Rob Pickett Design

Victory Lutheran College - Hudson Building

28 Drage Road, West Wodonga VIC 3690

HYDRAULIC SERVICES SPECIFICATION

Document: BSG1069 H-S01
Reference: 10112
Issue: Tender
Revision: T2
Dated: 21-May-25

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Building Services Group
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SUB SECTION 1.00 - GENERAL

1.10 - SCOPE OF WORK - HYDRAULIC SERVICES GENERALLY

The extent of this contract includes all works described in this specification and as indicated on the drawing/s for the final design, supply, installation, testing, commissioning, and maintenance of Hydraulic Services for the proposed Victory Lutheran College Student Services building at 28 Drage Road, West Wodonga VIC for Rob Pickett Design.

1.11 - Definitions:

Client – Rob Pickett Design
Hydraulic Services Consultant – Building Services Group
Architectural Consultant – Rob Pickett Design
Contractor – The successful tenderer for the Hydraulic Services Contract
Principal Building Contractor – The successful tenderer for the Construction Services Contract
Main Electrical Contractor – The successful tenderer for the Electrical Services Contract
Main Mechanical Contractor – The successful tenderer for the Mechanical Services Contract
Site Superintendent – Appointed Principal Building Contractor's site representative/coordinator for the duration of the works

1.12 - Scope of works "summary".

This project requires the supply and installation of hydraulic services for the proposed Class 5 office building development described above.

1.13 - Before You Dig Australia (BYDA):

Within the Construction Zone provide a detailed complete site survey of all the existing Hydraulic, Gas, Electrical and Communication services prior to carrying out any excavations. The Contractor shall provide pothole confirmation of services with high pressure water vacuum excavation prior to commencement of works. No mechanical excavation shall be allowed over or around communication, gas, and electrical services. High pressure water vacuum excavation only.

1.14 - Sewer Services:

Waste from sanitary fixtures shall discharge to the existing site sewer system.
Where indicated on design drawing/s, sewer inspection openings (io) shall be extended to finished ground level and finished with brass gas tight covers.
AC tundishes shall be connected to sanitary drainage unless otherwise noted.

1.15 - Gas Services:

Natural gas shall be supplied from the existing site natural gas system.
Natural gas shall be reticulated to appliances, as required, and as shown on drawings.

1.16 - Potable Water Services:

Cold water shall be supplied to the new building from the existing site cold water system.
Cold water shall be reticulated to fixtures, as required, and as shown on design drawings.

Hot water shall be supplied from a gas fired hot water units and dead leg systems.
Hot water shall be reticulated to fixtures, as required, and as shown on design drawings.

Tempered water shall be supplied by thermostatic mixing valves.
Tempered water shall be reticulated to fixtures, as required, and as shown on design drawings.

Direct hot water shall be supplied to non-ablution fixtures.
Tempered water shall be supplied to ablution fixtures.

Thermostatic Mixing Valves:

Thermostatic mixing valves supplying tempered water shall be installed where indicated on the drawings and as specified.
Thermostatic mixing valves shall be labelled and numbered with Traffolyte adhesive labels securely fixed to access panel of recessed box; or metal engraved labels securely fixed to access panel of recessed box; or tagged to valve with minimum 15mm high letters in a contrasting colour to the background label. Label numbering shall match design drawings or to Client requirements.

TMV temperature control pre-set to:

- 45° C. maximum for Disabled/Accessible fixtures.
- 45° C. maximum for Primary and Secondary Schools.

1.17 - Fire Services:

The existing fire system shall be extended, and a new hydrant shall be installed to provide coverage to the proposed building - By Victory Lutheran College.
Fire hydrants shall include locked landing valves with 003 fire brigade locks.
Fire extinguishers shall be installed in accordance with the BCA and AS2444.
The contractor shall supply all signage and identification as per AS 2419 and AS 2441.
The Contractor shall provide all fire system testing and commissioning and independent fire system certification, including as-constructed drawings and operating and maintenance manuals prior to practical completion.
The existing fire block plan shall be amended to reflect the completed system.

1.18 - Roof Drainage Services:

Provide PVC downpipes as indicated. Provide steel gutters, as indicated.
Roof mounted mechanical plant shall discharge over gutters, unless otherwise noted.

Cross reference:

Refer Architectural and Civil design documentation.

1.19 - Stormwater Services:

Stormwater drainage by the Civil Stormwater contractor, refer Civil stormwater drainage designs.
All external AC condensate discharge shall be connected to storm water unless otherwise noted.

Cross reference:

Refer Architectural and Civil design documentation.

1.20 - Fixtures and Tapware:

Refer Architectural Schedule.

1.20 - EXTENT OF WORK

1.21 - Requirement:

The hydraulic specification and design drawings shall be read in conjunction with the architectural design drawings and general requirements in the architectural specification; and all hydraulic service components nominated herein shall be installed in accordance with the Building Codes of Australia "BCA" and Australian Standards, in particular:

- AS/NZS 5601.1:2022 Gas Installations Part 1: General Installations.
- AS/NZS 3500 Plumbing and drainage Parts 0 – 4: 2021
- AS 2444-2001 Portable fire extinguishers and fire blankets – Selection and location.
- AS 2419.1:2021 Fire Hydrant Installations Part 1: System design, installation, and commissioning.
- The latest issue of all other relevant Australian Standards and other standards and guidelines associated with the works within this contract.
- The latest issue of the Local Network Supply Authority Service and Installation Rules.

All hydraulic services shall be installed by, or under the direct supervision of, a Licenced Plumber.

The design drawings are diagrammatic only and do not show all architectural and structural details. All existing services, levels and gradients shall be confirmed on site prior to commencement of works. The hydraulic services documentation shows the design intent and general arrangement of equipment.

Prior to submitting tenders, the Contractor shall perform a full and comprehensive site inspection to obtain an understanding of the existing site and facility and existing structural implications to the proposed hydraulic services installation. No price variations or extensions of time shall be allowed based on lack of site knowledge, or insufficient information provided during the tender period.

The design drawings provide approximate locations and mix of sanitary fixtures and additional items requiring connection to hydraulic services. Allowance shall be made for all diversions and minor adjustments of pipe work and equipment that may be necessary for construction, and during construction, to complete the works. The Contractor shall liaise with all associated contractors to ensure that any potential clashes of equipment or service is suitably avoided.

The Contractor shall make enquiries with Before You Dig Australia and obtain all available plans and information on existing services external to the site; and liaise with all network utility operators to confirm the positions and depths of external services before commencement of works.

No mechanical excavation shall be allowed over communication, gas or electrical services, hand excavation or high pressure water vacuum excavation only.

The design equipment is provided to assist in pricing and requirement. Alternative equipment may be provided by the Contractor only where such alternative equipment is of equal or superior quality and includes all features and functionality of the design equipment specified herein.
Due to the possibility of differences in equipment, it shall be the responsibility of the Contractor to ensure that all items of plant, pipe sizes, pipe types, pumps provided by the Contractor shall meet with the design conditions and intent of the specification.
The Contractor shall provide technical data equipment schedules for all plant being provided ensuring any alternative plant can be approved in appropriate time not to affect the building programme. *Refer to Section 1.60*.

1.22 - New Equipment and Systems

The following equipment and ancillary systems shall be provided the by the Contractor.

Sewer Drainage Services

- Supply and install all AC tundishes and waterless traps c/w access panels.
- Supply and install all vinyl floor waste grates.
- Supply and install all plumbing fixtures and tap ware as per Architectural Schedule.
- Supply and install all capped inspection openings and clear out points.

Potable Water Services

- Supply and install two (2) natural gas continuous flow hot water units.
- Supply and install two (2) 20mm thermostatic mixing valves in recessed wall boxes.
- Supply and install all plumbing fixtures and tap ware as per Architectural Schedule.

Fire Services

- Supply and install one (1) dual head external fire hydrant - by Victory Lutheran College.
- Supply and install eight (8) ABE rated powder type fire extinguishers.
- Supply and install one (1) AE rated Co2 type fire extinguisher.

1.23 - Associated Hydraulic Items

- Supply and Installation of all necessary hydraulic services and testing of the work specified below *(further details are outlined in Section 2.30 Materials – Hydraulic Services).*

  - Major plant and materials.
  - Excavation and backfill.
  - Sewer drainage.
  - Sanitary plumbing.
  - Hot water.
  - Potable cold water.
  - Natural Gas.
  - Fire Services.
  - Downpipes and overflows.
  - Sanitary fixtures and appliances.

