Hydraulic Services Specification

Multi-purpose and Evacuation Centre
Richmond Park,
Tumut NSW 2720

Architect:

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Document History

Revision	Date	Amendments
A	24.04.25	Tender Issue

INDEX

1 – GENERAL CONDITIONS

1.1 EXTENT OF WORK

The work under this section covers the complete supply, installation and testing of the work listed in the index, specified hereinafter and show on drawings listed here:

No.	Title
H000	Drawing Schedule & Legend
H001	Site Plan
H101	Drainage Services Floor Plan – Part 1
H102	Drainage Services Floor Plan – Part 2
H103	Roof Plan
H201	Water Services Floor Plan – Part 1
H202	Water Services Floor Plan – Part 2
H301	Hot & Cold Water Details
H401	Hydrant and Hose Reel Coverage Plan

1.2 DEFINITION OF TERMS

Architect	Facility Design Group PO Box 82 Cambewarra NSW 2540
Client	Snowy Valleys Council
Superintendent	The person managing the contract on the client's behalf
Inspected/Reviewed	Inspected/Reviewed by Superintendent and the approved Authority
Building Contractor	Main building contractor
Plumbing Contractor	Contractor carrying out the hydraulic services installation under this section of work.

1.3 AUTHORITIES & STANDARDS

The whole of the work shall be carried out by or under the full supervision of a fully licensed Plumbing Contractor in accordance with the drawings and specification, reviewed by the Superintendent and approved by all relevant authorities.
All work shall be at least equal or better than the appropriate current Australian Standard. Any proposal to install alternative items to those specified shall be accompanied by a written confirmation by the Manufacturer that the proposed article complies in each and every respect to the relevant Australian Standard.

The submission shall be made and the approval obtained prior to ordering of materials and commencement of the respective section of work.

Where some doubts exist as to the appropriate standard a decision shall be made by the Superintendent before commencement of any work on or off the site. If any doubt exists as to whether a section of the design is able to comply with the relevant authorities regulations the

Superintendent shall be notified prior to commencement of any work. No consideration of claim for redundant work shall be given if the Superintendent is not notified.
The relevant Authorities shall include but not be limited to the following;

Water/Sewer Authority	Snowy Valleys Council
Council	Snowy Valleys Council
Fire Authority	Fire and Rescue NSW

It is the responsibility of the Plumbing Contractor to carry out all liaison and co-ordination with all Authorities and to ensure satisfaction of their requirements.

1.4 TENDER PRICE

The tender price shall be based on current standards and associated amendments as of the date the tender is submitted / lodged.

1.5 APPLICATIONS, FEES AND CHARGES

The Plumbing Contractor shall be responsible for making application and paying all fees and charges rendered by the respective Authorities in reference to the project, which shall include but not be limited to the following:

Commencement of Work fees
Inspection Fees
Document inspection fees
Road Opening fees
Restoration Charges
Water main connection Fees
Sewer Connection Fees
Service Connection Charges

1.6 CERTIFICATION OF WORKS

At the completion of the works and prior to the submission for final payment the Plumbing Contractor shall make all necessary applications, pay all fees, obtain and issue to the Superintendent Certificates indicating that the works comply with the current regulations and requirements of the relevant Authority.

Wherever applicable the relevant Authority shall issue the Certificate. Where this is not standard practice, the Plumbing Contractor shall provide a Certificate or Letter of Certification, which will guarantee that the works comply with the relevant Authorities regulations, requirements and conditions.

1.7 COMMISSIONING

Allow to commission and bring into full working order all works under this contract. Provide technical staff as required to test, balance, sterilise, certify, and operate all plant and equipment not limited to;

- Pipework systems
- Valves and ancillaries
- Pumps and controls
- System balancing

- Plant and equipment
- Backflow prevention devices
- Storage tanks and controls
- Fire hydrants

1.8 CERTIFICATE OF COMPLIANCE

The Sub-Contractor shall provide a Certificate of Compliance to the Authorised Person, clearly noting satisfactory completion of all works under the contract in accordance with the requirements of relevant Authorities, this Technical Specification, the Technical Specification and the approved Drawings.

