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Burwood North Precinct Masterplan

Rapid transport appraisal

21 July 2023 | Version 5.0

Quality Assurance DRAFT

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1.0	3 March 2023	Draft for information
1.1	9 March 2023	Updated with revised parking rate recommendations
2.0	13 March 2023	Updated masterplan yield
3.0	15 March 2023	Updated masterplan yield
4.0	14 July 2023	Updated masterplan yield
5.0	21 July 2023	Updated with feedback from Council

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[01]

Introduction

Overview

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Burwood Council is preparing an updated masterplan and supporting studies for the Burwood North Precinct, building upon the work already undertaken as part of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The masterplan seeks to capture the opportunity afforded by a new metro station at Burwood North on the Sydney Metro West network.

The masterplan strives to deliver an outcome that is feasible, maximises public benefit and delivers high quality public domain, open spaces and community infrastructure. The masterplan articulates a cohesive vision for Burwood North that will underpin the growth and development of the precinct as a benchmark for sustainable urban renewal.

The masterplan is the result of a collaborative process that has been undertaken between Burwood Council, a wide range of government, institutional and community stakeholders, and the project's consultant team.

An Implementation Plan will also be prepared that outlines the recommended planning controls, policies and infrastructure necessary to enable the successful delivery of the masterplan. The recommendations may inform amendments to the Burwood Local Environmental Plan 2012 (LEP) and Burwood Development Control Plan 2012 (DCP).

Purpose of this report

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This report documents the rapid transport appraisal undertaken to assess the viability of the proposed Burwood North Precinct Masterplan.

The analysis undertaken:

- Quantifies the total trip generation for the precinct under existing approved schemes (including PRCUTS).
- Quantifies the total trip generation with the increased densities and land-use changes proposed in the masterplan.
- Highlights the changes to mode-share (including the shift to public and active transport) which would be required to achieve a net-zero increase in private vehicle trips and the associated impact on these other modes.
- Benchmarks and recommends parking provisions for the land uses proposed in the masterplan which balance customer needs, accessibility and helps achieve the target mode-shares.

The outcomes of this report will be refined and assessed in greater detail in the next phase in the form of a transport assessment to support the Burwood North Precinct Planning Proposal (PP).

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Draft masterplan option and yield

Burwood North Masterplan Option

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- COX has provided a revised masterplan option study for Burwood North Precinct (dated 20 July 2023).
- Development blocks were identified, with constrained sites identified for each development block that excludes heritage items, recent developments, strata developments, schools and open spaces.
- A proposed FSR has been identified for each block, responding to the strategic, transport and development context.
- The proposed FSR controls are translated into quantification of residential GFA and non-residential GFA. This represents the maximum development outcome for the precinct at built out.
- Precinct capacity for jobs, dwellings and population capacities have been calculated for each block using the following assumptions:
  - 90m^2 GFA per dwelling
  - 35m^2 GFA per job
  - 2.5 persons per dwelling

Burwood North Masterplan Yield

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The transport assessment compares the proposed masterplan to the baseline scenario, which as agreed with Transport for NSW, includes:

- Existing development to be retained
- Maximum development FSRs as approved by PRCUTS.

The relative change in yield from the baseline scenario to the proposed masterplan is summarised below:

	Baseline (PRCUTS + Existing)	Proposed (Burwood North PP)	Change
Non-residential (m^2 of GFA)	25,621*	42,155*	**(▲ 16,534)**
Residential (no. of dwellings)	4,476	6,243	**(▲ 1,767)**

Note (*) *This excludes the precinct to the north of Parramatta Road that is part of the Canada Bay Parramatta Road Corridor Planning Proposal, and Block E1 (Sydney Metro) which may be subject to a separate Planning Proposal.*

The Burwood North Masterplan Planning Proposal (PP) will consider the potential transport implications of the increase of:

- **~16,500m^2 of non-residential GFA**
- **~1,750 additional residential units**

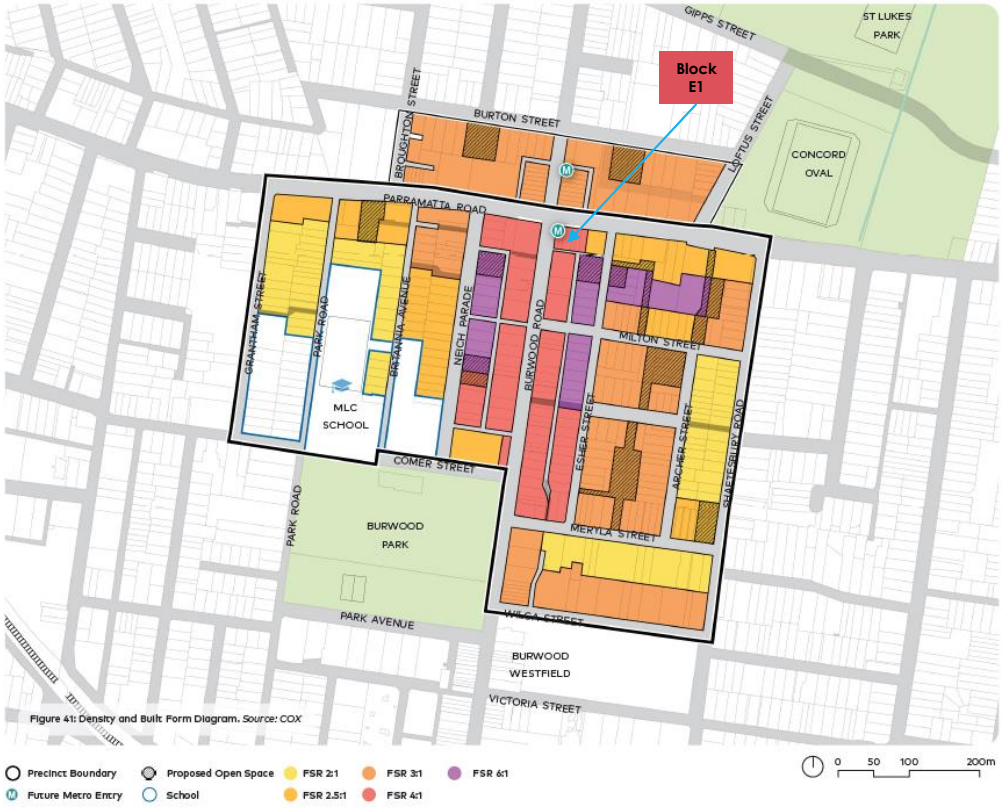

Figure 41: Density and Built Form Diagram. *Source: COX*

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[03]

Transport appraisal

Assessment scenarios and assumptions

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The assessment will consider scenarios:

- **Baseline:** development of Burwood North based on existing developments and the PRCUTS maximum approved FSRs with mode-share as per the Canada Bay Planning Proposal (PP).
- **Project (do nothing):** development based on the revised Burwood North masterplan with mode-share as per the Canada Bay PP.
- **Project (with intervention):** development based on the revised Burwood North masterplan with a revised mode-share to achieve a net-zero increase in private vehicle trips (compared to the previously approved scenario – baseline). The intervention includes measures such as changes to parking policies and improvements to active/public transport accessibility.

Mode share targets (baseline)

- There were no mode share targets set (or if set, not made publicly available) for the PRCUTS Transport Strategy.
- The Strathfield Burwood Canada Bay Traffic and Transport Strategy, prepared by Bitzios (and used to support the Canada Bay Planning Proposal), assumed mode share targets for Burwood Precinct as follows and they were assumed as the baseline of this appraisal.

Mode Share Targets	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger
Canada Bay PP	6%	2%	15%	45%	28%	4%

Trip rates

- The total trips expected to be generated by the baseline and the Burwood North Masterplan PP, were estimated using surveyed trip rates according to TfNSW Technical Direction (TD 2013-04a) and baseline mode share targets.
- The residential rates derived from the average of Sites 1, 2, 5 and 8 for high-density residential from the TD 2013|04a. The non-residential rates are derived from the average of office sites 1 to 8 from the TD 2013|04a and factored up with a higher density occupancy of 35 employees per 100m^2. Refer to **Appendix A** for details of these sites.

Person trip rates	AM	PM
Non-residential (trips per 100m^2 of GFA)	2.04	1.51
Residential (trips per unit)	0.73	0.62

Baseline scenario

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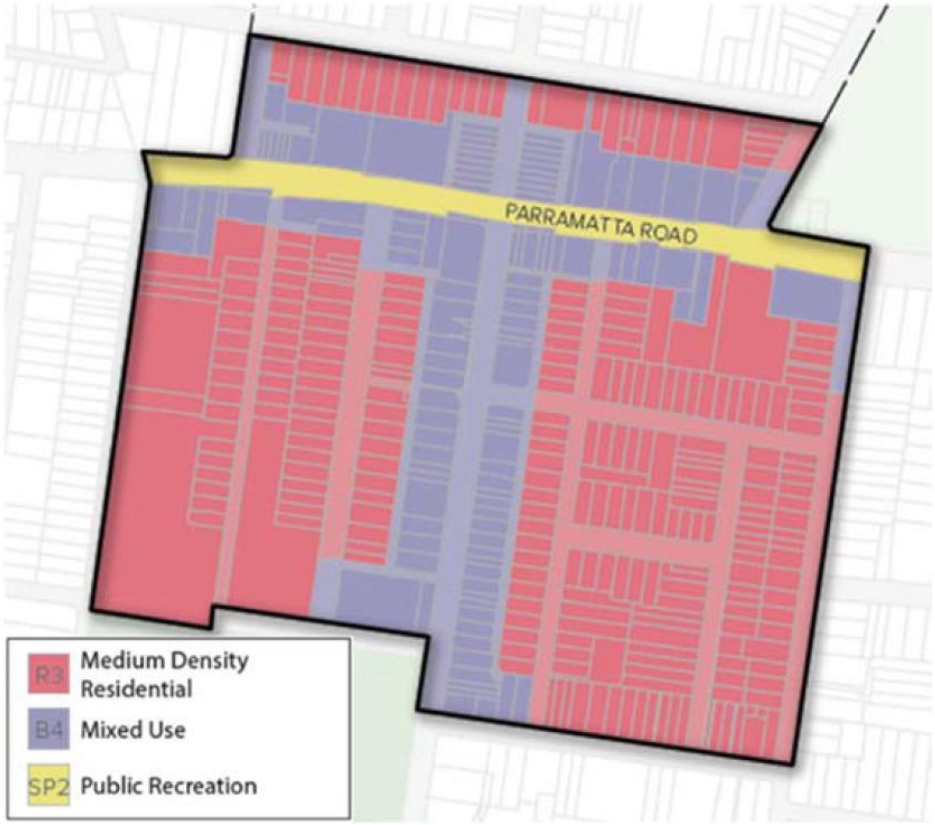

Source: PRCUTS Controls Built Form Testing – Burwood, Roberts Day

Under the baseline scenario (existing + PRCUTS approved FSR), the redevelopment of the sites would generate up to 3,800 and 3,150 total trips in the AM and PM peak hours respectively.

AM peak total trips	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger	Total
Non-residential	31	10	78	235	146	21	**522**
Residential	196	65	490	1,470	915	131	**3,268**

PM peak total trips	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger	Total
Non-residential	23	8	58	174	108	15	**387**
Residential	166	55	415	1,244	774	111	**2,764**

AM Peak summary (values are rounded)

Active Transport	Public Transport	Private Vehicle
300	**2,275**	**1,060**

Project (do nothing) scenario

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Figure 41: Density and Built Form Diagram. *Source: COX*

Under the Project (do nothing) scenario with the proposed masterplan densities (without transport intervention) will generate up to 5,400 and 4,500 total trips in the AM and PM peak hours respectively.

AM peak total trips	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger	Total
Non-residential	52	17	129	386	240	34	**858**
Residential	273	91	684	2,051	1,276	182	**4,557**

PM peak total trips	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger	Total
Non-residential	38	13	95	286	178	25	**636**
Residential	231	77	578	1,735	1,079	154	**3,855**

AM Peak comparison to baseline (values are rounded)

Active Transport	Public Transport	Private Vehicle
430	**3,250**	**1,520**
(▲ 130)	**(▲ 975)**	**(▲ 460)**

Project (with intervention) scenario

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Under the Project (with intervention) scenario, several measures (including parking policy and improvements to active/public transport accessibility) to reduce private vehicle mode-share.

Mode Share Targets	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger
Canada Bay PP	6%	2%	15%	45%	28%	4%
Proposed	10%	3%	13%	50%	20%	4%
Change	(▲ 4%)	(▲ 1%)	(▼ 2%)	(▲ 5%)	(▼ 8%)	(-)

Note: Bus mode-share has been reduced to reflective of the lower bus accessibility for Burwood South (compared to the Canada Bay PP) and more reflective of current observations (~5% in 2016 Journey-to-work data).

Under the Project (with intervention) scenario with the proposed masterplan densities will generate up to 5,400 and 4,500 total trips in the AM and PM peak hours respectively (unchanged from the *Project Do Nothing* scenario).

AM peak total trips	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger	Total
Non-residential	86	26	112	429	172	34	**858**
Residential	456	137	592	2,279	911	182	**4,557**

PM peak total trips	Walk	Bicycle	Bus	Train	Car as Driver	Car as Passenger	Total
Non-residential	64	19	83	318	127	25	**636**
Residential	386	116	501	1,928	771	154	**3,855**

AM Peak comparison to baseline (values are rounded)

Active Transport	Public Transport	Private Vehicle
700	3,400	1,080
(▲ 400)	(▲ 1,125)	(▲ 20)

Project (with intervention) scenario

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Key implications:

- By achieving net zero increase in car trips, there will be an increase in up to 400 active and 1,125 public transport trips respectively during peak hours.
- This level of increase in walking and cycling trips can be accommodated by the proposed street network in Burwood North with significant investment in the public domain and improved environment and infrastructure for pedestrians and cyclists.
- The increase of 1,125 public transport trips would be spread across buses (approximately 10%) and rail (approximately 90%).
    - Improved bus services, which predominately operate north-south, and potential new bus services along the Parramatta Road corridor. Buses would likely accommodate the 10% increase and serve customers with an origin or destination not directly served by the two rail modes.
    - Existing train services from Burwood Station may be able to accommodate some of the increased rail trips, as capacity on the T1 Western Line and T2 Inner West Line is freed up following the introduction of Sydney Metro West. However, given the increased distance (compared to Sydney Metro) to the station and the comparatively slower journey time to Parramatta and the Sydney CBD, it is assumed majority of Burwood North customers will opt for Sydney Metro West.
    - If a significant majority of the new customers opt for the high-frequency Sydney Metro West services from Burwood North Station, the increase in customers may have an impact on the capacity of the station (refer to adjacent commentary).

From the *Sydney Metro West - Rail infrastructure, stations, precincts and operations EIS* (March 2022), the forecast customer demand for Burwood North is as below. Therefore, it is assumed the station has been design to accommodate these demands (at a minimum).

Forecast customers	Access	Egress	Total
2036 AM peak hour	2,600	850	3,450

TfNSW projects typically assumed a 15% contingency during the phase to account for changes in assumptions (including land-use density). This equates to capacity for an additional 525 customers.

Forecast customers	Access	Egress	Total
2036 AM peak hour	3,000 (▲ 400)	975 (▲ 125)	3,975 (▲ 525)
Net deficit			600

Therefore, if a significant majority of the increase of the 1,125 public transport trips opt for Sydney Metro West, the increase in customers may have an impact on the capacity of the station (net deficit of 600). Hence it is recommended analysis be undertaken in conjunction with Sydney Metro to confirm design capacity of the station, and its implications on the station and services.

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Parking requirements

Parking requirements (residential)

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To support the initiative of achieving net-zero vehicular trips (Project (with intervention) scenario), the parking rates for residential uses have been reviewed to discourage excessive on-site parking and car ownership and promote more sustainable outcomes via restrained parking policy.

The following maximum parking requirements (residential) are proposed within the Burwood North Precinct for inclusion into the LEP, as outlined in table below:

Residential Parking	Studio	1 Bed	2 Bed	3+ Bed	Visitor
Proposed (maximum no. of spaces per unit)	0.1	0.3	0.7	1.0	0.1

The proposed rates have been informed by benchmarking to the existing Burwood Development Control Plan and other regions (refer to the table on the right of the page):

- Are generally aligned with the City of Sydney Category A rates (lowest rates for development with the best public transport accessibility) and PRCUTS (Category 1) rates that apply for high accessibility locations within 800m of multiple transport options.
- Are lower than those set out for the Canada Bay Burwood-Concord, Homebush North and Kings Bay Precincts and Burwood DCP (centres and corridors), but also aligned with those approved for Rhodes East and Rhodes West site-specific DCPs.
- Retain the suggested visitor parking rates for the Canada Bay Burwood-Concord, Homebush North and Kings Bay Precincts, rather than the zero-parking provision for visitors.

Benchmarking

Area	Residential Parking (spaces per unit)				
	Studio	1 Bed	2 Bed	3+ Bed	Visitor
PRCUTS (Category 1 applied for high accessibility locations)	0	0.3	0.7	1.0	0
City of Sydney (Category A)	0.1	0.3	0.7	1.0	0
Rhodes East site-specific DCP	0.1	0.3	0.7	1.0	0.05
Rhodes West site-specific DCP	0.1	0.3	0.7	1.0	0.05
St Leonards Precinct	0.25	0.25	0.5	0.5	0
PRCUTS (Category 2)	0.3	0.5	0.9	1.2	0.1
Canada Bay LEP - Burwood-Concord, Homebush North and Kings Bay Precincts	0.3	0.5	0.9	1.2	0.1
Canada Bay DCP (Category C)	0.3	0.5	0.9	1.2	0.2
Burwood (Centres and Corridors)	0.5	1.0		1.5	0.2

Parking requirements (non-residential)

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To reduce the attractiveness for workers to drive to work in an area that will be supported by trains, metro and buses, the parking rates for non-residential uses have also been reviewed and benchmarked to the Burwood DCP and other similar Precincts (refer to the table on the right of the page) .

The following maximum parking requirements (non-residential) are proposed within the Burwood North Precinct for inclusion into the LEP, as outlined in the table below

Non-residential Parking (maximum)	
Commercial	1 space per 150 m^2
Retail	1 space per 100 m^2

- The proposed rates are generally aligned with those suggested for the PRCUTS precincts (Category 1) for high accessibility locations within 800m of multiple transport options.

Benchmarking

Area	Non-residential Parking	
	Commercial	Retail
St Leonards Precinct	1 space per 400 m^2	
Burwood (Centres and Corridors)	1 space for the first 400 m^2 or part thereof, plus - 1 space per 120 m^2 or part thereof additional to the first 400 m^2	1 space per 50 m^2
City of Sydney (Category D)	1 space per 175 m^2	1 space per 90 m^2
PRCUTS (Category 1)	**1 space per 150 m^2**	**1 space per 100 m^2**
Rhodes East site-specific DCP	**1 space per 150 m^2**	**1 space per 100 m^2**
City of Sydney (Category E)	1 space per 125 m^2	1 space per 60 m^2
PRCUTS (Category 2)	1 space per 100 m^2	1 space per 70 m^2
Canada Bay LEP - Burwood-Concord, Homebush North and Kings Bay Precincts	1 space per 100 m^2	1 space per 70 m^2
Rhodes West site-specific DCP	1 space per 40 m^2	
Canada Bay DCP	1 space per 40 m^2	

Other parking considerations

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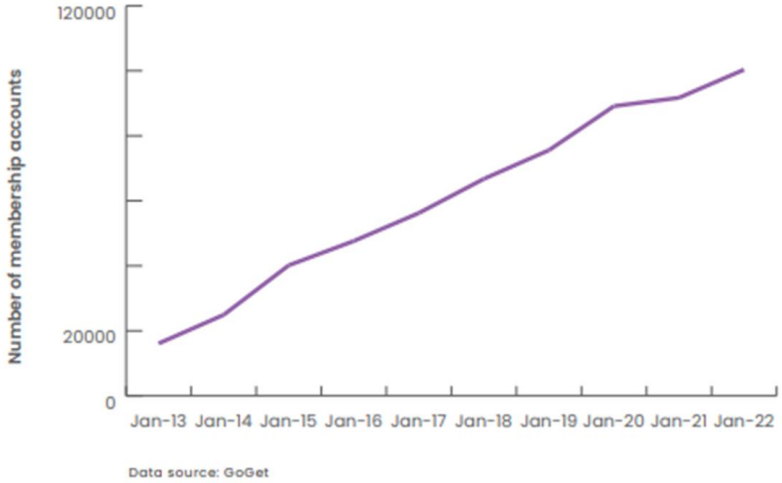
- Provide access to a car when they need one, without having to own and store one – car share and ride share
- Unbundled parking from the price of a unit – gives residents the option to rent or buy parking spaces, but also choose to save money by not having a parking space
- Making parking electric capable – requirement for all new development and retrofitting existing

Demand for car-share is increasing in NSW

GoGet has more than 100,000 membership accounts – there can be more than one registered driver per account.



Data source: GoGet

Other parking requirements

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Freight and servicing vehicle parking

- Adopt freight and servicing vehicle parking requirements as per Canada Bay DCP control as follows:

Land Use	Space required
Residential development	1 space per 50 apartments for first 200 apartments plus 1 space per 100 apartments thereafter
Commercial offices	1 space per 4,000m² GFA for first 20,000m² GFA and a space per 8,000m² GFA thereafter
Retail	1 space per 500m² for first 2,000m² and 1 space per 1,000m² thereafter (50% of spaces for trucks

Motorcycle parking

- Adopt maximum provision for residential dwellings as per Canada Bay DCP control – 2 spaces per 10 dwellings.

Bicycle parking

- Adopt minimum bicycle parking and storage provision as per Canada Bay DCP control as follows:

Land Use	Resident/Staff Bicycle storage facility	Visitor Bicycle parking facility
Residential	2 per dwelling	2 per 10 dwellings
Commercial	2 per 150m² GFA	2 per 400m² GFA
Retail	2 per 250m² GFA	2 per unit + 2 per 100m² GFA

Accessible parking

- Adopt accessible parking rates as per Canada Bay DCP control – 1 space for every 100 car parking spaces or part thereof.

Car share and ride share

- Adopt car share and ride share requirements as per Canada Bay DCP control as follows:
  - One car share space is to be provide for every 20 dwellings.
  - On-site car parking can be reduced at a rate of 5 parking spaces per 1 car share space.

Electric vehicles charging facility requirements

- Adopt minimum level 1 Electric Vehicle charging facility requirements as per Canada Bay DCP control as follows:

Table B-K Minimum Level 1 electric vehicle charging facility requirements

Type of development	Type of charging facility	Minimum number of charging points/facilities/stations
Manor houses, Multi-dwelling housing, Multi-dwelling housing (terraces), Residential flat building, Shop top housing	Level 1 • Regular 240V wall socket (10amps). • 2.4kW - 3.7kW. • No specialist installation required. • 16 – 20 hours to fully charge average vehicle.	1 per parking space 1 per five bicycle parking spaces (a dedicated space and charging point for electric bicycles and mobility scooters to be charged must be provided for every five bicycle parking spaces)
Non-residential	Level 1 • Level 1 Regular 240V wall socket (10amps). • 2.4kW - 3.7kW. • No specialist installation required. • 16 – 20 hours to fully charge average vehicle.	1 per parking space

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Appendix A

TD 2013 | 04a trip rates

Residential trip rates

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APPENDIX B3 – HIGH DENSITY RESIDENTIAL – GENERATION RATES										
Site No.	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
Location	St Leonards	Chatswood	Cronulla	Rockdale	Parramatta	Liberty Grove	Strathfield	Pyrmont	Charlestown	Wollongong
Weekday										
AM Peak Person Trips per Unit	0.64	0.64	0.32	0.81	0.95	0.72	0.52	0.69	0.53	0.89
AM Peak Person Trips per Car Space	0.39	0.51	0.22	0.47	0.5	0.62	0.43	0.3	0.62	0.53
AM Peak Person Trips per Bedroom	0.29	0.3	0.13	0.39	0.45	0.29	0.26	0.46	0.27	0.3
PM Peak Person Trips per Unit	0.54	0.82	0.14	0.53	0.65	0.91	0.42	0.46	0.65	1.11
PM Peak Person Trips per Car Space	0.54	0.82	0.14	0.53	0.65	0.91	0.42	0.46	0.65	1.11
PM Peak Person Trips per Bedroom	0.24	0.39	0.06	0.26	0.31	0.37	0.21	0.3	0.33	0.37
Daily Person Trips per Unit	3.49	5.35	2.96	5.36	5.01	6.5	4.16	3.05	6.03	8.67
Daily Person Trips per Car Space	2.52	3.35	4.61	4.83	3.85	4.47	4.3	2.01	5.76	4.11
Daily Person Trips per Bedroom	1.56	2.51	1.19	2.61	2.39	2.67	2.08	2.01	3.11	2.89
AM Peak Vehicle Trips per Unit	0.14	0.14	0.07	0.32	0.27	0.28	0.1	0.18	0.39	0.67
AM Peak Vehicle Trips per Car Space	0.1	0.09	0.11	0.29	0.2	0.19	0.1	0.12	0.37	0.32
AM Peak Vehicle Trips per Bedroom	0.06	0.07	0.03	0.16	0.13	0.12	0.05	0.12	0.2	0.22
PM Peak Vehicle Trips per Unit	0.07	0.12	0.11	0.18	0.12	0.41	0.06	0.1	0.42	0.22
PM Peak Vehicle Trips per Car Space	0.05	0.07	0.17	0.17	0.09	0.28	0.07	0.07	0.4	0.11
PM Peak Vehicle Trips per Bedroom	0.03	0.05	0.04	0.09	0.06	0.17	0.03	0.07	0.22	0.07
Daily Vehicle Trips per Unit	0.77	1.23	0.93	2.25	1.67	3.14	1.16	1.03	4.37	4.78
Daily Vehicle Trips per Car Space	0.56	0.77	1.44	2.03	1.29	2.16	1.2	0.68	4.18	2.26
Daily Vehicle Trips per Bedroom	0.35	0.58	0.37	1.1	0.8	1.29	0.58	0.68	2.26	1.59
AM Car Driver mode split	22%	22%	22%	40%	28%	39%	19%	26%	74%	75%
PM Car Driver mode split	13%	15%	79%	34%	18%	45%	14%	22%	65%	20%
Daily Car Driver mode split	22%	23%	31%	42%	33%	48%	28%	34%	72%	55%

Office trip rates

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APPENDIX D3 – OFFICE BLOCKS – PERSON-BASED TRIP RATES								
AM Peak Hour	OB1 North Sydney	OB2 Chatswood	OB3 Sydney Olympic Park	OB4 Hurstville	OB5 Macquarie Park	OB6 Parramatta	OB7 Liverpool	OB8 Norwest
Trips	397	249	842	119	142	387	95	34
Trips/100m2 GFA	1.26	2.44	2.47	3.66	2.47	1.43	3.37	2.83
PM Peak Hour								
Trips	338	205	801	77	126	349	65	14
Trips/100m2 GFA	1.08	2.01	2.35	2.37	2.19	1.29	2.31	1.17
Daily								
Trips	2975	1691	-	802	1079	5114	700	142
Trips/100m2 GFA	9.47	16.56	-	24.65	18.77	18.94	24.85	11.83
Road Network AM Peak Hour								
Trips	391	111	-	104	142	266	58	31
Trips/100m2 GFA	1.25	1.09	-	3.2	2.47	0.99	2.06	2.58
Road Network PM Peak Hour								
Trips	338	90	-	67	86	298	48	10
Trips/100m2 GFA	1.08	0.88	-	2.06	1.5	1.1	1.7	0.83
Source: Trip Generation and Parking Generation Surveys (Office Blocks), GTA Consultants for the NSW Roads and Traffic Authority, September 2010, p116								

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MOTT MACDONALD

Burwood North Precinct Masterplan

Stormwater & Flood Study

August 2023

Acknowledgment of Country

We recognise the Wangal People of the Eora Nation as the Traditional Custodians of this land that is being masterplanned. 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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Burwood North Precinct Masterplan

Stormwater and Flooding Report

August 2023

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	25/11/2022	JZ	FH	JM	Draft Issue
B	09/12/2022	JZ	FH	JM	Final Draft Issue
C	14/03/2023	JZ	FH	JM	Updated Issue
D	17/07/2023	JZ	FH	JM	Final Issue
E	10/08/2023	JZ	FH	JM	Updated for Stakeholder Comments

Document reference: 703100557 | E |

Information class: Standard

Contents

Tables

Figures

1 Introduction

Burwood Council is preparing an updated masterplan and supporting studies for the Burwood North Precinct, building upon the work already undertaken as part of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The masterplan seeks to capture the opportunity afforded by a new metro station at Burwood North on the Sydney Metro West network.

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The masterplan is the result of a collaborative process that has been undertaken between Burwood Council, a wide range of government, institutional and community stakeholders, and the project's consultant team.

An Implementation Plan will also be prepared that outlines the recommended planning controls, policies and infrastructure necessary to enable the successful delivery of the masterplan. The recommendations may inform amendments to the Burwood Local Environmental Plan 2012 (LEP) and Burwood Development Control Plan 2012 (DCP).

As part of the process, Mott MacDonald is engaged to prepare this technical report to address flooding and water quality concerns for the Burwood North revitalisation and assist in implementing new stormwater requirements for future developments within the precinct.

1.1 Catchment and Topography

The Burwood North Masterplan Precinct, referred to herein as 'the precinct', is indicated in Figure 1-3 and is located within the St Lukes Catchment. The catchment is shared between the Canada Bay and Burwood LGAs, and is split up along Parramatta Road, which serves as the main East – West transport link. The catchment comprises largely of urban residential developments, with commercial and light industrial corridors along the major roadways. Runoff from the whole precinct discharges into the Parramatta River, via an unnamed bay located downstream of Lyons Road.

Figure 1-1 Burwood Park and Town Centre

Figure 1-2 St Luke's Canal

1.2 Previous Studies

Burwood Council has published the *Exile Bay, St Lukes and William Street Flood Study* (2019), prepared by WMAwater as part of the first stage of the NSW State Government's policy on floodplain risk management. This study sets out the direction for floodplain risk management of the catchment, and developed detailed hydrological and flood models for use in making assessments of flood risk and impacts within the catchment.

Sydney Metro West is a prominent transport infrastructure project, currently in the design phase, with the potential to influence stormwater management and flooding at the northern end of the precinct. The approval conditions for this infrastructure require limited impacts on flooding in terms of worsening flood levels or affectation to third parties as a result of the project. The submissions for environmental approval of this project provide information on the proposed infrastructure for consideration as an interfacing project to the Burwood North precinct assessment of stormwater and flooding management.

Figure 1-3 Burwood North Masterplan Precinct

1.3 Purpose

This report will provide recommendations for the future precinct development within the context of the planning approach in order to serve the future community of Burwood with an improved outcome in terms of flooding and stormwater management. To enable the engineering review of stormwater and flooding conditions and determine the appropriate recommendations the following scope was developed.

- Establish baseline conditions within the existing detailed precinct flood model as well as high level MUSIC model
- Review proposed climate change factors in line with Australian Rainfall and Runoff 2019 (ARR19) and inclusion of potential climate change impacts as part of the baseline flooding assessment
- Investigate the impact the proposed development may have on existing flood conditions, including flood levels and flood storage as well as identify opportunities for natural water quality enhancements and biophilic flood protection
- Integration of the proposed design for the buildings, pavement grades and levels to the preferred model in consultation with the project team
- Coordinate flooding outcomes with the project team to address unacceptable flood impacts and iterate the model based on revised urban design configurations
- Determine required Flood Planning Levels and give advice on potential flood protection measures and flood evacuation measures
- Prepare flood map outputs for relevant minor, major and extreme events including the 5% AEP, 1% AEP and Probable Maximum Flood (PMF)

1.4 Planning Context

Statutory planning regulations in NSW govern the adoption of flood planning levels for development. Adoption of flood planning levels should consider the likely life of the structure meaning that climate change uplift on flood levels is to be adopted.

- NSW Flood Prone Land Policy (2022)
- NSW Floodplain Development Manual (2005)
- Burwood Local Environmental Plan (BLEP) 2012
- Burwood Development Control Plan (BDCP) 2021

Other Council plans around the future development in the precinct including the desired community amenity also set proactive goals to manage flood risk for the community into the future, specifically by committing to *Minimise the impact of flooding to the Burwood community*. These background plans include:

- Burwood Housing Strategy (2020)
- Burwood Community Facilities and Open Space Strategy (October 2019)
- Draft Community Strategic Plan – Burwood (2036)
- The Community Strategic Plan – Burwood (2030)
- Sustainable Burwood (2022)
- The Burwood Local Strategic Planning Statement

2 Stormwater Strategy

This section describes the intent for management of stormwater across the precinct. Information on best practice and examples of beneficial implementation of stormwater infrastructure elsewhere provides the basis for recommendations for actions within the precinct.

2.1 Stormwater Management Challenge

2.1.1 Existing Stormwater Management

The natural watercourse through the catchment has been formalised with a trunk drainage line carrying the catchment runoff from collection pit and pipe systems in the local road reserves. Figure 2-1 indicates the route of the trunk drainage main shown in blue, discharging to the north east within the major drainage easement east of Concord Oval.

Figure 2-1 Existing utilities plan indicating trunk stormwater route

Overland flow management through the precinct is fragmented, with historic development obstructing the continuous free overland flow paths along the natural valley from the south-east corner of Burwood Park to Concord Oval. The approach to stormwater management to date has focussed largely on underground pit/pipe systems to manage flows, however capacity limitations of the underground system result in undesirable ponding through the urban residential areas in moderate to large storm events.

2.2 Stormwater Management Opportunities

2.2.1 Green Corridor

With reference to the sustainability aspirations for the precinct, the opportunity to introduce a green corridor between Burwood Park and Concord Oval can offer stormwater management and flooding benefits. The potential for reinstating softer landscapes within road reserves (and potential future development lots) gives the opportunity for overland flow consolidation within the corridor, and an increased catchment flood storage potential. Additional benefits of this approach are in supporting biodiversity, recreation opportunities, and allows for additional rainfall infiltration relative to current conditions, ultimately reducing overland flow volumes.

Further opportunities also exist for “daylighting” stormwater infrastructure, where sections of the underground stormwater culverts are reinstated as natural creeks along the Green Corridor. This level of rehabilitation does require a significant corridor width and may not be feasible in many cases due to the depth of the stormwater infrastructure and space constraints.

2.2.2 Dual Use Public Domain for Flood Storage

Within the potential blue/green corridor but also local road reserves, the introduction of new storage volume within the profile of local roads and stormwater drainage features within the local road corridors can increase the resilience of development to future flood events. Current flood storage is fragmented and associated with informal ponding areas around existing flood affected properties, however re-grading local streets with civil design allowing for greater temporary ponding of overland flows in desired low points within the public domain and local road network can lower flood levels at the fringe of overland flow paths. This opportunity is considered alongside planned emergency and evacuation strategies to ensure that flood hazards are reduced;

a. in the number of hazardous locations by consolidating overland flows, or;
b. in terms of hazard severity for pedestrians and vehicles.

2.2.3 Introduction of Lot-Based Detention Infrastructure

On-site detention (OSD) is an infrastructure measure to provide flood storage to a local catchment, to reduce flooding constraints. It can take a number of forms, typically detention tanks, basins, or integrated depressions within the grading of new public domain areas. This can be considered in both a temporary or permanent approach to increasing flood storage and reducing the impacts of new development or infrastructure in the floodplain. In precinct re-development OSD can play an important role in the staging of new infrastructure, for example as temporary offset detention to be made available during the construction phase of permanent stormwater management infrastructure which would otherwise cause increases in flood hazards locally.

The provision of OSD at the lot-based or development level effectively provides the required detention as development occurs. The alternative method is the provision of regional basin type storage, consolidating the required detention volumes together. The lot-based approach is preferred to regional basin type approaches in Burwood due to the fragmented land ownership and likely development timeline, whereby the regional approach faces the challenges of staging, availability of suitable land and funding allocation.

2.2.4 Integrated Water Quality

Enhancement of water quality discharging from the catchment, both from building lots and new public domain is proposed to improve conditions in receiving watercourses and also achieve sustainability outcomes. Water quality is one of the “missing links” that is too often overlooked in current public domain design, and new precincts provide the opportunity to reset water quality to be a key part of the precinct design. With the EPA putting some of the most restrictive requirements on discharge to new development areas with Sydney (South Creek and Second Ponds Creek recently), integrated water quality treatment within the public domain form a key part of the discharge strategy while aligning with desired streetscape features within blue/green corridors. More details regarding water quality treatment measures are described in section 3.

2.3 Implementation

The masterplan design identifies the local streets subject to hazardous conditions in flood events (refer section 4) and relief of flood behaviour of these overland flows is achieved through precinct grading and open space relief areas which act to reduce the peak flows experienced in key locations across the precinct. Key locations benefiting from the provision of overland flow relief are overland flows in Esher Street and New Street.

Further optimisation for the management of local overland flows will occur through the development application process whereby detailed assessment of potential impacts from future development and the provision of mitigating measures is executed by developers through detailed design.

To assist developers in achieving the desired stormwater management outcomes, development controls have been reviewed and recommendations made regarding the relevant DCP controls. These controls assist in the mitigation of the peak stormwater discharge flows which are the key drivers of potential property damage and hazardous conditions in the upper portions of the catchment.

2.3.1 DCP Recommendation

The current DCP requirement to execute new development conforming to the Burwood Stormwater Management Code, is an appropriate mitigation for peak flows from private developments across the precinct in a lot-based approach to OSD.

Lot-based OSD

In accordance with Section 4.7 of the Stormwater Management Code, OSD is required on all types of development with impervious area exceeding 60%, regardless of the percentage of the site in its pre-development state.

OSD storages must restrict outflows from a site during 1% AEP storms to a permissible site discharge (PSD) determined from:

- *PSD (L/s) = Site Area (ha) x 150*

The volume of storage required is to be determined from:

- *Storage (m2) = Site Area (ha) x 300, where no rainwater tank is provided and.*
- *Storage (m2) = Site Area (ha) x 225, where a rainwater tank is provided as part of the NSW Government’s BASIX requirements.*

It’s recommended that the AEP terminology be adopted in preference to the previous Average Recurrence Interval (ARI) terminology, ie. 1% AEP instead of 100 year ARI. The permissible site discharge rate is appropriate to attenuate the peak stormwater flows effectively.

Overland Flow Management

The development controls note the flood planning context and previous studies Burwood Council have previously engaged consultants to carry out, being:

- Dobroyd Canal Overland Flood Study, September 2019
- Cooks River Overland Flood Study, August 2016
- Powell's Creek Overland Flood Study, March 2017
- Exile Bay-St Luke's-William Street Overland Flood Study, March 2017

Resulting from these draft studies, a draft Consolidated Flood Identification (CFI) map has been developed, which identifies properties affected by overland or mainstream flooding. The draft CFI map have been placed on Council's website which identify lots subject to flood control.

As per Section 4.3 of the Stormwater Management Code, a separate flood study will be required for developments and amalgamations within the identification area, defining depths, hazards and indicating safe levels for habitable rooms and other features.

These flood studies are to be conducted in accordance with the principles set out in the NSW Floodplain Management Manual (NSW Government, 2001).

It's recommended that references to the Flood Risk Management Manual be updated to reflect the most recent version dated 7th February 2022. This version has a number of additional parts and updated discussion on the treatment of flood hazard, particularly in regards to flooding events greater than the 1% AEP. Of particular relevance to the masterplanning and development processes is the Flood Impact and Risk Assessment guideline.

3 Water Quality

3.1 Water Quality Challenge

The Burwood North Masterplan Area is located to the south of the Parramatta River catchment, with Parramatta River a main tributary of Sydney Harbour. This catchment is highly urbanised and altered from its natural state, with pockets of open spaces and parkland.

3.1.1 Existing Water Quality

St Luke's Canal is connected to the river and located to the north east of the catchment. This waterway is concrete lined and contains to instream aquatic habitat. It is defined as a first order watercourse (as per Appendix 2 of the FBA (OEH, 2014)). This waterway is not considered to be Key Fish Habitat in accordance with the Policy and guidelines for fish habitat conservation and management – Update 2013 ((NSW Department of Primary Industries, 2013) and is classified as Class 4 (unlikely key fish habitat).

Watercourses within the precinct are influenced by several factors including:

- Current and historical polluting land uses within the catchments
- Stormwater and sewage overflows and leachate from contaminated and/or reclaimed land
- Urbanisation of the catchments and subsequent reduction in permeable area, increasing run-off and pollutant loads entering waterways
- Illegal dumping.

The watercourse is generally in poor condition and is representative of a heavily urbanised system. With water quality characteristics relevant to ANZECC/ARMCANZ (2000) indicators being the following:

- Low dissolved oxygen levels
- Elevated nutrient concentrations
- Elevated heavy metal concentrations
- High turbidity

3.2 Potential Treatment Options

Water Sensitive Urban Design is an environmental and planning measure used to integrate urban water cycles, hoping to replicate as far as possible in comparison to natural systems. It seeks to:

- Improve environmental performance by reducing the rate of runoff as well as to reduce pollutant loads.
- Enhance the recreational appeal and aesthetic of the urban environment.

WSUD can take form in various ways including:

- Stormwater detention
- Minimising stormwater pollution
- Water re-use
- Water efficiency
- Reduction in nuisance flooding
- Enhancing groundwater infiltration

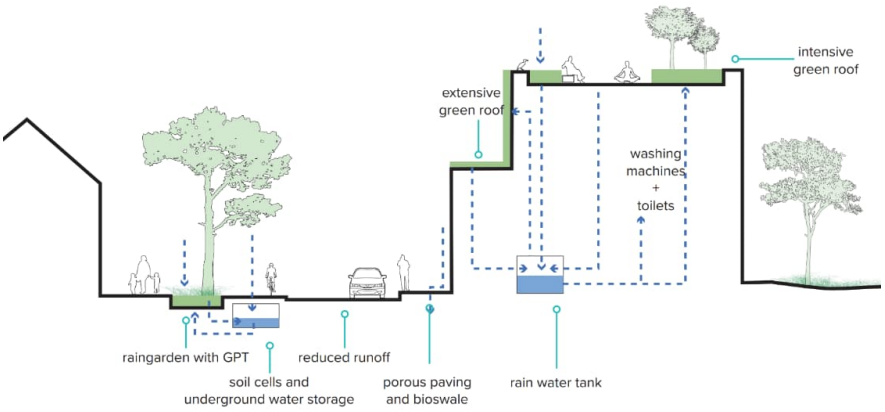


Figure 3-1 Water Sensitive Urban Design Options

Unlike many LGAs across Sydney, Burwood Council does not currently have a set water quality target within its Development Control Plan and Stormwater Management Code. As such there are significant opportunities for improvements within this area for future developments within the precinct.

Rainwater Tanks and Re-use

Rainwater tanks are a requirement of BASIX for all new residential developments, the required capacities are usually based on the total roof area. Rainwater tanks are typically used used to provide stormwater for non-potable purposes such as toilet flushing and garden watering while removing runoff from the stormwater system. Rainwater tanks can be further utilised for building cooling systems and as an alternative potable water source. Rainwater filtration and disinfection systems can be used as a way to provide safe potable drinking water from stormwater runoff. This will reduce the required water demand from potable water mains by providing an alternative means of supply.

Gross Pollutant Trap (GPT)

Gross Pollutant Traps are proprietary devices used primarily for the capture and retention of larger sediments and gross pollutants from stormwater runoff generated by developments. They are a common method of treating stormwater runoff where space is limited, a Cascade Separator is usually provided within pits, which removes sediment, hydrocarbons, trash, and debris from runoff.

Cartridge Devices

Cartridge based stormwater treatment is a precast system typically located within detention tanks, these are used to remove suspended solids and other water pollutants from stormwater runoff. Each filtration cartridge provides a membrane surface area which allows runoff to travel through the membrane while removing the pollutants. Off the shelf products such as StormFilter are advantageous when there is limited space in the project site.

Bioretention/Raingardens

Bioretention/raingardens are planted filtration system allowing water to temporarily pond and permeate through the ground whilst removing pollutants throughout the process. These treatment systems are planted with nutrient removing plants which provide an effective means of extracting dissolved nitrates and phosphates. Raingardens are usually end-of-line treatment of stormwater runoff from larger catchments, and are a more environmentally friendly ‘soft’ treatment device suitable for developments within the green corridor and new open space.

Green Roofs

Providing green roofs of at least 30% of the available rooftop will aid in reducing high nutrient loaded runoff from the roof space. Additional advantages include providing heating and cooling insulation, improved air quality, increase renewable energy efficiency, and increasing biodiversity in the area.

Permeable Paving

Permeable paving allows runoff to drain through the pavement and infiltrate to the under-lying base-course. Water drains through the sand and gravel and is then collected by standard subsoil drains. Particulates and other pollutants are removed by filtration and absorption by the filter media. Porous paving reduces the amount of directly connected impervious areas and increases the amount of surface water penetrating into the underlying soil to replenish groundwater.

3.3 Assessment

The water quality analysis has been undertaken by understanding the existing catchment environment, water quality and water users within each area, and identifying the environmental values for receiving waterways. Potential water quality controls have been identified, and appropriate and achievable water quality targets selected to minimise the potential impacts of future development and protect water quality.

Urban water quality modelling is generally undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software to simulate urban stormwater systems operating at a range of temporal and spatial scales. MUSIC models the total amounts of gross pollutants, phosphorus, nitrogen and total suspended solids produced within various types of catchments.

3.3.1 Potential Water Quality Targets

Water Quality targets are typically assessed on an individual basis for developments. Examples from regional councils and authorities can be found in Table 3-1 below:

Table 3-1 Water Quality Targets and Controls

	Percentage Retention of Post-development Loads			
	Total Suspended Solids (TSS)	**Total Phosphorous (TP)**	**Total Nitrogen (TN)**	**Gross Pollutant (GP)**
Canada Bay Development Control Plan	80%	45%	45%	70%
Canada Bay Development Control Plan Burwood-Concord Precinct	85%	65%	45%	70%
Strathfield Development Control Plan	85%	60%	45%	90%
City of Sydney Development Control Plan	85%	65%	45%	90%
Sydney Water	85%	60%	45%	90%
Green Star Buildings Rating	85%	65%	45%	90%

3.4 Implementation

Treatment targets recommended below represent the most balanced approach between maintaining development feasibility and sustainability objectives, and are largely in line with Canada Bay Council's Burwood-Concord Precinct. The two regions share the same receiving waterway at St Luke's Canal, which will have further treatment from Sydney Water's facilities before discharging into Parramatta River. The proposed measures can achieve the treatment objectives and are relatively flexible in their integration into the public realm.

3.4.1 DCP Recommendation

The following treatment targets are recommended for new developments within the Burwood North Precinct:

- 85% reduction in post-development loads for Total Suspended Solids (TSS)
- 65% reduction in post-development loads for Total Phosphorus (TP)
- 45% reduction in post-development loads for Total Nitrogen (TN)
- 90% reduction in post-development loads for Gross Pollutants (GP)

3.4.2 Recommended Treatment Train

Water quality is assessed based only on the proposed future development and not relative to the previous use of the site. Based on this methodology the proposed masterplan can be categorised into the following development types with the associated water quality controls applying to the development

3.4.2.1 Lot Development

These areas will provide their own onsite water quality treatment devices to achieve the new recommended targets. These areas have been excluded from the modelling assessment as they will be assessed during their individual DA lodgement. The treatment train is anticipated to comprise either bioretention planting within landscaped areas or cartridge filter systems integrated into the Iota based OSD system, dependent on the availability of appropriate landscaping space within each development proposal. These measures are located towards the end of the on-site stormwater reticulation system and after the capture of roof water in rainwater tanks.

3.4.2.2 Road and Public Domain

Road reserves are to incorporate water quality treatment devices to achieve Council's objectives before discharging into St Luke's Canal. Recommended treatments for various road typologies within the LGA are listed in the table below:

Table 3-2 Proposed Water Quality Treatment Devices

Road Name	Road Typology	Area (Ha)	Recommended Treatment Devices
Burwood Road	Transit Corridor	1.158	Bio-retention with a total filter area of 465 m^2
New Street	Shared Street	0.240	Bio-retention with a total filter area of 100 m^2
Shaftesbury Road	Primary Road	0.850	Bio-retention with a total filter area of 345 m^2
Neich Parade	Secondary Road	0.719	Bio-retention with a total filter area of 290 m^2
Webbs Lane N	Laneway	0.092	Bio-retention with a total filter area of 40 m^2

Generally, 4% of catchment area is needed for the water quality treatment train. These can come in the form of bio-swales or treebays with a width of 1.5 metres. It is noted that bio-retention devices should not be placed on steep slopes (>5%) which can become unstable when saturated.

Alternatively, OceanGuards can be installed upstream of existing stormwater pipes to capture suspended solids and gross pollutants, while Treebays can be used as bio-retention device within the road reserve areas afterwards to capture finer pollutants generated, such as Phosphorus and Nitrogen.

Each OceanGuard can treat around 1,400m^2 of road surface, which can potentially reduce the amount of bio-retention area needed to just 1% of the catchment area, however this introduces in-pit devices to the overall maintenance schedule, and introduce some risk of blockage. The alternative treatment recommendation setup is detailed in Appendix C, is generally implemented during the detailed masterplanning stage and will need to be investigated on a street-by-street basis in consultation with the stormwater asset maintenance group within Council.

Table 3-3 Typical Design Parameters of Proposed Treatment Devices

Treatment Devices	Design Parameters	Compliance
Bio-retention (Treebay)	Extended Detention Depth = 0.3 m Filter Depth = 0.4 m Saturated Hydraulic Conductivity = 120 mm/hr TN Content of Filter Media = 800 mg/kg Orthophosphate Content of Filter Media = 35 mg/kg	The design parameters are in compliance with the NSW MUSIC Modelling Guideline
OceanGuards	High Flow Bypass = 0.02 m^3/s	The MUSIC node is provided by Ocean Protect and in compliance with the NSW MUSIC Modelling Guideline
GPTs	High Flow Bypass = 0.022 m^3/s	The MUSIC node is designed as per Rocla's GPT CDS0506

3.4.2.3 Open Space

Bio-retention is the recommended treatment device for local runoffs within new open spaces of the proposed masterplan, as these features can be shaped to suit the desired landscaped character of the parks. The planted bed composition of the bio-retention can be disguised within the wider planting design for the open space, with the scale of filter area listed in the table below for the nominated open spaces through the masterplan.

Typical bioretention area is listed in Table 3-4 below, again taking the methodology of 4% of catchment area for treatment.

Table 3-4 Proposed Water Quality Treatment Device

Open Space	Area (Ha)	Recommended Treatment Device
F1/F2/F6	0.226	Bio-retention with a total filter area of 95 m^2
G3	0.364	Bio-retention with a total filter area of 150 m^2
H1/H2	0.387	Bio-retention with a total filter area of 155 m^2
E7	0.114	Bio-retention with a total filter area of 50 m^2
I3	0.120	Bio-retention with a total filter area of 50 m^2
B6	0.155	Bio-retention with a total filter area of 65 m^2
E3	0.121	Bio-retention with a total filter area of 50 m^2
D2	0.134	Bio-retention with a total filter area of 55 m^2
D3	0.115	Bio-retention with a total filter area of 45 m^2

Figure 3-2 Precinct Location Identifiers

Alternatively, GPTs can be installed upstream of existing stormwater pipes to capture suspended solids and gross pollutants to greatly reduce the amount of bioretention needed. This setup is detailed in Appendix C and recommended within the Green Corridor, which can be easily accessed for regular clean-up. The benefit of GPTs over the in-pit Oceanguard filters is the storage potential for pollutants. GPTs are customisable and can be sized to store large volumes of pollutant without causing system blockage.

As per Section 3.13 of Burwood Council Stormwater Management Code, all drainage and water quality products are to be designed to be visually unobtrusive and sympathetic with the development. This requirement is necessary to ensure future residents do not adjust or remove devices for aesthetic reasons without understanding the functional impact of such actions.

3.4.2.4 Life Cycle of Water Quality Products

The *Water Sensitive Urban Design Guidelines* by Melbourne Water provides a comprehensive breakdown of requirements throughout the lifecycle of typical water quality devices and covers the type proposed in the treatment train. The table below summarises the relevant requirements for the recommended devices.

Table 3-5 Lifecycle – Water Sensitive Urban Design

Product	Construction	Operation	Maintenance
Bioretention	Throughout the construction phase there are several hold points at which the constructed elements need to be cross checked with the design these include: • Liner – installation of the liner is as per standards. • Pipes – Check perforated pipes are installed as per design plans. • Filter Media – check hydraulic conductivity meets design requirements • Inlet & Outlet structures – Check construction of structures in accordance with design plans	Operational plans generally include the following information: • Site visit and relevant photos of surrounding infrastructure • Expected frequency of operation (can be based on design storms)	Vegetation on the batters and basin surface typically needs maintenance once a quarter, the labour varies depending on bioretention sizing. Visual inspection of drainage assets is required on a bi-annual basis, it is expected that the basin surface will be assessed during this inspection. Replacement of bioretention media is expected every 10-15 years with the frequency to be adapted based on the rain events. The labour costs are based on contractor rates.
OceanGuard /GPT	Throughout the construction phase there are several hold points at which the constructed elements need to be cross checked with the design these include: • Installation – as per manufacturers specifications • Backfill – as per design.	Operational plans generally include the following information: • Site visit and • Relevant photos of surrounding infrastructure Expected frequency of operation (can be based on design storms)	The recommended "Vortex" style GPT has a fairly simple maintenance procedure where cleaning can be accomplished using a vacuum truck, with no requirements to enter the unit. Debris removal works are generally required on a bi-annual basis with 2 personnel required for 4 hours depending on the size of the GPT.

3.5 Conclusion

WSUD can include a variety of methods such as stormwater detention or retention, water re-use, water efficiency, reduction in nuisance flooding, minimising stormwater pollution, enhancing groundwater infiltration and overall improve the visual amenity of the area.

However, the implementation of effective and durable WSUD systems in a dense urban environment can be challenging due to spatial limitations, particularly for small scale redevelopments. Redevelopment on a precinct scale provides an excellent opportunity for WSUD to be implemented in a rigorous and effective manner which will enhance the quality of the environment within Burwood North.

WSUD can be applied in a multitude of ways, there is no single approach that can be costed and utilised for adoption as it will depend on the designer and the building, site and other components available. The DCP recommendation outlines the target that should be considered and modelled, ensuring compliance with water quality requirements and best practice.

4 Flooding

4.1 Flood Hazard in Burwood

With the historical urbanisation of the catchment, there is no floodplain provision for the conveyance of runoff that occurs as a result of intense storms over the Burwood Precinct. Once the drainage system becomes full, excess runoff occurs through the precinct road reserves and through private land, with relatively widespread inundation occurring in major and extreme flooding scenarios.

4.1.1 Existing Flooding Conditions

Peak flood depth and water surface levels can vary significantly across the whole study area due to local level changes around buildings and structures, and the relatively steep slopes in parts of the catchment. Shallow depths of inundation are a defining feature of the public domain in many places, as a result of some wide road reserves within Burwood.

The most significant concentration of overland flow originates around Burwood Park and Burwood Westfield, which travels in a North East direction and often through private properties. Where buildings or fences intersect the flow path, flood water accumulates on the upstream side. It's evident that most of the stormwater pipes in the street system are operating at full capacity during minor storm events and surcharge in heavier storm events.

