

City of Canada Bay Electric Vehicle Strategy and Action Plan 2023

Adopted by City of Canada
Bay Council on 20 June 2023



Acknowledgements

We acknowledge the land now called the City of Canada Bay is the traditional home of the Wangal people of the Eora nation. We recognise their stewardship of this place. We acknowledge the vital contribution that indigenous people and cultures have made and still make to the nation that we share.

The ARUP logo is displayed in a bold, red, serif typeface.

City of Canada Bay Council acknowledges the support and expertise of Arup in preparing this Strategy and Action Plan.

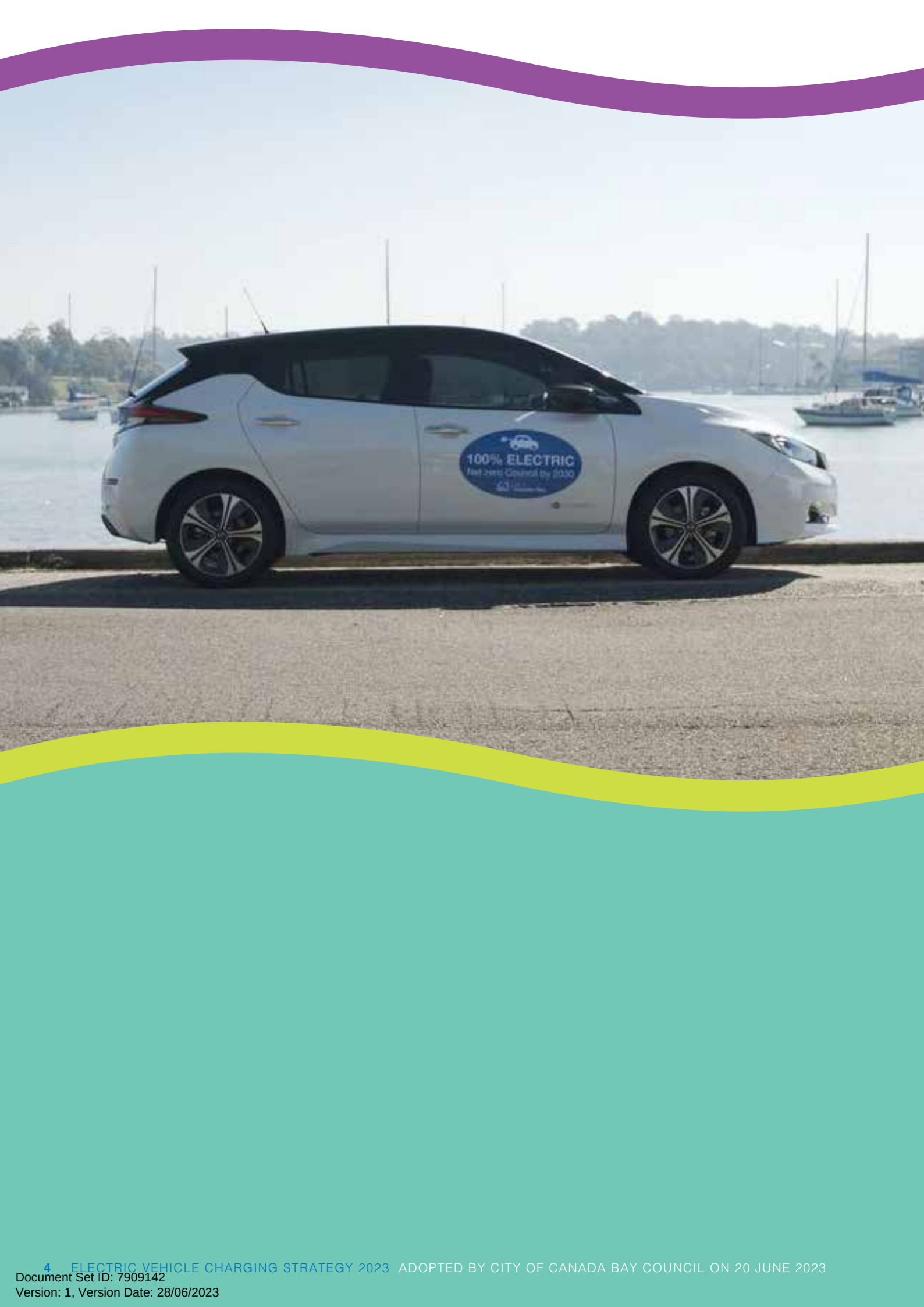


Southern Sydney Regional Organisation of Councils (SSROC)
City of Canada Bay Council acknowledges the learning shared by SSROC members in preparing this Strategy and Action Plan.

Research and information presented in the City of Canada Bay Electric Vehicle Strategy and Action Plan was completed between May 2022 – July 2022. As the EV market and policy settings are constantly changing, this Action Plan may not include all recent policy changes and market developments.

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I. Executive summary

This Electric Vehicle (EV) Strategy and Action Plan articulates Council's role in supporting City of Canada Bay's residents, organisations, and businesses to transition to EVs in a timely and effective way.

Our key design principles for this Strategy and Action Plan are:

- Increase transport resilience, by reducing emissions to reach net zero by 2050, implementing the transport hierarchy, and reducing reliance on imported liquid fuels.
- Collaborate for integrated transport solutions. Collaborate with other councils to deliver a regionally integrated transition. Support NSW and Australian Government to implement policies and initiatives in ways that work for our local context and community.
- Protect and enhance our neighbourhoods. Adopt a place-based approach to EV network design. Protect local neighbourhoods, public spaces and ensure public space is used fairly and equitably. Facilitate and regulate installation of EV charging in the public and private realm.
- Support the local community to navigate the transition. Deliver an education and awareness campaign. Customer at the centre.

Many major countries and global vehicle manufacturers have committed to switch to zero emission vehicles. In 2021, nearly 10% of global car sales were electric¹. This annual figure is increasing exponentially. Transition to EVs has potential to dramatically cut the carbon emissions and local air pollution caused by petrol and diesel vehicles, especially if recharged with renewable electricity. Filling up a car with electricity is also much cheaper than increasingly costly petrol and diesel and reduces the

international supply chain risks of imported liquid fuel. EV users could save up to \$1,800 per annum on vehicle ownership costs by 2030, while saving 10c per kilometre on fuel/energy costs², with further financial benefits of charging an EV completely off-grid with renewables.

Transition to EVs is an important action towards achieving Council's greenhouse gas (GHG) emissions reduction targets of net zero from Council operations by 2030 and from the community by 2050. Transition to EVs is also an action in Council's *Local Movement Strategy, Environment Strategy and Emissions Reduction Action Plan*. In the City of Canada Bay, almost 800,000 tonnes of greenhouse gasses (CO₂-e) are emitted each year of which one quarter are from transport. 65% of trips from the City of Canada Bay and 72% of trips to the City of Canada Bay involve a private vehicle or rideshare.

Our local road network is already congested along major corridors in peak periods and more car-based travel is not a desirable outcome. Council will encourage decarbonisation of the transport sector, based on the transport hierarchy which promotes the right mode for each trip purpose with people first, then bikes, then public transport, service vehicles, shared mobility (such as taxis and carshare) then finally private vehicles. As our city grows, we also need better infrastructure for walking, cycling and public transport to reduce congestion, reduces carbon emissions and pollution and makes our neighbourhoods healthier and more liveable. Planning places that serve local areas reduces the need to travel long distances.

Decarbonising the entire transport sector is a huge global project. City of Canada Bay's transition is largely dependent on broader influences and interest by the Australian and State governments, vehicle manufacturers and the market itself. Leading the transition to a zero-emissions transport future sits squarely with the NSW and Australian Governments and the private sector. The NSW Government has committed to making NSW the easiest place in the country to purchase and use an EV, investing in programs to encourage the private sector to install convenient, fast charging infrastructure and increase the range of affordable EV models in the market.

¹ Global EV Outlook 2022, International Energy Agency, Paris

² The Electric Vehicle Council estimate that the average Australia drives 15,000km per year, equating to a cost of 14c/km for ICE vehicles and 4c/km for EVs

In February 2023, NSW Government amended the *NSW State Environmental Planning Policy Transport and Infrastructure* (TISEPP) specifying the planning process for electric vehicle charging units to be installed on public land. With planning consent, residents can install their own EV charger in the public footpath. The main effect of the change is to allow public authorities to install electric vehicle charging units without the need to submit a development application in a broad range of situations. Public authorities, (and in some cases electricity supply authorities) do not need council planning consent to install EV charging units in the public footpath where next to a parking space, on electricity lighting poles, existing street furniture and on certain private premises (i.e. car parks, public administration buildings and service stations).

This EV Strategy and Action Plan establishes a place-based approach to siting EV charging infrastructure in City of Canada Bay. Anyone seeking to install EV charging infrastructure on Council property (land, buildings or assets such as street furniture) must consult Council about the site suitability, parking, leasing/licensing requirements.

The Electric Vehicle Strategy and Action Plan investigates the following:

Chapter 2

Design principles for the Strategy and Action Plan

Discussion of the role of local government in facilitating the transition to EVs, identifying key opportunities for the desired EV charging network and policy levers.

Chapter 3

Market analysis

Overview of the local, regional, national and international EV market, including environmental benefits, potential EV ownership, charging behaviour and statutory planning best practice.

Chapter 4

Current EV profile in City of Canada Bay

Current context of the area, exploring the characteristics and opportunities of existing transport patterns, emissions, electricity network and charging network.

Chapter 5

Desired charging network

Outline of the charging requirements and minimum standards for different urban areas in Canada Bay, with an appreciation of potential grid impacts and supporting initiatives.

Chapter 6

Action Plan

Council's priority actions to advocate for, act on and research EV charging options in the City of Canada Bay.

Council will facilitate and guide the private sector, NSW Government and residents to install local EV charging infrastructure that meets our community needs and suits the character of local neighbourhoods. We will also regulate public places and ensure safe access, management and equitable use. Rate payers should not be left with the cost of the infrastructure transition.

This Strategy and Action Plan has been informed by:

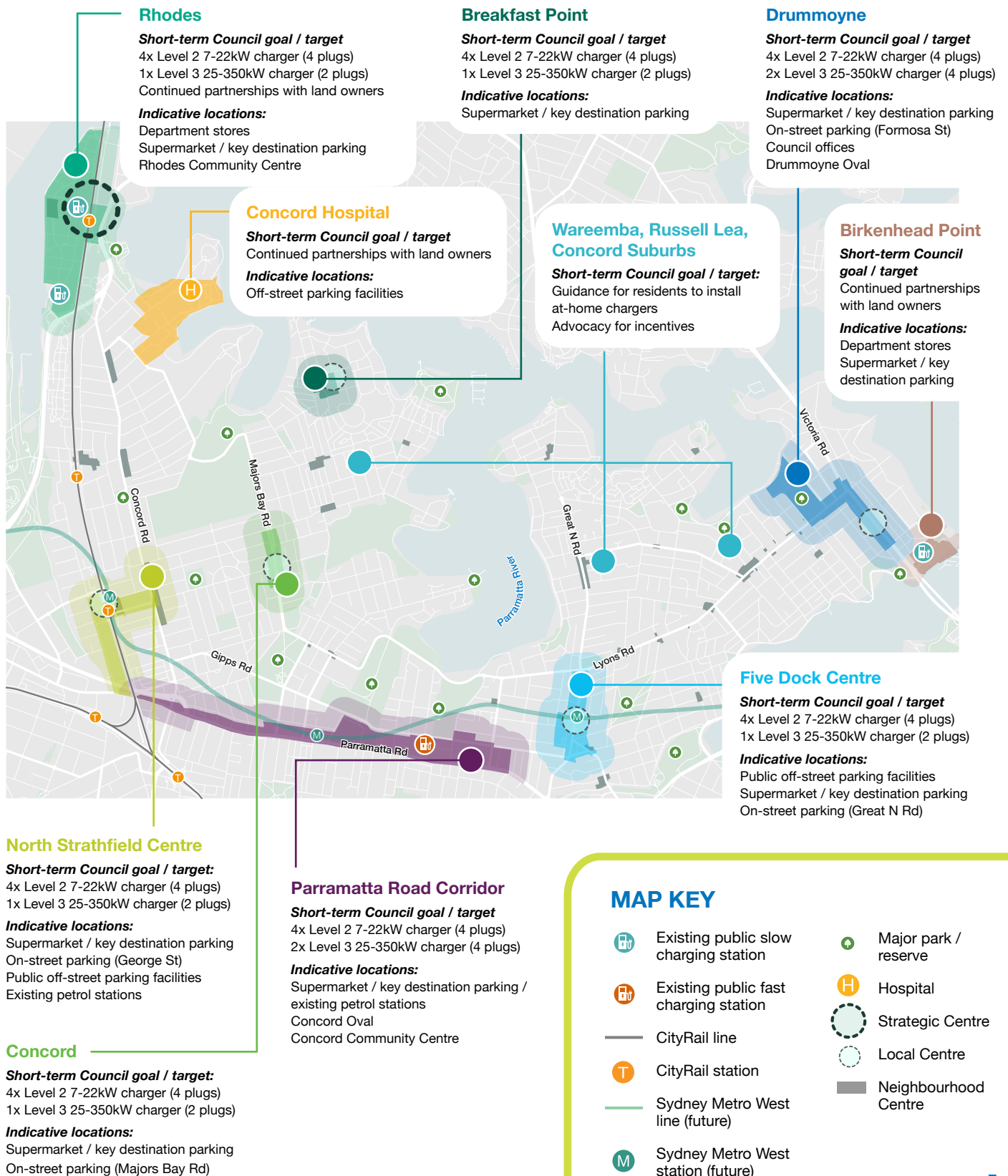
- Identification of Council's role across the specific spheres of influence.
- Collaboration with neighbouring councils and Southern Sydney Regional Organisation of Councils (SSROC) to share experience and identify common priorities and actions.
- Technical expertise from a specialist consultant to provide:
- Extensive research into the EV market, global attitudes, behaviours and best practice approaches in managing the transition to EVs.
- Integrated analysis of the City of Canada Bay's current context, including travel patterns, transport and emissions profiles, power infrastructure and climate resilience and potential EV charging landscape.
- Modelling transport needs by neighbourhood types and analysis of key issues.
- Developing key actions and mapping to inform an expanded EV charging network.

Canada Bay's proposed place-based charging network plan is shown on the following page.

City of Canada Bay's desired place-based charging network

Public EV charging network priorities 2022-2026

Figure 1 – Canada Bay's desired place-based charging network



Our role

Council will facilitate and guide the private sector, NSW Government and residents to install local EV charging infrastructure that meets our community needs and suits the character of local neighbourhoods. We will also regulate public places and parking to ensure safe access, management and equitable use.

Action Plan – Advocate, Act, Research

Council will advocate for, act on and research EV charging options. Over the next four years, the City of Canada Bay (Council) will focus its time, resources and influence to expand the electric vehicle (EV) charging network in prioritised precincts and locations with the identified charging types shown in the map on the previous page.

Council will establish a process to encourage and manage providers of public EV chargers to select appropriate sites and ensure equitable access for everyone.



Our Action Plan follows three themes: act, advocate and research.

Act	Advocate	Research
Council will act to support implementation of EV charging infrastructure through Council operations including fleet transition, planning instruments, public education campaigns, design guidelines and compliance.	Council will advocate and collaborate to strategically influence broader decisions outside immediate Council powers. We will advocate for economic incentives, standards and partnerships with the State and Federal Governments and industry stakeholders.	Council will investigate potential benefits of specific pilots, or ongoing monitoring and/or measuring to study the success of the transition. This includes potential partnerships and emerging technologies.
Fleet	Funding	Regional grid capacity
Implementation	Standards	Regional EV network
Planning/Process/Policy	Tax/Duties	EV cybersecurity
Assets	EV Roll out	Virtual power plants
Education & Partnerships	Incentives	Climate resilience

Table 1 – Electric Vehicle Strategy and Action Plan summary

Actions include:

- Identification of priority locations for EV charging infrastructure.
- Advocacy to State and Federal government and the private sector around funding, incentives, standards, tax and EV adoption.
- Policies and controls to effectively regulate the provision of EV charging infrastructure on private and public land.
- Managing and regulating the installation, operation, and maintenance of EV charging infrastructure on public land.
- Consideration of and planning for Council's fleet transition, with a Net Zero Fleet Transition Plan currently being developed.
- Targets for EV uptake and the rollout of EV charging infrastructure – focused on Council operations.
- Research and investigation to support the transition for key issues such as strata buildings, car share and residential properties without driveways.



2. Design Principles for this Strategy and Action Plan

Our key design principles for this Strategy and Action Plan are:

- **Increase transport resilience**, by reducing emissions to reach net zero by 2050, implementing the transport hierarchy, and reducing reliance on imported liquid fuels.
- **Collaborate for integrated transport solutions**. Collaborate with other councils to deliver a regionally integrated transition. Support NSW and Australian Government to implement policies and initiatives in ways that work for our local context and community.
- **Protect and enhance our neighbourhoods**. Adopt a place-based approach to EV network design. Protect local neighbourhoods, public spaces and ensure public space is used fairly and equitably. Facilitate and regulate installation of EV charging in the public and private realm.
- **Support the local community to navigate the transition** by delivering an education and awareness campaign.

2.1 Increase transport resilience

- ✓ Meet our targets for zero emissions.
- ✓ Implement the transport hierarchy in Council strategies, plans and operations.
- ✓ Reduce reliance on imported liquid fuel.

In 2021, *Council's Emissions Reduction Action Plan* set targets for net zero emissions from Council operations by 2030 and the community by 2050 as shown in Figure 2 below. Decarbonising the transport sector, based on the above transport hierarchy is a key priority. In the City of Canada Bay, almost 800,000 tonnes of greenhouse gasses (CO₂-e) are emitted each year, with one quarter of this from transport.

With most trips made to and from City of Canada Bay made in private vehicles or rideshare, EVs are an important element of decarbonising local transport. Transition to EVs cuts the carbon emissions and local air pollution caused by petrol and diesel vehicles, especially if recharged with renewable electricity. Filling up a car with electricity is also much cheaper than increasingly costly petrol and diesel and reduces supply chain risks associated with imported liquid fuel. It is acknowledged that if the EV transition across NSW doesn't result in less cars on local roads, the current issues will remain with increasing congestion and a lack of space for parking with higher density and more people. To support this transition, a new network of vehicle charging infrastructure must be installed across cities and regions, including charging in private homes and businesses and across the public domain.

