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1 King Street, Concord West

Sustainability Statement

March 2024

Issue and Revision Record

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Mott MacDonald Australia Pty Ltd

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Acknowledgment of Country

We recognise the Darug Wallamatta People as the Traditional Custodians of this land on which the proposed development will be built. We respect their enduring cultural and spiritual connections to the land and waters, and celebrate their knowledge, kinship and values.

We acknowledge that these connections, to the land and waters, have existed for millennia and will continue into the future. We respect the Elders who have gone before, together with those of today for their guidance on our shared journey.

We recognise that we are, and always will be, on Aboriginal land.

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Executive Summary

Vision

1 King Street, Concord West, will deliver a well-designed, transit orientated mixed-use precinct accommodating a range of open spaces and plazas, community, retail, health, childcare and residential uses that will invigorate Concord West and reconnect the site to the existing urban fabric.

It will deliver public benefit to the community through upgrades to the local road network, provision of community spaces, open space and through site links that will facilitate pedestrian and bicycle access through the site, and it will locate high-quality housing adjacent to public transport.

Purpose

This Sustainability Statement has been prepared by Mott MacDonald Australia Pty Ltd on behalf of Concord West Property Pty Ltd for 1 King Street, Concord West (the Precinct).

This Sustainability Statement is submitted to the Council of the City of Canada Bay (Council) to support a request for a Planning Proposal relating to land at 1 King Street, Concord West. The Planning Proposal report prepared by Ethos Urban outlines the proposed amendments to the Canada Bay Local Environmental Plan (CBLEP) 2013. The Planning Proposal is supported by a concept master plan prepared by GroupGSA which will facilitate the following:

- 10 buildings, ranging from 4-12 storeys accommodating approximately 600 dwellings in a range of 1, 2, 3 and 4 bedroom apartments and townhouses.
- New loop road through the site connecting King Street and George Street.
- A total of approximately 69,982m² of gross floor area which equates to a floor space ratio of 2.23:1. The gross floor area comprises approximately:
 - 65,641m² residential floor area
 - 4,229m² non-residential floor area

- A green connection of approximately 2,500m² to provide pedestrian and cycle access north-south through the site and including a neighbourhood park.
- A new civic precinct – the ‘station precinct’ – focused along the active spine and community plaza accommodating a range of non-residential uses (i.e.: retail, food and beverage, gym, health and childcare) at street level.

This Sustainability Statement demonstrates a Precinct design response that is aligned with the following material considerations:

- The vision and related themes set out in the City of Canada Bay *Local Strategic Planning Statement* (CBLSPS)
- The performance outcomes and sustainability targets outlined in the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) *Sustainability Implementation Plan*
- The increased standards put forward in the *State Environmental Planning Policy (Sustainable Buildings) 2022* (Sustainable Buildings SEPP)
- The objectives and controls of the City of Canada *Development Control Plan* (CBDCP)

Climate Analysis

Adaptation measures to respond to increasing hot days and intense rainfall events, and mitigation measures to reduce the urban heat island effect could include a combination of the following:

- Water features
- Water sensitive urban design (WSUD) features
- Raingardens and bioretention tree pits
- Increased urban tree canopy
- External shading features
- Building envelope reveals and returns
- Opaque wall surfaces that are matte or non-reflective
- Reflective hard surfaces and permeable pavement

Ambient conditions are favourable for natural ventilation for more than 40% of the year.

Mornings and evenings are generally within a comfortable humidity range. This reinforces peak pedestrian movement and active transport through the active spine and green connector, respectively.

The east-west urban grid receives high levels of direct sunlight throughout the year. This reinforces precinct permeability with cross connections to the wider community.

The north-south active spine and green connector receives good levels of direct sunlight throughout the midday period.

Consistent clear sky conditions are observed during afternoons and throughout the day during mid-season periods. A deciduous urban tree canopy will shelter the public and communal open spaces from early afternoon sun during mid-season and summer periods whilst maintaining direct sunlight during the winter period.

Prevailing north east and south east wind directions are observed in summer. North east summer breezes can permeate the north-south active spine in support of the dominant pedestrian movement through the site, and the public domain spaces and experiences focussed along the active spine.

South east summer breezes reinforce the green connector as a north-south active transport link through the site.

The ground plane has variable pockets of shaded and solar exposed areas in summer that provide options for different functions and conditions. This reinforces the public domain spaces and experiences focussed along the active spine.

The east-west urban grid receives high levels of solar access at the ground plane and medium levels of solar access at podium level throughout the year. This reinforces the cross connections of the site and wider community permeability, and supports community uses at podium level.

The ground plane of the Station Precinct received good levels of solar access throughout the year and reinforces the activation strategy.



The street hierarchy should support active transport modes and prioritise pedestrians for an enhanced user experience.

The pedestrianised east-west urban grid reinforces the surrounding community connection and cohesion.

The green connector offers a dedicated north-south active movement corridor that supports connection of the surrounding community to Rhodes and Sydney Olympic Park.

A shared zone should be investigated between Concord West Train Station and the activated ground plane of the Station Precinct. This creates a human-oriented experience, boosting foot traffic, revenue and placemaking.

An evergreen tree canopy along the east street edge of George Street will mitigate the impact of the prevailing north west winter wind.

A deciduous tree canopy along the north street edge of the east-west urban grid shelters the public domain during mid-season and summer periods whilst maintaining direct sunlight during the winter period. Awnings on the south street edge mitigate visual discomfort due to low angle solar exposure.

A deciduous tree canopy on both street edges of the green connector and new loop road connecting King Street and George Street shelters the public domain during mid-season and summer periods whilst maintaining direct sunlight during the winter period. This also acts to funnel the north east and south east summer breezes for improved outdoor thermal comfort.

Sustainability Strategy

The Precinct will position itself as a catalyst for transformation in response to a decarbonisation and circular agenda.

The Precinct design, delivery and operation will be governed by a sustainability imperative, **Circular**. This sustainability imperative fundamentally informs **Climate Positive**, **Movement and Place**, **Infrastructure** and **Nature-based Solutions** priorities.

Imperative + Priorities

Circular | The linear model of production and consumption ('take-make-waste') cannot continue. A shift to a circular system is needed in which waste and pollution are 'designed out', products and materials are kept in use and natural systems are regenerated.

Maximising the use and value of resources brings major financial, social and environmental benefits. It contributes to innovation, growth and job creation, whilst reducing our impact on the environment.

Climate Positive | Within the scope of the Precinct, the staged delivery of development will respond to market best practice.

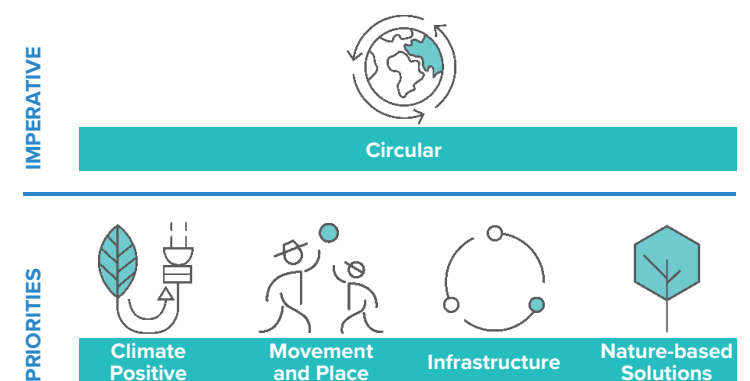
NSW Government has set objectives to achieve net zero emissions by 2050 and reduce emissions by 50% below 2005 levels by 2030. The transformation of the built environment towards net zero emissions will be accelerated under a range of Net Zero Buildings initiatives.

The Green Star Buildings rating tool responds to global megatrends, and national and regional policies to define a Climate Positive Pathway. All development is required to achieve whole life (upfront and operational) net zero by 2030.

Infrastructure | An embedded network (incl. thermal network) benefits from the diversified demand profile offered at a precinct scale. With the addition of on-site renewable energy generation, further peak demand reductions are achievable.

Management of electric vehicle (EV) charging and hot water storage demand to match renewable energy generation minimises solar spill (grid export) offers an enhanced solar PV system capacity and utilisation.

A load management (LM) strategy, whereby V2G capabilities facilitate EV discharging during peak demand periods, effectively flattens the demand curve, and significantly reduces capital plant and infrastructure sizing.



Movement and Place | Mobility is undergoing a transformational shift with far-reaching implications. As personal transport technologies and choice expands, new infrastructure is required.

To underpin this shift, the Precinct will create a walkable and liveable precinct through good urban design that promotes active and low carbon transport options.

As the Precinct develops, it must increasingly leverage the enhanced public transport infrastructure (e.g., train, metro, rapid bus, etc.) to facilitate a progressive shift away from public vehicle use.

Nature-based Solutions | Nature-based solutions act to address the climate and ecological emergency. Biodiversity and habitat loss is accelerating and expanding cities are some of the most nature-depleted areas, putting at risk many of the life-sustaining ecosystems services upon which communities and livelihoods depend. Cities are also increasingly vulnerable to the impacts of climate change, including soaring temperatures, storm events and sea level rise.

Nature based solutions improve air and water quality, and regulate temperatures, providing access to green spaces and nature that reinforce the physical and mental wellbeing of a community.

By prioritising nature in investment decision-making, the resilience and liveability of cities is improved, contributing to a secure, sustainable future for nature and people.

1 Introduction

1.1 Vision

1 King Street, Concord West, will deliver a well-designed, transit orientated mixed-use precinct accommodating a range of open spaces and plazas, community, retail, health, childcare and residential uses that will invigorate Concord West and reconnect the site to the existing urban fabric.

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- 10 buildings, ranging from 4-12 storeys accommodating approximately 600 dwellings in a range of 1, 2, 3 and 4 bedroom apartments and townhouses.
- New loop road through the site connecting King Street and George Street.

- A total of approximately 69,982m² of gross floor area which equates to a floor space ratio of 2.23:1. The gross floor area comprises approximately:
 - 65,641m² residential floor area
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- A new civic precinct – the ‘station precinct’ – focused along the active spine and community plaza accommodating a range of non-residential uses (i.e.: retail, food and beverage, gym, health and childcare) at street level.

This Sustainability Statement demonstrates a Precinct design response that is aligned with the following material considerations:

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- The increased standards put forward in the *State Environmental Planning Policy (Sustainable Buildings) 2022* (Sustainable Buildings SEPP)
- The objectives and controls of the City of Canada Bay *Development Control Plan* (CBDCP)

1.3 Regional Context

The Precinct is strategically located within the Eastern Precinct of Homebush, within Corridor East of the Parramatta Road Corridor (see Figure 1.1). The Precinct must be delivered consistent with the PRCUTS and its long-term vision for developing population and employment growth in the Parramatta Road Corridor.

While the PRCUTS does not directly rezone land, it establishes the framework for land use and transport planning to guide, coordinate and facilitate changes to local planning controls that will lead to the Parramatta Road Corridor's transformation.

The PRCUTS sets a vision for:

- Diverse housing choice and affordability
- Employment and economic growth
- Accessibility and connectivity
- Vibrant communities and places
- Green spaces and links
- Sustainable and resilient infrastructure and buildings

Homebush Precinct is identified as a major high-density mixed-use precinct strategically located between the two main central business districts (CBDs) of Parramatta and Sydney with a focus on providing employment and housing opportunities that are supported by an extensive open space network and efficient vehicular, active, and public transport linkages.

Located within the Homebush North Precinct, the Precinct contributes to reimagining of its future character as a mixed-use precinct housing a community of residents attracted to the area for its high amenity and access to employment at Sydney Olympic Park and Parramatta CBD.

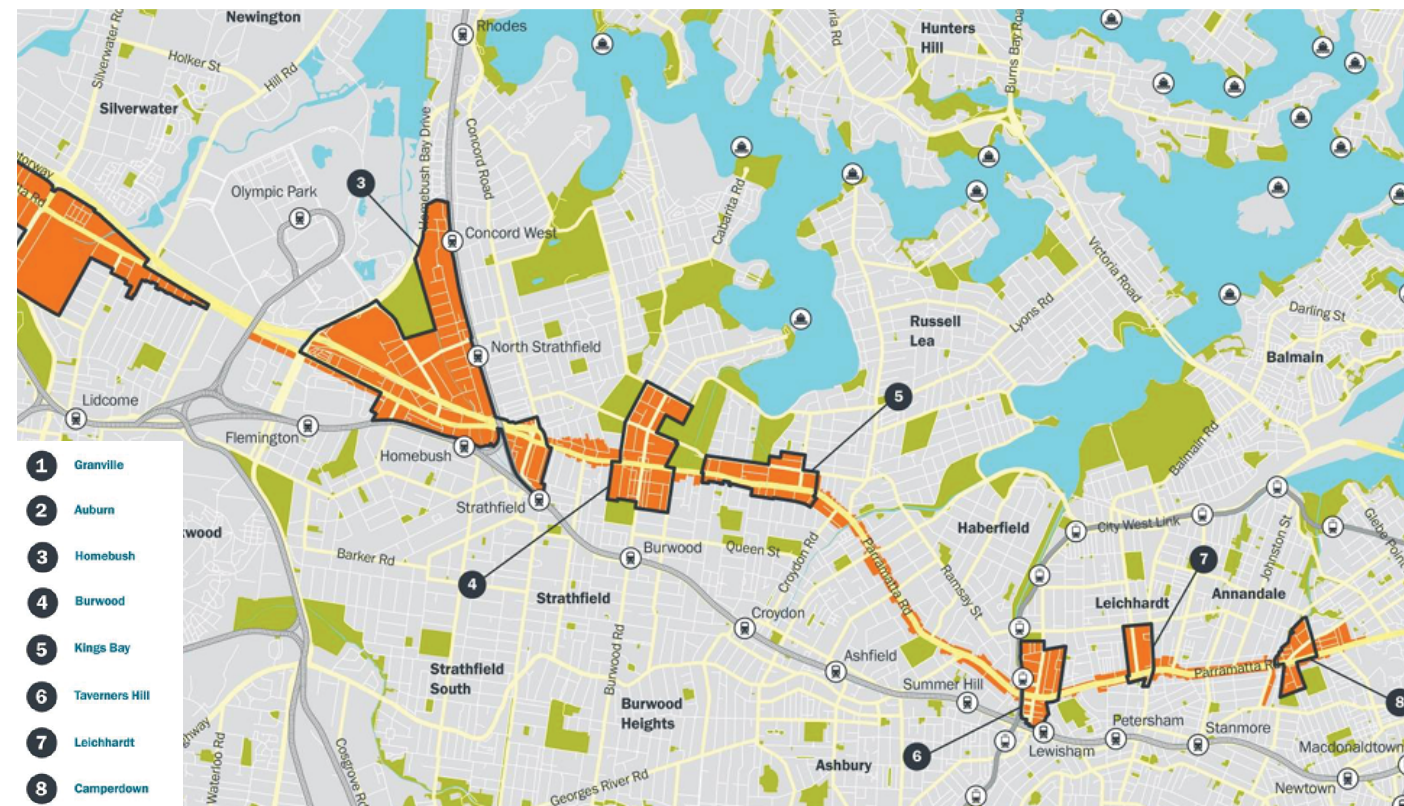


Figure 1.1 Regional context

1.4 Local Context

The Precinct is located in Concord West, 11km west of the Sydney CBD. It is located within the City of Canada Bay Local Government Area, north of Parramatta Road, immediately east of Sydney Olympic Park and adjacent to the Concord West Train Station (see Figure 1.2).

