

Building Services Infrastructure Report

**CEM – 271-275 Pearcedale Rd, Cranbourne
South**

Prepared For:
Christian Education Ministries



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Summary

BSE understand CEM are planning to lodge DA for the proposed development.

The extent of the project is as detailed within the preliminary architectural drawings and will include the following:

- 3- Storey Primary Classroom Building
- 3- Storey Secondary Classroom Building
- 3- Storey Tech building
- Single storey MPC building
- Single storey Manual arts building

BSE have been engaged to provide advice on the suitability of the existing services infrastructure to accommodate the proposed works. The intent of this report is to summarise the information gathered by BSE and provide advice with respect to the works anticipated to be required to the existing services infrastructure to accommodate the proposed works.

We have summarised our finding as follows:

- Water
 - There is an existing 150mm Authority water main fronting the site boundary in Pearcedale Road. Based on Stage 0 document, a 32mm potable water meter and connection was provided to supply existing building.
 - The existing 32mm potable water meter and connection is to be replaced and upgraded to 65mm (TBC) to service new development (Stage 1). Final sizing of potable water supply subject to further design development. South East water Accredited design consultants is to notify South East water to obtain approval on this school upgrade as part of the requirements noted in the Notice of agreement provided as part of Stage 0 works.
 - Pressure and flow statement of the existing 150mm water main Pearcedale Road have been obtained at the time of stage 0 works. Based on this statement, a domestic water pump will be required for the proposed buildings in stage 1.
- Sewer
 - There is no existing gravity sewer main pipe on Pearcedale Road, fronting the subject property. Based on the DBYD document and existing council sewer reticulation plans prepared as part of Stage 0, the existing property sewer system discharges into a sewer pumpstation which is pumped and connected into the existing 225mm sewer main in Pearcedale Road north of the property. Refer to appendix 08 for details.
 - Based on the council sewer plans (Appendix 08), there is an existing 150mm stub connection (IL 53.279) at the existing sewer pumpstation for connection of future stages. This existing 150mm pipe is sufficient to cater for the new buildings based on the preliminary sewer fixture load calculation. South East water Accredited design consultant is to notify relevant authority to obtain approval on this school upgrade. Subject to the size of existing assets, this sewer pumpstation and pipe may be required to be upgraded.
 - No information on the internal building layout at the time of this report. Where required, all trade waste from arts, food tech and canteen is to be treated through suitable pre-treatment device prior to discharging to the sewer system where required by South East water corporation. Further detailed to be designed during detailed design phase.
- Fire Hydrant System
 - Hydrant booster assembly (retained for Stage 1 and upgraded in Stage 3 per AS 2419.1)
 - Two (2) fire hydrant pumps (existing to be retained for Stage 1, subject to duty confirmation and hydraulic calculations, then upgraded in Stage 3)

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- Two (2) circular water storage tanks (minimum 144kL capacity for hydrants)
- Internal and external attack hydrants (as required for coverage)
- Fire Sprinkler System
 - New sprinkler booster assembly (adjacent to hydrant booster)
 - Two (2) new sprinkler pumps
 - Additional tank capacity (minimum 26kL for sprinklers)
 - Sprinkler control valve assembly for each building
 - System designed to AS 2118.1:2017, with Light Hazard classification for all classrooms and plant rooms to Ordinary Hazard classification, as per AS2118.1-2017 Appendix A (subject to certifier confirmation). Science labs may potentially be classified as Ordinary Hazard 3, see Section 3.5 for more detail.
- Combined Fire Requirements
 - Total fire water storage capacity: 170kL
 - Integrated tank solution

Refer to the body of this report for further information.

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1. Introduction

1.1. Purpose and scope

The primary objective of this report is to review the existing services infrastructure in conjunction with the proposed works and provide advice on any modifications required to be included as part of an overall feasibility study.