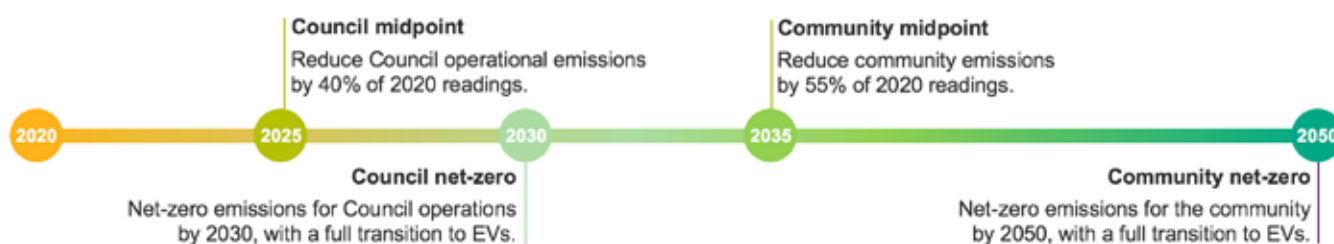


Figure 2 – City of Canada Bay net-zero targets as outlined by the Operational Plan 2022-2023

The Action Plan forms part of Council's response to *Resilient Sydney's* 'Direction 2: Live with our Climate'. It contributes to the community's resilience by reducing dependence on imported liquid fuel and reducing the carbon footprint of travel.

Transport Hierarchy

Council's Local Movement Strategy is an integrated approach to improving transport and mobility including actions to improve local public transport and infrastructure for non-motorised mobility, such as walking and cycling. As our city grows, we need better infrastructure for walking, cycling and public transport. Making these options available and usable helps to reduce congestion, improve health outcomes, and reduce carbon emissions and pollution.

In 2016, 65% of trips from the City of Canada Bay and 72% of trips to the City of Canada Bay involve a private vehicle or rideshare. This is quite high considering the proximity to the Sydney CBD and the number of public transport services available along key corridors. A further 16% of trips use the rail network, with 10% of trips by bus. Only 5% of trips are walked or cycled. Council supports the transport hierarchy approach which promotes the right mode for each trip purpose: people first, then bikes, then public transport, service vehicles, shared mobility (such as taxis and carshare) then finally private vehicles. City of Canada Bay's Environment Strategy sets local targets and actions for increasing walking and cycling, improving public transport and preparing for electric vehicles.

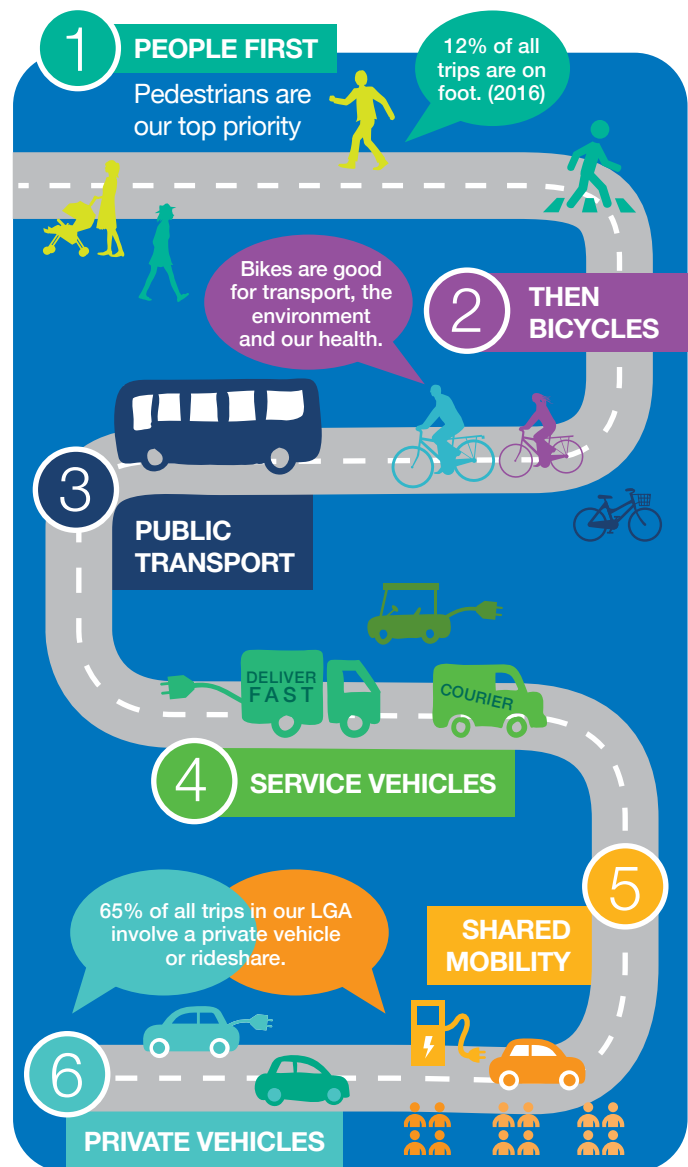


Figure 3 – Transport Hierarchy



Environmental Strategy targets and actions for transport



Figure 4 – City of Canada Bay Environmental Strategy targets and actions for transport



2.2 Collaborate for integrated transport solutions

- ✓ Work within our spheres of influence.
- ✓ Collaborate with other councils to deliver a regionally integrated transition.
- ✓ Support NSW and Australian Government to implement policies and initiatives in ways that work for our local context and community.

City of Canada Bay is one of 33 councils in the Greater Sydney Metropolitan Region. To be effective, transport networks must operate seamlessly across the Region and across transport mode.

This Strategy and Action Plan establishes our local response in the City of Canada Bay. It aligns with global, Federal, State and Local government frameworks. We follow the Guiding Principles in the Local Government Act to act fairly, plan for the diverse needs of our community ensure intergenerational equity and the principles of sustainable development.

Decarbonising the world's transport sector is a huge project, mainly dependent on the broader influence and interest of governments around the world, vehicle manufacturers and the market itself.

Australian and NSW Governments must lead the transition to zero-emissions transport and ensure industry, business and residents are supported through the change. Only Federal and State Governments have the scale of financial support and authorisation to lead integrated planning for a strategic approach aligned with commitments for greenhouse gas emission reduction, the economy and society.



Electric cars charging at an electricity filling station in the fast expanding, car charging network in the Netherlands.

2.2.1 Council spheres of influence

Council has a role in implementing State Government EV policies, approving planning and building applications, enforcing charging infrastructure requirements for new and existing public spaces and buildings, managing parking and safe and equitable use of public land. We are also responsible for integrating EV outcomes into our own city-shaping strategies, transport plans and parking strategies.

In February 2023, NSW Government amended the *NSW State Environmental Planning Policy Transport and Infrastructure* (TISEPP) specifying the planning process for electric vehicle charging units to be installed on public land. With planning consent, residents can install their own EV charger in the public footpath. The main effect of the change is to allow public authorities to install

electric vehicle charging units without the need to submit a development application in a broad range of situations. Public authorities, (and in some cases electricity supply authorities) do not need council planning consent to install EV charging units in the public footpath where next to a parking space, on electricity lighting poles, existing street furniture and on certain private premises (i.e. car parks, public administration buildings and service stations).

This EV Strategy and Action Plan establishes a place-based approach to siting EV charging infrastructure in City of Canada Bay. Anyone seeking to install EV charging infrastructure on Council property (land, buildings or assets such as street furniture) must consult Council about the site suitability, parking, leasing/licensing requirements.

The role of Local Government in the rollout of public EV charging infrastructure is summarised across eight spheres of influence, as shown in Figure 5.



Figure 5 – Local government spheres of influence in the rollout of public EV charging infrastructure

The broader context

2.2.2 International

At the 26th United Nations Climate Change Conference of the Parties (COP26). More than 30 countries, six major vehicle manufacturers and other actors, like cities, set out their determination for all new car and van sales to be zero-emission vehicles by 2040 globally and 2035 in leading markets, accelerating the decarbonization of road transport, which currently accounts for about 10 per cent of global greenhouse gas emissions.

≤ 1.5°C



The Australian Government released its National Electric Vehicle Consultation Paper in September 2022. Up until then, Australia had highly variable approaches to facilitating the transition to EVs, with State and Territory jurisdictions at different scales of vehicle uptake and knowledge maturity.



The Australian Government has announced the following:

- Development of a national electric vehicle strategy
- Policies to make electric vehicles more affordable by reducing tax
- A fast-charging network with chargers every 150 kilometres on highways
- Conversion of the Australian Government fleet to 75 per cent no-emission vehicles by 2025
- A plan to support low emission freight vehicles.

2.2.3 States and territories

New South Wales (NSW), Victorian, South Australian and Australian Capital Territory governments are committed to accelerate the transition of all owned or leased car and van fleets, to zero-emissions by no later than 2035. Building off this, the Australian Capital Territory government have banned the sale of all new ICE vehicles, effective 2035.

The National Construction Code 2022 (approved in August 2022 by Energy Ministers) has energy efficiency provisions to make it easier for people living in apartments to make the switch to an electric vehicle, by providing base infrastructure for future cabling and control point installation at the time of construction.

2.2.4 Australian Government

The Australian Government controls industry development and import systems, vehicle standards including limits for emissions, research and development, and tax. It sets the national framework for electric vehicle charging, including direct investment in the national highways. It is responsible for national resilience including fuel security. The Australian Government has a lead role in introducing vehicle fuel efficiency standards.



2.2.5 NSW Government

The NSW Government is responsible for road pricing and public transport and major control of traffic management. It is responsible for developing a network for vehicle charging stations in NSW. NSW Government has committed to net zero emissions by 2050 and has programs to accelerate the uptake of zero-emission technologies, including providing electric vehicle charging at destinations and in areas with limited off-street parking.

NSW Government's *Future Transport Strategy*³ sets strategic directions for world-leading mobility for customers, communities, businesses and people. It is part of a suite of government strategies, policies and plans that integrate and guide land use and transport planning across NSW.



The NSW *Electric Vehicle Strategy* is the NSW Government's plan to accelerate the State's vehicle fleet of the future. It outlines the Government's commitments to increase uptake of electric vehicles (EVs). The NSW Government wants to make NSW the easiest place in the country to purchase and use an EV. It expects EVs to make up 52% of new car sales in 2030-31 and it is the NSW Government's objective to achieve that uptake and see the vast majority of new car sales as EVs by 2035.

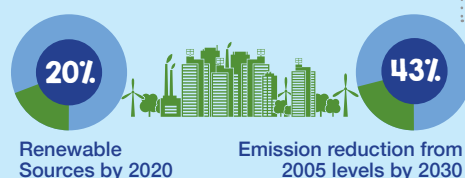
The NSW Government's Electric Vehicle Strategy outlines the following key actions:

- Helping drivers buy an electric vehicle
- Building a world-class electric vehicle charging network
- Making it easy to drive an electric vehicle
- Creating jobs and growing the economy
- Keeping road funding fair and sustainable

NSW Government has introduced initiatives including rebates for EV purchases, fleet transition incentives and funding for the progressive rollout of a fast EV charging infrastructure network including \$131 million in grants (until 2024) toward co-funding private-sector EV charging providers to install and operate fast charging stations across the state.

In February 2023, NSW Government amended the NSW State Environmental Planning Policy (Transport and Infrastructure) allowing electric vehicle charging units to be installed with consent on public and private land. The main effect of the change is to allow public authorities to install electric vehicle charging units without the need to submit a development application in a broad range of situations. Public authorities can, without consent, install EV charging units in the public footpath where next to a parking space, on electricity lighting poles, existing street furniture and on certain private premises (i.e. car parks, public administration buildings and service stations). With planning consent, residents can install their own EV charger in the public footpath.

³ Future Transport Strategy, NSW Government <https://www.future.transport.nsw.gov.au/documents/future-transport-strategy>



2.3 Protect and enhance our neighbourhoods

- ✓ Adopt a place-based approach to EV network design.
- ✓ Protect local neighbourhoods, public spaces and ensure public space is used fairly and equitably.
- ✓ Facilitate and regulate installation of EV charging in the public and private realm.

Council's role is to provide high quality planning and urban design outcomes for key sites and precincts. Council is establishing a clearly defined framework for Council engaging with third party providers seeking to install EV chargers on public land and in the public domain.

Within City of Canada Bay each neighbourhood has a different mix of residential, business and recreational activities attracting a different kind of visitor with a different reason and length of stay. EV chargers must be in suitable locations across the area, that protect local neighbourhood aesthetics and use public space fairly and equitably. International experience shows that people want to charge their vehicles at six location types: home, workplace, on-street, key destinations, en-route and at charging hubs.

Our desired EV charging network is designed using a place-based approach. Our place-based approach:

1. Matches reasons people visit the area with EV charging needs, charging types and assess associated grid impacts.
2. Co-locates chargers close to cafes, shops and services where people doing daily errands in the local area can wait for their cars to charge. This may increase visitation to local services and businesses.

Our Development Control Plan specifies the minimum standards for EV-Readiness in new developments.

2.4 Support the local community to navigate the transition

- ✓ Deliver an education and awareness campaign.
- ✓ Customer at the centre approach.

Council will support our local community to navigate the complexities of EV transition. We will ensure our processes, policies and communications are customer centred and we will develop an education and awareness campaign for residents, developers, local businesses, and suppliers of EV charging infrastructure.

Local residents and businesses considering purchase or use of EVs must navigate the complexities of installing residential and workplace EV charging. Council can support people retrofitting with EV charging infrastructure by explaining EV terminology, current market trends, NSW uptake targets, charging speeds available, pricing and charging locations, while also referring to useful links and references.

Our Development Control Plan includes minimum standards for EV-readiness in new developments. Council will provide supplementary communications to support developers and others to implement these standards.

Council is establishing a clearly defined framework for Council engaging with third party providers seeking to install EV chargers on public land and in the public domain.

3. Market Analysis



3.1 Why should we transition to EVs?

Many major countries and global vehicle manufacturers have committed to switch to zero emission vehicles. In 2021, nearly 10% of global car sales were electric⁴. This annual figure is increasing exponentially. Countries, states and cities that do not anticipate or prepare for this transition will ultimately be left behind dealing with older polluting vehicles, expensive fuel import costs, and diminished air quality and could struggle to meet domestic GHG emissions reduction targets.

In a joint study by the Australian Electric Vehicle Council, NRMA and others⁵, EVs produce zero tailpipe emissions when charged by renewables, removing all carbon monoxide and nitrogen oxide, half of PM₁₀ and volatile organic compounds and two thirds of PM_{2.5} emissions, reducing cumulative emissions and enhancing air quality. EV users could save up to \$1,800 per annum on vehicle ownership costs by 2030, while saving 10c per kilometre on fuel/energy costs⁶, and the further financial benefits of charging an EV completely off-grid with renewables.

If Australia's EV market share was more on par with the rest of the world (10%), it is estimated that 27 deaths and 910 significant health impacts would be prevented in NSW alone. This translates to savings in health costs of approximately \$2,400 per vehicle in the Sydney-Newcastle-Wollongong region, if charged with renewable energy. However, in 2021, EVs represented only 2% of new car sales in Australia, illustrating how far the country lags behind the global average, and missing out on substantial environmental, economic and health benefits that EVs offer.

⁴ Global EV Outlook 2022, International Energy Agency, Paris

⁵ Recharging the economy 2019, Electric Vehicle Council, NRMA, PwC, St Baker Energy Innovation Fund

⁶ The Electric Vehicle Council estimate that the average Australia drives 15,000km per year, equating to a cost of 14c/km for ICE vehicles and 4c/km for EVs

3.2 EV market players

There are a wide range of formal and informal stakeholders involved in the uptake of EVs, electrification of the transport sector and rollout of charging infrastructure. Table 2 below maps key stakeholders in local scale public EV charging infrastructure. in local scale public EV charging infrastructure.

Table 2 – Key stakeholders in local scale public EV charging infrastructure



Charging Manufacturers and Suppliers

Charging manufactures install, maintain and operate EV charging infrastructure. They test the installation of future technology, while ensuring that as charging technology evolves, it is efficient and easy to integrate and install within the existing network. They have high interest in the rollout of EV charging infrastructure due to their commercial aims and targeted investments, yet local governments are ensuring that this rollout is done in collaboration and under relevant controls and regulations.



Property Owners/ Developers

Property owners are responsible for managing the requirements of tenants and ensuring the EV charging infrastructure is integrated into new developments, providing guidance to promote the easy installation of infrastructure, and for installing charging infrastructure in existing buildings when required. Developers will be responsible for the installation of the mandated infrastructure to label a development “EV-Ready”. Developers must implement minimum standards outlined by building codes and planning controls set by NSW Government and councils.



Vehicle Manufacturers

Vehicle manufacturers’ primary interest is in the production and sale of EVs. An emerging secondary interest is in providing an end-to-end EV ecosystem which includes charging solutions (e.g., Audi, Tesla). While keeping these interests at the height of their concern, manufacturers are being influenced by the market to provide improvements to technologies available today and convenience for charging as a means to sell more vehicles.



EV Users

EV users are the end users who have drive and/or own electric vehicles. EV users are residents, employees, organisations and tenants who will use charging infrastructure to go about their daily transport needs. EV users must also pay vehicle taxes, tariffs, tolls and other associated fees which contribute to funding the expansion of the State charging network, future EV infrastructure, the EV subsidy scheme and maintenance of roads. EV users have limited influence. Their charging behaviours are directly impacted by the availability of charging infrastructure within the buildings in which they live, work and visit.



Electricity Distributors/Ausgrid

Electricity Distributors manage the electricity network. They must ensure it can appropriately respond to increased demand for electricity as private and public charging infrastructure begins to roll out and consumers increasingly switch to electric vehicles. Electricity distributors are interested in the impact of EV charging on the energy grid especially on peak loads, reliability and sustainability.

Ausgrid is seeking to expand its business and unregulated revenue by becoming a provider of EV charging. For example, Ausgrid has contracted with Jolt to attach EV chargers and advertising boards to its electricity substations. Ausgrid is also exploring ways to provide EV chargers attached to electricity poles.

3.3 Potential demand

EVs as a proportion of total vehicle registrations is projected to grow from 0.16% of the NSW fleet in 2021 to 9.81% in 2030 as shown in Figure 7. Even though EVs initially only represent a smaller percentage of the total NSW fleet, it does indicate a significant shift in EV numbers from today's figures, with exponential growth expected to continue strongly post-2031.