The Concord West Train Station is located on the T9 Northern Line, which links to the future Sydney Metro West line at North Strathfield Station, one stop south. The future Sydney Metro West line is a city and corridor shaping opportunity for many PRCUTS identified precincts.

Concord West is primarily residential, characterised by low-scale development in a medium density pattern, including some strata properties and low-rise apartments. There exists few opportunities in the suburb for significant redevelopment to meet dwelling targets.

The Precinct retains a strong connection to the Bakehouse Quarter to its south in Homebush North via George Street, the suburb's primary north-south thoroughfare west of the rail line, and Rhodes strategic town centre via Homebush Bay Drive. These areas are subject to a number of ongoing development strategies that will feature an increase in density, improved activation and various public domain upgrades.

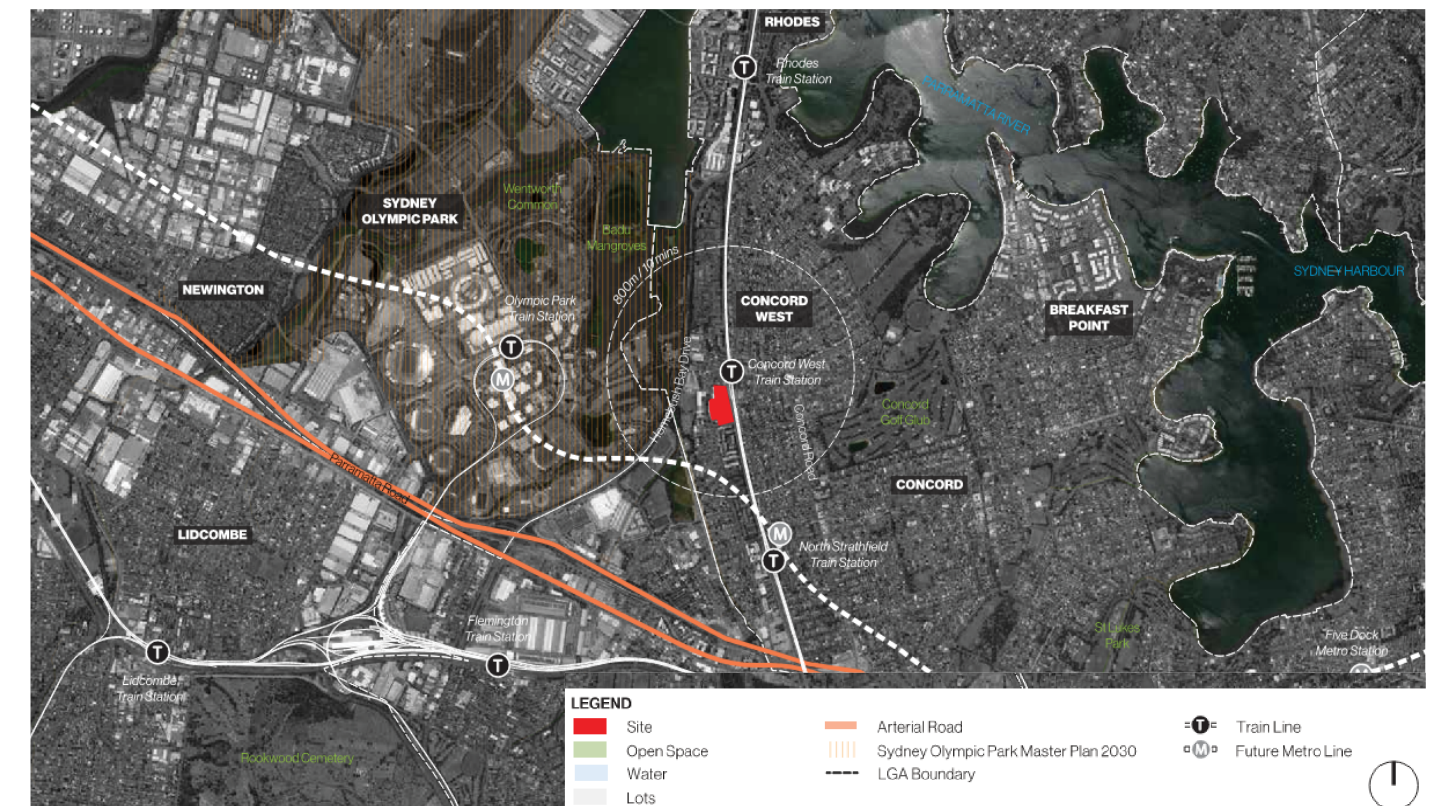


Figure 1.2 Local context

1.5 Site Context

The site is located at 1 King Street, Concord West. It is legally described as Lot 101 DP791908, approximately 31,390m² in area and is the largest landholding in Concord West under single ownership. It is irregular in shape and has frontages to King Street to the north and George Street to the west. The site is currently accessed from King Street at its southern termination point and is primarily occupied by a large footprint office building, previously used as a call centre facility by Westpac. It also accommodates a multistorey carpark, a childcare centre and tennis court.

An aerial photo of the site is shown at Figure 1.3.

The Precinct aims to renew the site and obtain maximum and highest use to meet the increasing resident population, demand and market growth.

Development will be staged to ensure minimum disruption to the existing residents and community.



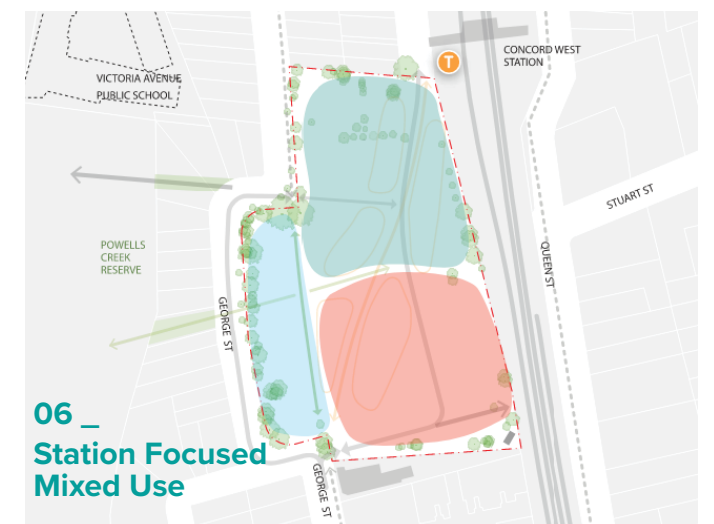
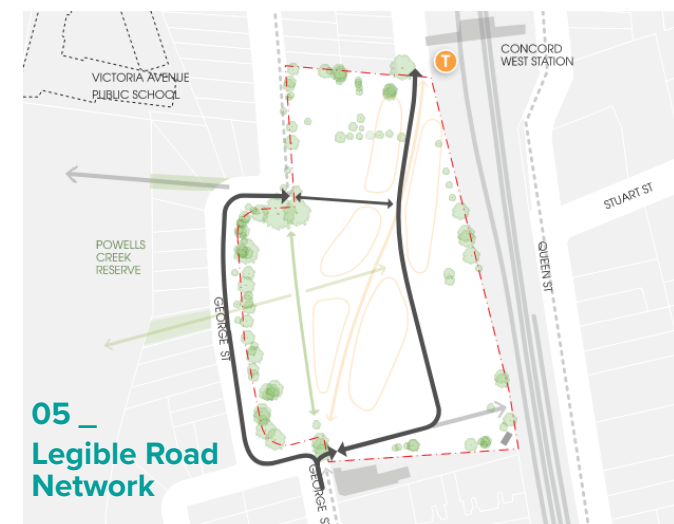
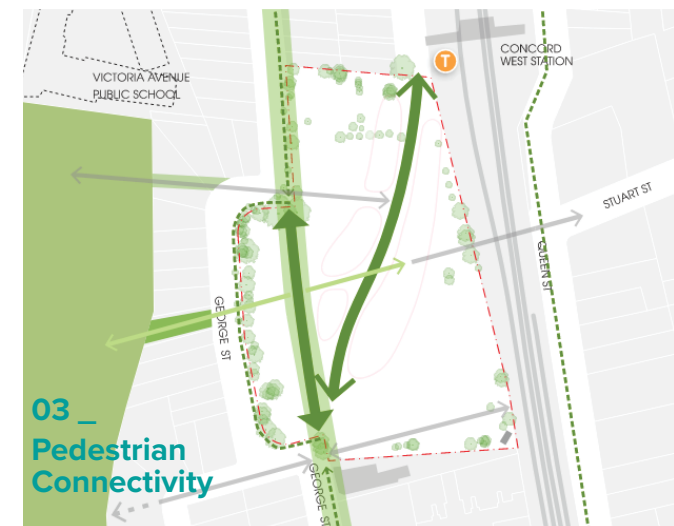
Figure 1.3 Site context

1.6 Urban Design Framework

The Precinct seeks to demonstrate the strategic and site-specific planning merit of accommodating the proposed land use, FSR and building height amendments to the CBLEP 2013.

A legible and logical urban design framework has been established based on six key moves that unlock the site and create a north-south connection.

1. A new spine provides a direct connection from the south and towards the train station, and formalises active movement through the Precinct
2. The urban grids to the north and south are adopted to create new connections and enhance the local context
3. A new pedestrian link between King Street and George Street connect the train station with residents to the south
4. A series of new public open spaces and experiences are focussed around the key movements within the Precinct
5. The new road network simplifies traffic movements within and around the Precinct, and integrates seamlessly into the surrounding streetscape
6. Retail activity is concentrated towards the north of the Precinct adjacent to the train station



1.7 Concept Master Plan

The built form and land uses proposed in the concept master plan illustrate how a quality design outcome can be delivered at the site under the proposed amendments to the CBLEP 2013. The concept master plan demonstrates how the proposed gross floor area (GFA) can be distributed across the Precinct in an orderly manner in buildings that range in height from four to 12 storeys (see Figure 1.4).

Taller buildings are located towards the railway line and the centre of the site, with shorter buildings at the perimeter to provide a transition to the surrounding area. Buildings have been located to enable compliance with building separation requirements and the key civic pedestrian connections will be activated by ground floor non-residential uses to provide a dynamic public domain. Key components of the master plan include:

- 10 buildings, ranging from 4-12 storeys accommodating approximately 600 dwellings in a range of 1, 2, 3 and 4 bedroom apartments and townhouses.
- New loop road through the site connecting King Street and George Street.
- A total of approximately 69,982m² of gross floor area which equates to a floor space ratio of 2.23:1. The gross floor area comprises approximately:
 - 65,641m² residential floor area
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- A new civic precinct – the ‘station precinct’ – focused along the active spine and community plaza accommodating a range of non-residential uses (i.e.: retail, food and beverage, gym, health and childcare) at street level.



Figure 1.4 Concept Master Plan

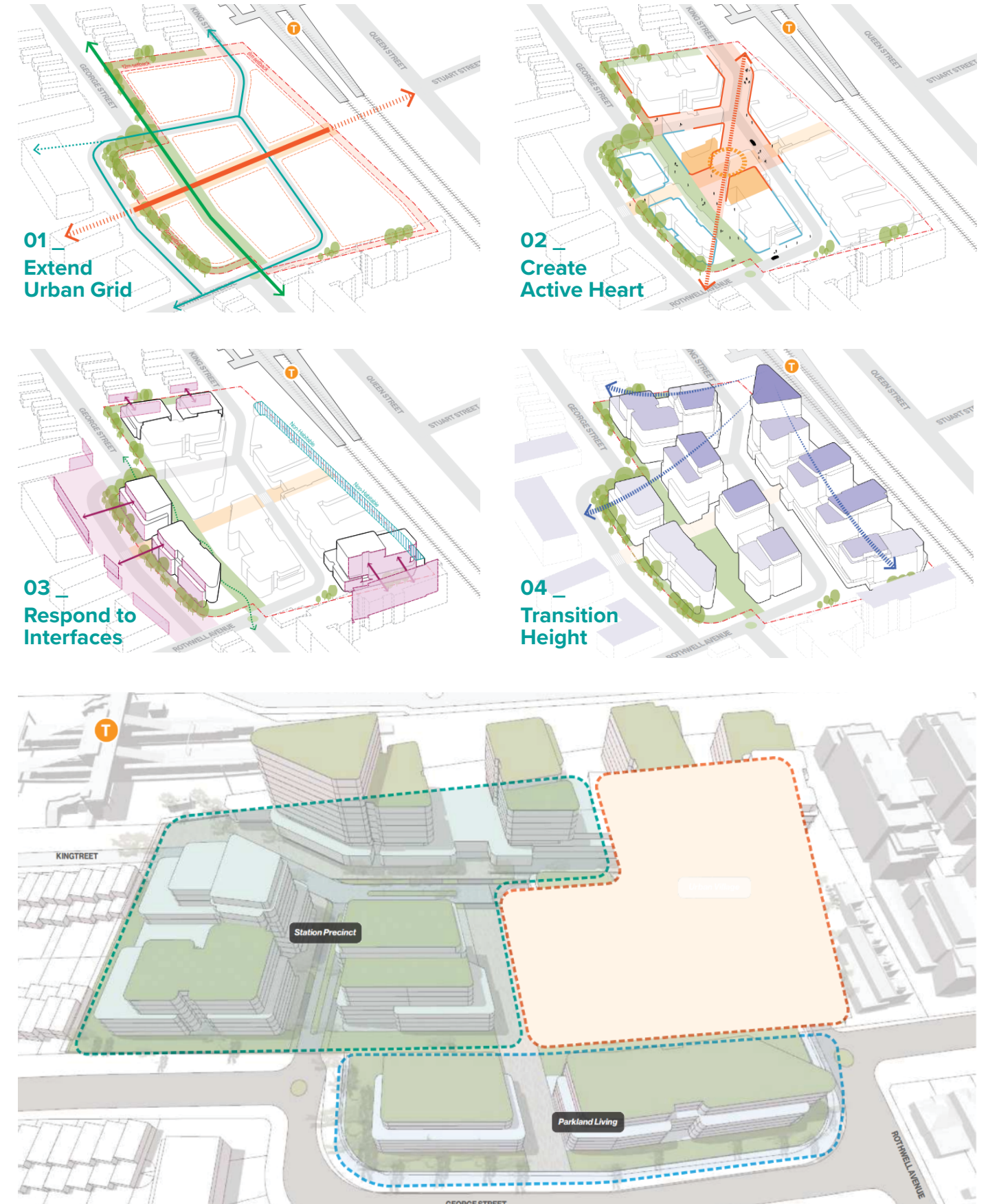


Figure 1.5 Neighbourhood precincts

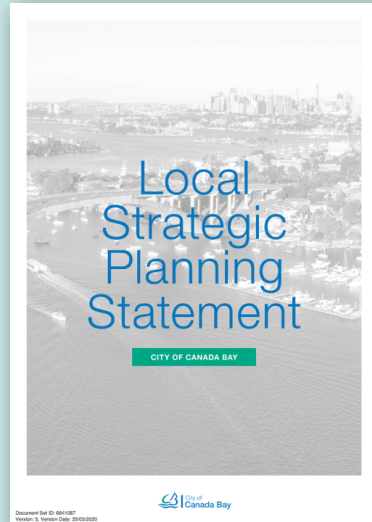
2 Drivers

2.1 Policy Context

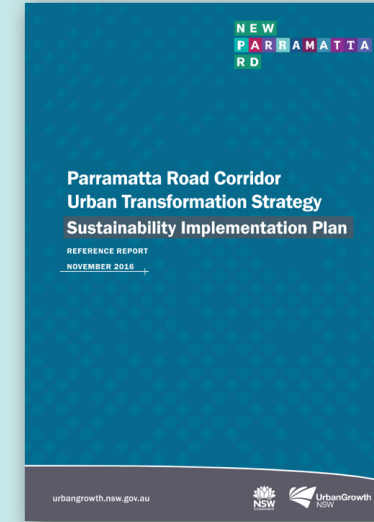
This Sustainability Statement demonstrates a Precinct design response that is aligned with the following:

