Item No:	14.1
To:	Council
Date:	22 September 2020
General Manager and Division:	Barry Cant – General Manager, Urban & Community
Subject:	ANNUAL ENVIRONMENTAL SUSTAINABILITY SCORECARD AND REVIEW 2020
Attachments:	A. Greenhouse gas emissions by Council source. B. Summary of results of energy audits. C. Results of trial of organics bins in Council reserves. D. Results of trial of recycling bins in Council reserves. E. Letter to State Ministers regarding waste (21 May 2020). F. WSUD systems installed across City of Burnside during 2019-20. G. Canopy Action Plan (February 2020 revision with notes). H. LiDAR-based assessment of canopy coverage across the City of Burnside. I. Comparison of LiDAR-based and i-Tree canopy coverage assessments.
Prev. Resolution:	C12049, 30/4/19 (Report on Initiatives to Promote the Maintenance and Retention of Native Trees on Private Property) C12208, 13/8/19 (National Tree Day) C12233, 27/8/19 (Annual Kerbside Waste and Resource Report) C12251, 10/9/19 (City of Burnside Participation in Local Government Association (LGA) SA Circular Procurement Pilot Project) C12266, 24/9/20 (Climate Change: Council Actions for Adaptation and Mitigation) C12267, 24/9/20 (Climate Emergency Declaration) C12402, 10/12/19 (City of Burnside Environmental Sustainability Strategy) C12427, 28/1/20 (Initiatives for Utilising RFID Technology in Kerbside Bins – Appropriate Diversion of Waste) C12446, 11/2/20 (Canopy Action Plan – annual progress report) C12516, 14/4/20 (City of Burnside Climate Change Policy) C12542, 12/5/20 (Waste Management, Diversion and Roles / Support of State Government) C12608, 14/7/20 (Waste Management – Residential Apartments)

Officer's Recommendation

1. That Council endorse the framework for reporting on Environmental Sustainability, including three reporting points each year:

    1.1. Annual Environmental Sustainability Scorecard and Review (October – from 2021)

    1.2. Annual environmental sustainability workshop for Elected Members (February – from 2021)

    1.3. Environmental Sustainability update report (April – from 2021)

Purpose

1.   To provide Elected Members with information about Council's performance and initiatives to improve environmental sustainability, including the management of greenhouse gas emissions, waste, water, trees, biodiversity and corporate action.

Strategic Plan

2.   The following Strategic Plan provisions are relevant:

    2.1   Theme: Environment (this encompasses all relevant priorities and principles)

Communications/Consultation

3.   The following consultation has been undertaken:

    3.1.   Data collection from across the organisation;

    3.2.   Data collection from external agencies, including suppliers of electricity, gas, water, trees and waste management; and

    3.3.   Data collection and consultation with external consultants and other councils in relation to energy use and tree canopy assessment.

    3.4.   Elected Member workshops held on 18 February 2020 (Environmental Sustainability Strategy), and 10 September 2020 (Environmental Sustainability Progress Update).

Statutory

4.   There are no statutory implications or requirements associated with this report.

Policy

5.   The following Council policies are relevant in this instance:

Climate Change Policy

Asset Management Policy

Environment and Biodiversity Policy

Open Space Policy

Urban Tree Management Policy

Water Sensitive Urban Design Policy

Watercourse Management Policy

Kerbside Waste Management Policy

Risk Assessment

6.   There are no risks associated with the Officers Recommendation.

CEO Performance Indicators

7.   The following CEO's Performance Indicators for 20/21 are relevant in this instance:

7.1.   Develop a Roadmap for the City of Burnside with regard to environmental sustainability and climate change

7.2.   Activate the Community to work in partnership with Council to achieve its environmental goals

Finance

8.   Annual operating budgets are in place for a number of ongoing environmental services, such as tree and biodiversity management. Budgets for specific initiatives are approved through the annual business plan and budget process.

9.   There are no further financial implications for the City of Burnside in respect of the Officer's recommendation.

10.   Future recommended investment in Environmental Sustainability initiatives is currently being reviewed and will be presented to Council as required in due course. Funding for these will be sought through the annual business plan and budget process as required.

Discussion

Background

11.   This new annual report has been designed to provide regular information on environmental sustainability, including the management of greenhouse gas emissions, waste, water, trees and biodiversity, as well as corporate action in this area.

12.   Several reports and existing resolutions that are required by Council have been amalgamated into this report:

12.1.   The **Climate Emergency Declaration** (24 September 2019; C12267) required Council staff to monitor and provide an annual report to Council on performance in relation to climate change adaptation and mitigation. An update on climate change actions was provided to Council on 24 March 2020 (C12516).

12.2.   Council's **Climate Change Policy** (approved 14 April 2020; C12516) requires Council to develop and maintain a system to monitor Council's greenhouse gas emissions and provide an annual report on performance.

12.3.   The **Annual Kerbside Waste and Resource Report**: the previous report was for the 2018/19 financial year, received by Council 27 August 2019 (C12233)

12.4.   The **Canopy Action Plan**: the previous report was received by Council 11 February 2020 (C12446) and requested that a Canopy Action Plan Report be provided to Council every six months.

13.   This report also addresses the priority areas identified in Council's **Environmental Sustainability Strategy 2019-2023** (approved 10 December 2019; C12402).

14.   An Elected member workshop was held on 18 February 2020 to inform Action Planning in relation to the Environmental Sustainability Strategy. Following the Elected Member and staff workshops, an **Environmental Sustainability Roadmap** was developed to provide some context on how the priorities in the Environmental

Sustainability Strategy can be addressed and the timeframes for Council actions (Figure 1).
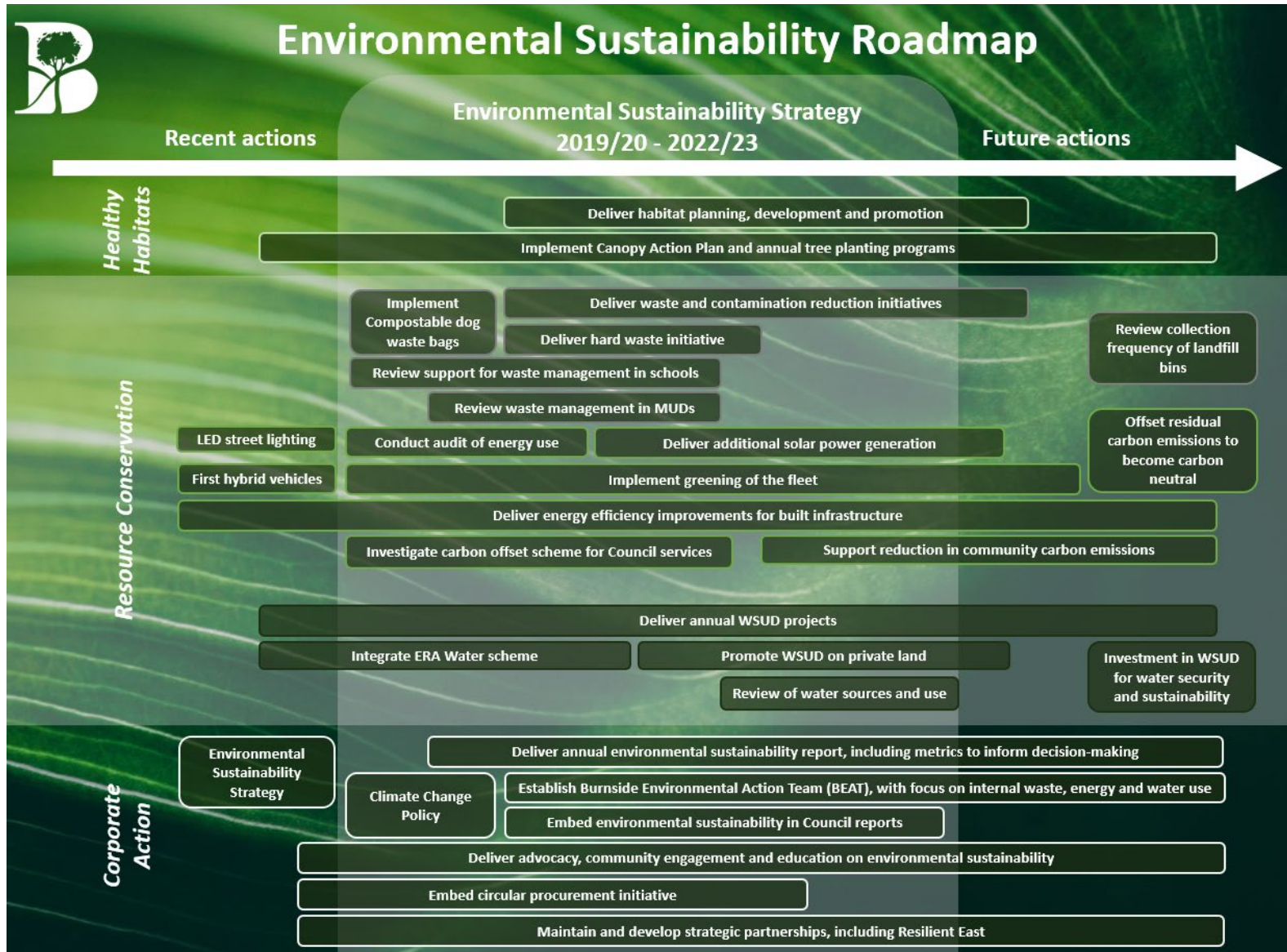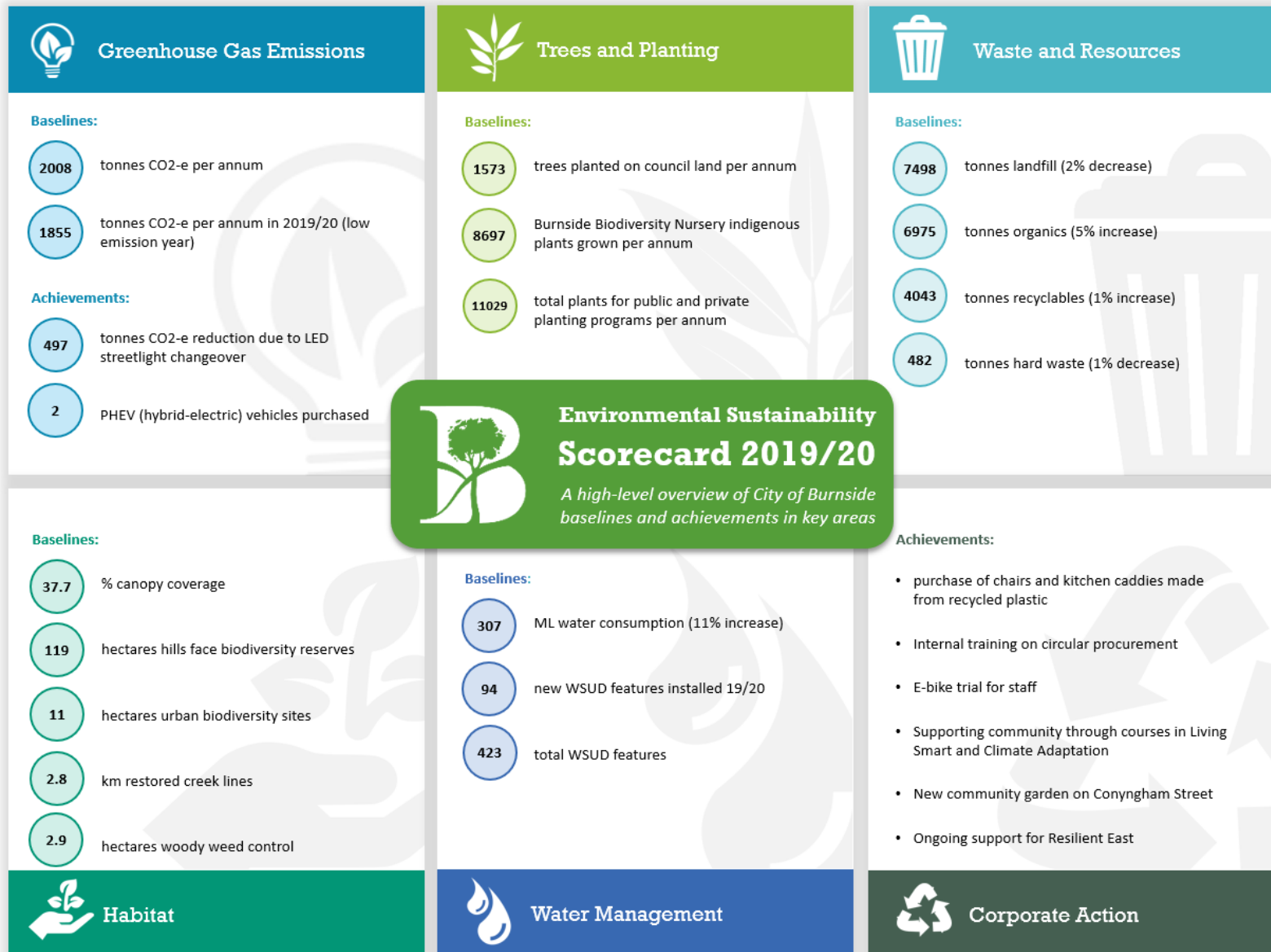
Figure 1 City of Burnside Environmental Sustainability Roadmap 2020

15.   To support decision-making, a framework for reporting on environmental sustainability is proposed, including three reporting points each year:

    15.1.   Annual environmental sustainability scorecard and review (October)

    15.2.   Annual environmental sustainability workshop for Elected Members (February)

    15.3.   Environmental Sustainability update report (April)

16.   The proposed reporting framework will allow Council to monitor the progress of environmental sustainability initiatives. Additional Council reports will be submitted if new initiatives or changes to existing projects require decisions from Council.

17.   The present report is being presented in September. It is proposed that future iterations of this report be presented in October each year. The reason for the proposed delay is that this report requires data and information from several external sources. Some of the information required is not available early enough to allow for this report to be generated by September each year. For example, the Federal Government had not yet published greenhouse accounts factors at the beginning of September 2020.

18.   This report provides a review of Council action and progress in environmental sustainability. Some of the matters addressed within this report have previously had regular reporting and the data presented can be compared to previous years (e.g. waste management). Other matters have not previously been reported (e.g. greenhouse gas emissions). For these new areas of reporting, baselines are established within this report.

19.   This report has three distinct sections:

    19.1.   **Environmental Sustainability Scorecard:** this section provides a high-level overview of Council baselines and progress in key areas. It is envisaged that scorecards in future years will include tracking of these metrics over time and potential setting of 'targets' where relevant;

    19.2.   **Environmental Sustainability Review:** this section provides details of actions undertaken and data to inform decision-making; upcoming actions may also be included where relevant; and

    19.3.   **Attachments:** the attachments provide more detailed analysis or supporting documentation.

SECTION 1: CITY OF BURNSIDE ENVIRONMENTAL SUSTAINABILITY SCORECARD (next page)

Greenhouse Gas Emissions

Baselines:

- **2008** tonnes CO2-e per annum
- **1855** tonnes CO2-e per annum in 2019/20 (low emission year)

Achievements:

- **497** tonnes CO2-e reduction due to LED streetlight changeover
- **2** PHEV (hybrid-electric) vehicles purchased

Trees and Planting

Baselines:

- **1573** trees planted on council land per annum
- **8697** Burnside Biodiversity Nursery indigenous plants grown per annum
- **11029** total plants for public and private planting programs per annum

Waste and Resources

Baselines:

- **7498** tonnes landfill (2% decrease)
- **6975** tonnes organics (5% increase)
- **4043** tonnes recyclables (1% increase)
- **482** tonnes hard waste (1% decrease)

Environmental Sustainability Scorecard 2019/20

A high-level overview of City of Burnside baselines and achievements in key areas

Habitat

Baselines:

- **37.7** % canopy coverage
- **119** hectares hills face biodiversity reserves
- **11** hectares urban biodiversity sites
- **2.8** km restored creek lines
- **2.9** hectares woody weed control

Water Management

Baselines:

- **307** ML water consumption (11% increase)
- **94** new WSUD features installed 19/20
- **423** total WSUD features

Corporate Action

Achievements:

- purchase of chairs and kitchen caddies made from recycled plastic
- Internal training on circular procurement
- E-bike trial for staff
- Supporting community through courses in Living Smart and Climate Adaptation
- New community garden on Conyngham Street
- Ongoing support for Resilient East

SECTION 2: CITY OF BURNSIDE ENVIRONMENTAL SUSTAINABILITY REVIEW

Greenhouse gas emissions

20. Council's Environmental Sustainability Strategy sets a priority for strategic and cost-effective reduction of Council's carbon footprint. This priority requires the monitoring of Council's greenhouse gas emissions to inform decision-making and gauge progress. Monitoring protocols were established during 2019/20.

21. Annual greenhouse gas emissions have been calculated for Council facilities and vehicles for the last two financial years. Two years have been calculated because the most recent financial year does not provide a reasonable baseline. The 2019/20 year was not a good baseline because of COVID-19 and the associated disruptions to Council activities (e.g. closed facilities and staff working from home).

22. Different types of emissions can be included in assessments of greenhouse gas emissions. The following types of emissions have been included in the calculations for the City of Burnside, following Australian Government protocols:

    22.1. **Scope 1 emissions** (direct emissions), generated by gas consumption in council facilities and the use of fuel in vehicles or machinery;

    22.2. **Scope 2 emissions** (indirect emissions), generated by electricity consumption in council facilities (emissions from electricity are considered indirect because the electricity is produced elsewhere); and

    22.3. **Scope 3 emissions** (other indirect emissions), including those emissions generated in the production and transport of gas, electricity and fuel.

23. The focus of this work has been on greenhouse gas emissions that may readily be reduced through changes to infrastructure (e.g. solar panel installations, vehicle upgrades or energy efficiency measures) and staff behaviour.

24. In future, additional emissions-causing activities could be added to this inventory, such as waste production, water use and the procurement of other goods and services. However, the additional work required to calculate these other Scope 3 emissions may not be worthwhile, particularly if the suppliers of the goods or services mitigate and offset their own emissions.

25. Table 1 provides the greenhouse gas emissions in tonnes of carbon dioxide equivalent (CO_2-e). The use of this standard measure allows for comparison across years and to other organisations. The term, 'equivalent' is used because the measure accounts for carbon dioxide (CO_2) along with other polluting gases such as methane (CH_4) and nitrous oxide (N_2O). These three gasses are reported because they all make substantial contributions to global warming. Carbon dioxide makes the greatest contribution of the three gasses and is therefore used as the reference. While their contributions are lesser, the other two gasses have greater warming potential than carbon dioxide. For example, the *National Greenhouse Accounts Factors* (2019) lists the global warming potential of methane at 25 times that of carbon dioxide, and nitrous oxide at 298 times that of carbon dioxide (but far less of these gasses is generated). The global warming potential of all three gasses is accounted for in the carbon dioxide equivalent (CO_2-e).

Table 1 City of Burnside greenhouse gas emissions 2018/19 and 2019/20

Financial Year	EMISSIONS (tonnes CO_2-e)	Change (% change from previous year)
2018/19	2,499	Not calculated
2019/20	1,855	-26%

26.   As it can be difficult to visualise emissions, the tonnage from 2019/20 has been converted into cubic metres. The 1,855 tonnes would occupy over one million cubic metres (at 21°C). To picture that volume of gas, imagine covering the Hazelwood Park Reserve entirely with two-story houses and filling them with carbon dioxide. That would be a blanket of gas across the reserve and over seven metres thick.