The intersection between Shaftesbury Road and Parramatta Road act as the topographic low point of the entire flow path. Most of the local flow paths converge at this location which is then conveyed north via the open channel of St Luke's Canal. Concord Oval to the west of the canal acts as a flood detention system during extreme flood events. The lower parts of the canal are also low lying and thus affected by high tailwater levels in the Parramatta River which constrains the free outflow of floodwaters.

Two Sydney Water trunk drainage pipes traverse Burwood (Figure 2-1) to convey flow across Parramatta Road, most of the masterplan area are served by this system. The pipe adjacent to Luke Avenue has a height of 1.37m and width of 2.67m. The pipe located between Shaftesbury Road and Loftus Avenue has a height of 1.37m and width of 3.35m.

The classification of flood hazard is based on the ARR19 hazard categories. These categories range from H1 to H6 and are based on a combination of flow velocity and depth.

A chart showing how the categories are defined is shown in Figure 4-1. The NSW Floodplain Manual describes High Hazard as areas where there 'possible danger to personal safety; evacuation by trucks difficult; able-bodied adults would have difficulty in wading safety potential for significant structural damage to buildings'. This generally relates to H4 to H6 for the ARR19 hazard categories. However H3 is considered to be the hazard class from which it is no longer safe.

Refer to the mapped results from the flood study, presented in section 4.3 and Appendices A and B.

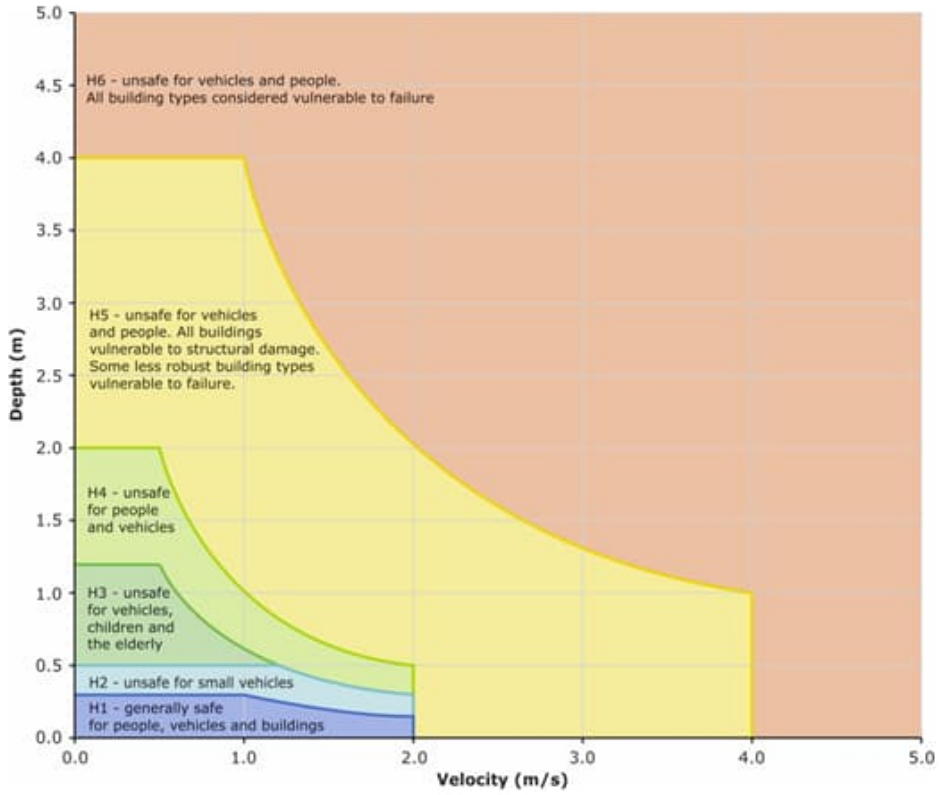


Figure 4-1 Australian Rainfall and Runoff 2019 Flood Hazard Categories

4.2 Flood Mitigation Options

Flood mitigation options can be categorised into the following general classification, whereby the measures target specific flood behaviour in reducing the velocity, depth or a combination of both.

4.2.1 Flood Storage

In larger storm events local depressions in the road reserves and general topography become filled runoff water, with excess runoff water forming overland flow. The quantity of runoff that can be stored temporarily in these depressions can mitigate against the effects of overland flows, with a greater storage of runoff associated with reduced impact of the overland flows.

By lowering ground levels around road reserves and lower areas of the topography, an increase in temporary storage potential for runoff can be achieved. Through coordinated civil design of open spaces, significant storage volumes can be achieved through lowering ground levels within landscaped areas and recreational areas that are not required to function as a flood evacuation route.

Additional flood storage is also created through integrating soft WSUD features which typically sit below the adjacent ground level such that these features are fed runoff water from the precinct ground level via gravity. This serves to create flood storage volumes in addition to their primary function in treating runoff water quality.

4.2.2 Overland flow conveyance

Set backs of the buildings and streetscape obstructions to overland flow adjacent to the road reserves, where overland flow occurs, can serve to calm the flood behaviour by widening the flow path available. For an existing road reserve that experiences overland flow, by widening the flow path the depth of flow is generally reduced which contributes to a safer resulting condition for people and vehicles. Conversely a larger flow capacity of the road reserve is afforded when a wider cross section adopted.

4.2.3 Piped System Capacity

Currently the site has a combination of Burwood City Council and Sydney Water networks that help convey flows within underground piped systems which eventually discharge to Parramatta River. Having a series of pits and pipes has allowed surface catchments to drain to these networks reducing overland flows within crucial areas of vehicular and pedestrian movement ie footpaths, pedestrian crossings.

There are a number of ways flood mitigation by increasing the capacity of the stormwater network can be achieved some of which are outlined below:

- Multiplying number of pipes concurrently running through the site;
- Providing additional inlet capacity within the pits by increasing lintel capacity; and
- Upsizing the existing stormwater pipes.

As the Council stormwater network is typically designed for minor storms (5% AEP), the reduction in overland flows may be most evident in these frequent storms. As the network seems to have downstream capacity constraint, a reduction in overland flows for rare storms up to and including 1% AEP diminishes with increased storm severity.

4.3 Assessment

The methodology adopted to assess the impact of the proposed masterplan is outlined below, which focused on:

- Potential increases in flood risk and flood affectation on properties within the precinct and assets as well as potential impacts to any emergency management arrangements
- Land use compatibility in relation to flood hazard
- Compatibility with council floodplain risk management in terms of safe velocities and depths for pedestrians and vehicles
- Where required mitigation and management measures have been identified.

Modelling for this proposal has been largely based on existing hydraulic models as provided by Burwood Council for the catchment. The hydrological modelling approach that has been adopted in this study includes extracting inflow hydrographs from a catchment and node-based DRAINS hydrological model and applying them at low points within digitised catchment polygons in the TUFLOW hydraulic flood model.

A TUFLOW one-dimensional/two-dimensional hydraulic model has been adopted for this proposal to simulate flooding behaviour for both the baseline (existing environment) scenario and the post development scenario. The post development scenario was run in an iterative approach, to test the effectiveness of the potential flood mitigation options.

The model has been prepared to assess the full range of infrequent flood events along with the extreme flood event. The flood events which will be presented for each assessment include the 1% AEP and PMF events. Climate change has been directly incorporated into each assessment.

A key phase of building a suitable hydraulic model is the process of model calibration and validation. Calibration involves utilising historic flood event data (referred to as observed data) to change model inputs to get the model to replicate the historic flood event. Validation then involves checking the model inputs against another historic flood event. This is preferred so that the adopted model adequately predicts flood behaviour, where historic data is available. In the absence of historical data, models have been developed based on standard parameters from ARR2019.

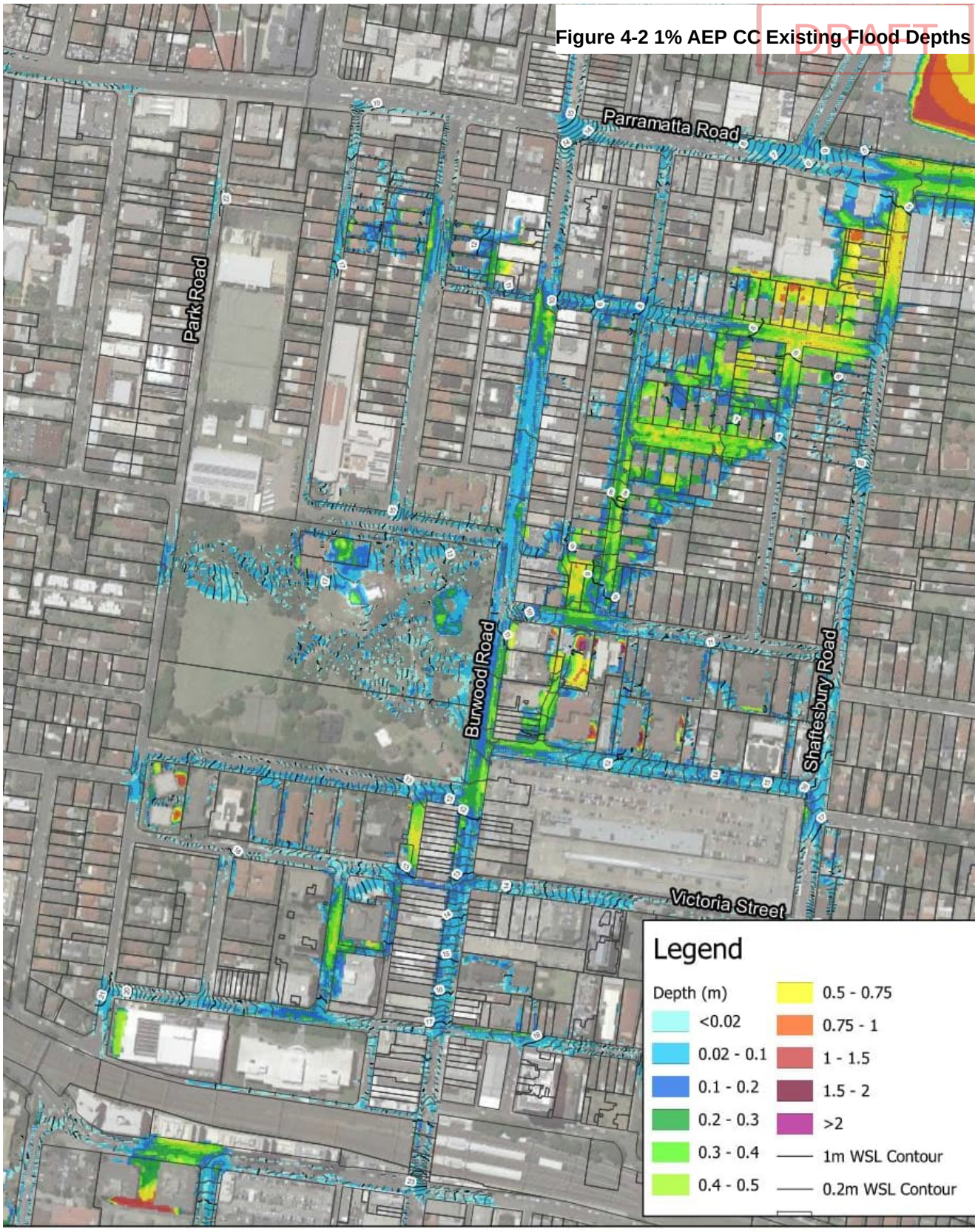
4.3.1 Climate Change Modelling

The Floodplain Risk Management Guideline: Practical Consideration of Climate Change – Department of Environment and Climate Change (2007) is designed to be used in addition to the Floodplain Development Manual (2005) and provides recommendations and methodologies for examining flood risk to developments in light of the projected impacts of climate change on sea levels and design rainfall events.

The one per cent Annual Exceedance Probability flood event (1% AEP flood event) incorporates allowances for climate change impacts, which includes sea level rise of 0.9m over a period to 2100, and rainfall intensity uplift 21.3% in accordance with ARR19.

4.3.2 Modelling Results

Figure 4-2 1% AEP CC Existing Flood Depths



TITLE
1% AEP Climate Change Flood Depth and Water Surface Levels

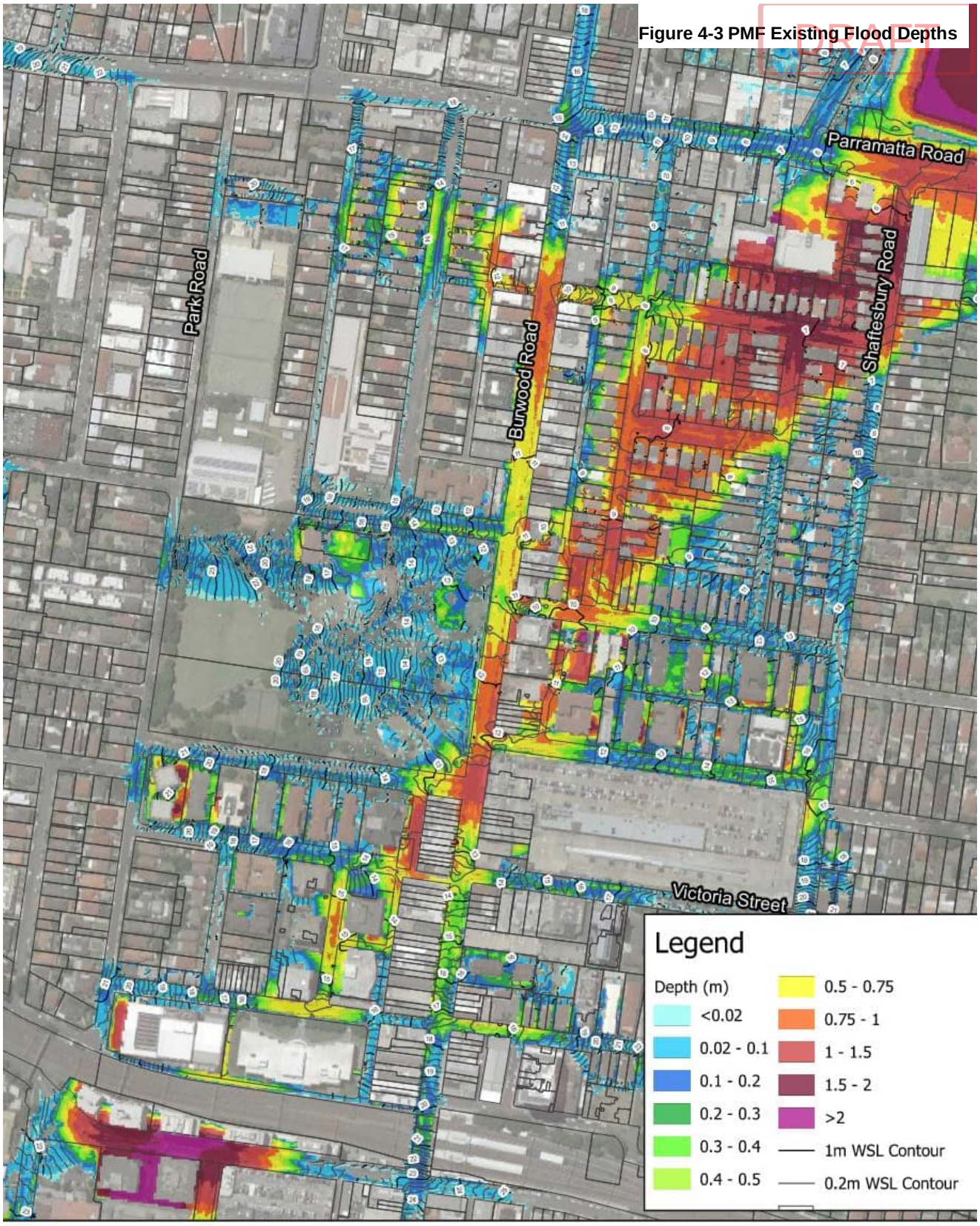
PROJECT
Burwood North Masterplan

0 50 100 m

MOTT MACDONALD

Date	Drawn	Check	Approved	Scale	Rev
09/11/2022	SC	SC	JM	1 : 4500	1

Figure 4-3 PMF Existing Flood Depths



TITLE
PMF Flood Depth and Water Surface Levels

PROJECT
Burwood North Masterplan

0 50 100 m

MOTT MACDONALD

Date	Drawn	Check	Approved	Scale	Rev
09/11/2022	SC	SC	JM	1 : 4500	1

4.3.3 Post Development Flooding Conditions

The assessment of potential flooding impacts on existing flood regimes has been conducted in accordance with the requirements of the Floodplain Development Manual (NSW Government, 2005), which incorporates the NSW Government's Flood Prone Land Policy. The key objectives of this policy are to identify potential hazards and risks, reduce the impact of flooding and flood liability on owners and occupiers of flood prone property, and to reduce public and private losses resulting from floods. This policy also recognises the benefits of the use, occupation and development of flood prone land.

The development of the post development flood model incorporated flood storage in the form of wide, shallow swales to provide storage prior to discharging to the existing Council network. The intent with wide shallow swales is to retain the recreational function of the land although only floodwater resilient street furniture would be present within the flood storage areas.

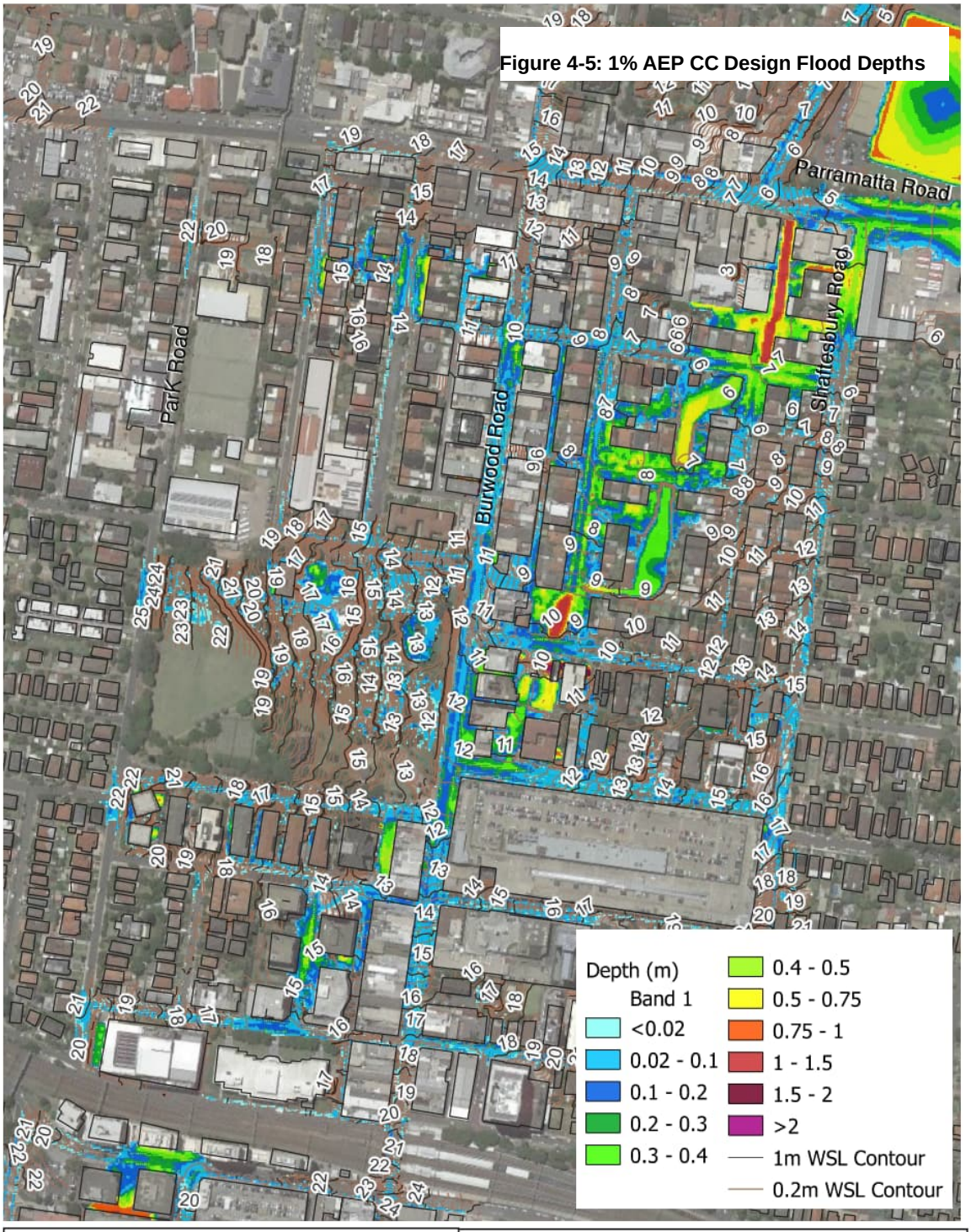
Once full, the flood storage swales deliver excess flows to the north into the adjacent road reserve, with the location of swales having been determined using The Draft Burwood North Precinct Masterplan: Masterplan Report by Cox, see Figure 4-4: Indicative below. The initial conservative approach to flood mitigation was to adopt swale depths up to a maximum of 1m, to be considered in the flood model. In addition to this, the post development modelling includes building footprint updates inline with the Masterplan. This revised footprint serves to ease some constraints on overland flow by improving overland flow conveyance.

Figure 4-4: Indicative flood storage swale locations

Results from the 1% AEP post-development modelling indicate an overall improvement in flooding within roads conveying major flowpaths ie Burwood Road, Esher and New Street see Figure 4-5. Flood level change, or afflux, up to 0.1m can be seen within paths of proposed buildings, this is expected as flow paths have been altered from the existing scenario, allowing ponding within open spaces/paths. Mitigation measures such as additional stormwater capacity (as discussed in section 4.2.3), can be provided during detailed design stages of developments to alleviate some of these local ponding issues.

Ongoing coordination will take place with Burwood City Council to determine appropriate swale extents and depths.

Figure 4-5: 1% AEP CC Design Flood Depths



TITLE
1% AEP Climate Change Flood Depth and Water Surface Levels

PROJECT
Burwood North Masterplan

0 50 100 m

MOTT MACDONALD

Date	Drawn	Check	Approved	Scale	Rev
14/03/2023	FH	SC	JM		1

4.4 Implementation

The creation of flood storage through the new open spaces serves to reduce flood hazard significantly through local street road reserves. In minor storms a stormwater inlet at the northern end of each flood storage swale will capture the runoff, with a capacity up to the 5% AEP event. In larger storms the flood storage will begin to fill as the stormwater system no longer accepts additional flow. Any surcharge from the flood storage areas must be design to occur back into the adjacent northern road reserve, providing a logical relief point for large flood flows towards St Lukes Canal downstream.

Adopting building setbacks and clear road reserve environments improves and calms the way overland flow is handled in the road reserves themselves.

The OSD policy which requires developments to provide detention on-lot will also provide a very significant reduction in flood risks during the worst case short duration storms. As this is developer led and potentially implemented incrementally this is not shown in the post-development scenario, but will yield an improvement on the documented overland flow regime over time.

4.4.1 Flood Planning Levels

In accordance with the NSW *Flood Prone Land Policy* and associated guidance the flood planning levels for development in the precinct are recommended to be the 1% AEP, with additional 500mm freeboard for habitable floors. Adoption of flood planning levels should consider the likely life of the structure meaning that climate change uplift on flood levels is to be adopted.

Sustainable Burwood published in 2022 sets a proactive goal to manage flood risk for the community into the future, specifically by committing to *Minimise the impact of flooding to the Burwood community*. Unless Council develops a specific climate change impact mitigation strategy including guidance on the use of climate change uplift on floor levels, the default position is recommended as the Australian Rainfall and Runoff advice on adopting representative concentration pathway (RCP) 8.5 projections.

Accordingly, increased flood planning levels are recommended to account for future rises in rainfall intensities. This can be achieved through requirements for habitable floor levels to consider future flood levels to be experienced through the design life of the structure.

4.4.2 Emergency Response Plan

The local catchments that cause flooding within properties and road reserves around the precinct are generally small urban catchments, with the resulting flood risk typically flash flooding type inundation that occurs in shorter intense storm events. The critical duration in a 30 minute PMF flood, which discharges through the precinct to the northeast, is 15-minutes.

There is no specific warning system for small catchments such as St Lukes as the time from rain falling to flooding occurring is too short a time to issue warnings. The SES is the legislated combat agency for floods in NSW and is responsible for the control of flood response operations. It maintains a flood intelligence system for key flood warning gauges in NSW on major river systems and develops specific flood emergency plans for LGAs which are subject to flooding.

Adequate warnings give residents time to move above the reach of floodwaters and to evacuate from the immediate area to high ground. The rate of rise and duration of inundation have been extracted on the likely evacuation routes through the precinct. General evacuation routes to the east and west along local roads is appropriate, however key connections in the north-south direction experience inundation.

The critical points on these north-south connections includes two locations along Burwood Road, and Shaftesbury Road nearer Parramatta Road. A map showing where the water levels were extracted are shown in Figure 4-6. A chart showing the PMF rainfall and flood depth at the three locations shown are presented in Figure 4-7. The response time from the local catchment is relatively fast with the PMF flood levels on the adjacent roads rising to a point that they would not be trafficable is less than 10-minutes.

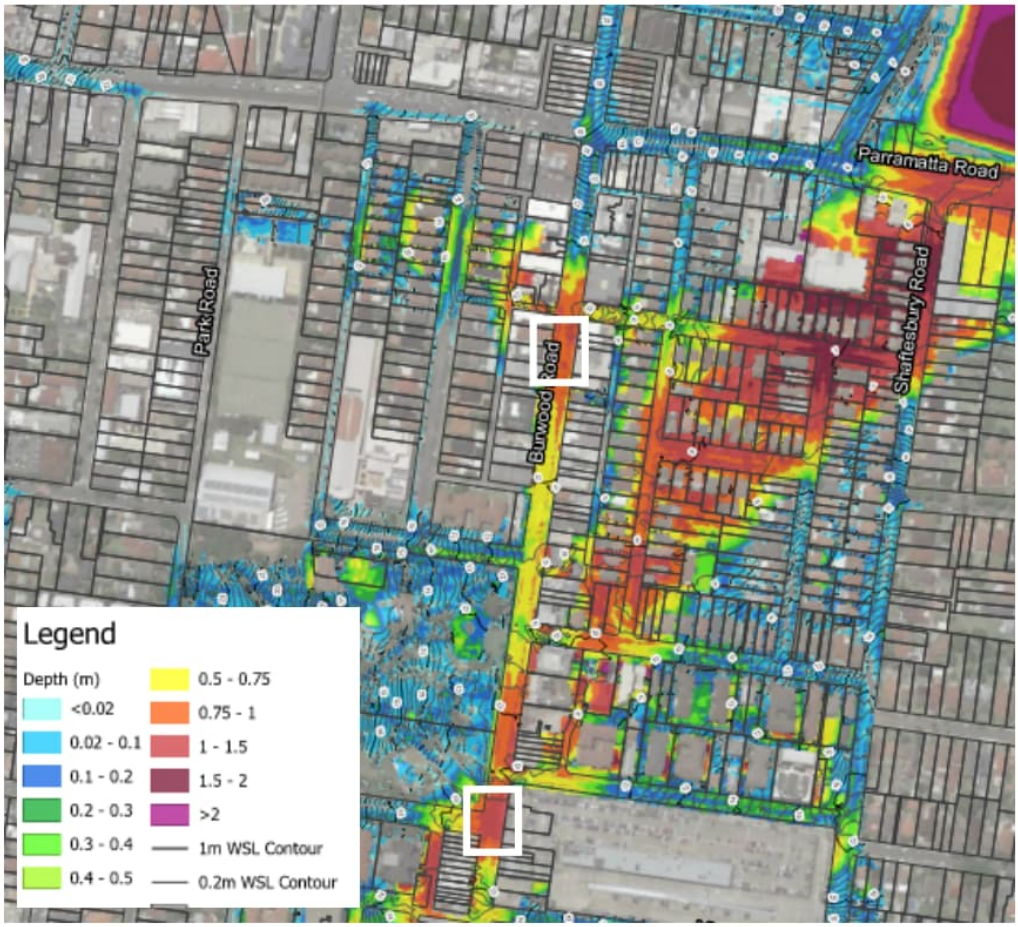


Figure 4-6 PMF Flood Inundation Check Locations

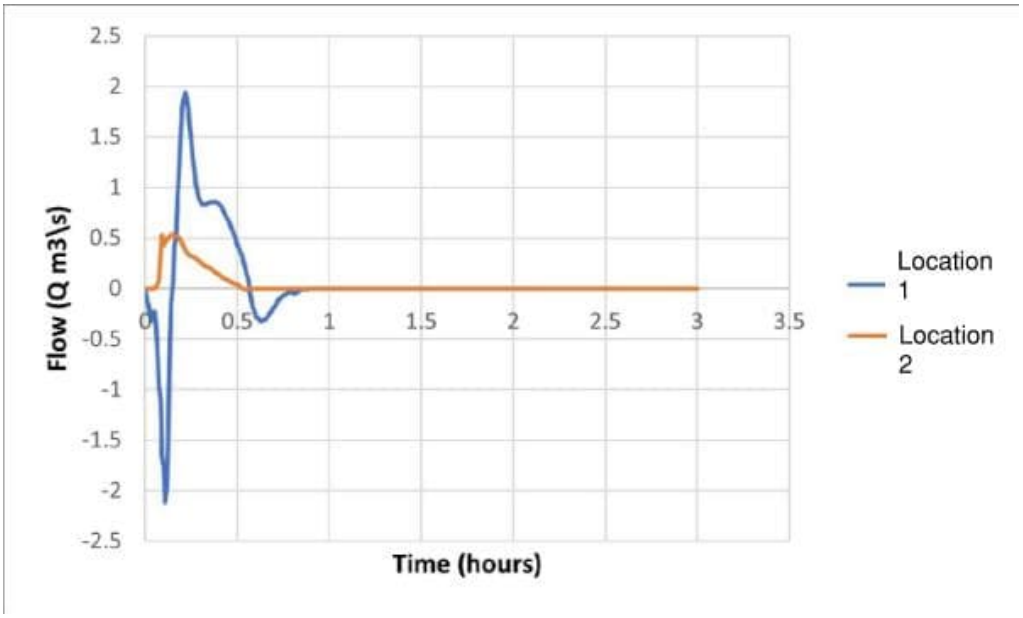


Figure 4-7: PMF Inundation time

Opportunities for improved evacuation access routes to the west are indicated in Figure 4-8 below, including;

- Formalised connectivity from Burwood Road through to Neich Parade via private carpark and Riley Lane;
- New connection to Burwood Road from New Street, and;
- Direct connectivity from Burwood Road through to Neich Parade via Nicoll Lane.

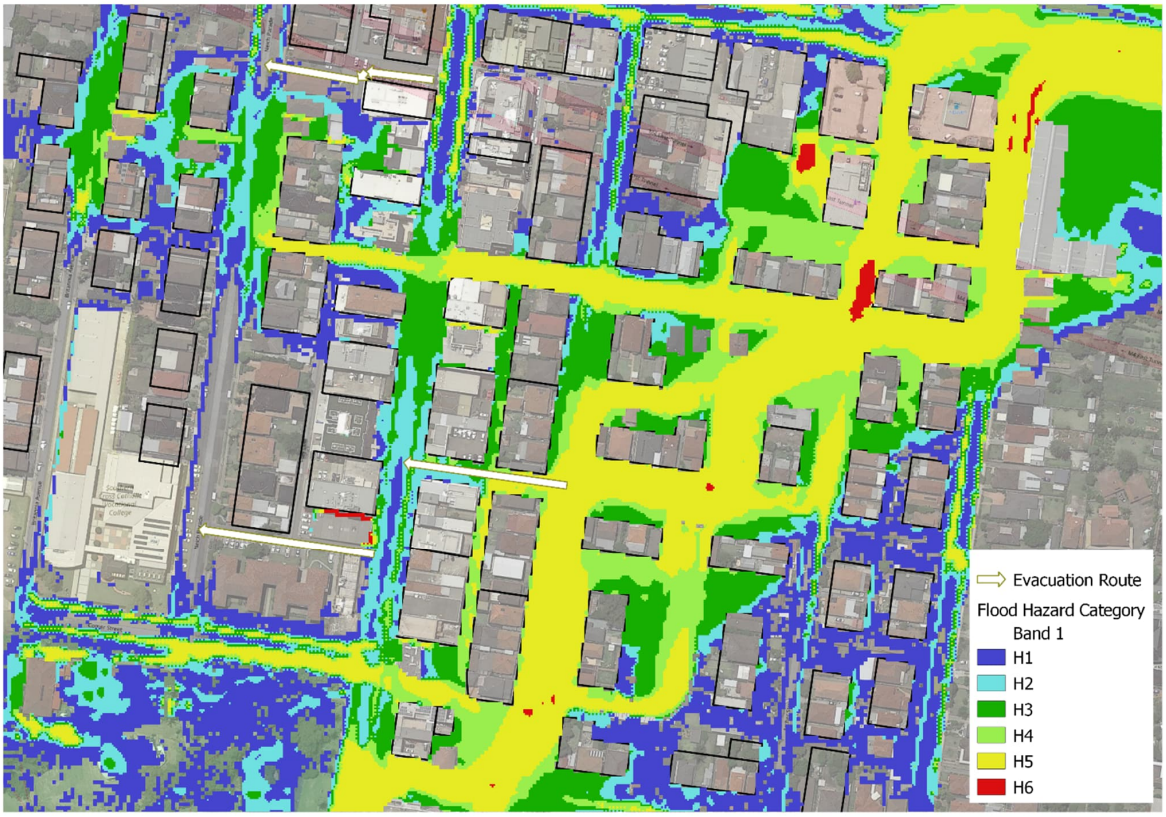


Figure 4-8 Opportunities for improved emergency evacuation routes

5 Conclusion

Detailed reviews of drainage, water quality and flood modelling for the precinct has been undertaken, adopting and updating the previous flood modelling and developing new water quality models. The results of these initial assessments have been presented along with a proposed masterplan level stormwater and flood management scheme and opportunities for Water Sensitive Urban Design (WSUD) enhancement.

Under current flood conditions, there is significant flooding through the precinct from south of Burwood Park through the urban environment to the east of Concord Oval. A combination of flood mitigation and stormwater infrastructure works are proposed to mitigate these issues:

- Increased flood planning levels to account for future rises in rainfall intensities;
- Establishment of a green corridor along the original riverbed to increase the amount of open space and assist in flood mitigation through the provision of flood storage swales; These flood storage swales will reduce development potential but can have increased massing shifted onto adjacent sites to meet feasibility requirements.
- It is noted that bio-retention system will increase maintenance cost especially within public open space. This will mainly be collected through council rates but have opportunities to shift the cost onto adjacent development lots via strata payment.
- Establishment of a minor and major drainage system to adequately drain the precinct with a view to integrate this to the green corridor including;
    - wider overland flow paths in key precinct areas previously constrained
- Introduction of Water Sensitive Design (WSUD) measures to
    - improve existing water quality of the precinct runoff, and;
    - increase local infiltration of runoff to reduce peak discharge flows to receiving watercourses.

Based on the investigations undertaken, solutions exist to reduce flooding risks on a precinct scale, with residual risk to be mitigated using appropriate FPLs, setbacks and emergency response frameworks. WSUD measures can be readily implemented for water quality enhancement, and will also serve to improve bio-diversity and align with the precinct's sustainability objectives.

5.1 LEP and DCP recommendations

Amendments to the Burwood Local Environmental Plan (BLEP) 2012 and Burwood Development Control Plan (BDCP) 2021 have been recommended to achieve the masterplan objectives. Some are minor updates to ensure relevant aspects of the current design standards are implemented across future development.

Other recommendations including controls relevant in achieving the water quality outcomes discussed in this report are summarised below. The following water quality targets are recommended for new developments within the Burwood North Precinct:

- 85% reduction in post-development loads for Total Suspended Solids (TSS)
- 65% reduction in post-development loads for Total Phosphorus (TP)
- 45% reduction in post-development loads for Total Nitrogen (TN)
- 90% reduction in post-development loads for Gross Pollutants (GP)

6 References

Australian Institute of Disaster Resilience (2017a) Australian Disaster Resilience Handbook 7. Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia

Australian Institute of Disaster Resilience (2017b) Guideline 7-3. Flood Hazard

Babister, M., Trim, A., Testoni, I. and Retallick, M. 2016. The Australian Rainfall & Runoff Datahub, 37th Hydrology and Water Resources Symposium Queenstown NZ

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) (2019) Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia

Burwood Council (2022) *Sustainable Burwood* (Version 1)

Department of Planning and Environment (previously Department of Planning, Industry and Environment) (2021) Considering flooding in land use planning Guideline July 2021

FAWB (2009). Adoption Guidelines for Stormwater Biofiltration Systems, Facility for Advancing Water Biofiltration, Monash University, June 2009.

Melbourne Water, *Water Sensitive Urban Design Guidelines*

NSW Department of Infrastructure, Planning and Natural Resources (2005) *Floodplain Development Manual – the management of flood liable land*

NSW Department of Planning and Environment (2022) *Flood Risk Management Manual – The management of flood liable land*

Sydney Water, *Western Parkland City: Urban Typologies and Stormwater Solutions* report (2020)

WMAwater (2019) Exile Bay, St Lukes and William Street Flood Study – Report

A. Flood Mapping Existing Conditions

B. Flood Mapping Future Development

C. Alternative Water Quality Treatment

An alternative approach to that nominated in Table 3-2 includes a treatment train of treebays and in-pit filter baskets or “OceanGuards” at discrete spacing along the road reserve, and reduced bioretention areas. This is another approach where street trees can be implemented into the WSUD treatment to make use of their footprint.

Table 6-1 Road Water Quality Treatment

Road Name	Road Typology	Area (Ha)	Recommended Treatment Devices	Description
Burwood Road	Transit Corridor	1.158	Bio-retention with a total filter area of 90 m^2	18 x Treebays with a dimension of 3.3 x 1.5
			OceanGuard	8 x OceanGuards to be placed within stormwater pits
New Street	Shared Street	0.240	Bio-retention with a total filter area of 25 m^2	5 x Treebays with a dimension of 3.3 x 1.5
			OceanGuard	2 x OceanGuards to be placed within stormwater pits
Shaftesbury Road	Primary Road	0.850	Bio-retention with a total filter area of 70 m^2	14 x Treebays with a dimension of 3.3 x 1.5
			OceanGuard	6 x OceanGuards to be placed within stormwater pits
Neich Parade	Secondary Road	0.719	Bio-retention with a total filter area of 65 m^2	13 x Treebays with a dimension of 3.3 x 1.5
			OceanGuard	5 x OceanGuards to be placed within stormwater pits
Webbs Lane N	Laneway	0.092	Bio-retention with a total filter area of 10 m^2	2 x Treebays with a dimension of 3.3 x 1.5
			OceanGuard	1 x OceanGuards to be placed within stormwater pits

Similarly for new open spaces proposed by the masterplan, Gross Pollutant Traps can be placed at the downstream location, prior to discharging into the local drainage system. This will greatly reduce the amount of bioretention required, which can come in the form of treebays, raingardens or even WSUD basins. Examples for treatment within the green corridor can be found in the table below.

Table 6-2 Green Corridor Water Treatment Strategy

Open Space	Area (Ha)	Recommended Treatment Devices	Description
F1/F2/F6	0.226	Bio-retention with a total filter area of 30 m^2	6 x Treebays with a dimension of 3.3 x 1.5
		GPT	1 x CDS0506 to be placed at the end of the treatment train before runoff entering the existing drainage network
G3	0.364	Bio-retention with a total filter area of 50 m^2	10 x Treebays with a dimension of 3.3 x 1.5
		GPT	1 x CDS0506 to be placed at the end of the treatment train before runoff entering the existing drainage network
H1/H2	0.387	Bio-retention with a total filter area of 60 m^2	12 x Treebays with a dimension of 3.3 x 1.5
		GPT	1 x CDS0506 to be placed at the end of the treatment train before runoff entering the existing drainage network
E7	0.114	Bio-retention with a total filter area of 15 m^2	3 x Treebays with a dimension of 3.3 x 1.5
		GPT	1 x CDS0506 to be placed at the end of the treatment train before runoff entering the existing drainage network
I3	0.120	Bio-retention with a total filter area of 15 m^2	3 x Treebays with a dimension of 3.3 x 1.5
		GPT	1 x CDS0506 to be placed at the end of the treatment train before runoff entering the existing drainage network

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Burwood North Precinct Masterplan

Sustainability Statement

August 2023

Acknowledgment of Country

We recognise the Wangal People of the Eora Nation as the Traditional Custodians of this land that is being masterplanned. 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.

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
0	28.02.2023	Camille Gaven	Alex Bogdanova	Daniel Fettell	Draft Issue
1	13.03.2023	Camille Gaven	Alex Bogdanova	Daniel Fettell	Final draft issue
2	13.07.2023	Camille Gaven	Alex Bogdanova	Daniel Fettell	Final issue
3	08.08.2023	Camille Gaven	Alex Bogdanova	Daniel Fettell	Final issue_Updated

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Executive Summary

Project Description

Burwood Council is preparing an updated Masterplan and supporting studies for the Burwood North Precinct, building upon the work already undertaken as part of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The Masterplan seeks to capture the opportunity afforded by a new metro station at Burwood North on the Sydney Metro West network.

The Masterplan strives to deliver an outcome that is feasible, maximises public benefit and delivers high quality public domain, open spaces and community infrastructure. The Masterplan articulates a cohesive vision for Burwood North that will underpin the growth and development of the precinct as a benchmark for sustainable urban renewal.

The Masterplan is the result of a collaborative process that has been undertaken between Burwood Council, a wide range of government, institutional and community stakeholders, and the project's consultant team.

An Implementation Plan will also be prepared that outlines the recommended planning controls, policies and infrastructure necessary to enable the successful delivery of the Masterplan. The recommendations may inform amendments to the Burwood Local Environmental Plan 2012 (LEP) and Burwood Development Control Plan 2012 (DCP).

Purpose

This Sustainability Statement has been prepared by Mott MacDonald Australia Pty Ltd on behalf of Burwood City Council for the Burwood North Precinct Masterplan.

This report identifies opportunities within the Precinct to implement sustainability objectives in future Development Control Plans. The accompanying Sustainability Statement demonstrates how the Precinct's design response aligns with or exceeds the following material considerations, highlighting its potential for sustainable development.:

- The vision and related themes set out in the current Burwood *Local Strategic Planning Statement* (BLSPS)
- 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 current Burwood *Development Control Plan* (BDCP)

Climate Analysis

Resilience is fundamental to decision-making. The Precinct must take into account science-based climate impacts to ensure that investments in social and community infrastructure are secure, and assets can serve the community for years to come.

Urban environments produce microclimate conditions affecting the health and wellbeing of residents, workers and visitors.

The climate analysis consists of a series of studies that address different aspects of urban design, describing a range of qualitative factors such as urban heat island, sun path, cloud cover, humidity and wind, that can impact the project's design response.

As we are designing for the future, we need to consider the effects of climate change and the local urban heat island effect resulting from the proposed Masterplan.

Benchmarking

Looking at exemplar projects from around the world, including those in Australia, can provide valuable insights into how sustainable strategies can be implemented at the precinct scale.

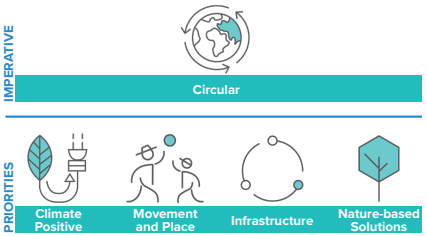
By studying the successes and challenges faced by other precincts, the design team can identify potential issues in their own design and address them at early stages. Exemplar projects inform the design response by highlighting which strategies were successful and which ones need more thought or investment.

By incorporating these lessons into the proposed strategies, the team can propose a more effective, feasible and sustainable design for the Precinct.

Sustainability Strategy

Renewal within the Precinct presents the opportunity to be a catalyst for transformation in response to a decarbonisation and circular agenda.

The Precinct design, delivery and operation can 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 by 2050 and reduce emissions by 50% below 2005 levels by 2030. The transformation of the built environment towards this objective will be accelerated under a range of Net Zero Buildings initiatives and green certifications.

Movement and Place | Mobility is undergoing a transformational shift with far-reaching implications. To underpin this shift, the Precinct will be walkable and liveable based on good urban design that promotes active and low-carbon transport options. As it develops, the Precinct must enhance public transport infrastructure (e.g., train, metro, rapid bus, etc.) to facilitate a progressive shift away from private vehicle use.

Infrastructure | An embedded network (incl. thermal network) benefits from the diversified demand profile offered at a precinct scale. Reducing peak demand is possible with the maximisation of on-site renewable energy generation. Management the of the on-site renewable energy generation to match electric vehicle (EV) charging and hot water storage demand minimises solar spill (grid export), and offers an enhanced solar PV system capacity and utilisation.

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 increase outdoor comfort, 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 Regional Context

The Precinct is strategically located within the southern portion of Burwood-Concord Precinct (see Figure 1.1). The Precinct must be delivered consistently 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 choices and affordability
- Employment and economic growth
- Accessibility and connectivity
- Vibrant communities and places
- Green spaces and links
- Sustainable and resilient infrastructure and buildings

The Burwood-Concord Precinct is identified as a commercial gateway to Burwood Town Centre. A mixed-use Precinct strategically located between the two main central business districts (CBDs) of Parramatta and Sydney, the Burwood North Precinct Masterplan should focus on providing employment and housing opportunities that are supported by an extensive open space network and efficient vehicular, active, and public transport linkages.

The Precinct contributes to the reimagination of its future character as a mixed-use Precinct housing a community of residents and workers attracted to the area for its vibrant culture, diverse amenity, and access to employment at Rhodes, Sydney Olympic Park, and Parramatta.

Figure 1.1 Parramatta Road

1.2 Local Context

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

The Burwood Train Station is located on the T1 North Shore & Western Line, T2 Inner West & Leppington Line, and T9 Northern Line. Burwood North Metro Station is located on the northern side of Parramatta Road within the northern extent of the Precinct. The future Sydney Metro West line is a city and corridor-shaping opportunity for many PRCUTS-identified precincts.

The Burwood North Precinct currently is primarily residential. It is characterised by low to medium-scale developments, including private properties, strata and mid-rise apartments. Opportunities exist in the suburb for significant redevelopment to meet dwelling targets.

The Precinct site is in proximity to the Burwood Town Centre. The connection provides expensive opportunities for the urban renewal of the Precinct to deliver vibrant and connected neighbourhood.

Neighbouring areas are subject to several ongoing development strategies that will feature an increase in density, improved activation and various Public Domain upgrades.

Figure 1.2 Precinct map

1.3 Collaborative Design Process

This report has been prepared in collaboration and must be read with the following reports:

- Burwood North Precinct Masterplan: Masterplan Report, by COX
- Burwood North Precinct Masterplan: Landscape and Public Domain Strategy Report, by Oculus
- Burwood North Precinct Masterplan: First Nations Design Principles Report, by Dominic Steel Consulting Archaeology
- Burwood North Precinct Masterplan: Rapid Transport Appraisal, by SCT Consulting
- Burwood North Precinct Masterplan: Sustainability Statement, by Mott MacDonald
- Burwood North Precinct Masterplan: Economic Assessment & Feasibility, by JLL
- Burwood North Precinct Masterplan: Stormwater and Flooding Report, by Mott MacDonald
- Burwood North Precinct Masterplan: Geotechnical Study, by Mott MacDonald
- Burwood North Precinct Masterplan: Utility Servicing Assessment, by Mott MacDonald
- Burwood North Precinct Masterplan: Preliminary Site Investigation, by Mott MacDonald
- Burwood North Precinct Masterplan: Engagement Outcomes Report, by COX

1.4 Process

This report supports the Vision of Burwood North and will inform proposed amendments for the revised Development Control Plans, Landscaping Code, policies, drivers and future guidelines associated with the Precinct.

1.5 Policy Context

The following statutory planning and policy instruments have been considered within the context of informing a sustainability strategy:

STATUTORY

1. Burwood Local Strategic Planning Statement (BLSPS)
2. NSW Sustainable Buildings SEPP
3. Parramatta Road Corridor Urban Transformation Strategy (PRCUTS)
4. Burwood Development Control Plan (BDCP)

CIRCULAR

5. NSW Circular Economy Policy Statement

CLIMATE POSITIVE

6. NSW Net Zero Plan Stage 1: 2020-2030

INFRASTRUCTURE

7. Staying Ahead State Infrastructure Strategy 2022-2042

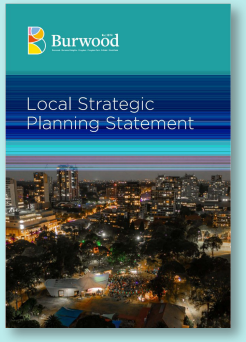
MOVEMENT AND PLACE

8. Cycleway Design Toolbox Designing for cycling and micromobility

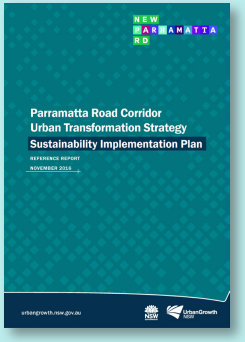
NATURE-BASED SOLUTIONS

9. Central District, Sydney Green Grid

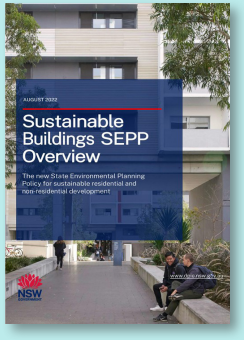
Sustainability Report



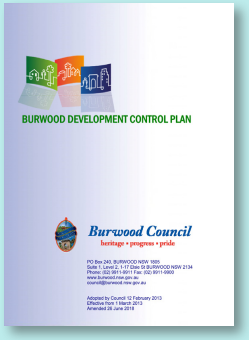
- Support the objectives of Greater Sydney to achieve Net Zero by 2050 by introducing controls to support efficient energy, water and waste systems
- Incorporate principles of passive solar design, and sustainable waste management, and achieve high levels of performance in environmental rating schemes (BASIX)
- Encourage the use of car share, electric and hybrid vehicles
- Maximise permeable areas, and reduce stormwater run-off volumes and pollution entering waterways
- Improve and strengthen waste recycling options
- Plan recycled water schemes for all non-potable water use
- Create a shared city, utilising rooftops, podiums, streets and lanes
- Improve walking and cycling, access to car sharing, carpooling and on-demand transport



- Meet relevant sustainability rating requirements, including BASIX, NABERS and NatHERs targets
- 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



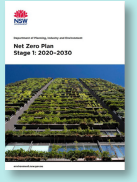
- Align with the National Construction Code (NCC)
- Calculate and disclose the embodied emissions of construction materials
- Minimise construction and demolition waste
- Reduce peak demand for electricity
- Generate and store renewable energy
- Reduce reliance on artificial lighting, and mechanical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



- Utilise car share schemes, unbundle and decouple car parking 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

2 Climate Analysis

2.1 Principles

Urban environments produce microclimate conditions affecting the health and wellbeing of residents, workers and visitors. This section presents a climate analysis methodology and results that inform and enhance the urban design response and the quality of amenities.

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 urban heat island, sun path and wind qualitative factors that impact the urban design response.

2.2 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 the 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 on the building envelope, and the public and communal open space provision
5. **Cloud cover** _ considering the level of the overcast sky to identify periods that impact the building envelope, and the public and communal open space provision
6. **Wind** _ considering prevailing wind conditions and built-form wind effects that impact the building envelope, and the public and communal open space provision
7. **Humidity** _ considering relative humidity conditions and built-form wind effects that impact the building envelope, and the public and communal open space provision

2.2.1 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 design life of 50 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 2.2 and Figure 2.3 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) principles
- Raingardens and bioretention tree pits
- Increased urban tree canopy
- Permeable pavement

2.2.2 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 in rural areas.

Figure 2.4 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

2.2.3 Natural Ventilation

Figure 2.1 highlights the opportunity for the adoption of natural ventilation strategies with preferable outdoor temperatures in a range between 19 to 25 degrees. Future projections (RCP 8.5 for 2070) and accounts for urban heat island were considered.

Daytime through mid-season and winter and morning periods over summer allow for implementation of passive strategies.

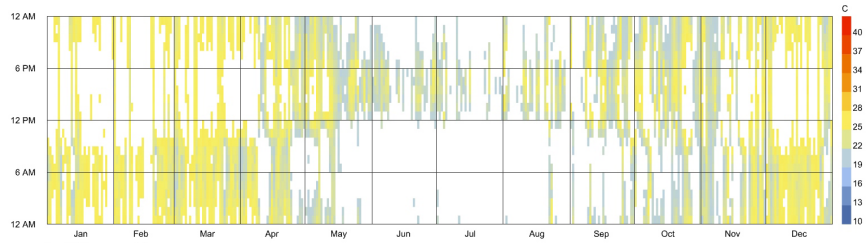


Figure 2.1 Annual hourly ambient temperature between 19-25°C - 2070

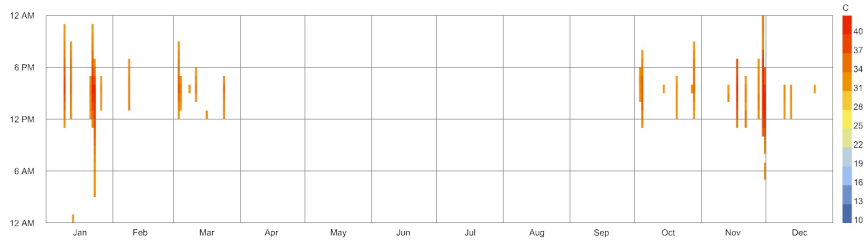


Figure 2.2 Annual hourly ambient temperature above 30°C - current

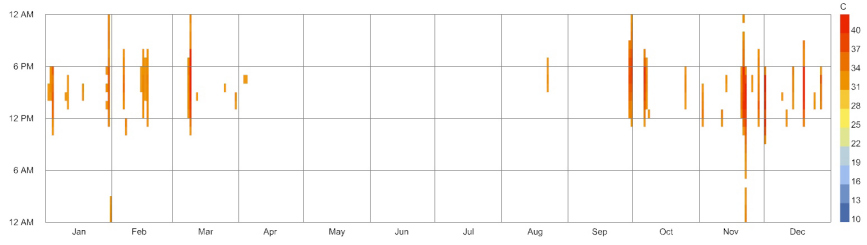


Figure 2.3 Annual hourly ambient temperature above 30°C - 2070

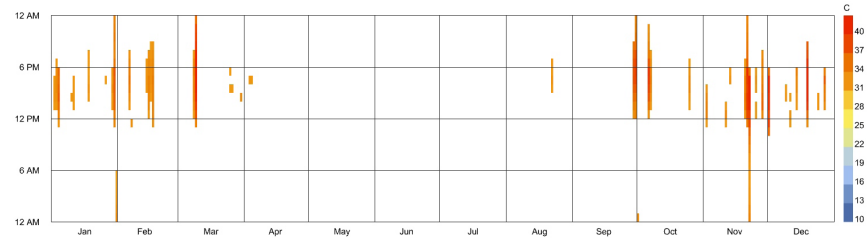


Figure 2.4 Annual hourly ambient temperature between above 30°C - 2070 + urban heat island effect

2.2.4 Sun Path

Figure 2.5 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 typically receives high levels of direct sunlight throughout the year. This reinforces Precinct permeability with cross-connections to the wider community.

The north-south active movement and the Blue-green corridor have an opportunity to receive good levels of direct sunlight throughout the midday period but are generally overshadowed during morning and afternoon periods. Deciduous vegetation and urban canopy should be provided to create relief during hot hours, but allow for winter sun.