- All fittings, fixtures and tap ware shall be supplied in accordance with Architectural schedules. *Refer to Section 3.90 Schedule of Sanitary Taps and Fixtures.*

- Cutting and removal from site of concrete for all hydraulic services required shall be provided by the Contractor.

- Drainage points shall be provided by the Contractor adjacent to all plant as required. Liaise and coordinate with Mechanical Contractor.

- Electrical connections to all plant and equipment supplied by the Contractor shall be provided by the Contractor.

- Drainage of roof level plant areas by the Contractor.

- Warranty and maintenance during the 12-month defects liability period, commencing at practical completion.

- If and where applicable all hydraulic service components nominated herein shall be installed in accordance with all relevant Authorities having jurisdiction over the site. The Contractor shall comply with the Building Codes of Australia "BCA", Australian Standards / guidelines - particularly AS/NZS 3500, AS 5601, AS 2419, and AS 2444 - and all relevant guidelines associated with the works within this contract.

1.30 - EQUIPMENT DUTY SPECIFICATIONS

1.31 - Drainage Services Equipment

ITEM	DUTY	ACCESSORIES
Vinyl Floor Clear-out Caps *SPS*	100mm Polished stainless steel	
Vinyl Floor Waste Assembly *SPS*	100mm Polished stainless steel	
External Inspection Opening Gas Tight Ground Finishing Caps. *CivilMart* SA Water No. 4 Cover (or equiv.)	100mm with cast iron gastight cap. Concrete (pre-cast or poured in-situ) finishing mound. Minimum 75mm thick around finishing cap, with concrete sponge finish.	
In Wall Tundish *M.A.G.* 78000 or 78001 (or equiv.)	Stainless steel in-wall tundish. Built in air gap. 40mm outlet threaded. Windowed face plate.	Waterless trap required if not discharging to fixture.

1.32 - Potable Water Services Equipment

ITEM	DUTY	ACCESSORIES
Thermostatic Mixing Valve *Enware* Aquablend 1500 (or equiv.)	Pre-set delivery temperature: max. 45°C. Supply to ablution fixtures.	Stainless steel recessed wall box with lockable access panel. Box installed at max. 1800mm above floor level.

Hot Water Unit *Rinnai* 2x B26 (or equiv.)	1x continuous flow water heater. Natural gas fired. Pre-set delivery temperature: 65°C. Delivery rate: 14 L/min at 50°C rise. Gas load: 210 mJ/hr	Valves and fittings for water and gas connections. Tundish discharge point for cold water expansion valve. Install in brick wall cavity. Include face cover.

1.33 - Fire Services Equipment

ITEM	DUTY	ACCESSORIES
External Fire Hydrant **by Victory Lutheran College** *Kline Fire* ADHH100C (or equiv.)	Attack Hydrant (Pump Assisted) Min. 10 l/s each @ 700 kPa. Dual 65mm brass landing valves c/w male Fire Brigade Thread (FBT) semi-permanently fitted with a female FBT Storz adapter conforming to *NEN 3374:1971,* Section 3, *Dimensions and Coding, Parts,* Part No.5. Storz adaptor/coupling must be forged aluminium alloy according to *DIN 1725 Sheet 1* or later. 100mm Hot dipped galvanised pipe riser.	Locking caps and chains. Landing valve handle wheel locking covers and 003 locks

Portable Fire Extinguishers *Firebox* Extinguishers (or equiv.): Water: FB90AW Foam: FXAF Wet Chemical: FB70WC Powder: FB45ABEHP Co2: FB50CO2	Extinguishers: Water (Refillable) - Rated 2A (9L min.) Foam - rated 3A:30B (9L min.) Wet Chemical - rated 2A:4F (3.5 L min.) Powder - rated 4A:60B:E (4.5kg min.) Co2 - rated E (5 kg min.)	Wall mounting brackets Signage to AS 2444

IMPORTANT

The above Makes and Model numbers have been noted as a guide only. It shall be the responsibility of the Contractor to ensure that the makes and models selected, suit the intent of the design.

Note:

All pipe dimensions shown on designs represent a nominal bore requirement as for copper tube. Alternative piping materials with a greater wall thickness must be sized to maintain the intended nominal bore requirement.

1.40 - EXTENT OF ASSOCIATED WORK BY OTHER TRADES:

REQUIREMENT:

The Contractor shall liaise and coordinate information to allow all other nominated services contractors to provide the following works.

- The Main Electrical Contractor shall provide the necessary 3 phase and 240-volt General Power Outlets adjacent to plant. The Contractor shall coordinate this provision and allow for connections of power to all plant required.
- Plinths to pumps and equipment installations shall be provided by the Principal Building Contractor.
- Penetrations and Under Flashing shall be provided by the Principal Building Contractor.
- Replacement of existing concrete shall be provided by the Principal Building Contractor.
- Roof, box gutters and eave gutters shall be provided by the Roofing Contractor.

1.50 - AUTHORITIES APPROVALS - HYDRAULIC SERVICES GENERALLY

1.51 - Requirement:

All the work shall be carried out by or under the full supervision of a fully licensed plumber in accordance with the drawings and specification, reviewed by the site superintendent and approved by all relevant authorities.

The Contractor shall carry out necessary liaison and co-ordination with all Network Supply Authorities to ensure satisfaction of their requirements.
The Contractor shall lodge all necessary applications, pay all fees, licenses, registrations, approvals, notifications, charges, and the like required by statutory authorities and as required for the satisfactory completion of the works.

If any uncertainty exists as to a section of the design being able to comply with the appropriate standard, the site superintendent shall be notified with written approval obtained prior to the commencement of any work. No claims for redundant works shall be considered if the Contractor fails to notify the site superintendent and obtain written approval before the commencement of such works.

The relevant Authorities shall include but not be limited to the following:

- City of Wodonga
- North East Water
- Victorian Building Authority
- Fire Rescue Victoria (FRV)
- CFA Victoria
- WorkSafe Vic

1.52 - Minor and Incidental Work:

Unless otherwise specified, provide all minor and incidental materials and labour including all cutting, boring, flashing and making good necessary to form a complete, safe, and reliable installation of the Hydraulic Services.
Minor works, or obvious works, and items that are necessary to provide fully functioning systems in full compliance with the design intent and the technical requirements of the documentation are not necessarily shown. It is the contractor's responsibility to provide such obvious work and/or confirm with the appropriate contractor/consultant if unsure. Make all necessary alterations to the general arrangement and system design to accommodate any equipment offered and accepted as an alternative to the specified equipment.

1.60 - INSPECTIONS AND MILESTONES HYDRAULIC SERVICES GENERALLY

1.61 - Inspection and Test Plan:

The Contractor shall provide the Site Superintendent with Inspection and Test Plans (ITP's) for each test, *refer to Section 2.20*.

1.62 - Witness Points:

The Contractor shall provide the Site Superintendent with two (2) working days' notice for Building Services Group inspection of the following witness points:

- Trenches after installation of pipes.
- Water and gas service rough ins before lining of walls.
- Operation and maintenance manuals, including as-constructed drawings, prior to issuing notice to Building Services Group for required completion inspection and commissioning review.
- Completion inspection and commissioning review.

The installation must pass all authority inspections. Each component of the installation must be tested in an approved manner to ensure its correct operational condition.

1.63 - Holds Points:

The Contractor shall provide the Site Superintendent with five (5) working days' notice for Building Services Group inspection of the following hold points:

- Approval of specified fixtures and tapware. Provide samples of all specified fixtures and tapware for approval by the Client.
- Supply a sample, or specific catalogue details, of all materials and equipment that are proposed as alternatives to the specification for approval by the Project Manager. In the case of equipment that is to be manufactured specifically for this work, and which is proposed as an alternative to the specification, supply the design for the equipment. The design shall be in satisfactory detail to enable an appraisal without reference to additional material. Provide samples with adequate time for evaluation without affecting project timing as no extensions of time will be allowed for delays associated with this requirement.
- Provide variation shop drawings if intending to alter services locations from project documentation.
- Confirmation of the exact position of all plumbing fixtures and tapware on site with reference to Architectural Consultant detail plan and elevation drawings prior to installation.
- Confirmation of the exact position of all AC tundishes on site with reference to Architectural Consultant detail plan and elevation drawings prior to installation.
- Confirmation of the exact position of all fire services on site with reference to Architectural Consultant detail plan and elevation drawings prior to installation.

1.70 - DRAWINGS

1.71 – Contract Drawings:

General:

The following drawings form part of this specification and contract. Information contained in either the drawings or the specification but not in the other is considered included in both and executed as part of this contract.

