

**Blackwattle Bay**  
State Significant Precinct

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# Attachment 23:

## Utilities and Infrastructure Servicing

June 2021



# Utilities and Infrastructure Servicing Report

Blackwattle Bay State Significant Precinct



# Utilities and Infrastructure Servicing Report

Blackwattle Bay State Significant Precinct

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## Quality Information


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## Executive Summary

### Objectives

AECOM has been engaged by Infrastructure NSW to prepare a Utilities and Infrastructure Servicing Report for the proposed Blackwattle Bay development (formerly known as Bays Market District). The study will be submitted as part of the State Significant Precinct Study for the proposed redevelopment of the precinct.

The purpose of this report is to identify existing utility infrastructure and consider any upgrades or new utility infrastructure that may be required. In doing so, this report addresses Section 10 of the Study Requirements for utilities and infrastructure servicing.

### Methodology

The methodology for the information contained within the Utilities and Infrastructure Servicing report can be summarised below:

1. Information Gathering
2. Determine the Demand for Services
3. Stakeholder Engagement (Being Undertaken)
4. Preliminary Infrastructure Assessment
5. Identifying Constraints, Potential Upgrades and Costs
6. Alternative Demand and Supply Opportunities

### Findings

There are a number of existing utility services in and around Blackwattle Bay which are summarised below and discussed in detail in this report:

- **Potable Water:** Drinking water is provided by Sydney Water Corporation (SWC) from the Prospect and/or Kurnell Systems via the Potts Hill Trunk Delivery System incorporating the Potts Hill Reservoirs and Crown Street Reservoir;
- **Wastewater:** Wastewater facilities servicing is provided by SWC with sewer mains running through the entirety of the site;
- **Electrical:** Electricity is provided by Ausgrid via cables from four main substations: Darling Harbour, Blackwattle Bay, Camperdown and Leichardt Zone Substations;
- **Gas:** Jemena currently supplies gas to the area through existing gas mains; and
- **Data and Telecommunications:** Various telecommunications providers have assets in the vicinity of the site including Telstra and NBN Co.

### Conclusions

Based on the investigations undertaken within this report, Study Requirements 10.1 to 10.5 for utilities and infrastructure servicing have been satisfied with appropriate investigations recommended for future development applications.

Indicative building service loads are summarised below; however, it should be noted that these are provided to inform lead-in infrastructure requirements only and are subject to change as part of design development:

- Demand calculations provide the following estimates based on development yields:
  - Potable water between **1,010 – 1,370 kL/day**
  - Sewer loading between **4.6 – 6.2 L/s**
  - Electrical load between **11.6 – 15.6 MVA**
  - Gas demand between **1,260 – 1,710 m<sup>3</sup>/day**

A number of utility constraints that affect Blackwattle Bay include:

- A concentration of potable water, wastewater, communications, Telstra and Ausgrid utilities infrastructure running adjacent to the Site which may require decommissioning prior to development;
- An Ausgrid 33kV transmission line along the southern boundary of the Site near Wattle Crescent and Jones Street; and
- Overhead powerlines around the site boundary which potentially need to be undergrounded (pending City of Sydney).

Opportunities and needs to support Blackwattle Bay include:

- Minimal utility infrastructure running through the Site, which gives an opportunity to plan the services in line with the urban design intent and sustainability outcomes;
- The site is currently well serviced by utility infrastructure;
- Existing trunk services may have excess capacity to service the initial phases of any new development, however local amplifications are likely and new electrical feeder cables will likely be required; and
- There may be an opportunity to re-use any redundant electrical utility routes for new infrastructure.

Potential Sustainability measures could include:

- Onsite renewable energy;
- Irrigation of public open space with recycled water;
- Diverting operational waste from landfill;
- Increased tree canopy cover;
- Onsite stormwater retention;
- Provision of bicycle parking and dedicated car share spaces; and
- Electric vehicle charging stations.

## Recommendations

- Coordination with the Urban Design team to understand development scenarios and limit the impact on the existing trunk utilities;
- To investigate potential utility amplification to areas of increased density;
- Further coordination with utility authorities to confirm lead-in infrastructure requirements and routes;
- Potential hydraulic modelling to confirm potable and wastewater lead-in infrastructure upgrades;
- Assessment of Ecologically Sustainable Development (ESD) and alternative utility supply options;
- Assessment of ESD options to confirm the effects on utility supply and lead-in infrastructure requirements and routes; and
- Further opportunities for alternative utility supply requiring further investigation as part of this ongoing study.

Preliminary investigation on the current utility servicing capacity has been obtained from DBYD records and servicing reports. A summary of each utility service to meet the proposed redevelopment is provided in Table 1.



**Table 1: Summary of Existing Utility Services Infrastructure and Required Upgrades**

Utility Service	Potable Water	Wastewater	Electrical	Gas	Data and Telecommunications
<b>Utility Authority Asset</b>	Sydney Water Corporation	Sydney Water Corporation	Ausgrid	Jemena	NBN Co. and Telstra
<b>Adequate Capacity for Proposed Development?</b>	Yes*	Yes*	No*	Yes*	Yes*
<b>Proposed Works</b>	Local network amplifications	Local network amplifications	Potential upgrade of standby feeder networks	No upgrades required	No upgrades required
<b>Funding</b>	TBC**	TBC**	Ausgrid	TBC**	TBC**
<b>Estimated cost of Developer Funded Works</b>	TBC**	TBC**	N/A	TBC**	TBC**

\*Current capacity and servicing requirements to be confirmed with relevant utility authority during the detailed design stage of the development.

\*\*To be confirmed once development consent has been approved.

## 1.0 Introduction

Blackwattle Bay offers an extraordinary opportunity to reconnect the harbour, its surrounding neighbourhoods and the city; to showcase Sydney's living culture and stories of Country; to build an inclusive and iconic waterfront destination that celebrates innovation, diversity and community.

This Utilities and Infrastructure Servicing Report has been prepared by AECOM on behalf of Infrastructure NSW (INSW) to form part of the Blackwattle Bay State Significant Precinct Study (SSP Study). The SSP Study seeks a rezoning for new planning controls for Blackwattle Bay, located on the south-western side of Pyrmont.

Blackwattle Bay presents a significant opportunity for urban renewal across 10.4 hectares of predominantly government owned land located approximately 1km from the Sydney CBD. NSW Government is also investigating the delivery of a Metro Station in Pyrmont and has recognised the potential to transform the Pyrmont Peninsula with a new 20-year vision and planning framework through the Pyrmont Peninsula Place Strategy.

In 2015 the NSW Government recognised The Bays Precinct as one of the highest potential urban transformation sites in Australia with the release of The Bays Precinct, Sydney Transformation Plan. Following this, the Minister for Planning identified the renewal of Blackwattle Bay and the broader Bays Precinct as a matter of State planning significance and to be investigated for rezoning through the State Significant Precinct (SSP) process. Study Requirements for the Blackwattle Bay (formerly known as 'Bays Market District') investigation area were issued by the Minister on 28 April 2017.

A critical part of Blackwattle Bay's revitalisation and vision has been the NSW Government's decision to relocate the Sydney Fish Market (SFM) from its existing location on Bank Street to the head of Blackwattle Bay. This was sought through a State Significant Development Application (SSDA) process and approved in June 2020. The new SFM was designed alongside the baseline Blackwattle Bay studies to ensure that key aspects of the project are consistent with the vision and principles for Blackwattle Bay.

The outcome of the Blackwattle Bay State Significant Precinct process will be a new planning framework that will enable further development applications for the renewal of the Precinct, connected to the harbour and centred around a rejuvenated SFM. The framework will also provide for new public open spaces including a continuous waterfront promenade, community facilities, and other compatible uses.

This report provides a comprehensive investigation of the utilities and infrastructure servicing opportunities within the Study Area to address a part of the Study Requirements and support the development of a new planning framework for Blackwattle Bay.

### 1.1 Purpose

The purpose of this report is to:

- Identify existing utility infrastructure in Blackwattle Bay and any future planned development within the precinct;
- Consider layout and capacity for new utilities required to meet forecast demand;
- Detail potential utility connection locations specific to Blackwattle Bay;
- Address Section 10 of the Study Requirements for utilities and infrastructure servicing.

## 1.2 Blackwattle Bay State Significant Precinct

The Blackwattle Bay SSP Investigation Area ('Study Area') encompasses the land and water area, known as Blackwattle Bay, between Bank Street and the Glebe foreshore shown in Figure 1. The land is located within the City of Sydney local government area (LGA).

The land within the Study Area is approximately 10.4 hectares (ha) in size. It is largely government owned land containing the SFM (wholesale and retail), recreation and boating operations and facilities. There are three privately owned sites including a concrete batching plant operated by Hymix, seafood wholesaler Poulos Brothers and private developer Celestino which owns further wholesaling facilities. The Blackwattle Bay land area wraps around the southern and eastern edges of Blackwattle Bay and is bounded by Bridge Road to the south and Bank Street to the east. The Western Distributor motorway / Anzac Bridge viaduct is located adjacent to the eastern boundary before traversing over the northern section of the site. The water area of Blackwattle Bay is approximately 21 hectares.



Figure 1: Blackwattle Bay Study Area (Source: FJMT 13/11/2020)

### 1.3 The Proposal

The SSP Study is proposing to rezone Blackwattle Bay with a new planning framework and planning controls to enable its future urban renewal.

The rezoning proposal is based on the Blackwattle Bay Precinct Plan ('Precinct Plan') which provides a conceptual layout to guide the development of planning controls for the precinct and has informed this report. The Precinct Plan is shown in Figure 2. The Precinct Plan provides overarching guidance about how the area should be developed based on community and stakeholder input, local character and place, current and future demographics, economic and social trends, cultural and environmental considerations, and urban renewal aspirations and needs regarding land use, community recreation, transportation, housing, and jobs. Key characteristics of the Precinct Plan include:

- New homes, jobs and services close to the CBD including:
  - 5,636 jobs / or approximately 5,600 jobs
  - 2,795 residents /or approximately 2,800 residents
  - 1546 dwellings
- A continuous waterfront promenade – the missing link in an otherwise 15km foreshore walk from Woolloomooloo to Rozelle
- New active transport connections to bring the neighbourhood closer to the harbour through new and improved pedestrian and cycling links
- Improved public transport options and minimised vehicle usage strategies including:
  - Minimising car parking spaces with limited on-street parking.
  - Ferry wharf
  - Opportunity for buses to service through site link
  - Connections to the existing light rail
  - Access to a future Sydney Metro West Station in Pyrmont
- New parks and green space with 30,000 m<sup>2</sup> of new open space
- An authentic, and world class new SFM at the heart of Blackwattle Bay
- An authentic place that builds on Indigenous and industrial stories and celebrating the local character.

Once the Study Area is rezoned and the new planning controls are in place, future development will need to seek development approval through the relevant approval pathway. This will include detailed development proposals and further associated environmental, social and economic assessments.

The rezoning proposal responds to the Study Requirements issued for Blackwattle Bay (formerly Bays Market District) by the Department of Planning and Environment in April 2017.

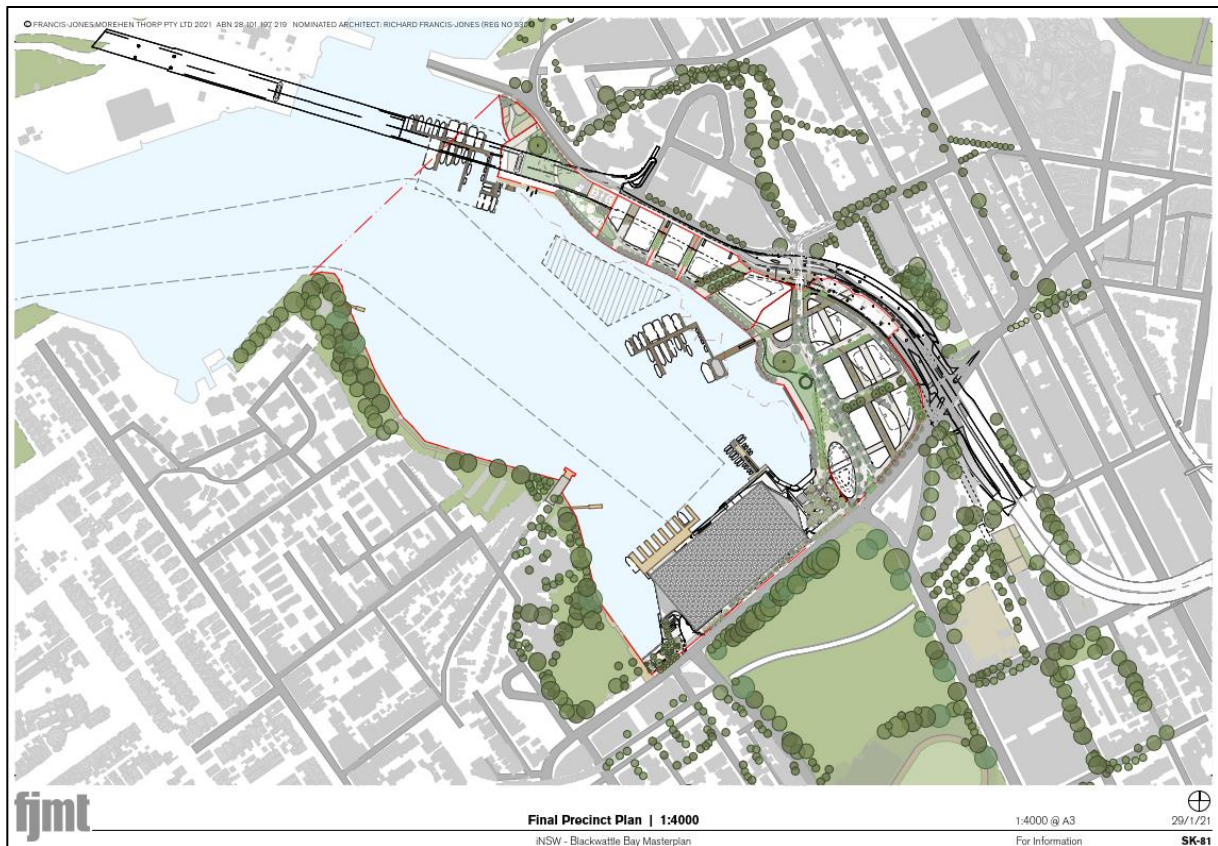


Figure 2: Precinct Plan (Source: FJMT 13/11/2020)

## 1.4 Vision and Principles

Principles for a future Blackwattle Bay were formed through extensive community consultation in August 2017. These were further developed in 2019, together with a vision for the precinct. Both are provided below. These have guided the development of the Precinct Plan and will continue to guide future development proposals within the Study Area.

Vision:

*“Blackwattle Bay offers an extraordinary opportunity to reconnect the harbour, its surrounding neighbourhoods and the city; to showcase Sydney’s living culture and stories of Country; to build an inclusive and iconic waterfront destination that celebrates innovation, diversity and community.”*

Principles:

1. Improve access to Blackwattle Bay, the foreshore and water activities for all users
2. Minimise additional shadowing to Wentworth Park and Glebe Foreshore (in mid-winter) and create new places with comfortable conditions for people to enjoy.
3. Pursue leading edge sustainability outcomes including climate change resilience, improved water quality and restoration of natural ecosystems.
4. Prioritise movement by walking, cycling and public transport.
5. Balance diverse traffic movement and parking needs for all users.
6. Link the Blackwattle Bay precinct to the City, Glebe Island and White Bay and other surrounding communities and attractors.
7. Mandate Design Excellence in the public and private domain.

8. Integrate housing, employment and mixed uses to create a vibrant, walkable, mixed use precinct on the city's edge.
9. Maintain and enhance water uses and activities.
10. Allow for co-existence and evolution of land uses over time.
11. A place for everyone that is inviting, unique in character, socially inclusive and affordable.
12. Expand the range of recreational, community and cultural facilities.
13. Plan for the future community's education, health, social and cultural needs.
14. Deliver development that is economically, socially, culturally and environmentally viable.
15. Embed and interpret the morphology, heritage and culture of the site to create an authentic and site responsive place.
16. Foster social and cultural understanding and respect to heal and grow relationships.

## 1.5 SSP Study Requirements

On 28 April 2017 the Minister issued Study Requirements for the Precinct. This report considers and addresses the following requirements as they relate to Utilities.

Table 2: Study Requirements

Study Requirement	Report Section
<b>10. Utilities</b>	
10.1 Provide a utilities and infrastructure servicing report identifying existing capacity, required capacity and augmentation needed for the proposal, sustainability and climate change adaptation measures (including Water Sensitive Urban Design (WSUD), and measures to manage increasing heat and changing rainfall patterns) and staging.	Whole report addresses utilities existing and future capacity requirements as well as makes recommendations on sustainability initiatives. This Study Requirement is addressed in coordination with other reports in the Blackwattle Bay State Significant Precinct Study.
10.2 The water utilities component must be prepared by a suitably qualified hydraulic consultant. The power utility requirements must be prepared by a suitably qualified (ASP) consultant.	As a suitably qualified consultant AECOM has addressed Potable and Wastewater utilities in Sections 6 and 7 respectively, Electrical utilities are addressed in Section 8.
10.3 The utilities and infrastructure servicing report should outline the development yield and staging and should include a high-level assessment of the capacity of: <ul style="list-style-type: none"> <li>• Ausgrid electrical network to service the development and outline the likely impacts on the broader Ausgrid electrical network. This will include direct engagement with Ausgrid on the high-level impacts to ensure early understanding and visibility of any network augmentation required,</li> <li>• Sydney Water's network to service the development and the proposed servicing options considered for the development including wastewater and stormwater recycling for non-potable use. It should propose</li> </ul>	Consideration of Ausgrid's Electrical network is provided in Section 8.3  Consideration of Sydney Water's existing Potable and Wastewater networks

	sustainability initiatives for the development, including any proposed alternative water supply, proposed end uses of drinking and non-drinking water and proposed water conservation measures. It should also confirm whether there is adequate capacity in the existing sewerage system to cater for additional loads and the systems environmental performance will not be compromised.	is provided Sections 6.3 and 7.3 respectively.  Consideration of sustainability initiatives for Potable and Wastewater is provided Sections 6.8 and 7.8 respectively.
10.4	Integrate outcomes of the ESD study and flood risk assessment to ensure optimisation of sustainable infrastructure opportunities.	A comprehensive review of ESD initiatives is provided in AECOM's Ecologically Sustainable Development (ESD) Report. Reference to utility specific ESD initiatives is provided in subsection 8 of each of the Sections on utilities.
10.5	Investigate a strategy for the undergrounding of overhead power, communication and other utilities.	A preliminary strategy for undergrounding and coordination between new and existing services is provided in Sections 3.1 to 3.6.

