, paths and play equipment, sculptural features/elements.
- Where a café/kiosk is provided, this use is to directly adjoin the landscape setback with an outdoor seating area extending to be partially located inside the landscape setback.
- Planted with long-lived large canopy trees that meet the criteria in Table 6-6.
- Proposed new canopy vegetation in medium and high density areas is to include long-lived large canopy trees to soften and address the scale of the built form, recognising that any building over 18 metres in height is unlikely to have emergent canopy trees above the roofline.
- Integrate the design with the adjoining streetscape taking into consideration the established street trees.
- Incorporate environmentally sustainable design principles, particularly in relation to sustainable water use and creating landscapes that are effective at mitigating urban heat build up.
- On-site parking is to be limited and to comprise a maximum of 15 per cent of the landscape setback only. A green landscaped area between the car park and

property boundary is to be a minimum width of 3 metres to allow planting of large canopy trees between the car park and the footpath. Preferably all parking is to be provided outside the landscape setback.

Guideline 2.3

Side and rear landscape setbacks to be designed to:

- Include large canopy trees for shade and character to parking and vehicle loading and unloading areas, and the perimeter of the site.
- Incorporate WSUD principles into the design of the whole site including use of permeable surfaces where feasible to increase moisture content available for trees and planting areas in the site.

6.3.2 Suburban commercial/industrial precincts

Guideline 2.4

Front landscape setbacks to be designed to:

- Include large canopy trees for shade to parking and vehicle loading and unloading areas.
- Minimum of 2.5 metre wide green frontage between the footpath and built form within the minimum 7.6 metre front setback. The green frontage of minimum 2.5 metre wide is to include at least one row of large canopy trees with a maximum spacing between the trees of 5 metres and meet the criteria in Table 6-6.
- Perimeter fencing is strongly discouraged with the built form to adequately incorporate necessary security features as part of the building fabric. Where fencing is proposed, preference will be for it to be low and transparent.
- Incorporate WSUD principles into the design of the whole site including use of permeable surfaces where feasible to increase moisture content available for trees and planting areas in the site.

6.3.3 Urban commercial/industrial precincts

Guideline 2.5

Promote urban greening in the existing commercial/industrial precincts including:

- Large canopy trees to be incorporated into local access streets where feasible, including consideration of planting them into roadside tree wells/cut outs to maximise opportunities to include footpaths in the road reserve.
- Where sites are redeveloped, encourage activated, landscaped setbacks that promote liveability principles and improve the shading and greening of the outdoor environment to encourage workers to take a break outdoors. These setbacks are to exclude car parking, with parking to be retained as on-street, or provision of off-street parking to the rear of the site.

6.3.4 All activity centres, high density precincts and strategic sites

Guideline 2.6

Retain and protect large mature trees on private and public land consistent with the guidelines in Section 6.4.

Guideline 2.7

When planting new trees on private land, recognise that in some cases, large canopy trees in front setbacks of sites greater than 4-stories in height may include some species that are more conical and columnar in shape, however broad-spreading canopy trees are preferred.

Guideline 2.8

In the public realm including road reserves:

- Road Reserves to be designed with adequate width to incorporate a boulevard treatment with broad spreading large canopy trees on major roads and commercial precincts within the activity centres. Council to review the minimum design requirements for Civil works, and then allow for adequate space to plant large canopy trees in the road reserve without compromising the civil clearances for underground and above ground services.
- Large canopy trees to be incorporated into local access streets where feasible, including consideration of planting them into roadside tree wells/cut outs to maximise opportunities to include footpaths in the road reserve.
- Urban plazas and public meeting spaces are to maximise opportunities to integrate urban greening including canopy trees, garden beds and grassing, well integrated with paved surfaces in high use environments. Urban greening to integrate sustainable water use principles to contribute to sustainability and urban cooling.

Guideline 2.9

Within the private landscape setbacks in the retail/commercial precincts:

- Maximise greening with a preference for canopy trees and garden beds so they contribute to urban greening, and retain suitable sightlines for safety. Trees and garden beds along with grassing where appropriate are to integrate sustainable water use principles to contribute to sustainability and urban cooling.
- In addition to trees and garden bed planting, other features such as green walls will be considered, however they will need to demonstrate they meet best practice sustainability principles.

6.3.5 Local strip shopping centres

Guideline 2.10

Within smaller commercial precincts - i.e. the small strip shopping precincts, identify opportunities to plant additional large canopy trees in these centres to improve the urban greening and *Garden City Character*. Tree species selection is to respond to the landscape character type where possible.

6.4 Guideline 3
Preferred landscape character types

Guideline 3.1

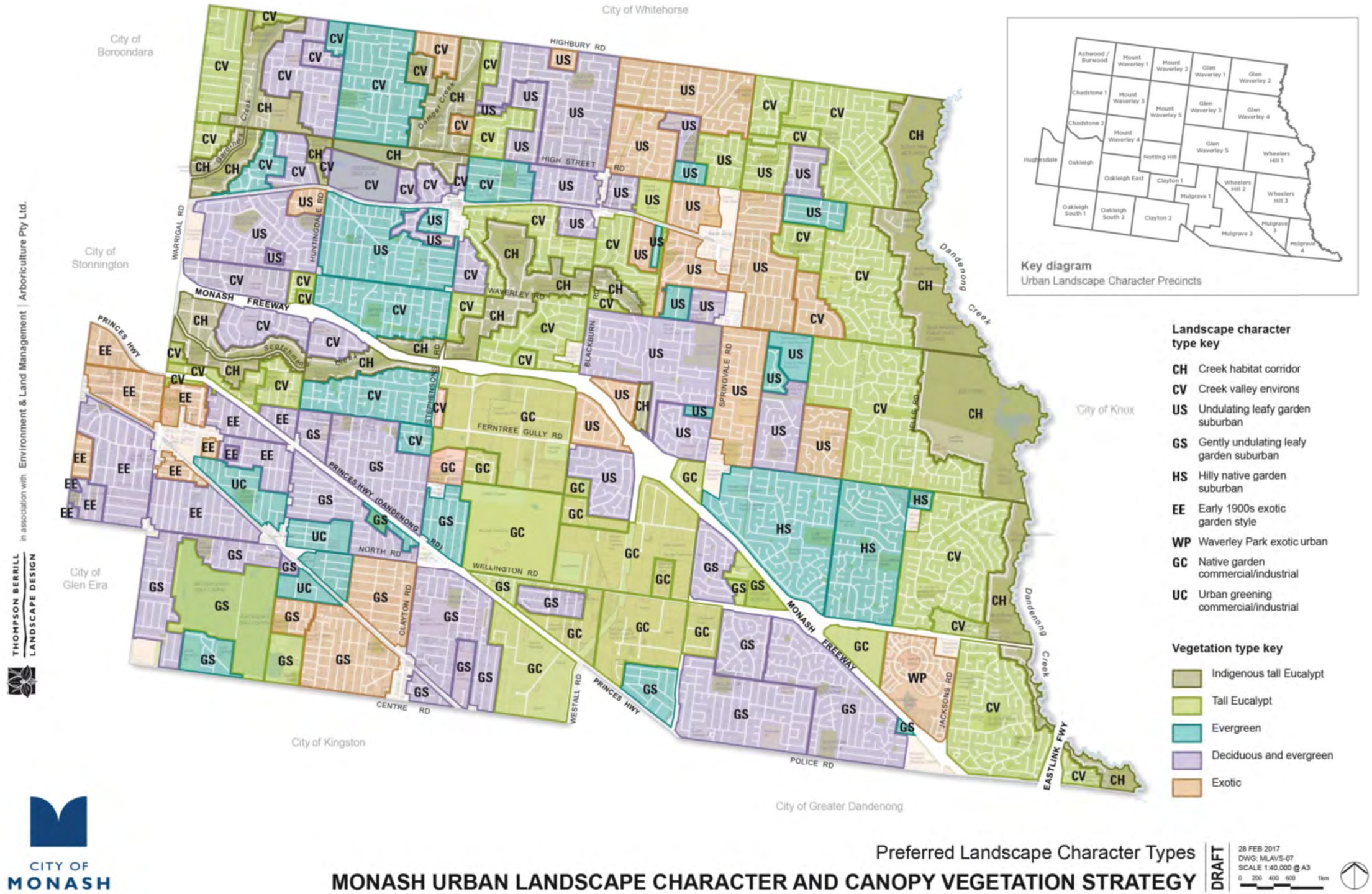
Use the Preferred landscape character type to guide proposed site development. The Preferred landscape character type sheets for each precinct are located in Appendix A. A diagram of the Preferred landscape character types is shown in Figure 6D and summarised in Figure 1A of this Strategy. The development application is to demonstrate how it meets Preferred landscape character type.

