Barangaroo

Project Application (MP11_0002)

Utilities Services Infrastructure Plan

October 2012

Lend Lease

TABLE OF CONTENTS

1. Introduction

This report supports a Project Application (MP11_0002) submitted to the Minister for Planning pursuant to Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). The Application seeks approval for construction of two residential flat buildings (known as Buildings R8 and R9) and associated works at Barangaroo South as described in the Overview of Proposed Development section of this report.

Overview of Proposed Development

The R8 and R9 Project Application seeks approval for the construction and use of two residential flat buildings comprising 161 apartments, ground floor retail, allocation of car parking spaces from the Bulk Excavation and Basement Car Parking Project Application, and the construction of the surrounding ancillary temporary public domain and landscaping.

Site Location

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by Sydney Harbour to the west and north, the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and bounded to the south by a range of new development dominated by large CBD commercial tenants.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South.

The R8 and R9 Project Application Site area is located within Barangaroo South as shown in Figure 1. The Project Application Site extends over land generally known and identified in the approved Concept Plan as Block X.

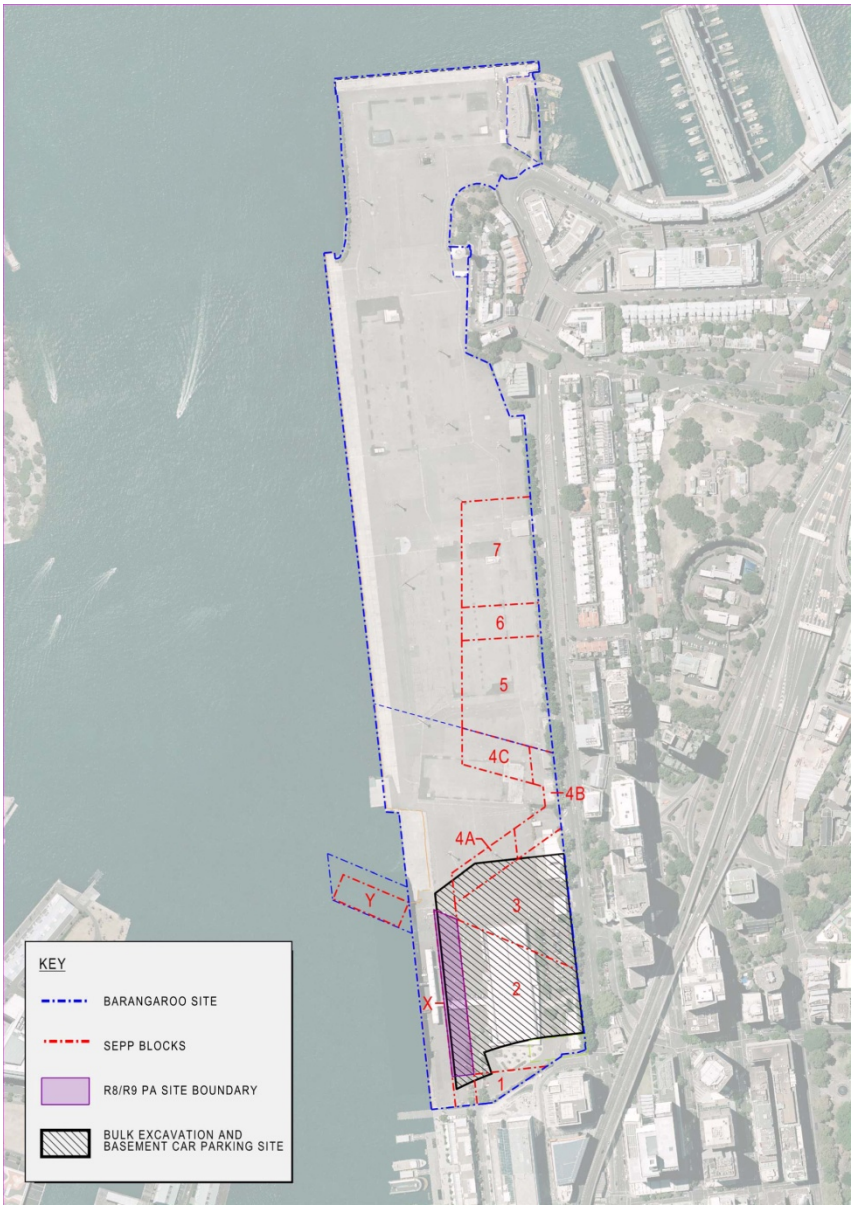


Figure 1: R8 and R9 Residential Building Project Application (MP11_0002) Aerial Site Location Plan

2. Stormwater Services

2.1. Existing Stormwater Services

Based on existing survey data and Department of Land database, the external catchment draining to the existing stormwater drainage system is approximately 14 Ha. The existing Stormwater Drainage system consists of large diameter pipes along Hickson Road that turn across the site and discharge untreated water into the harbour. Overland flows in excess of the piped flows are directed to the existing low point in Hickson Road and ponded water traverses the Barangaroo South site and ultimately discharges to the harbour.

Catchment Plan - Existing

2.2. Proposed Stormwater Services

The layout of the existing pipe system and overland flow path are non compatible with the proposed Barangaroo South basement footprint, ground plane and proposed buildings. The existing stormwater needs to be diverted around the site to suit the development master plan. It is proposed that a permanent diversion to the south along the existing Shelley and Lime streets will be provided.

The stormwater management system that conveys the stormwater from the external catchment located between Bradfield Hwy and Kent Street will be diverted around the site to the north along the future constructed roads and Hickson Road.

In respect to overland flows, due to the site constraints and climate change principles, the piped stormwater management system needs to cater for 1 in 100 year event. The design of the external stormwater managements system will be in accordance with design and catchment management best practice.

Internal, on site stormwater from the building roofs and hard surfaces will be collected, treated and either discharged into the harbour or reused for irrigation.

The treatment of the most efficient event of the onsite stormwater drainage will be designed to national best practice.

3. Potable Water Supply

3.1. Existing Potable Water Services

Based on existing available information, recent survey works and confirmed by Sydney Water, there is a 300mm diameter water main in the western side of Hickson Road. There are numerous connections serving the previous buildings on the site. The existing connections shall be capped off at the main in accordance with Sydney Water requirements. Some existing incoming supplies may be used as temporary incoming water supplies during construction.

3.2. Proposed Potable Water Services

The potable water supply to the Barangaroo South development is proposed to be from the existing 300mm Sydney Water water main in Hickson Road. Sydney Water has confirmed that the capacities in this main are sufficient to meet the demands of the development. The flow from this main could also be used for the main fire fighting water supply subject to flow and pressure available being satisfactory to the requirements of New South Wales Fire Brigade.

