ARUP

Pymble Ladies' College

Secondary Innovation Precinct and Campus Commons

SSD 79146716

Preliminary Utilities Infrastructure Assessment Report

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A.1 Appendix 22

1. Executive Summary

This Infrastructure and Delivery Plan has been developed for the purposes of the SEARs requirement relating to SSD 79146716.

This report has assessed the following services:

- Electricity Supply
- Communications
- Water Services including Cold Water and Fire Water
- Sewer Services
- Rainwater Drainage
- Gas Supply

In general utilities are privately owned and as such, alterations relating to SIP building are connected into existing services mains on campus. Upgrades to potable water and fire water services are not anticipated.

A new kiosk substation will be installed to serve the SIP building, the final location of the substation is subject to Ausgrid approval.

A Water Services Coordinator (WSC) should be engaged in the next stage to determine water and sewerage services to the new building.

2. Introduction

2.1 Introduction

Arup has been commissioned by Pymble Ladies' College (the College) to prepare this *Infrastructure Requirements and Utilities Report* in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs) and in support of the preparation of an Environmental Impact Statement (EIS) and State Significant Development Application (SSD- 79146716) to the Department of Planning, Housing and Infrastructure (DPHI).

This report has been prepared with reference to architectural plans prepared by 3XN and dated March 2025.

SEARs Table Response

Project SEAR SSD 79146716	Section of report
21. Infrastructure Requirements and Utilities	
> assess the impacts of the development on existing utility infrastructure and service provider assets surrounding the site.	Section 3
> identify any infrastructure required on-site and off-site to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained.	Section 3
> provide an infrastructure delivery and staging plan, including a description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development.	Section 5

2.2 Purpose of Report

The purpose of this Preliminary Utility Services Infrastructure report is to provide an overview of:

1. The availability, capacity and location of utility services infrastructure that will support the proposed development; and
2. Protection and relocation strategies for infrastructure assets belonging to each of the utility stakeholders.
3. Staging plan for infrastructure assets serving SIP

2.3 Description of the Site and Locality

The site is located at 20 Avon Road, Pymble, within the Ku-Ring-Gai Local Government Area (LGA). The site comprises multiple parcels of land and is legally described as:

- Lot 1 Deposited Plan 69541
- Lots 11- 17 Deposited Plan 7131

The site and proposed work areas are identified in the figures below. The site area is 10,856m^2.

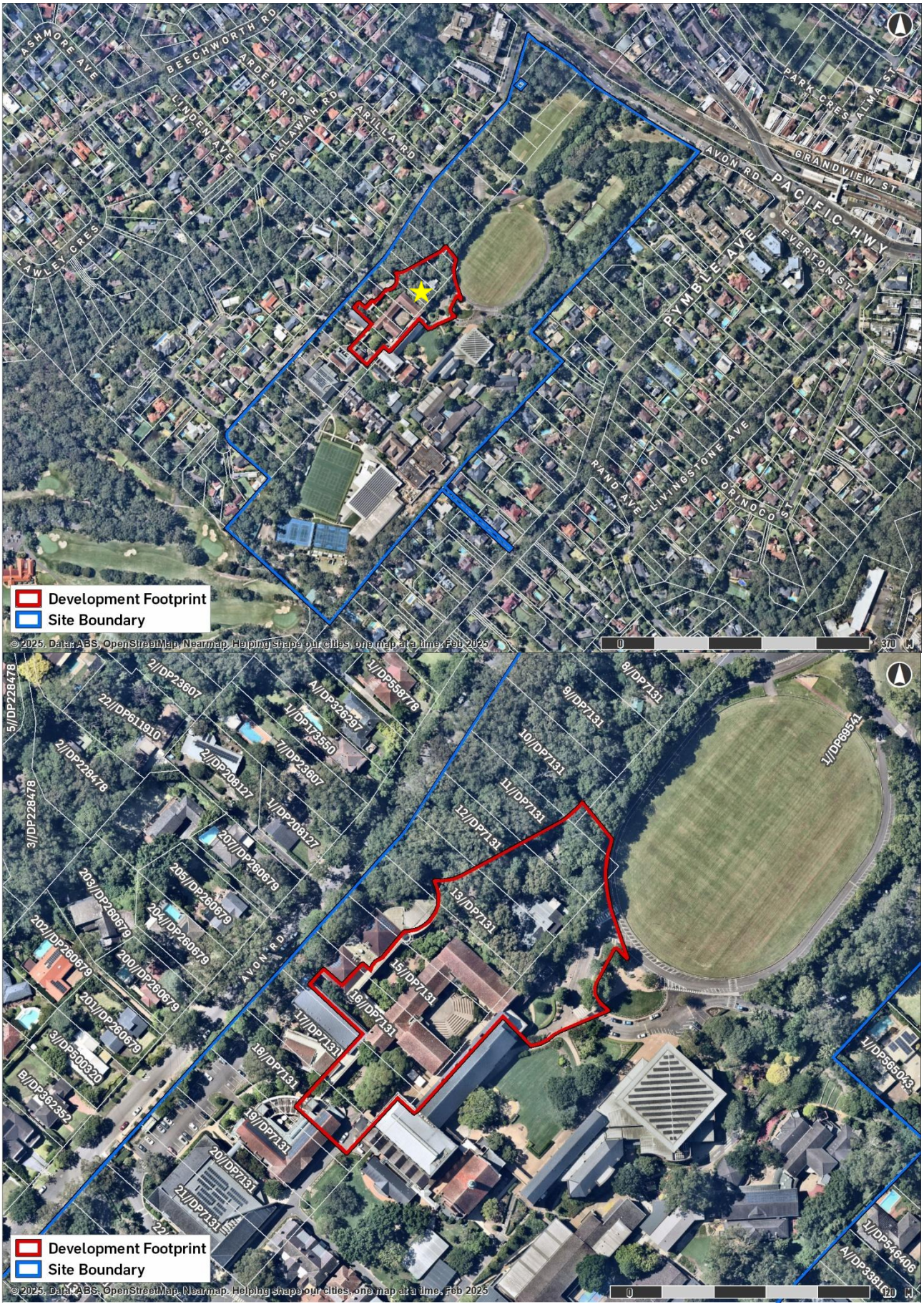

Figure 1 Proposed Secondary Innovation precinct (20 Avon Road, Pymble NSW 2073) source: Urbis