Guideline 3.2

In preparation of future design plans, refer to the Guideline 1 which identifies criteria for improved greening on private land.

For each preferred landscape character type precinct, the new planting is to demonstrate how it responds to the Preferred landscape character type. In all the character areas, there is a focus on increasing canopy vegetation in order to meet the target of 30% tree canopy cover by 2030 and to increase the overall urban greening to protect and improve the *Garden City Character.* This includes retention and planting to:

- Strengthen the biodiversity values along the waterway corridors through the use of indigenous species.
- Review the adequacy of building setback and design in sites directly adjoining waterway corridors or bushland reserves, to minimise the requirement for trimming and removal of trees in the adjoining bushland.
- Support a stronger framework of large canopy trees in both the streetscapes and on private land that reinforces the native tall Eucalypt style landscape character which is mainly present in the north and eastern parts of the municipality.
- Strengthen a framework of large non-native deciduous and evergreen trees and garden styles mainly in the south and western parts of the municipality.
- Improve tree canopy cover and introduce substantial greening in the non-residential and mixed use areas of the municipality.



Key diagram
Urban Landscape Character Precincts

Landscape character type key

- **CH** Creek habitat corridor
- **CV** Creek valley environs
- **US** Undulating leafy garden suburban
- **GS** Gently undulating leafy garden suburban
- **HS** Hilly native garden suburban
- **EE** Early 1900s exotic garden style
- **WP** Waverley Park exotic urban
- **GC** Native garden commercial/industrial
- **UC** Urban greening commercial/industrial

Vegetation type key

- Indigenous tall Eucalypt
- Tall Eucalypt
- Evergreen
- Deciduous and evergreen
- Exotic

THOMPSON BERRILL LANDSCAPE DESIGN
in association with Environment & Land Management | Arboriculture Pty Ltd.

CITY OF MONASH

Preferred Landscape Character Types

MONASH URBAN LANDSCAPE CHARACTER AND CANOPY VEGETATION STRATEGY

DRAFT

28 FEB 2017
DWG: MLAVS-07
SCALE 1:40,000 @ A3
0 200 400 600 1km

Figure 6D *Preferred landscape character types*

6.4.1 Indigenous tall Eucalypt vegetation type

For the extent of this vegetation type, refer to Figure 6D. It extends over the waterway corridors and the major bushland reserves in the municipality, and includes private land that directly adjoins or is opposite the waterway or bushland reserves.

a) Encourage the use of local provenance indigenous species including large canopy trees in the public open space, the streetscapes and on private land to improve the biodiversity values of the City of Monash.

b) Encourage the use of local provenance indigenous and native shrub and ground layer planting in private landscaping (non-residential) and gardens (residential). As a minimum, the use of non-invasive exotic species is required.

c) Where indigenous species do not meet the specific requirements of the site, then native species are to be selected to demonstrate they will not detrimentally impact on the indigenous vegetation values.

d) Street tree planting in close proximity to the waterways will complement the biodiversity values in the adjoining open space. This may include planting indigenous species, large canopy trees, or landscape treatment that assists the role of the streetscape as an effective bushfire buffer zone where this is required.

e) Indigenous species are to be of local provenance to the local area.

Table 6-1 List of typical trees for use in the Indigenous tall Eucalypt vegetation type

Botanical name	Common Name	Approx size (H x W)
Acacia melanoxylon	Blackwood	8 x 6 m
Allocasuarina littoralis	Black Sheoak	5-8 x 4-5 m
Allocasuarina verticillata	Drooping Sheoak	9 x 5 m
*Banksia serrata**	Saw Banksia*	10 x 5 m
Eucalyptus cephalocarpa	Sliverleaf Stringybark	8-20 x 10-15 m
Eucalyptus goniocalyx	Bundy	8-12 x 4-6 m
Eucalyptus melliodora	Yellow Box	10-15 x 8-10 m
Eucalyptus radiata	Narrow-leaf Peppermint	15-20 x 8-12 m
*Eucalyptus yarrarensis***	Yarra Gum	12 x 8 m

** Indigenous to Hughesdale, Oakleigh, Oakleigh East and Oakleigh South only.*
*** Indigenous only to the Dandenong Creek environs.*

Note – preference will be given to the use of indigenous species, however where a suitable indigenous species cannot meet the design criteria, then species from the following table can be used.

Botanical name	Common Name	Approx size (H x W)
Angophora costata	Smooth-barked Apple Myrtle	12 x 8 m
Corymbia citriodora	Lemon-scented Gum	15-20 x 15 m
Corymbia citriodora 'Scentuous'	Dwarf Lemon Scented Gum	7 x 5 m
Corymbia eximia	Yellow Bloodwood	12 x 10 m

Botanical name	Common Name	Approx size (H x W)
Corymbia eximia 'Nana'	Dwarf Yellow Bloodwood	8 x 6 m
Corymbia maculata	Spotted Gum	20 x 18 m
Eucalyptus melliodora	Yellow Box	10-15 x 8-10 m
Eucalyptus radiata	Narrow-leaf Peppermint	15-20 x 8-12 m
Eucalyptus sideroxylon	Ironbark	15-20 x 15 m
Eucalyptus sideroxylon 'Rosea'	Red Ironbark	15 x 6-10 m

Criteria for suitable canopy vegetation types for use in Indigenous tall Eucalypt vegetation type:

- Preferably indigenous, and of local provenance.
- Where indigenous species do not meet the specific requirements of the site, then native species are to be selected to demonstrate they will not detrimentally impact on the indigenous vegetation values.
- Native species are to complement the bushland character of Landscape Character Type - for example, if the site adjoins a waterway corridor, then the native specie are to complement the riparian corridor values.

6.4.2 Tall Eucalypt vegetation type

For the extent of this vegetation type, refer to Figure 6D. This vegetation type mainly corresponds with the Creek valley landscape character type and the Garden commercial/industrial landscape character type. They are generally overlooking the waterway corridors, but does not directly adjoin it, or is within the future Monash National Employment and Innovation Cluster or nearby in Mulgrave and Notting Hill.

This vegetation type is also applied to areas that have a significant presence of tall Eucalypt style emergent species that frame the overall character on the precinct.

a) Where space permits, strengthen existing street tree plantings to utilise tall Eucalypt style species in public open space, the streetscapes and on private land.

b) Strengthen existing shrub and ground layer planting, which is a combination of exotic and native species.

Table 6-2 List of typical character species suitable for the tall Eucalypt landscape character type

Botanical name	Common Name	Approx size (H x W)
Angophora costata	Smooth-barked Apple Myrtle	12 x 8 m
Corymbia citriodora	Lemon-scented Gum	15-20 x 15 m
Corymbia citriodora 'Scentuous'	Dwarf Lemon Scented Gum	7 x 5 m
Corymbia eximia	Yellow Bloodwood	12 x 10 m
Corymbia eximia 'Nana'	Dwarf Yellow Bloodwood	8 x 6 m
Corymbia maculata	Spotted Gum	20 x 18 m

Botanical name	Common Name	Approx size (H x W)
Eucalyptus melliodora	Yellow Box	10-15 x 8-10 m
Eucalyptus radiata	Narrow-leaf Peppermint	15-20 x 8-12 m
Eucalyptus sideroxylon	Ironbark	15-20 x 15 m
Eucalyptus sideroxylon 'Rosea'	Red Ironbark	15 x 6-10 m

Criteria for suitable canopy vegetation types for use in tall Eucalypt vegetation type:

- Trees to be predominantly evergreen and have a similar tall branching habit with a foliage density similar to the character of the Eucalypts - i.e. allows some filtered sunlight to penetrate during winter.
- Where deciduous trees are proposed due to sunlight access and overshadowing issues, these are to be used as feature trees and where possible complement the native landscape character. For example, the *Lagerstroemia* 'Natchez' has a smooth bark and small foliage which can complement many of the Australian native trees.
- Shrubs and ground covers are to be native to Australia, with contrasting texture and foliage. Where non-native specie are used, they to be used as a features rather than dominate the planting palette.

