The Urban Tree Canopy – Local Government Leading the Greening of Adelaide

Group Project

6.12.2019

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Executive Summary

Increasing the urban tree canopy is a great opportunity for Local Government over the next five years.

There are many benefits and barriers to increase the urban tree canopy across Metropolitan Adelaide. Some of the barriers are presenting as transition to opportunities as State Government and Local Government are recognising the benefit that maintaining and enhancing the urban tree canopy will have economically, environmentally and socially.

The changes to the Planning Development and Infrastructure Act and the associated Design Code assessment tool puts greater attention to deliver trees within private developments which is a big step. Along with a new consistent measuring baseline across Local Government areas this will further assist in new benchmarking for Councils and realising the targets of the 30 Year Plan for Greater Adelaide.

More research and specific action plans for effectively increasing tree canopy needs to be developed and supported by strategic policies. This will drive real solutions on ground with appropriate tools and engagement to ensure successful delivery.

Work needs to be done to ensure Councils are maintaining and enhancing the urban tree canopy including collaboration across all sectors of government, involving communities to change perceptions and identify the urban tree canopy as a significant asset moving into the future.

Our five-year implementation plan consists of:

Year 1	Planning, guidelines and working with State Government
Year 2	Improving processes, procedures and developing designs incorporating tree planting
Year 3	Community education and cross collaboration with private sector and developers
Year 4	On-ground implementation
Year 5	Monitor mapping and report

Refer to Appendix D for a detailed five-year plan.

The urban tree canopy needs to be put to the forefront of the minds of organisations and communities as a significant opportunity to enhance the way we live and where we live.

Introduction

The urban tree canopy has become a strong topic across all government sectors within Australia with many organisations and researchers promoting the benefits of increasing and retaining trees. The Australian Federal Government currently does not have a nationwide urban tree canopy. It has, however, been acknowledged as important by the Minister for Environment and Acting Minister for Cities who stated that "We will work with Australian cities to set decade by decade goals out to 2050 for increased overall tree coverage." (Cheng, 2016).

The Government of South Australia has provided direction in the *30-year Plan for Greater Adelaide* (DPTI, 2017). This state strategic plan provides targets for Councils to increase and maintain tree canopy coverage. It could be argued that this state target has been a key driver for South Australian Local Governments to start seriously thinking about tree canopy or has just reinforced the imperative of increased tree canopy.

This project aims to identify how Adelaide Metropolitan Local Governments are approaching ways to increase their urban tree canopy. Through a literature and context analysis, this report will consider and analyse the strategic drivers, benefits and issues of the urban tree canopy. Surveys with Local Government staff were used to identify current approaches that are being taken by Local Government to increase their tree canopy. The opportunities to increase tree canopy will be discussed and recommendations identified which should be considered. The recommendations will explore the benefits of collaboration across the Local Government sector to improve work processes and efficiencies and how collaboration with the community is essential to ensure the community can capitalise on the benefit of increased tree canopy.

There is the opportunity for Local Government to become leaders in this space over the next five years and facilitate multiple increased benefits for the environment, work processes and local communities.

Figure 1 Rundle Mall Redevelopment – South Australia (Trees make an impact)

Tree Canopy in the South Australian Context

A review of South Australian legislation and State Government strategic planning indicates that trees and tree canopy is considered highly valuable in South Australia. The current planning system for South Australia provides protection against the damage and removal of trees identified as regulated or significant as defined in legislation (*Development Act 1993*). The aim is to protect established trees by requiring a development application to be submitted prior to the removal of these trees. Increasing the urban green cover is considered extremely important and has formed the basis for "Target 5 - A green liveable city: urban green cover is increased by 20% by 2045" in the *30-year Plan for Greater Adelaide* (DPTI, 2017, p 16).

However, South Australia's tree canopy has been identified as low by a nationwide research review, "South Australia's metropolitan areas are marked by relatively low levels of tree canopy when compared to other Australian capitals. Of the assessed Councils, tree canopy ranges from 44% in the Adelaide Hills to 12% in Port Adelaide Enfield" (202020 Vision, 2017). While the legislation provides some protection for established trees, in practice, tree removal is still prevalent in a number of scenarios such as in large urban developments, street tree removal due to complaints or allowing the removal of trees in high bushfire risk areas without approval.

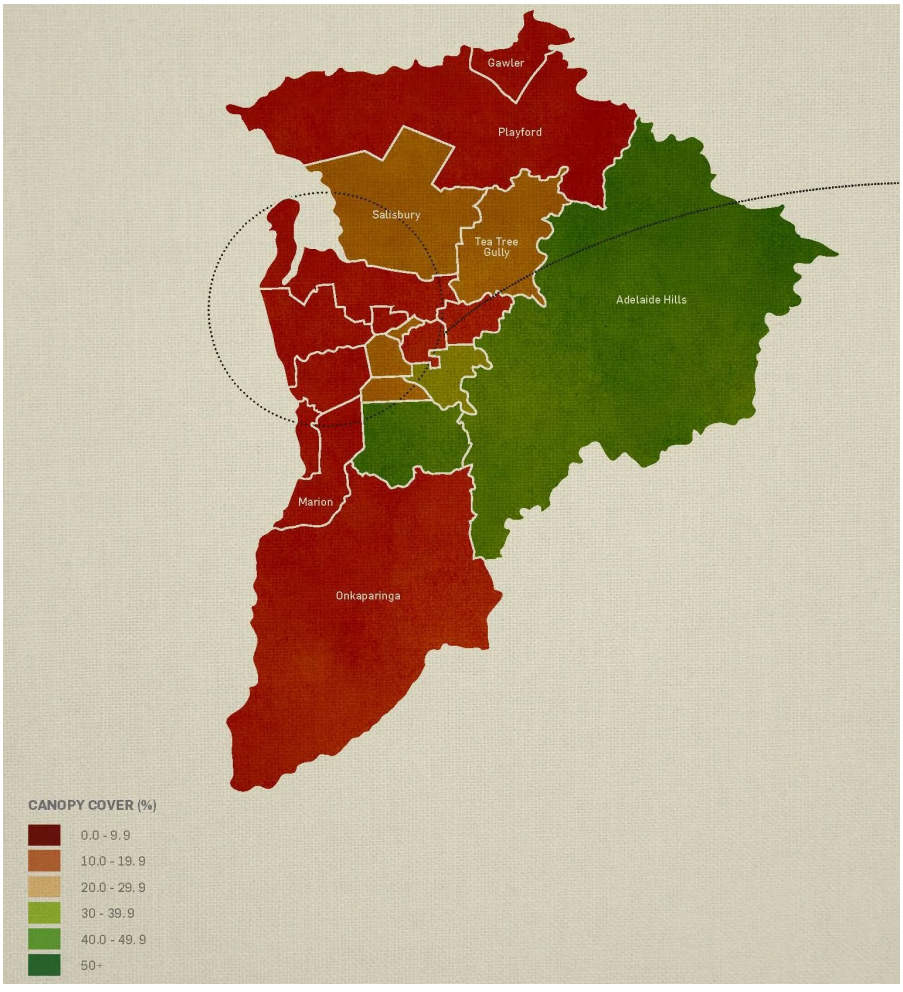

Figure 2 South Australia Tree Canopy Coverage (202020 Vision 2014)

South Australian Local Governments are guided by the State Government strategic direction to increase and maintain the urban tree canopy. However, in practice each Local Government in South Australia is responsible for developing their own tools to drive upper tiers of government policy on the ground. This has resulted in an ad hoc approach to implementing measures into relevant strategies and policy.

Most metropolitan Councils have a strategic direction for trees. A review was undertaken of the 19 Metropolitan Adelaide Local Governments; this found that 18 (or 95%) identified trees and increasing tree canopy as an important strategic direction within a strategic plan. Seven of these (37%) have developed a strategic document which focuses on trees or urban forest. Nine of all Metropolitan Adelaide Councils (47%) have identified a target for increasing the percentage of tree canopy or increasing the number of trees planted, however only three of these are consistent with the State Government target. These strategic documents are important because they set out the goals, aims, principles and values in relation to trees. Although these strategic plans are not legislated, Councils will still have regard to these through their decision-making process. The complete review of Metropolitan Adelaide Local Government Strategies and Policies is documented in Appendix A.

Local Governments have a responsibility for managing trees. As land managers, service providers and government regulators, Local Government can play an important role in seeking to balance infrastructure and community needs with environmental conservation and sustainability. Given the pressure on governments to plan for greater populations, increased urban density and climate change adaptation, there is a clear opportunity to communicate the importance and benefits of urban forests in creating resilient, sustainable cities that provide healthy and enjoyable places for people to live and work.