## 1.6 Demand Assessment Yields

Demand calculations were undertaken based on the development yields presented in the “*Blackwattle Bay Precinct Plan \_ Indicative Yields \_ 02 February 2021*” as summarised in Table 3 below. This staging has been reflected in the demand calculations for the various utilities.

**Table 3: Blackwattle Bay Development Yields (2021)**

Blackwattle Bay	Stages			
	2024	2026	2027	2028
<b>Residential (no.)</b>	419	263	439	463
<b>Residential GFA (m<sup>2</sup>)</b>	33,930	21,307	35,544	37,497
<b>Commercial GFA (m<sup>2</sup>)</b>	34,576	31,013	23,144	6,153
<b>Retail GFA (m<sup>2</sup>)</b>	3,498	3,544	1,361	1,744
<b>TOTAL (m<sup>2</sup>)</b>	72,005	55,864	60,049	45,394

The residential dwelling numbers are provided for the purpose of assessing the feasibility and required utility infrastructure upgrades and are subject to change as part of design development.

## 2.0 Site Analysis

The land side component of the Investigation Area is located within the City of Sydney (CoS) Local Government Area and is part of the Bays Precinct. The area wraps around the southern and eastern edges of Blackwattle Bay and is bounded by Bridge Road to the south and Bank Street to the east. The Western Distributor / Anzac Bridge is located adjacent to the eastern boundary before traversing over the northern section of the site.

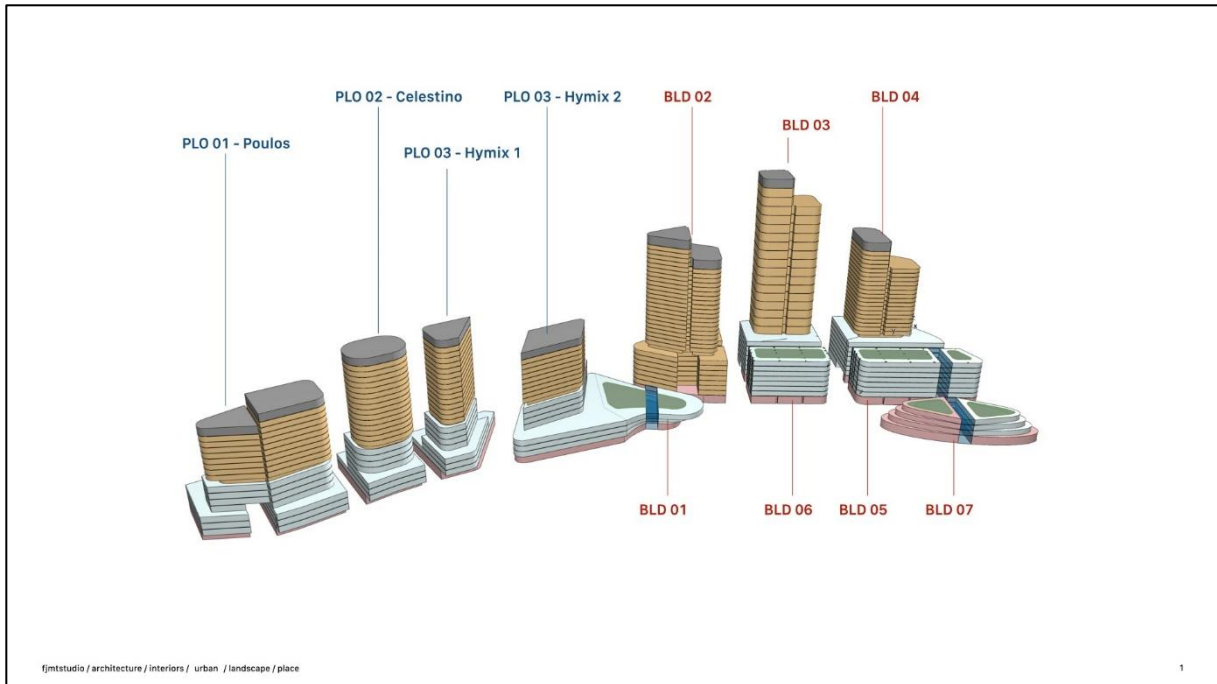
The ambition for the project is to create a new world class district matching international benchmarks in terms of design, profile and quality of experience. The urban renewal of Blackwattle Bay will draw on the activity and spirit of the new Sydney Fish Market (to be located at the head of Blackwattle Bay) and will provide housing opportunities suited to living on the edge of the CBD, commercial and retail facilities, public open space, community and recreational facilities and marine facilities.



Figure 3: Blackwattle Bay Precinct Context (Source: INSW)

INSW has provided an Indicative Precinct Staging Plan of the proposed renewal as shown in Figure 4. The potential diversion and/or decommissioning of existing infrastructure (and any interim works that may be required to achieve this) is to be undertaken as part of design development.





**Figure 4: Blackwattle Bay Indicative Staging Plan**

Stage 1 (2024) could occur for the development of buildings PL01, 2 and 3 (private landowners). However, the renewal status and timing of privately owned sites are ultimately at their discretion. Furthermore, whilst it should be noted that a disposal strategy is yet to be developed for the NSW Government owned land, staging could occur as follows: Stage 2 (2026) comprising buildings 4, 5 and 7, Stage 3 (2027) comprising buildings 3 and 6, and Stage 4 (2028) comprising buildings 1 and 2.

## 3.0 Regulatory Context

### 3.1 Coordination of Potable Water Infrastructure 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, these details are attached in Section 3.6.

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 5 .

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

NOTES – see over

#### NOTES:

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

**Figure 5: Sydney Water Clearances between Water Mains and Underground Services (WSA 03-2011-3.1, Sydney Water Edition - 2012)**

### 3.2 Coordination of Wastewater Infrastructure 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, these details are attached in Section 3.6

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 6.

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

#### NOTES:

- 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.*
- A minimum vertical clearance of 300 mm applies if the size of either the existing service or proposed sewer is >DN 300.
- 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.*
- 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.
- 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.*
- Clearance from kerbs shall be measured from the nearest point of the kerb.
- 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.

**Figure 6: Sydney Water Clearance between Sewers and Other Underground Services (WSA 02-2002-2.2, Sydney Water Edition - Version 3)**

### 3.3 Coordination of Electrical Infrastructure 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 (these details are attached in Section 3.6)

Ausgrid's specification "NS130: Specification for Laying of Underground Cables up to 22kV" 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.

### 3.4 Required Gas Service Clearances

Coordination of the proposed gas infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards (these details are attached in Section 3.6).

Jemena 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 Table 4.

**Table 4: 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 <sup>2</sup> Low Voltage electricity cables	150 mm	300 mm
Protected <sup>2</sup> 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

### 3.5 Required Communications Service Clearances

Coordination of the proposed communications infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards (these details are attached in Section 3.6).

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 7 below.

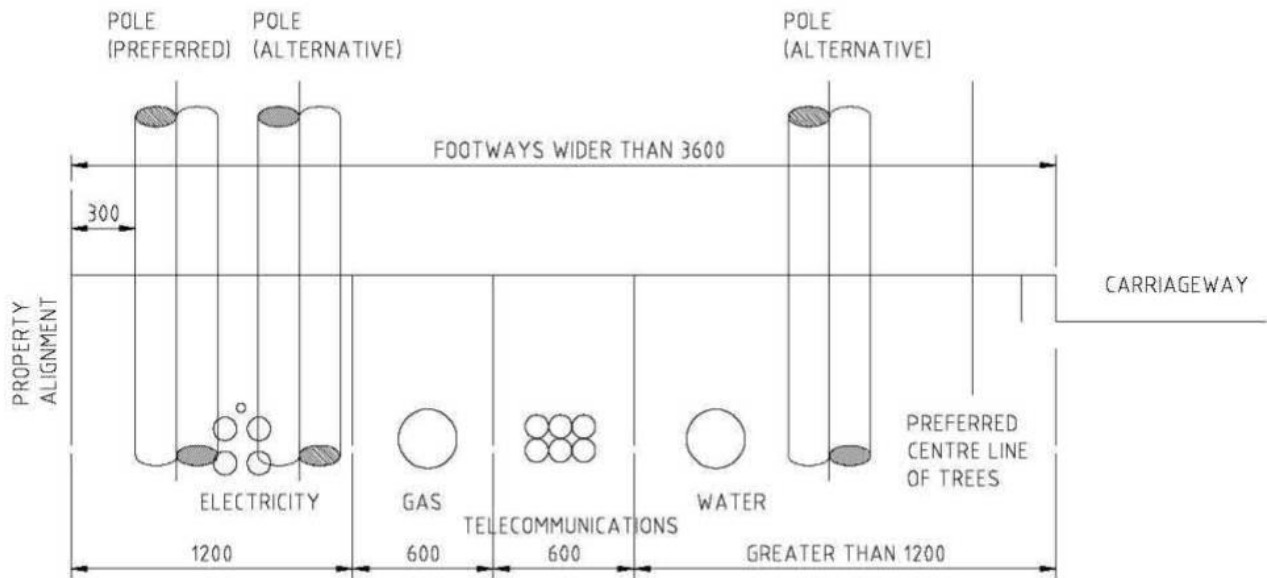
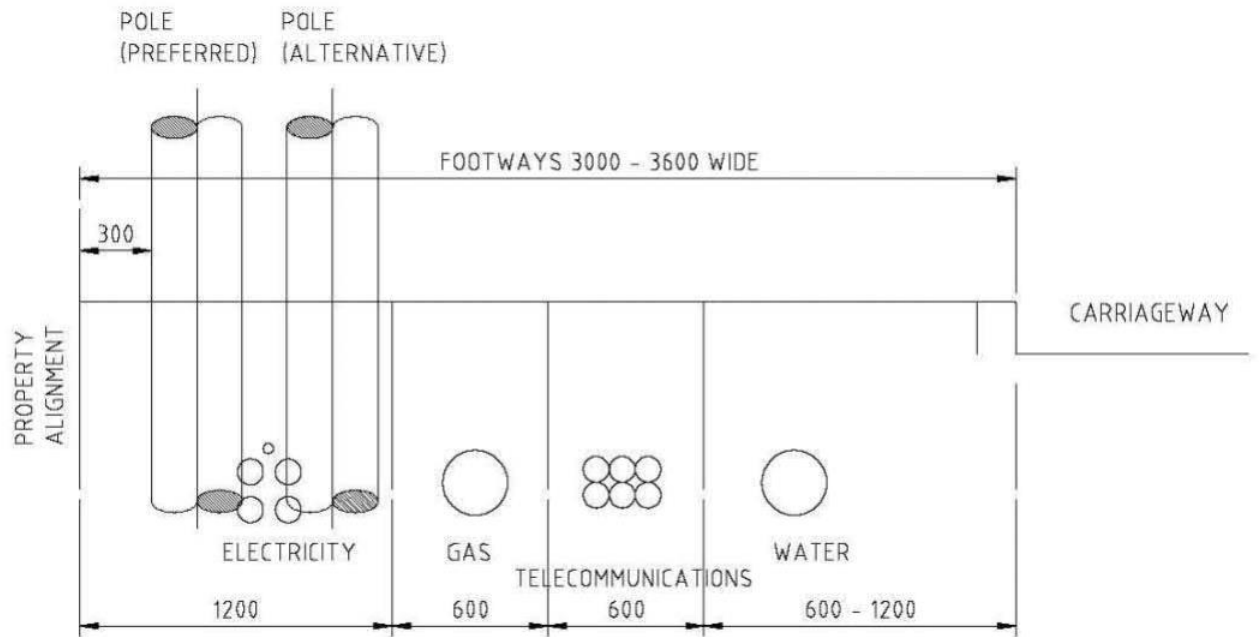
Service Item		Minimum Radial Clearances* <sup>1</sup>
<b>Gas Pipe</b>	Over 110 mm	300 mm
	110 mm or Less	150 mm
<b>Power</b>	High Voltage	300 mm
	Low Voltage	100 mm* <sup>2</sup>
<b>Water Mains</b>	High Pressure/Capacity	300 mm
	Local Reticulation	150 mm
<b>Sewer</b>	Main	300 mm
	Connection Pipe	150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

Figure 7: NBN Clearances from Other Carriers and Underground Services

### 3.6 Streets Opening Conference Service Corridors

The “NSW Streets Opening Coordination Council Guides, 2018”, provides guidelines for service allocations within the footpath.

It has been assumed that the majority of new utility infrastructure for the Site will be within new footpaths; these should follow the allocations shown in Figure 8.



**Notes:**

1. If installing assets in regional areas contact the local council for council specific requirements.
2. Where a utility/service provider providing underground services wishes to encroach on space allocated to another utility/service provider, it should consult and seek agreement with the other. Both utility/service providers should record such encroachments on their respective mapping systems.
3. The narrower water allocation shown may not be sufficient to include recycled water mains.
4. The preferred position for poles or street lighting columns is within 300mm of the property alignment. Some alternative positions are shown but location should be consistent with minimising the overall cost to the public while considering safety requirements
5. Where the erection of power poles in the 0-1200mm allocation is impracticable, these may be located in the water allocation by agreement with the appropriate Public Authority.
6. No specific allocation for trees can be identified for footways up to 3600mm wide. Consultation with utility/service providers is required and due regard must be given to tree species as outlined in *6.5 Street Trees*
7. Pillars/pedestals/Service pits etc. should be located in a position that is set back from street intersections.
8. See *Section 6.6* for guidance on new poles and pole replacements.
9. Sewer pressure mains to be laid in water allocation deeper than water mains.
10. Vacuum sewers typically laid in property but could also be in water allocation.
11. For structures to be erected over the electrical distributors footpath allocation for underground mains the electrical distributor must be consulted in accordance with Clause 5.3 Customer's Structure - Service and Installation Rules of New South Wales.
12. If both footpaths are able to be used, the assets should be able to be better distributed across both sides of the roadway so that there is space to install infrastructure at the most appropriate location with respect to minimising overall cost to the customers.

**Figure 8: Streets dedicated after 1 January 1991 (NSW Streets Opening Coordination Council Guides, 2018)**

Where narrow footpaths less than 3 m are required, then shared trench arrangements may be used as shown below in Figure 9.

Footways of width less than 3000mm require special consideration to accommodate services.

**Notes:**

- The preferred position for poles, pillars, cabinets and street lighting columns is within 300mm of the property alignment.
- The preferred position for street lighting columns is adjacent to the property alignment or centred to the property. Where the erection of power poles in the close to property alignment, is impractical these may be located in an alternative allocation by agreement with the appropriate utility/service provider. Power pole location should be consistent with minimising the overall cost to the public while considering safety requirements.
- No specific allocation for trees can be identified for footways up to 2000mm wide. Consultation with utility/service providers is required and due regard must be given to tree species. Refer *Section 6.5*.
- Pillars/pedestals/service pits etc should be located in a position that is set back from street intersections.
- See *Section 6.6* for guidance on new poles and pole replacements.

**Figure 9: Notes for allocation of space in narrow footways (NSW Streets Opening Coordination Council Guides, 2018)**

The shared trenching arrangement is not considered appropriated where main/trunk services are provided; this includes any potential HV electrical feeders.

Furthermore, while Ausgrid has shared trench agreements with Telstra, no such agreement exists with NBN Co. therefore shared trenching is not considered desirable for the Blackwattle Bay site.

Further consultation will also be required with the City of Sydney to confirm if street lighting will be separate from the electricity supply, if so, the standard allocation may require review.

## 4.0 Methodology

### 4.1 Information Gathering

The information gathering methodology undertaken is detailed below:

- Briefing from Infrastructure NSW and the urban design team regarding the aspirations and goals for the precinct as this will inform the physical inspections and assessments carried out on site;
- Source and procure available existing information regarding the existing precinct. This will include existing drawings, condition reports and master planning schemes etc. to inform us of the critical re-inspection requirements where there may be significant gaps;
- A summary of utility services infrastructure implications and constraints based on existing data and reports; and
- Assessment of the existing infrastructure capacities against the service authority's criterion and industry best practice.

### 4.2 Determine the Demand for Services

The demand assessment methodology undertaken is summarised below:

- Creation of yield estimates and demand curves for water, sewer, power, gas, telecommunications based on the number of dwellings and Gross Floor Area for retail and commercial development;
- Development of a sensitivity analysis on the service demand profiles by considering a demand range;
- Consideration of a range of unit rates, applicable diversity rates and impacts of alternative supply sources/sustainability initiatives on demand; and
- Assessment of the impact of building sustainability initiatives on demand and the demand arising from similar Precincts (such as Green Square Urban Renewal Area) as opposed to standard authority rates.

### 4.3 Stakeholder Engagement (Being Undertaken)

The stakeholder engagement methodology undertaken is summarised below:

- Contact with relevant authorities to ascertain their current capacity, planned upgrades and potential supply constraints, based on base estimation of the demand generated by the proposed increase in density;
- Consultation with strategic planners within each of these organisations, responsible for overall planning of infrastructure delivery to this area being conscious of the overall extent of development planned within the catchment;
- Submission of feasibility applications/requests to each utility service provider; and
- Updates to the high-level servicing strategy based on feasibility investigations and presentations to DP&E and key stakeholders to engage discussion and reach agreement prior to detailed planning/feasibility of individual projects.

### 4.4 Preliminary Infrastructure Assessment

The infrastructure assessment methodology undertaken is summarised below:

- Mapping the strategic infrastructure servicing the corridor;
- Examination and review of the existing utilities and system capacities to identify the optimal infrastructure connections;



- Preliminary investigation of the existing system capacities to service projected demand;
- Initial identification of potential constraints; and
- Feedback to Infrastructure NSW on potential future infrastructure requirements.