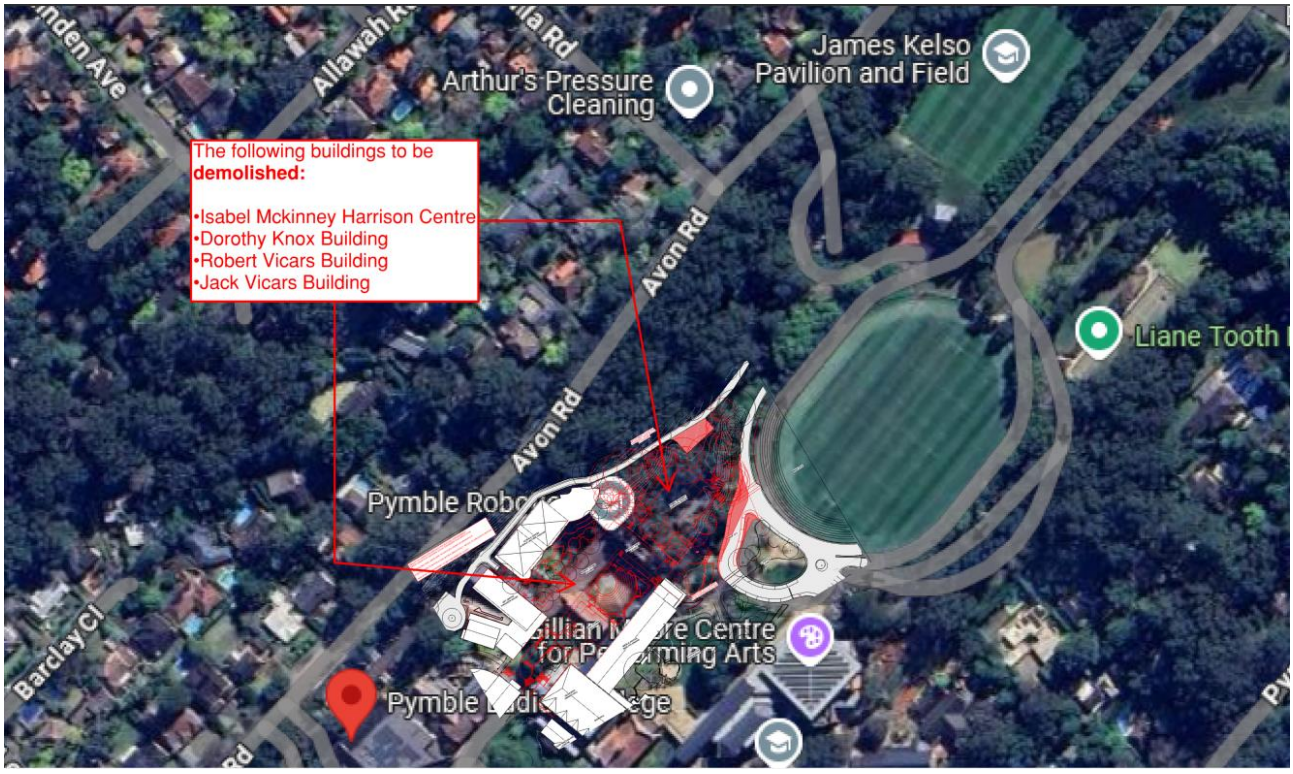

Figure 2 Demolition works intended for new SIP building shown in red

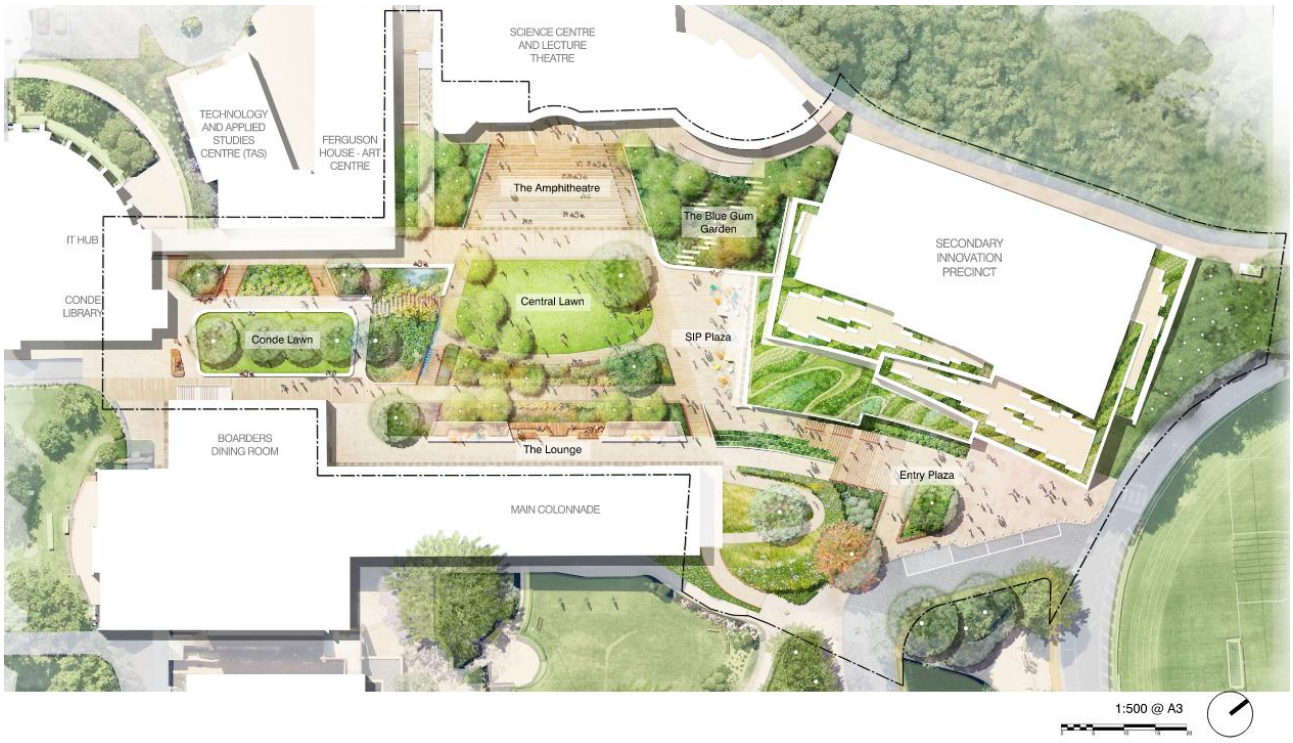

Figure 3 Site Plan of new SIP building site source: TCL

Key features of the site are as follows:

- The site accommodates the existing Pymble Ladies' College which accommodates Kindergarten to Year 12 students.
- Vehicular access to the College is provided via separate ingress and egress driveways on the northern and western sections of Avon Road.
- Pedestrian access is provided through multiple gates along Avon Road.