Benefits

Increased tree canopy is vital in creating an attractive, liveable city. Green street design encourages healthy and active outdoor lifestyles, is important to our natural heritage, provides character and makes public spaces more comfortable and inviting, helping to build community. Trees also provide health benefits and perform important ecological functions including reducing the heat island effect, enhancement of air quality, support of habitat and storage of carbon which would otherwise rise up and trap heat in the atmosphere. Councils should have an ‘acknowledgement of street trees as a core infrastructure asset that requires specialist management, cross-departmental coordination and adequate re-current funding’ (City of Hobart, 2017).

Figure 3 Benefits of trees in the Townscape (Landscape Interface Studio, 2015)

Barriers / Challenges

Establishing tree canopy in an ever-changing urban environment has many challenges. Planting new trees is often difficult due to vandalism, seasonal climatic conditions, impeding public views and limited space at a time when affordable housing allotments are getting smaller, leaving no room for trees on public or private land. Maintaining established trees is also a challenge as trees are constantly under threat of damage and removal to make way for new development and service installations, removal due to safety concerns (public and property damage), poor condition, species selection (some trees are not suitable for urban environments) and tree loss due to natural causes such as storms, drought and bushfire.

Figure 4 Tree storm damage

Figure 5 Pavement damage due to tree roots

Figure 6 Tree root damage from service installation

Figure 7 Tree vandalism

A comprehensive table of tree canopy benefits and challenges is documented in Appendix B.

Changes in State Government

The South Australian State Government released the Draft Planning and Design Code (DPTI, 2019) for consultation in October 2019. This will replace current planning policy across the state and will direct all future development including residential development. The Draft Planning and Design Code includes 'Performance Outcomes' and 'Deemed to Satisfy' policy which specifically direct the planting of trees in residential development (DPTI, 2019, pp 2289-2290). This was not included in the previous Council Development Plans and is a shift in planning policy which reflects the targets identified in the 30 Year Plan for Greater Adelaide (DPTI, 2017). This is a positive outcome and has the potential to resolve the issue of increasing tree canopy cover on private land which has been consistently raised in Local Government strategic planning on tree canopy. Local Government should continue to advocate for the retention of this policy direction in the final version and all subsequent versions of the Planning and Design Code. This will be a key contributing factor to the increase in tree canopy on private land.

There are funding opportunities, although limited, offered by the state government such as the Greener Neighbourhoods Grant Program. This funding program commenced in 2019 and was identified as part of the restructure of the Natural Resources Management boards and represents an increased focus on tree canopy. However, further and more targeted funding is required to assist Local Government in the development, design and support of tree canopy strategies and planning. There are currently no other funding programs that specifically target increasing urban tree canopy in the greater Adelaide region.

Current Approaches to Tree Canopy by South Australian Local Government

A review was undertaken to understand what Local Government in metropolitan Adelaide were currently doing to increase tree canopy. This included a review of strategies, policies and other documents and interviews. The complete review of Metropolitan Adelaide Local Government Strategies and Policies is documented in Appendix A. Interviews were conducted with a variety of stakeholders across both Local and State Government (8 in total) to identify the role Local Government can play in contributing to the greening of Adelaide. Appendix C provides a summary of the interview questions and the responses received.

The approaches taken by Local Government currently fall into the following categories:

- Research
- Planning and guidelines
- Improving processes and procedures
- Working with developers
- Community education

Research

Continued research is required to clearly define current tree canopy, track the changes and improve tree retention. Mapping of current tree canopy is being undertaken by individual Councils with a variety of techniques although no consistent approach identified for the whole of Adelaide. Some Councils are using LiDAR (Light Detection And Ranging) to map the crown of individual trees and infer tree heights whilst others are using i-Tree, an online survey tool which produces a statistical estimate of tree and other land cover types using Google Maps.

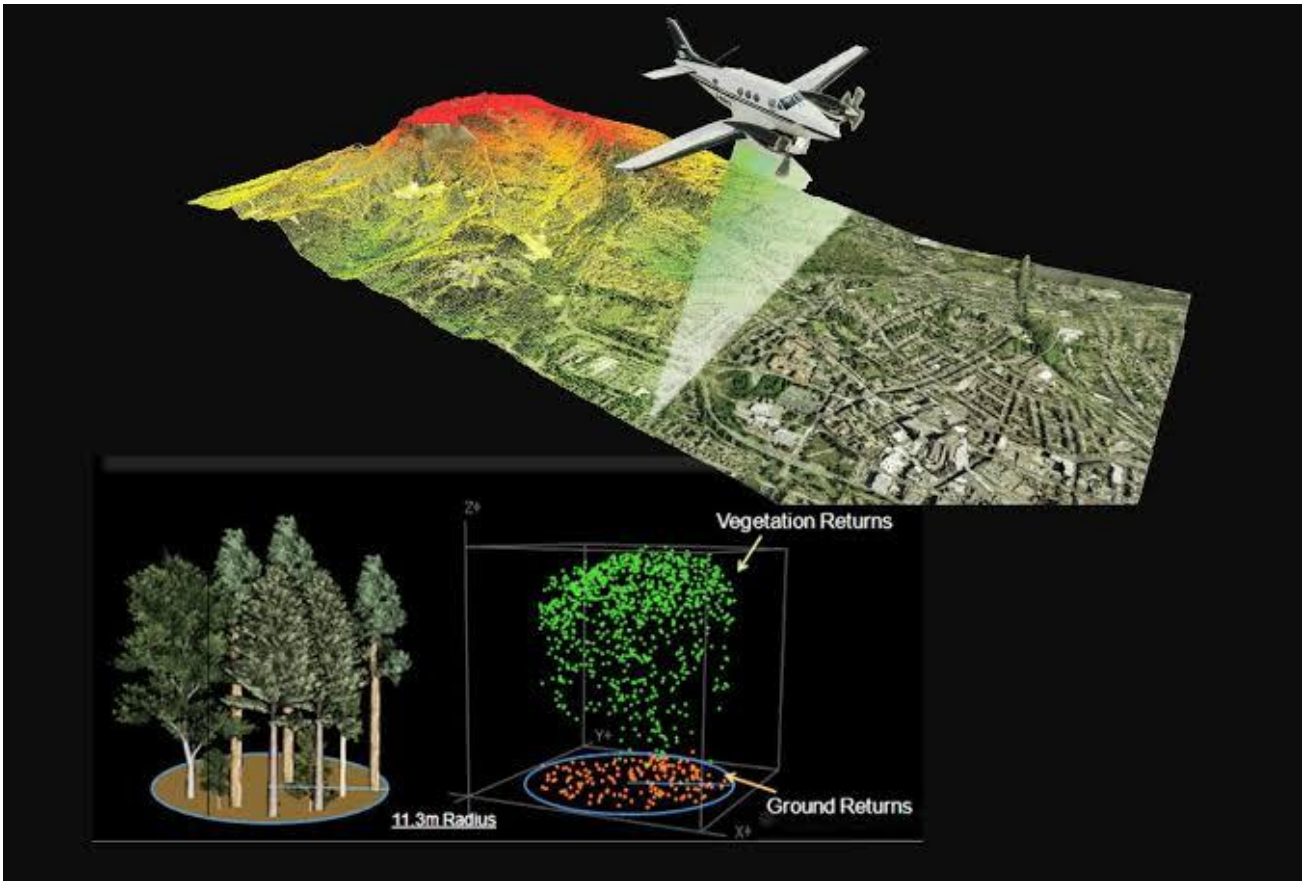

Figure 8 Airborne LiDAR mapping of trees

The State Government Department of Planning, Transport and Infrastructure (DPTI) have recently conducted LiDAR mapping over Adelaide with the data outputted into a 3D model. This would be a valuable resource for Councils to access (even if it comes at a cost) and use as a benchmark of current tree canopy extents to build Council strategy for urban green cover in the future.

Mapping other influences such as heat island mapping and stress factors have been developed by regional partnerships between Councils focusing on Climate Change Adaptation. State Government could also help facilitate connections across Council boundaries and provide a regional perspective.

Another opportunity to increase tree canopy is around better education of tree species. Ensuring appropriate tree species are chosen for the relevant planting area that will also be resilient to climate change in the future will help reduce the loss of trees and contribute to increasing tree canopy.