1.72 - Drawing N°s.

Drawing No.	Drawing Title	Drawing Date
BSG1069-H000	**Cover Page - Legend & General Notes**	**21/05/2025**
BSG1069-H010	**Site Services - Part Site Plan**	**21/05/2025**
BSG1069-H100	**Drainage Services - Ground Floor Plan**	**21/05/2025**
BSG1069-H101	**Drainage Services - First Floor Plan**	**21/05/2025**
BSG1069-H150	**Roof Drainage & Penetrations - Roof Plan**	**21/05/2025**
BSG1069-H250	**Water & Fire Services - Ground Floor Plan**	**21/05/2025**
BSG1069-H251	**Water & Fire Services - First Floor Plan**	**21/05/2025**
BSG1069-H300	**Typical Details - Page 01**	**21/05/2025**
BSG1069-H500	**Fire Hose Coverages - Ground & First Floor Plans**	**21/05/2025**

Co-Ordination:

The drawings are diagrammatic only. Determine exact installation positions, requirements and dimensions from site inspections and site measurements. Co-ordinate the installation with adjacent structure elements and all other services.

1.73 – Variation Shop Drawings:

If it is proposed to change the installation from that shown on the drawings, or if a change is required by a regulatory authority, the Contractor shall prepare and submit prior to commencement of such works, marked up drawings showing the proposed change and obtain written approval before commencing.

Drawings shall include elevations, sections, schematic diagrams/ single line diagrams, and equipment lists.

Drawings shall be produced using computer aided drafting software.

The variation drawings shall be coordinated with other building services to ensure that all equipment will fit in the locations nominated. Approval of the shop drawings does not remove from the Contractor the responsibility for the correctness of dimensions, quantities, calculations, construction, fabrication techniques, co-ordination of work with other trades, or supply authorities.

1.74 - As Installed Hydraulic Services Drawings:

General:

At practical completion, the installer shall be responsible for the amending, updating, and providing electronic CAD files to 'As Installed' status. These shall show accurately all changes made during the project including any changes to location of pipework, equipment, and fixtures. Three (3) paper sets of 'As Installed' Drawings are to be provided. Sheet size shall be full size to match construction drawings.
Provide all drawings on CD or USB to client in DWG and PDF format.

This includes the Contract drawings listed in this specification / shop drawings for all services.

All as installed drawings shall be complete in "CAD" format using a program capable of producing "DWG" drawings. All CAD works shall be completed by a competent drafter experienced in using AutoCAD or a similar program.

The project is deemed to be incomplete until the compliance with this section has been achieved. A copy of the 'As Installed' drawings shall be provided at Practical Completion and a complete set complying with the requirements of this specification at Final Completion including any alterations made during the Defect Liability Period.

'As Installed' Drawings shall have all previous revision lines and revision clouds removed and be clearly marked as 'As Installed' drawings.
Relocated items will only be shown in their new location. All notes on the drawings shall be clear and legible with the appropriate font to prevent clashing of text. Any approved alternative products that have been used on the project will be added to the legend.
The services route on any site plan shall be edited to show the actual path as was installed.

Drawing Requirements:

'As Installed' drawings shall include, but are not limited to, the following:

- Project Description to match contract drawings.
- Drawing number to match contract drawings.
- Drawing title to match contract drawings.
- Contractors company logo and/or details.
- Scale and size of drawing.
- Date of completion of as installed drawings.
- Initials of drafter completing the as installed drawings.

1.75 – Fire Block Plan(s) - by Victory Lutheran College:

General:

Where a fire brigade booster assembly is installed, there shall be a water-, fade-, and weather-resistant block plan(s) that complies with AS-2419.1:2021.
The block plan shall be engraved metal securely fixed to inside of fire brigade booster assembly cabinet and fire pump room (if required).
The fire block plan shall be completed in "CAD" format using a program capable of producing "DWG" drawings. All CAD works shall be completed by a competent drafter experienced in using AutoCAD or a similar program.
The project is deemed to be incomplete until the compliance with this section has been achieved.
A copy of the 'Fire Block Plan' shall be provided at Final Completion.

Drawing Requirements:

'Fire Block Plan' shall display the following:

- A diagrammatic layout of the protected building or open yards and adjacent streets.
- A diagram showing-
    - Size and location of water supply authorities' mains and street fire hydrants (dimensioned);
    - Any valves and connections with the water supply serving the building or site;
    - Location and size of on-site fire mains;
    - The length and size used of any PE underground pipework;
    - Location and capacities of water storage tanks;
    - Location of pumps;
    - Location and number of each fire hydrant;
    - Location of all fire brigade booster assemblies;
    - Location and number of any isolating valve;
    - Location of any non-return valves;
    - Any connection to other installed fire protection systems;
    - Location of the main electrical switch-room and substation;
    - The location of LPG tanks and gas supply shutdown valve;
    - The location of all flammable storage areas;
    - The location of any fire indicator panel or fire control centre;
    - The location of any sprinkler alarm valve sets; and
    - A north point symbol orientated to suit reader direction.
- The year of installation of the system, any major extensions thereto, and any unusual features of the installation, and-
    - The name of the contractor who installed or modified the system;
    - The name of the designer of the system;
    - The name of the contractor who commissioned the system;
    - The required system design and commissioning pressure and flow rate (kPa @ L/s) -
        - At the fire brigade booster connection inlets, when the fire hydrant system is boosted by a fire brigade pumping appliance; and
        - From the discharge side of any on-site pump, where applicable.
    - The automatic inflow rate to any reduced-capacity tank;
    - The network utility operator flow and pressure details under 95th percentile demand conditions;
    - The height of the highest fire hydrant outlet above the lowest booster inlet connection; and

The number of fire hydrants required to flow for each fire compartment, where the fire hydrant system design incorporates differing flow rates.

1.80 - OPERATING AND MAINTENANCE MANUALS

Cross Reference:

Refer to general requirements in the architectural specification.

General:

Submit operation and maintenance manuals for installations prior to practical completion for review and approval.

Authors and Compilers:

Use personnel experienced in the maintenance and operation of equipment and systems installed, and with editorial ability.

Subdivision:

By installation or system, depending on project size.

Referenced Documents:

If referenced documents or technical sections require that manuals be submitted, including corresponding material in the operational and maintenance manuals.

Format:

Comprehensive information in electronic form as detailed below and two (2) hard copies in A4 size loose leaf, in commercial quality, 4 ring binders with hard covers, each indexed, divided and titled.

Include the following features:

Pagination: Number pages consequently.

Cover: The cover and spine of the manual shall have the following on it:

HYDRAULIC SERVICES
OPERATION & MAINTENANCE MANUAL

[PROJECT NAME]
{Date of practical completion}

Ring size: 50mm maximum, with compressor bars.

Text: Manufacturers' printed data, including associated diagrams, or typewritten, single-sided on bond paper, in clear concise English.

Dividers: Durable divider for each separate element.

Drawings: Print drawings at full size and fold to A4 size.

Contents:

Include the following:

Drawings and technical data:

- As necessary for the efficient operation and maintenance of the installation.

Table of contents:

- For each volume. Title to match cover.

Directory:

- Names, addresses, and telephone and facsimile numbers of principal consultant, sub consultants, contractor, subcontractors, and names of responsible parties.

Installation description:

- General description of installation.

Systems descriptions:

- Technical description of the systems installed, written to ensure that the client's staff fully understand the scope and facilities provided. Identify function, normal operating characteristics, and limiting conditions.

Systems performance:

- Technical description of the mode of operation of the systems installed.

Equipment descriptions and Asset Register:

- Name, address and telephone and facsimile numbers of the manufacturer and supplier of items of equipment installed, together with catalogue list numbers.
- Schedules (system by system) of equipment, stating locations, duties, performance figures and dates of manufacture. Provide a unique code number cross-referenced to the record and diagrammatic drawings and schedules, including spare parts schedule, for each item of equipment installed.
- Manufacturers' technical literature for equipment installed, assembled specifically for the project, excluding irrelevant matter. Mark each product data sheet to clearly identify specific products and component parts used in the installation, and data applicable to the installation.
- Supplements to product data to illustrate relations of component parts. Include typed text, as necessary.

Operation procedures:

- Manufacturer's technical literature as appropriate.
- Safe starting up, running-in, operating and shutting down procedures for systems installed. Include logical step-by-step sequence of instructions for each procedure.
- Control sequences and flow diagrams for systems installed.
- Legend for colour-coded services.
- Schedules of fixed and variable equipment settings established during commissioning and maintenance.
- Procedures for seasonal changeovers.