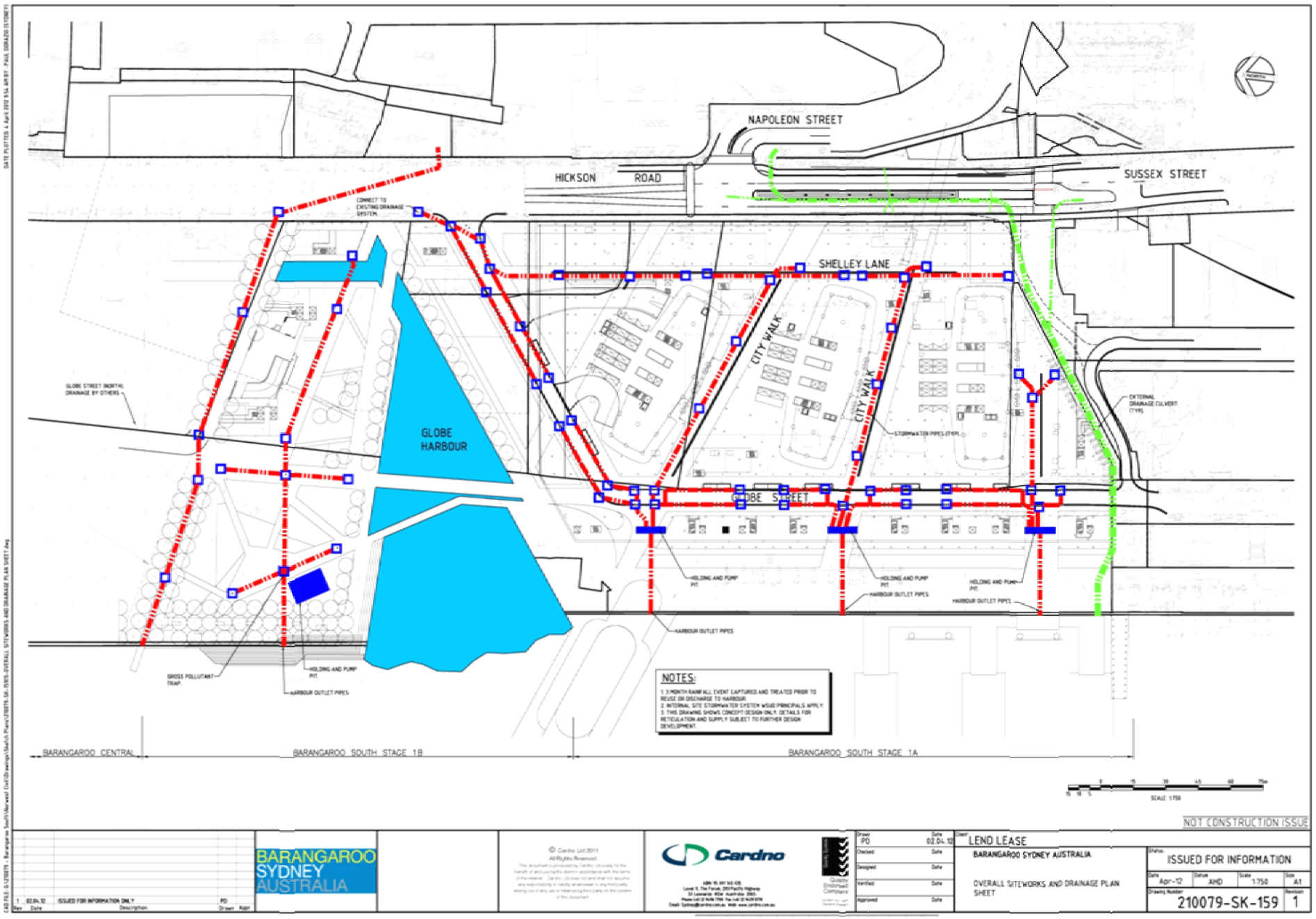
The proposed strategy to secure potable water supply to the site is to construct a water main extension connected in two pints to the existing 300mm main in Hickson Road fronting the Development. It is proposed the loped main to run west in Margaret Street from a connection to the existing 300mm main in Hickson Road , then turning north in Globe Street, then east in Globe Street to another connection to the existing 300mm dia water main in Hickson Road. .

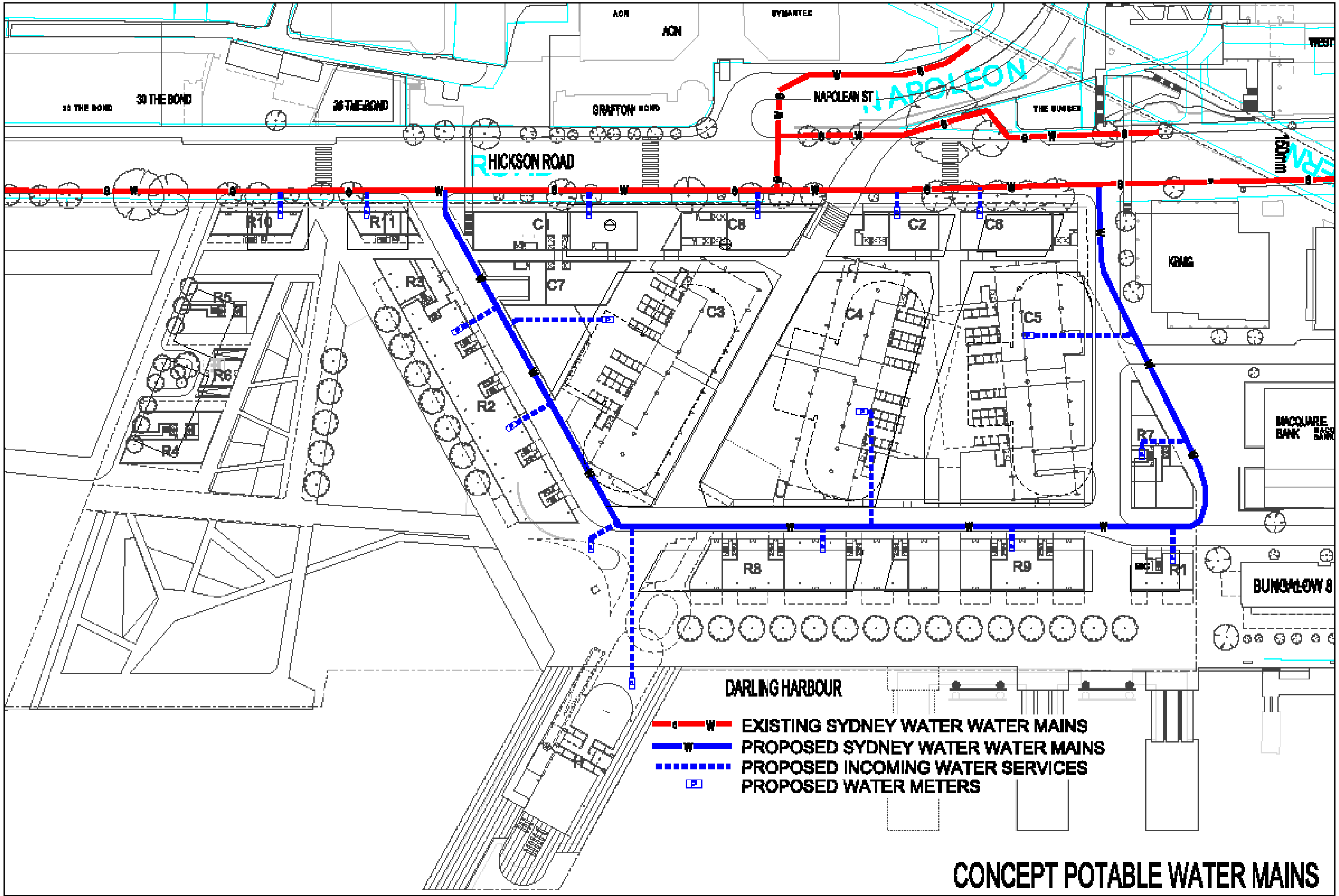
The Development water strategy and proposed implementation of a recycled water system will reduce the demand for potable water compared to a Business as Usual case. The potable water demand will be from the following potable water uses:

- All potable water uses other than toilet flushing, irrigation and wash downs.
- Potable water top up when the recycled water system is off line.

The Development will utilise standard Sydney Water process for the design and construction of a potable water main. , The asset will be created by Sydney Water or by the Developer and transferred to Sydney Water for operation and maintenance.

The new potable water infrastructure will be funded in accordance with Sydney Water funding policy and is subject to agreement between the Developer, Sydney Water and the BDA.