The following services were investigated:

- Water & Sewer (South East Water)
- Gas (Jemena)

This report does not cover the following:

- Inspection of services on site
- Investigation of structural or civil
- Measurement of services performance (e.g. data-logging)
- Review/verification of architectural design with respect to services provisions

1.2. Referenced documentation

1.2.1. General

NCC National construction code (Building code of Australia)

1.2.2. Hydraulic services

AS3500 Plumbing and drainage
PCA Plumbing Code of Australia (NCC VOL 3)
South East Water DBYD plans and pressure and flow enquiry results
VSIR Victorian Service and Installation Rules

1.2.3. Fire Services

AS 2419.1:2021 Fire Hydrant Installations
AS 2118.1 2017 Fire Sprinkler Installation

1.2.4. Electrical Services

AS/NZS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules)
Victorian SIR Victorian Service and Installation Rules
AS/CA S009:2013 Communications Alliance Ltd – Installation requirements for customer cabling (Wiring Rules)
United Energy DBYD plans, Authority design and construction standards

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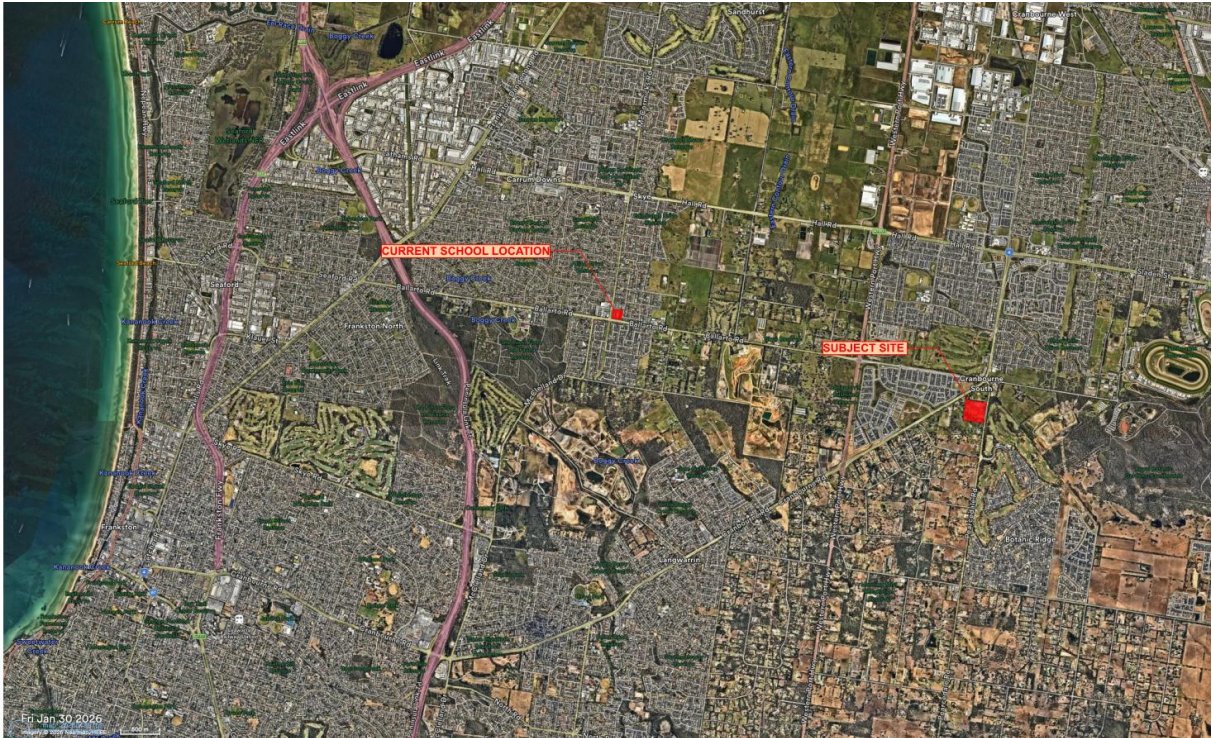
1.3. Definitions & abbreviations