2.2.5 Cloud Cover

Figure 2.6 visualises cloud cover over a typical year. Light blue represents a clear sky; dark grey represents an 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 Domain from the 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.

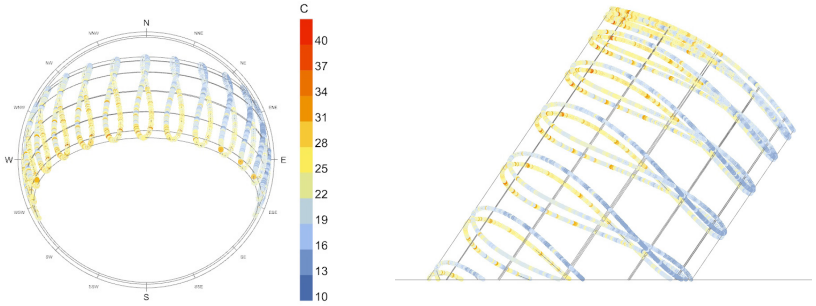


Figure 2.5 Sun path diagrams

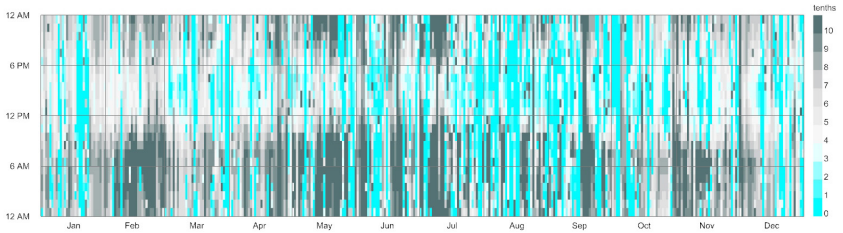


Figure 2.6 Annual cloud cover

2.2.6 Wind

Wind direction and velocity vary seasonally. Figure 2.7 and Figure 2.8 visualise the wind direction and velocity for summer and winter, respectively.

Prevailing northeast and southeast wind directions are observed in summer. Northeast summer breezes can permeate the north-south links in support of the active movement through the site, and the Public Domain spaces and experiences focussed along the active spine.

Southeast summer breezes reinforce the Blue-green corridor as a north-south active transport link through the site.

A prevailing northwest wind direction is observed in winter. The building envelope and an opportunity for a green boundary act to shelter the active movement zones and the Blue-green corridor.

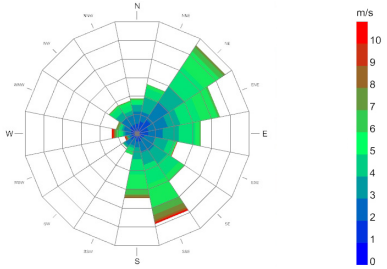


Figure 2.7 Summer wind rose

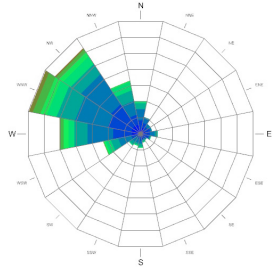


Figure 2.8 Winter wind rose

2.2.7 Humidity

High and low humidity can impact outdoor thermal comfort perceptions. Figure 2.9 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 provides an opportunity for active movement and transport through the site and the Blue-green corridor.

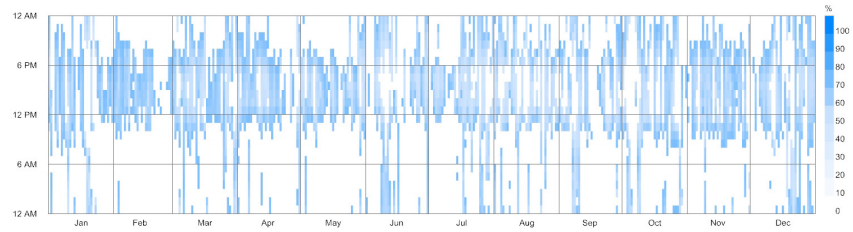


Figure 2.9 Annual humidity

3 Benchmarking

3.1 Circular

Hammarby Sjöstad, Stockholm, Sweden

The district has the strategy of a compact green town. A favourable balance has been found between the built and public spaces. The absence of fences and the permeability of public spaces yields a district with distinct characteristics and experiences.

- Heating is supplied by district sources
  - 34% of heat comes from purified wastewater
  - 47% from combustible household waste
  - 16% from biofuel (2002 figures)
- When the heat has been extracted from the warm, purified wastewater, the remaining cold water can be used for district cooling
- Reduction of potable water consumed by 50% through education and efficient fixture and fittings
- Local wastewater treatment. The sludge produced by the treatment process is recycled and used for fertilising farmland and forestry land. The waste releases biogas during processing. That biogas is used as fuel for vehicles such as buses, taxis and waste collection trucks, and to heat 1,000 homes in the area.
- Rainwater infiltrates the ground directly or is drained off through canals. The many small canals are part of the design of the urban landscape. Some of the roofs have been designed as green roofs that buffer much of the rainwater.
- Runoff from roads is captured separately and drained off to treatment pools before being allowed to infiltrate the ground

Figure 3.1 Channels of, Hammarby Sjöstad, Stockholm, Sweden

3.2 Infrastructure / Complex Ownership

Tonsley, SA

This innovative mixed-use Precinct integrates industrial, education, training, research, residential, retail, and community facilities.

A 61-ha site with an agricultural and industrial heritage, and is also home to the 11-ha former Mitsubishi Motors Main Assembly Building.

The Precinct focuses on high-value manufacturing in health, renewable energy, software, mining and energy services. It seeks to optimise collaboration between businesses.

The Precinct development is led by Renewal SA but reflects a complex delivery outcome whereby core delivery partners have been sought to realise the Precinct's ambitions. This includes institutional, corporate, residential, industrial, clean technology, retail, and energy stakeholders.

The Precinct has achieved:

- The first 6 star Green Star - Communities certification (2014)
- Australian design excellence through:
  - Low carbon and climate resilient infrastructure, including the re-use of existing buildings and materials
  - Integrated WSUD principles, including on-site rain gardens and recycled water from a nearby stormwater collection system
  - A focus on walkability, cycling and car share schemes
  - Four (4) on-site forests
  - Re-roofing the Main Assembly Building and supporting a 3 MW solar photovoltaic (PV) array to service the Precinct

Figure 3.2 A bird's-eye view of Tonsley

3.4 Infrastructure / Movement and Place

Kensington and Kingsford Town Centres, NSW

The Kensington and Kingsford town centres located along Anzac Parade, comprise an important urban renewal corridor in the Randwick City local government area. The town centres have been subject to a comprehensive planning review undertaken over 2016-2019 to address projected population growth and expected demographic changes, improve the quality of building design and the public realm, and accommodate the Sydney City to South East Light Rail infrastructure along Anzac Parade. It represents an exemplar in defining objectives and controls, including:

- All developments must equip 20% of all car parking spaces with EV charging points
- All new developments within strategic nodes are to incorporate future-ready provisions for a community-scale automated waste collection system
- Reduce congestion and carbon emissions by promoting active transport
- Reduce dependency on private vehicles and car ownership
- All new or substantial alterations of existing buildings within strategic nodes must achieve a 5 star Green Star rating

Figure 3.3 Conceptual view to Anzac Parade

3.3 Climate Positive / Social Housing

Eden Street, Arncliffe, NSW

The recently approved State Significant Development showcases a successful public-private partnership - the collaboration between NSW Government and the developer, Billbergia.

A Land and Housing Corporation (LACH) Communities Plus site, 25% of units must be delivered as social housing. The rest can be delivered as typical built-to-sell apartments, and commercial/ retail and community spaces.

The 60,000 m^2 development will comprise four towers, one of 21 storeys, two at 20 storeys and one of 17 storeys that will house the social housing elements of the project. Together they will offer 714 apartments, including 180 social housing apartments, which will be owned, operated, and managed by Evolve Housing, one of Australia's largest community housing providers.

- The development has been approved through the NSW State Design Review Panel (SDRP) process
- A commitment to full site electrification has been made to offer cost of living benefits and empower residents and businesses to make better decisions

Figure 3.4 Approved architectural concept design

3.5 Nature-Based Solutions

QV1 Perth, WA

- A 40-storey building with internal and external landscaping
- The north plaza has upper and lower areas for functions and events, and a community garden on the top of the car park operated by Perth City Farm. Garden plots for edible plants provided to the retailers, bees produce local fresh honey, and chickens have been introduced.
- The next step of the lobby refurbishment will be to introduce seeding to internal landscaping and extend this out for al fresco dining on St Georges Terrace
- North-facing orientation and double-glazed windows allow light to penetrate deep into the floor plate in winter. Shading elements protect the space from overheating and visual discomfort during the summer.
- On-demand air conditioning based on occupancy
- End-of-trip facilities, a wellness centre, basketball courts, and a childcare centre are provided
- Sustainability certification, including:
  - WELL Core v2 Gold 2ating
  - WELL Health Safety Rating
  - 6 star NABERS Indoor Environment rating
  - 5.5 star NABERS Energy rating
  - 4.5 star NABERS Water rating
  - 4 star Green Star Performance rating
  - 2022 Platinum and Gold Waterwise Building of the Year
  - Climate Active Carbon Neutral certification

Figure 3.5 Rooftop of QV1 tower

3.6 Movement & Place

Ed. Square, Edmonds Park, NSW

- Ed. Square aims to knit the town centre into homes within the community, as well as the adjoining national park
- The community is drawn through a green spine of activity, which transforms along its length from civic to communal
- A 15-minute city concept was applied to the Precinct with essential amenities within a short walk or cycle journey, making it a liveable and desired place to live
- Frasers Property's embedded network provider, Real Utilities, supplies Ed. Square Town Centre and some of the homes with Climate Active certified carbon neutral electricity, significantly reducing operational carbon emissions from the community
- Approximately 40% of the energy demand is produced locally with a large-scale rooftop solar PV system installed across the community. A total solar PV capacity of 1,420 kW has already been installed on completed properties. The remaining energy is sourced off-site via a mixture of carbon offset certificates and large-scale generation certificates (LGCs).
- Homes within the Ed. Square development that cannot be connected to the embedded network will benefit from a large solar PV array on their roof, with both strategies reducing resident's home energy costs
- Frasers Property is also integrating energy-efficient features across the homes. The strategy varies across home typologies and product types but includes features such as geothermal heat pumps, LED lighting, efficient appliances and solar PV.
- The geothermal heat pumps installed aim to reduce heating and cooling energy use significantly while eliminating heat rejection during hot days
- All apartment buildings within Ed. Square are all 5 star Green Star Design & As Built certified. With the transition to all-electric, the new stages will be carbon neutral in operation. All terrace and townhouses at Ed. Square are designed to be 'EV ready'. The electrical infrastructure, including the home's power board, allows an easy connection of future charging equipment. EV charging stations are also available at Ed.Square's Town Centre for residents and visitors.

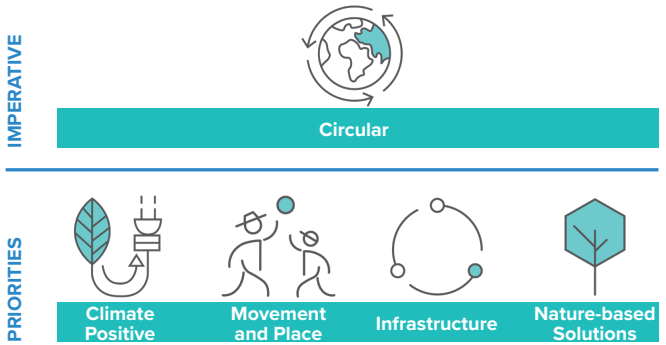
Figure 3.6 Pedestrianised street

4 Sustainability Framework

4.1 Sustainability Framework

Renewal within the Precinct presents the opportunity to be a catalyst for transformation in response to a decarbonisation and circular agenda.

The Precinct design, delivery and operation can 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 Approach

4.2.1 Precinct-Wide Strategies

The sustainability imperative Circular and the Climate Positive priority align with NSW Government's objective to achieve Net Zero by 2050 and reduce emissions by 50% below 2005 levels by 2030. Different strategies are being developed on a precinct-wide basis to achieve this objective for both the Public Domain and all buildings. Burwood Council is working towards net zero emissions for Coulncil by 2030 and for the community by 2050.

Figure 4.1 illustrates the stepped approach to achieve Net Zero the Precinct will have to pursue to reduce significantly emissions in the built-environment:

- No fossil fuel, promote on-site renewables, improve building fabrics
- Off-site renewable electricity procurement to deliver 100% energy
- Reduce upfront carbon, reduce waste, de-materialisation
- Offset residual emissions

Additionally, the Movement and Place, Infrastructure and Nature-based Solutions priorities address various sustainable precinct-wide strategies to improve liveability and circularity, which are applicable to both the Public Domain and all buildings:

- Promotion of active transport
- Reduce dependency on private vehicles and car ownership
- Promotion of small business towards 15-min city
- Improved waste separation and recycling at public realm and for residents
- Implement WSUD and reduce stormwater run off
- Increase green cover and tree canopy

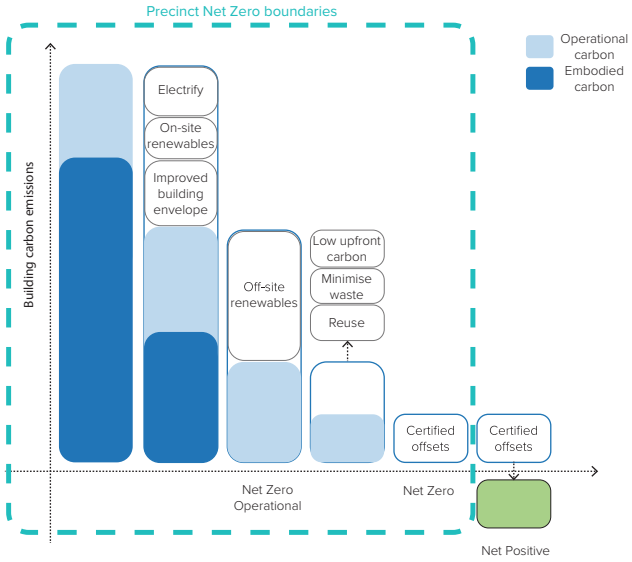


Figure 4.1 Net Zero Framework diagram

4.2.2 Proposed Masterplan

Circular principles are a fundamental consideration for all developments and the Public Domain, for both Council and private assets, under all densification scenarios. Figure 4.2 shows the proposed Masterplan for Burwood North with proposed new open space and buildings, and differentiates the lot distribution by FSR.

Climate Positive outcomes are expected to be achieved through the redevelopment of the Precinct, which will demonstrate leadership in aligning with the transition to Net Zero.

The new Masterplan provides an opportunity to review the Precinct's street hierarchy, allowing for a transition to a more pedestrian-oriented precinct. By promoting and developing active and public transport options, a reduction in car reliance is expected.

Precinct-wide infrastructure solutions can be implemented in stages, and the increase of density provides opportunity for improved energy, water and waste infrastructure.

The incorporation and integration of additional nature-based solutions presents a significant opportunity to foster strong social support and acceptance within the precinct. Defining and embedding these solutions has the potential to enhance the liveability, sustainability, and resilience of the precinct, while improving wellbeing of its residents and visitors.

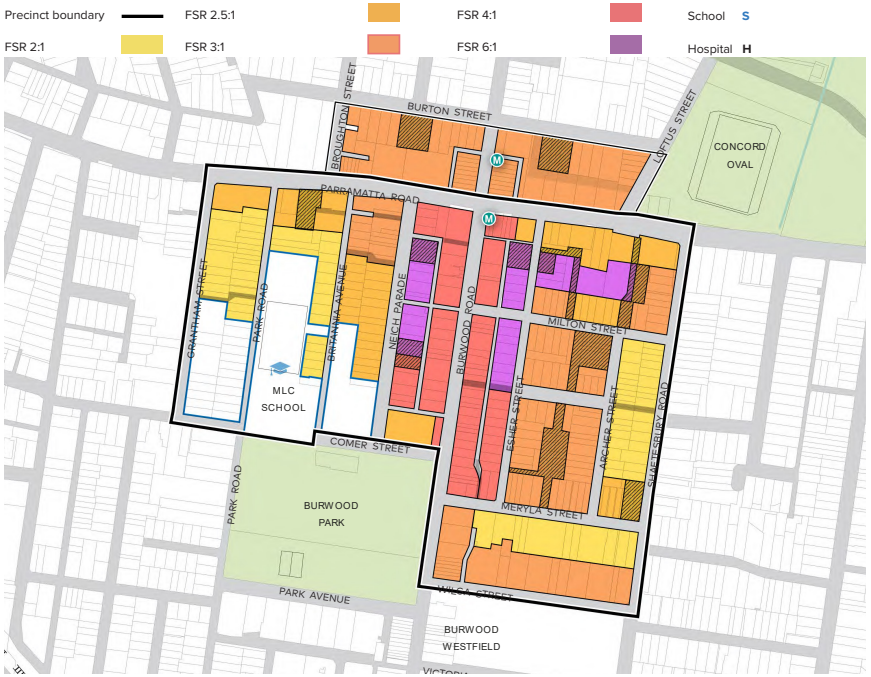


Figure 4.2 Proposed Masterplan with revised densities

4.2.3 Public Domain

The Public Domain includes land and infrastructure that is accessible to the community. The Public Domain plays a critical role in shaping the livability and sustainability within the Precinct and can efficiently support the sustainable priorities defined previously (Table 4.1).

Climate Positive | Built elements (existing or new) in the Public Domain can support Climate Positive strategies and emission reduction by reducing energy demand, and using a high percentage of local and recycled materials. Single-use and virgin plastics should be removed from the Public Domain, and to divert waste from landfill, different waste streams must be implemented in all public areas.
To reduce energy demand and night sky pollution from urban lighting , the following strategies have to be implemented:

- Energy efficient light fittings with warm colours
- Minimise urban light fittings
- Eliminate light spill (upwards and from reflective surfaces)
- Install PV on light fittings and public transport structures

Movement and Place | The Public Domain has an opportunity to deliver improved movement and place outcomes. This includes creating a walkable and liveable precinct through hard landscape that promotes active and low carbon transport options.

Infrastructure | Provisions for connection to the future Precinct embedded network and thermal network should be incorporated for all Public Domain assets.

Nature-Based Solutions | Soft landscaping is an important component of the Public Domain and is often used in combination with hard landscaping to create functional outdoor spaces. It refers to the living elements or vegetation used in a landscape, and it is often more cost-effective than physical (or grey) infrastructure.
Soft landscaping also helps improve urban heat and climate resilience. When combined with strategies related to planting and Water Sensitive Urban Design (WSUD), it can create efficient, durable, and agreeable public spaces for the community.

Table 4.1 Sustainable strategies in the Public Domain

	Climate Positive	Movement and Place	Infrastructure	Nature-Based Solutions
	• Minimise energy demand • Photovoltaic installations and energy storage • Responsible material procurement • Use BASIX Material Index • Increase number of recycling streams	• Improve and promote active transport and shared mobility services • Provide bicycle parking space in streetscape and open spaces • Provide high visibility and easy access to public open space	• Non-potable water collection, storage and reuse • Connection to precinct networks • Reduce night sky pollution	• Increase soft landscaping areas in streetscape • Green roof • WSUD strategies • Increase canopy cover • Drought resistant species • Soil cell systems • Community garden and composting

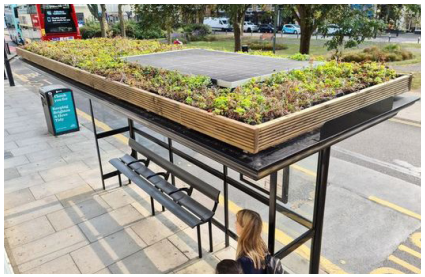


Figure 4.3 Bus stop with green roof and PV (London)

Figure 4.4 Recycled plastic street furniture (New York)

4.2.4 Buildings

It is expected that the urban renewal of the precinct will happen over the next 20-30 years.

Educational buildings and heritage buildings are likely to remain, and properties that are difficult to acquire or have been recently constructed could potentially be retained.

The development strategies proposed in this report are divided into those aimed at future developments and major building refurbishments, as well as those addressed for potential remaining assets.

New developments and major refurbishments

New developments provide an opportunity to significantly reduce carbon emissions in the built environment and set higher standards for buildings regarding water and energy use, as well as thermal comfort and healthy indoor environment (Table 4.2).

Climate Positive | All developments are expected to achieve certifications from green rating tools demonstrating to ensure the Precinct will achieve its Net Zero target.

- Passive design strategies should be prioritized, as they have been proven to have a high impact on energy use and are cost-effective solutions.
- All buildings to be fully electric to progressively eliminate fossil fuel demand
- On-site energy generation should be maximised to reduce dependency to the Main grid.
- Water use is expected to be significantly reduced through the installation of efficient fittings and the collection and reuse of rainwater for non-potable uses such as washing machines, toilet flush, landscaping, washdown, and cooling towers if present. Reduction in water demand is also expected through user education.

Movement and Place | To promote active transport parking should be minimised, and dedicated parking for car sharing and e-bike charging stations should be implemented.

Infrastructure | Provisions for connection to the future Precinct embedded network and thermal network should be incorporated in all buildings.

Nature-Based Solutions | By integrating green open spaces within development sites, new developments can help to reduce the urban heat island effect, reduce energy demand and enhance local biodiversity.

- Developments should increase deep soil planting, tree canopy, and permeable areas to cool the local microclimate and reduce stormwater runoff. Additionally, intensive or extensive green roofs could be implemented to absorb rainwater, cool buildings and provide enjoyable communal space.
- Building rooftops and green spaces between Burwood Park and Concord Oval can support the delivery of a green corridor.

Table 4.2 Sustainable strategies for New Assets and Major Refurbishments

	Climate Positive	Movement and Place	Infrastructure	Nature-Based Solutions
	• Green ratings (Refer to Table 5.1) • Passive design strategies • Fully electric, no fossil fuel • Photovoltaic panels • Efficient fixtures and fittings • Best practice waste separation and reduction • Increased number of recycling streams	• EV ready	• Provision for embedded network • Provision for centralised heating/cooling	• Increase deep soil planting • Increase tree canopy • Increase permeable areas • Collect and reuse rainwater
 	• Green ratings (Refer to Table 5.1) • Net Zero by 2030 • Fully electric, no fossil fuel • Passive design strategies • Photovoltaic panels on roof and shading structures • Battery storage ready • Efficient fixtures and fittings • Waste separation and reduction • Increased number of recycling streams	• Car park attenuation & decoupled parking • Car share dedicated areas • EV ready • Ebike charging stations	• Provision for embedded network • Provision for centralised heating/cooling	• Increase tree canopy • Intensive and extensive green roofs • Rainwater collection and reuse • Communal productive gardens • Increase tree canopy • On-site composting

Remaining assets

Council assets | Strategies for remaining Councils assets aim to reduce energy and water usage, increase permeable area and tree cover, without having major impacts on building services and structure. Table 4.3 provides a comprehensive list of these strategies.

Private assets | Given the difficulties of implementing strategies on privately owned assets that already exist, the Council should instead seek to influence the behaviour of owners through measures such as requiring information disclosure and advocating for or developing incentives that promote sustainable strategies such as:

- Yearly energy and water usage disclosure
- Energy and water ratings where applicable
- Incentive for solar photovoltaic installation
- Incentive for full electrification
- Incentive for EV and Ebike charging station installation
- Incentive for rainwater tank installation
- Incentive for compost waste services
- Incentive for tree planting

Table 4.3 Sustainable strategies for Remaining Assets

	Climate Positive	Movement and Place	Infrastructure	Nature-Based Solutions
	• Photovoltaic panels • Transition to fully electric • Passive design strategies • Best practice waste separation and reduction • Increased number of recycling streams	• EV ready	• N/A	• Increase tree canopy • Increase permeable areas • Collect and reuse rainwater
 	• Photovoltaic panels • Transition to fully electric • Passive design strategies • Shading canopy PV • Net Zero by 2050 • Efficient fixtures and fittings • Best practice waste separation and reduction • Increased number of recycling streams	• Car park attenuation & decoupled parking • Car share dedicated areas • EV provision • Ebike charging stations provision	• N/A	• Increase tree canopy • Intensive and extensive green roofs • Rainwater collection and reuse • Communal productive gardens • On-site composting

5 Sustainability Strategies

5.1 Sustainability Priorities

The review of the DCP is an opportunity to shift from business as usual thinking and set up high standards sustainability outcomes, to improve liveability and confirm the Precinct will achieve Net Zero.

The Precinct's objectives and targets can be reached through the implementation of new controls. These new controls are defined through the Climate Positive, Movement and Place, Infrastructure and Nature-based Solutions priorities.

5.2 Priority _ Climate Positive

The transformation of the built environment towards Net Zero emissions will be accelerated under a range of Net Zero Buildings initiatives. Energy sources have to evolve, energy use, water demand and embodied emissions have to reduce significantly. Waste has to be minimised and diverted from landfill. Circular economy principles have to be prioritised in the Public Domain and all developments.

Climate Positive Pathway for medium and high-rise

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 new 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 (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.

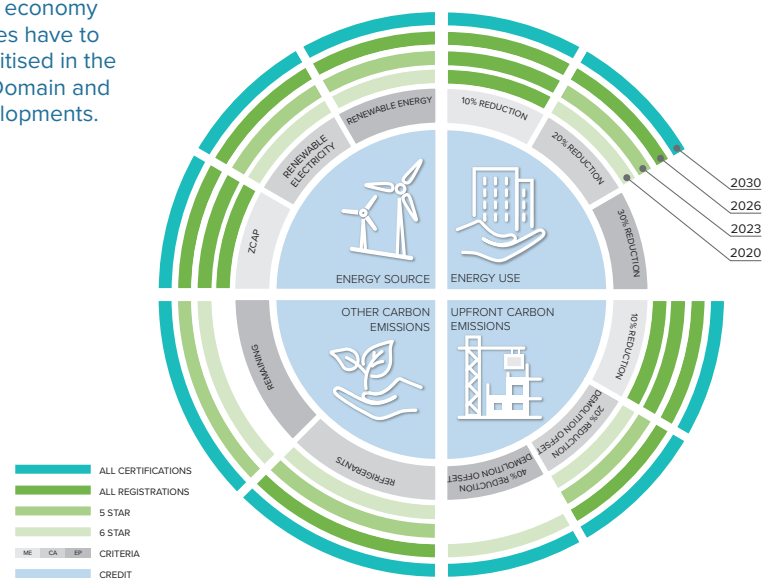


Figure 5.1 Green Star Climate Positive Pathway

Green rating tools

The following green ratings have been selected to demonstrate that the efforts required for the Precinct to achieve Net Zero and improve liveability are implemented in all new developments.

Green Star | There are five Green Star rating tools (Homes, Performance, Buildings, Interior and Communities) which focus on different concepts related to energy and water efficiency, indoor quality, carbon emission reduction, materials and responsible procurement, places, social inclusion and nature.

Climate Active Carbon Neutral | The certification is awarded to organisations that have credibly reached a state of carbon neutrality- based on an agreed emissions boundary for a specific certification type. It is available for precincts and buildings.

NatHERS | NatHERS provides energy ratings for new residential buildings with different benchmarks depending on the building location. NatHERS is pathway to demonstrate compliance with the NCC energy efficiency requirements.

BASIX | BASIX sets sustainability targets for water and energy as well as minimum performance levels for the thermal comfort of new development. The targets are expressed as a percentage saving against the NSW benchmark.

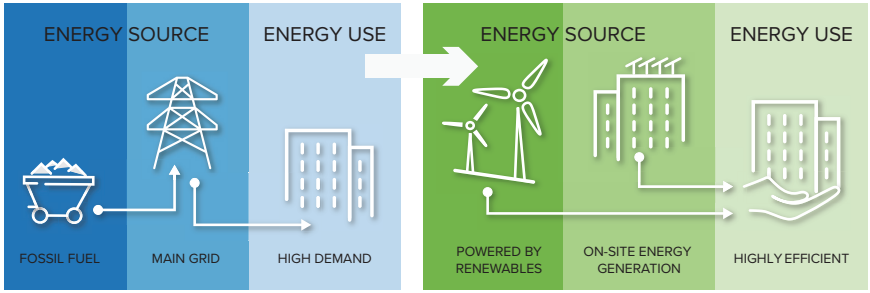
NABERS | NABERS is a tool that provides a rating for commercial buildings efficiency in terms of energy, water and waste. Ratings are publicly available and all office spaces over 1000 sqm are required to have an NABERS rating.

Table 5.1 Environmental Targets Summary for the Precinct

Precinct certifications	
Green Star	• Communities with staged approach (4 star 2030 → 5 star 2040 → 6 star 2050)
Climate Active Carbon Neutral	• Council developments to achieve Climate Active Carbon Neutral (operation)

Table 5.2 Environmental Targets Summary for New Developments and Major Refurbishments

Building Certifications	FSR 2:1 (dwellings)	Mid-rise (FSR 2.5:1 - 3:1)	High-rise (FSR 4:1 - 6:1)
Green Star	• Homes 5 star	• Buildings 5 star	• Buildings 5 star (6 star for DE)
NatHERS	• 7 star	• Average 7 star • Minimum 6 star	• Average 7 star • Minimum 6 star
BASIX	• Energy 60 • Water 50 • Material Index	• Energy 45 • Water 50 • Material Index	• Energy 35 (45 for Design Excellence (DE)) • Water 50 (60 for DE) • Material Index
NABERS	N/A under 1000sqm	• Energy 5.5 star (+25%) (without GreenPower) • Water & Waste : 5 star • Embodied emission tool	• Energy 5.5 star (+25%) (without GreenPower) • Water & Waste : 5 star • Embodied emission tool



Energy Source

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

Through staged development of the Precinct, the ultimate aim is to establish a comprehensive embedded network connected to all Public Domain and private assets within Burwood North (see Section 5.3).

Table 5.3 Proposed Controls_ Energy Source

PC.1	• All Public Domain and private developments to be all electric, fossil fuel-free
PC.2	• All new developments to have on-site Solar Photovoltaic installations that can cover: – at least 50% of yearly energy use for dwellings FSR 2:1 – at least 15% of yearly energy use for medium and high-rise (to be reviewed in stage 3)
PC.3	• All new developments to be battery storage ready

Energy and Water Demand

Sustainable Buildings | The PRCUTS *Sustainability Implementation Plan*, NSW Sustainable Buildings SEPP and Green Star Buildings establish energy use targets and requirements for new developments.

Burwood North Masterplan aims to achieve Net Zero by 2050, and to accomplish this, it encourages all developments, whether new or existing, to be energy and water-efficient and significantly reduce the Precinct energy and water demand.

Targeting high ratings with different green tools is a way to support and verify the energy and water demand has reduced.

Table 5.4 Proposed Controls_ Energy and Water Demand

PC.5	• All new developments must achieve the different green ratings tools as per Table 5.1 and 5.2, where applicable
PC6.	• Public Domain elements must minimise energy demand and use energy efficient systems and fittings
PC.7	• All Public Domain and private developments to install sanitary fixture and appliances at a minimum of 1 star below the highest WELS and Energy ratings

Embodied emissions

Upfront carbon | 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.

Public Domain and private developments within the Precinct can diligently calculate and disclose the embodied emissions of construction materials under the BASIX materials index and the future NABERS Embodied carbon tool. Reduction strategies aligned with the Green Star Climate Positive Pathway that leverage supply chain transformation and reduction targets can be set, where practicable.

End of life | At the end of life, materials should be appropriately separated, diverted from landfill and locally reused or recycled to minimize waste and environmental impact..

Anticipate | To further reduce carbon emissions, all Public Domain and private developments should source materials locally, design and build with minimising demolition and construction waste, and design for disassembly and reuse.

Table 5.5 Proposed Controls_ Embodied emissions

PC.8	• All Public Domain and private developments must disclose and reduce upfront carbon emissions. Medium and high-rise buildings are expected to achieve the Green Star Credit 21 _ Upfront Carbon Emissions
PC.9	• All Public Domain and private developments must divert at least 80% of materials from landfill from demolition processes

Waste

Reduce | The Precinct can investigate opportunities to reduce construction and operational waste. Promoting responsible waste stream separation and increased number of recycling streams alligned with the Council's development of waste separation strategy, implementing convenient and efficient waste management systems and organic compost on-site can significantly reduce the amount of waste that goes to landfill.

Remove | Additionally, all public spaces within the Precinct are to be plastic free zones, where no single-used plastic products are distributed or no virgin plastic is used as a construction or furniture material.

Anticipate | Adequate waste provisions and robust procedures that cater for potential changes during operation can be investigated, including additional area to store, collect and process waste and automatic vacuum waste collection system, dehydrators and any future technology.

Table 5.6 Proposed Controls_ Waste

PC.10	• All new medium and high-rise developments must have dedicated waste chutes and sufficient bin store area to collect 4 different waste streams
PC.11	• All new medium and high-rise developments must account for the future collection of at least two additional waste streams (6 streams total) and allocate additional space accordingly
PC.12	• All Public Domain space must have at least 2 separated waste streams
PC.13	• All Public Domain areas to be plastic-free
PC.14	• All Public Domain and private developments must allocate space for on-site compost
PC.15	• All new medium and high-rise developments should make provision for future vacuum waste collection system
PC.16	• All Public Domain and private developments must divert at least 80% of all construction waste to landfill

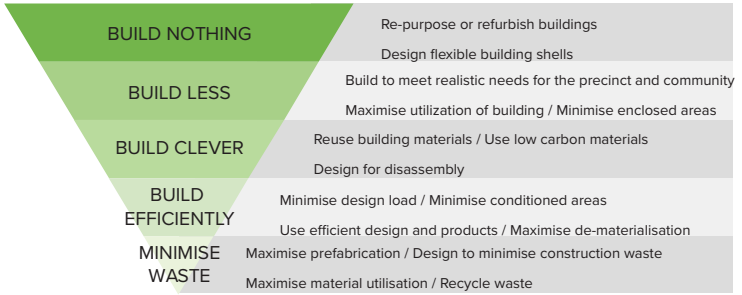


Figure 5.2 Embodied carbon reduction strategies during design and construction processes

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.

Diversified Demand

Figure 5.3 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.

Peaks | The diversified electrical demand profile is reinforced by the thermal demand diversity and heat recovery potential inherent in the Precinct. Figure 4.3 further demonstrates the diversified electrical demand profile. Notable peak demand reductions are observed during the morning and evening peak periods.

On-site energy generation | The installation of the distributed solar PV system can reduce the morning peak reduction. The daytime electrical demand can be met by the distributed solar PV system.

Heat recovery | 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 CO_2 electric heat pump hot water systems in each building drives down the thermal demand. Heatrecovery could be a potential strategy the Precinct could achieve.

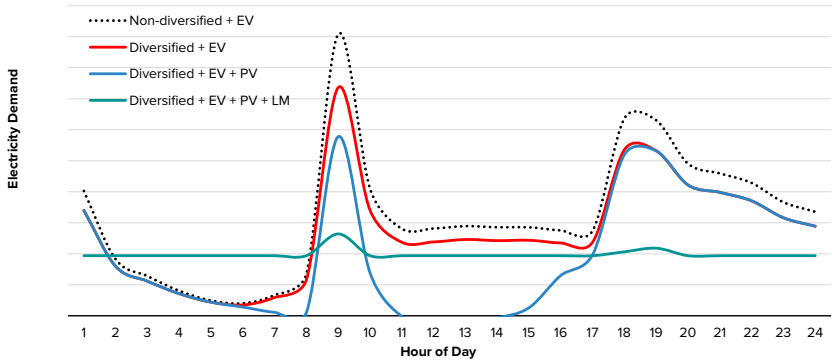


Figure 5.3 Electrical demand profiles, incl. peak demand reduction strategies

1. Business as Usual Individual utility connections to each building and the Public Domain of the Precinct limits demand diversification and cumulatively impact utility amplifications. Opportunity for innovation and access to capital is lost.

2. Precinct Utility Services Precinct utility services leverage unique site features and can deliver an integrated approach to energy use.

Existing Networks

The site infrastructure opportunities, risk and constraints are identified in the Burwood North Precinct Masterplan _ Utility Servicing Assessment. Business as Usual strategies have been developed within this report to upgrade existing infrastructure networks according to the proposed development densities.

Commercial Structure

Feasible | Precinct utility services represent a fundamental investment decision to enable circular, resilient and Net Zero operations.
The commercial ownership structures for the 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.

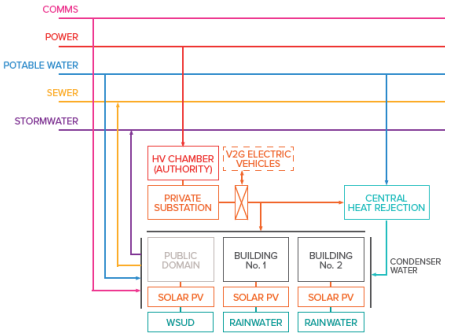


Figure 5.4 Precinct utility services

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, delivers 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.

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 the number are 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).

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, renewal can create a walkable and liveable Precinct through good urban design that promotes active and low-carbon transport options.

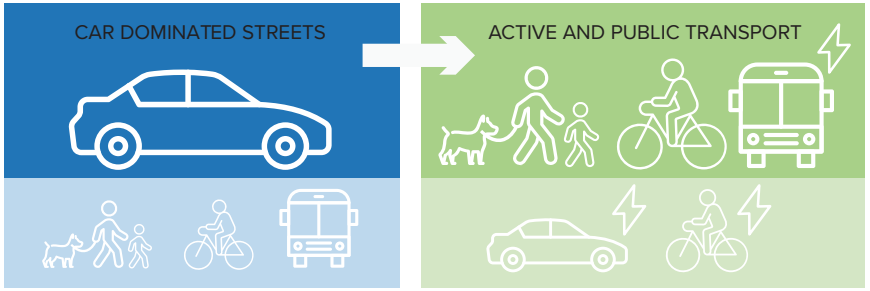
As the Precinct develops, it must increasingly leverage the enhanced active transport and and public transport infrastructure to facilitate a progressive shift away from private vehicle use.

Future Mobility

Transformation | The staged delivery of the Precinct will be critical to realising a mobility shift. Private vehicle use for residents, workers and visitors will be restricted and the number of car spaces reduced. The need for private vehicle will be progressively shift towards active transport thanks to the quality of existing and planned public infrastructure and active mobility conditions.
As an example, one approach could be, after reducing the speed on Burwood Road, to completely eliminate car traffic, dedicating it solely to buses and ultimately transitioning it to a fully pedestrianized area.

Shared mobility | As the quality of public transport and active mobility conditions improves (e.g., metro services commence circa 2030 and active mobility networks are expanded) acceptance of and preference for unbundled and decoupled car parking will accelerate, and shared mobility services are expected to become the norm.

Figure 5.5 Shared street (Rennes, France)



Mobility Shift

To achieve the desired mobility shift and provide a pedestrian friendly environment, a change needs to happen at all levels. Car parking rates and bicycle provisions are one of the steps that can be adjusted for new developments.

Context | Burwood North Precinct Masterplan: Rapid Transport Appraisal, by SCT Consulting addresses the desired increase in walkability and parking policy adjustments. Burwood North is adjacent to Canada Bay council, which implemented recent changes to DCP to support the mode shift and achieve Net Zero targets. BDCP design controls can align movement and place provisions with CBDCP, and Rhodes in particular.

Active transport | New pedestrianised streets and links are proposed within the site as well as larger footpaths, new cycling lanes, shared streets and open spaces which will create a permeable site and encourage walking and cycling.

Public Transport | The addition of the Metro station, as well as the implementation of slower speed limits and reduced traffic on roads such as Wilga Street and Burwood Road, are promising options that residents would enjoy using.

Parking | Improving the development of active and public transport infrastructure can effectively reduce the need for car parks, especially at a precinct scale. The proposed parking rates for residential and commercial buildings are provided by SCT Consulting in their report, Rapid Transport Appraisal.

The new rates are generally aligned with benchmark precincts across Sydney and include the following:

- Bicycle parking rates for residents and visitors
- Car share and ride share rates
- Car park rates for resident and visitors
- Accessible parking rates
- Motobicycle rates
- Freight and servicing vehicle parking

Electric Vehicles

All electric | To ensure future developments can support the transition to electric vehicles, the following initiatives can be addressed within the context of electrical infrastructure, and EV-ready and EV-capable capacity.

Electric charging station rates are provided by SCT Consulting in the Rapid Transport Appraisal.

Electric vehicle charging facility is to be provided for car spaces, for both residential and commercial developments.

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 ecosystem 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.

Design with Nature

Design for future | By prioritising nature in investment decision-making, the resilience and liveability of the Precinct is expected to rapidly improve, contributing to a secure, sustainable future for nature and people.

Resilience | In Burwood North, nature-based solutions can be implemented within the Blue Green grid by increasing the tree canopy, deep soil planting and permeable surfaces. By using Water Sensitive Urban Design (WSUD) strategies in open spaces and communal spaces, the Precinct will be more resilient to extreme weather events, and will reduce water demand by capturing, filtering, storing and reusing water appropriately.

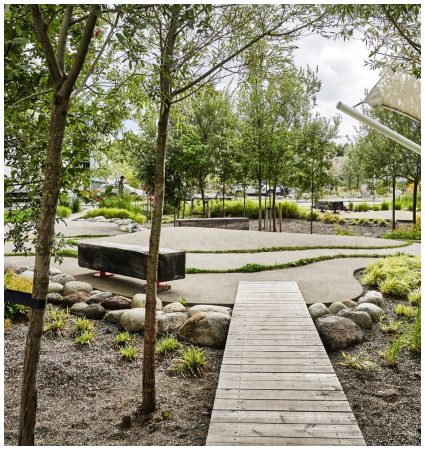


Figure 5.6 Urban park with flooding mitigation design (Norway)

5.5.1 Urban Heat Controls

Universal Thermal Climate Index (UTCI)

UTCI is an international standard defined by the COST European Cooperation in Scientific and Technical Research Action 730, and is based on recent research in human response-related thermophysiological effects of the atmospheric environment in human biometeorology. This metric analyses outdoor thermal comfort and how it is perceived by users of the public and communal open space. It quantifies the quality of amenity based on site-specific conditions including:

- Ambient air temperature
- Mean radiant temperature (produced with account of reflectivity and urban heat island effect)
- Wind velocity
- Relative humidity

When combined, these site-specific conditions describe an outdoor thermal comfort performance.

Analysis and results | UTCI analysis results are presented as perceived outdoor thermal comfort categories, as follows:

- +2 (Moderate heat stress 28° < UTCI < 32°)
- +1 (Slight heat stress: 26° < UTCI < 28°)
- 0 (No thermal stress: 9° < UTCI < 26°)
- -1 (Slight cold stress: 0° < UTCI < 9°)
- - 2 (Moderate cold stress: -12° < UTCI < 0°)

Comfortable range

Broader thermal comfort parameters are statistically interpreted to provide a quantitative measure of the quality of amenity.

Table 5.7 categorises the quality of amenity based on the acceptability of an urban space depending on their use throughout a statistical year.

Requirements

The Universal Thermal Climate Index (UTCI) metric is suggested for predicting outdoor thermal comfort in the Burwood North precinct. The methodology for computing this metric is provided at http://www.utci.org/.
UTCI analysis to be conducted on an annual basis for every hour, using predictive weather file and accounting for the urban heat island effect.
The frequency of the occurrence of UTCI 'comfortable range' (between 0° and 28°) is to be calculated. The categorisation of the area's performance is divided as follows:

Thermal Comfort Categories
- All seasons
- Seasonal
- Short Term
- Short term seasonal
- Transient

To tackle and mitigate the impacts of climate change on urban outdoor environments, the following measures are proposed:

Table 5.8 Proposed Controls_ Urban Heat

PC.17	• Undertake a UTCI analysis for all outdoor areas within the Public Domain and for medium and high-rise buildings – Adjust the current conditions weather file for the future climate projections RCP 8.5 to consider the life span of the development – Adjust the future projections weather file accounting for the Urban Heat Island Effect for the future development and remaining assets – Identify areas of concern and provide mitigation strategies
PC.18	• All outdoor areas have to comply with the percentage of acceptability listed in Table 5.7, depending on their functionality

Table 5.7 Urban Spaces quality categories and acceptability range

Category	Acceptability	Description	Colour	Function examples
All seasons	>90% acceptable hours in each season	Appropriate for use year-round		• Parks and courtyards • Playground • Al fresco dining areas
Seasonal	>90% acceptable hours in spring-autumn, >70% acceptable hours in winter	Appropriate for use during most of the year		• Rooftops and podiums
Short-term	>50% acceptable hours in each season	Appropriate for short term duration year-round		• Public transport waiting areas • Footpath
Short-term seasonal	>50% acceptable hours in spring-autumn, >25% acceptable hours in winter	Appropriate for short term duration most of the year		• Bicycle lane
Transient	>25% acceptable hours in spring-autumn, >50% acceptable hours in winter	Appropriate for transient public spaces		• Parking areas

5.5.2 Blue Green grid

The Blue Green grid network combines landscape, urban design and ecology, and helps bring nature back into urban areas. The different advantages of the Blue Green grid are the following:

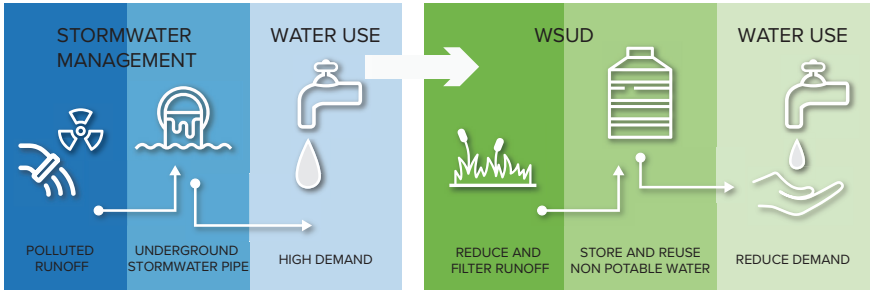
- Improve flood resilience
- Store carbon - climate crisis mitigation
- Increase natural and social capital, improve tourism and recreation
- Enhance biodiversity and habitat connectivity, protect, restore, expand and create natural habitats
- Reduce exposure to polluting substances, improve amenity value, and deliver recreational and health benefits

Proposed requirements for the Blue Green grid are developed in the Stormwater and Flooding Report, by Mott MacDonald and the Landscape and Public Domain Strategy Report, by Oculus.

Rewilding Burwood

Blue Green grid strategies create a visible green corridor through the Precinct and can be implemented by increasing tree canopy, permeable areas and by returning culverted watercourses to open water. Some of the proposed linked open spaces will connect existing habitats, Burwood Park and Concord Oval, and create a green trail.

Tree canopy | Increasing the tree canopy by 40% is a NSW state target. In the Public Domain, street trees contribute to the character of our urban areas, but also to better air quality by filtering the air and storing carbon. Trees provide shade for people and buildings and by cooling the local microclimate, reduce the urban heat island effect and create an enjoyable environment while encouraging biodiversity and wildlife, including providing travel corridors for birds and insects.
The inclusion of indigenous species, for trees and plants, will enhance the local flora and fauna and contribute to rewilding Burwood and bring back connection to Country.



Water Sensitive Urban Design

WSUD manages rain water, storing and slowing runoff before it enters waterbodies. WSUD generally combines natural elements, such as On-Site Detention strategies (OSD), bioswales, raingardens, integrated depressions, and porous surfacing. They mimic nature by managing rainfall close to where it falls to mitigate the risk of flooding in urban areas and further downstream.

- Maintain and improve water quality using Gross Trap Pollutant (GPT) and natural filtration
- Improve flood and drought resilience with porous surfaces, bioswale, ground integrated depression and water storage solutions.
- Reduce soil erosion and sediment transfer
- Improve amenity value, deliver recreational and health benefits

Green Roofs and Green Walls

Intensive or extensive green roofs and walls act as a rainwater buffer and an air purifier, as well as helping to reduce the ambient temperature and provide temporary storage for water. An accessible green roof is a place for meetings or recreation for a building's occupant and is a refuge for insects and birds. Nature-based solutions for roofs also include blue roofs – designed to slowly drain and store water – and brown roofs, where the substrate surface is left to self-vegetate.
At least 30% of the available rooftop of high and mid-rise buildings has to be covered with vegetation.

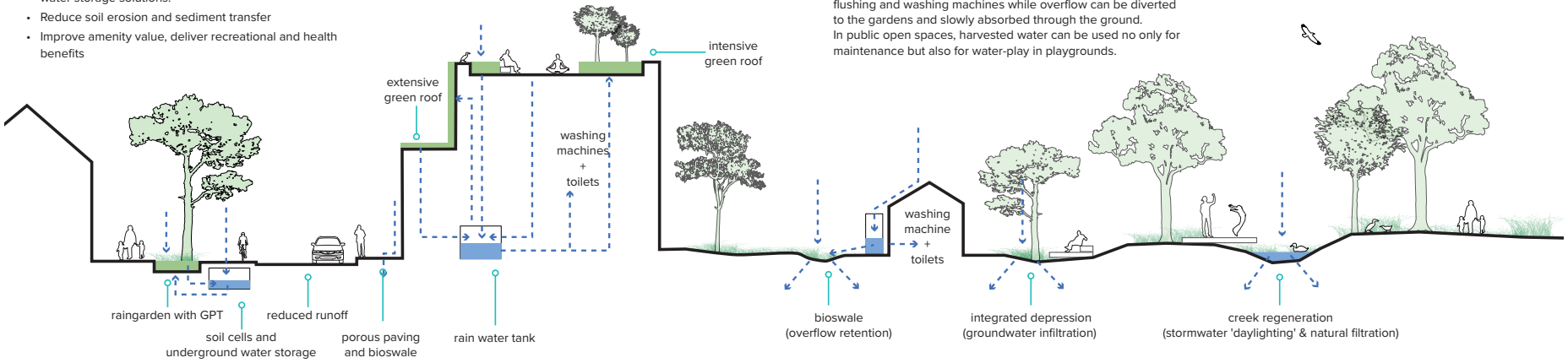
Green Spaces

All Public Domain or private green spaces contribute to cool the local microclimate, mitigate flooding and enhance biodiversity.

Green spaces intercept the overland flow of water, trapping and storing water before it can reach the roads susceptible to flooding. Vegetation provides carbon sequestration and air filtering and reduces a road's environmental footprint while delivering biodiversity net gain.
Gardens and parks can be designed to natural filter and absorb rainwater. These different strategies can clean and reduce significantly runoffs to the streets, improving the Precinct flood resilience. Harvested rain water from buildings stored and recycled for non-potable usage such as watering plants, toilet flushing and washing machines while overflow can be diverted to the gardens and slowly absorbed through the ground.
In public open spaces, harvested water can be used no only for maintenance but also for water-play in playgrounds.

Linear Park

Burwood has an opportunity to create a linear park by connecting pocket parks, green roofs/podiums and street landscaping. The linear park creates a green urban network, promote wild life presence which enhance the connection to nature in the city.
Partial naturalisation or interpretation through the streetscape and open spaces design of a historical creek running from Burwood Park to Concord Oval could bring back connection to Country and a natural flow. Opening up the creek that was sealed can provide enjoyable spaces for wanderings, develop Blue Green grid and improve flood resilience.



6 Requirements Summary

6.1 Performance Objectives

Opportunities within the Precinct to implement sustainability objectives are identified in section 5.2 of this report. This Sustainability Statement demonstrates the opportunity for the Precinct to respond in line with the following material considerations:

- The vision and related themes set out in Burwood *Local Strategic Planning Statement* (BLSPS)
- 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 Burwood *Development Control Plan* (BDCP)

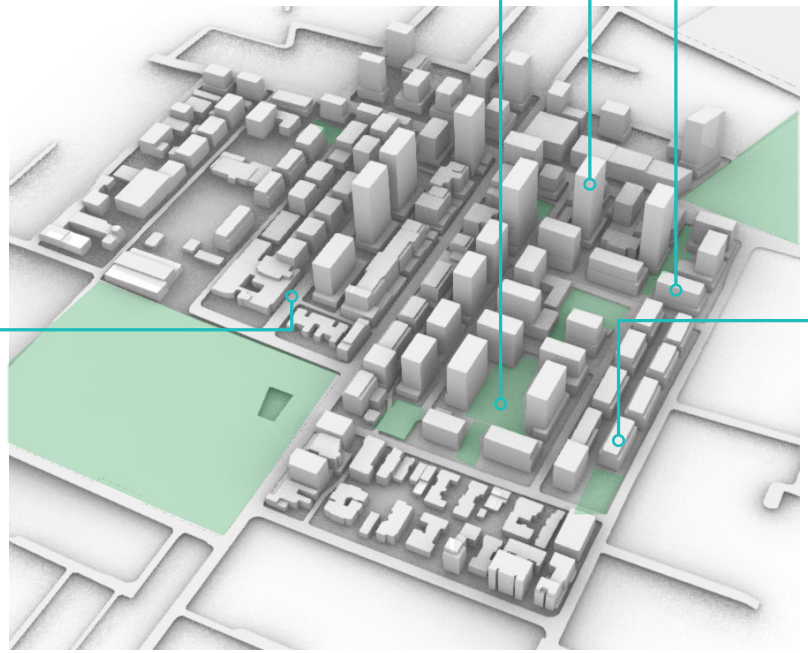
6.2 Summary of Strategies

OPEN SPACE

- Responsible material procurement
- increased number of recycling streams
- Provide bicycle parking
- Reduce night sky pollution
- Community garden and composting
- WSUD strategies
- Increase canopy cover
- Drought resistant species
- Indigenous species

STREETSCAPE

- Energy demand reduction
- Photovoltaic panels installations
- Responsible material procurement
- Increase number of recycling streams
- Improve and promote active transport and shared mobility services
- Provide bicycle parking
- Reduce night sky pollution
- Increase soft landscaping and permeable areas
- Green roof
- WSUD strategies
- Increase canopy cover
- Drought resistant species
- Soil cell system



DEVELOPMENTS with FSR 2.5 - 6 : 1

- Net Zero by 2030
- Fully electric / Transition to fully electric
- Passive design strategies
- Photovoltaic panels on roof and shading structures
- Battery storage ready
- Efficient fixtures and fittings
- Car park attenuation & decoupled parking
- Car share dedicated areas
- EV / Ebike ready
- Car park attenuation & decoupled parking
- Car share dedicated areas
- Embedded network
- 4 waste separation
- Increase number of recycling streams
- Green roofs
- WSUD strategies
- Increase canopy cover
- Drought resistant species
- Indigenous species
- Communal productive gardens
- On-site composting

DWELLINGS with FSR 2:1

- Passive design strategies
- Fully electric / Transition to fully electric
- Photovoltaic panels
- Efficient fixtures and fittings
- EV ready
- Increase tree canopy
- Increase permeable areas
- Collect and reuse rainwater
- Best practice waste separation and reduction
- Increase number of recycling streams

6.3 Summary of Requirements

The vision of Burwood North will be enforced through specific requirements from this report and reports listed in Section 1.3.

The sustainability requirements for Burwood North Masterplan are presented in Table 6.1. They intend to summarise the sustainable strategies described in Section 6.2 and complement other discipline reports.

