

Northern Beaches Council Draft Urban Tree Canopy Plan 2018



northern
beaches
council



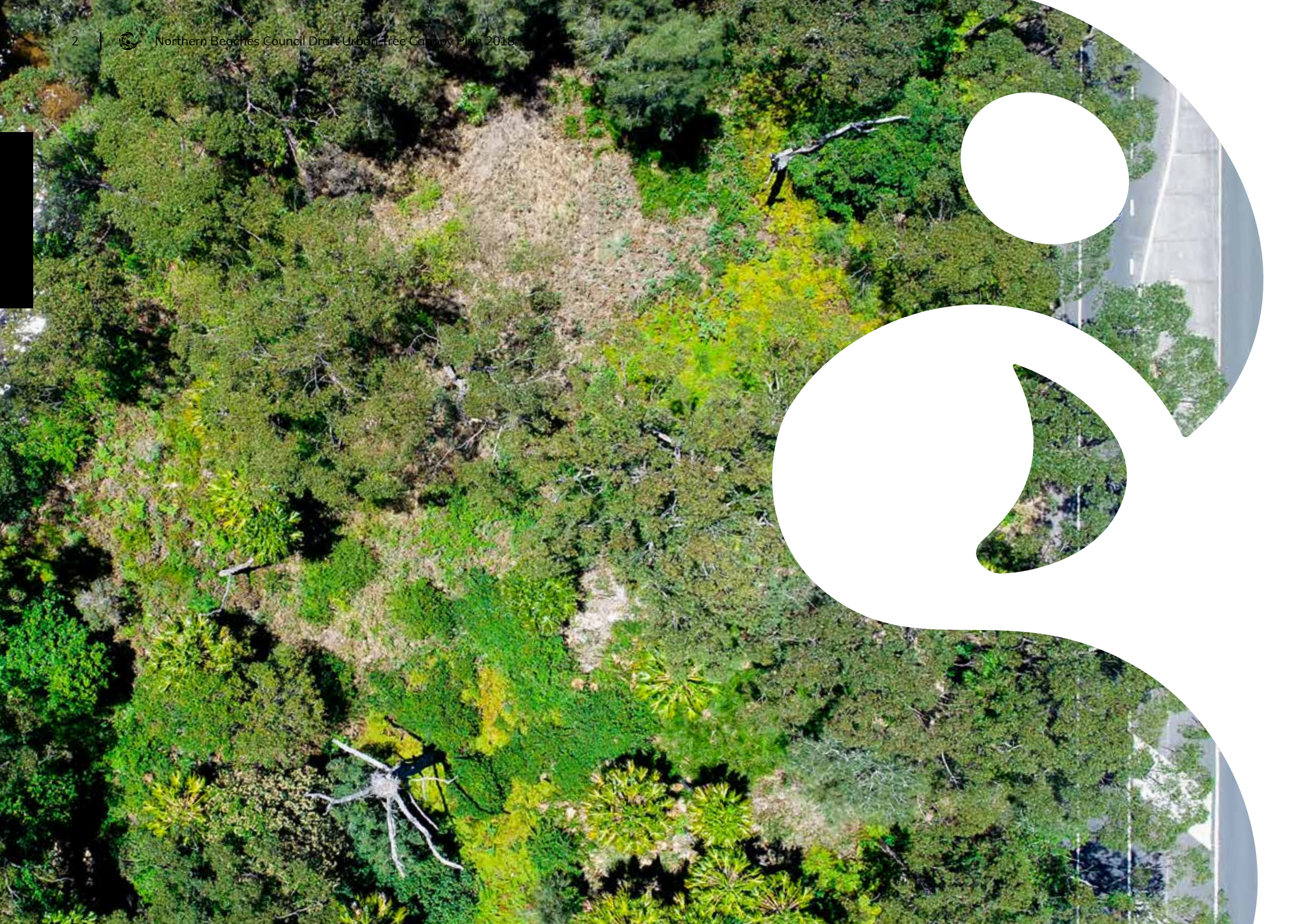


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1.0 Introduction

‘Northern Beaches – a safe, inclusive and connected community that lives in balance with our extraordinary coastal and bushland environment’
 Vision - Northern Beaches Council (2016)

The trees of the Northern Beaches are integral to its character, heritage and natural beauty. With one of the largest urban tree canopy coverages in Sydney, we are the envy of many other metropolitan areas. On Council-managed lands (bushland reserves, community centres, parks, road reserves and sporting fields), 56 percent of this area has been measured as being under canopy cover.

Urban tree canopy refers to trees on public and private land in an urban environment. Canopy refers to the extent of an individual tree’s crown (including branches and leaves) or the combined canopy area of trees.

The urban tree canopy is part of the ecosystem in the same way that roads, car-parks, footpaths, buildings and other structures form part of the complex-built environment.

Our urban trees need to be protected if we want to preserve our current lifestyle and environment. We need to protect not just the significant trees on the Northern Beaches but value trees that provide habitat, shade, protection and pleasing

aesthetics on both public and private land.

There are increasing demands on the Northern Beaches environment as more residents and businesses seek to call the Northern Beaches home. We recognise that there will be impacts on the urban tree environment over time as infrastructure and housing demands of a growing population need to be met.

This plan provides a framework for the management of our urban trees and will be measured through the collection and monitoring of data relating to our tree canopy and management actions.

1.1 Why is the urban tree canopy important?

A thriving urban tree canopy has significant benefits to the economic, environmental, social and health outcomes for its local community. Some of these benefits have a direct economic contribution while others can be more difficult to quantify. The benefits are also interrelated to each other. The following describes some of the many benefits we receive from urban trees.

Economic Benefits

- Energy saving in buildings through shading of walls and roofs
- Reduction of infrastructure damage and renewal from reduced heat stress
- Decreased health costs due to increased physical activity encouraged by green spaces
- Improved property prices along tree-lined streets
- More attractive commercial and retail centres encouraging economic activity
- Attracting visitors to enjoy the local amenity and landscape aesthetics
- Reduce impact of heat island effect through the cooling effects of shade

¹ 2011 and 2013 LIDAR – Council owned and managed lands excluding the National Parks

² NSW Government Architect (2018) Green places: Urban Tree Canopy Guide (Draft for Discussion)

Environmental Benefits

- Provides habitat and enhances biodiversity
- Mitigates air pollution by filtering particulate matter out of the atmosphere
- Carbon storage and sequestration
- Stabilises the soil and reduces erosion
- Reducing the heat island effect and air temperatures
- Attracting visitors to enjoy the local amenity and landscape aesthetics
- Reduce impact of heat island effect through the cooling effects of shade
- Reducing stormwater and nutrient run off into waterways
- Providing shade and cooling the environment by reducing heat storage
- Wind abatement
- Improve ambient air quality internally and externally

Social Benefits

- Provide a sense of place
- Reconnecting with nature, for all ages
- Soften and screen necessary street infrastructure
- Improve social cohesion through providing places for events and celebrations.
- Mitigate noise

Health Benefits

- Reduces peoples' exposure to the sun
- Encourages outdoor activity
- Wellness and stress reduction
- Reduces heat related illnesses
- Provides shade and cools the environment
- Improves mental health



Interesting Statistics

In a year, a mature tree can:

- cool the environment similar to 10 air conditioners running continuously ⁸
- absorb 3,400 litres of stormwater ³
- filter 27 kilograms of pollutants from the air ³
- absorb 21 kilograms of carbon dioxide and release enough oxygen back into the atmosphere to support two people's needs ⁹

Shade provided by mature trees can reduce:

- exposure to UV radiation from the sun by 75 percent ¹⁰
- localised temperatures on a hot summer day by 5 -20 degrees Celsius ¹¹
- cooling costs by up to 10 percent ¹²

It has been estimated that properties in tree-lined streets can be valued up to 30 percent higher than streets without trees ¹³

Significant canopy coverage can prolong the lifespan of assets such as asphalt by 30 percent by shading them from harmful rays of the sun ⁸

Eighty-three percent of Australians identify green space as a place for relaxation and taking time out ¹⁴

Seventy-three percent of Australians see their garden as a sanctuary for their mental wellbeing ⁶

⁴ The Nature Conservancy (2016) Planting Healthy Air www.natureorg/healthyair

⁵ The Nature Conservancy (2016) Planting Healthy Air www.natureorg/healthyair

⁶ The Nature Conservancy (2016) Planting Healthy Air www.natureorg/healthyair

⁷ The Nature Conservancy (2016) Planting Healthy Air www.natureorg/healthyair

⁸ National Environmental Education Foundation (NEEF) and the American Meteorological Society (AMS) website

⁹ McAliney, M 1993

¹⁰ Urban Forest Strategy - Melbourne

¹¹ Urban Forest Strategy, City of Greater Geelong

¹² Akbari, H., M. Pomerantz and Taka H. 2001)

¹³ Sander H., Polasky S., Haight R.G., 2010. The value of urban tree cover: a hedonic property price model in Ramsay and Dakota, Minnesota, USA.

¹⁴ Newspan, November 2011





2.0 Managing our urban tree canopy now and into the future – strategic directions and actions

Four strategic directions have been developed to provide a comprehensive and cohesive approach to protecting and sustaining the future of our urban trees. They aim to address the identified challenges that the urban tree environment faces and make the most of the opportunities this Plan affords the new Council.

Strategic Direction 1

To protect urban trees of the northern beaches

Strategic Direction 2

To maintain the existing urban tree canopy cover

Strategic Direction 3

To improve health and tree diversity across the northern beaches

Strategic Direction 4

To motivate, inspire and support the community to protect and enhance our urban tree canopy

The strategic directions contain a series of management principles which underpin our management practices and guide the way in which we will work and behave to meet the objectives.

A number of key actions have been developed to enable Council to deliver on these commitments. They have been identified as being specifically required in this next five-year period as a means of addressing the current challenges, priorities and gaps as identified and discussed in this Plan.

Strategic Direction 1 To Protect Urban Trees Of The Northern Beaches

Trees take many years to grow and it makes sense to protect the trees that are healthy and in good condition. We are committed to protecting and maintaining urban trees to harness the benefits they provide for the local community now and for the generations to come.

Challenges

- Impact of new development and infrastructure
- Impact of climate change on trees
- Integrating former Council LEPs and DCPs
- Managing risk or perceived risk related to trees

Key Actions

- 1.1 Identify and develop a Northern Beaches 'Iconic Tree Register' including ongoing protection and management guidelines.
- 1.2 Actively engage with utilities and other infrastructure stakeholders to protect and retain trees.

- 1.3 Review and develop controls relating to the retention and replacement of trees in the new integrated Local Environment Plan and Development Control Plans.
- 1.4 Develop a framework of operational, technical and planning documents for the management of public trees
- 1.5 Develop a reporting mechanism and tool that evaluates the effectiveness of the proactive tree management program.

Management Principles

- Prioritise the retention of existing mature trees in all circumstances.
- Audit and collate data on our existing urban trees, both in the public and private areas
- Ensure the controls and guidelines in the DCP strengthen tree retention, protection and replacement, and tree retention and protection principles are prioritised and included in relevant Council strategies, policies and practices (See Appendix 8.2 for further information on LEPs and DCPs).
- Maintain compliance with relevant Australian standards, other industry standards; and best management practice in tree management, including the management of contracts and contractors.

- Identify and protect those trees and tree-lined areas that are considered of significant heritage and cultural value.
- Work with relevant agencies to minimise the removal of existing trees and vegetation.
- Continue to seek and use innovative measures to build new infrastructure without removing existing trees.
- Apply regulatory and compliance tools to manage breaches concerning trees on private property.
- Continue to work with and educate other groups involved in tree management within the local government area (i.e. private contractors on private property).

Outcome:

The protection of our trees is a priority and our planning instruments, strategic documents, project management and work practices reflect this.



Strategic direction 2 to maintain the existing urban tree canopy cover

The existing canopy coverage in the Northern Beaches is considered high compared to other Sydney councils. However, the canopy cover on both public and private land is under threat from increased urbanisation and development. We are committed to maintaining a high canopy cover to ensure longevity of our green spaces for future generations. Specifically, however Council will strive to achieve the highest canopy cover on Council managed lands compared to Sydney councils by 2038.

Challenges

- Population increase and urban intensification
- Aging trees and time taken for trees to mature
- Competing land-use
- Linking wildlife corridors
- Planting on private property
- Measuring canopy cover
- Replacing trees equivalent to those removed

Key Actions

- 2.1 Develop a program to measure, assess and report on the Northern Beaches canopy cover.
- 2.2 Develop a proactive program of tree planting and new tree maintenance for public open spaces.
- 2.3 Develop an annual tree planting program ensuring a minimum of 5000 trees are planted each year.
- 2.4 Develop tree replacement and compensatory (offset) principles across Council programs.
- 2.5 Consider the development of tree replacement and compensatory principles for private development and utilities working on Council land.
- 2.6 Work with key landowners to encourage further canopy cover on their land.
- 2.7 Examine the benefits of implementing a tree valuation methodology for Council to use.

Management Principles

- Measure and monitor the canopy coverage, including the impact of both Council and State government policies and practices.

- Encourage the use of native tree species local to the Northern Beaches (where appropriate).
- Encourage canopy tree planting in new and existing residential and commercial properties and increase canopy cover in key public and community locations (i.e. schools and shopping centres).
- Enhance and expand existing connections for wildlife corridors.
- Monitor and consider emerging research and technology that increase canopy and improve tree management practices.
- Ensure that trees form part of the urban design for our spaces and streets.
- Manage young trees and monitor survival rates.
- Implement strategic compensatory and comprehensive replacement planting programs for those trees removed due to internal and external works.
- Work with and support relevant government agencies to progress State-wide and other regional targets and projects (i.e. Greener Places, North Sydney Plan [Greater Sydney Commission] See Appendix b)

Outcomes

- Northern Beaches Council actively manage and monitor tree canopy to ensure its canopy coverage remains one of the highest for LGAs in Sydney
- Northern Beaches Council achieves have the highest canopy coverage of council managed lands in Sydney by 2038 through the implementation of this Plan.





Strategic direction 3 – to improve health and tree diversity across the northern beaches

The urban trees in the Northern Beaches are not immune to the threat of disease, pests and climate change. To maximise the benefits we receive from urban trees it is critical that we ensure our trees are in good health and thriving.

We also need to increase the diversity of tree species planted to reduce the impact of threats on certain species of trees. Additionally, we need to increase the diversity of trees and other plants to provide food sources to protect habitat and to promote healthy ecosystems particularly across wildlife corridors.