#### **4.5 Identifying Constraints, Potential Upgrades and Costs**

The constraint and potential upgrades methodology undertaken is summarised below:

- Development of a robust plan for delivery of the infrastructure to the precincts, considering regulatory requirements, physical constructability and delivery timeframes;
- Determination of infrastructure upgrades to be identified for each precinct. These are population-based augmentation trigger that takes into account variable development production rates; and
- Identification of alternative strategies that may be application for the Study Area.

#### **4.6 Alternative Demand and Supply Opportunities**

The alternative demand and supply opportunities methodology undertaken is summarised below:

- Coordination with the sustainability consultant (separate report); on opportunities to reduce servicing requirements;
- Feedback on suitability for different alternative demand and supply opportunities with the sustainability consultant (separate report);
- Identification of potential cost-effective opportunities in the study area; and
- Opinion of probable costs for alternative demand and supply opportunities.

## 5.0 Information Gathering

### 5.1 Gathering Existing Utility Information

The preliminary information gathering considered data from a range of sources. Primarily these were obtained from Dial Before You Dig (DBYD) requests, authority infrastructure reports and master plans.

### 5.2 Dial Before You Dig Plans

Dial Before You Dig requests were undertaken for Blackwattle Bay. These identified a number of services as outlined below in Table 5.

**Table 5: Summary of Existing Services**

Authority Name	Phone	Utility Type
AAPT / PowerTel, NSW	1800786306	Data and Telecommunications
Nextgen, NCC - NSW	1800032532	Data and Telecommunications
Optus and/or Uecomm, Nsw	1800505777	Data and Telecommunications
PIPE Networks, Nsw	1800201100	Data and Telecommunications
Telstra NSW, Central	1800653935	Data and Telecommunications
Verizon Business (Nsw) <sup>1</sup>	294345000	Data and Telecommunications
Vocus Fibre Pty Ltd (NSW)	731770796	Data and Telecommunications
Ausgrid	249510899	Electricity
Jemena Gas South	1300880906	Gas
City of Sydney (IMS)	292659819	Other
RailCorp Central	297528682	Other
Roads and Maritime Services	288370285	Other
Sydney Water	132092	Potable Water and Wastewater

The plans provided from these DBYD requests were assessed as a part of our condition and capacity review.

### 5.3 Utility Reports

A number of authority infrastructure reports and master plans that have relevance to the study area were reviewed.

- A Plan for Growing Sydney, NSW Government, 2014
- BASIX Monitoring Report - Electricity Consumptions for 2007-2009, NSW Department of Planning, 2010
- BASIX Water Savings Monitoring – Sydney Water, 2009
- Distribution and Transmission Annual Planning Report, Ausgrid, 2020
- Draft Metropolitan Strategy for Sydney To 2031, NSW Government, 2014

<sup>1</sup> Verizon has indicated no assets in the Wentworth Park area.

- Growth Servicing Plan 2020 - 2025, Sydney Water, 2020
- NSW Long Term Transport Master Plan, NSW Government, 2014
- NSW Transmission Annual Planning Report, TransGrid, 2020
- Wastewater Systems, Sydney Water, 2014
- Water Savings Action Plan (WSAP), Leichhardt Municipal Council, 2012

Further to the above AECOM has also reviewed the following reports to provide a utilities strategy that is complementary and aligned to the strategies and proposals outlined:

- Pyrmont Peninsula Place Strategy, NSW Government 2020;
- Eastern City Districts Plan, Greater Sydney Commission, 2018;
- City Plan 2036: Local Strategic Planning Statement, City of Sydney, 2020.

#### **5.4 Combined Services Plan**

A combined services plan has been developed for the proposed Blackwattle Bay development, identifying existing utility service routes throughout the precinct with consideration for the following:

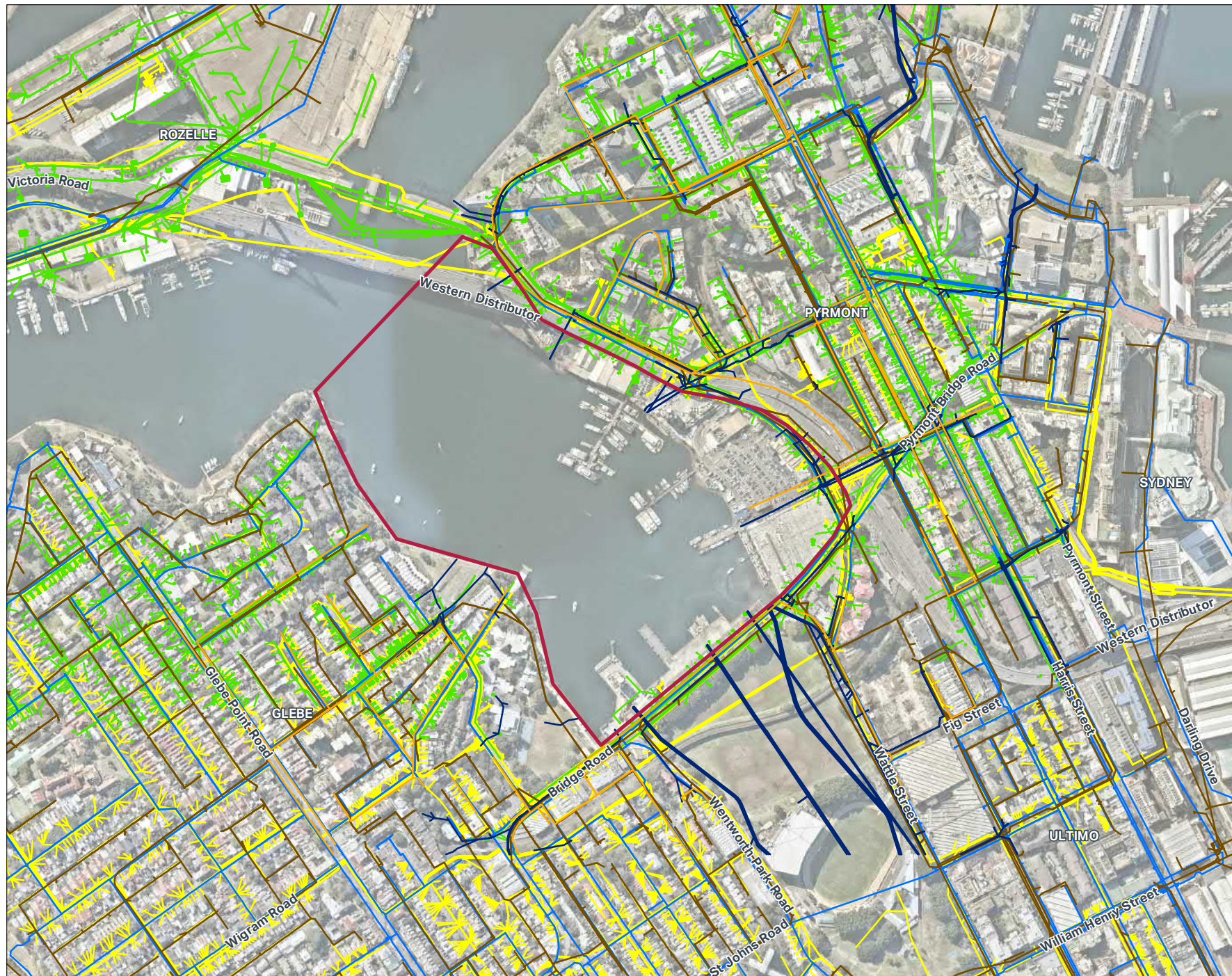
- Connection to existing utility infrastructure;
- Potential development lot connection points;
- Coordination between services; and
- Provision of water and electrical supply the public spaces to support facilities.

All services are shown schematically and are subject to changes during further design stages and input from the relevant utility authorities. Schematic layouts for each utility service are presented in the individual sections within this report.








A Combined Services Plan for the Site is shown in Figure 10 to inform this report.



**BAYS EAST**  
**FIGURE 10: COMBINED SERVICES PLAN**



### Legend

-  Site boundary
-  Communications line
-  Electrical line
-  Gas main
-  Potable water main
-  Stormwater main
-  Wastewater main

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## 6.0 Potable Water

### 6.1 Background

The preliminary information gathering considered data from a range of sources. Primarily these were obtained from Dial Before You Dig (DBYD) requests, authority infrastructure reports and master plans.

Sydney Water supplies potable water to all areas of The Bays Precinct from the Prospect and Kurnell Systems as shown below in Figure 11.

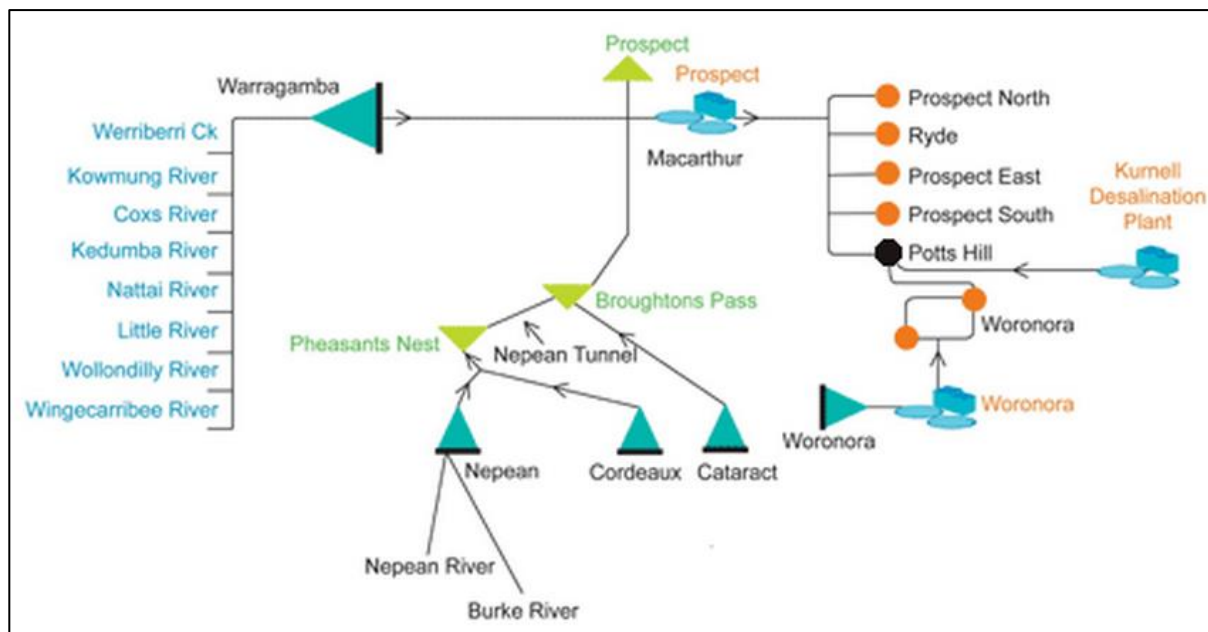


Figure 11: Potable Water Supply (Sydney Water Corporation, 2015)

This water is supplied via the Potts Hill Trunk Delivery System incorporating the Potts Hill Reservoirs and Crown Street Reservoir. There is one potable water pumping station within the system:

- John Street, WP0336.

There are a substantial number of trunk water mains and carrier water pipes within the vicinity of the proposed development. There is significant variation in the age, type and condition of these pipes. A plan showing these mains and pump station are shown at the end of this section. Balmain Road sports field, Callan Park.

Leichhardt Municipal Council has currently commenced stormwater harvesting at Glover Street playing fields where stormwater is naturally filtered and gravity-fed to tanks for irrigation re-use, and design commenced for a stormwater harvesting system at Balmain Road sports field, Callan Park.

### 6.2 Existing On-Site Utility Infrastructure

The existing Sydney Water potable water network on the Blackwattle Bay site has been identified based on Dial Before You Dig (DBYD) records. These records indicate the presence of numerous potable water mains within and adjacent to the precinct boundaries.

Key existing potable network infrastructure includes:

- A DN180mm PE main along Bank Street, north of Miller Street;
- A DN150mm PE main along Bank Street, south of Miller Street;
- A DN200mm CICL main along Pyrmont Bridge Road.

The depths and position of the existing reticulation mains are unknown, further investigation is required to determine the exact existing layout. Further investigation is required to confirm the potential impacts of the design on the existing network.

The main trunk mains adjacent to the precinct are:

- A DN600mm CICL trunk main running along Bulwarra Road;
- A DN250mm CICL trunk main running along Miller Street;
- A DN250mm CICL trunk main running along Bowman Street.

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 DBYD plans. The existing water infrastructure is shown below in Figure 12.

### **6.3 Preliminary Infrastructure Assessment**

The preliminary infrastructure assessment has been based on a number of system elements, these include:

- Dams;
- Water filtration plants; and
- Customer supply systems.

#### **6.3.1 Dams**

Seven major dams store the majority of Sydney's potable water. Secondary storage dams also hold water that can be transferred to the major dams. Storing water in dams allows time for many of the contaminants that may be in the water as it runs through the catchments to settle out. The Sydney Catchment Authority is responsible for the catchments and dams.

Warragamba dam supplies water to the proposed Bays precinct; while no capacity assessment has been performed it is assumed that there is sufficient capacity within the dam to service the future growth.

#### **6.3.2 Water Filtration Plant**

Water from the dams is treated at one of nine water filtration plants. The plants are designed to remove any remaining contaminants.

The Prospect Water Filtration Plant services the proposed development and is one of the world's largest water filtration plants, with a capacity to provide reliable and safe drinking water for up to 85% of Sydney's population. Similar to Warragamba dam it has been assumed that there is sufficient capacity within the filtration plant.

#### **6.3.3 Customer Supply Systems**

The Potts Hill Delivery Water System distributes potable water across The Bays Precinct and its surrounds via the Eastern Suburb Water Distribution System. The Growth Servicing Strategy (2020) has indicated servicing new developments adjacent to The Bays Precinct beyond FY2023 including:

- White Bay;
- Glebe Island; and
- White Bay Power Station.

The impact of these proposed developments on the The Bays Precinct have not been considered as a part of this analysis. However, the future growth of the area will be discussed with Sydney Water during the stakeholder engagement process.

While the reports indicate that the trunk delivery system may have spare capacity to service growth until 2036, carrier pipes running from the trunk system to each precinct will likely require upgrades. This will be confirmed with Sydney Water during further stakeholder engagement.

Plans of the existing potable water network are shown at the end of this section.

## 6.4 Potential On-site Infrastructure Layouts

The scope of external infrastructure upgrades is to be confirmed based on hydraulic modelling to be undertaken during detailed design.

New water mains are required throughout the site to provide internal reticulation to the proposed developments.

Potential potable water reticulation for the Fish Market site includes:

- A single point of connection to the fish market site adjacent to the proposed driveway; and
- Connection to the DN200 CICL main along Pyrmont Bridge Road.

Potential potable water reticulation for the Mixed-Use site includes:

- An internal network with connections to each building; and
- Connection to the DN150 CICL main along Bank Street.

It is noted that Sydney Water generally does not provide a lot connection until an application is made by that developer for a service. Where road crossings will be required it is recommended that oversized pipes be provided to minimise disturbance to completed works as part of building construction.

## 6.5 Demand Assessment

An assessment of the estimated increase in potable water demand generated from the development yields has been conducted to determine the required infrastructure upgrades. Individual project areas have been based on the average number of dwellings and proposed Gross Floor Area (GFA) for retail and commercial development outlined in Section 1.6. It is assumed that 50% of the GFA for hotels/serviced apartments is allocated for commercial use, while the remaining 50% is allocated for residential use at 60sqm per room.

Demand estimates for potable water have been calculated using the Water System Planning Guideline (Sydney Water, Version 1, September 2014) and is based on Maximum Daily Demand. The BASIX reduction has been taken from the Building Sustainability Index targets.

A summary of the water demand unit rates is presented below in Table 6.

**Table 6: Potable Water Demand Unit Rates**

Land Use	Design Criteria	Units	Potable Water Demand	Sources
Multi- Unit (>140 unit/net/ha) 6-12 storey apartment	Max Day Demand	kL/unit/day	0.8	Water System Planning Guide line (Sydney Water, Version 1, September 2014), Section 3, Table 3-2
Suburban Commercial	Max Day Demand	kL/ha/day	41	Water System Planning Guide line (Sydney Water, Version 1, September 2014), Section 3, Table 3-2
Large Shopping complex	Max Day Demand	kL/ha/day	63	Water System Planning Guide line (Sydney Water, Version 1, September 2014), Section 3, Table 3-2
BASIX Reduction		%	40	Building Sustainability Index Targets

## 6.6 Forecast Demand

An estimate of the future potable water demand for each precinct has been calculated based on development yields provided by INSW. These figures provide information on the estimated number of dwellings for residential use and GFA for non-residential developments. The site has been classified as comprising of 'high density dwelling' and 'local commercial development'.

The study area has been classified as 'multi-unit > 140 unit/net ha developments based on housing density with an equivalent potable water demand rate of 0.8 kL/unit/day. The commercial density has been classified as Suburban Commercial and estimated on an equivalent potable water demand rate of 41 kL/ha/day as shown in Table 6.

In accordance with BASIX requirement, new residential developments are required to reduce mains-supplied potable water consumption by 40% (since the BASIX amendment was introduced in 2006) compared to the average NSW dwelling. Commercial demands have not had a BASIX reduction applied as per BASIX information guidelines. The cumulative Maximum Daily Demand (MDD) of each precinct when assuming BASIX compliance is summarised below in Table 7.

**Table 7: Estimated Cumulative Maximum Daily Potable Water Demand**

Blackwattle Bay	Water Demand – kL/day		
	Residential (inc BASIX)	Non-Residential	Cumulative Total
Stage 1 (2024)	201	156	357
Stage 2 (2026)	126	142	625
Stage 3 (2027)	211	100	936
Stage 4 (2028)	222	32	1,190
<b>TOTAL</b>			<b>1,190 kL/day</b>

Considering a  $\pm 15\%$  range in development yields, the Maximum Day Demand (MDD) could vary between **1,010 – 1,370 kL/day**.

Stakeholder engagement with Sydney Water is currently underway and advice will be used to identify capacity and potential constraints when available.

## 6.7 Approvals and Next Steps

Following finalisation of the concept design, Sydney Water will be contacted to assist with the planning of future infrastructure upgrades.

Sydney Water formal approvals are typically provided as a part of a Section 73 process, these will likely be required for each lot. However, site wide strategy drawings can be submitted to Sydney Water as a part of the applications to establish a Head Deed.