Table 6.1 Summary of proposed requirements

Use Type	Public Domain	FSR 2: 1 (dwellings)	FSR 2.5 - 3 : 1	FSR 4-6 : 1
Framework	• PC.5 - Green Star Communities (to be reviewed with Council) • PC.5 - Carbon neutral Climate Active Precinct (to be reviewed with Council)	• PC.5 - Green Star Homes	• PC.5 - Minimum 5 star Green Star Buildings	• PC.5 - Minimum 5 star Green Star Buildings • PC.5 - Minimum 6 star for Design Excellence projects
Thermal comfort	• N/A	• PC.5 - 7 star NatHERS	• PC.5 - Average 7 star NatHERS • PC.5 - Minimum 6 star NatHERS	• PC.5 - Average 7 star NatHERS • PC.5 - Minimum 6 star NatHERS
Energy source	• PC.1 - Fully electric, fossil fuel-free • PC.2 - On-site energy generation • PC.4 - Provision for future Precinct electricity network	• PC.1 - Fully electric, fossil fuel-free • PC.2 - 50% of yearly energy use is produced by on-site solar photovoltaic • PC.4 - Provision for future Precinct electricity network	• PC.1 - Fully electric, fossil fuel-free • PC.2 - 15% of yearly energy use is produced by on-site solar photovoltaic • PC.4 - Provision for future Precinct electricity network	• PC.1 - Fully electric, fossil fuel-free • PC.2 - 15% of yearly energy use is produced by on-site solar photovoltaic • PC.4 - Provision for future Precinct electricity network
Energy demand	• PC.6 - Minimise demand and use energy efficient systems and fittings	• PC.5 - BASIX Energy 60 • PC.5 - 5.5 star (+25%) NABERS Energy for Offices and Shopping Centres	• PC.5 - BASIX Energy 45 • PC.5 - 5.5 star (+25%) NABERS Energy for Offices	• PC.5 - BASIX Energy 35 • PC.5 - 5.5 star (+25%) NABERS Energy for Offices
Water Demand	• PC.7 - Install efficient sanitary fixture	• PC.7 - Water efficient appliances • PC.5 - BASIX water 50	• PC.7 - Water efficient appliances • PC.5 - BASIX water 50	• PC.7 - Water efficient appliances • PC.5 - BASIX water 50
Embodied emissions	• PC.8 - Disclose and reduce upfront carbon emissions • PC.9 - Divert at least 80% of materials from landfill from demolition processes	• PC.8 - Disclose and reduce upfront carbon emissions • PC.9 - Divert at least 80% of materials from landfill from demolition processes	• PC.8 - Achieve Green Star Credit 21 (20% upfront carbon emissions) • PC.9 - Divert at least 80% of materials from landfill from demolition processes	• PC.8 - Achieve Green Star Credit 21 (20% upfront carbon emissions) • PC.9 - Divert at least 80% of materials from landfill from demolition processes
Waste	• PC.12 - Provide at least 2 separated waste streams • PC.13 - All areas to be plastic-free zones • PC.14 - Allocate space for on-site composting • PC.16 Divert at least 85% of construction waste from landfill	• PC.14 - Allocate space for on-site composting • PC16 - Divert at least 80% of construction waste from landfill	• PC.5 - NABERS Waste 5 star • PC.10 - Minimum 4 waste streams separation • PC.11 - Provision for 2 additional waste streams • PC.12 - Provision for the future vacuum waste connection (underground automated system) • PC.14 - Allocate space for on-site composting • PC.15 - Provision for future vacuum waste collection • PC.16 - Divert at least 80% of construction waste from landfill	• PC.5 - NABERS Waste 5 star • PC.10 - Minimum 4 waste streams separation • PC.11 - Provision for 2 additional waste streams • PC.12 - Provision for the future vacuum waste connection (underground automated system) • PC.14 - Allocate space for on-site composting • PC.15 - Provision for future vacuum waste collection • PC.16 - Divert at least 80% of construction waste from landfill
Urban Heat Control	• PC.17 - Undertake a UTCI analysis for all outdoor areas • PC.18 - Areas to comply with Table 5.7 depending on their functionality		• PC.17 - Undertake a UTCI analysis for all outdoor areas • PC.18 - Areas to comply with Table 5.7 depending on their functionality	• PC.17 - Undertake a UTCI analysis for all outdoor areas • PC.18 - Areas to comply with Table 5.7 depending on their functionality

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MOTT MACDONALD

Burwood North Precinct Masterplan

Utilities Study

July 2023

Infrastructure Servicing Strategy

Acknowledgment of Country

We recognise the Wangal People of the Eora Nation as the Traditional Custodians of this land that is being masterplanned. 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.

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	25/11/22	JL	DF	DF	Draft Issue
B	09/12/22	JL	DF	DF	Final Draft Issue
C	14/03/23	JL	DF	DF	Updated Issue
D	17/07/23	JL	DF	DF	Updated Issue

Document reference: 703100557 | A |

Information class: Standard

Contents

Tables

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Executive summary

Mott MacDonald has been engaged by Cox Architecture to develop an infrastructure servicing assessment for the Burwood North Precinct Masterplan. This assessment will support the delivery of this site as it will identify opportunities, constraints, and risks related to civil engineering and services infrastructure. The scope of this report summarises existing utility infrastructure.

The Burwood North Precinct is located west of the Sydney CBD and is within the Municipality of Burwood Local Government Area and City of Canada Bay Local Government Area (LGA).

Services

The site is currently serviced through the following means:

- **Potable Water:** Potable water is provided by Sydney Water from the Potts Hill Water Delivery System;
- **Sewer:** Wastewater facilities are provided by Sydney Water, which is processed through the Malabar Wastewater Treatment Plant;
- **Electrical:** Electrical supply is provided by Ausgrid;
- **Gas:** Gas servicing is provided by Jemena Gas; and
- **Telecommunications:** Multiple telecommunications providers service the site including Broadband, LBNCo, NBN, OptiComm, Optus, Telstra, TPG, Verizon, and Vocus.

Servicing Constraints

The main servicing constraints are:

- **Potable Water:** The site is well serviced from trunk assets on Parramatta Road, but local reticulation services may require amplification as a result of the proposed development uplift;
- **Sewer:** The site is well serviced from trunk assets on Parramatta and Neich Road, but local reticulation services may require amplification as a result of the proposed development uplift, additionally the reticulation network predominately runs under low density residential lots and may need to be relocated to the street network as a part of any change in building form;
- **Electrical:** It is likely that new feeder cables from the Burwood Zone substation will be required when existing LV distribution is at capacity. Additionally existing overhead power may need to be under grounded;
- **Gas:** While there are existing gas services to a large proportion of the site, consideration should be given to a "zero-gas" precinct to reduce use of non-renewable resources; and
- **Telecommunications:** No servicing constraints based on anticipated land uses however should this change and high use development (e.g., data centre, research, or university) then potential infrastructure upgrades may be required.

Although the outcomes of this assessment are subject to results of feasibility applications, it generally appears that there are mains available to service the site.

Additional Constraints

There are also other utility assets within close proximity to the site that may affect the development of this site. These assets are listed below:

- **Transport for NSW:** There are assets located at the intersection of Parramatta Rd and Broughton St as well as at the intersection of Shaftesbury Rd and Wilga St. There are also assets along Shaftesbury Rd, Wilga St, Burwood Rd, and Park Ave; and
- **Sydney Trains Central:** There are assets located along Rowley St and Wilga St.

1 Introduction

1.1 Background

Burwood Council is preparing an updated masterplan and supporting studies for the Burwood North Precinct, building upon the work already undertaken as part of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The masterplan seeks to capture the opportunity afforded by a new metro station at Burwood North on the Sydney Metro West network.

The masterplan strives to deliver an outcome that is feasible, maximises public benefit and delivers high quality public domain, open spaces, and community infrastructure. The masterplan articulates a cohesive vision for Burwood North that will underpin the growth and development of the precinct as a benchmark for sustainable urban renewal.

The masterplan is the result of a collaborative process that has been undertaken between Burwood Council, a wide range of government, institutional and community stakeholders, and the project's consultant team.

An Implementation Plan will also be prepared that outlines the recommended planning controls, policies, and infrastructure necessary to enable the successful delivery of the masterplan. The recommendations may inform amendments to the Burwood Local Environmental Plan 2012 (LEP) and Burwood Development Control Plan 2012 (DCP).

1.2 Scope of Works

Mott MacDonald has been engaged to identify existing opportunities, constraints, and risks associated with civil engineering and services infrastructure to support the delivery of the masterplan.

To assist in the preparation of the masterplan, Mott MacDonald have undertaken the following tasks:

- Undertaken a comprehensive services search, DBYD, and identified the existing service infrastructure in the vicinity of the site;
- Coordinated with the relevant service providers to determine the infrastructure requirements for the proposed masterplan;
- Assessed the existing capacity and any planned upgrades; and
- Mapped the existing services, identifying key infrastructure.

1.3 Purpose of Report

The purpose of this report is to identify the existing servicing infrastructure and identify requirements to service the Burwood North Precinct Masterplan. These requirements include:

- Identify the existing situation, including the constraints, opportunities, key issues, and existing network capacity;
- Assess the capacity of the relevant service infrastructure networks to service the site;
- Assess the implications of any proposed land use for local infrastructure and service delivery; and
- Inform and support the preparation of the proposed planning framework including any recommended planning controls of DCP / Design Guideline.

To accommodate these requirements, this report will cover the following:

- Existing servicing strategies;
- Key constraints and opportunities; and
- Staging recommendations.

1.4 Site Context

The proposed Burwood North Precinct Masterplan site is primarily located in Burwood, with the north portion of the site being located in Canada Bay. It is bounded by the following roads:

- **North:** Broughton St, Burton St, Loftus St, Parramatta Rd ;
- **East:** Shaftesbury Rd;
- **South:** Wilga St, Burwood Rd, Comer St, Rowley St; and
- **West:** Grantham St.

The extents of the site are shown in the figure below:

Figure 1 Site Extents

The site is 12.9km west of the Sydney CBD and is located within both the Burwood Municipality LGA and the City of Canada Bay LGA.

2 Information Gathering

2.1 Gathering Existing Utility Information

The existing utilities assessment is primarily based on information received as a result of a Before You Dig Australia (BYDA) search. The BYDA request identified multiple services as outlined in the table below. The services information has been consolidated and displayed on numerous plans which can be found throughout the report.

The details shown on the plans should be considered as indicative only as the original BYDA information is not based on detailed survey data.

Table 1 Summary of Existing Services

Authority Name	Phone	Utility Type
Municipality of Burwood	(02) 4951 0899	Council/Shire
City of Canada Bay	(02) 9911 6339	Council/Shire
Ausgrid	(02) 4951 0899	Electricity
Jemena	1300 880 906	Gas
Broadband	(03) 5165 0073	Telecommunications
LBNCo	1300 797 027	Telecommunications
NBN	1800 626 329	Telecommunications
OptiComm	1300 743 462	Telecommunications
Optus	1800 505 777	Telecommunications
Telstra	1800 653 935	Telecommunications
TPG	1800 786 306	Telecommunications
Verizon	(02) 8210 3400	Telecommunications
Vocus	1300 88 99 88	Telecommunications
Sydney Water	13 20 92	Potable Water
Sydney Water	13 20 92	Sewer
Sydney Trains Central		Government Agency
TfNSW		State Government Agency

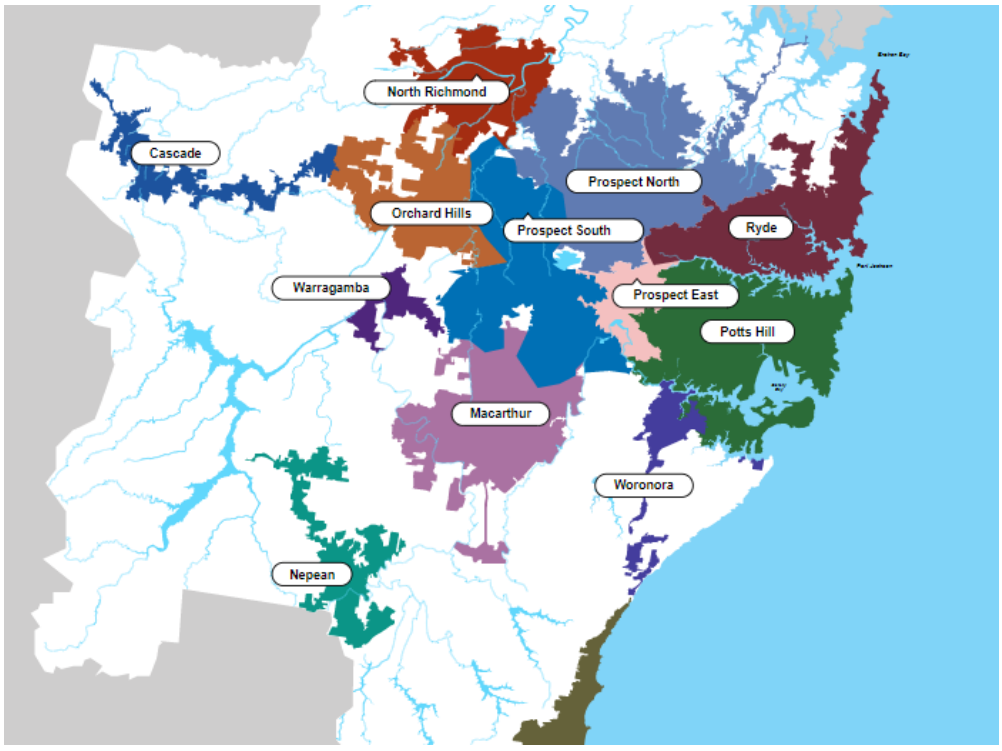
The plans provided from these BYDA reports were assessed as a component of our capacity review.

3 Potable Water

3.1 Background

Sydney Water supplies potable water to the proposed site from the Potts Hill Water Delivery System, as shown below in Figure 2.

Figure 2 Entire Sydney Water Network, Sydney Water



There are watermains within and along roads adjacent to the site boundary. A plan showing these mains and nearby pump stations are shown at the end of this section.

3.2 Existing On-Site Utility Infrastructure

The existing Sydney Water potable water network within and adjacent to the Burwood North Precinct has been identified based on BYDA records. These records indicate the presence of numerous potable water mains within and adjacent to the development boundary. These records also indicate the presence of multiple disconnected potable water mains. There is potential to repurpose the disconnected infrastructure. However, this will need to be coordinated with Sydney Water.

The key existing potable network infrastructure within and adjacent to the development site is outlined within the table below.

Table 2 Existing Potable Water Infrastructure

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Water	100	CICL	On east side of Broughton St
Sydney Water	Water	N/A	N/A	Disconnected. On east side of Broughton St, from Burton St.
Sydney Water	Water	100	CICL	On south side of Burton St, ending at Broughton St
Sydney Water	Water	125	PE	On south side of Burton St, from Broughton St to Loftus St
Sydney Water	Water	100	CICL	Across Burton St and continuing through to Lansdowne St
Sydney Water	Water	N/A	N/A	Disconnected. Across intersection of Burton St and Burwood Rd.
Sydney Water	Water	600	CICL	Along Parramatta Rd
Sydney Water	Water	150, 200	CICL	Along north side of Parramatta Rd, ending at Loftus St
Sydney Water	Water	200	CICL, DICL	Along south side of Parramatta Rd, ending at intersection with Shaftesbury Rd
Sydney Water	Water	N/A	N/A	Disconnected. Across intersection of Parramatta Rd and Shaftesbury Rd.
Sydney Water	Water	N/A	N/A	Disconnected. Along Parramatta Rd, at intersection with Shaftesbury Rd.
Sydney Water	Water	N/A	N/A	Disconnected. Along Shaftesbury Rd, at intersection with Parramatta Rd.
Sydney Water	Water	150	oPVC	Along north side of Comer St
Sydney Water	Water	N/A	N/A	Disconnected. Along and across Comer St.
Sydney Water	Water	100	oPVC	Along south side of Milton St
Sydney Water	Water	N/A	N/A	Disconnected. Along south side of Milton St
Sydney Water	Water	150	oPVC	Along north side of New St
Sydney Water	Water	N/A	N/A	Disconnected. Along New St.
Sydney Water	Water	100, 150	oPVC	Along south side of Meryla St
Sydney Water	Water	N/A	N/A	Disconnected. Along south side of Meryla St, between Esher St and Shaftesbury Rd.
Sydney Water	Water	100	DICL	Along north side of Wilga St

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Water	100, 200	mPVC	Along north side of Wilga St, from 17 Wilga St to Shaftesbury Rd
Sydney Water	Water	180	PE	Along west side of Burwood Rd, from Parramatta Rd
Sydney Water	Water	300	CICL	Across Parramatta Rd, at intersection of Burwood Rd and Parramatta Rd, and continues north along west side of Burwood Rd
Sydney Water	Water	125	PE	Along east side of Burwood Rd
Sydney Water	Water	N/A	N/A	Disconnected. Along Burwood Rd, adjacent to 25 Burwood Rd.
Sydney Water	Water	100	CICL, oPVC	Along west side of Burwood Rd, between Comer St and Parramatta Rd
Sydney Water	Water	150	CICL	Along east side of Burwood Rd, from 10-12 Burwood Rd and continuing south
Sydney Water	Water	200	uPVC	Along east side of Burwood Rd, from intersection with Parramatta Rd to 10-12 Burwood Rd
Sydney Water	Water	N/A	N/A	Disconnected. Starts near intersection with Parramatta Rd and ends at 10-12 Burwood Rd.
Sydney Water	Water	100	CICL	Along west side of Loftus St
Sydney Water	Water	150	CICL	Along west side of Grantham St
Sydney Water	Water	150	CICL	Along south side of Rowley St, ending at Park Rd
Sydney Water	Water	375	CICL	Along south side of Rowley St and continuing onto Park Rd
Sydney Water	Water	150	CICL	Across Parramatta Rd and continuing along west side of Park Rd
Sydney Water	Water	100	oPVC	Along west side of Britannia Ave, between Comer St and Parramatta Rd
Sydney Water	Water	N/A	N/A	Disconnected. Along Britannia Ave, at intersection with Comer St.
Sydney Water	Water	N/A	N/A	Disconnected. Along Britannia Ave, between Comer St and Parramatta Rd.
Sydney Water	Water	N/A	N/A	Disconnected. Along Neich Pde, between Comer St and Nicoll Lane.
Sydney Water	Water	100	CICL	Along east side of Neich Pde
Sydney Water	Water	N/A	N/A	Disconnected. Along Esher St, between Parramatta Rd and ending at Meryla Rd.
Sydney Water	Water	150	oPVC	Along west side of Esher St, from Parramatta Rd to Meryla Rd.
Sydney Water	Water	100	CICL	Along Archer St, from Meryla Rd to Milton St

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Water	N/A	N/A	Disconnected. Along Archer St, between Milton St and New St.
Sydney Water	Water	219	SCL, Conc Encased	Across Shaftesbury Rd, at intersection with Parramatta Rd
Sydney Water	Water	100	CICL	Along east side of Shaftesbury Rd
Sydney Water	Water	N/A	N/A	Disconnected. Along west side of Shaftesbury Rd, at intersection with Parramatta Rd.
Sydney Water	Water	200	mPVC Conc Encased	Along west side of Shaftesbury Rd, ending at intersection with Wilga St
Sydney Water	Water	100	CICL	Along west side of Shaftesbury Rd

The depths and positions of the existing reticulation mains are unknown. Further consultation with Sydney Water is required to determine the exact existing layout and potential impacts of the design on the existing network.

It is noted that the above discussion only considers Sydney Water infrastructure. There is the potential that private or other authority water infrastructure is present on the site however no records of this infrastructure have been made available for this study and have not been identified on the BYDA plans.

The existing water infrastructure is shown in the plan at the end of this section.

3.3 Demand Assessment

An assessment of the estimated net increase in potable water demand generated from the proposed development has been conducted to determine the required infrastructure upgrades.

Demand forecasting and profiles were developed for the study area, which were based on the proposed net lettable area (NLA) and number of proposed dwellings. An assumed conversion rate of 80% between the GFA and NLA was used.

Demand estimates for potable water have been calculated using the Design Criteria Guidelines Supplement for Single Reticulation System (Sydney Water, 2014) and is based on the maximum daily demand. A BASIX reduction of 40% has been included within these calculations and applied to the residential portion of this development.

A summary of the water demand unit rates adopted is presented in Table 3.

Table 3 Potable Water Demand Unit Rates

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential	A1	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	A2	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	A3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	A4 (MLC)	NO DWELLINGS PROPOSED			

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential	B1	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	B2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	B3	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	B4	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	B5 (MLC)	NO DWELLINGS PROPOSED			
Residential	B6 (OS)	NO DWELLINGS PROPOSED			
Residential	C1	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	C2	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	C3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	C4 (SCC)	NO DWELLINGS PROPOSED			
Residential	C5	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	D1	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	D2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	D3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	D4	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	D5	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	D6	NO DWELLINGS PROPOSED			
Residential	D7	NO DWELLINGS PROPOSED			
Residential	D8	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	D9	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	E1 (Metro)	NO DWELLINGS PROPOSED			
Residential	E2	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	E3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential	E4	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	E5	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	E6	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	E7 (OS)	NO DWELLINGS PROPOSED			
Residential	E8	NO DWELLINGS PROPOSED			
Residential	F1	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	F2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	F3	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	F4	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	F5	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	F6	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	G1	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	G2	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	G3 (OS)	NO DWELLINGS PROPOSED			
Residential	H1	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	H2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	I1	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	I2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	I3 (OS)	NO DWELLINGS PROPOSED			
Residential	I4	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	J1	NO DWELLINGS PROPOSED			
Residential	J2	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	J3	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Non-residential[1]	All Blocks	Suburban Commercial	Max Day Demand	kL/Nha/day	41

[1] It has been assumed that all non-residential spaces are comprised of only commercial spaces and are of the same type of commercial space.

3.4 Forecast Demand

An estimate of the future potable water demand for the development has been calculated based on the projected development yields.

The cumulative maximum daily demand (MDD) of the development has been calculated as 2894.8kL/Day. These results are provided in the table below.

Table 4 Estimated Potable Water Demand[1]

Development Type	Block Tag	Estimated Demand
Residential	A1	72.9
Residential	A2	57.3
Residential	A3	146.6
Residential	A4 (MLC)	0
Residential	B1	76.1
Residential	B2	114.6
Residential	B3	69.8
Residential	B4	70.3
Residential	B5 (MLC)	0
Residential	B6 (OS)	0
Residential	C1	56.2
Residential	C2	68.4
Residential	C3	213.8
Residential	C4 (SCC)	0
Residential	C5	122.8
Residential	D1	114.9
Residential	D2	178.1
Residential	D3	147.2
Residential	D4	93.4
Residential	D5	110.0
Residential	D6	0
Residential	D7	0
Residential	D8	73.3
Residential	D9	61.0
Residential	E1 (Metro)	0
Residential	E2	41.5
Residential	E3	169.2

Development Type	Block Tag	Estimated Demand
Residential	E4	218.8
Residential	E5	184.3
Residential	E6	135.9
Residential	E7 (OS)	0
Residential	E8	0
Residential	F1	118.7
Residential	F2	272.3
Residential	F3	122.0
Residential	F4	92.2
Residential	F5	87.7
Residential	F6	77.4
Residential	G1	198.1
Residential	G2	72.4
Residential	G3 (OS)	0
Residential	H1	359.7
Residential	H2	121.8
Residential	I1	92.4
Residential	I2	187.2
Residential	I3 (OS)	0
Residential	I4	51.3
Residential	J1	0
Residential	J2	118.8
Residential	J3	60.1
Non-Residential	A1	4.9
Non-Residential	A2	0
Non-Residential	A3	0
Non-Residential	A4 (MLC)	0
Non-Residential	B1	5.2
Non-Residential	B2	0.9
Non-Residential	B3	0
Non-Residential	B4	0
Non-Residential	B5 (MLC)	0
Non-Residential	B6 (OS)	0
Non-Residential	C1	3.1
Non-Residential	C2	0.4

Development Type	Block Tag	Estimated Demand
Non-Residential	C3	0
Non-Residential	C4 (SCC)	0
Non-Residential	C5	0
Non-Residential	D1	7.5
Non-Residential	D2	0.7
Non-Residential	D3	0.5
Non-Residential	D4	5.5
Non-Residential	D5	0.4
Non-Residential	D6	0
Non-Residential	D7	0
Non-Residential	D8	2.8
Non-Residential	D9	2.4
Non-Residential	E1 (Metro)	19.1
Non-Residential	E2	1.6
Non-Residential	E3	0.6
Non-Residential	E4	14.2
Non-Residential	E5	0.7
Non-Residential	E6	0.5
Non-Residential	E7 (OS)	0
Non-Residential	E8	7.3
Non-Residential	F1	10.0
Non-Residential	F2	17.7
Non-Residential	F3	10.2
Non-Residential	F4	0.3
Non-Residential	F5	0
Non-Residential	F6	0.2
Non-Residential	G1	0.7
Non-Residential	G2	0
Non-Residential	G3 (OS)	0
Non-Residential	H1	0
Non-Residential	H2	0
Non-Residential	I1	0
Non-Residential	I2	0
Non-Residential	I3 (OS)	0
Non-Residential	I4	0

Development Type	Block Tag	Estimated Demand
Non-Residential	J1	0
Non-Residential	J2	0.4
Non-Residential	J3	0.1
Total (kL / Day: Max Day Demand) - Non-Residential		118.0
Total (kL / Day: Max Day Demand) - Residential		4628.1
Total (kL / Day: Max Day Demand, incl. BASIX)		2894.8
Total (kL / Day: Max Day Demand, incl. BASIX, +15%)		3329.0
Total (kL / Day: Max Day Demand, incl. BASIX, -15%)		2460.6

[1] *Since the demand calculations do not include carparks, lifts, or impacts of ESD initiatives, a ±15% range is recommended.*

3.5 Coordination with Other Services

Coordination of the proposed potable water infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

In addition, Section 5.12.5.2 of the Water Services Association of Australia codes (WSA 03-2011-3.1, Sydney Water Edition – 2012) states that the clearance requirements for water mains from other service utility assets shall not be less than the minimum vertical and horizontal clearances as summarised in Figure 3.

Figure 3: Sydney Water Clearances between Water Mains and Underground Services (WSA 03-2011-3.1, Sydney Water Edition – 2012)

Utility (Existing or proposed service)	Minimum horizontal clearance mm		Minimum vertical clearance[1] mm
	New main size		
	≤DN 200	>DN 200	
Water mains[2] >DN 375	600	600	300
Water mains ≤DN 375	300[3]	600	150
Gas mains	300[3]	600	150
Telecommunication conduits and cables	300[3]	600	150
Electricity conduits and cables	500	1000	225[7]
Stormwater drains	300[3]	600	150[4]
Sewers – gravity	1000[5]/600	1000[5]/600	500[4]
Sewers – pressure and vacuum	600	600	300
Kerbs	150	600[6]	150 (where possible)
NOTES – see over			

NOTES:

1 Vertical clearances apply where water mains cross one another and other utility services, except in the case of sewers where a vertical separation shall always be maintained, even when the main and sewer are parallel. *The main should always be located above the sewer to minimise the possibility of backflow contamination in the event of a main break.*

2 *Water mains includes mains supplying drinking water and non-drinking water.*

3 *Clearances can be further reduced to 150 mm for distances up to 2 m where mains are to be laid past installations such as concrete bases for poles, pits and small structures, providing the structure will not be destabilised in the process. The clearance from timber poles should be at least 200 mm and preferably 300 mm..*

4 *Water mains should always cross over sewers and stormwater drains.* For cases where there is no alternative and the main must cross under the sewer, the design shall nominate an appropriate trenchless construction technique in accordance with Clause 5.5 or other water main construction and protection treatment, effectively joint-free in the vicinity of the sewer. Refer to Standard Drawings WAT–1211-V and WAT–1255-S.

5 Where a parallel sewer is at the minimum vertical clearance lower than the water main (500 mm), maintain a minimum horizontal clearance of 1000 mm. *This minimum horizontal clearance can be progressively reduced to 600 mm as the vertical clearance is increased to 750 mm.*

6 Clearance from kerbs shall be measured from the nearest point of the kerb. *For water mains ≤DN 375 clearances from kerbs can be progressively reduced until the minimum of 150 mm is reached for mains ≤DN 200.*

7 An additional clearance from high voltage electrical installations should be maintained above the conduits or cables to allow for a protective barrier and marking to be provided.

3.6 Approvals and Next Steps

The potable water strategy is to be confirmed through hydraulic modelling, with separate reports outlining the modelling outcomes to be submitted to Sydney Water. Further discussion is also to be undertaken with Sydney Water to confirm lead-in infrastructure requirements and pressures of existing potable water services. The key next steps in progressing the delivery of potable water infrastructure through detailed design, including the formal approval process for Sydney Water infrastructure, consists of the following:

1. Undertake hydraulic modelling to confirm the extent of any lead-in infrastructure upgrades required – Post Rezoning/Development Application;
2. Undertake site investigations to confirm the layout and extent of existing on-site infrastructure (including non-Sydney Water infrastructure) – Post Rezoning/Development Application;
3. Develop an overall water masterplan for the site including staging considerations and agree this with Sydney Water – As a part of Development Applications;
4. Develop diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted - As a part of Development Applications.
5. Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor) – As a part of detailed design;
6. Submit application/s for individual detailed design packages to SWC with drawing of proposed works in stages, Section 73– As a part of detailed design;
7. SWC to issue of Notice of Requirements (NOR) with their requirements for water main layout, sizing and funding matters confirmed– As a part of detailed design; and
8. Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval – As a part of detailed design.

It is noted that the above is for delivery of the water network through the street network. Depending on the strata arrangement, individual buildings will still need to make separate applications for each connection.

Utilities Report

4 Sewer

4.1 Background

Sydney Water wastewater facilities service the Burwood North Precinct. Wastewater from properties located between Grantham St and Burwood Rd gravitate towards the 600 x 900 brick trunk main on Neich Parade. From here, the wastewater is then discharged into the 1143 x 1447 brick trunk main located at the intersection of George St and Elsie St. Wastewater from properties in the other parts of the site gravitate towards Sewage Pump Station 22 (SP0022), which is located at 1C Gipps St. The wastewater from here is then pumped in a DN375 CICL pressure main on Lucas Rd, which then joins up to the 1143 x 1447 brick trunk main on Lucas Rd. The wastewater from the entire site is then discharged to the Western Outfall Main Sewer through the Cooks River Sewage Aqueduct, Wolli Creek Heritage Aqueduct, and Arncliffe Sewerage Aqueduct. It then arrives at the Malabar Wastewater Treatment Plant, which is of a primary treatment level, has a discharge volume limit of 1199 ML/day, and discharges to a deep-water ocean outfall located 3.6 km from the shoreline.

There are sewer mains within and along roads adjacent to the site boundary. A plan showing these mains and nearby pump stations are shown at the end of this section.

4.2 Existing On-Site Utility Infrastructure

The existing Sydney Water wastewater network within and adjacent to the Burwood North Precinct has been identified based on BYDA records. The key existing sewer infrastructure within and adjacent to the development site is outlined within the table below.

Table 5 Existing Sewer Infrastructure

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Sewer	225, 400	SGW, VC, PVC	Traverses through various properties, from 19 Broughton St, crosses Burwood Rd, and ends across Burton St
Sydney Water	Sewer	150	PVC	At 20-24 Burton St
Sydney Water	Sewer	225	VC	From Burwood Rd, adjacent to 18 Burwood Rd, and ends on Neichs Lane
Sydney Water	Sewer	150	VC	Traverses through various properties, from 20-24 Burton St and ends at Loftus St, adjacent to 1 Loftus St
Sydney Water	Sewer	150	SGW, VC	Traverses through various properties, from 9 Burwood Rd and continues along west side of Loftus St
Sydney Water	Sewer	150	VC, EW	Along west side of Neichs Lane, between 1 and 11 Neichs Lane
Sydney Water	Sewer	150, 225	PVC, SGW	From Parramatta Rd and entering 29-45 Parramatta Rd
Sydney Water	Sewer	225	SGW, VC	From 2 Parramatta Rd and continuing onto north side of Parramatta Rd and ending at intersection with Neichs Lane
Sydney Water	Sewer	400	VC	From Neich Pde, at intersection with Emanuel Lane, and continuing onto Emanuel Lane.

Owner	HLFC	Size (DN)	Material	Location
				Traverses through 1 Parramatta Rd, crosses Parramatta Rd, and continues onto Burwood Rd.
Sydney Water	Sewer	660x990	Brick	Along Parramatta Rd and continues onto Neich Pde
Sydney Water	Sewer	225	PVC Conc Encased, SGW	From 17 Neich Pde and crosses Neich Pde
Sydney Water	Sewer	450	SGW	Along Neich Pde, between 12-22 Neich Pde
Sydney Water	Sewer	150	SGW	From 20 Britannia Ave, through 23 Neich Pde, and ends on Neich Pde, near intersection with Milton Lane
Sydney Water	Sewer	150, 225	SGW	Traverses through properties, from 17 Neich Pde to 6 Britannia Ave
Sydney Water	Sewer	225, 300	VC	From MLC School and continuing north to 8 Grantham St. Crosses Park Rd and traverses east, through various properties. Crosses Britannia Ave, through various properties, and ends at Neich Pde.
Sydney Water	Sewer	225	VC	At 7 Neich Pde
Sydney Water	Sewer	225	SGW	From 3 Neich Pde and ending at 1A Britannia Ave
Sydney Water	Sewer	125	SGW	From 6 Park Rd to 386 Parramatta Rd
Sydney Water	Sewer	225	VC	From 4 Park Rd and ending at 388 Parramatta Rd
Sydney Water	Sewer	150	EW	Along Park Rd, adjacent to 4 Park Rd
Sydney Water	Sewer	225	VC	Traverses through properties on Britannia Rd, from north of Burwood Park to 1A Britannia Ave
Sydney Water	Sewer	150, 225	SGW, VC	Along Riley Lane, from intersection with Nicoll Lane to 348 Parramatta Rd
Sydney Water	Sewer	N/A	N/A	Disconnected. At 25-25A Burwood Rd.
Sydney Water	Sewer	N/A	N/A	Disconnected. At 35 Burwood Rd.
Sydney Water	Sewer	150	VC	Along Nicoll Lane
Sydney Water	Sewer	150	DICL, PVC Conc Encased	At 46A-46B Burwood Rd
Sydney Water	Sewer	150, 225, 300, 400	DICL,VC, SGW, VC	Along Milton Lane and Milton St, from intersection of Riley and Milton Lane. Crosses properties along Shaftesbury Rd and continues northeast.
Sydney Water	Sewer	150	VC, DICL Conc Encased, SGW	Along Esher Lane, from intersection with Burwood Rd, and continuing along Webbs Lane
Sydney Water	Sewer	N/A	N/A	Disconnected. At 322-324 Parramatta Rd.
Sydney Water	Sewer	150	VC, SGW	Traverses through properties along Parramatta Rd. From 322-324 Parramatta Rd and continues east.

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Sewer	150	VC	Traverses through properties along Shaftesbury Rd, from 298 Parramatta Rd to 5A Shaftesbury Rd.
Sydney Water	Sewer	225	VC, CICL	Along north side of Parramatta Rd and crosses Parramatta Rd. Traverses through 298 Parramatta Rd and ends at 302-312 Parramatta Rd.
Sydney Water	Sewer	150	SGW	At 9 Milton St
Sydney Water	Sewer	150, 225	VC, SGW	Traverses through properties on Esher St and Milton St. Crosses Burwood Rd and ends at 282 Parramatta Rd.
Sydney Water	Sewer	300	SGW	From Milton St and traverses through multiple properties. Ends at 7A Burwood Rd.
Sydney Water	Sewer	225	SGW, VC	From 1 New St and traverses north. Ends at 11 Milton St.
Sydney Water	Sewer	225	VC	From 14 Milton St to 11 New St
Sydney Water	Sewer	150, 225, 300	VC, SGW	From 31 Esher St and crosses Esher St. Continues onto New St and traverses through properties along New St. Ends at 13 Archer St,
Sydney Water	Sewer	225	PVC, VC	Along Wilga St, ending at 11-15 Wilga St
Sydney Water	Sewer	150	VC	Traverses through properties along Wilga St. From 17 to 33-39 Wilga St.
Sydney Water	Sewer	225	VC, SGW	Along Webbs Lane and across Meryla St. Traverses through 35 Meryla St and continues north. Ends at 8 New St.
Sydney Water	Sewer	225	VC	At 33 Archer St
Sydney Water	Sewer	150	VC	From 41 Archer St to 8 New St
Sydney Water	Sewer	400	VC	From 17 New St, continues north, and ends at Milton St, adjacent to 9 Milton St
Sydney Water	Sewer	225	VC	From 12 New St and continues along New St. Traverses along Archer St and onto Milton St. Ends near 1 Milton St.
Sydney Water	Sewer	150, 225	VC, SGW	From Webbs St and continues east along New St. Traverses through properties along New St and ends at 13 Archer St.
Sydney Water	Sewer	300, 225	VC	Along Esher St, adjacent to 33 Esher St. Traverses onto properties along New St and ends at 17 New St.
Sydney Water	Sewer	150	VC, PVC	From 38 Archer St and continues north. Ends at Milton St.
Sydney Water	Sewer	150	VC	At 37 Shaftesbury Rd and 34 Archer St
Sydney Water	Sewer	150	SGW	At 33 Shaftesbury Rd and 30 Archer St
Sydney Water	Sewer	150	VC	At 31 and 31A Shaftesbury Rd and 20 and 24 Archer St

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Sewer	150	VC	Traverses through properties along Meryla St, from 27 Meryla St. Continues east and crosses Archer St and Shaftesbury Rd. Continues east.
Sydney Water	Sewer	150, 225	VC, PVC	From 3 Wilga St and traverses west through various properties. Then continues north, across Meryla St and onto Esher St. Ends on Esher St, near 31A Meryla St.
Sydney Water	Sewer	150	VC	From Burwood Park and along Comer St
Sydney Water	Sewer	N/A	N/A	Disconnected. Across and along Burton St. Continues through Concord Oval.
Sydney Water	Sewer	225	VC	Along west side of Shaftesbury Rd and continues through properties located on Eurella St
Sydney Water	Sewer	225	VC	Along Rowley St

Similar to the potable water network, the exact depths and positions of the existing reticulation mains are unknown.

The existing wastewater infrastructure is shown in the plan at the end of this section. It is important to note that wastewater is a gravity service. Thus, for the proposed servicing design to work hydraulically, the inverts of the existing and proposed services must be checked to confirm that the falls are achievable. This should be done as part of design development.

Onsite utility investigations and service searches are recommended post rezoning as a part of any future detailed development application, including investigation for any private sewer mains. Further consultation is also required with Sydney Water to consider any lead-in infrastructure requirements.

The existing wastewater infrastructure is shown in the plan at the end of this section.

4.3 Demand Assessment

An assessment of the net increase in sewer loading resulting from the proposed development has been undertaken to assist in determining the required infrastructure upgrades. Servicing forecasting and profiles have been based on the gross floor area (GFA).

The design criteria used to forecast future sewer loading are taken from the Sydney Water Area Planning Design Criteria Guide: WSA 02-2002-3.0 (Sewer Code of Australia) and is expressed as an equivalent population (EP) for a particular land use. These are summarised below.

Table 6 Sewer Design Loading Criteria

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential[1]	All Blocks	Medium density (group housing)	Average Dry Weather Flow	EP/ha (gross)	120
Commercial[2]	All Blocks	Local commercial	Average Dry Weather Flow	EP/ha (gross)	75

[1] It has been assumed that all residential spaces are of the same housing type.

[2] It has been assumed that all non-residential spaces are comprised of only commercial spaces and are of the same type of commercial space.

The average dry weather flow (ADWF) per equivalent population (EP) has been taken as 150 L/day or 0.0017L/s (ADWF(L/s)) = 0.0017 * EP. A BASIX reduction of 40% has been included in the sewer loading calculations and applied to the residential portion of this development.

4.4 Forecast Demand

An estimate of the wastewater demand for the development has been calculated based on the development yields. The estimated wastewater demand is 6.2L/s. The results are shown in the tables below.

Table 7 Estimated Wastewater Demand[1]

Development Type	Block Tag	Estimated Demand
Residential	A1	72.2
Residential	A2	45.8
Residential	A3	197.8
Residential	A4 (MLC)	0
Residential	B1	75.4
Residential	B2	154.6
Residential	B3	69.2
Residential	B4	56.2
Residential	B5 (MLC)	0
Residential	B6 (OS)	0
Residential	C1	45.0
Residential	C2	67.7
Residential	C3	288.6
Residential	C4 (SCC)	0
Residential	C5	150.8
Residential	D1	155.1
Residential	D2	240.4
Residential	D3	198.7
Residential	D4	114.6
Residential	D5	135.0
Residential	D6	0
Residential	D7	0
Residential	D8	58.7
Residential	D9	48.8
Residential	E1 (Metro)	0
Residential	E2	33.2
Residential	E3	228.4

Development Type	Block Tag	Estimated Demand
Residential	E4	295.4
Residential	E5	248.8
Residential	E6	183.4
Residential	E7 (OS)	0
Residential	E8	0
Residential	F1	145.6
Residential	F2	367.6
Residential	F3	149.8
Residential	F4	113.2
Residential	F5	86.9
Residential	F6	76.7
Residential	G1	267.4
Residential	G2	57.9
Residential	G3 (OS)	0
Residential	H1	485.6
Residential	H2	164.4
Residential	I1	91.6
Residential	I2	252.7
Residential	I3 (OS)	0
Residential	I4	41.0
Residential	J1	0
Residential	J2	145.8
Residential	J3	48.1
Non-Residential	A1	11.3
Non-Residential	A2	0
Non-Residential	A3	0
Non-Residential	A4 (MLC)	0
Non-Residential	B1	11.8
Non-Residential	B2	2.0
Non-Residential	B3	0
Non-Residential	B4	0
Non-Residential	B5 (MLC)	0
Non-Residential	B6 (OS)	0
Non-Residential	C1	7.0
Non-Residential	C2	0.8

Development Type	Block Tag	Estimated Demand
Non-Residential	C3	0
Non-Residential	C4 (SCC)	0
Non-Residential	C5	0.0
Non-Residential	D1	17.1
Non-Residential	D2	1.5
Non-Residential	D3	1.3
Non-Residential	D4	12.6
Non-Residential	D5	0.9
Non-Residential	D6	0
Non-Residential	D7	0
Non-Residential	D8	6.5
Non-Residential	D9	5.4
Non-Residential	E1 (Metro)	43.7
Non-Residential	E2	3.7
Non-Residential	E3	1.4
Non-Residential	E4	32.6
Non-Residential	E5	1.6
Non-Residential	E6	1.2
Non-Residential	E7 (OS)	0
Non-Residential	E8	16.6
Non-Residential	F1	22.8
Non-Residential	F2	40.5
Non-Residential	F3	23.4
Non-Residential	F4	0.7
Non-Residential	F5	0
Non-Residential	F6	0.5
Non-Residential	G1	1.7
Non-Residential	G2	0
Non-Residential	G3 (OS)	0
Non-Residential	H1	0
Non-Residential	H2	0
Non-Residential	I1	0
Non-Residential	I2	0
Non-Residential	I3 (OS)	0
Non-Residential	I4	0

Development Type	Block Tag	Estimated Demand
Non-Residential	J1	0
Non-Residential	J2	0.9
Non-Residential	J3	0.3
Total (Equivalent Population) - Non-Residential		269.7
Total (Equivalent Population) - Residential		5658.0
Total (L/s: Average Dry Weather Flow) - Non-Residential		0.5
Total (L/s: Average Dry Weather Flow) - Residential		9.6
Total (L/s: Average Dry Weather Flow) - including BASIX		6.2
Total (L/s: Average Dry Weather Flow) - including BASIX (+15%)		7.2
Total (L/s: Average Dry Weather Flow) - including BASIX (-15%)		5.3

[1] *Since the demand calculations do not include carparks, lifts, or impacts of ESD initiatives, a ±15% range is recommended.*

4.5 Coordination with Other Services

Coordination of Sewer Infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

In addition, Section 4.4.5.2 of Water Services Association of Australia codes (WSA 02-2002-2.2, Sydney Water Edition – Version 3) states the clearance requirements for sewers in Table 4.2, as summarised below in Figure 5.

Figure 5: Sydney Water Clearance between Sewers and Other Underground Services (WSA 02-2002-2.2, Sydney Water Edition – Version 3)

Utility (Existing service)	Minimum horizontal clearance mm		Minimum vertical clearance[1] mm
	New sewer size		
	≤DN 300	>DN 300	
Sewers ≤DN 300	300	600	150[2]/300
Sewers >DN 300	600	600	300
Gas mains	300[3]	600	150[2]/300
Telecommunication conduits and cables	300[3]	600	150[2]/300
Electricity conduits and cables	500	1000	225[2]/300
Drains[7]	300[3]	600	150[2 and 4]/300[4]
Water mains	1000[5]/600	1000[5]/600	500[4]
Kerbs	150	600[6]	150 (where practicable)

NOTES:

1 Vertical clearances apply when sewers cross one another, except in the case of water mains when a vertical separation shall always be maintained, even when the sewer and main are parallel. *The sewer should always be located below the main to minimise the possibility of backflow contamination in the event of a main break.*

2 A minimum vertical clearance of 300 mm applies if the size of either the existing service or proposed sewer is >DN 300.

3 *Clearances can be further reduced to 150 mm for distances up to 2 m when passing installations such as poles, pits and small structures, providing the structure is not destabilised in the process.*

4 *Sewers should always cross under water mains and stormwater drains.* If this requirement cannot be met, consult Sydney Water in respect of alternatives such as adjusting the water main or stormwater drain. Where a sewer crosses a water main at or close to 90 degrees, the vertical clearance may be reduced to not less than 200 mm provided that the sewer is concrete encased and a 50 mm compressible material is placed over the encasement. The encasement shall not have any joints within 1000 mm either side of the water main and shall conform to Drawing SEW–1205-V.

5 When the sewer is at the minimum vertical clearance below the water main (500 mm) maintain a minimum horizontal clearance of 1000 mm. *This minimum horizontal clearance can be progressively reduced to 600 mm as the vertical clearance increases to 750 mm.*

6 Clearance from kerbs shall be measured from the nearest point of the kerb.

7 A sewer to be constructed under an existing or proposed stormwater pipe or channel ≥DN 375 shall be concrete encased. The concrete encasement shall extend at least one metre each side of the stormwater pipe or channel. Clearances between the sewer and other services shall be measured from the outer surface of the concrete encasement.

4.6 Approvals and Next Steps

The sewer strategy is to be confirmed through hydraulic modelling, with separate reports outlining the modelling outcomes to be submitted to Sydney Water. Further discussion is also to be undertaken with Sydney Water to confirm lead-in infrastructure requirements and to check inverts of gravity pipes to ensure falls are achievable.

The key next steps in progressing the delivery of sewer infrastructure through design development, including the formal approval process for Sydney Water infrastructure, consists of the following:

1. Undertake hydraulic modelling to confirm extent of any lead-in infrastructure upgrades required – Post Rezoning/Development Application;
2. Undertake site investigations to confirm the layout and extent of existing on-site infrastructure (including non-Sydney Water infrastructure) – Post Rezoning/Development Application;
3. Develop an overall wastewater masterplan for the site including staging considerations and agree these with Sydney Water. Being a gravity service, this will need to include consideration of the depth of the existing sewer infrastructure to be maintained and/or connected to (based on manhole survey) and proposed grading of the site - As a part of Development Applications;
4. Develop a diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted - As a part of Development Applications;
5. Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor) – As a part of detailed design;
6. Submit application/s for individual detailed design packages to SWC with drawing of proposed works in stages, Section 73 – As a part of detailed design;

7. SWC to issue of Notice of Requirements (NOR) with their requirements for water main layout, sizing and funding matters confirmed – As a part of detailed design; and
8. Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval – As a part of detailed design.

It is noted that the above is for delivery of the wastewater network through the street network. Depending on the strata arrangement, individual buildings will still need to make separate applications for each connection.

Utilities Report

5 Electricity

5.1 Background

Electrical servicing to the Burwood North Precinct is provided by Ausgrid. The Ausgrid network area is shown below.

Figure 7 Ausgrid Energy Network Area (Source: Ausgrid, 2022)

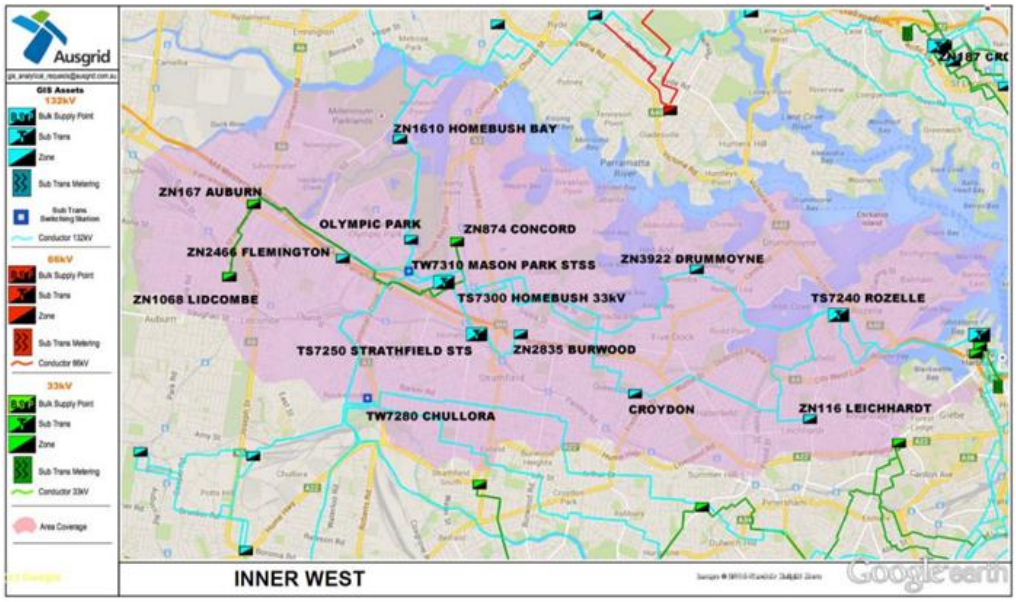
A plan showing these mains and nearby zone substations are shown at the end of this section.

5.2 Existing On-Site Utility Infrastructure

The entire site is serviced by Burwood Zone Substation No. 2835, which is a 132 kV zone substation located at 26-32 Ada St, Concord. If there is insufficient capacity for this development at Burwood Zone Substation, it is recommended that connections be made to either Drummoyne Zone Substation No. 3922 or Concord Zone Substation No.874. It should be noted that connections to these substations may require interconnectors.

The locations of all substations are shown in the figure below.

Figure 8 Locations of Ausgrid Substations (Source: Ausgrid)



The existing electrical infrastructure on the site has been identified based on BYDA records. The existing electrical assets within and adjacent to the site boundary are detailed below.

Table 8 Existing Electrical Infrastructure

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	From Rowley St and continuing onto Grantham St. Ends at 28-32 Grantham St.
Ausgrid	HV Cable (HV, In Service)	From Rowley St and continuing onto Grantham St. Ends at 15-17 Grantham St.
Ausgrid	HV Cable (HV, In Service)	Along and across Grantham St. From 15-17 Grantham St and ends at 28-32 Grantham St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Rowley St and continuing onto Grantham St. Ends at 15-17 Grantham St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Rowley St and continuing onto Grantham St. Ends at 15-17 Grantham St.
Ausgrid	LV Cable (Service, In Service)	At 21-29 Grantham St
Ausgrid	LV Cable (Service, In Service)	At 27 Grantham St
Ausgrid	LV Cable (Mains, In Service)	At 15-17 Grantham St
Ausgrid	LV Cable (Mains, In Service)	At 15-17 Grantham St
Ausgrid	LV Cable (Mains, Out of Service)	Along and across Grantham St. From 15-17 Grantham St and ending adjacent to 28-32 Grantham St.
Ausgrid	LV Cable (Mains, Out of Service)	Along and across Grantham St. From 15-17 Grantham St and ending adjacent to 28-32 Grantham St.

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Grantham St. From 28-32 Grantham St.
Ausgrid	LV Cable (Mains, In Service, partially Out of Service)	Along and across Grantham St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Grantham St, adjacent to 28-32 Grantham St
Ausgrid	LV Cable (Mains, In Service)	Along Grantham St, adjacent to 28-32 Grantham St
Ausgrid	LV Cable (Mains, In Service)	Along Grantham St, from 24 to 28-32 Grantham St.
Ausgrid	LV Cable (Service, In Service)	At 18 Grantham St
Ausgrid	LV Cable (Service, In Service)	At 8 Grantham St
Ausgrid	LV Cable (Service, In Service)	At 6 Grantham St and 408 Paramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 4 Rowley St
Ausgrid	LV Cable (Service, In Service)	At 4A Rowley St
Ausgrid	LV Cable (Service, In Service)	Along Rowley St, adjacent to 4 Rowley St
Ausgrid	LV Cable (Service, In Service)	At 388-390 Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Park Rd, from Parramatta Rd to 24 Park Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Park Rd, from Parramatta Rd to 18 Park Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Park Rd, from 18 to 24 Park Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, at intersection with Park Rd
Ausgrid	LV Cable (Service, In Service)	At 3 Park Rd
Ausgrid	LV Cable (Service, In Service)	At 5 Park Rd
Ausgrid	LV Cable (Mains, In Service)	At 22-24 Park Rd
Ausgrid	LV Cable (Mains, In Service)	Along Park Rd, between 22-24 Park Rd
Ausgrid	LV Cable (Mains, In Service)	Along Park Rd, between 24 Park Rd to 28-36 Park Rd
Ausgrid	LV Cable (Mains, In Service)	At 28-36 Park Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Park Rd, between 26 Park Rd to 28-36 Park Rd to
Ausgrid	LV Cable (Service, In Service)	At 360-370 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 12 Britannia Ave
Ausgrid	LV Cable (Service, In Service)	At 19 Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 27 Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 27A Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 29 Neich Pde
Ausgrid	HV Cable (HV, In Service)	From Parramatta Rd and continues along and across Neich Pde. Continues along Milton Ln and Riley Ln. Ends at 7A Burwood Rd.
Ausgrid	Auxiliary Cable (In Service)	From Parramatta Rd and continues along Neich Pde. Ends at Comer St.
Ausgrid	HV Cable (HV, In Service)	From Comer St and continues along and across Neich Pde. Continues along Nicoll Ln and Riley Ln. Ends at 27-29 Burwood Rd.
Ausgrid	HV Cable (HV, In Service)	From 7A Burwood Rd and along Riley Ln and Milton Ln. Continues along Niech Pde and Nicoll Ln and Riley Ln. Ends at 27-29 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Comer St, at intersection with Niech Pde
Ausgrid	HV Cable (HV, In Service)	Along north side of Comer St
Ausgrid	LV Cable (Mains, In Service)	At 7A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, adjacent to 7A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 7A Burwood Rd to 11-13 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 7A Burwood Rd to 24 Neich Pde
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 7A Burwood Rd to Milton Ln
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 9 Burwood Rd to 24 Neich Pde
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, from 30 Neich Pde. Ending on Riley Ln, at 24 Neich Pde.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Niech Pde, from 25 Neich Pde, and continuing along Milton Ln.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Niech Pde, from 25 Neich Pde, and continuing along Milton Ln.