1. Material consideration
 - CBLSPS
 - *PRCUTS Sustainability Implementation Plan*
 - Sustainable Buildings SEPP
 - CBDCP
2. Circular
 - NSW Circular Economy Policy Statement
3. Climate Positive
 - NSW Net Zero Plan
4. Infrastructure
 - NSW State Infrastructure Strategy 2022-2042
5. Movement and Place
 - NSW Electric Vehicle Strategy
6. Nature-based Solutions
 - GANSW Greener Places

MATERIAL CONSIDERATION



- Facilitate sustainable development and renewal
- Increase biodiversity and the urban tree canopy
- Deliver high quality open space and recreation facilities
- Provide high quality planning and urban design outcomes for precincts
- Create vibrant places
- Provide housing supply, choice and affordability
- Reduce carbon emissions and manage energy, water and waste efficiently
- Adapt to impacts of urban and natural hazards, and climate change
- Improve connectivity by encouraging a modal shift to active and public transport



- Meet sustainability targets for new residential buildings:
 - BASIX Water 50
 - BASIX Energy 40
- Transition future communities to a low car dependency:
 - Minimise car parking
 - Unbundle car parking
 - Share car parking
 - Decouple car parking
- Maximise the use of vegetation on buildings, including green roofs, green walls, and materials with a high solar reflectance index
- Support principles of water sensitive urban design (WSUD)
- Accommodate future energy infrastructure and emerging technologies



- Align with the National Construction Code
 - Average 7 star NatHERS rating
 - Minimum 6 star NatHERS rating
- Calculate and disclose the embodied emissions of construction materials
- Minimise construction and demolition waste
- Reduce peak demand for electricity
- Generate and store renewable energy
- Reduce reliance on artificial lighting, and mechanical heating and cooling through passive design
- Meter and monitor energy consumption
- Minimise water consumption

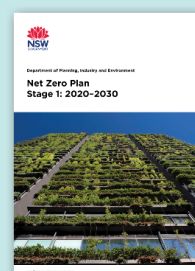


- Utilise car share schemes, car parking decoupling and the like wherever possible to reduce on-site car parking
- Provide adequate bicycle parking for residents, workers and visitors to encourage recreational use and as an alternative mode of transport
- Provide facilities for charging electric vehicles to meet current and future demand
- Minimise environmental impacts of operational waste
- Reduce water demand
- Increase total urban tree canopy
- Design roof forms to allow for the current and future installation of solar panels without adverse impacts on the amenity of neighbours or the streetscape
- Provide spaces within the building for the current and future installation of battery storage

CIRCULAR



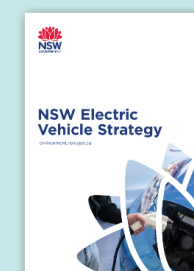
CLIMATE POSITIVE



INFRASTRUCTURE



MOVEMENT AND PLACE



NATURE-BASED SOLUTIONS



3 Climate Analysis

3.1 Principles

Resiliency is fundamental to decision making. Development must take account of science-based climate impacts to ensure investment in social and community infrastructure is secure and assets can serve the community long into the future.

Urban environments produce microclimate conditions affecting the health and wellbeing of residents, workers and visitors. A climate analysis methodology and results are presented that inform and enhance the urban design response and the quality of amenity.

The climate analysis methodology consists of a series of studies addressing different aspects of urban design.

A site analysis is initially conducted to describe and define climate change, urban heat island, natural ventilation, sun path, wind and humidity qualitative factors that impact the urban design response.

An urban design response is then articulated based on quantitative studies that measure the quality of amenity.

3.2 Site Analysis

A site analysis has been undertaken to determine site-specific climate characteristics that inform the urban design response. This includes:

1. **Climate change** _ considering future climate scenarios and increasing frequency of hot days (above 35°C)
2. **Urban heat island** _ consider future climate scenarios exacerbated by the urban heat island effect
3. **Natural ventilation** _ considering ambient temperature conditions of future climate scenarios to identify periods that are conducive for natural ventilation when assessing adaptive thermal comfort performance
4. **Sun path** _ considering sun movement and solar gain impact to the building envelope, and the public and communal open space provision
5. **Wind** _ considering prevailing wind conditions and built form wind effects that impact the building envelope, and the public and communal open space provision
6. **Humidity** _ considering relative humidity conditions and built form wind effects that impact the building envelope, and the public and communal open space provision

3.2.1 Climate Change

To affect sound decision making, RCP (Representative Concentration Pathway) 8.5 (high emissions scenario) climate modelling, in line with the NARClIM (NSW and ACT Regional Climate Modelling) Project, has been incorporated into the climate analysis to account for future climate scenarios. A 2070 timeline horizon (far future) has been selected based on a building design life of 40 years.

The following future climate projection impacts are identified:

- Maximum temperatures are projected to increase by 1.9°C and minimum temperatures are projected to increase by 2.0°C
- The number of cold nights will decrease
- The number of hot days (above 35°C) is projected to increase up to an additional 10-20 days per year. These increases in hot days are projected to occur mainly in spring and summer, extending into autumn.
- Rainfall is projected to increase in summer and autumn
- Severe fire weather days are projected to increase in summer and spring

Figure 3.2 and Figure 3.3 visually compare the projected increase in ambient temperature (2070) over current conditions.

The annual frequency of ambient temperatures and the intensity of ambient temperatures above 30°C is notably higher for 2070.

Adaptation measures to respond to increasing hot days and intense rainfall events could include a combination of the following:

- Water features
- Water sensitive urban design (WSUD) features
- Raingardens and bioretention tree pits
- Increased urban tree canopy
- Permeable pavement

3.2.2 Urban Heat Island Effect

The urban heat island effect occurs when natural land cover is replaced with dense concentrations of pavement, buildings and other surfaces that absorb and retain heat. Ambient temperatures in urban areas can be up to 10°C warmer than rural areas.

Figure 3.4 visually demonstrates the impact of the urban heat island effect on the projected increase in ambient temperature (2070). This effect acts to increase energy costs, air pollution levels, and heat-related illness and mortality.

Mitigation measures to reduce the urban heat island effect could include a combination of the following:

- External shading features
- Building envelope reveals and returns
- Opaque wall surfaces that are matte or non-reflective
- Increased urban tree canopy
- Reflective hard surfaces and permeable pavement

3.2.3 Natural Ventilation

Figure 3.1 visually demonstrates the periods when ambient temperatures are between 19-25°C for a RCP 8.5 future climate scenario (2070). This ambient temperature range is considered to be conducive to natural ventilation when assessing adaptive thermal comfort performance. Conditions are favourable for natural ventilation for more than 40% of the year.

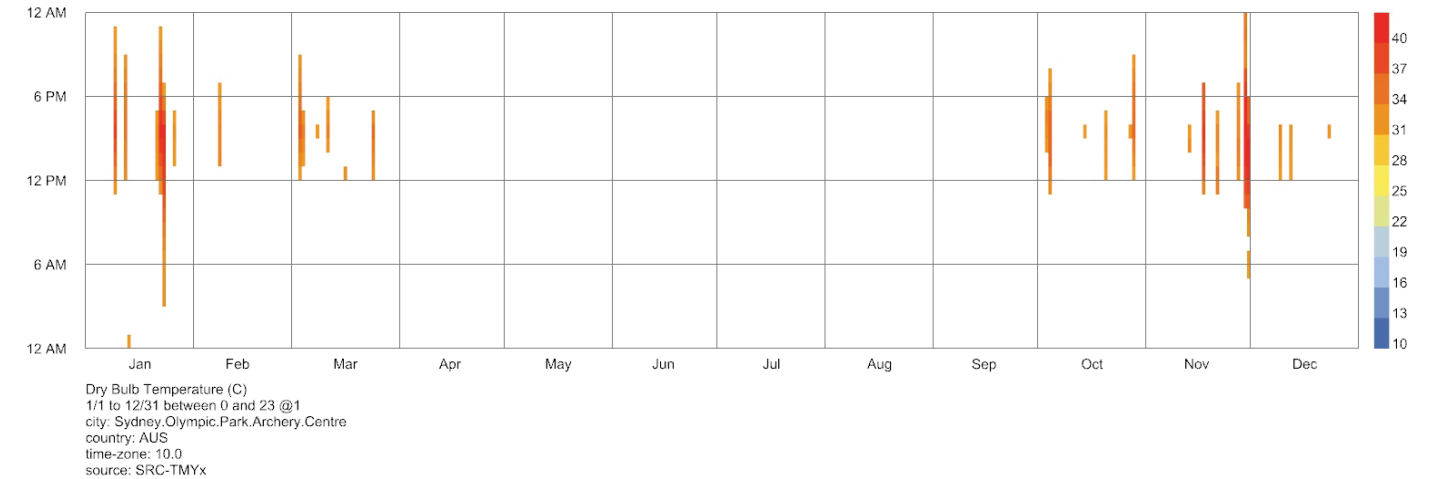


Figure 3.2 Annual hourly ambient temperature above 30°C - current

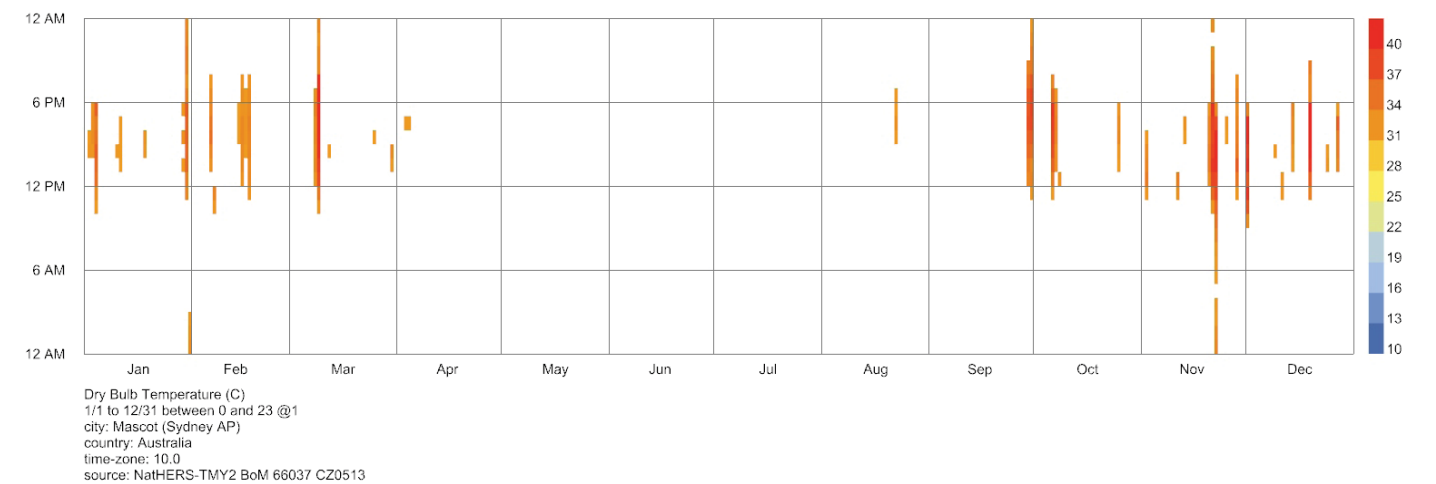


Figure 3.3 Annual hourly ambient temperature above 30°C - 2070

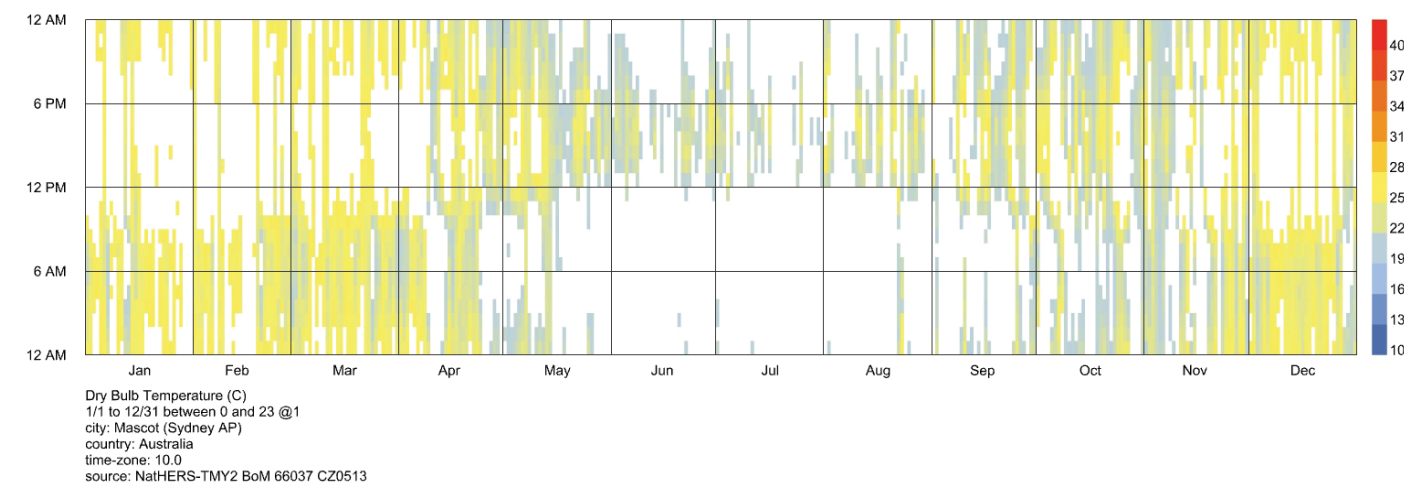


Figure 3.1 Annual hourly ambient temperature between 19-25°C - 2070

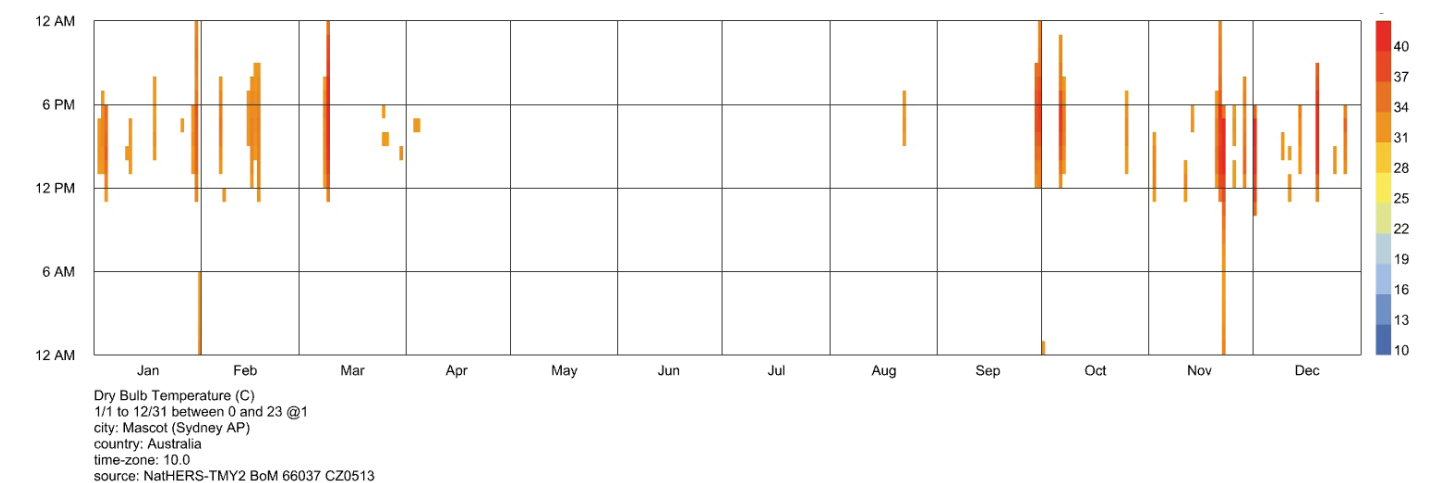


Figure 3.4 Annual hourly ambient temperature between above 30°C - 2070 + urban heat island effect

