



EDEN ST, SITE REDEVELOPMENT
HYDRAULIC & ELECTRICAL SERVICES ENGINEERING
INFRASTRUCTURE MANAGEMENT PLAN

STATE SIGNIFICANT
DEVELOPMENT APPLICATION
(SSD) No. 11429726

DOCUMENT CONTROL SHEET

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Project	Eden St Redevelopment
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Key Contact	Diego Montelvere

Prepared By

Company	JHA
Address	Level 23, 101 Miller Street, North Sydney NSW 2060
Phone	61-2-9437 1000
Email	diego.montelvere@jhaengineers.com.au
Website	www.jhaservices.com
Author	Diego Montelvere/ Kosma Tzannes
Checked	Patrick Ilagan
Authorised	Diego Montelvere

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1. EXECUTIVE SUMMARY

The redevelopment of the existing site at 26 – 42 Eden St & 161-179 Princes Hwy, Arncliffe has been identified as a State Significant Development. This report has been prepared in accordance with the requirements as outlined in the Secretary's Environmental Assessment Requirements (SEARs) from the Department of Planning and Environment (application no. SSD-11429726), dated 18th December, 2020.

This report has been prepared by JHA Consulting Engineers to identify and summarise the proposed utility infrastructure requirements which will be incorporated into the design of the proposed Eden St Redevelopment.

This report demonstrates that the existing authority's infrastructure have adequate capacity to support the proposed redevelopment. This report should be read in conjunction with the Architectural design drawings and other consultant design reports submitted as part of the application.

2. INTRODUCTION

2.1 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEARs)

This Infrastructure Management Report is submitted to the Department of Planning, Industry and Environment (DPIE) in support of a State Significant Development Application (SSDA-11429726) for the development of land identified at 26-42 Eden Street and 161-179 Princes Highway, Arncliffe (the site) for the purposes of a mixed-use precinct with open space, retail, and residential uses, comprising social and market housing as part of the NSW Land and Housing Corporation (LAHC)'s 'Communities Plus' program.

SSDA-11429726 seeks approval for the following development:

- Demolition of all existing buildings and structures on the site;
- Site preparation works, excavation and tree removal;
- The construction of a mixed-use development comprising:
 - 744 apartments across (4) buildings between 19-23 storeys in height, as follows:
 - 186 market housing apartments in Building A;
 - 202 market housing apartments in Building B;
 - 180 social housing apartments in Building C; and
 - 176 market housing apartments in Building D;
 - 3,113m² retail gross floor area;
 - 240m² for a future childcare centre;
 - 3,706m² of communal open space;
 - 813 spaces of lower ground and basement car parking; and
- 4,870m² of publicly accessible open space including a 4,000m² park, an 870m² public plaza (meeting space), and through site link connecting Eden Street and the Princes Highway.



Site Plan

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) for SSDA-11429726 were issued on 18 December, 2020. This report has been prepared to respond to the following SEARs:

SEARs ITEM	COMMENT / REFERENCE
Item 24 – Utilities	<p>The EIS shall:</p> <ul style="list-style-type: none">▪ Identify and address the existing capacity to service the proposed development any augmentation requirements for utilities in consultation with relevant agencies.▪ Identify any potential impacts of the proposed construction and operation on existing utility infrastructure and demonstrate how these assets will be protected, or impacts mitigated.

SEARs Utility Requirements

This report summarises the existing utility infrastructure that will be affected by the proposed development works specifically addressing the following key elements:

- 1. The location of existing major Hydraulic and Electrical infrastructure surrounding the site;
- 2. The suitability and compliance of such identified services infrastructure to support the development; and
- 3. The key service infrastructure works required to supply the proposed development.

All analysis undertaken has been done so with an understanding that a high level of seamless integration with the development is achieved.

Information on existing infrastructure as detailed within this report has been obtained from Dial-Before-You-Dig (DBYD), Ausgrid GIS, site investigations, provided survey documents and discussions with utility companies, which include:

- Water Authority – Sydney Water
- Gas Authority - Jemena
- Electrical Authority – Ausgrid

Any potential works on existing authority infrastructure services is subject to negotiation and approvals by each affected authority. Liaison with each authority will be undertaken as part of the detailed design phase works for the site.

3. EXISTING INFRASTRUCTURE

3.1 HYDRAULIC INFRASTRUCTURE

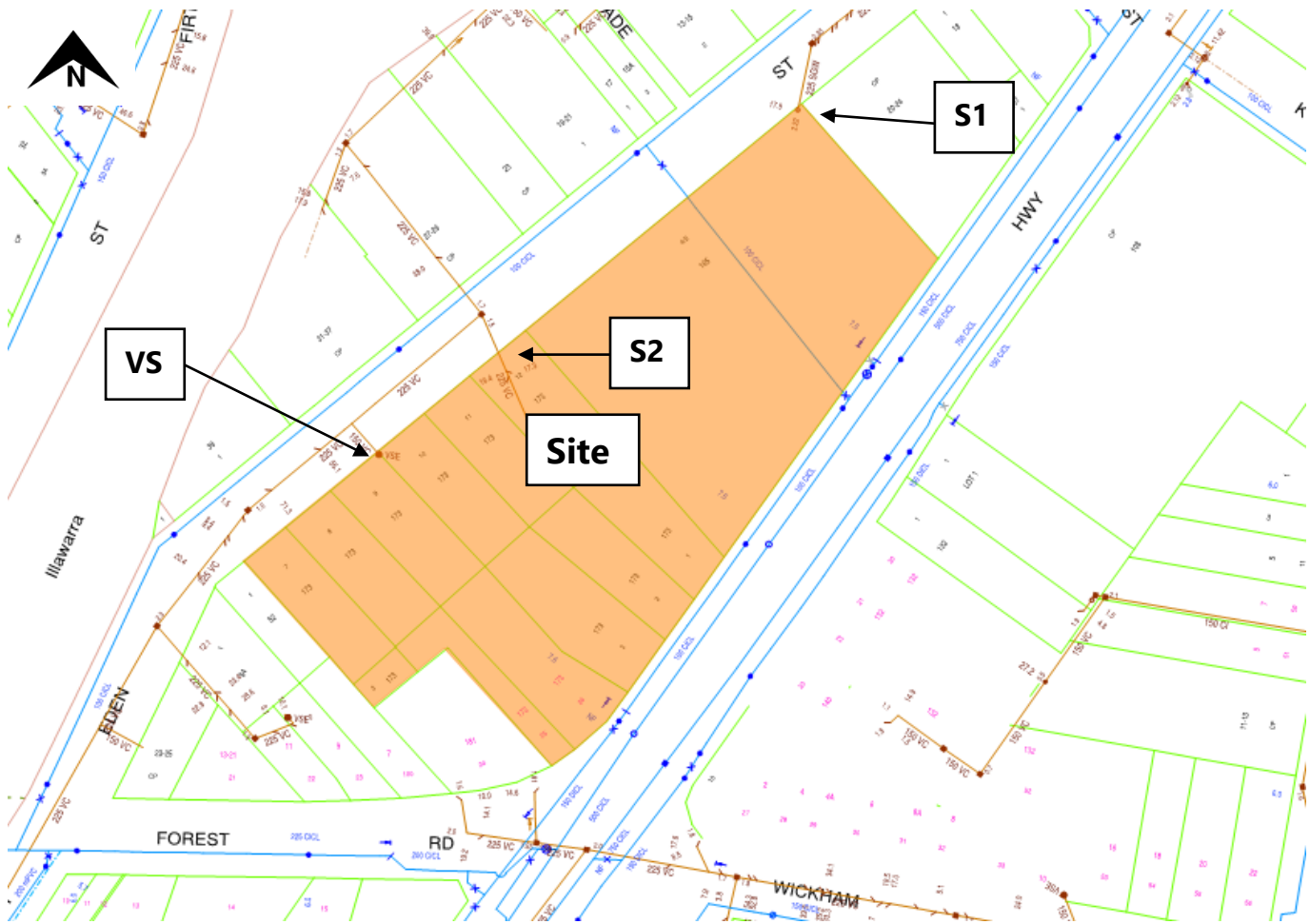
3.1.1 SEWER DRAINAGE

The existing Eden St site is gravity drained by 2 x Ø225mm authority sewer mains, extending through Eden St, as per the following:

- Ø225mm connection point in the northern corner of the site (S1)
- Ø225mm connection point half way along the Eden St boundary (S2)

It is also noted that there is an existing authority vent shaft (VS) located within the site boundaries

Diagram 3.1.1 below, illustrates the surrounding authority sewer mains.