Planning and guidelines

Policies or guidelines developed in relation to this issue by either State or Local Government agencies need to incorporate planting on both public and private land as well as advocate for the retention of existing trees. The biggest opportunities to increase tree canopy are in new developments (greenfield sites) but there are also huge opportunities in already developed areas (brownfield sites). Tree design needs to be a key consideration when designing landscapes in new developments and guidelines should be given to developers and designers for contemplation throughout the design process. Guidelines should also encourage consideration of rooftop

gardens and garden walls for multi-storey developments. State Government play a critical role in developing and implementing planning policies and guidelines.

Figure 9 Bogota, Colombia_ World's largest vertical garden on multistorey residential building (115,000 plants) treehugger.com.

Improving processes and procedures

Innovative thinking needs to be applied to streetscape design to incorporate tree planting as a primary and not a secondary consideration led by 'hard' civil infrastructure programs. It is difficult to create good conditions to grow trees in typical street design, as trees are surrounded by hard 'impervious' infrastructure which prevents water infiltration to the root system.

To incorporate trees in streetscape designs some improved measures are as follows:

Measure	Benefit
Permeable Paving	Water infiltration into tree roots / soil and cooling adjacent paved area.
Tree inlet pits	Divert kerbside stormwater to tree roots / soil which can reduce demand on drainage system.
Road kerb openings to verge trees	As per tree inlet pits.
Root Barriers	Redirect tree roots away from Council assets.
Tree Pits / Stratacells	Install trees in uncompacted soil in heavily trafficked urban areas.
Water Sensitive Urban Design (WSUD)	Harvesting stormwater to improve water quality, aesthetics, recreational appeal and increase greening.
Construct roadside raingardens / planted swale verges with trees	Benefit of stormwater harvesting which reduces the demand on drainage networks, improves water quality through filtration in addition to providing a vital water source to combat hotter months.

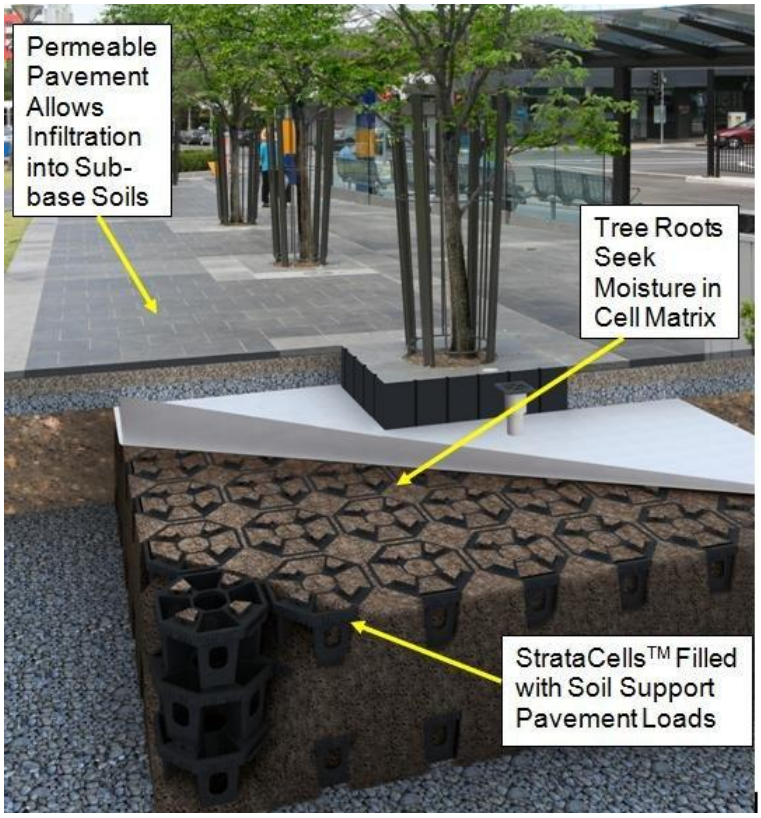

Figure 10 Permeable pavement/ tree pit/ stratacell arrangement in urban area (Typical StrataCell TM Application http:citygreensystems.com)

An example of an improved streetscape design is Dubbo Urban Heat Island Amelioration Project undertaken by the Dubbo Regional Council, where a section of Butje Street was identified having high heat exposure and high pedestrian traffic. This area of the street had 2.8% canopy cover (calculated using i-Tree Canopy) before the project.

The project goal was to increase the existing tree canopy by up to 300% and incorporate water sensitive urban design (WSUD) to capture stormwater runoff from nearby streets and provide a source of water for irrigating the trees in its dry climate.

I-Tree Canopy Tool was used to determine canopy cover and TARGET (urban microclimate model) was used for implementation of WSUD strategies and to visualise the urban heat island (UHI) effect benefits of the project using satellite imagery and meteorological data to simulate extreme heat events. Tree selection was undertaken to maintain the heritage value of the precinct, maximise shade in warmer months, solar access in winter months and select species that are extremely hardy and adaptable to the urban environment tolerating heat, air pollution and periods of drought.

Grid-base maps of modelled land surface temperature before and after tree planting were as follows:

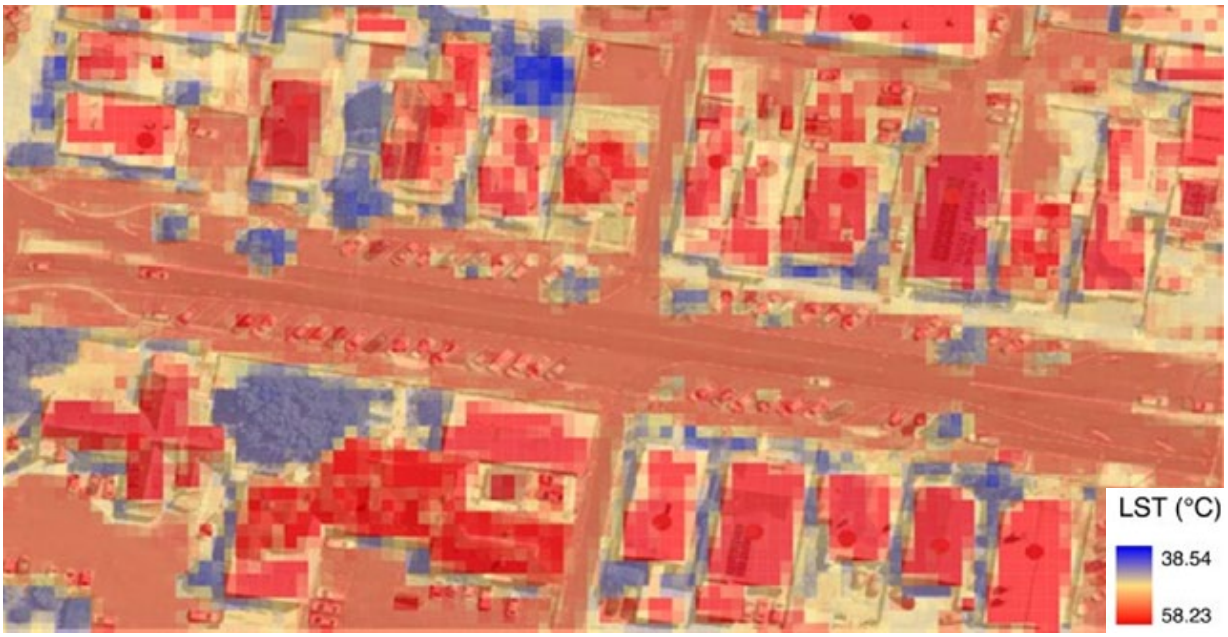

Figure 11 Bultje Street, Dubbo – before tree planting

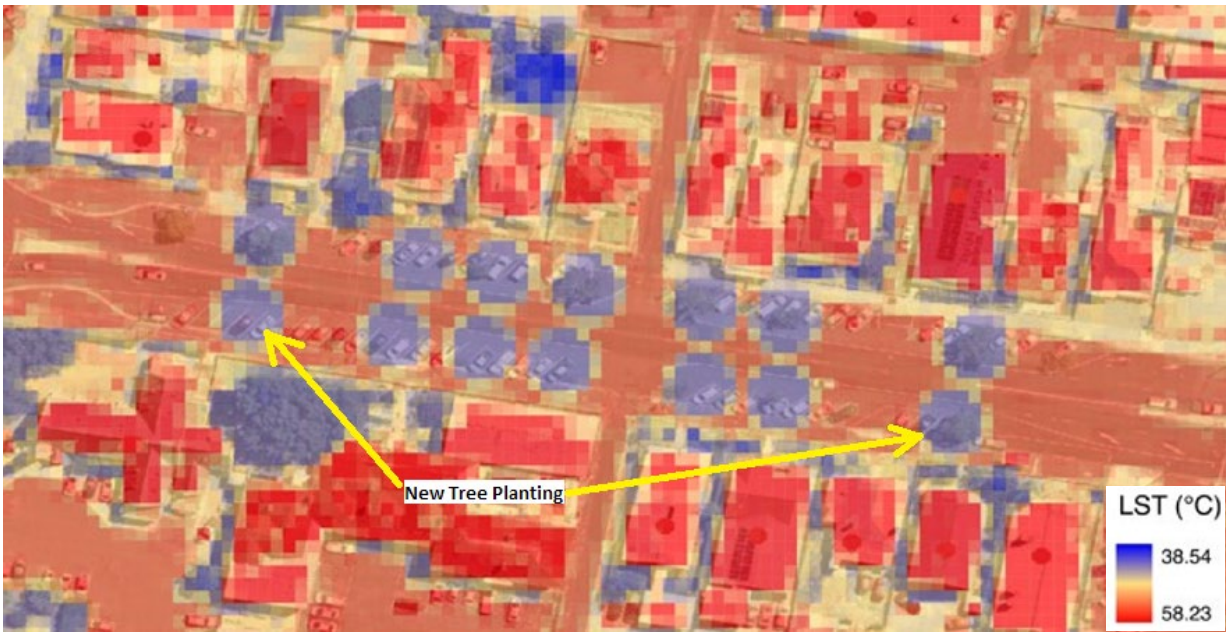

Figure 12 Bultje Street, Dubbo – after tree planting

These maps show a reduction of surface temperature under tree canopies from 58 – 38 degrees. Tree pits in kerbs divert water to street trees providing additional benefits of reducing water quantity and pollutant loads into the Macquarie River.

Some Councils are already improving the programming of works for streetscaping projects by overlaying capital works programs with road works and street tree plantings. Collaboration across Councils is already underway on initiatives such as the LG Urban Forest Alliance, regional climate change adaptation partnerships and TreeNet.

Most urban development strategies are beginning to include the capital value of forests in policies and programs that modify tree stocks, qualities and distributions. Urban trees are more widely acknowledged as both productive capital stocks and as components of public infrastructural systems.

Trees need to be considered as an asset with a life cycle cost assigned to them including the establishment and maintenance of the tree and the maintenance of surrounding infrastructure.

Working with Developers and the Private Sector

A greater effort is required in educating developers about the benefits of trees including the "financial value based on the carbon they store, the air pollution they remove, the rainwater they hold (allowing it to be re-evaporated by the sun rather than disappearing into drains and sewers) and how they ameliorate extreme temperatures" (Barkham, 2015).

Trees are typically viewed as a cost to a city (installation and maintenance) but the fact is these costs are well offset by the considerable economic return trees provide. A few examples are below:

Residential Housing – Tree lined streets
Increase in residential property values. Amenity + cultural + privacy value of trees
Health benefits (equivalent to 7 years younger) - decrease in health care costs
Energy saving costs (tree canopy cools down buildings and streetscape). Reduce costs of air conditioning in hot summers.
Stormwater management (streetscapes designed to capture runoff through stormwater harvesting reduce demand on drainage network, which reduces pipe sizing and overall infrastructure costs)
Air / noise quality improvements (trees absorb pollutants and assist creating a barrier against sound)
Retail and Commercial – Tree lined precincts
Large trees in shopping precincts affect the perception and behaviour of shoppers. Shopping / business areas become a richer experience for residents and visitors leading to better economic performance in retail precincts through increased financial returns, attraction of customers, creation of improved atmosphere and sense of security.
Trees and vegetation contribute to the liveability of a city, encouraging visitors and pedestrians to linger in our streets, commercial and retail centres for longer.
Encourages active transport such as walking and cycling which reduces demand on car parking, pollution reduction and promotes outdoor living in a green neighbourhood.
A study into office occupancy rates in retail and commercial environments results suggest that trees / landscaping have the highest correlation with occupancy rates, even higher than building architecture, urban design and direct access.

Councils need to work with developers and private industry to promote and advocate tree planting, ensuring innovative and quality tree focussed solutions are achieved which all parties (Council, developers and community) can benefit from now and in the future.

Some Councils across Australia are already providing incentives to the private sector to encourage tree planting on public and private land. This has been undertaken through financial (tree supply), physical (planting trees) and technical (document provision on tree installation and maintenance guidelines) assistance. As Council owned land is typically limited to tree planting within streetscapes and reserves, establishing tree canopy on private land to assist to combat the urban heat island effect is a significant area Councils need to promote.

Community Education and Partnership

There is recognition across organisations that Local Government has a role in educating the community on the benefits and importance of trees. Education and promotion of the value of trees across various areas is important. This includes schools, local communities, businesses and developers. Councils already have a program for education and communication including methods such as videos, graphics and marketing elements, planting days, tree tags and citizen science. An example of the City of Marion's 'Adopt a Tree' program is shown below (City of Marion, 2019). However currently this is being undertaken by individual Councils even though many of the messages are consistent.

Figure 13 City of Marion Adopt a Tree program

Figure 14 Information signage onsite to educate community

Recommendations

The Local Government sector has demonstrated an understanding of the benefits of trees and a commitment to increasing tree canopy. State and Local Government strategic planning shows this commitment and there is an increasing amount of projects on the ground which demonstrate this in practice. Over the next five years the biggest opportunities to continue to demonstrate the commitment to tree canopy are:

1. **Use current research and analysis to identify tree canopy targets and a detailed action plan for how to achieve this target.**

There should be a clear understanding of the State Government tree canopy target (20% increase) and what this means in a local context as well as an action plan identifying how this target will be achieved. Develop an action plan which identifies how many trees, which species and annual requirement for tree planting are required to meet this target over a specified timeframe.

2. **Work with State Government and the private sector through the Planning Reforms to achieve better outcomes for increasing trees within private developments.**

Advocate for the retention of requirements for tree planting in residential developments in the Planning and Design Code. Once the final version is in effect there is an opportunity for Local Government to develop guidelines or technical specification sheets which provide detailed information on how to achieve these policies. This should provide information on preparing the plantable area (soil, irrigation, size) as well as appropriate species selection (size, root size and spread, growing time, nuts, leaves and berries). This should aim to increase tree retention rates and reduce impact and damage to residential buildings through appropriate species selection and establishment of trees.

3. **Collaborate across the whole sector in areas such as community education, infrastructure design, and technology and technique testing to improve efficiencies, create a consistent approach and develop a positive culture for trees.**

There is an opportunity for Local Government to collaborate on community education about trees and undertake a shared program of community education. This could include establishing a working party across Councils with each Council contributing resources to develop an education platform and materials which is then linked through each Council's website and utilised by relevant staff. Information such as tree species, climate conditions, and events specific to the Council location could then be added individually. Other opportunities include establishing a cross divisional group across Council to support establishment of street trees as part of an integrated infrastructure program. The group should be provided with specific training to understand street tree requirements, promote tree-friendly design concepts (i.e. WSUD) and solve street tree related issues with the

use of new technology and techniques. This will help Councils to develop a culture where street trees are supported, encouraged and managed as infrastructure assets (green infrastructure).

4. Plant more trees! In the right location and the right species to be successful.

Undertake tree planting works identified in the Action Plan and assign tree maintenance programs for the establishment and future ongoing maintenance requirements. This should be implemented progressively through increased annual planting programs to manage financial commitments over time. Ensure all upfront and ongoing costs are documented for future review and analysis.

5. Monitor and measure to test how the program is doing and continuously improve the approach.

Continuously monitor the success of the program and identify how this can be improved. Consistent data and analysis will allow understanding of how tree canopy is measured and track the changes at a regional level which can be utilised for multiple other applications.

The implementation table below shows how these directions can be implemented over the next five years including the role of Local Government. A more comprehensive implementation table is provided in Appendix D.