BCA	Building code of Australia
BPA	Building Plan Approval
BSE	Building Services Engineers
DBYD/BYDA	Dial before you dig/Before you dig Australia
NCC	National construction code

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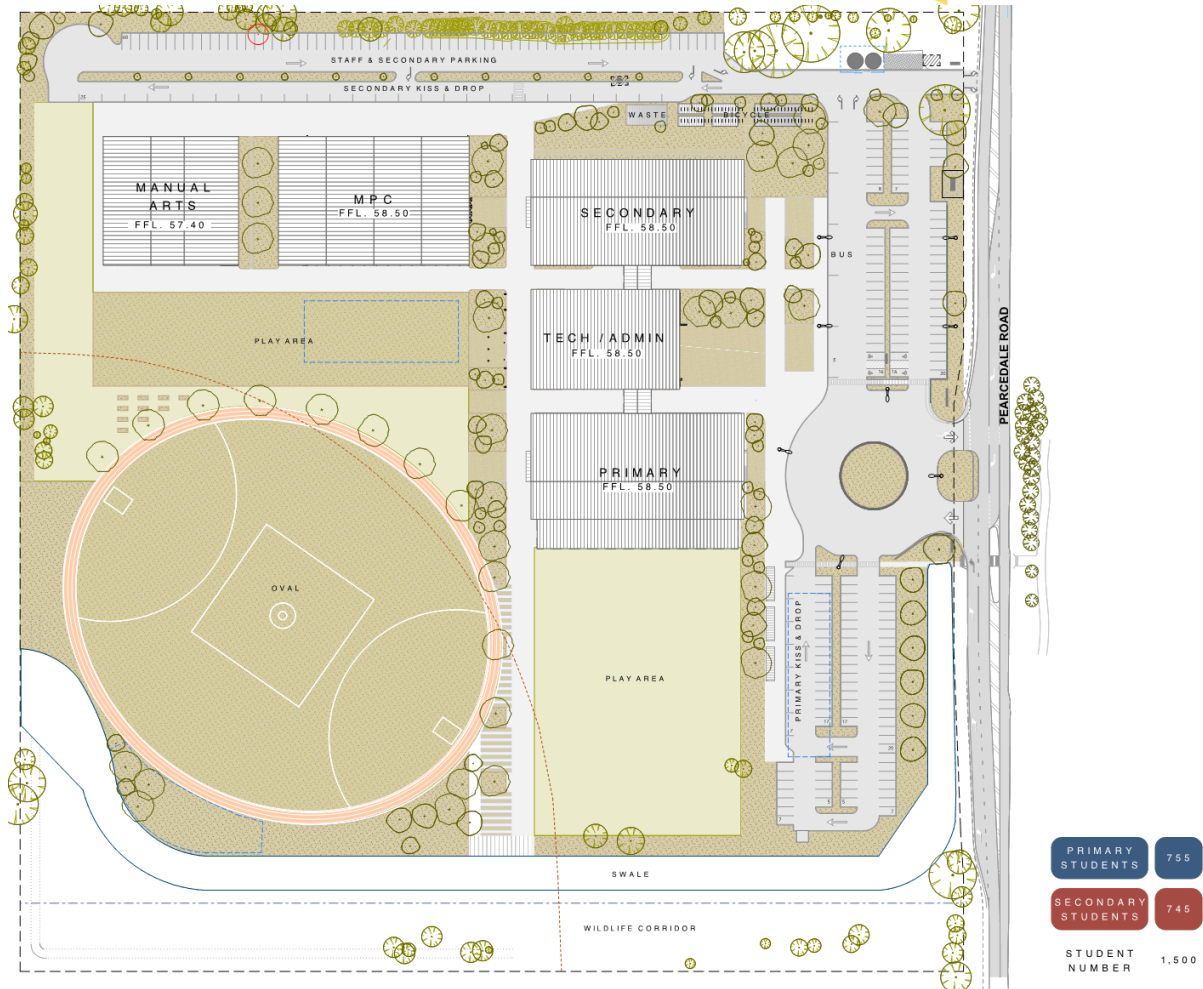
2. The site

This proposed development is located at 271-275 Pearcedale Road, Cranbourne South.