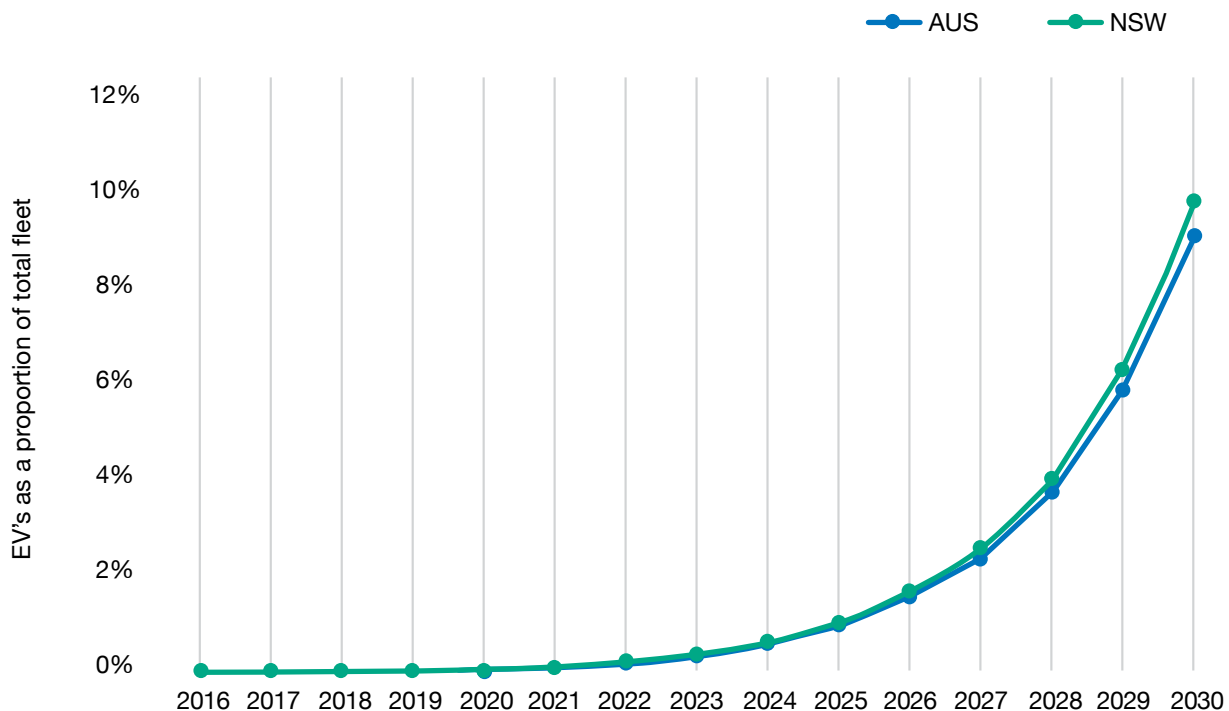


Figure 7 – Projection of EVs as a proportion of total fleet in Australia and New South Wales (source: EVC, ARENA and current EV sales data)

This magnitude of growth means that strategic planning action is needed now to support anticipated EV charging infrastructure investment and deployment, while providing market certainty and delivering positive outcomes:

- **Transition away from ICEs** – a late or delayed rollout of supporting EV charging infrastructure and policies could lead to a slower fleet transition and contribute to failure in realising emission reduction targets.
- **Economic benefits of EVs are realised** – EVs are widely recognised as being lower cost to maintain and operate than ICEs particularly in relation to the minimal number of working parts in EVs (no ICE componentry) and flexible electricity prices, with upfront purchase costs rapidly dropping. With current technologies, the widespread availability of charging infrastructure could ensure total cost of ownership remains low for EV users.
- **Increased choice and options in manufacturers** – Global experience indicates that supportive government policies for charging infrastructure in anticipation of EV uptake opens up domestic markets to new EV manufacturers and increases their commercial benefit of operating and trading in an “EV-friendly” region. This can ensure the availability of a wide selection of models to suit community needs and fleet managers alike.
- **Environmental benefits are realised** – EVs benefit the environment when using electricity generated by certified renewable, zero emissions energy sources. Proactive planning for charging infrastructure with the integration of renewables into the electricity grid significantly contributes to reducing carbon emissions and improving local air quality.

3.4 Charging speeds, behaviours and preferences

Trials, surveys and supporting literature has shown that EV users have varying preferences for where charging their vehicle is most convenient, which in turn impacts how and when to charge. These preferences are known as charging behaviours and differ based on key influencing factors such as: available infrastructure, charging times, location and cost. Charging behaviour provides an insight into the appropriate charging times, infrastructure types and quantities required for different urban typologies.

Figure 8 illustrates the ‘Levels’ of charging typically associated with specific charging locations. The ‘Level’ of charge refers to the voltage, power and speed of the charging system. The higher the voltage, the higher the power output and the quicker an EV will charge.



EV users generally have six main choices for where to charge their vehicle: at-home, at-work, at-destination and on-route, including on-street and at ‘charging hubs’. At-home charging is widely regarded as the most convenient and lowest cost form of charging due to overnight trickle charging options, control over energy use and renewable energy options. Studies from some of the world’s highest adopters of EVs such as Norway and Austria, including strong emerging markets in the United Kingdom, United States of America and Canada, show that between 80 and 90% of EV users prefer to charge at home⁸. However, not all users have convenient access to at-home charging due to a range of factors including limited off-street parking, availability of space and distribution of energy supply.

Away from home, where carparking may be available at workplaces and destinations (i.e., shopping centres, retail centres, supermarkets, etc.), a variety of charging levels and costs may be offered, often with a mix of slow, fast and rapid chargers. Preferences for charging locations outside of home are largely dependent on: (1) the amount of charge required and (2) the length of time a user is willing to wait for their vehicle to charge.

Charging preference is also based on the type of trip and whether a user needs to fully charge their vehicle for a longer trip, or just ‘top-up’ for short commutes. On long journeys, users are more likely to require a full charge of their battery (to allay fears of range anxiety) and therefore on-route charging is typically associated with rapid/ultra-rapid charging stations likely to be installed at convenient locations along highways (similar to existing service stations) or at emerging dedicated clustered facilities known as ‘charging hubs’.

Charging Behaviour

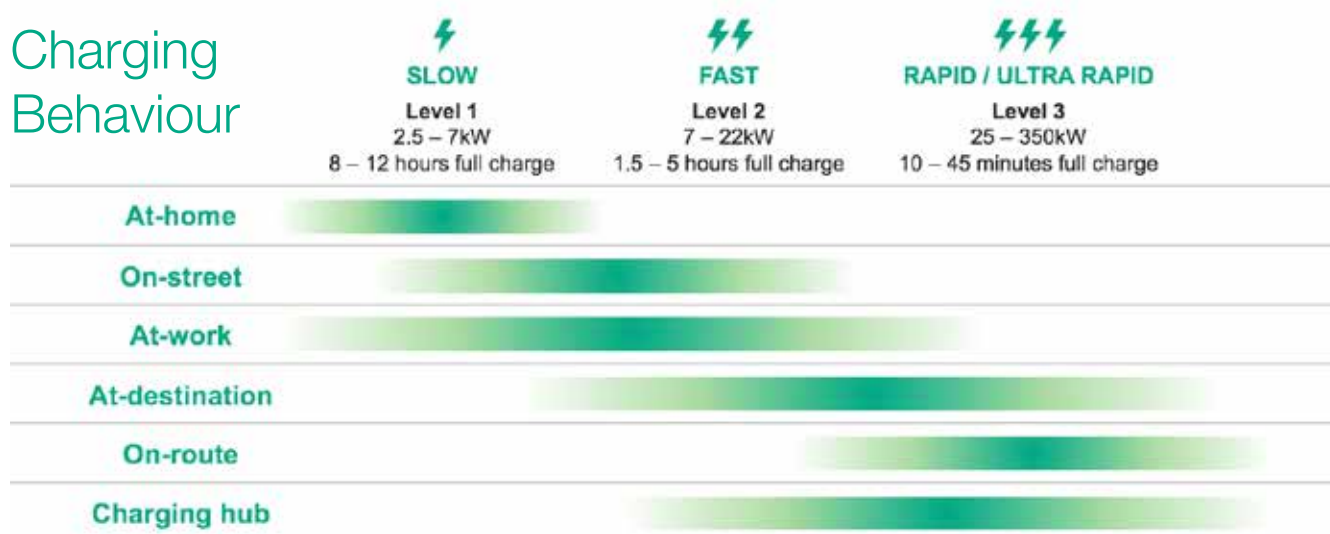


Figure 8 – Typical levels of charging and speeds associated with specific locations

⁸ Electric Vehicle Charging: A review of consumer preferences and behaviours. University of Melbourne, 2020.

3.5 Planning for EV-Readiness

The social, environmental and economic impacts of EV uptake have been considered by major jurisdictions such as the USA, UK, European Union, Norway, Canada, India and China over the past few decades. By tailoring policies, incentives and regulations, global leaders have streamlined EV uptake by progressively increasing affordability, improving the convenience of EV charging and optimising downstream costs. To try and achieve EV uptake targets, strict and ambitious minimum compliance regulations have been introduced for the provision of EV charging infrastructure within new developments, redevelopments and renovations, and within the public domain.

Setting minimum compliance regulations is an influential lever, as it sets a minimum threshold baseline and ensures provision of infrastructure, capturing any laggard developers who may be less inclined to provide infrastructure for EVs. Allowing for the installation of EV charging infrastructure from opening day, involves the provision of cabling, electrical capacity and spacing for charging stations. This proactive approach is more affordable in the long run, as it avoids retrofit costs, reduces market failures and minimises downstream costs. This practice uses the concept of 'EV-Readiness', which means the appropriate level of infrastructure has been provided to allow for the future provision of sufficient EV charging infrastructure at a particular location.

3.5.1 EV-Readiness terminology for new developments and renovations

Clear national standards and guidelines are key to implementing any policy or regulation in the EV space.

Leading jurisdictions use three categories of EV-Readiness: 'EV-Capable', 'EV-Ready' and 'EV-Installed'. These categories specify standards for the extent of infrastructure that must be provided in new developments and renovations from "day-one". Such standards reduce any subsequent retrofit costs for a developer, landlord or property owner and allow EV users to install charging infrastructure and/or drive up and charge their vehicle.

Table 3 below describes each category of EV-Readiness, including their "day-one" charging capabilities, typical locations and requirements for additional infrastructure. While the charging capability of each category differs at "day-one", this does not impact the level of charging capable in the future. This is determined by the electrical panel capacity installed and capability of the charger provided at the EV parking bay.

Table 3 – International standard in reference to an individual car parking bay fitted with EV charging infrastructure

Category	EV-Capable	EV-Ready	EV-Installed
			
Description	Install electrical panel capacity with a dedicated branch circuit and continuous raceway from the panel to the future EV parking spot.	EV-Capable requirements are met, with addition of raceway with conduit to terminate at a 240-volt General Power Outlet (GPO).	EV-Capable and EV-Ready requirements are met, with the addition of installing a physical EV charger with tethered cable.
Charging capability at "day-one"			
Level 1	–	✓	✓
Level 2	–	–	✓
Level 3	–	–	✓
Additional infrastructure required to allow future charging levels	• 240-volt GPO (Level 1) • Wall-mounted 7-22kW charger attached to 240-volt GPO (Level 2) • 25-350kW DC charger (Level 3)	• Wall-mounted charger attached to 240-volt GPO (Level 2) • 25-350kW DC charger (Level 3)	All infrastructure provided from "day-one".
Typical location/s	Dwellings, company fleet parking bays.	Dwellings, offices, destinations.	Destinations, service stations, highways, charging hubs.

3.5.2 International benchmarks for EV-Ready parking bays

Across jurisdictions, there is an emerging trend towards regulating a minimum number of EV-Capable, EV-Ready or EV-Installed parking bays as a proportion of the total number of parking bays required within a development or public area. Global examples of EV-Readiness have been benchmarked from across 16 leading jurisdictions with the most ambitious minimum compliance regulations illustrated in Figure 9 below.

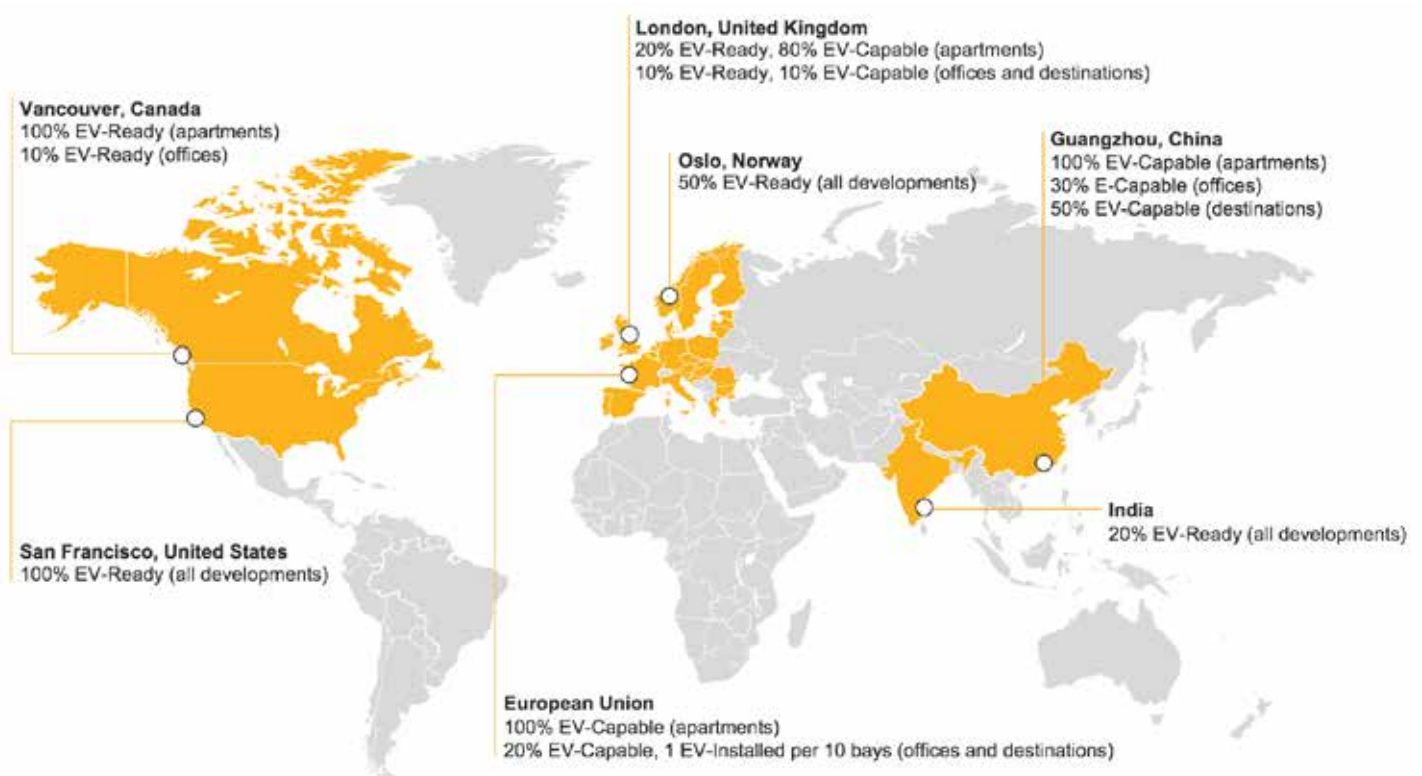


Figure 9 – Minimum compliance regulations for the provision of EV charging infrastructure as a proportion of parking bays in buildings and developments

3.6 Three models for the role of councils in EV charging infrastructure

A recent SSROC workshop evaluated the three potential models for the role of councils in EV charging infrastructure provision. They vary based on the local context, other council objectives, and consideration of upfront costs, maintenance costs and revenue.

1. Council-owned: Publicly accessible charging stations provided within a locally governed area for a user-fee or initially free to incentivise EV uptake.
2. Council facilitates third party-owned infrastructure: Council engages with providers of privately-owned, publicly accessible charging stations. Council encourages installation of EV chargers in key locations and may set terms and conditions for installing EV charging infrastructure on public land.
3. Council accepts third-party owned infrastructure: Council has minimal involvement and only engages where legally or otherwise required to do so. Privately owned, publicly accessible charging stations are installed with minimal involvement by council.

Table 4 – Comparison of EV charging ownership models and their interface with Council

Model	Council Ownership	Council Facilitation	Council Acceptance
	Council owns EV chargers and directly provides EV charging services	Council establishes framework for facilitating EV charging infrastructure to meet community needs and local urban form. Third parties own EV chargers and manage charging services.	Third parties own EV chargers. Council has minimal involvement.
Funding model	• Council appoints contractors to install charging stations and pays for installation and operation. • Council partners with independent third parties to install additional stations. • Council pays for infrastructure and installation (potentially with ratepayer revenue), and charges user for electricity and parking	• Council partners with third-party providers through a process to determine charger locations and conditions for use of public space. Third-party is then responsible for installation and operation. • Private sector owns and operates. Private sector funds EV charging equipment, potentially with financial support from NSW Government grants. • Utility owns and operates EV charging stations installed by third-party. Utility provides electrical infrastructure for third-party operated charging stations. • Community owned for example community title or Indigenous community trust owned systems. It could be an option for chargers installed in strata-estates, community housing and retirement villages.	• Private sector owns and operates. Private sector funds EV charging equipment, potentially with financial support from NSW Government grants. • Utility owns and operates EV charging stations installed by third-party. Utility provides electrical infrastructure for third-party operated charging stations.



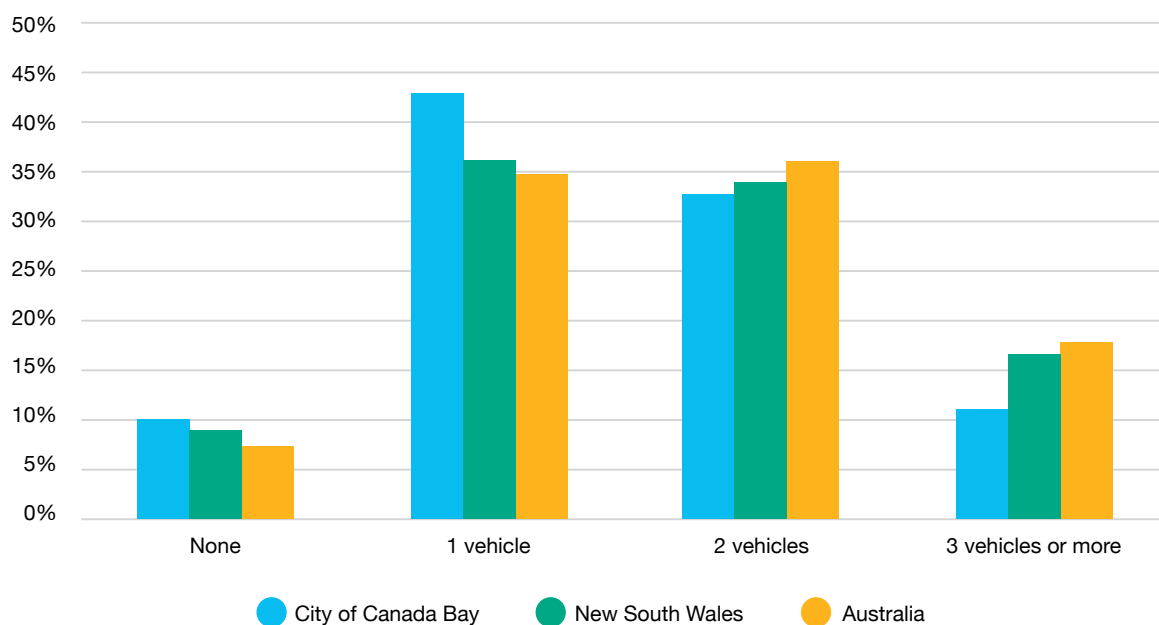
4. Current EV profile in City of Canada Bay

4.1 Transport profile

87% of households in the City of Canada Bay own at least one car. This is generally on par with the rest of NSW (87%) and Australia (89%) as shown in the breakdown in Figure 10. As discussed in Section 3.4, most EV users prefer to charge their vehicle overnight while it is parked at their home or nearby, meaning that the demand for residential EV charging in the City of Canada Bay is likely to be high.