3.2.4 Sun Path

Figure 3.5 visually illustrates the sun path diagram for winter, mid-season and summer. The ambient temperature based on the monthly representative day is visually expressed.

The east-west urban grid receives high levels of direct sunlight throughout the year. This reinforces precinct permeability with cross connections to the wider community.

The north-south active spine and green connector receives good levels of direct sunlight throughout the midday period but is generally overshadowed during morning and afternoon periods.

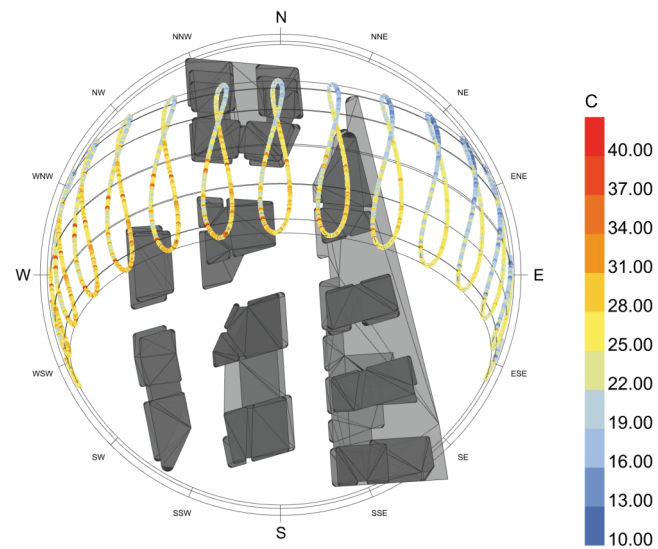


Figure 3.5 Sun path diagrams; [left] top view; [right] elevation view

Figure 3.6 visualises cloud cover over a typical year. Light blue represents clear sky; dark grey represents overcast sky.

Consistent clear sky conditions are observed during afternoons and throughout the day during mid-season periods. A deciduous urban tree canopy will shelter the public and communal open spaces from early afternoon sun during mid-season and summer periods whilst maintaining direct sunlight during the winter period to create a thermally and visually comfortable outdoor environment.

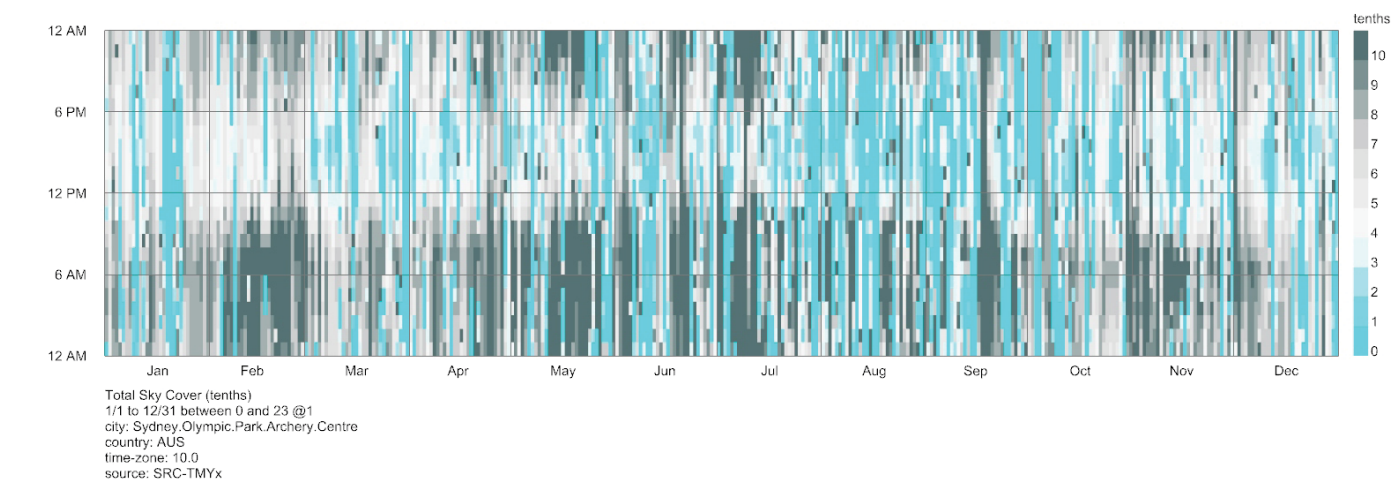
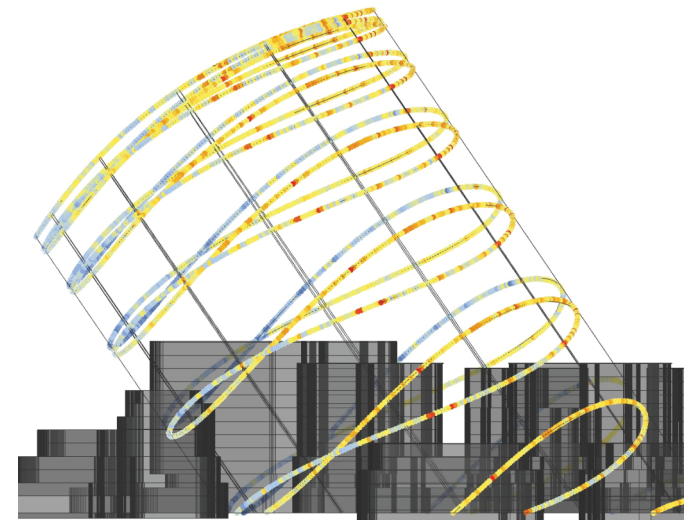


Figure 3.6 Annual cloud cover

3.2.5 Wind

Wind direction and velocity varies seasonally. Figure 3.7 and Figure 3.8 visualise the wind direction and velocity for summer and winter, respectively.

Prevailing north east and south east wind directions are observed in summer. North east summer breezes can permeate the north-south active spine in support of the dominant pedestrian movement through the site, and the public domain spaces and experiences focussed along the active spine.

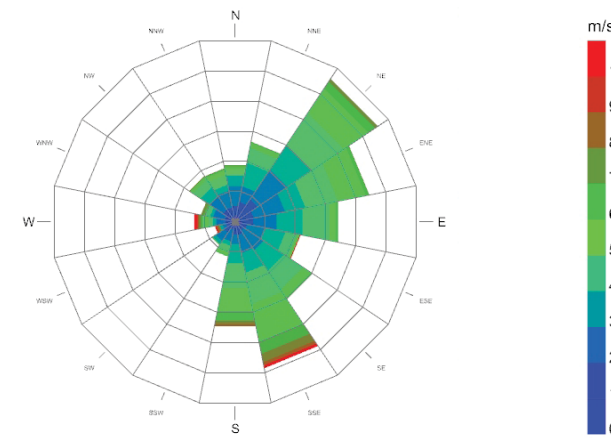


Figure 3.7 Summer wind rose

South east summer breezes reinforce the green connector as a north-south active transport link through the site.

A prevailing north west wind direction is observed in winter. The building envelope acts to shelter the active spine and green connector.

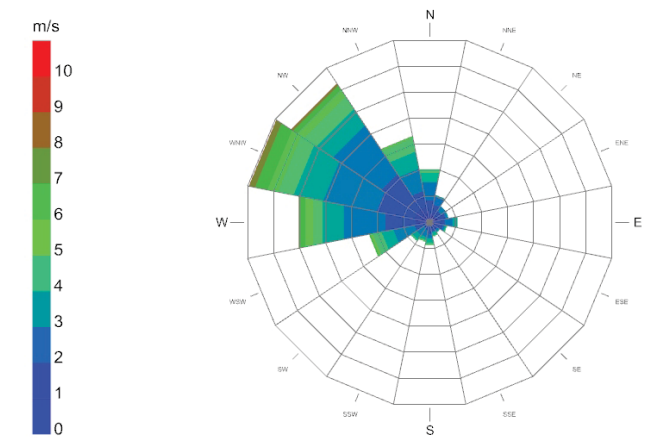


Figure 3.8 Winter wind rose

3.2.6 Humidity

High and low humidity can impact outdoor thermal comfort perceptions. Figure 3.9 visualises humidity over a typical year.

Humid conditions are observed during afternoons throughout the year.

Mornings and evenings are generally within a comfortable humidity range.

This reinforces peak pedestrian movement and active transport through the active spine and green connector, respectively.

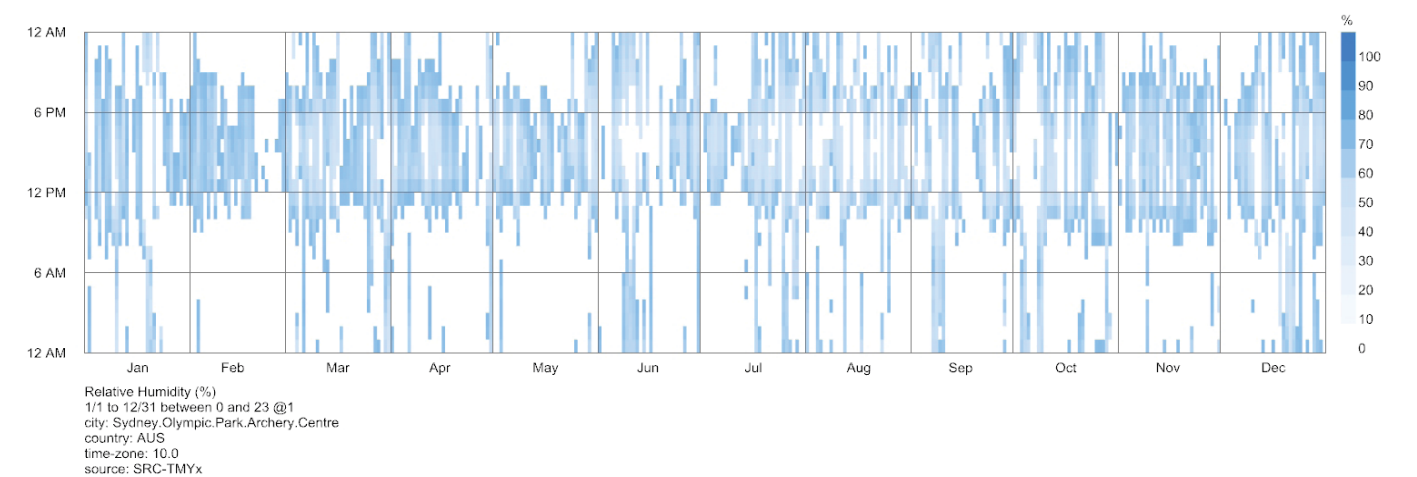


Figure 3.9 Annual humidity

3.3 Urban Design Response

An urban design response has been articulated that qualifies the quality of the urban design. This includes:

1. **Sun hours** _ demonstrating the quantity of solar exposure to the building envelope, and solar access public and communal open spaces
2. **Street hierarchy** _ demonstrating the quality of the active spine and green connector in relation to pedestrian movement and active transport, respectively
3. **Urban tree canopy** _ demonstrating canopy type that leverage site conditions to create a thermally and visually comfortable outdoor environment



Figure 3.10 Summer sun hours analysis - top view

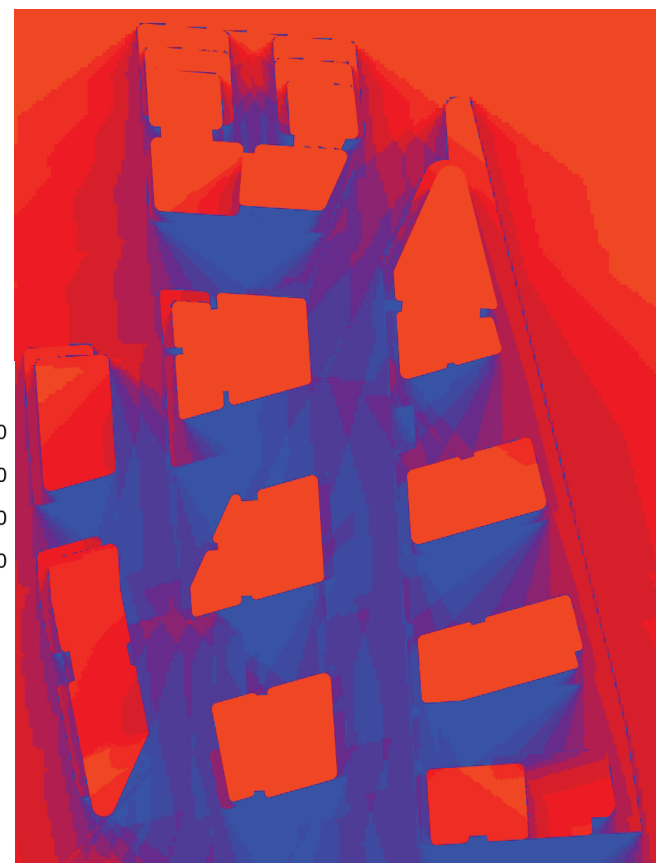


Figure 3.11 Winter sun hours analysis - top view

3.3.1 Sun Hours

A sun hours analysis has been conducted to quantify solar exposure to the building envelope, and solar access to the public and communal open spaces. This is visually represented as follows:

- Figures 3.10 and 3.12 - 3.13 _ summer sun hours for top, north west and south east views, respectively
- Figures 3.11 and 3.14 - 3.15 _ winter sun hours for top, north west and south east views, respectively

The ground plane has variable pockets of shaded and solar exposed areas in summer that provide options for different functions and conditions. This reinforces the public domain spaces and experiences focussed along the active spine.

