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Services Infrastructure Report for SSD - 16858710

Pacific Brook Christian School
72-74 Maitland Street, Muswellbrook

Prepared for: Pacific Brook Christian School Ltd.

Project No.: NSW200034

Revision No.: 04



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REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
01	25.11.2020	Initial Issue for Review	W. Nel, S. McCartney	W. Meadows
02	28.05.2021	Issued for Review	W. Maiwald, S. McCartney	W. Meadows
03	07.07.2021	SSDA Submission	W. Maiwald, S. McCartney	W. Meadows
04	15.09.2021	SSDA Submission	S. McCartney	W. Meadows

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Table of Contents

1	Introduction.....	4
2	Site Description	7
3	New Build Works	9
4	Hydraulic Services.....	11
	4.1 Existing Authority Assets.....	11
	4.2 Proposed School Site Infrastructure	13
5	Electrical.....	15
	5.1 Power Supply.....	15
	5.2 Maximum Demand.....	16
	5.3 Substation Requirements.....	16
	5.4 Accredited Service Provider	17
	5.5 External Lighting	17
6	Communications Services	19
	6.1 Existing	19
	6.2 Proposed Communication Service	19
	Appendix A - Muswellbrook Shire Council - Hydraulic Infrastructure Email.....	20
	Appendix B - Authority Water Main Pressure and Flow Results.....	21
	Appendix C - Obtrusive Lighting Calculation.....	22

1 Introduction

Pacific Brook Christian School proposes the staged construction of a new school at 72-74 Maitland Street, Muswellbrook. This will involve site preparation work (including remediation), the removal of 96 trees (7 within Stage 1), civil works, infrastructure works, landscaping, signage and construction works in stages over the next 10 years.

The masterplan will support high-quality educational outcomes to meet the needs of students within the local community as follows:

- Administration building and Library;
 - One (1) staff and student amenities block;
- Junior School facilities;
 - Ten (10) General Learning Areas (GLAs);
 - Two (2) Specialist classroom;
 - One (1) Store; and
 - Covered Outdoor Learning Area (COLA)
- Middle School facilities;
 - Seven (7) General Learning Areas (GLAs);
 - One (1) Science classroom; and
 - Covered Outdoor Learning Area (COLA)
- Senior School facilities;
 - Eight (8) General Learning Areas (GLAs);
 - One (1) Specialist classroom;
 - Three (3) TAS classrooms;
 - Two (2) Food Tech classrooms;
 - One (1) Art classroom;
 - One (1) Drama classroom;
 - Four (4) amenities block;
 - Three (3) Store; and
 - Covered Outdoor Learning Area (COLA)
- Hope School (special needs) facilities;
 - Four (4) General Learning Areas (GLAs);
 - One (1) Specialist classroom;
 - Four (4) Shared Withdrawal rooms;
 - One (1) Office;
 - One (1) Staff room;
 - One (1) Interview + Therapy room;
 - Three (4) amenities block;
 - Three (3) Store; and
 - Covered Outdoor Learning Area (COLA)

- Multi-Purpose Hall;
- Maximum student capacity of 656;
- Maximum 65 staff;
- Agricultural teaching facility;
- Maintenance and bus area;
- On-site Parking (67 spaces, inclusive of 1 accessible);
- Bike parking x 36;
- Internal pathways;
- Kiss and drop off areas;
- Bus stop;
- Waste Storage and collection area;
- Signage;
- Bush Chapel
- Removal of 96 trees (total);
- Landscaping (including Bush Chapel);
- Infrastructure works;
- Earthworks;
- Secondary emergency vehicle/ large vehicle access;
- Acoustic and safety fence; and
- Widening of existing vehicular access from Maitland Street

Stage 1 of the masterplan consists of:

- Site remediation;
- Removal of 7 trees;
- Facilities for a maximum of 140 students and 16 staff, including:
 - One (1) administration and staff area;
 - One (1) staff and student amenities block (including one (1) end of trip facility);
 - Five (5) General Learning Areas (GLAs);
 - One (1) Science classroom; and
 - Covered Outdoor Learning Area (COLA)
- Internal pathways;
- On-site Parking (15 spaces, inclusive of 1 accessible);
- Bike parking x 6;
- Kiss and drop off areas;
- Bus stop;
- Bin storage and collection area;
- Signage;
- Infrastructure works; and

- Widening of existing vehicular access from Maitland Street.

2 Site Description

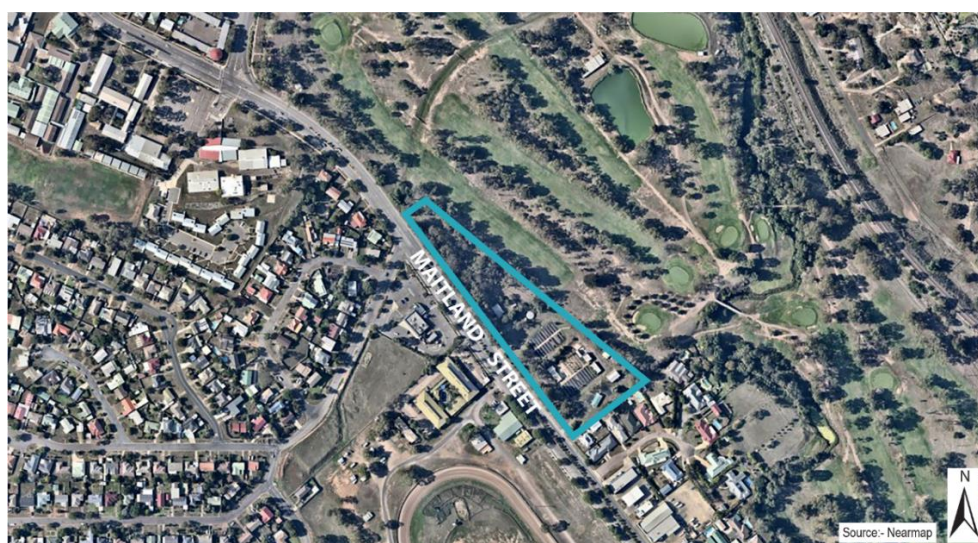
The site is triangular in shape, with a northwest/southeast alignment and has an area of 2.432 ha. The site is bound by Muswellbrook Golf Course along the north eastern boundary, Maitland Street along the south western boundary and residential properties to the south eastern boundary (see **Figure 1**). The site address is 72-74 Maitland Street and is legally described as Lot 100 in Deposited Plan (DP) 1261496 (see **Figure 2**).

