Ku-ring-gai Urban Forest Strategy

Strategic Directions Paper

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Contents

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PURPOSE

The Urban Forest Policy Strategic Directions Paper:

- Provides the background and basis for the development of an Urban Forest Policy and Strategy.
- Outlines Council's proposed preliminary strategic direction to ensure that Ku-ring-gai's Urban Forest is maintained and enhanced for future generations.

BACKGROUND

The Ku-ring-gai Urban Forest comprises all of the trees, other vegetation as well as the soil and water that support these. It includes the network of vegetation within both public and private ownership, encompassing the spectrum of vegetation growing within:

- Natural soils that exists independent of human involvement
- Altered soils, including gardens, bioretention basins, raingardens
- Engineered structures such as tree cells/vaults, vertical gardens, roof top gardens

Urban Forestry provides a holistic approach addressing both the individual needs of species and the requirements of the entire population of trees and other vegetation. This approach:

- Works to maximise social, biological, economic, physical, and aesthetic benefits that trees and vegetation provide.
- Enables consideration of interrelated issues such as biodiversity and ecosystem services, open space and public recreation needs, development pressures from urbanisation and projected population growth (housing needs), urban heat island, climate change and extreme weather events.

Management of Ku-ring-gai's Urban Forest has shifted from a traditional approach to tree and vegetation management to a modern Urban Forestry approach. The change is a significant step in improving Ku-ring-gai's Urban Forest as outlined in Table 1.

Urban Forests play a vital role in creating liveable, economically and ecologically sound communities. Unlike traditional infrastructure such as roads and storm water systems, a well-managed Urban Forest accrues value and provides a variety of greater benefits including;[1]

- Increased public and private amenity
- Contribution to an areas current and desired future character
- Enabling reduction of energy consumption
- Increased land and property values
- Increased social and health wellbeing
- Recreational opportunities
- Provision of shade and reduction of Urban Heat Island Effects
- Reduced air pollution
- Provision and support of biodiversity
- Increased ground water infiltration (improving drought tolerance and reducing storm water runoff).

[1] *North Sydney Urban Forest Strategy. 2019. North Sydney Council*

Table 1. Traditional Tree Management vs Modern Urban Forest Approach[2]

Traditional Tree and Vegetation Management	Modern Urban Forest Management Model
Trees and other vegetation as ornamental (excluding bushland and remnant areas)	Trees and other vegetation (including bushland and remnant areas) as green infrastructure. Consisting of a more holistic approach to management, planning and design
Trees as individuals, other vegetation as isolated natural or planted areas	Forest (overall canopy and other vegetation cover)
Trees and other vegetated areas having a lower priority in the development process (excluding bushland and remnant areas)	Urban Forest management considers the range of benefits that Urban Forest provides in urban infrastructure management, planning and design
Trees and other vegetation have no monetary value	Urban Forest (particularly trees, bushland and remnant areas) are regarded as a valuable asset
Small and ornamental trees	Focus on a diverse structure which includes native, exotic and ornamental trees, but ensures provision of large canopy trees
Tree maintenance (replacement once failed / removed)	Forest Management - Proactive analysis and management of tree replacement, diversity, age and risk to disease
Aesthetic-based design (excluding bushland and remnant areas)	Replacement that considers the range of values provided by trees and other vegetation including ecological, water, heat, pollution removal and aesthetics
Legal boundaries determine management	Management determined by ownership boundaries, but valued, monitored and strategically planned for as a continuous resource

Known as the 'Green Heart' of Sydney, Ku-ring-gai has long recognised the benefits and importance of its urban forest as evidenced by the following quote by Phillip Matthews[3]

"More than anything else in Ku-ring-gai it is the trees. More than the green folds of the hills and gullies; more than the affluence of the homes that pepper them; more than the shiny threads of creeks and watercourses; more than the quiet. Trees dominate Ku-ring-gai's skyline, its slopes and the banks of its water–courses….. If a single bond draws Ku-ring-gai together, then surely it is the determination to protect the intrinsic value of the landscape".