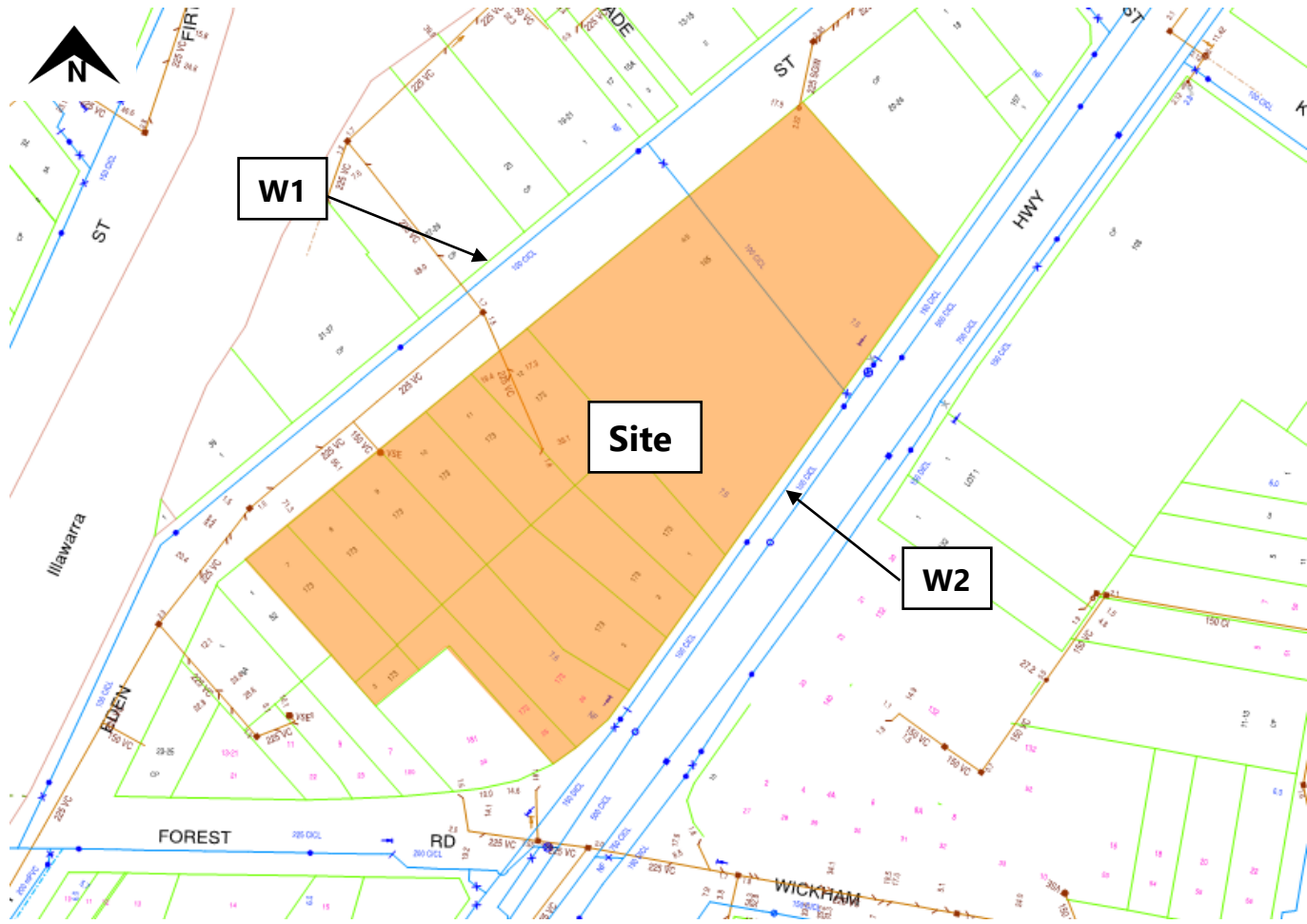
3.1.2 POTABLE WATER

The existing Eden St site has frontage to the following authority water mains:

- Ø100mm CICL main in Eden St (W1)
- Ø100mm/ Ø150mm CICL main in Princes Hwy (W2)

The pressure test results for each of the Princes Hwy water main can be found in the appendices of this report.

Diagram 2.1.2 below, illustrates the surrounding authority water mains.

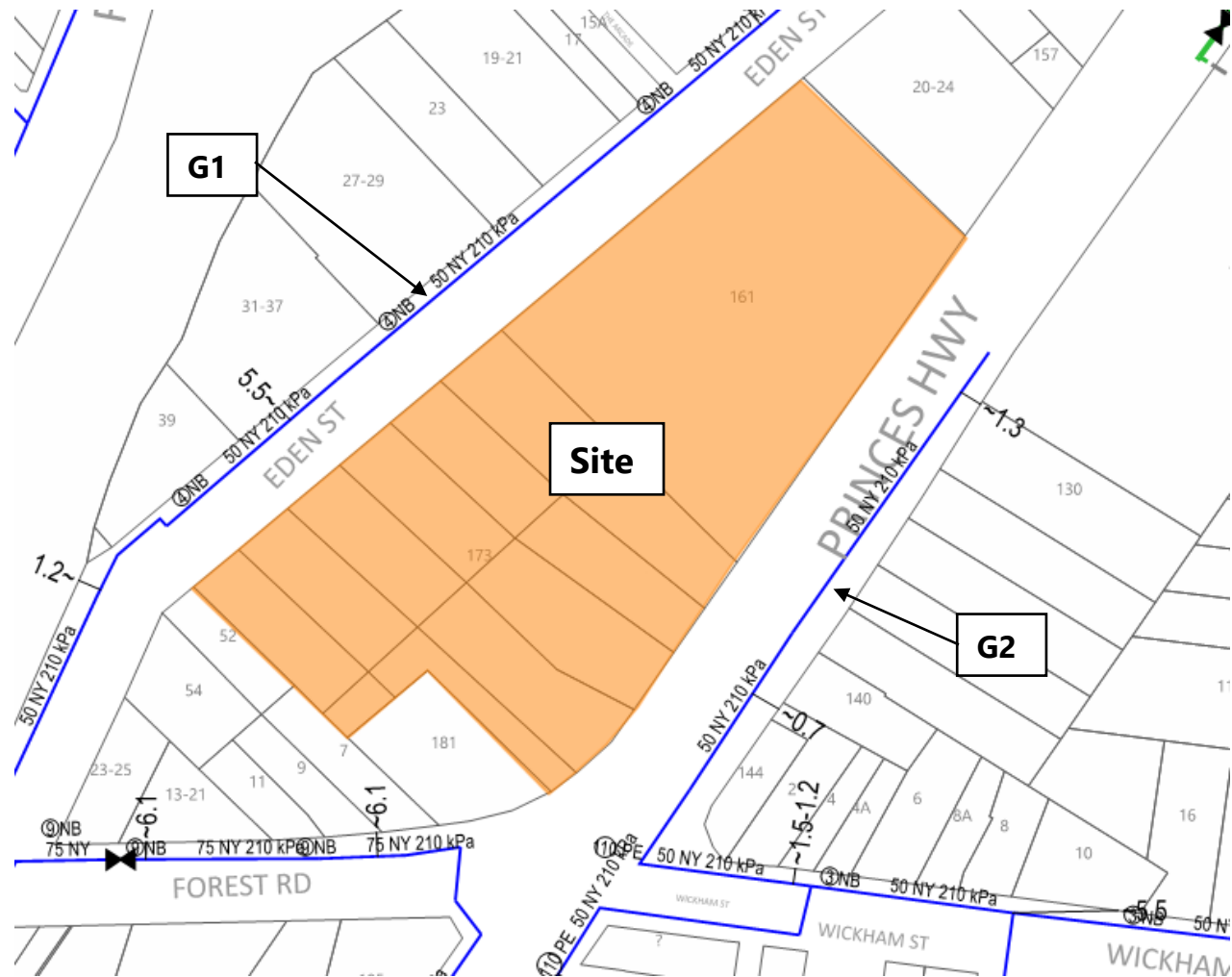


3.1.3 GAS SERVICES

The existing Eden St site has frontage to the following authority natural gas mains:

- Ø50mm Nylon, 210kPa main in Eden St (G1)
- Ø50mm Nylon, 210kPa main in Princes Hwy (G2)

Diagram 3.1.3 illustrates the location of the gas connection point.