The site is generally level with a slight slope to a watercourse at the north west boundary. This watercourse flows northeast into the adjoining golf course and on to Muscle Creek via a series of dams on the golf course. Muscle Creek flows west into the Hunter River which at its closest is 1.3 km north-west of the site. Stormwater management currently on site is pit and pipe and overland flow.

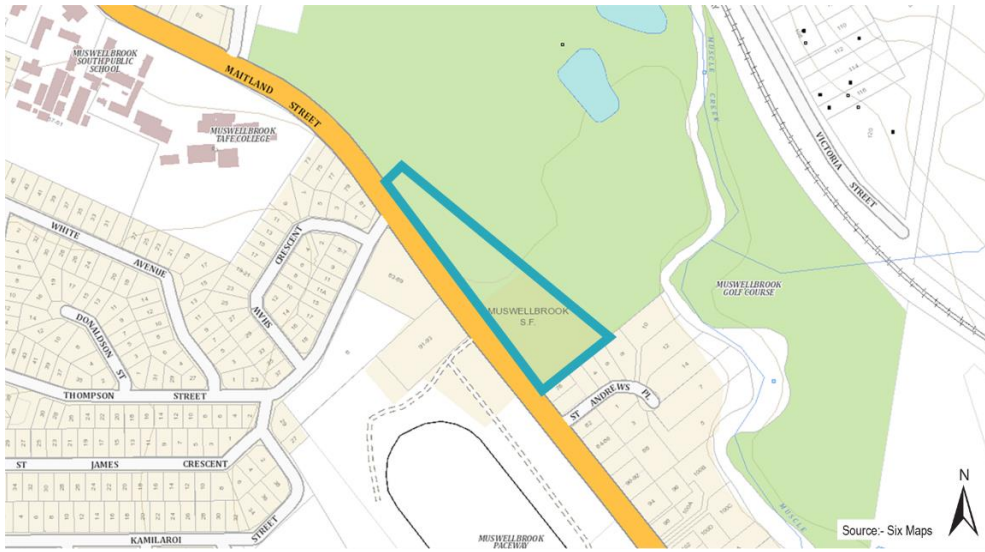
72-74 Maitland Street was previously used for forestry plantation purposes and is mapped as Muswellbrook State Forest. The site is no longer used for this purpose and currently sits as an empty and underutilised site.

The main vehicular access to the site is from Maitland Street, as well as pedestrian access. Existing vehicular parking on site includes open air at grade parking spaces facing Maitland Street.

In terms of travel, Muswellbrook is approximately three (3) hours from Sydney, three hours (3) from Dubbo, two (2) hours from Tamworth and 90 minutes from Newcastle.



Aerial image of site boundary



Site Context

3 New Build Works

It is important to understand the broad area metrics of the masterplan as the magnitude of the works proposed should be uppermost in the minds of Client and Design team alike.

The existing dwelling, associated driveway and metal shed to the north east of the site are proposed for initial re-use. The existing buildings for re-use and all new structures are envisaged as part of the overall masterplan.



To facilitate the proposed new works, demolition will be undertaken in accordance with DA 2020-104.

The extent of new build works totals approximately 8,500m². For certainty, this excludes open play areas, pathways & landscaped areas, ovals and driveways.



In brief, this masterplan is a “once in a generation” opportunity to establish guiding design principals for whomever is charged with completing the various phases.

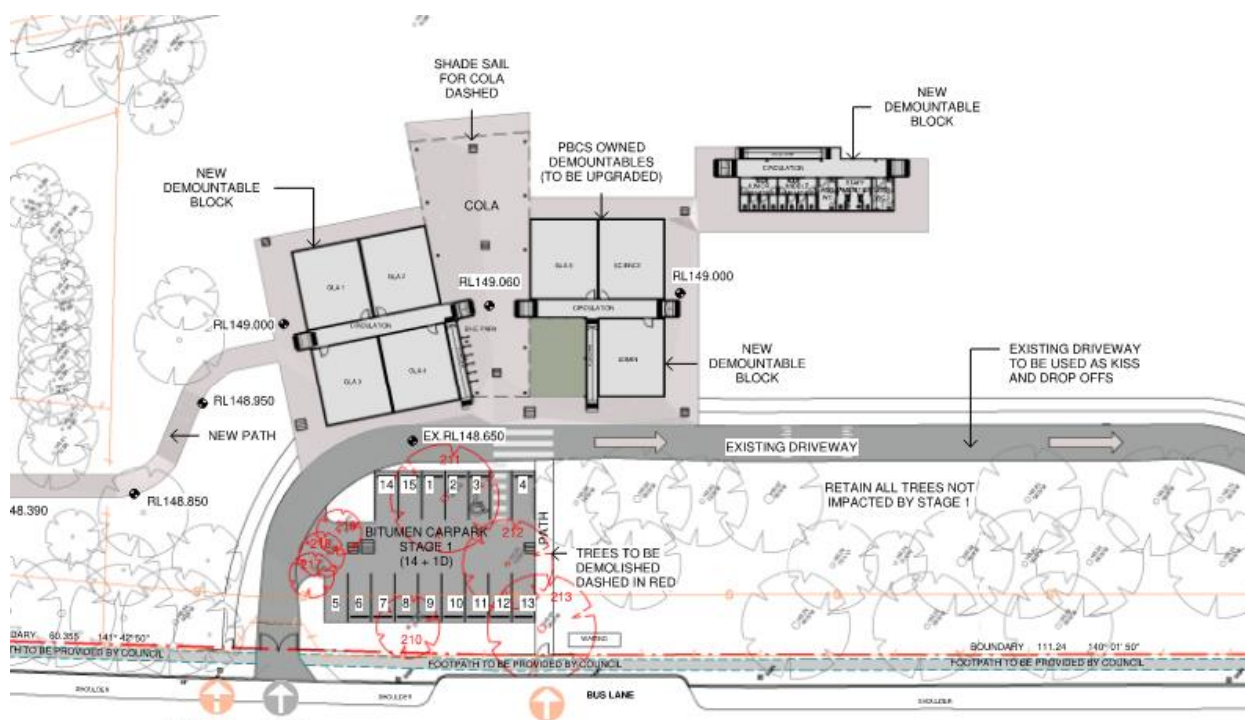
The strategy for the staging of the works should also be understood by all as a significant consideration.