The east-west urban grid receives high levels of solar access at the ground plane and medium levels of solar access at podium level throughout the year. This reinforces the cross connections of the site and wider community permeability, and supports community uses at podium level.

The ground plane of the Station Precinct received good levels of solar access throughout the year and reinforces the activation strategy.

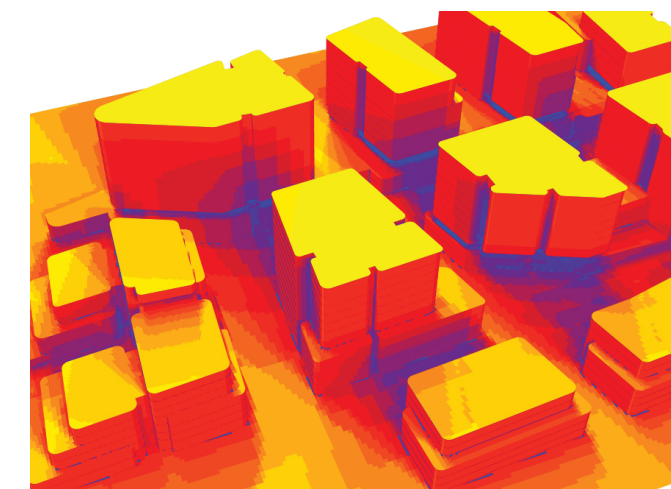


Figure 3.12 Summer sun hours analysis - north west view

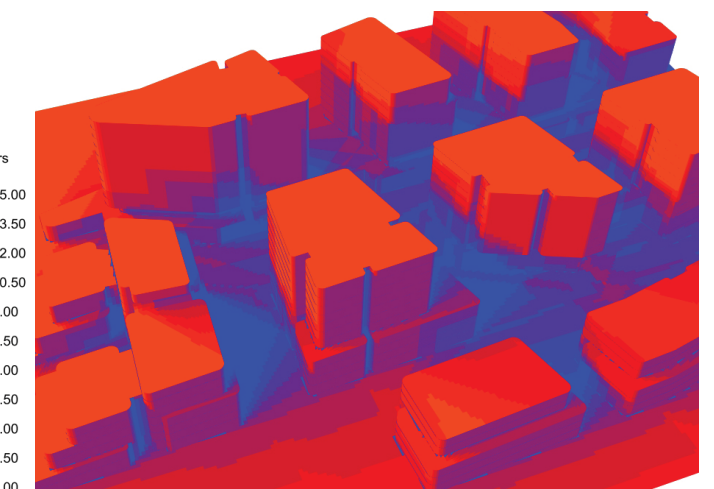


Figure 3.14 Winter sun hour analysis - north west view

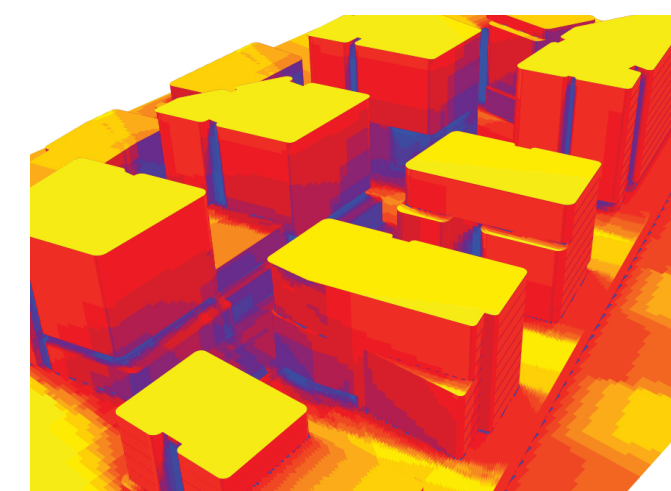


Figure 3.13 Summer sun hours analysis - south east view

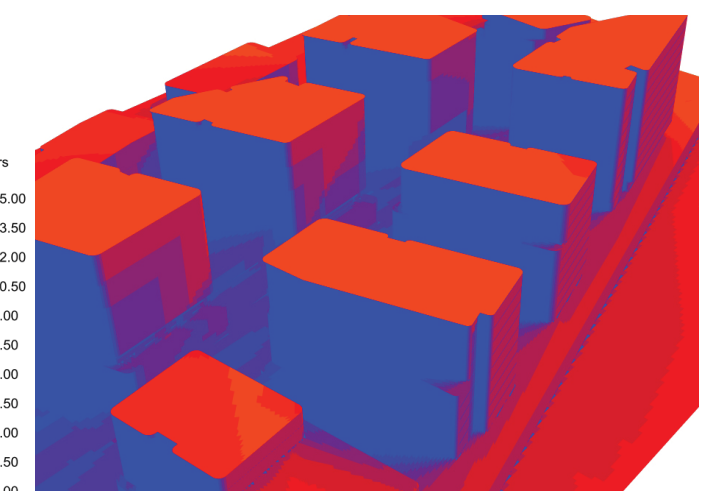


Figure 3.15 Winter sun hour analysis - south east view

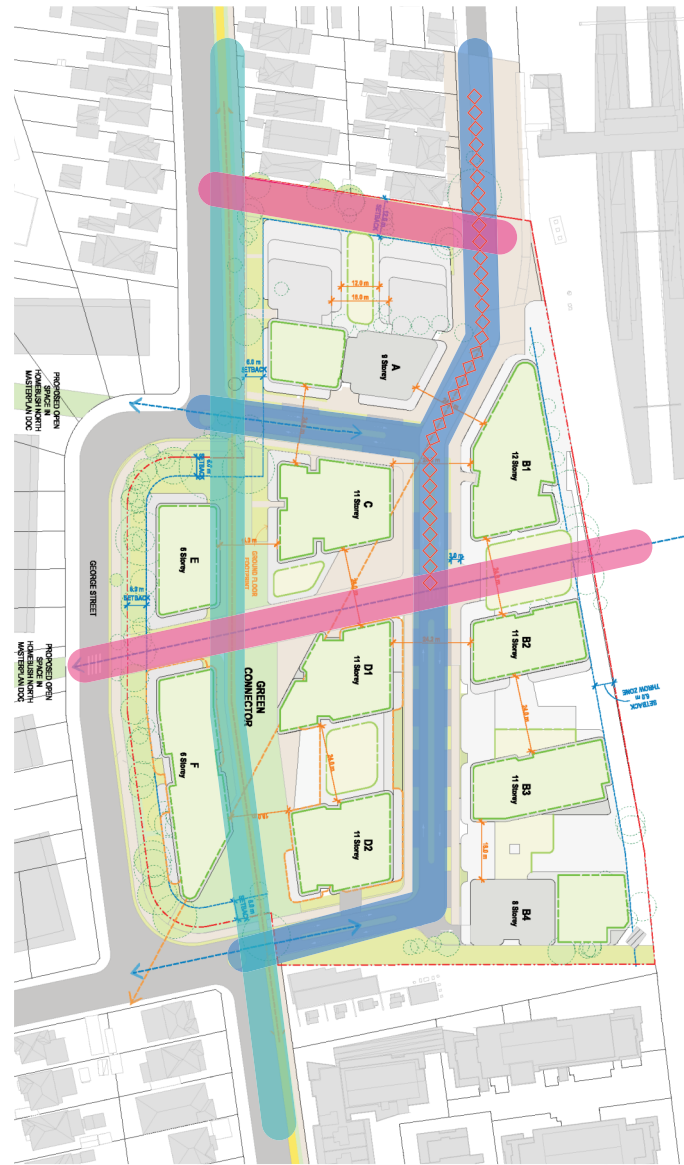
3.3.2 Street Hierarchy

Where private vehicle access is required in and through the Precinct, including the new loop road connecting King Street and George Street, the street hierarchy should support active transport modes and prioritise pedestrians for an enhanced user experience. Quietways offer this user experience by imposing a 30 km/h speed limit that allows shared active transport and private vehicle use, and prioritises pedestrians through a more integrated streetscape design.

The pedestrianised east-west urban grid reinforces the surrounding community connection and cohesion by delivering a permeable precinct.

The green connector offers a dedicated north-south active movement corridor that supports connection of the surrounding community to Rhodes and Sydney Olympic Park.

To reinforce the anticipated high pedestrian movement along the loop road between Concord West Train Station and the activated ground plane of the Station Precinct, a shared zone should be investigated. This creates a human-oriented experience, boosting foot traffic, revenue and placemaking for the retail precinct.



- Quietway 30 km/h speed limit (shared active transport and private vehicle use + pedestrians prioritised)
- Active movement green connector
- Pedestrian only community connections
- Shared zone (to be further investigated)

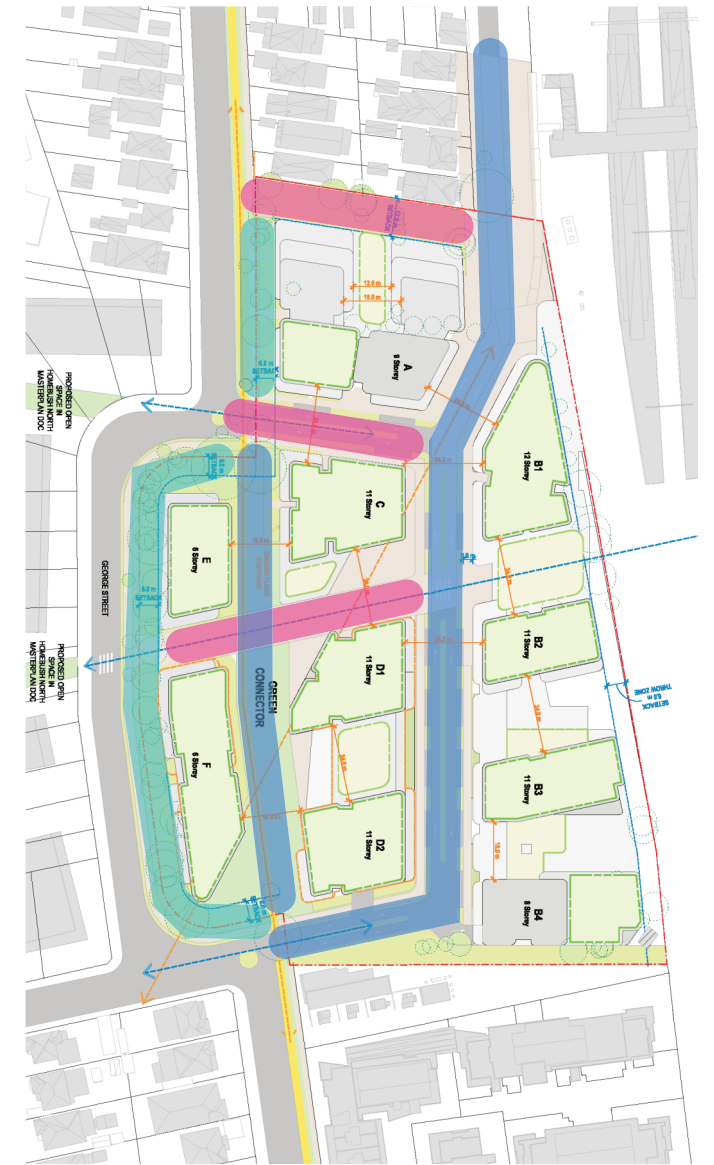
Figure 3.16 Street hierarchy

3.3.3 Urban Tree Canopy

An evergreen tree canopy along the east street edge of George Street acts to mitigate the impact of the prevailing north west winter wind on the Precinct.

A deciduous tree canopy along the north street edge of the east-west urban grid shelters the public domain during mid-season and summer periods whilst maintaining direct sunlight during the winter period. Awnings on the south street edge mitigate visual discomfort due to low angle solar exposure.

A deciduous tree canopy on both street edges of the green connector and new loop road connecting King Street and George Street shelters the public domain during mid-season and summer periods whilst maintaining direct sunlight during the winter period. This also acts to funnel the north east and south east summer breezes for improved outdoor thermal comfort.



- Deciduous tree canopy on both street edges
- Evergreen tree canopy on east street edge
- Deciduous tree canopy on north street edge + awnings on south street edge

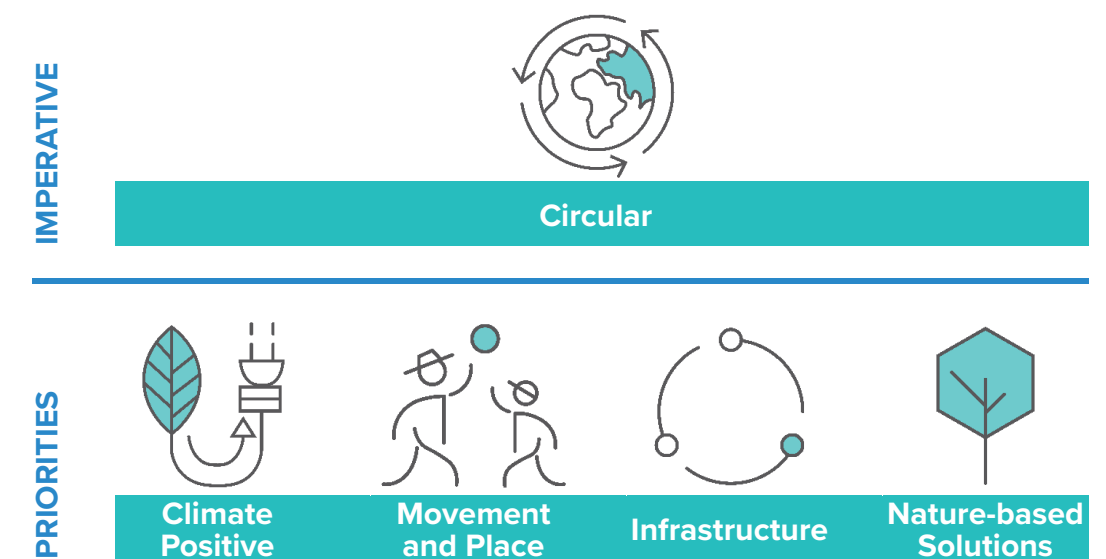
Figure 3.17 Street hierarchy

4 Sustainability Strategy

4.1 Sustainability Framework

The Precinct will position itself as a catalyst for transformation in response to a decarbonisation and circular agenda.

The Precinct design, delivery and operation will be governed by a sustainability imperative, [Circular](#). This sustainability imperative fundamentally informs [Climate Positive](#), [Movement and Place](#), [Infrastructure](#) and [Nature-based Solutions](#) priorities.