3.2 ELECTRICAL INFRASTRUCTURE

3.2.1 LOW VOLTAGE INFRASTRUCTURE

The proposed Eden Street development site is currently occupied by multiple smaller lots consisting of existing apartment buildings, single residencies, and commercial buildings.

These separated lots are currently supplied individually from the existing Ausgrid low voltage distribution street network via underground and overhead connections as below.

Existing low voltage Ausgrid assets reticulate around the perimeter of the site, outside of the development boundary within public footpath and roadways.

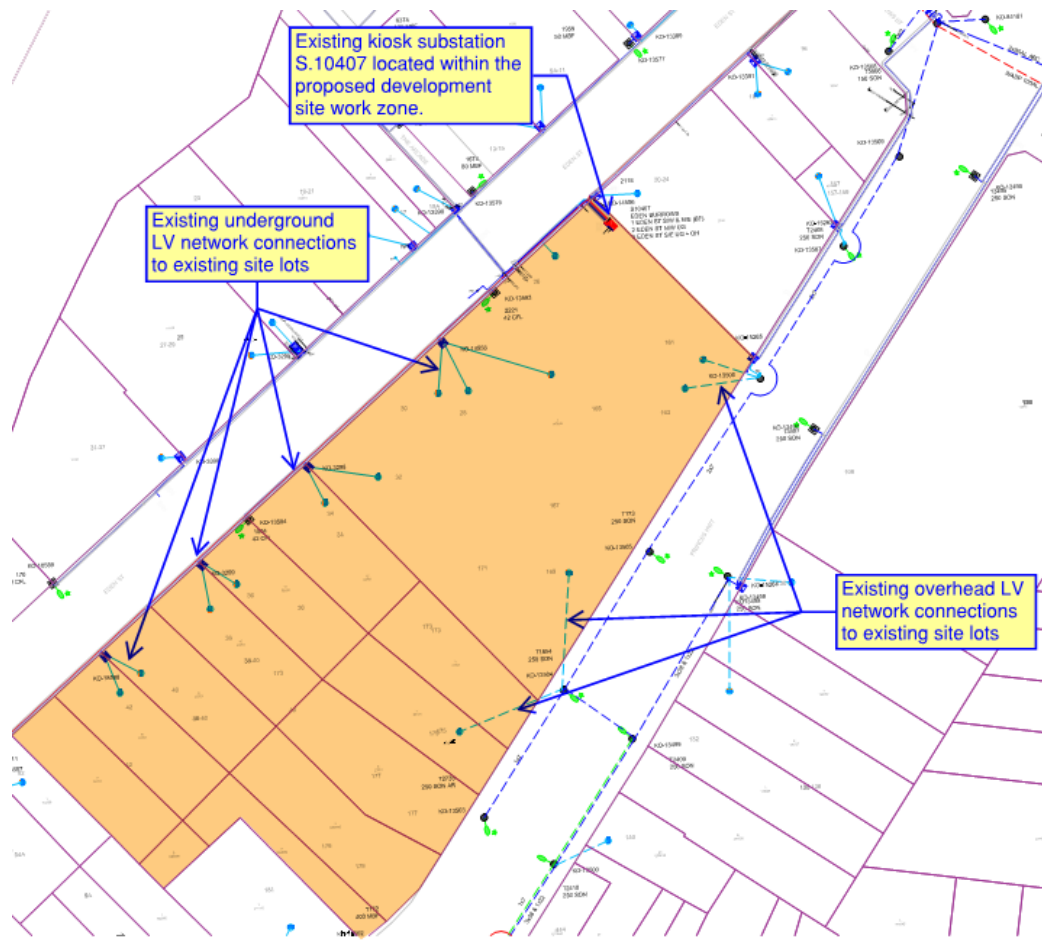
3.2.2 HIGH VOLTAGE INFRASTRUCTURE

Existing high voltage Ausgrid assets reticulate below ground along the Eden Street frontage of the site, outside of the development boundary within public footpath.

The existing site is also encumbered by an existing Ausgrid kiosk substation (S.10407 Eden Burrows) located at the northern most corner of the site along the Eden Street frontage.

The existing kiosk substation is understood to currently supply existing properties and street lighting along Eden Street.

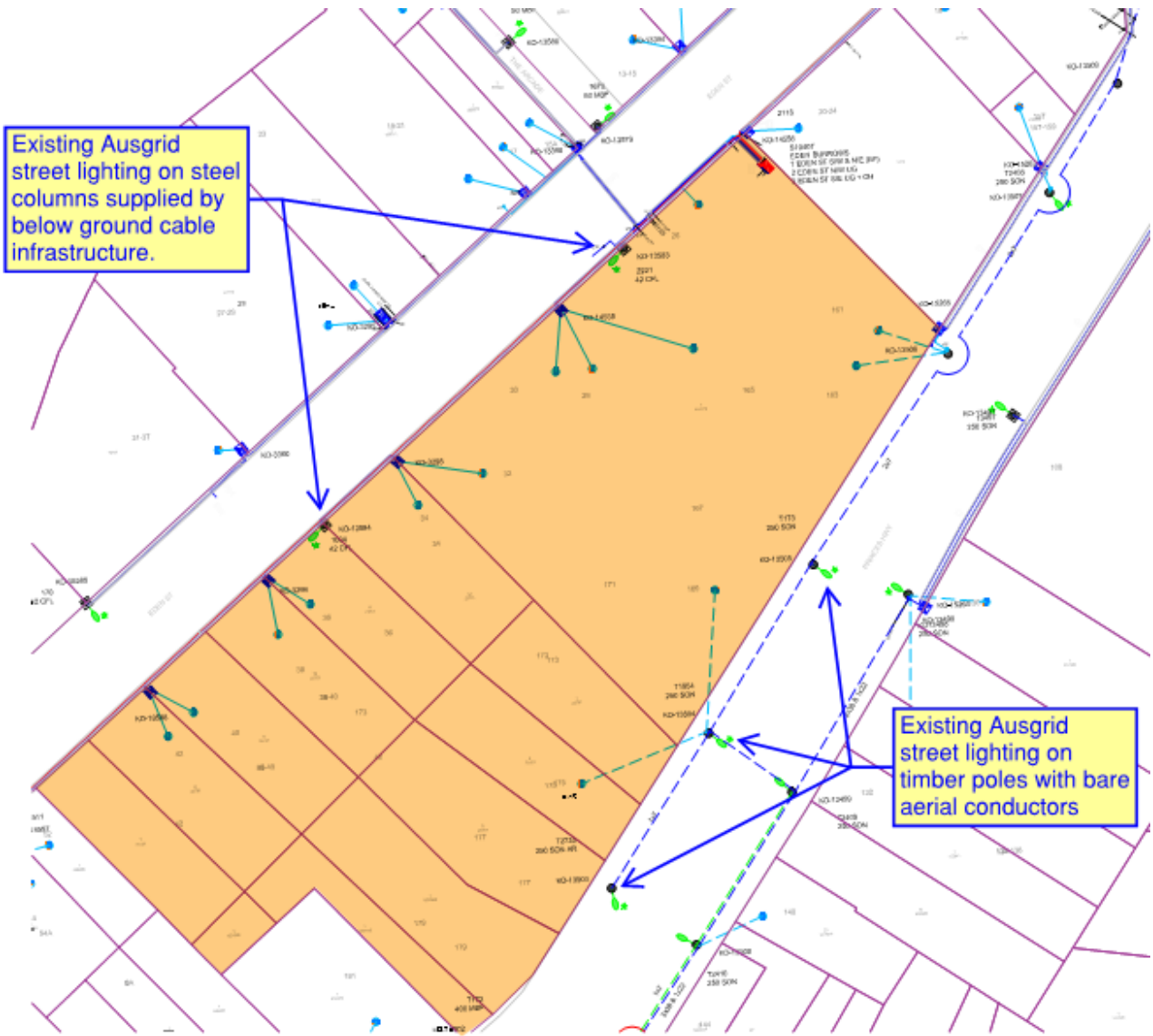
As part of the proposed redevelopment works, existing substation S.10407 will be decommissioned and removed from site.



Existing Ausgrid HV / LV Infrastructure (Ausgrid GIS Extract 05/11/2020)

3.2.3 STREET LIGHTING & OVERHEAD INFRASTRUCTURE

Existing Ausgrid street lighting assets currently provide illuminance to the area surrounding the development site. These includes steel lighting columns along Eden street supplied by underground cables; and street lighting attached to timber poles along Princes Highway supplied by existing overhead aerial cables.