Changes in greenhouse gas emissions

27.   Table 1 notes **a 26 per cent decrease in emissions from 2018/19 to 2019/20**. This decrease can be attributed to several factors that are discussed below.

28.   **LED streetlights**: a number of streetlights across the City were converted to Light Emitting Diodes (LEDs) during 2018/19 (Council Motion C11780). The greenhouse gas emissions from streetlights reduced by 497 tonnes in 2019/20, accounting for 75 per cent of the Council's decrease in emissions.

29.   **COVID-19**: The Swimming Centre and Regal Theatre were closed because of COVID-19 restrictions and therefore had reduced power usage, accounting for 15 per cent of the Council's decrease in emissions. Further, some Council staff worked from home during 2020 and energy consumption at the Civic Centre and Glynburn Road Depot was reduced, accounting for around 10 per cent of the Council's decrease in emissions. Conversely, there was a small increase in emissions from vehicles, which may be attributed to COVID-19. Social distancing requirements meant that staff could not share vehicles. The increase in fuel use contributed a 3 percent increase in greenhouse gas emissions.

30.   **State-wide savings from the grid**: around 1 per cent of the decrease in Council emissions is due to state-wide improvements in electricity emissions factors (i.e. cleaner energy production in South Australia). When more renewable energy is produced in South Australia it benefits all users of energy across the energy grid. These changes are not driven by Council but demonstrate the benefit in Council advocating to State and Federal governments to increase the production of renewable energy. While the benefit in the last year was modest (1 per cent), larger improvements are typical. For example, if the last 5 years are considered, the improvement to the grid was more substantial. Those improvements over 5 years saved Council around 300 tonnes of greenhouse gas emissions in 2019/20.

31.   **Additional considerations**: there were several other factors that had minor but noteworthy impacts on Council's greenhouse gas emissions. First, energy efficiency measures were introduced with building and office upgrades. Some of the reductions in emissions from buildings should be attributed to these upgrades, but it is difficult to disentangle these reductions from the COVID-19 reductions noted above. Second, there were very minor increases and decreases in energy use at other Council facilities and reserves. One noteworthy increase was at the new Conyngham Street Depot, where activity recommenced during 2019/20. That site had a 106 per cent increase in greenhouse gas emissions, but because it is a small

site (from an energy-use perspective) it only accounted for one fifth of one per cent of the change in Council's emissions.
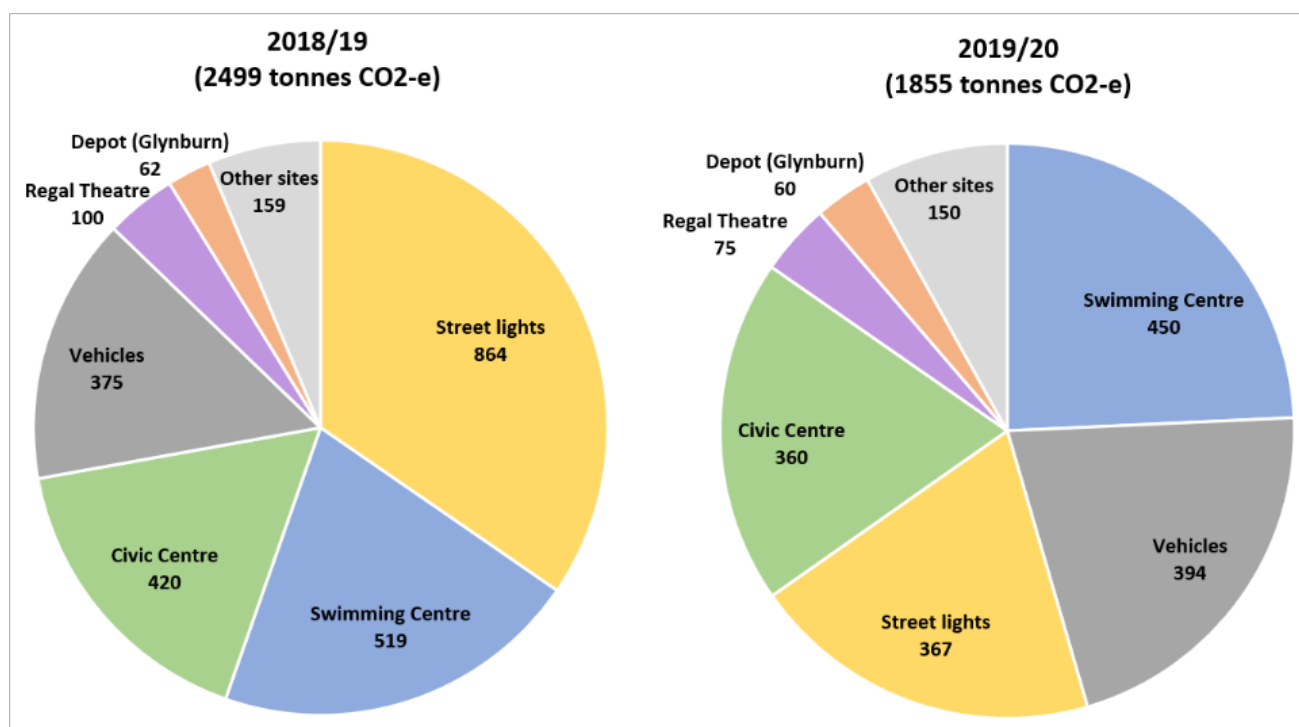
Sources of greenhouse gas emissions

32.   Table 2 provides data on the types of energy use that generated Council's greenhouse gas emissions. Most emissions resulted from the use of electricity. The swimming centre accounted for 93 to 95 per cent of gas usage across the two years. Fuel use increased slightly.

Table 2 City of Burnside greenhouse gas emissions by type, 2018/19 and 2019/20

Year	Electricity EMISSIONS (tonnes CO_2-e)	Gas EMISSIONS (tonnes CO_2-e)	Fuel EMISSIONS (tonnes CO_2-e)	TOTAL EMISSIONS (tonnes CO_2-e)
2018/2019	1,754	370	375	2,499
2019/2020	1,131	331	394	1,855

33.   Figure 2 depicts the greenhouse gas emissions by Council source over the two most recent financial years, illuminating the substantial reduction of emissions from street lighting. Figure 2 also demonstrates the major sources of Council emissions. Further details and emissions from smaller sites are provided in Attachment A.

Figure 2 City of Burnside greenhouse gas emissions by Council source, 2018/19 and 2019/20 (tonnes CO_2-e)

Looking forward: greenhouse gas emissions

34.   The impact of COVID-19 means that 2019/20 does not provide a useful baseline of greenhouse gas emissions for the Council. The previous year is also problematic because the LED streetlights were not installed. Therefore, a combination of the two years has been used to generate a reasonable baseline. The 2018/19 year was most informative for the baseline, with a few exceptions. The first exception was the

use of 2019/20 streetlight data (because the LED streetlights were fully implemented by then). The second exception relates to the new Depot on Conyngham Street. As a new development, there is no baseline for this site and an estimate of future emissions was necessary. Because a combination of data has been used to generate a reasonable baseline, it is a 'notional' baseline, rather than an actual baseline.

35. The notional **baseline for City of Burnside greenhouse gas emissions is 2008.2 tonnes CO_2-e/annum**. Attachment A includes the baseline details by Council source. Future years should be compared to the notional baseline to determine if there have been reductions or increases in greenhouse gas emissions.

36. The carbon accounting presented above represents a key step in Council's work to reduce carbon emissions. The results can inform future actions, budget preparations, and ongoing monitoring. There are several initiatives that should reduce greenhouse gas emissions over coming years. These initiatives are outlined in the following points.

37. The Environmental Sustainability Roadmap (Figure 1) proposes the Council embark on a path towards carbon neutrality. Council staff have commenced work on a detailed financial and environmental analysis of measures that could reduce or offset greenhouse gas emissions. This cost/benefit analysis will generate scenarios, from which Council can select a preferred course of action. For example, preliminary modelling suggests that Council could readily become carbon neutral by 2030 and that reducing emissions would also save money over that time. The savings would come from energy efficiency measures and through investment in solar power generation. While upfront investment is required, these measures provide return-on-investment within reasonably short timeframes (e.g. 3-5 years). Several scenarios will be developed to inform decision-making.

38. For this work, Council staff are developing a <u>C</u>arbon <u>R</u>eduction <u>S</u>cenario Tool, the Burnside CARES Tool. This tool will be used to develop and compare potential actions. For example, the tool will be used to compare potential locations for solar generation systems, and which systems should be installed first. The tool will also help review potential energy efficiency measures, vehicle initiatives and carbon offset measures. The Burnside CARES Tool will be informed by two key pieces of work that were conducted during the last year:

    38.1. The development of monitoring of greenhouse gas emissions (following Council Motion C12267) as presented in this report.

    38.2. Specialist consultants have audited the energy use at four Council facilities and provided advice on the potential to reduce greenhouse gas emissions through solar power generation and energy efficiency measures. The four facilities audited were: Civic Centre complex, George Bolton Swimming Centre, Regal Theatre, and Council Depot (Glynburn Road). Notes on the audits are provided as Attachment B. The data from the energy audit will be used in the CARES Tool.

39. Once the CARES Tool is finalised, the results of this modelling will be presented to Council for consideration. It is anticipated that these results will be presented during October or November 2020.

40. The Burnside Carbon Offset Scheme (B-COS) was developed during 2019-20 and presented to Council for consideration on 25 August 2020. This scheme will enable Council to offset a substantial proportion of the greenhouse gas emissions of Council services, including the George Bolton Swimming Centre, Regal Theatre, and the additional waste-to-landfill bins that some residents obtain from Council.

Council resolved to delay a decision on the scheme pending the present report and an Elected Member workshop (held on 10th September 2020) (Motion C12646).

41.   The implementation of B-COS has been included in the CARES Tool as a potential action. The results of this modelling will be presented to Council when it is complete.

42.   The Burnside Environmental Action Team (BEAT) will be established during 2020/21 to address waste management and energy use by Council staff. The team will be comprised of staff members from each unit within Council. The BEAT will work collaboratively to make environmental improvements (further details are provided in the 'Corporate Action' section of this report).

43.   Transport-related greenhouse gas emissions are being addressed in several ways:

  43.1.   In accordance with Council's Light Fleet Management Policy, Hybrid vehicles and PHEVs (plug-in hybrid electric vehicles) are being purchased in preference to traditional diesel or petrol vehicles where it is financially reasonable to do so. During 2019/20, Council purchased two PHEVs.

  43.2.   Two electric vehicle charging stations were installed – one at the Civic Centre complex (available to staff and the public) and the other at the Council Depot (Glynburn Road; available for Council vehicles only).

  43.3.   Council is trialling two e-bikes for 12 months, with one based at the Civic Centre and the other at the Council Depot (Glynburn Road). The e-bikes are being used like pool cars, for short staff trips, with potential benefits including exercise for staff and a reduction in greenhouse gas emissions.

  43.4.   The performance of the new vehicles and the bike trial will be utilised within the Burnside CARES Tool.

Waste and resources

44.   Council's Environmental Sustainability Strategy sets a priority to support our community to reduce waste and increase recycling of resources. Council works closely with East Waste, a regional subsidiary, to monitor and promote improvements in the management of waste and resources.

Kerbside waste and resources (landfill, recycling and organics)

45.   Table 3 includes statistics for kerbside collections of waste and resources during 2019/2020, plus comparisons with the previous financial year. Key metrics include:

  45.1.   **A 151 tonne reduction in waste-to-landfill** – a two per cent reduction on the previous year. The reduction was all attributable to the first half of the financial year (175 tonnes less than the same period in the previous year). The second half of the financial year saw a small increase in waste sent to landfill, so that the total reduction for the year was 151 tonnes. The increase in kerbside waste production in the second half of the financial year is likely attributable to COVID-19 restrictions, when more people were working from home, and therefore generating more household waste.

  45.2.   **A 326 tonne increase in organics –** a five per cent increase on the previous year. Much like the landfill, there were two halves to the financial year when it came to organics (compared to the same periods in the previous year). In the first half of the year there was a reduction of 158 tonnes. In the second half of the financial year there was an increase of 484 tonnes. There is typically a relationship between rainfall and organics.

High rainfall encourages plant growth and therefore increases the quantity of vegetation that is trimmed and placed in organics bins (i.e. trees, shrubs and lawns). Further, when there is high rainfall, organic waste is more likely to be wet (and therefore heavier), than when it is dry. The rainfall is likely to explain much of the change in tonnages of organics from the first half of the year to the second. The first half of the year had below average rainfall and the second half of the year had above average rainfall (based on ten-year averages at Burnside). Some of the increase may also be attributable to the COVID-19 restrictions, with housebound residents spending more time than usual in their gardens. An increase in the use of organics bins for kitchen organic waste may also be occurring, but it is impossible to discern with the available data, particularly in such an atypical year. The increase in organics does come at a cost, but as organics costs around one-fifth as much as landfill, the savings in landfill costs more than compensate for increases to the cost of processing organics.

Table 3 City of Burnside kerbside waste and resources collected 2019/20: weights and comparisons to 2018/19

	Landfill	Organics	Recyclables	Hard waste	Notes
Weight (tonnes)	7,498	6,975	4,043	482	The weight of waste collected through the kerbside system.
Corrected weight (tonnes)	8,025	6,905	3,974	365	Accounts for contamination in waste streams (e.g. landfill waste collected in recyclables). For hard waste, the reported total is utilised to produce energy. Some estimates required, based on the most recent and appropriate data possible.
Equivalent weight (Boeing 747s)	36	31	18	2	This equivalent weight is provided to assist in visualisation of tonnages; a Boeing 747-8 commercial passenger aeroplane (unladen weight = 220 tonnes)
Comparison to previous year					
Previous financial year (tonnes)	7,649	6,649	4,004	486	Data from City of Burnside Kerbside Waste and Resource Report (2018/19 Financial Year – non-corrected weight); landfill tonnage has been updated based on further analysis of data from the landfill site (previously reported as 7,570)
Change from previous year (tonnes and %)	-151 2% decrease	+326 5% increase	+39 1% increase	-4 1% decrease	

46.   **Waste levy savings:** the reduction in the tonnes of waste sent to landfill has environmental benefits and financial benefits, too. Each tonne of waste costs for collection, transport and dumping in landfill. Further, each tonne of waste attracts a State Government waste levy. In the first half of 2019/20 the levy was $110 per tonne, rising to $140 in the second half of the financial year. The reduction in waste sent to landfill in the first half of the financial year saved Council over $19,000 in waste levy. However, the increase in waste generation in the second half of the financial year consumed some of the savings so that, overall, around $16,000 in waste levy was saved during 2019/20. There were also an additional few days of waste collection in the 2019/20 financial year due to the 2020 leap year and the days on which weekends fell. The reduction in landfill tonnages and waste levy costs have been achieved despite these additional days of waste collection.

47.   The graphs below provide further data on changes over time for waste-to-landfill (Figure 3), organics (Figure 4), and recycling (Figure 5) collection tonnages. The graphs report the averages of kilograms of waste or resource per capita per week, which may help visualise the quantities. The graphs all use the same scale on the vertical axis, so they are comparable. When the averages are calculated, changes in population are accounted for based on community profile data available through the Council website. The comparative data from other councils are from public sources (e.g. East Waste Annual Reports), noting that data from the 2019/20 financial year are not yet publicly available and are therefore not presented.
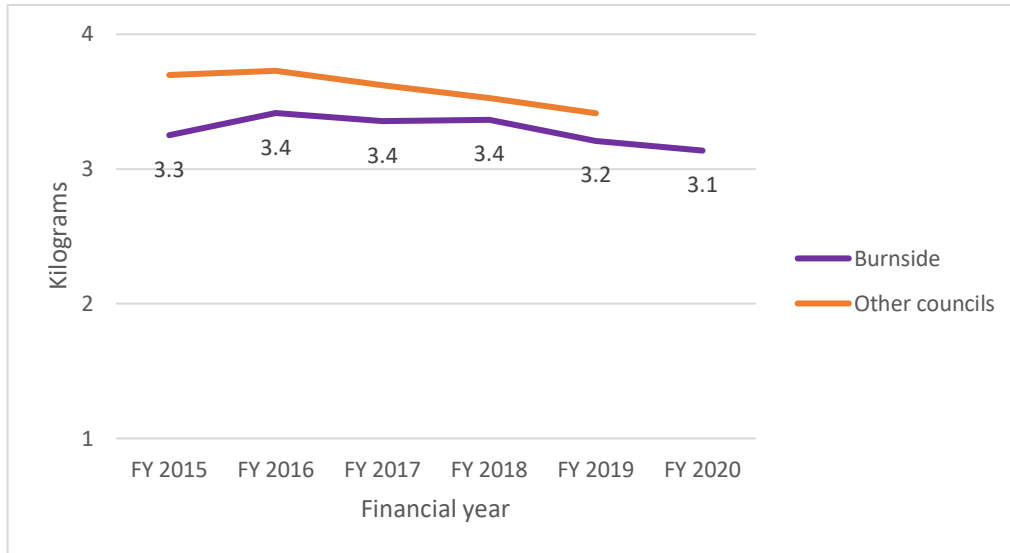
Figure 3 Landfill per capita per week - East Waste Councils
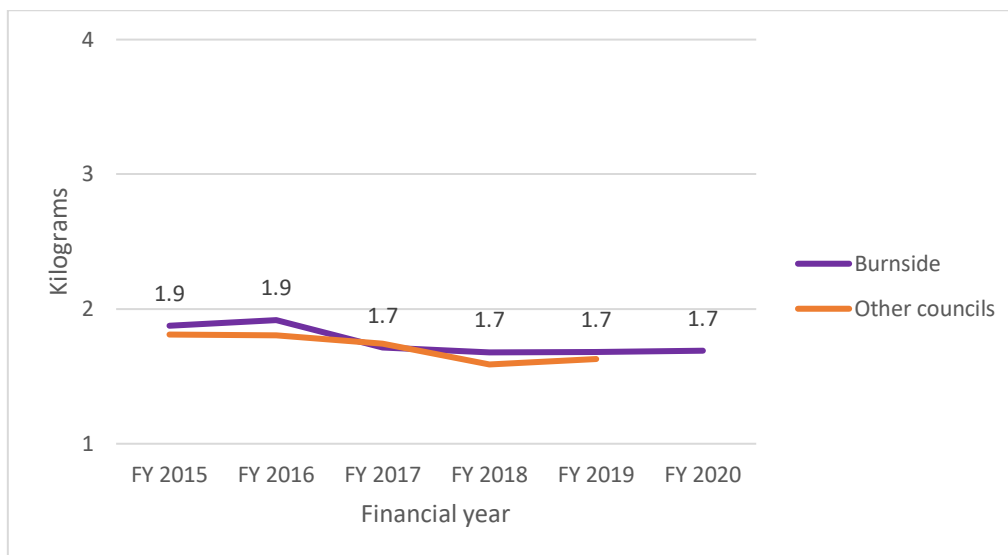*(data labels are for City of Burnside data)*
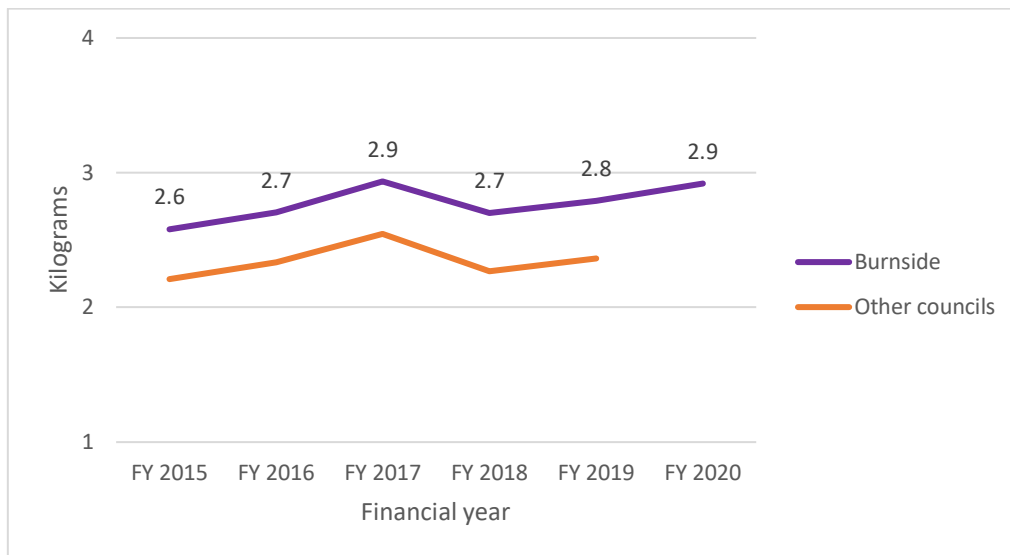
Figure 4 Organics per capita per week - East Waste Councils
(data labels are for City of Burnside data)

Figure 5 Recyclables per capita per week - East Waste Councils
(data labels are for City of Burnside data)

At-call hard waste service

48.   The following graphs provide further data on changes over time for hard waste collections. The earliest data provided is for the 2016/17 financial year, the first full year of the at-call hard waste service.

