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Gwynneville Estate - Utilities Servicing Study

Homes NSW

20 February 2025





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Servicing Study**

20 February 2025

Prepared for:

Homes NSW

Prepared by:

Stantec Pty Ltd



GWYNNEVILLE ESTATE - UTILITIES SERVICING STUDY | February 2025

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GWYNNEVILLE ESTATE - UTILITIES SERVICING STUDY | February 2025

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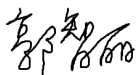
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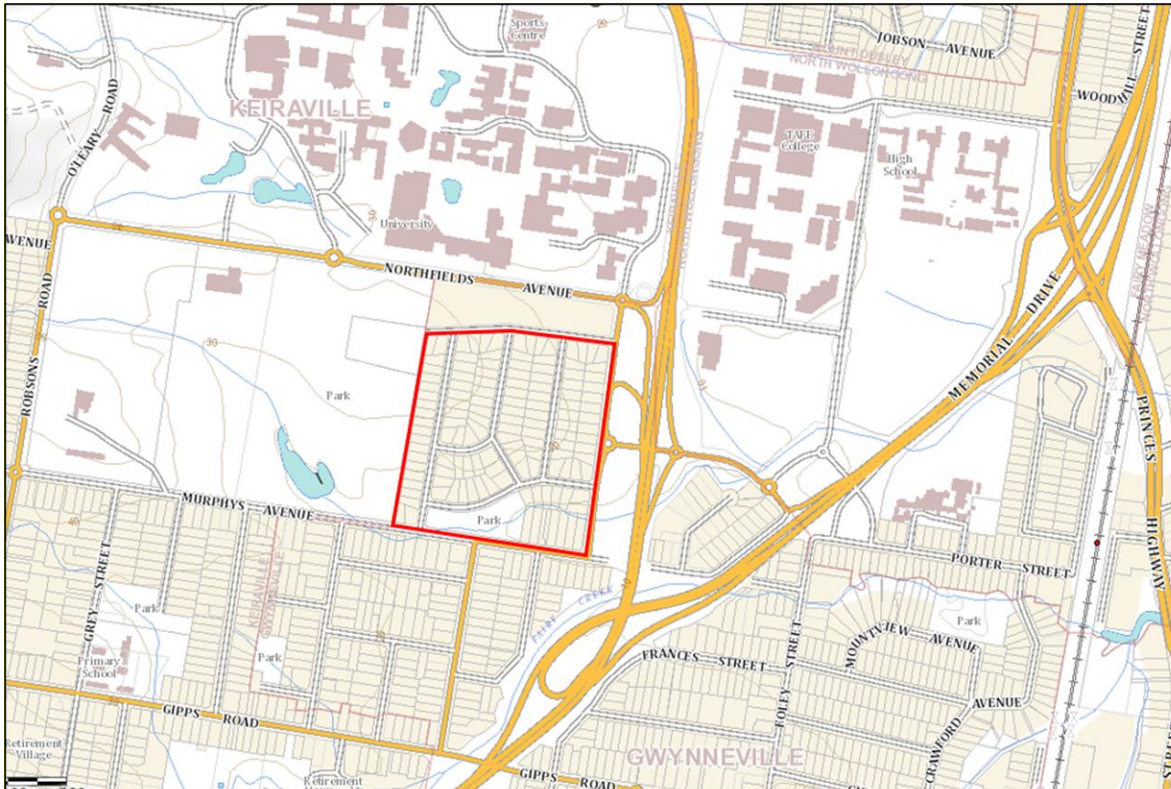


Gwynneville Precinct – Project Summary

This report has been prepared by Stantec Australia Pty Ltd (Stantec) on behalf of Homes NSW (formerly the NSW Land and Housing Corporation - LAHC) to support a planning proposal for urban renewal of land at Gwynneville, NSW.

Covering approximately 9 hectares in area, the Gwynneville precinct is located 2km north-west of the Wollongong CBD. The site sits immediately south of the University of Wollongong, and east of the Botanic Gardens. Irvine Street makes up the site's eastern boundary, with Murphy Avenue to the south. Refer Figure 1 below.

Figure 1



Source: SIX Maps, 2023

The Northfields Avenue Bus Interchange is approximately 150m northwest of the site, and North Wollongong Railway Station is approximately 1km to the east.

Many of the existing dwellings in Gwynneville were constructed by the NSW Government during the 1950s. The precinct is made up of predominantly single storey detached dwellings set in a modified grid-type street layout.

The Gwynneville precinct has been identified as a location capable of supporting more social, affordable and diverse private market housing for the Illawarra community, and to contribute to addressing NSW's housing crisis.

The site currently comprises approximately 131 residential lots, consisting of:

- A total of 79 social dwelling units on 75 individual lots owned by Homes NSW; and
- Approximately 56 privately owned dwelling units on 56 individual lots.

Over 60% of the homes in the precinct are owned by Homes NSW, providing an opportunity to consider additional density while taking into account key constraints such as traffic, views to and from Mount Keira as well potential to increase and embellish existing areas of open space.

Redevelopment of the Gwynneville precinct requires a formal rezoning process to confirm an amended land use zone; increased FSR and building heights, and result in improvements to the current street network, pedestrian connectivity, open space / parkland, and public amenity.

Homes NSW propose amending the Wollongong Local Environmental Plan 2009 (WLEP) to help deliver a diverse range of housing typologies which will include additional social and affordable housing, market housing products and seniors housing, as well as opportunities to develop build-to-rent, key worker housing and student accommodation.

The planning proposal intends to change the current zone of the land from R2 Low Density Residential to R4 High Density Residential, with new and expanded areas of RE1 Public Recreation. This will create the opportunity for more low to mid- rise apartments in the precinct.

The base FSR of 0.5:1 and the height control of 9m that currently applies to the precinct is not proposed change. However, building height and FSR incentives will facilitate site amalgamation to create lots more capable of accommodating increased density and providing amenity. Height and FSR bonuses will be contingent upon achieving design excellence outcomes, providing public benefits such as social and affordable housing, and increased public open space within the precinct.

Homes NSW aims to create a high-amenity, walkable residential neighbourhood with an increased density and choice of affordable and diverse housing options that provide for a broad range of community needs and family types - including students, people on low incomes, people with disability and seniors.

New residential development will enable increased housing choices within in a well-connected location benefiting from frequent free shuttle bus services operating between University of Wollongong, North Wollongong railway station and a multitude of destinations including the city centre and hospital.

The planning proposal was submitted to Wollongong City Council on 19 July 2024, which was then placed on preliminary notification for public and agency comment. Following this notification period, Council and Homes NSW worked together to establish key amendments to the proposal and master plan that formed the basis of the reporting to Council in November 2024. The planning proposal was unanimously approved by Council on 25 November 2024 to proceed to the next step in the approval process, i.e. Gateway Determination. The revised proposal and masterplan included revisions which relate to key sites and implementation, built form outcomes, and public open space delivery. This report has been updated to reflect the outcomes of the amended planning proposal and master plan, current as at February 2025. The revised outcome has not altered the conclusion and recommendations of this report



Executive Summary

Homes NSW has engaged Stantec to undertake a utilities servicing study for the Gwynneville redevelopment precinct as part of a Planning Proposal. The purpose of this utility report is to identify existing utility infrastructure and any anticipated infrastructure upgrades required to service the precinct.