Existing Ausgrid Street Lighting Infrastructure (Ausgrid GIS Extract 05/11/2020)

4. PROPOSED INFRASTRUCTURE SERVICES

4.1 HYDRAULIC INFRASTRUCTURE

4.1.1 SEWER DRAINAGE

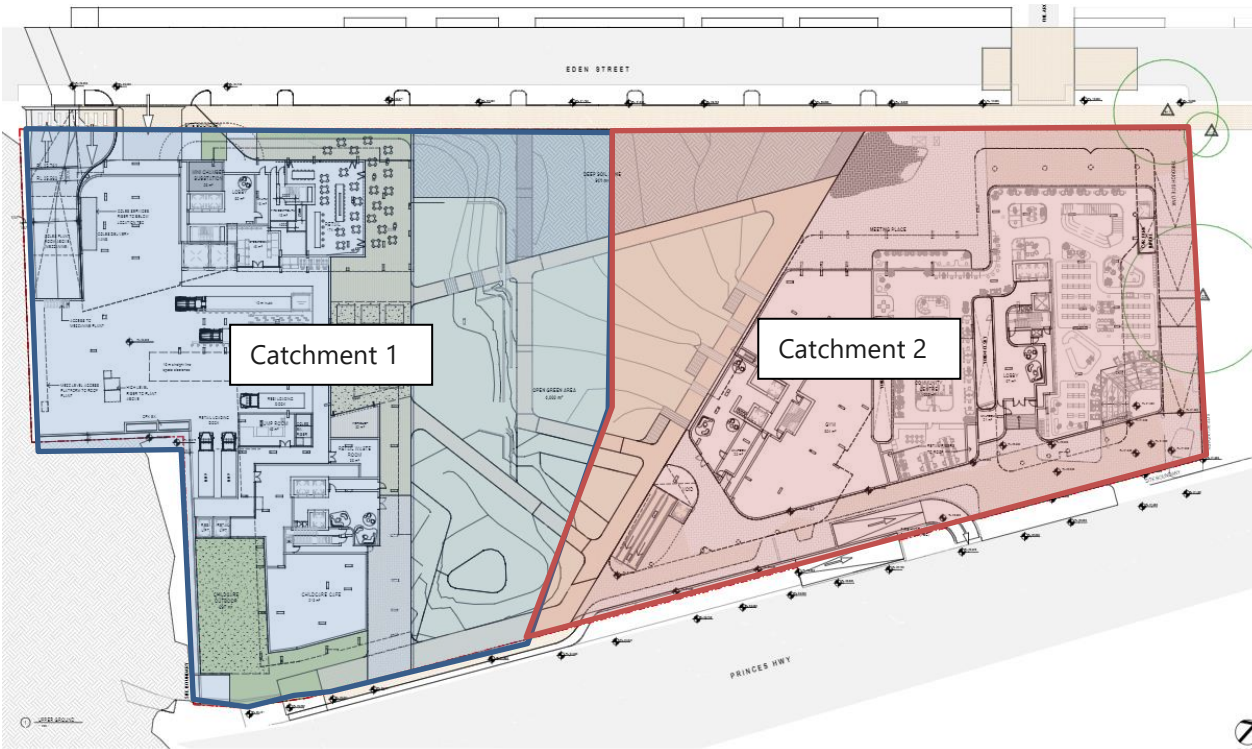
4.1.1.1 Connection Point

Sewer drainage for the mixed-use development will utilise the existing 2 x Ø225mm connections to authority sewer mains. No additional connections to authority lines will be required.

- o 744 apartments across (4) buildings between 17-21 storeys in height (not including upper and lower ground levels), including:
 - 186 market housing apartments in Building A;
 - 202 market housing apartments in Building B;
 - 180 social housing apartments in Building C; and
 - 176 market housing apartments in Building D;
- o 3,353m² gross floor area of retail premises;
- o 3,727m² of communal open space;
- o 797 spaces of lower ground and basement car parking; and

It is estimated that the development will be split into 2 x catchments as per the following:

- Catchment 1:
 - Residential Buildings C & D
 - Retail space of 759m²
- Catchment 2:
 - Residential Buildings A & B
 - Retail space of 2.594m²



Load Estimation

A preliminary load analysis has been undertaken and the following sewer discharges have been calculated:

Catchment	Calculated EP's Residential	Calculated EP's Retail / Commercial	Sub – Total EP's
Catchment 1	706	63	769
Catchment 2	1,037	291	1,328
Total			2,097

4.1.1.2 Adequacy of Authorities Infrastructure

Sydney Water As- Built documentation indicates that the connection points are installed at the following grades:

- Catchment 1 – Ø225 laid at 1 in 60 or 1.67%
- Catchment 2 – Ø225 laid at 1 in 30 or 3.33%
- Line where Catchment 1 & 2 connect together - Ø225 laid at 1 in 60 or 1.67%

Based on the above load estimates, and in accordance with Water Supply Code of Australia (WSA 02), Sydney Water Edition, the existing Ø225 connection point is adequate to serve the development. Refer to below extract

DN 225	1 in 270	0.37%	1,600
	1 in 250	0.40%	1,700
	1 in 200	0.50%	1,950
	1 in 150	0.67%	2,350
	1 in 125	0.80%	2,650
	1 in 100	1.00%	3,025
	1 in 80	1.25%	3,450
	1 in 60	1.67%	4,100

4.1.2 WATER SUPPLY

4.1.2.1 Connection Points

Potable water is proposed to be provided from the Sydney Water potable watermain in Princes Hwy

The need for amplification will be confirmed with Sydney Water via the Section 73 application, subsequent to receiving development approval

4.1.3 LOAD ESTIMATION – POTABLE WATER

A preliminary cold water usage analysis has been undertaken and the following estimated loads have been calculated:

- Average daily demand – 336kL
- Average flow – 3.89 l/s
- Peal flow – 19.45 l/s

4.1.4 ADEQUACY OF AUTHORITIES INFRASTRUCTURE

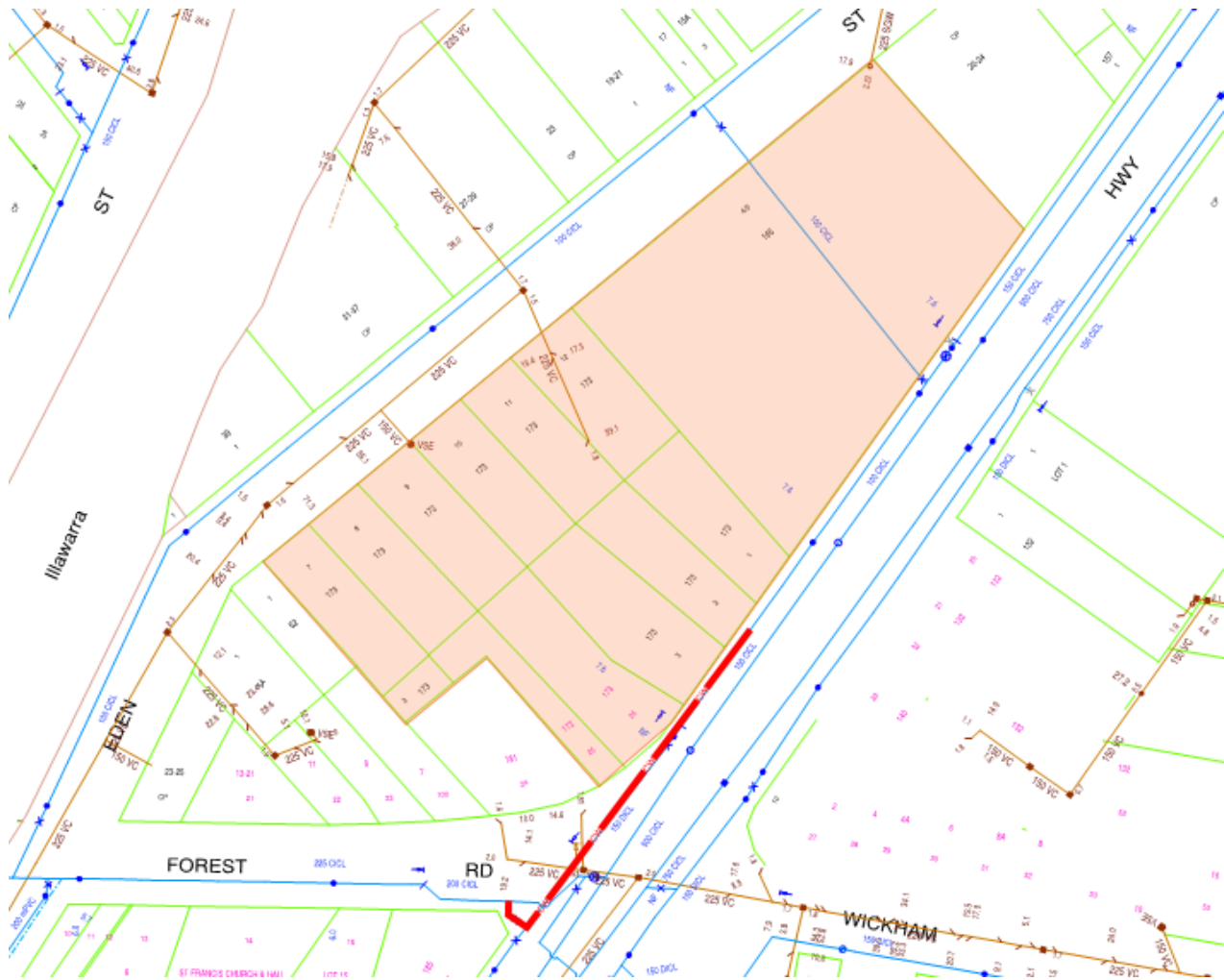
Results obtained from Sydney Water regarding water main flow and pressured can be found in the appendices section of this report. Data for flow rates provided appear sufficient to serve the water demands for the proposed development.