Source: ACC Casey Site location - Architectural plan prepared by CEM dated 09.04.2026

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Source: ACC Casey - Architectural plan Materplan prepared by CEM dated 09.04.2026

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3. Services Connections

3.1. Water

3.1.1. Existing Supply

Information regarding South East water potable water infrastructure has been gathered through a Dial Before You Dig Investigation and council civil plans prepared by Accredited design consultant during stage 0. As part of stage 0 works, there is an existing 150mm combined fire and domestic connection into the existing 150mm water main in Pearcedale Road. A 32mm site water meter and connection are installed as part of stage 0 works. Refer to Attachment 1, 4 and 6 in the Appendix for approximate location of these authority water mains and existing water connection.

3.1.2. Proposed Supply

Refer to attachment 5 for hydraulic plans markup on proposed water supply for the new development.

As per section 3.1.1 above, there is an existing 32mm master water meter and connection that supplies the existing development. Based on preliminary site calculations, this existing pipe and meter will need to be upgraded to 65mm to supply stage 1 works. Final size of the water supply will be subject to further design development. Refer to attachment 7 for preliminary hydraulic calculations for your reference.

As part of the stage 1 works, South East water Accredited design consultant is to notify South east water to obtain approval on this school upgrade as part of the requirement noted in the Notice of agreement provided as part of Stage 0 works.

We have obtained on site pressure and flow statement for the 150mm DICL water main in Pearcedale Road at the time of stage 0 works. Refer to attachment 3 for onsite Pressure and Flow test results. Based on these results, there is insufficient pressure on the existing main for domestic water services. Potable water pumps are to be located within a weatherproof enclosure adjacent to the master water meter to supply the whole site.

Potable cold water shall be provided to all fixtures used for washing, cooking, drinking and personal hygiene in accordance with NCC and AS3500.1 requirement. Water connection is to be provided to all Fire hose reels where required.

Rainwater from non-trafficable roof areas is to be collected, stored and reused for landscape irrigation purposes where required by ESD and/or relevant Authority. The rainwater reuse system shall consist of a filtration plant, pump set, and potable water top up.

3.2. Sewer

Refer to attachment 5 for hydraulic plans markup on proposed sewer drainage for the new development.

Based on the DBYD plans and stage 0 hydraulic and civil plans, there is a sewer pumpstation and pressure sewer designed and installed as part of the Authority asset by the accredited design consultant. The size of this existing sewer pumpstation is unknown, however there is a 150mm sewer stub connection at IL 53.279, provided on this equipment for future stages connection. Based on the preliminary sewer load calculation, the sewer drainage from the proposed buildings can be drained to this stub connection via gravity line and 150mm pipe size is sufficient.

There is no information on the size of this existing authority sewer pumpstation. Subject to the existing size of this authority asset, the sewer pumpstation may need to be upgraded. As part of the stage 1 works, South East water Accredited design consultant is to notify South east water to obtain approval on this school upgrade as part of the requirement noted in the Notice of agreement provided as part of Stage 0 works through the 'Property connect' portal.

Internal building layout is not provided at the time of this report. Provision of pre-treatment devices are to be provided to the new buildings (where required) prior to the connection to the sewer drainage in accordance with South East water requirements.

3.3. Gas

Based on the DBYD plans, there are no existing gas main on Pearcedale Road adjacent to the proposed development. We understand that gas connections to the gas main for all buildings are not required. Gas bottled LPG will be provided by the tenant for the science building (where required). Final sizing and location to be determined at the detailed design phase.