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;
2. Undertake site investigations to confirm the layout and extent of existing on-site infrastructure (including non-Sydney Water infrastructure);
3. Develop an overall water master plan for the Precinct including staging considerations and agree this with Sydney Water;
4. Develop diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted;



5. Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor);
6. Submit application/s for individual detailed design packages to be submitted to SWC with drawing of proposed works in stages, Section 73;
7. SWC to issue of Notice of Requirements (NOR) with their requirements for water main layout, sizing and funding matters confirmed; and
8. Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval.

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

## 6.8 Potential ESD Initiatives

Increases in water demand could be mitigated through incorporation of water sustainability initiatives and provision of a non-potable water supply. It is estimated that such initiatives could reduce potable water demand by up to 50% for new dwellings.

This report shows “baseline” utilities responses but key ESD initiatives that can have the potential to reduce mains potable water demand and are recommended for further investigation:

- Onsite rainwater reuse;
- Green walls and green roofs;
- High efficiency water fixtures; and
- Stormwater harvesting and water recycling.

## 6.9 Future Work

Future work to identify with Sydney Water where amplification is required. Workshops would be required with Sydney Water to coordinate the system performance and the preferred options. Detailed planning would follow the strategic planning where applications are required. Future work would include:

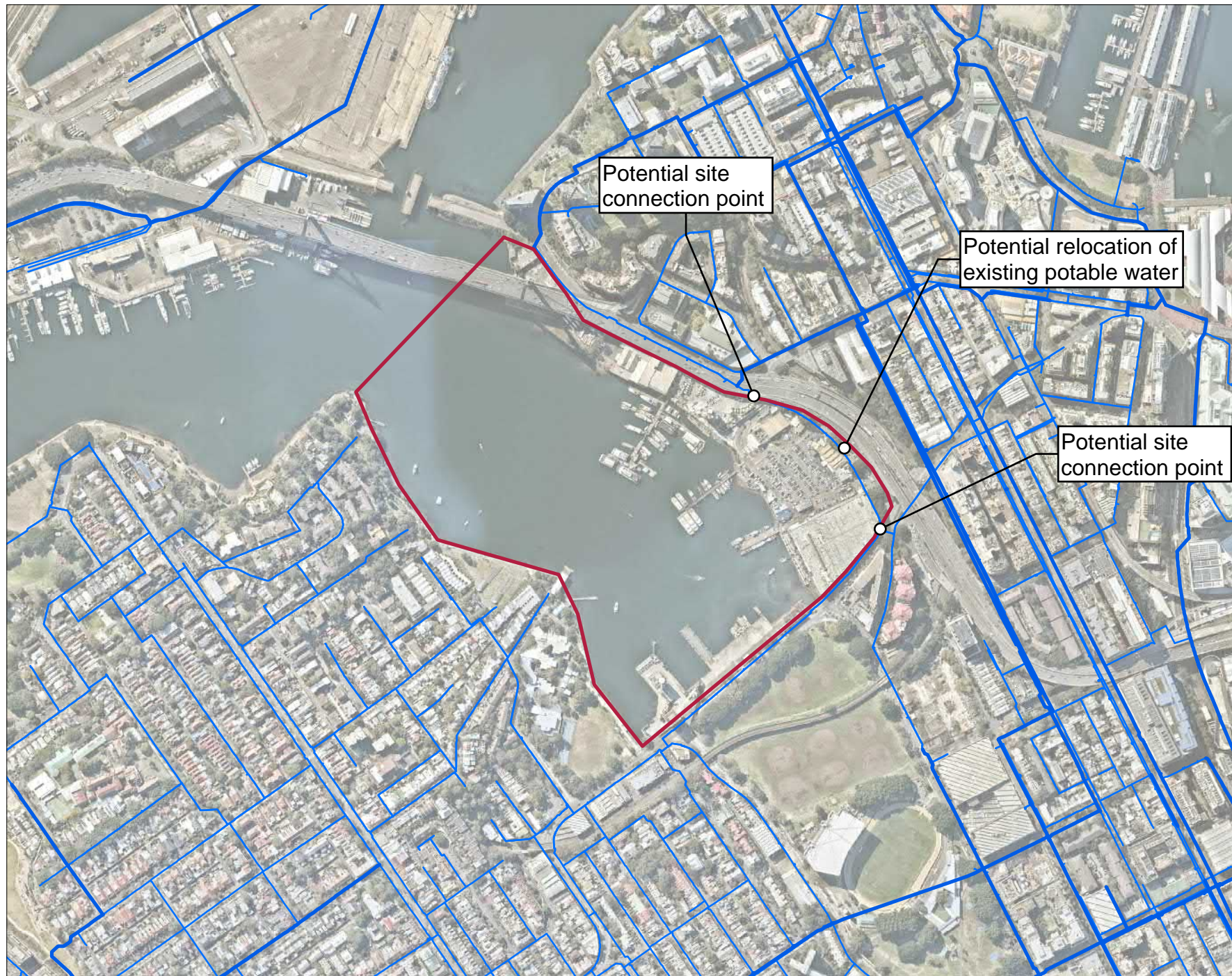
- The potential for recycled water servicing including planning criteria; and
- Establishment of boundary conditions such that assessment of the wider upstream trunk network is not required.

The existing Growth Servicing Plan (2020-2025) network models will be used for this assessment in coordination with feedback from Sydney Water. No new modelling is proposed.

Servicing options would be established against the ultimate development to address local network issues. The current study is focused on utility supply infrastructure and does not include an allowance for adjustments of existing infrastructure layout to suit site works.

Potential diversions will be considered within the detailed precinct specific reports.

**BAYS EAST**  
**FIGURE 12: POTABLE**  
**WATER PLAN**



- Legend**
- Site boundary
  - Trunk main
  - Reticulation main

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## 7.0 Wastewater

### 7.1 Background

Sydney Water currently services The Bays Precinct through the Bondi Sewerage Treatment Plants. The Bondi Wastewater Network System Waste Water Treatment Plan (WWTP) (115.6 ML/d) which services Glebe, Newton, Pyrmont, Ultimo, Haymarket, Surry Hills and Darlinghurst.

The extent of the Bondi Wastewater Network System is shown below in Figure 13.

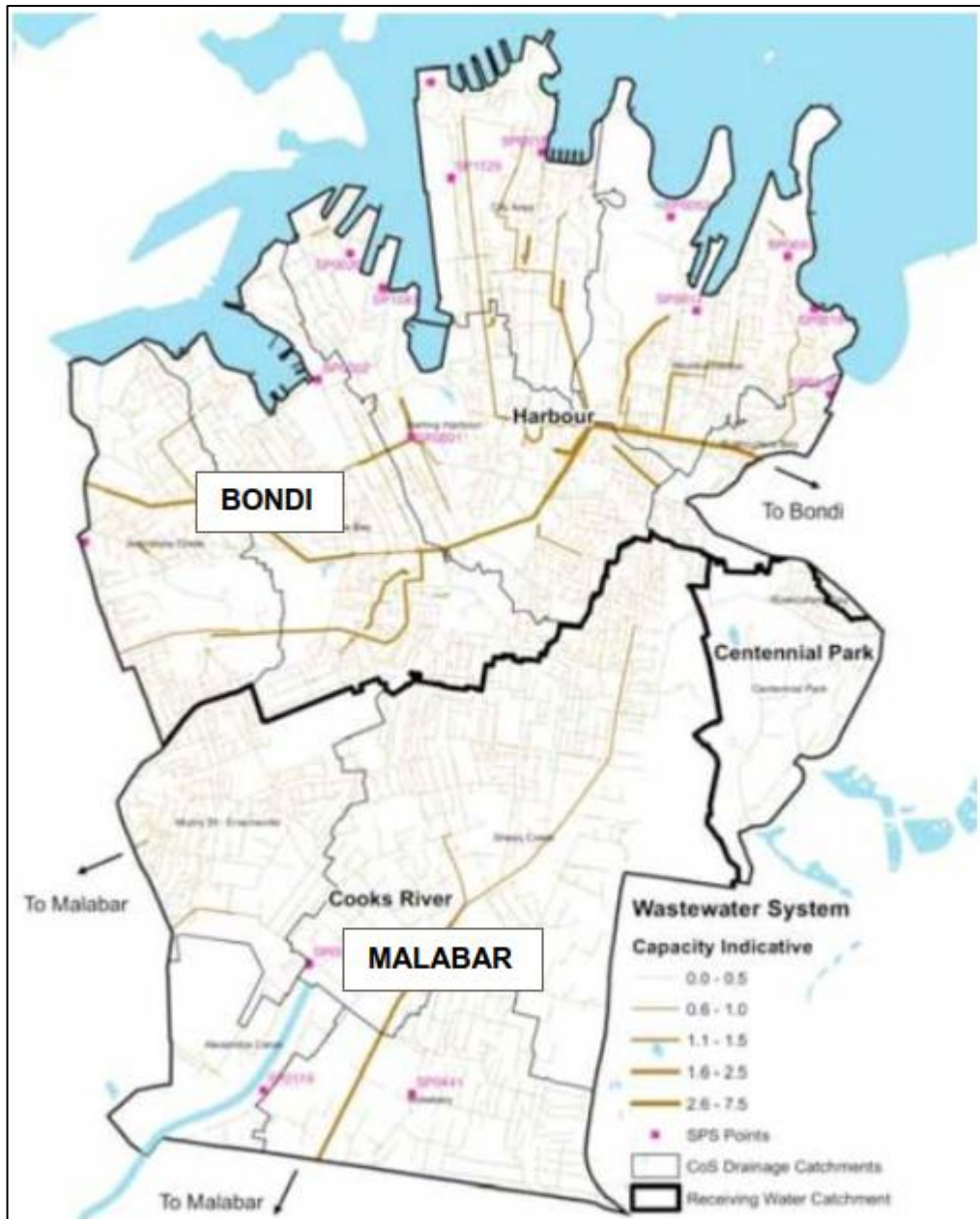


Figure 13: Sydney Water Sewer Catchment (Sydney Water, 2015)

The Growth Servicing Plan (2020 to 2025) identifies Sydney Water’s planned improvement works.

## 7.2 Existing On-Site Utility Infrastructure

The existing Sydney Water wastewater network has been identified based on Dial Before You Dig (DBYD) records. These indicate the presence of a number of existing wastewater mains throughout the study area.

Wastewater is directed toward a sewerage pump station on the corner of Pymont Bridge Road and Wattle Street, which delivers wastewater to the Bondi Sewerage Treatment Plant.

The existing internal wastewater network primarily consists of a number of wastewater mains present along the perimeter of the site, including:

- A DN300mm GRP main along Bank Street;
- A DN375mm GRP main and a DN225mm VC main along Jones Street;
- A DN375mm CI main along Pymont Bridge Road from Darling Street to Wattle Street;
- A DN450mm GRP main along Pymont Bridge Road between Wattle Street and Jones Street.

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

Further investigation is required to determine the exact layout and depths of these services; this should be an investigation of the levels of the existing infrastructure from manhole surveys. It is also noted that the above discussion only considers Sydney Water infrastructure.

The existing and wastewater infrastructure is shown below Figure 14.

## 7.3 Preliminary Infrastructure Assessment

The preliminary infrastructure assessment has been based on two main system elements:

- Wastewater Treatment Plants; and
- Customer Supply Systems.

### 7.3.1 Wastewater Treatment Plants

The Sydney Water wastewater network consists of 30 different systems, 24,000km of pipes, 16 wastewater pumping plants and 680 pumping stations.

The Bays Precinct is currently supplied through the Bondi Sewerage Treatment Plant.

The Bondi Waste Water Treatment Plant (WWTP) currently discharges up to 126.5 ML/day. This is projected to increase with new developments such as the Glebe Redevelopment, Barangaroo Development, Darling Harbour Precinct, Bays Precinct, and Harris Street requiring supply.

The design capacity of the Bondi WWTP is 679.97 ML/day, the capacity of this plant to service the projected demand will be discussed with Sydney Water as a part of the feasibility applications.

### 7.3.2 Customer Supply Systems

Sydney Water maintains a number of trunk water mains and carrier pipes within the vicinity of the proposed redevelopment. The age, type and condition of these pipes varies significantly. A plan showing these mains and pump station are shown at the end of this section.

It is estimated that the trunk mains have sufficient capacity to service The Bays until 2036 however this will be confirmed with Sydney Water during further stakeholder engagement. Similar to the potable water, carrier pipes will likely require amplification.

## 7.4 Potential On-site Infrastructure Layouts

The scope of external infrastructure upgrades are to be confirmed based on hydraulic modelling to be undertaken during detailed design.

New water mains are required throughout the site to provide internal reticulation to the proposed developments. Potential potable water reticulation for the Fish Market site includes:

- A single point of connection to the fish market site adjacent to the proposed driveway; and
- Connection to the DN375 CI wastewater main along Pyrmont Bridge Road.

Potential potable water reticulation for the Mixed-Use site includes:

- A connection the existing main to the north of the site.

The exact configuration of the potable water reticulation may change depending on concept and detailed designs.

It has been assumed that one point of connection is required per building; as such the proposed connection points have been located adjacent to the assumed driveway locations of each building and are proposed to be co-located with other services connections. Sub-division of lots is required prior to submitting applications to Sydney Water.

The existing and proposed wastewater infrastructure is outlined below in Figure 14.

It is noted that Sydney Water generally does not provide a lot connection until an application is made by that developer for a service. Where road crossings will be required it is recommended that oversized pipes be provided to minimise disturbance to completed works as part of building construction.

## 7.5 Demand Assessment

An assessment of the estimated increase in sewer loading generated from the development yields has been conducted to determine the required infrastructure upgrades. Individual project areas have been based on the average number of dwellings and proposed Gross Floor Area (GFA) for retail and commercial development outlined in Section 1.6. It is assumed that 50% of the GFA for hotels/serviced apartments is allocated for commercial use, while the remaining 50% is allocated for residential use at 60sqm per room.

The design criteria used to forecast future sewer loading are taken from Gravity Sewerage Code of Australia, WSA 02-2014- (Water Services Association, Version 3.1, 2014) and is expressed as an Equivalent Population for a particular land use. The BASIX reduction has been taken from the Building Sustainability Index targets; these are summarised below in Table 8.

**Table 8: Sewer Design Loading Criteria**

Land Use	Units	Wastewater Demand	Sources
High Density Residential	EP/dwelling	2.5	Gravity Sewerage Code of Australia, WSA 02-2014- (Water Services Association, Version 3.1, 2014), Appendix B
Local Commercial	EP/ha	75	Gravity Sewerage Code of Australia, WSA 02-2014- (Water Services Association, Version 3.1, 2014), Appendix B
ADWF	L/s	0.0017	Gravity Sewerage Code of Australia, WSA 02-2014- (Water Services Association, Version 3.1, 2014), Appendix C
BASIX Reduction	%	40	Building Sustainability Index Targets

## 7.6 Forecast Demand

An estimate of the future wastewater loading for each precinct has been calculated based on development yields provided by INSW. These figures provide information on the estimated number of dwellings for residential use and GFA for non-residential developments.

In accordance with the WSA 02-2014 Gravity Sewerage Code of Australia criteria guide, the Site has been classified as comprising of 'high density dwellings' and 'local commercial' with an Equivalent Population (EP) per dwelling/ha. The Average Dry Weather Flow (ADWF) per Equivalent Population (EP) has been taken as 150 L/day or 0.0017 L/s (ADWF (L/s) = 0.0017 \* EP).

Under BASIX requirement, new residential developments are required to reduce wastewater loading by 40% (since the BASIX amendment was introduced in 2006) compared to the average NSW dwelling. Under this new scenario, the ADWF allowing for BASIX for each precinct is summarised below in Table 9:

**Table 9: Estimated Average Dry Weather Flow (ADWF) including BASIC (L/s)**

Blackwattle Bay	Wastewater – ADWF (L/s)		
	Residential (inc BASIX)	Non-Residential	Cumulative Total
Stage 1 (2024)	1.1	0.5	1.6
Stage 2 (2026)	0.7	0.4	2.7
Stage 3 (2027)	1.1	0.3	4.1
Stage 4 (2028)	1.2	0.1	5.4
<b>TOTAL</b>			<b>5.4 L/s</b>

Considering a ±15% range in development yields, the ADWF could vary between **4.6 – 6.2 L/s**.

Stakeholder engagement with Sydney Water is currently underway and advice will be used to identify capacity and potential constraints when available.

## 7.7 Approvals and Next Steps

Following finalisation of the concept design, Sydney Water will be contacted to assist with the planning of future infrastructure upgrades.

Sydney Water formal approvals are typically provided as a part of a Section 73 process, these will likely be required for each building lot. However, site wide strategy drawings can be submitted to Sydney Water as a part of the applications to establish a Head Deed.

The sewer strategy is to be confirmed through hydraulic modelling, with separate reports outlining the modelling outcomes to be submitted to Sydney Water.

The key next steps in progressing the delivery of sewer infrastructure through detailed design 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;
2. Undertake site investigations to confirm the layout and extent of existing on-site infrastructure (including non-Sydney Water infrastructure);
3. Develop an overall wastewater master plan for the Precinct 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;
4. Develop a diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted;

5. Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor);
6. Submit application/s for individual detailed design packages to be submitted to SWC with drawing of proposed works in stages, Section 73;
7. SWC to issue of Notice of Requirements (NOR) with their requirements for water main layout, sizing and funding matters confirmed; and
8. Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval.

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

## **7.8 Potential ESD Initiatives**

This report shows “baseline” utilities responses, but key ESD initiatives recommended for further investigation as a part of detailed design include:

- Onsite rainwater reuse;
- Blackwater / greywater use including split system; and
- Wastewater harvesting and water recycling.

It is noted that these would have an impact on the final wastewater demand and associated infrastructure upgrade requirements.