49.   Figure 6 displays hard waste collection tonnages. The results are displayed in kilograms of hard waste per capita so that volumes can be readily visualised. Changes in population are also accounted for based on community profile data available through the Council website. It is important to note that the volumes are presented as kilograms per year and so cannot be directly compared to the previous graphs which displayed kilograms per week (there is far less hard waste collected per resident than other kerbside waste collections).

50.   The decrease in hard waste per capita between 2017/18 and 2018/19 is likely to be partly attributable to a change in arrangements for mattresses. There was a move to separate mattress collection in 2018/19. In prior years, some mattresses were included in the hard waste tonnages.

51.   Figure 7 displays the number of mattresses collected annually through the at-call hard waste system. The totals before 2018/19 are not reported as mattress collection was combined with hard waste collection and the number of mattresses were not always recorded. The number of mattress reported in the City of Burnside Kerbside Waste and Resource Report (2018/19 Financial Year) was based on data provided by East Waste. Interrogation of monthly invoices has found the quantity reported to be inaccurate and it has been updated in Figure 6 (from 533 to 662).

52.   There was a steep rise in the number of mattress collected during 2019/20. This increase may be partly attributable to the COVID-19 restrictions, with more residents at home and (potentially) cleaning or de-cluttering their homes. In line with this explanation, most   mattresses (696) were collected between January and June 2020 (inclusive). That represents 62 per cent of the mattress collected for the financial year, compared with 54 per cent of mattresses collected in the corresponding period in the previous year.
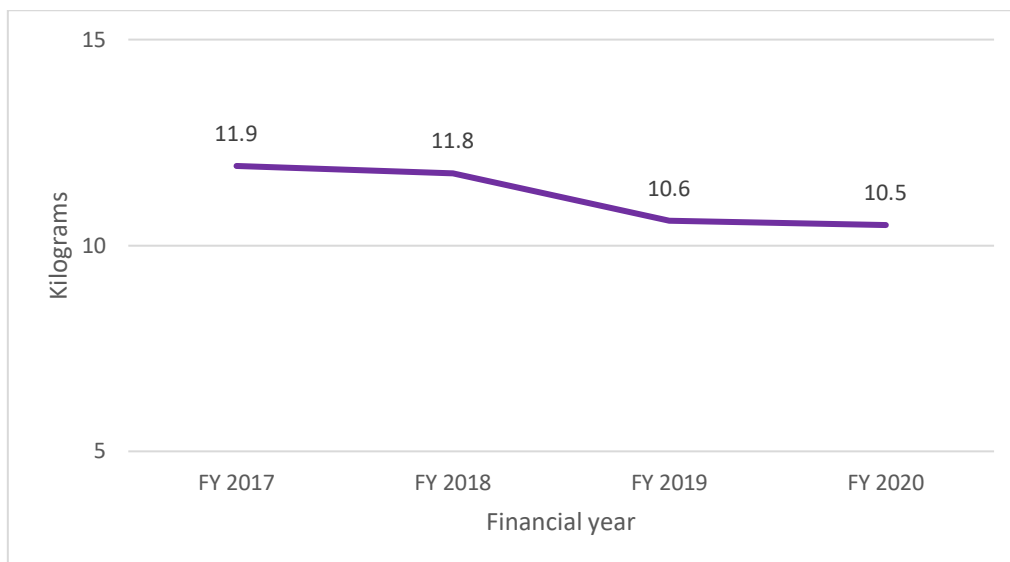
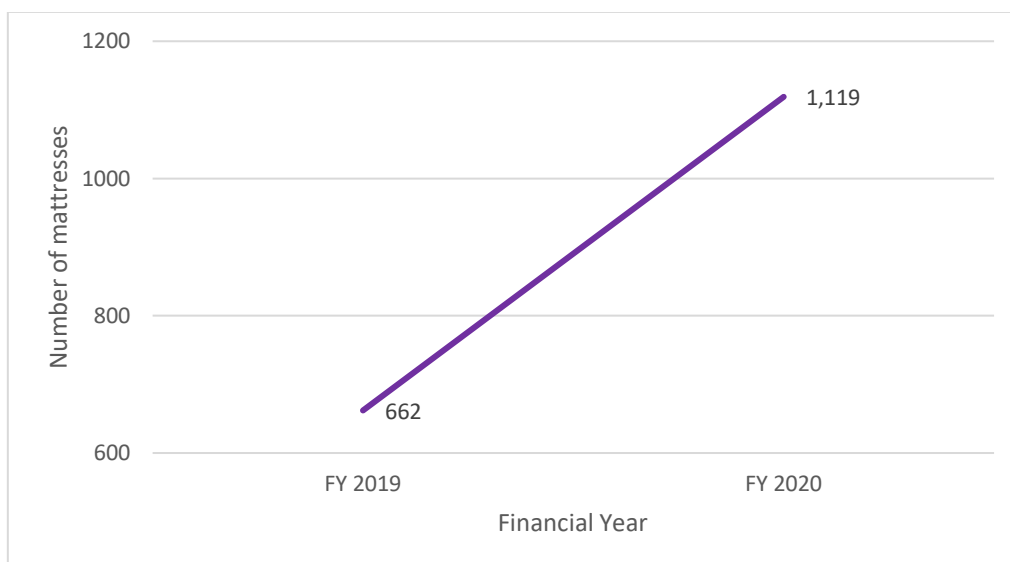*Figure 6 Annual hard waste per capita - City of Burnside*

Figure 7 Annual mattress collection - City of Burnside

Additional waste matters

53.   Table 4 provides additional waste statistics. Noteworthy items include:

53.1.   There was an increase in bookings for hard waste, likely due to many residents being housebound during the COVID-19 restrictions. Interestingly, there was a slight decrease in the tonnage of hard waste collected (Table 3 and Figure 6). This divergence between bookings and tonnages may have been caused by housebound residents wanting even small quantities of hard waste removed while they were at home.

53.2.   There is a consistent and small increase in the number of compostable bags residents are obtaining from Council each year. Similarly, the proportion of households obtaining bags is increasing. For this report, the number of households includes independent living households and is based on rates data (previously, census data were used and the number of households was lower).

53.3.   East Waste have advised that they are no longer recording the wait times for hard waste because they have changed the systems used for bookings. They have advised Council that wait times do not exceed four weeks and the average wait is around three weeks.

Table 4 Additional waste statistics: hard waste, bins and compostable bags

	2016/17	2017/18	2018/19	2019/20
Hard Waste				
Hard waste bookings	4,163	4,416	4,142	5,161
Hard waste collections	3,682	3,894	3,556	3,672
Cancelled bookings	264	281	327	372
Bookings not collected (no items to collect on collection day)	217	241	259	352
Average customer wait (days)	21	22	22	~21
Second collections within the financial year (paid by resident)	56	87	97	104
Number of customer requests relating to dumped rubbish	506	320	336	421
Compostable bags (household bags provided free to residents)				
Households provided with compostable bags		3,313	3,416	3,531
Percentage of households in City of Burnside provided with compostable bags (including independent living households)		17.2%	17.7%	18.3%
Bins				
Bins reported as stolen or misplaced			207	187
Bin repair requests			307	282
Bins replaced due to irreparable damage			154	96
Missed bins (bins missed that were not the fault of the driver are not included, e.g. blocked roads where the truck returns later)			2	1
Complaints to Ranger Services about bins being left out			22	27
E-Waste				
E-waste (tonnes; sources include the monthly resident drop off to the Council Depot plus collection of illegally dumped e-waste; 2019/20 was the first full year of e-waste service at the Council Depot)				8.3

54.   Two initiatives were planned to commence during 2019/20 that have not yet commenced. The two initiatives were from the 'Initiatives for Utilising RFID Technology in Kerbside Bins – Appropriate Diversion of Waste' report (Council Motion C12427):

54.1.   The first project was a direct feedback trial targeting a reduction of organics in the waste-to-landfill bins. This project was to use techniques such as bin tagging and door-stepping to provide feedback to residents on the use of the three-bin system. Monitoring of bin weights and frequencies of bin collections was an integral part of the project, necessary to determine the impact of the work. Initial delays were unavoidable due to the unavailability of data that was required to monitor the project. East Waste were working

to connect bin weighing systems with RFID and GPS systems. Before these issues were resolved, COVID-19 restrictions came into force and the project was postponed. East Waste have made progress with the technology and the project is expected to recommence in the present financial year.

54.2.   The second project was a three-stage trial focused on non-recyclable materials in recycling bins. This project was also postponed because of technology issues. The linking of RFID, GPS and driver monitoring systems is required to easily identify the houses with contaminated bins. These links are expected to be made in 2020 and the project will recommence in the present financial year.

55.   Council has continued to trial recycling bins and organics bins in council reserves:

55.1.   For the trial of organics bins, four bins were monitored on 22 occasions. On only one occasion were all the bins free of contamination. Most sites had obvious contamination most of the time. The contamination levels in the bins continued to be too high for the materials to be collected for commercial composting. Commercial composting operations require very low levels of contamination in the organic materials they receive. Rather than continuing with this trial, Council is working with East Waste to procure several purpose-built bins that are designed to only accept dog waste bags. Attachment C provides further details.

55.2.   For the trial of recycling bins, six bins were monitored on 25 occasions. Most of the bins had obvious contamination over 90 per cent of the time. The most common contaminant was disposable coffee cups. These cups are lined with plastic and are not suitable for recycling systems. The lids of the bins were modified to make them quite different from other bin lids and more obviously for recycling. When the lids were changed there was a reduction in some types of contamination. However, contamination was still highly problematic. Attachment D provides further results of the recycling bin trial, including a discussion about reducing contamination in bins. Rather than continuing the trial, Council will take several steps to work on contamination in household bins (outlined in Attachment D). When household contamination issues are largely resolved, recycling bins should again be trialled in Council reserves.

56.   Council has made a change to the dog waste bags supplied in parks (and along some popular dog walking routes):

56.1.   Council previously supplied black oxo-degradable dog waste bags. The oxo-degradable bags are environmentally damaging (e.g. they create plastic litter). Additionally, the naming of the oxo-degradable bags is problematic because the word 'degradable' suggests that the bags are not environmentally harmful.

56.2.   Compostable dog waste bags were trialled along with the trial of organics bins. Several residents provided Council with positive comments about the trial of compostable dog waste bags. Council switched all dog waste bags across Council to compostable bags during June 2020. The introduction of compostable bags received both praise and complaints from residents. Council is working with East Waste to ensure access to the best possible bags at the best possible price.

56.3.   Council wrote to the Minister for Environment and Water and the Minister for Local Government regarding waste management, waste diversion and

support provided by State Government (Council Motion C12542). The letter is attached as Attachment E.

Looking forward: waste plans for 2020/21

57. Council will recommence the two initiatives planned following Council Motion C12427: 'Initiatives for Utilising RFID Technology in Kerbside Bins – Appropriate Diversion of Waste'. These projects will be able to recommence when East Waste have resolved the technology issues that have caused delays.

58. Council will review the Kerbside Waste Management Policy with a focus on schools.

59. Council will review the waste services provided to residential apartments (also known as multi-unit dwellings, or MUDs), in line with Council Motion C12608.

60. Council are working with East Waste to develop a new initiative to reduce hard waste tonnages through potential reuse opportunities. The initiative is an early planning phase and will be presented to Council when the details are established.

Water

61. Water is a valuable resource used by Council to maintain parks and reserves and supply buildings, pools and other services. Parks and reserves account for most of Council's water use.

62. There are two important elements to water management contained in Council's Environmental Sustainability Strategy:

   62.1. Manage water for best value to the environment and community, recognising the multiple sources and uses of water; and

   62.2. Strategic approach to water management, incorporating WSUD.

Water use

63. Council utilises water from various sources, including:

   63.1. **Mains water**: provided by SA Water and used in reserves and buildings around the City.

   63.2. **Bore water**: Council has bores in two reserves, Hazelwood Park and Kensington Park Reserve. The bores provide water at very low cost (relative to mains water), but there are limits on how much can be used and there are costs involved in using it. The pumping of water from the bores was responsible for over 85 megawatt-hours of electricity during 2019/20.

   63.3. **Recycled Water**: the Glenelg to Adelaide Parklands Recycled Water Project is commonly known as GAP water. The GAP scheme provides for the reuse of treated wastewater from the Glenelg wastewater treatment plant. The project is designed to reduce Adelaide's reliance on River Murray water, reduce wastewater being pumped into Gulf St Vincent, and increase water availability to support urban greening. Wastewater is filtered and disinfected before being pumped to the Adelaide Parklands. The City of Burnside has access to this water near Fullarton Road and the water is used to water the reserve along Alexandra Avenue.

63.4.   **ERA Water**: ERA Water is a regional subsidiary of three councils: Burnside, Walkerville and NPSP (Norwood, Payneham and St Peters). The ERA Water scheme provides Aquifer Storage and Recovery (ASR) capacity to Council. The scheme diverts creek water during high flows (e.g. winter) into Felixtow Wetlands. The Wetlands are designed to clean the water. After flowing through the wetlands, the clean water is pumped underground and stored in a natural aquifer. The water is then pumped out of the aquifer when it is required to water parks and reserves during the drier months. An extensive network of pipes and pumps has been installed to deliver ERA water to parks and reserves across the City of Burnside and other collaborating Councils. The water may also be sold to other users (e.g. other councils and industry). In the long-term, this scheme should provide water to Council at a lower cost than mains water and increase waster security.

64.   Figure 8 depicts Council's water use from various sources. **With 307 megalitres of water consumed, there was an 11 per cent increase from the previous year**. This increase is likely to be mostly attributable to two matters:

64.1.   **Rainfall**: both spring and the beginning of summer had limited rainfall. Rainfall was well below the ten-year average at the Burnside weather station from July to December. During October, November and December rainfall was particularly low, with only 56.6 mm recorded at Burnside, where the ten-year average for those months is 92.0 mm. Figure 9 depicts the relationship between rainfall and Council's water consumption. There is lower water consumption in wet years and higher water consumption in dry years, indicating appropriate management of water resources.

64.2.   **Integration of ERA Water**: the initial integration of the ERA Water infrastructure with local watering systems caused a few problems over the last year, which Council staff worked with ERA Water to resolve. The integration caused blockages and system control issues that, in some instances, caused watering systems to be locked on, rather than shutting down according to schedules. Thus, more water was used.