Pressure boosting pumps will be provided to boost low towns mains pressures and ensure adequate pressure are received at the upper most floors of the proposed residential towers.

In accordance with the Water Supply Code of Australia (WSA 03), Sydney Water Edition, it is may be necessary to amplify the existing Ø150mm watermain in Princes Hwy to Ø200mm, in order to cater for the potable water demands of the development. Refer to extract below

Multiple developments of high density residential (≥ 8 storeys)	200 or 225 ⁽²⁾ If a 100 or 150 mm main currently fronts a proposed development and the hydraulic capacity is sufficient to serve the property's domestic future demand, then the existing main will be deemed acceptable until the main requires renewal. The developer might upgrade the existing pipe size for other reasons – this is subject to Water Agency agreement.	250 or 280 ⁽²⁾ If a 125 or 180 mm main currently fronts a proposed development and the hydraulic capacity is sufficient to serve the property's domestic future demand, then the existing main will be deemed acceptable until the main requires renewal. The developer might upgrade the existing pipe size for other reasons – this is subject to Water Agency agreement.
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The extent of the amplification (if required) is envisaged to be extended from the existing 200mm watermain at the intersection of Forest Rd & Eden St. Refer to snapshot below.



4.1.5 GAS SUPPLY

4.1.5.1 Connection Points

Natural gas to the development is proposed to be provided from the existing Ø50mm Nylon, 210kPa main in Princes Hwy

The gas main shall directly supply gas to the following:

- Gas Meter for Residential Building A
- Gas Meter for Residential Building B
- Gas Meter for Residential Building C
- Gas Meter for Residential Building D
- Boundary regulator for retail commercial amplifications

4.1.5.2 Load Estimation

A preliminary gas load analysis has been undertaken and the following estimated usages have been calculated:

- Building A – 143m³/hr
- Building B – 98m³/hr
- Building C – 112m³/hr
- Building D – 137m³/hr
- Retail/ Commercia – 221m³/hr

The total diversified peak gas load is estimated to be 402m³/hr

4.1.6 ADEQUACY OF AUTHORITIES INFRASTRUCTURE

Preliminary discussions with Jemena have confirmed that the surrounding gas mains in both Princes Hwy & Eden St are adequate to meet the gas demands of the development.

It is noted that a 50mm, 210kPa nylon gas supply line is capable of supplying in the order of 2,000m³/hr. This is based on a dead-end line, extending in the order of 150m

4.2 ELECTRICAL INFRASTRUCTURE

4.2.1 ELECTRICAL DEMAND LOADINGS

A site-specific maximum demand was calculated (by others) to determine the anticipated demand for the proposed development. From this it was determined the optimum demand for the site is anticipated to be approximately 4.3MVA.

The development will operate as an LV customer, with 400V connections being made from newly proposed Ausgrid substations located within the building footprint.

Furthermore, the LV electrical loads from the existing kiosk substation currently on site will need to be transferred to the new Ausgrid infrastructure should Ausgrid not be able to transfer these loads to their surrounding network.

On the strength of the above, the constraints set by Ausgrid regarding their chamber substation firm ratings, and consideration towards futureproofing the installation, the following authority electrical infrastructure will be required for the Eden Street development:

Eden Street Development	Approx. Amp Rating	Approx. Firm KVA Rating
Ausgrid 3 TX Custom Chamber	5500A Firm	3.8MVA
Ausgrid 1 TX Standard Chamber	1450A Firm	1.0MVA
Total Capacity	6950A Firm	4.8MVA
Required Capacity		~4.3MVA
Existing Ausgrid Network Street Supplies		~0.5kVA
Spare Capacity		~0.0MVA

These substations are standard fixed sizes from Ausgrid and are the only available in discrete step sizes. These discrete step sizes are quite large, which yields the spare capacity noted above.

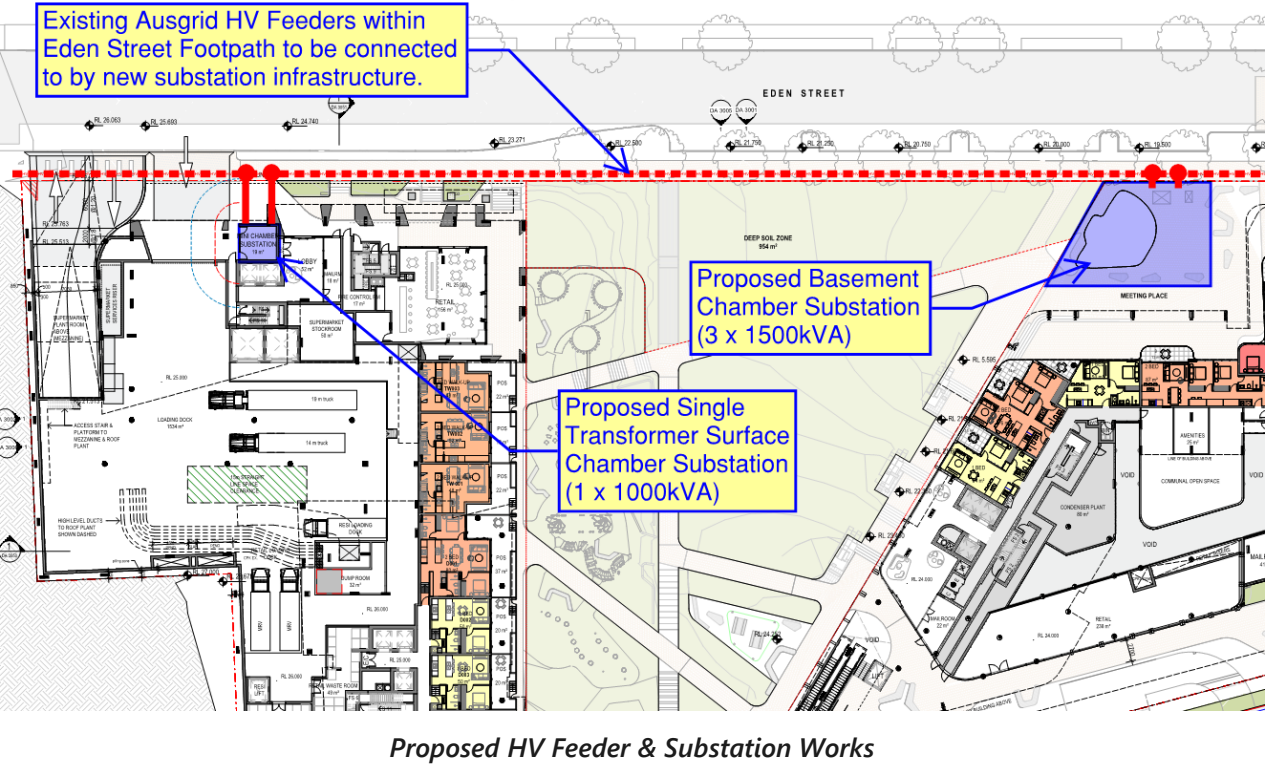
The buildings power distribution system can be summarised as follows:

- One (1) Ausgrid basement chamber at the northern corner of the site below the ‘meeting place’ plaza
- One (1) Ausgrid surface single transformer chamber substation at the north-west corner of the site
- Each substation shall be firm rated in accordance with NS109 with a rating of 5500A and 1450A
- Connected LV Main Switchboards to service the building will be documented by others.