6.4.3 Evergreen vegetation type

For the extent of this vegetation type, refer to Figure 6D. The precincts respond to the established evergreen landscape character, which is predominantly a combination of native and non-native evergreen species. While this includes tall Eucalypt style species, the dominance is achieved with the medium and smaller sized trees.

a) The preferred character will strengthen this by increasing the presence of medium to large canopy evergreen trees along with some deciduous trees in the mix. This includes in public open space, streetscapes and on private land.

b) In this landscape character type areas include residential gardens with a dominance of shaped cypress and conifers. This is particularly evident in parts of Wheelers Hill and Mulgrave.

Table 6-3 List of typical character species suitable for the Evergreen vegetation type

Botanical name	Common Name	Approx size (H x W)
Angophora hispida	Dwarf Apple Myrtle	8 x 7 m
Banksia integrifolia	Coast Banksia	8 x 4 m
Brachychiton acerifolius	Illawarra Flame Tree	12 x 6 m
Callistemon salignus	Willow Bottlebrush	6 x 4 m
Cupaniopsis anacardioides	Tuckeroo	8 x 7 m
Ficus rubiginosa	Port Jackson Fig	10 x 15 m
Hymenosporum flavum	Native Frangipani	8 x 4 m

Botanical name	Common Name	Approx size (H x W)
Lophostemon confertus	Brush Box	12-15 x 10 m
Magnolia grandiflora	Bullbay Magnolia	10 x 8 m
Phoenix canariensis	Canary Island Date Palm	12 x 6-8 m
Trachycarpus fortunei	Windmill Palm	8 x 3 m
Tristaniopsis laurina	Kanooka	8 x 6 m
Waterhousia floribunda	Weeping Lily Pily	12 x 12 m

Criteria for suitable canopy vegetation types for use in Evergreen vegetation type:

- Trees to be predominantly evergreen with a variety of textures and characteristics and can be both exotic evergreen and native evergreen species.
- Where deciduous trees are proposed due to sunlight access and overshadowing issues, these are to be used as feature trees, with more than 50% of proposed trees to comprise evergreen species.
- Shrubs and ground covers can be a combination of exotic and or native species.

6.4.4 Deciduous and evergreen vegetation type

For the extent of this vegetation type, refer to Figure 6D. This vegetation type includes the combination of deciduous and Eucalypt style and other evergreen trees. Much of this style is consistent with pre-1965 urban development. In the Oakleigh area, the style is characterised with alternating evergreen and deciduous avenue style street tree plantings. In the Chadstone and Mount Waverley areas, the character is influenced by the garden styles, along with mixed street tree planting styles.

a) The future preferred vegetation type will strengthen this style, including with consideration of extending the alternating evergreen and deciduous avenue style street tree plantings given the excellent balance they achieve between winter sun and summer shade in east-west oriented streets.

b) Other features of this landscape character type will be to strengthen the presence of the large broad spreading deciduous canopy trees on private land.

Table 6-4 List of typical character species suitable for the deciduous and evergreen landscape character type

Botanical name	Common Name	Approx size (H x W)
Evergreen		
Angophora costata	Smooth-barked Apple Myrtle	12 x 8 m
Angophora hispida	Dwarf Apple Myrtle	8 x 7 m
Banksia integrifolia	Coast Banksia	8 x 4 m
Brachychiton acerifolius	Illawarra Flame Tree	12 x 6 m
Callistemon salignus	Willow Bottlebrush	6 x 4 m
Cupaniopsis anacardioides	Tuckeroo	8 x 7 m

Botanical name	Common Name	Approx size (H x W)
Ficus rubiginosa	Port Jackson Fig	10 x 15 m
Lophostemon confertus	Brush Box	12-15 x 10 m
Tristaniopsis laurina	Kanooka	8 x 6 m
Waterhousia floribunda	Weeping Lily Pily	12 x 12 m
Deciduous		
Acer palmatum	Japanese Maple	7 x 6 m
Acer x freemanii 'Jeffersred'	Autumn Blaze Maple	15 x 10 m
Ginkgo biloba	Ginkgo	12 x 8 m
Lagerstroemia indica x 'Natchez'	Crepe Myrtle (White flowering)	6 x 4 m
Lagerstroemia indica x 'Tuscarora'	Crepe Myrtle (Pink flowering)	8 x 4 m
Malus species and cultivars	Crabapples	6 x 6 m
Melia azedarach 'Elite'	White Cedar	12 x 10 m
Pistacia chinensis	Chinese Pistachio	8 x 8 m
Platanus orientalus	Oriental Plane	15 x 10 m
Platanus x acerifolius	London Plane	20-25 x 15-20 m
Quercus canariensis	Algerian Oak	15 x 10 m
Quercus cerris	Turkey Oak	15 x 10 m
Quercus robur	English Oak	10 x 8 m
Ulmus parvifolia	Chinese Elm	10 x 10 m
Zelkova serrata 'Green Vase'	Japanese Zelkova	15 x 10 m

Criteria for suitable canopy vegetation types for use in deciduous and evergreen vegetation type:

- Minimise the use of Eucalyptus species in these areas, however *Corymbia sp.* and *Angophora sp.* are suitable. Evergreen trees are preferably to have large textural or glossy green leaves and with characteristics that complement the deciduous trees.
- Deciduous trees are to be proven to be relatively hardy in more extreme weather events including strong winds and extended heat.
- Shrubs and ground covers to preferably have a greener and more exotic character, however they can include native and indigenous species.

6.4.5 Exotic vegetation type

For the extent of this vegetation type, refer to Figure 6D. This vegetation type is where the dominant planting character is both evergreen and deciduous species that does not have a strong presence of identifiable 'native' character that is typically generated by the Eucalyptus style and 'dryer' bushland species.

a) Encourage additional large canopy non-Eucalypt style evergreen and deciduous trees on private land.

Table 6-5 List of typical character species suitable for the exotic landscape character type

Botanical name	Common Name	Approx size (H x W)
Evergreen		
Brachychiton acerifolius	Illawarra Flame Tree	12 x 6 m
Cupaniopsis anacardioides	Tuckeroo	8 x 7 m
Ficus rubiginosa	Port Jackson Fig	10 x 15 m
Hymenosporum flavum	Native Frangipani	8 x 4 m
Magnolia grandiflora	Bullbay Magnolia	10 x 8 m
Olea europaea 'Swan Hill'	Swan Hill Olive	7 x 7 m
Phoenix canariensis	Canary Island Date Palm	12 x 6-8 m
Trachycarpus fortunei	Windmill Palm	8 x 3 m
Deciduous		
Acer palmatum	Japanese Maple	7 x 6 m
Acer x freemanii 'Jeffersred'	Autumn Blaze Maple	15 x 10 m
Ginkgo biloba	Ginkgo	12 x 8 m
Lagerstroemia indica x 'Natchez'	Crepe Myrtle (White flowering)	6 x 4 m
Lagerstroemia indica x 'Tuscarora'	Crepe Myrtle (Pink flowering)	8 x 4 m
Malus species and cultivars	Crabapples	6 x 6 m
Melia azedarach 'Elite'	White Cedar	12 x 10 m
Pistacia chinensis	Chinese Pistachio	8 x 8 m
Platanus orientalus	Oriental Plane	15 x 10 m
Platanus x acerifolius	London Plane	20-25 x 15-20 m
Quercus canariensis	Algerian Oak	15 x 10 m
Quercus cerris	Turkey Oak	15 x 10 m
Quercus robur	English Oak	10 x 8 m
Ulmus parvifolia	Chinese Elm	10 x 10 m
Zelkova serrata 'Green Vase'	Japanese Zelkova	15 x 10 m

Criteria for suitable canopy vegetation types for use in exotic vegetation type:

- Minimise the use of Eucalypt style species in these precincts. Evergreen trees are preferably to have large textural or glossy green leaves and with characteristics that complement the deciduous trees and are not identifiably 'Native Australian'.
- Deciduous trees are proven to be relatively hardy in more extreme weather events including strong winds and extended heat.
- Shrubs and ground covers to preferably have a greener and more exotic character, however they can include native and indigenous species.

6.5 Guideline 4
Maximise the retention of existing canopy trees

Guideline 4.1

Prioritise the retention of significant and large canopy trees on private land. Where there are a number of trees on the site, the retention of large canopy trees is to be prioritised over the medium and small canopy trees. This is irrespective of whether there is a proposal to develop the site or not.