In 1998, resident surveys identified 'greening and tree preservation' as an issue of high importance to the community[4]. This has continued to be relevant in the 21st Century, with continued emphasis on preservation of the natural environment, including the tree canopy, as identified in community strategic plans adopted by Council in 2013 and 2018. Residents continue to support preserving the

[2] *North Sydney Urban Forest Strategy. 2019. North Sydney Council*
[3] *Mathews, Phillip., 1978. 'Ku-ring-gai – Living with Trees', The Currawong Press, Milsons Point.*
[4] *Hunter Valley Research Foundation 1998. Ku-ring-gai resident survey.*

leafy character, bushland and green spaces of Ku-ring-gai and protecting the future of its urban forest[5].

Council has a long history of supporting canopy replenishment, implementing a canopy replenishment program in 2000. Additionally, Council's planning controls include provision to maintain and improve vegetation within Ku-ring-gai. Despite this, pressures from development, bush fire risk mitigation, severe weather events, an aging canopy and significant legislative changes (including *10/50 Vegetation Clearing Code of Practice for New South Wales*[6]), have impacted and place ongoing constrains upon Ku-ring-gai's Urban Forest past and future health, extent, structure and density.

STRATEGIC ALIGNMENT

Ku-ring-gai's Urban Forest management and strategy is supported by state, regional and local planning directions. Key planning priorities, objectives and documents as outlined within Figure 1.

Figure 1. Strategic Planning and Policy Framework

State and Regional Planning

The Plan A Metropolis of Three Cities - The Greater Sydney Region Plan
Regional Plan - NSW Government 20 year plan, 40 year vision

Objective 1 - Infrastructure supports the three cities
Objective 27 - Biodiversity is protected and urban bushland and remnant vegetation is enhanced
Objective 30 - Urban tree canopy cover is increased
Objective 31 - Public open space is accessible, protected and enhanced
Objective 32 - The Green Grid links parks, open spaces, bushland and walking and cycling paths
Objective 25 - The coast and waterways are protected and healthier
Objective 34 - Energy and water flows are captured, used and re-used
Objective 38 - Heatwaves and extreme heat are managed

The North District Plan
District Plan - NSW Government 20 year plan, 40 year vision

Planning Priority N1 - Planning for a city supported by infrastructure
Planning Priority N15 - Protecting and improving the health and enjoyment of Sydney Harbour and District waterways
Planning Priority N16 - Protecting and enhancing bushland and biodiversity
Planning Priority N19 - Increasing urban tree canopy cover and delivering Green Grid connections
Planning Priority N20 - Delivering high quality open space
Planning Priority N21 - Reducing carbon emissions and managing energy, water and waste efficiently

[5] *Ku-ring-gai Council Sustainability Vision Report 2008-2033.*
[6] *NSW Rural Fire Service, 2015. 10/50 Vegetation Clearing Code of Practice for New South Wales.*

Local Planning

Council's Community Strategic Plan – Our Ku-ring-gai 2038

10+ year plan, 20 year vision

Long Term Objectives:

P1.1 Ku-ring-gai's unique visual character and identity is maintained
N2.1 Our bushland is rich with native flora and fauna.
N3.1 Our natural waterways and riparian areas are enhanced and protected.
N4.1 A community addressing and responding to the impacts of climate change and extreme weather events.
P5.1 Ku-ring-gai's heritage is protected, promoted and responsibly managed.
P3.1 The built environment delivers attractive, interactive and sustainable living and working environments.
C3.1 A community where opportunities are provided for all voices to be heard and where community stewardship, participation and engagement is supported and promoted.

Ku-ring-gai Local Environmental Plans and Ku-ring-gai Development Contrail Plans

Ku-ring-gai's draft Local Strategic Planning Statement

Plans for Ku-ring-gai's economic, social and environmental land use needs for the next 20 years (2016-2036).