4.2.2 HV FEEDER CONNECTIONS & RETICULATION

To provide electrical supply connections to the Eden Street development, it is proposed the existing Ausgrid high voltage feeders located within the Eden Street footpath will be utilised to connect the new Ausgrid basement and surface chamber substations proposed along the Eden Street frontage of the site. this arrangement is subject to suitable spare capacity in the existing HV feeder and Ausgrid design acceptance.

High voltage joints will be installed within the Eden Street footpath to the existing high voltage feeders and new cabling installed underground to the new substation infrastructure.



A formal application will be required for submission to Ausgrid to determine the available capacity in the existing HV network and to confirm viability of the proposed substation infrastructure for the development site.

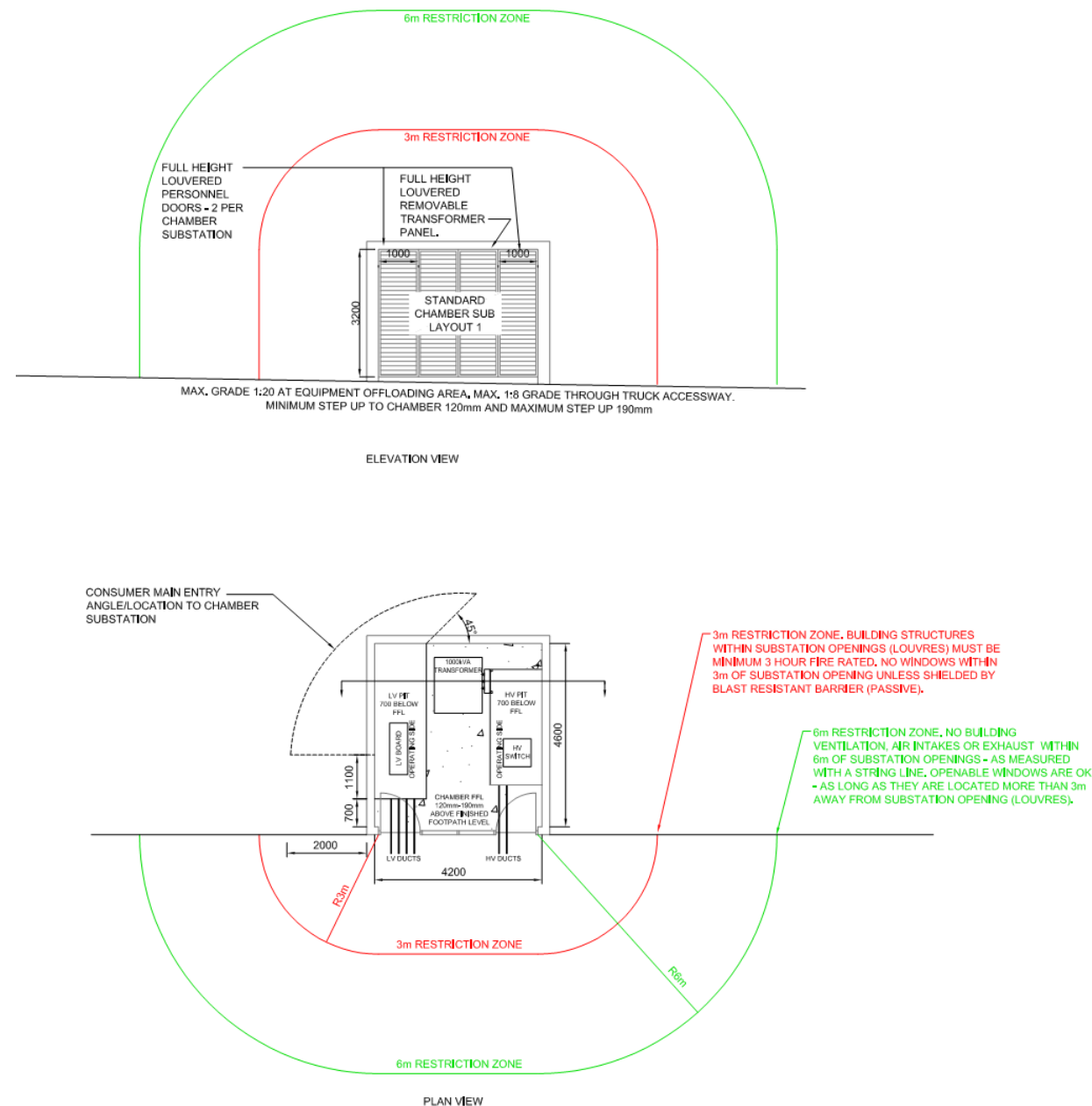
4.2.3 AUSGRID SUBSTATION ARRANGEMENTS

The design team has considered a number of options for substation location and have developed a basement and surface chamber substation option at the corner of High Street and Hospital Road.

The following are general spatial requirements/principles adopted for the proposed basement and surface chamber substations:

- Surface Chamber Substation (1 x 1000kVA Transformer)**
 - Chamber room (19m²) to be established at Ground Level in the north-west corner of the site
 - All substation structural and architectural elements will require a fire rating of minimum FRL 180/180/180 and a blast rating of 2kPa
 - A transformer handling area in front of the chamber is to be provided to Ausgrid’s requirements. Ausgrid generally use a Franna crane for moving large equipment in and out of the substation using and require a minimum 4.0m head height clearance for the full width of the chamber room from the boundary
 - The substations will be naturally ventilated through the use of fixed louvers for the entire façade of the substation. All building elements within 3m of the substation are to be 3hr fire rated and all other building ventilation is to be at least 6m from the substation louvers.
 - 24hr/7day week access is to be provided from Eden Street to the substation from the boundary for heavy vehicle movement and personnel access to the substation

- All works are to be in accordance with the site specific Ausgrid Design Information Package, Ausgrid Network Standards, and a certified Level 3 design