Guideline 4.2

Require assessments lodged with tree removal applications to demonstrate how the application has minimised the loss of trees on the basis that Council is seeking to maximise the retention of existing mature canopy trees. This is to include a site context report with reference to the existing and preferred landscape character of the site and location and it may include remedial arboricultural works to be carried out to prolong the health of the tree, as described in Recommendation 7.4.1.

Guideline 4.3

Developments are to incorporate the requirements of Australian Standards *AS 4970-2009 Protection of trees* (or its equivalent current Australian Standard) and *AS 4373-2007 Pruning of amenity trees* for remedial works to the tree canopy.

Decision guidelines for retaining large canopy trees:

a) Avoid removal of existing long-lived large canopy trees.

b) Prioritise remedial action in preference to removal in accordance with the new guidelines recommended to be prepared by Council as described in Recommendation 7.4.1 in the Strategy. For example undertake remedial arboricultural works or modify the built form/structural foundations/footings/road construction technique to allow retention of the tree where possible.

c) If removal is the only option, then planting and maintenance of at least 3 trees of the same species, or a species specified by Council will be required on the site as compensation for the loss.

6.6 Guideline 5
Plant new canopy trees

6.6.1 Private land

Guideline 5.1

Plant a minimum number of large canopy trees in the front setback in accordance with the performance criteria in Table 6-6.

Guideline 5.2

Provide an adequate side boundary setback to retain and plant medium to large canopy trees between properties and achieve emergent canopy to break up the roofline of built form.

Guideline 5.3

Use the Australian Standards *AS2870-2011 for Residential slabs and footings* to determine the minimum area required for the tree to establish in terms of minimum off-set from adjoining built form.

Guideline 5.4

Refer to the key performance criteria and typical species palettes suitable for each of the Preferred vegetation types. Refer to the performance criteria for the selection of appropriately sized trees in Table 6-6 in this Strategy.

Table 6-6 Performance criteria for new trees in Monash (excluding street trees)

Setback and tree size	Criteria
Standard residential	
1. Front setback 7.6 metres or greater Minimum of 3No. large canopy trees in the front setback and a minimum of 2 No. small canopy trees. Where only 2No. large canopy trees are feasible, then a minimum of 3No. additional medium sized trees are required. Minimum of an additional 2No. large canopy tree or 4No. medium canopy trees elsewhere on the lot (i.e. in the side and rear setback)	a) Large canopy tree (as defined in this Strategy) b) Long-lived tree (80 years plus) c) Structurally sound, good quality planting stock free of structural defects. d) Provide summer shade and winter sunlight access to paved surfaces and north and west facing windows of the main areas of the dwelling/workplace. This may include sparse shade that is typically provided by Eucalypt species e) Demonstrate they are suitable for the existing soil profile. This includes demonstrating that the building and footing design takes into account the proposed tree location and demonstrates it meets the relevant Australian Standards including *AS2870-2011 for Residential slabs and footings*, in relation to the proposed footing and building design f) Provide a natural soil/garden bed/grassed area around the tree of at least 15 square metres. Where this is not

Setback and tree size	Criteria
	feasible, demonstrate that the planting conditions will be conducive to the growth and ultimate size of the tree g) Are suitably hardy enough to grow without irrigation in non-drought conditions (other than during the first two years of establishment) h) Mature tree canopy will emerge above the roofline of the proposed built form to provide adequate shade and break up the built form (with the exception of 4-storeys plus) i) The conditions will allow for the proposed tree to assume its natural form within reason and not require hedging or pollarding j) Selected tree species is consistent with the Preferred landscape character type described in Section 5.5.
2. Front setback of between 7.5 and 4.0 metres Minimum of 2No. large canopy trees in the front setback and 2 No. medium and small sized trees elsewhere on the lot. Minimum of 1No. large canopy tree or 2No. medium canopy trees elsewhere on the lot (i.e. in the side and rear setback)	a) Medium canopy tree (as defined in this Strategy) b) Long-lived tree (50 years plus) c) Refer to all criteria listed in above from 1(c) to 1(k)
3. Front setback of less than 3.9 metres Minimum of either 1No. large canopy trees, or 2No. medium canopy trees. Minimum of an additional 1No. medium canopy tree or 2No. small canopy trees elsewhere on the lot (i.e. in the side and rear setback)	a) Small canopy tree (as defined in this Strategy) b) Long-lived tree (30 years plus) c) Refer to all criteria listed in above from 1(c) to 1(k)
Medium to high density residential	
4. All front setbacks Minimum of 2No. large canopy trees. Minimum of some planting, either fastigiate trees/hedges to side and rear setbacks, or as a minimum a combination of shrubs/ground layer planting and climbers in the side and rear setbacks to provide greening.	a) Large canopy tree (as defined in this Strategy). b) Long-lived tree (80 years plus) c) Refer to all criteria listed in above from 1(c) to 1(k)

Table 6-6 Performance criteria for new trees in Monash (excluding street trees) *continued...*

Setback and tree size	Criteria
All residential types	
5. Canopy trees located in the 35 square metres of private open space Minimum of 1No. large canopy tree or 2No. small canopy trees.	a) Provides summer shade and winter sunlight access to all living areas of the dwelling. b) Emergent above the roofline of the proposed dwelling. This is likely to result in the use of a tall columnar species rather than a broad spreading canopy tree. c) Long-lived tree species (50 years plus). d) Adjacent slab and footings are designed to meet the requirements of the tree. The plans are to demonstrate the building is designed to allow for the mature size of the proposed tree in accordance with the relevant Australian Standards including *AS2870-2011 for residential slabs and footings*.

6.6.2 Public open space

Guideline 5.5

Plant new long-lived large canopy trees in the parks and reserves, guided by design plans for the open space. Plant trees in appropriate locations that will maximise their health and longevity, while retaining areas for recreational use. (For example, open grassed areas in open space are important for informal recreational activities. Rather than plant trees through the open grassed areas which would interrupt their use, planting them to the perimeter to frame these areas will improve their character, provide shade and make them more attractive to use.)

Guideline 5.6

New tree species selection to be guided by the Preferred landscape character type and vegetation type in which the open space is located. For overall guidelines on selection of appropriate large canopy trees, refer to Table 6-6, Item 1.

Guideline 5.7

Where appropriate, increase the diversity of tree species planted in the open spaces, particularly given that conditions in the parks are usually more favourable for tree growth where there is more space.

6.6.3 Streetscapes

Guideline 5.8

Increase the presence of large canopy trees in streetscapes where there is suitable space for them to establish. This will include a greater emphasis on site preparation for planting including the use of passive irrigation (WSUD) and other measures if required including structural soils and root barriers where space is limited in high density precincts. Refer to Table 6-7 for performance criteria for street trees.

Table 6-7 Performance criteria for street trees

Naturestrip width	Criteria
2.5 metres wide or greater	i) Large canopy tree (as defined in this Strategy) ii) Long-lived tree (80 years plus) iii) Structurally sound, good quality planting stock free of structural defects. iv) Tolerant of urban and dry conditions. v) Selected tree species is consistent with the Preferred landscape character type described in this Strategy and the tree lists included in the Monash Street Tree Strategy. vi) Consider alternating deciduous and evergreen planting styles in east-west streets for summer shade and winter sunlight to the streetscapes.
From 2.4 to 2.0 metres wide	i) Medium canopy tree (as defined in this Strategy) ii) Long-lived tree (50 years plus) iii) Structurally sound, good quality planting stock free of structural defects. iv) Tolerant of urban and dry conditions. v) Selected tree species is consistent with the Preferred landscape character type described in this Strategy and the tree lists included in the Monash Street Tree Strategy. vi) Consider alternating deciduous and evergreen planting styles in east-west streets for summer shade and winter sunlight to the streetscapes.
From 1.9 to 1.5 metres wide	i) Small canopy tree (as defined in this Strategy) ii) Long-lived tree (30 years plus) iii) Structurally sound, good quality planting stock free of structural defects. iv) Tolerant of urban and dry conditions. v) Selected tree species is consistent with the Preferred landscape character type described in this Strategy and the tree lists included in the Monash Street Tree Strategy vi) Consider alternating deciduous and evergreen planting styles in east-west streets for summer shade and winter sunlight to the streetscapes.
Less than 1.4 metres wide	i) Consider the option of planting trees into roadside cut-outs where the road pavement width is a minimum of 6 metres wide. The road pavement cut-outs will be able to accommodate Medium to Large street trees.