OWNER	ASSET TYPE	LOCATION
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Niech Pde, from 18 Neich Pde, and ending at intersection of Milton Ln and Riley Ln.
Ausgrid	LV Cable (Mains, In Service, partially Out of Service)	From 24 Neich Pde and continuing onto Milton Ln and ending on Milton St.
Ausgrid	LV Cable (Mains, In Service)	From 24 Neich Pde and continuing onto Milton Ln and ending on Burwood Rd, adjacent to 11-13 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service, partially Out of Service)	From 24 Neich Pde and continuing onto Milton Ln
Ausgrid	LV Cable (Mains, Out of Service)	From intersection of Milton Ln and Riley Ln. Ending at intersection of Burwood Rd and Milton Ln
Ausgrid	LV Cable (Service, In Service)	On Milton Ln, adjacent to 11-13 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 40 Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Neich Pde and continuing onto Nicoll Ln. Continues onto Riley Ln and ends at 33 Burwood Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Neich Pde and continuing onto Nicoll Ln. Continues onto Riley Ln and ends at 33 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde and continues onto Nicoll Ln. Continues onto Riley Ln and ends at 27-29 Burwood Rd.
Ausgrid	HV Cable (HV, In Service)	Along Riley Ln, from 27-29 to 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 27-29 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, between 27-29 to 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, from 27-29 Burwood Rd. Continues along Nicoll Ln and ends at intersection with Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	At 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, from 33 Burwood Rd and ends at intersection with Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Milton Ln, from intersection with Riley Ln to intersection with Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	At 35 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Milton Ln, from 35A Burwood Rd to 3-13 Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 35A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Milton Ln, from intersection with Riley Ln to intersection with Burwood Rd.

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 27-29 Burwood Rd. Continues along Burwood Rd. Ends at 60 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	At 60 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 2A Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 10 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 10 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 348-352 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 348-352 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 7A Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd and at 15 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 21 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 25 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	From Burwood Park onto Burwood Rd
Ausgrid	LV Cable (Service, In Service)	On Burwood Rd, adjacent to Burwood Park
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	In Burwood Park and onto Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to Burwood Park
Ausgrid	LV Cable (Service, In Service)	At 88 Burwood Park
Ausgrid	LV Cable (Service, In Service)	At 46 Burton St
Ausgrid	LV Cable (Service, In Service)	On Broughton St, at intersection with Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 49 Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	At 29-45 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, near Neichs Ln
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 4 Burwood Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, adjacent to 1 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 24 Burton St
Ausgrid	LV Cable (Service, In Service)	Along Burton St, adjacent to 26 Burton St
Ausgrid	LV Cable (Service, In Service)	At 2-4 Burton Rd
Ausgrid	LV Cable (Service, In Service)	At 13 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 3-5 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 312-314 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 320-324 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 8 Esher St
Ausgrid	LV Cable (Service, In Service)	At 25 Milton St
Ausgrid	LV Cable (Service, In Service)	At 12 Milton St
Ausgrid	LV Cable (Service, In Service)	At 25 Esher St
Ausgrid	LV Cable (Service, In Service)	At 31 Esher St
Ausgrid	LV Cable (Service, In Service)	At 39 Esher St
Ausgrid	LV Cable (Service, In Service)	At 28 Esher St
Ausgrid	LV Cable (Service, In Service)	At 38-40 Meryla St
Ausgrid	LV Cable (Service, In Service)	Along Meryla St, adjacent to 36 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 34 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 6-8 Meryla St
Ausgrid	LV Cable (Service, In Service)	Along Meryla St, adjacent to 11 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 19 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 25 Meryla St

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Service, In Service)	At 17 New St
Ausgrid	LV Cable (Service, In Service)	At 19 New St
Ausgrid	LV Cable (Service, In Service)	At 32 Archer St
Ausgrid	LV Cable (Service, In Service)	At 31 Shaftesbury St
Ausgrid	LV Cable (Service, In Service)	At 15 Shaftesbury St
Ausgrid	HV Cable (HV, Out of Service)	Along Milton Ln and continuing onto Milton St
Ausgrid	HV Cable (HV, Out of Service)	Along Milton Ln and continuing onto Milton St
Ausgrid	LV Cable (Mains, In Service)	At 28-30A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Ln. From 28-30A to 18-22 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Ln. From 28-30A to intersection with Milton St.
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Ln. From 28-30A and onto Milton St. Ends adjacent to 19 Esher St.
Ausgrid	LV Cable (Service, In Service)	At 18-22 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, from 10-12 Burwood Rd to 16-22 Burwood Rd.
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Auxiliary Cable (In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Auxiliary Cable (In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Auxiliary Cable (Out of Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from 7B Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Burwood Rd, from 11-13h Burwood Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Burwood Rd, from intersection with Milton Ln to 21 Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from 25 to 31 Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	At 27-29 Burwood Rd
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, between Park Rd and Niech Pde
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, between Park Rd and Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, between Park Rd and Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, between Park Rd and Neich Pde
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, adjacent to 374 Parramatta Rd
Ausgrid	LV Cable (Street Lighting, In Service)	Along Burton St and continues onto Loftus St
Ausgrid	LV Cable (Street Lighting, In Service)	Across and along Loftus St. Ends on Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Burton St. Continues along Loftus St and onto Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along and across Loftus St.
Ausgrid	LV Cable (Mains, In Service)	Along Loftus St and ends on Parramatta Rd.
Ausgrid	LV Cable (Street Lighting, In Service)	Across Loftus St, adjacent to 2 Loftus St.
Ausgrid	LV Cable (Mains, In Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	LV Cable (Mains, In Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	LV Cable (Mains, Out of Service)	At 8 Loftus St.
Ausgrid	HV Cable (HV, Out of Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	HV Cable (HV, Out of Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	Along Burton St and Broughton St. Ends at 1E Broughton St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	HV Cable (HV, Out of Service)	Along Broughton St. Ends adjacent to 1E Broughton St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Broughton St. Ends adjacent to 1E Broughton St.
Ausgrid	HV Cable (HV, In Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	HV Cable (HV, In Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	Auxiliary Cable (In Service)	Along Broughton St. Ends adjacent to 1 Broughton St.
Ausgrid	Auxiliary Cable (In Service)	Along Broughton St and continues along Parramatta Rd.
Ausgrid	HV Cable (HV, In Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	HV Cable (HV, In Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	HV Cable (HV, In Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	Auxiliary Cable (In Service)	Along and across Broughton St, from Burton St.
Ausgrid	Auxiliary Cable (Out of Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	Auxiliary Cable (Out of Service)	Along and across Broughton St, from Burton St. Ends at intersection with Parramatta Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	On Broughton St and at 1E Broughton St.
Ausgrid	LV Cable (Mains, In Service)	On Broughton St and at 1E Broughton St.
Ausgrid	LV Cable (Mains, In Service)	Along Broughton St. From 1E Broughton St to 59 Parramatta Rd.
Ausgrid	HV Cable (HV, Out of Service)	Along north side of Burton St
Ausgrid	LV Cable (Mains, In Service)	Along west side of Broughton St and continues onto Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	Across Broughton St, at intersection with parramatta Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Street Lighting, In Service)	Along Parramatta Rd, starting at intersection with Broughton St
Ausgrid	LV Cable (Mains, In Service)	Across Parramatta Rd, adjacent to 56-60 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, at intersection with Park Rd
Ausgrid	Auxiliary Cable (In Service)	Across and along Burton St. Ends at 26 Burton St.
Ausgrid	Auxiliary Cable (In Service)	At 26 Burton St.
Ausgrid	Auxiliary Cable (In Service)	At 26 Burton St.
Ausgrid	Auxiliary Cable (In Service)	Along Burwood Rd, from 26 Burton St.
Ausgrid	HV Cable (HV, In Service)	Along Parramatta Rd and Neich Pde
Ausgrid	HV Cable (HV, In Service)	Along Parramatta Rd
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, ending at Neich Pde
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, ending at Neich Pde
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, and continuing along Neich Pde
Ausgrid	Auxiliary Cable (In Service)	Along Parramatta Rd, and continuing along Neich Pde
Ausgrid	Auxiliary Cable (In Service)	Along Parramatta Rd, ending at Broughton St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, ending at Broughton St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, ending on Broughton St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, ending at Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd and crossing Parramatta Rd, at Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Broughton St, adjacent to 59 Broughton St, and continues along Parramatta Rd
Ausgrid	H Cable (HV, Out of Service)	At corner of 59 Parramatta Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Broughton St, adjacent to 59 Broughton St, and continues along Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, adjacent to 49 Parramatta Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, between 29-45 and 49 Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, between 29-45 and 49 Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, adjacent to 29-45 Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, adjacent to 2 Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, between Loftus Rd and 7-9 Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, adjacent to 1 Loftus St
Ausgrid	LV Cable (Mains, In Service)	Across Parramatta Rd and at 316 Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	From 316 Parramatta Rd and continuing along Parramatta Rd. Ends at Loftus St.
Ausgrid	LV Cable (Street lighting, In Service)	Along Parramatta Rd, from Loftus St.
Ausgrid	Auxiliary Cable (Out of Service)	Along Parramatta Rd, from Loftus St and continuing along Shaftesbury Rd.
Ausgrid	Auxiliary Cable (Out of Service)	Along Parramatta Rd, from Loftus St and continuing along Shaftesbury Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, from intersection with Loftus St
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, from intersection with Loftus St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from intersection with Loftus St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from intersection with Loftus St
Ausgrid	HV Cable (HV, In Service)	From Paramatta Rd and continuing onto Shaftesbury Rd
Ausgrid	LV Cable (Street Lighting, Out of Service)	Along Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, near intersection with Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, and continuing along Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, near intersection with Shaftesbury Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Burwood Rd, from intersection with Shaftesbury Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	Auxiliary Cable (In Service)	Across Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	Auxiliary Cable (In Service)	Across Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	LV Cable (Mains, Out of Service)	Along Parramatta Rd, and continuing along Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 1A Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along south side of Parramatta Rd and continues along Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	At intersection of Parramatta Rd and Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, from 1 Shaftesbury Rd and continuing south
Ausgrid	LV Cable (Service, In Service)	Along Shaftesbury Rd, from 3 to 5A Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 5 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	At 3 and 5 Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 6 Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 20 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, from Milton St, and continues onto Arthursleigh St
Ausgrid	LV Cable (Service, In Service)	At 30 Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 36 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, adjacent to 27A Shaftesbury Rd, and continues onto Arthursleigh St
Ausgrid	LV Cable (Mains, Out of Service)	Along Shaftesbury Rd, adjacent to 27A Shaftesbury Rd, and continues onto Arthursleigh St
Ausgrid	LV Cable (Mains, Out of Service)	From Arthursleigh St and continues onto Shaftesbury Rd to 33 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	From Arthursleigh St and continues along and across Shaftesbury Rd to 33 Shaftesbury Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Shaftesbury Rd at intersection with Arthursleigh St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Shaftesbury Rd at intersection with Arthursleigh St

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	From Arthursleigh St and continuing south onto Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	Along south side of Comer St
Ausgrid	LV Cable (Mains, In Service)	Along and across Burwood St and continues onto Meryla St. Ends at 76 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	Along Meryla St, adjacent to 70A Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	From 74-76 Burwood St, on Meryla St. Ends at 27 Meryla St.
Ausgrid	Auxiliary Cable (In Service)	Across and along Meryla St. From 74-76 Burwood Rd. Continues onto Shaftesbury Rd.
Ausgrid	HV Cable (HV, In Service)	Across and along Meryla St. From 74-76 Burwood Rd. Continues onto Shaftesbury Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Meryla St and continuing along Burwood Rd. Ends at 78-82 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	At 33-39 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 25 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 21-23 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 17 Wilga St
Ausgrid	LV Cable (Mains, In Service)	At 9 Wilga St
Ausgrid	LV Cable (Mains, In Service)	Along Wilga St, adjacent to 7 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 3 Wilga St
Ausgrid	LV Cable (Mains, In Service)	At 3 Wilga St
Ausgrid	LV Cable (Mains, In Service)	From 3 Wilga St and on Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	From 3 Wilga St and along Shaftesbury Rd. Continues along Wilga St and ends at 11-15 Wilga St.
Ausgrid	HV Cable (HV, In Service)	From 3 Wilga St and along Shaftesbury Rd. Continues along Wilga St and ends at 9 Wilga St.
Ausgrid	HV Cable (HV, In Service)	Along Shaftesbury Rd and continues along Eurella St.
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, at intersection with Wilga St.
Ausgrid	LV Cable (Street Lighting, In Service)	Along Shaftesbury Rd, at intersection with Wilga St.

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, Out of Service)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	HV Cable (HV, Out of Service)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	HV Cable (HV, Out of Service)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	LV Cable (Street Lighting, In Service)	Along Burwood Rd, near intersection with Wilga St
Ausgrid	LV Cable (Mains, In Service)	At 84-86 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, ending at 84-86 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along Webbs Lane, starting at 84-86 Burwood Rd, and continuing along Wilga St and Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, starting at 84-86 Burwood Rd, and continues onto Wilga St. Ends at 98 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, starting at 84-86 Burwood Rd, and ending at intersection with Wilga St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Wilga St, from intersection with Webbs Lane. Continues onto Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Wilga St and continues onto Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	At intersection of Wilga St and Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Across Wilga St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Wilga St. From intersection with Burwood Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Wilga St, from 98 Burwood Rd to 25 Wilga St.
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd and along Wilga St
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd and along Wilga St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Wilga St, from 25 Wilga St to intersection with Shaftesbury Rd.
Ausgrid	HV Cable (HV, Out of Service)	Along Wilga St, from 25 Wilga St to intersection with Shaftesbury Rd.

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	Along Wilga St, between 25 and 17 Wilga St.
Ausgrid	HV Cable (HV, In Service)	Along and across Wilga St, between 9 to 17 Wilga St.
Ausgrid	HV Cable (HV, Out of Service)	Along Wilga St, from 9 Wilga St to intersection with Shaftesbury Rd.
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Sydney Trains Central	HV Cable	Along Rowley St. Continues through Burwood Park and onto Burwood Rd, Wilga St, and Shaftesbury Rd.
Sydney Trains Central	HV Cable	Along Shaftesbury Rd.
TfNSW	Electric supply cable in 20NB GI Pipe	On north corner of Burwood Rd and Park Ave.
TfNSW	Electric supply cable in 40NB GI Pipe	Along Parramatta Rd, near intersection with Broughton St
TfNSW	Electric supply cable in 32 HD PVC Conduit	At south corner of Wilga St and Shaftesbury Rd

5.3 Demand Assessment

An assessment of the estimated net electrical demand for the development has been undertaken to assist in determining the required infrastructure upgrades. Demand forecasting and profiles were developed based on AS3000 Table C3 rates and Ausgrid NS109 Table B unless indicated otherwise. These are shown respectively in Table 10 and Table 11.

Table 9: AS3000:2007 – Table C3 Maximum Demand (non-domestic installations)

Type of occupancy		Energy demand	
		Range, VA/m^2	Average, VA/m^2
Offices	Light and Power	40-60	50
	Airconditioning		
	- cooling	30-40	35
	- reverse cycle	20-30	25
	- zonal reheat	40-60	50
	- variable volume	20	20
Carparks	Open air	0-10	5
	Basement	10-20	15
Retail shops	Light and power	40-100	70
	Airconditioning	20-40	30
Warehouses	Light and power	5-15	10
	Ventilation	5	5
	Special equipment	(use load details)	
Light industrial	Light and power	10-20	15
	Ventilation	10-20	15
	Airconditioning	30-50	40
	Special equipment	(use load details)	
Taverns, licensed clubs	Total	60-100	80
Theatres	Total	80-120	100

Table 10: Ausgrid NS109 – Table 4 Guide to Typical Load Densities

Type of Development		Range VA/m^2	Average VA/m^2
Offices -	- Not air-conditioned - air-conditioned - cooling only	40-60 70-100	50 85
	- reverse cycle - electrical reheat open areas - electrical reheat zonal or package units - variable volume	60-90 80-120 90-130 60-80	75 100 110 70
Car parking	- open air - ventilated	0-10 10-20	5 15
Warehousing	- unventilated - ventilated	5-15 10-20	10 15
Shops	- Not air-conditioned - air conditioned	40-100 60-140	70 100
Shopping centres (assumed air-conditioned shops)	- Not air-conditioned public areas - air conditioned public areas	60-140 80-160	100 120
Industrial	- light - if ventilated add - if air-conditioned add (see note)	10-20 10-20 30-50	15 15 40
Theatres, halls, etc	- ventilated - air-conditioned	50-70 80-120	60 100
Hotels, Taverns, Restaurants (Residential section, use Annexure C)		60-100	80

5.4 Forecast Demand

The maximum demand for peak usage was calculated to be approximately 20.3MVA. At this stage of the design, an 80% diversity factor has been used.

Table 11 Minimum and Maximum Estimated Electrical Demand[1]

Development Type	Block Tag	Estimated Demand
Residential	A1	0.2
Residential	A2	0.1
Residential	A3	0.6
Residential	A4 (MLC)	0
Residential	B1	0.2
Residential	B2	0.5
Residential	B3	0.2
Residential	B4	0.2
Residential	B5 (MLC)	0
Residential	B6 (OS)	0
Residential	C1	0.1
Residential	C2	0.2
Residential	C3	0.9
Residential	C4 (SCC)	0
Residential	C5	0.5
Residential	D1	0.5
Residential	D2	0.8
Residential	D3	0.6
Residential	D4	0.4
Residential	D5	0.4
Residential	D6	0
Residential	D7	0
Residential	D8	0.2
Residential	D9	0.2
Residential	E1 (Metro)	0.0
Residential	E2	0.1
Residential	E3	0.7
Residential	E4	1.0
Residential	E5	0.8
Residential	E6	0.6
Residential	E7 (OS)	0

Development Type	Block Tag	Estimated Demand
Residential	E8	0
Residential	F1	0.5
Residential	F2	1.2
Residential	F3	0.5
Residential	F4	0.4
Residential	F5	0.3
Residential	F6	0.2
Residential	G1	0.9
Residential	G2	0.2
Residential	G3 (OS)	0.0
Residential	H1	1.6
Residential	H2	0.5
Residential	I1	0.3
Residential	I2	0.8
Residential	I3 (OS)	0
Residential	I4	0.1
Residential	J1	0.0
Residential	J2	0.5
Residential	J3	0.2
Non-Residential	A1	0.1
Non-Residential	A2	0
Non-Residential	A3	0
Non-Residential	A4 (MLC)	0
Non-Residential	B1	0.1
Non-Residential	B2	0
Non-Residential	B3	0
Non-Residential	B4	0
Non-Residential	B5 (MLC)	0
Non-Residential	B6 (OS)	0
Non-Residential	C1	0.1
Non-Residential	C2	0
Non-Residential	C3	0
Non-Residential	C4 (SCC)	0
Non-Residential	C5	0
Non-Residential	D1	0.2

Development Type	Block Tag	Estimated Demand
Non-Residential	D2	0
Non-Residential	D3	0
Non-Residential	D4	0.1
Non-Residential	D5	0
Non-Residential	D6	0
Non-Residential	D7	0
Non-Residential	D8	0.1
Non-Residential	D9	0
Non-Residential	E1 (Metro)	0.4
Non-Residential	E2	0
Non-Residential	E3	0
Non-Residential	E4	0.3
Non-Residential	E5	0
Non-Residential	E6	0
Non-Residential	E7 (OS)	0
Non-Residential	E8	0.2
Non-Residential	F1	0.2
Non-Residential	F2	0.4
Non-Residential	F3	0.2
Non-Residential	F4	0
Non-Residential	F5	0
Non-Residential	F6	0
Non-Residential	G1	0
Non-Residential	G2	0
Non-Residential	G3 (OS)	0
Non-Residential	H1	0
Non-Residential	H2	0
Non-Residential	I1	0
Non-Residential	I2	0
Non-Residential	I3 (OS)	0
Non-Residential	I4	0
Non-Residential	J1	0
Non-Residential	J2	0
Non-Residential	J3	0
Total (MVA)		20.8

Development Type	Block Tag	Estimated Demand
Total (MVA, including 0.8 Diversity Factor)		20.3
Total (MVA, including 0.8 Diversity Factor, +15%)		23.3
Total (MVA, including 0.8 Diversity Factor, -15%)		17.2

[1] Since the demand calculations do not include carparks, lifts, or impacts of ESD initiatives, a ±15% range is recommended.

5.5 Coordination with Other Services

Coordination of the proposed electrical infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

Ausgrid does not provide specific information on clearances from other services. If the electrical services are installed within the standard allocation, the separations given by the other services provider should apply for all crossings. Where a reduced allocation is proposed, separations should be determined in consultation with Ausgrid.

In addition to the above, all works will also comply with Ausgrid standards.

It is assumed that developers would be responsible for undergrounding nearby electrical assets as part of their development process. Where this has not occurred historically, the overhead powerlines will likely be retained unless removed as a part of any future council public domain upgrades

5.6 Approvals and Next Steps

The key next steps in progressing the delivery of electrical infrastructure through detailed design including the formal Ausgrid approval processes consists of the following (in conjunction with further Ausgrid coordination and consultation with all placeholders):

1. Undertake site investigations to confirm the layout and extent of existing services (including non-Ausgrid assets) – Post Rezoning/Development Application;
2. Confirm arrangements for supply and ownership of street lighting – As a part of Development Applications;
3. Confirm extent of existing infrastructure that can be abandoned and/or requires diversion – Post Rezoning/Development Application;
4. Develop duct masterplan and make submission to set up case with Ausgrid – As a part of Development Applications;
5. Develop staged designs for delivery of the new infrastructure – As a part of detailed design;
6. Liaise with Burwood Municipality and City of Canada Bay LGAs to confirm requirements for undergrounding of existing infrastructure – As a part of Development Applications;
7. Ausgrid to provide detailed requirements – As a part of Development Applications, As a part of detailed design;
8. Ausgrid to issue Design Information Pack (DIP), Design Contract & Deed of Agreement As a part of detailed design; and
9. Submit detailed design of individual packages for approval – As a part of detailed design;

It is noted that the above is for delivery of the duct network through the street network. It is expected that the buildings will need to make separate applications for connection, including installation of new feeders.

Utilities Report

6 Gas

6.1 Background

Gas servicing to the precinct site is provided by Jemena Gas.

6.2 Existing On-Site Utility Infrastructure

The existing gas infrastructure within and in close proximity to the development site has been identified based on BYDA records. These records indicate the presence of numerous gas mains within and adjacent to the development boundary. These are detailed within the table below.

Table 12 Existing Gas Infrastructure

OWNER	ASSET TYPE	LOCATION
Jemena	210kPA Medium Pressure gas main	Across Broughton St
Jemena	210kPA Medium Pressure gas main	Along east side of Broughton St
Jemena	210kPA Medium Pressure gas main	Across Burton St
Jemena	210kPA Medium Pressure gas main	Along Parramatta Rd and continuing along west side of Burwood Rd
Jemena	210kPA Medium Pressure gas main	Along west side of Burwood Rd
Jemena	210kPA Medium Pressure gas main	Along Comer St, ending at intersection with Burwood Rd
Jemena	210kPA Medium Pressure gas main	Along north side of Burton St
Jemena	7kPA Low Pressure gas main	Along the north side of Parramatta Rd, ending at 56-60 Parramatta Rd
Jemena	7kPA Low Pressure gas main	Along the south side of Parramatta Rd, ending at 360-370 Parramatta Rd
Jemena	7kPA Low Pressure gas main	Along the east side of Loftus St
Jemena	7kPA Low Pressure gas main	Along Parramatta Rd, at intersection with Loftus St
Jemena	7kPA Low Pressure gas main	Along the south side of Parramatta Rd, from intersection with Burwood Rd
Jemena	7kPA Low Pressure gas main	Along the east side of Grantham St
Jemena	7kPA Low Pressure gas main	Along the north side of Rowley St
Jemena	7kPA Low Pressure gas main	Along the east side of Park Rd
Jemena	7kPA Low Pressure gas main	Along Britannia Ave

OWNER	ASSET TYPE	LOCATION
Jemena	7kPA Low Pressure gas main	Along the north side of Comer St
Jemena	7kPA Low Pressure gas main	Along the east side of Neich Pde
Jemena	7kPA Low Pressure gas main	Across Neich Pde, adjacent to 37 Neich Pde
Jemena	7kPA Low Pressure gas main	Along Shaftesbury Rd
Jemena	7kPA Low Pressure gas main	Along Shaftesbury Rd, starting at intersection with Eurella Rd
Jemena	7kPA Low Pressure gas main	Along Milton St
Jemena	7kPA Low Pressure gas main	Along Archer St, from Milton St to 41 Archer St
Jemena	7kPA Low Pressure gas main	Along New St
Jemena	7kPA Low Pressure gas main	Along Esher St
Jemena	7kPA Low Pressure gas main	Along Meryla St
Jemena	7kPA Low Pressure gas main	Along Wilga St
Jemena	7kPA Low Pressure gas main	Along the east side of Burwood Rd
Jemena	7kPA Low Pressure gas main	Along the west side of Burwood Rd
Jemena	7kPA Low Pressure gas main	Along Comer St and Burwood Rd

6.3 Demand Assessment

An assessment of the net gas demand has not been completed as it is assumed that there will be no new gas connections within the precinct. However, it is noted that existing properties may retain their current gas connections.

6.4 Coordination with Other Services

Coordination of the proposed gas infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

Jemena to provide guidance on horizontal and vertical clearances, the minimum separations between electrical and natural gas mains are provided in Table 1.0 of “Natural Gas Requirements for Developer Provided Trench” as summarised in the table below.

Table 13 Jemena minimum separation between utilities

Utility	Minimum Separation	
	Gas Mains up to 75mm diameter	Gas Mains of 110mm diameter or larger
Telecommunication cables and/or conduits	150 mm	300 mm
Protected[2] Low Voltage electricity cables	150 mm	300 mm
Protected[2] High Voltage electricity cables	300 mm	300 mm

1. *Separations relate to distances between conduits/cables peripheries*
2. *"Protected" refers to mechanical protection of the cables, which usually takes the form of either polymeric strips (at least 3 mm thick) or clay brick*
3. *The above table is considered to provide desirable minimum separations. Consideration should be given for the need to access for future maintenance of services when determining the required separations*

6.5 Approvals and Next Steps

Jemena does not have a formal approval process, with supply arrangements being confirmed by Jemena as part of their quotation for construction to be provided following submission of applications for connection.

The formal approval process for provision of Jemena infrastructure to be progressed through detailed design processes consists of the following main steps:

1. Undertake site investigations to confirm the layout and extent of existing services (including non-Jemena infrastructure) – Post Rezoning/Development Application.
2. Submit masterplan including staging of delivery to Jemena for agreement – As a part of detailed design.
3. Submit application for design to Jemena for individual detailed design packages (to include proposed alignment) – As a part of detailed design; and
4. Jemena will provide a quote for construction works – As a part of detailed design.

It is noted that the above is for delivery of the gas network through the street network, depending on the strata arrangement individual buildings will still need to make separate applications for each connection

Utilities Report

7 Telecommunications

7.1 Background

Numerous communication providers have assets running within and adjacent to the site:

- Broadband;
- LBNCo;
- NBN Co NswAct;
- OptiComm;
- Optus/Uecomm Nsw;
- Telstra, NSW;
- TPG Telecom (NSW);
- Verizon; and
- Vocus.

While there are numerous utility providers within the development, if a developer does not choose another developer, then NBN is the infrastructure provider of last resort for developments greater than 100 units.

The existing telecommunication services is shown in the plan at the end of this section.

7.2 Existing On-Site Utility Infrastructure

7.2.1 Broadband

Existing underground Broadband services have been located within the site as well as along Rowley St, Comer St, Burwood Rd, Meryla St, and Shaftesbury Rd. It has been assumed that the existing Broadband services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.2 LBNCo

No LBNCo assets have been identified within the site or adjacent to the site boundary.

7.2.3 NBN

Existing underground NBN services have been located within the site as well as along Broughton St, Burton St, Loftus St, Parramatta Rd, Shaftesbury Rd, Wilga St, Burwood Rd, Comer St, Rowley St, and Grantham St. It has been assumed that the existing NBN services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.4 OptiComm

Existing underground OptiComm services have been located on Burwood Rd, near the intersection with Wilga St. It has been assumed that the existing OptiComm services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent

with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.5 Optus/ Uecomm

Existing underground Optus services have been located within the site as well as along Shaftesbury Rd and Wilga St. Existing underground Uecomm services have been located within the site and on Burton St, Rowley St, Grantham St, Comer St, Burwood Rd, and Wilga St. It has been assumed that the existing Optus/Uecomm services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.6 Telstra

Existing underground Telstra services have been located within the site as well as along Shaftesbury Rd, Wilga St, Burwood Rd, Comer St, Grantham St, Parramatta Rd, Broughton St, Burton St, and Loftus St. It has been assumed that the existing Telstra services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.7 TPG

Existing underground TPG services have been located within the site as well as on Parramatta Rd, Burton St, Comer St, Wilga St, and Loftus St. It has been assumed that the existing TPG services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.8 Verizon

Existing underground Verizon services have been located within the site as well as on Burwood Rd and Shaftesbury Rd. It has been assumed that the existing Verizon services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.9 Vocus

Existing underground Vocus services have been located Burwood Rd, near the intersection with Meryla St. It has been assumed that the existing Vocus services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.3 Demand Assessment

No demand has been calculated for telecommunications infrastructure as it cannot be estimated in the same way as other utilities.

7.4 Coordination with Other Services

Coordination of the proposed communications infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

The clearances for NBN services from other utilities is given in Section 5.2.13 of "New Development: Deployment of the NBN Co Conduit and Pit Network – Guidelines for Developers", these requirements are presented in Figure 11.

Figure 11: NBN Clearances from other carriers and underground services

Service Item		Minimum Radial Clearances*1
Gas Pipe	Over 110 mm	300 mm
	110 mm or Less	150 mm
Power	High Voltage	300 mm
	Low Voltage	100 mm*2
Water Mains	High Pressure/Capacity	300 mm
	Local Reticulation	150 mm
Sewer	Main	300 mm
	Connection Pipe	150 mm
Other Telecommunications	100 mm*1	

* 1 – Reduced separation is possible where all parties (including NBN Co) are consulted and agreement is reached.

* 2 – Only where protection barriers are used, for example, conduit, bedding, marker tape and cover batten.

It is assumed that redundant cabling is to remain onsite unless conflicting with development lots where it may progressively be replaced or removed by either the developer or NBN.

7.5 Approvals and Next Steps

Confirmation is required from NBN Co that the site is eligible for supply from their network. Following this an initial application is required and a formal agreement entered between NBN Co. and the developer prior to construction works commencing (this does not prevent designs from being approved). The next steps generally consist of the following:

1. Undertake site investigations to confirm the layout and extent of existing services (including private infrastructure associated with previous land-uses) – Post Rezoning/Development Application;
2. Liaise with existing telecommunication providers to confirm the requirement for diversion and/or relocation of their existing infrastructure – Post Rezoning/Development Application;
3. Confirm proposed infrastructure masterplan (including staging) and in principle supply arrangements with NBN or other provider - As a part of Development Applications;
4. Initial application submitted to NBN Co. for supply of the site from their network - As a part of Development Applications;
5. NBN Co. to confirm supply can be provided and provide draft agreement – As a part of detailed design;
6. Revisions of agreement where required – As a part of detailed design;
7. The developer to sign NBN Co. agreement – As a part of detailed design;
8. Liaise with existing telecommunication providers for quotes for diversions or abandonments including any interim works – As a part of detailed design; and

9. Submit detailed design of individual packages for approval – As a part of detailed design.

It is noted that the above is for delivery of the NBN pit and pipe network through the new street network, it is expected that the buildings will need to make separate applications for connection.

Utilities Report

8 Stormwater

8.1 Flooding

Refer to Mott Macdonald's *Burwood North Master Plan Flooding Report* for detailed information relating to flooding.

8.2 Existing Stormwater infrastructure

Stormwater infrastructure within the site is owned by Burwood Council, City of Canada Bay Council, and Sydney Water.

The existing stormwater infrastructure within and in close proximity to the development site has been identified based on BYDA records. These records indicate the presence of numerous mains within and adjacent to the development boundary. Refer to Mott Macdonald's *Burwood North Master Plan Flooding Report* for further information.

It should be noted that Council currently undertakes CCTV inspection to 10% of its stormwater assets at each financial year. These may include assets in Burwood North Precinct. This report will be updated at later stages of the project to include assets from this inspection.

Utilities Report

9 Separation Between Services

9.1 Streets Opening Conference Service Corridors

The NSW Streets Opening Coordination Council (SOCC) is a voluntary association of member organisations that have agreed to meet to resolve issues on a cooperative basis. The most widely used publication is the Guide to Codes and Practices for Street Opening (2018).

This guide is published to document industry practice and provide essential information and guidance on managing street openings for the provision of underground utility services, the typical allocation of utilities is shown below in Figure 14.

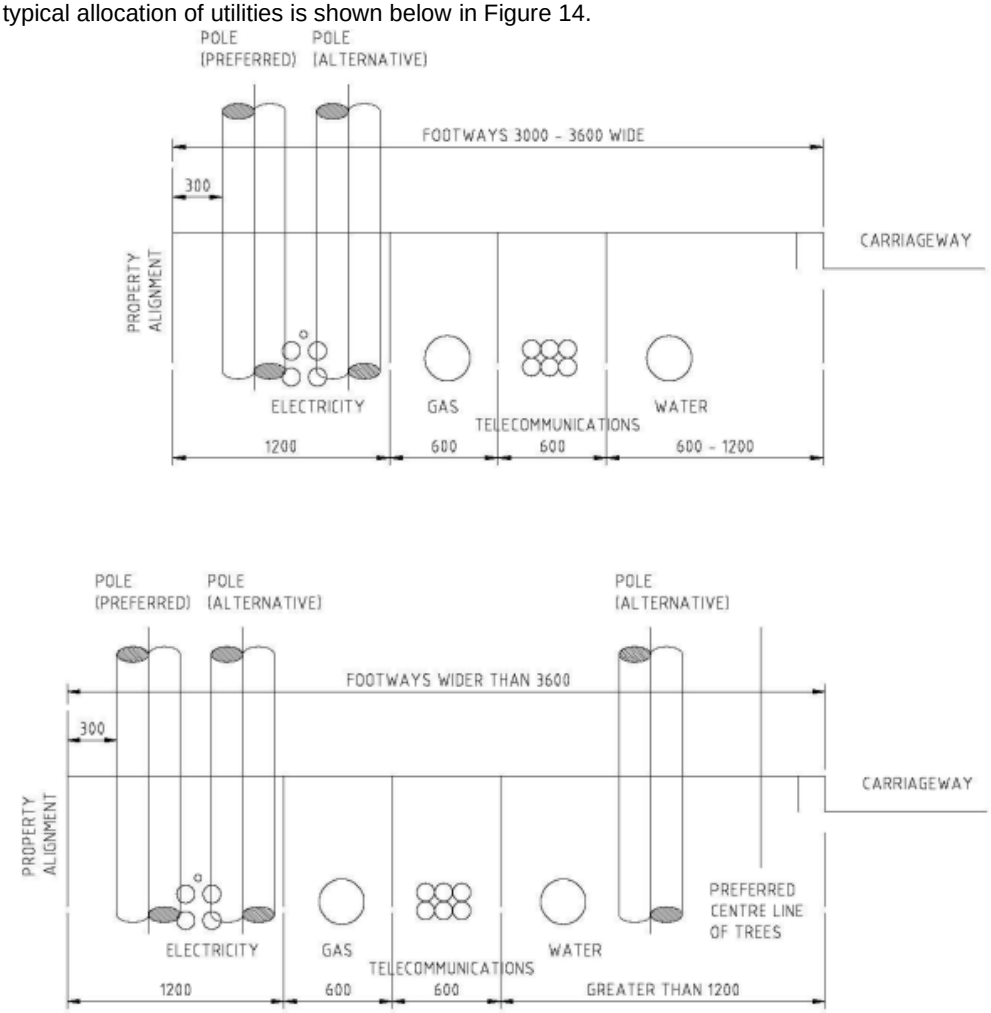


Figure 14 SOCC Utility Allocation

This section does not typically allow for the provision of precinct utilities or street trees and while elements of this have been used for the concept Utilities Services instead key elements from the Western Sydney Engineering & Street Design Manual have been used to better align with the Precinct goals.

10 Conclusion

10.1 Assessment Summary

This Utility Servicing Assessment has concluded that servicing is available to site with indicative connections for each service being:

- **Potable Water:** The site is well serviced from trunk assets on Parramatta Road, but local reticulation services may require amplification as a result of the proposed development uplift;
- **Sewer:** The site is well serviced from trunk assets on Parramatta and Neich Road, but local reticulation services may require amplification as a result of the proposed development uplift, additionally the reticulation network predominately runs under low density residential lots and may need to be relocated to the street network as a part of any change in building form;
- **Electricity:** It is likely that new feeder cables from the Burwood Zone substation will be required when existing LV distribution is at capacity. Additionally existing overhead power may need to be under grounded;
- **Gas:** While there are existing gas services to a large proportion of the site, consideration should be given to a "zero-gas" precinct to reduce use of non-renewable resources; and
- **Telecommunications:** No servicing constraints based on anticipated land uses however should this change and high use development (e.g., data centre, research, or university) then potential infrastructure upgrades may be required.

It should be noted that the above assessment is preliminary only and will be further developed upon consultation with utility providers. Additionally, restoration of any future utility upgrades that will affect Council road reserve assets will be dealt with Council's current road restoration policies.

It should also be noted that the development should additionally consider impacts upon other utility assets owned by Transport for NSW and Sydney Trains Central as they are within and adjacent to the site. The details of these assets have been included in this report.

MOTT MACDONALD

September 2023

Burwood North Precinct Masterplan Engagement Outcomes Report

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Contents

Terms and Abbreviations

AHCS	Affordable Housing Contribution Scheme
BASIX	Building Sustainability Index
BRT	Bus rapid transit
CBD	Central business district
CPTED	Crime Prevention Through Environmental Design
DCP	Development Control Plan
DPE	Department of Planning and Environment
ESG	Environmental, Social and Governance
EV	Electric vehicle
FSR	Floor space ratio
LEP	Local Environment Plan
LGA	Local Government Area
PRCUTS	Parramatta Road Corridor Urban Transformation Strategy
PV	Photovoltaic
SMW	Sydney Metro West
TfNSW	Transport for New South Wales
VPA	Voluntary Planning Agreement
WSUD	Water sensitive urban design

Acknowledgement of Country

COX acknowledges the enduring spirit of Wann Country. We recognise the knowledges, languages, stories, songlines, land, skies, waterways, and Spirit systems that have nurtured the local peoples here for millennia.

We pay our respects to the local peoples of the place on which the Burwood North Precinct stands, the Wangal people, and any other peoples that call this place home. We pay our deepest respects to Elders, past, present, and emerging and recognise your continuing cultural and Ancestral connections.

We also acknowledge Gadigal Country, upon which this document was crafted, as well as the Traditional Custodians of this place, the D'harawal, Dharug, Eora, Gia-maragal, Gundungurra and Guringai peoples. We pay our respects to the many Aboriginal peoples that now know this place as your home and mother and acknowledge the caretaking relationships you have here.

Introduction

Introduction

Burwood North Precinct Masterplan

Burwood Council is preparing an updated masterplan and supporting studies for the Burwood North Precinct building upon the work already undertaken as part of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS).

The masterplan will articulate a clear vision and provide an urban design framework for the public and private domain, with a view to improve the amenity and quality of the built environment. In addition, the masterplan will provide recommendations on land use zones, building heights, floor space ratios (FSRs), road network improvements and public domain improvements that will facilitate activation, job creation and housing choice.

The masterplan will articulate a cohesive vision for the precinct that strives to deliver an outcome that is feasible, maximises public benefit and delivers high quality public domain, open spaces and community infrastructure.

Extensive stakeholder engagement forms a critical piece of the analysis evidence base needed for the design of the masterplan, as well as being an important way to enable stakeholders and community to have a sense of ownership over the project and its outcomes.

Study Area

The Burwood North Precinct is located immediately north of the existing Burwood Town Centre and Rail Station. The Burwood North Precinct as identified in the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) is bound by Meryla Street and Burwood Park to the south, Parramatta Road to the north, Shaftesbury Road to the east and Park Street to the west. Council has extended the precinct southwards from Meryla Street to include Wilga Street and westwards from Park Street to include Grantham Street. This area is identified as the study area.

The area of influence for the Burwood North Precinct extends north across Parramatta Road. This part of the Precinct, bound by Burton Street to the north, Loftus Street to the east and Broughton Street to the west is within the LGA of the City of Canada Bay. This part of the Precinct does not form part of the Masterplan, but will be considered in the context of investigations as part of the preparation of the Masterplan.

Study Area. *Source: COX*

Study Area Boundary (Burwood LGA) Area of Investigation LGA Boundaries

Purpose

This Engagement Outcomes Report provides a summary of the outcomes from the programme of stakeholder engagement undertaken during Task 1: *Visioning Charrette, Review and Analysis* for the Burwood North Precinct Masterplan.

Task 1 has included a number of review and analysis investigations including:

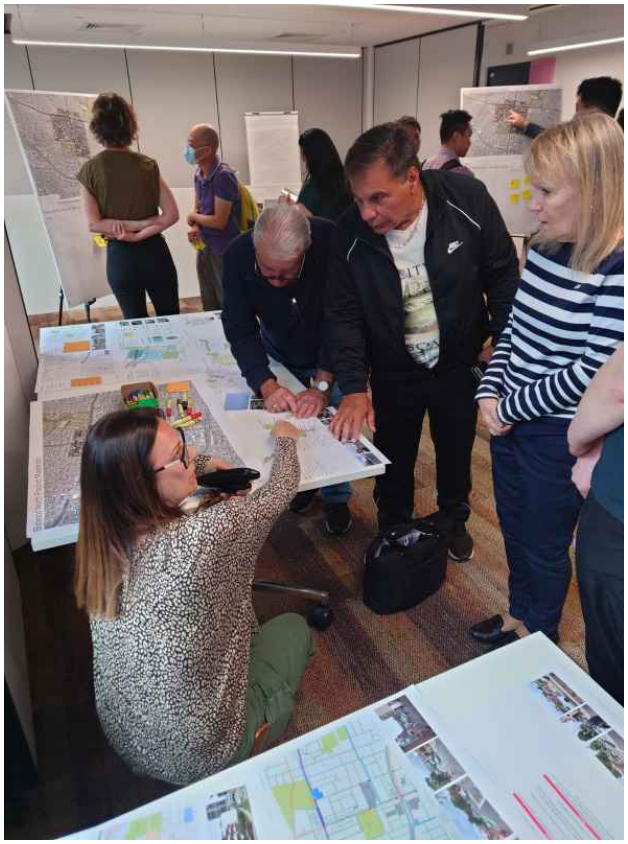
- **Desktop analysis** - reviewing previous reports and studies undertaken for the precinct and reviewing the current strategic planning context
- **Stakeholder engagement** - a wide range of stakeholders have been engaged through the analysis and visioning process including Burwood Council staff, State government and institutional stakeholders of the precinct, landowners in the precinct, and the general community
- **Site visits** - the project team undertook numerous site visits at various times of the day, week and year to gain an appreciation for the Precinct.

An overview of each stakeholder engagement activity including; who was engaged, the method of engagement, and a summary of the key findings and outcomes of each engagement is presented in this report.

The outcomes of the stakeholder engagement undertaken through Task 1 of the project have been distilled into a vision and set of priorities for the future of the Burwood North Precinct and will underpin the design and development of the masterplan.

The outcomes contained within this report will also be used as an evidence base for ongoing reference throughout the design of the masterplan.

This report should be read alongside the *Burwood North Precinct Masterplan: Precinct Analysis Summary Report*, by COX, which presents the results of the project analysis and investigation of the precinct context, opportunities and constraints.



Community drop-in session. *Source: COX*

Project Timeline

Engagement

The following table identifies the groups of stakeholders that have been engaged throughout Task 1 of the masterplan, and the method by which they have been engaged.

Stakeholder	Interest in Masterplan	Method of Engagement
Government agencies	• Public transport planning and operations • Traffic and road management • Alignment with strategic planning priorities • Service provision (health, education, infrastructure) • Approval and implementation of the masterplan	Visioning Charrette participation One-on-one meetings
Institutional stakeholders	• Service provision (health, education, infrastructure)	Visioning Charrette participation
Landowners and residents within the boundaries of the masterplan area of investigation	• Delivery of the masterplan • Users of the wider precinct	Community drop-in session Online survey One-on-one meetings
Local businesses within the boundaries of the masterplan area of investigation	• Provision of services to meet the needs of the existing and future residents and workers within the masterplan area • Users of the precinct and wider area	Online social map Land Use Survey
First Nations groups	• Connection to Country and custodianship • Recognition of cultural heritage	First Nations workshop
Community members of the Burwood LGA	• Users of the precinct and wider area	Online social map

Engagement Methods and Outcomes

COX

Visioning Charrette

Overview

The Visioning Charrette was held on Wednesday 16 November 2022 at Burwood Council.

The objective of the Visioning Charrette was to inform the vision and top priorities for the Burwood North Precinct Masterplan with Council staff and precinct stakeholders.

The Visioning Charrette allowed participant stakeholders to understand the opportunities and constraints within the precinct, and to collectively share their non-negotiable outcomes, visions and priorities for the future planning of the precinct.

The day was structured around a series of presentations, followed by facilitated small group discussions.

Visioning Charrette. *Source: COX*

Visioning Charrette breakout group discussion. *Source: COX*

Attendees

The Visioning Charrette was attended by over 45 representatives including Burwood Council staff, stakeholders and the consultant team, each bringing a great variety of expertise, experience and priorities for the Burwood North Precinct.

Collaboration and participation took place between representatives from planning, transport, education, urban design, business, industry and infrastructure including from a number of government agencies.

Connecting these stakeholders enabled the sharing of competing and complementary aspirations for the Burwood North Precinct in a collaborative forum.

Burwood Council

- Council staff

Stakeholders

- Greater Cities Commission
- Canada Bay Council
- Department of Planning & Environment
- Sydney Metro
- Transport for NSW
- NSW Land and Housing Corporation
- Office of the 24 Hour Economy Commissioner, Investment NSW
- Schools Infrastructure NSW
- Burwood Police Local Area Command
- Burwood Chinese Business Association

Consultant Project Team

- COX
- SCT Consulting
- JLL
- Oculus
- Mott MacDonald

Visioning Charrette

Process and Participation

The Visioning Charrette began with welcomes and an introduction to the project, followed by an overview of the Visioning Charrette purpose and format for the day.

Session 1 introduced the opportunities and constraints at Burwood North, based on site analysis and research undertaken by the consultant project team. This session was structured around four 'stations' positioned around the room each about one of the four themes:

- People, Places and Productivity
- Urban Design and Landscape
- Movement
- Sustainability and Smart Infrastructure

Participants were distributed into four groups and were rotated around to each station during the session. The consultant project team provided a presentation of the opportunities and constraints at each theme 'station' supported by mapping, diagrams, benchmark imagery and information pinned up on the walls at each station.

Session 2 heard short presentations to all participants from Department of Planning and Environment (DPE), followed by some time from questions.

DPE presented the NSW government priority to deliver 400,000 additional homes across NSW, with Burwood North being a location that can accommodate additional housing as a result of the future Sydney Metro station. DPE also spoke about their support to Councils to deliver the PRCUTS vision for Parramatta Road.

Sydney Metro presented indicative site planning and station design for the future Burwood North metro station using the publicly available information.

Session 3 was structured as four small group facilitated discussions to capture the visions and priorities for the future of Burwood North. Participants were again split into the four groups they had been with for Session 1. Consultant team members facilitated the small group discussions.

During this session, all participants were engaged, each being asked to contribute their non-negotiables and nice-to-haves for the precinct, followed by key vision ideas, and top priorities. These were captured on post-it notes shared on large format worksheets for each group. During the session, participants were engaged in discussion about their ideas and needs for the precinct so that all attendees could hear each others perspectives.

At the conclusion of Session 3, stakeholder representatives from each of the four groups presented back to the wider group highlighting the visions and top priorities that had been captured by the group.

The key takeaways from Session 1 and full outcomes from Session 3 are contained within Appendix A.

Visioning Charrette Session 1 opportunities & constraints analysis presentation, 'People, Places and Productivity'.
Source: COX

Visioning Charrette Session 2 stakeholder presentations.
Source: COX

Visioning Charrette

Agenda

Time	Activity
10:30am	Arrival and registration
10:45am	**Welcome and Introduction** *Acknowledgement of Country* *Project briefing - Burwood North Masterplan* *Visioning Charrette purpose, format and desired outcomes*
11:00am	**Session 1: The opportunity at Burwood North** *Themed presentations & discussions:* - *Urban Design & Landscape* - *People, Places & Productivity* - *Movement* - *Sustainability & Smart Infrastructure*
12:30pm	Lunch
1:00pm	**Session 2: Stakeholder Presentations** • *Department of Planning and Environment* • *Sydney Metro*
1:30pm	**Session 3: Vision and Priorities for the Burwood North Precinct** *Facilitated small group discussions followed by presentation back to the wider group*
2:30pm	Afternoon tea and close

Visioning Charrette Session 3 breakout group discussion.
Source: COX

Visioning Charrette Session 3 breakout groups presenting back to the wider group.
Source: COX

Visioning Charrette

Key Opportunities & Constraints

In addition to the Precinct Analysis Summary Report prepared by the consultant team, this section outlines key opportunities and constraints that were raised by stakeholders under each of the four themes presented during Session 1.

People, Places and Productivity

Employment

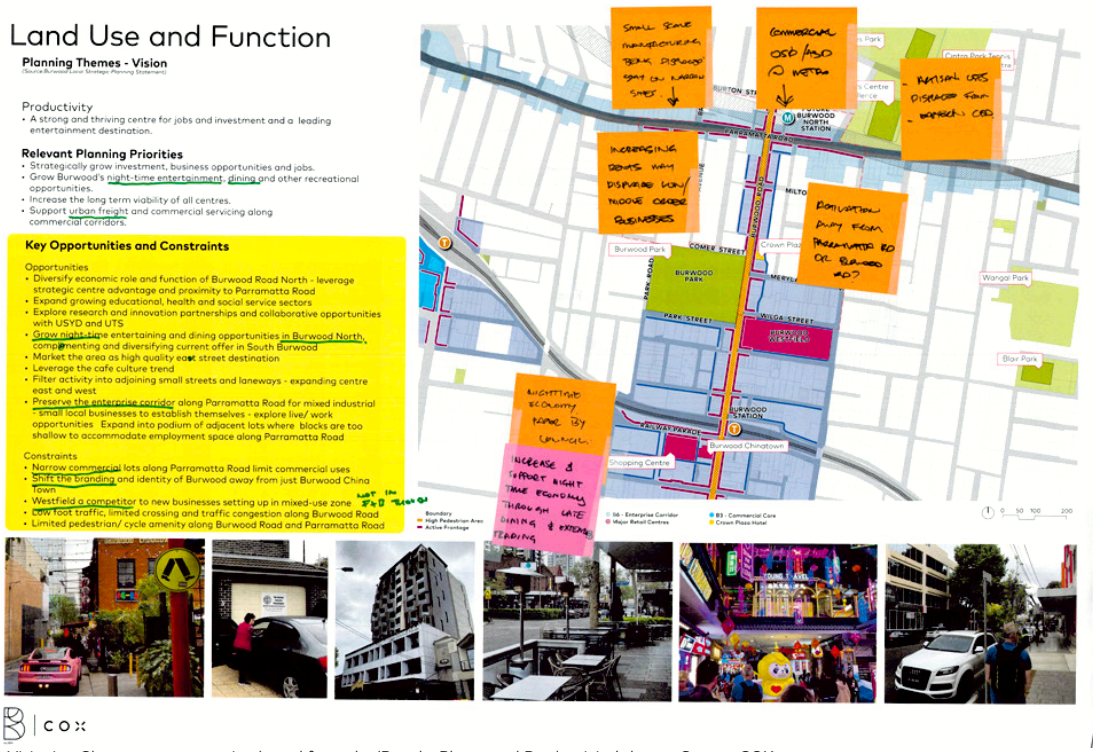
- There is high demand for food & beverage within the broader Burwood Precinct
- There is a night time economy paper by Council - proposes to increase and support night time economy through late dining and extended trading house
- Small scale manufacturing along Parramatta Road may be displaced through renewal
- Sydney Metro is proposing commercial over station development on the metro site
- There is a medical cluster in Burwood North, in response to regional accessibility and rent
- An employment and investment strategy is required to retain existing and encourage new small and medium businesses in Burwood North

Community

- There is an existing demographic of a predominantly young and agile workforce and residents

Implementation

- Government owned sites are an opportunity in the precinct
- Schools are at capacity - particularly public schools



Visioning Charrette presentation board from the 'People, Places and Productivity' theme. *Source: COX*

Visioning Charrette

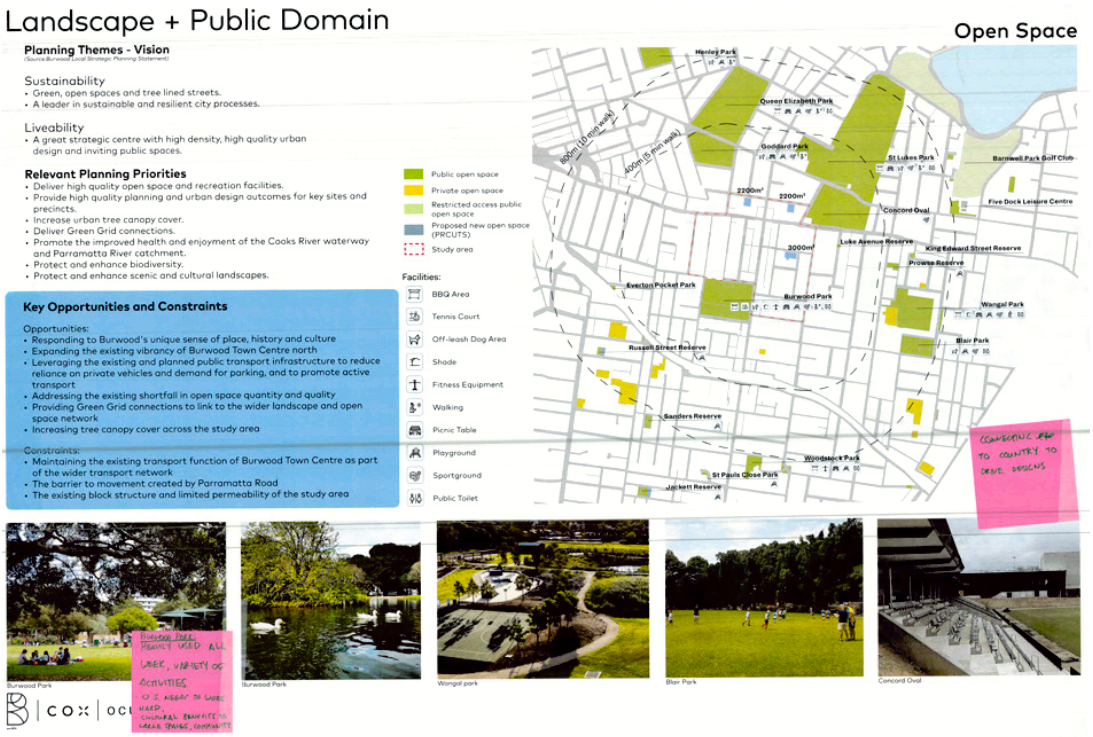
Urban Design and Landscape

Implementation
- Reliance upon both public and private funding and delivery mechanisms to deliver public benefits within the precinct
- Amalgamation and acquisition of lots of a particular scale is a consideration for development feasibility

Landscape and Open Space
- Green link opportunity -revealing or re-interpreting the original creek line that extends from Burwood Park to the Parramatta River
- Providing additional tree planting within the road reserves will be a challenge based on the widths of the road reserves and the location of services under footpaths
- Consult with community on open space and recreation needs
- Connecting to Country to drive designs - potential opportunities connecting to Country through movement networks within the precinct
- Burwood Park - heavily used all week with a variety of activities
- How can use of public space complement active transport and pedestrian areas?
- More open spaces are needed accommodating a variety of community uses

Built Form and Activation
- Explore a variety of new built form in addition to the podium and tower typology
- Recent new development has lost the fine grain street address that characterises the existing precinct
- Some buildings within the precinct may be coming to a logical end of their lifecycle and present as opportunities for renewal
- More residential of different character to that currently in Burwood North
- Activation of back and side streets to promote safety.
- Westfield presents an opportunity to activate open frontages to the public domain on Wilga Street

Streets and Movement
- Street variety is an opportunity to reinforce a hierarchy of pedestrian vs vehicular links
- Burwood Road is already a successful 'high street' - it has a blend of infrastructure, place and experience
- Conflict between parking, outdoor dining and trees on streets
- Burwood Road is at capacity for both pedestrians and vehicles on the weekends (in particular) that provide for conflicts between users
- Utilise wide road reserves to create public domain
- Improve the full length of Burwood Road - nurture walking, restrict or reduce private vehicles
- Safer cycling, but separate from main pedestrian movements



Visioning Charrette presentation board from the 'Urban Design and Landscape' theme. *Source: COX*

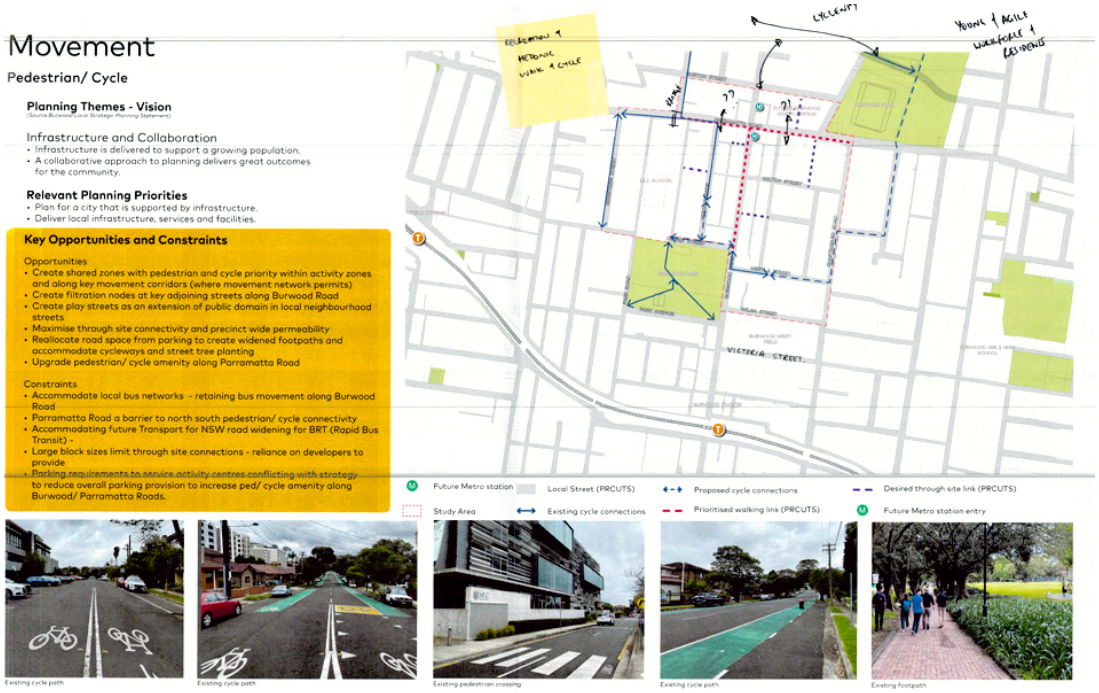
Visioning Charrette

Movement

Public Transport
- Local connections are slower by public transport
- Important north-south bus connections on Burwood Road, need to maintain connectivity whilst enhancing Burwood Road as an active high street.