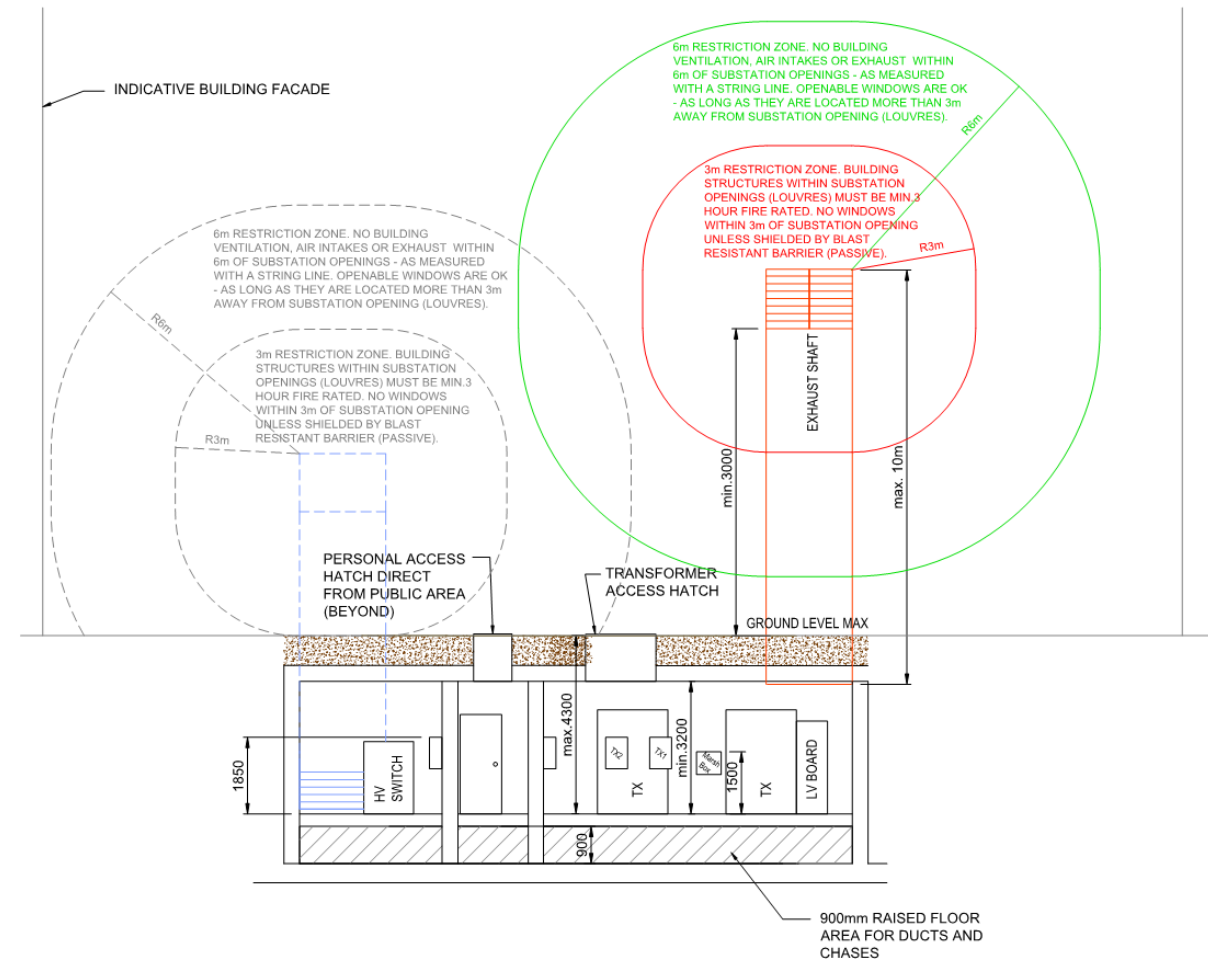
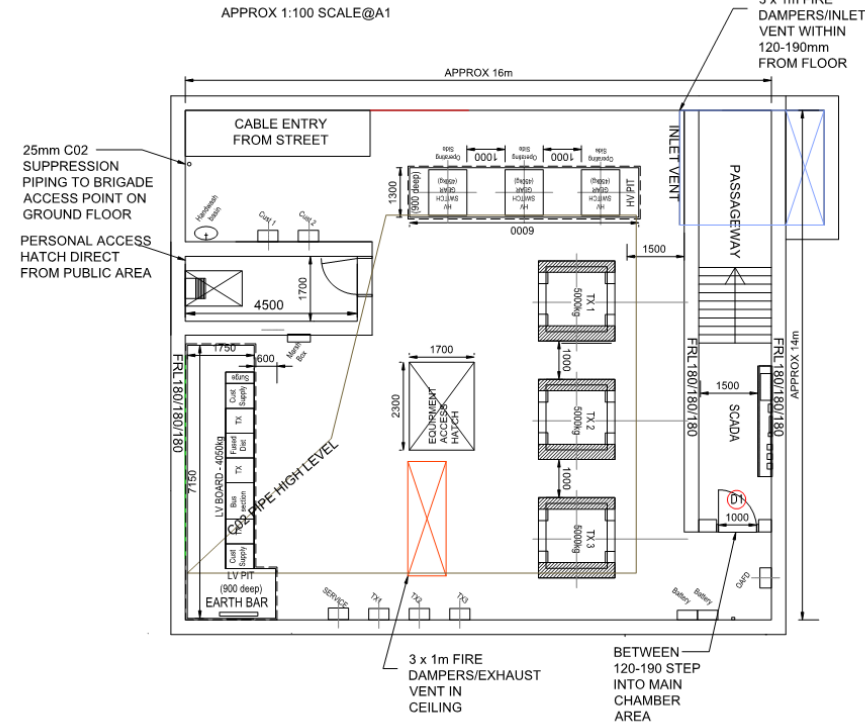
Typical Single Transformer Surface Chamber Layouts

■ Basement Chamber Substation (3 x 1500kVA Transformers)

- Chamber room is to be established on Level B1 in the northern corner of the site
- All substation structural and architectural elements will require a fire rating of minimum FRL 180/180/180 and a blast rating of 2kPa
- Equipment and personnel access will be through dedicated hatches/shafts at Ground Level to be access using a Franna Crane and Ausgrid vehicles
- A transformer handling area in front of the equipment hatches is to be provided to Ausgrid's requirements. Ausgrid generally use a Franna crane for moving large equipment in and out of the substation using these hatches and require a minimum 4.0m head height clearance
- A dedicated access door will be required via dedicated stairwell providing free Ausgrid access from Ground Level. These accessways are dedicated to the substation and are not to lead to any other portion of the building
- The substation will be naturally ventilated through dedicated ventilation shafts in the Ground Level meeting area at a minimum 3m above the ground. The substation will have a dedicated intake shaft and exhaust shaft (2 vent shafts in total). Shaft discharges are to be spaced a minimum 6m apart. All building elements within 3m of a ventilation shaft's discharge are to be 3hr fire rated and all other building ventilation is to be at least 6m from a vent shaft's discharge.
- 24hr/7day week access is to be provided from Eden Street to the hatches and doorways at Ground Level for heavy vehicle movement to the substation hatches
- A dedicated CO2 injection system shall be installed for fire suppression to Ausgrid requirements. The injection point shall be in an accessible location from the Ground Level area
- All works are to be in accordance with the site specific Ausgrid Design Information Package, Ausgrid Network Standards, and a certified Level 3 design

TRIPLE TRANSFORMER BASEMENT CHAMBER MINIMUM REQUIREMENTS

APPROX 1:100 SCALE@A1



Typical 3 x 1500kVA Transformer Basement Chamber Layouts

4.2.4 AUSGRID OVERHEAD ASSET RELOCATIONS

As part of the received Bayside Council Checklist provided for direction of submission of the SSDA and Council requirements, it has been noted all overhead Electrical conductors are to be undergrounded as part of this development.

This requirement is also accompanied with the requirement to upgrade lighting around the local streets to a Council requested AS/NZS1158 compliance levels as follows:

- All local Council Street: Category P3 / PP3
- Princes Highway and Forest Road: Category V2

All street lighting works will be in accordance with the Arncliffe and Banksia Public Domain Plan and Technical Manual from Council.

Refer to Appendix E for a preliminary arrangement to underground the existing Ausgrid overhead aerial conductors and street lighting (subject to Ausgrid, Council and RMS design approvals and lighting assessment).

5. APPENDIX A – PRESSURE FLOW INQUIRY RESULTS

ASSUMED CONNECTION DETAILS

Street Name: Princes Highway	Side of Street: West
Distance & Direction from Nearest Cross Street	90 metres South from Burrows Street
Approximate Ground Level (AHD):	23 metres
Nominal Size of Water Main (DN):	150 mm