Naturestrip width	Criteria
No naturestrips Trees planted into road pavement cut-outs/tree wells	i) Large and Medium canopy trees (as defined in this Strategy) relative to the road pavement width. Road pavements greater than 7 metres width to have Large canopy trees, and less than 7 metres may have Large or Medium sized canopy trees. ii) Long-lived trees (Large 80 years plus, Medium 50 years plus) iii) Structurally sound, good quality planting stock free of structural defects. iv) Tolerant of urban and dry conditions. v) Selected tree species is consistent with the Preferred landscape character type described in Section 6.4 and Appendix A of this Strategy and the tree lists included in the Monash Street Tree Strategy vi) Consider alternating deciduous and evergreen planting styles in east-west streets for summer shade and winter sunlight to the streetscapes.

6.7 Guideline 6
Requirements for landscape plans

Guideline 6.1

Landscape plans are required to be submitted to Council as part of the planning permit process and will need to be consistent with current Monash Landscape Plan Guidelines and will include a minimum of:

- Scaled, accurate Existing Conditions Plan preferably based on a feature and level survey. The Plan will clearly show and label all existing trees and vegetation areas to be retained and removed.
- Where the site has existing trees, a report prepared by a qualified Arborist.
- Landscape Plan/s showing the proposed works, including clearly showing all proposed surface treatments, existing vegetation, vegetation to be removed and proposed new vegetation. The Landscape Plan is to include at least a brief design statement that explains how the plan is consistent with the Preferred landscape character type, as described in Appendix A of this Strategy.

6.8 Guideline 7
Permit conditions

Guideline 7.1

Permit conditions will be included for approved applications to ensure nominated trees are retained and that landscape plans are endorsed and implemented. Appropriate conditions include, but are not limited to:

- Preparation and endorsement of a landscape master plan/detailed landscape plan. Normally a detailed landscape plan will be the requirement but both types of plans will be required for larger sites with masterplans/multiple lots.
- Landscape works are to be completed.
- Establishment and maintenance of landscaping, with minimum of 2 years maintenance prior to hand over to Council, where the works are undertaken on public land.
- Tree retention including minimum of 12 months maintenance of the retained tree following completion of works to confirm it has not been damaged as part of the works. Where the retained tree is to be handed over to Council, a minimum of 2 years maintenance will be required prior to hand over.
- Tree protection during construction in accordance with Australian Standard *AS 4970-2009 Protection of trees on development sites* (or successor).
- Prohibited works within the tree protection zone.
- Pruning of trees by a qualified arborist in accordance with Australian Standard *AS4373-2007 – Pruning of Amenity Trees* (or successor).
- Storage and disposal of landscaping materials.
- Removal, replacement and planting of street trees.

7. Implementation recommendations

7.1 Implement the Strategy in the Monash Planning Scheme

Council to prepare a planning scheme amendment to include the following:

Municipal Strategic Statement

In the MSS, update and expand the definition and purpose of Garden City character, particularly with respect to the contemporary understanding of the importance of green spaces. Reference benefits such as community health and wellbeing, sense of place, climate change response, habitat protection and enhancement, and providing a point of difference for investors and employers of commercial and industrial land.

Include a new section in the MSS or Local Planning Policies to introduce the Existing and Preferred landscape character types prepared as part of this Strategy. These are to be used in the future assessment of all planning applications irrespective of whether the land is included in an overlay.

Local Planning Policies

Use a local planning policy to call up the Section 6 guidelines and to guide the exercise of discretion with respect to tree removal and landscape plans. For example, how Council will use the Strategy and the new guidelines (as set out in this Section 6) in decision making for any planning application or emergency application involving tree removal, the assessment of building setbacks as they affect landscape plans for new development, the amount and location of green space in the landscape plan and the species selection.

Guidelines as an incorporated document

Prepare an incorporated document to include the definitions and guidelines contained in this Strategy and introduce the document into the planning scheme as part of the amendment.

Use of Overlays

Extend the current planning protections to strengthen the role of the vegetation as an essential element of the Garden City. This direction is consistent with and supported by international best practice, Plan Melbourne (2016) and contemporary changes to the Victorian planning provisions requiring minimum garden areas in residential developments and tree planting for apartment projects. The following directions should inform the use of an overlay:

- Trigger the need for a planning permit to remove significant trees identified by Council and canopy trees as defined by this Strategy to support the retention and expansion of canopy tree cover. Permit triggers will need to be assessed but can be expected to be more expansive than the current permit trigger in the Vegetation Protection Overlay.
- Emphasise the habitat significance of waterway corridors and adjoining private land and the landscape requirements for these areas (This action refers to the Indigenous Tall Eucalypt Landscape Character Type.)
- Protect the ridgelines where built form can become dominant if designed without regard for the height of the tree canopy.
- Protect special landscape character precincts that represent the different periods of development in the municipality.
- Require use of the Existing and Preferred landscape character types for permits triggered by an overlay.

7.2 Planning for the Monash National Employment and Innovation Cluster, commercial/industrial precincts, activity centres and strategic sites

7.2.1 Update the urban design guidelines

Update the Landscaping component of the Urban Design Guidelines – Monash Technology Precinct to design future wide landscape front setbacks to incorporate urban greening and contribute to the health and wellbeing of the employment community. This is to be achieved by designing the front setbacks to be dynamic, social, activated green and inviting spaces that contribute to the *Garden City Character*, and the unique point of difference for the Monash National Employment and Innovation Cluster. Refer to the Guideline 2 in Section 6.3 for the design outcomes to be achieved in these setbacks.

7.2.2 Future structure plans for the Monash National Employment and Innovation Cluster

Council to work with the Victorian Planning Authority to ensure that structure plans for the Monash National Employment and Innovation Cluster align with the preferred outcomes and guidelines of this Strategy, both for the public realm and private land development.

Council's structure plans and other plans and policies for activity centres, commercial/industrial areas and strategic redevelopment sites should align with the preferred outcomes and guidelines of this Strategy, both for the public realm and private land development.

7.3 New local law to protect significant trees and canopy trees

Introduce a local law to provide protection for significant trees and canopy trees. A local law can be used to protect individual trees in areas of the municipality where the canopy trees are more scattered and a planning scheme overlay is not strategically supported.

There is ample precedent for this approach as demonstrated by several Victorian councils that have introduced a local law for tree protection. In Melbourne the councils using this type of local law include (amongst others) Bayside, Boroondara and Port Phillip. This approach is recognised as a legitimate alternative to a planning scheme overlay. It appears to be especially useful where there is limited or scattered tree cover, which reduces the justification for a specific planning scheme provision, and where a planning permit is not otherwise needed, e.g. for site redevelopment. A local law may offer a more straight forward method of regulating trees in the municipality and its adoption would also provide the opportunity to introduce a community education program around trees

When drafting the local law, draw on the information and guidance contained in this Strategy. Key elements will include:

- Purpose, application, powers of the local law.
- Definitions for canopy trees and significant trees to be protected.
- The permit application process, forms, fees and requirements for applicants seeking removal or lopping (etc.) of a tree covered by the local law.
- Tree protection requirements and bonds for site and infrastructure works.
- Guidance on assessments for tree protection and tree removal.
- Guidance on assessments for emergency tree removal.
- Reference to remedial arboricultural works.
- Permit conditions and permit cancellation.
- Enforcement notices and fines

7.4 Recommendations to support planning permit assessments and the local law

7.4.1 Prepare new guidelines for tree protection and pruning on development sites

Prepare a comprehensive set of tree protection guidelines that are based on *AS 4970-2009 Protection of trees on development sites* (or its equivalent current Australian Standard) and *AS 4373-2007 Pruning of amenity trees* for the remedial works to the tree canopy. The guidelines will assist the developers in relation to designing the development to meet the Australian Standards and Council requirements regarding tree protection. This will also provide clarity and transparency for both the developer and the Council in relation to assessing the planning application for the development. The tree protection guidelines are to include:

- The space and offsets required from the tree to buildings and other built infrastructure to ensure the trees can be effectively managed and retained in the long term.
- Specify appropriate tree protection bonds that are payable to Council prior to commencement of works on the development site. This is to increase the chances of tree protection on the site and also on adjoining sites, including the street tree/s.
- Development applications are recommended to include the following information about existing tree as a minimum to provide suitable material to Council for assessment of the planning application including the protection of existing trees including:
    - An assessment and description of existing trees including the botanical and common name.
    - The landscape life expectancy (which is the estimated life expectancy range being the minimum number of years a tree could be expected to live in a reasonably healthy and safe condition given moderate weather conditions and if the reasonable maintenance works are carried out in a timely manner).
    - Priority given to long-lived species (80 years, with estimated life expectancy remaining of 10+ years).
    - An assessment of each individual existing tree by a suitably qualified Arborist that describes or categorises the health and structure of each tree. Where the tree is in good to fair health then this is described, or alternatively where there is poor structure, the report is to include recommendations as to how poor health or structure can be remediated or managed using arboricultural techniques.
    - Adequate space and conditions to be conducive to the growth and ultimate size of the tree.
    - Demonstrate that the existing tree has been taken into account as retained in the building plans, and that the slab and footing design meets relevant Australian Standards including *AS2870-2011 for Residential slabs and footings*.
    - Demonstrate that the conditions will allow for the existing tree to retain its natural form within reason and not require hedging or pollarding.
    - Demonstrate that the potential risk from shedding branches etc has been allowed for in the development layout and landscape design beneath the tree's canopy.

7.4.2 Best practice method for assessing tree removal applications

This Strategy recommends prioritising remedial arboricultural work to trees in preference to removals. This requires a change from the existing process where trees are removed in preference to remedial work. This change in approach will need to be communicated to the arborists that undertake assessment work in the municipality.

Update the process for assessing tree removal applications to minimise the loss of trees on the basis that Council is seeking to maximise the retention of existing mature canopy trees. This is recommended to be updated to:

- Include an assessment of the tree in its site context. This will include the Existing and Preferred landscape character type as described in Appendix A and the presence, location and types of trees on the sites that directly adjoin the property (including in the streetscape).
- Prioritise remedial arboricultural works in preference to removal, to minimise tree canopy loss. For example, where the Council prepared arborist assessment report recommends that remedial works can be undertaken instead of removal, then this informs the Council decision to retain the tree, rather than agree to removal. Arboricultural works should aim to preserve the health of the tree for a minimum of 10 years.

7.4.3 Guidelines for retention of large canopy trees

Council to prepare specific guidelines to support retention of large mature trees on public and private land when redevelopment occurs. This includes in structure plan areas, activity centres and on strategic redevelopment sites.

This advice could also be used to supplement the local law (where a planning permit is not required), and is to be developed to provide clear guidance on determining the priorities of which tree/s are retained, particularly in sites with a number of existing trees.

7.4.4 Management of canopy vegetation in public open space

Council to prepare Canopy Vegetation Management Plan for public open space. This will focus on:

- Management guidelines for existing long-lived large canopy trees in public open space in accordance with relevant Australian Standards (e.g. *AS 4373-2007 Pruning of amenity trees*). This will include consideration of appropriate levels of irrigation during extended dry periods, higher level of monitoring of the health and proactively managing them to avoid catastrophic damage or loss, particularly within the context of forecast climate change and increased severe weather events. The focus of the management guidelines will be on maximising the retention of mature trees.
- Guidelines for appropriate species selection and planting consistent with the Existing and Preferred landscape character types along with other includes including the need for species diversity, cultural landscape values, response to open space character and use, sustainable water use and resilience to climate change.

.

7.4.5 Review the approach to management of street trees

Council to review the assessment criteria for prioritisation of the street tree planting program in the context of this Strategy and documented decline in tree canopy cover between 1992 and 2015. Specifically this includes:

- Aim to protect where feasible the mature canopy street trees in recognition of their important role in mitigating the impacts of climate change. Street tree removals to be a low priority (unless specific safety concerns are specified by an arborist) in precincts where there has been recent canopy tree loss on private land in order to retain some mature canopy tree cover until canopy trees on private land have become established.
- Aim to plant large canopy street trees where feasible so that Council provides a leadership role in increasing canopy tree cover in the City of Monash in the future.
- Maximise the potential shading that the street tree provides to the road pavement area and footpath in preference to planting small trees under powerlines. It is noted that the objective is to achieve excellent shading and canopy cover to the street therefore managing the larger canopy trees around the powerlines will achieve more canopy cover and shade than small trees that do not reach the height of powerlines.
- Review tree pruning techniques under power lines to meet best practice, which is currently Australian Standard *AS4373-2007 Pruning of amenity trees*.
- Afford a higher level of management and maintenance to the existing large canopy street trees to maximise their health, structural integrity and resilience. This may include civil design works to For example:
  - Aerial bundle cable wires to minimise required clearance pruning that can be damaging to mature large canopy trees.
  - All pruning of trees to be in undertaken by qualified personnel and as a minimum in accordance with *AS 4373-2007 Pruning of amenity trees*, and other relevant standards and requirements from power authorities.
  - Consider options to modify the road layout to retain and improve the health and longevity of large canopy trees. For example, modify the kerb and channel profile, modify the permeability of the road pavement surface etc.
  - During periods of extended drought, develop management protocols to ensure that appropriate levels of irrigation are in place to protect the large canopy trees and minimise loss or long-term damage to the canopy trees.

7.4.6 Prepare landscape guidelines

Council to prepare landscape guidelines to supplement the Residential Checklist that is available on the Council's website. The landscape guidelines will assist land owners, developers, designers and consultants, providing them with a clear direction of Council's preferred outcome for private and public landscaping based on the aims in this Strategy. This will include good site planning to maximise tree retention and green open spaces and the appropriate selection and establishment of new trees including matters relating to the appropriate extracts to provide direction for developers to meet *AS2870-2011 for Residential slabs and footings* regarding distance from footings and design of building foundations.

7.4.7 Trees on other public land

Council to investigate options to advocate for and facilitate retention of existing long-lived large canopy trees. Some of the schools, university and TAFE sites have large remnant indigenous trees and they may be subject to loss through building programs and/or risk issues.

7.4.8 Significant tree study

In the longer term, Council to prepare a Significant Tree Study to:

- Document the existing large canopy trees in the municipality.
- Broaden the appreciation of the cultural landscape heritage value of these trees.
- Broaden the appreciation of the contribution these trees make towards the sense of place, the *Garden City Character* and community health and wellbeing.

7.4.9 Protect examples of the Post WWII garden suburban style

Council to identify the best remaining examples of the Post WWII garden suburban style detached dwellings. These will be representative of the era in which they were established from 1945 to 1965. The key features include:

- Original detached dwellings with the original setbacks between the dwellings retained.
- Low or no front fence.
- Dominance of the canopy trees from the era in which the dwelling was constructed.
- Modest vehicle driveways and car ports/garage.

Council to undertake a heritage assessment with a focus on the cultural heritage landscape values along with the architectural character, and expand the Heritage Overlays and controls to protect the best examples where required.

7.5 Community education and engagement

7.5.1 Information packs for new residents, land owners and developers

Prepare and distribute 'Information Packs' within the Monash context inclusive of:

- The beneficial effects of canopy vegetation, particularly large mature trees, on community health and wellbeing, biodiversity values, the landscape character and how they mitigate the effects of climate change. This Strategy contains useful research and information to be used in preparing the education materials.
- The relevant summary sheet of Existing and Preferred landscape character type.
- The relevant suggested tree species planting list from the Guidelines in Section 6.
- Encouragement to retain trees on site when considering renovations and new builds.
- Inclusion of other relevant material already produced by Council including the Gardens for Wildlife Booklet for residents, land owners and developers in the *Creek habitat corridor, Creek valley environs* and the *Hilly native garden suburban* preferred landscape character types.

7.5.2 Tree retention

In combination with the above action, encourage land owners and developers to retain and plant new trees on their properties where feasible so that it is possible to maintain their natural form without hedging and shaping the trees. This is to maximise the benefits of shading and overall structural health and longevity of the tree, and the tree's contribution to the site and to the tree canopy cover of the municipality. An education program will be assisted through the preparation of the materials described in this Strategy.

7.5.3 Community groups

Work with established community groups and organisations to communicate and promote the beneficial effects of canopy trees. Draw on the experience and passion of community champions in implementing community education and planning initiatives.