3.4. Fire Hydrant System

A compliant fire hydrant system is proposed for the site, comprising:

A hydrant booster assembly with large bore suction

Two (2) fire pumps

Two (2) circular water storage tanks – it is proposed to install larger tanks that will share capacity with the sprinkler system.

These components are to be located on the northern boundary near the vehicle entrance. Based on the current architectural layout and BCA report, the three interconnected buildings will become a Large Isolated building making a single fire compartment exceeding 10,000 m². As per AS2419.1-2021, this necessitates three (3) hydrants operating at a minimum flow rate of 10 L/s each. The town's main is indicating a flow capacity of maximum 20L/s and hence, the hydrant system requires tanks to makeup the additional 10L/s requirement for the duration of 4 hours as required in AS2419.1-2021.

Where feasible, external attack hydrants have been specified to service the buildings. However, due to limitations in coverage, particularly across internal floor areas—internal attack hydrants have also been incorporated into the design.

Hydraulic performance testing of the Authority's water main indicates insufficient flow to support the hydrant system without supplementary infrastructure. As such, a reduced-capacity tank of minimum 144kL is required for the hydrant system. The existing Stage 0 tanks have not been sized to allow for a combined hydrant and sprinkler system supply, hence, they will need to be replaced. Two (2) new 85kL minimum effective capacity tanks (total 170kL) will be installed and commissioned as part of Stage 1 works, this is to be completed before demolition of existing tanks occurs.

The existing hydrant booster assembly, located adjacent to the site boundary and vehicle access point, is to be retained to meet AS2419.1 until Stage 3. This location aligns with the recommendations of the existing Regulation 129 report. In Stage 3, it is proposed to replace the existing dual head booster inlets with a quad head booster inlets riser to meet the additional hydrant flow requirement since the fire compartment size will exceed 10,000m².

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Fire pumps are necessary to meet pressure and flow demands. Two (2) existing fire pumps installed under Stage 0 works are proposed to be retained, subject to pump duty confirmation and the hydraulic calculations for the Stage 1 works. They will be upgraded in Stage 3 for the increased flow demand of the hydrant system. Detailed hydraulic calculations must be undertaken at each stage to ensure that the hydrant pumps can achieve the required performance of the site-wide hydrant system. Should they prove insufficient, additional or replacement pumps will be required.

The existing hydrant main is to be extended as shown for Stage 1 works. The main pipework is then to be extended in Stages 3 and 4 and finally installed as a Ring Main which is required for a Large Isolated building as per AS2419.1-2021. The ring main shall be installed compliant to AS2419.1-2021 Section 8.6.2.2 -

1. Ring main shall be able to be isolated in 20%-33% increments and maintain not less than 50% of the fire hydrants for the fire compartment.
2. Fire hydrant pipe risers shall be installed in fire-isolated stairs or fire-isolated shafts, where provided.
3. The external ring main surrounds the entire building.

Furthermore, isolating valves shall be located along the ring main as per AS2419.1-2021 Section 8.7.2 –

- On each arm of the ring main, adjacent to the connection with the supply pipe;
- On branches into buildings, adjacent to the tapping in the ring main;
- On branches supplying more than one fire hydrant, adjacent to the tapping in the ring main;
- On branches supplying a sub-ring main, adjacent to the tapping in the ring main;
- On any supply pipe feeding a ring main, adjacent to the tapping in the ring main;
- On any interconnection within the ring main, on the cross-connecting pipe adjacent to the ring main, and on the ring main on each side of the cross-branching pipe; and
- On the ring main so that the ring main is isolated in 20%-33% increments and not less than 50% of the fire hydrants for the fire compartment are maintained.

Due to these requirements, the ring main design and installation is to be completed as part of Stage 4 works after detailed plans of all buildings have been developed and the total number of hydrants required for coverage is determined.

The fire services contractor is to coordinate with Fire Victoria where the hydrant system is to be taken offline to complete the scope of works and ensure that all on-site hydrant system works are completed within the downtime provided and brought back online.