Contents cont.…:

Maintenance procedures:

- Manufacturer's technical literature as appropriate. Register with the manufacturer, as necessary. Retain copies delivered with equipment.
- Detailed recommendations for preventative maintenance frequency and procedures which should be adopted by the client to ensure the most efficient operation of the systems installed. This information will include the following documentation:
- Comprehensive Asset Register
- Detailed Maintenance Program
- Description of Maintenance Tasks
- Safe troubleshooting, disassembly, repair and reassembly, cleaning, alignment, and adjustment, balancing and checking procedures. Provide logical step-by-step sequence of instructions for each procedure.
- Schedule of spares recommended to be held on site, being those items subject to wear or deterioration and which may involve the client in extended deliveries when replacements are required. Include complete nomenclature and model numbers, and local sources of supply.
- Schedule of normal consumable items, including local sources of supply and expected replacement intervals; up to a running time of 40,000 hours. Include lubricant and lubrication schedules for equipment.
- Instructions for use of tools and testing equipment.
- Emergency procedures, including telephone numbers for emergency services, and procedures for fault finding.

Certificates:

- Copies of manufacturers' warranties.
- Certificates from authorities.
- Product certification.
- Copies of test certificates for the mechanical installation and equipment used in the installation.
- Test and balancing reports.

Drawings:

- Work-as-executed drawings, full size.
- Switchgear and control gear assembly circuit schedules including electrical service characteristics, controls, and communications.
- Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Timing and Quantity:

Draft manuals:

- Submit 2 draft manuals 8 weeks before the date for practical completion to enable the client's staff to familiarize them with the installation. Include provisional record drawings and preliminary performance data.

Format:

- As for the final manuals, with temporary insertions for items which cannot be finished until the installation is commissioned and tested.

Revised draft manuals:

- Submit revised draft manuals 2 weeks before commissioning.

Progressive:

- For equipment put into service during construction and operated by client, submit manuals within 2 weeks after acceptance.

Final drafts:

- Submit for review after completion of commissioning and no later than 2 weeks before the date for practical completion. If available, include certificates from authorities, and warranties.

Final copies:

Submit 3 sets of final volumes within 2 weeks after practical completion. Incorporate feedback from review and from training of client's staff, including preparation and insertion of additional data.

Revisions:

- Submit 3 sets of loose-leaf amendments for insertion in the manuals, incorporating feedback from the maintenance period, within 2 weeks after completion.

Contractor's Copy:

Retain a copy of the operation and maintenance manual until expiry of the maintenance period.

Certification:

On satisfactory completion of the installation, submit certificates stating that each installation is operating correctly.

SUB SECTION 2.00 - SPECIFIC REQUIREMENTS

2.10 - DEFECTS LIABILITY PERIOD

The entire installation shall be warranted for a full 12-month Defect Liability Period. Any equipment replaced during this Defect Liability Period shall be subject to a further 12 months Defect Liability Period from the time of installation.
During the Defect Liability Period the contractor shall carry out all mandatory maintenance required by Australian Standards and the Building Code of Australia.
Details of this maintenance shall be recorded in logbooks, signed off by the Site Superintendent, and then left with the Principal Building Contractor.
The Contractor shall provide a service schedule detailing all maintenance to be carried out.

2.20 - TESTING, TRAINING AND MAINTENANCE

COMMISSIONING DATA:

All commissioning shall be witnessed by an appointed representative of the Principal Building Contractor.
All commissioning data shall be included as Section 4 of Operating and Maintenance Manual.

TESTING:

The Contractor shall allow for the costs (labour and materials) of carrying out all tests as required by the respective authorities. All underground or enclosed work must be inspected prior to being concealed *refer Section 1.62 Witness Points*.

INSPECTION AND TEST PLAN:

The Contractor shall provide the Site Superintendent with Inspection and Test Plans (ITP's) for each test, these ITP's shall show:

- Date of test.
- Test undertaken.
- Test equipment used.
- Name of test personnel.
- Results of test.

On completion of the works included under this part of the specification the Contractor shall carry out any procedure required to prove that the respective systems are operational under normal working conditions, as requested by the Site Superintendent and authorities. Provide a minimum of two (2) working days' notice to the Site Superintendent before the commencement of testing.

A separate set of ITP's and drawings recording testing results shall be maintained on site. The drawings of each section of work that has passed a satisfactory test shall be initialled by the Site Superintendent. Remedy any defects in the piping found during testing and retest as specified under each section of work.

TRAINING:

General:

Operation and maintenance manuals: Use items and procedures listed in the final draft operation and maintenance manuals as the basis for instruction.
Review contents with the operational staff in detail.
Format: Conduct training at agreed time, at system or equipment location allowing adequate time to transfer the level of detailed systems knowledge to operational staff as required.

Operation:

Immediately prior to Practical Completion, explain and demonstrate to the operational staff the purpose, function, and operation of the installations. Generally, this process will require a formal handover session to operational staff consisting of the following:

- General overview of the systems concept and operational targets
- Detailed understanding of main system components
- Understanding of the controls' strategy

Demonstrators:

Use qualified manufacturer's representatives who are knowledgeable about the installations.

Seasonable Operation:

For equipment requiring seasonal operation, demonstrate during the appropriate season and within 6 months.

MAINTENANCE:

General:

General: Any new specification shall include standard clauses for the preventative maintenance requirements of plant and equipment.
As a minimum maintenance works shall run for the duration of the Defects Liability period and will include periodic inspections and maintenance work as recommended by the manufacturers of the supplied equipment.
The contract shall require the Contractor to provide a same day response to items that are designated by the Client as being of an urgent nature during the defect liability period.

Maintenance Program:

Submit details of maintenance procedures and program, relating to installed plant and equipment, 6 weeks before the date for practical completion.
Indicate dates of service visits. State contact telephone numbers of service operators and describe arrangements for emergency calls.

Maintenance Records:

Submit in binders, loose leaf logbook pages designed for recording completion activities including operational and maintenance procedures, materials used, test results, comments for future maintenance actions and notes covering the condition of the installation.
Include completed logbook pages recording the operational and maintenance activities performed up to the time of practical completion.

Certificates:

Include all test and approval certificates.

Service Visits:

Record comments on the functioning of the systems, work carried out, items requiring corrective action, adjustments made and name of service operator.
Obtain the signature of the client's designated representative.

Referenced Documents:

If referenced documents or technical sections require that logbooks or records be submitted, include this material in the maintenance records.

2.30 - MATERIALS

Piping:

Piping shall conform to the relevant standards and be in accordance with materials and sizes shown on the tender drawings and/or detailed in the specification. All piping shall be identified with adhesive type label and painted, if necessary, by relevant standard.

All pressure and gravity piping shall be flushed out to remove any foreign debris from the pipe work and capped off during the construction period to prevent the entry of any foreign debris into the piping.

Concrete:

Concrete used in the completion of the works shall have a minimum strength of 20 mPa at 28 days as per Australian Standard AS1012.

Core Holes and Sleeves:

Core holes and sleeves shall be set out in floors, walls, columns, and beams in conjunction with formwork or concrete finishing. All core hole locations shall be approved prior to concrete placement to prevent weakening of the building structure.

Sleeve material used in forming the core shall be either P.V.C or 0.7 mm galvanised sheet metal and shall have a diameter of at least 80 mm greater than the pipe served.

Fire Stopping:

Pipes passing through any fire rated element shall be fitted with an approved fire stop collar and appropriately filled using a sealant of approved material capable of completely sealing pipe penetration under fire conditions.

Concealed Piping:

Unless otherwise approved or directed, piping must be concealed. A mechanical saw must be used for all chasing requirements. Chasing is forbidden in concrete walls or face walls unless directed to do so by the Site Superintendent.

Block work chases shall not exceed 1200 mm horizontally and be less than 600 mm to supporting elements vertically. Where pipes are unable to be chased, they shall be installed as the work proceeds. The Site Superintendent will provide direction with respect to the location of services in masonry walls. Concealed piping in walls shall be insulated, allowing for adequate expansion and contraction.

Exposed Pipework Treatment:

VOC Limits
Any paint used in an internal application (including inside enclosed AHU plant rooms) and applied on site, must meet the TVOC content limits outlined in Green Star Table IEQ13.1. This includes exterior-grade and solvent based paints should they happen to be used in an interior application. Values should reflect the final product as mixed and ready to use, inclusive of tints. Paints are defined as any liquid applied finishes.