Local Planning Priorities:

K1. Providing well-planned and sustainable local infrastructure to support growth and change
K27. Ensuring the provision of sufficient open space to meet the need of a growing and changing community
K28. Improving the condition of Ku-ring-gai's bushland and protecting native terrestrial and aquatic flora and fauna and their habitats.
K29. Enhancing the biodiversity values and ecosystem function services of Ku-ring-gai's natural assets
K30. Improving the quality and diversity of Ku-ring-gai's urban forest
K31. Increasing, managing and protecting Ku-ring-gai's urban tree canopy
K40. Increasing urban tree canopy and water in the landscape to mitigate the urban heat island effect and create greener, cooler places

Council Policies and Strategies

Key documents include:

Biodiversity Policy
Weed Management Policy
Tree Notification Policy
Fauna Management Policy
Playground Strategy
Open space Acquisition Strategy
Climate Change Policy and Adaptation Strategy
Water Sensitive City Policy and Strategy (to be created 2020)
Green Grid Strategy (to be created 2022-2024)
Local Character Study (to be created 2021)
Scenic and Cultural Landscape Study (to be created 2021)

WHAT IS AN OPTIMAL CANOPY COVERAGE?

The capacity to optimise canopy coverage in an area is influenced by the climatic and land-use patterns within a city. Therefore, it is logical that in determining specific targets for the creation and maintenance of canopy that they be based on densities and land use patterns.

Canopy targets are based on measurable outcomes that are to be achieved by a given date or other predefined circumstance. These measures can be utilised to highlight positive or negative changes over time thereby enabling the effectiveness of strategic actions to be appraised.

International and national best practice precedents recommend the following minimum targets based on three urban conditions[7]:

- 15 percent tree canopy cover in town centre areas.
- 25 percent tree canopy cover in residential (medium to high density) and light commercial areas.
- 40 percent tree canopy in suburban areas.

HOW DOES KU-RING-GAI MEASURE UP?

In 2014, a joint study of tree cover, between the NSW University of Technology and 202020 Vision[8], indicated that Ku-ring-gai had a 52.1% tree coverage. At the time, this was the fourth highest amongst the 39 NSW local government areas studied.

In 2016, the NSW Office of Environment and Heritage commissioned mapping of urban vegetation cover for the Greater Sydney Region[9], providing percentage canopy for property boundaries (see Figure 2).

