

Thermal Comfort

Public Realm and built form both impact thermal comfort. Streets are consistently the hottest places in South Melbourne, with high surface temperatures from wide, low-shaded streets.

As the population, ambient temperature and the frequency of extreme heat events increases, the challenge of urban overheating grows. While this is a global challenge, many of the impacts of urban overheating are experienced at a local level.

Table 1: Frequency of extreme heat days and hot nights projected for Greater Melbourne under a high greenhouse gas emissions scenario (Jalili et al., 2019)

Extreme Heat Days (Days/Year with a Maximum Temperature $\geq 35^{\circ}\text{C}$)	
1991-2019	2020-2050
8.5 days	13.1 to 20.4 days
Hot Nights (Days/Year with a Minimum Temperature $\geq 20^{\circ}\text{C}$)	
1991-2019	2020-2050
5.8 days	13.3 to 15.4 days

Variations in surface temperature are influenced by built form, scale, density and materials. A significant number of dwellings have higher roof surface temperatures which can be attributed to materials from darker or lower performing heritage buildings. Areas of high surface temperatures are in the north-eastern area of business, retail and industrial areas. The lower surface temperature are predominantly seen in heritage residential areas to the south and social housing sites with higher street canopy cover.

To help understand the existing urban overheating challenges facing South Melbourne, the thermal map shows the surface temperature distribution across the study area in April 2020. The significant variations in surface temperature are influenced by differences in the physical urban environment (built form, scale, density, materials, etc.) and land cover (paved, vegetated, water, etc.).

Areas of lower surface temperatures (shown in purple, blue and green) are predominantly seen in the heritage residential areas to the south and the social housing areas where there is a higher street canopy coverage. Within these residential areas, a significant number of dwellings have higher roof surface temperatures which can often be attributed to darker or lower performing materials of heritage buildings.

Areas of higher overall surface temperatures (shown in red, yellow and white) are predominantly the business, retail and industrial areas of the Study Area. Factors that contribute to these higher surface temperatures are the wide unshaded streets, the compact urban context and the large exposed roof surfaces. Importantly, the areas of higher overall surface temperatures are the key redevelopment areas within the South Melbourne Study Area. Therefore, it is crucial that new development effectively mitigates the impacts of urban overheating to protect pedestrian amenity and thermal comfort.



Canopy Cover

Canopy cover is seen in two forms of retail frontages with awnings and street trees. Both provide weather protection and make the areas more attractive. They provide amenity and have a role in the streetscape character and heritage context. The Study Area has 115 shopfront awnings providing more than 2.5km of weather protection. The awnings retain more heat than trees and, combined with overhead power lines, constrain tree canopy growth. Some of the heritage awnings have been repaired and are noted for their convex shape, iron lace work and striped appearance.

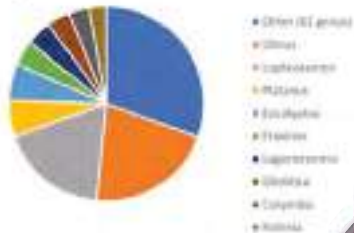
Street Trees

Within the Study Area there are over 2,500 trees located within the road reserve and Council-owned land. Street trees in the study area provide 17% canopy coverage. While most streets have some canopy coverage, tree plantings are lacking along Park Street, City Road, Kings Way and Clarendon Street between Coventry and Park streets. Public parks and public housing estates provide significant green spaces with canopy coverage above 18%. Street trees provide significant benefits including weather protection, thermal comfort, attractiveness, ecological habitat and uptake of surface water. However, South Melbourne tree canopy cover targets are under performing compared to other areas in the municipality.. In part, this is affected by most buildings being built to the property boundary and an abundance of overhead power lines in the road reserves. The age of the tree canopy is mixed, with some mature trees and many younger, smaller specimens. About 68% of trees are in good health.

While there are over 150 tree species planted in the Study Area, 50% of trees come from only five genera: Ulmus (Elm), Lophostemon (Brush box), Platanus (Plane), and Eucalyptus/Corymbia (Gum). The lack of species diversity can diminish the resilience of the urban forest. Around 32% of trees are shown to be in poor health possibly due to difficult growing conditions such as constrained soil volumes, lack of permeable surfaces and space above and below ground for growth.

These areas present the greatest opportunity for increasing canopy cover and understorey planting to convert hardscapes to more sustainable environments. There was a modest 0.6% increase in tree canopy cover across the City of Port Phillip from 2014 to 2018. In that time, South Melbourne parks and gardens experienced a reduced canopy cover of -2.22%. The Greening Port Phillip Strategy will be reviewed in 2022 and recommendations for planting configuration and species will be used to inform future expansion of ecological planting and canopy cover.

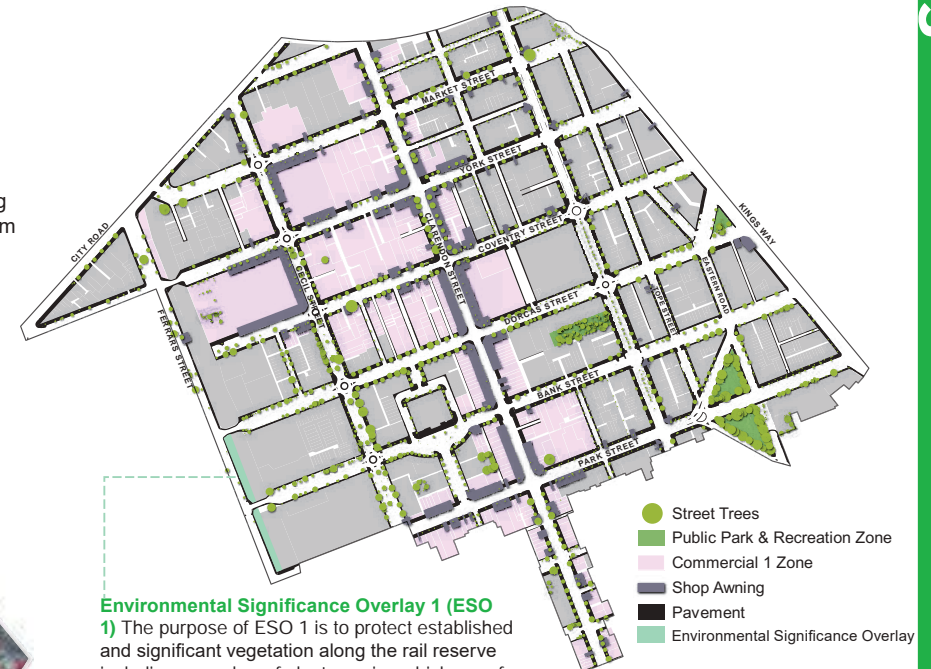
Tree genera in South Melbourne



Normalised Difference Vegetation Index (NDVI)

NDVI measures the ratio of the reflective difference in the red and near-infrared portions of the spectrum to the sum of red and near-infrared reflectance.

Green, healthy vegetation reflects light in the near-infrared portion of the spectrum and absorbs red light. NDVI ranges from values of 1.0 to -1.0 where larger, positive values indicate green vegetation.



Environmental Significance Overlay 1 (ESO 1) The purpose of ESO 1 is to protect established and significant vegetation along the rail reserve including a number of plant species which are of high local or regional significance within the Port Phillip region.



View of the ESO 1 from the Bank Street Bridge

South Melbourne Emerald Hill

1850