NAPOLEON STREET
HICKSON ROAD
SUSSEX STREET
SHELLEY LANE
CITY WALK
CITY WALK
GLOBE HARBOUR
GLOBE STREET
CONNECT TO EXISTING DRAINAGE SYSTEM
GLOBE STREET (NORTH) DRAINAGE BY OTHERS
EXTERNAL DRAINAGE CULVERT (TYP)
STORMWATER PIPES (TYP)
HOLDING AND PUMP PIT
HARBOUR OUTLET PIPES
GROSS POLLUTANT TRAP
NOTES:
1. 3 MONTH RAINFALL EVENT CAPTURED AND TREATED PRIOR TO REUSE OR DISCHARGE TO HARBOUR.
2. INTERNAL SITE STORMWATER SYSTEM WSUD PRINCIPALS APPLY.
3. THIS DRAWING SHOWS CONCEPT DESIGN ONLY. DETAILS FOR RETICULATION AND SUPPLY SUBJECT TO FURTHER DESIGN DEVELOPMENT
BARANGAROO CENTRAL
BARANGAROO SOUTH STAGE 1B
BARANGAROO SOUTH STAGE 1A
SCALE 1:750
NOT CONSTRUCTION ISSUE
BARANGAROO SYDNEY AUSTRALIA
Cardno
LEND LEASE
BARANGAROO SYDNEY AUSTRALIA
OVERALL SITEWORKS AND DRAINAGE PLAN SHEET
ISSUED FOR INFORMATION
210079-SK-159
1



AON
SYMANTEC
WEST
30 THE BOND
30 THE BOND
30 THE BOND
GRAFTON BOND
NAPOLEAN ST
NAPOLEON
THE BUNGEE
HICKSON ROAD
150mm
R10
R11
C1
C8
C2
C6
KPMG
R5
R3
C7
C3
C4
C5
R6
R2
R4
R7
MACQUARIE BANK
R8
R9
R1
BUNGALOW 8
DARLING HARBOUR
EXISTING SYDNEY WATER WATER MAINS
PROPOSED SYDNEY WATER WATER MAINS
PROPOSED INCOMING WATER SERVICES
PROPOSED WATER METERS
CONCEPT POTABLE WATER MAINS

4. Sewer Services

4.1. Existing Sewer Services

Based on existing available information and recent survey works, there is a sewer trunk main in Hickson Road near the western kerb line draining into the existing Sewage Pumping Station SP1129.

All existing connections servicing the existing buildings are to be demolished and capped off in accordance with Sydney Water requirements.

4.2. Proposed Sewer Services

The sewage collection system on the site will discharge to a central Barangaroo Recycled Water Treatment Plant (BRWTP) located in the Barangaroo South basement. A bypass overflow from the BRWTP connection shall be provided, connecting the Development to the existing Sydney Water Sewer located in Hickson Road.

When the BRWTP is offline or there is surplus recycled water available for the needs of the buildings, then the wastewater shall be diverted to discharge directly to the Sydney Water sewer in Hickson Road, and ultimately to the Sewage Pumping Station SP1129. It is proposed to discharge the waste by-products from the BRWTP system to the Sydney Water sewer, including the desludging from the Membrane Bioreactor (MBR), and the reverse osmosis-reject water.

The buildings on the eastern section of the site, including the office towers C3, C4 and C5 will drain by gravity connection to the inlet works of the BRWTP. In by-pass mode, a diversion valve will operate, directing the flow by gravity into the Sydney Water sewer. The buildings on the western side (including R8 and R9) of the development, including sections of the retail outlets below the commercial towers, will discharge to a private sewer pumping stations located in the Basement of Barangaroo South. The discharge from the sewer pumping stations shall connect into the high level gravity collection system upstream of the by-pass diversion valve and drain to the inlet works of the BWTP.

Due to the Development water strategy and proposed implementation of a recycled water system and off-site export, the flow to sewer will be reduced (on average by 110%) when compared to a Business as Usual case.

The Development will be required to enter into Trade Waste Agreement with Sydney Water for discharging of waste water, excess recycled water and BWTP process by-products in the Sydney Water sewer system.

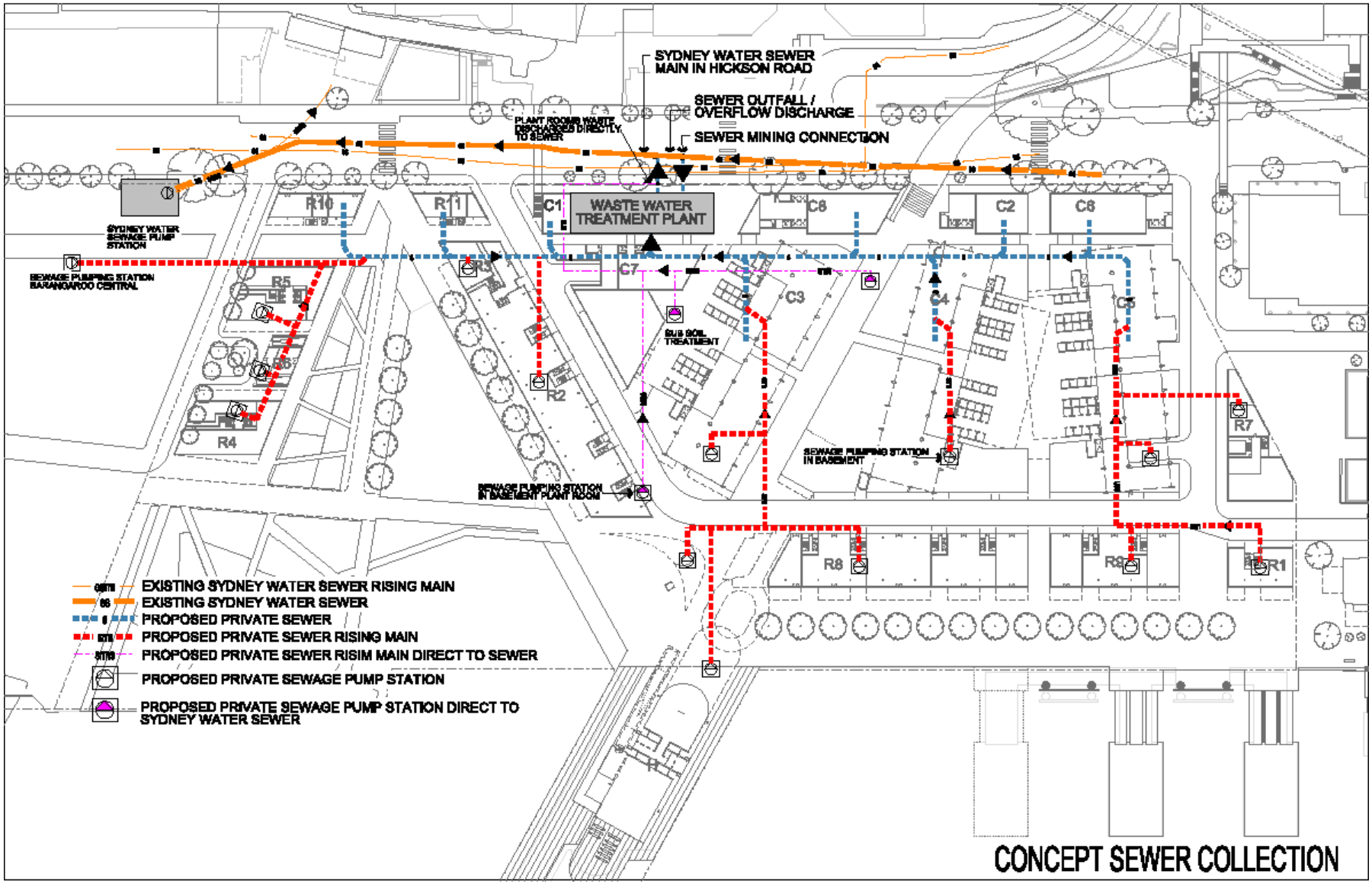
In addition, the Development will require sewer mining to increase the quantity of recycled water as required for off-site export. The proposed sewer mining connection is into the Sydney Water sewer main in Hickson Road, intended to be upstream of the sewer connection serving the Barangaroo Site.

The Development will be required to enter into a Sewer Mining Agreement with Sydney Water for the proposed sewer mining at Barangaroo South.

Prior to issue of a Construction Certificate for the relevant works, a detailed design of the BRWTP shall be submitted to and approved by the Director General (Director General of the Department of Planning)

The sewer outfall connection shall be designed and approved by Sydney Water. The funding of the new sewer infrastructure required will be in accordance with Sydney Water funding policy and is subject to agreement between the Developer, Sydney Water and the BDA

The operation of the recycled water system will be in accordance with the WICA licensing requirements and IPART regulations.