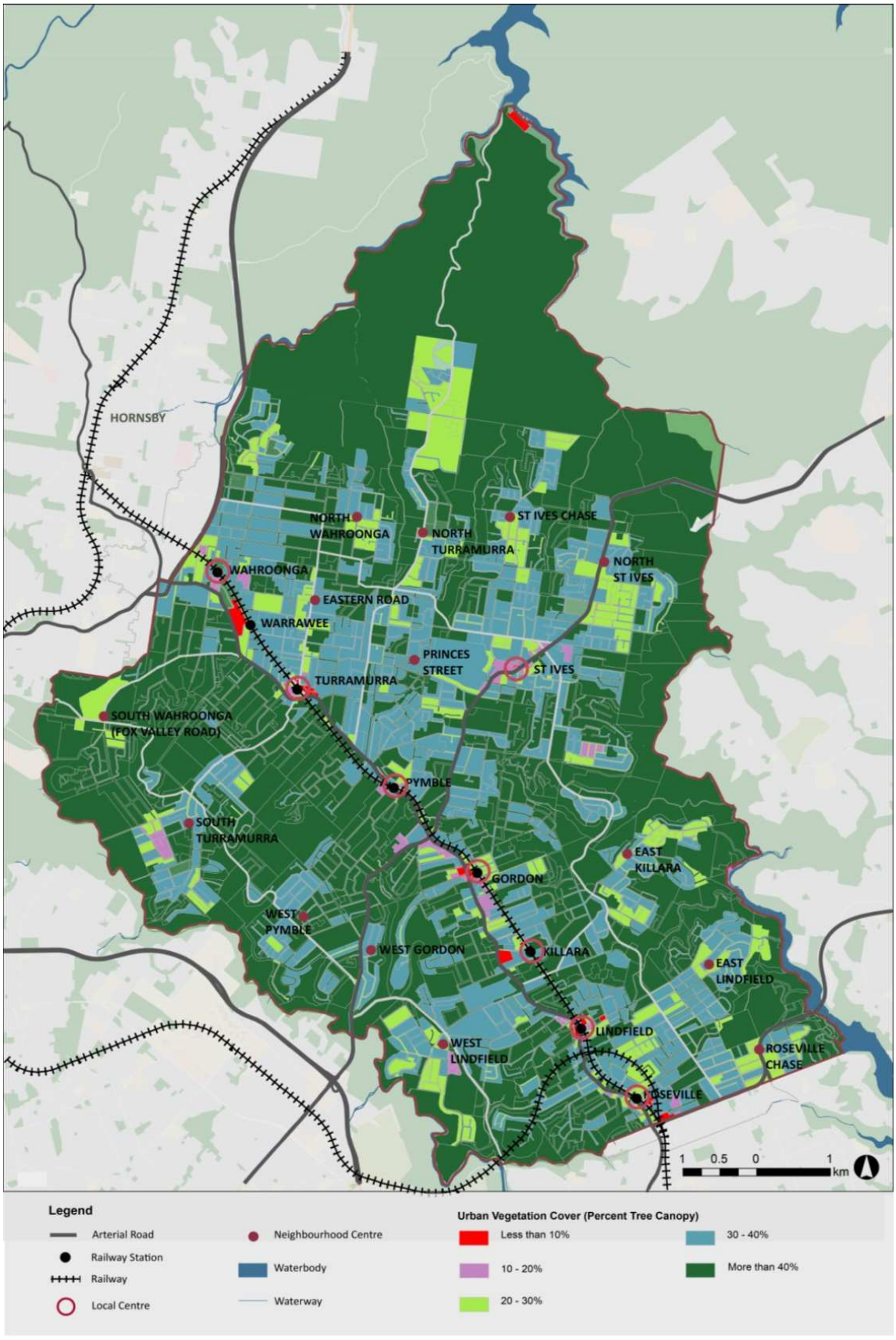
Development of the Urban Forest Monitoring Program will provide a framework for future and historic tree (canopy) and other vegetation mapping and monitoring. Enabling comparison of historic change and providing a base line for future management, including the creation of targets specific to the Ku-ring-gai Local Government Area (LGA).

[7] *Draft Urban Forest Canopy Guide, 2018 Government Architect, Orange NSW*

[8] *Jacobs, B., Mikhailovich, N., and Delaney, C., 2014. Benchmarking Australia's Urban Tree Canopy: An i-Tree Assessment. Prepared for Horticulture Australia Limited by Institute for Sustainable Futures, University of Technology Sydney.*

[9] *Office of Environment and Heritage, 2016. NSW Urban Vegetation Cover to Modified Mesh Block 2016.*

Figure 2. 2016 Ku-ring-gai Urban Tree Cover By Property



(Source: NSW Office of Environment and Heritage, 2016)

WHAT IS A SUSTAINABLE URBAN FOREST?

Sustainable urban forest management typically includes maintaining biodiversity, productivity, regenerative capacity and the potential to fulfil relevant ecological, economic and social functions.

A key attribute of a sustainable urban forest is a wide age-distribution of trees. This ensures that there is a new generation of trees to take the place for any trees that require removal. The most expensive stages of a trees life are in establishment and in old age. Therefore, an urban forest with a wide age-distribution is more economically sustainable. It is important however to recognise the ecological value that older trees provide including habitat and hollows (which can take hundreds of years to form).

Another important attribute of a sustainable urban forest is diverse mix of species. The unique visual character and identity of Ku-ring-gai is determined by the presence of bushland and urban areas containing large remnant forest trees in amongst a mix of native and exotic species.

With regard to species selection, the Urban Forest Strategy and Replenishment Program will need to address existing site and biodiversity (such as fauna habitat) requirements, as well as future desired character and future climate conditions. To assist in this a partnership approach with industry and research institutions is proposed.