1.9 WARRANTY

By accepting the contract, the Sub-Contractor will be deemed to have guaranteed design and installation of the works under normal working conditions for a period of twelve (12) months from the date of Practical Completion of the contract.

Provide to the Authorised Person, two (2) copies of all guarantees and warranties relating to any item of plant and equipment installed by the Sub-Contractor where such guarantees or warranties are issued by the manufacturer.

1.10 DEFECTS LIABILTY

Should any part of the works under this contract require rectification or replacement within the specified Warranty period, the Sub-Contractor shall carry out such works at No cost, and will further guarantee the rectified works for a period equal to the original warranty period starting from the date of rectification.

1.11 MAINTENANCE DURING WARRANTY

Following Practical Completion of the works, the Sub-Contractor shall provide twelve (12) months maintenance of the installation in accordance with the approved Operation & Maintenance manual. This shall include all pipework, pumps, filters, thermostatic mixing valves, backflow preventers, etc

The work required is as follows;

- Attend the site regularly as per the O & M manual requirements.
- Attend the site at any time on Authorised Person request to carry out any remedial work necessary to keep the plant and equipment in good operating order.
- Attend the site at any time to carry out any remedial work necessary to restore the plant and equipment to operating order.

Where the Sub-Contractor fails to provide remedial works within eight (8) normal working hours after notification of a breakdown, for reasons other than obtaining spare parts from the nearest supplier, the Principal reserves the right to order such works to be carried out by others at the Sub-Contractors expense, without releasing the Sub-Contractor of his responsibilities under the contract.

During each visit the Sub-Contractor shall complete a report in the form of a checklist which shall indicate the performance of all components of the system, as well as a detailed description of the remedial or maintenance works carried out. The reports shall be completed and signed by the Sub-Contractor and have one copy sent to the Authorised Person with one copy retained by the Sub-Contractor.

Final payment of retention monies will only be certified after satisfactory completion of maintenance during warranty procedures.

1.12 SERVICE DRAWINGS

The accompanying drawings indicate the approximate positions and number of sanitary fixtures and other items requiring connection to the hydraulic services. Allow for all necessary diversions and minor adjustments of pipe work and equipment as may be necessary to carry out the work as required and as necessary to complete the works. Refer to architectural drawings for location of equipment and co-ordinate with other services where applicable.

1.13 DIMENSIONS AND LEVELS

All invert levels on the drawings are recommended only and must be checked on site before excavation or installation of pipework to ensure connection to supply services and correct cover and fall. Advise the Superintendent of any apparent discrepancies before the commencement of any work; claims for redundant work as a result of failing to do so shall not be considered valid.

Note:
Ascertain the depth, position and suitability of the sewer & stormwater connection points prior to the commencement of any work (Pipelaying & excavation) and ensure that the sewer & stormwater can gravitate to the relevant connection points. The Superintendent shall be advised immediately should any adjustment be required to execute the work.

No claims for redundant work will be considered due to failure to comply with this requirement.

No pipelaying or excavation shall be undertaken until this has been undertaken.

1.14 TESTING

Allow for the cost of carrying out all tests set out on the drawings or in the specification or as required by the respective authorities. Supply all plugs, apparatus, and other materials necessary for the tests. Underground or enclosed work shall not be covered or concealed from view until it has been inspected, tested and sighted by the Superintendent and approved by the Authority concerned.

On completion of the works included under this part of the specification the Plumbing Contractor shall carry out any procedure required to prove that the respective systems are operational under normal working conditions, as requested by the Superintendent and authorities.

Provide a minimum of two (2) working days notice to the Superintendent before the commencement of testing.

Maintain a separate set of drawings on site to record progress of testing. The Superintendent shall initial the drawings of each section of work that has passed a satisfactory test. Remedy any defects in the piping found during testing and re-test as specified under each section of work.

1.15 PIPING

All piping shall conform to the standards and descriptions and be in accordance with materials and sizes shown on the drawings and/or detailed in the specification.