SYDNEY WATER SEWER MAIN IN HICKSON ROAD
SEWER OUTFALL / OVERFLOW DISCHARGE
PLANT ROOM WASTE DISCHARGES DIRECTLY TO SEWER
SEWER MINING CONNECTION
WASTE WATER TREATMENT PLANT
SYDNEY WATER SEWAGE PUMP STATION
SEWAGE PUMPING STATION BARANGAROO CENTRAL
SUB SOIL TREATMENT
SEWAGE PUMPING STATION IN BASEMENT PLANT ROOM
SEWAGE PUMPING STATION IN BASEMENT
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
C1
C2
C3
C4
C5
C6
C7
C8
EXISTING SYDNEY WATER SEWER RISING MAIN
EXISTING SYDNEY WATER SEWER
PROPOSED PRIVATE SEWER
PROPOSED PRIVATE SEWER RISING MAIN
PROPOSED PRIVATE SEWER RISIM MAIN DIRECT TO SEWER
PROPOSED PRIVATE SEWAGE PUMP STATION
PROPOSED PRIVATE SEWAGE PUMP STATION DIRECT TO SYDNEY WATER SEWER
CONCEPT SEWER COLLECTION

5. Recycled Water Services

5.1. Proposed Recycled Water Service

The proposed Recycled Water Scheme consists of:

- wastewater collection system,
- wastewater treatment,
- recycled water reticulation system.

The proposed Barangaroo Recycled Water Treatment Plant (BRWTP) at Barangaroo South will treat waste water to a suitable quality and produce recycled water for non potable water use on the Barangaroo South site, and for export to neighbouring buildings. The input capacity of the proposed BWTP will be 1ML/day based on the current water model. The plant will produce enough recycled water to fill approximately 120 Olympic size swimming pools per year.

The export for neighbouring buildings, that will reduce their potable water demand, is primarily expected to be recycled water for cooling water and will therefore be treated to reverse osmosis (RO) quality suitable for use in cooling towers.

The recycled water use on the Barangaroo South site shall be for all non-potable water uses such as toilet flushing, irrigation, fire systems test water and wash-down. The use of the recycled water in residential clothes washing machines shall be considered during the design process. If the quality of recycled water produced is suitable for washing machine use an optional recycled water supply tap shall be installed adjacent to the potable water supply taps.

The BWTP process shall include 24 hour storage tanks for the recycled water supply. A recycled water pressure system shall pump the water from the storage tanks. The recycled water distribution system shall be a network of pipes located at high level within the basement. Each building / strata title lot shall have an individual supply point and recycled water meter.

The recycled water storage tanks shall have a back up water supply fed from the Sydney Water potable water main in Hickson Road.

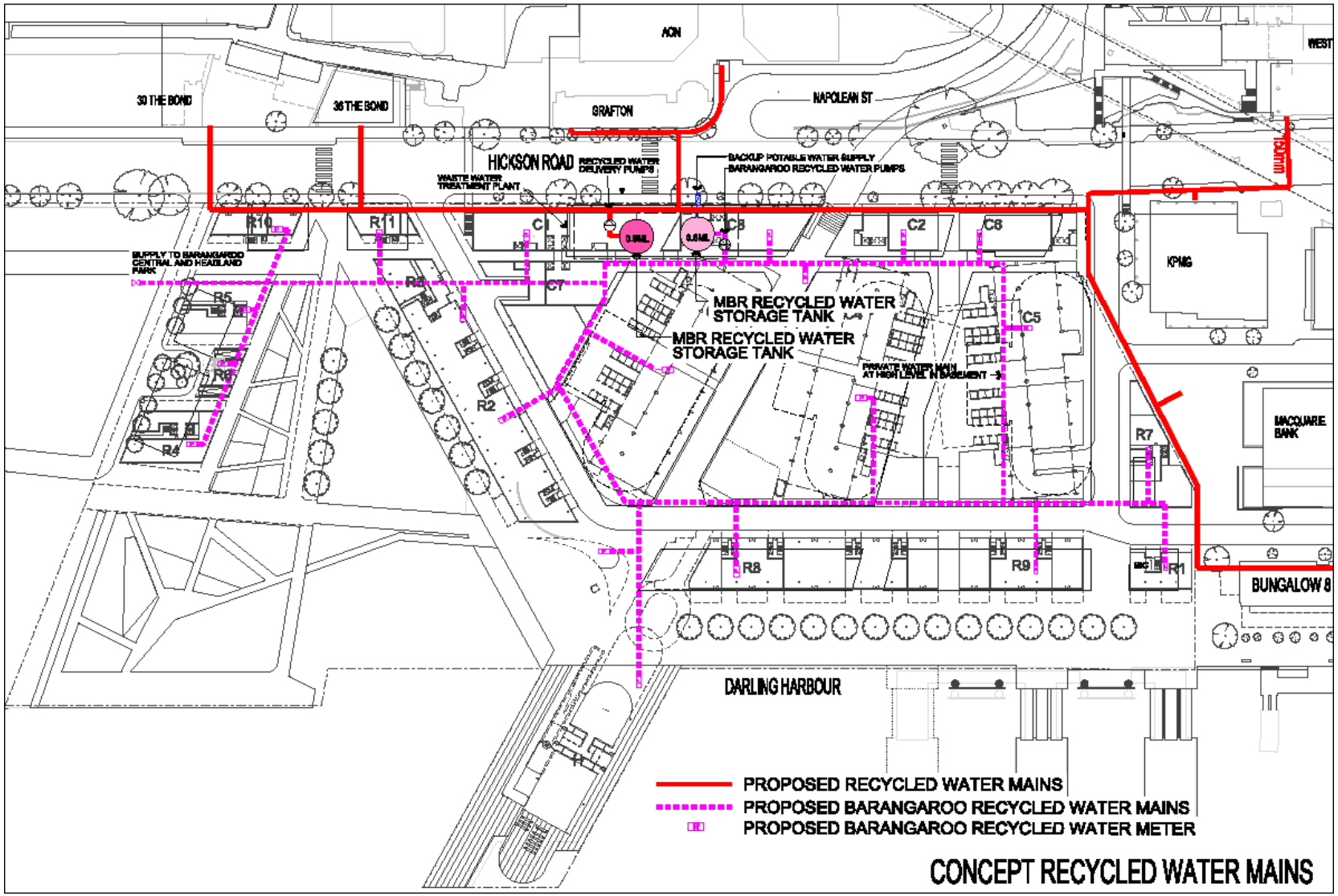
If the water level in the storage tanks drops to a low level then the storage shall be automatically supplemented from the potable water supply to maintain this low level. The water level in the recycled water storage tanks may drop to low level if the BWTP is off line for maintenance.

The backup potable water supply shall supply the buildings on Barangaroo South, Central and Headland Park. The backup recycled water supply for the export buildings is proposed to be from the existing potable water supply in the export buildings.

Recycled water to all buildings in Barangaroo South and Barangaroo Central will be supplied from the proposed BWTP.

It is proposed that recycled water from Barangaroo South BWTP will also be available for use as irrigation supply to the Barangaroo Central and Headland Park.

The recycled water scheme will be designed in accordance with NSW health regulations and Standards. Appropriate Independent Pricing and Regulatory Tribunal (IPART) Network Operators Licence will be obtained to build and operate a recycled water scheme in accordance with Water Industry Competition Act (WICA). An IPART Retail Supplier license will also be obtained.


ACN
WEST
30 THE BOND
36 THE BOND
GRAFTON
NAPOLEAN ST
HICKSON ROAD
RECYCLED WATER DELIVERY PUMPS
BACKUP POTABLE WATER SUPPLY BARANGAROO RECYCLED WATER PUMPS
WASTE WATER TREATMENT PLANT
MUSEUM
R10
R11
C1
C3
C2
C8
KPMG
SUPPLY TO BARANGAROO CENTRAL AND HEADLAND PARK
R5
R3
C7
MBR RECYCLED WATER STORAGE TANK
MBR RECYCLED WATER STORAGE TANK
C5
R6
R2
PRIVATE WATER MAIN AT HIGH LEVEL IN BASEMENT
MACQUARIE BANK
R4
R7
R8
R9
R1
BUNGALOW 8
DARLING HARBOUR
PROPOSED RECYCLED WATER MAINS
PROPOSED BARANGAROO RECYCLED WATER MAINS
PROPOSED BARANGAROO RECYCLED WATER METER
CONCEPT RECYCLED WATER MAINS

6. Electrical Services

6.1. Existing Electrical Services

Barangaroo South site was served by 5 KV high voltage feeders entering the site at the southern end of Hickson Road and terminating in an Ausgrid (formerly Energy Australia) HV switch room. The HV supply and private HV reticulation were decommissioned and the private substations demolished as part of demolition works in 2010/2011. The existing electricity supply in the CBD is the traditional triplex 11KV Distribution Network Supply. It was presumed that the connection for electricity supply to Barangaroo South would be from the new City North Zone Substation at Erskine Street.