Presently, stage 1 works are a significant portion of the masterplan and will have a major bearing on the approach to building services.

In simple terms, it may be necessary to invest in services infrastructure that is cognisant of the proposed subsequent stages.

There is a “balance” to be struck between reasonable capital expenditure to enable future works to continue in the same design philosophy, and the desire to retain finances and freedoms for works that might be a decade into the future. This matter is one the Design team needs to understand, and this should be a focus of discussions with the School.

For reference, the current staging plan (Stage 1) is shown below:



For certainty, this report is focussed on the overall masterplan for the site and the services infrastructure that is anticipated to be required.

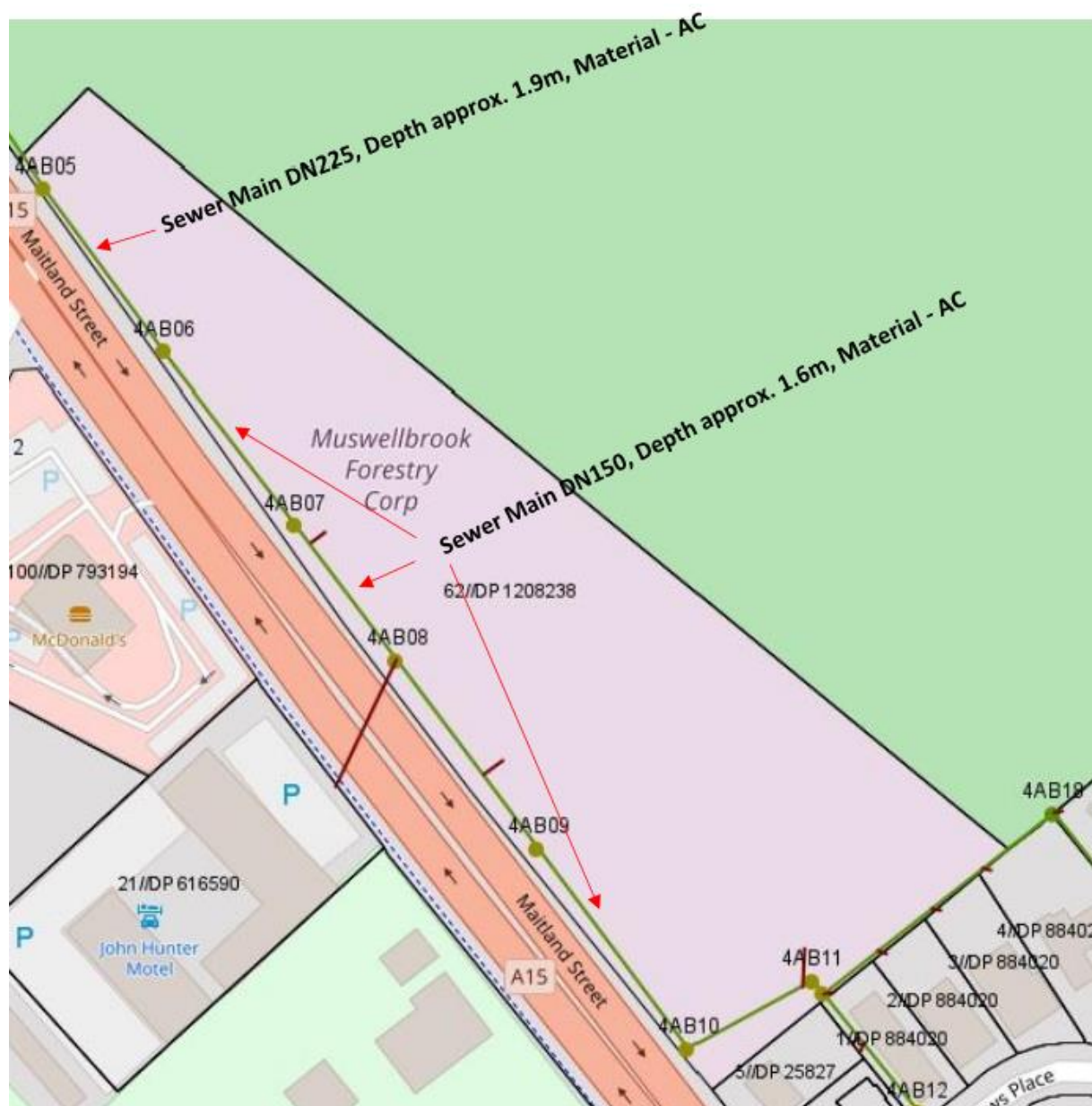
4 Hydraulic Services

4.1 Existing Authority Assets

4.1.1 Sewer Drainage

An existing authority sewer drainage asset reticulates along the south western boundary of the site. Muswellbrook Council have confirmed the pipeline size to be DN150mm, which increases to DN225mm as the pipeline reticulates downstream along the boundary line. The pipe depth ranges from approx. 1.6m deep, to 1.9m deep, and is of Asbestos Cement material.