Active Transport
- Enable links to regional cycleways
- Balance between space for street side dining and walking space
- Explore additional Burwood Road and Parramatta Road crossing opportunities
- Balance safety, seating/ access/ active transport and needs of cars
- Improve access to Bayview Park and the Parramatta River - it is close but Parramatta Road acts as a barrier to north-south movement and legibility could be improved
- Prioritise walkability first

Vehicles
- Businesses feel they need street-side parking for their customers
- An assessment should be undertaken to determine where people are driving to and from within Burwood North, as well as why people choose to drive through the precinct
- Consider land use changes to reduce cars on Parramatta Road
- Westfield provides convenient, off-street parking for the precinct. Are there more off street parking opportunities?
- Maintain access and parking for those who need it - disability spaces - mobility impaired
- Impact of last mile and online delivery services on movement particularly around eateries and Westfield
- Create micro-mobility hubs - consider impacts to freight and e-mobility
- M4 East will create more traffic through Burwood
- Explore removing loading from laneways



COX | OCULUS

Visioning Charrette presentation board from the 'Movement' theme. *Source: COX*

Visioning Charrette

Sustainability and Smart Infrastructure

Stormwater and Flooding

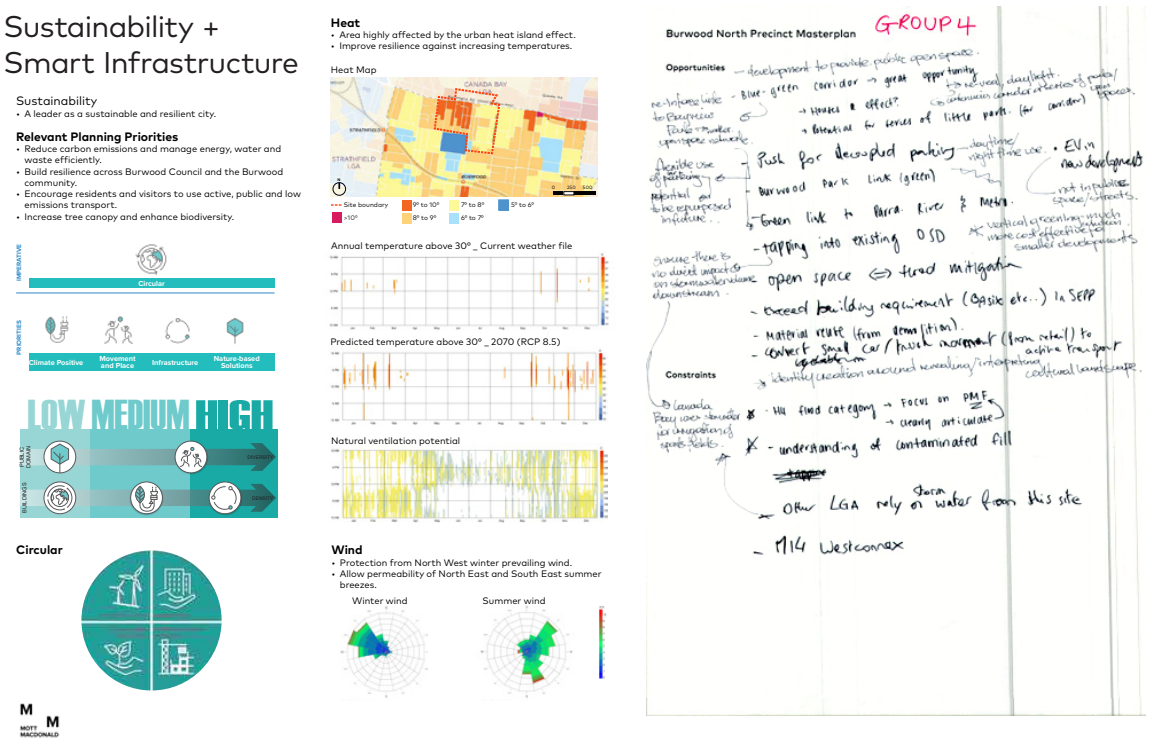
- Flooding risks impact large areas of the precinct, risks and potential mitigations need to be considered and articulated
- Tap into existing and expand on-site stormwater detention - ensure there is no direct impact on stormwater volume downstream - Canada Bay uses stormwater runoff from Burwood North for irrigation of sports fields
- Potential blue-green corridor along former creek line is a great opportunity to incorporate water sensitive urban design and mitigate flooding impacts
- Open space to act as flood mitigation

Development Constraints

- Develop understanding of location, type and quantum of contaminated fill
- M4 Westconnex - need to understand tunnel depths as it has implications for the development of structures and basements

Potential Sustainability Initiatives

- Explore decoupled parking for new developments - different ownership mechanisms and daytime and night time use
- Flexible car parking use - potential to be re purposed in future
- Explore car share and EV charging spaces and infrastructure in new developments
- Opportunity to exceed minimum building sustainability requirements (BASIX etc.) to be a leading sustainable precinct
- Material re-use from demolition
- Vertical greening much more cost effective for smaller developments



Visioning Charrette presentation board from the 'Sustainability and Smart Infrastructure' theme. *Source: COX*

Visioning Charrette

Vision and Priorities

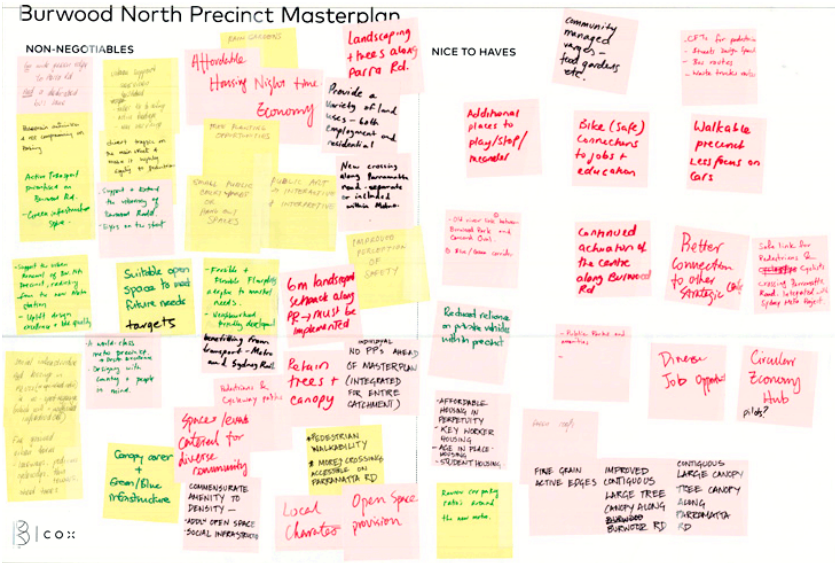
Vision

Identity
- Keep the 'grunge'
- Progressive and revolutionary
- A world class metro precinct achieving design excellence
- Burwood North as a live/play/work precinct, promoting a 15 minute neighbourhood
- District employment focus with diverse employment opportunities including supporting small businesses
- Designing with Country and people in mind
- Organic – create the right conditions for local initiatives
- Honouring cultural needs – cultural awareness when developing/ supporting local communities

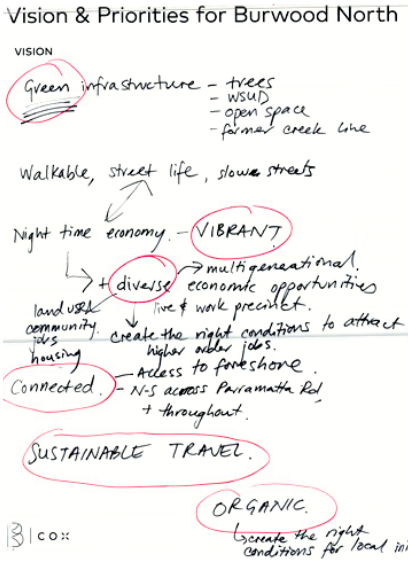
Activation
- Life on the streets, with activated public domain and a variety of public spaces
- A vibrant, exciting place – a melting pot of culture, cuisines etc with a thriving night time economy.
- Burwood Road as destination - an active and attractive high street
- Diversity of open spaces and places for community and cultural events and uses

Connectivity
- Improved north-south connectivity, including public transport as well as pedestrian connections across Parramatta Road
- Walkable and connected, with a network of attractive laneways

Sustainability
- Increased canopy cover and blue/green infrastructure – reveal or reinterpret the former creek line
- Greening Burwood – increased tree canopy, habitat, ecosystem biodiversity integrated and supported, urban greening and rain gardens
- Burwood North as an exemplar sustainable precinct, leading the way with smart infrastructure, emissions reductions, on-site energy generation, circular economy, sustainable buildings and urban farming initiatives



Visioning Charrette breakout group ideas - Non-Negotiables and Nice to Haves. *Source: COX*

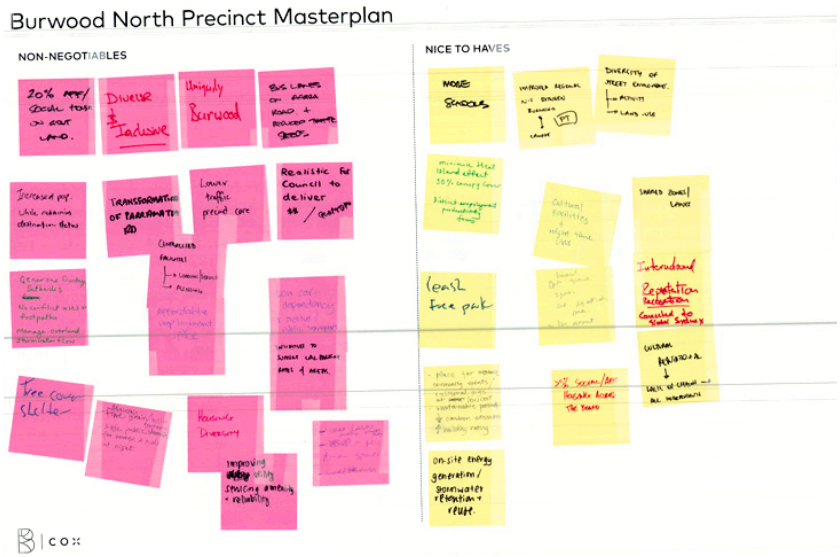


Visioning Charrette breakout group ideas - Vision and Priorities *Source: COX*

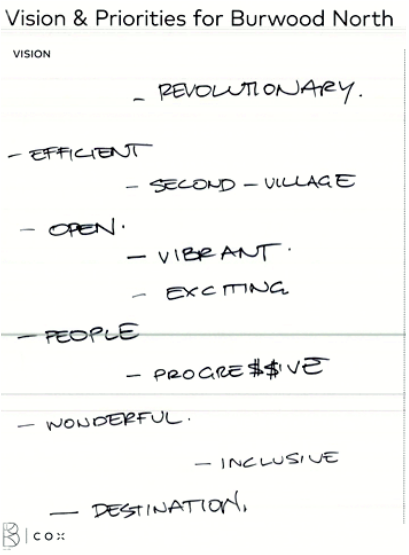
Visioning Charrette

Key Priorities

- Diverse housing – provision of affordable housing in perpetuity, multi-generational housing, key worker housing, age in place housing, student housing, build to rent
- Provide more than 5% social and affordable housing across the precinct and 20% affordable and social housing on government land
- Commensurate amenity to density – additional open space and social infrastructure to support increased population
- Slower speed limits, prioritising walkability and amenity for pedestrians over vehicles
- Active transport prioritised on Burwood Road – a green infrastructure spine, as well as on adjoining streets to encourage and support walking and cycling through the precinct
- Review car park ratios and parking mechanisms throughout precinct to incentivise public and active transport use
- Concept vs reality – mechanisms to deliver the vision must be feasible and implementable



Visioning Charrette breakout group ideas - Non-Negotiables and Nice to Haves. *Source: COX*



Visioning Charrette breakout group ideas - Vision and Priorities *Source: COX*

Landowner One-on-One Meetings

Overview

Major landowners in the precinct that are known to be preparing significant development proposals (at various stages of development) were approached by Council to understand what their proposals are and what they see as the opportunities and constraints to development within the precinct. Individual meetings with the landowners who responded to the meeting request took place online through November and December 2022.

Landowners

The project team and Council met with the landowners of the sites indicated in the table opposite. Shelter NSW also provided a written submission to Council regarding the masterplan, with key recommendations in the submission captured within this section of the report.

Key Outcomes

- There is developer appetite to deliver medium-high density mixed use and residential developments within the precinct
- Affordable housing contributions, either monetary or in-kind, need to be feasible and with clear upfront expectations
- Mechanisms to deliver open space and community infrastructure within the precinct need to be explored
- Developers are investigating provision of car share with reduced parking requirements (as per PRCUTS recommendations)
- Redevelopment opportunities near schools have the added consideration of overshadowing, overlooking and safety of students

Landowner	Meeting Date
Westfield Burwood	14/11/22
50A-54 Burwood Road, Burwood	11/11/22
17-23 Esher Street, Burwood	11/11/22
302-314 Parramatta Road, Burwood	14/11/22
Euralla	14/11/22
Landowner group: • 1-15 Esher Street, Burwood • 17-23 Esher Street, Burwood • 27-31 Esher Street, Burwood • 10-22 Neich Parade, Burwood • 24-32 Neich Parade, Burwood	21/11/22
166-204 Parramatta Road, Croydon	22/11/22
10-22 Neich Parade, Burwood	15/12/22
Shelter NSW	Written submission

Community Drop-in Session

Overview

A community drop-in session was held at Burwood Council on 22 November from 3:30-7:30pm. The session was attended by over 100 people, primarily residents and landowners from within and surrounding the precinct.

Representatives from the project team including COX, SCT Consulting and Burwood Council were set up around the room with a precinct map and some site analysis mapping, providing the opportunity for landowners and residents to talk to the project team in small groups or individually.

Discussion points and inputs from the community were captured on the maps with post it notes and via the online Community Survey using a number of iPads available at each station.

Complete outcomes from the community drop-in session are contained within Appendix B.

Key Outcomes

This section outlines key outcomes including opportunities and constraints identified by the community during the session. These are grouped under five themes.

Land-Use

- Desire to extend trading hours and boost night time economy
- Desire to create self sustaining local economy with more mixed business
- Desire for more medical services in the precinct
- Need for walking access to additional local services specifically to support density around metro
- Desire to integrate public facilities with MLC
- Provision of critical infrastructure to population density ratio

Movement

- Desire to mitigate existing traffic congestion and create a low traffic neighbourhood, taking cars off the road to create a walkable and safe precinct
- Reducing speed limits to increase walkability
- Desire for improved active transport connections - mostly N-S with designated cycle paths as part of a connected network
- Desire to create walkable laneways
- Traffic calming measures required at Meryla and Shaftesbury and Milton and Archer
- Improved access to Wangal Park and other local parks
- Provide safe and comfortable transit between stations

Sustainability

- Desire to move towards zero carbon operations - 6 star ESG rating
- Desire to retain trees
- More trees, rain gardens, green space
- Integrate rooftop green spaces into new development

Built Form and Character and Public Domain

- Need for more open space - catering to both formal and informal recreation - distribute parks across the precinct
- Focusing density around metro station
- Don't want the area to be dominated by high rise and the importance of retaining human scale - density done well
- Desire to be sympathetic to heritage items - with no high rise directly adjacent
- Co-housing principles to inform masterplan - shared facilities for efficiency and community buildings
- A desire to keep the laneway grunge culture
- A desire to keep Burwood 'prestige' with high quality building outcomes and generous living space

Governance

- Certainty and clarity from Council around process and delivery

Community drop-in session. *Source: COX*

Community drop-in session. *Source: COX*

Landowner Survey

Overview

A landowner & resident survey for those located within the precinct boundary was hosted online on the Participate Burwood page from 22 November - 4 December 2022. The survey received 59 responses during this period.

A copy of the survey and full survey results are contained within Appendix C.

Survey Respondents - Key Facts

Over 50% of people surveyed have been living in Burwood over 10 years

35% of people grew up in the area

98% of people visit the shops followed by parks, restaurants and health services.

89% of people walk to get around Burwood, compared to 3% that cycle

70% of people rate that their top priority for living in Burwood is shops, restaurants and services within walking distance

54% of people say they choose to live in Burwood because its close to family and friends and because its close to places they like to visit.

52% of people work outside of Burwood compared to 35% that work in Burwood

There are both young adult and older residents in Burwood. Main age group surveyed are between the ages of 25-34 and 60-69

Key Outcomes

Key findings from the survey are contained within this section.

Strengths of Burwood North

- Central location, convenience - shops, restaurants, public transport
- Exciting community feel
- Continuing to make Burwood the place with the best food and shopping
- Multi-cultural community
- City lifestyle
- There is a strong supportive community
- Burwood Park is probably one on the best features of the suburb - however more parks are need to support a growing population
- A place where families settle, children grow, high level of convenience to parks, schools and health services for the elderly to connect with community
- Currently a wonderful connected location - a thriving hub
- Well placed and central to all Sydney areas

Challenges at Burwood North

- Unsafe walking environment
- Affordability
- Roads dominated by cars and parking
- Not enough greenery on streets
- Overcrowding - too many people
- Not enough open space within the precinct boundary
- Limited diversity of shops and restaurants
- Not enough choices of units/ apartments
- No real bike lanes
- Poor quality homes designed to be too hot or cold
- Traffic congestion and noise
- Footpaths are too narrow
- Too many barriers and not enough places to cross Burwood Road
- Lack of infrastructure for growing population
- Parramatta Road acts as barrier preventing north-south connections
- Urban heat island effect
- Need for collaboration and interconnectedness between active and public transport

Landowner Survey

Ideas for Burwood North

Streets and Movement

- Burwood Road - a beautiful pedestrian boulevard with light rail connections, with excellent separated bike lanes that form a full network
- Prioritising public and active transport including rapid mass transit on Parramatta Road, bike lanes on State roads and improved local bus services
- 30km/h safe, walkable speeds and minimised car parking provision
- Burwood to be known as a cycle town with ample safe bicycle lanes as well as convenient and safe bicycle parking and facilities
- Underground links from the metro - keep the cultural and connected feel of Burwood

Destination

- Making Burwood the place with the best food and shopping
- Retain the historical character but modern in its services and offering - a place to take notice of

Sustainability

- Exemplar sustainable precinct
- Urban greening throughout Burwood North to reduce urban heat island effect - including tree planting / planter boxes, hanging baskets, verge planting, roof gardens

Community and Character

- Intergenerational living - ability to live in separate apartments in same apartment block - generous in size - to strengthen sense of family - important in Burwood with many growing families that need separate living spaces
- A 'village type' atmosphere blended into high rises, including commercial spaces down below to accommodate community uses and resident run retail and services
- Community rooftop garden of edible plants and vegetables
- Bustling social and commercial hub - attract new generation of workers and residents
- A new oval for sports, fairs and outdoor festivals

Online Community Engagement

Overview

The Participate Burwood page has received over 2,300 visits from more than 1,400 unique visitors from October 2022 - July 2023. Visitation peaked during November 2022 following a campaign by Burwood Council.

An online 'social map' has been hosted on the Participate Burwood page since October 2022. 76 contribution had been made as at December 2022. The 'social map' will remain open throughout the next stage of the masterplan project to continue enabling community members to share their perspectives and ideas for the precinct.

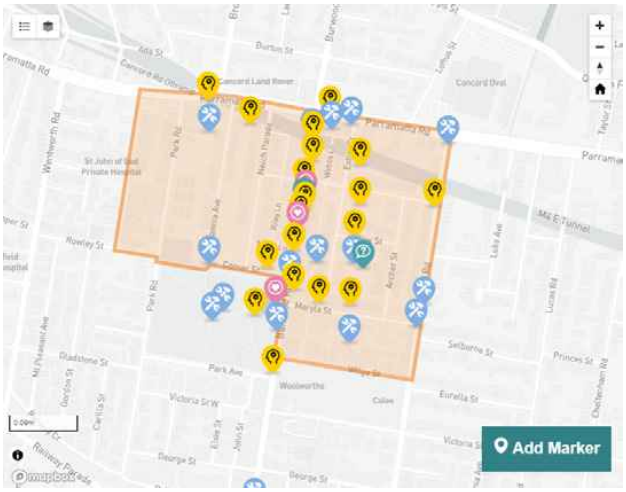
This online engagement platform seeks further community views to understand:

- What makes Burwood North unique and interesting?
- What needs improvement?
- What are their ideas for growth and change in the future?

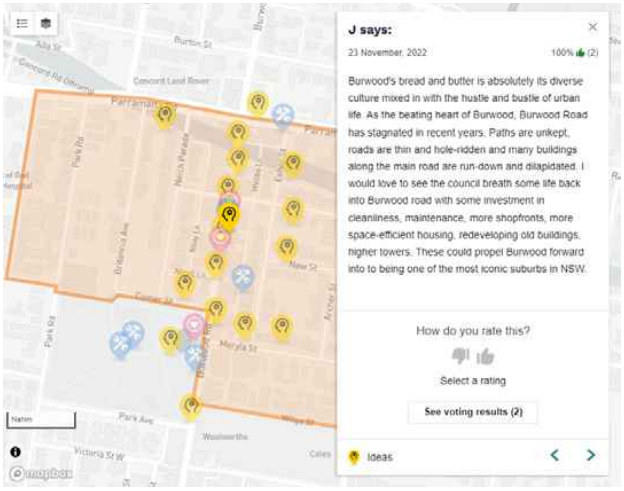
Participants are asked to add a marker and comments under the four following categories:

- Love - Places you love in the centre and why you like them
- Improve - Issues or challenges facing the centre
- Ideas - Big ideas and opportunities for improvement
- Research - Places or buildings important to the community for further investigation

A copy of all responses as at December 2022 are contained within Appendix D.



Participate Burwood Social Map. *Source: COX*



Participate Burwood Social Map, showing comment from participant. *Source: COX*

Online Community Engagement

Key Outcomes

Things They Love

- Being able to access a range of health facilities along Burwood Road
- Lovely established trees along Burwood Road which contribute to its character
- Burwood Park is an amazing asset for the community

Issues and Challenges

- Car and truck traffic creates air and noise pollution to nearby residents
- Unkept paths and hole ridden roads, run down and dilapidated buildings
- Improved vehicular access onto Parramatta Road from Shaftesbury Road
- Traffic congestion at Meryla Street and Milton Street intersections with Shaftesbury Road
- Entry points into Burwood Park off Burwood Road are limited
- Traffic congestion at Meryla and Burwood Road intersection
- Concerns around increasing densities on existing traffic congestions and unsafe roads and footpaths
- Traffic congestion at Milton and Shaftesbury Road intersection
- Burwood Road is always congested
- The local high school (Concord High) cannot support the influx of new students proposed by the new residential development
- Concord Hospital, Burwood Police Station, Ambulance etc all need additional resources.

Ideas and Opportunities for Improvement

Movement

- Section of Parramatta Road adjoining precinct reduce to 40km/h one lane zone
- Improve pedestrian crossing along Burwood Road.
- Remove trucks and expand zone for pedestrians, cyclists and vegetation - will benefit local residents, shop owners and commuters alike.
- Roundabout at Meryla and Shaftesbury Road intersection
- Traffic improvements at Milton and Shaftesbury Road
- Traffic improvements at Meryla and Burwood Road
- Walkway under or over Burwood Road near the new station would be useful
- A free shuttle bus service between the Burwood North Metro Station and Burwood Station with 1-2 stops along Burwood Road
- Eliminate kerb side parking during busy time and use them as exclusively bus lanes.
- To connect Burwood North to the rest of Burwood. provide good signage, so Burwood North residents know where to find all the key services in Burwood
- Improve the island in the middle of the road when turning right from Shaftsbury road into Arthursleigh Street
- Through site links on the western side of the precinct would really help the walkability of the area
- Avoid further congestion by making the area friendly to commuting by bike, particularly to the new station.

Economy and Community

- Burwood North should strive to be a walkable liveable area for all. Mixed use dense development and safer streets are the best way for this to happen so everyone can enjoy easy walking/cycling to shops and businesses
- How can we support Burwood North as a Health Hub?
- Higher densities around new metro station - with vibrant, buzzing businesses doing a brisk trade
- Potential for Meryla Street to be redeveloped to accommodate childcare facility and other community facilities
- Adjacent station development at metro to include car parking and shops
- Activate area with wide open spaces, tall and slim towers, commercial and retail and accommodation scattered throughout
- The existing bus depot at the corner of Shaftesbury Rd and Parramatta Rd could be redeveloped to a multipurpose establishment. Can be utilised as an existing bus depot; a bus interchange; as well as a multi-storey public car park that Burwood really needs
- The Masterplan needs support from the NSW State Government to resource the infrastructure required to follow the proposed increase in density
- Recreation facilities are strained and need to be considered for additional large scale opportunities for this scale of development.

Landscape and Urban Design

- Enhancing streetscape with additional plants and trees
- Smaller and medium sized parks should be considered as part of the masterplanning of the precinct
- New green open space associated with new metro station - space would benefit from a small cafe/ restaurant and maybe a dog roaming area.
- Provide more green spaces filled with trees for people residing in the areas around Park Road and for patients of St John of God Private Hospital to enjoy, relax and exercise in.
- Enhance the streetscape and maintain 'space' in Burwood north by ensuring new development accommodates street trees without awning conflicts

First Nations Engagement

Overview

Council contacted over sixty First Nations organisations and individuals and notified of them of the Burwood North Masterplan project. Council received expressions of interest from sixteen First Nations organisations and individuals about being participants in the project and being involved in the identification, discussion, and development of the First Nations design principles that are intended to guide the masterplan.

An advisory panel was established with those groups that expressed interest in participating in the project. Two workshops were convened by Council with the advisory panel:

- Workshop One convened as a start-up engagement on 6 December 2022 at Burwood Council.
- Workshop Two convened on 1 March 2023 at Burwood Park Community Centre, as a follow on workshop to discuss the masterplan progress and ideas for First Nations design interventions and recognition through the precinct.

The cultural knowledge shared by the advisory panel has been used through the Burwood North Masterplan. Further information is contained within the *Burwood North Precinct Masterplan: First Nations Design Principles Report*, by Dominic Steele Consulting Archaeology.

First Nations workshop 1. *Source: COX*

Workshop 1

Council convened a start-up engagement workshop with the advisory panel on 6 December 2022. Council and the design team listened to the stakeholders initial thoughts and points of view and this understanding enabled conversations to be had about ways Council are hoping to engage and represent First Nations people within future stages of the masterplan.

Key Outcomes

The discussion was formed around opportunities for First Nations people to lead the design of Aboriginal elements in the masterplan, and for engagement to occur throughout the process. A set of preliminary design principles were tabled and considered for endorsement.

Preliminary Design Principles

- First Nations people should lead or co-lead the First Nations elements of design in the Masterplan and should make decisions on how cultural knowledge is used.
- Local First Nations communities should be given opportunity to be involved in the process.
- All First Nations design elements used in the Masterplan must be approved for use by the First Nations people who conceived and/or created the design element.

The First Nations advisory group resolved at the close of the meeting to take away the ideas for the above design principles and provide feedback to Council and the design team on them at a follow up meeting that is to be convened with Council and the design team and the advisory group in early 2023.

The project team resolved at this meeting to provide the First Nations advisory group with illustrative concepts for the Masterplan and ideas about how to create places and spaces for First Nations people to share and celebrate and continue culture and Language.

First Nations Engagement

Workshop 2

A second workshop was convened with the advisory panel at the Burwood Park Community Centre on 1 March 2023. Council and the design team presented an update on the Masterplan progress, including open space and streetscape concepts for the precinct that incorporated considerations identified during Workshop 1. This included the need to create an attractive and varied built form character, safe and pedestrian friendly public domain with good connectivity, and a design that is responsive to the former creek line that ran through the precinct acknowledging the flooding impacts that occur through that part of the precinct.

Key Outcomes

Discussion was formed around the opportunities for First Nations design interventions and recognition of First Nations knowledge and culture within the landscape and public domain. Outcomes from the discussions included:

- The advisory group were supportive of the respect shown by the project to the old Wangal drainage line that runs through the land in the design of the masterplan to recognise its cultural significance to First Nations people and by ensuring it is not built on and is seen and cared for in public open space.
- The advisory group were supportive of the precinct open space strategy. In particular, the initiative to integrate sustainable water management practices balanced with providing recreational spaces.
- The advisory group would like to see this park and the watercourse it contains given cultural and natural heritage identity and a story through First Nations storytelling and interpretation.
- Recommendation that any public art and interpretation strategy proposed for the Precinct should include First Nations art and storytelling in future design of open spaces and key streets and laneways.
- Recommendation that Council should pursue First Nations place naming for the Precinct and should engage a First Nations service provider to create and implement an Aboriginal place naming strategy for the Burwood North Precinct as part of a Connecting with Country process for the masterplan.
- Recommendation that Council should continue to talk to people about future education and training and employment opportunities that may be enabled by the Masterplan that are associated with future landscape, building, landscape restoration, and maintenance of lands within the public domain in the precinct.

Updated Design Principles

Additional Design Principles were developed, intended to promote the integration of First Nations storytelling and interpretation into the design of the Masterplan public space strategy:

- Public art and interpretation strategies that are proposed for the Burwood North Precinct should include and integrate First Nations art and storytelling and interpretation in the design of public open spaces and in the design of key streets and laneways.
- A First Nations art and interpretation strategy should be prepared for the linear park that will cover the alignment of St Luke's Park canal.

Masterplan Scenario Workshop

Overview

The Scenario Workshop was held on Friday 10 February 2023 at Burwood Council.

The purpose of the Scenario Workshop was to invite comment from stakeholders and Council staff on the options developed for the Burwood North Precinct Masterplan, which was then used to formulate the preferred masterplan

The Scenario Workshop allowed participant stakeholders the opportunity to interrogate the options developed by the project team and Council, and to provide guidance on any constraints, opportunities and needs that may impact option selection.

Scenario Workshop Welcome. *Source: COX*

Scenario Workshop breakout group discussion, Movement & Sustainability. *Source: COX*

Attendees

The Scenario Workshop was attended by over 40 representatives including Burwood Council staff, stakeholders and the consultant team, each bringing a great variety of expertise, experience and priorities for the Burwood North Precinct.

Most of the attendees had previously been participants at the Visioning Charrette, so were familiar with the project and brought a continuity of knowledge and collaboration to the project.

Discussions took place between representatives from planning, transport, education, urban design and infrastructure including from a number of government agencies. Connecting these stakeholders enabled the sharing of competing and complementary perspectives and requirements for the Burwood North Precinct in a collaborative forum, allowing for greater certainty in the selection of a final masterplan option.

Burwood Council

- Council staff

Stakeholders

- Greater Cities Commission
- Canada Bay Council
- Department of Planning & Environment
- Sydney Metro
- Transport for NSW
- NSW Land and Housing Corporation
- Schools Infrastructure NSW
- Sydney Water

Consultant Project Team

- COX
- SCT Consulting
- JLL
- Oculus
- Mott MacDonald

Masterplan Scenario Workshop

Process and Participation

The Scenario Workshop began with an outline of the project programme, followed by a summary of findings from previous engagement undertaken for the project. The masterplan vision and Top Priorities that were developed following the Visioning Charrette and other stakeholder engagement were then presented and formed the basis for assessing the masterplan options.

The participants were then provided with a brief overview of the masterplan options to be assessed during the workshop. The masterplan options were developed collectively by the project team and Council, and while they were interconnected, they were presented under the following themes to enable focussed discussions:

- Open Space
- Built Form and Density
- Land Use and Economy
- Movement and Sustainability

Participants were placed in four groups and rotated between four 'stations' corresponding with the themes above. Members of the consultant project team facilitated the group discussions, presenting each option as a series of diagrams. The group facilitators encouraged participants to engage in discussion and provide comments on the drawings, in reference to the alignment of the options with the masterplan Vision and Top Priorities. Engaging a wide variety of stakeholders ensured that each viewpoint is heard in context, and that the final option is most efficient in its delivery of collective stakeholder outcomes.

There was a clear preference for option 3, primarily for its responsiveness to the former creek line through a linear open space. A detailed breakdown of the comments received through the workshop are detailed below.

Agenda

Time	Activity
9:15am	Arrival and registration
9:35am	**Welcome and Introduction** *Acknowledgement of Country* *Scenario Workshop purpose and format*
9:45am	**Engagement Outcomes, Vision & Priorities** **Overview of options and objectives by theme** - *Open Space* - *Built Form & Density* - *Land Use & Economy* - *Movement & Sustainability*
10:00pm	**Breakout Groups** Options by theme *Attendees rotate to each of the four themes (25 minutes per theme)*
11:40am	**Summary and Next Steps**
12:00pm	Close

Scenario Workshop breakout group discussion, Built Form & Density.
Source: COX

Scenario Workshop breakout group discussion, Open Space.
Source: COX

Masterplan Scenario Workshop

Options: Built Form & Density

Key Priorities

- Provide a range of housing typologies and options to support a diverse population, including catering for multi-generational living
- Create opportunities for medium rise development in addition to high rise development, enabling community oriented neighbourhoods to occur
- Provide generous living space for young people in share housing as well as growing families
- Deliver an exemplar high density urban precinct with a diversity of building types and prioritisation of a high amenity human experience
- Encourage innovative architectural, design and delivery models to ensure design excellence in new development and the public domain

Objectives

- Position higher densities around higher amenity locations such as public spaces
- Position taller buildings one block back from Burwood Road and Parramatta Road to maintain a finer grain
- Built form scale transitions down to surrounding low density blocks
- Avoid overlooking and overshadowing of schools

Assumptions

- Height and FSR to be confirmed through the development of the masterplan alongside feasibility and more detailed site testing
- Minimum Lot size: 1,600m^2
- Maximum tower floor-plate: 750m^2
- Building separation to comply with the Apartment Design Guide
- Constraints to short and medium term renewal
  - recent development
  - strata titled properties
  - fragmented lot ownership

Options Overview

Option 1

- Dispersed open spaces
- Higher densities positioned on sites known to have been amalgamated
- Burwood Road remains as a medium density fine grain street with new infill development
- Opportunity for taller towers set back from Parramatta Road

Option 2

- Higher densities surrounding large open space to capture the amenity of the park and to provide the opportunity for contributions to assist in funding the delivery of the open space
- Requires significant property acquisition to deliver large open space (not feasible for Council)
- Opportunity for a landmark tower at the junction of Burwood Road and Parramatta Road, with adaptive reuse of the Bath Arms Hotel

Option 3

- Open space along former creek line with higher densities oriented around it
- Opportunity for height concessions to enable the delivery of open space on amalgamated sites between Esher Street and Archer Street

Masterplan Scenario Workshop

Key Discussion Points & Outcomes

Implementation

- Controls should be introduced to encourage lot amalgamation, likely a bespoke option beyond a rudimentary minimum lot size
- A maximum parking rate should be introduced
- 750m^2 maximum tower floor-plates are useful as an assumption and have the potential to become a development standard
- Sound management controls should take note of sensitive uses
- 2% quota of affordable housing is insufficient
- An additional school within the precinct is not required under population numbers outlined in PRCUTS

Built Form and Activation

- The metro station can host high-density landmark sites on street corners
- A variation of densities throughout the site can create distinct communities
- Street level should be a podium interface
- Transition zones with lower built along the edges of the precinct will ensure a good interface with surrounding existing low density

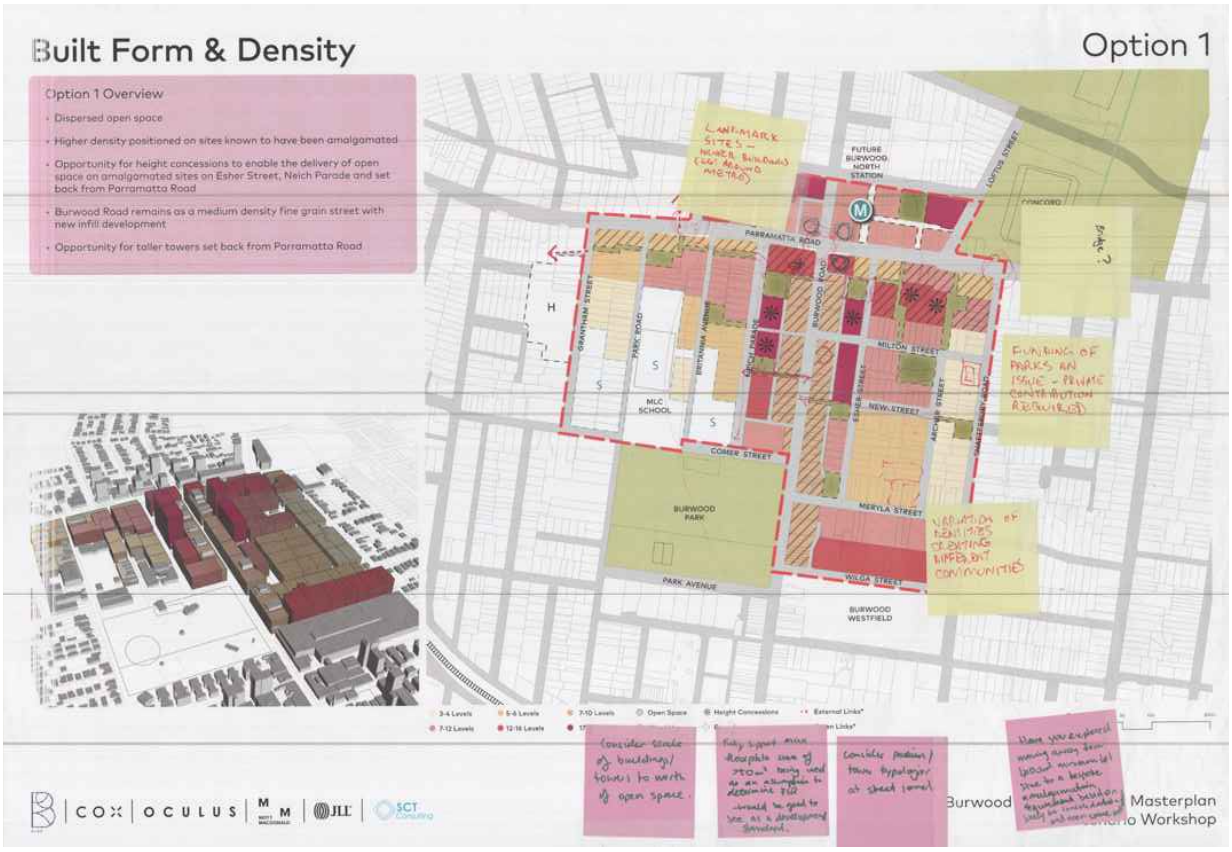
Landscape and Open Space

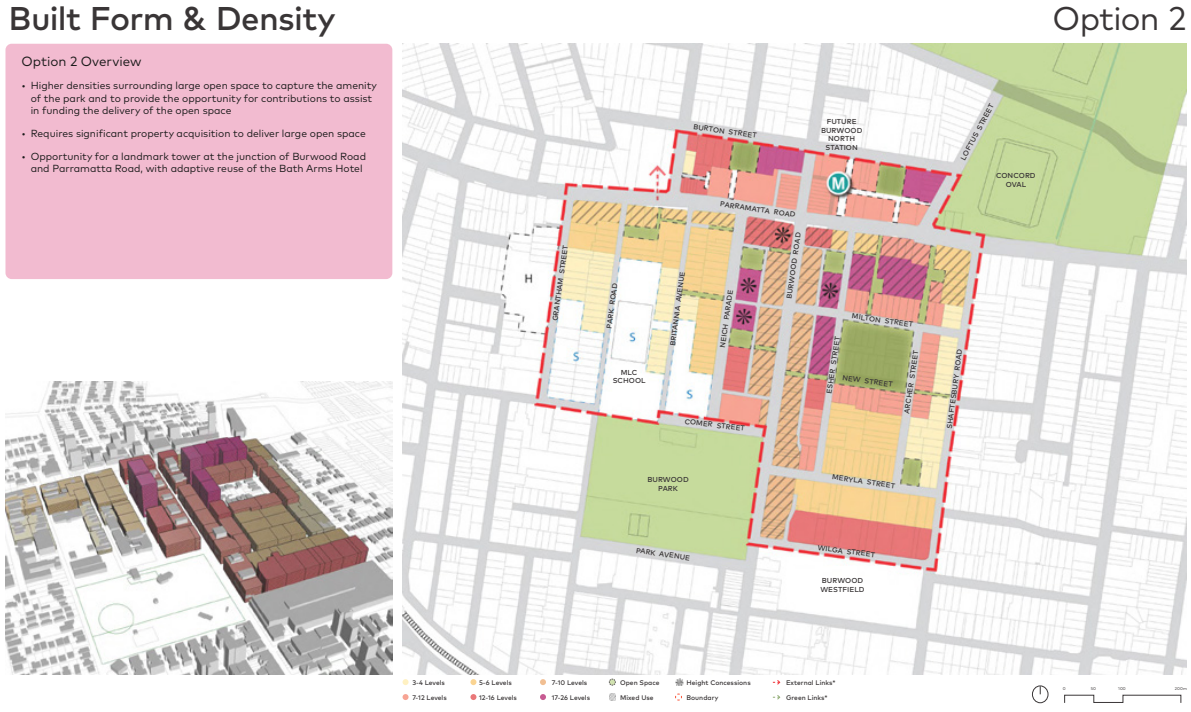
- Building scale should be in harmony with open space and minimise overshadowing
- Linear park will activate the street
- Opportunity for re-vegetation along green link with flora
- Green link through open space can address overflow and flooding issues
- Developer contributions are required to deliver parks

Streets and Movement

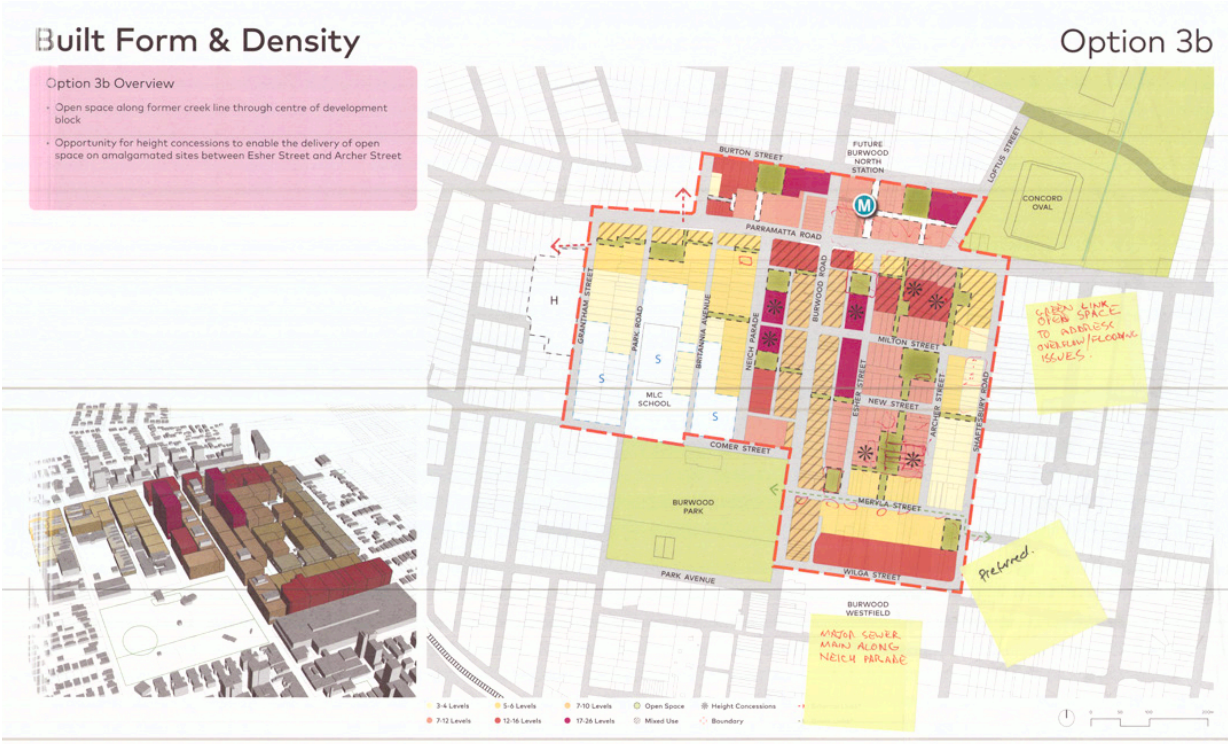
- Pedestrianisation of Burwood Road may impact active frontages
- Possibility that bus interchange on Parramatta Road will limit pedestrian permeability

Masterplan Scenario Workshop





Masterplan Scenario Workshop



Masterplan Scenario Workshop

Options: Land Use & Economy

Key Priorities

- Maintain and expand on the richness and complexity of existing land uses with diversified dining and retail experiences
- Provide local service and community facilities within walking distance
- Support the growth of the Burwood Town Centre as a strategic centre
- Maximise opportunities for activation of streets and public spaces, drawing on existing vibrancy to create a hub around the Burwood North metro station.
- Enable people to experience Burwood North as both a quiet and bustling neighbourhood, with defined areas of genuine mixed use balanced with quieter streets and spaces
- Support small business of different scales and types that provide a diversity of job opportunities
- Build on the existing fine grain character, with laneway activation and small scale retail tenancies

Observations

- Commercial and mixed use development accommodated on Sydney Metro's site at Burwood North across all options.
- Burwood North will continue to benefit from public transport connectivity including the existing Burwood station, extensive bus network and new metro station at Burwood North with travel to both Parramatta and Sydney CBD in ~10 minutes.
- Established commercial area with a strong health/medical, education and professional industry presence.
- Benefits from considerable retail and amenities along Burwood Road and Burwood Westfield, located to the immediate south of the precinct.
- As it relates to 'investment grade office', Burwood North can't be considered in isolation from its competitor centres, including current competing markets (Burwood Town Centre, SOP, Parramatta, Rhodes) as well as future markets (The Bays).
- Longer-term implications of COVID-19 to be considered. Originally considered to have more greatly impacted the CBD, significant impact for a selection of suburban office markets has also been witnessed. As at end of 2022, most markets are showing elevated vacancy levels across A-grade stock, with nearby examples including SOP (~13%), Parramatta (~20%), and Rhodes (~35%). Across these three markets, ~180,000m^2 of A-grade office is vacant.
- Part of the explanation is an emerging hub & home model, compared to the previously growing hub & spoke model – the latter which benefited Sydney's suburban office markets.

Assumptions

- Commercial floorspace assumed at 4:1 FSR
- 25m^2 per job
- GFA to NLA efficiency 90%
- Approximate NLA and jobs is for the area noted as potential large floor plate commercial only, and excludes jobs within the potential retail/commercial areas and dispersed jobs throughout the precinct

Options Overview

Option 1

- Smallest concentration of commercial uses, located on Sydney Metro sites only
- Mixed-use on Parramatta Road and Burwood Road

Option 2

- Additional area of large floor-plate commercial uses fronting Parramatta Road in the block between Esher Street and Archer Street
- Mixed-use on Parramatta Road and Burwood Road

Option 3

- Increased area of large floor-plate commercial uses fronting Parramatta Road between Esher Street and Shaftesbury Road to create an employment hub at Burwood North
- Mixed-use on Parramatta Road and Burwood Road expanded to Esher Street, Neich Parade and Wilga Street

Masterplan Scenario Workshop

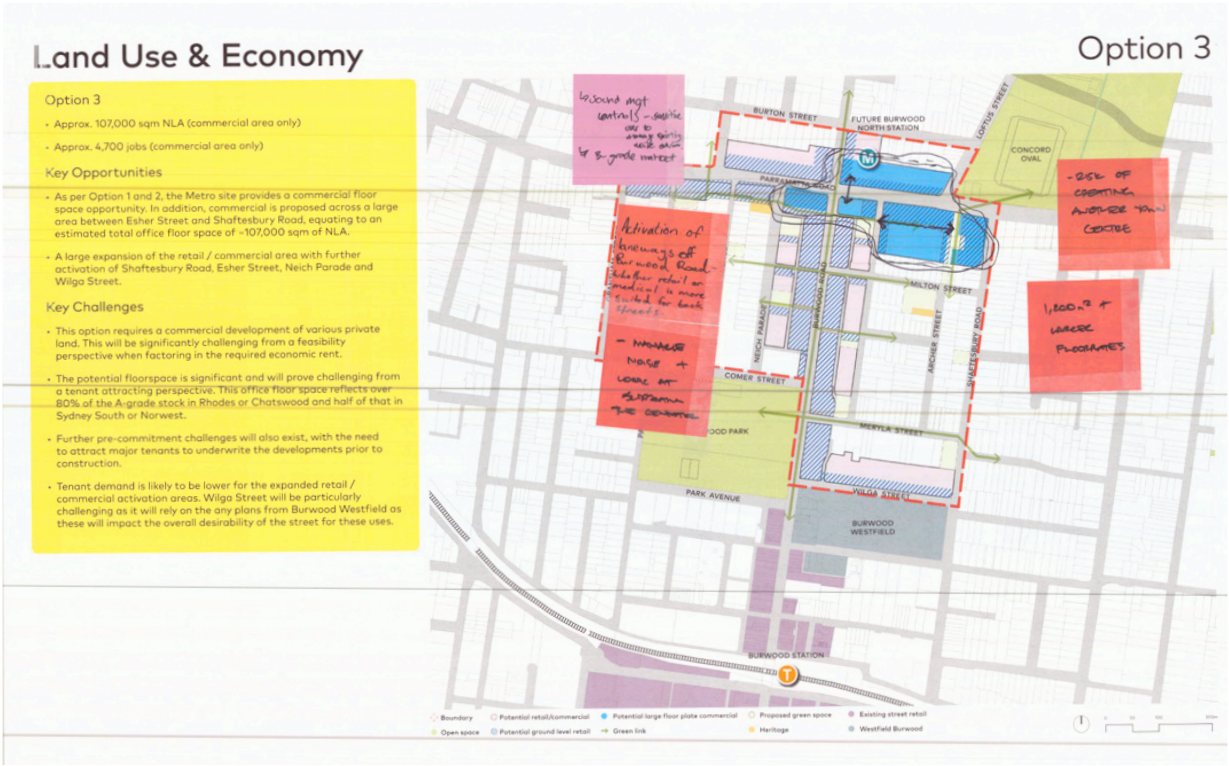
Key Discussion Points

Implementation and Land Use

- Residential is relatively easy to achieve - Government could catalyse an employment precinct here, akin to Crows Nest/St Leonards and Brookvale/Dee Why.
- Current approvals within the precinct are being revisited for additional commercial
- 1000m^2 floor-plates could accommodate a small supermarket
- Land use mixes of future amalgamations should be at most 20% commercial
- The Metro site has potential for B-Grade commercial and medical uses
- Zoning on Parramatta Road should allow for urban services to be densified
- The large extent of commercial uses depicted in option 3 risks creating another town centre, potentially in competition with Burwood Town Centre
- Active retail and dining uses should be located on laneways perpendicular to Parramatta Road rather than on the road itself
- On Parramatta Road, the podium level should accommodate non-residential uses
- Overshadowing of the southern side of Parramatta Road should be considered - this has consequences for activation
- Affordable housing for key workers is necessary to support future employment uses
- Potential exists for an education campus and hotel accommodation
- Sound management controls will be necessary on Parramatta Road
- A maximum parking rate should be applied for non-residential uses
- Westfield could host a last-mile logistics hub for the greater Burwood area

Masterplan Scenario Workshop

Masterplan Scenario Workshop



Masterplan Scenario Workshop

Options: Open Space

Key Priorities

- Design and deliver the precinct to Connect with Country by celebrating the cultural landscape
- Provide a sufficient quantum and diversity of open space types for cultural events, gatherings, activities throughout the precinct to complement Burwood Park
- Integrate places and spaces within streetscapes and public domain, enabling the community to come together informally and for chance encounters to occur

Objectives

- Delivering places for people
- Minimise property acquisition by Council
- Maximise delivery of open space as part of development sites and within the public domain
- Most residents can access an open space within 200m, that has a minimum size of 1500m^2
- Utilise open space and pedestrian connections to improve accessibility to open space as well as general accessibility across the precinct
- Maximise functionality of open space to provide for a range of activities and gathering sizes as well as environmental and ecological benefit

Assumptions

- Provision of open space for population growth north of Parramatta Road is covered by Canada Bay Council
- Potential street closures / shared streets / through site links could be included in open space provision
- Provision of a new district scale park within the precinct is not feasible
- Achieving a target open space provision of 10.2m^2 per person in accordance with the 2019 Burwood Community Facilities and Open Space Strategy is not feasible within the site, requiring an estimated 3.5ha+ to accommodate the increased population

Options Overview

Option 1

- Dispersed local parks, designed to be easily accessible for the local community and offer a variety of recreational spaces including:
  - 4 local parks including 1 urban park
  - 10 pocket parks including 4 urban plazas

Option 2

- A combination of a large consolidated local park and several pocket parks including:
  - 1 large local park (not feasible for Council to acquire)
  - 2 local parks including 1 urban park
  - 8 pocket parks including 3 urban plazas

Option 3

- Planning of linear parks along a natural drainage line presents an opportunity to integrate sustainable water management practices while providing new recreational spaces for the community including:
  - 3 linear parks
  - 3 local parks including 1 urban park
  - 7 pocket parks including 3 urban plazas

Masterplan Scenario Workshop

Key Discussion Points

Streets and Movement

- Parramatta Road is a significant barrier to walkability. This should be reflected in walking catchment plans
- Walking connections to schools should be considered
- Laneways and shared streets can form part of the open space network
- Pedestrian and cycling links to Concord Oval, Canada Bay and the Parramatta River should be considered

Implementation

- The option selection process needs to be explained, particularly its alignment with PRCUTS visions
- The large park in option 2 is not feasible for Council to acquire
- Possibility of using defined 'key sites,' rather than assigning lot-specific FSRs for open space delivery
- Open space delivery will be staged to align with the feasibility of residential development

Landscape and Open Space

- The proposed 6m setback on Parramatta Road can be quantified as part of the open space network
- Small pocket parks can be less useful as open space but are still important parts of the open space network, offset by the regional Burwood Park
- Potential for private open spaces to be made public
- Potential for plazas associated with the metro station to be located within the Parramatta Road setback, as well as on Burwood Road
- New Street presents an opportunity for a linear urban park and active transport connections
- Linear park option (3) presents a good outcome for flood mitigation
- Linear open space (option 3) can create a sub-precinct, with green space aligning with surrounding built form and density

Masterplan Scenario Workshop

Open Space

Option 1

Dispersed Local Parks

Dispersed local and pocket parks are being planned in the study area. These parks are designed to be easily accessible for the local community and offer a variety of recreational activities.