Chrome Plating:

Internal exposed piping adjacent to plumbing fixtures, including traps and fittings shall be chrome plated finished and, where passing through a finished wall, floor, or ceiling, shall be fitted with approved chrome plates, unless directed otherwise by the Site Superintendent.

Protection of finished and polished services:

Finished surfaces shall be adequately protected against damage during the construction period, scratched or damaged finished surfaces will not be accepted.

Fixing and Supporting of Pipes:

Pipe work and fittings shall be:

- Only fixed in approved locations.
- Adequately secured to the structure to support the pipe work under full load conditions.
- Kept clear of structure and other services.
- Utilise galvanised sheet metal sleeves for pipes passing through structure.
- Allow for adequate expansion and contraction, eradicating stress on pipes or joints.
- Fixed on hanger brackets to allow adjustment for fall.
- Explosive power tools for fixing purposes are forbidden.

If, and where, required, the contractor shall obtain design documentation from a seismic specialist consultant for AS 1170.4 installation requirements.

Supply of Material:

Supply and fix all materials required to complete the works. Poor quality or inferior materials shall be rejected. All costs associated with replacement of rejected materials shall be borne by the Contractor.

Samples:

Labelled samples of materials are to be supplied on request. On approval, all installed work shall conform to the quality of the provided sample.

Copper Tube and Fittings:

Copper tube shall:

- Conform to Australian Standard AS-1432 Copper Tubes for Plumbing, Gas Fitting and Drainage Applications.
- Be approved by local authority.
- Be type B for hot and cold water.
- Be type B for internal Fire Hose Reels supplied via town main supply only.
- Be type A for Potable Cold Water supply from authority water main to authority water meter assembly.
- Be jointed with silver solder containing not less than 15% silver for pressure piping and 5% silver for all other copper tube.
- Be press-fit jointed with fittings made of copper or gunmetal (Viega or equivalent)

Fittings for Copper Tube shall:

- Conform to Australian Standard AS-3688 Water Supply Copper and Copper Alloy Compression and Capillary Fittings and Threaded End Connectors.
- Be approved by Local Authority.
- Be dezincified brass or copper suitable for jointing by silver solder.
- Minimum wall thickness shall be not less than the tube thickness it serves.

Installation/Commissioning:

- Copper pipe and fittings shall be installed and commissioned to comply with AS-4809.

Cross Linked Polyethylene Pipe and Fittings (PE-X):

Cross linked polyethylene pipes shall be:

- Installed in accordance with AS/NZS-2033 for hot and cold water systems.
- Compliant with AS/NZS 2492 and 2537.
- Not less than PN 16 for water applications.
- Not less than SDR 11 for gas applications.
- To the equivalent pipe size tables as stated in AS-3500.
- Not be use in prohibited areas as specified in AS-3500.

Fittings for polyethylene pipes shall:

- Comply with AS/NZS 2492 and 2537.
- Be of brass type dezincification resistant to AS-3688.

PVC Pressure Pipe:

PVC pressure pipes and fittings shall be:

- Manufactured to AS/NZS 1477
- PN rating shall be selected based on expected working pressures for individual systems.
- Type: PVC-U:
    a) Series 1 minimum PN12 for domestic building supply.
    b) Series 1 Rubber Ring Joint (RRJ) PN ratings 4.5 – 12.
    c) Series 2 Rubber Ring Joint (RRJ) PN ratings 12 – 20.
    d) Series 2 Solvent Cement Joint (SCJ) PN ratings 4.5 – 18.
    e) Maximum temperature 60°C.

Type: PVC-M pressure pipes and fittings shall be:

a) Series 1 minimum PN12 for domestic building supply.
b) Non fire services - Series 1 Rubber Ring Joint (RRJ) & Solvent Cement Joint (SCJ) PN ratings 9 – 12.
c) Fire Services - Series 2 Rubber Ring Joint (RRJ) PN ratings 16 – 20.
d) Minimum PN16 for below ground fire service.
e) Ductile Iron RRJ fittings.

Ductile Iron Cement Lined Pipes and Fittings:

Ductile iron cement lined pipes shall be:

- Of rubber ring joint construction and sleeved in protective PVC sheath where installed underground.
- Of flanged connections and appropriately supported and fixed, when installed above ground.
- Compliant with AS/NZS-2280

Thrust Blocks:

- As per AS-3500.

Polyethylene Pressure Pipe:

Polyethylene pressure pipes and fittings shall be:

- Conform to AS/NZS-4130:2003.
- PN rating shall be selected based on expected working pressures for individual systems.
- Type: PE100 AS4130 BLUE STRIPE – Minimum PN12.5 for domestic building supply.
- Type: PE100 AS4130 BLUE STRIPE – Minimum SDSR11 PN16 for below ground fire service.
- Type: PE100 AS4130 RED STRIPE – Minimum SDR11 PN16 for below ground fire service.
- Type: PE100 AS4130 GAS YELLOW STRIPE SDR11 – SDR 17 for below ground gas supply.
- Type: PE100 AS4130 BLACK – Minimum SDR21 PN8 for pressure storm water drainage.
- Electro fusion welded fittings and pipe connections.
- Installed as per manufacturer's specifications.
- Installed with detectable marking tape, OR: a copper trace wire connected to the exposed metal piping at end connections.

uPVC Pipes and Fittings for Sewer and Stormwater Non-Pressure Drainage:

All U.P.V.C. pipes and fittings shall be:

- uPVC (DWV)
- ISO 14001 certified EMS that includes the requirements of the Best Practice Guidelines
- Independently audited manufacturer's declaration of compliance to the Best Practice Guidelines; or product third party certification of compliance to the guidelines (ISO type 5 certificate or eco label)
- The best practice guidelines are outlined in the updated Green Star PVC Credit released in May 2011. These guidelines must be complied with for all PVC.
- In conformity with AS 1260 Un-plasticised PVC (PVC-U) Pipes and Fittings for Sewerage Applications Parts 1 to 4.
- Approved by Local Authority.
- Solvent weld jointed in accordance with the manufacturer's instructions.
- Incorporate fittings of similar manufacture to the pipe used.

High Density Polyethylene (HDPE) for Trade Waste Drainage:

All HDPE pipes and fittings shall:

- Conform to AS/NZS-4401 for above ground installations.
- Conform to AS/NZS-5065 for Below ground installations.
- Be installed in accordance with AS/NZS-2033.
- Installation shall be to manufacturers specifications.
- Pipes and fittings to be electro fusion welded.
- Expansion sockets to be installed as per manufacturers specifications.

Pipework fixing:

- Obtain approval for any alternative fixing methods before commencement of work. Mild steel must be hot dipped galvanised.
- Use P.V.C. barrier between copper pipes and steel brackets.
- Use P.V.C. coated brackets on P.V.C. pipes.
- Use galvanised bolts and fixings of appropriate size.
- Use patented masonry anchors for fixing into masonry elements.

Spacing:

- Cross-linked polyethylene as per AS-2033
- All other pipes as per AS-3500.

Flanges:

Flanges shall:

- Conform to AS-2129 Flanges for Pipes, Valves and Fittings.
- Be brass for copper tube.
- Be galvanised mild steel or cast iron and galvanised mild steel tube.
- Be jointed with 4 mm thick reinforced rubber insertion.
- Use gunmetal bolts with a tensile strength of 600 mPa on brass flanges.
- Use galvanised steel bolts in accordance with AS 2451 Bolts, Screws and Nuts with British Standard Whitworth Threads on cast iron and steel flanges.
- Bolts and nuts below ground shall be stainless steel.

Valves:

Unless otherwise indicated all valves shall be:

- Manufactured in Australia.
- Approved by the relevant local authority.
- To the respective Australian Standard as noted.
- Installed in an accessible position for means of operation and/or removal.
- Of bronze material for valves up to and including 80 mm diameter.
- Of cast iron with bronze trim for valves of 100 mm diameter and larger. Where installed for hot water reticulation, the valve shall be bronze.
- Of ¼ turn ball valve pattern with a union fitted to the outlet each side of valves up to and including 50mm diameter.
- Of flanged bolted pattern for valves of 65 mm diameter and larger.
- Of non-rising spindle pattern, with clockwise closing.