- The project area that is subject to this SSDA is located at the entrance to the College west of the oval.
- The project area slopes down from south to north with a fall from RL 124.50 at the southern corner to RL 116 at the north west corner.

Key features of the locality:

The development context surrounding the site is a leafy suburban environment, predominantly made up of detached residential properties set within expansive gardens and along avenues lined with mature trees.

Recent developments of moderate-scale residential apartment buildings occur closer to the railway corridor. Two storey commercial establishments are located near to Pymble train station, specifically along the Pacific Highway and on the northern flank of the railway line.

- The site is located approximately 19km north west of the Sydney Central Business District.
- The College is situated approximately 200m from Pymble train station, situated on Pacific Highway and Pymble town centre.

The immediately surrounding locality is described as follows:

- **North:** Avon Road and Pacific Highway (approximately 400m).
- **East:** Residential uses, accommodating a mixture of dwelling houses and residential flat buildings.
- **South:** Avondale Golf Course.
- **West:** Avon Road, beyond which is a residential area characterised by detached dwelling houses.

2.4 Project Brief Description

The project comprises demolition of several existing buildings and the construction of the Secondary Innovation Precinct, associated landscaping and Campus Commons at the Pymble Ladies College. The SIP is a five-storey building that will consolidate STEM based learning opportunities within the College.

2.5 Project Detailed Description

The proposal seeks development approval for the Secondary Innovation Precinct (SIP) and Campus Commons at Pymble Ladies' College. The development comprises:

- Demolition of the existing Isabel Harrison, Dorothy Knox, John Vicars and Robert Vicars Buildings.
- Tree removal.
- Excavation of the basement level.
- Construction of the new five storey SIP building of RL 145.3m and including:
  - General Learning Spaces.
  - STEM teaching spaces.
  - Senior student facilities.
  - Function spaces.
  - Food and beverage facilities.
  - Associated amenities.
  - Storage and building services.
- 2 car spaces within the basement (for service vehicles) accessible from the existing rear vehicle service road.

- Minor kerb realignment of the existing access road to the east of the SIP.
- Landscaping on the outdoor terraces and surrounding the building.
- The project also includes the Campus Commons, a significant garden lawn and amphitheatre connecting the SIP precinct to the rest of the campus.

3. Utility Services Infrastructure

3.1 Summary of Consultation

Stakeholder (examples below)	How this group was consulted and when	Issues Discussed	Project response
Ausgrid	Before You Dig Australia (BYDA), 31/02/2025	Query location of existing services on and around PLC site	Plans provided
Sydney Water			
Jemena			
Telstra, NBN, TPG, AARNet, Nextgen			
Ausgrid	Initial query/project registration, 14/02/2025	Width of access road for kiosk substation	Formal application for dispensation required
Ausgrid	Formal project application, 20/02/2025	Site location and proposed kiosk location	In progress

A 'Before You Dig Australia' (BYDA) enquiry, previously known as 'Dial Before You Dig', was sought on (31/01/2025) for the address: 31 Pymble Avenue, Pymble NSW 2073, with the relevant information being collated into this report.

The available utility information indicates the existing utilities of the following services serving or traversing the development:

- **Electricity Supply** – Ausgrid
  - Existing HV and LV services
- **Communication Services**
  - Telstra, NBN, TPG, AARNet, Nextgen
- **Water Services** – Sydney Water
  - Sewer
  - Potable Water
- **Gas Supply** – Jemena
  - Natural gas service

3.2 Electricity Supply

3.2.1 Site New Maximum Demand

The following sections outline the maximum demand calculations and assumptions for the new SIP site. It should be noted that for further accuracy it is recommended that the final design assessment will complete a revised maximum demand calculation using connected equipment loads to AS/NZS 3000 rather than VA/m^2 calculations. This will be completed once the next stage of design has been completed and will provide greater accuracy than the initial VA/m^2 calculations.

The maximum demand calculation was carried out using the following allowances, in which the VA/m^2 values used are inclusive of power, lighting and mechanical loads, with diversity:

Table 1 Maximum Demand Calculation for SIP Building

MAXIMUM DEMAND SUMMARY				
	Area	**kVA**	**Amps**	**VA/m2**
Building	7169 m2	507 kVA	732 A	71
Kitchen	394 m2	453 kVA	653 A	1150
Basement including Auditorium	1013 m2	82 kVA	119 A	81
Total	8575 m2	1042 kVA	1505 A	122
	Spare capacity	15%		
	Total + Spare	**1199 kVA**	**1730 A**	

A key load demand within the building is **~394 m²** of Electric cooking. The diversity across the different kitchen areas will be reviewed at the next design stage to rationalise the anticipated load demand to reflect operational usage profiles.

However, based on the above and the latest area schedules received in January 2025, the total calculated electrical load including spare capacity of 15% is **1199 kVA** and **1730 A** respectively.

Campus Commons electrical demand is expected to be minimal, with electricity provided to the area as required which will be developed in the next stage.

3.2.2 Existing kiosk substations

The PLC campus is served by five Ausgrid substations, as identified in the BYDA plans. The two closest substations, S.6442 and S.4618, both rated at 750kVA, are approximately 90 metres from the proposed SIP site. Ausgrid has unrestricted access via a registered right of way (ROW) along the existing services road from Avon Road.

These substations receive power via 11kV overhead cables from Avon Road and supply various PLC buildings. While the exact buildings they serve are unclear, they likely power some of those scheduled for demolition. Metering investigations from demolished buildings can confirm the impact on substation load.

However, these two substations are unsuitable for the SIP site due to:

1) High electrical demand: The new building includes four fully electric cooking kitchens, significantly increasing load. Even with the demolished buildings removed, the reduction in demand is expected to be minor in comparison.

2) Insufficient capacity: Ausgrid WebGIS data shows the remaining combined spare capacity of these substations (681 kVA) cannot meet the 1200kVA maximum demand required for the SIP building.

Table 2 Maximum Demand Indicator (MDI) readings from 2022 to Present, from Ausgrid WebGIS were retrieved from the two closest substations. The peak demands demonstrated combined spare capacity of 681 kVA.