Two sewer rising mains reticulate along the north eastern boundary of the site. Muswellbrook Council have confirmed these rising mains to be DN150mm and DN375mm and both of Asbestos Cement material. These rising mains cater for emergency overflow purposes between two pump stations and are not currently in operation. There are no connections from the site to these trunk rising mains. The pipelines are covered by a council easement, which is 5m wide for the entire length of the pipework.

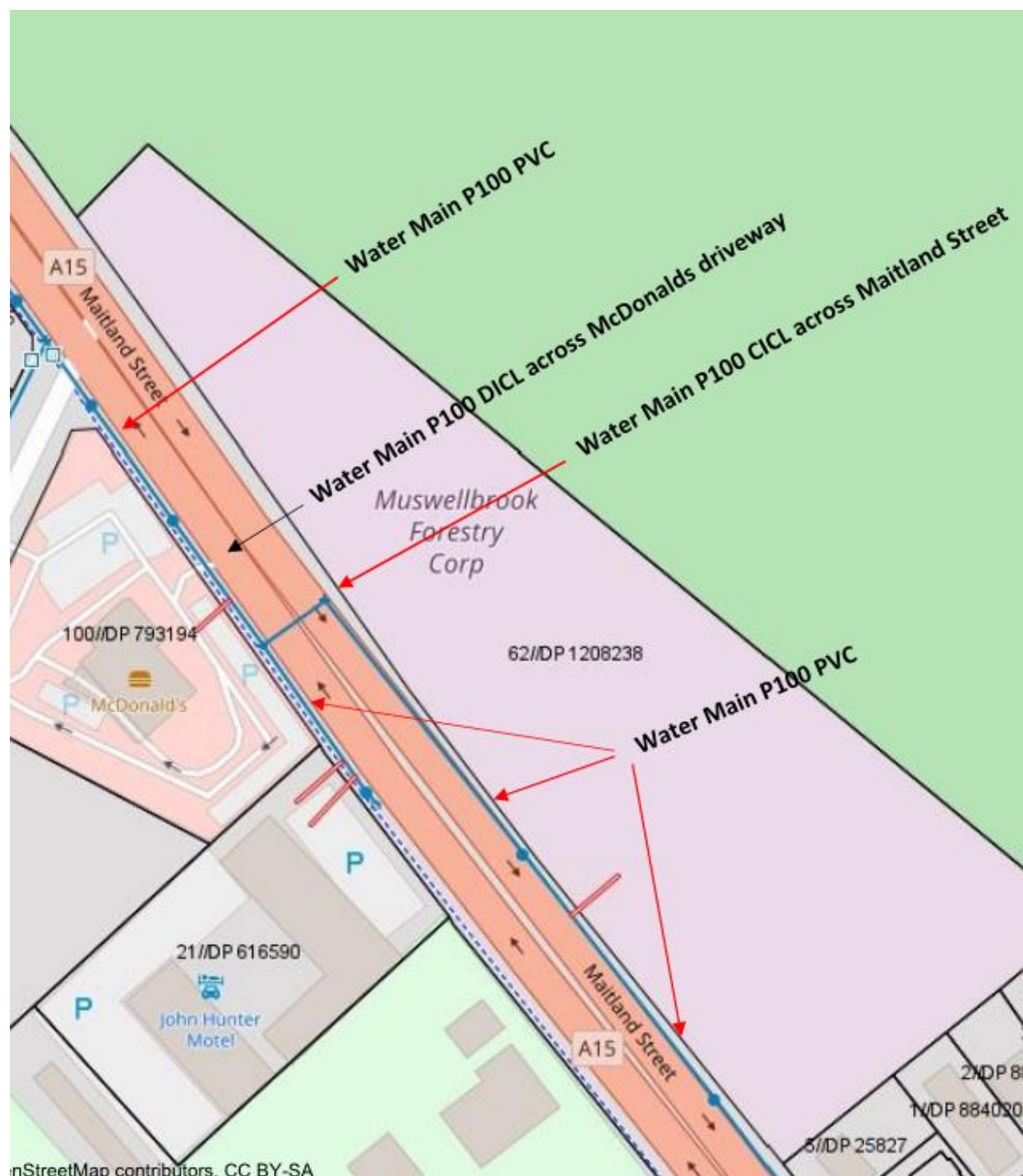


4.1.2 Potable Water

An existing authority water main asset reticulates within Maitland Street. It is understood the main is DN100mm with material ranging from Cast Iron Cement Lined to Poly Vinyl Chloride.

The site has two connections to the authority main. One DN50mm connection located approximately at the main entrance driveway, and one DN20mm connection located approximately at the dwelling driveway.

The DN50mm connection does not have a meter and is understood to of been disconnected when the previous landowners moved from site. The DN20mm connection is metered and is understood to serve the existing dwelling on the property.



4.1.3 Natural Gas

Muswellbrook Shire has no working gas infrastructure. Please refer to section 4.2.3 - Liquefied Petroleum Gas of this report for analysis on gas supply for the site.

4.2 Proposed School Site Infrastructure

Preliminary advice has been sought from Muswellbrook Shire to confirm the impacts of the development on existing authority infrastructure surrounding the site. The following table identifies the estimated daily peak water usage and sewage discharge for the site:

Total number of students	656 students
Average demand (L/student/day)	20 L
Total estimated daily water usage (kilolitres)	13.12 kL
Total estimated daily sewage discharge (assuming 10% of water supply is consumed)	11.808 kL

Muswellbrook Shire have confirmed that the previous landowners daily water usage exceeded 16 kL / day, and therefore **do not** see any need for upgrading the existing authority infrastructure due to the impact of the proposed development.