4.2 Sustainability Strategy

The Precinct will seek to adopt and implement the following Climate Positive principles (see Figure 5.2):

1. Build using responsible products and materials with lower upfront carbon emissions
2. Deliver energy efficient buildings and infrastructure that reduces the stress on a decarbonising grid
3. Deploy on-site active generation and storage systems
4. Create a walkable and liveable precinct through good urban design that promotes active and low carbon transport options
5. Take advantage of a decarbonising grid by transitioning all energy uses to fossil fuel-free operations
6. Take advantage of a decarbonising grid to supply all energy uses with renewable energy
7. Maximise on-site nature-based solutions

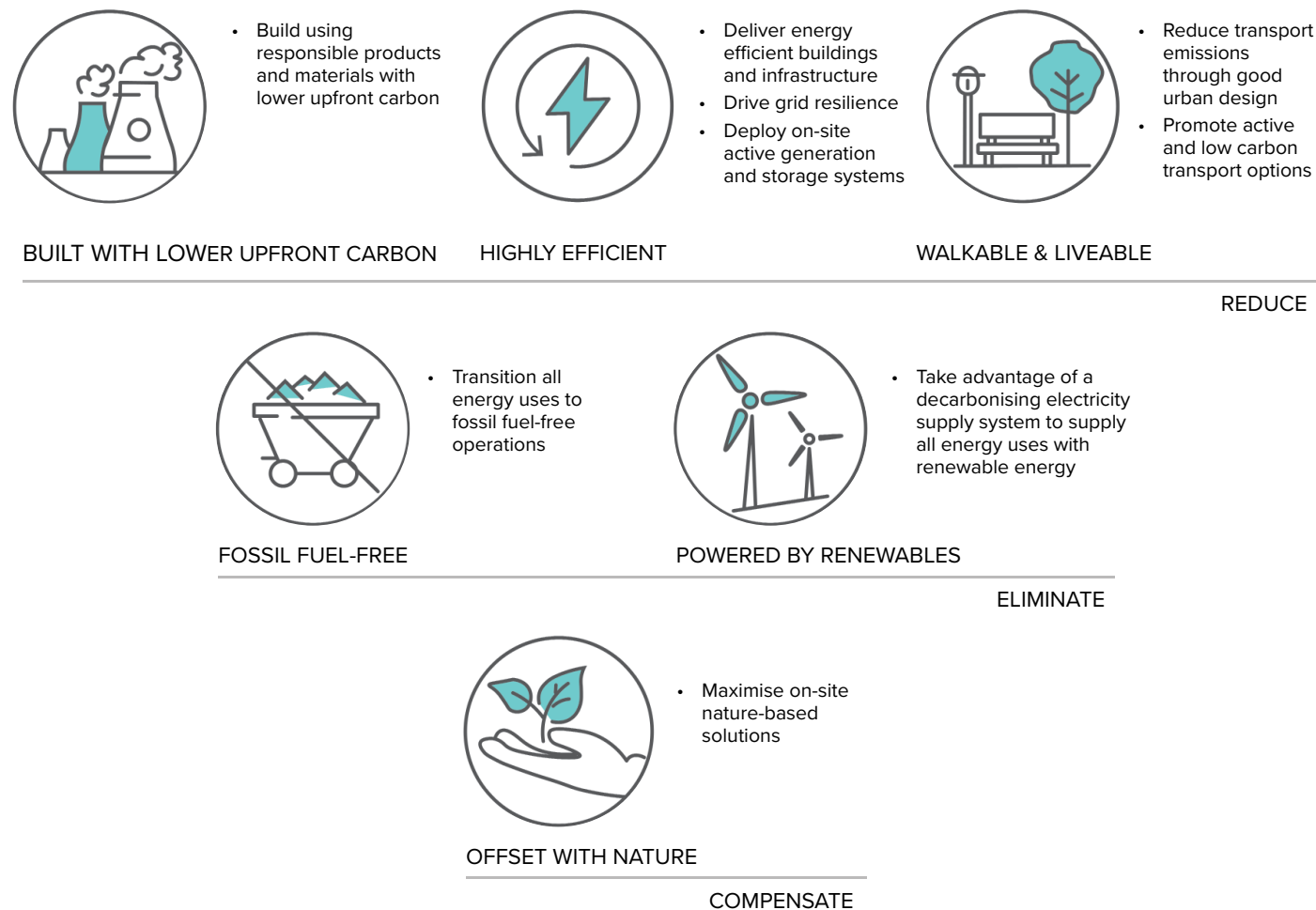
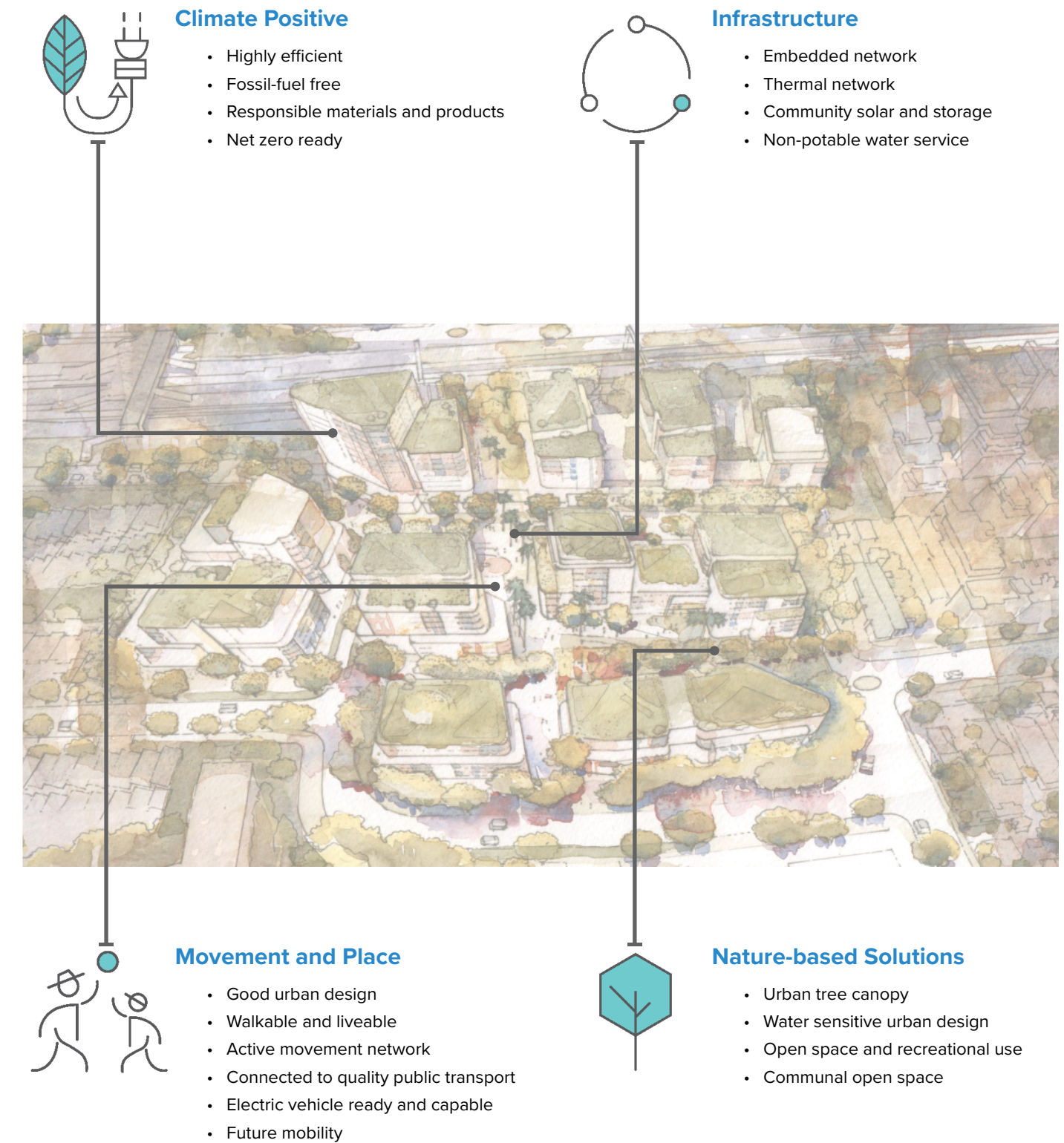


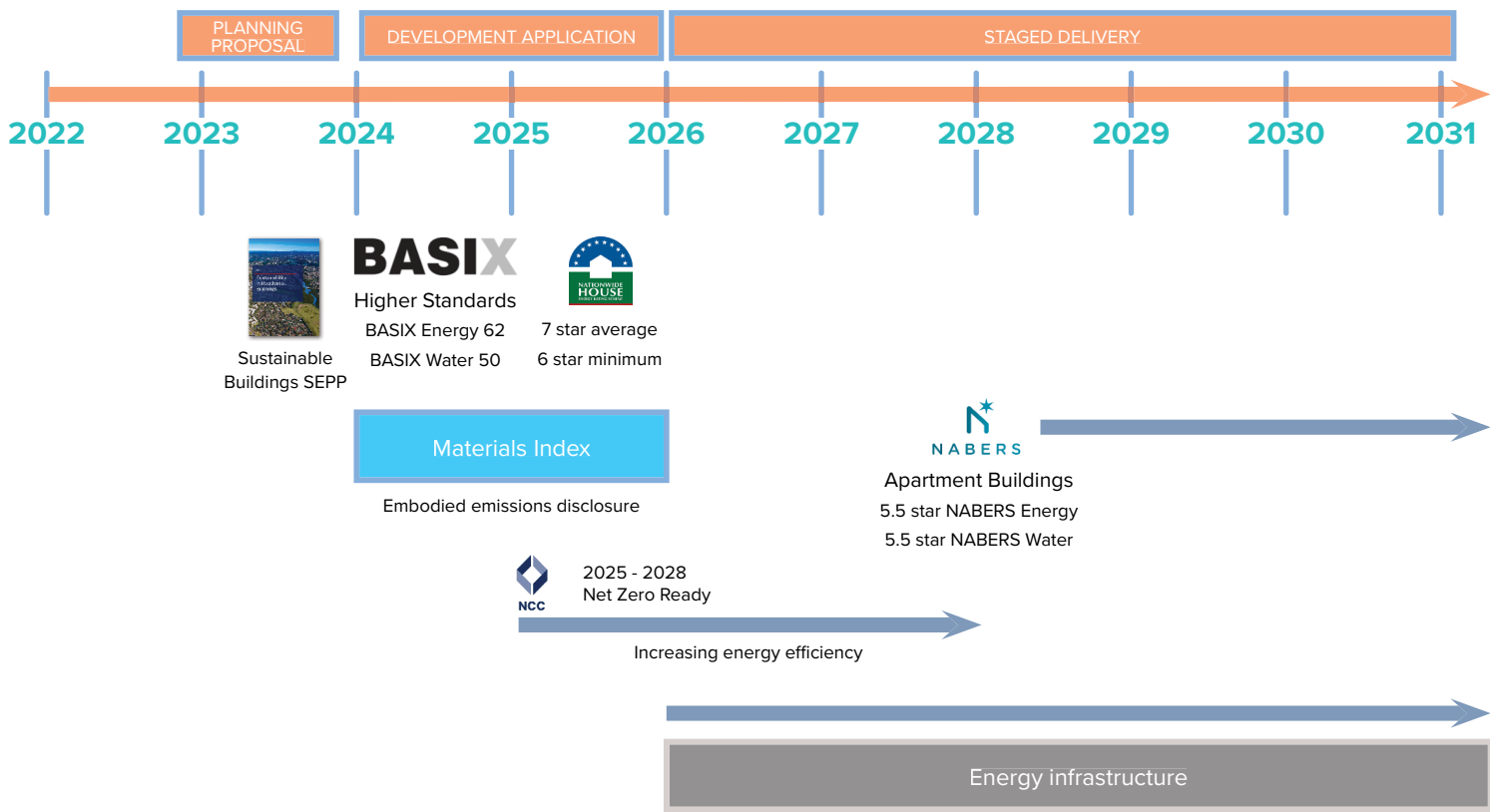
Figure 4.1 Climate Positive principles

4.3 Sustainability Initiatives



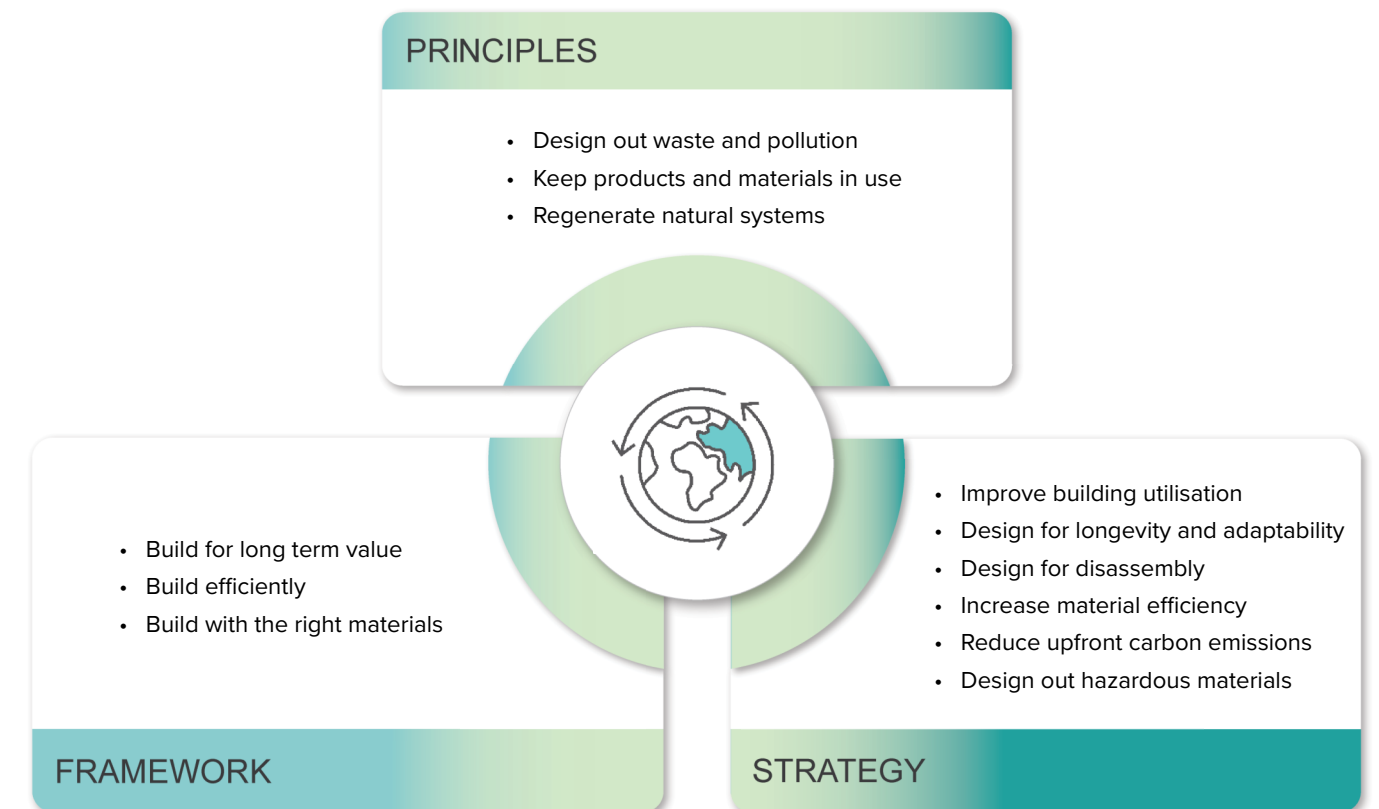
4.4 Sustainability Implementation

The Precinct will seamlessly embed the sustainability imperative and priorities through design and delivery, and into operations.