Existing Substations		
S.6442	**AVON PLC NO. 2**	
Substation size	**750 kVA**	
Maximum Demand	**360 kVA**	**519 A**
Date read	**29/02/2024**	
Remaining supply	**390 kVA**	
S.4618	**AVON Lonsdale/PLC NO. 1**	
Substation size	**750 kVA**	
Maximum Demand	**459 kVA**	**663 A**
Date read	**21/06/2023**	
Remaining supply	**291 kVA**	
Total Remaining Supply	**681 kVA**	

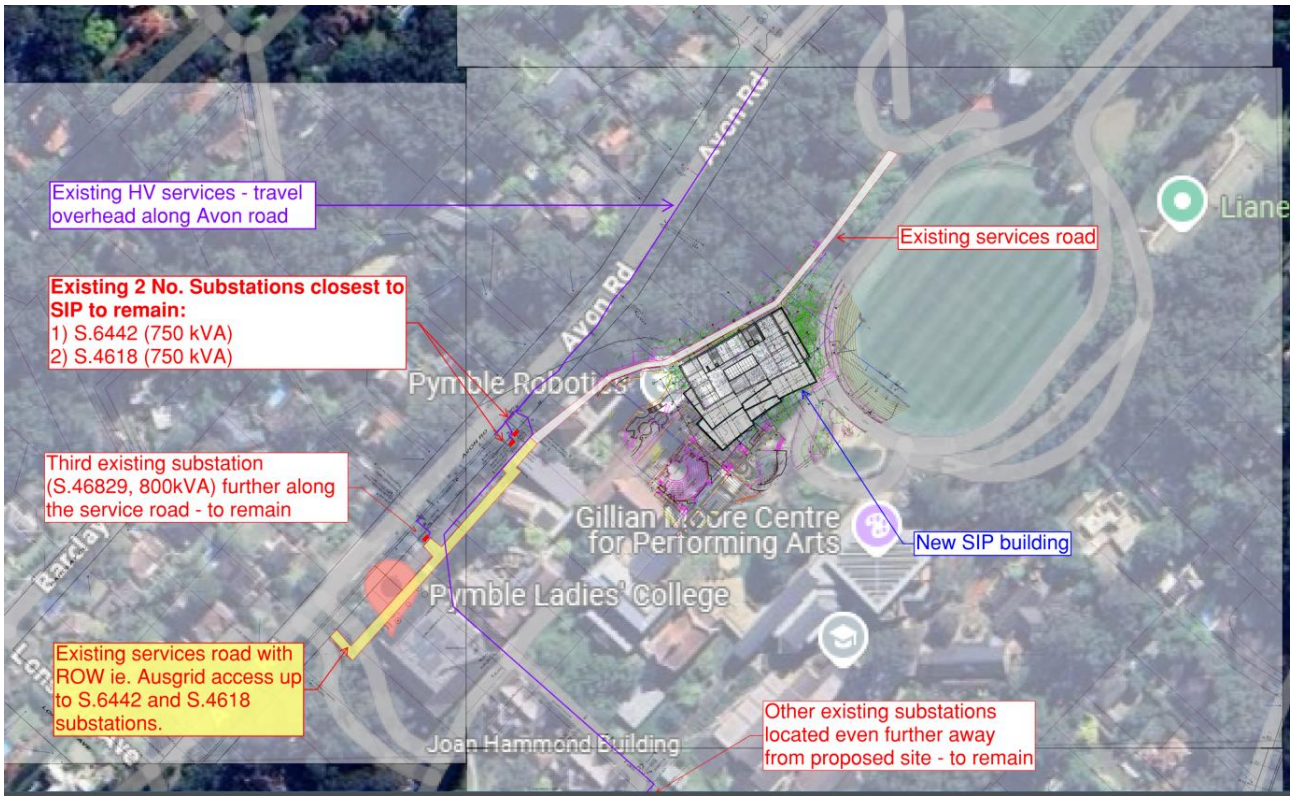

Figure 4 Site map of Existing substations and HV lines retrieved from BYDA and Ausgrid WebGIS data

Figure 5 Existing services road in front of Substation S.6442

3.2.3 Proposed kiosk substation

Given the unsuitability of the nearest existing substations for the proposed site, a new **1500kVA/2000A** transformer, housed in a kiosk substation designed to Ausgrid standards and installed within the site boundary, is proposed for the development.

The service road extends past the existing substations, providing a connection to Avon Road upstream. It is anticipated that the current easement, granted to Ausgrid for registered HV services, could be extended along this road.

This approach is preferable, as the dense tree coverage above the proposed site would make tapping into the HV cables along Avon Road challenging.

Location of proposed substation

Requirements:

1) The main switchroom for the proposed SIP will be located centrally to the building. Inground cables will provide 230/400V supply from the substation to the main switch room.
    a. This distance will need to comply with the maximum 50-meter consumer mains cabling requirement.
2) The road which ensures appropriate access for delivery, installation and future maintenance of the substation must meet Ausgrid standards:
    a. All access ways must be located to ensure egress and ingress from or onto a public street or an all-weather heavy duty access roadway which complies with the BCA egress and ingress requirements.
    b. Must enable Ausgrid access at all times 24 hours a day, 7 days a week
    c. 4.5m wide minimum
    d. 4m high minimum
    e. All weather
    f. Heavy Duty access suitable for a 26T Franna.
    g. Must not be blocked by other vehicles or equipment
    h. The surface grade along the Right of Way should not exceed 1:8
    i. The surface area in the transformer handling area should not exceed 1:20

    The access and replacement strategy for the kiosk substation is to be reviewed with Ausgrid at the next design stage
3) Easement of 4.5 x 6.65m as per Ausgrid requirements.
4) Positioned above the 1:100 year flood level.
5) Minimal grading of the proposed kiosk location to ease HV cable trenching and reduce installation challenges. Any trees within the zones will be impacted.

Given these requirements, two options for the new substation kiosk were explored and a location was selected as described below. Note the final kiosk substation is subject to access road suitability and as such further engagement with Ausgrid is required. The Level 3 Accredited Service Provider (ASP) has commenced the consultation process with Ausgrid. Regardless of the final kiosk location, trenching will be required from the most suitable HV cable run to the substation.