Covering approximately 9 hectares, the site is located 2km north-west of the Wollongong CBD. There are several existing utility services within and near the development precinct as summarised below:

- Potable Water – Supplied by Sydney Water from the Illawarra water delivery system
- Wastewater – Supplied by Sydney Water. This wastewater system is located within the Gwynneville SCAMP which is part of the Bellambi Catchment Area.
- Gas – Gas servicing to the Gwynneville redevelopment precinct is provided by Jemena.
- Electrical – Serviced by Endeavour Energy. The precinct is approximately 1km from Endeavour Energy's Mount Ousley Supply Zone Substation.
- Telecommunications – Data and telecommunications are serviced by AARNET, Optus and/or Ucomm, NSW, NBN Co, NSW/ACT, and Telstra NSW with assets within and adjacent to the Gwynneville redevelopment precinct.

The locations of such services are indicated within the combined services plan included within the report. As part of this utilities study, the following utility authority consultation has been undertaken:

- Feasibility application with Sydney Water;
- Endeavour Energy Technical Enquiry - Letter ENL4707;
- Jemena Gas Technical Enquiry;
- Correspondence with NBN.

The proposed Gwynneville redevelopment precinct is currently well serviced by utility infrastructure. Demand calculations have determined the following estimations:

- Potable Water – 251.71 KL/Day
- Wastewater – 3.76 L/s
- Gas – 2711 m³/day
- Electrical – 3750 KVA



Recommendations

Further work required for the development precinct includes:

- Coordination with utility authorities to determine appropriate design and requirements.
- Hydraulic modelling to confirm potable and wastewater infrastructure and lead-in requirements.
- Augmentation of potable water network. A water main extension from the DN500 trunk main located at the intersection of Robsons Road and Northfields Avenue would be required to service the development.
- Augmentation of the electrical network. To service the site a new underground 11kV feeder will need to be developed from feeder CB MYD2 located at the Mount Ousley Zone station. The associated underground cable may be run through spare ducts adjacent to and crossing the Princes Highway, along and crossing Northfields Avenue to Madoline Street.



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1 INTRODUCTION

This report has been prepared on behalf of Homes NSW to support a planning proposal to amend the Wollongong Local Environmental Plan 2009 to accommodate urban renewal of land at Gwynneville, NSW.

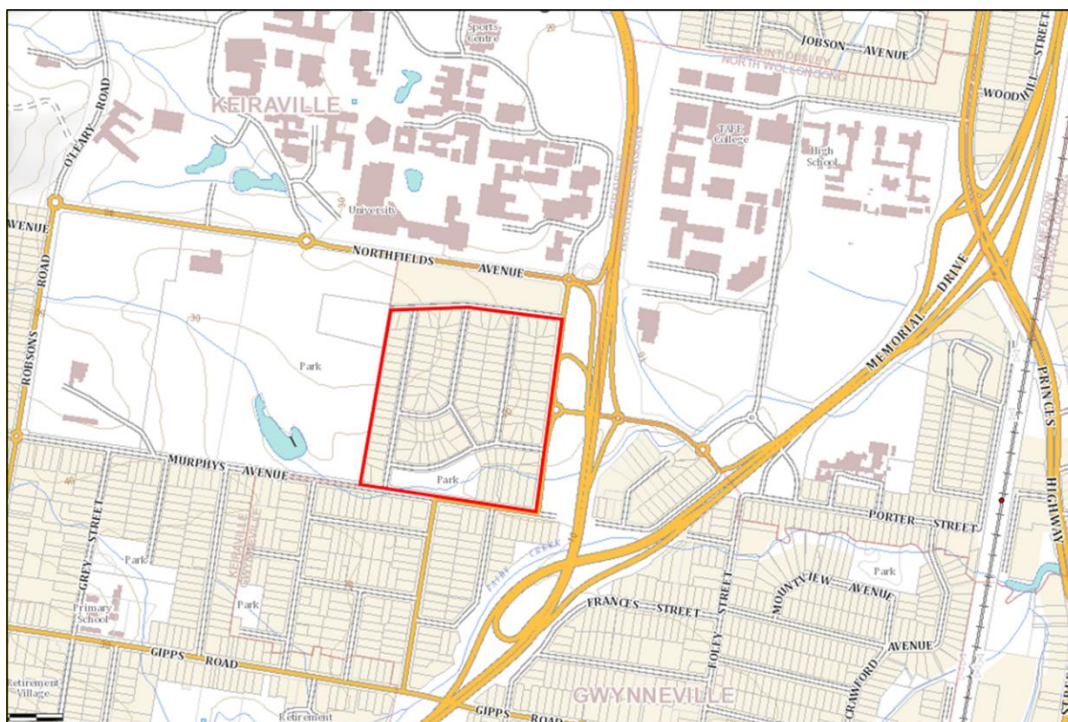
The amended controls will facilitate the delivery of a diverse range of housing typologies which will include additional social and affordable housing, market housing products and seniors housing, as well as opportunities to develop build-to-rent and student accommodation.

1.1 THE PRECINCT

The proposal will allow for approximately 1,250 dwellings, 50% of which will be social and affordable housing.

Covering approximately 9 hectares, the site is located 2km north-west of the Wollongong CBD. The site is immediately south of the University of Wollongong, and east of the Botanic Gardens. Irvine Street makes up the site's eastern boundary, with Murphy Avenue to the south (refer Figure 1-1 below). The Northfields Avenue bus interchange is approximately 150m northwest of the site, and North Wollongong railway station is approximately 1km to the east.

Figure 1-1 Site Location



Source: SIX Maps, 2023

The site currently accommodates approximately 131 residential lots, consisting of:

- 79 social dwelling units on 75 residential lots owned by Homes NSW; and
- Approximately 56 privately owned dwelling units on 56 residential lots.

Most of the dwellings were constructed during the 1950s. The site is made up of predominantly single storey detached dwellings set in a modified grid-type street layout.

Redevelopment of the Gwynneville precinct will require rezoning to facilitate an amended land use zone; increased FSR and building heights, and result in improvements to the current street network, pedestrian connectivity, open space / parkland, and public amenity. The proposal will improve connections to the University of Wollongong Campus with an opportunity to incorporate student accommodation as part of the overall housing mix.

The site rises from a low point in the south-eastern corner to the west providing important vistas to and from the Botanic Gardens and further west to the escarpment.

The development is well positioned to support the NSW Government's affordable housing targets and increase housing supply in the Illawarra.

The proposal is supported by an urban design concept plan (refer Figure 1-2 below):





Figure 1-2 Urban Design Concept Plan (Source: Gyde Consulting, 2025)

1.2 PURPOSE

This report relates to the Gwynneville Precinct Redevelopment planning proposal. The key matters addressed within this study include:

- Identification of existing utilities and potential constraints;
- Capacity assessment of existing utility infrastructure;
- Potential utility upgrades to facilitate the development.

2 BASELINE INVESTIGATIONS

2.1 EXISTING UTILITY INFORMATION

The preliminary information was gathered from a wide range of sources including Before You Dig Australia (BYDA) requests, utility owners GIS and existing drawings.

Table 2-1 Summary of Existing Services

Authority Owner	Utility Type	Phone
AARNet	Communications	(02) 6222 3530
Endeavour Energy	Electrical	131 003
Jemena Gas South	Gas	1300 880 906
NBN CO., NSW/ACT	Communications	1800 626 329
Optus and/or Uecomm, NSW	Communications	(02) 7922 7550
Sydney Water Co., NSW	Water	132 092
Telstra South, NSW	Communications	132 203
Wollongong City Council, NSW	Council	(02) 4227 7111

2.2 COMBINED SERVICES PLAN




A combined services plan has been developed based on DBYD information for the Gwynneville development precinct. The locations of these services are indicated in the below figure.