Year	Action	Details	Council Role
Year 1	Planning and Guidelines	● Identify tree canopy target for Local Government Area ● Develop an Action Plan to drive implementation ● Evaluate Council policies and guidelines, budget, maintenance programs to ensure support for the Action Plan	Research Manager Owner
	Work with State Government	● Review State Government funding opportunities to support implementation ● Advocate for retention of tree planting policies in Planning and Design Code	Advocate Partner

Year	Action	Details	Council Role
Year 2	Improving Processes and Procedures	● Establish a cross divisional group across Councils to support an integrated infrastructure program ● Establish a comprehensive, live inventory of all street trees linked to GPS ● Create tree data base in collaboration with other Councils/State Government to assist tree species selection for street trees and track performance ● Develop partnerships with service providers to coordinate street tree planting ● Review life cycle costings for tree planting and investigate how costs can be reduced without reduction in quality of stock and maintenance practices. Some Councils have found cost savings by propagating trees in their own nurseries and installing in desirable seasons for better survival rates.	Manager Collaborator Partner
	Develop designs incorporating tree planting	● From the Action Plan developed in year 1 identify and undertake necessary site investigations and design work for high priority areas for next year planting ● Identify trial locations for innovative tree planting in difficult areas i.e. areas with significant hard surfaces, services etc. to trial new technology and techniques.	Owner Manager
Year 3	Working with developers and private sector	● Develop and implement strategies including marketing and technical guidelines to work with developers to deliver quality and successful trees within developments ● Explore providing incentives to encourage tree planting on private land	Partner
	Community Education	● In collaboration across the Local Government sector develop a website (and supporting marketing material) where the community can access educational material and be involved in tree planting.	Collaborate Partner Advocate Educate
	Ongoing implementation	● Undertake tree planting identified in year 2 ● Progressively remove weeds and declining tree stock and replace ● From the Action Plan developed in year 1 identify and undertake necessary site investigations and design work for high priority areas for next year planting ● Trial the new technology/techniques in the difficult areas identified in Year 2	Owner Manager

Year	Action	Details	Council Role
Year 4	Ongoing implementation	● Undertake tree planting identified in year 3 ● Progressively remove weeds and declining tree stock and replace ● From the Action Plan developed in year 1 identify and undertake necessary site investigations and design work for high priority areas for next year planting	Owner Manager
	Monitor and Report	● Inspect the trial of new technology/techniques in the difficult areas ● Adjust as required and report	Research
Year 5	Ongoing implementation	● Undertake tree planting identified in year 4 ● Progressively remove weeds and declining tree stock and replace ● From the Action Plan developed in year 1 identify and undertake necessary site investigations and design work for high priority areas for next year planting	Owner Manager
	Monitor and Report	● Inspect tree planting undertaken and assess designs, cost and process ● Adjust program as required	Research
Year 10 and beyond	Measure	● Undertake up-to-date tree canopy and Urban Heat Island Mapping to assess implementation progress	Research
	Round-back	● Provide feedback both internally and externally	Advocate Educate

Achieving an increase in tree canopy in South Australia will require the involvement of State Government, Local Government as a whole sector, individual Local Governments, regional partnerships (such as climate change adaptation groups), community groups (such as environmental and volunteer groups) and individual community members.

Reflection

At the start of the Emerging Leaders Group Project the group discussed each person's Team Management Profiles (TMP). It was quickly identified that there was not a representation of all the sectors of the TMP wheel which meant that group members would need to step into roles that they were not completely comfortable for them. Through the project planning tasks were distributed so that group members had both tasks that fit with their TMP and ones that did not.

The group had the initial project meeting quite late during the course timeline. While this was due to other commitments, both for this course and other work commitments, it put pressure on the project timeline. To alleviate this, a comprehensive task list and timeline to track project deliverables was developed. This helped to keep everyone on the same page and made it easier to allocate tasks to individual team members and track progress. However this project plan was not continuously updated throughout the project which made coordinating the work tasks later in the project more difficult.

Regular meetings were organised throughout the project timeline. This was quite difficult to achieve as people live and work in diverse areas across South Australia. One way this was managed was to diversify communication methods; the group communicated through email and WhatsApp, and used Google Docs so that everyone could access the document anywhere and at the same time.

The group used the 'My Team' – Project Performance Questionnaire to assess project progress at the half way point of the project. This demonstrated that there were greatly different perspectives on how the team was performing at this stage of the project. Some group members rating every section over 75% indicating a high performing team while other group members rated some sectors below 50% which indicated areas which could be improved.

On reflection the team and the project would have benefitted from some regular conversations about how the team was performing and how the project was tracking, including exploring differences of opinions and identifying where improvements could be made. These types of questions within the team often resulted in positive conversations indicating that the project was going generally well but the conversations didn't delve deeply into if anything could be improved or highlighting where there were different experiences from different group members.

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Appendix A – Review of Metropolitan Adelaide Local Government Strategic and Policy Documents

A review was undertaken of Adelaide Metropolitan Local Governments (19 Councils in total) Strategic and Policy documents to assess their commitment to increased tree canopy.

This review only considered publicly available plans and policies accessible from each Council's website. The review included assessing the following information:

Tree Strategy	This identifies if the Council has a tree specific strategic plan
Other Strategy	This identifies if increasing tree canopy is identified as a strategic direction within another Council Strategy
Canopy Target	This identifies if the Council has a target for either increasing the number of trees planted or increasing tree canopy (shown as either number or canopy)
Tree Policy	This identifies if the Council has a tree management policy
Other Support	This identifies if there are other documents such asset management plans, guidelines, landscape plans or manuals which the Council uses to plan and deliver trees

Review of Metropolitan Adelaide Local Government Strategic and Policy Documents

Local Government Area	Tree Strategy	Other Strategy	Canopy Target	Tree Policy	Other Support	Comment
City of Unley	Y	Y	Y Canopy	Y	Y	Target: Maintain at least 26% tree canopy cover in the city
City of Marion	Y	-	Y Canopy	Y	Y	Target the same as the State Strategic Plan (20% increase)
City of Mitcham	Y	-	Y Number	Y	-	Target: Increasing tree establishment to 1800 trees per year will stop the decline in canopy

Town of Walkerville	Y	-	Y Canopy	Y	-	Target the same as the State Strategic Plan (20% increase)
City of Onkaparinga	Y	-	Y Canopy	-	-	Target: No Net Loss of canopy*, ensuring our tree canopy cover does not drop below current average level of 12.5%. (*to be reviewed in 2017 following analysis below) Does acknowledge the State Strategic Plan target but does not use this as a target (20% increase)
City of Burnside	Y	-	-	Y	Y	Strategy to "proactively identify opportunities to increase canopy cover across the local government area. Improving the quality of this canopy cover will be achieved through planting "the right tree in the right location". This includes stock quality, installation, selection criteria and species diversity."
City of West Torrens	Y	-	-	Y	-	Strategic Direction to "expand the urban forest canopy cover comprising a diverse species mix" but no specific target
City of Campbelltown	-	Y	Y Canopy	Y	-	Target the same as the State Strategic Plan (20% increase)
City of Adelaide	-	Y	Y Number	-	-	Target to that green space and greenery in built up areas will have increased by 100,000 square metres (action to plant

						1,000 additional trees in built up areas of the city by June 2020)
City of Holdfast Bay	-	Y	Y Canopy	Y	-	Tree canopy target: increase by 10%
City of Norwood Payneham & St Peters	-	Y	Y Number	Y	-	Target: Plant an additional 300 trees in streets and / or in public places by 2020, to increase the total number of street trees by 1.3% on the 2016 level. Tree policy has the principle for increasing tree as part of the Urban Forest
City of Prospect	-	Y	-	-	Y	Identify all streets that will not achieve “green tunnel” street canopy coverage by the end of 2016 and incorporate into the program for 2017/18.
City of Salisbury	-	Y	-	Y	Y	No specific target - but tree canopy is being used as a measure of Council progress. There is a Street Tree Asset Management Plan
City of Charles Sturt	-	Y	-	Y	-	Development of a tree canopy cover strategy required
Town of Gawler	-	Y	-	Y	-	Finalise and implement a street and public reserve tree planting program(amenity and biodiversity)
City of Playford	-	Y	-	-	-	Specific Target not identified: Increase tree planting within open spaces and connected open space corridors to enhance the quality and appeal of open spaces and help cool urban

						spaces and address the impacts of climate change.
City of Port Adelaide Enfield	-	Y	-	Y	-	Living Environment Strategy "Scope and Implement the i-Tree program to map and assess tree and vegetation cover in the Council area – with view to further use of the program to inform streetscape and open space planning and with the State's 30 Year Plan target for tree canopy cover"
Adelaide Hills Council	-	Y	-	Y	-	Strategy recommends exploring programs including Vision 202020
City of Tea Tree Gully	-	-	-	Y	-	