Challenges

- Pests and disease
- Limited diversity in species and age
- Management of new plantings
- Problematic trees and weeds
- Illegal removal and vandalism
- Survival rates of new plants

Key Actions

- 3.1 Develop and implement Urban Tree Diversity Guidelines to assist in tree planting on public land.
- 3.2 Determine what tree species have an undesirable impact on the Northern Beaches' environment.
- 3.3 Develop an assessment process to identify trees that are not growing to maturity, offer little aesthetic value or fail to maintain acceptable health.
- 3.4 Develop a process or tool to identify and monitor high-risk vandalism areas.

Management Principles

- Undertake proactive tree maintenance programs.

- Monitor, treat and evaluate threats and attacks from pests and pathogens.
- Plant robust and resilient tree species and ensure best practice planting practices.
- Actively manage problematic trees and weed species.
- Apply best practice tree assessment procedures when determining tree removal, root pruning and other pruning requirements.
- Strengthen key partnerships with utility companies (Ausgrid, NBN, Sydney Water) and infrastructure development agencies (RMS, Dept of Public Works).
- Monitor, prevent and strengthen enforcement activities related to tree vandalism.
- Investigate new and emerging methods to harvest rain-water and other water sources for use to water our trees.
- Use of tree vaults for hard surfaces where relevant and justified.

Outcome

- The health and diversity of the trees across the Northern Beaches is monitored, maintained and managed.

Strategic direction 4 – to motivate, inspire and support the community to protect and enhance our urban tree canopy

Council acknowledges the importance of engaging with and educating our community for the successful protection and enhancement of the Northern Beaches urban tree environment.

Challenges

- Encouraging residents to plant and maintain large trees.
- Increasing awareness of the value and importance of trees.
- Managing community expectations and perceptions

Key Actions

- 4.1 Create a comprehensive online tree information page on Council’s website.
- 4.2 Review and improve Council notification process for actions related to public trees.
- 4.3 Develop an education program for schools and other relevant groups.
- 4.4 Investigate the further development of community arboretums.

- 4.5 Implement a Citizen Forester Program or similar program to collect data about trees on private properties.
- 4.6 Develop a ‘adopt a new tree program’.
- 4.7 Continue to develop and expand the annual community-planting activities.
- 4.8 Provide an online application service for tree removals and pruning permits.
- 4.9 Consider programs that incentivise private owners to plant, replace and maintain healthy trees.
- 4.10 Develop an online infographic that demonstrates how urban trees are contributing to key benchmarks in health, economics and wellbeing for the Northern Beaches.
- 4.11 Develop and implement a tool to capture community attitudes regarding urban trees and tree management.

Management Principles

- Provide opportunities for open and ongoing conversations with our community.
- Use a creative and ‘hands-on’ practical approach to promote the urban tree protection at community events.

- Inform and consult the community regarding public tree management projects such as streetscape planning, tree removal and tree planting.
- Work with schools and other relevant groups to further educate children on the importance of trees in our everyday lives.
- Provide resources and information that facilitate good tree management practices for private land-owners.
- Promote external programs and initiatives aligned with this Plan and where relevant seek grants from these groups.
- Improve systems and processes for managing customer requests and private tree permits.
- Support volunteer programs and local community groups who are involved in enhancing the urban tree environment.
- Support our community to advocate on behalf of urban trees to government and other groups.

Outcomes

The community is aware of the importance of trees in our urban environment and are actively involved in enhancing and protecting our urban canopy.

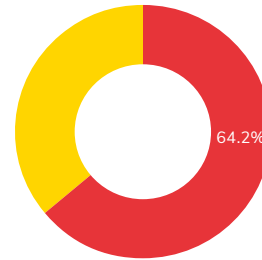


3.0 The northern beaches urban tree canopy

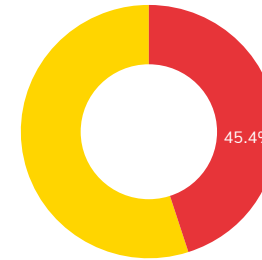
3.1 Current Tree Canopy

Canopy cover is a measure of the coverage of the layers of leaves and branches of the trees. It is measured using a LIDAR (Light Detection and Ranging) survey through aerial photography.

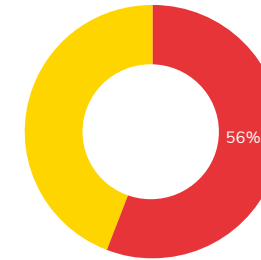
The NSW State Government undertook LIDAR surveys in 2011 (the northern part of the LGA) and 2013 (the southern part of the LGA). This data has indicated the following:



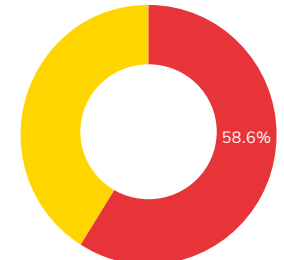
The canopy cover for the Northern Beaches Council area is 64.2% including the National Parks.



The canopy cover for street trees on the Northern Beaches Council area is 45.4%.



The canopy cover for the Council managed lands (community centres, playgrounds, sports fields, parks and bushland reserves) on the Northern Beaches Council area is 56%.



The canopy cover for all other areas residential, commercial and public spaces not managed by Council (schools, TAFE, hospitals, etc.) is 58.6%

Given this survey was taken over five years ago, the percentage of canopy cover may have changed. Changes could be due to the new residential, commercial and road infrastructure development that has taken place in this period. In addition, the 2014 changes in the Rural Fire Act 1997 (10/50 Vegetation Clearing Entitlement Scheme see Appendix b) and the two severe storms in April 2015 and 2016 may have impacted on the canopy cover in the area.