Regardless of the preliminary advice sought to date, a formal Section 68 application will be required to be submitted to council to seek approval for any new connections made to the authority asset. Confirmation is required from Council to ascertain if any augmentation works and head works charges are required to the existing main to cater for the increase in site demand as a result of the Section 68 application.

4.2.1 Sewer Drainage

It is proposed that the sanitary drainage for the school will utilise an existing point of connection to the authority main. Where this is unachievable, a new connection to the authority main shall be made. It is envisaged a boundary trap will be required to aurally disconnect the school from the authority main.

Sanitary drainage shall reticulate throughout the school as required to serve all fixtures and fittings in accordance with AS3500.2-2018 and Council requirements. It is envisaged that gravity drainage is achievable to all areas of the school, and that pump out stations should not be required.

The proposed design criteria for the internal drainage shall be elevated drainage principals. This system significantly reduces venting requirements, subsequently reducing hydraulic riser spatial requirements within the building envelope.

4.2.2 Potable Water

Due to the requirements of a new fire service, the proposed school will have a single connection to the existing authority asset within Maitland St complete with an authority water meter and backflow prevention device. This connection shall be a minimum size of DN100mm and shall cater for both the potable supply and firefighting needs of the school. All new works shall comply with AS3500.1-2018.

Pressure and flow advice received from council confirms that the residual pressure in the main is adequate to deliver a minimum of 250kPa to all fixtures within the school, and that no booster pump is envisaged to be required for the school's potable supply. The flow capacity in the main also appears to be adequate for the proposed site's total combined flow rates.

Potable supply will reticulate throughout the school as required to serve all fixtures and fittings. Backflow prevention devices shall be installed for high risks areas, such as laboratories and art classrooms as required by AS3500.1-2018.

4.2.3 Liquified Petroleum Gas

Should the school choose gas to be used as an energy source, Liquified Petroleum Gas storage and reticulation will be provided in accordance with AS5601-2013 and AS1596-2014.

An onsite LPG storage tank shall be sized to cater for the peak demand of all fixtures. Consultation with market leading LPG suppliers shall provide the required information surrounding filling points, tank location and filling/delivery timing.

4.2.4 Rainwater Re-Use

In accordance with Ecologically Sustainable Development targets as set out in the Project's ESD report, the development shall implement a strategy to reduce the reliance on authority mains water supply. This shall include, but is not limited to, the implementation of a rainwater harvesting system to serve the site's irrigation supply and toilet flushing.

Rainwater shall be captured from all non-trafficable roofs and harvested in above ground storage tanks. A water balance exercise will determine the minimum size of the storage tanks, to ensure the tank is adequately sized to cater for the site's peak demand, whilst considering the average monthly rainfall for the area.

All re-used water shall be treated through a bag filtration and ultraviolet disinfection plant prior to it reticulating throughout the site.

4.2.5 Trade Waste Drainage

Trade waste provisions will be made for the following applications:

- A grease arrestor for the canteen
- A grease arrestor for the food tech classrooms
- A plaster arrestor for the visual arts classrooms
- Trade waste provisions as required for any specialist classrooms

All trade waste provisions shall be to the standards and approval of Muswellbrook Shire Council

4.2.6 Fire Hydrants and Hose Reels

In accordance with AS2419-2005, fire hydrants will be required to serve all buildings with a fire compartment over 500m². Based on the proposed floor areas of the school, two hydrants are required to flow simultaneously, which equates to 20L/s.

Pressure and Flow results confirm that the town main is not capable of delivering this flow rate, and as such, storage tanks, booster pumps and tank model fire brigade booster assembly will be required. All hydrant infrastructure is to be located in a strategic location and must be in sight of the main entry for the school, for the brigade to access in accordance with AS2419.

Fire hose reels will be provided to meet the requirements of the National Construction Code. This shall include areas such as gymnasiums and/or assembly halls. Classrooms coverage is exempt under the NCC.

5 Electrical

5.1 Power Supply

The existing power supply to the site is via a pillar connection. The current maximum capacity of the connection is 155A 3phase as received from Ausgrid on 15 October 2020:

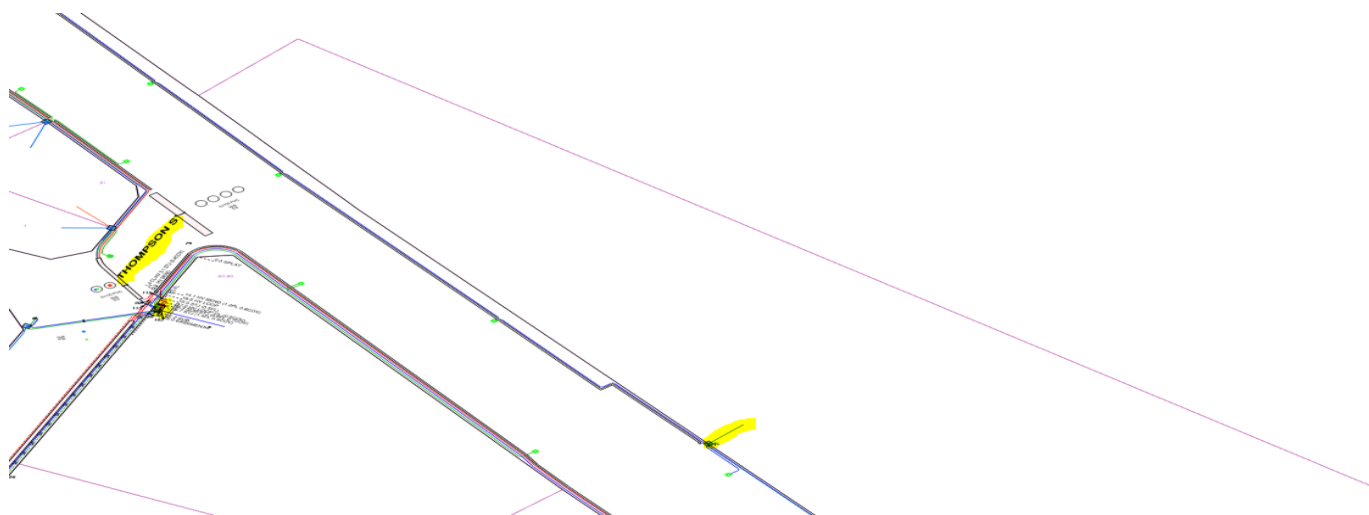
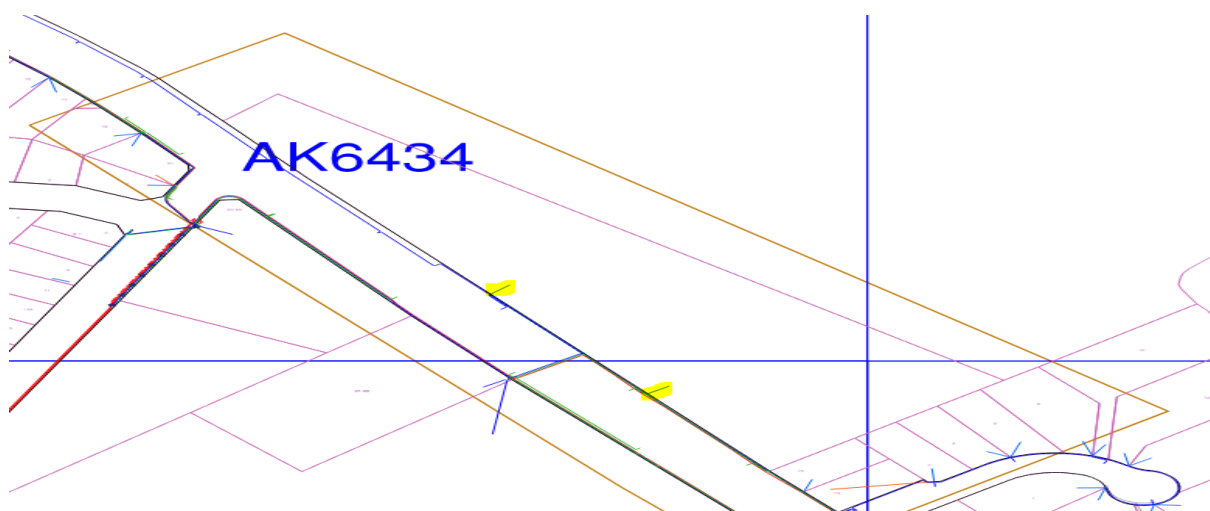
Ausgrid is pleased to inform you that it has approved your connection application, received on 7/10/2020 for basic connection services in respect of the premises referred to above.

*Ausgrid provides basic connection services of the kind required for this connection in accordance with our standard form connection contract known as **Contract for Basic Connections Over 100 Amps**. You elected for an expedited connection in the connection application and you consider that this model standing offer is acceptable. Therefore, in accordance with the provisions of Chapter 5A of the National Electricity Rules, the contract commenced on the date Ausgrid received your connection application.*

Due to reasons relating to Ausgrid's obligation to maintain the safety, security and reliability of its distribution system, Ausgrid may have modified the connection details as specified in your connection application. The connection details are as specified below:

- **The maximum capacity of the connection is 155 amps 3 phases.** Ausgrid may revise the maximum capacity downwards after 2 years if the maximum has not been achieved in order to relieve a network constraint. See also clauses 2.5, 2.6 and 3 of the connection contract.
- The connection point is PRIVATE PILLAR . See also clause 2.7 of the connection contract.
- The point of common coupling is PILLAR AK90538 . See also clause 2.8 of the connection contract.

The two drawing extracts below are from Ausgrid DBYD plans and show the point of existing connection.



5.2 Maximum Demand

ACOR have calculated a likely maximum demand for the new entire school. This maximum demand calculation deducts the electrical loads being replaced by the redevelopment.

The maximum demand calculation is based off AS/NZS:3000 Table C2 VA/m². The estimated kiosk substation size for the site is 750kVA.

Preliminary Electrical Maximum Demand: Pacific Brook Public School (Masterplan site)						
				Current (A)		
Location	Area (m ²)	VA/m ²	kVA	Phase A	Phase B	Phase C
Learning areas/Office	3300	110	363	523.95	523.95	523.95
TAS/Food tech	-	-	-	125.00	125.00	125.00
Lift	-	-	-	28.00	28.00	28.00
Multipurpose hall	560	110	61.6	63.00	63.00	63.00
Storage/Ammenities	590	20	11.8	17.03	17.03	17.03
Canteen	-	-	-	25.00	25.00	25.00
Maintenance	160	90	14.4	20.78	20.78	20.78
External lighting and hydraulic	2720	-	-	20.00	20.00	20.00
Total Demountable						
Total Current per Phase				822.76	822.76	822.76
Notes:						
Maximum demand based off NBR5 staging and Concept Masterplan 19055-NBR5-PP-0150_1 and 19055-NBR5-PP-0201_2						
19055-NBR5-PP-0201_2 (30.09.20)						
Area calculation is as per AS/NZS 3000 VA/m ² Table C3						
Maximum demand is for completed masterplan only.						
VA/m ² values are for assumed power, lighting and AC loads						
Date:	Revision	Description				
24-Nov-20	B	Prelim				

Figure 1: Maximum Demand

5.3 Substation Requirements

Our concept electrical infrastructure plan is for a new dedicated pad mounted kiosk substation located along Maitland Street near main entrance and centrally located to the site, the location of the substation is to be reflected within Architectural documentation also. Based on maximum demand of 822A, the estimated kiosk substation size will be 750kVA.