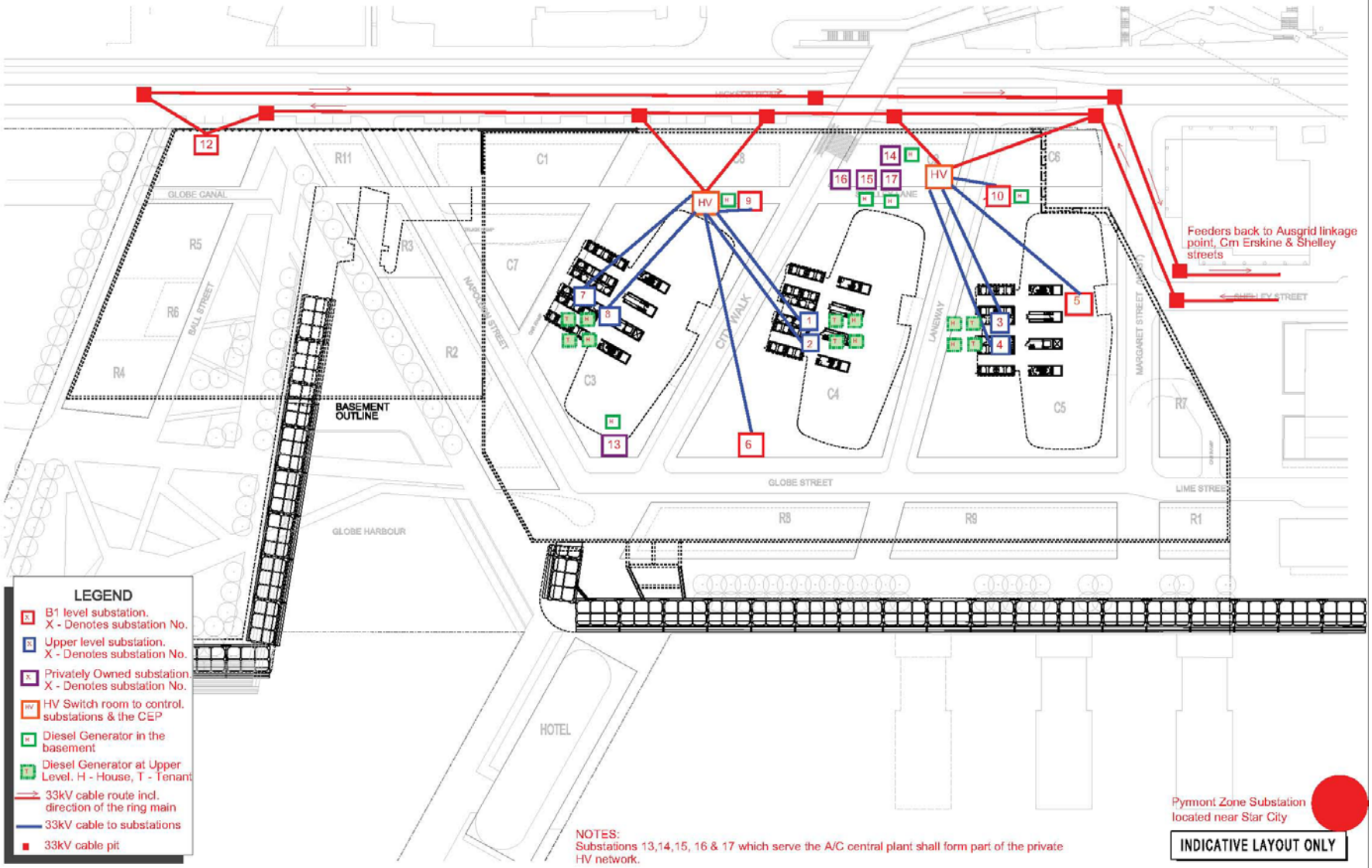
6.2. Proposed Electrical Services

Ausgrid have informed that the electricity supply to Barangaroo South will be through 33KV feeders from Pyrmont Zone Substations. The feeders from Pyrmont Zone Substation will be brought to Barangaroo South site via pit and duct system in the existing roads network or by the sea (submarine cables or directional drilling). Four feeders will be provided to the precinct to supply an N-1 level of redundancy. The anticipated infrastructure planning capacity provided in these feeders will be approximately 43MVA. The exact rating will be determined on the level of de-rating applied to these cables by Ausgrid.

Barangaroo will be the first development in the CBD connected to 33KV Distribution System. The 33KV Distribution Network is different to the traditional 11KV Distribution Network.

The design intent is to reticulate the feeders from the linkage point receiving pit, along Shelley Street and Hickson Road in an underground pit and duct system. The reticulation of the new 33KV network will be in a ring main configuration. The feeders will terminate in the HV Control Rooms that will be located in the basement. The substations, established in the basement and upper levels of the commercial towers, to service the site demand, will be connected to the HV Control Points.

It is proposed that the HV supply to the District Central Chilled Water Plant is by a private HV networks including private substations connected to HV supply in an Ausgrid HV Control Room.



Land Lease

GRAHAM W JONES
Principal Architect
FRAIA NSW ARB 4005

BARANGAROO SOUTH
STAGE 1

ELECTRICAL SERVICES
SITE INFRASTRUCTURE STAGE 1A & 1B

Scale 1:500 @ B1 1:1250 @ A3
0 25 50M

Drawing No. SK-E01
Date 13 July 2011 Revision 00

7. Telecommunications Services

7.1. Existing Telecommunications Services

Telecommunications networks, including Mobile Voice and Wireless Broadband services exist in Hickson Road, Lime Street, Sussex Street and Kent Street.

The majority of the existing network infrastructure is limited to basic copper services in the vicinity of the Barangaroo South site. The current pathways in the area are servicing a temporary Shipping Terminal and surrounding developments. Several other Carriers and Telecommunications Services Providers (i.e. resellers) of telecommunications infrastructure are supported by these pathways.

All major telecommunications services are located to the east on Kent Street, and new and augmented pathways have been recently installed to the south of the Precinct to service new developments in Kent Street, Shelly Street and the 'King Street Wharf' precinct. Major existing pathways for large commercial grade services do not exist on Hickson Road adjacent to the site.

7.2. Proposed Telecommunications and Building Communications Services

The vision for communications systems at Barangaroo South is to provide a co-ordinated precinct infrastructure that provides:

- An open access telecommunications network infrastructure to facilitate provision of telecommunications services (voice and data) for essential building services and future tenancy requirements.
- An integrated Communications Network (ICN) consisting of a common IP based communications backbone for Building Control Systems within buildings and across the precinct.

This communications infrastructure is envisaged to be an enabler for connectivity and accessibility, community communication, and utilities monitoring. The design is based upon a fibre based network for speed and performance with a wireless overlay to support mobility and convenience where required.

Lend Lease will co-ordinate the location of new 'Carrier Neutral' access pits on Hickson Road and pathways within the development to central Campus Distribution Rooms and then extend access to the site and various individual buildings in the precinct. Lend Lease will provide by way of 'Pits & Pipes' or cable pathways into the site on pre-defined and coordinated routes. The co-ordination of the infrastructure design from day one will extend long term flexibility and provide the ability to cater for all potential tenants, residents and visitors in the delivery into Barangaroo any Telecommunication Services from any Carrier or Service Provider.