65.   Community expectations are also a driver of water use. Keeping parks and reserves well-watered has both environmental and cost implications. Environmentally, there may be benefits where water is used (e.g. urban greening and the associated cooling), but an environmental cost at the location of the water extraction. For example, the use of mains water in the City has an environmental impact on the Murray River system, particularly during drought years. Therefore, the use of alternative water sources (e.g. ERA Water or GAP water) has broad environmental benefits beyond to City. Council also saves substantial water resources by maintaining indigenous and drought-tolerant vegetation in many Hills Face Reserves and at Urban Biodiversity Sites.
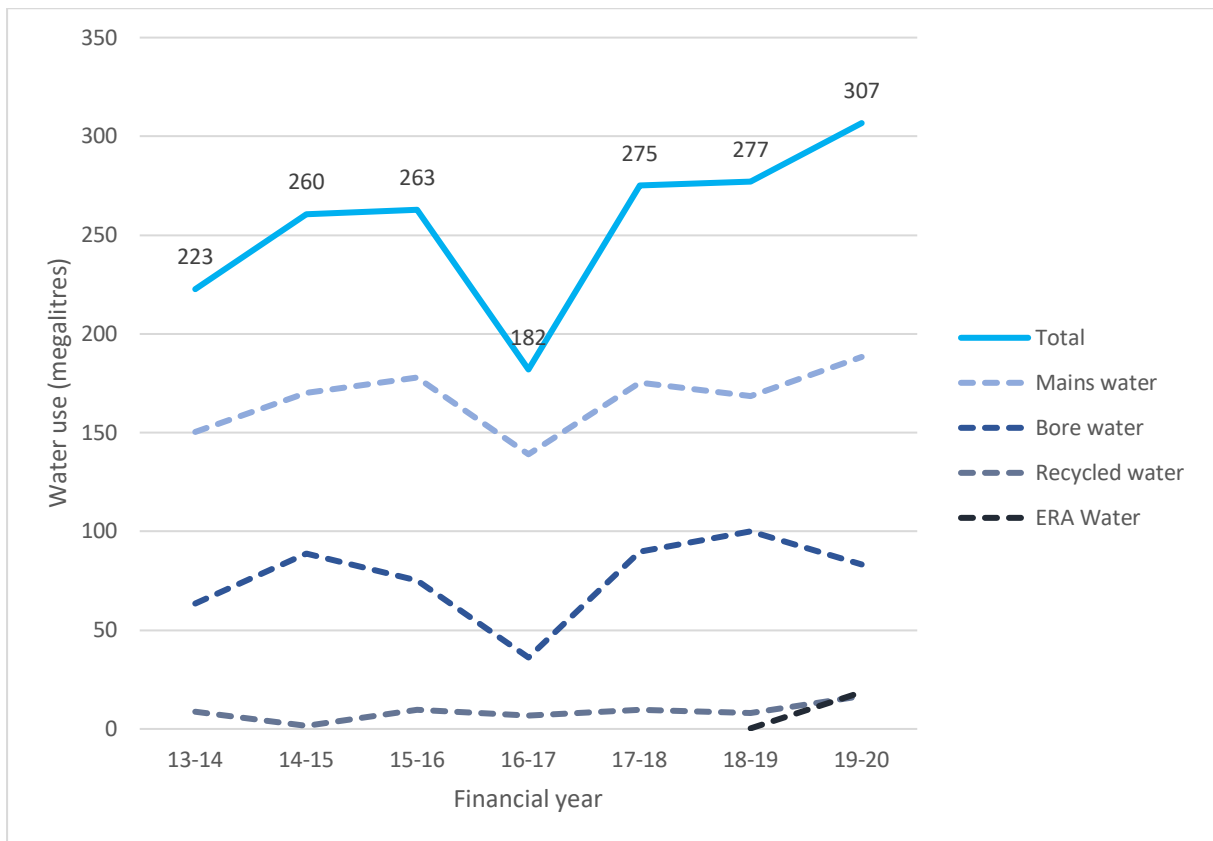
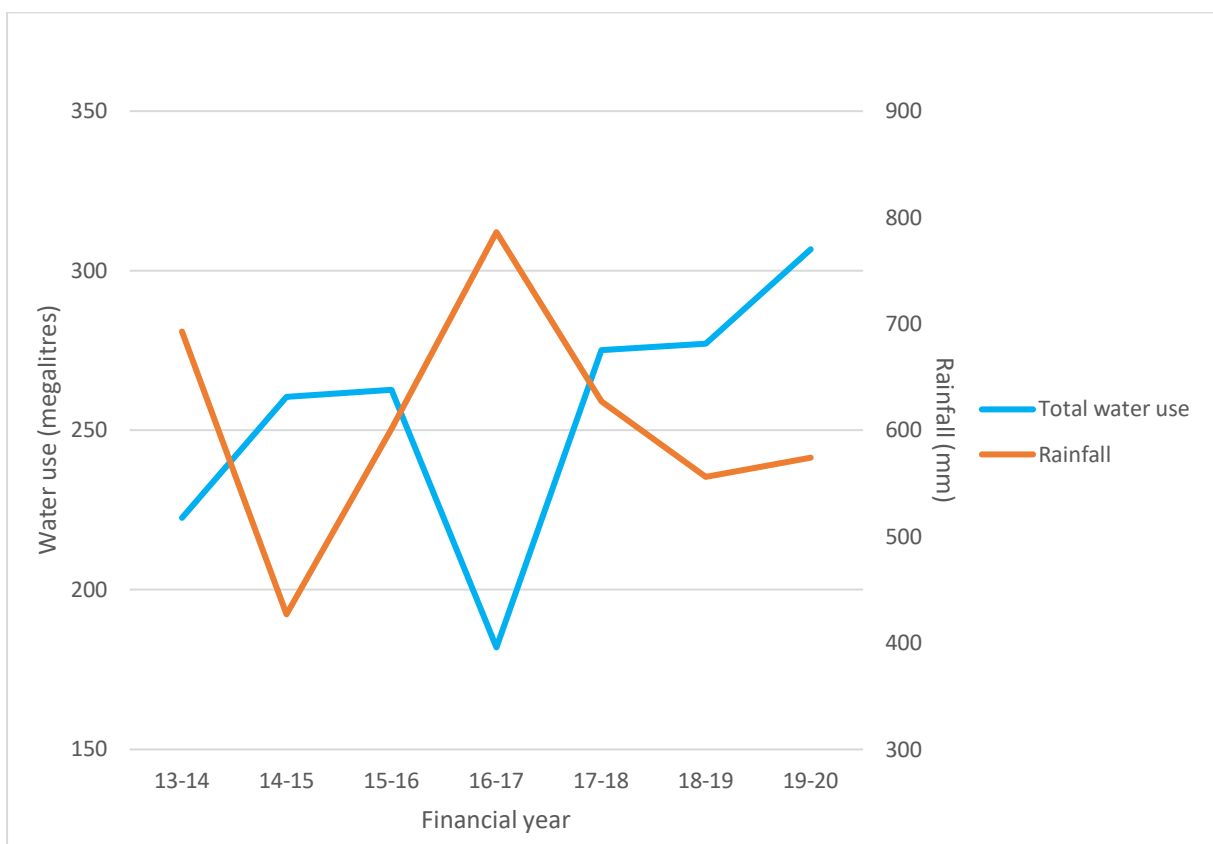Figure 8 City of Burnside water use (megalitres)

Figure 9 City of Burnside water use (megalitres) versus
rainfall at Burnside weather station (mm)

Water Sensitive Urban Design (WSUD)

66.   WSUD involves integrating the sustainable use of water into urban areas. This approach to planning and urban design can include the management of rainwater, stormwater, groundwater, mains water and wastewater. Implementing WSUD typically involves measures to slow water flows, allow water to infiltrate, or capture water for later use. WSUD is often implemented to support urban greening. In practice, WSUD can be as simple as installing rainwater tanks to collect water or swales to slow water flows. At the other end of the spectrum, WSUD can be complex and involve multiple treatments, such as the construction of artificial wetlands to clean water for aquifer storage for subsequent use. There are many benefits of WSUD, including the support for urban greening (i.e. water management to support trees and vegetation). Urban greening has many associated benefits, such as urban cooling and the maintenance or improvement of neighbourhood character. WSUD features can also improve water quality and reduce downstream pollution (e.g. by reducing freshwater pulses into Gulf St Vincent).

67.   Council utilises water from two large-scale WSUD sources, ERA Water (an Aquifer Storage and Recovery scheme) and the GAP scheme (treated wastewater).

68.   Council also implements many smaller-scale WSUD systems. Table 5 lists the small-scale WSUD system installations within the Council, with 94 systems installed during 2019/20. Attachment F lists each installation. By the end of the year, 423 WSUD features had been identified across the City (Table 5).

Table 5 Small-scale Water Sensitive Urban Design (WSUD) systems in the City of Burnside

System	Existing (prior to 2019/20)	Installed (2019/20)	Total (June 30, 2020)
B-Pod subsurface infiltration systems	213 (20 sites)	8 (4 sites)	221 (24 sites)
Kerbside tree inlets	36 (4 sites)	78 (7 sites)	114 (11 sites)
Creekline WSUD (e.g. weirs, pollutant traps)	43		43
Permeable paving	12	7	19
Rainwater tanks	8	1	9
Rain Gardens	5		5
Swales	6		6
Detention basins	4		4
Soakage pits	2		2
TOTALS	**329**	**94**	**423**

69.   Council staff were part of collaborative Resilient East teams who worked on two reports about WSUD (Figure 10):

69.1.   **WSUD for a Resilient East**: investigates the extent and performance of WSUD initiatives in our region, demonstrating that there are over 1,000 examples of WSUD across the Resilient East region

69.2. **Monetised benefits of WSUD**: results of an investigation of WSUD and green infrastructure initiatives to understand the value they have on water quality, neighbourhood character, health benefits and more.

Figure 10 Cover shots of WSUD reports released by the Resilient East group during 2019/20 and available at: https://www.resilienteast.com/resources

Looking forward: water plans for 2020/21

70. Two large-scale WSUD systems have noteworthy milestones:

70.1. ERA Water: 2020/21 should be the first year of full operation (pending availability of water); and

70.2. The Kensington Gardens Reserve wetland development will be implemented, improving stormwater quality on Stonyfell Creek and driving substantial revegetation and creation of habitat.

70.3. The upgraded Glenside detention basin is due to be handed over from the developer in the next few months.

71. Numerous new small-scale WSUD systems will be installed during 2020/21, including:

71.1. B-Pod and kerbside tree inlet devices: 50+ devices; exact numbers yet to be confirmed;

71.2. Permeable paving: carpark on Waterfall Gully Road (Langman Reserve), plus four footpaths;

71.3. Release of public online map with descriptions of Water Sensitive Urban Design features across Council (e.g. B-Pods, tree inlets, rain gardens, wetlands); and

71.4. Develop and conduct resident tour to introduce Water Sensitive Urban Design.

72.   Council are developing an interactive online map of WSUD sites and systems in the City. Once launched, this map will assist in promoting the progress Council is making in this space. Anecdotally, residents are often keen to lean more when large- or small-scale systems are installed or utilised near their homes or in public places they frequent. Council will continue to work with Resilient East and Water Sensitive SA to promote the benefits of WSUD.

Trees and Biodiversity

73.   There are two important elements related to the management of trees and biodiversity in Council's Environmental Sustainability Strategy:

73.1.   Preserve and promote biodiversity, and the natural environment, including habitat for healthy wildlife populations; and

73.2.   Conserve and enhance canopy cover, including promotion and protection of trees on private land.

The 2020 planting season

74.   The 2020 planting season commenced in April and ran until late August. While this report is focused on the 2019/20 financial year, the timing of planting each year means that reporting is best done for the planting season, rather than the financial year. This approach will provide a better understanding of trends over time and allow more reasonable discussion of annual variations.

75.   While reporting on planting seasons will be most useful, one exception to this reporting protocol exists. The Burnside Biodiversity Nursery grows plants for the planting season, starting well before planting begins, so data related to the number of plants grown in the nursery is related to the 2019/20 financial year.

76.   Table 6 includes relevant statistics for growing and planting of trees, shrubs, wildflowers and native grasses during the 2020 season. Key metrics include:

76.1.   **A total of 1,573 trees planted on Council land**, including street trees, trees in reserves, and trees planted at conservation sites (Hills Face Reserves and Urban Biodiversity Sites; Figure 11)

76.2.   **A total of 8,697 plants grown at Burnside Biodiversity Nursery.** During 2019/20 the Laurel Avenue Biodiversity Nursery with the assistance of the volunteer program produced these local native plants for local plantings. COVID-19 restrictions determined that the annual Local Native Plant Day could not be held for residents. Instead, an on-line Local Native Plant Giveaway was conducted, with contactless delivery to Burnside residents. A total of 3,065 trees, shrubs, wildflowers and creek plants were given to local residents (Figure 12). Most of the remaining plants were planted on urban biodiversity sites and in Hills Face Reserves.

76.3.   **The Native plant giveaway (Council motion C12049)** saw 100 trees collected by residents from tree nurseries. This initiative is further discussed in the Canopy Action Plan section of this report.

76.4.   **A grand total of 11,029** plants were utilised in public and private planting programs

Table 6 Season 2020: growing and planting statistics for trees, shrubs, wildflowers and grasses

Plant growing	
Plants grown at Burnside Biodiversity Nursery	**8,697**
Plants provided to be planted on private land	
Native tree giveaway initiative	100
Biodiversity Nursery giveaway: trees	289
Biodiversity Nursery giveaway: shrubs, wildflowers and grasses	2,776
Subtotal: trees given to residents	389
Subtotal: Shrubs, wildflowers and grasses given to residents	2,776
TOTAL: plants provided for planting on private land	**3,165**
Planting on public land	
Street tree planting	905
Urban Biodiversity site planting: trees	221
Urban Biodiversity site planting: shrubs, wildflowers and grasses	2,500
Hills Face Reserve planting: trees	381
Hills Face Reserve planting: shrubs, wildflowers and grasses	967
Park planting: trees	66
Park planting: shrubs (including roses)	1,970
Michael Perry Reserve Historic Garden planting (exotic plants)	854
Subtotal: trees planted on public land	1,573
Subtotal: shrubs, wildflowers and grasses planted on public land	6,291
TOTAL: planting on public land	**7,864**
GRAND TOTAL: public and private planting programs	**11,029**

Figure 11 Wattle Park Reserve tree planting 2019/20

Figure 12 Local Native Plant Giveaway 2020

Biodiversity sites

77.   The term 'Biodiversity' refers to the variety of living things on Earth. This term is used by Council to describe sites where indigenous plants are the focus (i.e. "biodiversity sites"). While these sites are managed to create healthy habitat, biodiversity is not limited to these sites. Biodiversity exists in public parks and streetscapes, as well as in private gardens everywhere. Indigenous plants are those that are naturally found in the City of Burnside and may also be found naturally in other places (e.g. River Red Gums, Gold Dust Wattle and Hardenbergia are indigenous).

78.   Council has a focus on the management of biodiversity at numerous sites, where restoration of natural environments is prioritised, along with fire risk reduction. Examples include the hillside woodland and creekline in Michael Perry Reserve. There are also highly urban examples such as the beds in Beaumont Common and the south-eastern end of Alan E Cousin Reserve.

79.   Council restores and maintains vegetation that has existed in this area for hundreds or thousands of years. The local plants provide habitat for local native wildlife. Together, these indigenous plants and animals are distinctive and underpin the character of the City of Burnside.

80.   Council's skilled biodiversity teams, specialist bushcare contractors and volunteers carefully control invasive exotic plants and encourage native plants to regenerate naturally, with supplementary planting also used to re-introduce diversity. The result is a patchwork of hills-face and urban reserves that protect, reflect and celebrate the environmental heritage of the City.

81.   Numerous Hills Face Reserves are managed for biodiversity, including Gully Reserve, Heatherbank Reserve and Wyfield Reserve. **The total area under management for biodiversity at Hills Face Reserves in 2019/20 was 119.07 hectares**. This total included all Hills Face Reserves but not roadsides. Further, the total does not include several trails (i.e. McBeath unmade road reserve, Old Bullock Track and Mt Osmond unmade road reserve).

82.   The Hills Face Reserves were assessed during 2019/20 using a standard measure developed by the Department for Environment and Water (DEW). The DEW Native Vegetation Condition Rating has five levels. Sites are assessed and assigned a score according to the level of native plant species coverage and the diversity and degree of exotic weed invasion. Table 7 provides a summary of the condition of Council's Hills Face Reserves.

Table 7 Native Vegetation Condition Ratings for Council's Hills Face Reserves 2019/20

Rating	Description	Percentage of reserve area
Very High (1)	Very little or no sign of alien vegetation in the understory; likely to resemble pre-European condition.	0.3%
High (2)	High proportion of native species and native cover in the understorey; a reasonable representation of pre-European vegetation.	5.7%
Moderate (3)	Substantial invasion of alien species but native understorey persists; for example, there may be a low proportion of native species and a high native cover, or a high proportion of native species and low native cover.	27.8%
Low (4)	The understorey consists predominantly of alien species, although some natives persist.	57.1%
Very Low (5)	The understorey consists of only alien species.	9.0%

83.   Table 7 provides a useful baseline on the condition of Council's Hills Face Reserves. These reserves should be assessed regularly using the DEW Native Vegetation Condition Rating to monitor change over time. These styles of monitoring are best conducted on five-year cycles to ensure that meaningful change can be detected. With Council's extensive annual workplans, the condition of these parks is improving slowly over time. Monitoring the condition of the reserves every five years will allow that improvement to be quantified and promoted. More frequent monitoring will not provide enough value to justify the time and cost involved.

Woody weed control

84.   Woody weeds are a persistent issue in Hills Face Reserves. Woody weeds degrade the City's natural heritage and contribute to fuel loads (a factor in the risk of fire).

Infestations of woody weeds have been mapped using aerial photography and ground truthing (on-site observations to confirm the analysis). Each year, progress in primary clearance of woody weeds is mapped and quantified. The woody weeds mapped and managed include declared pest species such as Olives, Italian Buckthorn, Aleppo Pine, Desert Ash, and Boneseed. These plants are declared as weeds and regulated under the Landscape South Australia Act (2019) because of their threat to primary industry, the natural environment or public safety.

85.   During 2019/20, **2.9 hectares of primary woody weed control was conducted** in Hills Face Reserves. To help visualise that area, consider that the grassed surface of the Adelaide Oval is 1.9 hectares. Thus, the area of weeds controlled was over one-and-a-half times the playing surface at the Adelaide Oval.

86.   The area of woody weeds that can be controlled each year is highly variable because of variation in sites, weed densities and methods used. For example, some sites have difficult terrain, safety issues and poor access for machinery. **Over the last six years, 26.8 hectares have undergone primary woody weed control**. Annual progress has ranged from two hectares (difficult sites) to over nine hectares (easier sites). The extent of woody weed infestations remaining in Hills Face Reserves is 48.2 hectares. This area includes some major unmade road reserves and roadsides where woody weeds have been mapped.

Urban Biodiversity Sites

87.   Council's Urban Biodiversity Sites exist in reserves, or parts of reserves, and are managed to create healthy habitat. Examples include Simpson Reserve, Sydney Street Reserve, Linden Gardens Reserve and parts of Bell Yett Reserve, Kensington Park and Harris Reserve (Figure 13). **The total area under management as Urban Biodiversity Sites in 2019/20 was 11.19 hectares**.

Figure 13 Harris Reserve biodiversity planting

88.   Several Urban Biodiversity Sites saw increases in the area managed for conservation in 2019/20. **Overall, around one-third of a hectare was added to the Urban Biodiversity Site program**. The sites that saw increases in conservation work were:

88.1.   Moorcroft Reserve, where vegetation restoration works followed major creek engineering works to stabilise the eroded channel.

88.2.   Beaumont Common Reserve and Philps Reserve, where weedy, difficult to manage areas of the reserves were converted to local native plantings, adding to the existing regeneration areas.

Creeklines

89.   Creeklines provide habitat and form important corridors of vegetation through urban areas. These corridors allow indigenous plants and animals to persist in the City when much of the natural habitat has been removed or fragmented.

90.   **There are 6.16 kilometres of identified creeklines within the City**. The designation of creeklines is complex because creeks in the region often have intermittent flows and it can be problematic to distinguish between a creek and other areas where water flows are intermittent. In quantifying the length of creeklines in the City, Council staff have focussed on creeklines that are readily identified as such, including First, Second and Stonyfell creeks.

91.   **There are 2.78 kilometres of creeklines restored and managed for conservation and habitat within the City**. This length of creekline equates to 45 per cent of the identified creeklines in the City, up 2 per cent from the year prior.

Conservation trails

92.   **A network of over 26 kilometres of Conservation Trails exists through the City's hills face reserves**. This network of trails has been maintained and upgraded, with over 5 kilometres actively upgraded during 2019/20. The condition of each trail is assessed annually and works are prioritised according to this condition monitoring.

93.   Trail counters are installed in three locations and monitoring of these counters reveled that an average of nearly 13,000 walkers pass these points each month:

93.1.   Chambers Gully (4,432 per month)

93.2.   Women's Pioneer Trail (4,332 per month)

93.3.   Michael Perry Reserve (4,202 per month)

Additional biodiversity matters

94.   **Michael Perry Reserve Historic Garden**: Following the preparation of the Michael Perry Reserve Historic Garden Adaptation Plan in 2018 great progress has been made in the revitalisation of the historic garden (Figure 14). Throughout 2019/20 teams of volunteers from Conservation Volunteers Australia were engaged to restore pathways, rock edging and garden beds followed by extensive planting of over 800 new plants including a wide range of specialist plant species chosen for their historic or botanical interest. The restoration has gained much public appreciation from park users and compliments to council on the initiative.

Figure 14 Michael Perry Reserve, May 2020

95. **Conservation volunteers**: Despite the onset of COVID-19 restrictions in early 2020, the first part of the year saw a continuation of successful conservation volunteering programs. Volunteers contributed 2983 hours, down from 4,158 the year before. Volunteer contributions included:

   95.1. City of Burnside volunteers conducted conservation, nursery and monitoring work at the biodiversity nursery, Karra Tartu (Waterfall Gully Reserve) restoration site, urban biodiversity sites, and along conservation trails;

   95.2. Trees for Life volunteers conducted work at nine Bush for Life sites on Burnside Hills Face Reserves; and

   95.3. Conservation Volunteers Australia teams worked on a range of Council reserves, including Michael Perry Reserve and Chambers Gully Reserve.

96. **Burnside Urban Foresters**: through this volunteer program, Council provides opportunities for residents to learn about and participate in urban forestry activities. The Burnside Urban Foresters program allows council volunteers to participate in workshops to learn about the urban forest. Urban Foresters can also participate monitoring activities through this citizen science initiative. The program was put on hold during COVID-19 restrictions. A reboot is being planned for spring 2020. There number of participants has been growing steadily, with 22 active participants involved in monitoring activities and an additional 15 participants who attend workshops. Forty more residents have registered their interest to become involved.