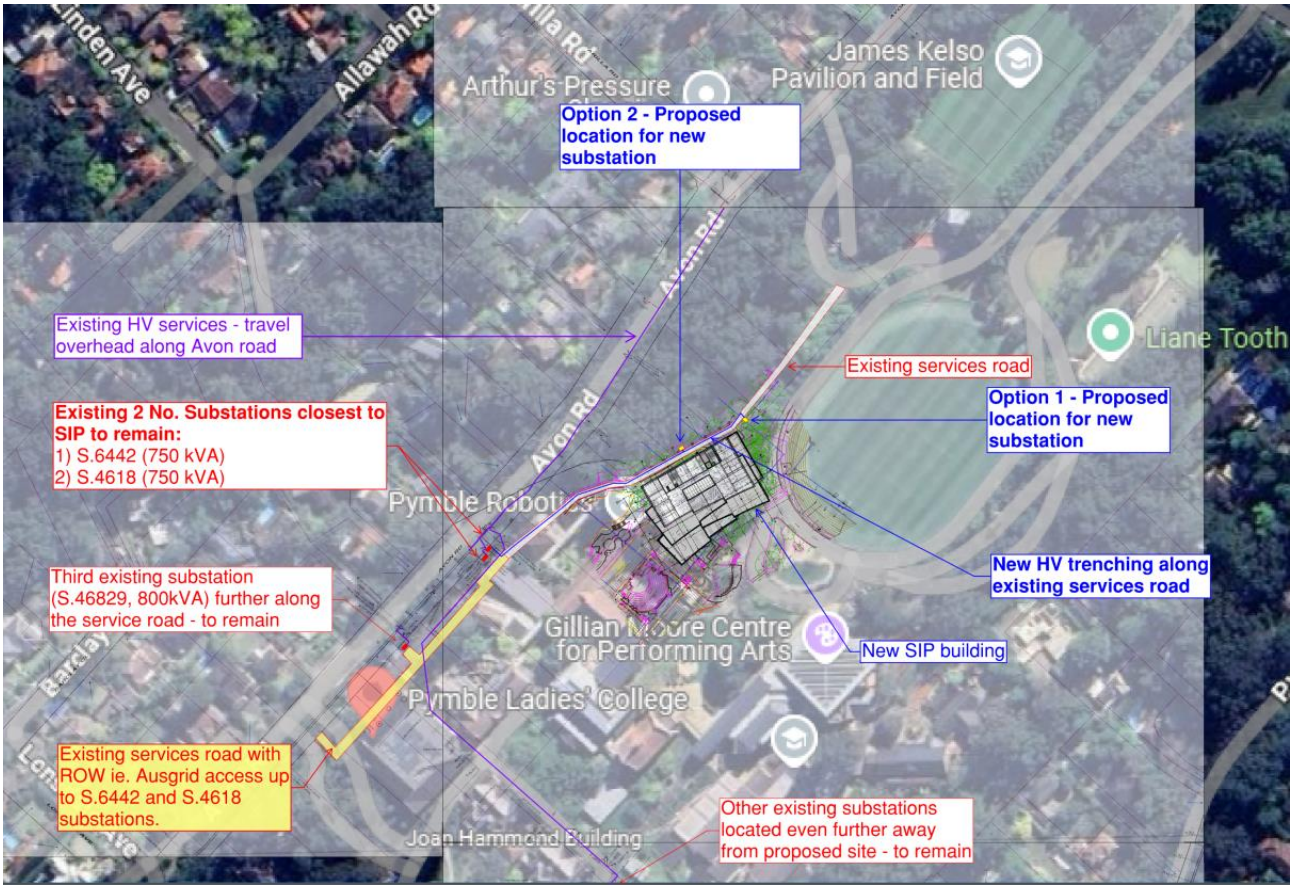

Figure 6 Proposed options for new substation kiosk on Site Plan

- **Proposed Kiosk Substation Location**

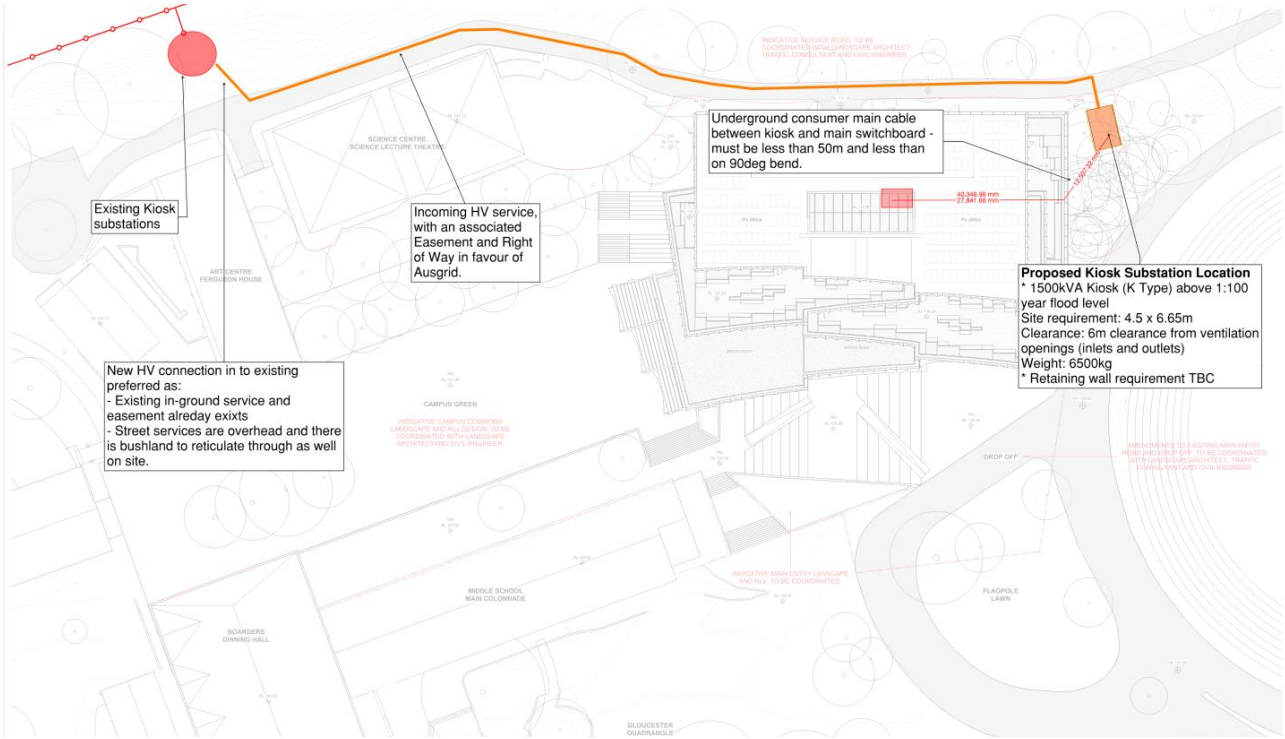

Figure 7 Proposed location for new kiosk substation and required HV trenching

a. If the services road is deemed to be a compliant access and maintenance road to Ausgrid standards, then this option would be preferable as it positions the kiosk substation in a discreet location, keeping it out of public view.

b. Retaining wall may be required due to landscape contours.