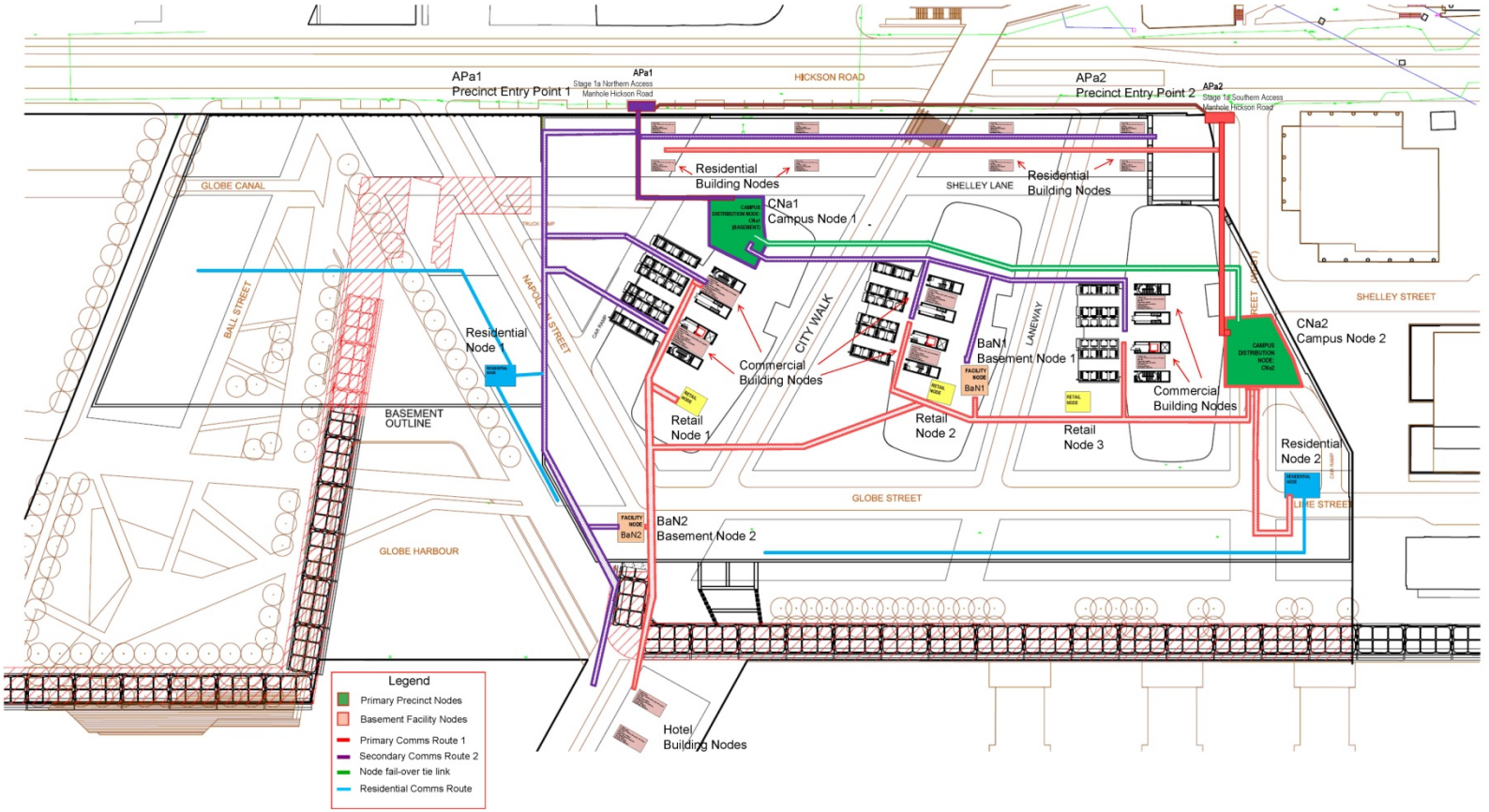
Pathways from existing city exchanges may need to be upgraded to support the onsite demands. It is currently envisaged that the Kent Street Exchange and Daley Street Exchange be the two key diverse locations to service the precinct.

The ICN will provide a common platform for the interconnection and management of a number of information and base/tenant building services, to provide a fully integrated communications facility throughout the precinct. The ICN will utilise optical fibre technology so as to support "day-one" systems as well as future proofing the site.

Typical services delivered across each of these infrastructure types include:

- Telecommunications Network – allowance for high speed fibre based telecommunications services for delivery of broadband, telephony, tenant specific data services..

- Integrated Communications Network – allowance for a high speed communications network for delivery of centralised services such as FTA TV, Foxtel and Satellite Services and for the management and control of systems such as BMS, CCTV, Intercom, Access control, energy monitoring, PA, Car park management, etc.



Lend Lease

GRAHAM W JONES
Principal Architect
FRAIA NSW ARB 4005

BARANGAROO SOUTH
STAGE 1

LEND LEASE INTEGRATED
COMMUNICATIONS NETWORK (ICN)
PATHWAYS AND SPACES

Scale 1:500 @ B1 1:1250 @ A3
0 25 50M

Drawing No. TDC_014
Date 11 July 2011 Revision 01

8. Gas Services

8.1. Existing Natural gas Services

Based on existing survey data and information from Jemena, there is an existing gas supply at the intersection of Napoleon St and Hickson Road and also at the end of Lime St near the south-west corner of the site.

8.2. Proposed Natural gas Services

Jemena has indicated that the existing gas network is insufficient to supply the capacity required for Barangaroo and significant augmentation works will be required to the existing gas network and at the Redfern pressure station.

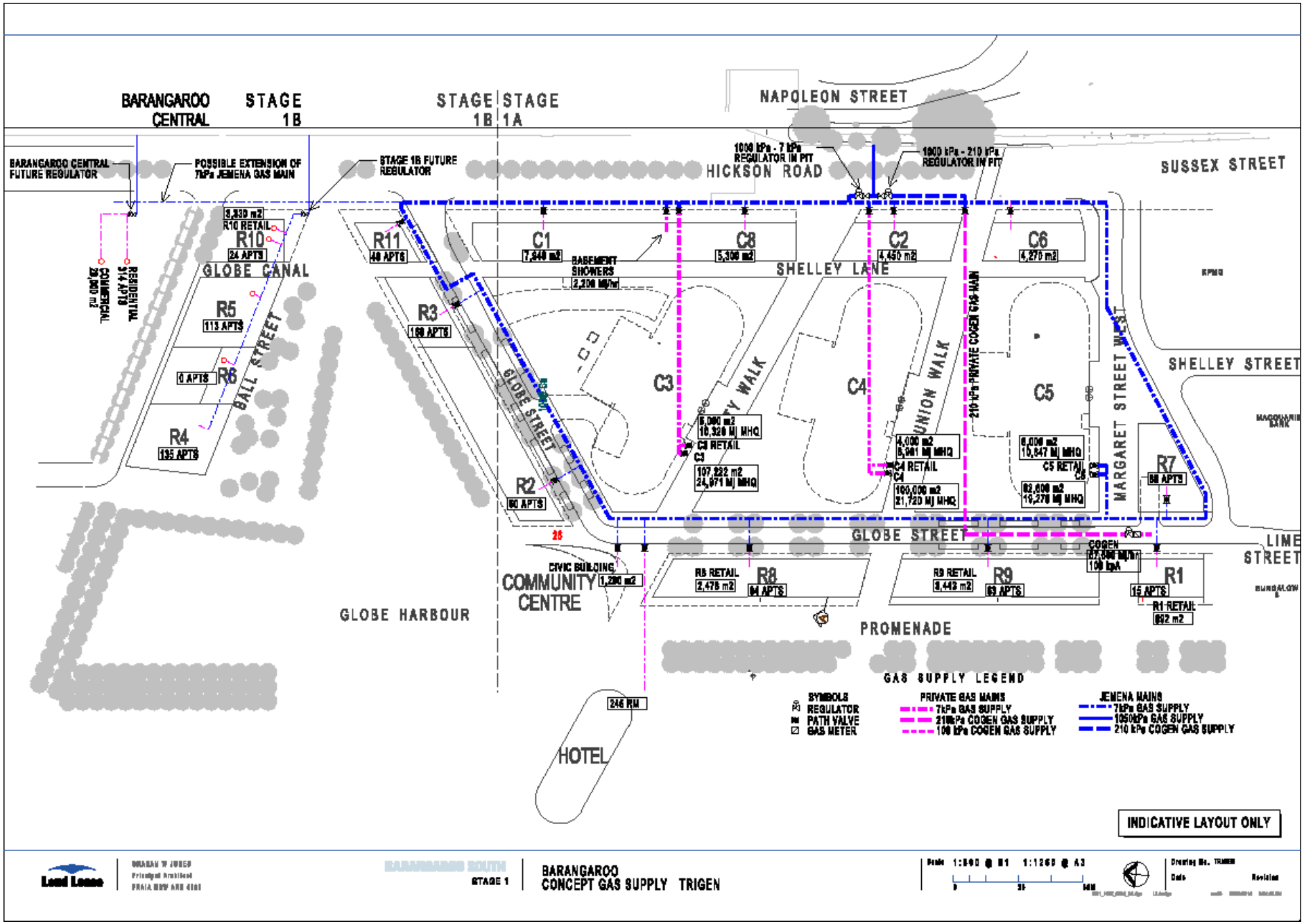
Jemena will provide metering equipment while Barangaroo South will be required to provide a gas room, pay connection fees and fund gas reticulation network within the site including required regulators.