Ensuring species diversity improves resilience by reducing the susceptibility of populations to a new pest or disease. Species diversity is typically measured by the percentage of the tree population contained in particular families, genera and species. Recognised standards for species diversity are in the range of[10]:

- 30%-40% for any particular family
- 20%-30% for any particular genus
- 5%-10% for any one species

DOES TREE SIZE MATTER?

Research indicates that the greatest benefits are provided by large trees[11]. The Ku-ring-gai landscape, geology and climatic attributes have supported a range of native forest communities, characterised by large trees, as well as enabling the growth of large planted native and exotic tree species.

Although large trees require more space above and below ground than small trees, the obvious benefits to the community are increased exponentially throughout their lifetime. Larger trees have the capacity to:

- Create more shade due to their proportionately larger canopy spread
- Intercept more particulate pollutants and rainfall due to proportionately larger leaf area
- Absorb more gaseous pollutants
- Improve available habitat
- Provide larger canopy cover with fewer impacts at ground level from stems, trunks and lower branches
- Provide greater contribution to visual amenity
- Provide higher canopy clearance over roads, car parks and footpaths
- Contribute more to traffic calming on local streets than small trees

[10] *Draft Urban Forest Canopy Guide. 2018 Government Architect. Orange. NSW.*
[11] *City of Sydney, 2013. Urban forest Strategy.*

For these reasons, tree height is a key indicator in Ku-ring-gai's urban forest management and monitoring

OUR STRATEGY FOR THE FUTURE

To meet the objectives of the Urban Forest Policy, the Urban Forest Strategy will be guided by the following strategic directions, to be implemented across a number of sections of Council.

Planned and Monitored Management

A strategic plan is fundamental to achieving the optimal development and quality of the urban forest. This will include the creation of an Urban Forest Strategy, Urban Forest Monitoring Program, continued development of the Urban Forest Replenishment Program, and review and development of Vegetation Management Guidelines.

The Urban Forest Strategy will identify strategies/programs and targets for the following key areas:

- Tree and other vegetation targets
- Risk to and from the Urban Forest (including pests, disease)
- Urban forest species, structural and age diversity
- Asset management, including monitoring, protection, replacement, removal, planting
- Partnerships, advocacy and community engagement

The strategy will seek to provide direction for:

- Council planning documents; including Local Environmental Plans and Development Control Plans and Public Domain Plans
- Planting on public and private land, including Council's Urban Forest Replenishment Program
- Creation of a public land and street tree inventory
- Utilisation of green infrastructure and water sensitive urban design

The Urban Forest Monitoring Program will enable effective monitoring and reporting of Ku-ring-gai's Urban Forest, assessing past and informing future management.
The program will seek to:

- Improve Council's understanding of Ku-ring-gai's existing and future urban forest extent, condition and composition (including native/non -native, species diversity, age distribution)
- Set urban forest canopy targets and indicators specific to the Ku-ring-gai LGA
- Consider urban heat island, biodiversity corridor and hard surface mapping
- Investigate assessment of ecosystem services such as shade, stored carbon, air and water quality benefits
- Provide periodic mapping and evaluation using current mapping technologies
- Align with relevant local, regional, state and national mapping and monitoring

A staged approach will be applied to the Urban Forest Monitoring Program with additional detail being collected and managed as resources and technology permit.

The initial stage will focus on Council's tree population, including canopy extent, height and vegetation communities across the LGA. Additional details such as species and age profile, structural and spatial diversity and Useful Life Expectancy (ULE) for council managed lands shall be incorporated in latter stages.

Creation of tree and other vegetation targets will be informed (limited) by data collected within each stage.

Urban Forest Replenishment Program

Council has a long history of supporting canopy replenishment. Council's commitment to canopy replenishment increased in the late nineties, in response to an identified canopy decline. The program focused on increasing canopy and development of a more sustainable mixed aged tree population on open space land and road reserves. This initiative resulted in planting of over 15,000 trees in all streets and parks within its LGA between 2000 and 2009 (with a 48% mortality rate). This canopy replenishment program is ongoing with a reduced operational budget since 2009. The Urban Forest Strategy (including targets) will provide direction for future implementation of this program.