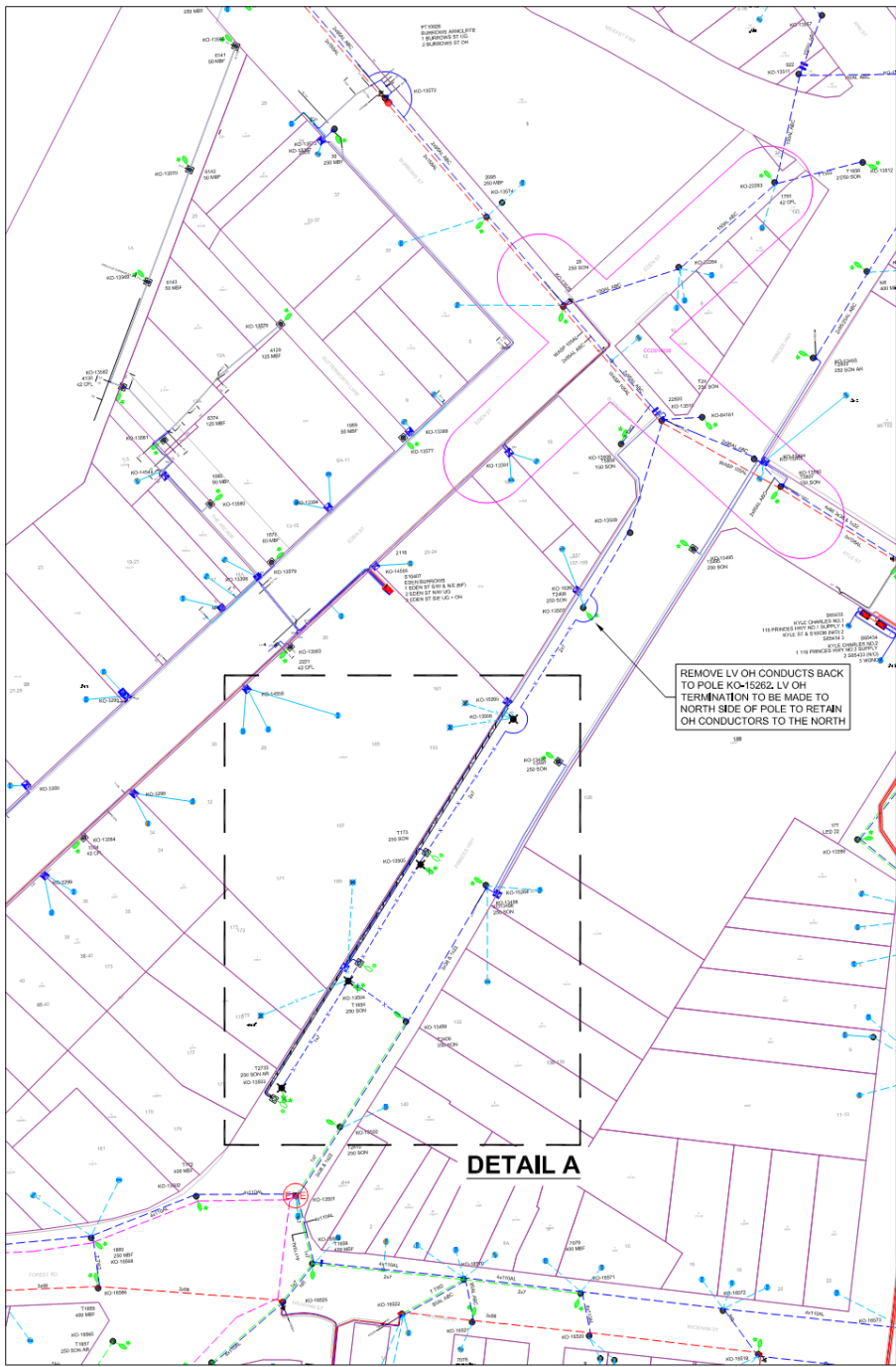
EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	52 metre head
Minimum Pressure	17 metre head

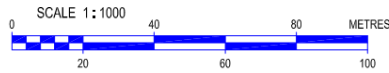
WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	17
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5	17
	10	16
	15	15
	20	13
	26	11
	30	9
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5	16
	10	16
	15	14
	20	13
	26	10
	30	8
Maximum Permissible Flow	37	4

(Please refer to reverse side for Notes)

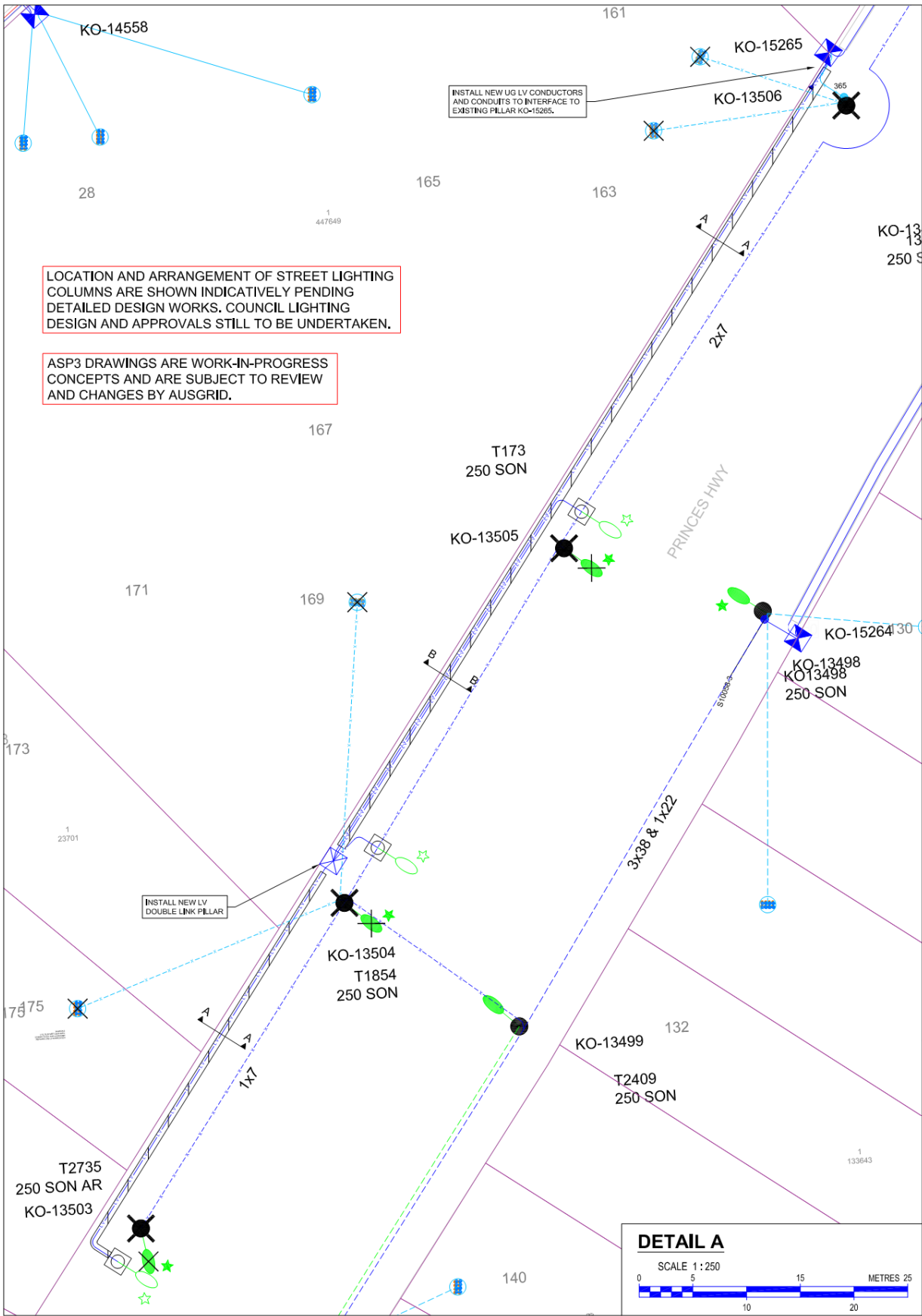
6. APPENDIX B – UNDERGROUND OF AERIAL AUSGRID CONDUCTORS & STREET LIGHTING



CONSTRUCTION PLAN



- WARNING**
- THIS DESIGN CANNOT BE USED FOR CONSTRUCTION PURPOSES UNTIL THE LOCATION OF ALL EXISTING SERVICES IS VERIFIED.
 - THE INFORMATION PROVIDED IN THIS DESIGN MUST BE CHECKED ON SITE AND THE MOST CURRENT INFORMATION ON THE CONFIGURATION OF ALL SERVICES, INCLUDING AUSGRID'S NETWORK, MUST BE VERIFIED IMMEDIATELY BEFORE CONSTRUCTION COMMENCES BY CONTACTING DIAL-BEFORE-YOU-DIG BY TELEPHONE ON 1100 OR AT www.1100.com.au.
 - DIAL-BEFORE-YOU-DIG INFORMATION MUST NOT BE OLDER THAN 20 BUSINESS DAYS AT THE TIME OF CONSTRUCTION.
 - DUE CONSIDERATION OF EXISTING SERVICES HAS BEEN CARRIED OUT IN DESIGN, HOWEVER, THE PROJECT CONSTRUCTOR IS WHOLLY RESPONSIBLE FOR VERIFYING THE EXACT LOCATION OF EXISTING SERVICES & SURVEY WORKS BEFORE CONSTRUCTION, NO RESPONSIBILITY OR LIABILITY WILL BE ACCEPTABLE OF INFORMATION GIVEN OR DAMAGE TO EXISTING SERVICES IN THE VICINITY OF THE WORKS.
 - DO NOT PLACE ANY RELIANCE ON ANY QUANTITIES OR DIMENSIONS GIVEN IN THIS DRAWING. QUANTITIES AND DIMENSIONS GIVEN ON THIS DRAWINGS ARE ON DESIGN INFORMATION AND SITE CONDITIONS AT THE TIME OF DESIGN. AS QUANTITIES AND DIMENSIONS ARE SUBJECT TO CHANGE, THE BUILDER OF THIS PROJECT MUST CHECK ALL QUANTITIES AND DIMENSIONS ON SITE PRIOR TO TENDERING AND CONSTRUCTION.



DETAIL A