The supply strategy for natural gas supply to Barangaroo South is dependent on natural gas demand and possible implementation of onsite power generation. Provision of Cogeneneration will significantly increase the demand for the gas supply required to the site and will determine the optimum gas pressure and metering strategy employed on the site.

The proposed strategy to secure supply a natural gas at Barangaroo South is to extend the existing 1050 kPa main across Hickson Road to a boundary regulator in the footpath area. It is propose to construct a 7 kPa looped main from the regulator in Hickson Road, Margaret Street West and Globe Street to provide connection for each customer.

Lend Lease is currently undertaking studies for the provision of Cogeneration Plant at Barangaroo.

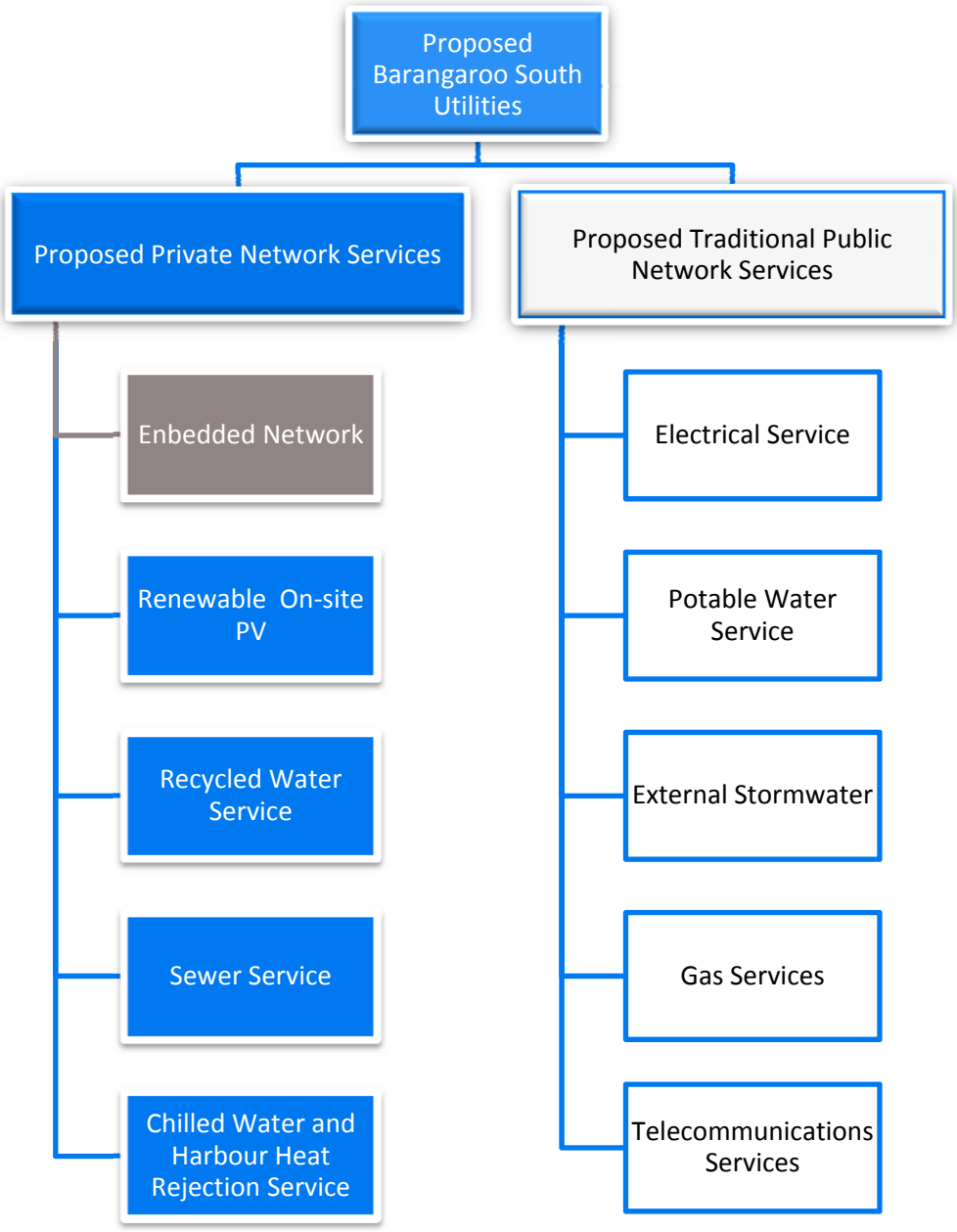
.


BARANGAROO CENTRAL
STAGE 1B
STAGE 1B
STAGE 1A
NAPOLEON STREET
BARANGAROO CENTRAL FUTURE REGULATOR
POSSIBLE EXTENSION OF 7kPa JEMENA GAS MAIN
STAGE 1B FUTURE REGULATOR
1008 kPa - 7 kPa REGULATOR IN PIT
1900 kPa - 210 kPa REGULATOR IN PIT
HICKSON ROAD
SUSSEX STREET
R10
24 APTS
R10 RETAIL
GLOBE CANAL
R11
48 APTS
C1
7,848 m2
BASEMENT SHOWERS
2,200 MJ/hr
C8
5,306 m2
C2
4,450 m2
C6
4,270 m2
SHELLEY LANE
R5
113 APTS
R3
168 APTS
R6
0 APTS
BALL STREET
GLOBE STREET
C3
C4
C5
UNION WALK
210 kPa PRIVATE COGEN GAS MAIN
MARGARET STREET WEST
SHELLEY STREET
R4
195 APTS
5,090 m2
10,328 MJ MHQ
C3 RETAIL
107,222 m2
24,971 MJ MHQ
4,000 m2
8,961 MJ MHQ
C4 RETAIL
100,000 m2
21,720 MJ MHQ
6,000 m2
10,647 MJ MHQ
C5 RETAIL
82,000 m2
19,270 MJ MHQ
R7
58 APTS
R2
60 APTS
GLOBE STREET
LIME STREET
COGEN
100 kpA
CIVIC BUILDING
COMMUNITY CENTRE
1,250 m2
R8 RETAIL
2,475 m2
R8
84 APTS
R9 RETAIL
8,443 m2
R9
69 APTS
R1
15 APTS
R1 RETAIL
652 m2
GLOBE HARBOUR
PROMENADE
246 RM
HOTEL
GAS SUPPLY LEGEND
SYMBOLS
REGULATOR
PATH VALVE
GAS METER
PRIVATE GAS MAINS
7kPa GAS SUPPLY
210kPa COGEN GAS SUPPLY
100 kPa COGEN GAS SUPPLY
JEMENA MAINS
7kPa GAS SUPPLY
1050kPa GAS SUPPLY
210 kPa COGEN GAS SUPPLY
INDICATIVE LAYOUT ONLY
Lend Lease
STAGE 1
BARANGAROO
CONCEPT GAS SUPPLY TRIGEN

09.SERVICES OPERATIONAL MANAGEMENT

The future operation of utilities at Barangaroo will be through a combination of a traditional public utility service and a private network service. The Barangaroo Management Plan, Building Management Statements, Leases, Easements and Licences will be the core governance arrangements adopted by key stakeholders for the ongoing management and operation of Barangaroo South.