Isolating Valves (cold water supply):

Unless otherwise indicated isolating valves shall be:

- Of ¼ turn ball valve pattern with a union fitted to the outlet each side of valves up to and including 50mm diameter.
- 65mm and above, resilient seated gate cast Iron Gate valves.
- Loose jumper valve type fitted with "O" ring seals to the spindle.
- Approved by the Local Authority.
- Manufactured and tested in conformity with AS-1718 Water Supply Copper Alloy Screw Down Pattern Taps Specified by Dimensions.
- Constructed of materials and have the method of connection as specified before for gate valves.
- Installed with suitable unions to enable easy removal for maintenance purposes.
- Located as per AS3500.1 whether shown on design drawings or not.

Non-Return Check Valves:

Unless otherwise indicated, non-return check valves shall be:

- Comply with the requirements of AS-2845.1 and AS-3500.1
- Non-testable dual check valves.
- Approved by Local Authority.
- Manufactured and tested in conformity with AS-1718 Water Supply Copper Alloy Screw Down Pattern Taps Specified by Dimensions.
- Body fitted with screw headed inspection cap.
- Constructed of materials and have the method of connection as specified before for Gate Valves.

2.40 - EXCAVATION AND BACKFILL

Piping (general):

Shall comply with AS-3500.

The reticulated underground service mains nominated, shall be laid in trenches complete with a minimum cover of 450 to 700mm. Excavations, bedding and backfilling shall follow the manufacturer's recommendations with Reference to AS /NZS-3500.

Notifications

The appropriate Occupational, Health and Safety Authority must be notified if any excavations greater than 1.5 metres in depth are required.

Trench Excavation:

Ground shall be excavated to allow for the various pipelines to be constructed in accordance with the drawing/s. Trenches shall be excavated in straights lines and uniform grades. Tunnelling shall be provided in lieu of trenches where required by the relevant authority or as directed by the Site Superintendent.

On commencement of trenching an inspection reveals the presence of any material that could have a detrimental effect on the long-term life of the installation, and then the Site Superintendent must be notified immediately.

All excess excavated material shall be removed from site and all cartage and disposal fees are payable by the Contractor.

Road/Pavement Excavation:

In the event of excavating through established roads or pavements, the route shall be appropriately diamond saw cut to a depth of 100mm, and remaining fill be removed, as necessary.

Exceeding Excavation:

In the event of any excessive excavation as consequence of injudicious working, falls, slips or any other cause other than directed by hydraulic design, then this material shall be removed and make good the additional excavation with a material approved by the Site Superintendent.

Shoring Excavation:

Where required in accordance with Occupational, Health and Safety legislation, shoring and timbering shall be implemented to ensure a safe working environment is realised. The Contractor shall bear the cost of supply, install, and withdraw any such shoring or timbering. No further claim in relation to these works will be accepted.

Precautions and Safeguards:

The Contractor shall conduct the works in a safe, secure, and tidy manner to ensure that the risks associated with poor workmanship, machinery or plant breakdown, flooding, poor timbering, or any other cause are appropriately minimised.

The Contractor shall implement appropriate warning signs, barriers, lighting, and temporary fences required eradicating the risk of harm or injury to persons or traffic.

When instructed by the Site Supervisor with respect to the provision of lighting or such barriers, these shall be implemented immediately.

Use of Explosives:

Explosives for the purposes of excavations are not permitted.

Trenches Excavated in Rock:

The Contractor shall allow appropriate contingency with respect to excavation in rock in accordance with typical local conditions.

Bedding Material and Backfilling:

All pipes must be bed on an approved coarse sand bedding material to a minimum depth of 100mm. After testing and inspection of the pipeline and permission to backfill is obtained the trench shall be backfilled with approved coarse sand bedding material to a minimum depth of 100mm above the top of the pipe collars.

The balance of the trench shall be backfilled with an approved material and compacted in 200mm layers to finish at ground level.

Restoration of Surfaces:

Any disturbed surface caused by excavation shall be rectified and restored to the satisfaction of the Site Superintendent.

SUB SECTION 3.00 - HYDRAULIC SERVICES

3.10 - SEWER DRAINAGE

Supply and install all sewer drainage from soil and wastes and fixtures to the existing sewer connection indicated on design drawings.

Provide all necessary pipes, junctions, bends, pits, floor wastes, excavation, backfilling, testing, and ancillary equipment required to complete the installation. The locations of pipelines indicated on the drawings are diagrammatic only.

Pipeline positions shall be determined on site in conjunction with all other disciplines to ensure adequate co-ordination of all services and elements. This communication shall be performed prior to any setting out, excavation or pipe installation taking place.
Execute the works, using only materials and structures as approved by the relevant authorities and to the satisfaction of the Site Superintendent.

Materials Sewer:

Pipes and fittings shall be of U.P.V.C. - DWV material all as specified under "Materials".

Testing

1. ***Air Pressure Test:***
   - Seal all sanitary plumbing and drainage inlets, outlets, and access openings prior to testing.
   - Provide an air pressure test to 15 kPa to the section being tested.
   - Allow the air pressure to stabilize for a minimum 3 minutes whilst checking for leaks.
   - Commence the test to allow the pressure to fall to 10 kPa then begin recording for the minimum duration stated in AS-3500.2 - Table 15.3.2.

Or

2. ***Hydrostatic Test (Water Test):***
   - The sanitary plumbing and drainage shall be filled with water (non-potable may be used):
     - For sanitary drainage, to a height of not less than 1m above the soffit level at the highest point being tested.
     - For sanitary plumbing, to the spill level of the highest fixture or to the flood level of the lower sanitary fixture, whichever is higher; and
     - In either case, not exceeding 3m at the lower point of the test section.
   - The pressure shall be maintained without leakage for at least 15min. The source of any leak shall then be ascertained, and any defects repaired. The section under test shall then be retested.

Excavation and Backfilling:

As per excavation and backfill section.

Gradients:

Pipelines shall be laid true to line and bore from point to point. Pipelines shall be graded to a minimum slope of 1 in 60, unless indicated otherwise on the tender drawings.
All pipeline gradients shall comply with AS3500.2-2018.

3.20 - SANITARY DRAINAGE

Provide all necessary pipes, junctions, bends, expansion joints, inspection openings, floor wastes, bracketing, supporting, and testing of the soil waste and vent systems indicated on the drawings from the drainage turn up points to the vent terminals. The locations of pipelines indicated on the drawings are diagrammatic only.

Pipeline positions shall be determined on site in conjunction with all other disciplines to ensure adequate co-ordination of all services and elements. This communication shall be performed prior to any setting out or pipe installation taking place.

The installation shall include all air conditioning tundish and drain points, the Main Mechanical Contractor shall confirm all tundish requirements.
Execute the works, using only materials and structures as approved by the relevant authorities and to the satisfaction of the Site Superintendent.

Pipeline Materials:

Pipelines and fittings shall be in accordance with the schedule listed below and with the relevant clause under "Materials".

Acoustic Insulation:

All sanitary drainage and stack work shall be acoustically insulated.
(Soundlag 4525C or equivalent)

Standard:

Pipe work to be installed in accordance with AS-3500.2.

Sanitary Plumbing:

Stacks and Main Vents:	PVC – DWV
Domestic fixture traps and risers concealed:	Polypropylene.
Domestic fixture traps and risers exposed:	Chrome plated brass.
Hot water discharge fixture traps and risers:	HDPE or chrome plated brass.

Joints:

All joints shall be in conformity with that specified under the relevant clause in Hydraulic Services Materials.

Vent Pipes:

Terminate vent pipes through roof with a suitable Dek-tite style roof flashing and finish with an approved PVC vent cowl at least 600 mm above roof, clear of openings to comply with authority requirements.
Vent pipe termination shall have clearances to comply with AS-3500.2.

3.30 - POTABLE COLD WATER

Supply and install all domestic potable cold water pipes to all fixtures, fittings and faucets requiring domestic cold water.
Include for all pipe work, bends, offsets, brackets, valves, taps and faucets and sundry equipment required for the installation.

Pipe materials shall be as follows:

External and Internal Exposed Potable Cold Water:

Copper Tube Type B

Internal Potable Cold Water (less than 25mm diameter):

Cross-linked Polyethylene (PE-X) pipes and fittings to Australian Standard test marking (AS-2492, AS-2537) equal to Rehau.

Below Ground Potable Cold Water:

Polyethylene pressure pipe and fittings as specified in *"Materials".*
All pipes in masonry walls shall be pre lagged copper tube.

Labelling/Identification:

All piping shall be identified with adhesive type labels and painted or manufactured colour coded as required by AS-1345.
Pipework labelling shall be located adjacent to all junctions, valves, services appliances, bulkheads, wall penetrations and the like at intervals not exceeding 8m along the service.
An exception shall be made for uninterrupted external pipework where intervals shall be extended to a maximum of 50m.