All services are indicative only and are subject to change within subsequent stages of the design. Individual layouts for each utility service are detailed within relevant sections of this report.



1	12/07/23	FOR REVIEW		BA	RF
Rev.	Date	Description		Des.	Verif.
					Appd.

KEY

	PRECINCT BOUNDARY		S (D)	SEWER
	C (D)		C (D)	TELSTRA
	E (D)		W (D)	WATER
	G (D)			
	G (D)			
	C (D)			
	C (D)			



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Project	GWYNNEVILLE PRECINCT REDEVELOPMENT
Title	COMBINED SERVICES PLAN

Status		PRELIMINARY	
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
GDA20		Scale 1:1500	Size A1
Drawing Number UTIL01-01			Revision 01

3 POTABLE WATER

3.1 BACKGROUND

Potable water at the existing Gwynneville Precinct development is supplied by Sydney Water from the Illawarra water delivery system as shown in Figure 3-1 and 3-2. This delivery system supplies about 300,000 people in the Wollongong, Shellharbour, and Kiama local government areas. The development lies within the MT Keira Pressure Reduced 2 sub-zone.

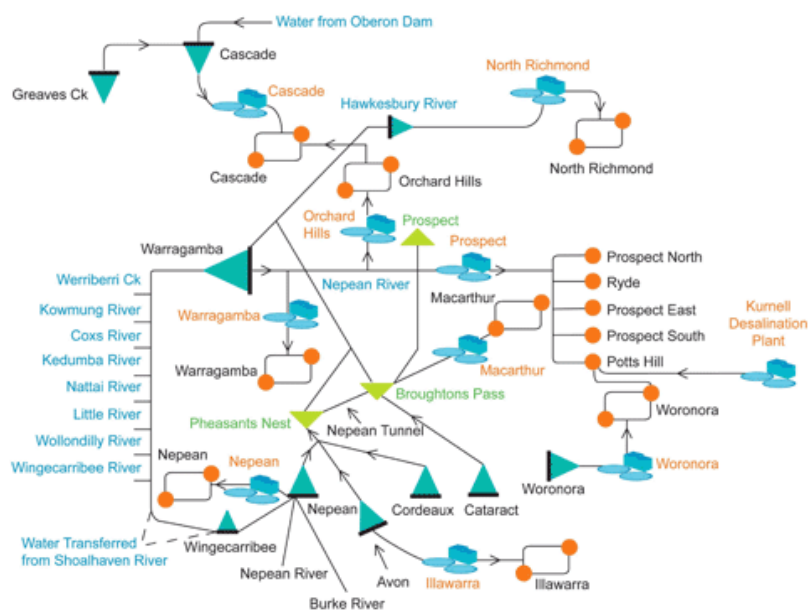


Figure 3-1 Potable Water Supply (Source: Sydney Water Corporation, 2017)

Figure 3-2 Potable Water Supply – Illawarra

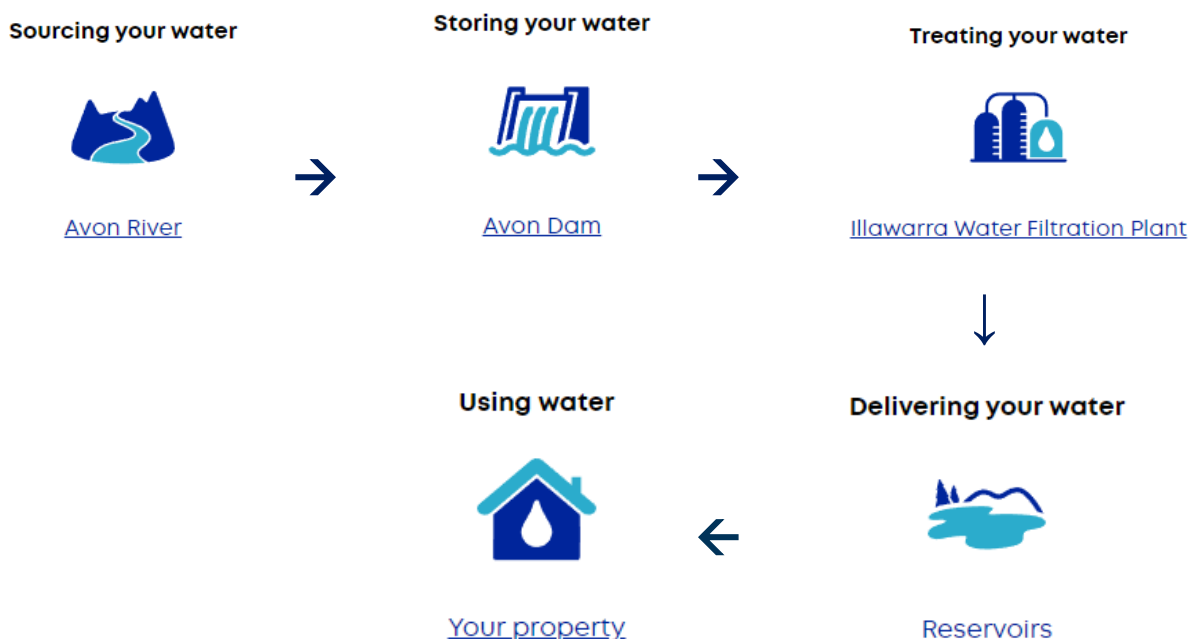


Figure 3-2 Potable Water Supply – Illawarra (Source: Sydney Water Corporation, 2017)

3.2 DEMAND ASSESSMENT

An assessment of the increase in potable water demand resulting from the proposed redevelopment at Gwynneville has been conducted to determine if any infrastructure upgrades are required.

Demand estimates have been calculated using the *Water Supply Code of Australia 03-2011 Sydney Water Edition* and *Average Daily Water Use By Property Development Type (Sydney Water)*. A summary of water demand unit rates is shown in Table 3-1.

Table 3-1 Summary of Potable Water Demand Rates

Development Land Type	Design Criteria	Key Metric/Units	Average Demand
High Rise Units (>2 storey)	Average Daily Demand	L/Square Meter/Day	3.34

3.3 FORECAST DEMAND

An estimate of future potable water demand for the Gwynneville Precinct Redevelopment has been calculated using the information provided by the client. The study area has been assessed as high-rise units based on housing density with an associated demand of 3.34 L/Square Meter/Day. This is an overestimation of demand. The demand management, stormwater harvesting, and development of more efficient property typed will reduce the demands encountered in areas of Sydney.

The cumulative average daily demand of the Gwynneville Redevelopment Precinct is estimated to be 251.71 KI/Day. Allowing a range of $\pm 15\%$, the average demand can vary between 289.47 KI/Day and 213.29 KI/Day.

Table 3-2 Cumulative Average Daily Potable Water Demand

Average Demand (L/Sq M/Day)	Total Floor Area (m ²)	Cumulative Average Daily Demand (KI/Day)
3.34	105,303	251.71



3.4 ON-SITE UTILITY INFRASTRUCTURE

The Gwynneville redevelopment precinct is supplied by an existing potable water reticulation network owned and operated by Sydney Water. Assets have been identified using Before You Dig Australia (BYDA) plans in combination with Sydney Water's GIS – Hydra Mapping.