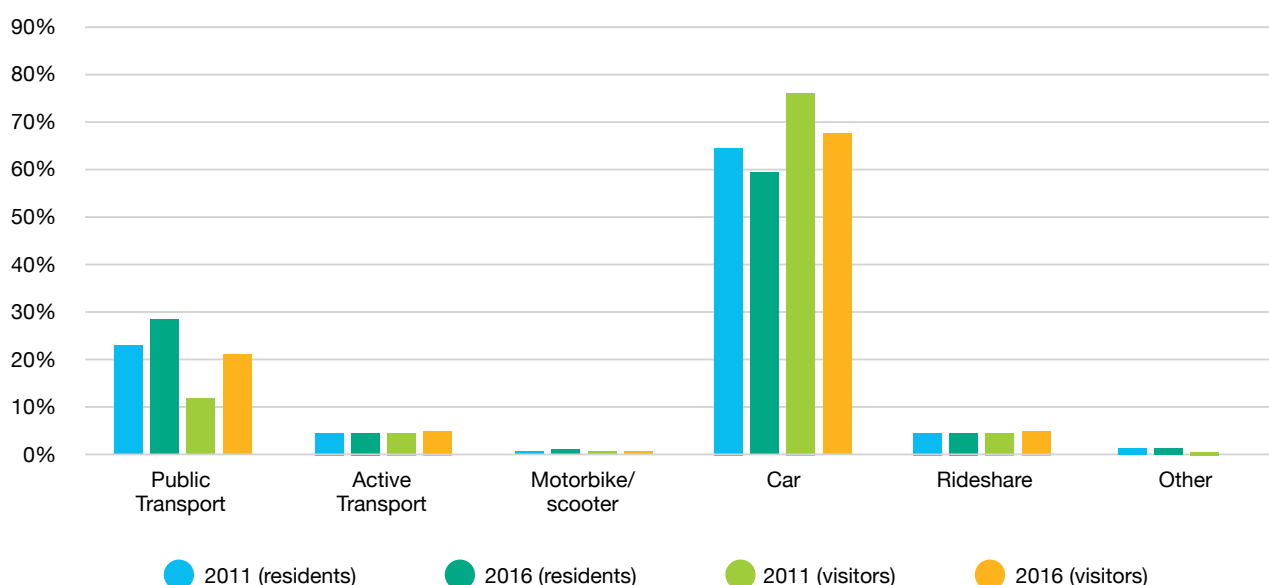


Figure 10 – Car ownership breakdown by dwelling (source: ABS 2016)



Vehicles are also the most popular form of travel. As shown in Figure 6, 65% of trips from the City of Canada Bay and 72% of trips to the City of Canada Bay involve a private vehicle or rideshare. With not all residents having access to at-home charging, this suggests that the demand for EV charging at public destinations is also likely to be high, presenting a need for increased accessibility to more public charging stations. However, Figure 11 also shows that a mode shift away from the car is taking place, with trips by vehicles decreasing and trips by public and active transport increasing from 2011. This suggests that policies and strategies aimed at reducing vehicle-based trips could also result in a reduced demand for charging infrastructure.

Figure 11 – Mode share breakdown for City of Canada Bay residents and visitors 2011-16 (source: ABS 2011 and 2016)



4.2 Emissions profile

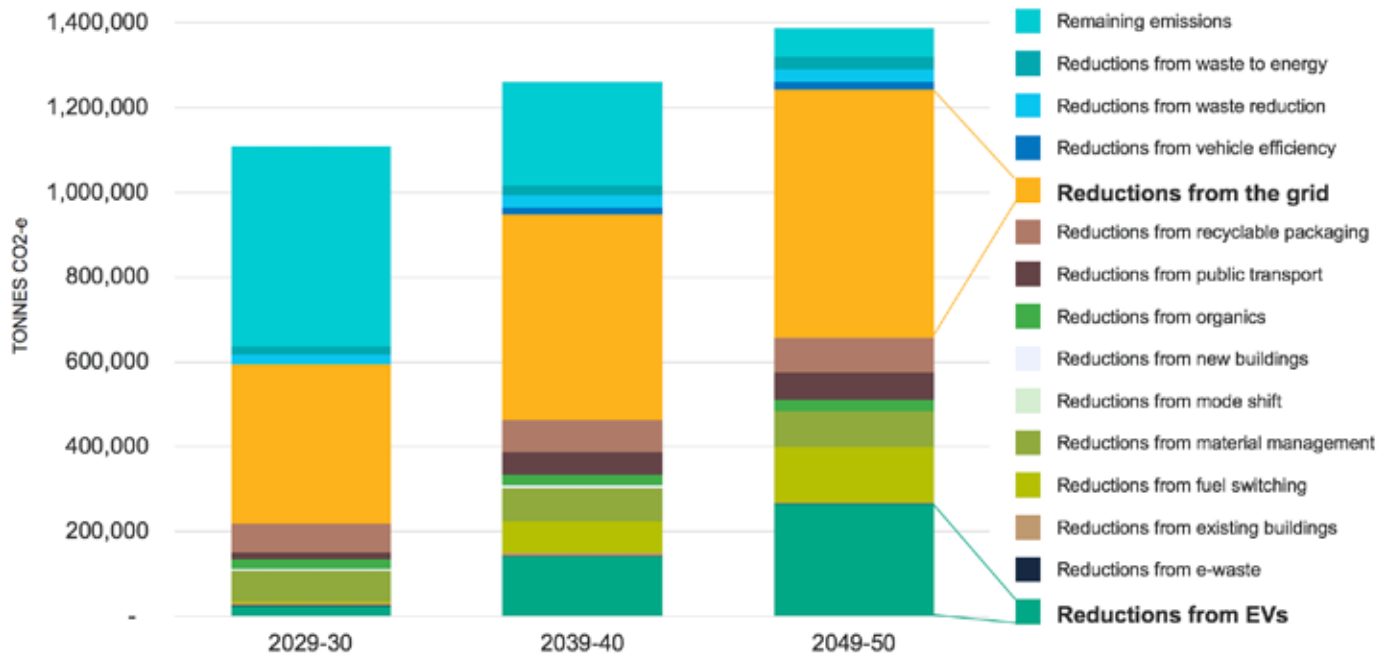
The City of Canada Bay emits close to 800,000 tonnes of net carbon emissions (CO₂-e) each year. Most of these emissions arise from electricity and natural gas consumption, with transport contributing 27% of total emissions. As analysed in the transport profile above, the City of Canada Bay is heavily reliant on cars for daily travel and this travel pattern is expected to continue to dominate the transport sector for many years to come. This means that car-use (electric or otherwise) will need to be considered as a dominant mode within Council's strategic transport planning to support expected increased commuting for residents to and from our area. With an increased number of vehicles on the road, supporting the shift from ICE vehicles to zero emission vehicles will be critical to achieve Council and NSW Government emissions reduction targets.

The City of Canada Bay is well positioned to capitalise on this transition, as highlighted by recent emissions modelling by Kinesis for Resilient Sydney. If EVs are adopted at their current projected rate, along with the current NSW and Federal Government's policy settings, they could directly contribute to a reduction in up to 265,000 tonnes of CO₂-e by 2050 in the City of Canada Bay alone (repressing 19% of the area's overall annual emissions). Indirectly, the potential of EVs to transform the way the electricity grid is used, especially in later years through decarbonisation of electricity, bidirectional charging and integration with renewables, could lead to a reduction of 42% of the City of Canada Bay's overall annual emissions by 2050.

⁹ City of Canada Bay Emissions Reduction Action Plan, 2020

¹⁰ Resilient Sydney – Canada Bay emission reduction pathway to 2050, 2022, Kinesis, Greater Sydney Commission, NSW Department of Planning and Environment

Figure 12 – Incremental impact of CO2-e reductions in the City of Canada Bay across sectors (source: Kinesis, Resilient Sydney)



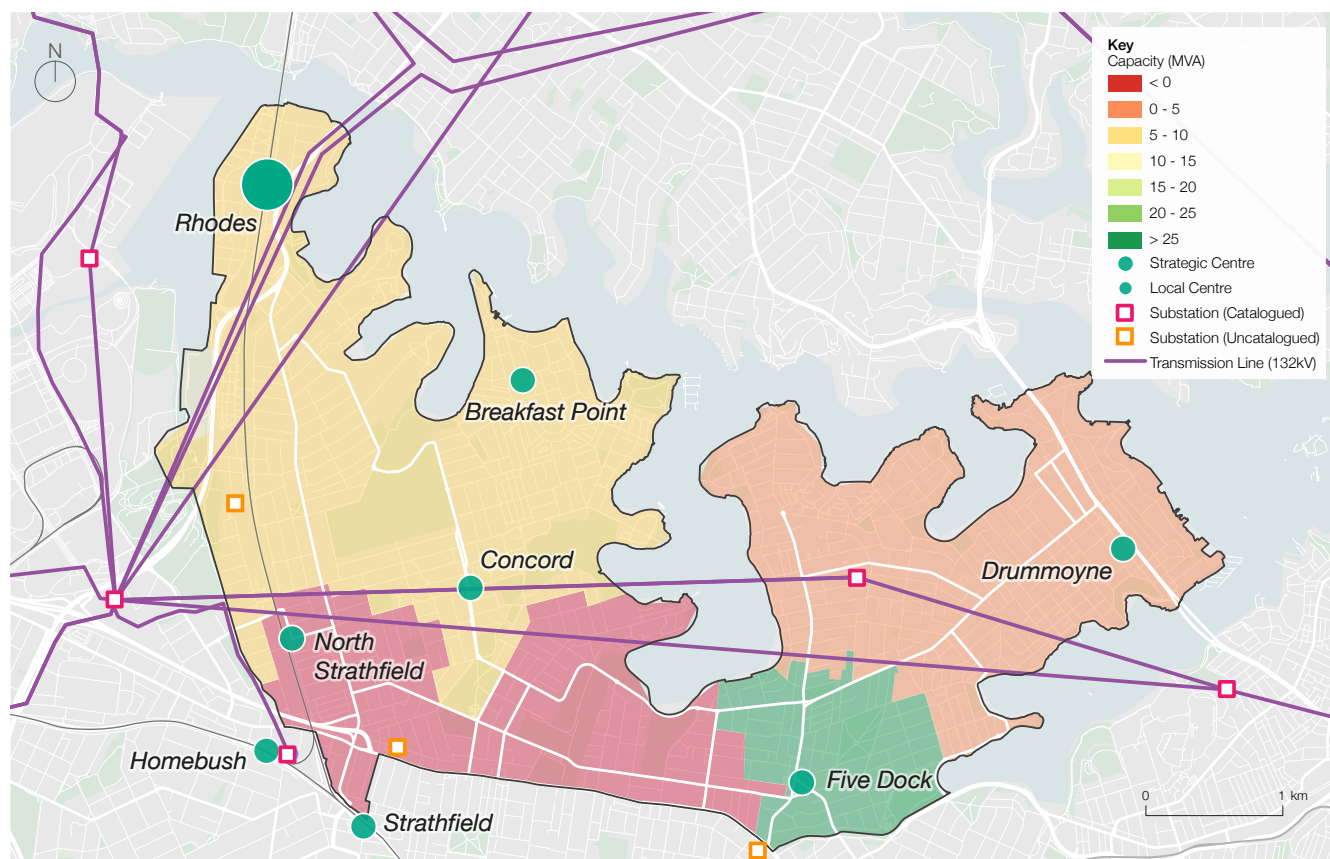
4.3 Electrical infrastructure

People choose to live, work and visit City of Canada Bay for many reasons and the area has a variety of land uses. With different land uses, comes different levels of activity and density, which in turn affects the use, demand and performance of the electricity network. For example, areas of high activity and density, such as Five Dock, generally have an increased demand for electricity than areas of lower density, due to the higher number of people, assets and appliances connected to the grid and using electricity. Planned growth in the City of Canada Bay, including the development of new metro stations and increased development intensification in North Strathfield, Concord/Burwood North and Five Dock, are anticipated to put strain on the future residual capacity of the electricity network.

EV charging infrastructure could potentially introduce a new asset dependent on the network, if not integrated with renewable energy. The rollout of new charging stations will need to be carefully planned to avoid risks of power outages, identify network capacity constraints and plan grid augmentation projects. A breakdown of the residual capacity of the electricity network in 2031 is shown in Figure 13.

Across the majority of the City of Canada Bay, planned capacity on the electricity network is not expected to create problems in supporting the daily needs of future population growth and residential EV charging. However, increased charging demand in apartment buildings and high-power charging at major destinations will need to be monitored with energy distributors. Areas of concern for electricity supply capacity arise along the Parramatta Road corridor, namely North Strathfield and Concord/Burwood North, due to increasing residential infill and development of commercial areas such as Concord Oval and Sydney Metro West stations. The inclusion of network capacity upgrades and grid augmentation in these areas will need to be investigated by EV charging providers and energy distributors if future EV charging demand is to be provided at these locations.

Figure 13 – Spare capacity on the electricity network in 2031 (source: Network Opportunity Maps, Energy Networks Australia, 2021)



4.4 Climate resilience

Changes in climate have already been observed across NSW, such as increases in the frequency and intensity of heatwaves, extreme rainfall events, severity of king tide patterns, humidity and risk of flooding due to concerns of rising sea levels. These events and weather conditions affect the performance, longevity and accessibility of zero-emission technologies. Studies from areas that typically experience extreme heat throughout the year, such as the Middle East, have found that energy intensity, or the effective force of charging, is over 20% higher at 40°C, which could cause physical stress and damage to batteries and charging infrastructure. Increased inundation of areas prone to flooding from sea level rise, rainfall or extreme tides can restrict access to chargers while also placing increased strain on chargers outside of prone areas.

For the City of Canada Bay, areas more prone to flooding such as low-lying areas on the Parramatta River foreshore, could become inaccessible during periods of extreme rainfall and tides. Site selection studies into the location of charging infrastructure should consider this, to ensure the future charging network is within reach of all EV users during all times of the year. The design of charging sites should also consider protecting charging stations from the heat by providing canopies or locating chargers in undercover parking facilities.



¹¹ Effects of high ambient temperature on EV efficiency and range: case study of Kuwait, Hambí et al., 2022.

¹² Integration of EVs in areas of extreme heat, Bayhan et al., 2020.

¹³ Resilience of urban public EV charging infrastructure to flooding, Raman et al., 2022

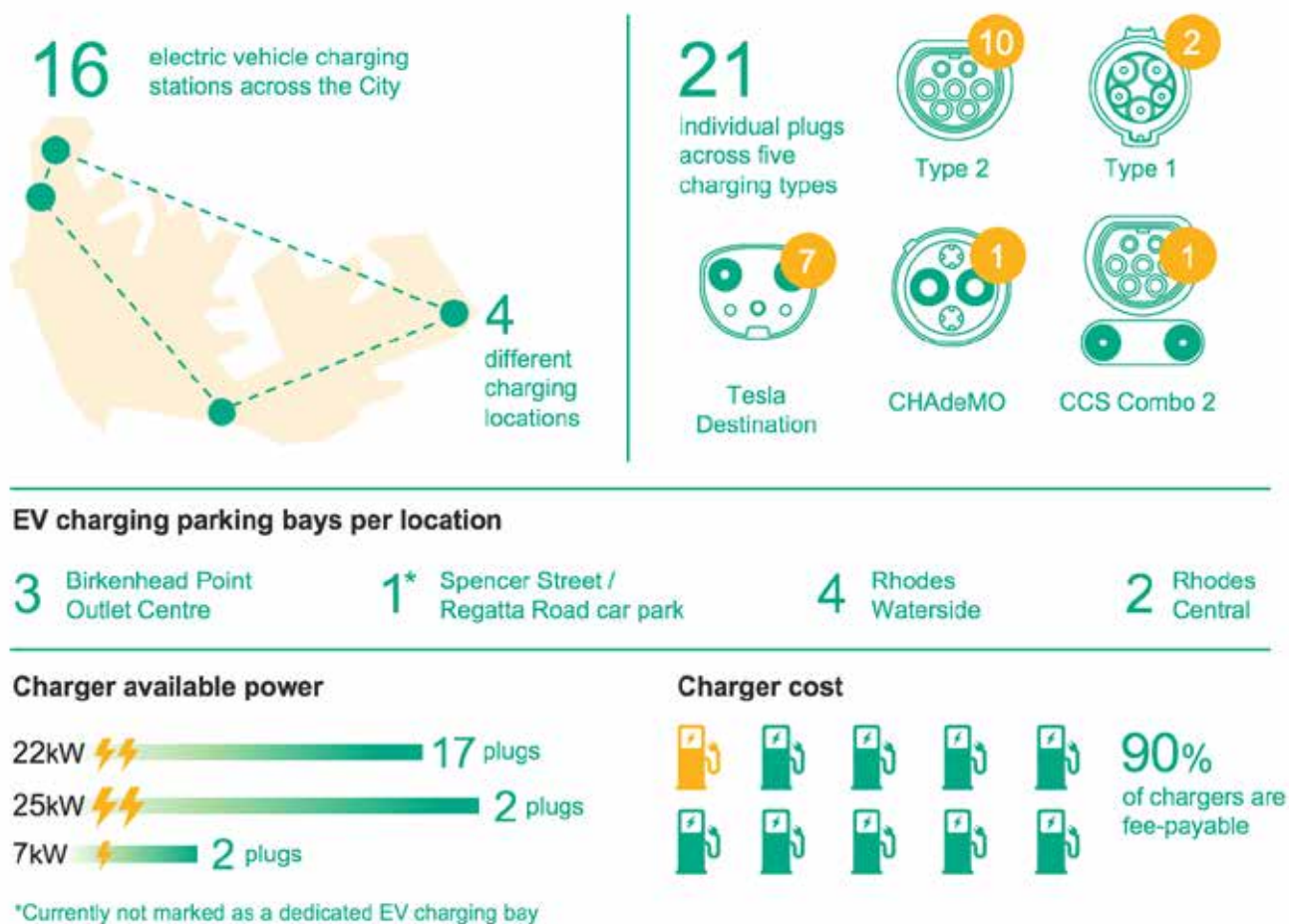


4.5 Public charging in the City of Canada Bay and gaps

At the time of writing this Strategy and Action Plan, there are a total of 16 chargers across the City of Canada Bay, consisting of 21 individual plugs at four locations. There are 10 parking bays adjacent to these chargers, allowing 10 vehicles to charge at any given time. All chargers are classified as public chargers available to be used by anyone at a cost. 17 of these plugs are 22kW, meaning they can provide up to 40 kilometres of range per hour or fully recharge a typical, mid-size EV in around 5 hours. provided at these locations.