97. **Vegetation Management Framework**: strategic management of Council's biodiversity sites has been furthered during 2019/20 through the completion of the Hills Face Vegetation Management Framework 2019-2024. Sitting within that framework, several Reserve Vegetation Management Plans were completed, including plans for Dashwood Gully Reserve (required by Council Motion C11907), Magill Stonemine Reserve and Gully Reserve. Further Vegetation Management Plans will be developed for Council reserves during 2020/21.

98. **Chambers Gully Reserve**: an opportunity to improve conservation outcomes at Chambers Gully Reserve exists as the former rifle range and clubrooms building is returned to open space (Council Motion C12605) (currently scheduled for 2021/22).

99.   **Grey Box trees**: There are numerous environmentally and culturally significant grey box (*Eucalyptus microcarpa*) throughout the City. Some of these trees are displaying signs of premature decline. This concern has been noted at Beaumont Common. Council has taken several actions to support the trees and is monitoring the health of the trees in the long-term (with support from the Burnside Urban Foresters). Actions have included: supplementary watering, soil treatment to reduce compaction, and the use of possum guards on several trees to reduce pressure on the trees.

100.   **Nest boxes**: Burnside Rotary are generously supporting Council by constructing and painting nest boxes. Council supplies the materials and the community members are supplying ready-to-install boxes back to Council. These boxes are used to support wildlife populations, particularly in areas where trees have been removed. A high proportion of Australian wildlife require cavities in trees for nesting, including indigenous birds and mammals. Several boxes were recently installed along Alexandra Avenue.

The Canopy Action Plan

101.   The Canopy Action Plan has previously been endorsed by Council (Motion C12446). The actions in the endorsed plan are provided as Attachment G with comments provided on an update of progress.

102.   The 2020/21 year saw slow progress on the Canopy Action Plan due to funding for certain actions under the Plan being removed by Council when COVID-19 restrictions occurred through the Annual Business Plan and Budget process.

103.   Despite the limitations, some progress on actions in the Canopy Action Plan was made, including:

103.1.   Scheduled National Tree Day events across the country were either cancelled or scaled-back because of COVID-19 restrictions. Council was able to partner with seven local schools for low-key events. Council provided 24 trees to eight local schools (three trees per school) for planting on National Tree Day on 31 July. Links to lesson plan resources were also provided and the schools were asked to promote the Native Tree Giveaway Program to their communities. This activity addresses both the Canopy Action Plan and the Council Motion on National Tree Day (C12208).

103.2.   While work on a Tree Week celebration was delayed, Council are participating in the inaugural South Australian Nature Festival (25 September – 4 October 2020). Council are conducting a tree walk in Hazelwood Park and a botanical walk at Michael Perry Reserve. Further information about the Nature Festival is available at: https://www.naturefestival.org.au/.

103.3.   A LiDAR-based assessment of canopy coverage across the City of Burnside has found relatively high levels of canopy coverage (37.7 per cent) when compared to canopy coverage across metropolitan Adelaide (23.4 per cent). Private land accounts for most of the land with no canopy and provides the greatest opportunity to increase canopy coverage, as approximately 67 per cent (~12.5 km2) is non-canopy. This assessment has also identified a strong pattern of lower canopy coverage towards the west and higher canopy coverage towards the east and along creeklines within the Council area. While many of the suburbs within the City of Burnside have greater than 30 per cent canopy coverage, a key State Government target, there are 13 suburbs that do not meet that threshold.

Reassessment of the metropolitan Adelaide region is being considered and is likely to be scheduled at five-year intervals to monitor change in canopy coverage over time and inform decision making. Further details are provided in Attachment H.

104.   Following the LiDAR assessment of canopy coverage, a new technique for targeting the promotion of tree planting on private land was developed. This new technique utilises canopy data and building footprints to identify private residential land with enough open space to accommodate additional trees. This targeted approach may assist in getting more trees in the ground on private land. Further details are in Attachment H. This approach is relevant to the Canopy Action Plan and to the Council Motion C12049, the 'Initiatives to Promote the Maintenance and Retention of Native Trees on Private Property'. Further analysis and planning will be conducted before a report on the Native Tree Giveaway is due to Council in November 2020.

Looking forward: trees and biodiversity in 2020/21

105.   Many tree and biodiversity initiatives are now 'business-as-usual', including tree planting (at high numbers), the Biodiversity Nursery giveaway and volunteer programs that engage and educate residents.

106.   Over the next year, additional work will occur to identify and plan the development of habitat corridors in the City. This work will focus first on the most prevalent existing habitat corridors, creeklines. The work will identify how creeklines and other corridors connect biodiversity sites and green space in parks and reserves.

107.   Additional analysis of LiDAR data will be conducted to inform the report on 'Initiatives to Promote the Maintenance and Retention of Native Trees on Private Property' (Council Motion C12049).

108.   Further Vegetation Management Plans will be developed for Hills Face Reserves during 2020/21.

Corporate action

109.   There are three important elements related to corporate action in Council's Environmental Sustainability Strategy:

109.1.   Promote environmental sustainability through advocacy, community engagement and education

109.2.   Environmental sustainability is embedded within decision-making, resource allocation, processes and operations

109.3.   Increase Council and community resilience and preparedness for the impacts of climate change

Promotion of environmental sustainability

110.   Council published several articles on waste management and other environmental matters in the Focus newsletter and online and regularly makes social media posts about waste and other environmental matters.

111.   Council has supported two externally run courses focussed on environmental sustainability:

111.1.   Council partnered with the Natural Resources Management Board and the City of Norwood, Payneham & St Peters to support the delivery of a Living Smart Course. The course was branded as 'Living Smart: Eastern Suburbs'. The Living Smart course ran for seven weeks from 23 October 2019, with one evening session per week plus a fieldtrip. The course was held at the St Peters Youth Centre, Linde Reserve, Stepney. These educational courses are designed to build community, helping to create networks of like-minded locals. Course topics included: living simply, waste, water, gardening for biodiversity, gardening for food, energy, healthy you, healthy home, transport and community. This was the second Living Smart course supported by the Council. The first course, held in 2018, has led the formation of a group of residents who are still actively working together to advance several initiatives in the City of Burnside. For example, the group were successful in obtaining a small grant from Council to build and install several 'bee hotels' for native bees.

111.2.   Through the Resilient East collaboration, Council partnered with the Australian Red Cross to help communities become climate ready and prepare for extreme climate events. The Red Cross established Climate Ready Communities training to empower people to understand the risks they currently face, the ways these are changing and what they can do to build resilience. A one-day community training session was held on 15 February at Glenunga Hub. Further information about this initiative is available online: https://www.redcross.org.au/saclimateready.

Embedding environmental sustainability within decision-making, resource allocation, processes and operations

112.   Council Motion C12516 (Climate Change Policy) determined that all Council Reports should include a new section that considers environmental sustainability and climate change. This work will be completed when the Council Report template is reviewed and updated. In preparation for this change, Council staff have developed a guide to assist report writers in considering sustainability implications of their reports and initiatives.

113.   The Council Environment and Sustainability Officer participated in a cross-council training program in Carbon Accounting for Councils.

114.   Council has continued to participate in the circular procurement project with the Local Government Association (SA) and eight other councils (Council Motion C12251). Participation in this project has had several outcomes thus far:

114.1.   **Meeting room chairs**: new chairs were required for the meeting room at the Council Depot (Glynburn Road). Council staff conducted a review of the availability of chairs with recycled content. Thirteen office chair suppliers were contacted and asked for information. Six types of chairs were found with some recycled content. Some of the chairs were suitable for short-duration locations such as waiting rooms, while others were suitable for longer-duration locations such as training or seminar rooms. Staff tested two of the chairs for comfort for a long-duration location. 'Tipo' chairs were selected (Figure 15) because they are constructed with 100 per cent recycled content (including recycled fibre from PET bottles) and were more comfortable than the other chair tested (the other chair may be suitable in short-duration locations). Council then purchased 35 Tipo chairs for the meeting room.

114.2. **Kitchen organics baskets**: Council purchases these baskets through East Waste. The baskets are provided to residents to assist them in putting kitchen waste into organics bins (compostable bags are also supplied). Until recently, only baskets made from virgin plastic were available from the supplier (MASTEC). Council has previously requested that recycled plastic be used, as it is in the bins Council purchases from the same supplier (bins are around 30 percent recycled plastic). The supplier is now producing kitchen caddies from 100 per cent recycled plastic. The first batch has been ordered and baskets made from virgin plastic will be avoided in future orders.

114.3. **Office paper and stationery**: Council staff are reviewing how paper and stationery are purchased and if purchases can be limited to recycled materials (many staff already select recycled materials).

114.4. **Road construction materials**: Council staff at the Council Depot (Glynburn Road) are trialling recycled rubble for footpath and road repairs. For larger-scale works, contractors use a proportion of Reclaimed Asphalt Pavement (RAP). The asphalt typically contains a minimum 10 per cent recycled material. Council will be reviewing its contract for the Supply and Lay of Asphaltic Resurfacing at the end of 2020/21 and will include recycled content as an evaluation criterion in the procurement process.

114.5. **Staff training**: Council staff have developed and delivered a training presentation to key staff who are involved in procurement. An internal webpage has been established to share the training presentation and information on the project. procurement documents, including acquisition plans, have also been updated to include relevant information.

114.6. **Community education**: an informative article about circular procurement was published through engage.burnside: https://engage.burnside.sa.gov.au/FOCUSOnBurnside/news_feed/when-is-it-good-to-think-in-circles-while-shopping

Figure 15 Meeting room chairs made from 100% recycled materials

Increase Council and community resilience and preparedness for the impacts of climate change

115.   Most of the work outlined thought this report will assist in increasing Council and community resilience and preparedness for the impacts of climate change.

116.   In addition, work in this area is a focus of the Resilient East collaboration. Highlights of the work conducted by the group this year include:

116.1.   Completion of a study looking at the Monetised Benefits of Water Sensitive Urban Design (WSUD) for five Resilient East on-ground projects;

116.2.   Participation in the Australian Red Cross Climate Ready Communities program;

116.3.   Development and release of the WSUD for a Resilient East report, demonstrating the breadth and diversity of WSUD use, effectiveness and knowledge within our region;

116.4.   Conduct of a research project on the risk to productivity for councils during days of extreme heat;

116.5.   Organisation of a Cool Infrastructure Forum for staff, and subsequent trials of cool road products in City of Adelaide and Campbelltown City Council;

116.6.   Collaborative analysis of canopy LiDAR data;

116.7.   Multiple submissions, advocacy and engagement on State Government's planning reform, most specifically on the draft Phase 3 of the Planning and Design Code;

116.8.   Renewal of a Sector Agreement among Councils and with State Government for another five years;

116.9.   Development of a draft action plan to 2025; and

116.10. Fostering of stronger partnerships, working collaboratively, storytelling and sharing learnings within councils, across councils and with governments, external organisations and communities.

Looking forward: corporate action

117.   **BEAT**: During 2020, Council will commence an internal cross-organisational team, the Burnside Environmental Action Team (BEAT). This initiative will provide learning opportunities for those interested in environmental sustainability. Over time, the team will address internal management of environmental matters, such as waste, energy and water management. The team will include a representative from each work area. The approach for the first BEAT project, waste management, will include:

117.1.   Issue identification: discussion about bins, bin placement, and the complexities of waste management – the group is tasked with discussing waste management with their colleagues and exploring options;

117.2.   Planning: decide best bin systems for Council purposes, and how to action any necessary changes;

117.3.   Implementation: roll out any promotion of changes to infrastructure with explanatory signs and emails, plus reminders;

117.4.   Monitoring: review bin usage and discuss with colleagues; feedback on success and identification of problem items or areas; and

117.5.   Reporting: review the project and share the results internally.

118.   **Library of Things**: a community consultation has been conducted to gauge interest in establishing a 'Library of Things' at the Burnside Library. A Library of Things works similarly to a regular library, but instead of books being the items for loan, a diverse group of objects may be involved. Highly favourable feedback was received. The consultation identified several areas of interest for items that could be included in a Library of Things, including gardening implements, kitchen or entertaining accessories, and camping gear. Further work is being conducted by the Community Connections team to explore implementation options. This initiative has many potential benefits, including a reduction in the need for households to purchase seldom-used household items.

119.   **Community gardens**: the new community garden at 'The Shed' on Conyngham Street is set for its first full year of operation. Additionally, planning will continue for a new community garden on Laurel Avenue, Linden Park (Council Motion C12596).

120.   **Cycle networks**: Council will be investigating cycle networks through City Master Planning and Regional Health Planning.

121.   **Resilient East**: key projects identified for 2020/21 include:

121.1.   Work with Green Adelaide to develop greening programs for private land;

121.2.   Scope large-scale regional planting projects for coming years;

121.3.   Prepare and implement capacity building and a Communications Strategy to develop consistent and increased messaging across the region;

121.4.   Engage councils in understanding the climate risks to local government; and

121.5.   Prepare a regional monitoring, evaluation and reporting plan to understand change over time and report on progress in climate adaptation.

Conclusion

122.   Council has invested a significant amount of resources into environmental sustainability initiatives over many years.

123.   Following approval of Council's Environmental Sustainability Strategy, and Council's declaration of a Climate Emergency in 2019, forward planning of actions to deliver on these objectives has been undertaken.

124.   Proposed future actions will be informed by sound data and analysis, and the order of actions carefully selected to ensure the quickest and best outcomes for Council and our community.

125.   Baselines have been developed to allow tracking of Council's progress over time.

126.   Regular updates will be provided to Council in relation to environmental sustainability progress, with additional reports provided to Council on specific initiatives as required.

Attachment A:

Greenhouse gas emissions by Council source, 2018/19 and 2019/20, with change between years and theoretical baseline (tonnes CO_2-e; rounding may influence calculations; baseline is taken from 2018/19 except streetlights and Conyngham Depot)

Emissions source	2018/19	2019/20	Change (18/19 to 19/20)	Baseline
Streetlights	864.38	367.09	**-497.28**	367.09
Swimming Centre	519.32	450.37	**-68.95**	519.32
Civic Centre	419.71	359.65	**-60.06**	419.71
Vehicles	375.41	393.59	+18.18	375.41
Regal Theatre	99.89	74.77	**-25.11**	99.89
Depot (Glynburn Road)	61.78	59.74	**-2.04**	61.78
Glenunga Hub	33.77	27.60	**-6.17**	33.77
Bore (Kensington Gardens Reserve)	21.02	21.18	+0.17	21.02
Bore (Hazelwood Park)	20.39	23.88	+3.50	20.39
Kiosk (Swimming Centre)	14.37	14.72	+0.35	14.37
Pepper Street Gallery	14.15	12.45	**-1.70**	14.15
Kensington Gardens Reserve	9.25	8.74	**-0.51**	9.25
Hubbe Court Reserve	7.02	5.05	**-1.97**	7.02
Tusmore Park wading pool	7.00	7.13	+0.13	7.00
Miller Reserve	4.59	3.46	**-1.13**	4.59
Regal Theatre house	3.91	4.30	+0.39	3.91
Kensington Park Reserve	3.34	2.54	**-0.81**	3.34
Dulwich Community Centre	3.15	2.07	**-1.08**	3.15
Andrews Walk	2.72	2.50	**-0.21**	2.72
Pedestrian lights	2.36	2.34	**-0.02**	2.36
Streetlights (Trust Lane, Eastwood)	2.33	2.80	+0.47	2.33
Penfold Park	2.22	1.47	**-0.74**	2.22
JB Ware Reserve	1.88	1.56	**-0.31**	1.88
Depot (Conyngham Street)	1.23	2.53	+1.30	7.60
Tusmore Park	0.89	0.89	0.00	0.89
Irrigation (unmetered)	0.67	0.64	**-0.03**	0.67
Cedar Crescent Reserve	0.54	0.58	+0.04	0.54
Hazelwood Park	0.50	0.48	**-0.01**	0.50
Michael Perry Reserve	0.21	0.17	**-0.04**	0.21
Amber Woods public lights	0.21	0.22	+0.01	0.21
Two-way radio repeater station	0.21	0.15	**-0.06**	0.21
Old Biodiversity Nursery	0.13	0.10	**-0.03**	0.13
Alexandra Ave Medium Strip	0.11	0.10	**-0.01**	0.11
Langman Lookout	0.10	0.07	**-0.03**	0.10
Linden Ave Medium Strip	0.07	0.06	**-0.00**	0.07
Symons & Symons Reserve	0.06	0.08	+0.02	0.06
Austral Reserve	0.06	0.07	+0.01	0.06
Ray Cooper Gardens	0.06	0.06	**-0.00**	0.06
Wood park	0.06	0.07	+0.02	0.06
Branson Reserve	0.05	0.05	+0.00	0.05
Constable Hyde Reserve	0.04	0.06	+0.02	0.04
Glyde Street Reserve	0.02	0.02	+0.00	0.02
TOTALS	**2499.14**	**1855.44**	**-643.70**	**2008.23**

Attachment B

Summary of results of energy audits

Council engaged specialist consultants, The Energy Project, to audit select major facilities and identify measures that could be implemented to reduce greenhouse gas emissions. Key opportunities that were identified include:

1. Installation of rooftop solar power systems to generate electricity; and

2. Energy efficiency measures to reduce energy consumption.

The results of the audits will inform the Burnside CARES Tool being developed during 2020/21. This tool will provide several scenarios designed to inform decision-making on when and where to invest to reduce greenhouse gas emissions in a cost-effective manner.

Solar power generation

The calculations below are based on site analyses that account for available space, roof shading, the timing of energy consumption, and the site-specific cost of electricity. Typically, sites with minimal shading, consistent electricity consumption during the day and high electricity prices will payback faster than others.

Site	Solar PV system size (kW)	Annual energy saving (kWh)	Annual cost saving ($)	Annual Reduction (tonnes CO_2-e)	Project cost estimate ($)	Simple payback (years)
Civic Centre	99	137,900	$27,800	73	$123,750	4.5
Swimming Centre	60	75,000	$14,500	40	$75,000	5.2
Regal Theatre	90	117,000	$27,500	63	$104,000	3.8
Depot (Glynburn Road)	70	86,000	$30,800	46	$87,500	2.8

Energy efficiency measures

The consultants noted that electricity consumption has reduced over time at the Civic Centre, evidence that ongoing energy efficiency work has been effective at that site. Council staff have continued the analysis of energy use at the civic centre and determined that there was a 12% reduction in consumption from 2010/11 to 2018/19. Over those eight years, the average annual reduction in electricity use was 1.5 per cent. The most recent financial year saw further reductions but was not included because it was atypical (i.e. affected by COVID-19 restrictions).

Measures that could improve energy efficiency were identified by the consultants and are provided below. Some of these items have already been recognised and will be actioned over time through the Council's Buildings Asset Management Plan. Other items are new and may be added to the Plan. Some of the items are already funded, including larger items (e.g. the air conditioning upgrade at the Regal Theatre), and smaller items (e.g. lighting and air-conditioner upgrades occur according to Council's Buildings Asset Management Plan). The speed of implementation on additional items will depend on Council investment in building asset management. Investment options will be presented once the Burnside CARES Tool has been developed.