Conclusion

- 18 out of 19 Councils recognised the importance of tree canopy and increasing tree canopy as a strategic direction
- 7 out of 19 have a strategic document which focuses on trees or urban forests
- 9 out of 19 Councils have identified a specific target for increasing tree canopy or increasing the number of trees being planted, 3 of these Council are using the State Strategic Target
- 15 out of 19 Councils have a tree management policy however many of these focus on retention and not increasing tree stock

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Appendix B – Benefits of Trees

Benefits of Trees	
Environmental	**Tree Canopy effect**
Climate Change (Carbon Storage) & reduction of heat island effect	Tree canopy mitigates effects of climate change by providing shade, storing carbon dioxide and soaking up stormwater runoff. Tree canopies can reduce the temperatures of the surfaces they shade by as much as 10-25OC. Trees also provide atmospheric cooling through evapotranspiration.
Biodiversity and Habitat	Trees support many animals which nest or feed off trees (ie Birds, Bee's).
UV Protection	Trees provide shade and reduce exposure from UV radiation.
Oxygen Production	Trees produce oxygen. A human breathes about 9.5 tonnes of air per year which equates to the oxygen produced by eight, 12m high Sycamore tree's over a year.
Air Quality (Pollution/ filtration)	Traffic related air pollution has detrimental effects on people's health and the environment. Studies have shown particular particulate matter smaller than 10□m increase the risk of cardiopulmonary symptoms and diseases. Street trees absorb particulate matter and are a key mechanism in scrubbing a city's air.
Reduction in noise pollution	A properly designed buffer of trees can reduce noise by 5 to 10 decibels (or 50% as perceived by the human ear). The sound produced by the wind passing through the leaves of certain types of trees can significantly muffle noise.
Protection from weather	Established trees provide windbreak and raincover protection.
Community	**Tree Canopy effect**
Increase in outdoor healthy, active lifestyles	Trees improve the mental health of people, improved childhood development and wellbeing.
Provide shade in heatwaves	SA has hot summers and hospitals typically have increased presentation during heat waves due to heat exhaustion/ sunstroke effects. Trees provide shade from direct sunlight.
Character/ Culture/ Amenity/ Natural Heritage	Trees provide character and lead to social cohesion, sense of place and promotes cultural links to the past. Trees are required for an attractive and liveable city.
Improved mental health	Living in an area with more tree canopy has been proven to lower levels of stress. Findings suggest that contact with the natural environment promotes psychological restoration, improved mood, improved attention, reduced stress and anxiety."
Cooling	Trees provide natural cooling by shade and evaporative cooling in hot weather which is important in hot/ dry summers for people undertaking activities outdoors.
Productive street trees (ie fruit or nuts)	Productive fruit trees can provide urban environments with a range of social, economic and environmental benefits such as building equitable food access, increased opportunities for social engagement and connection to nature.

Financial	**Tree Canopy effect**
Economic Investment and Growth	Trees provide character, protection from the weather which can encourage visitors and pedestrians to linger in our streets and commercial and retail centres
	Cooling streets using trees reduces the need to use air-conditioning and save on energy costs.
	Trees increase property value and rental value.
	A clean, green city demonstrates Council's commitment to the community about the quality of its public domain. This subsequently attracts visitors and investment into the area.
Reduced 'council' cost for road reseal	Studies have shown roads which benefit from being shaded by tree canopy restrict direct sunlight damage which can save on long term road reseal costs (less reseals required over a designated long term timeframe).
Streetscape	**Tree Canopy effect**
Traffic	Green street design encourages active transport such as walking and cycling and reduces congestion on roads and traffic calming.
Journey Quality	Trees provide a more enjoyable journey quality for motorists & pedestrians. Trees also assist in driver comfort by providing relief from sun glare.
Stormwater	Good design can improve water permeability via trees and pervious surfaces by absorbing surface water to reduce the volume of stormwater flows to downstream catchments and assist mitigate flooding issues.
Safety	Trees planted along the kerb (especially if closely spaced) define a pedestrian zone separated from traffic, creating a sense of safety both physically and psychologically. Trees can be used as traffic calming devices and encourage lower speeds.
Future	**Tree Canopy effect**
Future Generations	Create a vibrant, clean and green city for future generations to enjoy.

Challenges/ Barriers of Trees	
Environmental	**Tree Canopy effect**
Climate Change/ Drought	Soil moisture/ watering over summer months critical for tree establishment.
Pests and Diseases	Disease and pests can result in tree degradation and potential loss. Large pests (ie birds, possums, bats, rodents etc) can cause public disturbance and dwelling damage, smell and spread disease.
Bushfire Risk	Trees removal due to the potential bushfire risk to the community.
Storms	In the City of Onkaparinga area, the winter period of 2016 resulted in the loss of 404 trees on council land in 28 days of storm activity.
Tree litter	Some species drop bark, leaves, nuts etc that can be an issue if not managed correctly and drop litter on nearby footpaths/ roofs etc.
Community	**Tree Canopy effect**
Vandalism	Especially during establishment, trees can be stolen, broken (typically snapped trunk) or poisoned by local residents, juveniles or people with nothing better to do.
Impeding views	Community resistance to tree planting caused by complaints on tree canopy interference with views (in particular coastal areas).
Safety concerns	Trees removed due to poor condition or safety concerns (assessed by qualified arborist). Community concerned about tree damage to infrastructure.
Perception of Trees	Traditional street trees are reviewed as ornaments and not critical infrastructure
Increasing population and density	Infill development resulting from population density increases, results in less private space and opportunities for landscaping and tree planting in urban areas.
Tree (pollen) allergies	Pollen produced from trees can cause symptoms such as sniffling, sneezing and watery eyes. There are many types of pollen from trees which typically peak during spring.
Financial	**Tree Canopy effect**
Roof mounted solar panels	Complaints are regularly received from residents to cut down trees due to interference with solar panel's effectiveness due to tree canopy overshadowing panels.
Property Damage	ie falling branches during storm events onto buildings, houses, cars etc. Root damage to underground services
Establishment costs	Establishing new trees (watering, pruning, pest/ disease control etc) needs to be reviewed as whole lifecycle cost and not ínstallation only.
Streetscape	**Tree Canopy effect**
Council asset damage (footpath, kerb works, road surface)	Tree roots damaging council assets. Typically through bad specie selection or civil assets constructed too close to existing tree.
Service provider asset damage	Damage to power lines (storm damage) from fallen trees and damage to underground services if planted in too close proximity.
Ongoing Development	Tree root damage due to underground services installed through existing tree structural root zone causing tree damage and potential failure.
Driver safety	Tree species and location to be selected not to interfere with driver safety (ie sight lines, street lighting etc).

Existing hard surface areas	Holdfast, Norwood, Payneham, Prospect and St Peters all feature hard surface proportions in excess of 60% (ie feature significant areas that are currently non-plantable). This makes reaching tree canopy targets difficult as hard areas need to be removed prior to plantable areas being established.
New Development	**Tree Canopy effect**
New underground service installations	New development typically requires new underground services (gas, electrical, communications, potable water, sewerage, stormwater). Reticulating new infrastructure frequently impacts on existing tree roots of mature trees and can cause structural failure of the tree.

Appendix C – Interview Response Summary

Interviews were conducted during September and October 2019. Eight interviews were conducted including staff from Local Government (City of Onkaparinga, City of Burnside, City of Port Adelaide Enfield, and City of Playford), Regional partnerships (ADAPT West), and State Government (Department of Planning, Transport and Infrastructure).

Question 1

What level of government do you believe should be leading the increase in urban tree canopy, Local, State or Federal Government?

Summary

Of the people interviewed 83% believe all levels of government have a role to play to increase the urban tree canopy. At the federal level, setting the strategic direction, a broad based 'green cities' policy agenda. At the state level, setting the policy direction and providing incentives, funding and support. Then operational at the local level. Working with the community and providing support and control over planning and development to protect, preserve and enhance.

Question 2

What opportunities do you think Local Government has to increase the urban tree canopy?

Summary

To meet the targets, it needs to incorporate planting on both council and private land and advocate for the retention of existing trees. There's opportunity in newly developed areas, existing streets with non-planted verges and along creek lines, however there are challenges with streetscapes completing against service infrastructure. Work with the private sector to deliver more trees in new developments

Improve the design of the public realm and the provision of trees but also understand the soil conditions and plant species appropriate to the area that are also climate resilient.

Trees require better protection. Treat trees as an asset with appropriate asset management.