Testing:

- Shall conform to the requirements of AS-3500.1.
- Prior to commencement of hydrostatic test, the section of pipework being tested shall be thoroughly flushed to remove any foreign matter.
- Disconnect any equipment connected to the section being tested that is not rated to the test pressure prior to commencing the test.
- Provide a water pressure test of 1500 kPa for a minimum period of 30 minutes.
- The test shall be performed on installed pipework prior to burial or concealment.

Valves:

To pipelines supplying cold water to each group of fixtures, supply and install valves for the purpose of shutting down the system for isolation and maintenance purposes. Valves located in ground shall be provided with cast iron path box and lid set into concrete surround with P.V.C. pipe riser around valve stem.
Isolation valves in wall cavities shall be complete with recessed wall boxes and lockable panels.

Connection to Fixtures:

Provide unions and isolating valves (i.e., Arco Mini-stops or equivalent) at wall or floor surface and at fixtures appliances to allow removal and replacement without the need to isolate main supply legs.

Backflow Prevention Valves:

Provide back flow prevention valves (i.e., vacuum breaker) at all hose connection points within the building and elsewhere at connections to items of equipment etc in accordance with the requirements of AS-3500 and the Local Authority.

Provide RPZD valve assemblies to any High Hazard water connections if required as per AS-3500 whether shown on the drawings or not.

3.40 - HOT WATER

Supply and install all domestic hot water pipes from the hot water unit to all fixtures, fittings and faucets requiring hot water. Allow for all pipe work, bends, offsets, lagging, brackets, taps and faucets and sundry equipment required for the installation.

Pipe materials shall be as follows:

Hot Water External and Internal Exposed Reticulation:

Copper Tube Type B

Hot Water Internal to Fixtures (less than 25mm diameter):

Cross-linked Polyethylene (PE-X) pipes and fittings to Australian Standard test marking (AS-2492, AS-2537) equal to Rehau.

Pipe Lagging to Exposed Pipelines in Plant Area:

Thermotec 40mm wall or equivalent, sealed and sheathed with an aluminium sleeve (0.5mm).

Pipe Lagging to Fixtures:

Armaflex 19mm wall or equivalent.

All pipes in masonry walls or within stud walls shall be lagged copper tube.

Labelling/Identification:

All piping shall be identified with adhesive type labels and painted or manufactured colour coded as required by AS-1345.
Pipework labelling shall be located adjacent to all junctions, valves, services appliances, bulkheads, wall penetrations and the like at intervals not exceeding 8m along the service.
An exception shall be made for uninterrupted external pipework where intervals shall be extended to a maximum of 50m.

Thermostatic Mixing Valves:

Thermostatic mixing valves supplying tempered water shall be installed where indicated on the drawings and as specified.
Thermostatic mixing valves shall be labelled and numbered with Traffolyte adhesive labels securely fixed to access panel of recessed box; or metal engraved labels securely fixed to access panel of recessed box; or tagged to valve with minimum 15mm high letters in a contrasting colour to the background label. Label numbering shall match design drawings or to Client requirements.

TMV temperature control pre-set to:

- 45° C. maximum for Disabled/Accessible fixtures.
- 45° C. maximum for Primary and Secondary Schools.

Hot Water Relief Valves:

Discharge from all hot water temperature, pressure, expansion, vacuum relief valves shall be piped to and discharge into an approved tundish location.

Testing:

- Shall conform to the requirements of AS-3500.4.
- Prior to commencement of hydrostatic test, the section of pipework being tested shall be thoroughly flushed to remove any foreign matter.
- Disconnect any equipment connected to the section being tested that is not rated to the test pressure prior to commencing the test.
- Provide a water pressure test of 1500 kPa for a minimum period of 30 minutes.
- The test shall be performed on installed pipework prior to being insulated or concealed.
- The complete system shall be tested under normal operating conditions for a minimum period of 48 hours and visually checked for leaks.

Valves:

To pipelines supplying hot water to each group of fixtures, supply and install valves for the purpose of shutting down the system for isolation and maintenance purposes.

Automatic Air Valves:

Automatic hot water air valves shall be installed:

- In accordance with AS3500.4-2018.
- At the highest point(s) in the piping system.
- Adjacent to the water heater(s).
- In an accessible location.
- With a connected drain discharging over a tundish.

Automatic air valves shall not be installed on the suction side immediately prior to the pump.

Connection to Fixtures:

Provide unions and isolating valves (i.e., Arco Mini-stops or equivalent) at wall or floor surface and at fixtures appliances to allow removal and replacement without the need to isolate main supply legs.

Installation:

Install pipe work in straight lines and uniform grades without sags; and arranged to prevent air locking. Provide bends and offsets and adequate unions, flanges, and isolating valves for satisfactory removal of piping and fittings for maintenance. Arrange and support pipe work so that it remains free from vibration whilst maintaining necessary movements such as thermal expansion and contraction. Provide the fittings and components connected and ready for testing the service. Keep the number of joints to a minimum. Insulate hot water pipes and seal all joins in insulation.

Expansion:

Allow for adequate expansion and contraction, eradicating stress on pipes or joints.

No joints shall be allowed in concrete slabs or under concrete slabs where slab is on ground.

3.50 - GAS SERVICES AND ASSOCIATED APPLIANCES

Supply and install all gas service pipe work from the gas connection point to all gas appliances as specified within this specification and design drawing/s. Include for all pipe work, valves, brackets and fixings and sundry equipment required for the installation.
All work shall comply with AS-5601.
The Contractor shall co-ordinate with the Local Gas Authority and the Site Superintendent to facilitate the installation of the gas main service pipe to the building and the gas meter assembly installation.

Testing:

The Contractor shall install and test the gas service reticulation pipes as per AS-5601 and organise inspections and approvals from the local regulating authority as required.

Pipe materials shall be as follows:

Internal and Above Ground Gas:

Copper Tube Type B

Below Ground Gas:

Polyethylene pressure pipe and fittings (equivalent to Vinidex yellow stripe gas PE100B).

Pipework being installed under building line shall be approved by the local gas authority.

Labelling/Identification:

All piping shall be identified with adhesive type labels and painted or manufactured colour coded as required by AS-1345.
Pipework labelling shall be located adjacent to all junctions, valves, services appliances, bulkheads, wall penetrations and the like at intervals not exceeding 8m along the service.
An exception shall be made for uninterrupted external pipework where intervals shall be extended to a maximum of 50m.

Valves:

Manual shut off valves to be ¼ turn ball valve.
To pipelines supplying natural gas to appliances, supply and install valves for the purpose of shutting down the system for isolation and maintenance purposes.
Isolation valves in wall cavities shall be complete with recessed wall boxes and lockable panels.

3.60 - FIRE SERVICES

General:

Hydrants are to comply with AS 2419.1 whether shown on the drawings or not.
Fire Extinguishers are to comply with AS 2444 whether shown on the drawings or not.
The fire services contractor shall supply all pipe work, fittings, valves, brackets, and sundry items to complete the installation to the approval of the relevant authority and the Site Superintendent.

Design Parameters:

Applicable NCC:	- NCC 2022	
Building Classification:	- Class 5	
Building Size:	- Ground Floor:	610m^2
	- First Floor:	605m^2
	- Total:	1,215m^2
	- Adjoining Building:	450m^2 (approx.)
	- Adjoining COLA:	730m^2 (approx.)
Extent of full fire loading & building sizes to be confirmed by building surveyor		
Fire Compartment Size:	- > 1,000 m^2 ≤ 5,000 m^2	
Hydrant Requirement:	- 2x Attack/Feed Hydrant Outlets flowing simultaneously	
(Victoria)	- 10.0 L/sec each @ 700 kPa residual (Brigade Assisted)	
	- 5.0 L/sec each @ 700 kPa residual (Pump Assisted)	
Total Hydrant Flow:	- 20.0 L/sec @ 700 kPa residual (Brigade Assisted)	
	- 10.0 L/sec @ 700 kPa residual (Pump Assisted)	
Annual Hydrant Test Result:		
Tester: Private	- 0.0 L/sec @ 860 kPa static	
Test Date: 04/12/2024	- 10.0 L/sec @ 770 kPa residual	
No changes to existing fire system performance		
Fire Hose Reel Requirement:	- No requirement (class 5 office building)	
Fire Extinguisher Requirement:	- Class A Fire Risk:	Powder: 4A:60B:E (4.5kg)
	- Class B Fire Risk:	Foam: 3A:30B (9.0L)
	- Class E Fire Risk:	Carbon Dioxide: 1A:E (5 kg)
	- Class F Fire Risk:	Wet Chemical: 1A:4F (3.5L)
Fire risks may be covered by other type of extinguishers if they are suitably rated. Fire extinguishers may cover multiple fire risks classes if they are suitably rated to do so.		