Figure 14 – Existing charging network location, plug type, speed and cost



There is not an exact science to calculate the number of chargers and dedicated parking bays required to support a growing fleet of EVs. In mature markets with a high uptake of EVs, such as Norway, planning allows for 7 EVs per publicly accessible EV charger and dedicated parking bay¹⁴. Whereas other international benchmarks suggest that at least one publicly accessible charger is required for every 10 to 15 EVs¹⁵.

Based on these numbers, the current charging network in the City of Canada Bay is suitable to support anywhere between 70 to 150 EVs. If every vehicle were electric, there would be roughly one publicly accessible EV charger per 5,460 passenger vehicles, far too little compared to international benchmarks. Existing chargers are also concentrated in specific locations on the eastern and western extents of the City of Canada Bay (6 in Rhodes, 3 at Birkenhead Point), with large gaps in between, particularly in the local centres of Five Dock, Concord, North Strathfield and Breakfast Point.

This Strategy and Action Plan indicates where Council will focus its efforts in providing, supporting and advocating for the coordinated rollout of public EV charging infrastructure. The precise number of public chargers required needs to be monitored based on projected versus actual EV uptake, change in total number of vehicles in the City of Canada Bay, support for high demand locations and the number of chargers installed in homes, offices and privately owned destinations (department stores, supermarkets, etc.). These matters are addressed in the following Sections.



¹⁴ <https://www.statista.com/statistics/696548/number-of-electric-car-charging-stations-in-norway-by-type/>

¹⁵ <https://graphics.reuters.com/AUTOS-ELECTRIC/USA/mopanyqxwva/>

5. Desired charging network

5.1 Place-based charging typology

EV users generally have six main choices for where to charge their vehicle: at home, at work, at destination and on route, including on-street and at ‘charging hubs’. The proposed charging network is designed by mapping these six charging places onto the urban form of City of Canada Bay.

Table 5 – Place-based typology of charging

		
1. Home charging Description: Home charging is the cheapest and most convenient form of charging, usually slow charging overnight. Likely target users: Users with off-street parking. Challenges: Cost and no space for charging. Responsibility for installation: Residents, property developers, strata bodies.	2. Workplace charging Description: Workplace charging is typically provided in private car parks. Charging can be slow or fast and offers a convenient way to recharge an EV for employees and business fleets. Likely target users: Employees, business fleet users. Challenges: Parking bay availability. Encourages vehicle use. Responsibility for installation: Property developers, tenants, employers.	3. On-street charging Description: Standalone pillars, typically ‘fast’ chargers provide on-street charging options. Dedicated kerbside charging points have been developed that avoid cables trailing across footpaths. Likely target users: Users without off-street parking. Challenges: Managing parking. Grid constraints. Interaction with other road users. Perceived inequality. Responsibility for installation: Council, third party EV charging providers.
		
4. Destination charging Description: Fast charging is provided at destinations where the user may park for a number of hours, e.g. gyms, cinemas or shopping centres. Hotel chains may take advantage of the overnight charging and use slow charging as it is more cost-effective. Likely target users: Destination visitors. Challenges: Not strategically planned or managed – based on individual investment decisions at destination. Responsibility for installation: Property developers, tenants, Council, third party EV charging providers.	5. On-route charging Description: On-route charging is used to top-up midway through a long journey, for example at highway service stations. Likely target users: Business travel users, private leisure users, freight and logistics. Challenges: Multiple suppliers. Lack of strategic planning. Grid constraints for high powered charging. Responsibility for installation: State Government, third party EV charging providers.	3. Charging hub Description: Charging hubs can be at centralised or out-of-town locations. Hubs can include different types of users, as part of a multi-modal transport Action Plan. A mix of charging types would be required to service different user needs. There is the potential for synergies to offer greater value. Likely target users: Taxis, buses, business fleet, park and ride/multi-modal transport users, car rental/share companies, freight and logistics. Challenges: Land availability. Grid capacity and cross-sector integration. New delivery models are required to deliver multi-modal transport services. Responsibility for installation: State Government, third party EV charging providers.

5.2 Canada Bay's proposed place-based charging network

The map below shows City of Canada Bay's proposed place-based charging network. Each area type attracts a different kind of visitor with a different reason and length of stay.

The place-based approach:

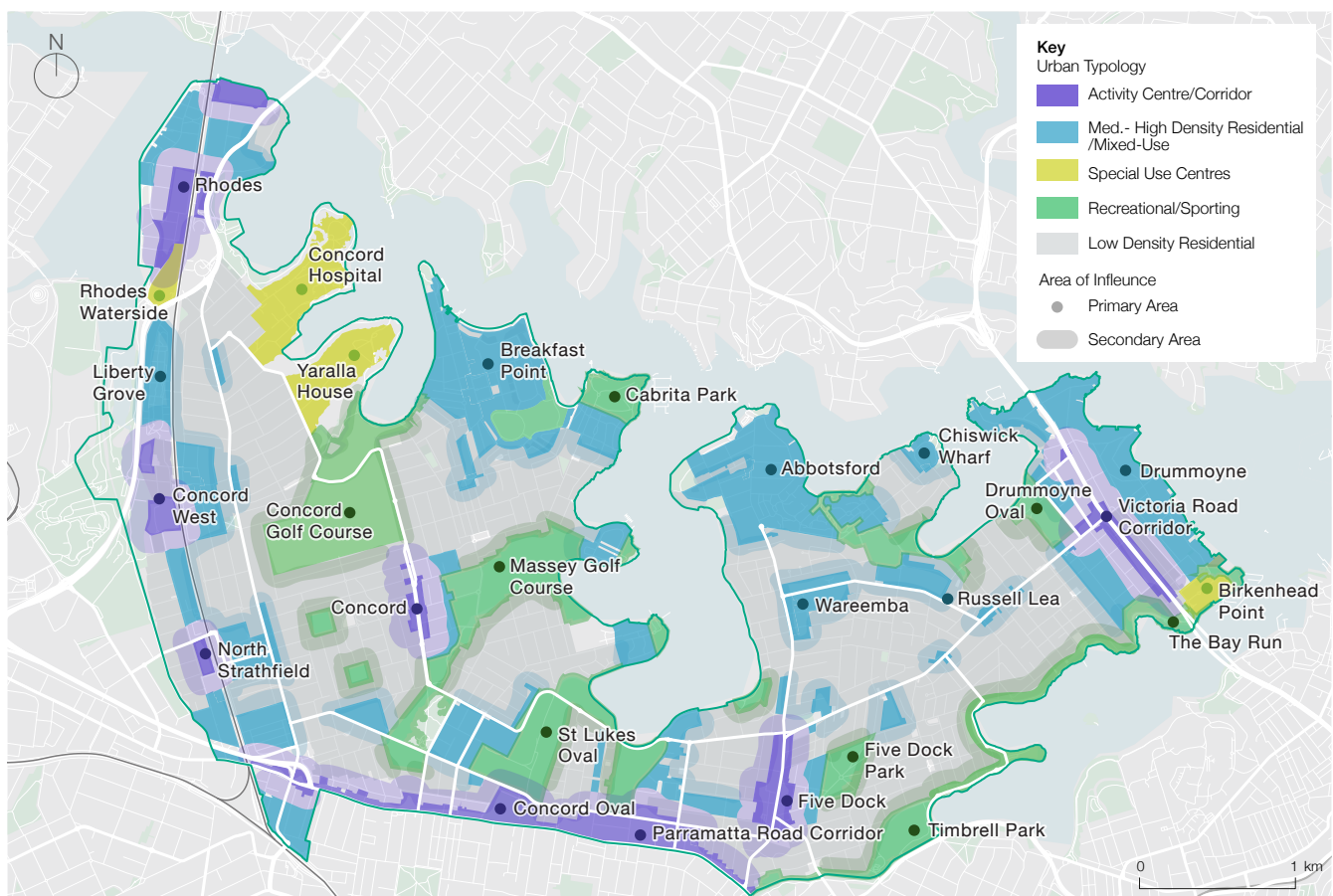
1. Matches reasons people visit the area with EV charging needs, charging types and assess associated grid impacts.

2. Co-locates chargers close to cafes, shops and services where people doing daily errands in the local area can wait for their cars to charge. This may increase visitation to local services and businesses.

Car parking time limits and configuration will be considered within each precinct using a place based approach considering the local needs, issues and impacts.

This section details the charging needs, requirements and impacts, including potential Council actions.

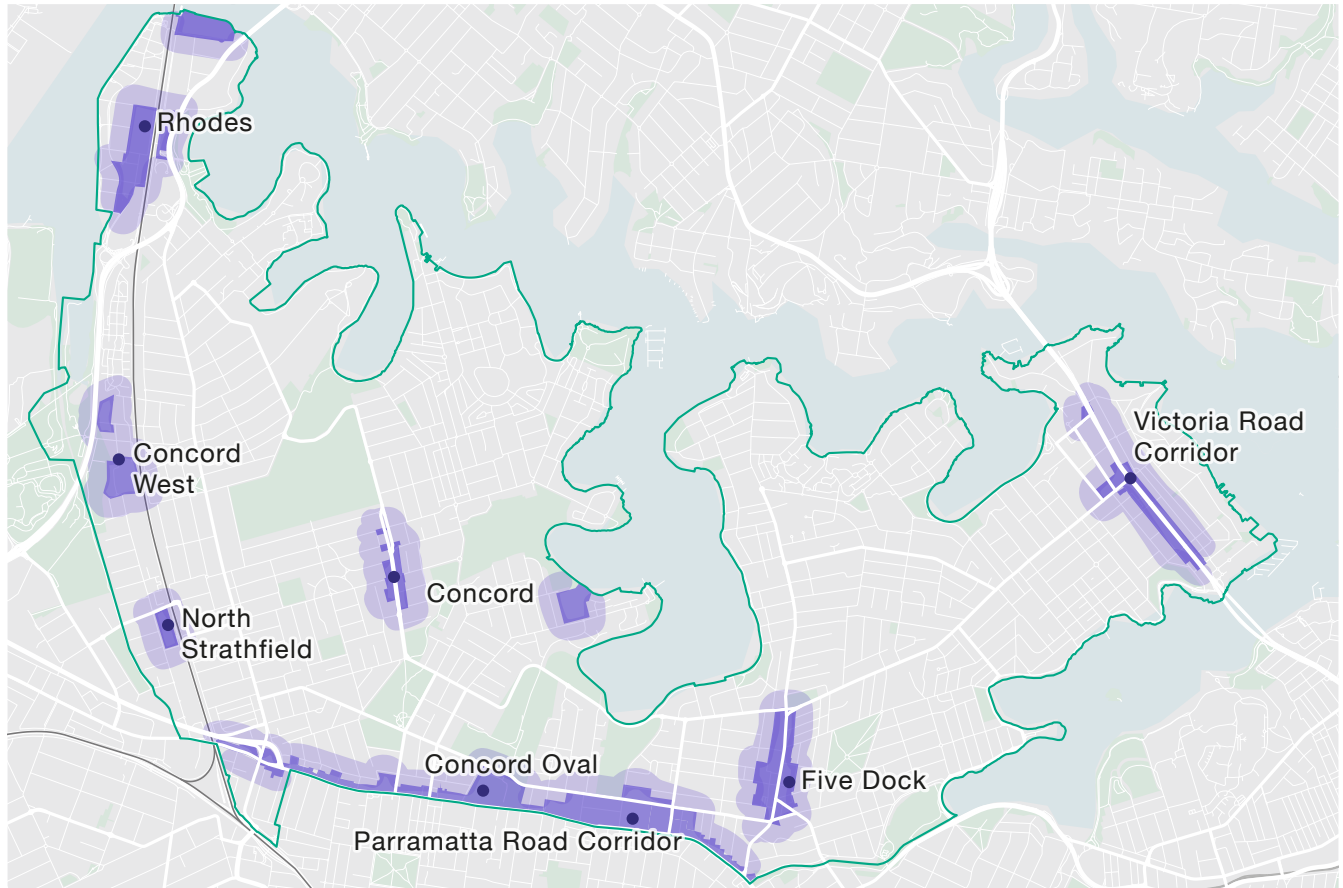
EV users generally have six main choices for where to charge their vehicle: at home, at work, at destination and on route, including on-street and at 'charging hubs'. The proposed charging network is designed by mapping these six charging places onto the urban form of City of Canada Bay.



	Home (Level 1)	Workplace (Level 2)	On-street (Level 2)	Destination (Level 2-3)	On-route (Level 3)	Charging hub (Level 3)
Activity Centre & Corridor	•	•	•	•		•
Medium-High Density Residential/ Mixed-Use	•		•	•		
Special Use Centre		•	•			•
Recreational & Sporting Precinct			•	•		•
Low Density Residential	•		•			

Figure 15 – Desired EV charging network

Activity Centres/Corridors



Typical areas: Great North Road (Five Dock), Victoria Road (Drummoyne)

Priority locations: Five Dock, Concord, North Strathfield, Concord West

Activity centres/corridors are relatively dense urban centres for the context of the City of Canada Bay, located within or adjacent to good quality public transport corridors or arterial roads. They facilitate a high concentration of commercial and retail land uses, while servicing the surrounding area as a key destination for employment, shopping and recreation.

Typically attracting short stay visits from both local and regional areas, a focus on fast public EV charging is required to support users who want a quick top-up of charge. Given the density of different land uses within short walking distances, a high number of businesses can capitalise on the co-location of EV chargers, which can lead to a local uplift in economic activity.

Activity centres and corridors are also strategic hubs on the public transport network. Careful planning is needed to encourage the transport hierarchy and incentivise active and public transport. An abundance of EV infrastructure could encourage an influx of private vehicle trips into these areas, which otherwise could be completed by active or public transport.



Charging typologies

- Activity Centres will require a mix of destination, workplace and on-street chargers to support the likely needs of users
- Increased residential density next to public transport hubs is likely to increase home charging demand
- Charging hubs are a viable option for activity centres within the City of Canada Bay, as they offer new facilities for the co-location of contemporary land uses and are suitable in supporting regional trips.

Charging requirements

These charging types will require fast levels of charging to service the needs of likely users.

- **Home:** Level 1 charging (2.5-7kW, 8-12 hours full charge)
- **Workplace and on-street:** Level 2 charging (7-22kW, 1.5-5 hours full charge)
- **Destination:** Mix of Level 2 and Level 3 charging (7-22kW chargers, 1.5-5 hours full charge /25-350kW chargers, 10-45-minute full charge)
- **Charging hub:** Level 3 charging (25-350kW fast chargers, 10-45-minute full charge).

Grid impacts

Higher service standards within activity centres will have an impact on available grid capacity at a localised scale. Sites within North Strathfield, Drummoyne and adjacent to Paramatta Road may face limited residual grid capacity by 2031. In these areas where the grid is vulnerable, grid capacity upgrades and on-site renewable energy integration should be considered to support increased electricity demand.

Policies/Interventions

Now

- Development controls for provision of EV chargers in buildings.
- Encourage competitiveness of manufacturer contracts and private investment
- Partnership with Ausgrid to monitor grid impacts
- Charging rebates for purchases from co-located businesses – or initial free charging
- Showcase demonstration projects/ trials to the public.

Mid-term

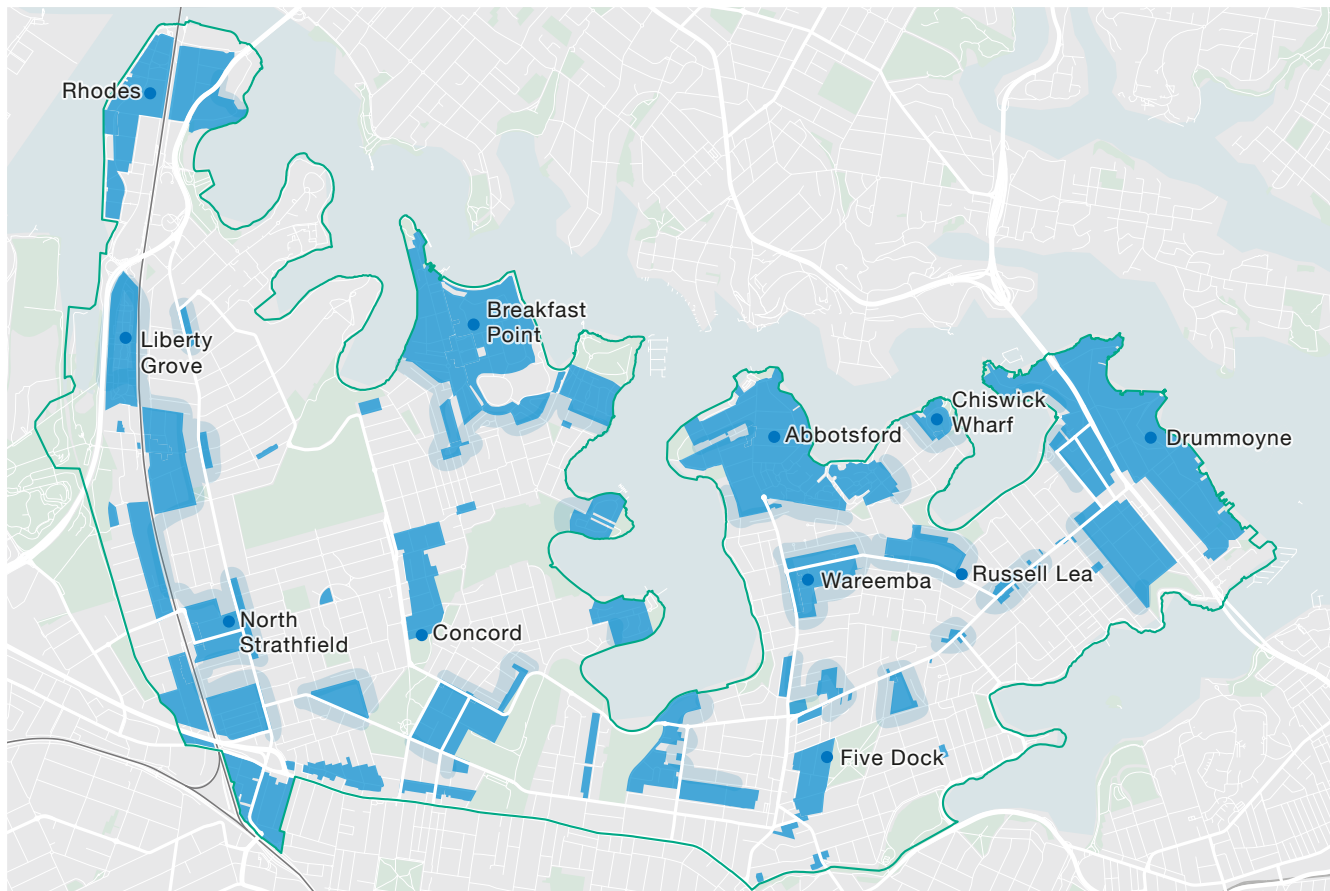
Encourage micromobility and prioritise active transport through improved infrastructure provisions and parking controls

- Investigate secure charging for e-bikes and e-rideable
- Examine spatial distribution of fast charging network
- Link charging infrastructure roll-out to public education campaigns relating to electro-mobility.