Encourage planting trees on private land by providing incentives for landowners through rate discounts or encouraging households to adopt a tree. This goes hand in hand with educating the community about the value and benefits of trees.

Question 3

What role do you see State Government has to play in increasing tree canopy across the state?

Summary

The state government's role is to provide a regional perspective of the tree canopy which includes connections across council boundaries. Providing information such as canopy mapping, heat island mapping and stress factors and setting the targets. They play a critical role in planning rules. There is tension between

development and existing trees as existing/established trees are typically removed and not replaced to allow for the development. State government needs to provide local government with more power to protect trees. There is a need to protect canopy and allow space for new canopy and provide funding for tree planting programs.

Question 4

What level of importance do you think local government and your Council places on increasing the urban tree canopy? (very important, important, neutral, less important, not important at all)

Summary

Respondents place the level of importance on increasing the urban tree canopy as either very important (50%) or important (50%).

Question 5

Does your organisation have strategies/ policies/ plans in place that direct and guide tree canopy targets on public and private land? If so, what are the key criteria/ drivers?

Summary

The responses varied at a Local Government level. A few have a policy position statement – setting canopy targets and seeking better protection of trees in both public and private open space. Urban infill development is placing increased pressure on being able to retain canopy contribution within private open space.

Some other Council's have the following:

- Canopy Action Plan – Key drivers are protection, improved planning and education both internal and external.
- Street Improvement Plan – aligns with urban heat island, canopy cover mapping as well as social-economic criteria.
- One Council has Community Plan – commitment to increase tree cover, a Green City Plan – established targets, and a Suburb Improvement Program – works in established areas
- Climate Adoption Plan, Environmental Strategic Directions POC, OS Strategy,

Question 6

Does your Council have a set tree canopy target and do they know how they are going to meet it?

Summary

Other than the State target, targets varied in the responses received. Some have no target, another has a No Net Loss of canopy target, ensuring their tree canopy doesn't fall below the current average of 12.5%. This particular Council gathered baseline data in 2016 and will undertake additional mapping in 2020 to identify the changes which will then inform the future targets. City of Burnside in particular uses Target 5 of the Metropolitan Planning Strategy and monitor it by Aerial Lidar imagery, NVDI and iTree Canopy.

Question 7

Is tree planting a coordinated approach that aligns with existing/ future programs and projects (i.e. road reseal program/ footpath program/ precinct upgrades etc.)?

Summary

There has been strong responses from the local government Sector that increasing the urban tree canopy is included in projects however the scope is often limited as they are not the driving factor. Projects such as road resaling, streetscape upgrades, precinct and open space development often include a level of landscaping that increases the urban tree canopy by default. Factors such as design around the implementation of infrastructure or services is often the key driving factor for such projects and trees are often seen as a supplementary outcome.

Question 8

What effective measures is your organisation currently undertaking to increase tree canopy on the ground? What drives what trees are planted where and when?

Summary

There are currently a number of effective measures that Local Government is undertaking to increase tree canopy on the ground. This includes research into appropriate soil and species type, space available for tree planting, irrigation techniques, the impact of climate change. A number of technological advances are also allowing Local Government to map the locations of existing trees and the use of heat mapping to understand where trees can benefit the social and urban environment. A number of Local Government organisations have also indicated that there are ongoing tree planting programs and are setting up nurserys to educate and support the community in tree planting.

Question 9

Do you believe the increase in the urban tree canopy currently falls through any gaps and why?

Summary

Many of the respondents indicated that there are gaps where the urban tree canopy falls through. Largely they are policy, funding, knowledge and research gaps where increasing the urban tree canopy is not a direct focus. Another gap identified is that no one holds direct responsibility for increasing the urban tree canopy and that many different Local Government Areas, organisations have different approaches and agendas. One of the standout responses was that trees and the urban tree canopy is not seen as an asset or form part of asset management planning. There are also legislative gaps where enforcement is difficult and costly and incentives are limited.

Question 10

How important is it that neighbouring Councils work strategically together to increase tree canopy across Council boundaries to ensure corridors of tree canopy are maintained for the benefit of all (i.e. council/ community etc.)? If this is being undertaken, is it effective?

Summary

In response to how important it is for Councils to work strategically together to increase tree canopy across Council boundaries, respondents feedback varied from vital to not essential. The main benefits highlighted for maintaining corridors of tree canopy is from a wildlife, habitat and biodiversity perspective. Respondents indicated knowledge sharing between Councils is important and although some measures are currently in place (i.e. LG Urban Forest Alliance, Resilient South Group etc) there is an opportunity for this to be explored further. The main reason some respondents advised working together wasn't essential, is that there is quite a bit of work required internally to get internal stakeholders approval on tree canopy targets and funding requirements prior to implementing programs and coordinating with neighbouring Councils.

Question 11

What resources do you believe is required to implement these options? (Including research and knowledge which is relevant to the Council area)

Summary:

Resources are required to increase tree canopy across Council particularly in the areas of planning, design, establishment, ongoing maintenance and stakeholder collaboration. In planning, evidence based research (heat mapping, tree canopy cover survey, demographic trends etc) is important to prioritise tree planting works including the resources required to integrate data collection and GIS mapping to ensure decision making is undertaken on current data. In the design phase innovative design typologies (whether road upgrades, precinct upgrades etc) is required to encourage the establishment of canopy trees, in addition to cross disciplinary approach to problem solving to ensure the right tree species are planted in the right location, with appropriate space allowances to grow with appropriate clearances from existing services and assets. Establishment and ongoing maintenance is where the largest amount of resources are required in regards to funding and on-ground materials and labour required to implement. Install costs are easily recognised, but future ongoing maintenance required for irrigating, pruning, fertilising etc. needs to be highlighted, resourced and 'lifecycle costs' determined so this cost can be incorporated into the decision making process for Council tree planting programs. In delivering tree canopy options, a focus is required to be placed on the community with appropriate resources allowed for community consultation, education and engagement to ensure the best tree canopy outcomes are achieved for both Council and the community.

Question 12

What are the current barriers to these opportunities to increase the urban tree canopy in Local Government? Ranking the following in order of difficulty - 1 being most difficult:

Summary:

1. Limited space with increasing developments
2. Designing infrastructure around new or existing trees
3. Policy/legislation
4. Cost
5. Damage to infrastructure
6. Planting appropriate species for the environment they're being planted in and their; establishment
7. Relevant authority ownership
8. Vandalism

Interviewees were asked to rank eight identified barriers to identify which were considered the most difficult barrier to overcome. Limited space to plant trees with increasing urban development was ranked as the most difficult barrier to overcome overall. It was also the barrier that respondents identified consistently as the most difficult. Designing infrastructure around new or existing trees was identified as the second most difficult barrier overall. The responses however, varied with some respondents not considering this has having a high level of difficulty.

Although cost ranked high overall there was a mix of views from respondents. Relevant authority ownership ranked quite low comparatively. This may be due to people only focusing on trees on land within their control. Vandalism was consistently identified as a minor barrier, this may be as it has a comparatively low impact to overall tree stock or if it was easy to resolve.

The difference in responses identifying the most difficult barriers to overcome may indicate that there is not a common understanding about increasing tree canopy, particularly in the case of cost and designing around infrastructure. There may be some benefit in information sharing between local governments to fill these gaps in knowledge.

Damage to infrastructure and designing around infrastructure are two barriers which relate to each other, however their overall ranking is quite different. This reflects an understanding that the design of the tree pits directly relates to future damage to infrastructure. Therefore the focus should be on designing the tree pits appropriately as this would resolve two barriers.

Question 13

What does your organisation see as the main benefits of increased tree canopy?

Summary

All respondents identified that there is now a wide range of benefits of trees that are recognised by local and state government organisation. The benefits which were most regularly identified were habitat, amenity and

cooling or mitigation of the Urban Heat Island effect. This would indicate that understanding the benefits is not a key factor in increasing tree canopy but rather responding to the barriers for implementation.

Question 14

Does LG play a role in educating the community about the importance or benefits of tree canopy?

If yes, what does your organisation currently do? What could be done?

Summary

All respondents acknowledged that Local (and State) Government plays a role in community education about the importance and benefits of tree canopy. Local Governments identified a number of ways they are achieving this including videos, graphics and marketing, tree tags, planting days, and citizen science.

This interview did not ask if these programs have been successful, it is unclear if any ongoing tracking or monitoring of the success of these programs have been undertaken.

Various State Government Departments were identified as having a number of programs, SA Health, DEWNR and DPTI, however examples were not provided and could not be found through research.