7.5.4 Garden tours

Introduce garden tours, awards and other incentives to showcase good examples of tree retention and planting and the use of plants that provide multiple benefits of greening as described in this Strategy.

7.5.5 Assistance with private landscaping

Give residents access to an experienced landscape designer or horticulturalist (with a proven track record) to provide advice to residents on plant selection for their Preferred landscape character type and the availability of local plant sources, say at a subsidised rate.

8. Monitoring and review

Implementation and monitoring of the Strategy will aim to:

- Establish a committee with representatives from strategic and statutory planning, environment, communications, urban design and open space to oversee the implementation of this Strategy to ensure ongoing commitment and awareness of it within the organisation.
- Determine and establish an appropriate method of measuring and recording the effectiveness of the planning and regulatory controls on tree canopy loss. This may include undertaking canopy mapping for the municipality periodically (for example at 5 year intervals) on a precinct basis using i-Tree Canopy software.
- Regularly monitor the implementation of the Strategy to assess the progress and success of the recommendations.
- Review the Strategy at the 5-year point to monitor its implementation.
- Integrate the implementation of the Strategy with other existing and future Council plans, local laws and practices.

Glossary

Abbreviation/Term	Definition for this Strategy
Activity centre	Suburban centres that provide a focus for services, employment, housing, transport and social interaction. *Source: Plan Melbourne*
Biodiversity	Biodiversity (biological diversity) is the variability among living organisms from all sources, including terrestrial, aquatic, marine and other ecosystems and the ecological complexes of which they are part, at all levels of organisation, including genetic diversity, species diversity and ecosystem diversity. *Source: Australia's Biodiversity Conservation Strategy 2010-2030.*
Canopy	An almost continuous stratum of foliage formed by the crowns of trees. Source: *A Dictionary of the Natural Environment, 1978*
Canopy tree	A perennial plant having a permanent, woody, self-supporting main stem or trunk, usually growing to a considerable height and usually developing branches at some distance from the ground. There is no minimum or maximum height, however for the purposes of this the Strategy the canopy trees are generally greater than 3 metres in height. Canopy refers to the upper stratum of foliage.
Canopy vegetation	Canopy refers to the upper layer formed by shrub and tree crowns including the extent of the outer layer of leaves of an individual tree and shrub or group of trees and shrubs.
Cultural significance	Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups. The term cultural significance is synonymous with cultural heritage significance and cultural heritage value. Source: *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013 edition*
Eucalypt style	Refers to three genus of the *Myrtacea* family that are commonly referred to as 'Eucalypts' or 'Gum trees', and include *Eucalyptus*, *Corymbia* and *Angophora*.
EVC	Ecological Vegetation Class, which are the standard unit for classifying vegetation types in Victoria. *(Source: Department of Environment, Land, Water and Planning Website, June 2017).*
Groundcover	A low spreading plant which covers the earth and retards the growth of weeds. *Source: Macquarie Dictionary, 5th Edition.*
High density	Housing types are typically apartments and shop top housing that is 4 storeys or more and can form part of mixed-use developments.
Landscape	Landscape refers to the inherent natural physical features of the land combined with the human influences including land use and cultural heritage.
Landscape character	Landscape character is the interplay of the geology, topography, vegetation, water bodies and other natural features, combined with the effects of land use, the built development and local statutory requirements.
Medium density residential	Housing types are typically diverse and may include attached and semi-detached houses and 2 to 3 storey townhouses and multi-unit developments.
MSS	The Municipal Strategic Statement is part of the Planning Scheme's Local Planning Policy Framework containing strategic planning, land-use and development objectives for the relevant planning authority.

Abbreviation/Term	Definition for this Strategy
Public realm	All the publicly owned land including streetscapes, public open space, urban plazas, railway reserves, road reserves and the other government owned land such as schools, public hospitals, universities etc.
Shrub	A woody perennial plant smaller than a tree, usually having permanent stems branching from or near the ground. *Source: Macquarie Dictionary, 5th Edition.*
Tree	Perennial plant having a permanent, woody, self-supporting main stem or trunk, usually growing to a considerable height and usually developing branches at some distance from the ground. There is no minimum or maximum height. *Source: Macquarie Dictionary, 5th Edition.*
Urban character	Urban or neighbourhood character is essentially the combination of the public and private realms. Every property, public place or piece of infrastructure makes a contribution, whether great or small. It is the cumulative impact of all these contributions that establishes neighbourhood character. *Source: Planning Practice Note 43, Understanding Neighbourhood Character, June 2015.*
Urban heat island effect (UHI)	UHI is the cumulative effect of modifying the natural environment through urbanisation including the covering of the soil surface, causing a rise in temperature of any urban area. This results in a defined, distinct "warm island" among the "cool sea" of lower temperatures of the surrounding nearby natural landscape. The urban surfaces are prone to store and release large quantities of heat.
VPA	Victorian Planning Authority
WSUD	Water Sensitive Urban Design (WSUD) is a philosophical approach to urban planning and design that aims to minimise the hydrological effect of urban development on the surrounding environment *Source: WSUD Engineering Procedures, CSIRO.*

References

202020 Vision (undated) **Where Are All The Trees? An analysis of tree cover in urban Australia** A summary of findings in the 2014 study *Benchmarking Australia's Urban Tree Canopy*

City of Monash (2004) **Monash Development Guide - Part 3 Neighbourhood Character Study**

City of Monash (2013) **VPO Advice - Tree Removal or Tree Works Within the VPO Area**, Monash Development Guide 24 September 2013

City of Monash (2014) **Monash 2021 - A Thriving Community - Council's Snapshot Report on progress towards achieving our long term strategy**

City of Monash (2015) **Amendment C125: Proposed zones**, Map

City of Monash (2015) **City of Monash Environmental Sustainability Strategy 2016-2026**, Draft 29 September 2015

City of Monash (2015) **Council Plan 2013 - 2017 - Major initiatives and services for 2015/16**

City of Monash (2015) **Draft Monash Street Tree Strategy**, from City of Monash website

City of Monash (2015) **Feedback on Draft Street Tree Strategy**, Online submission form from City of Monash website

City of Monash (2015) **Motion carried at 27 October 2015 Council meeting**, from City of Monash website, 2015

City of Monash (2015) **Proposed residential zone changes to undergo further review**, from City of Monash website, 1 December 2015

City of Monash (2015) **Vegetation Protection Overlay**, from City of Monash website, 20 February 2016

City of Monash (2015) **Amendment C125 & C120 New Residential Zones - Schedule changes summary table**, Report from Council meeting 24 November 2015

City of Monash (Undated) **Annual Report 2014/15**

City of Monash (undated) **Assessment Form for Trees Affected by the Vegetation Protection Overlay (VPO) TP391**

City of Monash (undated) **Monash Housing Strategy, Residential Development Framework Map**, Report from Council meeting 24 November 2015

Deakin University (2010) **Beyond Blue to Green : The Health Benefits of Contact with Nature in a Park Context** Prepared by Professor Mardie Townsend and Ms Rony Weerasuriya.

Deakin University and Parks Victoria(March 2008) **Health Parks, healthy people – The health benefits of contact with nature in a park context A review of relevant literature** Prepared by the School of Health and Social Development.