3.5. Fire Sprinkler System

All three school buildings are to be equipped with a new automatic fire sprinkler system designed in accordance with AS 2118.1:2017. No existing infrastructure is available to support this system, and all components will be newly installed.

Key system components include:

- A dedicated sprinkler booster assembly (booster inlets adjacent to the hydrant booster)
- Two (2) sprinkler pumps
- Additional tank capacity integrated with the hydrant system

Each building will be provided with its own sprinkler control valve assembly, positioned as close as practicable to the respective buildings to minimise pipework and optimise system efficiency.

Based on preliminary architectural information, the buildings include the following:

- Teaching spaces - classified as Light Hazard under AS 2118.1 Appendix A
- Plant rooms for building services - classified as Ordinary Hazard 1.

This requires certifier confirmation as they may require a greater hazard classification for specific areas in the buildings, which would increase the tank capacity requirements. Appendix A does not accept chemical laboratories as light hazard, however, does not go into further details as to what a chemical laboratory would consist of. Hence, certifier is to review and advise if the sprinkler system is to be designed to a greater hazard classification.

The calculated tank capacity for the sprinkler system is 26kL, resulting in a total combined fire water storage requirement of 170kL. The proposed circular tanks are to have an approximate dimension of 3.5m H x 5.84m diameter each. Tank dimensions may be adjusted based on manufacturer limitations and ACC needs. It is to be noted that the DA conditions for Stage 0 works required that a privacy screen be installed between the fire services infrastructure and Pearcedale Rd, hence, it may be advisable to install tanks with a lower height requirement.

The new tanks are proposed to be installed in Stage 1, replacing the current tanks. The contractor must ensure that the new tanks are installed and commissioned prior to the existing tanks being demolished.

3.6. Electrical

3.6.1. Existing Supply

The site is situated within the United Energy Distribution Network. There are existing high / low voltage overhead power transmission lines running along Pearcedale Road with underground supply to street lighting along the frontage of 271-275 Pearcedale Road.

The current site is being supplied from a pole top transformer and high voltage supply originating from Pearcedale Road, extending into the property and where this connection is rated for 160A.

3.6.2. Proposed Supply

Based on the provided masterplan documentation, the total maximum demand for the finished site has been calculated at 1505 kVA. Thus, the school will need a set of 2x1000kVA dedicated kiosk transformers located on the proposed site with an easement in favour of United Energy being established for their access and servicing requirements.

The rating of the existing pole top transformer is unknown, but these are typically 250-300kVA which will be unsuitable for the size of the proposed development. The existing pole top transformer and overhead connection will be demolished/modified to suit the new arrangement.

It will be a requirement to make a new application for connection via a United Energy Authorised Designer to facilitate the new load for the development.

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4. Referenced Documentation

Table of referenced documentation attached to this report are listed below:

#	Document description	Source	Quantity of Pages
1.	South East Water/sewer/Recycled water DBYD enquiry plans dated 24.07.25 – BSE Markup	South East Water	3
2.	APA Gas Network DBYD plans dated 24.07.25 – BSE Markup	APA Gas Network	1
3.	Onsite Flow and pressure test results dated 22.07.2024	Victorian Hydrant Testing & Plumbing Pty Ltd	3
4.	Existing Council sewer and water plans – Stage 0 dated 12.03.2020	KLM Spatial	3
5.	20240419 Preliminary hydraulic markup and calculations - Water and Sewer V3	CEM/BSE	1
6.	20240419 Hydraulic services site plan – Stage 0	BSE	1
7.	Hydraulic Spatial V2	BSE	5
8.	Fire Spatial V2	CEM/BSE	5
9.	Electrical Spatial V1	BSE	1
10.	Overhead Power Line Survey 05.06.25	Key Consult	1
11.	Electrical Max Demand Calculations Dated 01/05/2026	BSE	1

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