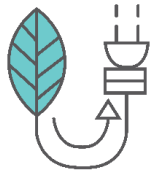
5 Imperative + Priorities

5.1 Imperative _ Circular



The linear model of production and consumption ('take-make-waste') cannot continue. A shift to a circular system is needed in which waste and pollution are 'designed out', products and materials are kept in use and natural systems are regenerated.

Maximising the use and value of resources brings major financial, social and environmental benefits. It contributes to innovation, growth and job creation, whilst reducing our impact on the environment.



5.2 Priority _ Climate Positive

NSW Government has set objectives to achieve net zero emissions by 2050 and reduce emissions by 50% below 2005 levels by 2030. The transformation of the built environment towards net zero emissions will be accelerated under a range of Net Zero Buildings initiatives.

The Green Star Buildings rating tool responds to global megatrends, and national and regional policies to define a Climate Positive Pathway. This is addressed within the following four credits (see Figure 5.1):

1. Credit 21 Upfront Carbon Emissions
2. Credit 22 Energy Use
3. Credit 23 Energy Source
4. Credit 24 Other Carbon Emissions

The Climate Positive Pathway increases in stringency over this decade. All development is required to achieve whole life (upfront and operational) net zero by 2030. This sustainable built environment response is captured in strengthening credit criteria over three-year cycles (2020 → 2023 → 2026 → 2030).

Within the scope of the Precinct, the staged delivery of development will need to respond to this representation of market best practice.

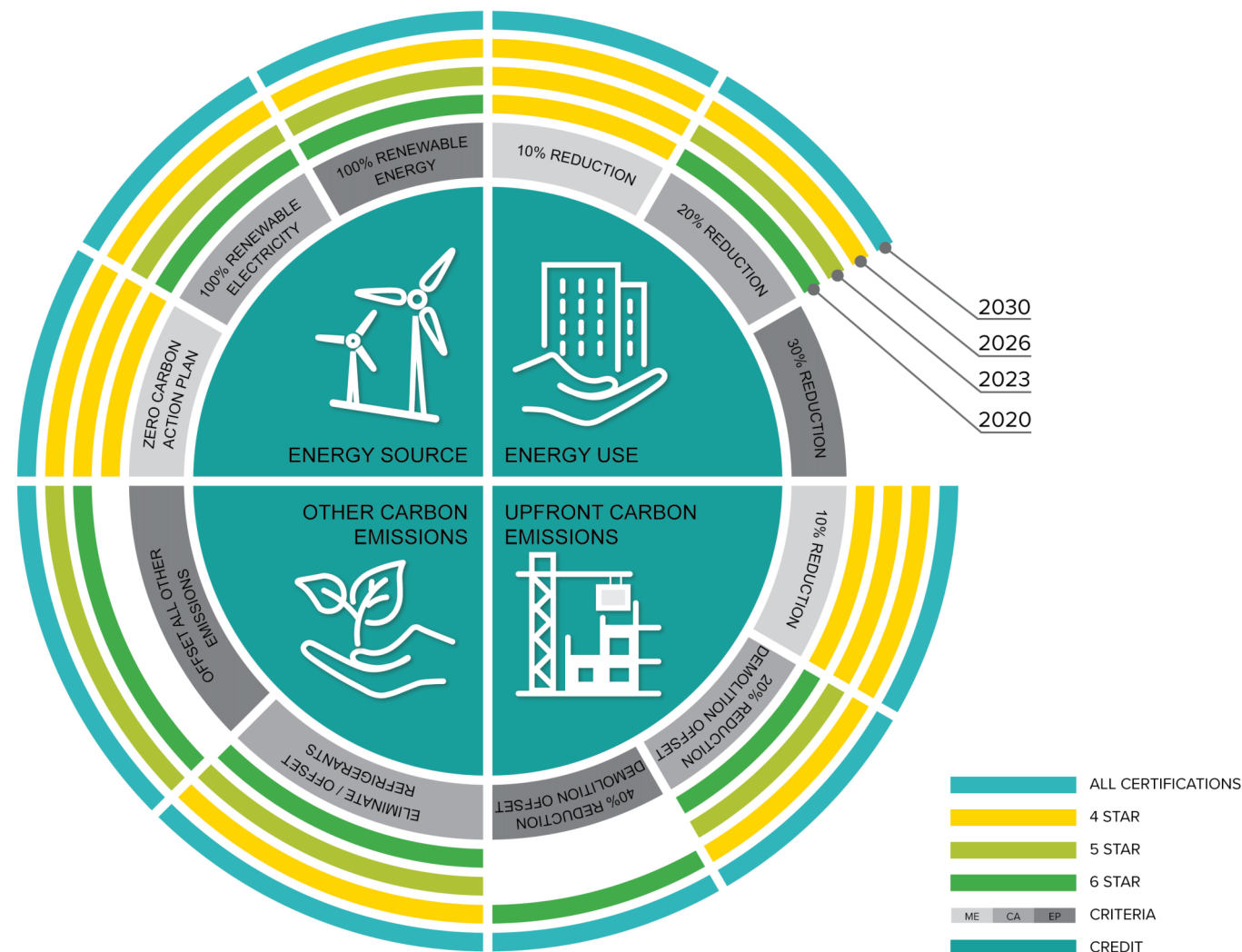


Figure 5.1 Climate Positive Pathway

Energy Use

Sustainable Buildings | The PRCUTS *Sustainability Implementation Plan*, Sustainable Buildings SEPP and Green Star Buildings establish energy use targets and requirements:

- Targets
 - Average 7 star NatHERS | minimum 6 star NatHERS
 - BASIX Energy 62 (BASIX Higher Standards)
 - 5.5 star NABERS Energy for Apartment Buildings
- Requirements
 - 4 star WELS showers | 4 star WELS kitchen taps | 5 star WELS hand wash basin taps
 - 5 star ENERGY STAR fridge | 4.5 star ENERGY STAR dishwasher | 4 star ENERGY STAR clothes washer | 9 star ENERGY STAR clothes dryer
 - Central electric heat pump hot water system with a coefficient of performance (COP) > 3.0
 - Central condenser water system coupled with water-cooled variable refrigerant flow (VRF) air conditioning systems with a COP > 5.5
 - Energy efficient vertical transportation
 - Hallway supply ventilation only
 - On-site solar photovoltaic (PV) system

Upfront Carbon

Materials Index | The upfront carbon emissions from construction materials accounted for 16% of carbon emissions from Australia's building stock in 2019. Without any reduction actions, this will increase to 85% by 2050 due to a decarbonised grid.

The Precinct will diligently calculate and disclose the embodied emissions of construction materials under the BASIX materials index. Reduction strategies will be evaluated that leverage a supply chain transformation and reduction targets will be set that are aligned with the Climate Positive Pathway, where practicable.

Other Carbon Emissions

Offset | The Precinct will investigate opportunities to offset residual carbon emissions in construction.

Water Use

Offset | To support water resilience, buildings must integrate water efficiency measures and make use of alternative water sources to reduce the demand for potable water.

The PRCUTS *Sustainability Implementation Plan* and Green Star Buildings establish water use targets and requirements:

- Targets
 - BASIX Water 50
 - 5.5 star NABERS Water for Apartment Buildings
- Requirements
 - 4 star WELS showers | 4 star WELS kitchen taps | 5 star WELS hand wash basin taps | 5 star WELS dishwasher | 4 star WELS clothes washer
 - Non-potable water service with future ready connection to a recycled water network
 - Rainwater harvesting and reuse system for each building
 - Water efficient landscaping

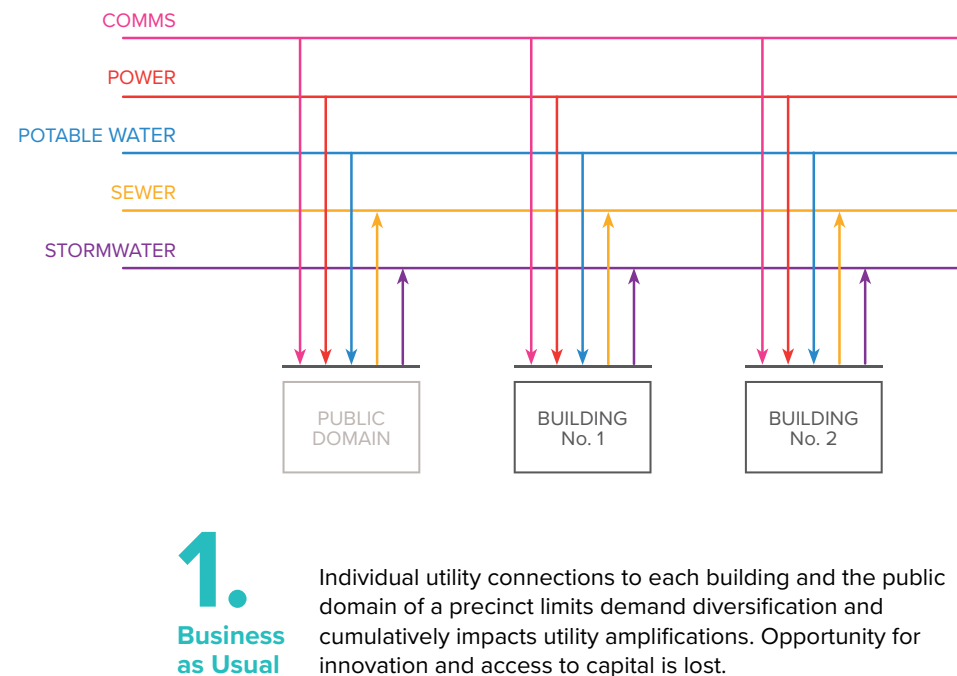
Energy Source

Decarbonisation | The Precinct will take advantage of a decarbonising grid by transitioning all energy uses to fossil fuel-free operations. Coupled with an embedded network operator (see 5.3 Priority _ Infrastructure) offering carbon neutral and renewable electricity, this will empower consumers and businesses to make sustainable choices, and reduce the cost of their operations.



5.3 Priority _ Infrastructure

The transition to a net zero economy is rapidly gaining ground. Key policies and statutory planning requirements are already in place or emerging. A key principle being considered is fossil fuel-free operations, electrification of all energy uses, and the supply of renewable electricity generated on- and off-site.



Embedded Network

Infrastructure | An embedded network optimises the high voltage (HV) incoming electrical feeder configuration, better matching feeder capacity to electrical load groups.

Authority design standards for transformer chamber substations are onerous. Transformer capacity and number is limited for each chamber. Private transformer chamber substations, compliant with Australian standards, aggregate transformers within a chamber to better match capacity to load.

This realises a reduction in the number of substations.

Activation | Authority design standards impose rigid access and egress requirements, with substations generally located at grade. This acts to break up street frontage and activation. Private substations offer greater flexibility with respect to location. Contiguous street frontage and activation can be better maintained.

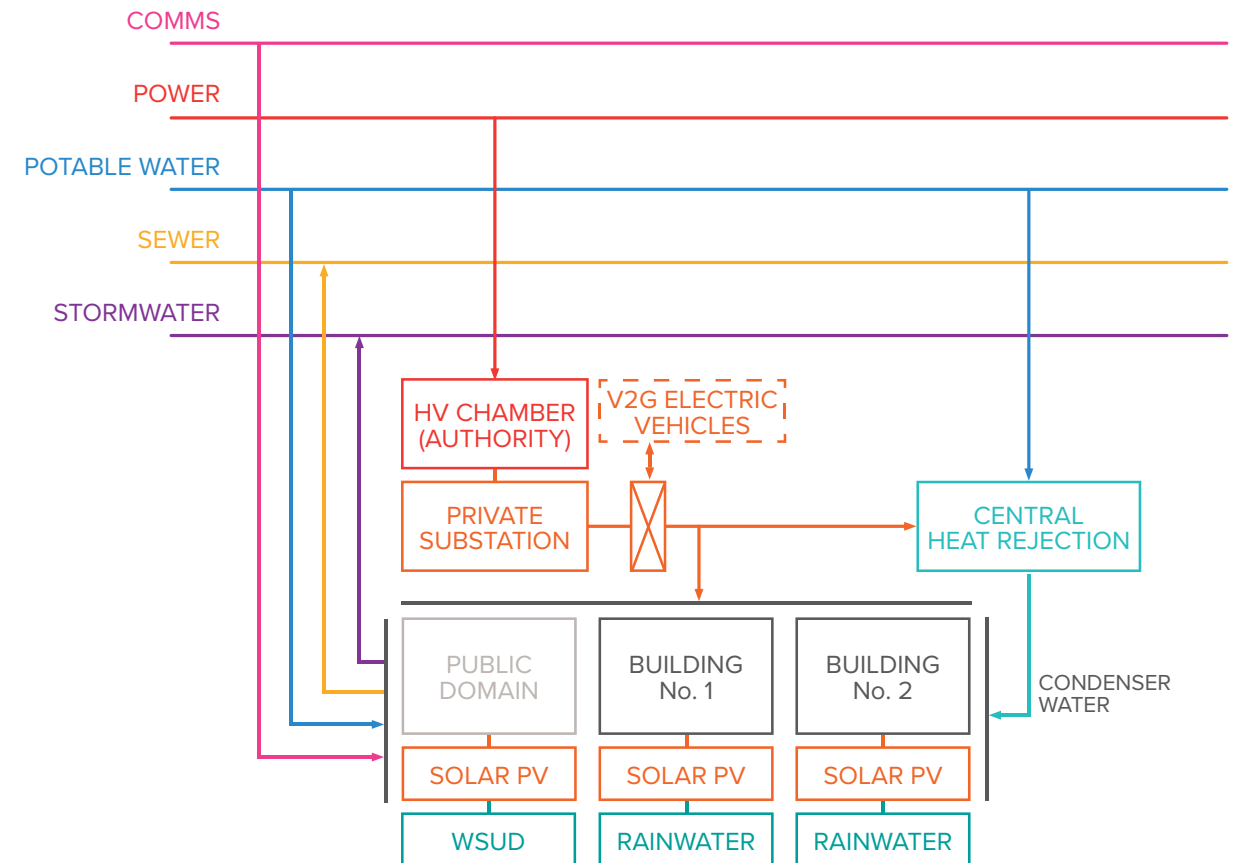
Integration | An embedded network offers ready integration of embedded generation and energy storage technologies, including electric vehicle bi-directional capabilities (also called V2G - vehicle-to-grid).

Thermal Network

Open Space | A thermal network releases public and communal open space by centralising heat rejection plant and equipment. This approach offers increased rooftop amenity and mitigation of the urban heat island effect.