Measures	Annual energy saving (kWh)	Annual cost saving ($)	Annual CO_2-e Reduction (tonnes)	Project cost estimate ($)	Simple payback (years)
Civic Centre					
Air conditioning measures	81,000	$14,000	43	$116,000	8.3
Lighting upgrade	41,600	$15,000	22	$81,000	5.4
Electrification of gas appliances	-	$500	-	$5,000	10.5

Replace storage electric hot water systems	5,500	$1,000	-	$8,000	8.0
George Bolton Swimming Centre					
Reduce night pump flow rates	32,500	$4,500	17	$10,000	2.2
Replace boiler with electric heat pump	-	$40,000	75	$300,000	7.5
Update domestic hot water pump control	10,000	$1,500	5	Staff time only	0
Regal Theatre					
Air conditioning upgrade	35,000	$12,000	19	$175,000	14.6
Lighting upgrade	12,700	$4,700	7	$10,000	2.1
Refrigeration upgrade	2,200	$700	1	$3,000	4.3
Replacement of hot water service	1,600	$500	1	$4,000	8.0
Council Depot (Glynburn Road)					
Lighting upgrade	8,300	$4,200	4	$21,000	5.0
Hot water systems management	1,100	$300	1	$250	0.8

Attachment C

Results of trial of organics bins in Council reserves

Four organics bins have been trialled at two Council sites since late 2019. The bins were trialled at the same time as compostable dog bags at the two sites. There trial involved two bins at Glenunga Hub and two bins at the dog park in Glenunga. The bins were standard 140 litre bins, the same size as household waste-to-landfill bins (but with green lids for organics). The bins were monitored for two periods:

- 14 weeks during 2019 and early 2020 when the bins were not modified.

- 8 weeks during 2020 when the bins were modified and the lids were locked (pictured). It was hoped that the modified bins would reduce contamination.

The monitoring of the bins included taking a photograph of the contents of each bin on a weekly basis. The photographs were then observed and obvious contamination was noted. This method does not capture all contamination in the bins but is sufficient to determine if contamination is a common problem.

Results

All sites were monitored on 22 occasions. On only one occasion were all the bins free of contamination. Most sites had obvious contamination most of the time:

Site	Occurrence of obvious contamination
Glenunga Hub north-east	82%
Glenunga Hub south-west	45%
Dog Park south-east	68%
Dog Park north-nest	50%

The most common contaminant was non-compostable dog waste bags, despite green compostable bags being supplied at both sites during the trial. Plastics and other non-compostable materials were also recorded as contaminants:

Item	Occurrence (percentage of bins in which item was observed)
Black dog waste bags (non-compostable)	48%
Plastics and non-compostables	35%

The second phase of the trial, with a modified bin, did see some reduction in contamination. The second phase was conducted almost two months after the introduction of compostable dog waste bags at the sites (and the removal of non-compostable bags). However, a substantial number of non-compostable dog waste bags were still being placed in the bins. There was a more substantial reduction in other contaminants.

Item	Regular bin	Modified bin
Black dog waste bags (non-compostable)	54%	38%

Plastics and non-compostables	50%	9%

Overall, the contamination levels in the bins continued to be too high for the materials to be collected for commercial composting (the contamination levels determined that the waste be sent to landfill). Commercial composting operations require very low levels of contamination in organic materials they receive.

Rather than continuing with this trial, Council is working with East Waste to procure several purpose-built bins that are designed to accept dog waste bags (but not other waste). Small versions of these bins have been trialled by other councils and were found to allow very low levels of contamination. East Waste is working with suppliers to develop dog-waste bin surrounds that will accept 240 litre bins that are suitable for East Waste trucks to empty (a prototype pictured). Delivery of several of these bins is expected during 2020. These bins will be installed at the Glenunga dog park and at other sites. The bins will be monitored to determine if they are effective in the City of Burnside.

Attachment D

Results of trial of recycling bins in Council reserves

Six recycling bins have been trialled at two Council sites since 2018. The trial involved two bins at Glenunga Hub and four bins at Hazelwood Park. The bins were monitored for two periods:

- 13 weeks during 2018/19 when the bins had standard bin lids (like other bins in parks)

- 12 weeks during 2020 when the bins had modified lids (pictured). It was hoped that the modified lids would reduce contamination.

The monitoring of the bins included taking a photograph of the contents of each bin on a weekly basis. The photographs were then observed and obvious contamination was noted. This method does not capture all contamination in the bins but is sufficient to determine if contamination is a common problem.

Results

All sites were monitored on 25 occasions and most sites had obvious contamination over 90% of the time (see table below).

Site	Occurrence of obvious contamination
Glenunga Hub, L'Estrange Street, north end	92%
Glenunga Hub, near playground	100%
Hazelwood Park, near poolside cafe	92%
Hazelwood Park, Davenport Terrace, near carpark	72%
Hazelwood Park, Davenport Terrace, near playground	96%
Hazelwood Park, Davenport Terrace, near service road	96%

The most common contaminant was disposable (plastic lined) coffee cups. These cups should be in waste bins unless they are compostable (compostable cups should go in organics bins). The plastic lids of coffee cups were not counted as a contaminant for the table above, but they are included for information in the table below. The lids typically belong in recycling bins (unless they are compostable and belong in organics bins). It is impossible to determine if a plastic lid is compostable without close inspection. The occurrence rates of various items are provided in the table below.

Item	Occurrence (percentage of bins in which item was observed)
Coffee cups (contaminant)	67%
Coffee cup lids (not typically a contaminant)	63%
Soft plastic (contaminant)	54%
Compostable items (contaminant)	50%
Other contamination	20%

The trial of different bin lids did reduce some types of contamination (see table below). However, contamination was still problematic. Consequently, the contents of the bins were sent to landfill. Contamination should be lowered to below 15 per cent (preferably much lower) before it is reasonable to request a recycling facility to process the materials. Interestingly, contamination by coffee cups increased after the bin lids were changed, likely

because the monitoring was conducted during 2020 (i.e. this result was not related to the lids of the bins). Anecdotally, the use of disposable coffee cups increased with COVID-19 because many shops have been less willing to fill re-useable cups. The increase in coffee cups in recycling bins is likely to reflect this increased use of disposable coffee cups.

Item	Regular bin lid	Modified bin lid
Coffee cups (contaminant)	50%	86%
Coffee cup lids (not typically a contaminant)	47%	79%
Soft plastic (contaminant)	72%	35%
Compostable items (contaminant)	58%	42%
Other contamination	22%	18%

Matters that should assist in reducing contamination are discussed below.

The State Government has introduced legislation to restrict and prohibit the manufacture, production, distribution, sale and supply of certain single-use and other plastic products. The 'Single-use and Other Plastic Products (Waste Avoidance) Bill 2020' currently bans:

- Single-use plastic straws, cutlery and drink stirrers; and
- Expanded polystyrene cups, bowls, plates and clamshell containers.

A reduction of polystyrene in general circulation will be beneficial in the park bin setting. The legislation presents new opportunities, too. Additional single-use plastic items can be added to the legislation. Based on the results presented here, the addition of disposable (plastic-lined) coffee cups would be highly beneficial. If plastic-lined single-use cups were banned, all disposable coffee cups would need to be compostable. Then, clear messaging around how to dispose of them (in organics bins) could be developed and it would be easier for the community to manage their waste appropriately. The current situation, with some disposable cups needing to be placed in landfill and others in organics bins, and the added complication of the lids being either recyclable or compostable, is far too complex. The addition of coffee cups (and their lids) to the Waste Avoidance Bill is something for which Council can advocate.

Soft plastics are another contaminant that can be reduced. Council can advocate to industry groups and other levels of government to take more action on soft plastic packaging. Any overall reduction in soft plastics is likely to flow through to reduce contamination in park and household recycling bins.

Further community waste education may also assist, but this education is perhaps best focused on households where the impact will also benefit household bin use. Current levels of contamination in household recycling bins are around 10%. This contamination adds to the cost of kerbside recycling. Working with East Waste, Council has plans to focus on contamination in household bins. This work is expected to commence later in 2020.

It is worth noting that there is a risk in maintaining recycling bins in parks when they are being emptied into landfill. The risk is that community will become disenfranchised with waste management if they are aware of this practice. It would be better to focus on initiatives that are likely to have positive outcomes for waste education and reduction of contamination, rather than diverting resources on this problematic project.

The results of this trial indicate that the community are not yet ready to use recycling bins in parks. While some improvements were evident through this trial, the issue of contamination was not resolved. There is no silver-bullet solution to the contamination issue in park recycling bins. A campaign to educate park users would likely be costly because there are many park users and they are clearly not focused on waste management. Funds would be better spent on initiatives with higher likelihoods of success and that will have greater environmental and financial returns.

Education and engagement focused on household bins is likely to have greater impact because it can be more targeted and because householders feel a sense of ownership over

their bins. Better waste management in homes is likely to flow through to waste management in parks. State Government is currently funding television advertising that will support the work of Council in this space. Additionally, improvements in household waste management generate savings for Council. Those savings could be used in the future, when the public should be more receptive, to address waste management in parks.

With this strategic approach, the logical steps are:

1. Remove the recycling bins from parks;
2. Advocate to State Government to add non-compostable coffee cups to the Waste Avoidance Bill;
3. Advocate to industry groups and other levels of government for a mandatory reduction in plastic packaging; and
4. Recycling bins in parks should be trialled again once contamination in household bins has been substantially reduced (e.g. to less than 2%).

Attachment E

Letter to State Ministers regarding waste (21 May 2020)

21 May 2020

The Honourable David Speirs
Minister for Sustainability, Environment and Conservation
GPO Box 1047
Adelaide SA 5000

SENT VIA EMAIL

Dear Minister Speirs

WASTE MANAGEMENT, DIVERSION AND ROLES / SUPPORT OF STATE GOVERNMENT

Following consideration of a Motion on Notice, Council, at its meeting of 12 May 2020 resolved.

C12542

That Council:

1. *Acknowledge that there are no current envisaged restrictions or changes to service delivery by East Waste.*

2. *Taking into consideration the large increases made by the State Government to the Solid Waste Levy in recent years, write to the Minister for Environment and Water and the Minister for Local Government to address the following:*

 2.1 *The extent to which funds generated from the Solid Waste Levy are being redirected to reduce waste production, increase waste diversion, provide education on appropriate waste management, and promote a circular economy in South Australia;*

 2.2 *Request that the State Government consider increasing the overall resources allocated to and the initiatives around reducing waste production, increasing waste diversion and promoting a circular economy in South Australia; and*

 2.3 *Request feedback on the role the State Government will play in supporting business continuity for waste collection services should a significant disruption, like the COVID-19 pandemic, reduce the available workforce, including all actions that are likely to be considered, e.g. changes to permitted bin collection frequencies.*

The purpose of this letter is to address Point 2 in the above. It would be appreciated if you could give consideration to this matter and ascertain the required information. We look forward to continuing our solid rapport to date and collaborative efforts towards best practice waste management and diversion from landfill.

Yours sincerely
Anne Monceaux
Mayor

cc   Minister for Local Government

Attachment F

WSUD systems installed across City of Burnside during 2019-20

Location	System	Number of units
Austral Avenue, Linden Park	B-Pod subsurface infiltration systems	2
Kennaway Street, Tusmore	B-Pod subsurface infiltration systems	2
Rayne Avenue, Linden Park	B-Pod subsurface infiltration systems	1
Taylor Terrace, Rosslyn Park	B-Pod subsurface infiltration systems	3
Austral Avenue, Linden Park	Kerbside tree inlet	24
Bolingbroke Grove, Toorak Gardens	Kerbside tree inlet	14
Hawke Street, Linden Park	Kerbside tree inlet	1
Kennaway Street, Tusmore	Kerbside tree inlet	12
Rayne Avenue, Linden Park	Kerbside tree inlet	3
Sturdee Street, Linden Park	Kerbside tree inlet	7
Taylor Terrace, Rosslyn Park	Kerbside tree inlet	17
Alexandra Avenue, Toorak Gardens	Permeable paving (footpath)	-
Conyngham Street Depot, Glenside	Permeable paving (car park)	-
Scott Street, Dulwich	Permeable paving (footpath)	-
Sturt Avenue, Toorak Gardens	Permeable paving (footpath)	-
Treacy Street, Tusmore	Permeable paving (footpath)	-
Constable Hyde Memorial Garden, Leabrook	Permeable paving (paths)	-
Queen Street, Glenunga	Permeable paving (footpath)	-
Conyngham Street Depot, Glenside	Rainwater tanks	2 x 3,000 litre tanks

Attachment G

Canopy Action Plan (February 2020 revision with current notes in green and italic font)

Objective	Action Item	Target	Dates	KPI	Detailed Progress / Actions (current notes in green)
Education	1.1	Urban Forest Interactive	Jun 2021	Update and maintain website to include contemporary information on trees and urban forestry research to provide a source of community information.	*A review of the Urban Forest Interactive website will be conducted once the new tree management software is embedded within Council. Waiting for the new tree management software may delay the completion of this work until later in 2021 but will ensure that the outcome minimises system maintenance requirements (i.e. if the two systems are well integrated then maintenance issues will be minimised).*
			Jun 2021	Develop a mobile online reporting functions to support community led Citizen Science projects that help support environmental education and awareness	*This item is complete – the Burnside Urban Foresters volunteers are using the BioCollect app for data collection and storage.*
	1.2	Tree Week	Dec 2021	New Initiative: Undertake an event to promote and celebrate trees within the City of Burnside	• Engage external consultant to develop event planning, event marketing & communication plan • Keynote speakers & consumables • Advertising & Promotion *This item is delayed pending allocation of funding through the Annual Business Plan and Budget process. In a related action, Council is participating in the inaugural South Australian Nature Festival (25 September – 4 October 2020), by conducting a tree walk in Hazelwood Park and a botanical walk at Michael Perry Reserve. Further information about the Nature Festival is available at:* https://www.naturefestival.org.au/
	1.3	Collaborate with local schools to enhance educational outcomes regarding the urban forest	Ongoing	Continue support of local school to raise awareness and importance of trees.	• Develop and maintain stakeholder engagement • Provide education and training as requested • Identify education opportunities *Council is actively developing resources for schools.*
			Dec 2020	New Initiative: Support National Tree Day and School Tree Day 2020.	• Provide tube stock to schools • Provide educational support • Conduct tree walk *Due to Covid-19 restrictions, scheduled National Tree Day events across the country were either cancelled or scaled back. Council, however, was able to partner with seven local schools for low-key events. Council provided 24 trees to eight local schools (three trees per school) for planting on National Tree Day on 31*

Objective	Action Item	Target	Dates	KPI	Detailed Progress / Actions (current notes in green)
					July. Links to lesson plan resources were also provided and the schools were asked to promote the Native Tree Giveaway Program to their communities.
	1.4	Promote the urban Forest	Ongoing	Continue with a marketing strategy to strategically promote the urban forest and engage community.	• Engage external consultant to marketing & communication plan *Council has increased its marketing of the urban forest significantly during the current calendar year, particularly on social media and in Council publications. Additional actions with respect to engaging consultants are delayed pending allocation of funding through the Annual Business Plan and Budget process.*
Protection	2.1	Continue to promote and educate internal and external stakeholders in regards to AS4970-2009 Protection of Trees on Development Sites	Ongoing	Continue to provide training program for internal departments including an online induction process	• Develop online training program in consultation with innovation and Technology department *Implementation of this item is ongoing and will be reviewed before future iterations of this Plan are released.*
	2.2	Continue the development of public educational material regarding tree protection during development	Jun 2020	Develop educational materials for public	• Develop education materials for public in partnership with marketing plan *This item is delayed pending allocation of funding through the Annual Business Plan and Budget process, and is subject to the development of the marketing plan.*
	2.3	Identify those trees to be included within the local development plan through an Audit of public trees, utilising existing data where possible	Dec 2019	Undertake Audit	• On hold pending outcome of changes to the Local Government Planning Reforms and Development Plans
			Jun 2020	Include trees identified in asset register	
	2.4	Apply Australian Standard 4970-2009 protection of trees on Development Sites	Ongoing	Continue to improve training and develop systems to apply standards to all projects	• Deliver internal training workshops with internal staff *Ongoing*

Objective	Action Item	Target	Dates	KPI	Detailed Progress / Actions (current notes in green)
		to all Council works and contractors working on Council land where these activities may affect tree viability			
	2.5	Advocacy	Dec 2021	Advocate state government to increase protection of tree to achieve Target 5 30-year Plan for greater Adelaide	• Engage with LGAs • Educate community • Lobby state government *This item is being addressed through regional partnerships (e.g. Resilient East has a Canopy Working Group who have made submissions to State Government regarding canopy cover) and through support of Water Sensitive SA.*
Planning	**3.1**	Draft Tree Planting Master Plan based on ERA Heat Mapping and verge impact study	June 2020	Draft Tree Planting Master Plan	• Engage external professional services to deliver plan *This item has been delayed due to additional priorities identified through the internal audit of Council's Tree management program. The Tree Planting Master Plan will now be delivered during 2021.*
Planning	**3.2**	Revise the Urban Tree Strategy 2014-2024	June 2020	Commence the review and revision of the strategy	• Engage key stakeholders and external professional services to help draft plan, including historical and benchmark review *The Urban Tree Strategy is still in the process of being reviewed. It is anticipated that a formal strategy may not be required in the future because all functions of the strategy can be fulfilled through three other sets of documents.* *First, the recently-endorsed Strategic Plan and the Environmental Sustainability Strategy both provide the necessary strategic focus in this area. The Strategic Plan includes a priority for canopy cover and a priority for healthy habitats. These priorities are echoed in the Environmental Sustainability Strategy.* *Second, the Canopy Action Plan has ongoing relevance and fits within Council's strategic framework under the Environmental Sustainability Strategy. This plan will be a key document in delivering on the canopy priorities of the two aforementioned strategies.* *Third, there is a need to review the technical guidelines for urban tree management during 2020/21. The existing Urban Tree Strategy does include some technical matters that would fit more comfortably within these technical guidelines, rather than a strategic document.*

Objective	Action Item	Target	Dates	KPI	Detailed Progress / Actions (current notes in green)
					Therefore, all the content of the current Urban Tree Strategy (revised) will be maintained along with the strategic framework that will maintain a focus on canopy and habitat.
	3.3	Tree Planting	Ongoing		• Continue planting a minimum of 1,000 new trees throughout the City's verges, reserves and Hills Face and report progress to Council annually *The 2020 planting season saw a total of 1,573 trees planted on Council land.*
Monitoring	4.1	Extend assessment of historical land cover to include entire Council area (over and above what was included in the 2010-2015 assessment)	May 2020	Present findings to Council	• Review and provide report to Council detailing findings of canopy cover assessment *This item has now been superseded by the collaborative LiDAR canopy assessment project, explained in Attachments H and I. Future Canopy Action Plans will be updated to reflect the new measuring tool.*
	4.2	Undertake assessment of canopy change at 5 year intervals. Next review due 2020	Feb 2021	Present findings to Council	• Engage external professional services to undertake I-tree canopy cover assessment *This item has been superseded by the collaborative LiDAR canopy assessment project, explained in Attachments H and I. Future Canopy Action Plans will be updated to reflect the new measuring tool.*

Attachment H

LiDAR-based assessment of canopy coverage across the City of Burnside

Background

The urban forest that exists in the City of Burnside makes a substantial contribution to the character and identity of the area. There is a vast body of research to support the benefits of trees in urban areas. These benefits include urban cooling, interception of stormwater, cleaning of air, provision of habitat for wildlife, and supporting the wellbeing of the community. Management of the urban forest requires that Council understands the extent of the urban forest and how it is changing over time.