Institute for Sustainable Futures, University of Technology, Sydney (2014) **Benchmarking Australia's Urban Tree Canopy: An i-Tree Assessment**, Final report May 2014

Kardan, O et al (2015) **Neighborhood greenspace and health in a large urban center** Sci. Rep 5, 11610; doi: 10.1038/srep11610 www.nature.com/scientificreports

Loughnan, ME, Tapper, NJ, Phan, T, Lynch, K, McInnes, JA (2013) **A Spatial Vulnerability Analysis of Urban Populations During Extreme Heat Events in Australian Capital Cities**, Final report, National Climate Change Adaptation Research Facility, Monash University, Gold Coast, 128pp March 2013

Nowak, DJ et al (2014) **Tree and forest effects on air quality and human health in the United States, Environmental Pollution** 193 (2014), 119-129, published by Elsevier www.elsevier.com/locate/envpol

Parliament of Victoria (2012) **Inquiry into Environmental Design and Public Health in Victoria**, Final Report May 2012, prepared by the *Legislative Council Environment and Planning References Committee*

Planisphere (2014) M**onash Housing Strategy 2014**, Final Report prepared for Monash City Council 28 October 2014

Planisphere (2015) **Neighbourhood Character Review**, Consultation Draft Report prepared for the City of Monash February 2015

Planning Panels Victoria (2013) **Monash Planning Scheme Amendment C115 - Vegetation Protection Overlay Schedule 1 - Tree Protection Area**, Panel Report 13 August 2013

Urban Initiatives, GW Arboriculture, May Horticulture Services and City of Monash (2015) **City of Monash Street Tree Strategy**, Draft Street Tree Strategy, November 2015

Victorian Government (2014) **Plan Melbourne - Metropolitan Planning Strategy** Map 13 - Monash Employment Cluster

Victorian Government (2014) **Plan Melbourne Metropolitan Planning Strategy**, prepared by the Department of Transport, Planning and Local Infrastructure

Victorian Government (2014) **Reformed Residential Zones for Victoria**, Fact Sheet July 2014

Victorian Government (accessed 2016) **Monash Planning Scheme - 42.02 Vegetation Protection Overlay**

Victorian Government (accessed 2016) **Monash Planning Scheme - Schedule 1 to the Vegetation Protection Overlay**

Victorian Government (accessed 2016) **Monash Planning Scheme, Land Subject to Inundation Overlay - Clause 44.04**

Victorian Government (accessed 2016) **Monash Planning Scheme, Municipal Strategic Statement - Clause 21.02**

Victorian Government (August 1999) **VPP Practice Note – Vegetation Protection in Urban Areas**

Appendix A

Existing and Preferred Landscape Character Precincts

A1	Ashwood | Burwood
A2	Chadstone 1
A3	Chadstone 2
A4	Clayton 1 (Notting Hill residential)
A5	Clayton 2
A6	Glen Waverley 1
A7	Glen Waverley 2
A8	Glen Waverley 3
A9	Glen Waverley 4
A10	Glen Waverley 5
A11	Hughesdale
A12	Mount Waverley 1
A13	Mount Waverley 2
A14	Mount Waverley 3
A15	Mount Waverley 4
A16	Mount Waverley 5
A17	Mulgrave 1
A18	Mulgrave 2
A19	Mulgrave 3
A20	Mulgrave 4
A21	Notting Hill (non-residential use)
A22	Oakleigh
A23	Oakleigh East
A24	Oakleigh South 1
A25	Oakleigh South 2
A26	Wheelers Hill 1
A27	Wheelers Hill 2
A28	Wheelers Hill 3

Appendix B

Case studies regarding canopy vegetation loss

B1 Case Study 1

B1.1 Location

Angus Drive is in Glen Waverley 1 landscape character precinct and is a residential area within a Vegetation Protection Overlay. The 1997 Urban Character Study described the character as:

'The character of this area is set mainly by the predominance of the double and triple fronted pressed cream and pink brick veneer small scale single storey residences set on the slopes of Scotchmans Creek valley.

B1.2 Canopy vegetation cover

There has been a reduction in tree canopy cover, garden beds and grassed areas, with an increase in the hard surfaces as shown in the following diagram:

B1.3 Comparison between the 1992 and 2015 aerial photographs

The aerial photos show the change in this section of Angus Drive from the original dwellings constructed in the 1950s through to the current state of development in 2016. In this location there are elevated views to the north over the tributary to Scotchmans Creek. A series of large single detached 2 to 3 storey dwellings have been recently constructed on the south side of Angus Street and 2 storey unit developments on the north side of Angus Drive. A key change that is visible in the aerial photos is the increase in hard paved and roof area and the reduction in the green and permeable surfaces. This change directly impacts on the existing landscape character of this area. This case study illustrates the cumulative impact and effect of a number of single dwelling redevelopments over a seven year period.

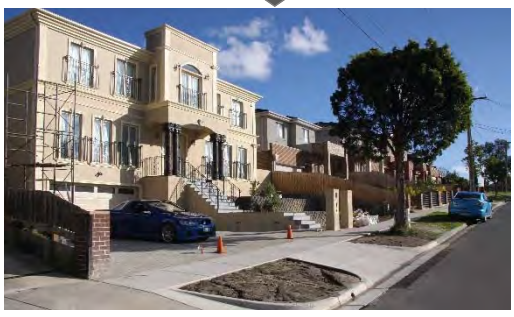
Figure B1 Case Study 1 1992 aerial photo on the left and 2015 aerial photo on the right
Note that the 2015 aerial photo is taken in September and deciduous trees are not as visible compared with 1992 aerial photo which is during summer.

B1.4 Comparison between the landscape character in 2009 and 2016

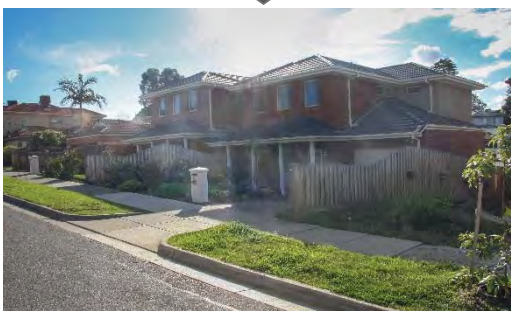
Below are the November 2009 images from Google Street View of Case Study 1, contrasting with the 2016 photos of the same locations.

2009 Google Street View south side Angus Dr

2009 Google Street View north side



2016 Photo south side of Angus Dr



2016 Photo north side of Angus Dr

The photos shown above illustrate the substantial change to the existing landscape character through the increase in built form. This includes the increase in site coverage, height and visual prominence of built form in the street, combined with the removal of canopy trees and shrubs. The example the properties on the south side of Angus Drive have almost entirely paved front gardens with minimal permeable areas of grass or a garden bed. The minimal 1m side setbacks on the south side of the street means there is

no space to plant and establish canopy trees to create a garden setting for these dwellings. The garden setting with grass, garden beds and trees is what contributes to the *Garden City Character* of Monash. This example of recent development does not support and strengthen the *Garden City Character* of Monash.

The 2016 view shows the skyline is dominated by continuous built form rather than viewed through vegetation with emergent tree canopy to break up the rooflines. Additionally, the photos of the north side of Angus Dr illustrate the loss of the street tree from the front of the properties as well.

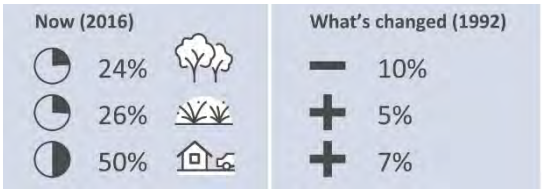
B2 Case Study 2

B2.1 Location

Park Road is located in the Mount Waverley 1 landscape character precinct in a residential area within a Vegetation Protection Overlay. The 1997 Urban Character Study described the character as:
'The area is characterised by a variety of architectural styles, but a general similarity in quality of design and finish. Most of the houses are constructed of red brick and a large percentage are two storey.'

B2.2 Canopy vegetation cover

There has been a reduction in tree canopy cover and an increase in garden bed and grassed areas along with hard surfaces as shown in the following diagram:



B2.3 Comparison between the 1992 and 2015 aerial photographs

The aerial photos show the change of vegetation cover in Park Road over this period. It demonstrates an increase in tree canopy cover on public land associated with Damper Creek, contrasting with the loss of canopy vegetation on private land. A series of 2 lot subdivisions have occurred in Park Road, leading to a loss of canopy vegetation on private land and also street trees in front of the properties that have redeveloped. In this location the private lots are on undulating land in the creek valley overlooking Damper Creek.

Figure B2 Case Study 2 1992 aerial photo on the left and 2015 aerial photo on the right

B2.4 Comparison between the landscape character in 2009 and 2016

Below are the November 2009 images from Google Street View of Case Study 2, contrasting with the 2016 photos of the same locations.

2009 Google Street View west side of the Park Road

2016 Photo of west side of the Park Road

Case Study 2 illustrates the loss of canopy vegetation on private land, particularly the low canopy vegetation between the two storey dwellings and the street. In the context of the

Garden City Character, this example demonstrates a significant change in the balance of built form and greenness. It does also illustrate the value in retaining tall canopy trees, which emerge well beyond the roofline height of the built form, to break up the skyline with vegetation. This case study also illustrates the extent of smaller canopy vegetation in the front gardens that have been removed. This case study shows the contribution that grass, garden bed and small canopy trees makes to the overall greenness and *Garden City Character*.

Attachment

Index of Drawings