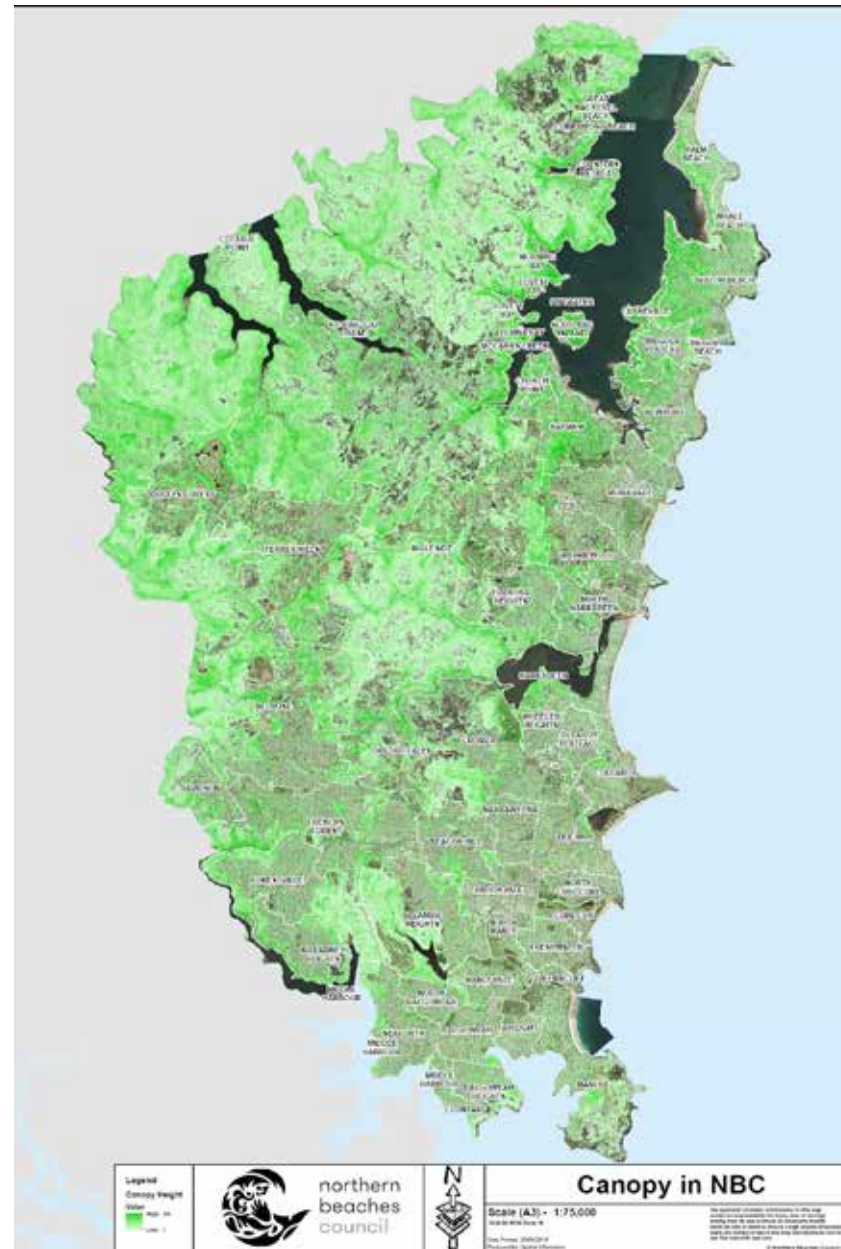
Figure 4.1 indicates the level of canopy cover across the Northern Beaches. The darker the green the higher the canopy cover.

We are however in an enviable position of being one of the few areas within the Sydney Metropolitan area with canopy coverage greater than 50 percent. Many local government areas in Sydney have less than 20 percent urban canopy.¹⁵

New LIDAR data is required now and has been identified as a key action within this Plan. It is important that we develop a program to measure, assess and report on the Northern Beaches canopy cover regularly. Such information will enable us to monitor the actions within this Plan and measure our performance against our objective to retain a high canopy cover.

¹⁵ NSW Government. Land and Property information. Sydney North 2013 Classified LAS Data/ Hawksbury South 2011 LAS Data LIDAR for Northern Beaches.

Figure 4.1 – Tree Canopy coverage across the Northern Beaches (2011 & 2013)





3.2 Public Trees in the Northern Beaches

Public trees are located on Council land and therefore managed by Council. They include the thousands of trees on our streets, parks, sportsgrounds, community centres and bushland reserves. This Plan primarily focuses on public trees on our open space areas, which include streets, gardens, parks and sportsgrounds.

Council undertakes both proactive cyclic works and reactive tree works. A proactive tree maintenance program aims to reduce risk and increases the health and structural condition of the trees. This, in turn, should reduce the level of reactive tree maintenance.

Reactive maintenance is urgent or responsive works such as removal of dangerous branches or trees and is carried out on a prioritised basis. Such work may result from resident notification, damage from storm or other weather events or work required due to interference with infrastructure.

In 2017, over 2,000 trees were removed from public open spaces such as streets, parks and other reserves. The primary reason for the removal of these trees is due to death or declining health or the tree becoming structurally unsound.

In this same period only 500 trees were recorded as being planted on open space across the LGA.

Action 2.3 proposes that Council will develop an annual planting program. Council has however already begun to implement this action. The annual program will identify priority areas such as parks and sportsgrounds, wildlife corridors and gaps in streetscapes. It will also identify the species selection suitable for each location.

The replanting of trees is dependent on the suitability and viability of the location and resident consultation. A minimum of 5000 trees will be planted each year as part of this planting program.

Our aim will be to plant twice as many public trees as there are removed and our performance on this target will be monitored and reported.

3.3 Bushland and Bushcare programs

Northern Beaches Council manages more than 1,700 hectares of bushland containing 540 species of native animals and 1,460 species of native plants. Bushland management includes bush regeneration, bushland maintenance and responses to customer requests.

Council currently manages 44 bushland management contracts across the Northern Beaches area and planted more than 12,000 native plants during the 2017/2018 financial year.

Our Bushcare program focuses on community

volunteers working with Council to conserve and rehabilitate publicly owned natural bushland. There are over 400 volunteers who work at over 80 different sites throughout the Northern Beaches.

Council also provides tree 'giveaways' at special events such as National Tree Day, Arbour Day and market days. In 2018, over 3,000 tubes of young trees were given to the community to plant in their own gardens. Advice regarding care and planting of the new tree is provided at these events. Action 4.7 proposes to further develop annual community planting and giveaway opportunities.

3.4 Private Trees

Private trees are those on private property. Council's data on private tree planting and tree removal is limited. The number of private trees removed as part of approved development applications or complying developments is not collected.

Currently, property owners are only required to seek approval to remove trees larger than five metres. However, approval is not required to remove larger than five metres:

- if the tree species is on the Northern Beaches Council Species Exemption List (undesirable species as identified by Council),

- as part of a Complying Development Certificate or
- if the property is located in a 10/50 Vegetation Clearing Entitlement Area.

Several actions within this Plan aim to encourage private land owners to retain canopy trees, plant more trees and assist Council in private tree data collection.

Action 2.7 specifically identifies that there is an opportunity to work further with community and private land owners to maintain and enhance tree canopy cover. This includes stakeholders such as government (i.e. schools and hospitals), community groups (i.e. churches, youth organisations, etc.) and commercial landholders.

3.5 Wildlife Corridors

Wildlife corridors are connections across the landscape that link up areas of habitat. They support natural processes that occur in a healthy environment, including the movement of species to find resources, such as food and water. Large canopy trees form these wildlife links and corridors.

The North District Green Grid projects (see Appendix b for further information), an initiative resulting from the Greater Sydney Commission, are focussed on supporting biodiversity

and recreation activities. Green Grid project opportunities have been identified for the Northern Beaches.

The Northern Beaches Council is committed to maintaining and building upon the existing wildlife corridors on Council managed lands. This will involve retaining and planting appropriate trees and plants to restore and manage natural connections and interactions across the landscape. Strategic Objective 2 includes the expansion of existing wildlife corridors.

3.6 Arboretums

An arboretum is botanical garden devoted to trees and can assist landowners to identify the right tree for the right location. There are four pseudo-arboretums in the Northern Beaches - Stony Range Botanical Garden at Dee Why, Ivanhoe Park Botanical Garden in Manly, Bible Gardens at Palm Beach and Manly West Park. In neighbouring council areas, there are also the Royal Botanical Garden in Sydney City and Ku-ring-gai Wildflower Garden.

As listed in Strategic Objective 4, Council will investigate the further development and expansion of these arboretums, including the development of a virtual (online) arboretum which would allow people to view different plants and trees online.