Long-term

- Establish close cooperation with electricity network providers to plan the roll-out of fast charging infrastructure network cooperatively and identify measures to address grid challenges prior to grid augmentation
- Aim for integration of tariff and payment mechanisms across the Metropolitan Sydney.

Medium-High Density Residential/Mixed Use



Typical areas: Breakfast Point, Rhodes, Chiswick, Abbotsford

Priority locations: Breakfast Point, Abbotsford, Chiswick

Medium-high density residential/mixed-use is typically characterised by low-rise apartment buildings to multi-unit complexes with underground parking facilities. Generally consisting of waterfront developments and relatively low provision of good quality public transport (in relation to the southern portion of the City of Canada Bay), these precincts offer a range of private and visitor parking options.

Larger developments offer ground floor retail and shopfronts such as post offices, services and small produce stores, including adjacent commercial offices.

These areas attract visitors throughout all times of the day, while keeping a relatively high night-time residential population. Due to a higher proportion of residential land uses than Activity Centres, and the likelihood that most EV charging will occur overnight at home, mixed-use areas have a limited potential of generating local economic opportunities in the co-location of chargers with land use.

Charging typologies

- Mixed Use areas will require a high focus on home charging to support the likely needs of the majority of EV users
- Where off-street parking is not provided, on-street and destination charging will require consideration.

Charging requirements

These charging types will require slow to fast levels of charging to service the needs of likely users.

- **Home:** Level 1 charging (2.5-7kW, 8-12 hours full charge)
- **On-street:** Level 2 charging (7-22kW, 1.5-5 hours full charge)
- **Destination:** Mix of Level 2 and Level 3 charging (7-22kW chargers, 1.5-5 hours full charge/25-350kW chargers, 10-45-minute full charge).

Grid impacts

Grid impacts will depend on the variability between charging types and speeds provided in the future planning of the mixed-use area.

In areas of high residential populations and high availability of off-street parking, such as Breakfast Point and Rhodes, a focus on home charging is not anticipated to have an impact on grid performance.

On-street and destination charging is not recommended to support the majority of charging in these areas, due to increased energy demand and adverse impacts on the grid.

Policies/Interventions

Now

- Development controls for provision of EV chargers in buildings
- Encourage competitiveness of manufacturer contracts and private investment
- Partnership with Ausgrid to monitor grid impacts.

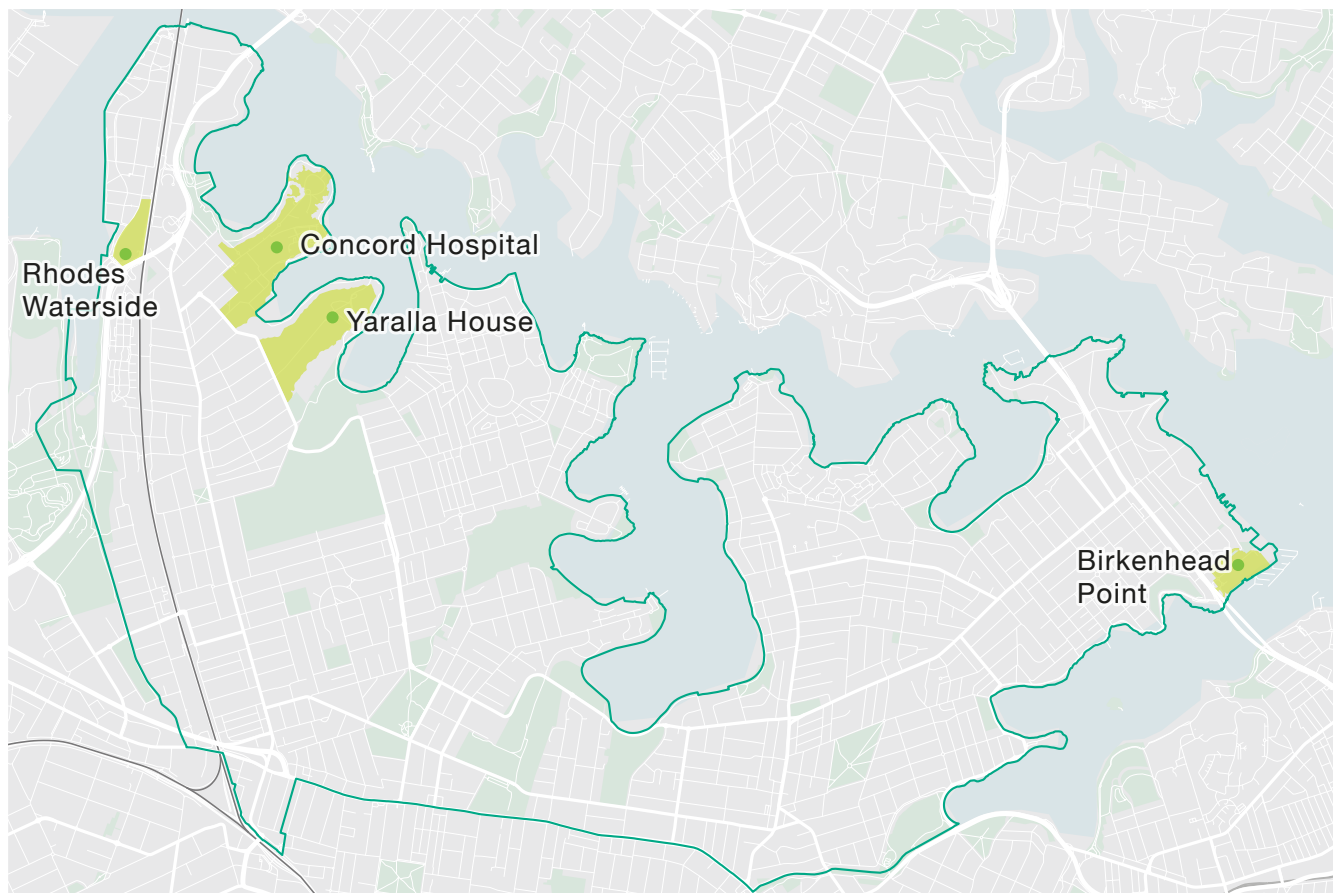
Mid-term

- Manage the access to the different charger types available (e.g., higher tariffs for people electing to use fast charging).

Long-term

- Aim for integration of tariffs and payment mechanisms across metropolitan Sydney
- Give thought to all—electric neighbourhoods.

Special Use Precincts



Typical areas: Concord Hospital, Rhodes Waterside

Priority locations: Concord Hospital, Rhodes, Birkenhead Point

Characterised by land uses such as hospitals, anchor retail/shopping destinations and aged care facilities. They are generally not Council-owned assets and support high volumes of employment opportunities.

Special Use Precincts mainly attract visitors for one particular reason. For instance, a person parking at Concord Hospital is not likely to venture to other areas while parked.

These areas offer a high availability of purpose-built off-street visitor parking, particularly at Birkenhead Point and Rhodes Waterside. Due to private ownership of the facility, EV charging infrastructure is likely to be considered on a case-by-case basis by the owner and operator. Particularly for retail destinations, EV charging presents commercial opportunities for charging manufacturers to offer free charging through purchases at stores.

Although smaller in land uses than Activity Centres, Special Use Precincts generate a high number of vehicle-based trips and the installation of EV charging infrastructure could consider alignment with Council's integrated transport strategic goals to reduce this.

Charging typologies

- Special Use Precincts will require a mix of workplace and destination charging to support the likely needs of visitors and employees
- To attract potential customers and maximise commercial opportunities, private proponents could anchor charging demand by proposing charging hubs in these locations and promising fast charging with reduced fees.

Charging requirements

These charging types will require faster levels of charging to service the needs of likely users.

- **Workplace:** Level 2 charging (7-22kW, 1.5-5 hours full charge)
- **Destination:** Mix of Level 2 and Level 3 charging (7-22kW chargers, 1.5-5 hours full charge/25-350kW chargers, 10-45-minute full charge)
- **Charging hub:** Level 3 charging (25-350kW fast chargers, 10-45-minute full charge).

Grid impacts

Grid impacts will depend on the variability between charging types and speeds provided in the future planning of the Special Use Precinct.

These areas generally have high existing electrical capacity to support daily uses yet are vacant for long periods outside of opening hours. Vacant parking facilities could be optimised for charging during this time to take advantage of residual grid capacity.

Policies/Interventions

Now

- Development controls for provision of EV chargers in buildings
- Encourage competitiveness of manufacturer contracts and private investment
- Partnership with Ausgrid to monitor grid impacts.

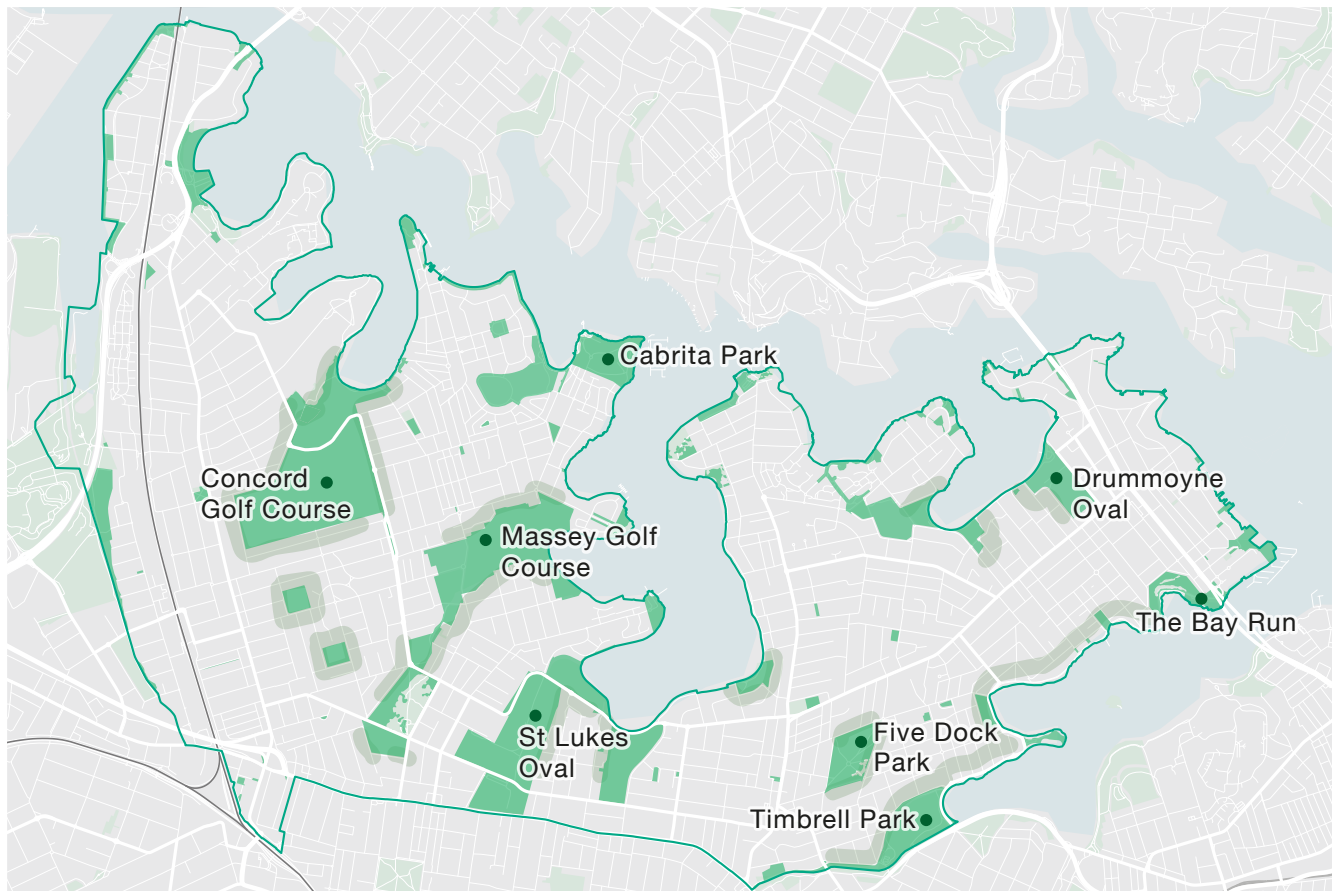
Mid-term

- Manage the access to the different charger types available (e.g., higher tariffs for people electing to use fast charging)
- Partnerships between Council and asset-owners.

Long-term

- Aim for integration of tariffs and payment mechanisms across metropolitan Sydney
- Allow access for the public outside of opening hours for charging needs.

Recreational and Sporting Precincts



Typical areas: Parramatta River foreshore, Drummoine Oval

Priority locations: Concord Oval, Drummoine Oval, The Bay Run

The City of Canada Bay is home to a number of popular recreational and sporting precincts, attracting users locally and regionally, generally during the day. The foreshore attracts a variety of city-wide trips for short-stay recreational or all-day leisure activities, particularly at Timbrell Park, Nield Park and along the Bay Run.

Sporting precincts, particularly Drummoine and Concord Ovals, attract a high volume of visitors at specific times during the day or night during event times. Outside of these hours, parking facilities remain relatively vacant.

Some sporting facilities, notably Drummoine Oval, have significant energy capacity to provide essential infrastructure such as high-powered lighting, and could be optimised for EV charging facilities during non-event times.

Charging typologies

- Recreation and Sporting Precincts will require a mix of on-street and destination chargers to support the likely needs of users
- Charging hubs could be explored at selected sites with existing energy capacity.

Charging requirements

These charging types will require faster levels of charging to service the needs of likely users.

- **On-street:** Level 2 charging (7-22kW, 1.5-5 hours full charge)
- **Destination:** Mix of Level 2 and Level 3 charging (7-22kW chargers, 1.5-5 hours full charge/25-350kW chargers, 10-45-minute full charge)
- **Charging hub:** Level 3 charging (25-350kW fast chargers, 10-45-minute full charge).

Grid impacts

Due to visits usually taking place during the day, recreational areas generally have limited grid capacity for infrastructure beyond lighting. High powered chargers in these locations are therefore anticipated to require connection to the grid. However, increased availability of outdoor space presents opportunities for on-site renewably powered chargers.

Chargers at sporting facilities are not anticipated to have a considerable impact on the grid due to existing capacity to support high powered lighting.

Policies/Interventions

Now

- Partnership with charging manufacturers
- Encourage competitiveness of manufacturer contracts and private investment
- Partnership with Ausgrid to monitor grid impacts.

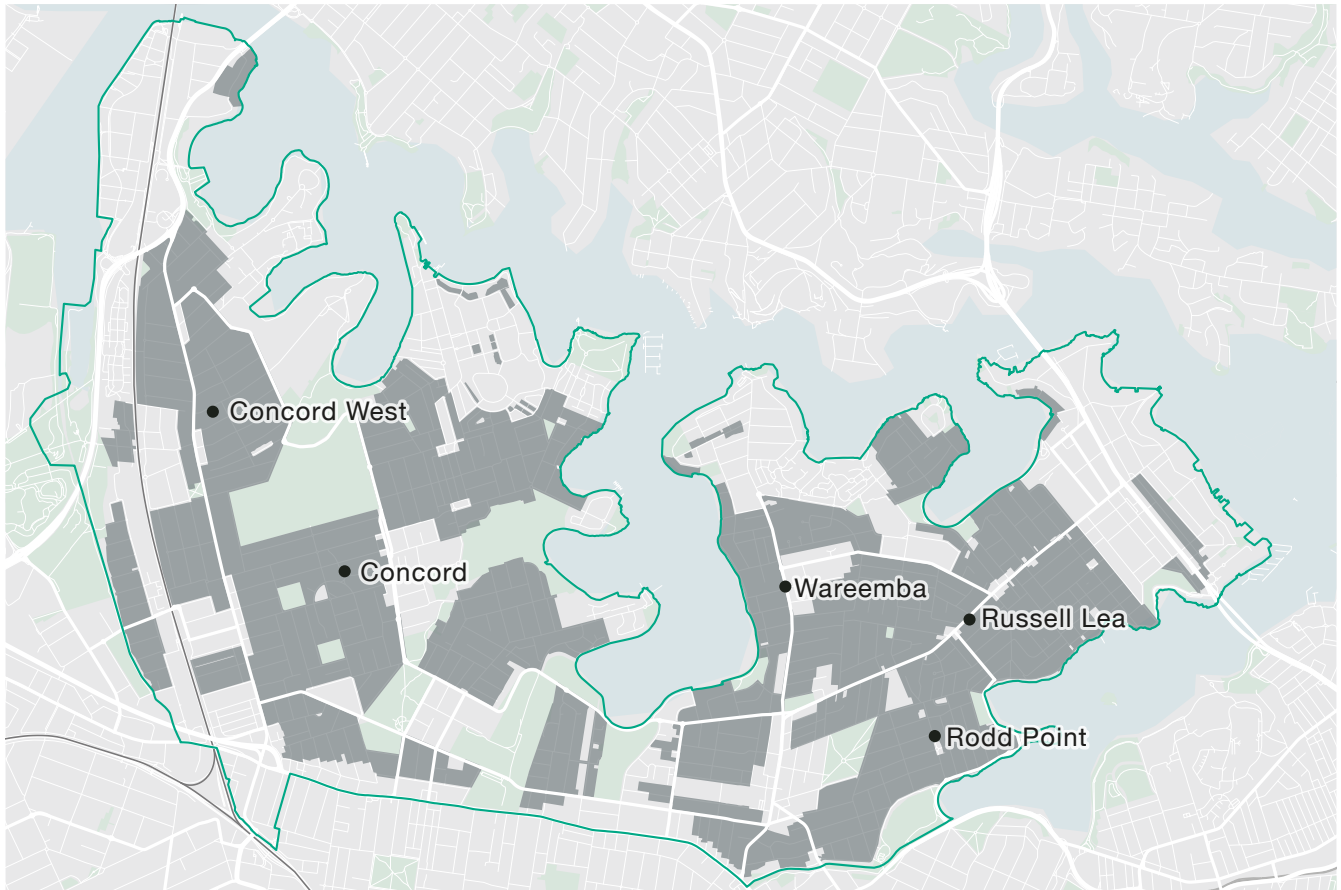
Mid-term

- Manage the access to the different charger types available e.g. through higher tariffs for fast charging.

Long-term

- Aim for integration of tariffs and payment mechanisms across metropolitan Sydney.

Low Density Residential



Typical areas: Concord, Wareemba

Priority locations: Support to be provided area wide.