3.3 Communications

3.3.1 Existing Services

The following communications services networks exist within or in proximity of the boundary of the development base on our interpretation of the BYDA information. The utility communications cabling is generally installed in underground conduits on street verges with regular access points though manholes or pits.

Services identified at the PLC address include:

- Telstra
- NBN
- TPG
- AARNet
- Nextgen

However, only Telstra, NBN, and AARNet were found to be in proximity to the proposed SIP location. This is illustrated in the figure below.

Figure 8 Existing services for service providers surrounding proposed site

3.3.2 Required Alterations

No new carrier connectivity is planned for the building. Instead, all communications will be provided through connections to the existing sitewide fibre ring. As part of these works, the new building will be linked to this fibre network, which already connects the Data Centres where core connectivity is housed. These private networks will not impact utility services.

However, if the school requires additional carrier connectivity, upgrades to the pit and duct systems may be needed to support the connection. Confirmation on this requirement is needed.

3.3.3 Impact on existing carrier services

A key factor to consider is the presence of existing carrier trenches within the proposed building site. Coordination with the respective carriers may be required to manage any potential impacts.

As shown in Figure 8, BYDA data indicates that only Telstra communication services cross the proposed SIP site. A 10-pair copper link runs through buildings scheduled for demolition as part of the SIP works, and this link will likely need to be decommissioned. Any impact on Telstra's existing connectivity within the site will need to be addressed.

Further discussions with service providers are necessary to confirm current arrangements, with these works to be carried out in the next design stage.

Campus Commons communications requirements is expected to be minimal, with infrastructure provided to the area as required which will be developed in the next stage.

3.4 Water and Sewer Services

3.4.1 Existing Services

The following section identifies the existing water and sewer utilities surrounding the building and the current connections into the building which are owned by Sydney Water. This is also reflected in *Figure 12: Existing Sewer Utility*.

Cold Water

The existing water utilities which are available to the development for cold water services are described as follows:

- Avon Road: 100 DICL water main.

The school is supplied via Avon Road water main via existing authority water meter located at the site boundary on Avon Road. Domestic water is then distributed to existing buildings within the school via an inground private domestic water network.

The new SIP building is expected to be fed by the private site domestic water network without the need for any direct connection the utility network.

Figure 9: Existing authority water meter assembly

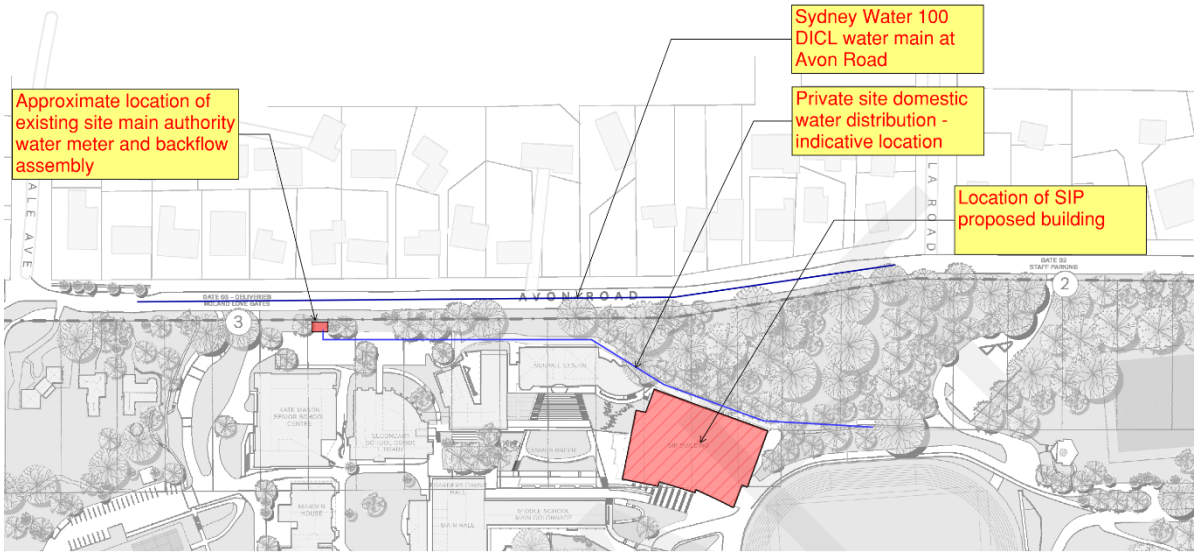

Figure 10: Existing authority and private domestic water services surrounding proposed site

Fire Water

The existing water utilities which are available to the development for fire water services are the same as those for the cold-water services.

There is an existing fire brigade booster assembly that is currently serving the school site located opposite to Avon Road next to the domestic cold water authority meter in a booster cabinet.

An existing fire services storage tank is installed on site to store water for fire services operations. A fire services pump enclosure is also installed to supply the fire services private network that feeds individual buildings on site.