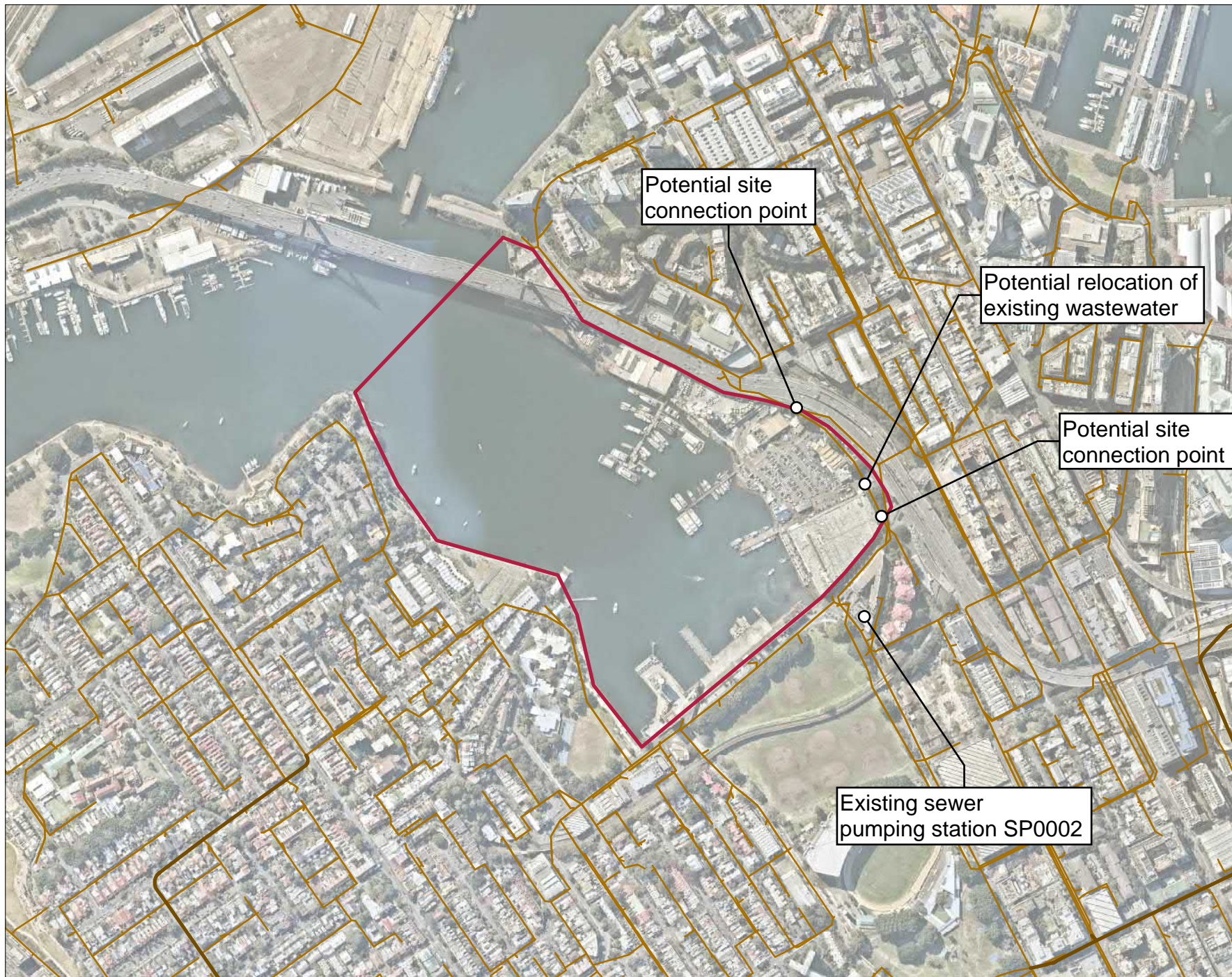
## **7.9 Future Work**

Detailed planning by individual developers would follow the strategic planning where applications are required.

This report focuses on utility supply infrastructure and does not include an allowance for adjustments of existing infrastructure layouts to suit site works. These potential diversions will be considered within the detailed site reports prepared by individual developers.

## BAYS EAST

FIGURE 14:  
WASTEWATER PLAN



Potential site connection point

Potential relocation of existing wastewater

Potential site connection point

Existing sewer pumping station SP0002

### Legend

- Site boundary
- Trunk main
- Reticulation main

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## 8.0 Electrical

### 8.1 Background

Ausgrid is the main supplier of the corridor as shown below in Figure 15.



Figure 15: Ausgrid Supply Network (Ausgrid, 2015)

There are four main zone substations that service the area surrounding the proposed Bays redevelopment:

- Darling Harbour ZN7481;
- Blackwattle Bay ZN711;
- Camperdown ZN384; and
- Leichhardt ZN116.

Ausgrid and Transgrid have also established an additional cable link between Beaconsfield West and Haymarket 330/132 kV Substations to meet future requirements. Electricity is distributed from the zone substations to each site through Ausgrid's extensive 11 kV network.

### 8.2 Existing On-Site Utility Infrastructure

The existing Ausgrid electrical infrastructure on the site has been identified based on Dial Before You Dig (DBYD) records. Electrical assets within and surrounding the Fish Market site includes the following:

- Electrical cables along Pyrmont Bridge Road
- A 33kV transmission line along Wattle Crescent and Jones Street

Electrical assets within and surrounding the Mixed-Use site includes the following:

- Electrical cables along Bank Street
- Electrical cables along Jones Street, entering the site boundary
- A 33kV transmission line along Wattle Crescent and Jones Street

The exact depths and positions of the existing reticulation mains are unknown thus further investigation are required to determine the exact existing layout.

It is expected that all existing aerial infrastructure within each development site would be abandoned or relocated underground. Furthermore, City of Sydney will likely require undergrounding of existing aerial infrastructure in the streets bounding the site.

The existing Ausgrid main and lead-in infrastructure are shown below in Figure 16 and Figure 17. It is noted that these plans only consider Ausgrid infrastructure and private electrical infrastructure present on the site.

### **8.3 Preliminary Infrastructure Assessment**

The preliminary capacity assessment has been based on a number of system elements, these include:

- Bulk Supply Points;
- Zone Substations;
- High Voltage Feeders; and
- Pole transformer and kiosk substations.

Plans of the existing Ausgrid network are shown at the end of this section.

#### **8.3.1 Bulk Supply Points**

The Bays Precinct is supplied from the Beaconsfield and Haymarket Bulk Supply Points (BSP). These bulk supply points drop the voltage from power station switchyards to feed zone substations.

In Sydney these Bulk Supply Points are operated and managed by TransGrid while the zone substations are managed by Ausgrid.

#### **8.3.2 Zone Substations**

The Ausgrid zone substations drop the voltage again from the BSP's and convert into lower voltage for further distribution to supply residential and commercial developments. Typically, Ausgrid operates an 11kV distribution network consisting of poles, wires and underground services.

Blackwattle Bay is situated within the Camperdown & Blackwattle Bay Load Area (Distribution and Transmission Annual Planning Report, 2020).

The closest two zone substations ZN7481 (Darling Harbour) and ZN711(Blackwattle Bay) may not have capacity to service the new Bays development. ZN711 is nearing the end of its life and is due to be decommissioned, converting the 5kV distribution system with 11kV assets and transferring the load to Camperdown and Darling Harbour ZS. Works are expected to be completed by May 2022.

Advice from Ausgrid, received 23 April 2021), notes there is currently minimal (<2MVA) remaining capacity for the proposed load from Darling Harbour ZS until ZS firm capacity is reached. ZN384 (Camperdown) and ZN116 (Leichhardt) may potentially be able to service portions of the development, with ZN116 recently refurbished to provide additional capacity.

New zone substations typically supply between 30 MVA to 100 MVA, stakeholder engagement with Ausgrid is required to determine if a new zone substation is required as a part of the proposed development.

#### **8.3.3 High Voltage Feeders**

The majority of the Precinct is serviced by underground high voltage feeders. These transmit electricity from the zone substations to distribution substations that are typically situated on new developments.

Distribution substations include pole transformer and kiosk substations as well as substations in the basements of commercial buildings.

It is likely that augmentation of the feeder network will be required to service the new development; the extent of works will be discussed with Ausgrid as a part of the stakeholder engagement process.

### 8.3.4 Pole Transformer and Kiosk Substations

Kiosk substations are located next to residential properties or roadways. Connected to the underground feeder network, their role is to decrease the electricity voltage for residential use. From the kiosk substation, the electricity is then passed through underground low voltage lines to a pillar before connecting through to residences. Pillars act as service points for up to two residences at a time.

Pole transformer substations decrease the electricity from the incoming overhead feeder to the level suitable for a household electrical service. The electricity is then passed onto the residence through overhead service lines.

## 8.4 Potential On-Site Infrastructure Layouts

As noted previously the scope of external infrastructure upgrades and lead-in works will be confirmed when formal Ausgrid applications are made as part of detailed design.

Additions to the existing Ausgrid underground electrical network are proposed to service each lot. This proposed network is shown below in Figure 16.

Potential electrical infrastructure for the Fish Market site includes:

- A single point of connection to the fish market site adjacent to the proposed driveway; and
- Connection to the existing HV line along Pyrmont Bridge Road.

Potential electrical infrastructure for the Mixed-Use site includes:

- An internal network with connections to each building; and
- Connection to the existing HV line along Bank Street.

It is assumed that each proposed building would be supplied by an internal chamber substation as City of Sydney has expressed a strong preference for external kiosk substations to be avoided (these cannot be located within the road reserve).

Similar to the water and wastewater networks, it has been assumed that internal building chamber substations will be placed adjacent to building driveway entrances. The exact locations are to be determined in detailed design and through coordination with the building lots where possible.

It has been assumed that internal road layouts will remain with the City of Sydney and Roads & Maritime Service; therefore, it has been assumed that easements will not be required where the electrical assets pass through public land or roads.

As noted previously, ownership of the street lighting will need to be confirmed as part of detailed design. If Ausgrid own the assets then they would be fed by the local Ausgrid LV network and may require the proposed network shown in Figure 16 to be expanded to ensure that all road networks are covered.

Alternatively, if City of Sydney owns the lighting assets, they would be fed from a private City of Sydney LV network which would take a supply from the external Ausgrid LV network. The layout of City of Sydney LV infrastructure is not included on Figure 16.

## 8.5 Demand Assessment

An assessment of the estimated increase in electrical demand generated from the development yields has been conducted to determine the required infrastructure upgrades. Individual project areas have been based on the average number of dwellings and proposed Gross Floor Area (GFA) for retail and commercial development outlined in the demand assessment yields presented in Section 1.6 and Table 9 below.

**Table 10: Forecast Development Yield**

Forecast Breakdown	Development Yield
Apartments (No.)	1,584
Commercial Floor Space (m <sup>2</sup> )	94,886
Retail Floor Space (m <sup>2</sup> )	10,147
Carparking (m <sup>2</sup> )	8,640 (640 parking spaces)
Electric Vehicle Charging	100

Electrical demands based on Endeavour Energy Growth Servicing After Diversity Maximum Daily (ADMD) demand unit rates and AS3000 Table C3 were used and summarised in Table 11 and Table 12.

**Table 11 Endeavour Energy Growth Servicing Plan 2019 - Table 1 - ADMD by application**

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	

**Table 12: AS3000 - Table C3 Maximum Demand – Energy Demand Method for Non-Domestic Installations**

Type of occupancy		Energy demand	
		Range, VA/m <sup>2</sup>	Average, VA/m <sup>2</sup>
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
	EV charging	5–15	10
	Basement	10–20	15
	EV charging	10–30	20
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

NOTE: EV charging relates to charging equipment associated with electric vehicles and should be considered in addition to all other energy demands.

The following load ranges were adopted based on a combination of defined unit rates from Endeavour Energy, AS3000 and past AECOM experience with building developments in Table 13 below. The rates from Endeavour Energy are assumed to be inclusive of diversity while the AS3000 rates are assumed not to include diversity, therefore a 0.8 diversity factor has been applied to the Ausgrid rates.

**Table 13 Adopted Maximum Electrical Demand Unit Rates**

Electrical Loads	Unit	kVA/unit	Diversity Factor	kVA/unit (incl. Diversity Factor)	Source
Apartments	No.	3.0	-	3.0	<i>Endeavour Energy Growth Servicing Plan 2019 – Table 1</i>
Commercial	m <sup>2</sup>	0.1	0.8	0.08	<i>AS3000 – Table C3</i>
Retail	m <sup>2</sup>	0.25	0.8	0.20	<i>Assumed Value</i>
Carparking	m <sup>2</sup>	0.015	0.8	0.012	<i>AS3000 – Table C3</i>
EV Charging	No.	5.25	0.6	3.15	<i>NSW Electric and Hybrid Vehicle Plan (NSW Government)</i>

## 8.6 Forecast Demand

Table 14 below summarises the total maximum electrical demands for the precinct based on the development yields provided by INSW (refer to Section 1.6).

**Table 14: Estimated Maximum Electrical Demand**

Electrical Load	Electrical Demand - ADMD (kVa)			
	Quantity	Unit	kVA/unit (incl. Diversity Factor)	Subtotal kVA (ADMD)
Apartments	1,584	No.	3.0	3,564
Commercial	94,886	m <sup>2</sup>	0.08	7,591
Retail	10,147	m <sup>2</sup>	0.20	2,029
Car Parking	8,640 (640 parking spaces)	m <sup>2</sup>	0.012	104
EV Charging	100	No.	3.15	315
<b>TOTAL</b>				<b>13.6 MVA</b>

**Table 15: Cumulative Electrical Demand**

Blackwattle Bay	Cumulative Electrical Demand - ADMD (kVa)
Stage 1 (2024)	4,548
Stage 2 (2026)	8,450
Stage 3 (2027)	11,660
Stage 4 (2028)	13,600
<b>TOTAL</b>	<b>13.6 MVA</b>

Considering a  $\pm 15\%$  range in development yields, the ADMD could vary between **11.6 - 15.6 MVA**. It should be noted that the above loads currently do not account for BASIX reduction factors.

The impact of Photo Voltaic (PV) cells have not been accounted for in this electrical demand estimation as ESD options will be subject to design development. However, PV systems have the ability to reduce electrical demand and assist in managing peak demand. The extent of this reduction is dependent on the PV array size and associated operational losses.

While a gas connection has been allowed for and indicative gas demand rates have been developed, the above table assumes that apartments use electricity rather than gas for cooktops and heating.

Advice from Ausgrid received on 23 April 2021 has assessed that the current network does not have the capacity to service the proposed load and will require an extension of Ausgrid network. It is assumed that the proposal will be supplied at 11kV. 4 x 11kV feeder supplies from Camperdown ZS will be required to provide N-1 supply to the proposed development via existing panels.

If the proposed sites are to be supplied at LV, then new feeders will still be required for the proposed load as per the above. Numerous substations as per NS109 will be required to be established on the various lots as the stages progress. This advice has been included in Appendix A – Authority Advice.

## 8.7 Approvals and Next Steps

Ausgrid formal approvals are usually provided for individual detailed design packages. It is possible to submit precinct wide drawings to establish a Case for the entire area with Ausgrid.

The key next steps in progressing the delivery of electrical infrastructure through detailed design including the formal Ausgrid approval process consists of the following:

1. Undertake site investigations to confirm the layout and extent of existing services (including non-Ausgrid assets);
2. Confirm arrangements for supply and ownership of street lighting;
3. Confirm extent of existing infrastructure that can be abandoned and/or requires diversion;
4. Develop duct masterplan and make submission to set up case with Ausgrid;
5. Develop staged designs for delivery of the new infrastructure;
6. Liaise with City of Sydney to confirm requirements for undergrounding of existing infrastructure;
7. Ausgrid to provide detailed requirements;
8. Ausgrid to issue Design Information Pack (DIP), ES9 and Deed; and
9. Submit detailed design of individual packages for approval.

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

## 8.8 Potential ESD Initiatives

This report shows “baseline” utilities responses but key Ecologically Sustainable Development (ESD) initiatives recommended for further investigation as a part of detailed design include:

- Solar PV;
- Building orientation;
- Natural ventilation of common areas;
- Electric car charging;
- Centralised heat extraction system;
- Geothermal cooling;
- Smart metering; and

- Glazing options to improve thermal comfort and reduce heating and cooling loads.

It is noted that these would have an impact on the final electrical peak demand and associated infrastructure upgrade requirements.

## **8.9 Future Work**

The developer is required to engage Ausgrid to confirm the requirements for connection when formal connection application is received. They will then assess the connection requirements and make a connection offer under the National Electricity Rules.

The current plan is focused on utility supply infrastructure and does not include an allowance for adjustments of existing infrastructure layouts to suit site works.

These potential diversions will be considered within the detailed precinct specific reports along with a refinement of the electrical connection strategy as further coordination with Ausgrid progresses.