The Vegetation Management Guidelines will include a range of internal and external supporting material including:

- Tree Assessment and Inspection Standard Operating Procedure – A Standard Operating Procedure (SOP) detailing qualifications, assessment approaches and risk assessment methodology and documentation for Council staff involved in tree assessment and inspection.
- Tree Assessment Guidelines for Application to Prune or Remove Trees on Private Property and Council Managed Land – A guideline detailing what criteria Council will utilised in determining what tree works will be authorised by Council on both council managed land and private land.
- Tree Investigations Standard Operating procedure – Provides a basic guideline for staff in the investigation of alleged breaches of Tree and Vegetation Preservation controls, within Council's Development Control Plan.
- Guidelines for obtaining Arborist reports – A guideline detailing the minimum qualifications and reporting requirements that Council will accept for Arborists reports.
- Trees on Development Sites Technical Manual – A guideline/manual to assist potential applicants in the compilation of development applications involving trees.
- Tree Works Guideline – A guideline detailing qualification requirements and standards applicable to persons carrying out works on trees.
- Street Tree Master Plan/Street Tree Selection Manual – Defines the process for selecting tree species for planting in Ku-ring-gai's streets including risk assessment approaches to species selection and planting.

Systematic and Adequately Resourced Management

Adequate resourcing and investment is necessary to ensure effective and efficient planning, monitoring and management. It is important that the maintenance cost of tree and other vegetation management is considered within the whole of life cost for the asset (trees may span a number of human generations). In addition to recurrent and capital works expenditure, other external funding sources should be sought such as grants and other partnerships (including community, government and utility providers).

Development and analysis of key monitoring criteria and a systematic approach to the management of the urban forest will provide the best cost-benefit outcomes. In valuing the cost of Urban Forest creation, management and protection, considerations should be afforded to the contribution provided by this asset. This may include evaluating the cost of alternative engineering approaches to protect trees rather than removal.

Integrated Management and Planning

There is a need to recognise and manage underlying vulnerabilities to Ku-ring-gai's Urban Forest, resulting from:

- A lack of detailed knowledge regarding Ku-ring-gai's Urban Forest composition, including: age distribution, species composition, associated disease risk and Useful Life Expectancy (ULE) of established trees
- A perceived aging tree population
- Proliferation of weed species
- Climate change
- Urban Heat Island Effect
- Increasing population and urban intensification
- Mitigation from bushfire hazard
- Utility maintenance
- A range of land manager (including private and public land)
- Provision of adequate soil volumes to support optimal tree health and growth to minimise risks to adjacent infrastructure
- Fear of trees
- Vandalism
- Solar access
- Influence from government policy (such as 10/50 Vegetation Clearing Code of Practice for New South Wales and State of the Environment Planning Policies)

The challenge for Council and other stakeholders (including government agencies, utility companies, residents, business owners and the broader community), will be to respond to these issues in a coordinated, strategic and sustainable manner, to ensure that we can create a healthy, diverse and resilient urban forest to be enjoyed by current and future generations. This should include Urban Forest planning and management that:

- Seeks to engage stakeholders from a wide range of disciplines, including arboriculture, urban planning, landscape architecture, natural resource management, engineering, water management and finance
- Strategically plans and works across administrative boundaries and disciplines within and adjacent to Ku-ring-gai
- Utilises a wide range of tools including planning mechanisms, research, education, replenishment programs, monitoring and inventory/asset management systems

Partnerships, Advocacy and Community Engagement

The Urban Forest Strategy will promote community engagement and consultation, advocacy, and development of partnerships, in order to:

- Improve urban forest protection and management
- Increase utilisation of green infrastructure
- Promote participation in the greening of Ku-ring-gai
- Increase awareness regarding the value, benefits and need to protect and sustainably manage our Urban Forest

Key international, national, regional and local stakeholders may include local governments and other public agencies, greening agencies (such as Landcare and 202020 Vision), educational institutions, service and utility providers, private enterprise, industry representative bodies and the local community.