3.7 Other vegetation

While this Plan focuses primarily on trees, there are other forms of vegetation that are significant to the Northern Beaches. Council manages areas which include bushy understory, dune flora, wetlands vegetation and native grasses. The long-term and strategic management of these areas will be addressed in the Environment Strategy and included in other related plans.

3.8 National Parks and Bushland Reserves

There are three National Parks located within the Northern Beaches Council area

- The Ku-ring-gai Chase National Park
- Garigal National Park
- Sydney Harbour National Park (northern section)

These National Parks are managed by the state government through the NSW National Parks and Wildlife Service and play an essential role in the conservation of our state's biodiversity.

Several parks and reserves managed by Northern Beaches Council adjoin these National Parks. This provides Council with an opportunity to plant canopy trees that enhance and are sympathetic to the National Park environment, further connect wildlife corridors and create a seamless bush environment.



4.0 Challenges and opportunities

There were a range of challenges and opportunities that we needed to consider when developing our strategic directions. Many of these challenges are interrelated across the directions. Understanding these challenges helped to develop solutions and the mitigation strategies listed in this Plan.

4.1 Competition for physical space

Population increase and urban intensification

The population of the Northern Beaches is projected to reach almost 300,000 people living in 105,650 residences by 2036. This represents an increase of 18.4 percent over 25 years and equates to an average annual growth rate of approximately 0.7 percent

There is a range of new housing, high rise residential, commercial and infrastructure projects currently underway on the Northern Beaches.

Urban trees are at risk of being reduced due to increased development. In many cases building and sub-division design has not adequately considered the retention of current trees or the planting of new additional trees.

Action 1.3 focuses on the strengthening of tree protection and replacement controls within in Council's Local Environment Plan and related

Development Control Plans. Other Actions and Management Principals in Strategic Objective 1 and 2 also aim to reduce or compensate tree removals due to development on both private and public land.

Competing land use

Tree canopies are being reduced on residential properties due to:

- the replacement of old dwellings with new dwellings that have a larger footprint,
- increase in preference for maintenance free yards, and
- additional buildings such as granny flats being placed on a block of land.

As such public spaces continue to be a priority for retaining trees and additional tree plantings. Action 2.2 and Action 2.3 focus aim to increase planting on our public open spaces.

Infrastructure

Current and future infrastructure often conflict with maintaining mature street trees and their canopies. The need to maintain clearance between overhead power lines, streetlights and the movement of tall vehicles result in pruning programs which may not be conducive to the overall tree health or removal of a tree to protect

the infrastructure asset.

Future above ground level and underground services may also impact on the retention of mature trees root systems or the trees themselves. Access for maintenance to underground services and the replacement of assets such as pipes, conduits and paths is also required.

Actions 1.2 identifies the need to work closely with external infrastructure and utility service providers who manage trees related to their infrastructure across the Northern Beaches. Council will continue to build relationships and advocate with these stakeholders to minimise their impact on our existing urban trees. This could include the development of Memorandum of Understandings (MOUs), compensatory/offset provisions, liaison with key organisational contacts or a proactive cooperative problem-solving approach.

It will also be beneficial to increase collaboration to pro-actively plan for an urban tree environment that results in minimal interference with infrastructure and utility assets in the future.

4.2 Offset or compensatory programs

Sometimes, trees that have been removed cannot be replaced by new trees in the same

location. This could be due to new development, infrastructure or other issues. The planting of one replacement young tree is not equivalent in value or benefit of the mature tree that has been removed.

Compensatory or offset programs are designed to consider both the need to plant trees in another location and/ or that more than one young tree be required as an equivalent replacement for a mature tree.

Actions 2.5 and 2.6 have been prioritised to develop compensatory programs for the removal of trees in relation to both internal council and external projects. Specific compensatory criteria will be developed to remediate the removal of trees.

For example, Transport for NSW for the Sydney Light Rail project has set a range of benchmarks for its compensatory program. Every replacement tree will be of high quality stock and be generally around three-to-four metres high. For every large tree, eight new trees will be planted; for every medium tree, four new trees; and for every small tree, two new trees.

A range of different Council departments are involved in works that impact on trees in developing Council assets or new infrastructure i.e. local roads and footpaths. An offset program and guidelines for the replacement of trees will be established and applied across Council programs. Our program will have a minimum replacement principle of two (2) suitably advanced sized trees for any mature trees that are removed.

Likewise, utilities and other services will not always be able to avoid removing trees when maintaining existing above and below ground infrastructure. Tree replacement and offset programs need to be developed in consultation with these entities to ensure that they are consistent, adequate and valid for the situation. This action will also aim to ensure that any removal of trees from Northern Beaches should be replaced with at least twice the number of trees or equivalent (as determined) within the Northern Beaches.

4.3 Climate change

There is clear evidence that our climate is changing due to human activity.¹⁶ Changes

in climate include warmer than average temperatures, heat waves, more extreme storm, fire, drought, and flood events, lower average rainfall, rising sea levels and ocean acidification

For urban trees and Council this may mean:

Warmer average temperatures

- Poorer health outcomes for existing tree species
- Consideration of tree species suitable for the warmer temperatures
- Increased impact of disease and pests on tree health as warmer weather can increase reproductive potential and increase pest and disease development rate
- Introduction of a range of new pathogens and pests as they find the new climate conditions favourable

¹⁶ CSIRO (2016) Australia's changing climate



Heatwaves

- Premature death of some tree species due to intolerance to heat; including young and vulnerable trees
- Decline in tree health due to foliage and trunk scorching and canopy desiccation

Extreme storm and fire events

- Increased branch and whole tree failure of otherwise healthy trees due to high winds and heavy rains
- Increased risk of damage caused by tree failure increasing potential claims and litigation. The increased risk raises community concern and results in tree removal - only to perpetuate climate change impacts
- Bushfire events can lead to increased risk and occurrence of tree failure
- Consideration of bushfire tolerant, resistant or adaptive tree species on bushfire-prone land

Flood and increased rainfall intensity

- Increased tree instability, soil erosion and salinity from heavy rains
- Increased disease-causing rot and decay in trees from inundated water

Seasonal drought and decreased rainfall

- Increase in pre-mature tree deaths and detrimental health impacts
- Decreased tree planting due to the potential effects if water restrictions are implemented

Rising sea levels

- Increase in pre-mature tree deaths due to raised salinity soil levels or repeated flooding by seawater
- Trees located in areas vulnerable to saline inundation require more energy to distil water from saline soils

Healthy, diverse and structurally sound urban trees are far more likely to adapt to the

challenges of climate change. All the Strategic Objectives within this Plan aim to improve the overall management of trees on the Northern Beaches. Strategic direction 3 specifically targets improving the health and diversity of our urban trees.

Action 3.1 specifically proposes to develop diversity guidelines to encourage the diversity and resilience of urban trees. For example, some councils have suggested that the following composition of urban trees be limited to:

- 5% of one tree species
- 10% of one genus
- 20% of any one family

The diversity guidelines should also identify bushfire-tolerant, resistant or adaptive tree species for planting on bushfire prone areas.

4.4 Urban heat island effects

The impact of the urban heat island effect is being increasingly recognised. Our urban landscapes are significantly warmer than the rural less developed areas. Heat in our towns and cities can build up more quickly during periods of hot weather and continue into the evening.