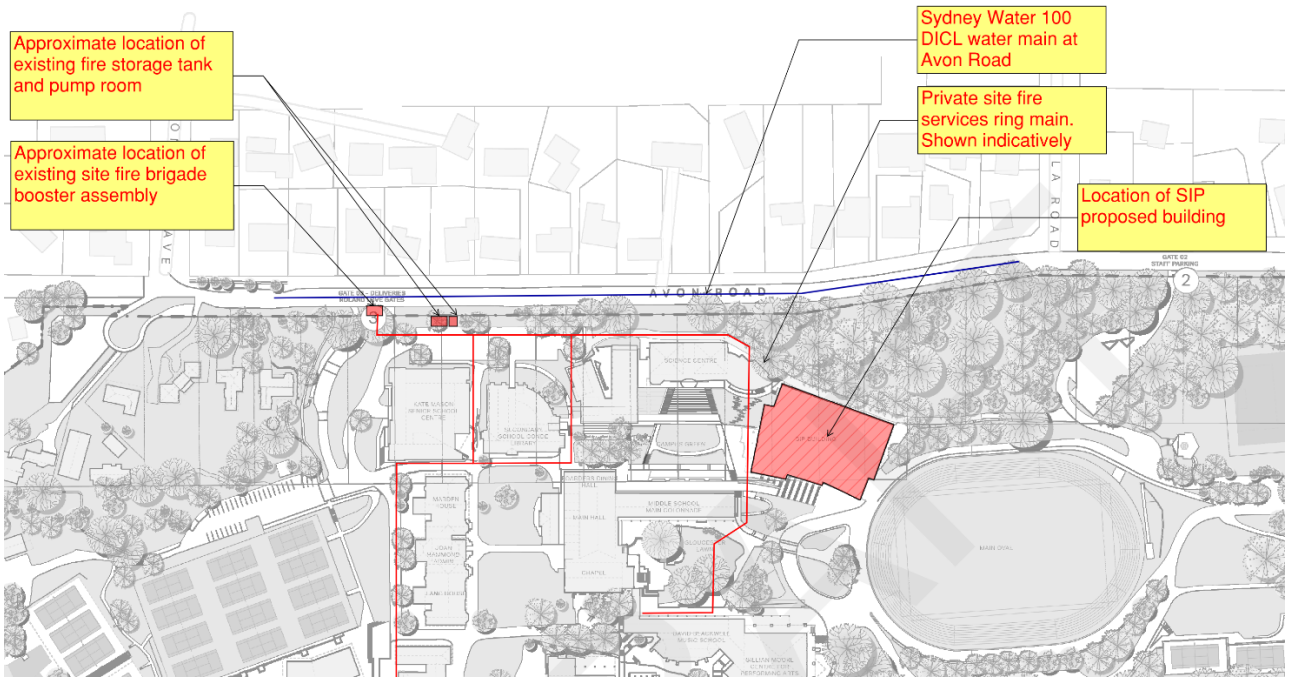

Figure 11: Existing fire services private network

Sewer Drainage

The existing sewer utilities which are available to the development for sewer drainage services are described as follows:

- Avon Road: 225 VC sewer main.

Based on available information from the DBYD investigation, the available existing authority sewer to the site appears to be the 225VC sewer main crossing Avon Road and into the school site boundary.

There is an existing private sewer network running within the site campus which discharges campus buildings towards the authority sewer.

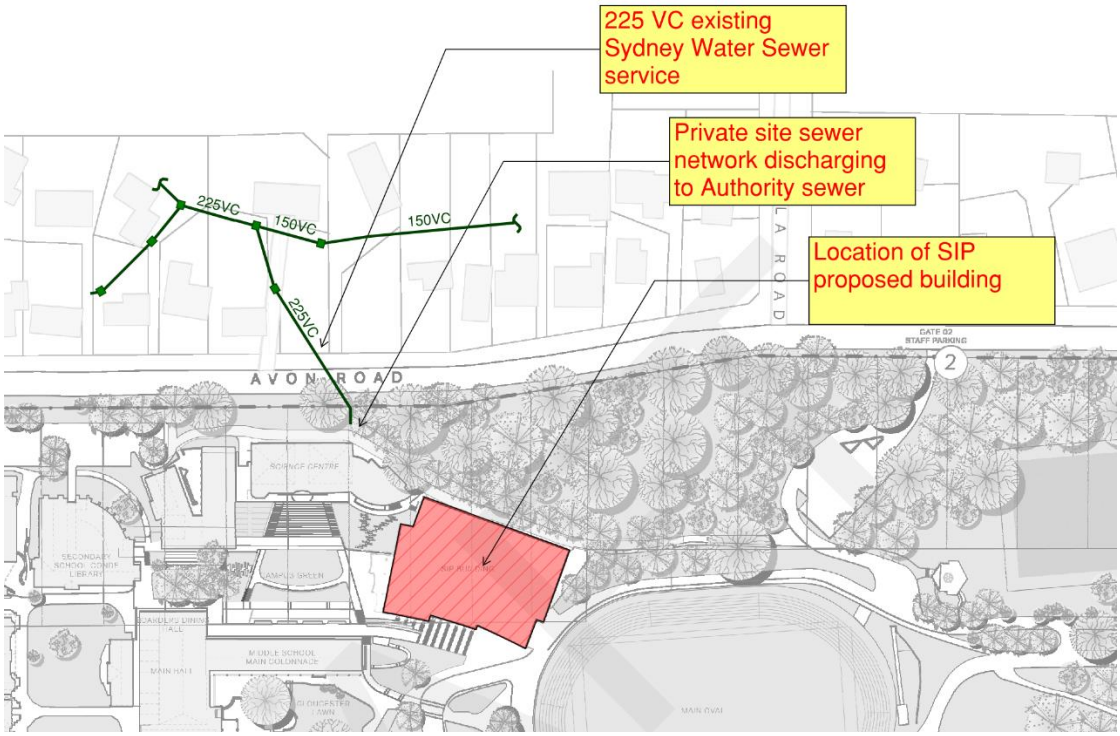

Figure 12: Existing Sewer Utility

3.4.2 Proposed Alterations

The following section describes the expected alterations (if any) for the new development relating to the water and sewer services.

Cold Water

At present, with the proposed information for the new design, we do not anticipate meaningful additional cold water demand above the current existing cold water demand. This is because PLC are not intending to grow the school population as a result of this SIP development being built, the total school population remains unchanged. The demand of the SIP building it is not expected to exceed the capabilities of the existing utilities and connections.

The new cold water system supply will be extended to the new SIP building from the existing private domestic cold water site network. There will be no direct connection to the utility serving the new building.

The existing authority water meter assembly appears in good condition and is considered unlikely to be replaced for the purposed new works.

The need for amplification to the existing connection is considered highly unlikely. The need for amplification of the city water network is considered highly unlikely and will need to be confirmed with Sydney Water as part of a future formal Section 73 application by a Water Services Coordinator.

Fire Water

At present, with the proposed information on the new design, we anticipate an increase in water demand for the new fire services. The fire demand for water is expected to exceed the capabilities of the existing utility supplied water, and the existing connection. As such, the following provisions have been considered.