The majority of Canada Bay's land area consists of low-density residential suburbs, characterised by large single dwelling lots (over 500square metres) with high availability of either off-street or on-street parking.

It is likely that users parking their EV in these areas will charge their vehicle either on their lot, or within a garage close to their dwelling.

Public chargers are not likely to be feasible in these locations due to the lack of competing land uses and limited opportunity for activation. For dwellings without off-street parking, Council will investigate appropriate measures to support safe and convenient on-street charging for residents that is integrated into the public realm. Up until such time, EV users in low density residential suburbs will need to rely on the rollout of public chargers at nearby precincts and centres, as described in previous urban areas.

Charging typologies

- Low density residential areas will primarily require a focus for home charging to support the likely needs of users, given off-street parking availability at the premise
- While on-street charging can be considered, specific challenges will need to be explored, such as localised increases in land value outside individual dwellings leading to poor social outcomes
- Dwellings without off-street parking will need to be supported by destination charging facilities and charging hubs at surrounding activity centres and precincts

Charging requirements

These charging types not likely to require faster levels due to the long dwell times associated with vehicles being parked overnight at residential homes.

- Home: Level 1 charging (2.5-7kW, 8-12 hours full charge)
- On-street: Level 2 charging (7-22kW, 1.5-5 hours full charge).

Grid impacts

Slow chargers in homes are not anticipated to have a noticeable impact on the grid. The installation of smart chargers will allow users to manage how and when to charge, allowing charging to occur in off-peak times depending on the availability of grid capacity at that time.

Grid impacts can be further limited by integrating homes with renewable energy sources, V2G/V2H technology and time-of-use tariffs.

Policies/Interventions

Now

- Introduction of charging audit identifying locations where new chargers are being installed
- Incentivise renewable energy and battery storage purchase in homes
- Encourage incentives for the installation of smart chargers in homes
- Encourage and support 'charger-sharing' or 'co-charging'.

Mid-term

- Lobby for the introduction of time-of-use tariffs in peak energy consumption times
- Bidirectional charging trials and pilots.

Long-term

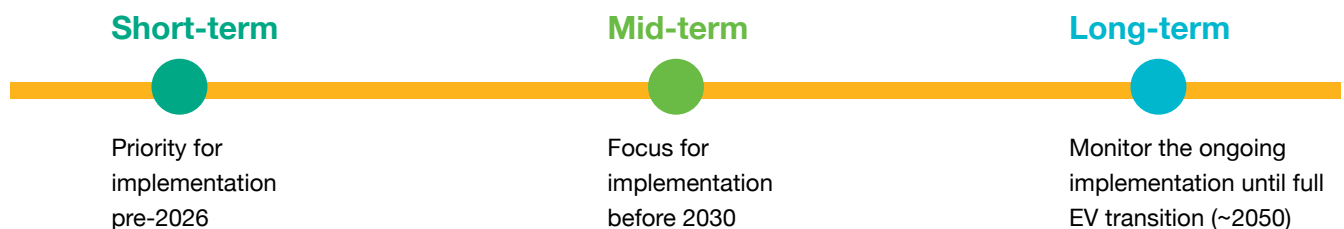
- Trial virtual power plant measures to monitor power usage on a large scale.

6. Electric Vehicle Charging Action Plan

Council will encourage implementation of EV charging infrastructure by Advocating, Acting and Researching. This applies to all EV charging infrastructure on public land and to support infrastructure on private land, whether installed by Council or under partnerships with third party operators.



Timeframes for implementation:



6.1 Advocate

Council will advocate and collaborate to strategically influence broader decisions outside immediate Council powers. We will advocate for economic incentives, standards and partnerships with the State and Federal Governments and industry stakeholders.

Table 6 outlines Council's priorities for advocacy.

Table 6 – Priority advocacy actions for Council

Opportunity	Details	Timeframe	Target stakeholder/s
Specific opportunity for Council to advocate to target stakeholders	Details of the opportunity, including focus areas, outcomes and specific information	Timeframe to act	Stakeholder

Funding

1	Collaborate with SSROC and other councils to advocate for appropriate national and State policy and programs.	- Funding availability for Council fleet transition. - Funding availability for EV charging infrastructure in strategically important locations and innovation pilots for emerging technologies and policies. - Emissions standards that meet the Paris Agreement. - Strategic charging network planning. - Transport hierarchy approach. - Public communications. - Streamlined process for approving EV chargers in strata e.g. "right to charge" legislation.	Short-term	NSW and Australian Government, Sydney Regional Organisation of Councils (SSROC) and other councils
2	Collaborate with neighbouring LGAs for funding pools to facilitate joint purchasing.	- Joint purchasing of fleet vehicles. - Joint purchasing of charging infrastructure.	Short-term	Neighbouring LGAs, Sydney Regional Organisation of Councils (SSROC)

Standards

3	Advocate for state and national building regulations to make developments 'EV-Ready.'	- Wider recognition of Council DCP's by neighbouring local governments, and the State and Federal Government. - Clear and concise 'EV-Readiness' terminology across jurisdictions.	Short-term	SSROC, NSW and Australian Government
4	Advocate for the development of nationwide universal access to infrastructure standards.	- Design standards for universal access to charging infrastructure for people of all abilities. - Consider hardware, software, site-specific design requirements. - Consider interface with Disability Discrimination Act 1992. <i>Example: Electric Vehicle charging infrastructure for people living with disabilities, Motability 2020, UK.</i> <i>Example: PAS 1899:2022 Electric vehicles – accessible charging – specification (Draft), British Standards Institution 2022, UK.</i>	Short-term	Australian Government
5	Collaborate with consultants, developers and industry stakeholders to ensure compliance with Council's updated DCP.	Engagement on projects and planning amendments to make buildings ready for EVs.	Short-term	SSROC, private consultants, NSW Government

Table 6 continues over

Table 6 continued

Opportunity	Details	Timeframe	Target stakeholder/s
Specific opportunity for Council to advocate to target stakeholders	Details of the opportunity, including focus areas, outcomes and specific information	Timeframe to act	Stakeholder
Tax/duties			
6 Advocate for a tax reform for Council and corporate fleets in the short-term to accelerate EV uptake.	- Exemptions and discounts from fringe benefits tax for purchases and use of EVs. - Travel and charging tax deductions for fleet EVs. - Accelerated depreciation reform for application to fleet EVs. - Subsidy and/or rebates for installation of at-home charging infrastructure for fleet EV use.	Short-term	NSW and Australian Government
7 Lobby for the introduction of time-of-use tariffs for EV chargers in peak energy consumption times.	- Particularly for residential homes, the modification of user behaviour is the only demand management Action Plan for Level 1 EV chargers. - Implementation of time-of-use tariffs is recommended to encourage charging outside of peak times and reduce grid stress.	Mid-term	NSW and Australian Government, DNSPs (Ausgrid)
EV Rollout			
8 Collaborate with state agencies and advocate for the installation of charging infrastructure on state-controlled regional and major roads.	- Installation of rapid/ultra-rapid charging stations on state-controlled roads to support regional trips. - Focus on Paramatta Road and Victoria Road. - High up-front capital investment for rapid/ultra-rapid charging stations is likely to require state and federal capital input.	Mid-term	NSW Government, Transport for NSW
9 Advocate for the electrification of public transport.	- Electrification of the entire transport sector to reach net-zero. - Achieve cleaner air and health benefits.	Mid-term	NSW Government, Transport for NSW
10 Advocate for the transition of electricity generation from fossil fuels to renewables.	'Greening' the grid can reduce the pressure on Council to explore specific cases for on-site renewables for EV charging.	Mid-term	NSW and Australian Government, Renewable energy providers
11 Advocate for collaboration with petrol retailers within the City of Canada Bay to support transition to zero-emissions, waste management and contamination.	- Government advice, direction and education for transition of stranded assets. - Proactively manage waste and residual site contamination during transition period.	Long-term	Petrol retailers (BP, Shell, Budget Petrol, Ampol, etc.)
12 Advocate for appropriate support and encouragement to speed up EV transition for carshare/rideshare businesses.	- Government advice, direction and education for transition of carshare/rideshare assets. - Incentives for EV purchasing.	Long-term	Taxi industry, carshare/rideshare industry
Incentives			
13 Continued push for incentives for both public and private purchases of vehicles and charging infrastructure.	- Incentives for vehicle purchases. - Incentives for the installation of smart charging devices in homes. - Incentives for the installation of demand management systems in new developments and major restorations.	Long-term	NSW and Australian Government
14 Continued push for incentives for both public and private transition to renewable energy sources and storage in homes and developments.	Incentives for wind/solar PV installation and storage in residential and non-residential developments.	Long-term	NSW and Australian Government

6.2 Act

Council will act to support implementation of EV charging infrastructure through Council operations including fleet transition, planning instruments, public education campaigns, design guidelines and compliance. Table 6 outlines priority Actions for Council operations. Table 6 outlines Council's priorities for advocacy.

Table 7 – Recommendations for in-house levers for Council

Action	Details	Council effort	Target users	Time-frame	Measure
Specific action for Council to pursue	Purpose and potential outcomes of the action	Cost, stake-holders and time required	Target-ed user base	Time-frame to act	Target or measure

Fleet

1 Prepare a zero-emission Council fleet plan. Early transition to EVs could enable Council to bring forward its target for net zero Council operations.	Council's <i>Operational Plan 2021-2022</i> , targets net-zero emissions for Council operations by 2030. The transition to a zero-emission fleet is Council's final step to reach net-zero operations by 2030. A Council fleet plan for all new fleet vehicles to be zero-emission fleet from 2026 would enable Council to bring forward its achievement of net-zero Council operations. From 1 July 2022, Council moves to 100% renewable electricity operation. Electrification projects in Council's approved capital works plan will largely phase out gas use by 2025. Council's Zero Emission Fleet Plan will investigate the purpose and procurement approach for vehicles which are either electric or hydrogen. A zero-emission Council fleet could encourage businesses and the public to follow. A Council EV fleet increases local demand for charging, attracting third-party proposals to install charging infrastructure in the City of Canada Bay.	Low	Council	Short-term	Transition entire Council fleet to zero-emission from 2026
2 Purchase only zero-emissions transport from 2026. Update Council contracting policies and procurement conditions for all new vehicles used for Council to be zero-emission from 2026.	Council purchases a range of services which include transportation. Achieving a net zero fleet and procurement of Council transport services requires a step change in contractual requirements for vehicle purchase, hire, lease or service provision. Council would update all contractual policies to allow only zero-emission vehicles by 2026. The extent of this change would apply to any vehicle under a leasing or service agreement with Council, including, but not limited to, waste trucks, street sweepers, passenger vehicles, etc. This will depend on the availability of vehicles within the Australian market, and relevant caveats could be put in place to ensure the transition of vehicles to zero-emissions once a viable vehicle is available.	Moderate	Council Private	Short-term	Transition entire Council fleet to zero-emission from 2026
3 Investigate feasibility of EV and hydrogen fuel-cell electric vehicles for heavy vehicles.	Different vehicle technologies have different strengths and weaknesses that make types of operations more viable than others. EV technology is becoming widely available, mature and proven as an alternative to ICEs, yet current technology yields long refuelling times, variability in high and low temperatures, and large batteries make heavy vehicles even heavier. Hydrogen powered vehicles can be refuelled in the same time as ICEs, are lighter and have higher energy/power density, yet there is low green hydrogen availability and requires greater infrastructure development. A discussion paper that explores these key characteristics could assist Council in determining the most appropriate future for the transition of heavy vehicles (such as buses, waste trucks and sweepers) towards net-zero.	Low	Council	Short-term	1x Council study paper prior to 2026

Table 7 continues over

Table 7 continued

Action	Details	Council effort	Target users	Time-frame	Measure
Specific action for Council to pursue	Purpose and potential outcomes of the action	Cost, stake-holders and time required	Targeted user base	Time-frame to act	Target or measure

Fleet

4 Establish Council as 'grant-ready', by developing and lodging a fleet transition plan.	Tapping into major funding pools of NSW or Australia Government is a major opportunity for realising net-zero targets while mitigating direct costs for Council. Developing a Fleet Transition Plan makes it easier for Council to apply for funding. The Plan would be similar to the current procurement plan for vehicles, updated to include specific criteria for EV procurement. This would include a financial Action Plan for procurement and reselling, assessment of available vehicles on the Australian market and minimum requirement for zero-emission operation. The plan would summarise the charging protocols for acquired vehicles, including the existing charging network, plans for upgrades and the locations at which the procured vehicles are intended to be charged. As well as EV's the plan would investigate a wider range of mobility options including leasing/purchasing agreements of e-micromobility devices (e-bikes, e-scooters, etc.) in place of EVs. Micro-mobility devices are already used in more dense areas such as City of Melbourne for park maintenance and other routine operations¹⁶. A wealth of guidance and resources to assist in EV fleet management can be accessed via the Charge Together Fleets program¹⁷.	Low	Council Private	Short-term	1x Council transition plan prior to 2026
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Implementation process

5 Implement a streamlined process for assessing third-party proposals to install public charging infrastructure.	Clear and succinct evaluation criteria makes it easier for Council to assess EV charging installation proposals, while guiding the preferred rollout of publicly and privately located charging infrastructure.	Moderate	Council Private	Short-term	Publish process on the Council website
6 Advertise a process for the submission of public EV charging proposals by third party providers.	Partnerships for the installation of public EV charging infrastructure may be established through a public EOI process, seeking proposals from third party providers. The request for EOI would outline the brief of operating charging infrastructure in the City of Canada Bay, including requirements of public chargers, Council-determined locations and responsibilities required by the third party.	Moderate	Council Private Government, Sydney Regional Organisation of Councils (SSROC) and other councils.	Short-term	Install at least 4x Level 2 and 1x Level 3
7 Develop an Electric Vehicle Charging Infrastructure Policy.	Council's Electric Vehicle Infrastructure Charging Policy describes the requirements and obligations for people and companies seeking to install EV charging infrastructure in the City of Canada Bay area.	Low	People wanting to install EV infrastructure	Short-term	Policy developed and adopted

Table 7 continues over

¹⁶ Smooth path ahead for citywide pedal powered partnership, City-Wide 2020. Source: <https://www.citywide.com.au/detail/smooth-path-ahead-for-citywide-s-pedal-powered-partnership>

¹⁷ Charge Together Fleets. Source: <https://fleets.chargetogether.org/>

Table 7 continued

Action	Details	Council effort	Target users	Time-frame	Measure
Specific action for Council to pursue	Purpose and potential outcomes of the action	Cost, stakeholders and time required	Target-ed user base	Time-frame to act	Target or measure
Fleet					
8 Analyse potential sites, identifying sites for high-powered charging stations.	Charging sites can be strategically planned and prioritised to encourage visitation to areas, guide traffic and manage demand on the grid. Through collaboration within Council and with external stakeholders such as Ausgrid and property owners, a site selection study could identify and prioritise a suite of sites for the installation of charging stations. A study could involve identification of sites based on land availability, residual grid capacity, existing infrastructure and existing charging demand. Council could also develop a process to implement kerbside public charging in residential streets where residents do not have off-street parking. This could involve an investigation into the funding of such infrastructure in the public domain for private use, how it would be installed (in the kerb, pedestal chargers, smart poles, etc.) and who the beneficiaries would be.	High	Council Private Public	Mid-term	1x Council site selection study paper prior to 2030
Assets					
9 Target the installation of Level 2 or Level 3 public chargers.	Arguably the best way to increase awareness and uptake of EVs is by providing public charging infrastructure. Council should partner with third parties and progressively install a mix of Level 2 and Level 3 chargers throughout the the City of Canada Bay region. Prioritise public chargers in strategic locations with a high volume of visitors such as activity centres and corridors, special use precincts and some sporting facilities as shown in City of Canada Bay's preferred place-based charging network.	Moderate	Council Private Public	Short-term	Install at least 4x Level 2 and 1x Level 3 charger/s in priority locations prior to 2026
10 Set up a Steering Committee to monitor the planning, rollout and impact of the EV charging network on an ongoing basis.	A number of factors will need to be monitored by Council on an ongoing basis to ensure the rollout of EV charging infrastructure is equitable, compliant and effective. Council should monitor the following, and work with suppliers and the community as required: • Expressions of interest from charging manufacturers and suppliers • Requests for information and general inquiries • Relevant approvals for installation • Routine checks of chargers and consult Local Emergency Management Officers about risk e.g. battery fires. • User experience of chargers in the City of Canada Bay (either directly through engagement with the community, public websites i.e. PlugShare, or anecdotally) • Implementation of all actions in the Action Plan.	Moderate	Council	Long-term	n/a

Table 7 continues over

Table 7 continued

Action	Details	Council effort	Target users	Time-frame	Measure
Specific action for Council to pursue	Purpose and potential outcomes of the action	Cost, stake-holders and time required	Targeted user base	Time-frame to act	Target or measure

Assets

11 Update Development Control Plan to include internationally recognised EV-Readiness terminology and differing requirements for 'non-residential' developments. Note: Benchmarks are based on best practice and investigation of charging behaviour for 100% uptake of EVs. While they are a best reflection of likely requirements to support full uptake of EVs, they require lobbying with the State Government for support.	Council is already including controls in the DCP to guide development standards in the City of Canada Bay area. We will review and update these to set a clear standard for EV-Readiness, following the international standard categories of EV-Capable, EV-Ready and EV-Installed and to include that any major restorations/repurposing of existing developments should follow this Control. Best practice benchmarks for new developments and major restorations to be included in the DCP include:	Low	Council Private Public	Short-term	Operation of updated DCP from 2026														
	<table><tr><th>Development type</th><th>Minimum proportion of parking bays with charging infrastructure</th></tr><tr><td>Residential flat building</td><td>Private parking bays: 100% EV-Capable with capacity for Level 1 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging</td></tr><tr><td>Hotel</td><td>Guest parking bays: 100% EV-Ready with capacity for Level 1 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging</td></tr><tr><td>Office</td><td>Employee parking bays: 20% EV-Ready with capacity for Level 2 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging Fleet parking bays: 100% EV-Capable with capacity for Level 1 charging</td></tr><tr><td>Warehouse/factory</td><td>Employee parking bays: 20% EV-Ready with capacity for Level 2 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging Fleet parking bays: 100% EV-Capable with capacity for Level 1 charging Heavy vehicle bays (GVM >4.5 tonnes): 100% EV-Ready with capacity for Level 2 charging</td></tr><tr><td>Shop/supermarket</td><td>Public parking bays: 20% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging</td></tr><tr><td>Hospital/public building</td><td>Public parking bays: 20% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging</td></tr></table>					Development type	Minimum proportion of parking bays with charging infrastructure	Residential flat building	Private parking bays: 100% EV-Capable with capacity for Level 1 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging	Hotel	Guest parking bays: 100% EV-Ready with capacity for Level 1 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging	Office	Employee parking bays: 20% EV-Ready with capacity for Level 2 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging Fleet parking bays: 100% EV-Capable with capacity for Level 1 charging	Warehouse/factory	Employee parking bays: 20% EV-Ready with capacity for Level 2 charging Visitor parking bays: 25% EV-Ready with capacity for Level 2 charging Fleet parking bays: 100% EV-Capable with capacity for Level 1 charging Heavy vehicle bays (GVM >4.5 tonnes): 100% EV-Ready with capacity for Level 2 charging	Shop/supermarket	Public parking bays: 20% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging	Hospital/public building	Public parking bays: 20% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging
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	Shop/supermarket					Public parking bays: 20% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging													
	Hospital/public building					Public parking bays: 20% EV-Ready with capacity for Level 2 charging Employee parking bays: 20% EV-Ready with capacity for Level 2 charging													
	Additional notes: • An EV-Installed bay/s with capacity for Level 3 (rapid/ultra-rapid) charging are to be considered on a case-by-case basis • For all new developments and major restorations, it is recommended that Demand Response capabilities for EV Demand Management Systems with throttling be supported, through either AS/NZS 4755 or internationally accepted protocols. • Access to suitable charging capabilities for e-micromobility devices (e-bikes, e-scooters, etc.) is considered as part of a development plan, particularly in the case of visitor and workplace micromobility parking bays.																		
Eg: Southwest Energy Efficiency Project (SWEEP) – EV-Ready Building Codes, Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming.																			