Features:

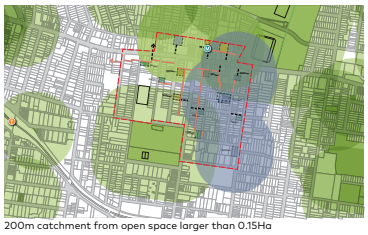
- 4 Local Parks (0.15 to 0.3 ha), including 1 Urban Park / Plaza
- 10 Pocket Parks (<0.15 ha), including 4 Urban Plazas
- 2.18ha new open space

Opportunities:

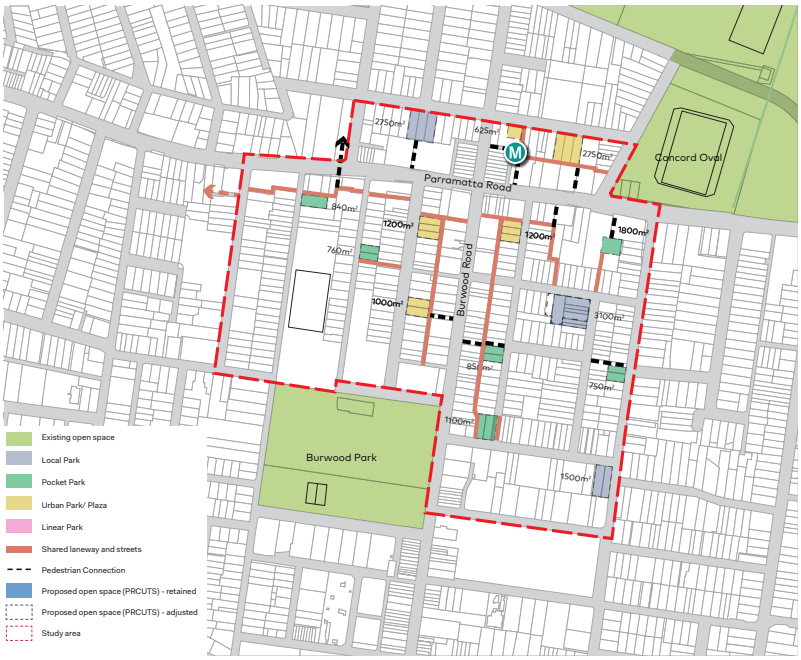
- Easily accessible for the local community
- Variety of activities offered
- Avoids constrained sites
- Can be more easily delivered as part of amalgamated lot development or land acquisition

Challenges:

- Reduced recreational opportunities and functionality associated with smaller park sizes
- Lack of additional space for larger gatherings and events
- Lack of open space connectivity and corridors



200m catchment from open space larger than 0.15Ha



Open Space

Option 2

Large Local Park

A combination of a large consolidated local park and several pocket parks.

Features:

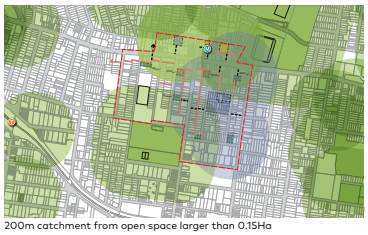
- 1 Large Local Park (1.3 ha)
- 2 Local Park (0.15 to 0.3 ha), including 1 Urban Park / Plaza
- 8 Pocket Parks (<0.15 ha), including 3 Urban Plazas
- 2.22 ha in total

Opportunities:

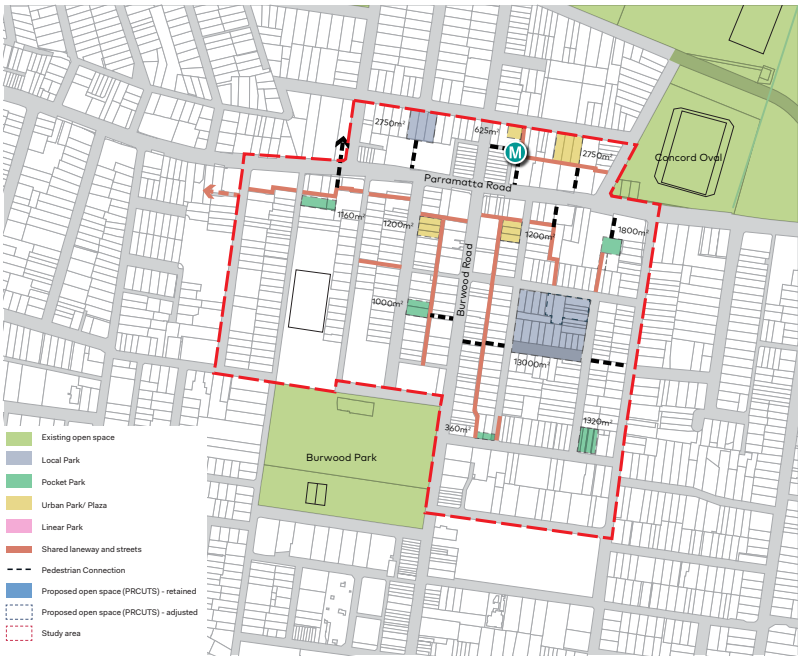
- Consolidated park has greater opportunities for larger gatherings, play spaces and informal recreation
- Eases pressure on Burwood Park by providing similar functionality
- Large local park located on less constrained land and in a relatively central location
- Greater variety of recreational opportunities
- Accessibility of open space retained

Challenges:

- Large amount of land acquisition required in a single location
- Conversion of New Street to open space



200m catchment from open space larger than 0.15Ha



Masterplan Scenario Workshop

Open Space

Green corridor

The planning of linear parks along a natural drainage line in Burwood presents an opportunity to integrate sustainable water management practices while providing a new recreational space for the community.

Features:

- 3 Linear Parks (0.15 to 2 ha)
- 3 Local Parks (0.15-0.3ha), including 1 Urban Park / Plaza
- 7 Pocket Park (<0.15 ha), including 3 Urban Plazas
- 2.17Ha in Total

Opportunities:

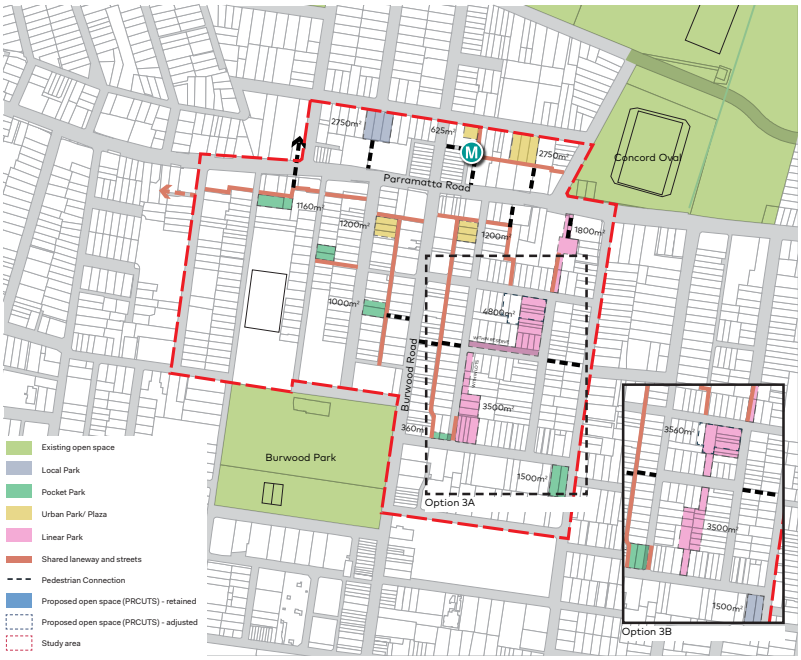
- Incorporating sustainable water management within ecological corridors that reveal underlying hydrological systems
- Creates an open space connection between Burwood Park and Concord Oval
- 3A: more street presence, better integration with surrounding areas and increased public access
- 3B: supports more efficient development and may be more easily delivered through consolidated lot development

Challenges:

- Cost of land acquisition and implementation of WSUD elements
- Focuses open space to one side of the site
- Reduced recreational opportunities in narrower open space
- 3A: less efficient development potential with streetside parks
- 3B:appearance of privatisation for internalised open space

200m catchment from open space larger than 0.15Ha

Option 3



Masterplan Scenario Workshop

Options: Movement & Sustainability

Key Priorities

- Support Burwood North to become a renowned and sustainable urban renewal precinct, that supports the movement towards zero carbon operations
- Maximise urban greening of Burwood North with increased tree canopy, rain gardens, rooftop gardens, community gardens and enhanced ecosystem biodiversity
- Incorporate water sensitive urban design - stormwater management integrated with public domain and open space
- Support sustainable technologies and initiatives that will reduce carbon emissions

Objectives

- Council owned open areas can be converted into public open spaces
- High density buildings contribute to public open space even if located away from the proposed public spaces
- Council will drive Net zero strategies across the precinct
- Design transport network to account for future enhancement of alternative mobility
- Provide overland flow route along historical creek line following existing topography
- Provide safe evacuation routes
- Enable development by removing/relaxing flood constraints
  - Allow for effective flood conveyance/overland flow
  - Allow for temporary flood storage in open space

Options Overview

Option 1
Dispersed open spaces evenly located within the precinct and well connected via pedestrian lanes.

- East West pedestrian link, vibrant plazas along Burwood Road
- Green roofs in high density areas to reduce heat island effect and create a biodiversity corridor between Burwood Park and the Oval
- High potential for efficient buildings within the precinct
- Fewer opportunities for the regeneration of the creek line
- Smaller urban parks with less opportunities for large outdoor group activities

Option 2
One main large park, well connected to Burwood Road via pedestrian lanes and a collection of smaller parks. Part of Burwood road is entirely pedestrianised to promote al fresco dining and host events such has farmer markets, festivals etc.

- Possibility for large group outdoor activities
- Burwood Road as main green link, pedestrian only
- Green roofs along Parramatta and Burwood Rd to reduce heat island effect
- Smaller amount of open space within the site
- No Connector proposed on Burwood Rd, Neich Parade to be main Transport link. Additional study required to confirm feasibility of bus route adjustment.

Option 3
Linear park along the former creek line.

- Trail/promenade along the creek, continuous green link between the Oval and Burwood Park
- High density buildings along Parramatta Rd, Burwood Rd and opposite Westfield
- Green roofs along Parramatta Rd and Burwood Rd to reduce heat island effect
- Green roofs provide additional green open space for the community
- Most of the proposed open space are small pocket parks

Masterplan Scenario Workshop

Key Discussion Points

Stormwater and Flood Mitigation

- Opportunity to align open space with areas of flood risk, providing flood storage (option 3), in turn mitigating flooding in Concord Oval

Potential Sustainability Initiatives

- Provide FSR and height bonuses for water and energy sustainability implementation
- Opportunity to recycle water

Streets and Movement

- Opportunity for Burwood Road to become a transit mall catering to bus movements, potentially staging and trialling road closures to private vehicles - this is highly desirable but requires investigation of the impacts to the wider street network
- Elizabeth Street, Hobart is a model for closing a main street to vehicles
- Bus connections are essential - health of Burwood relies upon routes to Campsie/Hurstville/Macquarie Park
- Consideration of how regional trips (>5km) are addressed
- Street typologies should be aligned to the Movement and Place Framework
- 30km/h speed limit is non-standard - adhering to standards will avoid opposition, however it is being implemented in other LGAs (City of Sydney)
- Account for Metro uplift in pedestrian traffic. Pedestrianising north-south routes is a possibility
- Evacuation capacity of the precinct is important to understand
- Laneways adjacent to open space can remove the appearance of 'private' open space

Masterplan Scenario Workshop

Sustainability

Objectives

- Provide overland flow route along historical creek line following existing topography
- Provide safe evacuation routes
- Enable development by removing/relaxing flood constraints
  - Allow for effective flood conveyance/overland flow
  - Allow for temporary flood storage in open space

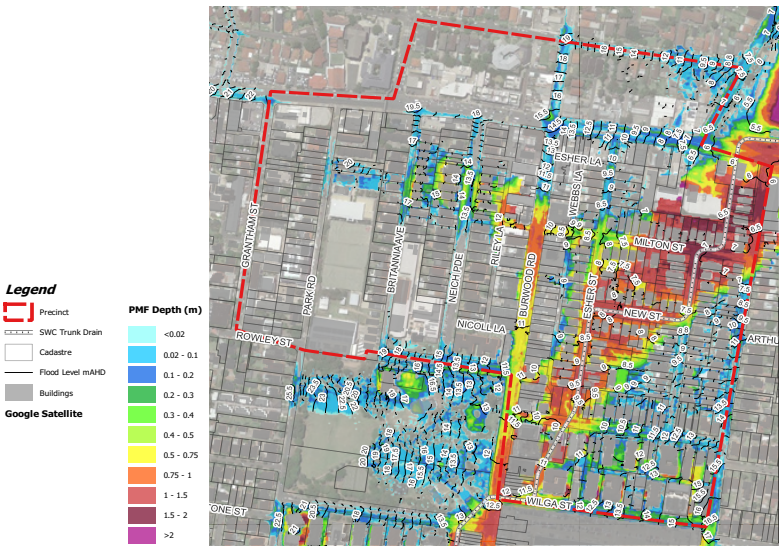
Opportunities

- Align overland flow route in proposed green corridor
  - Promote infiltration within the corridor
  - Reduce flood affectation by consolidating overland flow in (new) open space
- Egress – improve (currently limited and discrete) east-west links to Burwood Road and wet towards Park Road to provide evacuation route out of high hazard flood areas
- Drain local trapped sag areas with new pit/pipe infrastructure within road reserves

Constraints

- High flood hazard – dangerous conditions in rare flood events
- Significant additional costs related to high rise buildings within flooding zones (site specific flood studies, flood compatible materials, additional protection for electrical systems, flood barriers and for basements etc)
- Overland flow levels, providing constraints with high FPL where freeboard to FFL is a requirement
- Fragmented development lots and remaining existing development as barrier to overland flow route
- Existing development as sensitive receiver for potential flood impact

Flooding



PMF Flood Depth and Water Surface Levels

Sustainability

Overview

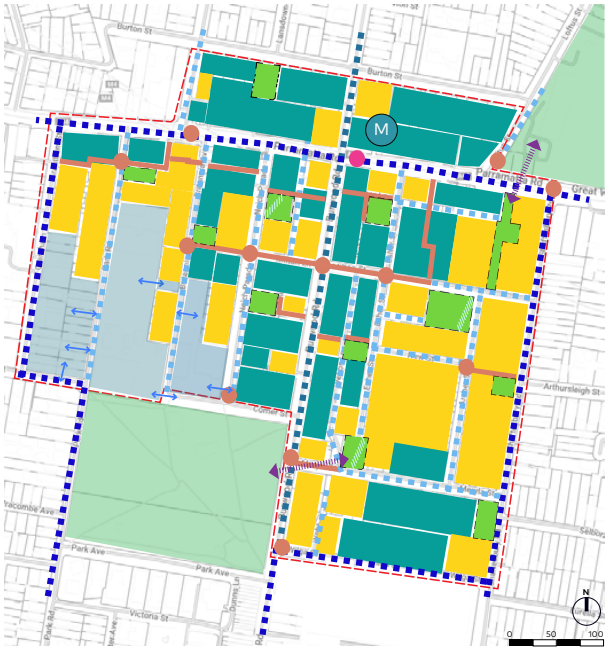
Collection of small and large open spaces evenly located within the site and well connected via pedestrian lanes.

- East West pedestrian link, vibrant plazas along Burwood Road
- Green roofs in high density areas to reduce heat island effect and create a biodiversity corridor between Burwood Park and the Oval
- High potential for efficient buildings within the precinct
- Fewer opportunities for the regeneration of the creek line
- Smaller urban parks with less opportunities for large outdoor group activities

Proposed Open Space
Low to Medium density
Green roof - Medium to High density
Quietway
Connector
Transport link
Green Link
Pedestrian lane/plaza
Main pedestrian crossing
Water body
Visual connection between open spaces

Climate Positive
Movement and Place
Infrastructure
Nature-based Solutions

Option 1



Masterplan Scenario Workshop

Sustainability

Option 2

Overview

One main large park, well connected to Burwood Road via pedestrian lanes and a collection of smaller parks. Part of Burwood road is entirely pedestrianised to promote al fresco dining and host events such has farmer markets, festivals etc.

- Possibility for large group outdoor activities
- Burwood Road as main green link, pedestrian only
- Green roofs along Parramatta and Burwood Rd to reduce heat island effect
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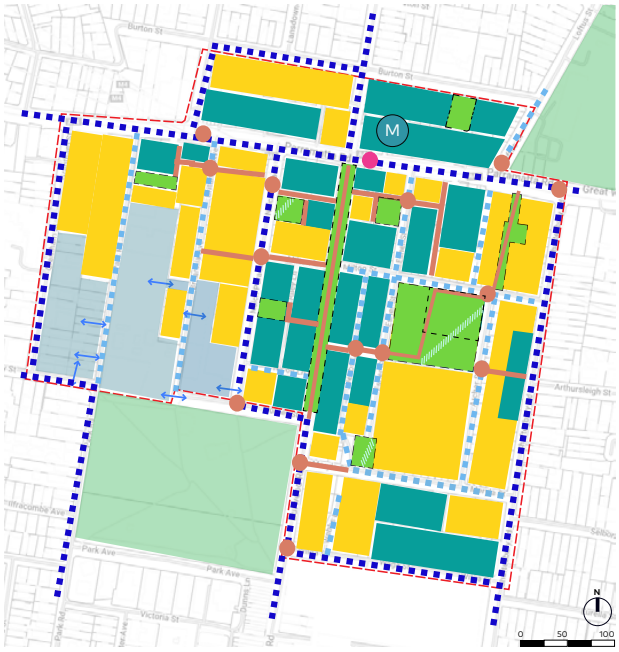
Visual connection between open spaces

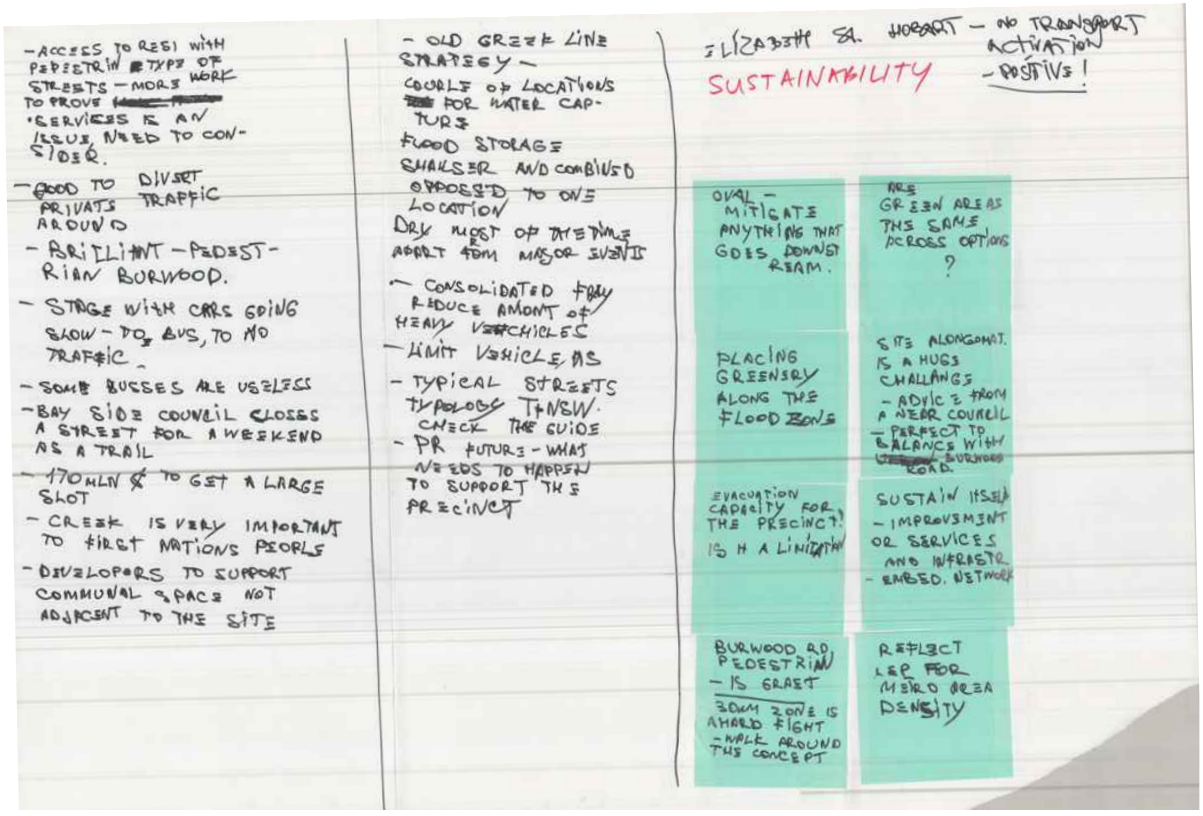
Climate Positive

Movement and Place

Infrastructure

Nature-based Solutions





Vision and Priorities

COX

Our Vision for Burwood North

Our Vision

The vision for Burwood North has been prepared, distilled and refined in a participatory manner with key outcomes from the visioning charrette, community, landowner and first nations stakeholders.

The vision aims to set the desired future character, ambitions and objectives for Burwood North in a language that means something to everyone.

Burwood North is a benchmark of sustainable urban renewal and design excellence.

The community of Burwood North is inclusive and liveable, embracing diversity and change.

The economy of Burwood North is vibrant and dynamic; attracting activity through the day and night with its unique offering of cultural, food and employment destinations.

The streets of Burwood North are people-oriented, connected and green; a network of high amenity public places that are underpinned by the unique ecology and history of place and connection with Country.

Burwood North is the gateway to Burwood that is regional in outlook and local in amenity. It is a highly accessible, thriving urban centre offering an authentic experience of urban life and community.

Burwood North is an attractive destination that welcomes existing and future residents, workers, students and visitors with an authentic urban lifestyle and flourishing economy through the day and night.

Burwood North is a distinctive place built upon its cultural heritage, its changing demographics and its natural environment. Burwood North successfully combines culture and nature, grunge and polish, intensity and serenity, history and change, local and global.

Burwood North leverages the regional connectivity afforded by the Sydney Metro station and existing public transport connections. Local connectivity is also convenient and attractive, with its walkable street network that connects places and destinations within and surrounding the precinct.

Burwood North is an exemplary model of sustainable urban renewal and regeneration with its high quality buildings, variety of welcoming public places and its leafy street network. Burwood North is a precinct of thriving ecologies, economies and communities.

The Strategic Advantage for Burwood North

Burwood North is uniquely placed to successfully deliver upon the Vision. The key advantages for Burwood North are:

- Existing Transport Infrastructure – Burwood North benefits from the existing connection to Sydney's rail network at Burwood Station and extensive bus network along Parramatta Road and Burwood Road.
- High Speed Metro – Future home of the Burwood North Station on the new Sydney Metro West Line, providing fast connections (~10 minutes) to both Parramatta and Sydney CBD.
- Established commercial area with a strong health/medical, education and professional industry presence with potential to continue to grow these industries, whilst attracting new types of occupiers.
- Benefits from considerable retail and amenities along Burwood Road and at Burwood Westfield, located to the immediate south of the precinct.
- Strong property market fundamentals - overall low vacancy measured across the precinct for existing commercial uses: estimated at ~7% for office and ~5.6% for retail.
- Considerable development potential with low densities across the majority of the precinct's current land providing opportunities for a variety of development densities and typologies.
- Engaged community who enjoy living and working within Burwood and who understand the need for urban renewal and intensification around the future metro station.

Top Priorities

1

Deliver a Precinct with rich and varied open spaces that acknowledges connection with Country

- **Acknowledge the opportunity for connection to County by celebrating the cultural landscape**
- **Provide access to a diverse range of spaces across the Precinct, that complement Burwood Park to ensure that the community can enjoy cultural events, gatherings and activities**
- **Deliver quality open space within 200m of everyone's front door**
- **Integrate places and spaces within streetscapes and public domain, enabling the community to come together informally and for chance encounters to occur**
- **Support the delivery of spaces that contribute and connect to the green and blue grid network**

Matron Ruby Grant Park, Zetland. *Source: Landscape Australia*

Dyuralya Square, Green Square. *Source: City of Sydney*

Newmarket, Randwick. *Source: Cbus Property*

Top Priorities

2

Create a legible and comprehensive active transport network

- **Maximise active and public transport connectivity to the Burwood North Metro station**
- **Support a connected open space network with enhanced local and regional cycle connections**
- **Enable connections through to the Parramatta River - prioritising north-south active transport connections**
- **Support the transition of Burwood Road to enhance active and public transport connections**
- **Create walkable activated lane-ways, through-site links and shared zones as part of an integrated walking network**
- **Reduce the need for private car ownership**

Slovenska Boulevard shared street for pedestrians, cyclists and buses. *Source: Landzine*

Hackney Play Street, UK. *Source: The Guardian*

New Acton Precinct, Canberra. *Source: Landzine*

Top Priorities

3

Deliver a range of well-designed, highly flexible housing

- **Provide a range of housing typologies and options to support a diverse population, including catering for multi-generational living**
- **Create opportunities for medium rise development in addition to high rise development, enabling community oriented neighbourhoods to occur**
- **Provide generous living space for young people in share housing as well as growing families**
- **Allow for a diverse range of tenures, including the meaningful provision of affordable housing**

Powerhouse Philadelphia - street level activation on a contemporary stoop. Source: Architect Magazine


Arkadia, Alexandria. Medium density residential development with landscaped terraces and shared rooftop gardens. *Source: Arch Daily*


Nightingale Housing, Melbourne. Community oriented housing development with communal amenities such as rooftop gardens and laundries. *Source: ArchitectureAU*

Top Priorities

4

Deliver a precinct with a richly defined identify and sense of place

- **Deliver an exemplar urban precinct with a diversity of residential building types that ensure the prioritisation of a high amenity human experience**
- **Encourage innovative architectural, design and delivery models to ensure design excellence in new development and the public domain**
- **Respect, build on and celebrate how culture has influenced the way people live, work and play in Burwood and ensure that future development acknowledges this culture and diversity.**
- **Build on the existing fine grain character by encouraging laneway activation and small scale, fine grain retail tenancies**
- **Respect, build on and celebrate how culture has influenced the way people live, work and play in Burwood**

'The Last Lion' art installation by Christina Huynh and Sophi Odling
Source: Burwood Council

'Chess In The Park', Railway Parade Burwood, by Mike Watt, Gina Deams and Tom Deams. *Source: COX*

Temporary event and pedestrian use of Burwood Road. *Source: Burwood Council*

Top Priorities

5

Create a centre that is regional in outlook and local in amenity

- **Maintain and expand on the richness and complexity of existing land uses with diversified dining and retail experiences**
- **Provide local service and community facilities within walking distance**
- **Support the growth of the Burwood Town Centre as a strategic centre**
- **Maximise opportunities for activation of streets and public spaces, drawing on existing vibrancy to create a hub around the Burwood North metro station.**
- **Enable people to experience Burwood North Precinct as both a quiet and bustling neighbourhood, with defined areas of genuine mixed use balanced with quieter streets and spaces**
- **Support small business of different scales and types that provide a diversity of job opportunities**

Fish Lane, Brisbane. *Source: Fish Lane*

Llankelly Place, Potts Point - service laneway activated with small retail and dining tenancies. *Source: Concrete Playground*

Judith Neilsen Community Centre in an adaptively reused heritage building. Includes co-working spaces and community spaces. *Source: City of Sydney*

Top Priorities

6

Promote a sustainable, green, and resilient Precinct

- **Support Burwood North to become a renowned and sustainable urban renewal Precinct, that supports the movement towards zero carbon operations**
- **Maximise urban greening of Burwood North with increased tree canopy, rain gardens, rooftop gardens, community gardens and enhanced ecosystem biodiversity**
- **Incorporate water sensitive urban design – stormwater management integrated with public domain and open space**
- **Support sustainable technologies and initiatives that will reduce carbon emissions**

Arkadia, Alexandria. Medium density residential development with shared rooftop gardens. *Source: Arch Daily*

Tanner Springs, Portland - reintroduction of a wetland park into the city where a now piped former creek line occurred. *Source: Green Works*

One Central Park has green walls and environmentally sustainable services systems. *Source: COX*

Appendix A

Visioning Charrette Outcomes

Visioning Charrette

Vision and Priorities

Group 1

Non-negotiables

Housing
- 20% affordable and social housing on government land
- Increased population while retaining destination status

Movement
- Transformation of Parramatta Road
- Bus lanes on Parramatta Road and reduced traffic speeds
- Lower traffic in the precinct core
- Low car dependency, increase active and public transport

Public Domain
- Generous frontage setbacks
- No conflicting uses on footpaths
- Tree cover
- Maintain fine grain/active frontages
- Safe public domain for women and children at night
- Water Sensitive Urban Design in public domain
- Wider footpaths

Infrastructure
- Manage overland stormwater flow
- Improving utility servicing amenity and reliability

Delivery
- Realistic for Council to deliver
- Affordable employment space
- Diverse and inclusive

Nice to Haves
- More schools
- Improved regional north-south public transport connections between Burwood and Campsie
- Diversity of street environment - land use and activity
- Shared zones in laneways
- Minimise heat island effect with 30% canopy cover
- District employment productivity focus
- Cultural facilities and night time uses
- Off leash dog park
- More open space and play equipment
- Place for organic community events/cultural/gigs at low cost
- Sustainable precinct - reduce carbon emissions, increase building sustainability ratings
- More than 5% social and affordable housing across the precinct
- On-site energy generation / stormwater retention and reuse
- Build to rent

Vision and Key Priorities
- Revolutionary
- Efficient
  - Second village
- Open
  - Vibrant
  - Exciting
  - Melting pot of culture, cuisine etc.
- People
  - Progressive
- Wonderful
  - Inclusive
- Destination
  - Gateway/first experience of Sydney

Visioning Charrette

Group 2

Non-negotiables

Public Domain
- 6m wide green edge to Parramatta Road AND a dedicated bus lane
- Pedestrian amenity not compromising parking
- Rain gardens
- Support and extend the vibrancy of Burwood Road
- Eyes on the street
- Small public courtyards or hang out spaces
- Public art - interactive and interpretive
- Tree planting opportunities
- Fine grained urban form
  - Laneways, podiums, cycleways, thin towers, street trees
- Canopy cover and green/blue infrastructure
- Pedestrian walkability
- Local character

Movement
- Active transport prioritised on Burwood Road - green infrastructure spine
- Divert traffic on the main street and make it highly safe for pedestrians
- New crossing along Parramatta Road

Infrastructure
- Urban support services facilitated:
  - Greater floor to ceiling heights
  - Active frontages
  - Rear servicing

Community and Activity
- Improved perception of safety
- Night time economy
- Designing with Country and people in mind
- Neighbourhood friendly development

Delivery
- Feasible and flexible floor plates adaptive to market needs
- Affordable housing
- Support the urban renewal of Burwood North Precinct radiating from the new metro station
- Uplift design excellence and building quality
- Suitable open spaces to meet future needs - form open space targets
- Social infrastructure and housing in PRCUTS (or equivalent ratio) i.e. no spot rezoning (which will equal insufficient infrastructure)
- A world class metro precinct achieving design excellence
- Variety of land uses - both employment and residential
- No individual planning proposals ahead of Masterplan, needs to be an integrated approach to entire precinct
- Commensurate amenity to density - additional open space and social infrastructure

Nice to Haves
- Community managed verges - food gardens etc.
- Additional places to play/shop/meander
- Safe bike connections to jobs and education
- CFTs for pedestrians
  - Slower street speeds
  - Bus routes
  - Waste truck routes
- Walkable precinct, less focus on cars
- Former creek link between Burwood Park and Concord Oval and Bayview Park
- Continued activation of the centre along Burwood Road
- Better connections to other strategic centres
- Safe link for pedestrians and cyclists crossing Parramatta Road, integrated with Sydney Metro project
- Reduced reliance on private vehicles within precinct
- Public parks and amenities
- Diverse job opportunities
- Circular economy hub - Burwood North as a pilot precinct?
- Green roofs
- Diverse housing:
  - Affordable housing in perpetuity
  - Key worker housing
  - Age in place housing
  - Student housing
- Fine grain active edges
- Review car parking ratios around metro station
- Improved contiguous large tree canopy along Burwood Road and Parramatta Road
-

Vision and Priorities
- Green infrastructure
  - Trees
  - WSUD
  - Open space
  - Reveal former creek line
- Walkable, slower streets
- Vibrant
  - Active street life
  - Night time economy
- Diverse
  - Community
  - Multi-generational
  - Economic opportunities
  - Live & work precinct
  - Land uses
  - Create the right conditions to attract higher order jobs
  - Housing
- Connected
  - Access to Parramatta River foreshore
  - North-south connections across Parramatta Road
  - Connections to other centres
  - Sustainable travel
- Organic
  - Create the right conditions for local initiatives
  - Authentic

Visioning Charrette

Group 3

Non-negotiables

Land Use
- Commercial integration with southern Burwood Road
- Mixed-uses and local service promoting a 15min neighbourhood and a 30 min city
- Local services within walking distance
- Burwood North should complement the Burwood Town centre not compete with it
- Financial and operation sustainability - future proofing

Movement
- Pedestrian links
- Walkability
- Consideration of road space allocation to balance footpath vs road width
- Safe and efficient transport networks prioritising active public transport
- Active transport links
- Convenient interchange with rail and buses
- Retain access for emergency services and healthcare services near to the Sydney Metro on Parramatta Road

Public Domain
- Open green space for community - for recreation and events
- Community Gardens
- Green corridor
- Safety and security - overground entry and exit from Burwood North Station should be well lit at night, patrolled - support by underground tunnel lighting cameras and police in the area
- Wide footpaths
- Permeability

Infrastructure
- Flood analysis

Community
- People at heart - be mindful of the background and culture of the people who live in the area - built on their cultural habits e.g.. family celebrations - outdoor and terrace dining

Delivery
- Adequate open space with delivery plan

Nice to Haves
- Support of non-residential uses
- Increased and alternate f&b offering
- Genuine mixed-use
- Service to support potential density, population
- Supermarket within walking distance
- Off-leash dog park in open space
- Tramway line - north-south
- Diversity of open space offering
- Width of Burwood Road - getting the proportions right
- Destination - active Main Street - bus only
- Proposed open space at corner of Milton and Archer (not viable)
- Liveability - retaining the cultural aspects of this community and honouring the needs of the existing community and developing their requirements
- Rich and fine grained experience - point of difference p what is so special about Burwood?

Vision and Key Priorities
- Vibrancy
  - Supporting small businesses
  - Inhabit public space
  - Live/ play/ work
  - Attractive laneways network
  - Essential services at walking distance
- Diversity
- Culture
  - Honouring cultural needs
  - Cultural awareness when developing/ sustaining/ supporting local communities
- 'Renowned sustainable precinct'
  - Active transport - (community already orientated)
  - Greener sustainable precinct
- Authentic
  - Identity
- Connected
  - Connection/ access to open space - complementary to town centre
  - Permeability/ connectivity/ walkability
  - Encourage active and public transport
- Feasible
  - Big picture - concept vs reality - deliverability
  - VPA to ensure strategic community outcomes
- Liveability
  - Solar access - comfort -refer apartment design guide
  - VPA to ensure strategic community outcomes
  - Respectful neighbours

Visioning Charrette

Group 4

Non-negotiables

Housing
- Sustainable living

Movement
- Pedestrian oriented street design
- Safety - pedestrian crossings
- Safe crossings - protection of vulnerable road users
- Connected footpaths from north-south Burwood Road with seating/ resting spots along paths
- Connected cycling network
- Nice comfortable cycle connections - not just fastest route - enjoyable and safe - not congested
- Multiple forms of cycle connections
- Safe easy connection from metro to school (reduce car drop-offs)
- Metro to school - walking and cycling connections
- Dedicated active travel links e.g.. separated cycleways and paths
- Can't ignore car uses - commuter car park
- Safe bus stops for commuters to sit and wait for transport - buses/ taxis
- Bus priority along Burwood Road
- Limit speed limits ie. 40km/h along Burwood Road

Public Domain
- Precinct as continuation along length of Burwood from railway to metro
- More bars/ cafés
- Activated streets
- Increased green and community space
- Great canopy, green spaces, community gardens
- More tree canopy and open spaces of high quality
- Green space and canopy - large not just pocket to alleviate Burwood Park
- Artistic expression integrated (not just murals)
- Safe and comfortable pedestrian environment
- CCTV cameras - lighting along Burwood Road

Infrastructure
- Improving infrastructure - future proofing
- Good drainage underground for multiple usages

Nice to Haves
- Low traffic zones (<30km)
- Improve amenity along Burwood Road and Parramatta Road
- Jazz bars, cafés - forecourt space for outdoor entertainment - busking
- Redo of footpaths to encourage foot traffic from north to south Burwood Road.
- Separation/ filter traffic at some hours
- Frequent bus timetables - shelters to bus stops
- East -west cycle and pedestrian connection parallel to Parramatta Road
- Separated bike paths depending on function
- Dedicated separated cycle paths to consider all cycling abilities
- Disability friendly footpaths
- Noise reduction
- Active transport connections
- Self-sufficiency - community gardens
- Tell the story of Country - connection to country
- Not too much planning - different approach to different areas
- More shared car parks (shared (car schemes)
- All utilities to be undergrounded - including power-lines
- Solar power sockets at seating areas - free wifi
- More seating areas
- Smart city technology integrated into the precinct
- On-site energy production
- Fossil fuel free - all electric development
- EV battery storage to reduce grid load
- Removing private vehicles from Burwood Road - Transit Mall?
- Street network is sympathetic to the previous natural creek line
- Green infrastructure - urban farm
- Reveal, naturalised, celebrate underlying creek line
- Greenery-re-wilding
- Habitat, eco-systems and biodiversity integrated and supported - urban greening - rain gardens
- Plants decorated footpaths
- Opportunities to provide street art - by local artists and indigenous communities

Vision and Key Priorities
- Keep the grunge
- Genuine Connection to Country
- Re-wilding
- Circular Economy
- Life on the Streets and Lanes/ Courtyards
- The most sustainable precinct
- Flexible Open spaces/ facilities
  - Leasable areas for community to make it their own
  - Provide a structure but with flexibility for change
  - Different approach to different areas
- Diversity
  - Diverse spaces for diverse people

Appendix B

Community Drop-In Session Outcomes

Community Drop-in Session

Vision and Key Priorities

Green infrastructure - tactical urbanism - community participation

- Guerrilla gardening
- Community gardens
- Retain trees
- Increased open space- greenery
- Glebe - naturalised creek
- Roof gardens
- More trees, rain gardens, green space
- Wildlife corridor - Parramatta to Cook's River
- Preserve character outside the study area - all green inside boundary
- Rooftop green spaces

Landuse - Vibrance - Local Micro-economies

- Self contained expenditure in Burwood
- 18hour trading
- Increase livelihood
- Small bars
- Retain peaceful enclaves amidst the buzz
- Daily services to support density around metro outcomes
- Increase diversity of f&b
- Increase population
- Convenience - doctors, schools, Westfield
- Transport is key - already got everything - a real 'hub'
- Provide more community facilities
- Daily services to support density around metro
- Provide walking access to supermarket
- Should co-exist with MLC
- Would like public swimming pool
- Burwood Road Medical centre
- More mixed business
- More shops on Burwood Road
- Swimming pool in Burwood Park
- Decent restaurants
- Spaces/ studios to cater for artistic pursuits
- Indoor sports/ under Burwood Park
- Restaurants, cafés 'casual' family and dog friendly
- More shops/ residential
- Opportunity for shops/ restaurants eg. Broadway, Kings Street Wharf, Mascot Zetland, Waterloo
- Movie theatre/ IGA
- More cafés shops to make North Burwood more vibrant
- Local supermarket metro
- Coronation Club is a key destination

Built Form/ Urban Model for other places in Sydney

- Height around train station
- Crazy not to make full use of this infrastructure
- Don't want Burwood to look like Mascot
- Maximum building height should be 6 storeys
- 4-5 storeys across
- St. Kilda - height is set back from main road - internal core
- Moving away from towers
- Development fronting open space
- Human scale
- Higher density on Burwood Road
- Developer should amalgamate to have dual frontage
- What is optimal density
- Less high rise
- Proposal to upzone northern part of Meryla Street to R3 or higher density?
- Sequence development to match projected demand and take into account supply in the town centre
- Keep as is 1-2 storey
- Locate height along Parramatta Road
- Not to have high rise next to heritage
- Destiny done well - Parramatta Square - Central Park
- High Density and accessibility focused around Metro Station
- Medium - high rise
- Quality design requirements for buildings
- More apartments for the metro
- Around the metro first then later southern part
- Create beautiful classic buildings - contemporary interpretations
- Nightingale principles should inform the project masterplan
- Consider using less land by concentrating high rise in one areas so use less than for high rise
- More mixed use - high rise along Parramatta road and Milton Road
- Continuous skyline from south to north
- Bonus - exclude commercial GFA from FSR
- Density done well on top of metro station
- Explore similar heights and densities on Neich Parade as Burwood Road
- More height and commercial use in the middle
- Archer/ Esher, New Street areas for higher density
- Increase study area to east
- Heights only on Parramatta Road and not in centre of area
- Archer Street minimum 8 storey high-rise
- Equitable distribution of density
- Density on Parramatta Road
- Keep Burwood 'Prestige'

Community Drop-in Session

- Bid development - top notch, good design
- More density around Metro
- Larger units, more spaces - double storey 3+ bedrooms
- Increased density for housing
- Bonus GFA if high quality
- Wind tunnel - loss of sunlight - noise - space between buildings - not a ghetto - high unit quality eg. 2Mil
- Noise impact to neighbours
- If rezoned will need 2.5 to 3 FSR due to high land costs
- 15 storeys along Burwood Road
- Medium density - upmarket - away from Burwood Road - walking distance
- Parramatta Road backing onto Milton Street should be high rise to match Canada Bay Council and Burwood Station Heights.
- Limit underground car parks as these use concrete (climate impact) takes more time to build (disturbs residents)

Public Open Space

- More Open Space
- More off leash parks
- No building to edge of the boundary - require setback to allow for landscape and public space
- Public spaces between buildings
- Concord Oval - need more ranger to check littering at events
- Kite
- New Open Spaces - active and informal
- Consolidate 3 pocket parks into 1 large open space
- Laneways/ grunge culture
- Teenager recreation spaces
- Revamp tennis courts in Burwood Park
- Leverage open space north of queens road
- Park on New Street quiet and safe for kids to play
- More table tennis tables in Burwood Park
- Move open space to corner of New Street and Archer - Milton Street is too busy for park - very dangerous - or smaller open space
- 4 small parks - New Street, Neich, Archer and Esher

Movement

- Less traffic better roads
- Create overpass on Burwood Road
- Remove through traffic from Burwood Road
- Improve active transport options - mostly north-south some east-west
- Bike - defined bike paths
- Take away cars from the road - catch public transport
- Better rapid public transport
- Connected bike lanes
- More bike parking
- Milton Street is very busy - speed humps - dogs killed
- Parking taken off Milton Street - park on quiet street
- Reduce traffic jam
- Safe and better streets
- Walkable laneways
- Parking - commuters - employees - customers for restaurant
- Access for people with disability
- Bike access to retail
- Create roundabout at Meryla street and Shaftesbury Road
- Create roundabout at Milton and Archers Streets
- 30km/hour speed limits
- Bike access and parking to the metro
- Car share - but it should be easy to walk and ride a bike
- Maximum car parking levels
- Free shuttle bus between Burwood North and Burwood South
- Improve access to Wangal Park
- Provide parking at basement levels
- More car parks especially around station
- Allow easy transit between stations
- More walking/ public transport
- Active transport, no driving
- Access to local parks
- Don't want to drive in Burwood
- No parking at bus depot - hence all day parking are filled in the area
- Continue public domain improvements to improve presentation to foot traffic
- Milton too busy for park, very dangerous

Sustainability

- E-waste strategy needed - Enfield
- Move toward zero carbon operations
- 6 star ESG gets 0.4% discount on loan

Infrastructure

- No residential gas connections - climate and health impacts
- Sustainable critical infrastructure to population density - hospitals, healthcare, schools, parks, trees and open space areas

Governance

- Certainty and clarity from Council
- Certainty on delivery
- Enforced conditions on developers amalgamating properties to help property owners with compensation for unique circumstance - ie. Foreign taxes
- Clarity around process
- Move away from prescriptive controls/ guidelines
- Would stay if government didn't change zoning
- Certainty with rezoning date

Appendix C

Landowner Survey Results

Participate Burwood

Report Type: Form Results Summary
Date Range: 22-11-2022 - 06-12-2022
Exported: 06-12-2022 10:33:35

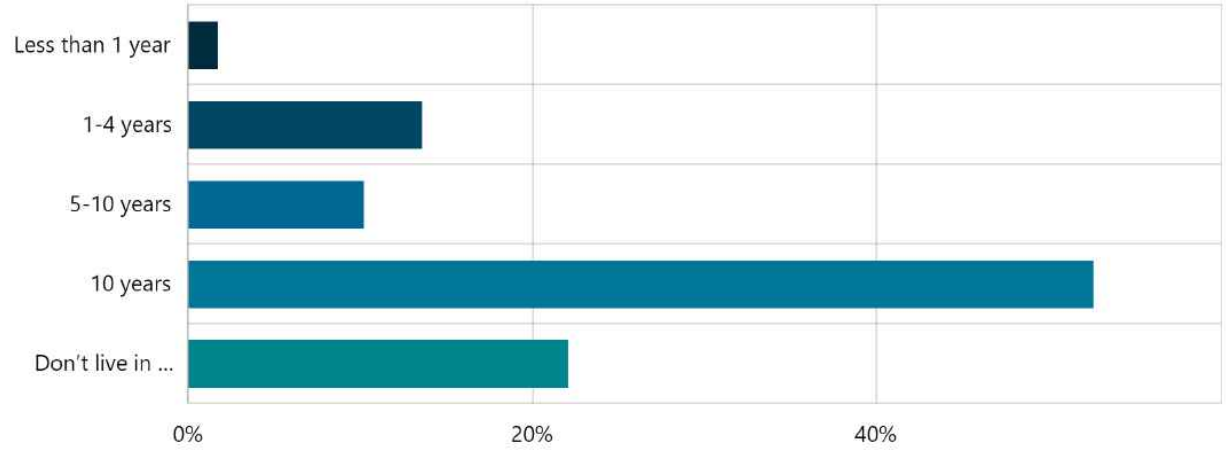
Closed

Survey	33 Contributors	59 Contributions
Burwood North Precinct Masterplan		

Contribution Summary

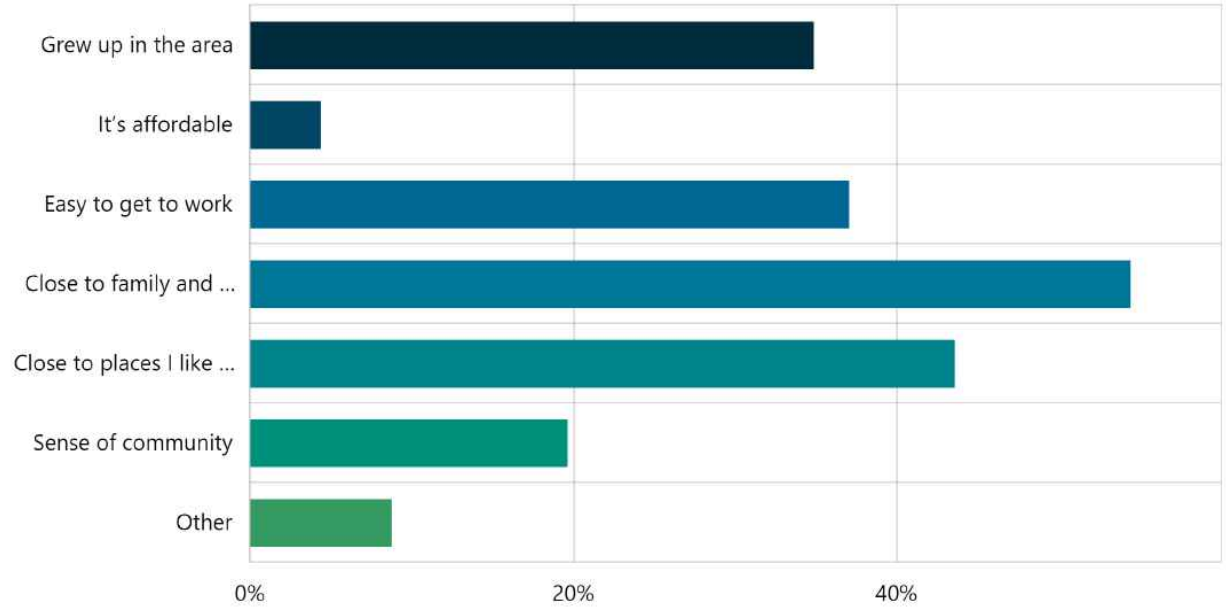
1. How long have you lived/owned property in Burwood North? Required

Multi Choice | Skipped: 0 | Answered: 59 (100%)



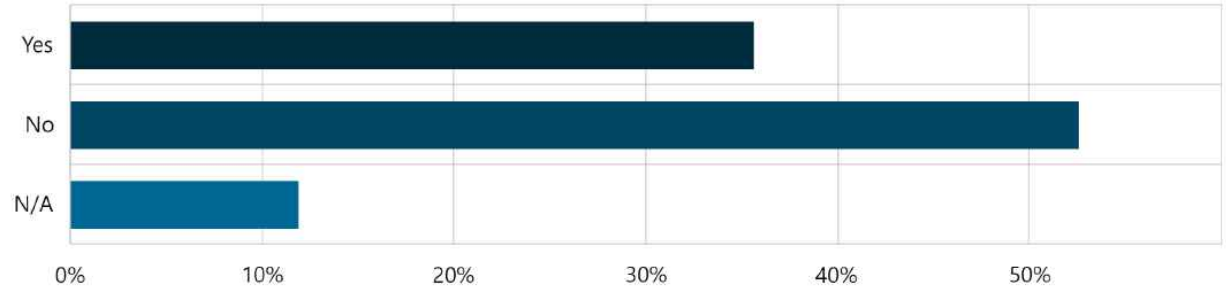
Answer choices	Percent	Count
Less than 1 year	1.69%	1
1-4 years	13.56%	8
5-10 years	10.17%	6
10 years	52.54%	31
Don't live in Burwood North (go to question 3)	22.03%	13
Total	100.00%	59

2. Why did you choose to live in Burwood North? (select all that apply)
Multi Choice | Skipped: 13 | Answered: 46 (78%)



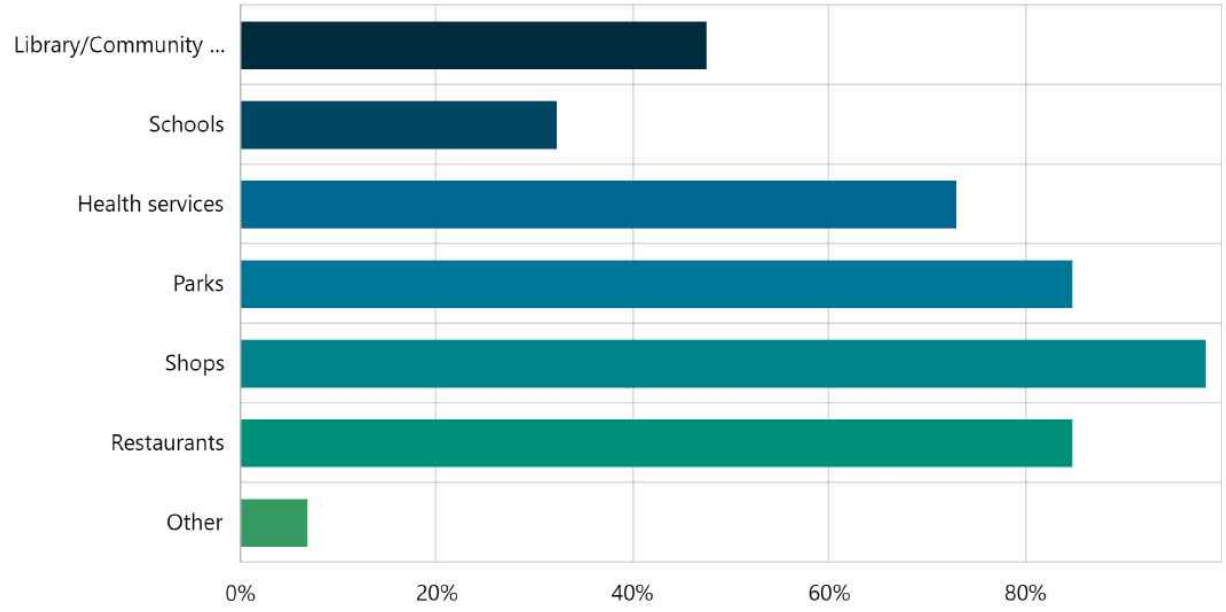
Answer choices	Percent	Count
Grew up in the area	34.78%	16
It's affordable	4.35%	2
Easy to get to work	36.96%	17
Close to family and friends	54.35%	25
Close to places I like to visit (restaurants, shops etc.)	43.48%	20
Sense of community	19.57%	9
Other	8.70%	4