Question 15

Does the public/ local community generally support increased tree canopy? What are the benefits/ concerns raised by the community?

Summary

Generally, communities across SA support increased tree canopy but don't want to have to put up with the maintenance issues that come with it. Some common concerns are leaf litter, damage to services and infrastructure, damage to plant/property and shading of solar panels.

Question 16

Does your Council have any tools to monitor your urban tree canopy in order to reach the state government's target of increasing urban green cover by 20% in metropolitan Adelaide by 2045 (30 Year Plan for Greater Adelaide)?

If yes, what tool do you use, and can you provide details on its effectiveness and/or areas for improvement

Summary

All the councils interviewed have some form of monitoring tool to measure urban tree canopy, mainly iTree and LiDAR data. Although this first step has been taken the consensus is that this monitoring is in the very early stages and ongoing monitoring needs to be assessed to develop targets to achieve the 20% cover by 2045

Question 17

Significant resources are required to effectively plan, establish, increase and maintain tree canopy. Is this achievable with current budget and resourcing? How is your organisation managing these demands?

Summary:

Although some organisations have the budget and resources to plan and establish an increased tree canopy, all respondents claimed that their organisation would require additional resources to manage and maintain a growing Urban Forest.

To meet demands, organisations will need to develop policies and programs, looking at resourcing requirements, setting manageable targets and identifying actions to achieve these goals. These policies and programs need to be planned for and managed to ensure they are sustainable and minimise the risk of a burden being passed onto future generations.

Question 18

How important are volunteer groups and the community in the planning, development and ongoing maintenance of trees? What volunteer / community groups does your organisation support? Could we reach our targets with their support?

Summary:

Volunteers and Community Groups can play a very important role in the planning, development and ongoing maintenance of trees, however, many of these groups are motivated by bush care (biodiversity planting) rather than streetscape planting. Further engagement with the community to educate them about the benefits of trees could help reduce the perception of some that they are a nuisance or danger and encourage the community to get involved. Small contributions from the community such as caring for the verge or watering the street trees in front of their property, especially during the establishment phase, would go some way to assist reaching targets.

Bonus Question (State Government only)

What funding (i.e. grants) does the state government have that can assist local government reach the state government's target of increasing urban green cover by 20% in metro Adelaide by 2045?

Summary:

No responses supplied

Greener Neighbourhoods Grant Program

The South Australian Government is providing up to $2 million in funding over four years to support councils located within the proposed Green Adelaide region keep Adelaide's suburban streets green and cool.

https://www.environment.sa.gov.au/topics/green-adelaide/greener-neighbourhoods-grants

Open Space and Places for People Grants

Providing quality public open spaces which can provide a range of activities and support safe, healthy connected communities is becoming increasingly important. The Planning and Development Fund provides investment into the planning and improvement of open space and public realm in South Australia through two grant programs (Open Space and Places for People). Projects funded through the Planning and Development Fund support the Government's priorities including the implementation of the 30 Year Plan for Greater Adelaide and the Regional Planning Strategies for South Australia.

https://www.dpti.sa.gov.au/updates/news_item?a=330623

https://www.saplanningportal.sa.gov.au/current_planning_system/strategic_planning/open_space_and_public_realm_investment

Appendix D – 5 Year Implementation Plan

5 YEAR IMPLEMENTATION PLAN	
YEAR 1	
Planning and Guidelines	Using current research (tree canopy and Urban Heat Island mapping) identify a tree canopy target for the Council considering the following: ● Amount of plantable space on Council, State Government and private land ● High priority areas where new tree planting works will have the greatest impact such as areas of vulnerable populations (e.g. elderly) or increased community use (e.g. area of high pedestrian traffic) ● Species selection within the local context
	Develop an Action Plan to drive the implementation of the tree canopy target over the next five years identifying resources and budgets
	Evaluate and review current Local Government policies and guidelines for tree planting, budgets and maintenance programs to ensure the whole system supports the Action Plan.
Work with State Government	Advocate for the retention of stronger planning policies for tree planting on private land through the Planning & Design Code consultation.
	Review State Government funding opportunities for Council planting programs and identify how this could apply to implement the Action Plan.
YEAR 2	
Improving processes and procedures	Establish a cross divisional group across Council to support establishment of street trees as part of an integrated infrastructure program. The group shall be provided specific training to understand street tree requirements, promote tree-friendly design concepts (ie WSUD) and solve street tree related issues with use of new technology and techniques. Council to develop a culture where street trees are supported, encouraged and managed as infrastructure assets (green infrastructure).
	Maintain an up-to-date, comprehensive and live inventory of all street trees within the Council area linked to GPS mapping. Specifically highlight regulated, significant and heritage/cultural valued trees.
	Create tree database through collaboration with other Councils/ State Government departments to assist in tree species selection for streetscape designs. Database to include native and exotic tree species, highlight both positive (i.e. drought tolerant) & negative (i.e. invasive root system) attributes of each species and locations where they have been used successfully in South Australia.
	Establish connections across service providers to coordinate street tree planting with existing and proposed underground/ overhead services to minimise conflicts between trees and services.
	Review life cycle costings for tree planting and investigate how costs can be reduced without reduction in quality of tree stock or planting establishment/ maintenance practices. Some Councils have found cost savings by developing their own nurseries to propagate trees for council projects in addition to planting in desirable seasons for better survival rates at establishment and reduction of watering costs.

Site investigations and design work for priority areas	From Action Plan developed in Year 1. Identify and strategically prioritise required tree planting works required for the next financial year. Undertake necessary site investigations at tree planting locations to identify site constraints and opportunities. Design and document next year's planting program.
YEAR 3	
Working with developers and private sector	Prepare marketing material for developers to educate of the economic, environmental, community and streetscape benefits of street trees. Develop and implement strategies throughout the development planning and approval process to advocate tree planting and work with developers to deliver quality, innovative tree lined streetscape solutions to benefit the developer, council and future generations. This could include the development of technical guidelines to aid developers to successfully implement planning policies and provide the best support for longevity of trees on private land
	Provide incentives (financial, physical, technical assistance) to encourage tree planting on private land. Investigate how this is best implemented from a marketing perspective (council website, include brochure in rates notice, on-ground signage etc.) and investigate funding/ resourcing required to undertake.
Community education	In collaboration across the whole of the Local Government Sector and with the Local Government Association establish a permanent website (and other marketing and promotional material) where residents can be involved in the processes of tree planting, become involved in developing the urban forest, report issues and link to educational information about the value of trees. Each Council should have a clear link to this page promoted on their individual websites.
	For areas where research has identified new street tree planting will have the greatest impact, provide opportunities for local community engagement in the planning and establishment of trees.
On-ground Implementation	Undertake tree planting works identified in Year 2 and assign tree maintenance program for the establishment and future on-going' maintenance requirements. Ensure all upfront and ongoing costs are documented for future review and analysis.
	Progressively remove known environmental weeds and replace with appropriate street tree selections. Likewise for declining/ poor performing trees.
	Repeat 'site investigations and design work for priority areas' step for following year
YEAR 4	
On-ground Implementation	Undertake tree planting works identified in Year 3 (pending budget approval) and assign tree maintenance program for the establishment and future on-going' maintenance requirements. Ensure all upfront and ongoing costs are documented for future review and analysis.
	Progressively remove known environmental weeds and replace with appropriate street tree selections. Likewise for declining/ poor performing trees.
	Repeat 'site investigations and design work for priority areas' step for following year

YEAR 5	
On-ground Implementation	Undertake tree planting works identified in Year 4 (pending budget approval) and assign tree maintenance program for the establishment and future on-going' maintenance requirements. Ensure all upfront and ongoing costs are documented for future review and analysis.
	Progressively remove known environmental weeds and replace with appropriate street tree selections. Likewise for declining/ poor performing trees.
	Repeat 'site investigations and design work for priority areas' step for following year
Monitor & Report	Inspect tree planting works undertaken in Year 4 and undertake condition assessment. Review 'actual' maintenance costs vs program 'estimated' costs.
Year 10 and beyond	
Measure	Undertake new mapping of council area (tree canopy, heat mapping) and review specific tree planting sites implemented in Year 4 and report. Undertake comparison of results between Year 4 and Year 10 in addition to undertaking an onsite assessment. Prepare report detailing findings (good and bad) and use information for implementation in future tree planting/ streetscape projects.
Round-back	Provide feedback internally and externally (i.e. community) on how tree planting has performed on specific projects using report findings from above. Promote value of trees and rally community support in tree planting on public and private land.