FIGURE 16:  
ELECTRICAL PLAN



### Legend

- Site boundary
- High voltage line
- Low voltage line
- Potential feeder route

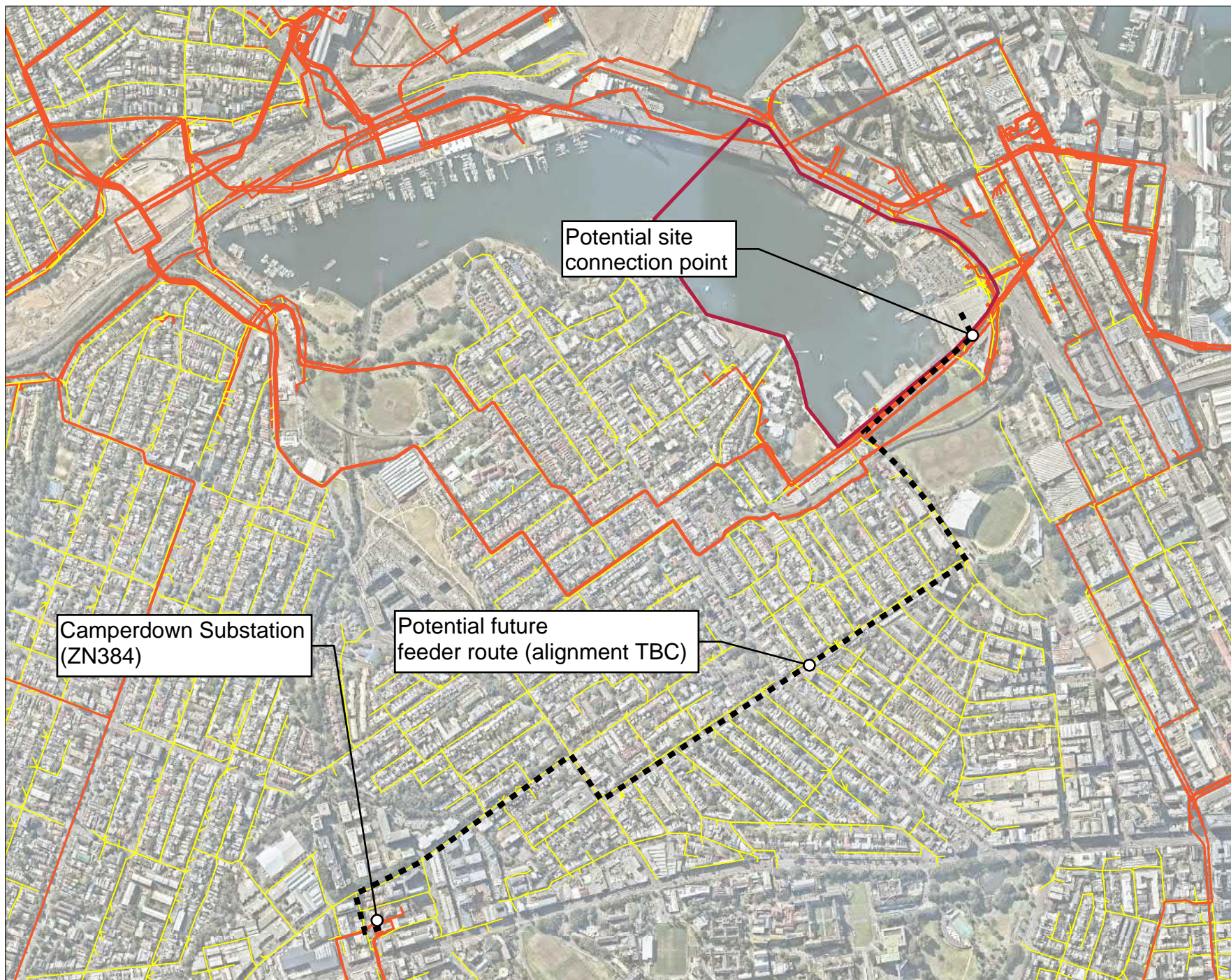
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#### Legend

- Site boundary
- High voltage line
- Low voltage line

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## 9.0 Gas

### 9.1 Background

The Site area is supplied with natural gas through connection to the Jemena Network.

Jemena have not confirmed whether the existing infrastructure within the Site has sufficient capacity. Confirmation of capacity and potential required upgrades will be received when formal connection applications are received.

Figure 18 below shows the overall Jemena distribution network indicating delivery of gas to metropolitan Sydney via a series of Primary Mains.

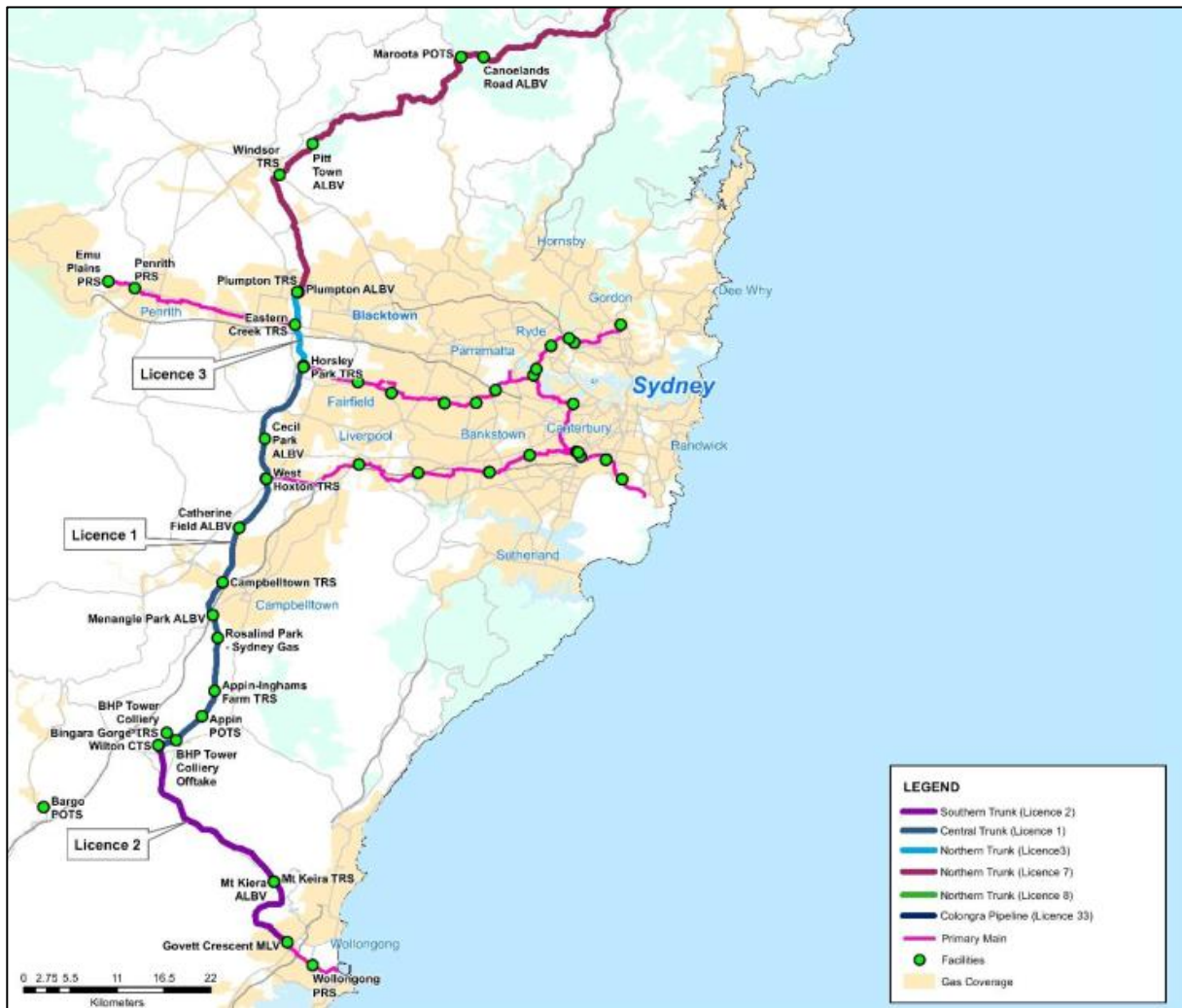


Figure 18: Jemena Gas Network (Jemena, 2020)

## 9.2 Existing On-Site Utility Infrastructure

There is currently a small network of gas mains within the Bays Market District, in particular:

- Network mains along Bank Street, Jones Street and Pyrmont Bridge Road;
- A 100mm Secondary Main near the intersection between Pyrmont Bridge Road and Bank Street, running through the site.

The existing services are shown below in Figure 19. 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.

## 9.3 Preliminary Infrastructure Assessment

Advice from Jemena, received 20 May 2021, has confirmed there is sufficient network capacity to support the proposed development; however, additional work will be required once site loads are validated. Plans to service the new Sydney Fish Market via the installation of a district regulator set off the existing 1050kPa high pressure gas network could potentially be used to reticulate the proposed Blackwattle Bay Precinct with 210kPa mains and possibly abandon some of the existing high pressure steel mains running through the site. This advice has been included in Appendix A – Authority Advice.

A plan showing the existing Jemena network is shown at the end of this section.

## 9.4 Potential On-Site Infrastructure Layouts

A new internal gas reticulation network is proposed with a connection point to each lot. The position of each connection has been designed to be adjacent to the assumed building driveways.

Potential gas infrastructure for the Fish Market site includes:

- A single point of connection to the fish market site adjacent to the proposed driveway via installation of a district regulator set; and
- Connection to the existing 120 kPa gas main along Pyrmont Bridge Road.

Potential electrical infrastructure for the Mixed-Use site includes:

- An internal network with connections to each building; and
- Connection to the existing HV line along Bank Street.

## 9.5 Demand Assessment

An assessment of the estimated increase in gas demand generated from the development yield has been conducted to determine the required infrastructure upgrades. Individual project areas have been based on the average number of dwellings and proposed Gross Floor Area (GFA) for retail and commercial development outlined in the demand assessment yields presented in Section 1.6. It is assumed that 50% of the GFA for hotels/serviced apartments is allocated for commercial use, while the remaining 50% is allocated for residential use at 60sqm per room.

The City of Sydney LGA has an average annual household consumption of 17.86 gigajoules (GJ) per year for natural gas in residential dwellings as referenced in the 2019 Calendar Year LGA Rolling Average Gas Consumption Data (Jemena, 2019). This usage rate typically equates to a natural gas hot water tank, cook top and heating point. Peak demand and annual gas demand are also dependent on the plant supplying the project area.

Jemena have confirmed that different rates are to be used for commercial spaces but were unable to confirm estimated rates. As such, commercial demand has been excluded from this assessment. However, the demand from commercial land use is expected to be substantially less than from residential usage. It should be noted that the gas demands do not account for alternative supply scenarios such as trigeneration.

Table 16 below outlines the rates used to derive the estimated gas demand within the study area, applied to residential dwellings only.

**Table 16: Gas Demand Unit Rates**

	Units	Rate	Source
City of Parramatta LGA Average annual household consumption	MJ/year per dwelling	17,860	2019 Calendar Year LGA Rolling Average Gas Consumption Data (Jemena, 2019)
Conversion Factor	MJ/m <sup>3</sup>	39.1	Natural Gas: Energy for the New Millennium (Parliament of Australia, December 1998)
Peak Demand Rate (Residential)	m <sup>3</sup> /day per dwelling	1.25	N/A
BASIX Reduction	%	25	Building Sustainability Index Targets

## 9.6 Forecast Demand

Table 17 presents the estimated natural gas usage for the Precinct, assuming supply to residential properties only. A BASIX reduction of 25% has been applied to the gas demand.

While gas usage can increase under BASIX to offset electrical demand, gas prices have a much greater effect on demand. Due to this variability, it has been assumed that there is no net increase or reduction consequent of BASIX compliant dwellings.

**Table 17: Estimated Cumulative Gas Demand Assessment**

Blackwattle Bay	No. of Units	Peak Demand Rate Residential – m <sup>3</sup> /day/dwelling	BASIX Reduction Factor (%)	Cumulative Gas – m <sup>3</sup> /day Total (inc. BASIX)
Stage 1 (2024)	419	1.25	25	393
Stage 2 (2026)	263	1.25	25	340
Stage 3 (2027)	439	1.25	25	1050
Stage 4 (2028)	463	1.25	25	1,490
<b>TOTAL</b>	<b>1,584</b>			<b>1,490</b>

Considering a ±15% range in development yields, the gas demand could vary between **1,260 – 1,710 m<sup>3</sup>/day**.

## 9.7 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);
2. Submit masterplan including staging of delivery to Jemena for agreement;
3. Submit application for design to Jemena for individual detailed design packages (to include proposed alignment); and
4. Jemena will provide a quote for construction works.

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

## **9.8 Potential ESD Initiatives**

It is noted that mains gas, while currently less carbon intensive than grid electricity per unit of energy, is still a fossil fuel and releases greenhouse gases during combustion. If the goal is to transition to a zero-carbon economy by 2050, the focus naturally must be on minimising the use of energy and lowering energy emissions overall.

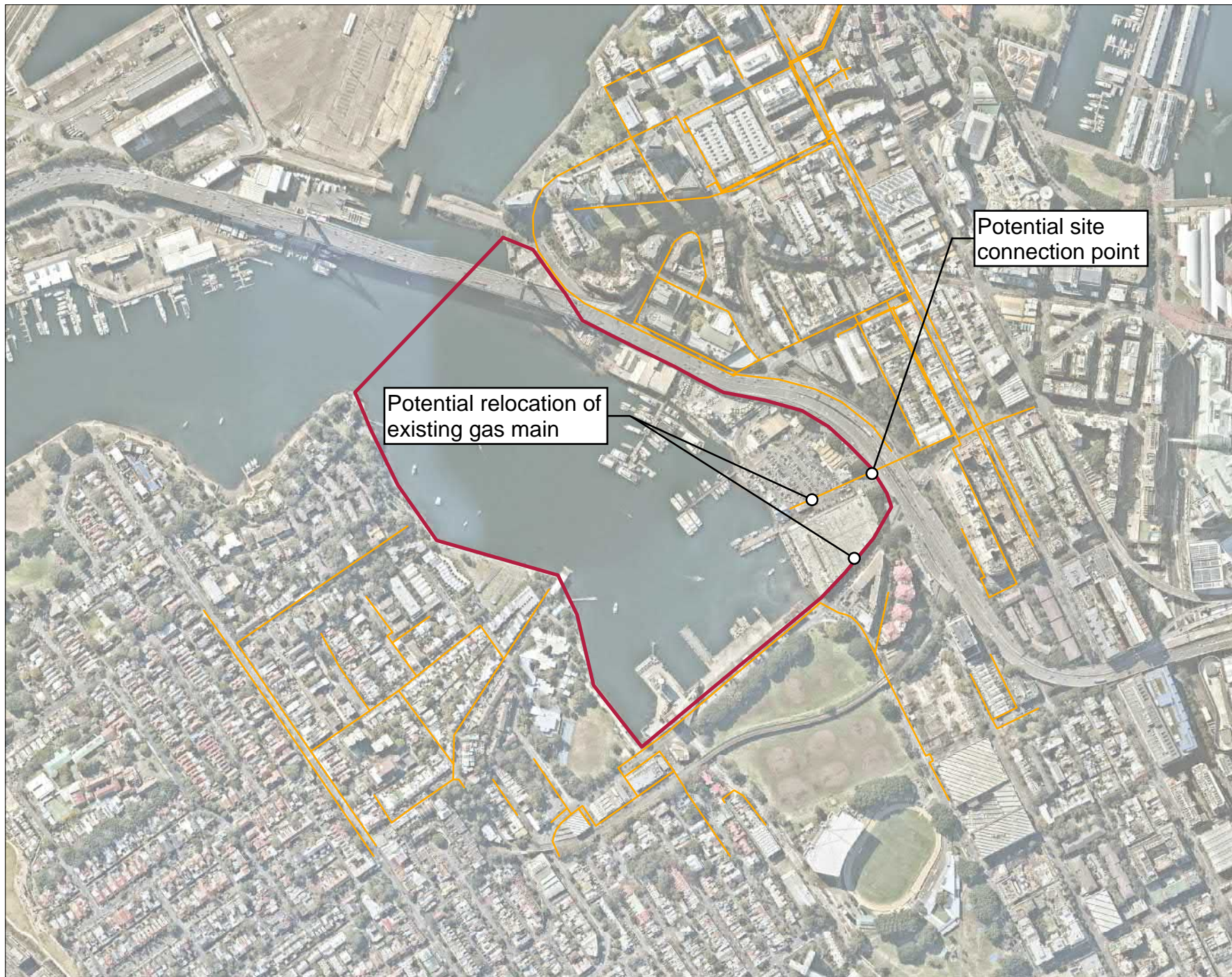
As a part of future design development, consideration should be given to using a sustainable electrical supply rather than gas for heating and cooking.

## **9.9 Future Work**

When developing lots, individual developers are required to complete a connection application which needs to be lodged with Jemena, within ten business days they will provide an offer for connection service or advise that an offer will be made for a negotiated service.

The terms of the offer will depend on the site-specific information and if upgrades are required to the system to service the estimated demand, and if the offer is accepted, Jemena will schedule and perform the required gas connections.

The current study is focused on utility supply infrastructure and does not include an allowance for adjustments of existing infrastructure layouts to suit site works.



#### Legend

- Site boundary
- Gas main

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## 10.0 Data and Telecommunications

### 10.1 Background

Several communication providers have assets running adjacent to and intersecting Blackwattle Bay:

- Vocus Fibre;
- Verizon;
- AAPT;
- Nextgen;
- Telstra; and
- Optus.

Identified data and telecommunications assets are shown on plan in Figure 22. Due to the scale of development expected on the site, it is expected that the new telecommunications servicing will be provided by the NBN, with the developer responsible for designing and installing pit infrastructure to NBN Co's guidelines and requirements.

### 10.2 Existing Infrastructure

There is substantial data and communications infrastructure present throughout the Bays Precinct corridor. Data and communications infrastructure are generally present within roads adjacent to the development.

#### 10.2.1 NBN

The National Broadband Network (NBN) is currently upgrading the existing fixed line phone and internet network infrastructure throughout the corridor. A map showing the current rollout (purple highlight) of the NBN network in the area is shown below in Figure 20.

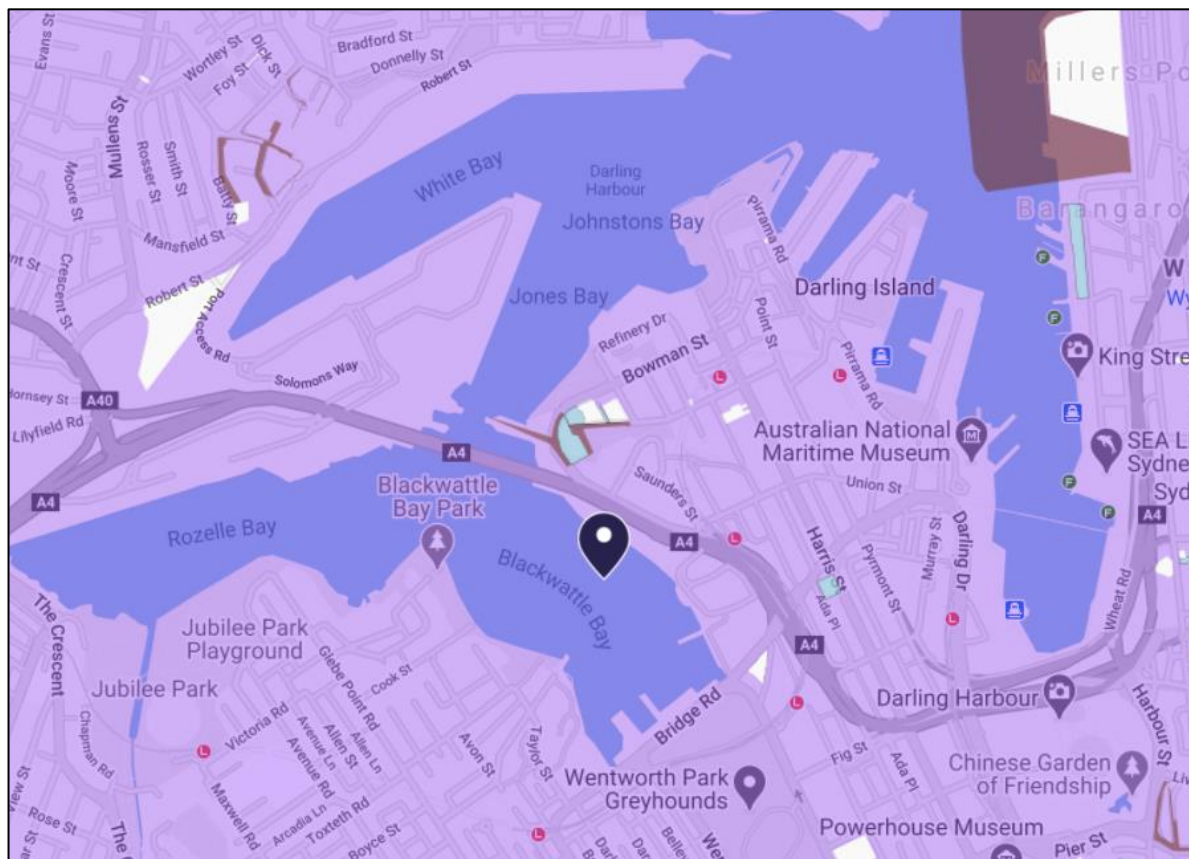


Figure 20: NBN Rollout (NBN, 2020)

No demand calculations have been provided for the telecommunications requirements as the National Broadband Network (NBN) is currently upgrading the existing fixed line phone and internet network infrastructure throughout the corridor and the increase in density will be accounted for in their internal planning.