3. Do you work in the Burwood Local Government Area?
Multi Choice | Skipped: 0 | Answered: 59 (100%)



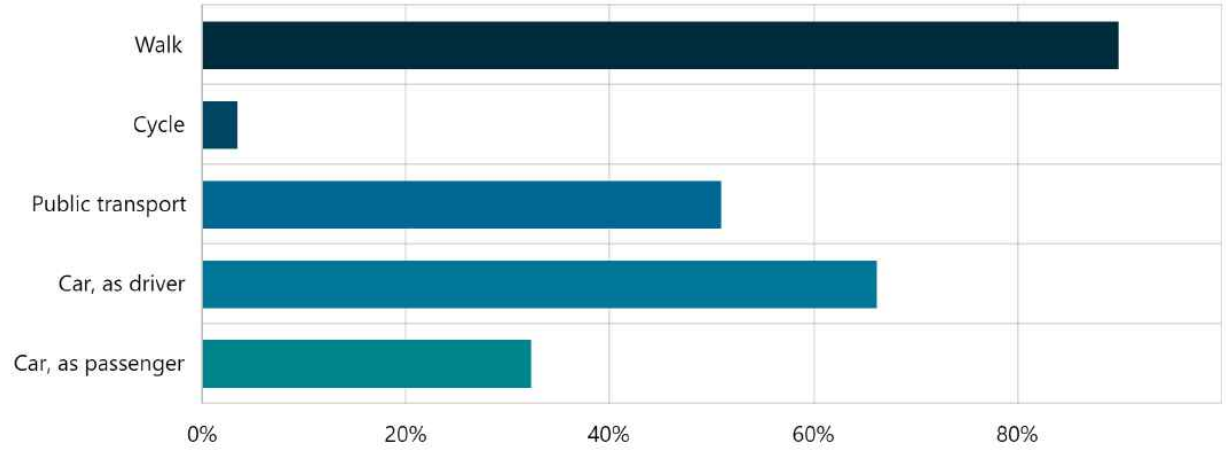
Answer choices	Percent	Count
Yes	35.59%	21
No	52.54%	31
N/A	11.86%	7
Total	100.00%	59

4. What local services and places do you use/visit in Burwood? (select all that apply)
Multi Choice | Skipped: 0 | Answered: 59 (100%)



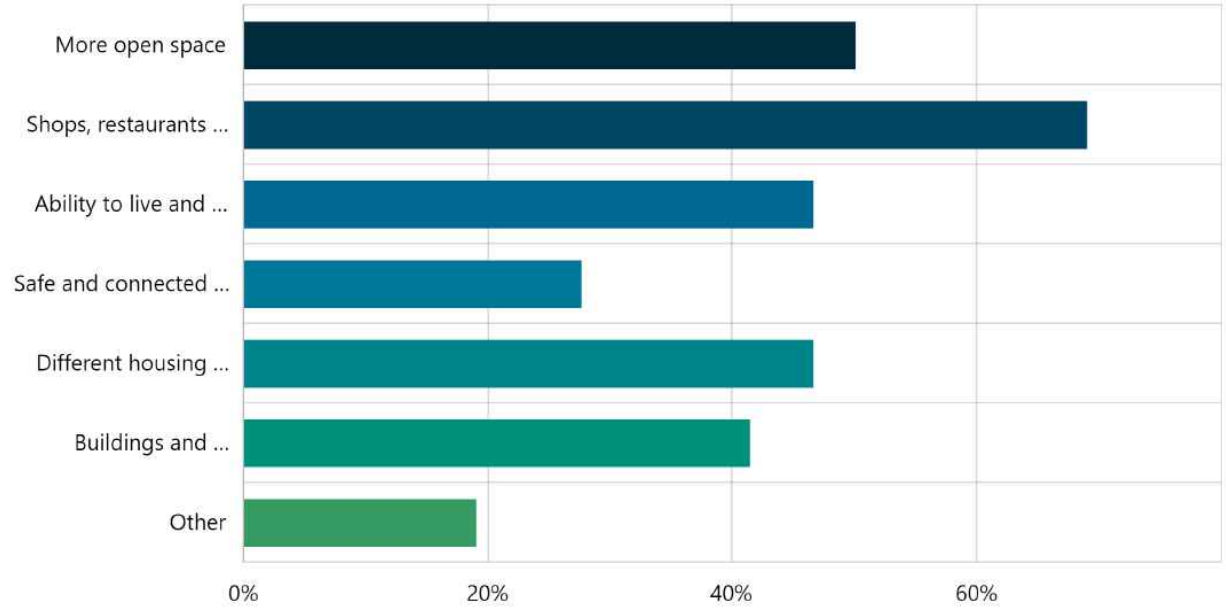
Answer choices	Percent	Count
Library/Community Centre	47.46%	28
Schools	32.20%	19
Health services	72.88%	43
Parks	84.75%	50
Shops	98.31%	58
Restaurants	84.75%	50
Other	6.78%	4

5. How do you get around in Burwood? (select all that apply)
Multi Choice | Skipped: 0 | Answered: 59 (100%)



Answer choices	Percent	Count
Walk	89.83%	53
Cycle	3.39%	2
Public transport	50.85%	30
Car, as driver	66.10%	39
Car, as passenger	32.20%	19

6. What are your top 3 priorities for the future planning of Burwood North? (choose 3)
Multi Choice | Skipped: 1 | Answered: 58 (98.3%)



Answer choices	Percent	Count
More open space	50.00%	29
Shops, restaurants and services within walking distance	68.97%	40
Ability to live and work in Burwood	46.55%	27
Safe and connected cycle and walking paths	27.59%	16
Different housing types and size	46.55%	27
Buildings and infrastructure that is environmentally sustainable	41.38%	24
Other	18.97%	11

7. As a resident, what would attract you to stay in Burwood North?
Short Text | Skipped: 6 | Answered: 53 (89.8%)

Sentiment

No sentiment data

Tags

No tag data

Featured Contributions

No featured contributions

8. As a resident, what would make you move out of Burwood North?
Short Text | Skipped: 6 | Answered: 53 (89.8%)

Sentiment

No sentiment data

Tags

No tag data

Featured Contributions

No featured contributions

9. Is there a place/story about Burwood North you would like to share?
Short Text | Skipped: 26 | Answered: 33 (55.9%)

Sentiment

No sentiment data

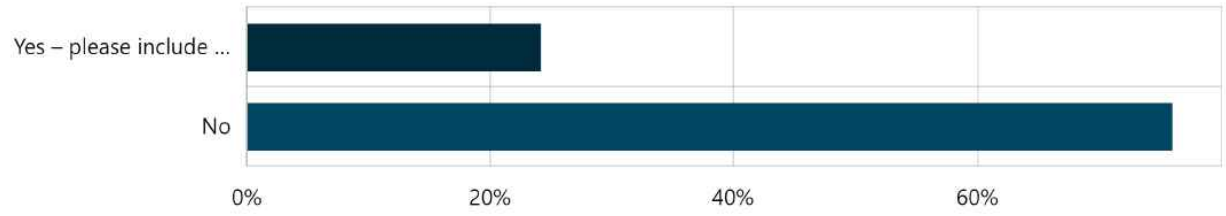
Tags

No tag data

Featured Contributions

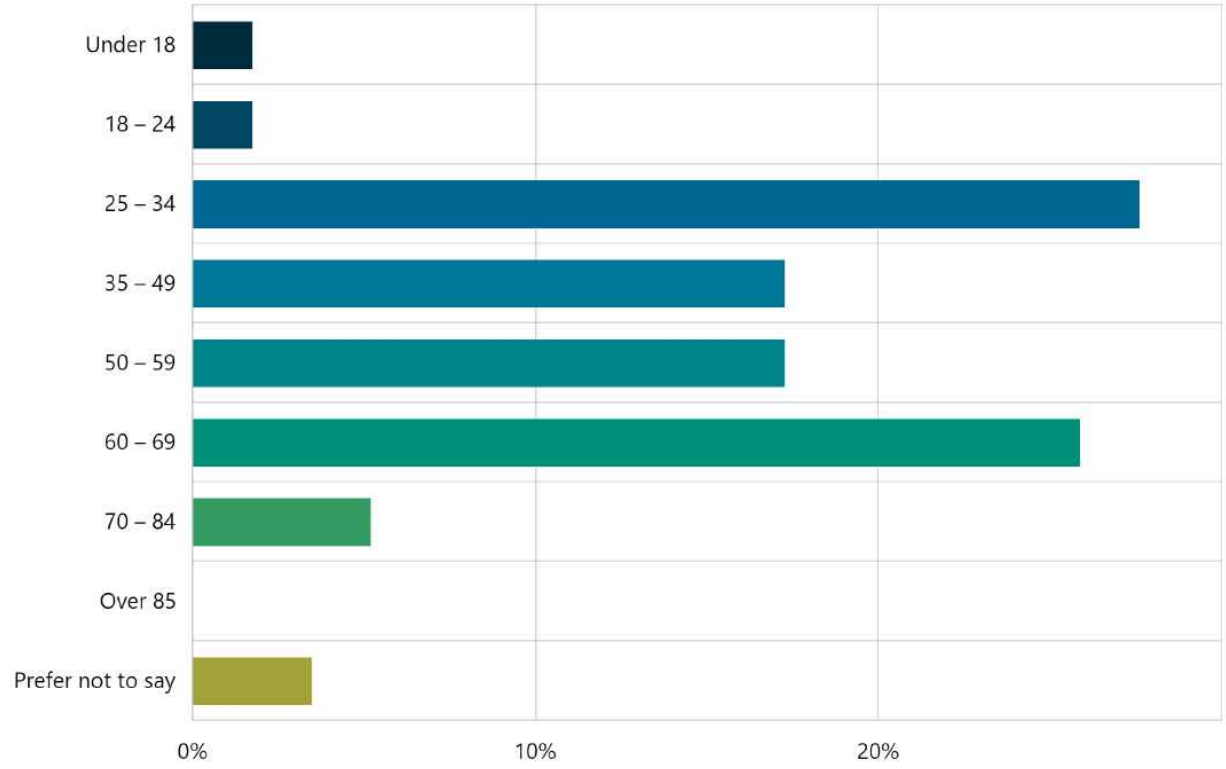
No featured contributions

10. Do you have any plans for your property that you would like to share with us?
Multi Choice | Skipped: 5 | Answered: 54 (91.5%)



Answer choices	Percent	Count
Yes – please include your email below and we will contact you to discuss	24.07%	13
No	75.93%	41
Total	100.00%	54

11. What is your age?
Multi Choice | Skipped: 1 | Answered: 58 (98.3%)



Answer choices	Percent	Count
Under 18	1.72%	1
18 – 24	1.72%	1
25 – 34	27.59%	16
35 – 49	17.24%	10
50 – 59	17.24%	10
60 – 69	25.86%	15
70 – 84	5.17%	3
Over 85	0%	0
Prefer not to say	3.45%	2
Total	100.00%	58

12. My big idea for the Burwood North Precinct is:
Long Text | Skipped: 11 | Answered: 48 (81.4%)

Sentiment

No sentiment data

Tags

No tag data

Featured Contributions

No featured contributions

13. Name
Short Text | Skipped: 14 | Answered: 45 (76.3%)

Sentiment

No sentiment data

Tags

No tag data

Featured Contributions

No featured contributions

14. Email
Short Text | Skipped: 15 | Answered: 44 (74.6%)

Sentiment

No sentiment data

Tags

No tag data

Featured Contributions

No featured contributions

15. Phone Number
Short Text | Skipped: 16 | Answered: 43 (72.9%)

Sentiment

No sentiment data

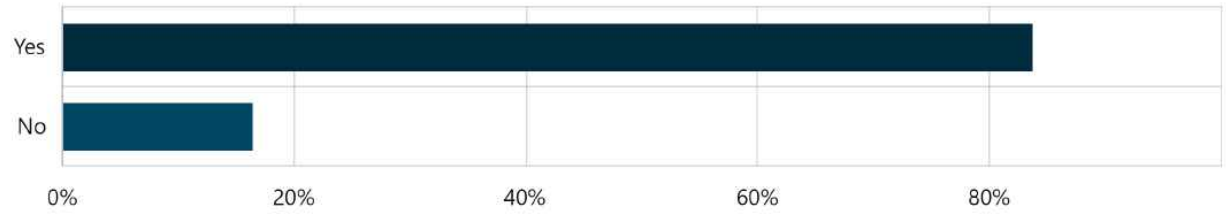
Tags

No tag data

Featured Contributions

No featured contributions

16. Would you like to receive updates on the Burwood North Precinct Masterplan Project and other planning projects?
Multi Choice | Skipped: 4 | Answered: 55 (93.2%)



Answer choices	Percent	Count
Yes	83.64%	46
No	16.36%	9
Total	100.00%	55

17. By checking this box, you are agreeing to the Terms and Conditions of entry. Required
Single Checkbox | Skipped: 0 | Answered: 59 (100%)

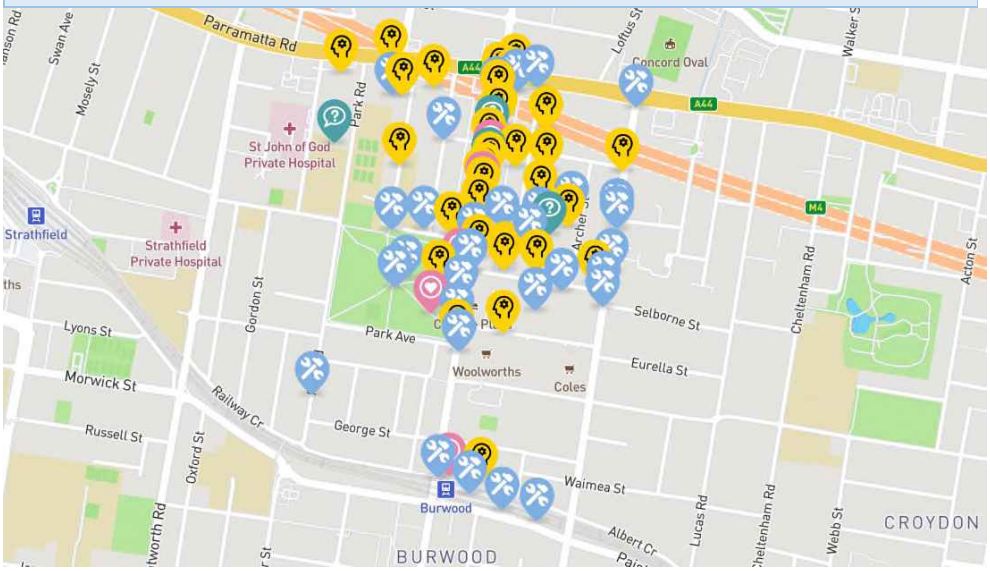
Answer choices	Percent	Count
Yes	100.00%	59
Total	100.00%	59

Appendix D

Social Map Results

Burwood North Precinct Masterplan - Social Map Results

Oct 2022 - Jul 2023



Contribution ID	Date Submitted	Your comment
2582	Oct 28, 2022, 11:03 AM	More restaurants, shopping centre and park pls.
2584	Oct 31, 2022, 12:07 PM	Burwood Park is an amazing asset for the community. Will be even better with the new nature play space, sensory garden and pond upgrade which Council is currently delivering.
2585	Nov 01, 2022, 09:13 AM	Improve north-south public and active transport links. Entering Burwood by non-car means is very challenging and inconvenient.

Contribution ID	Date Submitted	Your comment
2607	Nov 04, 2022, 06:00 PM	Burwood Park needs to be reshaped to fit the whole community needs. I think the teenagers do not have interest to be at the park to enjoy it, this should be encouraged more by adding attractions and features that is appealing more to this group. The health and fitness equipment is a great feature and should be expanded. I think the works done at Meadowbank Park is certainly something we can adapt into Burwood park. which includes, skateboard ramps and track for all levels, bicycle path, water features etc. More services to encourage our elderly to adequately and comfortably enjoy the park areas. There should also be more emergency medical devices available around the park. In addition to current cultural events, I would love to see movies, performing and visual arts in the park being sponsored by the local business, community and Council. I would discourage having more shops in the park, there is currently plenty of commercial services available around and near the park.
2610	Nov 12, 2022, 10:22 AM	There is only one JOLT fast charger on Park Av so why not improve future EV charging with a bank of 3 - 5 Level 2, 32A CCS (BYO charging cables) chargers with longer 3 - 4 hrs free EV parking and this can support the apartment EV owners and Burwood EV community. Also co-fund with Westfield for some EV charging bays to attract more business and support the growing EV community which continues to rise dramatically each year. Regular inspection amd routine maintenance of EV chargers is advised as you always find they go faulty over time or damaged from vandalism.
2611	Nov 13, 2022, 01:58 PM	The area is quite aged and require urgent improvement. The location is suitable to be developed as high-density residence in combination with more modernised shopping areas developed along the Burwood Road and Comer Street, the area can be a new commercial HUB to ease the development constraint in the over-crowded Burwood station area.
2614	Nov 13, 2022, 10:12 PM	Let's get a dedicated cycleway between Burwood Park and the Bay Run
2615	Nov 13, 2022, 10:17 PM	Affordable housing is a must for Burwood

Contribution ID	Date Submitted	Your comment
2618	Nov 16, 2022, 02:55 PM	What has been planned for the footprint location for the Metro station? Are there communal car parks above the station? I noted some of the existing Metro stops does not utilise the space above the station. Chatswood is the only one that has shops/ restaurants to better utilise the space near it. We could have car parks/shops above/near the Metro to ease the need for more high rise/congestion near the Burwood train station/Plaza. Only allow medium size development in the area.
2623	Nov 17, 2022, 03:04 PM	Every time I go up Burwood Road to the precinct past the station, I'm reminded of Hong Kong – in the best possible way: it's vibrant, buzzing, businesses are doing a brisk trade and there are loads of options for shopping and eating. This shift is due to the higher densities in new residential and commercial buildings. And that's what we need in the Burwood North precinct, especially around the hub of the new metro station. When I was growing up here, there were many and various businesses: a general store, butchers, chemists, etc. This precinct, especially south of Parramatta Road, is the real gateway to Burwood and it'd be great to see it buzzing with people and things to do – just like the area round the railway. The way to do that is to go up, preserving the heritage of the Bath Arms Hotel, but boosting high-density housing. This will buoy successful businesses already there, but promote so much more for local residents and visitors alike.
2624	Nov 19, 2022, 08:05 PM	- Please don't develop any more apartment complexes in this area - Please consider how to ensure that both foot and motor traffic don't spoil / overrun this part of Burwood
2628	Nov 21, 2022, 11:31 AM	A free shuttle bus service between the two stations with 1-2 stops along Burwood Rd would help facilitate more flexibility with transport and improve commerce immensely. However, traffic on Burwood Rd is always congested in the daytime due to parked cars and buses stopping every 100 meters. It can take up to 30 minutes to drive from Parramatta Road to Plaza. Perhaps free up 2 more lanes by eliminating parts of the sidewalk that extend onto road, eliminating curb side parking during busy times, and using those 2 extra lanes exclusively as bus lanes during the day.
2629	Nov 21, 2022, 12:14 PM	At present there is no green space in the suburb soother is no incentive to come and rally in the area. This could be linked to the new metro station. The space would benefit from a small cafe/ restaurant and maybe a dog roaming area. Also a walkway under or over Burwood road ned the new station would be useful.

Contribution ID	Date Submitted	Your comment
2630	Nov 21, 2022, 03:31 PM	Could we get a basketball court somewhere. There isn't really any nearby and the MLC courts aren't open to the public.
2633	Nov 22, 2022, 07:58 AM	Rarely is such an opportunity presented to a LGA to reshape the area into a vibrate mini-city to be able to compete with the likes of Central Park Sydney, Parramatta Square and Chatswood. The area needs to be activated with wide open spaces, tall and slim towers (30+ stories), commercial and retail scattered throughout, hotels to keep up with demand in what is Burwoods great advantage of being dead center between the Sydney CBD and Parramatta CBD and ample public transport with metro, heavy rail and bus exchanges.
2635	Nov 22, 2022, 01:30 PM	The current entry to burwood train station is incredibly tight in peak hour on the footpath. Metro opening is only going to exacerbate this as people alight from metro, walk up parramatta road and get onto the heavy rail line for other stops. something needs to be done to improve the experience for pedestrians here!
2636	Nov 22, 2022, 01:35 PM	Entry points into burwood park along this edge are really limited.
2637	Nov 22, 2022, 01:37 PM	The condition of Parramtta road for pedestrians and cyclists is currently very low on the southern side of the road. The stadium redevelopment has significantly improved that side, however more should be done to improve the southern side to encourage people walking along parramatta road to the new metro station. This should include upgraded footpaths and cycling facilities, trees creating shade and street furniture.
2638	Nov 22, 2022, 01:40 PM	improve pedestrian crossing points for this part of burwood road. currently people dodge traffic as it is too far between intersections.
2639	Nov 22, 2022, 01:40 PM	i love being able to access a range of health facilities in this area. how can we support this as a health hub?
2640	Nov 22, 2022, 01:42 PM	this intersection should be a 4 way crossing. it is so hard and takes too long to get from westfield into Burwood Park!
2641	Nov 22, 2022, 01:43 PM	there are some really lovely established trees along Burwood road - especially further north. they contribute to it's character a lot. we should consider how to enhance this character with additional plants and trees.
2642	Nov 22, 2022, 01:44 PM	This part of burwood road seems to have a bit more 'space' than further south. how can we enhance this experience before it gets 'tighter' and less able to have street trees due to awnings?

Contribution ID	Date Submitted	Your comment
2643	Nov 22, 2022, 01:46 PM	There are no council run childcare facilities in Burwood LGA. could the council car park site on meryla street be redeveloped to accomodate this and other community facilities? it would be nicely co-located with burwood park
2644	Nov 22, 2022, 01:47 PM	smaller and medium sized public parks should be considered as part of masterplanning of this precinct.
2654	Nov 22, 2022, 04:07 PM	Turning right onto Shaftesbury road has become very difficult out of Meryla street ever since Shaftesbury road became 2 lanes from parramatta road. Most drivers also ignore the 'keep clear' signs and block the intersection. A round about is required.
2670	Nov 23, 2022, 10:31 AM	A 20m setback for all buildings from the curb is needed. - 6m for 45 degree parking/recessed bus stops/garden/separation from road. - 4m shared path. - 6m green space/café dining/tree planting/seating/bike racks etc. - 4m shop front pedestrian area/green space. This would provide active transport; almost 50% extra parking spaces; safety and separation for all users; thousands of new trees planted as well as wider roads enabling better vision, accident avoidance and pedestrian crossing islands. All this would be built during redevelopment (at developers cost) and be of major benefit to the local community and visitors.
2678	Nov 23, 2022, 05:53 PM	Want to see Burwood North connect to Burwood centre, with the Metro coming in, need more housing. Recreate Burwood Road more vibrance and prestige shopfront and office. FSR 4-1 height 12 -15 level Roof top garden and Gym room: Due to not enough parkland in Burwood
2679	Nov 23, 2022, 06:19 PM	Would be good to have more apartments or housing especially near the station and close by shops in Burwood. For convenience and easy for people who don't have cars especially elderly. Also, would be good if Burwood have a night life for local to enjoy. More shops and restaurants that can open late.
2681	Nov 23, 2022, 06:52 PM	Burwood's bread and butter is absolutely its diverse culture mixed in with the hustle and bustle of urban life. As the beating heart of Burwood, Burwood Road has stagnated in recent years. Paths are unkept, roads are thin and hole-ridden and many buildings along the main road are run-down and dilapidated. I would love to see the council breath some life back into Burwood road with some investment in cleanliness, maintenance, more shopfronts, more space-efficient housing, redeveloping old buildings, higher towers. These could propel

Contribution ID	Date Submitted	Your comment
		Burwood forward into to being one of the most iconic suburbs in NSW.
2721	Nov 28, 2022, 06:11 PM	A pedestrian crossing is needed here since Parramatta road became 2 lanes
2722	Nov 28, 2022, 06:52 PM	Rezoning and redevelopment of the whole street of Park Avenue, Burwood. To put some modern shops or higher rise modern apartments.
2744	Nov 29, 2022, 08:44 PM	Whoever's idea it was to put stickers on the ground everywhere I hope you realise you've created a new game for my kids. Like seriously, how many are there? Cool idea though
2746	Nov 29, 2022, 08:53 PM	Given Council's letting giant towers go ahead at what was to be the Mercedes showroom (currently a giant hole) I wouldn't be surprised with what skyscrapers we're going to get closer to the metro station. No guesses given with what's happening around the town centre
2791	Dec 02, 2022, 02:54 PM	Traffic is soooo congested in Burwood due to the lack in research/funding/improvement in infrastructure, combined with the excessive development of high rise buildings and towers. With the additional work being done to bring people to Burwood Park, it will only make Burwood even more crowded, the traffic and congestions problems worse and make footpaths and roads unsafe.
2801	Dec 04, 2022, 08:34 PM	Car and specially truck traffic is currently too fast and dense on this section of Parramatta rd to make the area enjoyable and safe. The air nd noise pollution is also a big issue. To make North Burwood lively, this freeway-like traffic must be redirected, this section of Parramatta rd reduced for motorists to maybe 40km/h one lane zone, ban trucks and expand zone for pedestrian/bicycles/vegetation. This will benefit to local resident, shop owners and commuters alike.
2802	Dec 04, 2022, 08:42 PM	Rezone both side of Parramatta rd from industrial warehouses to a shopping and residential precinct like the Strathfield North, George st mall.
2830	Dec 05, 2022, 10:35 PM	The condition of Burwood Road south of Parramatta Road has gone from bad to worse over the course of the last few years, with multiple sections on both sides of the road being cut up numerous times for various underground works and it is never adequately repaired. Terrible riding experience for anyone (bicycle, motorbike, car or truck). Surely its possible to expect that the main drag of our suburb to have a smooth surface

Contribution ID	Date Submitted	Your comment
2832	Dec 05, 2022, 10:49 PM	Suggestion to make this intersection 'No Right Turn' from Milton St onto Shaftesbury Road as it can be quite dangerous and cars speed along Shaftsbury Rd. Also, if you are wanting to turn left and the car infront is trying to turn right, you will be stuck for some time as most people hesitate to safely turn out of Milton St.
2863	Dec 06, 2022, 04:28 PM	A second entry to Burwood station is required on the Shaftesbury Road side. The single entrance and exit on burwood road creates a significant bottleneck and given Burwood station also meets the needs East of Burwood station, a 2nd entrance makes sense
2864	Dec 06, 2022, 04:32 PM	Whilst we are supportive of the rezoning, the workshopped density and height limits for the area need to increase dramatically. The site at 194 Parramatta Road Croydon is being proposed for 22 stories, which will set the pace for the remainder of Parramatta road. The extension of Burwood CBD needs to achieve heights and densities will in excess of 22 stories for it to be feasible
2871	Dec 07, 2022, 08:08 AM	The new density and height limits once agreed need to be final, we would hate to see the rezoning occur, neighbours selling and then developers further increasing the heights and density via spot rezoning.
2887	Dec 07, 2022, 10:56 PM	Councils been very secret and putting off since 2016 and give excuses like a traffic study as to why they won't rezone based on the 2016 strategy. Developers say it doesn't stack up. State had to put a metro station to fix issues with future population and traffic. They talked with everyone last year on the vision and made it clear then the 2016 strategy didn't stack up. Then it all went quiet back to closed door secrecy and council brought in an expensive consultant to fix it all this year. Now we're back here today talking about the same thing about vision and ideas instead of the real issue with heights. Now we know about 194 Parramatta Road Croydon it's clear what's going on. If Council's having to give 22 storeys all the way that far in Croydon they're going to have to give owners around the metro a LOT more and that has huge implications.
2933	Dec 11, 2022, 11:18 AM	We need a turn left lane onto Paramatta road to improve traffic flow. More cars and peoplle need planning. [Pity this was not done last time this corner was under construction]
2959	Dec 13, 2022, 02:16 PM	Need to bring some certainty to the rezoning conversation. This has been too long in finalization.

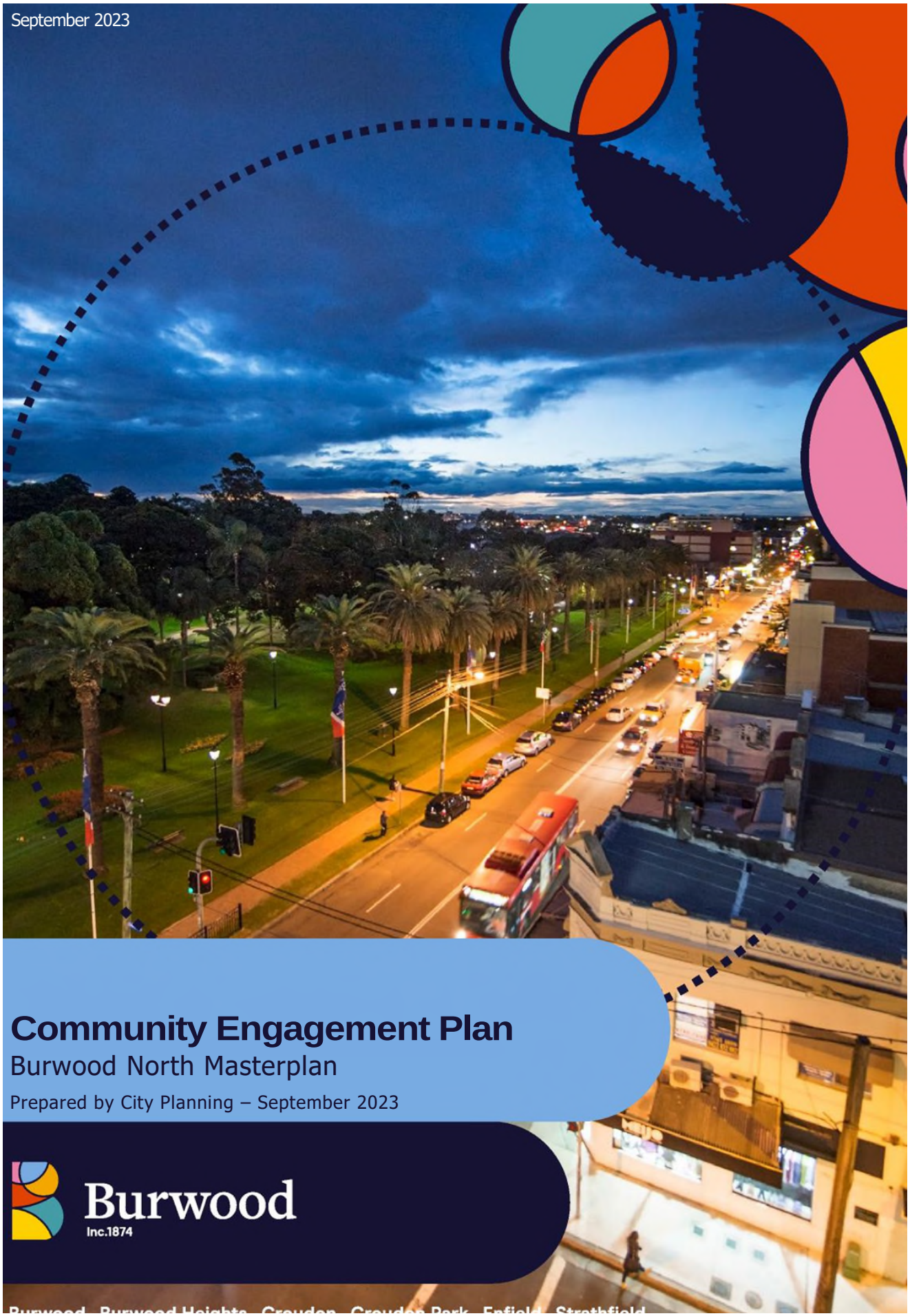
Contribution ID	Date Submitted	Your comment
2960	Dec 13, 2022, 11:04 PM	Turning right from Meryla Street onto Burwood Road in peak hours is basically mission impossible. This is because we need to give way to two-way traffic on Burwood Road, two pedestrian crossing and non-stopping buses. It creates a backlog on Meryla and no one can move! Something about traffic needs to be fixed here.
2961	Dec 14, 2022, 12:17 PM	Rezone this area to RE1 Public Recreation so that this area of Burwood North will have more green spaces filled with trees for people working here, for people residing here and for patients of St John of God Private Hospital to enjoy, relax and exercise in.
2989	Dec 22, 2022, 03:13 PM	Burwood North has so much potential. Given it's going to be near a new metro you should put high density residential buildings in the area. To connect Burwood North to the rest of Burwood you need to provide very good signage, so Burwood North residents know where to find all the key services in Burwood. The only other important thing is for the State Government to build a decent by-pass through Burwood. This can be one on Shaftsbury Road or Wentworth Road.We love how multicultural Burwood is and welcome more residents from different backgrounds to the area.
2992	Dec 29, 2022, 06:38 AM	Burwood needs a nice Aquatic and fitness centre like Ashfield. This suburb will never compete with nicer suburbs until it has a decent swimming pool and fitness centre for the hordes of apartment dwellers to live like human beings even rats in a cage get an exercise wheel.
2996	Jan 06, 2023, 12:30 PM	The island in the middle of the road has done nothing but made traffic a nightmare when turning right from Shaftsbury road into Arthursleigh Street
2997	Jan 06, 2023, 12:32 PM	Turning from from Selborne Street onto Shaftsbury during busy periods (when traffic is banked up heading to Westfield) means that you have zero visibility of cars travelling towards Parramatta road. This needs to be fixed
2999	Jan 10, 2023, 04:11 PM	Council have been on a mission to remove all well established roadside trees. We need many more trees along these roads rather than a reduction. Not only will this provide a safe haven for bird and animal life but it will improve the heat island effect as well as add value to the area for all.

Contribution ID	Date Submitted	Your comment
3021	Feb 05, 2023, 08:55 PM	Avoid further congestion by making the area friendly to commuting by bike, particularly to the new station. There's 3 parts to this:1. Burwood North itself. There's a shared cycle lane along Parra Rd (or is there? clarify and upgrade, will also help wheelchairs and prams), but some relatively safe routes through the back streets could be identified. The outline of Burwood Park could have shared lanes.2. Entry from Canada Bay, from the overpass near Britannia Ave. Ask that council to do something nice as well on their side.3. Entry from Southern Burwood. Just a simple bike gutter, similar to the one used in Rhodes to enter the railway bridge, installed on the stairs of the railway overpass would make a big difference in connecting this area.Then top it off with some bicycle parking at the actual station entrance.
3096	Mar 27, 2023, 12:08 PM	The existing bus depot at the corner of Shaftesbury Rd and Parramatta Rd could be redeveped to a multipropose establishment: to be utilised as an existing bus depot; a bus interchange; as well as a multi-storey public car park that Burwood really needs.
3245	May 02, 2023, 11:53 PM	This part (meryla, archer, wilga) is still nice and green, lots of trees, low rise. Keep it that way please, high density and tall apartments perhaps on burwood road or closer to the the new station but keep the little green we have left. It doesn't make sense to have units or high rise this far away from both the stations too at this location, perhaps 2 stories max.
3297	May 19, 2023, 08:47 PM	The Masterplan needs support from the NSW State Government to resource the infrastructure required to follow the proposed increase in density. The local high school (Concord High) cannot support the influx of new students proposed by the new residential development. Burwood Public is overrun by demountables and the catchment area has already significantly reduced. Concord Hospital, Burwood Police Station, Ambulance etc all need additional resources. Also the roads need widening to safely accomodate bicycles and existing and increased traffic. Electric vehicles are becoming more common and more sustainable and therefore parking is also a consideration which needs to be addressed properly. Recreation facilities are strained and need to be considered for additional large scale opportunities for this scale of development.

Contribution ID	Date Submitted	Your comment
4751	Jun 02, 2023, 03:41 PM	Close Burwood Road to traffic except for buses. This would allow the footpath to be made wider and the installation of new trees and street furniture. Currently the footpath is very congested and it takes a long time to walk down with all the traffic lights. It also takes forever on the bus. A couple of sections could be left open to allow you to drive across from Park Ave to Wilga St or Comer St to Meryla St. Parking would be lost but maybe it could be made up with a new council car park eg at developers expensive in the basement of a new building.
6783	Jul 05, 2023, 11:32 AM	This is a rare opportunity to totally revitalise the Burwood North area. We must allow for densification, to help more residents live closer to work and nearby to an efficient transport link. A good mixed-use development should really be built. Ensure active transport links are integrated here, with bike lanes and wide footpaths which will help promote businesses in the area. Open park spaces should also definitely be provided. Make this an area where more people can live, and benefit from fast transport links here.
6784	Jul 05, 2023, 11:40 AM	Burwood Rd is a prime candidate for a movement and place study (https://www.movementandplace.nsw.gov.au/). Its primary use is as a retail and entertainment strip and so has a very high place value, but also includes bus connections with a train station (soon two), and so also has a high movement value. In order to accommodate both purposes private car traffic should be heavily reduced or even removed so that (quiet, electric) buses can move more freely, -- space can be made for some cycling infrastructure (both more efficient ways of moving people than private cars) and pedestrians and shoppers can enjoy the space more.
6785	Jul 05, 2023, 12:19 PM	These streets just off the main drag are perfect for gradually tapering off the density from high in the middle of the precinct along Burwood Rd, to medium density/missing middle at the very edge of the study area. This would help integrate the precinct into the surrounding area, provide a mix of housing options, and a nice sense of intrigue when walking through the area, as opposed to a stark contrast from single detached houses to high rise. Like the flour mills at Lewisham West, only scaled (way) up.
6786	Jul 05, 2023, 12:20 PM	Through site links on the western side of the precinct would really help the walkability of the area.
6787	Jul 05, 2023, 12:26 PM	Is this car park the best use of the land? Many people calling for more green space and this lot is already surrounded by

Contribution ID	Date Submitted	Your comment
		beautiful trees. Would be quite a nice park with some grass, seating and play equipment.
6788	Jul 05, 2023, 06:25 PM	Would be great to see high density mixed use development and extensive pedestrianisation around the new metro stop, as well as cycling facilities. Unfortunately a lot of the metro stops in the Hills have focussed too much on parking, and even some nearby train stations such as Ashfield and Strathfield, which negatively impacts the sense of place
6789	Jul 05, 2023, 06:26 PM	As others have mentioned, Burwood Rd should be pedestrianised/made bus only. This should extend from at least the metro station to the train station. Ideally Burwood Road would be home to light rail that comes from the city down Parramatta Road, then down Burwood Rd to terminate at Burwood station
6790	Jul 05, 2023, 06:27 PM	Great park!
6791	Jul 05, 2023, 06:29 PM	Love the new parklet. More of Burwood's laneways should be pedestrianised and streetscaped like this
6792	Jul 05, 2023, 06:31 PM	Pedestrianisation of Deane Street is great and should be expanded all the way to Mary Street at least!
6793	Jul 05, 2023, 06:38 PM	I once tried to bike to this Westfield and it was a horrific experience. Burwood needs a safe, direct cycleway network and serious traffic calming
6794	Jul 05, 2023, 06:47 PM	Burwood North should strive to be a walkable livable area for all. Mixed use dense development and safer streets are the best way for this to happen so everyone can enjoy easy walking/cycling to shops and businesses.
6795	Jul 05, 2023, 06:56 PM	Could restore trams (light rail) along Burwood road following the former route, to Cabarita junction and breakfast point via majors bay road. Congestion along Burwood road at peak times would benefit greatly
6796	Jul 06, 2023, 07:01 AM	Urgent rezoning is needed to maximise the amount of housing in this area. Sydney is facing a housing crisis and we need to build more houses as fast as possible. With the metro coming, there is a great opportunity to do a lot of good in addressing our housing needs and make Burwood North one of the liveliest places in Sydney.

Contribution ID	Date Submitted	Your comment
6797	Jul 06, 2023, 07:15 AM	stop the NIMBYs - allow 20 floor towers, build social housing, pedestrianise and link to the station - were already spending millions to build it anyway - demolish everything on parramatta road five blocks each side of the station - it's ugly as hell - and make it mixed use
6798	Jul 11, 2023, 08:38 AM	There's a lot of slapped together infrastructure going on in Burwood. Particularly the island on Shaftesbury road and double lane at the Parramatta road lights to turn right into Shaftesbury..what an absolute nightmare. The traffic build up is horrendous & take triple the time now to exit our residential st in Arthursleigh. Return to how it was.
6799	Jul 11, 2023, 08:43 AM	Stop the construction of high rises in Burwood. It is now congested concrete jungle with high traffic & no road infrastructure to support. Stop the demolition of what gave Burwood its character. Perhaps establish some more green spaces not just worry about lining council's pockets.
6800	Jul 11, 2023, 08:47 AM	Pedestrian crossing here is a hazard. Cars turning right into Meryla from Burwood road creates banked up traffic on Burwood road.
6801	Jul 11, 2023, 08:50 AM	As a pedestrian crossing Burwood road, something needs to be done about cars stopping. Most do not. Perhaps clearer sign age or better still some lights as it is most definitely hazardous.


September 2023
Community Engagement Plan
Burwood North Masterplan
Prepared by City Planning – September 2023
Burwood
Inc.1874

Contents

Introduction

Council has prepared a draft Masterplan that sets the vision for the future of the Burwood North precinct. The draft Masterplan for Burwood North precinct provides the framework for increased capacity for jobs and housing, including the delivery of affordable housing, the delivery of infrastructure, improvements to the design and sustainability of buildings, public domain improvements and new community facilities.

The draft Masterplan allows Council to:

- Plan for future growth of Burwood North in a coordinated way
- Prioritise more than just housing by planning for jobs, community infrastructure and new open space
- Set the vision for Burwood North and create controls to achieve that vision with input from the community, rather than reacting to ad-hoc rezoning proposals
- Advocate to the NSW Government about the need for important community infrastructure that aligns with the growth envisaged in the Burwood North Masterplan.

The Masterplan itself will not result in any changes to current planning controls. Its role as a guiding strategic document would form the basis of a Planning Proposal to amend the Burwood Local Environmental Plan 2012. The Planning Proposal process requires further public exhibition and engagement with the community, and further reporting to Council.

This engagement strategy aims to ensure the Burwood community and our stakeholders are aware of the Burwood North masterplan and understand the proposed changes that relate to them and feel encouraged and confident to submit their feedback to Council.

Engagement to date

The development of the Masterplan has been informed by a series of early engagement activities from November 2021 to February 2023 to inform the vision and priorities for Burwood North Masterplan. In total, 500 individuals participated in early engagement activities including landowners, residents, First Nations groups, local businesses, community members, Government and institutional stakeholders.

The following early engagement activities were undertaken:

- Principles Survey
- Interactive mapping on Participate Burwood where community member could leave comment on specific parts of the precinct
- Landowner and resident survey
- Local business survey
- Visioning Charrette with government agencies and institutional stakeholders
- Landowner and resident drop-in session hosted at Burwood
- Targeted engagement with First Nations community
- Scenario Workshop with government agencies and institutional stakeholders

The outcomes of this early engagement are included in Engagement Outcomes Report attached to this strategy.

Objectives

The following objectives aim to deliver a comprehensive engagement strategy to:

- Inform the community and potentially impacted land owners of the Masterplan
- Use engagement tools and techniques that widen our reach to include our diverse population (non-English speaking, younger professionals, students etc)
- Make complex planning documentation easy to comprehend for the community, including CALD communities, to provide feedback on
- Provide a meaningful visualisation tool that can communicate proposed changes to the community. Visual tools also allow information to be accessible for CALD communities, as Burwood is a diverse community
- Seek feedback via multiple engagement methods
- Ensure our neighbour councils and stakeholder agencies are informed, engaged and aware of opportunities to make submissions
- Create broad awareness of the Masterplan in the community, including CALD communities.

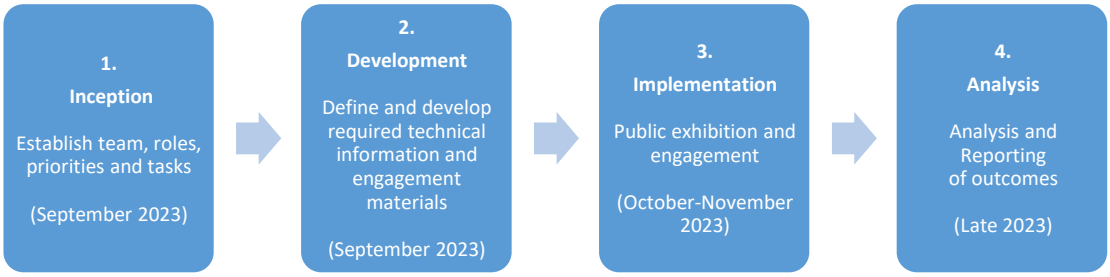
Timing

The draft masterplan is a guiding strategy with no statutory requirements for public exhibition under the Environmental Planning and Assessment Act 1979.

A 6-week (42 day) engagement period is proposed to provide the community with ample time to become informed and involved in planned engagement activities and provide feedback.

The implementation of this engagement strategy will be undertaken over 4 stages with Public Exhibition scheduled to commenced in mid-October 2023 to allow for time to finalise the collateral and ensure that information can be sent to the community at least a week prior to the exhibition of the commencement of the exhibition period.

This timing is subject to endorsement by Council to allow adequate time for the preparation of material as outlined in this Strategy. The engagement period will commence outside of any school holiday period.



Target groups

This engagement strategy is designed to have a wide reach to engage with the following target groups:

- Broad community including residents and businesses
- Potentially impacted land owners (resident and non-resident)
- Potentially impacted residents
- Potentially impacted businesses, institutions, community groups and agencies
- Individuals/agencies who registered interest via Council's webpage
- Individuals/agencies who participated in early engagement activities
- Stakeholder government and peak agencies
- Neighbour councils

Those identified as being impacted or potentially impacted will be:

- located (or have an interest) within the masterplan study area; or
- located immediately (or have an interest) adjoining the masterplan study area.

Key Messages

Key messages are important to provide clarity, certainty and consistency within the community and stakeholders. The following key messages will be delivered to the identified target groups in plain English.

Proposed messaging to the community as part of the exhibition will include:

- Greater Sydney and Burwood LGA will continue to grow with or without a masterplan.
- A masterplan sets a clear vision and direction so growth will continue in a coordinated way and not in an ad hoc manner via site specific developer led planning proposals.
- A masterplan helps to improve the look and feel of the centre by raising design standards, planning for infrastructure upgrades and improving waste management
- Concentrating growth in our centres, close to accessible public transport protects our suburban and heritage character that our residents highly value
- The Masterplan sets a long term vision for the next 20-30 years – the changes proposed by the draft Masterplan will happen incrementally over time.

Engagement approach

The public exhibition of the draft masterplan will be supported by timely communications and engagement. The following engagement approach follows Council's Community Engagement Strategy 2023-2026 (CES) and proposes a variety of communication and engagement tools to reach our diverse community and stakeholders. The priority focus will be to ensure that landowners and community affected by the proposed masterplan are aware of any potential change and have the opportunity to make a submission.

Our community

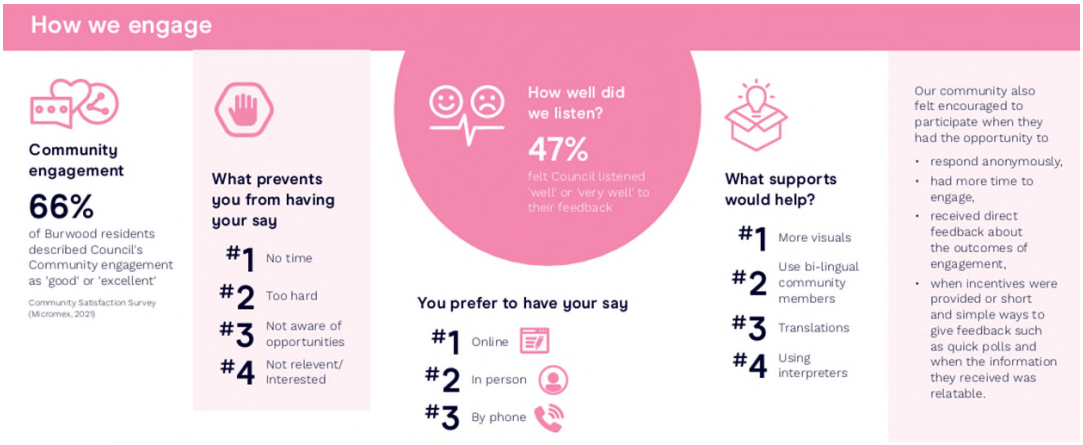
- Burwood has a very diverse community, 62.9% of people used a language other than English at home in 2021. 30% of Burwood's population is of Chinese ancestry according to the 2021 Census. 13.8% of Burwood's population speaks English not well or not at all (approximately 5,600 people).
- We know that residents are time poor, find it too hard to engage and may not be aware of the opportunities to participate.
- They prefer to have their say online, in person or by phone.

Visualising the master plan

- Visuals make it easier for everyone, including CALD communities, to access and understand information
- 3D animation to convey the vision of the masterplan and key changes
- Photo montages of major viewpoints within the precinct, including public domain improvements

Seek feedback from CALD communities

- To support our diverse community in the consultation process, the following will be undertaken:
    - Participate Burwood project page can be translated in languages other than English via the Google Translator function in Open Cities.
    - Postcards to spread awareness of the draft masterplan will be translated into top 3 languages: Chinese, Nepalese and Arabic with link to Participate Burwood project page.
    - Collateral to include information on how to access a Language Assistance Service (TIS)
    - In pop-up sessions, multilingual staff to be present where possible
    - Advertisements in relevant language newspapers



Snapshot of 'How we engage' From *Burwood Community Engagement Strategy*

Face-to-face

- Drop in and speak to planner session in Burwood Library
- Pop-ups at community events (family day Burwood park)
- Local places where community members frequent – Enfield Aquatic Centre

Inform, seek feedback and capture all comments

- Begin with informing the community about the draft master plan, whether it be general sense or by theme, then to seek feedback.
- Aim to ensure feedback is based on knowledge rather than perceptions of aspects of the draft master plan.
- During the engagement interactions – provide information to the community then ask feedback including their general sentiment towards the master plan.
- Proposed feedback approach – provide a background sentence and deeper into themes introduced and targeted Master Plan aspects
- Any face-to-face or phone conversations with community/stakeholder feedback will be captured with comments and details recorded.

Engagement Methods

The table below identifies each communication channel and how it will be used:

Tool/Technique	Description
Letters to community (LGA wide)	Colour double sided A4 letter / designed leaflet folded into DL for letterbox drop to residents, businesses and landowners in the Burwood LGA and adjoining area (north of Parramatta Road) advising of vision and engagement activities.
Addressed letter to affected landowners	Addressed envelope with cover letter to landowners, identifies properties that are affected. Include colour flyer with letter
Post cards (multiple languages)	Postcards produced in multiple languages (English, Chinese, Nepali, Korean) and distributed to service centres, libraries and local businesses in Burwood. Provide a snapshot on seeking feedback with QR code to Participate Burwood website.
Factsheets/ Brochure	An 8 page plain English brochure/newsletter with information on the masterplan and key changes in factsheets for distribution at sessions and online on the Participate Burwood page
3D visualisation tool online	3D visualisation of the masterplan on the vision and proposed changes under master plan.
Community Pop Up Sessions	To be held at community events, community facilities and high visitation areas. Also strategically at local events to capture people who may not usually participate in consultation process. Pop-ups to include A0 size display boards and proposed structure plan and proposed building height map along with renders of future of Burwood North.

	Printed copies of collateral available for community including factsheets, notification letter, postcards translated into top 3 languages.
Burwood Hub Display and Speak to a Planner	Display setup in Burwood Hub with strategic planner available to talk from in specific time slots during the consultation period. Allows for personalised approach to ask questions and talk through plan's key features and provide tailored advice for impacted property owners. In person sessions helpful for community members who are not comfortable using the computer.
Social media	Promotion of masterplan engagement activities. Social media posts on Facebook, Instagram, Twitter and WeChat.
Update footpath stickers	With QR code to Burwood Participate project page.
Phone (speak to a planner)	One-on-one conversations with Council strategic planners. Able to request translation service.
Burwood Participate	Website for the draft masterplan provides • Digital 24/7 access to information and to provide feedback • Timelines and information about consultation undertaken • Masterplan and technical reports • 3D visualisation of master plan • Factsheets • List of consultation activities • Link to register to be informed of updates on project
Advertisements	Print and digital advertisement with QR code link to website in school newsletters and language newspapers.

Community Group meetings	Opportunity for briefing on the project with local community groups, schools and Council advisory committees and group panels.

Risks

The Risk Register identifies the elements that represent a risk to the successful delivery or the intended outcomes of this strategy.

Issue/Risk	Mitigation
Community misunderstands the content	The provision of appropriate, timely information to the community before, during and at the conclusion of the Project.
Community unhappy that there will be change to their property, neighbourhood or the LGA	Ensure that those impacted are directly informed, have an opportunity to seek more information specific to their property and are able to easily make a submission if they wish to.
Competing priorities impact resourcing	Should there be inadequate resourcing of the project, the Director will need to reconsider timing and/or methodology.

Resourcing

To ensure the success of this Strategy the following resources will be utilised:

Scope	Responsibility
• Project coordination and management • Monitoring • Support, guidance and direction to team	Manager City Planning / Project Manager
• Provision of templates and structure for communications and engagement materials	Coordinator Communications & Engagement
• Provision of technical information in plain English as required by the project	Nominated Planners
• Preparation of key messages/content for communications	Nominated Planners & Coordinator Communications & Engagement
• Preparation of communications materials (eg social media posts etc)	Coordinator Communications & Engagement
• Preparation of engagement materials	Nominated Planners & Coordinator Communications & Engagement
• Oversight of Project • Decisions on Project implementation, resourcing and response to risks and issues if and as they arise	Manager City Planning / Project manager

Success Criteria

The success of this Strategy is reliant on:

- Commitment: identified members of Council's City Planning Team and Communications & Engagement Team
- Resourcing: adequate and timely resourcing of the Project
- Input: the timely input of content by Council's City Planning Team and advice to support the project
- Engagement: of all key internal stakeholders and identified members of Council's City Planning Team, Communications Team and Executive Manager Place Management and Communications
- Internal communications: all internal stakeholders are informed of the various stages, their role and contribution requirements
- External communications: all communications are delivered in plain English, succinct and timely manner, specifically to the right people at the right time
- Where possible opportunities for translation will be used.

Monitoring and evaluation

The Engagement Project Manager will manage progress of the implementation of this Strategy. As part of this they will monitor any community feedback or evolving sentiment and raise these in the first instance with the Manager City Planning who will make a decision on appropriate action.

Evolving issues will also be reported to the Manager City Planning.