Table 7 continues over

Table 7 continued

Action	Details	Council effort	Target users	Time-frame	Measure
Specific action for Council to pursue	Purpose and potential outcomes of the action	Cost, stake-holders and time required	Targeted user base	Time-frame to act	Target or measure

Assets

12 Update relevant plans and policies to incorporate EVs, including but not limited to the Plans of Management and Local Environment Plan.	Many key plans and policies documents are outdated and lack mention of EVs. Council refresh them to include this.	Low	Council	Short-term	Identify and update relevant legislation prior to 2026.
13 Continue supporting policies and strategic directions that prioritise and encourage public transport, walking and cycling as alternatives to the private car.	Council will focus on policies and strategic directions that promote the transport hierarchy and mode shift to walking and cycling, public transport, micromobility, car share and rideshare alongside transition to EVs for Council, private fleet managers and the community. The City of Canada Bay in a period of growth and change, with new Metro stations as public transport hubs and urban planning and design to increase numbers of people walking and cycling. Privately owned EVs may achieve net-zero emissions but continued use of private vehicles still increases congestion, undesirable streetscape outcomes, increased parking demands and barriers to movement and health targets.	Low	Council Private Public	Long-term	n/a
14 Implement enforcement mechanisms such as time limited charger use and line marking to ensure equitable access to charging stations.	EV charging stations must be accessible for people of all abilities, socio-economic situations, technological access and so on. Many access equity aspects are wider scale than the City of Canada Bay and need state legislation and national alignment. However, Council can directly ensure charging stations (and their corresponding parking bays) are available for use by the maximum number of users with parking/charging time regulations (fines for exceeding allocated time) and designated EV linemarking (fines for ICEs parking in designated EV charging bays).	Moderate	Public	Long-term	n/a

Education & Partnerships

15 Promote EV-readiness with an education and awareness campaign for local residents and businesses, developers and providers of charging infrastructure.	Council will support implementation of the EV Strategy and Action Plan with an education and awareness campaign for residents, developers, local businesses, and suppliers of EV charging infrastructure. Council has already hosted two webinars on EV charging for strata and has planned an EV Expo at the 2023 Concord Carnival. Council will develop and EV-readiness education and awareness campaign with audience-focussed factsheets, web and social content, and public workshops. Guidance for residents on retrofitting homes with EV charging infrastructure could include EV terminology, current market trends, NSW uptake targets, charging speeds available, pricing and charging locations, while also referring to useful links and references. Guidance for Stata building managers, owners and tenants on navigating the complexities of installing, owning and managing charging infrastructure could be supplied at building handover. The factsheet could cover building EV readiness, the buildings' energy capacity, location of substations and distribution boards, provision of EV-Readiness (EV-Capable, EV-Ready, EV-Installed carparking bays), location of raceways and contacts of appropriate manufacturers and/or electrical professionals to carry out the installation of charging infrastructure. Guidance for developers on EV-Ready developments with EV-Readiness terminology, design advice and rationale for controls set out by the DCP <i>Eg: Moreland City Council – Moreland Zero Carbon Development Guidelines: Electric Vehicle Infrastructure.</i>	Low	Private Public	Short-term	1x publicly available EV factsheet prior to 2026
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Table 7 continued

Action	Details	Council effort	Target users	Time-frame	Measure
Specific action for Council to pursue	Purpose and potential outcomes of the action	Cost, stake-holders and time required	Targeted user base	Time-frame to act	Target or measure

Education & Partnerships

16 Establish a working group/partnership with Ausgrid, involving SSROC and other coordinating organisations (Resilient Sydney) to coordinate grid performance, upgrades and monitoring.	Early engagement with Ausgrid will give Council a better chance of coordinating EV charging infrastructure roll-out with Ausgrid. Working with Ausgrid increases likelihood that site selection, design and functionality of charging stations are more in-line with desired outcomes for Council. Involving SSROC could facilitate wide-scale collaboration between neighbouring local governments. The working group could meet (biannually) to discuss proposed EV charging installations, grid performance, upgrades and renewables. SSROC has successfully negotiated other works with Ausgrid, such as LED streetlighting upgrades.	Moderate	Council	Short-term	Form group before 2026 and hold ~2 sessions per year
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6.3 Research

Council will research the benefits of specific pilots, or ongoing monitoring and/or measuring to study the success of the transition. This includes potential partnerships and emerging technologies. Table 8 outlines Actions for Research and investigation.

Table 8 – Priorities for further research and investigation for Council

Research Opportunity	Details	Timeframe	Target stakeholder/s	Measure
Priority area for Council to research	Details of the opportunity, including focus areas, outcomes and specific information	Recommended timeframe to act	Responsible stakeholder	Recommended target or measure
1 Set up ongoing discussions and working groups between SSROC and Ausgrid (and other relevant DNSPs).	- Understand existing and future grid capacity. - Collaborate on potential projects, installation of EV charging infrastructure and site selection studies for third-party involvement. - Streamline grid augmentation and management of grid stress.	Short-term	SSROC, DNSPs (Ausgrid)	Form working group prior to 2026 and hold ~2 sessions per year
2 Explore the formation of a private charging infrastructure audit.	- Identify locations and volume of where chargers (public and private) have been installed. - Identify proposed locations for future chargers. - Identify vulnerable areas to increased grid demand.	Short-term	SSROC, DNSPs (Ausgrid)	Develop charging audit prior to 2026 and regularly update (monthly)
3 Partner in research to strengthen EV cybersecurity.	- As more EVs connect to the electricity network, increased risks to cybersecurity, vehicle security and data security emerge. - Study the cybersecurity vulnerabilities and measures to protect charging infrastructure and vehicles, such as third-party firewalls and authentication software	Short-term	Council, State Government, Charging manufacturers/suppliers	Ongoing research
4 Investigate the establishment of net-zero precincts, centres and electric-only streets.	- Precincts, centres and streets contributing net-zero emissions and transport is completely zero-emission. - Restriction of ICE movements (not including residents) on streets during specific times of the day. - Increase awareness, showcase benefits of EV technology. <i>Eg: City Fringe Ultra-Low Emissions Streets, London UK</i>	Mid-term	Public	1x electric-only precinct, centre or street pilot prior to 2030
5 Investigate EVs as an input to virtual power plant (VPP) measures.	- Used like a household smart charger, EV batteries can be used to help stabilise the balance of electricity supply. - EVs can be supplemented within a VPP system to manage power usage and optimise renewable energy generation and surplus on a multi-household, suburban scale. <i>Eg: Tesla Energy Plan on the Tesla Virtual Power Plant, SA and VIC</i>	Mid-term	Council, DNSPs (Ausgrid), NSW Government	1x VPP pilot involving EVs prior to 2030

Table 8 continues over

Table 8 continued

Research Opportunity	Details	Timeframe	Target stakeholder/s	Measure
Priority area for Council to research	Details of the opportunity, including focus areas, outcomes and specific information	Recommended timeframe to act	Responsible stakeholder	Recommended target or measure
6 Monitor climate resilience and the impact of shocks and stresses to charging infrastructure and electricity network.	- Investigate grid stability at existing charger sites and monitor impacts with the introduction of new chargers and increased development and electricity demand. - Study the impacts and vulnerabilities of grid and charging station stability due to climate change, including volatile weather and heatwaves. - Identify areas of particular vulnerability to sea level rise, king tides, high intensity rainfall and humidity and put measures in place to avoid the installation of infrastructure in these areas and/or safeguard charging infrastructure from inundation.	Mid-term	Council, DNSPs (Ausgrid), NSW Government	Ongoing research
7 Monitor and manage the responsible maintenance and disposal of EV infrastructure at end-of-life.	- EV batteries consist of chemicals and materials that can be harmful to the environment. - Limited research has been done on the disposal and management of end-of-life waste. - NSW Government recently released an issues paper on Going Circular in Clean Energy.	Long-term	NSW Government	Ongoing market research
8 Monitor the progression of emerging technologies that could change the technological and planning landscape.	- EV technology is still in its infancy and is continuously being researched and developed. - It is important that in any roll out of charging technology, the possible future impacts of these emerging technologies are taken into consideration. There is a risk that as new technology is developed, the infrastructure that is currently being implemented could become stranded assets and lead to 'sunk costs'. - Monitor disruptive and emerging technologies e.g. battery swap services to understand the potential impacts for local residents.	Long-term	All	Setup bidirectional charging, wireless charging and connected autonomous vehicle trials prior to 2050
9 Conduct place based analysis of data to support EV transition	Undertake place-based analysis on numbers of strata dwellings to create more fine scale assessment of likely local demand for on-street charging where required.	Mid-term	Council	Ongoing analysis of data to support the EV transition
9 Monitor and Review	Establish a process for monitoring and reviewing EV charging infrastructure annually using charger utilisation rates or similar on public and private land. - Publish the outcome within yearly reporting and within Councils environmental reporting. - Update an updated target for the provision of public charging that is in line with international benchmarks within the new Environmental Strategy.	Short term	Council	Updated target established, monitoring process established, yearly monitoring published

Glossary and acronyms

Glossary

Electric Vehicle

There are currently four types of electric vehicles (EVs) available on the market:

1. **Battery Electric Vehicle (BEV)** – A BEV is a vehicle that is powered solely by an electric motor, which gains electricity from internal batteries charged by connecting with an external energy source. BEVs are also defined as zero-emission vehicles (ZEVs).
2. **Plug-in Hybrid Electric Vehicle (PHEV)** – A PHEV is a vehicle that is powered by both an electric motor and an internal combustion engine (ICE). Similar to a BEV, the electric motor is powered by internal batteries and can be charged by connecting with an external energy source. The ICE is powered by petrol or diesel fuel, which in some cases may also be able to charge the internal batteries.
3. **Hybrid Electric Vehicle (HEV)** – Similar to a PHEV, an HEV is a vehicle that is powered by both an electric motor and an ICE. While the electric motor in a HEV is powered by internal batteries, these batteries are not charged by connecting to an external energy source. These batteries are charged by an ICE and/or regenerative braking.
4. **Fuel-cell Electric Vehicle (FCEV)** – An FCEV is a vehicle that is powered by producing electricity from combining hydrogen gas and oxygen in a fuel cell to power an electric motor.

For the purpose of the City of Canada Bay Electric Vehicle Charging Strategy, an EV refers to a BEV, as they are the only EV that are powered purely by batteries and charged by an external electricity source.

EV-Readiness

EV-Readiness refers to the application of appropriate infrastructure that allows the future provision for sufficient EV charging infrastructure.

In the case of an EV-Ready Building, this refers to a development with a dedicated electrical circuit and associated infrastructure with sufficient capacity to allow future charging of EVs at each charging spot, should the appropriate infrastructure be installed. This includes the application of, or spatial consideration for the later installation of:

- Transformers, substation, switchboard, cable trays, wiring, load management systems and a 240-volt General Power Outlet (GPO) or power point.
 - Connections to the network to sustain power supply
 - On-site renewable energy and energy storage.
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EV-Capable parking bay

EV-Capable means the electrical capacity to support a future EV charger is installed, including a dedicated branch circuit and continuous raceway from the panel to the future EV parking bay.

If a parking bay is constructed to be EV-Capable, a contractor would only need to pull a wire through the conduit and install a charger to enable EV charging. This charger could be a 240-volt GPO to enable Level 1 charging, a special wall-mounted attachment to enable Level 2 charging or a DC rapid/ultra-rapid charger to enable Level 3 charging, given electrical capacity is sufficient to support this. EV-Capable parking bays are suited to privately owned bays, as they give the owner the option of easily installing a charger.

Glossary continued

EV-Ready parking bay

EV-Ready is the next step up from EV-Capable, meaning the electrical capacity to support an EV charger is installed, including a raceway with conduit that terminates in a junction box or a 240-volt GPO.

If a parking bay is constructed to be EV-Ready, an EV can be charged from “day-one” by connecting the vehicle’s provided charger to the GPO. The owner of this bay could also choose to install a special wall-mounted attachment to enable Level 2 charging or DC rapid/ultra-rapid charger to enable Level 3 charging, given electrical capacity is sufficient to support this. EV-Ready parking bays are suited to public or employee parking bays such as at shops/supermarkets or office buildings, as they allow charging from “day-one”, while giving the option to the owner of upgrading to higher powered charging.

EV-Installed parking bay

EV-Installed means that all the requirements of an EV-Capable and EV-Ready parking bay is met, with the addition of installing an actual Level 2 or Level 3 EV charging station for use from “day-one”.

If a parking bay is constructed to be EV-Installed, an EV can be charged from “day-one” by either Level 1, Level 2 or Level 3 speeds, depending on the power of the charger installed. EV-Installed parking bays are suited to public parking bays where there is a demand for high powered charging from “day-one”, such as major destinations, service stations, on highways and at charging hubs.

General Power Outlet (GPO) or power point

A three pin flat pin socket outlet or power point

Level 1 Charger

Level 1 Chargers are typically used in standalone domestic homes to ‘top up’ daily use of EVs. They are essentially an existing general power outlet (10-15A, single phase), used by plugging in a special cable from the vehicle to the wall. This method can add between 10-20km of range per hour when charging. Level 1 chargers are commonly used with the goal of fully recharging an EV overnight.

Level 2 Charger

Level 2 Chargers are dedicated AC EV chargers up to 7kW (32A single phase) or 22kW (three-phase). These are typically installed in homes, apartment complexes, shopping centres and other locations where vehicles are parked for a long period of time. To support a Level 2 Charger, infrastructure requires a dedicated circuit, heavy gauge wire and is commonly hardwired to comply with standards. A Level 2 Charger has a tethered cable, allowing an EV owner to plug the tethered cable into their vehicle, adding up to 40km of range per hour and delivers a full recharge overnight.

Level 3 Charger

Level 3 Chargers are fast and ultra-fast DC chargers, which have power levels from 25kW to 350kW (40-500 Amp, three phase). These are typically commercial chargers, which provide fast charging services, and are commonly found along major highways, shopping complexes and charging hubs. Cables are tethered to the charging station and cannot be removed, meaning users connect the provided wire to their vehicle only. At the lower end, this method adds up to 150km of range per hour to fully charged vehicles in 10-45mins

Type 1 plug

Type 1 plugs are single-phase plugs that allow for a charging power level of up to 7.4kW. These are typically used in residential charging settings and are also known as J1772 plugs. Type 1 plugs are typically associated with Level 1 charging.

Glossary continued

Type 2 plug

Type 2 plugs are single-phase plugs with three-phase capabilities. When used in private bays, they have charging power levels of up to 22kW. In public charging stations, Type 2 plugs can have power levels of up to 43kW. Most public charging stations are equipped with Type 2 sockets, however EVs can typically be charged by a Type 1 and 2 plugs. Type 2 plugs are typically associated with both Level 1 and 2 charging.

Tesla supercharger

Tesla superchargers are bespoke modified Type 2 plugs which can only be used by Tesla vehicles. By using two of the plug's pins for DC charging, Tesla plugs are able to deliver more power than standard Type 2 plugs of up to 120kW.

CHAdemo

CHAdemo are plugs used at DC charging stations which can be installed as a second socket by vehicle manufactures next to the AC charging socket on the EV. These plugs are typically associated with Level 3 charging, delivering high power of over 50kW.

Combined Charging System (CCS) Combo 1 and 2

Combined Charging system (CCS) Combo 1 and 2 are based on Type 1 and 2 plugs by adding two additional pins at the base. CCS's are made for DC fast charging. However, the connectors can be used for both AC and DC charging up to 350kW. Similar to CHAdemo plugs, CCS plugs are typically associated with Level 3 charging.

V2G or V2H/B

An EV with bidirectional charging capability, also known as enablers to vehicle-to-grid (V2G) and vehicle-to-home (V2H) charging, can take power from the grid or home to charge batteries while interchangeably supplying power back to the grid or home using the stored power in the battery. This feature creates an opportunity for EVs to not only be used for transport, but as an additional mechanism to power homes, mitigate electricity costs and stabilise the energy grid at peak times. Bidirectional charging can also allow EV batteries to become energy storage points to capture and store renewable energy when it is generated during the day and support the grid during low renewable energy supply.

With current technology, only EVs fitted with a CHAdemo charge port can facilitate bidirectional charging, whereas CCS2 charge ports are becoming increasingly more popular and the globally accepted standard. Therefore, the future use of this technology in Australia is contingent on it being readily available at a commercial scale and accepted by the charging and electricity network.

Acronymns

AC	Alternating current
ACT	Australian Capital Territory
CO2-e	Carbon dioxide equivalent
COP26	26th United Nations Climate Change Conference
DC	Direct current
DCP	Development control plan
DNSP	Distribution Network Service Provider
EOI	Expression of interest
EV	Electric vehicle
EVC	Electric Vehicle Council
FCEV	Fuel cell electric vehicle
GHG	Greenhouse gas
GPO	General Power Outlet
GVM	Gross vehicle mass
ICE	Internal combustion engine
kW	Kilowatt
LED	Light-emitting diode
LGA	Local government area
NSW	New South Wales
PM	Particulate matter
PV	Solar photovoltaic
REOI	Request for expression of interest
SA	South Australia
SSROC	Southern Sydney Regional Organisation of Councils
SWEEP	Southwest Energy Efficiency Project
UK	United Kingdom
USA	United States of America
V2G	Vehicle-to-grid
V2H/B	Vehicle-to-home/building
VPP	Virtual Power Plant
ZEV	Zero-emission vehicle



City of Canada Bay

Electric Vehicle Strategy and Action Plan 2023

Draft Strategy for adoption