– Provide fire water storage tanks on-site

- The existing fire services connection will be utilised as an automatic inflow to feed new fire services storage tanks that are privately owned by PLC and sized to cater for the fire services demand of the new SIP building and will address the shortage of supply within the existing utility network, without the need for amplification to the existing utility service.

The supply requirements will need to be confirmed with Sydney Water as part of a future formal Section 73 application by a Water Services Coordinator (WSC).

The need for amplification of the city water network is considered highly unlikely and will need to be confirmed with Sydney Water as part of a future formal Section 73 application by a Water Services Coordinator.

Sewer Drainage

At present, with the proposed information for the new design, we do not anticipate a meaningful additional sewer demand above the current existing sewer demand. This is because PLC are not intending to grow the school population as a result of this SIP development, the total school population remains unchanged. The demand of the SIP building it is not expected to exceed the capabilities of the existing utilities and connections.

The new sewer service will be extended to the new SIP building from the existing private sewer site network. There will be no direct connection to the utility serving the new building.

The need for amplification to the existing connection is considered highly unlikely. The need for amplification of the city sewer network is considered highly unlikely and will need to be confirmed with Sydney Water as part of a future formal Section 73 application by a Water Services Coordinator.

Campus Commons water and sewer requirements are expected to be minimal, with infrastructure provided to the area as required.

3.5 Rainwater Drainage

3.5.1 Proposed Alterations

Rainwater captured from the new building roof will be captured in a rainwater storage tank, and reused within the building. Terraces, green roof, and rainwater tank overflow will be discharged into a new OSD tank for the development which would then discharge the water into the private stormwater infrastructure surrounding the site.

Information regarding the project's stormwater design will be contained within the Stormwater Management Plan.

Refer to civil engineering report for information regarding site existing stormwater services and utility stormwater serving the site.

3.6 Gas Supply

3.6.1 Existing Service

The following section identifies the existing gas services surrounding the building and the current connections into the building which are owned by Jemena.

- Avon Road – Distribution main 50mm NY @ 210kPa
- Avon Road – Distribution main 75mm NY @ 210kPa

From the BYDA information from Jemena, it is indicated the 50mm main from Avon Road is currently supplying the existing buildings (which are to be demolished) with its gas requirements.

Figure 13: Existing Authority Gas Utility

3.6.2 Required alterations

The proposed new development is to be fully electrified with no gas requirements. As such the existing gas connections into the development will be removed. No further alterations will be required.

4. Protection and relocation strategies for infrastructure assets

A ‘Before You Dig Australia’ (BYDA) enquiry was sought and the information collated for proposing preliminary plan of protection and relocation strategies to allow for minimal impact and appropriate protection of infrastructure assets. The following lists strategies:

- Being aware of affected utility stakeholders, including: Ausgrid, Ku-Ring-Gai Council, Jemena, Optus, Roads and Maritime Services, Sydney Water, and Telstra.
- Locating assets: Assets’ and permanent survey mark’s exact location and assistance will be required from each utility stakeholders at a reasonable time before works begins. A thorough site examination will be conducted for visible structures through field survey including the use of appropriate qualified personnel and equipment
- Acquiring approvals: Relevant approvals will be obtained prior to commencement of works on or near infrastructure assets of various utility stakeholders. Al works are to be undertaken in accordance with the requirements of any approval.
- Reporting damage: Damage of assets will be reported immediately to utility stakeholders any time, any day.

5. Infrastructure Delivery and Staging Plan

5.1 Electricity Supply

Electricity Supply will be supplied to the new SIP Building and Campus Commons following the steps noted below:

1. Disconnect existing supplies to existing buildings
2. Decommission existing supplies to existing buildings
3. Install new kiosk substation
4. Trench from HV main to new kiosk substation
5. Install cable from HV main to new kiosk substation and cable from kiosk substation to building switchroom
6. Commission new electricity supply

5.2 Communications

Communications will be supplied to the new SIP Building and Campus Commons (if required) following the steps noted below:

1. Trench from communications network ringmain to main building distributor room
2. Connect into existing private campus communication network

5.3 Cold Water Services

Cold Water will be supplied to the new SIP Building and Campus Commons following the steps noted below:

1. Trench from existing private network ring main to SIP building incoming supply
2. Connect cold water from existing private network ring main to SIP building

5.4 Fire Water Services

Fire Water will be supplied to the new SIP Building and Campus Commons (if required) following the steps noted below:

1. Trench from existing private network ring main to SIP building incoming fire water supply
2. Connect fire water from existing private network to SIP building

5.5 Sewer Services

Sewer Services will be supplied to the new SIP Building and Campus Commons (if required) following the steps noted below:

1. Trench from existing private network
2. Connect building sewer into existing campus sewerage network

5.6 Rainwater Drainage

Rainwater Drainage will be captured from the building and reused, with excess drained to the building's OSD tanks.

5.7 Gas Supply

All gas infrastructure within the ground will be capped off and decommissioned/removed as necessary.

6. Conclusion and Recommendations

This report has identified the following:

- Engagement with relevant authorities
- All utilities serving the proposed SIP building
- New services required
- Extensions/modifications to existing services
- Infrastructure staging plans

The kiosk substation location is to be agreed and initial consultation with Ausgrid has commenced. We recommend this issue is tracked in the next stage of the project as the design develops.

In the next stage a Water Services Coordinator (WSC) should be engaged to complete an analysis of the water supply and sewerage services to the building.

A.1 Appendix

From using the Sydney Water Guide, the BCA Guidelines and the existing and new NLAs the following flows are assumed to be for the existing and new building.

Existing Building

Item	Flows
Cold Water (Average)	0.82L/s
Cold Water (Peak)	2.46L/s
Retail	1.5L/s
Mechanical System	2.5L/s
Irrigation	1.0L/s
Total Cold Water (Peak)	7.46L/s
Sewer (65% of Peak Water Demand)	4.85L/s

New Building

Item	Flows
Cold Water (Average)	1.39L/s
Cold Water (Peak)	4.17 L/s
Retail	1.5L/s
Mechanical System	3.8L/s
Irrigation	1.0L/s
Total Cold Water (Peak)	10.47L/s
Sewer (65% of Peak Water Demand)	6.81L/s

As the building is increasing in size it is expected the total water and sewer demand to increase as shown by the tables above.

Although the existing flows have increased in size, the existing utilities serving the site are of an appropriate size to accommodate both the water and sewer demand.

This is a provisional review only, and a WSC should looked to be engaged as part of the next phase.

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