These records show the presence of multiple Sydney Water mains within and adjacent to the site. Key infrastructure includes:

- DN100 CICL reticulation network constructed in 1957 within the precinct excluding Madoline Street;
- DN100 mPVC reticulation network constructed in 2009 along Madoline Street;
- DN150 CICL reticulation network along Northfields Avenue;
- DN500 CICL Trunk main along Robsons Road.

The depths and exact alignment of the Sydney Water Potable Water assets are unknown. Further investigation is required to determine the potential impacts of the design on the existing network.

As per the Sydney Water Feasibility Letter CN206552 (v2), the Mt Keira Pressure Reduced 2 zone does not have capacity to service the redevelopment precinct and augmentation of the network is needed. A water main extension from the DN500 trunk main located at the intersection of Robsons Road and Northfields Avenue would be required to service the development. This would also require rezoning into the Mt Keira Water Supply Zone and installation of a pressure reducing valve on the supply main. Please refer to Appendix A for Sydney Water feasibility letter 206552 detailing the above advice.



MINIMUM PIPE SIZES FOR INFILL DEVELOPMENTS		
ZONING/DEVELOPMENT	MINIMUM PIPE SIZE (DN)	
	Cast iron equivalent outside diameter series	ISO series ⁽³⁾
Low and medium density residential	100 ⁽¹⁾	125 ⁽¹⁾
High density residential (≥ 4 storeys)	150	180
	If a 100 mm main currently fronts a proposed development and the hydraulic capacity is sufficient to serve the property's domestic future demand, then the existing main will be deemed acceptable until the main requires renewal. The developer might upgrade the existing pipe size for other reasons – this is subject to Water Agency agreement.	If a 125 mm main currently fronts a proposed development and the hydraulic capacity is sufficient to serve the property's domestic future demand, then the existing main will be deemed acceptable until the main requires renewal. The developer might upgrade the existing pipe size for other reasons – this is subject to Water Agency agreement.
Multiple developments of high density residential (≥ 8 storeys)	200 or 225 ⁽²⁾	250 or 280 ⁽²⁾
	If a 100 or 150 mm main currently fronts a proposed development and the hydraulic capacity is sufficient to serve the property's domestic future demand, then the existing main will be deemed acceptable until the main requires renewal. The developer might upgrade the existing pipe size for other reasons – this is subject to Water Agency agreement.	If a 125 or 180 mm main currently fronts a proposed development and the hydraulic capacity is sufficient to serve the property's domestic future demand, then the existing main will be deemed acceptable until the main requires renewal. The developer might upgrade the existing pipe size for other reasons – this is subject to Water Agency agreement.

NOTES:

- 1 The Water Agency may authorise smaller pipe sizes to address issues such as water quality in cul-de-sacs.
- 2 The Water Agency to nominate the preferred size consistent with an overall servicing strategy.
- 3 For steel (SCL) and polyethylene (PE) pipes only.

Figure 3-3 Minimum Pipe Size Extract

Source: WSA 03-2011 Water Supply Code of Australia 3.1

As per WSA 03-2011-3.1, Table SW 3.5, brownfield high density residential developments (≥4 storeys) are required to be a minimum of DN100 if the hydraulic capacity is sufficient to service the development (Figure 3-3). Dependent on Hydraulic investigation, mains running along Irvine Street and Madoline Street may require upsizing.



3.5 APPROVALS AND NEXT-STEPS

Sydney Water formal applications are managed under the Section 73 (S73) process. These will likely be required for each of the development lots within the precinct. The potable water strategy is to be confirmed through hydraulic modelling and is to be submitted to Sydney Water. The key next steps consist of:

1. Develop an overall water master plan for the development precinct, including lead-in infrastructure and local reticulation network sizing, and agree this with Sydney Water;
2. Establish protection/build over requirements for impacted infrastructure;
3. Submit application for head deed detailing lead-in infrastructure and rezoning of water supply zone with Sydney Water. To be managed under the S73 process (Anticipated requirements pathway);
4. Sydney Water to issue a Notice of Requirements (NOR) with detailed requirements of alignment, sizing and funding for the development;
5. Detailed design to progress as per NOR and submitted to Sydney Water for approval.

Please note that individual developments within the precinct will require separate applications for connection, and the above is for the delivery of water network and masterplan.

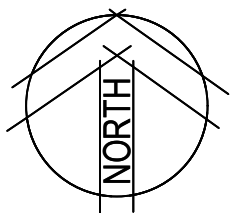




NOTE:
Utility locations are indicative only. Services investigations are required to confirm exact locations.

Rev.	Date	Description	Des.	Verif.	Appd.
1	12/07/23	FOR REVIEW	BA	RF	RF

KEY					
—	PRECINCT BOUNDARY				
— (D) —	SYDNEY WATER POTABLE WATER MAIN				
●	PROPOSED SITE CONNECTION				
—	PROPOSED POTABLE WATER MAIN				



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Title	POTABLE WATER SERVICES PLAN

Status			
PRELIMINARY			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
GDA20	Scale	1:1500	Size
Drawing Number			Revision
UTIL01-02			01

4 WASTEWATER

4.1 BACKGROUND

Wastewater at the existing Gwynneville Precinct development is supplied by Sydney Water. This wastewater system is located within the Gwynneville SCAMP which is part of the Bellambi Catchment Area as shown in Figure 4-1.



Figure 4-1 Sydney Water Wastewater System Map Extract (Source: Sydney Water (2022))

4.2 DEMAND ASSESSMENT

An assessment of the increase in wastewater demand resulting from the proposed redevelopment at Gwynneville has been conducted to determine if any infrastructure upgrades are required.

Demand estimates have been calculated using the *Sewerage Code of Australia 02-2002-2.2 Sydney Water Edition* and *Average Daily Water Use By Property Development Type (Sydney Water)*. A summary of water demand unit rates is shown in Table 4-1.

Table 4-1 Summary of Wastewater Demand Rates

Development Land Type	Design Criteria	Key Metric/Units	Average Demand
Medium Density	Equivalent Population	EP/HA	210

4.3 FORECAST DEMAND

An estimate of future potable water demand for the Gwynneville Precinct Redevelopment has been calculated using the information provided by the client. The study area has been assessed as medium density with an associated EP of 210/Ha. The average dry weather flow (ADWF) per equivalent population (EP) is deemed as 150L/day/EP or 0.0017 L/s/EP.

The cumulative average dry Weather flow of the Gwynneville Redevelopment Precinct is estimated to be 3.76 L/s. Allowing a range of ±15%, the average demand can vary between 4.32 L/s and 213.29 Kl/Day.

Table 4-2 Cumulative Average Daily Wastewater Demand

Average Demand (EP/Ha)	Total Floor Area (m ²)	ADWF Factor (L/s/EP)	Cumulative Average Dry Weather Flow (L/s)
210	105,303	0.0017	3.76

4.4 ON-SITE UTILITY INFRASTRUCTURE

The Gwynneville redevelopment precinct is supplied by an existing wastewater reticulation network owned and operated by Sydney Water. Assets have been identified using Before You Dig Australia (BYDA) plans in combination with Sydney Water’s GIS – Hydra Mapping.

These records show the presence of multiple Sydney Water mains within and adjacent to the site. Key infrastructure includes:

- DN150 VC reticulation network within the precinct;
- DN225 VC reticulation network within Murphys Avenue Road corridor and residential lots 9-15 DP 19109;



- DN225 VC reticulation network within Madoline Street Road corridor and residential lots 126-129 DP 36218;
- DN300 VC branch main within lots fronting Murphys Avenue crossing under Irvine Street and the Southern Freeway;
- DN300 VC branch main crossing under Irvine Street and the Southern Freeway.