Pipelines shall be installed using the longest practicable length of tube/pipe to eliminate unnecessary jointing. Building up lengths from short off-cuts shall not be permitted.

1.16 CAPPING OFF

During construction, leave all unfinished work in a safe condition and protect the works against damage or loss through any cause whatsoever. At all times open ends of pipes shall be sealed off in such a manner as to prevent the entry of foreign matter into the lines. Plugs of rags, paper or wood will not be acceptable for this purpose. Drainage risers shall be temporarily sealed off with patented plastic caps

1.17 FIXING & SUPPORTING OF PIPES

1. General

Pipework and fittings shall be:

a) Only fixed in approved locations.
b) Adequately secured to the structure to support the pipework under full load conditions with a safety margin of 2:1.
c) Kept clear of structure and other services.
d) Provided with 0.75 mm galvanised sheet metal sleeves where passing through structure. Pack space between pipe and sleeve with fire rated material equal to fire rating of structure through which pipe passes.
e) Installed to allow for adequate expansion and contraction without causing stress on pipes or joints.
f) Fixed on hanger brackets to allow adjustment for fall.
g) Not be fixed with explosive power tools.
h) Cleaned of all cement dropping on completion.

2. Materials

a) Use purpose made Abey brackets

3. Spacing

Fix piping at the following maximum intervals.

(a) Sanitary, Vents and Downpipes - Non Pressure Lines.

Pipe	Vertical	Horizontal/Graded
Copper & Brass - Internal	1.8 m	1.8 m
PVC-U – Internal & External DN40 -50	1.8 m	1.0 m
PVC-U – Internal & External DN65 - 150	1.8 m	1.2 m

In the case of rubber ring jointed pipes there shall be a fixing at least at each collar or pipefitting. Brackets shall be adequate to restrain the effect the internal forces of piping.

(b) Pressure Lines.

Size	Copper Pipe
15 mm	1.8 m
20 mm	2.0 m
25 mm	2.25 m
32 mm upwards	2.5 m

Note: Pipework in walls shall be fixed every 900mm.

NOTE: Hoop Iron will not be acceptable for pipe hangers or Brackets.

1.18 EXPOSED PIPEWORK TREATMENT

Except as otherwise specified or directed all internal exposed piping adjacent to plumbing fixtures, including traps and fittings shall be **chromium plated** finished and where passing through a finished wall, floor or ceiling, shall be fitted with approved chrome cover plates.

All other exposed piping shall be cleaned free of cement droppings, and painted.

1.19 IDENTIFICATION

Labels on pipework shall be installed in accordance with AS 1345 - Identification of the Contents of Pipes, Conduits and Ducts - and be equal to Safetyman pattern positioned on each side of valves, bends and junctions and along the length of the pipeline at maximum 3000-mm centres. Where pipes are installed within ducts or false ceiling areas additional labels shall be installed so as to be visible at the access panel position.

1.20 UNDERGROUND PIPE WARNING TAPE

During the process of backfilling lay a plastic warning tape 150mm above all underground pipes. This tape shall extend for the full length of pipes. Warning tapes shall be 100mm in width of approved durable plastic material with colour to comply with AS 1345 printed with the words " DANGER - BURIED ….. PIPE BELOW" repeated continuously.
Warning tape shall contain a copper trace wire which shall be secured and terminate above surface each end.

1.21 PROTECTION OF FINISHED & POLISHED SURFACES

Throughout the project, all finished surfaces shall be adequately protected against damage. Provide suitable material for protection of finished surfaces as required and as may be directed.

Remove protection from finished surfaces on completion of project and leave surfaces in such a manner that final cleaning of dust only is required.

Scratched or damaged finished surfaces will not be accepted.

1.22 CONCRETE

All concrete used in conjunction with this work shall have a minimum strength of 20 mPa at twenty-eight days when tested in accordance with AS 1012 Part 8 - Method for Making and Curing Concrete Compression, Indirect Tensile and Flexure Test Specimens in the Laboratory or in the Field.