This is subject to change until a contract is formally engaged with the Power Authority and is based upon preliminary information only.

5.3.1 Substation Requirements

The Electrical Distributor's main requirements for a kiosk substation to be established on site include:

- Dedicated easement of 5,300 x 3,300mm (excluding existing substation easement).
- No services and structures above/below or through the easement.
- Above 1:100yr flood level.
- No non-combustible building elements within 3,000mm of the kiosk housing.
- No supply or exhaust openings and the like within 6,000mm of the kiosk housing.
- 24/7 access to the substation must be provided with parking at the frontage of the substation.

The new location must be level and clear of all construction.

The installation of high voltage cabling and associated works such as trenching, backfilling, etc., will be governed by Ausgrid Network standards for laying underground cables up to and including 11kV. No

roadway trenching is envisaged. On this basis, we believe that Maitland Street will not need to be opened and as such disruption to traffic is not expected.

Backfilling of excavations shall be undertaken to restore the sub-grade to its original condition and shall be compacted as required by Ausgrid Standards. Reinstatement of the pavement will be to local Council requirements to match the existing surfaces. All works will be undertaken at a selected time and day to cause minimal disruption to the public.

5.4 Accredited Service Provider

The school will commission a Level 3 Accredited Service Provider to design the contestable works of the Ausgrid network, including the design of the extension / augmentation of the underground cables and conduits. All installation works on public infrastructure shall be carried out by a Level 1 Accredited Service Provider with suitable field, technical and engineering staff experienced in projects of this nature.

5.5 External Lighting

The proposed external lighting arrangement for the school is to comply with the requirements of AS/NZS 4282:2019 – Control of the Obtrusive Effects of Outdoor Lighting. This standard has several different criteria associated with complying lighting technical parameters, and it is intended that the category of A3 – *Suburban areas in Towns and Cities* is to be applied in this case.

TABLE 3.1
ENVIRONMENTAL ZONES

Zones	Description	Examples
A0	Intrinsically dark	UNESCO Starlight Reserve. IDA Dark Sky Parks. Major optical observatories No road lighting -unless specifically required by the road controlling authority
A1	Dark	Relatively uninhabited rural areas No road lighting - unless specifically required by the road controlling authority
A2	Low district brightness	Sparsely inhabited rural and semi-rural areas
A3	Medium district brightness	Suburban areas in towns and cities
A4	High district brightness	Town and city centres and other commercial areas Residential areas abutting commercial areas
TV	High district brightness	Vicinity of major sports stadium during TV broadcasts
V	Residences near traffic routes	Refer AS/NZS1158.1.1
R1	Residences near local roads with significant setback	Refer AS/NZS 1158.3.1
R2	Residences near local roads	Refer AS/NZS 1158.3.1
R3	Residences near a roundabout or local area traffic management device	Refer AS/NZS 1158.3.1
RX	Residences near a pedestrian crossing	Refer AS/NZS 1158.4

NOTE: Recreational areas are not considered commercial.

The proposed external lighting design is to comprise of the following key lighting categories:

- Pole top Lighting
- Covered Learning Area (COLA) lighting

The Pole top lighting arrangement is intended to be strictly limited only to the main road-area of the school as well as the carpark area. The lighting is intended to be arranged using un-tilted mounting brackets, therefore nil direct uplight is anticipated.

This lighting is intended to be arranged to satisfy requirements for navigation of the school carpark and roadway only.

This lighting is intended to be controlled centrally by manual override switch, as well as timeclock controlled to ensure lights are not operational during curfew hours.

The COLA lighting is intended to be implemented with linear LED battens mounted to the underside of the shelter structures, therefore nil direct uplight is anticipated.

This arrangement is intended to be manually switched, and timeclock controlled to ensure lights are not operational during curfew hours.

Preliminary design modelling of the lighting arrangement on site indicates performance of the lighting arrangement satisfies the requirements set by the A3 category of AS/NZS 4282:

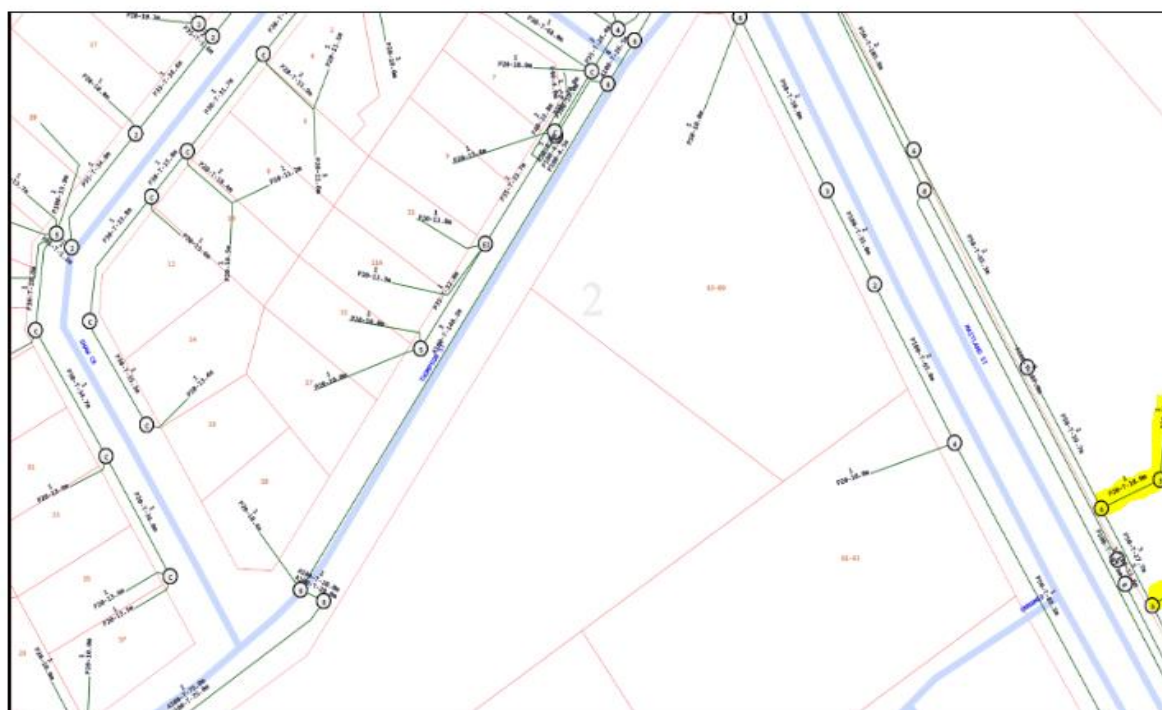
Calculation Summary					
Label	CalcType	Units	Avg	Max	Min
Obtrusive Calc_Ill_Seg1	Obtrusive Light - Ill	Lux	0.25	1.5	0.0
Obtrusive Calc_Ill_Seg2	Obtrusive Light - Ill	Lux	2.11	7.4	0.1
Obtrusive Calc_Ill_Seg3	Obtrusive Light - Ill	Lux	0.04	2.7	0.0
Obtrusive Calc_Ill_Seg4	Obtrusive Light - Ill	Lux	0.00	0.0	0.0
Obtrusive Calc_Ill_Seg5	Obtrusive Light - Ill	Lux	0.71	5.7	0.0