The depths and exact alignment of the Sydney Water Wastewater assets are unknown. Further investigation is required to determine the potential impacts of the design on the existing network.

As per the Sydney Water Feasibility Letter CN306552 (v2), the existing connections have capacity to service the development. Flows are required to be split between the northern and southern branch mains, with proposed split to be determined once flows for each development is confirmed. Excluding the DN225 VC main within Madoline Street, all reticulation sewer mains within the precinct have no other upstream properties and can be removed or realigned as per developer's needs.

4.5 APPROVALS AND NEXT-STEPS

Sydney Water formal applications are managed under the Section 73 (S73) process. These will be required for each individual lot within the precinct. The sewer servicing strategy is to be confirmed through hydraulic modelling and is to be submitted to Sydney Water. The key next steps consist of:

1. Develop an overall water master plan for the development precinct and agree this with Sydney Water;
2. Establish protection/build over requirements for impacted infrastructure;
3. Submit application for head deed detailing proposed split of wastewater between reticulation lines. To be managed under the S73 process (Anticipated requirements pathway);
4. Sydney Water to issue a Notice of Requirements (NOR) with detailed requirements of alignment, sizing and funding for the development;
5. Detailed design to progress as per NOR and submitted to Sydney Water for approval.

Please note that individual developments within the precinct will require separate applications for connection, and the above is for the delivery of masterplan.

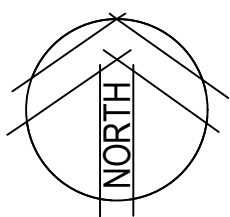




NOTE:
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Rev.	Date	Description	BA	RF	RF
1	12/07/23	FOR REVIEW	BA	RF	RF
Rev.	Date	Description	Des.	Verif.	Appd.

KEY	
	PRECINCT BOUNDARY
	SYDNEY WATER SEWER MAIN



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Checked RF	Date 14/07/23	Project GWYNNEVILLE PRECINCT REDEVELOPMENT
Designed BA	Date 12/07/23	Title WASTEWATER SERVICES PLAN
Verified RF	Date 14/07/23	
Approved		
RF		

Status GDA20	Scale 1:1500	Size A1
NOT TO BE USED FOR CONSTRUCTION PURPOSES	Revision 01	

5 GAS

5.1 BACKGROUND

Gas servicing to the Gwynneville redevelopment precinct is provided by Jemena. Indicative demand calculations show there will be a substantial increase in gas demand within the precinct.

5.2 DEMAND ASSESSMENT

An assessment of gas demands has been undertaken to determine the infrastructure upgrades required to service the development precinct. Jemena assume a gas demand of 20 gigajoules (GJ) per year to estimate the annual domestic usage of natural gas for residential dwellings. This rate assumes natural gas appliances are limited to hot water tank, cooktop, and heating point.

The following Table 5-1 outlines the demand rates used.

Table 5-1 Summary of Gas Demand Rates

Development Land Type	Design Criteria	Key Metric/Units	Average Demand
Residential	Estimated daily demand	m ³ /day/dwelling	2.169

5.3 FORECAST DEMAND

An estimate of future gas demand for the Gwynneville Precinct Redevelopment has been calculated using the information provided by the client. The study area has been assessed as residential. Table 5-2 outlines the cumulative gas demand calculations.

Table 5-2 Cumulative Gas Demand

Average Demand (m ³ /day/dwelling)	Dwelling Amount	Cumulative Gas Demand (m ³ /day)
2.169	1250	2711



Noting that both the gas and electrical indicative demand calculations have assumed use of electrical cooktops and heating and will have a reduction in total demand dependent on appliances.

5.4 ON-SITE UTILITY INFRASTRUCTURE

The precinct is currently serviced by an extensive network of gas mains owned and operated by Jemena. Assets have been identified using Before You Dig Australia (BYDA). Key infrastructure includes:

- 32mm and 50mm nylon reticulation mains inserted into a mixture of cast iron and steel pipes throughout the precinct.

The exact depths and positions of the existing reticulation mains have not been confirmed and further investigations will likely be required to determine the extent of diversions required.

Upon consultation with Jemena, the existing connections have capacity to service the development. The medium pressure 210 kPa 110mm network north of Murphy's Avenue may require minor augmentation to suit proposed new connections.

5.5 APPROVALS AND NEXT-STEPS

Jemena formal applications are managed through their connection's portal and associated process. A formal offer will be required following submission of applications. The key next steps consist of:

1. Undertake site investigations to confirm layout of existing services – post land rezoning and development application;
2. Develop an overall water master plan for the development precinct and agree this with Jemena.

Please note that individual developments within the precinct will require separate applications for connection, and the above is for the delivery of masterplan.



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Designed BA	Date 12/07/23				
Verified RF	Date 14/0/23	Title GAS SERVICES PLAN	GDA20	Scale 1:1500	Size A1
Approved	Date 14/07/23		Drawing Number UTIL01-04	Revision 01	
RF					

6 ELECTRICAL

6.1 BACKGROUND

Electrical servicing to the Gwynneville redevelopment precinct is provided by Endeavour. The precinct is approximately 1km from Endeavour Energy's Mount Ousley Supply Zone Substation, located at 12 Gowan Brae Avenue.