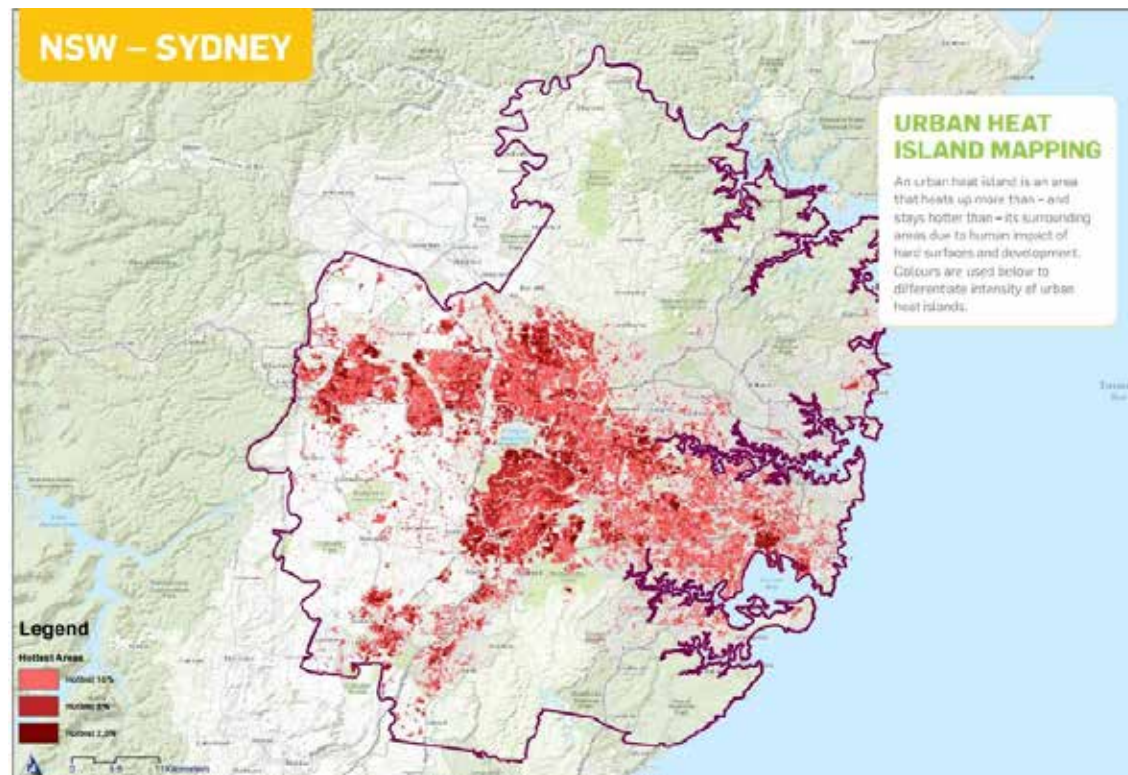


Figure 5.1 – Sydney Urban Heat Island Mapping



The main contributors to the urban heat island effect are;

- buildings and pavements that absorb the heat from the sun rather than being reflected
- the lack of shade and vegetation cover
- The impact of human activity through motorised transport and air conditioning.

Urban trees have proven to be one of the most effective methods for mitigating the urban heat island effect by providing increased canopy cover in these environments.

The Management Principles and Actions within this Plan are based on the need to facilitate the benefit of trees for our urban environment, including the reduction of the heat island effect.

4.5 Risk management

The trees of the Northern Beaches must be maintained in a safe, healthy and aesthetically appealing condition to maximise their many benefits.

Risk assessment is an important part of best practice urban tree management. The Northern Beaches Council takes a risk-based approach to the management of trees on public land and the assessment of trees on private land.

Adhering to best practice in tree management and maintenance will maximise the health and longevity of individual trees and minimise Council's and the community's exposure to risk.

Council wants to avoid:

- incidents of trees and large branches that fall into utility lines, on to vehicles, houses and people
- incidents of trees and large roots that interfere with underground utilities
- potential trip and other health hazards.

Some of the risks that need to be assessed are:

- tree failure
- poor tree health
- vandalism
- soil erosion
- inappropriate tree species for its location

When managing its risk profile and assessing the impact of trees, Council must consider the other factors that contribute to infrastructure damage, including but not limited to: soil types, construction methodology, excess soil moisture from leaky pipes; and ageing infrastructure.

This Plan identifies the need to focus and further

develop proactive programs and measure their success.

4.6 Water and soil moisture

Water availability and adequate soil moisture are critical elements for vegetation health and growth. Access to ample soil moisture enables trees to actively transpire and assist in atmospheric cooling.

There are opportunities to harvest rain water to water trees using tree vaults instead of hard surfaces which would have the water runoff into stormwater or local flooding.

Extended droughts and water restrictions also affect the health of urban trees and hasten tree mortality. This provides an opportunity to identify and plant trees that require less water.

Strategic Objective 3 considers these opportunities.

4.7 Planning and design

To achieve the best result for urban trees future long-term planning is required and a commitment to work in tree life cycles. Developing urban tree canopies requires professional input from arborists, planners, engineers, urban designers, biodiversity experts, landscape architects, economists, sustainability experts and the Northern Beaches community.

The Management Principles within Objective 1 and 2 identify that to manage our urban canopy comprehensive planning, best practice implementation and a strategic design approach are all required.

4.8 Pests and disease

As noted, climate change is likely to increase the spread and severity of pest and disease in trees. However, increased international travel has also increased the risks of pests arriving.

By actively monitoring tree health we can identify and treat trees affected by disease and pests. Early intervention allows for better treatment of the affected trees. This has been addressed within Strategic Direction 3.

4.9 Problematic trees and weeds

While it has been noted that trees provide a range of benefits to the community, there are some trees species that are more problematic than others.

Different tree/plant species are listed as exempt species under the Northern Beaches Council Exempt Tree Species list. This list of exempt species may change over time due to the impacts of climate change and other emerging research. This document should be reviewed regularly (see Strategic Objective 3).

4.10 Ageing trees

Managing ageing trees requires careful consideration. Ageing trees are less tolerant to changes within the environment and they require greater resources to manage while their environmental value diminishes and the risk to public safety increases.

A further challenge is that many tree lined streets have trees of the same maturity and species. To maintain the current aesthetic, it is desirable to plant identically aged trees. However, this can cause challenges when large numbers of trees require replacement at the same time. This may lead to no or little canopy cover until the trees grow into mature trees with large canopies.

Tree succession planning is important to address the challenge to enable a sustainable canopy coverage and local amenity for the area (see Action 2.3). Action 4.2 acknowledges that working closely with the community to ensure they are aware of what is happening is also required.

4.11 Young trees

The successful establishment of new urban street trees is important because trees must reach maturity to maximise proven benefits. However, many young trees do not survive to maturity. Young trees are more vulnerable and require

more care than older mature trees. Unfortunately, young trees are often vandalised and damaged.

Action 2.3 states that Council will develop an annual planting program. This will include the development of planting guidelines which will outline how the annual tree planting program will be implemented, including the consideration of succession planting, the avoidance of overhead or underground infrastructure, proactive new tree maintenance programs and the monitoring of survival rates of new trees.