For further details of the model, please refer to the exported calculation file in the appendices.

6 Communications Services

6.1 Existing

Following the review of Dial Before You Dig (DBYD) plans, we have identified existing utility telecommunications services in the immediate vicinity of Pacific Brook Christian School – Muswellbrook Campus, 72-74 Maitland Street, Muswellbrook.



6.2 Proposed Communication Service

It is proposed the Main Communication Room will be in the main admin building. A new incoming NBN service off Maitland Street will be installed to replace any redundant Telstra service/NBN cabling to suit new masterplan.

The redevelopment communications cabling will be reticulated internally using dedicated risers and ducts specifically set aside for this purpose. From this main communications server room optical fibre and / or copper cabling will be reticulated to the server room / comms racks located within each individual building of the School.

ACOR Consultants

Appendix A - Muswellbrook Shire Council - Hydraulic Infrastructure Email

Sam McCartney

From: Gamini Hemachandra <Gamini.Hemachandra@muswellbrook.nsw.gov.au>
Sent: Thursday, 3 June 2021 1:53 PM
To: Sam McCartney
Cc: Hamish McTaggart; Peter Chambers; Chris Kimpton; Kugan Thiru; Vivian Go; Matthew Grady
Subject: RE: 72-74 Maitland St - Hydraulic queries

Hi Sam,

This land was previously used as a plant nursery by Dept of Forest up to 2016.

Annual water use of the nursery has been around 4800 Kl/year .(over 16 KL/day assuming 300 days of office and irrigation use)

I do not see any need for upgrading for servicing the school.

But the guaranteed fire flow/pressure of the existing main will be limited to 10 l/sec at min 150 kpa.

Regards,

Gamini Hemachandra | Project Engineer (Water & Wastewater)

T: 02 6549 3845 | M: 0428 117 233 | E: gamini.hemachandra@muswellbrook.nsw.gov.au

W: www.muswellbrook.nsw.gov.au



Please consider the environment before printing this email.

From: Sam McCartney <SMcCartney@acor.com.au>
Sent: Thursday, 3 June 2021 12:47 PM
To: Gamini Hemachandra <Gamini.Hemachandra@muswellbrook.nsw.gov.au>
Cc: Hamish McTaggart <Hamish.McTaggart@muswellbrook.nsw.gov.au>; Peter Chambers <Peter.Chambers@muswellbrook.nsw.gov.au>; Chris Kimpton <Chris.Kimpton@muswellbrook.nsw.gov.au>; Kugan Thiru <Kugan.Thiru@muswellbrook.nsw.gov.au>; Vivian Go <Vivian.Go@nbsarchitecture.com>; Matthew Grady <Matthew.Grady@muswellbrook.nsw.gov.au>
Subject: RE: 72-74 Maitland St - Hydraulic queries

Hi Gamini,

The school has confirmed that there will be 656 students. Using Sydney Water's average daily usage chart (attached) there will be an estimated daily use of 20L / student / day. This equates to a total daily usage of 13.120kL / day.

Please let me know if there is anything else I can provide to assist.

Cheers

Sam McCartney
Hydraulic Services Consultant



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ACOR Consultants Pty Ltd

Suite 2, Level 1, 33 Herbert St
St Leonards NSW 2065



Appendix B - Authority Water Main Pressure and Flow Results



Phone: (02) 6549 3840
Fax: (02) 6541 0345
Email: council@muswellbrook.nsw.gov.au

P.O. Box 122
MUSWELLBROOK NSW 2333

FLOW & PRESSURE TEST

Name	ACOR Consultants Pty Ltd		
Address	Lot 62 Maitland Street Muswellbrook		
Date	13 th November 2020		
Person Requiring Test	Laura Skillicorn		
Static Pressure	PSI kPa 800		
Size of Main and Material	100mm PVC		through a 65mm Fire Stand
Flow Litres/sec	Meter Reading	Time Taken/Sec	Residual Flow Pressure (kPa)
1.65	100	60.7	800
6.17	100	16.22	780
9.83	100	10.17	760
11.81	100	8.47	760
11.60	200	17.24	740
Max. Flow 11.92 Litres/sec	200	16.78	740

Kind Regards

**Irene Chetty
Operations Manager
Water & Waste**

Appendix C - Obtrusive Lighting Calculation