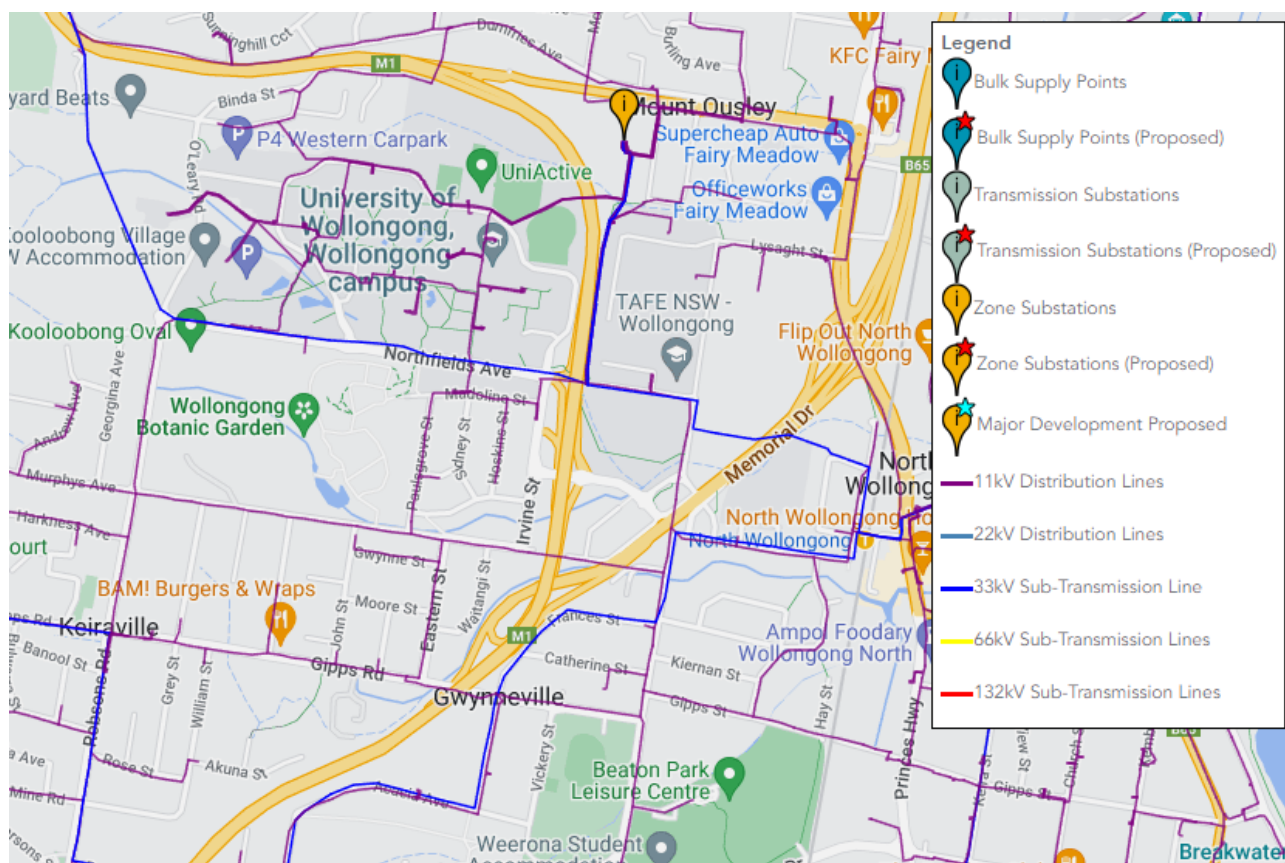


Figure 6-1 Endeavour Connections Portal Extract Source: Endeavour Energy (2023)

Indicative demand calculations show there will be a substantial increase in electrical demand within the precinct.

6.2 DEMAND ASSESSMENT

An assessment of electrical demand has been undertaken to determine the infrastructure upgrades required to service the development precinct. Electrical demand calculations have been based on AS3000 Table C3, Ausgrid ADMD for residential areas and endeavour growth servicing plan 2018 ADMD by application table, as shown respectively in the following Figures 6-2 & 6-3.

TABLE C3
MAXIMUM DEMAND—ENERGY DEMAND METHOD FOR 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

Figure 6-2 AS3000 Table C3 (Source: AS/NZ3000:2018)

Level of Network	Residential Dwelling Type	ADMD kVA	Example Application
Distribution Substation and Low Voltage network	Detached House	5 (medium) 6.5 (large)	Size Distribution Transformer
	Apartments	3.5	
11kV feeders	Detached House	4	Area Studies
	Apartments	3	
Zone Substation	Detached House	3.2	Summer Demand Forecast
	Apartments	2.4	
	Detached House	4	Area Planning
	Apartments	3	

Figure 6-3 Endeavour Energy ADMD by application (Source: Endeavour Energy Growth Servicing Plan 2018)

6.3 FORECAST DEMAND

An estimate of future electrical demand for the Gwynneville Precinct Redevelopment has been calculated using the information provided by the client. The study area has been assessed as residential. Table 6-1 outlines the cumulative electrical demand calculations.



Table 6-1 Cumulative Electrical Demand

Electrical Load	Dwelling Amount	Electrical Demand (kVa/dwelling)	Cumulative Electrical Demand (kVa (ADMD))
Apartments	1250	3	3750

Noting that both the gas and electrical indicative demand calculations have assumed use of electrical cooktops and heating and will have a reduction in total demand dependent on appliances.

6.4 ON-SITE UTILITY INFRASTRUCTURE

The precinct is currently serviced by both underground and aboveground electrical lines owned and operated by Endeavour Energy. Assets have been identified using Before You Dig Australia (BYDA) and Endeavour Connection Opportunities Mapping. Key infrastructure includes:

- 11kV overhead distribution within the redevelopment precinct;
- 33kV Sub-Transmission Lines along Northfields Avenue;
- Mount Ousley Zone Station approximately 1km North West;
- West Wollongong Zone Station approximately 1.2km South.

The exact positions of the existing electrical distribution network have not been confirmed and further investigations will likely be required to determine the extent of diversions required.

The existing connections are serviced by Mount Ousley's Zone substation which has capacity to service the development. As per Endeavour Energy Enquiry Letter ENL4707, the existing supply area is in high voltage feeder MYQ2, which as of May 2023 does not have spare capacity. To service the site a new underground 11kV feeder will need to be developed from feeder CB MYD2 located at Mount Ousley Zone station. The associated underground cable may be run through spare ducts adjacent to and crossing Princes Highway, along and crossing Northfields Avenue to Madoline Street. The new pad mount substation locations and cross feeder HV linkage to existing HV feeder will need to be established to provide suitable operational flexibility and reliability. This will be reviewed further when a firm application for load is submitted. Please refer to Appendix B, Endeavour Energy Enquiry Letter ENL4707.



6.5 APPROVALS AND NEXT-STEPS

Endeavour Energy formal applications are managed under the application for connection service. These will likely be required for each individual lot within the precinct. The key next steps consist of:

1. Undertake site investigations to determine layout and extent of existing services— post land rezoning and development application;
2. Develop arrangements for supply and street lighting;
3. Develop an overall master plan/Proposed method of supply for the development precinct and agree this with Endeavour Energy to receive Notification of Arrangement;
4. Liaison with Wollongong Council to confirm requirements for undergrounding of existing infrastructure;
5. Endeavour Energy to provide detailed requirements within design brief;
6. Detailed design to progress as per design certification and submitted to Endeavour for acceptance.

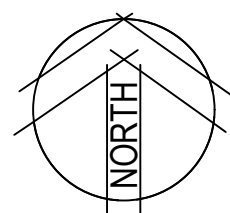
Please note that individual development lots within the precinct may require separate applications for connection, and the above is for the delivery of masterplan.



1	12/07/23	FOR REVIEW		BA	RF
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KEY

- PRECINCT BOUNDARY
- ENDEAVOUR ENERGY
- PROPOSED ENDEAVOUR ENERGY HV
- PROPOSED PADMOUNT SUBSTATION
- MOUNT OUSLEY ZONE STATION



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Drawn BA	Date 12/07/23	Client Homes NSW				
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Designed BA	Date 12/07/23			NOT TO BE USED FOR CONSTRUCTION PURPOSES		
Verified RF	Date 14/0/23			GDA20 <div></div> Scale 1:1500Size A1		
Approved	Date 14/07/23		Title ELECTRICAL SERVICES PLAN	Drawing Number UTIL01-05		Revision 01
RF						

7 TELECOMMUNICATIONS

7.1 BACKGROUND

Data and telecommunications are serviced by numerous providers with assets within and adjacent to the Gwynneville redevelopment precinct:

- AARNET;
- Optus and/or Uecomm, NSW;
- NBN Co, NSW/ACT;
- Telstra NSW.

It is anticipated that the site telecommunications will be serviced by NBN.

7.2 DEMAND ASSESSMENT

Not applicable. Demand estimations are not calculated in the same way as other utilities.

7.3 FORECAST DEMAND

Not applicable. Demand estimations are not calculated in the same way as other utilities.

7.4 ON-SITE UTILITY INFRASTRUCTURE

Utility infrastructure within the Gwynneville development precinct is summarised as per below.

7.4.1 AARNET

AARNET has a major optic fibre cable along Northfields Avenue. No connection to this asset is currently proposed for the development.