The Federal Government has determined from January 2011 that under *The Fibre in New Development* NBN Co will provide telecommunication infrastructure to new developments (NBN Co, 2015). NBN Co will be responsible for installation of the fibre network in the new development and covers the cost of installation.

Developers are required to install and fund fibre-ready pit and duct infrastructure to NBN Co's specifications. Once the developer has demonstrated to have met the specifications, the ownership of this infrastructure will be required to be transferred to NBN Co as a condition of servicing the development.

Advice received from NBN on 04 May 2021 has advised that Fibre to the Premise (FTTP) can be delivered to the location and no additional backhaul costs to feed the fibre to the boundary is required. This advice has been included in Appendix A – Authority Advice.

### 10.2.2 Telstra

There are also existing Telstra conduits within the precinct; these are shown in Figure 22. The existing Telstra infrastructure may be removed during the development of Precinct and replaced with a NBN fibre optic network. Underground Telstra infrastructure is located extensively throughout the site, along the streets adjacent to and within the study area. It has been assumed at this stage that the existing Telstra services are to be retained to continue servicing the site's existing buildings, and to provide connection points for the new reticulation required to service the proposed buildings within the site. This will need to be confirmed as part of the detailed design.

To improve data and communication connection coverage, there may be opportunity to utilise new Telstra 5G technology. Figure 21 below maps out the current 5G coverage for the study area (purple).



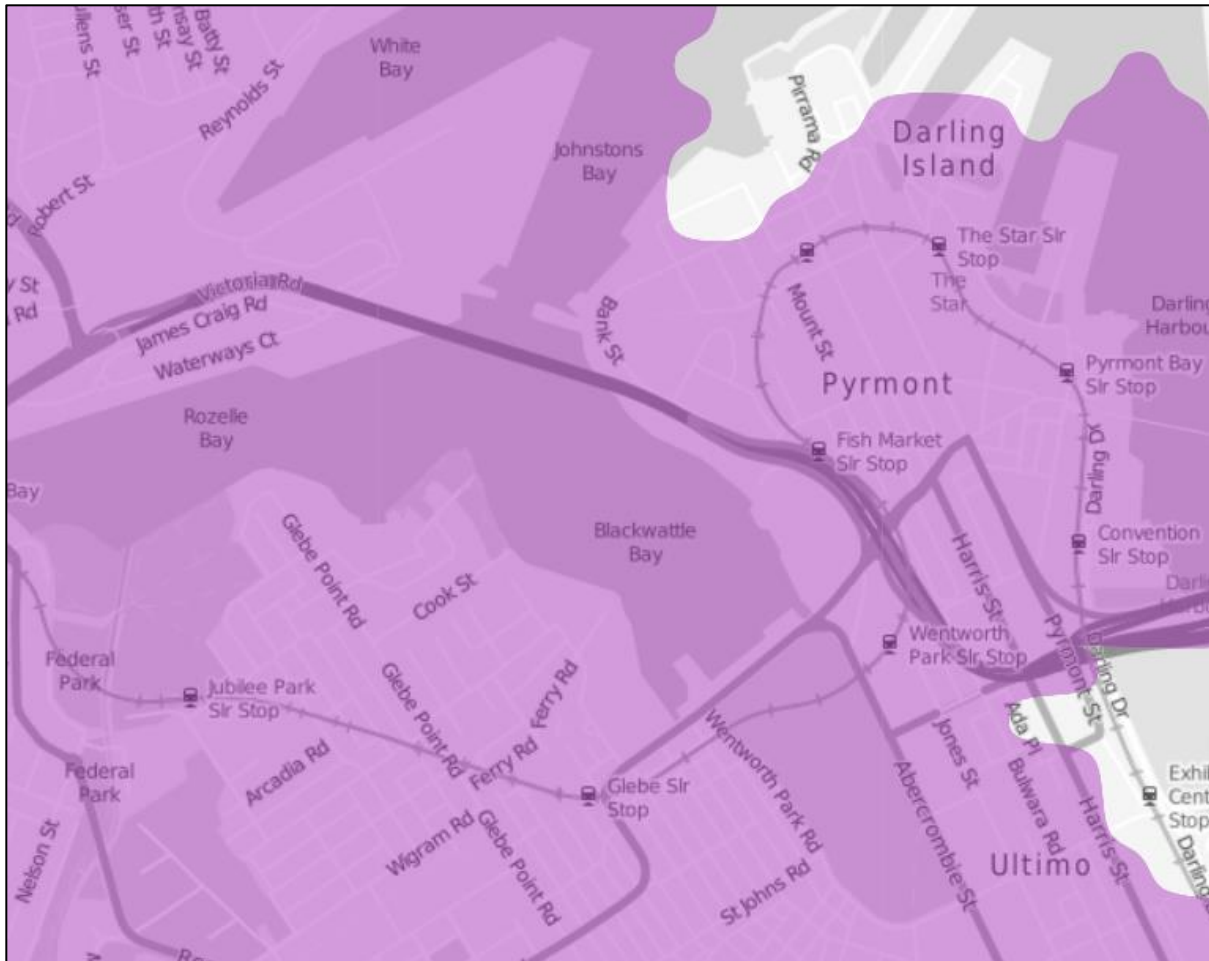


Figure 21: Telstra 4G/5G Coverage Map

### 10.2.3 Optus

Optus have fibre optic cables running adjacent to the site along Bank Street, Miller Street and Pymont Bridge Road.

## 10.3 Potential On-Site Infrastructure Layouts

As the layout of the existing assets is unlikely to provide sufficient reticulation for the proposed development or align with proposed layouts, it is proposed that existing assets will be retained, removed or replaced.

The following upgrades are proposed to service the Market Bays District:

Fish Market site:

- A single point of connection to the Fish Market site;
- Connection to existing Telstra infrastructure along Bridge Road.

Mixed-use site:

- New conduits throughout the site to provide a single point of connection to each building;
- Connection to existing Telstra infrastructure along the Western Distributor.

## 10.4 Demand Assessment

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

## 10.5 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 into between NBN Co. and Infrastructure NSW prior to construction works commencing (this does not prevent designs from being approved).

The formal approval process for NBN Co. infrastructure to be progressed through the Phase 2 detailed design processes consists of the following main steps:

1. Undertake site investigations to confirm the layout and extent of existing services (including private infrastructure associated with previous land-uses);
2. Liaise with Telstra and Optus to confirm the requirement for diversion and/or relocation of their existing infrastructure;
3. Confirm proposed infrastructure master plan (including staging) and in principle supply arrangements with NBN or another provider;
4. Initial application submitted to NBN Co. for supply of the site from their network;
5. NBN Co. to confirm supply can be provided and provide draft agreement;
6. Revisions of agreement where required;
7. Infrastructure NSW to sign NBN Co. agreement;
8. Liaise with Telstra and Optus for quote for diversions or abandonments including any interim works; and
9. Submit detailed design of individual packages for approval.

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.

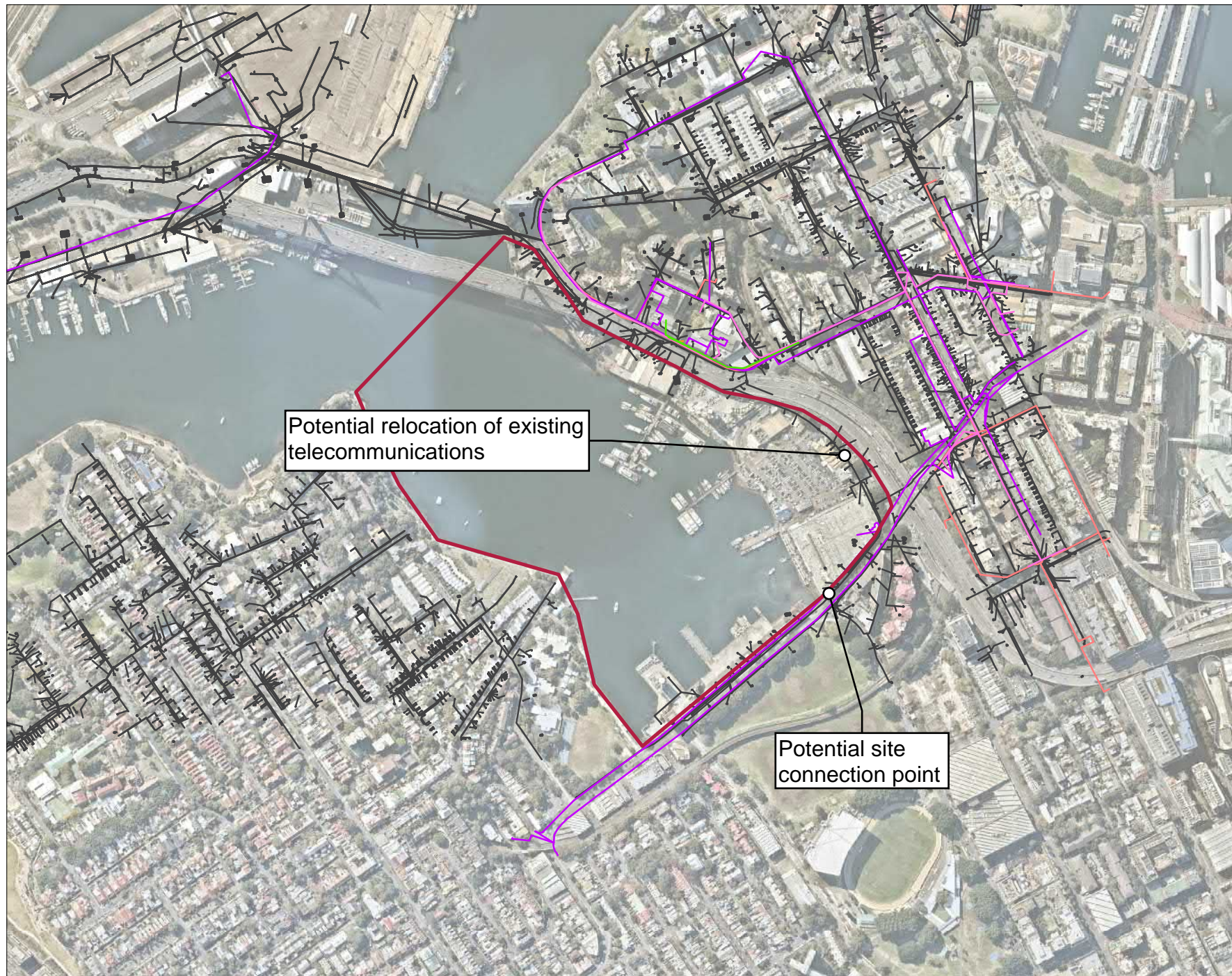
## 10.6 Future Work

NBN Co. has established a Feasibility Assessment process to provide early planning information and indicative backhaul contributions. These assessments are designed to assist developers in the early stages of planning and costing developments including pre-acquisition. The assessment is designed to take into consideration the location and size of each development and estimate a cost based on the existing NBN Co. network.

Upon finalisation of design developments, these will be issued formally to NBN Co. to assess the potential backhaul costs. Once the detailed design is undertaken applications to connect will be completed, three months' notice is required for each stage prior to the commencement of construction or civil works.

## BAYS EAST

FIGURE 22:  
COMMUNICATIONS PLAN



Potential relocation of existing telecommunications

Potential site connection point

### Legend

- Site boundary
- AAPT
- Nextgen
- Optus
- Telstra
- Verizon
- Vocus

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## 11.0 Conclusion

The proposed area of development within Blackwattle Bay has a number of utilities running through the Site area and along the streets by which it is bound. Initial investigations indicate that local amplifications to potable water, wastewater, electrical and gas delivery systems may be required to service increased demand from the proposed redevelopment. Upgrades to the local zone substation may also be required subject to confirmation by Ausgrid. Further, existing capacity of gas mains remains to be confirmed by Jemena.

Utility constraints that may affect the Blackwattle Bay development include:

- Demand calculations provide the following estimates based on  $\pm 15\%$  range in development yields:
  - Potable water between **1,010 – 1,370 kL/day**
  - Sewer loading between **4.6 – 6.2 L/s**
  - Electrical load between **11.6 – 15.6 MVA**
  - Gas demand between **1,260 – 1,710 m<sup>3</sup>/day**
- A concentration of potable water, wastewater, communications, Telstra and Ausgrid utilities infrastructure running adjacent to the Site which may require decommissioning prior to development;
- An Ausgrid 33kV transmission line along the southern boundary of the Site near Wattle Crescent and Jones Street; and
- Overhead powerlines around the site boundary which potentially need to be undergrounded (pending City of Sydney).

Opportunities and needs to support Blackwattle Bay include:

- Minimal utility infrastructure running through the Site, which gives an opportunity to plan the services in line with the urban design intent and sustainability outcomes;
- The site is currently well serviced by utility infrastructure;
- Existing trunk services may have excess capacity to service the initial phases of any new development, however local amplifications are likely and new electrical feeder cables will likely be required; and
- There may be an opportunity to re-use any redundant electrical utility routes for new infrastructure.

Based on the investigations undertaken within this report, Study Requirements under Section 10 have been satisfied with appropriate investigations recommended for future development applications.

## 12.0 Recommendations

Future work includes:

- Coordination with the Urban Design team to understand development scenarios and limit the impact on the existing trunk utilities;
- To investigate potential utility amplification to areas of increased density;
- Further coordination with utility authorities to confirm lead-in infrastructure requirements and routes;
- Potential hydraulic modelling to confirm potable and wastewater lead-in infrastructure upgrades;
- Assessment of Ecologically Sustainable Development (ESD) and alternative utility supply options;
- Assessment of ESD options to confirm the effects on utility supply and lead-in infrastructure requirements and routes; and

Further opportunities for alternative utility supply requiring further investigation as part of this ongoing study.

## Appendix A Authority Advice

## Preliminary Enquiry – Response Letter



23/04/2021

Webform ref: 225338

AECOM Australia Pty Ltd  
Attention: WILLIAM WONG  
Via email: [william.wong2@aecom.com](mailto:william.wong2@aecom.com)

Premises address: **BLACKWATTLE BAY PYRMONT BRIDGE ROAD, PYRMONT**  
Ausgrid AE Reference: **700007183**

Dear WILLIAM

I refer to your preliminary enquiry regarding the electricity connection at the above address and provide the following information.

- The Ausgrid network does not have the capacity to connect the proposed 17.6MVA load. An extension of the Ausgrid network is required.
- An extension/augmentation of the Ausgrid network is Contestable and requires the customer to engage accredited service providers to undertake the design and construction of the required works. Information on how to connect to the Ausgrid network can be found on our website at the following link: <https://www.ausgrid.com.au/Connections>
- Ausgrid is unable to provide costs or timeframes for Contestable works. However, accredited service providers may be able to provide the information.
- The electrical connection will require Ausgrid to provide auxiliary services that only Ausgrid can provide. The auxiliary services and the associated fee are detailed in the Ausgrid document **Alternative control services fee schedule**. The document is available on our website at the following link: <https://www.ausgrid.com.au/Connections/charges>

### Planning Study:

- Background:
  - The following preliminary response investigates the available network capacity and connection options for the proposed 17.6MVA load at Blackwattle Bay, Lot 2 Pyrmont Bridge Rd, Pyrmont.
  - It has been assumed the proposal will be supplied at 11kV.
- Existing zone substation capacity:
  - There is minimal (<2MVA) remaining capacity for the proposed load from Darling Harbour ZS until ZS firm capacity is reached.
  - There is available capacity for the proposed load from Camperdown ZS.
- Existing 11kV network capacity:
  - There is minimal 11kV available network capacity in the immediate vicinity of the proposed development as Blackwattle Bay ZS 11kV feeders will be transferred to other zones as part of Blackwattle Bay ZS decommissioning (SM25252). These transfers are planned to be completed by the end of 2021.
- Proposed 11kV connection option:
  - 4 x 11kV feeder supplies from Camperdown ZS will be required to provide N-1 supply to the proposed development.
  - It is feasible to provide 4 x new 11kV feeders from Camperdown ZS to the development from existing panels.

- 1-2 feeders may need to be connected to existing feeders near the ZS where some short cable lengths (<100m per feeder) would need to be upgraded to 300Cu back to the panel.

Feeder route:

- Ausgrid Contestable project AN20780 is proposed to use part of the same route as this development appears to want to use. There may be synergies in installing the new conduits for both projects at the same time in the same route. Both projects may be impacted if completed independently of each other and at the same time and Infrastructure NSW should consider carry out this future work as part of AN20780.
- Using the feeder route proposed by the ASP3 from Camperdown ZS to Blackwattle Bay ZS via Wentworth Park will potentially allow for Camperdown PA65R to be utilised as one of the feeders. Connection could be made via a tee joint on St Johns Rd upstream of S2983 Mitchell Wentworth.