Materials:

The fire hydrant external below ground reticulation shall be constructed of PVC "Blue Brute" or equivalent, Class PN16 rated with all bends, changes of direction and outlet connections etc. installed in Ductile Iron Cement Lined fittings. All valving, thrust blocks, excavations, bedding and backfill are to be provided by the fire services contractor.
The internal fire hydrant reticulation pipes and fittings shall be galvanised steel medium grade (AS-1074) and shall comply with the requirements within AS2419-2005.
The Contractor shall provide landing valves, as shown on drawing/s.
Hydrant risers shall be galvanized steel medium grade (AS-1074). All joints shall also be galvanized including “Table ‘E’” flanges, roll groove couplings and malleable fitting.
Include for protective bollards.

Fixing:

Pipe support to be of an approved type hot dipped galvanized Unistrut type.

In Ground Valves:

All valves shall be of a "Sluice Valve" pattern only, positioned as shown on the tender drawing/s. All sluice valves shall be fitted with a 150mm PVC pipe over the spindle assembly and be complete with a Fitzroy / Sluice Valve cover colour coded (yellow). Valve identification as per AS-2419.

Flushing:

As per piping section.

Fire Services Block Plan:

The existing fire block plan shall be amended to reflect the completed system.

Fire Extinguishers:

Class A Fire Risk:	- Powder: 4A:60B:E (4.5kg) - Located so that a fire extinguisher is within 15m reach of any fire risk.
Class B Fire Risk:	- Foam: 3A:30B:E (9.0L) - Located 3-7.5m from the fire risk.
Class E Fire Risk:	- Carbon Dioxide: 1A:E (5kg) - Located 2-20m from the fire risk.
Class F Fire Risk:	- Wet Chemical: 1A:4F (3.5L) - Located 2-20m from the fire risk.

Location:

Shall comply with BCA as indicated on design drawings.

Testing, Commissioning and Maintenance:

The Contractor shall provide all pressure testing, fire services inspection and commissioning of equipment prior to practical completion / handover to the client.

All pipe work shall be tested at 1.7 MPa or twice the normal working pressure and held for a period of two (2) hours. This test shall be witnessed by the Site Superintendent. Documentation and written confirmation of such tests are required and shall be included in manuals as previously specified.

The Contractor shall provide monthly testing of the system during the defects and liability period in accordance with the requirements of AS-1851.

Flow Testing Requirements:

Equipment Required: - 1x McCrometer per 10.0 L/sec required to flow.
- *1x pressure gauge*

Hydrant Testing Method:

1) Connect a McCrometer to each of the most disadvantaged hydrant landing valves.
    a. Where two or more hydrant risers installed, connect 1x McCrometer per riser.
2) Connect pressure gauge to hydrant landing valve.
3) Run the most disadvantaged landing valve to 5.0 L/sec and measure the residual pressure.
4) Run the second most disadvantage landing valve to 5.0 L/sec (**10.0 L/sec total**) and measure the residual pressure.
5) Increase the flow at the most disadvantaged landing valve to 10.0 L/sec (**15.0 L/sec total**) and measure the residual pressure.
6) Increase the flow at the second most disadvantaged landing valve to 10.0 L/sec (**20.0 L/sec total**) and measure the residual pressure.

Note: hydrant testing method used for both unassisted hydrant flows and pressures and brigade flows and pressures across the booster assembly where applicable.

Certifications:

At the conclusion of the works, the Contractor shall provide a **"Certificate"** for works as installed conforms to the requirements of Local Government, BCA and FRVIC authorities. Associated costs for this inspection / certification shall be the responsibility of the Contractor. Inspection and certification shall be carried out by an accredited **"Fire Services Certifier"** excluding the Contractor (self-certification is not acceptable). Copies of the reports etc. shall also be supplied to the Client and Fire Services Consultant.

3.70 - DOWNPIPES AND OVERFLOWS

Supply and install necessary pipes, junctions, bends, acoustic dampening insulation, expansion joints, fixing clips and brackets, and ancillary equipment required to transfer stormwater from the eave gutters to the point of discharge as shown on the drawings.
Downpipe and overflow connections to the eave gutters shall be sealed watertight in an approved manner.

Locations of downpipes and overflows indicated on the drawings are diagrammatic only. Pipeline positions shall be determined on site in conjunction with all other disciplines to ensure adequate coordination of all services and elements. This communication shall be performed prior to any setting out or pipe installation taking place.

Pipeline and Fittings:

Downpipes shall be of PVC material, to client's specification.
Pipes and fittings shall be of PVC DWV material all as specified under "Materials". Joints shall comply with relevant clauses under "Jointing".

Testing:

Provide an air pressure test to 30kPa for a minimum period of 3 minutes to comply with AS-3500.3 and as required by the testing authority and the Site Superintendent.

Expansion:

Allow for adequate expansion and contraction, eradicating stress on pipes or joints using approved expansion joints.

Acoustic Insulation:

All internal downpipes shall be acoustically insulated.
(Soundlag 4525C or equivalent)

3.80 - STORMWATER DRAINAGE

Refer Civil Documentation

3.90 - SCHEDULE OF SANITARY TAPS AND FIXTURES

Refer Architectural Schedule

ATTACHMENT H - Tender Schedules

Rob Pickett Design

Victory Lutheran College - Hudson Building

28 Drage Road, West Wodonga VIC 3690

HYDRAULIC SERVICES TENDER SCHEDULE

Document: BSG1069 H-S01
Reference: 10112
Issue: Tender
Revision: T2
Dated: 21-May-25

Tender Schedule.

Contractors Name: _____

Complete Project Tender Price Components

ITEM	COST
Authority fees and payments.	$
Location and disconnection of existing hydraulic services.	$
Sewer Drainage	$
Mechanical tundishes and drainage.	$
Potable cold water services.	$
Hot water services.	$
Natural gas services	$
Fire Services	$
Downpipes and overflows	$
Plumbing fixtures and tap ware.	$
Installation of plumbing fixtures and tap ware.	$
Commissioning and Certification of fire services.	$
Commission installed hydraulic services systems.	$
Hydraulic services operation and maintenance manuals and 'As Constructed' issue drawings.	$
Other work included under contract but not specifically listed in the above schedule. [Specify]	$
Total (excluding GST)	$
GST	$
Complete Project Total (including GST)	$

Schedule of Rates.

Contractors Name: _____

Provide the following schedule of rates information for staged works progress claims and variations to contract price, as applicable.
The rates shall include for all profit, preliminaries, installation and equipment, night work, cleaning, dust protection and security, whether in or out of sequence with issued program of works.

Schedule of pipe work Unit Rates

ITEM	**COST/METRE**
100mm sewer drainage below ground with compacted sand backfill (max. 1.5 metres deep)	$ /M
80mm Sanitary drainage above ground	$ /M
65-50mm Sanitary drainage above ground	$ /M
100mm water services PVC pressure pipe below ground (max 1.00 metre deep)	$ /M
50mm Polyethylene Pressure Pipe (max. 1.00 metres deep)	$ /M
50mm copper tube	$ /M
40mm copper tube	$ /M
32mm copper tube	$ /M
25mm copper tube	$ /M
20mm copper tube	$ /M
15mm copper tube	$ /M
20mm x 10mm wall pipe insulation	$ /M
15mm x 10mm wall pipe insulation	$ /M
In-wall AC tundish and connection to sewer drainage	$ /item
Additional galvanised downpipe	$ /item
Additional fixture hot and cold water supply.	$ /fixture
Additional natural gas appliance	$ /fixture
Additional fixture sewer sub-drain.	$ /fixture
LABOUR/PLANT	**COST/HOUR**
Plumber	$ /HR
Apprentice Plumber	$ /HR
Electrician	$ /HR
Painter	$ /HR
Supervisor	$ /HR
Excavator	$ /HR
Truck for spoil removal	$ /HR
Other work included under contract but not specifically listed in the above schedule. [Specify]	$

Notes:

Schedule prices for all variations shall be deemed to include:

- All changes to shop/working drawings.
- All wall and ceiling penetrations including fire stopping as required.
- Making good wall and floor penetrations including replacing of plaster board linings, as necessary.