7.4.2 Optus

Optus has a major optic fibre cable along Northfields Avenue and travelling south down Irvine Street. No connection to this asset is currently proposed for the development.

7.4.3 NBN

NBN has 20, 35 & 50mm fibres running underground throughout development within PVC conduits owned by Telstra. A100mm fibre travels along Madoline Street. Upon consultation with NBN, it was confirmed there is available capacity for the development as of June 2023.



7.4.4 Telstra

Underground Telstra assets are located within the road corridors as well as servicing existing lots within the development precinct. Assets include 20, 35 & 50mm PVC conduit throughout the precinct.

7.5 APPROVALS AND NEXT-STEPS

NBN Co's formal applications are managed under the NBN application for connection service. These will likely be required for each individual lot within the precinct. The key next steps consist of:

1. Undertake site investigations to determine layout and extent of existing services— post land rezoning and development application;
2. Develop an overall master plan for the development precinct and agree this with NBN or other provider;
3. Detailed design to be submitted to NBN for approval.


Please note that individual development lots within the precinct may require separate applications for connection, and the above is for the delivery of masterplan.







Utility locations are indicative only. Services investigations are required to confirm exact locations.



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KEY

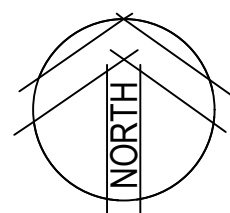
 PRECINCT BOUNDARY

 C (D)  NBN

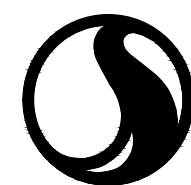
 C (D)  AARNET

 C (D)  OPTUS

 C (D) TELSTRA



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RF	

Client	Homes NSW
Project	GWYNNEVILLE PRECINCT REDEVELOPMENT
Title	TELECOMMUNICATION SERVICES PLAN

Status		<div>PRELIMINARY</div> <div>NOT TO BE USED FOR CONSTRUCTION PURPOSES</div>	
GDA20			
Drawing Number			Revision
UTIL01-06			01

8 CONCLUSION

The proposed Gwynneville redevelopment precinct is currently well serviced by utility infrastructure. Demand calculations have determined the following estimations:

- Potable Water – 251.71 KL/Day
- Wastewater – 3.76 L/s
- Gas – 2711 m³/day
- Electrical – 3750 KVA

Required lead in infrastructure is required for potable water and electrical. All of services have capacity to service the development.

Further work required for the development precinct includes:

- Coordination with utility authorities to determine appropriate design and requirements.
- Hydraulic modelling to confirm potable and wastewater infrastructure.
- Augmentation of potable water network. A water main extension from the DN500 trunk main located at the intersection of Robsons Road and Northfields Avenue would be required to service the development.
- Augmentation of the electrical network. To service the site a new underground 11kV feeder will need to be developed from feeder CB MYD2 located at Mount Ousley Zone station. The associated underground cable may be run through spare ducts adjacent to and crossing Princes Highway, along and crossing Northfields Avenue to Madoline Street.

Based on the investigations undertaken within this report, the anticipated planning proposal requirements have been satisfied and appropriate investigations have been recommended for future development applications.



9 REFERENCES

WSA 03-2011 Water Supply Code of Australia 3.1

WSA Sewer

AS/NZ3000:2018

Endeavour Energy Growth Servicing Plan 2018

Endeavour Energy (2023) connections portal

SIX Maps, 2023

Before You Dig Australia (BYDA) requests

Sydney Water Corporation, 2017 – water source

Sydney Water (2022) – Wastewater treatment plants



Appendix A

Sydney Water Feasibility Letter CN206552

We design with community in mind



Case Number: 206552

17 July 2023 Rev 2

LAND AND HOUSING CORPORATION
c/- CARDNO NSW ACT PTY LTD.

Feasibility Letter

Developer: LAND AND HOUSING CORPORATION
Your reference: 304000956
Development: Madoline St, Gwynneville
Development Description: Planning proposal for Gwynneville Precinct to facilitate new development of lots and increase to approximately 940 total dwellings.
Your application date: May 23, 2023

Dear Applicant

This Feasibility Letter (Letter) is a guide only. It provides general information about what our requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

We have not allocated any system capacity to your proposal from the investigation into this Feasibility advice. This advice is only an indication of our systems and possible requirements as of today. Where there is system capacity, it may have been fully utilised by the time you obtain a Consent. The requirements applied to any approved Development proposal may differ significantly in the future since the original advice was issued.

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (WSC).

We'll then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed)
or
- Certificate.

These documents will be the definitive statement of our requirements.

There may be changes in our requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/site layout, after today, the requirements in this Letter could change when you submit your new application
- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from us and to the extent that it is able, we limit its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

What You Must Do To Get A Section 73 Certificate In The Future.

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting [Plumbing, building & developing](#) page on our website.

1. **Obtain Development Consent from the consent authority for your development proposal.**
2. **Engage a Water Servicing Coordinator (WSC).**

You must engage your current or another authorised WSC to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another WSC (at any point in this process) you must write and tell us.

You'll find a list of WSC's at [Listed providers](#) on our website.

The WSC will be your point of contact with us. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including our costs).

4. Water and Sewer Works

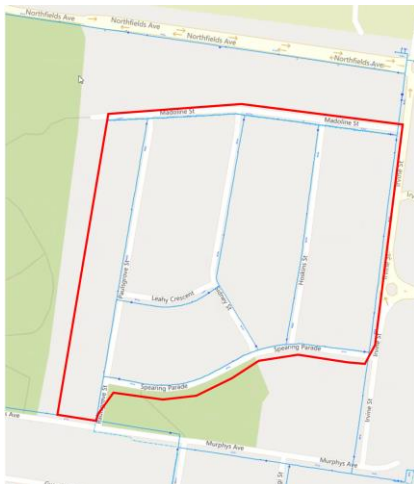
4.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

We've assessed your application and found that:

- The proposed development lies in the Mt Keira Pressure Reduced 2 zone, a sub-zone of the Mt Keira Water Supply Zone (WSZ) which is part of the Illawarra water delivery system (WDS).
- The development site is currently supplied by a network of DN100 CICL water mains constructed in 1957 apart from Madoline Street which has DN100 mPVC main constructed in 2009. The development site and drinking water mains are indicated in **Error! Reference source not found..**

Figure 1 – Drinking Water Location Map



- The existing watermain in the Mt Keira Pressure Reduced 2 zone do not have the capacity to service the proposed development. The adjacent Mt Keira WSZ has the capacity to service the development.
- Amplification of the existing mains within the development area and a supply main from the DN500 trunk main offtake located at the intersection of Robsons Road/Northfields Avenue (Mt Keira WSZ) would be required to service the development.
- This would also require rezoning into the Mt Kiera WSZ and the installation of a pressure reducing valve on the supply main. The PRV would need to be set to match the existing Mt Keira Pressure Reduced zone HGL or the development area water distribution network would need to be isolated from the network. This could be achieved by closing two (2) existing isolation valves at the Spearing Parade/Irvine St intersection and at Spearing Parade/Paulsgrove St intersection. The lead-in supply main and local reticulation sizing will be confirmed during the S73 process.
- **All work must comply with the WSA code requirements.**

4.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

We've assessed your application and found that:

- The development site is located in the Gwynneville SCAMP which is part of the Bellambi catchment area.
- There are two existing connections that flow out to the east of the site. These would both be required to service the development, and the alignment of the northern one should ideally be unaltered since it has existing upstream flow.
- Both the northern and southern connections as well as the link after they join all have capacity based on the existing split of flow between the two links.
- The actual proposed split in S73 could impact capacity so the capacity will be reconfirmed once the flows to each sewer are confirmed.
- Capacity of joining DN150 links toward the centre of the development site will also be assessed in S73 once alignment of these is confirmed. Other than the DN225 on Madoline St, all existing sewers on the site have no other upstream properties so would be able to be removed or realigned as to developer's needs.
- **All work must comply with the WSA code requirements.**

5. Ancillary Matters

5.1 Asset adjustments

After we issue this Notice (and more detailed designs are available), we may require that the water main/sewer main/stormwater located in the footway/your property needs to be adjusted/deviated. If this happens, you'll need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. We'll need to see the completed designs for the work, and we'll require you to lodge a security. The security will be refunded once the work is completed.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use our **Permission to Enter** form(s) for this. You can get copies of these forms from your WSC or on our website. Your WSC can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

6. MLIM requirements (Applicable for Multi-Level residential dwellings)

Multi-level individual metering requirements

Your development must either allow for or provide individual metering. This means that you must:

1. comply at all times and in all respects with the requirements of our "*Multi-level Individual Metering Guide*". You can find this in the [Meters & metered standpipes](#) page on our website.
2. provide and install plumbing and space for individual metering in accordance with our "*Multi-level Individual Metering Guide*".
3. if and when you implement a strata/ stratum plan (or strata/ stratum subdivide) you must:
 - a. engage an Accredited Metering Supplier ("**AMS**") to provide individual metering in accordance with the "*Multi-level Individual Metering Guide*" and meet the cost of the meters and metering system.
 - b. transfer the meters and metering system to us once the Testing Certificate has been issued by us to the AMS and the AMS has confirmed that payment for the meters and metering system has been paid in full.

Before the Section 73 Certificate can be issued, you will be required to sign an undertaking to show that you understand and accept these metering requirements and associated costs.

Visit [Meters & metered standpipes](#) to see the *Multi-level individual metering guide* and find out more.

OTHER THINGS YOU MAY NEED TO DO

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement from us in the future because of the impact of your development on our assets. You must read them before you go any further.

Approval of your building plans

Please note that the building plans must be approved when each lot is developed. This can be done at in our Tap in™ system [Sydney Water Tap in](#)™.

This is not a requirement for the Certificate, but the approval is needed because the construction/building works may affect our assets (e.g. water, sewer, and stormwater mains).

If our stormwater channel, pipe, or culvert is located within ten (10) metres of your development site it must be referred to us for a detailed review.

Your Coordinator can tell you about the approval process including:

- Possible requirements
- Their costs
- Timeframes.

If your building plans need to be referred to us for detailed review you will be required to pay us for the costs associated with the detailed review.

We recommend that you apply for Building Plan Approval early as in some instances your WSC may need to refer your building plans to us for detailed review. You'll be required to pay us for the costs associated with the detailed review.

Note: You must obtain our written approval before you do any work on our systems. We'll take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the Sydney Water Act 1994.

Backflow Prevention Water supply connections

A backflow prevention containment device appropriate to the property's hazard rating must be installed at the property boundary. The device is to be installed on all water supplies entering the property, regardless of the supply type or metering arrangements. It is needed to reduce the risk of contamination by backflow from these supplies.

A licensed plumber with backflow accreditation can advise you of the correct requirements for your property. To view a copy of our Backflow Prevention Policy and a list of backflow accredited plumbers [Plumbing, building & developing](#).

The water service for your development

We don't consider whether the existing water main(s) talked about above is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

You must make sure that each home/lot has its own 20mm meter.

When access to the water supply is required, the property owner or agent must apply to with us online. A meter must be installed before any water is used. It is illegal for anyone other than us to remove the locking mechanism on the water meter.

The online application can be found by visiting our website [Plumbing, building & developing](#). You'll need to have the:

- account (Property) Number which can be obtained from the WSC
- serial Number which can be found on the metal tag on your property service.

You can find more information by using the "Ask Sydney Water" section of our website.

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of our systems to provide that flow in an emergency. Sydney Water's Operating Licence directs that our mains are only required to provide domestic supply at a minimum pressure of 15 m head.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to our water main. This work must meet our standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Disused Sewerage Service Sealing

Please don't forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to our sewer main. This work must meet our standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet our soffit requirements for property connection and drainage.

Other fees and requirements

The requirements in this Notice relate to your Certificate application only. We may be involved with other aspects of your development and there may be other fees or requirements. These include:

- plumbing and drainage inspection costs
- the installation of backflow prevention devices; and
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from us and to the extent that it is able, we limit its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

END

Appendix B

Endeavour Energy Enquiry Letter ENL4707

We design with community in mind



8 June 2023



Endeavour Energy Ref: ENL4707

Stantec Australia PTY LTD
Burelli Street
Wollongong NSW 2500

Attention: Branden Adams

CONNECTION OFFER – STANDARD CONNECTION SERVICE

**ENL4707 – LOT 18, DP 36218, Enquiry Application: 27 MADOLINE STREET,
GWYNNEVILLE**

Thank you for your application providing information of the proposed development at the above location. Your application has been registered under the above reference number. Please quote this reference number on all future correspondence.

Below are, the comment from capacity regards to the reticulations HV network to the site.

“It is understood this enquiry (ENL4707) and the proposal from NSW Land and Housing Corporation is for the residential redevelopment site off Madoline Street Gwynneville which, is expected to increase the existing residential dwellings from 117 to 941 dwellings. Timing for the proposed redevelopment has not been provided.

The site located off Madoline Street, Gwynneville and is approximately 1.0km from Endeavour Energy’s Mount Ousley Zone Substation (12 Gowan Brae Ave) which, has spare capacity to support the total proposed demand. The existing residential area is currently supplied from 11kV feeder MYQ2. As of May 2023, there is insufficient spare capacity in HV feeder MYQ2 and the existing adjacent HV distribution system.

To support the proposed redevelopment and the total maximum demand, a new underground 11kV feeder will need to be developed from the existing spare feeder CB MYD2 - ‘Spare’ at Mount Ousley ZS to the redevelopment site. The first length of HV cable from CB MYD2 is to be laid with 240mm² Cu XLPE through to the first new padmount substation. Then from the first new padmount substation the HV feeder can transition to 240mm² Al XLPE cable.

The envisaged HV cable route is south from Mount Ousley ZS via existing spare ducts adjacent to Princes Hwy (east), under Princes Hwy (west), Northfields Ave (west) and Irvine St (south) to Madoline St (east) where new ducts would be required to link to the new padmount substation/s. New padmount substation locations and cross feeder HV linkage/s to existing HV feeder/s will need to be established to provide suitable operational flexibility and reliability. This can be reviewed further when a firm application for load is submitted.

Endeavour Energy’s supply security standards will need to be met during the staging phases of the proposed development. All electrical infrastructure within the development site will need to be reticulated with underground cables and padmount substations.

It should be noted capacity is not reserved, and the method of supply may change at the time the proponent makes a firm application. The advice provided is in response to an enquiry only.

Endeavour Energy is committed to making provisions for proponents to connect to its network in a fair and equitable manner in accordance with current policies.”

Should you have any enquiries regarding your application please contact the undersigned.

Yours faithfully,

A handwritten signature in cursive script that reads "Waheed".

Waheed Ebrahimi
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