Quantifying and monitoring the urban forest can be done in several ways. For example, we can quantify the number of trees in parks and along streets. However, that approach typically neglects trees on private land and does not quantify the size or coverage of the trees. The use of remote sensing technologies provides additional opportunities. Remote sensing is often used to detect and classify objects or landscapes, using cameras or sensors mounted on satellites or aeroplanes. Remote sensing enables large areas of urban forest to be studied without requiring the resources to measure every tree from the ground. Remote sensing can also gather information on buildings and other urban features.

LiDAR is one type of remote sensing. The term 'LiDAR' originated as a blend of two words, 'light' and 'radar', but is commonly now used as an acronym for **Li**ght **D**etection **a**nd **R**anging. The technology involves sending light signals from a rapidly-firing laser in a LiDAR unit. The LiDAR unit then measures the timing and intensity of the reflection as the signals return to the unit. If the LiDAR unit is mounted in an aeroplane, the heights of the land, trees and buildings below can then be calculated, and a three-dimensional model of the landscape can be constructed. These models can be used for assessments of canopy coverage.

Both local and state governments have interests in urban canopy coverage. Local government has a clear interest in the management of urban trees for amenity and other benefits to the community. The state government shares these concerns and has declared its interest within the 30-Year Plan for Greater Adelaide. The 2017 update to the Plan includes a target to increase urban green cover in metropolitan Adelaide by 20% by 2045. More specifically, the update includes two measures to help achieve the target (p.150):

- For council areas with less than 30% tree canopy cover currently, cover should be increased by 20% by 2045
- For council areas with more than 30% tree canopy cover currently, this should be maintained to ensure no net loss by 2045

The Plan also calls for a consistent approach to monitoring across the Adelaide metropolitan area, making a collaborative canopy assessment project ideal.

The project: tree canopy coverage across Metropolitan Adelaide

This tree canopy assessment was conducted as a partnership with 16 participating councils, the Department for Infrastructure and Transport (DIT; formally DPTI), and the Department of Environment and Water (DEW). Most of metropolitan Adelaide was covered, including the entire area of the City of Burnside and the Resilient East region. Councils have been working in regional groups and across metropolitan Adelaide to interpret and discuss the results of the project, ensuring that reporting is consistent and comparable, with support from project consultants, Aerometrex. The partnership model, with councils and state government, also minimised cost to Council. The total project cost to Council was in the vicinity of $1,500.

Several datasets have been derived from the LiDAR modelling and provided to participating councils by Aerometrex. These datasets have been useful in canopy coverage assessments

and will be used in future projects. The datasets include: canopy coverage and height, canopy coverage by land types, plus elevation, contours and building footprints.

Detailed LiDAR analysis was completed within Adelaide, Burnside, Campbelltown, Holdfast Bay, Marion, Mitcham, Norwood Payneham & St Peters, Onkaparinga, Port Adelaide Enfield, Prospect, Salisbury, Tea Tree Gully, Unley and Walkerville LGAs. Analysis was also completed within the built areas (only) of Gawler and Playford LGAs. The study area also encompassed West Torrens and Charles Sturt. However, other than summaries of city-wide tree canopy to enable benchmarking and LGA comparisons, no detailed LiDAR analysis was performed in these LGAs as part of this Aerometrex analysis. Both Councils have conducted their own separate inhouse analyses

The next phase of this project is a release of the LiDAR canopy data through the state government data portal. This release will be through the portal that was set up to share heat mapping data during 2019 (https://www.resilienteast.com/heat-map-viewer). This release is currently planned for September 28.

The LiDAR data collection for this project was conducted on two separate occasions. The first flyover was during June 2018 and the second during October 2019. The two flyovers were necessary to capture the full project area. Most of the urban area in the City of Burnside was captured during the first date, with hills face areas captured during the second flyover. It is reasonable to combine the two datasets as the change in canopy of the hills face area would have been minimal in the period between flyovers. Assessments of changes in urban canopy coverage typically require a longer time interval, such as five years, to enable meaningful analyses. Reassessment of the metropolitan Adelaide region is being considered and is likely to be scheduled at 5-year intervals to monitor change in canopy coverage over time and inform decision making (pending support from project partners).

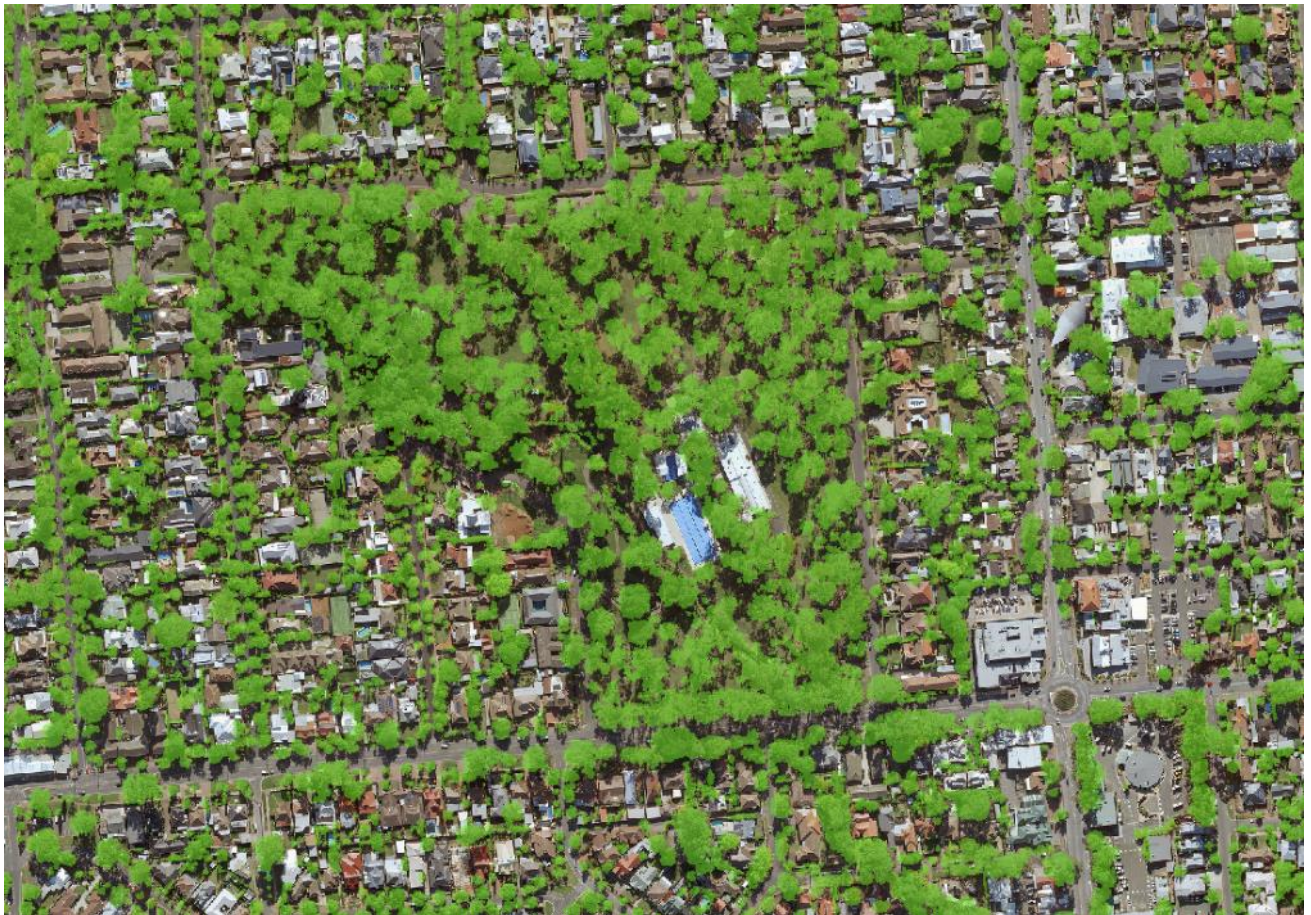### *Interpretation of LiDAR-based canopy cover assessments*

LiDAR-based assessments can provide useful insight into the extent of canopy coverage, but there are limitations to the data provided by this project. The present analysis has assessed canopy by categories of land, based on land use and land ownership. For example, results are provided for canopy on streets and canopy on private land. It is important to note that these classifications do not indicate where the trunks of the trees are located. For example, some canopy that is attributed to private land would be produced by street trees, and vice-versa.

LiDAR-based assessments can guide decision making regarding tree planting. Areas that are identified as being canopy-free may be targeted for tree planting. For example, it may be possible to determine where the greatest opportunities for tree planting exist, on private or public land. However, it must be noted that those areas may include built infrastructure, shrubbery or grassed areas that are also important land uses for various purposes. Therefore, more detailed analyses may be required to ascertain where trees can be planted to increase canopy coverage.

Further information about LiDAR-based canopy cover assessments is provided as Attachment I, including a discussion about comparing this style of assessment to other methods of canopy assessment.

Results and discussion

The LiDAR-based assessment found that canopy cover across the City of Burnside is 37.7%. This assessment includes only canopy that is classified as being greater than 3 metres in height. The three-metre threshold is used because it is reasonable way to separate tree canopy from shrubs. Figure 1 demonstrates the canopy model.

Figure 1. Demonstration of LiDAR-derived canopy coverage model
(George Bolton Swimming Centre, Hazelwood Park and surrounding suburbs;
canopy = vegetation >3 metres)

The LiDAR-based assessment found that canopy cover across the metropolitan study area was 23.4%. The percentage of canopy cover in the City of Burnside well exceeds the canopy across the metropolitan area and exceeds the canopy coverage in all other councils in metropolitan Adelaide, except the City of Mitcham.

Figure 2 depicts the canopy coverage in the City of Burnside by land category. The land categories are private land, streets and other public land. Most canopy is over privately-owned land. Private land also accounts for most of the land with no canopy. The assessment of canopy coverage is also depicted by area and land category (Figure 3), and area and land sub-category (Figure 4).

Figures 3 and 4 display the canopy cover assessment results in categories that can be used to understand where tree planting efforts can be focussed. Figure 3 depicts three broad land categories: Private land, Streets, and Other public land. Private land represents the largest area at over 18.5 km^2, of which 67% (~12.5 km^2) is non-canopy. Streets and other public land represent less than 5km^2 each.
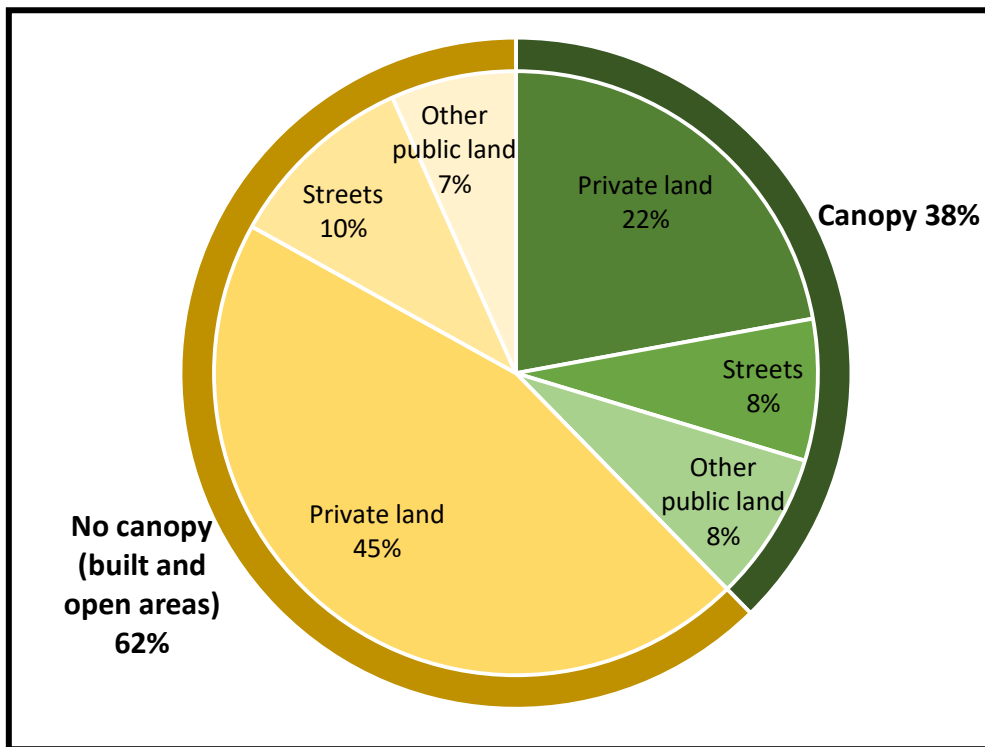
Figure 2. Canopy coverage in the City of Burnside by land category
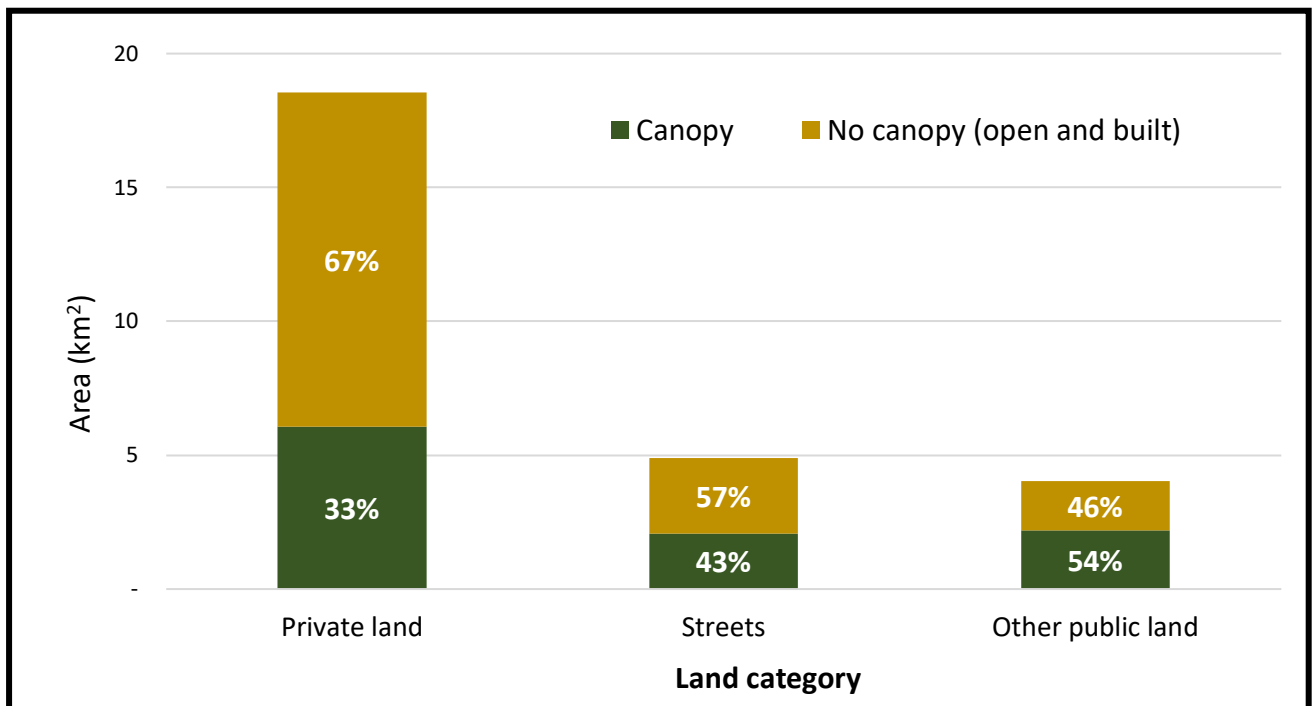*(canopy = vegetation >3 metres)*

Figure 3. Canopy coverage in the city of Burnside by area and land category
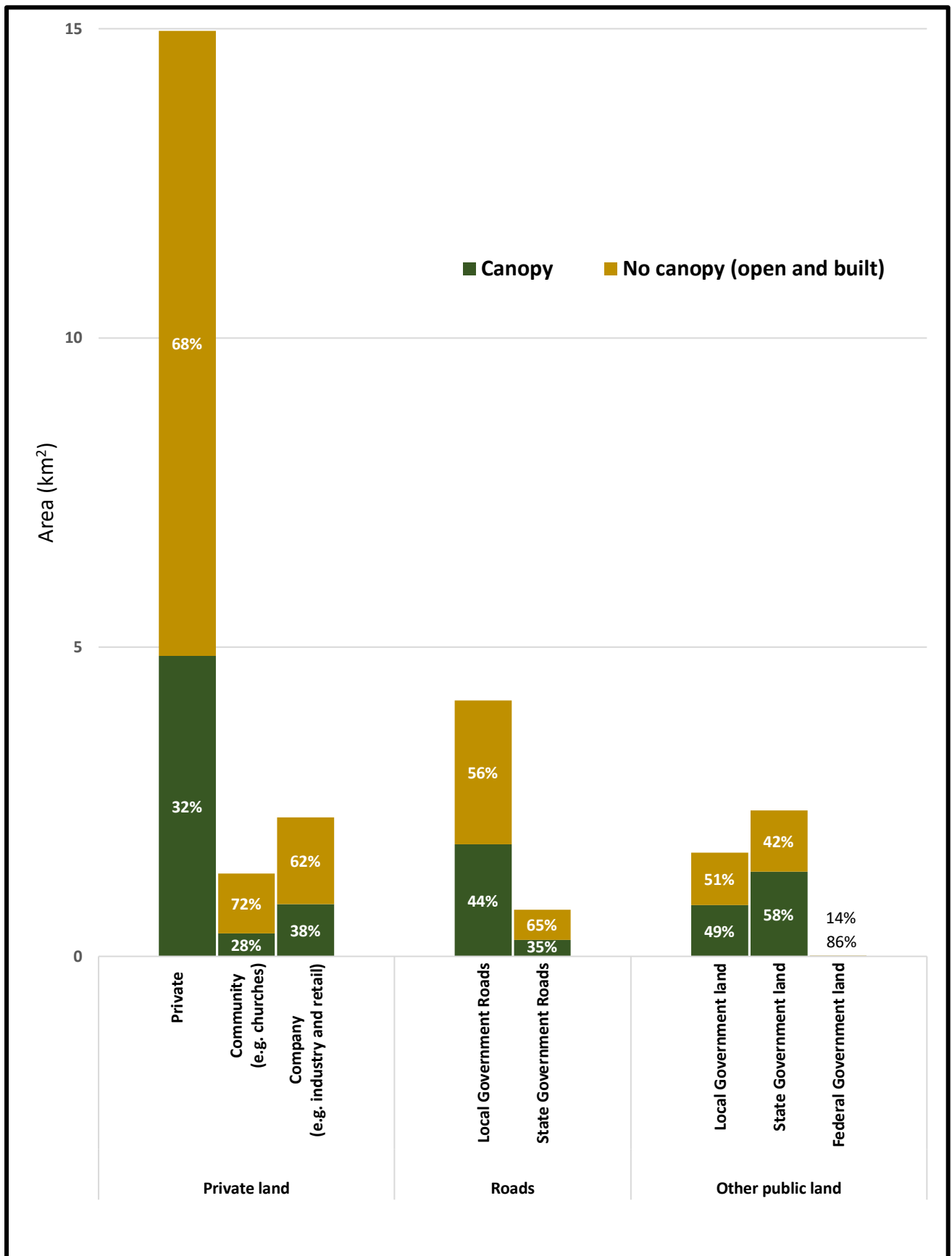*(canopy = vegetation >3 metres)*

Figure 4 Canopy coverage in the City of Burnside by area and land sub-category
(canopy = vegetation >3 metres)

Private land

Figure 4 is more detailed than the previous figure and includes subcategories of each land category. Within the Private land category, the subcategory of private land is separated from land that is privately owned by community organisations (e.g. churches or non-government organisations) or companies (e.g. retail or industrial land). The subcategory of private land alone covers almost 15 km^2, of which 68% (~10 km^2) is non-canopy. This area represents the greatest opportunity for increasing canopy coverage within the City of Burnside. While other private land subcategories also have high proportions of non-canopy, they cover far less area, and are therefore less attractive targets for increasing canopy coverage.