Diversity | Precinct development, where centrally serviced, deliver inherent diversity and demand reduction benefits, facilitating immediate capital plant and spatial savings. Capital plant reductions typically exceed 5% and spatial savings are estimated at approximately 2% of gross floor area (GFA). A thermal network aggregates plant away from high value areas.

Environment | A thermal network facilitates the centralisation and effective management of pollution (e.g., acoustic impacts) to improve the overall performance of the Precinct in relation to acoustics, and visual and thermal comfort performance.



Commercial Structure

Feasible | Precinct utility services represent a fundamental investment decision to enable circular, resilient and net zero operations.

The commercial ownership structures for precinct utility services are well established, proven and understood. Supported by strong investment interest, it offers the Precinct a seamless, low capital mechanism to drive high efficiency and net zero outcomes that do not impact the commercial feasibility of development. It will empower consumers and businesses to make sustainable choices, and reduce the cost of their operations.

Operator | Concord West Property Pty Ltd is committed to working with Evergy, an embedded network operator and an authorised electricity retailer. Evergy owns and operates embedded networks across several major residential communities, and provides electricity, hot water and air conditioning services direct to residents and businesses. Evergy's buying power benefits residents and businesses by providing a better than market energy rate, including carbon neutral and renewable electricity. This drives cost of living relief.

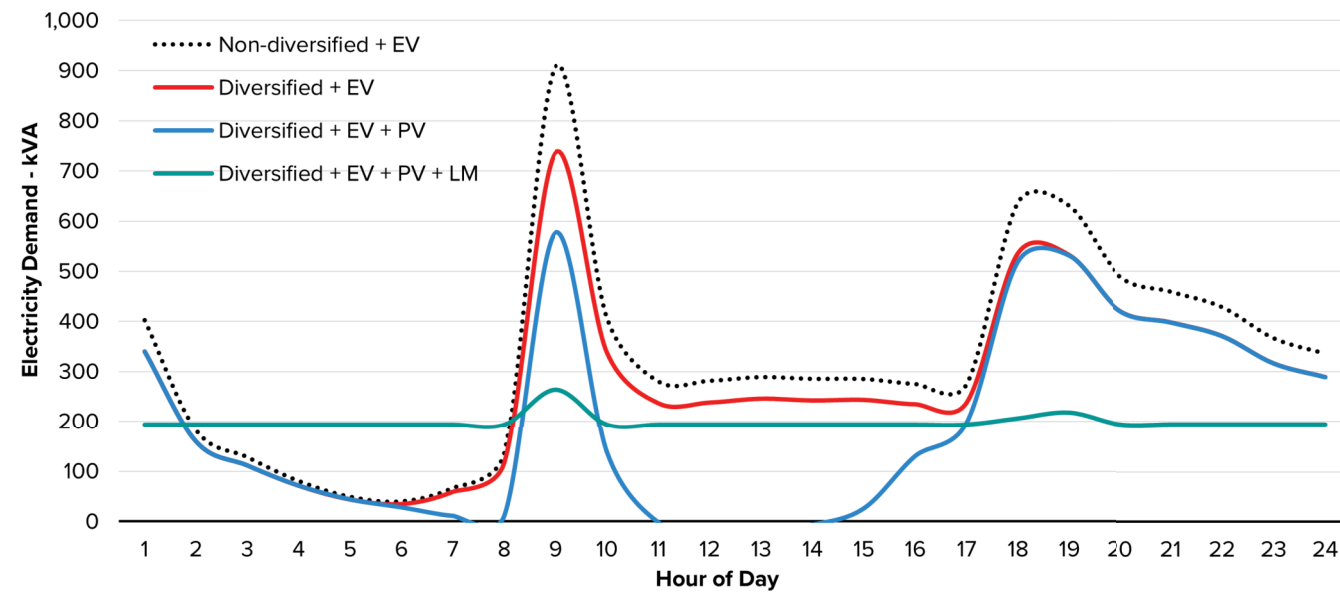


Figure 5.2 Electrical demand profiles, incl. peak demand reduction strategies

An embedded network (incl. thermal network) benefits from the diversified demand profile offered at a precinct scale. With the addition of on-site renewable energy generation, further peak demand reductions are achievable. Management of electric vehicle (EV) charging and hot water storage demand to match renewable energy generation minimises solar spill (grid export) offers an enhanced solar PV system capacity and utilisation. A load management (LM) strategy, whereby V2G capabilities facilitate EV discharging during peak demand periods, effectively flattens the demand curve, and significantly reduces capital plant and infrastructure sizing.

Diversified Demand

Figure 5.2 visualises electrical demand profiles for a range of scenarios to demonstrate opportunities inherent within the Precinct. A non-diversified electrical demand profile demonstrates the typical daily demand 'duck curve' with morning and evening peaks. The electrical demand profile includes hot water, heating, cooling and EV charging as the Precinct will operate as fossil fuel-free.

Figure 5.3 visualises the inherent electrical demand diversity across the Precinct based on its unique urban design characteristics.

The diversified electrical demand profile is reinforced by the thermal demand diversity and heat recovery potential inherent in the Precinct. Figure 5.4 visualises the heat recovery potential of a thermal network using heat map graphics; blue represents cooling load, orange represents heating load, and green represents heat recovery potential of the Precinct. Heat rejected from cooling can be recovered for heating (primarily hot water heating). This effect can be captured in an ambient loop system, whereby heat rejected to and abstracted from an ambient (or condenser water) loop serving water-cooled VRF air conditioning and CO₂ electric heat pump hot water systems in each building drives down the thermal demand.

Figure 5.2 further demonstrates the diversified electrical demand profile. Notable peak demand reductions are observed during the morning and evening peak periods.

The installation of a 320 kWp distributed solar PV system, constituting 25% of all building roof areas, is also presented in Figure 5.2. A morning peak reduction is observed. The daytime electrical demand is met by the distributed solar PV system.

Demand Response

To affect a demand response strategy that flattens the electrical demand profile (see Figure 5.2), V2G capabilities can be leveraged.

Best practice EV capable infrastructure provisions for 25% of all car parking spaces to have Level 1 charging points. Based on the Precinct yield, this equates to approximately 165 car parking spaces. Assuming 25% of EV owners opt-in (i.e., approximately 40 EV owners) to a load management strategy, whereby the EVs discharge during the morning and evening peak periods, peak demands are effectively flattened.

This demonstrates the ability for real and effective demand response solutions that significantly reduce electrical infrastructure provisions, drive real cost of living benefits, and realise grid resilience.

The Precinct utility strategy presented is conceptual and subject to business case evaluation. It is intended to outline a possible future ready response to the PRCUTS Sustainability Implementation Plan.

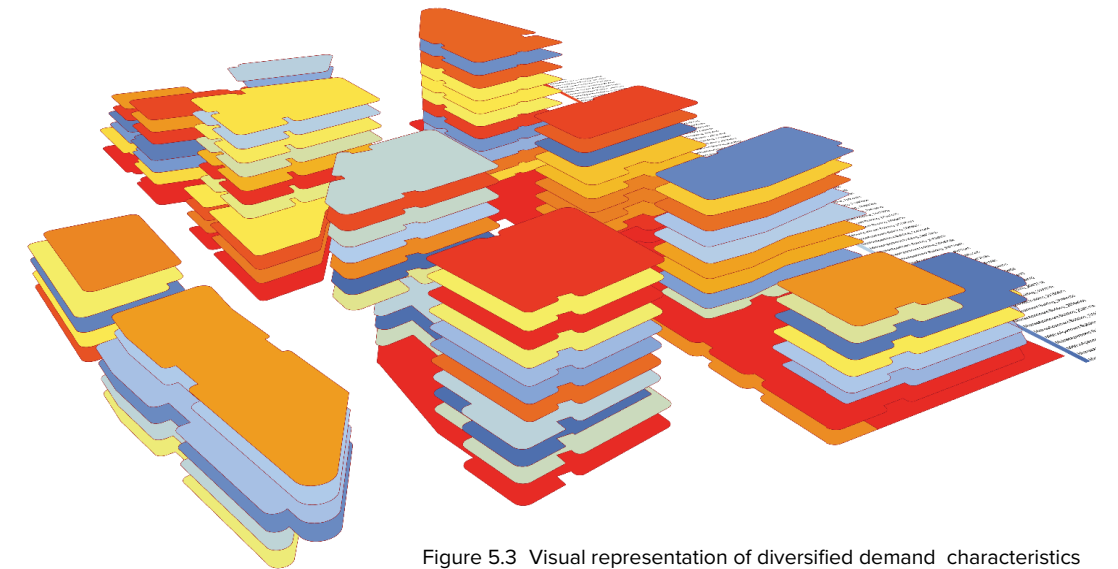


Figure 5.3 Visual representation of diversified demand characteristics

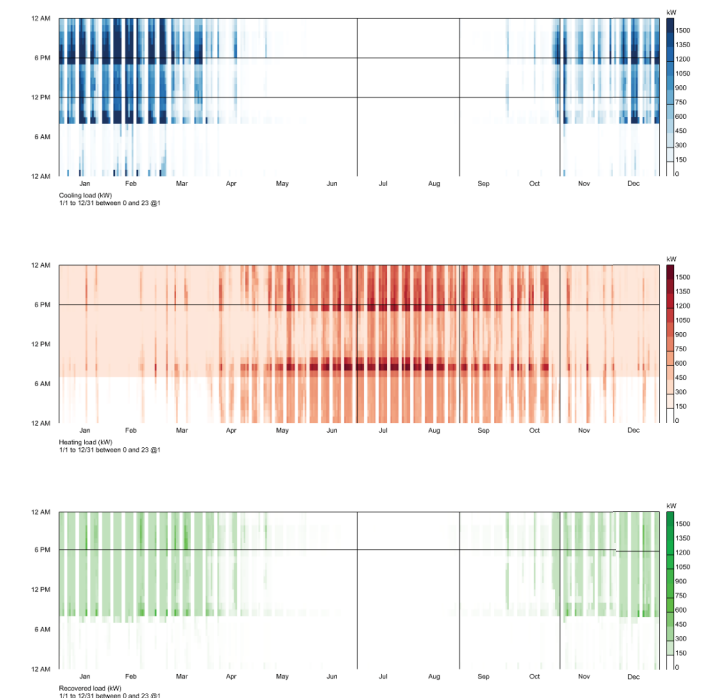


Figure 5.4 Visual representation of heat recovery potential



5.4 Priority _ Movement and Place

Mobility is undergoing a transformational shift with far-reaching implications. As personal transport technologies and choice expands, new infrastructure is required. To underpin this shift, the Precinct must create a walkable and liveable precinct through good urban design that promotes active and low carbon transport options. As the Precinct develops, it must increasingly leverage the enhanced public transport infrastructure (e.g., train, metro, rapid bus, etc.) to facilitate a progressive shift away from public vehicle use.

Future Mobility

The staged delivery of the Precinct will be critical to realising a mobility transformation. The private vehicle use needs of residents, workers and visitors will be limited initially by the quality of existing public transport and active mobility conditions.

As the quality of public transport and active mobility conditions improve (e.g., metro services commence circa 2030 and active mobility networks are expanded) acceptance of shared mobility services are expected to become the norm.

OBJECTIVES

- Transition future communities to a low car dependency
- Integrate electric vehicle (EV) infrastructure, including:
 - Provide Level 1 EV charging points to every residential car parking spaces and Level 2 charging points to 10% of non-residential car parking spaces (CBD CP B3.2 C1 and C2, respectively)
 - Develop a load management plan to facilitate V2G functionality
- Reinforce the local active movement networks, including north-south community connections and the east-west urban grid
- Provide community services that reinforce the active movement network
- Consider an adaptive building design approach that enables car parking conversion for alternative uses in the future, e.g., a mobility hub, and is reinforced by community services



5.5 Priority _ Nature-based Solutions

Nature-based solutions act to address the climate and ecological emergency. Biodiversity and habitat loss is accelerating and expanding cities are some of the most nature-depleted areas, putting at risk many of the life-sustaining ecosystems services upon which communities and livelihoods depend. Cities are also increasingly vulnerable to the impacts of climate change, including soaring temperatures, storm events and sea level rise. Nature based solutions improve air and water quality, and regulate temperatures, providing access to green spaces and nature that reinforce the physical and mental wellbeing of a community. By prioritising nature in investment decision-making, the resilience and liveability of cities is improved, contributing to a secure, sustainable future for nature and people.

OBJECTIVES

- Green grid
 - Link active movement networks to green spaces and recreational facilities
 - Achieve a 30% urban tree canopy
 - Increase biodiversity with a high proportion of indigenous planting (+60%) and a significant nesting tree per 500m² of landscaped area
- Water sensitive urban design
 - Install natural features, such as retention ponds, detention basins, swales, raingardens, soakaways and infiltration trenches, and physical features, such as tree pits and permeable/porous surfacing that mimic natural processes to treat, reduce and slow stormwater discharge
- Public open space
 - Provide publicly accessible open spaces to strengthen community and mitigate the urban heat island effect
 - Offer a range of recreational facilities
 - Locate small businesses near these areas to capture economic co-benefits
- Communal open space
 - Deliver podium and rooftop amenity, such as green roofs, to improve air quality, mitigate the urban heat island effect and provide temporary storage for rainwater
 - Create a refuge for insects and birds
 - Offer urban agriculture/agrioltaics to residents to enhance access to fresh food

6 Conclusions

6.1 Performance Objectives

The Precinct will seek to implement the performance objectives identified in Table 6.1. This Sustainability Statement demonstrates a Precinct design response that is aligned with the following material considerations:

- The vision and related themes set out in the City of Canada Bay *Local Strategic Planning Statement* (CBLSPS)
- The performance outcomes and sustainability targets outlined in the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) *Sustainability Implementation Plan*
- The increased standards put forward in the *State Environmental Planning Policy (Sustainable Buildings) 2022* (Sustainable Buildings SEPP)
- The objectives and controls of the City of Canada *Development Control Plan* (CBDCP)

Table 6.1 Performance objectives

Basis	Response
Sustainable Buildings SEPP	<ul style="list-style-type: none">• Average 7 star NatHERS minimum 6 star NatHERS• BASIX Energy 62 (BASIX Higher Standards)• BASIX Materials Index
PRCUTS <i>Sustainability Implementation Plan</i>	<ul style="list-style-type: none">• BASIX Water 50• 5.5 star NABERS Energy for Apartment Buildings• 5.5 star NABERS Water for Apartment Buildings• Energy infrastructure
Green Star Buildings	<ul style="list-style-type: none">• Credible reductions in upfront carbon and energy use• Fossil fuel-free• 100% renewable energy• High impact refrigerants are eliminated, where possible• 80-90% diversion of construction and demolition waste from landfill
Movement and Place	<ul style="list-style-type: none">• Level 1 EV charging points to every residential car parking spaces and Level 2 charging points to 10% of non-residential car parking spaces
Nature-based Solutions	<ul style="list-style-type: none">• 30% urban tree canopy• Increase biodiversity with a high proportion of indigenous planting (+60%) and a significant nesting tree per 500m² of landscaped area



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