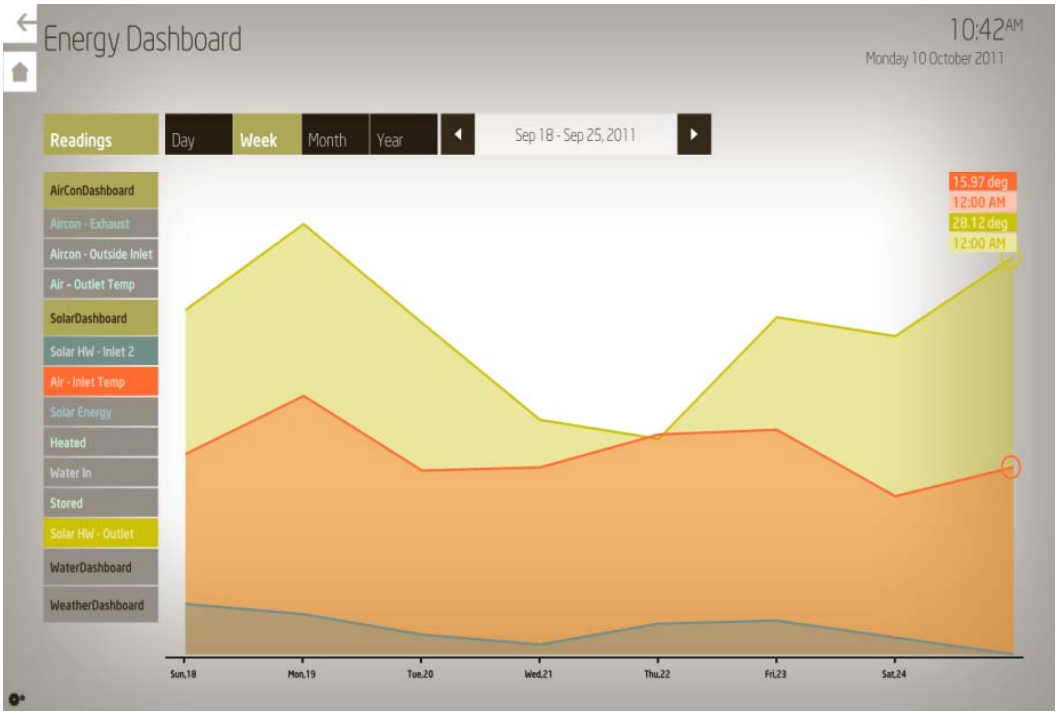
Below is a high-level diagram showing the utilities likely to be private versus traditional public at Barangaroo South:

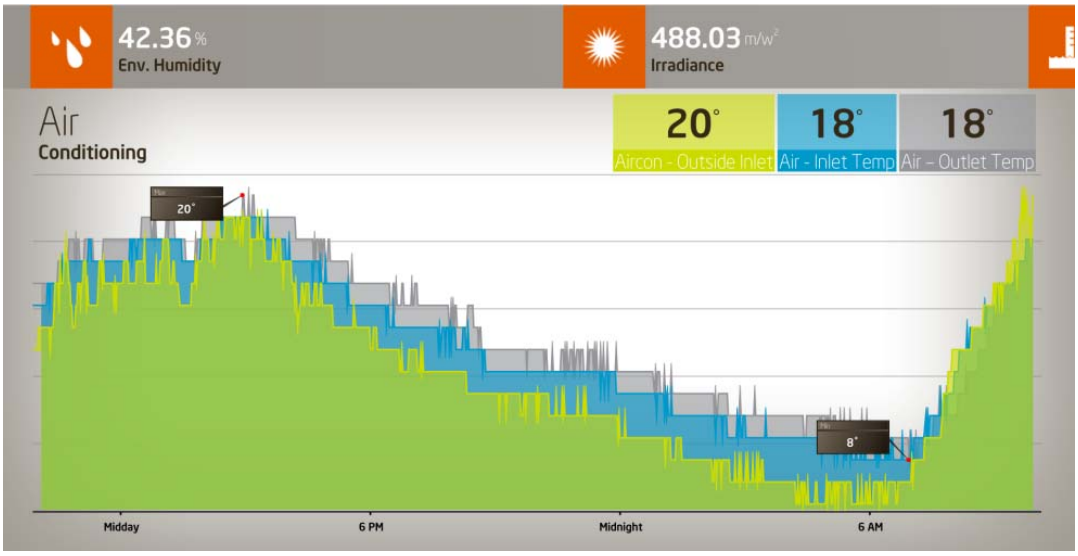


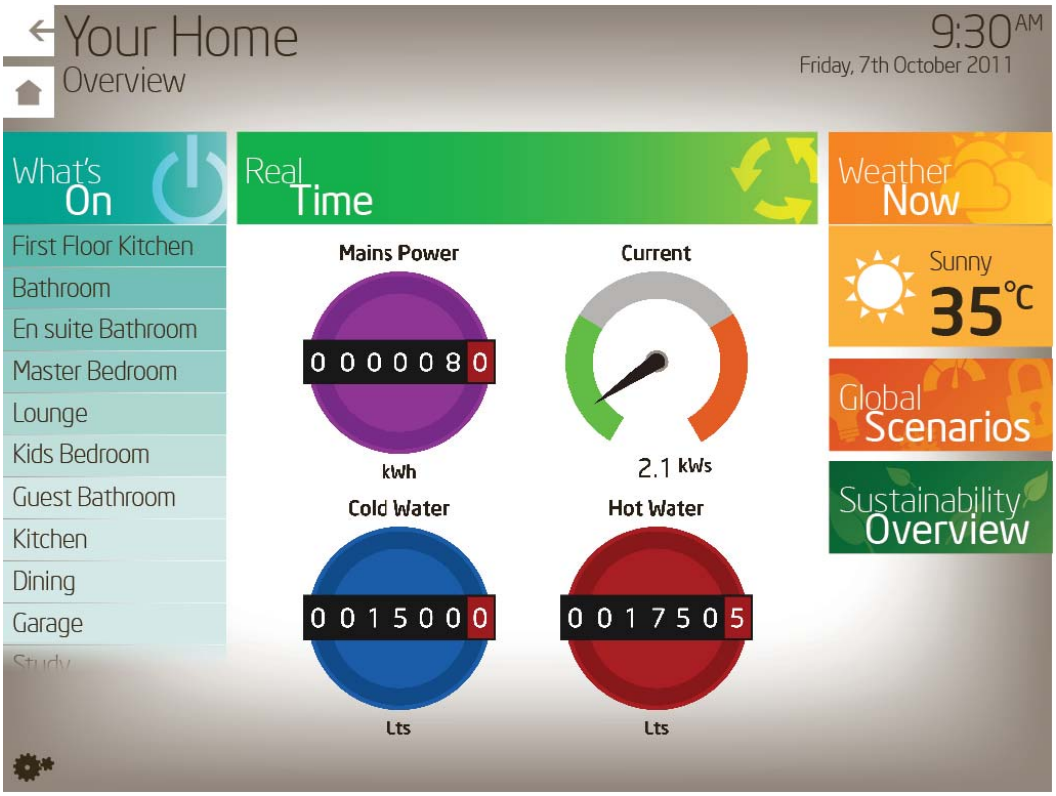
The principles for ownership and management are subject of on-going discussion and agreement with relevant parties.

10. RESOURCE CONSUMPTION REPORTING

- Barangaroo aims to provide a range of energy monitoring solutions implemented for a range of environments such as commercial, retail and residential.
- These solutions will provide real time reporting and trend analysis of energy, water and other renewable energy sources.
- Information from energy monitoring systems are capable of being displayed on various forms of digital signage, lift cars, in home displays and web browsers using mobile devices.
- Examples of how information obtained via proposed monitoring could be displayed are shown below






Your Home
Overview
9:30 AM
Friday, 7th October 2011
What's On
First Floor Kitchen
Bathroom
En suite Bathroom
Master Bedroom
Lounge
Kids Bedroom
Guest Bathroom
Kitchen
Dining
Garage
Real Time
Mains Power
0 0 0 0 0 8 0
kWh
Current
2.1 kWs
Cold Water
0 0 1 5 0 0 0
Lts
Hot Water
0 0 1 7 5 0 5
Lts
Weather Now
Sunny
35°C
Global Scenarios
Sustainability Overview