The development of built infrastructure, both more houses and larger house footprints, has been recognised as a driver of a reduction of canopy coverage on private land in the City of Burnside. The Council has recognised the potential of tree planting on private land as is actively encouraging increased canopy coverage. One initiative is a Native Tree Giveaway that is being trialled during 2020. The LiDAR canopy assessment project may make it possible to target this initiative more directly to private land with space for trees – further details are provided below in the "Additional Opportunity" section.

Roads

In Figure 4, the Roads category has been separated into two subcategories: Local Government roads and State Government roads, with 56% and 65% of non-canopy area respectively. There is some opportunity for increased canopy coverage in these areas, but it is limited. Local Government roads have over 2 km^2 of non-canopy space, while State Government roads have less than half a square kilometre. Tree planting along both Local and State Government roads is managed by the Council. While the proportion of non-canopy may seem high, there are conditions along roads that limit canopy coverage and may make it difficult to exceed 50% canopy coverage in these areas. For example, the road surfaces and use of the roads limit planting space. Planting space is also limited by the volume of soil within road reserves (verges), underground services, footpaths and crossovers. Overhead powerlines also limit the sizes of trees that can be planted along roads. There is an existing tree planting program for roads that will increase canopy coverage over time.

Other Government Land

In Figure 4, the Other Government land category has been separated into three subcategories, with one for each level of government: Local, State and Federal. Federal Government land is only 500 m^2 and has 86% canopy coverage, making it irrelevant as an opportunity for increasing canopy coverage. There may be opportunities for increasing canopy coverage on Local and State Government lands, with 51% and 42% non-canopy, respectively. However, these areas are largely reserves. Some of the State Government land represents school properties, with non-canopy area consumed by necessary buildings and ovals. Local Government land that is not covered by tree canopy also has many uses that reduce the opportunity for increased canopy coverage, such as ovals and open recreation space. However, there are opportunities for some increases of canopy coverage in some Council reserves and these should be explored. These opportunities are relatively small when compared to the opportunity for increased canopy coverage on private land, where most effort should be directed.

Variation in canopy coverage among suburbs

There is variation in the canopy coverage across the City of Burnside. Figure 5 depicts an assessment of canopy coverage based on 100 x 100 metre grid cells. The colours used in Figure 5 range from red, which represents low canopy coverage, to green which represents very high canopy coverage. A clear pattern is evident, with lower levels of canopy coverage in the west of the Council and higher levels of canopy coverage towards the foothills in the east and along the creeklines.
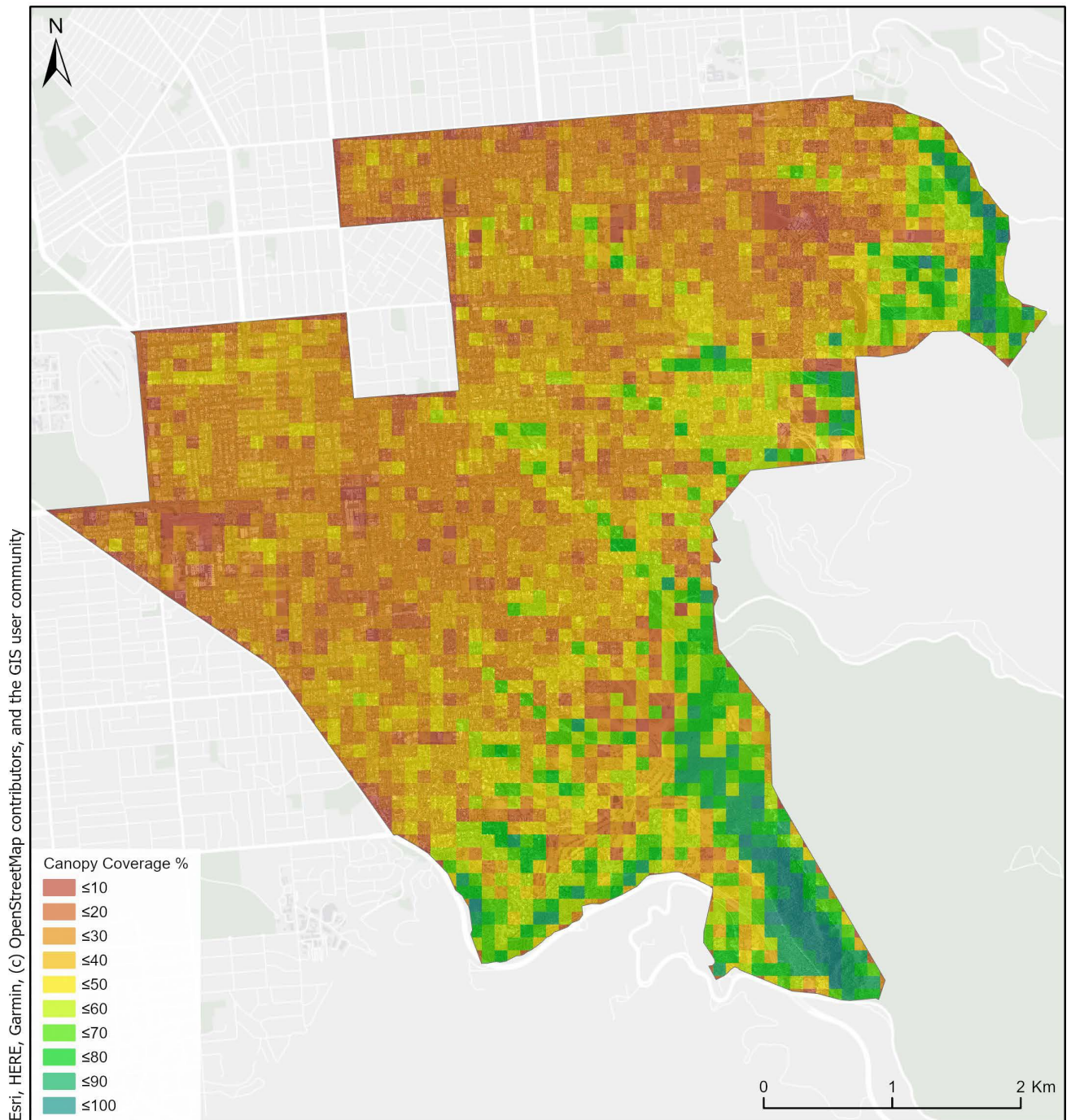
Figure 4. Grid-based assessment of canopy coverage
(canopy = vegetation >3 metres; grid cells 100 x 100 metres)

An assessment of canopy coverage per suburb has also been conducted. This assessment was conduced across most of metropolitan Adelaide, and the suburbs were assessed without division of Council boundaries. Therefore, for three suburbs, the assessments are not wholly based on areas within the City of Burnside. However, there is not likely to be a substantial change in the results if only the suburb areas within the City of Burnside were assessed.

The results of the suburb-based assessment (Table 1) are in line with the grid-based results presented above. Suburbs to the west have lower canopy coverage and suburbs to the east have higher canopy coverage. These results can be used to target areas in need of additional canopy coverage, in conjunction with an assessment of space that is available for canopy coverage.

*Table 1. Canopy coverage assessment by suburb in the City of Burnside
(canopy = vegetation >3 metres; an asterisk denotes suburbs that are not wholly within the
City of Burnside and where the assessment includes the entirety of the suburb (i.e. including
areas outside of Burnside))*

Suburb	Canopy cover (%)
Waterfall Gully	71.9%
Skye	60.6%
Cleland*	59.3%
Leawood Gardens*	50.3%
Mount Osmond	49.9%
Stonyfell	48.3%
Burnside	40.4%
Glen Osmond	37.5%
Wattle Park	36.2%
Beaumont	34.9%
Hazelwood Park	34.3%
Auldana	30.9%
Leabrook	30.8%
Toorak Gardens	30.8%
St Georges	29.8%
Kensington Gardens	29.6%
Erindale	29.0%
Tusmore	28.5%
Rose Park	28.4%
Glenunga	28.3%
Kensington Park	28.0%
Dulwich	27.3%
Linden Park	25.6%
Frewville	25.0%
Beulah Park	23.3%
Magill*	22.5%
Glenside	22.2%
Rosslyn Park	21.5%
Eastwood	20.1%

Canopy coverage targets

The City of Burnside has already adopted tree planting initiatives to make a positive contribution to canopy cover. There is a priority within the Council's Environmental Sustainability Strategy 2019-2023 to, "Conserve and enhance canopy cover, including promotion and protection of trees on private land." The results of this project will help inform actions to support this priority.

State Government targets can also be considered. It is possible to interpret the canopy coverage targets in the 30-Year Plan for Greater Adelaide in two ways. The first interpretation involves a council-wide goal. The Plan states that council areas with greater than 30% tree canopy coverage should ensure no net loss by 2045. Considering the results of this project, with the City of Burnside having 37.7% canopy coverage, the Council could aim to maintain this condition if it seeks to meet this state government target.

There is a second way to interpret the canopy coverage targets in the 30-Year Plan. The Plan states that council areas with less than 30% tree canopy cover should increase this proportion by 20% by 2045. If the term 'council areas' is applied to areas within the council, rather than the council as a whole, then there are 13 suburbs that would require 20% increases in canopy coverage. Two suburbs that are above 29% have not been included as they reach 30% if rounded to the nearest whole number. If this target were to be sought, targets for canopy coverage in relevant suburbs are presented in Table 2.

Table 2. Potential canopy coverage targets by suburb in the City of Burnside (canopy = vegetation >3 metres; only suburbs with <30% canopy coverage are included; an asterisk denotes suburbs that are not wholly within the City of Burnside and where the assessment includes the entirety of the suburb (i.e. including areas outside of Burnside))

Suburb	Existing canopy cover (2018-19)	20% of existing canopy cover	Potential target for canopy cover by 2045
Erindale	29.0%	5.8%	34.8%
Tusmore	28.5%	5.7%	34.2%
Rose Park	28.4%	5.7%	34.1%
Glenunga	28.3%	5.7%	34.0%
Kensington Park	28.0%	5.6%	33.6%
Dulwich	27.3%	5.5%	32.8%
Linden Park	25.6%	5.1%	30.7%
Frewville	25.0%	5.0%	30.0%
Beulah Park	23.3%	4.7%	28.0%
Magill*	22.5%	4.5%	27.0%
Glenside	22.2%	4.4%	26.6%
Rosslyn Park	21.5%	4.3%	25.8%
Eastwood	20.1%	4.0%	24.1%

Canopy stratification

Another data output from this project will be useful in monitoring the urban forest over time. The LiDAR-based approach can assess the height of the canopy coverage across the council. The canopy has been stratified into eight height intervals (Figure 6). While the majority of trees are below 10 metres, it is important to maintain tree canopy of taller trees. Taller trees provide important habitat as they provide vantage points for birds and nesting hollows for a range of birds and mammals. Large trees also make important contributions to the identity and character of the City of Burnside. These trees are iconic and provide landmarks around the council.
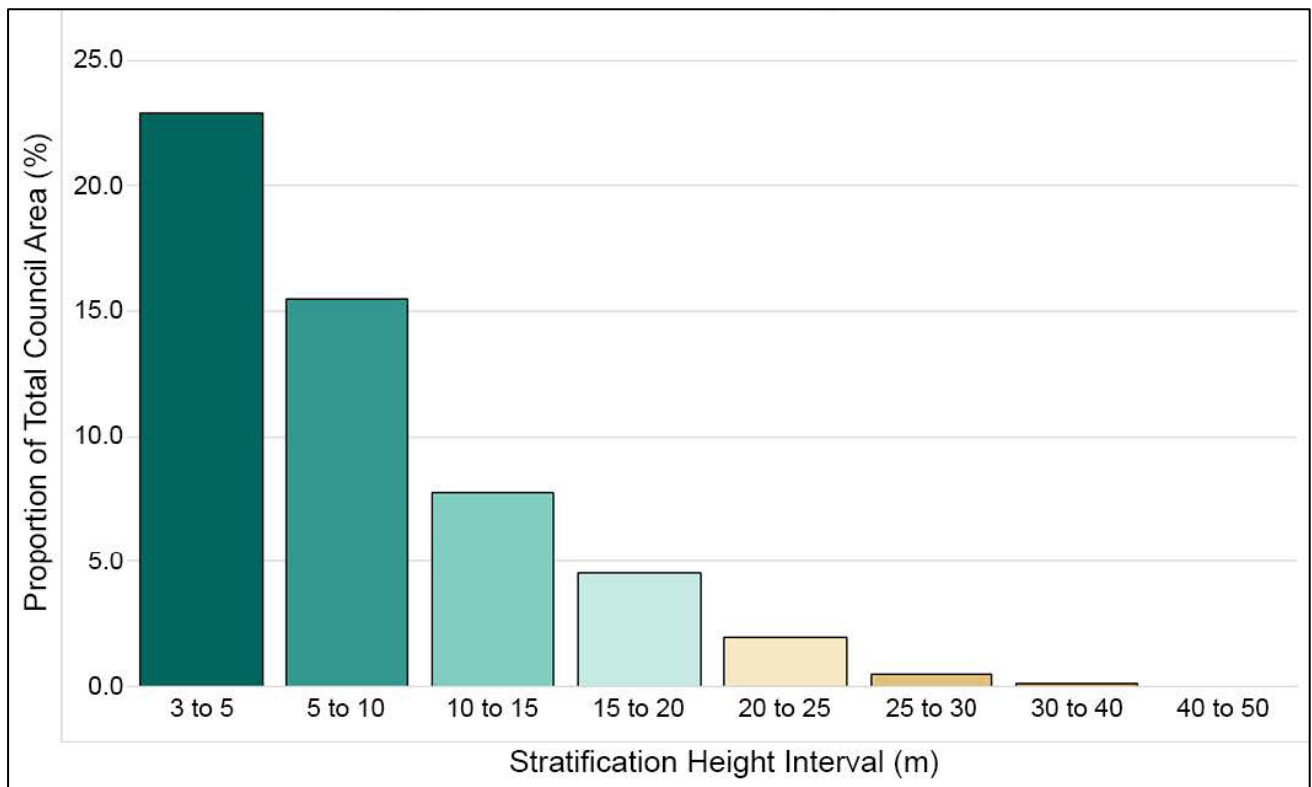
Figure 6. Canopy stratification across the City of Burnside
(canopy = vegetation >3 metres)

Additional opportunity: identification of tree planting opportunities on private land

The LiDAR data presents some additional opportunities that are currently being explored. The analysis has demonstrated the importance of private land for increasing canopy coverage. Council has some initiatives in place, such as a Native Tree Giveaway to promote tree planting on private land.

Anecdotally, not all residents receive council messages or make time to act on the messages they receive. More targeting may increase rates of tree planting on private land through the Native Tree Giveaway initiative. To make this work cost-effective, Council could target houses that have the space to plant trees.

A trial analysis has been conducted to determine if the LiDAR-derived data can assist in targeting households for tree planting initiatives. For this analysis, building footprint data has been combined with the canopy coverage data. Using Hazelwood Park as a test area, private properties with greater than 400 m^2 of available space have been identified. The threshold of 400 m^2 is arbitrary and was based on a cursory visual inspection.

Figure 7 depicts a few blocks within Hazelwood Park that were part of the trial analysis. Over twenty properties are depicted, with one identified as "tree-ready" through this process. Further work is needed to refine this process and apply it to suburbs with higher densities of houses.

Figure 7a. An example output from a trial analysis of Hazelwood Park to identify houses with space to plant additional trees
(areas shaded in red are building footprints and tree canopy >3 metres; a blue outline indicates a property that has been identified as having space for tree planting; the threshold for this trial analysis was house blocks with >400 m² open space)

Conclusion

The LiDAR-based assessment of canopy coverage across the City of Burnside has found relatively high levels of canopy coverage (37.7%) when compared to canopy coverage across metropolitan Adelaide (23.4%). The greatest opportunity to increase canopy coverage is on private land, which is 18.5 km², of which 67% (~12.5 km²) is non-canopy. This assessment has also identified a strong pattern of lower canopy coverage towards the west and higher canopy coverage towards the east and along creeklines within the Council area. While many of the suburbs within the City of Burnside have greater than 30% canopy coverage, a key state government target, there are 13 suburbs that do not meet that threshold. Innovative analyses can be used to identify properties with space to plant new trees which can support initiatives to increase canopy coverage. Reassessment of the metropolitan Adelaide region is being considered and is likely to be scheduled at 5-year intervals to monitor change in canopy coverage over time and inform decision making.

Additional resources

- An introduction to LiDAR is at: https://www.neonscience.org/lidar-basics
- The 30-Year Plan for Greater Adelaide is at: https://livingadelaide.sa.gov.au/

Attachment I:

Comparison of LiDAR-based and i-Tree canopy coverage assessments

It is not possible to directly compare the canopy assessment presented in this report with canopy assessments that have used different methodologies. For example, the City of Burnside has previously engaged consultants to conduct i-Tree canopy assessments. The two methods of canopy assessments (i-Tree and LiDAR) calculate the coverage of trees in very different ways, so comparing the results is like comparing apples and oranges.

i-Tree assessments rely on a visual inspection of randomly-selected points on aerial photography. The points are inspected and categorised (e.g. categories include tree, building, road, and grass). The percentage of points in an area that are classified as tree cover is then extrapolated across the area being assessed. For example, if 25% of the points in a suburb are classified as tree canopy, then the suburb is considered to have 25% canopy coverage. There is likely to be some variation in i-Tree assessments for several reasons. One cause of variation would be if the selected points are not representative of the entire suburb. A second cause of variation would be error in manual classifications. For example, because there is no way to accurately assess the height of vegetation on an aerial photograph, it is not possible to be entirely consistent in the classification of tree and shrubs.

The LiDAR data collection and post-processing techniques are robust, but it is not a perfect system. LiDAR analyses do not rely on extrapolation, but measures all vegetation to calculate canopy coverage. However, there is a small systematic overestimation of canopy coverage within the procedure. The analysis of canopy is conducted on grid cells that are each one square metre in size. Each cell includes numerous data points (e.g. eight data points are gathered per square metre). Any cell with a point of vegetation over three metres within it is counted as canopy (i.e. the entire square metre is considered canopy), even if some of that cell is vegetation under three metres or is not vegetation. Thus, an overestimation of canopy coverage occurs. This overestimation is likely to be reasonably consistent. Thus, any ranking of areas assessed is likely to be reasonably accurate. Further, any future analysis of change over time is likely to be reasonably accurate, and certainly of sufficient quality to inform decision making.

Temporal considerations are also important. LiDAR and i-Tree assessments have been conducted with data from different years. Canopy coverage may have changed between the different types of assessments and that change may not have been uniform. However, general trends are consistent across these two assessments. For example, the eastern side of the Council has higher canopy coverage than the western side, and the two suburbs with the highest canopy coverage are Waterfall Gully and Skye.

Both i-Tree and LiDAR based assessments can provide valuable information that can inform decision-making. The consistency of LiDAR-based canopy assessments and the collaboration across metropolitan Adelaide favour this approach for ongoing monitoring.