4.12 Tree vandalism

Tree and vegetation vandalism can occur in a variety of forms, including poisoning, pruning, removal and destruction from mowing of native understorey. This kind of vandalism has a significant and cumulative impact on the environment. Impacts include reduced visual and community amenity, loss of environmental services such as wind-breaks and erosion control, and loss of wildlife habitat.

There have been incidences of tree vandalism on the Northern Beaches, especially in foreshore areas.

Action 3.4 will involve Council identifying and monitoring high-risk areas such as the foreshores



and the recording of vandalism incidents on a database. This will enable an assessment of the cumulative impacts of vandalism and monitor the effectiveness of rehabilitation over time.

Council will also consider how to increase and better target compliance measures.

4.13 Community expectations

An individual's behaviour and attitude towards trees on their property can be very personal.

The Northern Beaches community have a variety of values and experiences with urban trees. These can be shaped by a range of factors such as age, education, cultural backgrounds, exposure to the natural environment and socio-economic factors.

Fostering a greater awareness of the benefits and challenges of maintaining and increasing our urban tree canopy should encourage the local community to support and enhance the work being done in the public sphere. In turn, it is hoped that the local community will translate this into action within their own sphere of influence

Strategic Direction 4 specifically aims to increase awareness and involvement of the community. The actions primarily focus on improving information flow to the community, enhancing the customer experience, increasing

the understanding of the importance of trees and motivating people to plant and effectively manage trees on their own properties.

Programs such as 'adopt a tree' (Action 4.6) and Citizen Forester (Action 4.5) aim to actively engage the community and elicit support for trees in the public realm. Whereas incentives for planting and maintaining trees on private property (Action 4.9) and infographic (Action 4.10) display of the impact of trees on our homes and environment focus on getting residents to think about their contribution to the urban tree canopy.

Action 4.11 enables Council to develop a survey or tool to ascertain community attitudes regarding urban trees and tree management. This could be used to identify any concerns about tree management and this Plan. This information will help determine future Council direction and community activities.





5.0 Implementation and conclusion

This Plan has been developed to begin the process of strategically managing the Urban Tree Canopy across the Northern Beaches Local Government Area. It highlights the need to collect, collate and monitor data related to urban trees, integrate the former Council management systems and processes and engage and involve our community to protect and further enhance the canopy cover.

The identified key actions will be implemented over the next five years. Their initiation and completion is dependent on available resources and current Council priorities. Each action is to be considered and where relevant included in annual operational plans.

The immediate focus will be on the need to collate accurate baseline data. Such data will facilitate the monitoring of the actions of this plan and ultimately how successful we are in protecting and maintaining a healthy and diverse canopy cover.

The success and progress of all the actions listed in this Plan will be reviewed annually. Any new data collated including the new LIDAR information will be analysed and considered.

The key actions of this Plan may be modified and adapted where:

- monitoring and evaluation support an alternative approach
- new data identifies additional or new priorities
- there are new advances in the field of urban tree canopy management
- it would be advantageous to seek new opportunities

The plan has a life of five years at which time it will be reviewed, and its success reported. The current Plan may either be extended for ongoing implementation or redeveloped as a new Plan for adoption by Council.





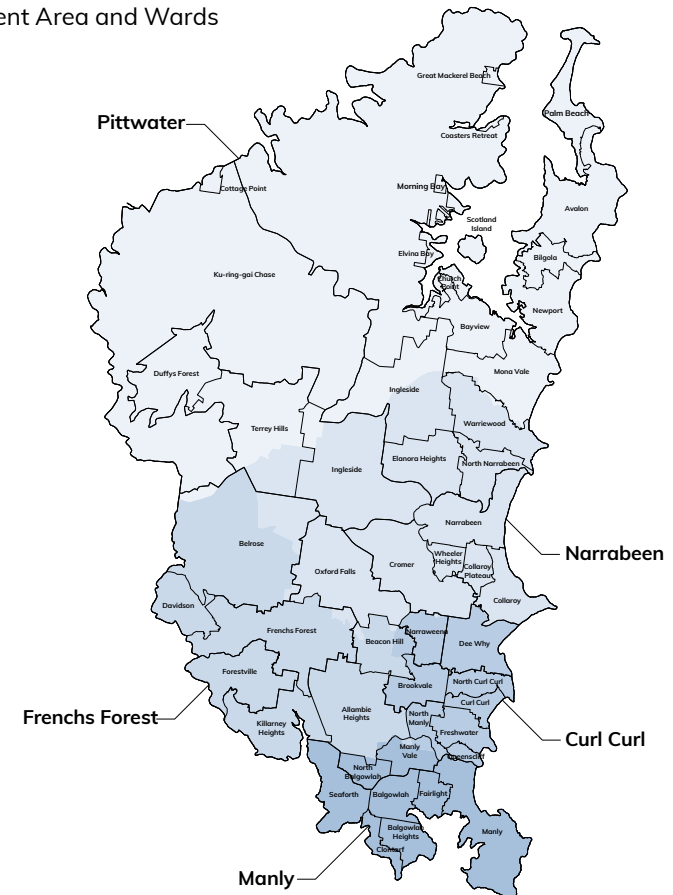
6.0 Appendix

6.1 Appendix a: the northern beaches environment

The Northern Beaches Council was proclaimed in May 2016 with the merger of former Manly, Warringah and Pittwater Councils. The Council covers an area of 254km² and extends from Manly in the south to Palm Beach in the north and Davidson and Duffys Forest in the west.

Community Strategic Plan 2018 - 2028

The map details Northern Beaches Local Government Area and Wards



The Northern Beaches is a place of unique natural beauty shaped by a beach and bush lifestyle. We have 80 kilometres of coastline, 15 coastal headlands, 23 coastal beaches, a series of harbour beaches and waterways and 114 square kilometres of National Parks. Our beautiful land and water environments are home to diverse and rich flora and fauna and also offer excellent active and passive recreational opportunities. The unique natural environment provides a distinctive sense of place and belonging for our community and is a defining feature of our collective identity and culture.

We are a diverse community made up of many unique town centres, villages and open spaces and we share a common love of the place we live in. Our population is concentrated along our coastline and in the main centres of Manly, Dee Why, Brookvale, Mona Vale and Avalon. Smaller villages and neighbourhood centres connect the main centres and provide local amenities to people living in our leafy suburbs and in our semi-rural areas to the northwest. The area is also home to offshore communities that enjoy a unique lifestyle immersed in nature.

Currently Northern Beaches is home to 263,413 people living in 93,400 households. It also contains 31,000 businesses and has a Gross Regional Product is estimated at \$19.94 billion, which represents 3.6% of the state's GSP (Gross State Product).¹⁷

New housing projects are underway on the Northern Beaches with the majority of new dwellings being built in the Warriewood Valley land release area, planned precincts and the development of medium density dwellings in our main centres such as Dee Why.

New infrastructure is also being developed in the Northern Beaches area to meet the needs of the current and future population. Currently this includes projects such as the Northern Beaches Hospital redevelopment at Frenchs Forest and the widening and construction of major transport corridors development across the area.

Amid all this development, there is a strong shared desire from the community to protect and enhance the natural and built environments of the Northern Beaches.¹⁸

¹⁷ idcommunity (2017) Northern Beaches Council Economic Profile

¹⁸ Community survey 2017

6.2 Appendix b: urban tree management - other considerations

1. Does tree size matter?

Yes, larger mature trees provide greater benefits than smaller trees. Large mature trees, considered to be above 7 metres in height, can provide 4 to 8 times the benefit of smaller trees.