Planning Considerations

There are many influencing factors that could affect the available supply capacity including but not limited to other developments, future network augmentation, load growth and policy changes. This preliminary response is based on information available at the time and may change into the future. It is expected that a connection application will be submitted by the applicant. Upon receipt of the connection application a more detailed planning study will be undertaken to enable a Design Information Package to be produced outlining the connection requirements. The information in this response is for use by Contestability to enable a response to the preliminary enquiry by the applicant.

- If the proposed sites are to be supplied at LV then new feeders will still ultimately be required for the proposed amount of load as per the above. Numerous substations as per NS109 will be required to be established on the various lots as the stages progress.

- To proceed further in obtaining a new or altered electrical connection to the property a Connection Application will need to be submitted. The various application forms are available on our website at the following link:  
<https://www.ausgrid.com.au/Connections>

It should be noted that the above advice is based on Ausgrid's policies and network status as of today and are subject to change.

Connections to the Ausgrid network are governed by a set of laws and rules referred to as the National Energy Customer Framework (NECF). Included in the NECF is the National Electricity Rules (NER). Under these rules, a binding contract may only be formed after a connection application is lodged and Ausgrid has made a connection offer in response to that application. Accordingly, to make arrangements for the electricity connection of the development to the Ausgrid network you should lodge a completed connection application.

Should you require any further information please contact me.

Yours sincerely,

**Jeffrey Crough**

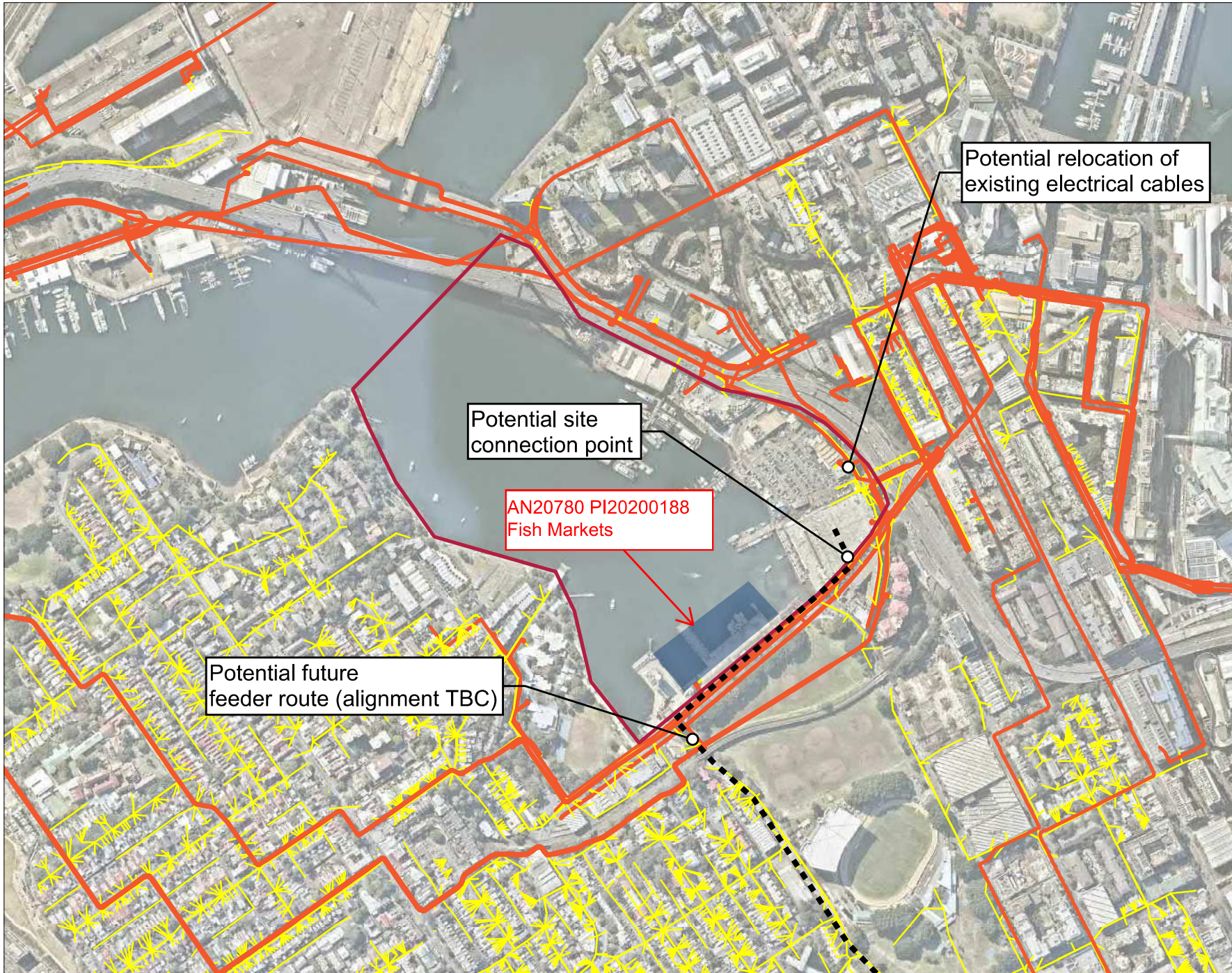
**Ausgrid**

Direct Telephone Number: 0296639221

Email: [JCrough@ausgrid.com.au](mailto:JCrough@ausgrid.com.au)



FIGURE 15:  
ELECTRICAL PLAN



Potential relocation of existing electrical cables

Potential site connection point

AN20780 PI20200188  
Fish Markets

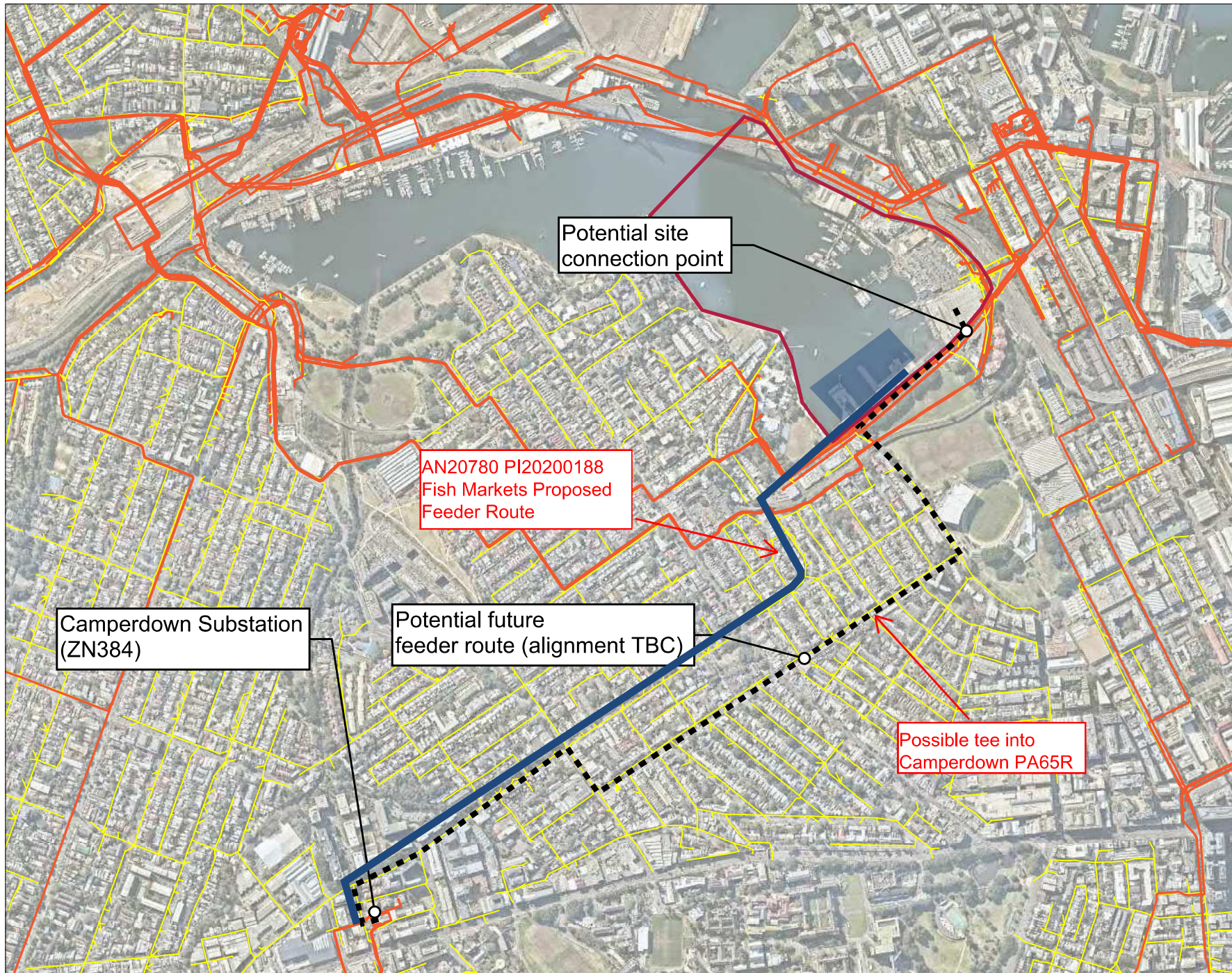
Potential future feeder route (alignment TBC)

- Legend
- Site boundary
  - High voltage line
  - Low voltage line
  - Potential feeder route

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#### Legend

- Site boundary
- High voltage line
- Low voltage line

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Wong, William

---

From: Kareena Prado <kareenaprado@nbnc.com.au>  
Sent: Tuesday, 4 May 2021 1:52 PM  
To: Wong, William  
Subject: [EXTERNAL] nbn development application DEV-00138377 for Blackwattle Bay

Follow Up Flag: Follow up  
Flag Status: Flagged

Hello William,

We have completed our planning assessment for the Blackwattle Bay development.

We can deliver FTTP (fibre to the Premise) to this location.

There is no additional backhaul costs to feed the fibre to the boundary.

Kind regards,  
Kareena Prado

Senior Business Development Manager, NSW/ACT | New Developments, Business Enterprise & Government  
| M +61 4 2853 7208 | E [kareenaprado@nbnc.com.au](mailto:kareenaprado@nbnc.com.au)

Visit our New Developments site: [www.nbn.com.au/newdevelopments](http://www.nbn.com.au/newdevelopments)  
Remember to submit all Pre-Construct and As-Built designs for review via the [new upload tools](#).  
For all existing application updates please use the [tracker](#)

business nbn™



Wong, William

---

From: Zachary Kennett <Zachary.Kennett@jemena.com.au>  
Sent: Thursday, 20 May 2021 10:52 AM  
To: Wong, William; Stephen Angel  
Cc: Shahzaib Sheikh; Roeffen, Gijs  
Subject: [EXTERNAL] RE: Blackwattle Bay - Jemena Feasibility Application

Follow Up Flag: Follow up  
Flag Status: Flagged

Hi William,

Apologises on the delay responding to you on regarding this enquiry.

Jemena has reviewed the black wattle bay precinct project and initial engineering works confirms that the network can potentially support the proposed development however more work will be required once the loads of the sites have been validated.

Jemena currently plans to service the new Sydney fish market by installing a district regulator set off the existing 1050kPa high pressure gas network (indicative location below), this district regulator set would also potentially be able to service the proposed Blackwattle bay precinct allowing us to reticulate the precinct with 210kPa mains and possibly abandon some of the existing high pressure steel mains that run through the site.



If you need any further details please do not hesitate to contact me directly.

Regards,  
**Zachary Kennett**  
Network Development Specialist – I&C  
**Jemena**  
99 Walker Street, North Sydney NSW 2060  
PO Box 1220, North Sydney NSW 2059  
Tel: 02 9867 7182 | 0409 608 399  
[www.jemena.com.au](http://www.jemena.com.au)



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From: Wong, William <William.Wong2@aecom.com>  
Sent: Monday, 17 May 2021 3:58 PM  
To: Stephen Angel <Stephen.Angel@jemena.com.au>  
Cc: Shahzaib Sheikh <shahzaib.sheikh@zinfra.com.au>; Roeffen, Gijs <gijs.roeffen@aecom.com>; Zachary Kennett <Zachary.Kennett@jemena.com.au>  
Subject: RE: Blackwattle Bay - Jemena Feasibility Application

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Hi Stephen,

When can we expect a response from Jemena regarding this feasibility application? I am free for a call anytime if additional information is required.

Regards,

**William Wong**

Civil Engineer  
M +61 466 297 222  
[William.Wong2@aecom.com](mailto:William.Wong2@aecom.com)

**AECOM**

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[www.aecom.com](http://www.aecom.com)

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From: Wong, William  
Sent: Tuesday, 4 May 2021 2:26 PM  
To: Stephen Angel <[Stephen.Angel@jemena.com.au](mailto:Stephen.Angel@jemena.com.au)>  
Cc: Shahzaib Sheikh <[shahzaib.sheikh@zinfra.com.au](mailto:shahzaib.sheikh@zinfra.com.au)>; Roeffen, Gijs <[gijs.roeffen@aecom.com](mailto:gijs.roeffen@aecom.com)>; Zachary Kennett <[Zachary.Kennett@jemena.com.au](mailto:Zachary.Kennett@jemena.com.au)>  
Subject: RE: Blackwattle Bay - Jemena Feasibility Application

Hi Stephen,

Wondering if there was any update to this feasibility application? Happy to chat through any questions you have anytime.

Regards,

**William Wong**

Civil Engineer  
M +61 466 297 222  
[William.Wong2@aecom.com](mailto:William.Wong2@aecom.com)

**AECOM**

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From: Stephen Angel <[Stephen.Angel@jemena.com.au](mailto:Stephen.Angel@jemena.com.au)>  
Sent: Friday, 16 April 2021 4:42 PM  
To: Wong, William <[William.Wong2@aecom.com](mailto:William.Wong2@aecom.com)>  
Cc: Shahzaib Sheikh <[shahzaib.sheikh@zinfra.com.au](mailto:shahzaib.sheikh@zinfra.com.au)>; Roeffen, Gijs <[gijs.roeffen@aecom.com](mailto:gijs.roeffen@aecom.com)>; Zachary Kennett <[Zachary.Kennett@jemena.com.au](mailto:Zachary.Kennett@jemena.com.au)>  
Subject: [EXTERNAL] RE: Blackwattle Bay - Jemena Feasibility Application

William,

Thanks for sending this through I will talk with our design engineers and will come back to you if any additional information is required

Thanks

**Stephen Angel**

Network Development Manager

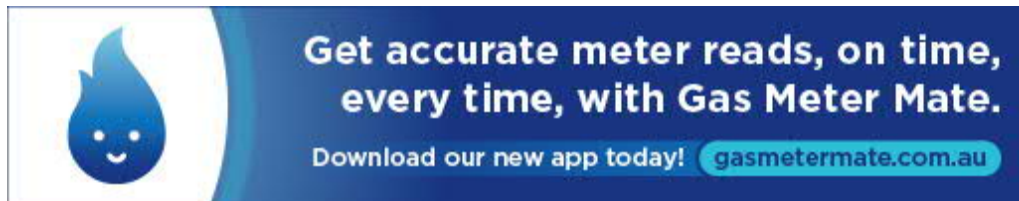
**Jemena**

Level 14, 99 Walker Street, North Sydney, NSW 2060

PO Box 1220, North Sydney 2059

(02) 9867 7034

[stephen.angel@jemena.com.au](mailto:stephen.angel@jemena.com.au) | [www.jemena.com.au](http://www.jemena.com.au)



---

From: Wong, William <[William.Wong2@aecom.com](mailto:William.Wong2@aecom.com)>

Sent: Friday, 16 April 2021 4:01 PM

To: Stephen Angel <[Stephen.Angel@jemena.com.au](mailto:Stephen.Angel@jemena.com.au)>

Cc: Shahzaib Sheikh <[shahzaib.sheikh@zinfra.com.au](mailto:shahzaib.sheikh@zinfra.com.au)>; Roeffen, Gijs <[gijs.roeffen@aecom.com](mailto:gijs.roeffen@aecom.com)>

Subject: Blackwattle Bay - Jemena Feasibility Application

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Hi Shahzaib, thanks for the heads up.

Hi Stephen,

AECOM are currently engaged on behalf of Infrastructure NSW to support the renewal of Blackwattle Bay through the State Significant Precinct process. As part of this process, we would like to submit a feasibility application to Jemena requesting for high level commentary on gas infrastructure servicing the proposed Blackwattle Bay site area. I've tried to submit an application via Jemena's online portal however was given the response in the email below.

Attached is a feasibility application letter detailing the proposed development and requested items with site plans and demand forecasts enclosed.

Could you please advise who the best contact is from your planning team to action this request? Let me know if you require additional information which may assist with this application.

Regards,

**William Wong**

Civil Engineer

M +61 466 297 222

[William.Wong2@aecom.com](mailto:William.Wong2@aecom.com)

**AECOM**

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T +61 2 8934 0000 F +61 2 8934 0001

[www.aecom.com](http://www.aecom.com)

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From: Shahzaib Sheikh <[shahzaib.sheikh@zinfra.com.au](mailto:shahzaib.sheikh@zinfra.com.au)>

Sent: Friday, 16 April 2021 3:41 PM

To: Wong, William <[William.Wong2@aecom.com](mailto:William.Wong2@aecom.com)>  
Subject: [EXTERNAL] 000328694 - Complex Works- AECOM Pymont Bridge Road, PYRMONT, NSW, 2009

Hi William,

As discussed, your application will need to be re-raised in the Jemena portal as a New-estates application and can be further investigated by Jemena.

Also you may email [Stephen.Angel@jemena.com.au](mailto:Stephen.Angel@jemena.com.au) directly in order to start your feasibility study.

Once the project is ready for relocation my team can assist you.

Best Regards,

**Shahzaib Sheikh**

Project Manager – Routine Projects  
M: 0408 626 406 T: (02) 9867 7986  
E: [Shahzaib.Sheikh@zinfra.com.au](mailto:Shahzaib.Sheikh@zinfra.com.au)



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Sydney NSW 2145 Australia  
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