These trees:

- provide large canopies to create more shade
- create better shade over buildings due to their height
- support greater levels of biodiversity
- have larger leaves that are able to intercept greater amount of particulate pollutants and rainfall
- are less susceptible to accidental or malicious vandalism
- can be pruned to provide high canopy clearance for above ground level infrastructure and tall vehicles
- may hold heritage and historical value



Figure 6.2 - Tree size does matter - the benefits of trees increase exponentially with size and increase in leaf area.¹⁹

¹⁹ Adapted from Urban Tree Alliance accessed 5/7/18

2. Does tree species matter?

There are a range of issues that need to be considered when selecting the right tree for a location. Not all trees thrive in the harsher urban conditions or are suitable for all environments. Some tree species are more vulnerable to the pests; disease and climate change so it is prudent to plant a range of species to protect an urban tree canopy.

3. Does tree age diversity matter?

It is common that tracts of urban tree planting consist of similar trees of a similar age. Consequently, trees will likely decline at the same rate. While the mature trees are in good physical and structural health they provide a sustainable canopy. However, as trees age they can become more costly to maintain and difficult to manage.

Replacement trees will often be younger immature trees which may require years of growth before providing the same benefits as the previous tree.

Sustaining the urban tree canopy requires a range of tree ages; varying life spans and growth rates that help maintain the tree canopy.

4. Can urban trees be given a monetary value?

The recognition that urban trees bring a range of economic, social, health and environmental benefits have focused efforts to quantify the economic value of urban trees.

Urban trees also provide a range of ecologically beneficial services – reducing the heat island effect²⁰, capturing airborne particulates and intercepting storm water – services that would otherwise require greater capital expenditure than the cost of maintaining canopy cover. The greater the quality and quantity of urban trees, the greater the value of the ecosystems provided. These are ‘free’ services yet are worth hundreds of millions of dollars. If these services are diminished by loss or deterioration of urban trees we pay a price for this in a range of economic, social, health and environmental impacts.

The value of a tree appreciates over time and then depreciates as it reaches the over-mature phase. A well-maintained suitable species tree may hold its mature status and therefore value for many decades.

There are a number of tree valuation methodologies that currently exist but as yet no agreed tree evaluation method is widely applied across local government. Assigning a monetary value of tree may have some benefits when public trees are removed for private development. Action 2.8 proposes that we look at any benefits assigning a dollar value to a tree may have in facilitating the replacement trees or reducing removals.

²⁰Urban heat island effects occurs when a city experiences much warmer temperatures than nearby rural areas due to with how well the surfaces in each environment absorb and hold heat.



5. Does council manage urban trees as financial assets?

Although Council identifies and manages trees as important and valuable assets, we do not manage trees as financial assets. Due to the core differences between infrastructure assets and trees, such as appreciation and depreciation of value and condition deterioration, trees are not considered financial assets.

However applying an Asset Management approach to the management of trees ensures they are managed effectively, efficiently and meet the needs of the community. Applying asset management principles to trees facilitates considerations such as:

- Lifecycle planning (determination of the whole of life costs of planting a tree in a specific location)
- Recognising and maximising community benefit (Levels of service)
- Implementing considered lifecycle management practices (maintenance and operations)

- Risk management and development of risk management strategies and approaches
- Model of continuous learning and improvement

6. What is the role of local government in managing urban trees?

Local Government is the closest tier of government to the local community. It is responsible for good governance and care of local communities and their environment. The Local Government Act 1993 states that Councils have a legal and moral obligation to manage its assets (including trees on private and public properties) to a standard that will not cause injury to the public.

Local Councils, in consultation with their communities, prepare Local Environmental Plans (LEPs) to control the form and location of new development, along with protecting open space and environmentally sensitive areas through zoning and development controls. These policies must comply with regional and district plans, the NSW Government Standard Instrument for LEPs

and various government circulars and directions.

Provisions in LEPs can aim to improve sustainability, liveability and the urban environment by ensuring future developments retain and restore wildlife habitats and corridors, bushland, natural landforms, foreshores and waterways as well as minimise impacts of these areas. Often these objectives are supported by Council strategies on biodiversity, wildlife corridors, urban trees, waterway rehabilitation and open space.²¹

Development Control Plans (DCP) prepared by local councils can promote development that conserve and enhances bushland, waterways, biodiversity and tree canopy.

As such the protection of trees at a local level is achieved through provisions in the DCP which identify when a permit is required to clear a tree or other vegetation under the State Environmental Planning Policy (Vegetation in Non-Rural Areas 2017). These provisions also list trees species which do not require a permit and provide for tree clearing with a permit if they are a risk to public safety.

²¹ NSW Government Architect (2018) Green places: Bushland and Waterways Guide (Draft for Discussion)

7. Are there any external plans, programs and policies that influence this tree canopy plan?

Yes, there are a range of overarching strategies, programs and partnerships that influence and support the Northern Beaches Urban Tree Canopy Plan. These provide opportunities to work together in partnership with other organisations, authorities or as a community. They include:

The North District Plan and Greener Places

Council is guided by NSW State Government plans and directions. Northern Beaches is part of the Greater Sydney Commission's, North District Plan of Sydney. The District Plan informs local strategic planning statements and Local Environmental Plans, the assessment of planning proposals as well as community strategic plans and policies. The District Plan also assists Councils to plan for and support growth and change and align their local planning strategies to place-based outcomes. It guides the decisions of State agencies and informs the private sector and the wider community of approaches to manage growth and change.

The North District Plan (2018) commits Council increasing urban tree cover and delivering green grid connections.

The Greener Places Policy and guidelines have been drafted to build on the Sydney Green Grid Strategy which was developed by the NSW Government Architect to create a network of high quality green areas that connect town centres, public transport networks and major residential areas in Sydney. The elements of Green Infrastructure in the policy include assets such as urban trees. The Urban Tree Canopy Guide has been developed to advise local councils, State agencies and other stakeholders and provides a series of objectives, strategies and targets for the NSW Government to preserve and enhance the urban tree canopy.

The management of our tree canopy and related plans and documents (including this Plan) will need to be aligned and guided by the NSW Government directions.

There will also be State Government initiatives and grants such as '5 Million trees' that enables Council to be involved and further facilitate the

achievement of the objectives of this Plan.

10/50 Vegetation Clearing Scheme

The 10/50 Vegetation Clearing Scheme is an amendment to the Rural Fires act 1997 and allows people to clear certain vegetation around their homes to improve protection from bush fires.

The Scheme was introduced on 1 August 2014, several amendments have been made since this time. The amendments were made after Councils lobbying the Rural Fires Service after there was clear evidence of unnecessary tree removal on private property.

While Council encourages residents to prepare and protect against potential bush fires, this Scheme has encouraged some private land owners to remove mature trees. Future LIDAR information may provide a valuable insight regarding the impact on the canopy across the Northern Beaches during the initial period of the 10/50 Vegetation clearing entitlement scheme.



8. Northern beaches council planning context

Figure 6.3 illustrates the relationship of the Urban Tree Canopy Plan to Council's other strategies and plans which inform and underpin it.

Implementation will require coordination with a wide range of other initiatives across Council.



Figure 6.3 Planning context for the Urban Tree Canopy Plan





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