1.23 EXCAVATION IN EXISTING CONCRETE SLABS, PAVEMENTS & ROADWAYS

If required by the Superintendent trenches across existing roads shall be excavated and the pipeline constructed therein so that half the roadway is always maintained open to the public.

Slabs shall be saw cut and then the concrete removed with pneumatic tools.

Council road opening application and payment of all fees shall be made and approval granted prior to any works being undertaken.

1.24 AUTHORITIES SERVICES SEARCH - DIAL BEFORE YOU DIG

The Plumbing Contractor shall allow to undertake an Authorities services search and obtain all available information on Authorities services within the street and site area.

Dial Before You Dig PH: 1100

1.25 EXCAVATION NEAR AUTHORITIES SERVICES AND EASEMENTS

The Plumbing Contractor shall allow to hand dig when excavating Authorities services and easements. The Authorities shall be given 48 Hours notice prior to any excavation-taking place. If required or requested by the Authority excavation shall take place only under their supervision.

1.26 CONCEALED PIPING

Unless otherwise approved or directed, pipes shall be concealed.

All chasing in walls for pipes and equipment shall be carried out with a mechanical saw. Chasing will not be allowed in concrete walls unless agreement in writing is obtained from the Superintendent.

In general, chases in block work shall not exceed 1200 mm horizontally and not closer than 600 mm to supporting elements vertically. No face walls shall be chased. Where pipes cannot be chased, they shall be built in as the work proceeds. Discuss with the Superintendent the location of services in masonry walls. Where pipes are concealed in walls, they shall be insulated. The insulation shall be placed on the pipes in such a manner that expansion and contraction will be unhindered and the wall finish will not be cracked or otherwise damaged.
Where piping is to be concealed in timber or metal stud walls:

- Holes through studs, noggins etc shall be carefully drilled, with piping kept in straight lines.
- Copper hot, warm and cold water piping – 20mm and smaller shall be fixed with ‘Plastic’ sleeves / brackets. Each such sleeve / bracket to be screw fixed.
- Unless otherwise noted each penetration through studs, noggins etc shall include a PVC sleeve with a wall thickness not less than 2mm.
- Ensure that all pipework is adequately fixed that no water hammer occurs.
- Provide timber noggins, not less than 100mm x 50mm and adequately fixed to studs, for fixing of faucets / tapware, including ancillary pipefittings.

1.27 PROGRAMMING OF WORK

Allow to comply with the program of the main contract.

1.28 EXISTING AUTHORITIES’ CONNECTIONS TO SITE

All redundant existing authorities’ connection points not being reused shall be located and disconnected at their point of connection to the authorities’ service. Disconnections shall be to the approval of the relevant Authority.

Disconnection shall be in accordance with their respective guidelines and regulations.

Make all applications and pay all fees to the respective authorities prior to any disconnection taking place.

This shall include but not be limited to Sewer, Water/Fire and Gas connections.

1.29 EXISTING SERVICES

The contract drawings indicate services within the site and have been prepared from available records and site investigations. Investigate for exact location, depth and size of services. Deviations of services other than that indicated are to be brought to the attention of the Superintendent prior to the commencement of any excavation and/or installation relating to such deviation.

1.30 SITE VISIT

Visit the site before submitting final tender to assess "on site" conditions. Failure to do so will forfeit any claim for not being aware of conditions affecting the tender.

1.31 MECHANICAL SERVICES CO-ORDINATION

Position of cold water, floor wastes and drainage points for mechanical services are indicative only. Plumbing Contractor shall co-ordinate with the Mechanical Services Sub-Contractor to ensure the correct position for final choice of equipment and appliances.

1.32 SERVICES CO-ORDINATION

Plumbing Contractor shall co-ordinate with the Services Sub-Contractor’s and Builder to ensure all co-ordination of pipework and equipment is undertaken.

Detailed co-ordination is the responsibility of the plumbing contractor; the Hydraulic drawings are design co-ordinated only.

1.33 INSTALLATION CO-ORDINATION

Various items of apparatus and equipment will be provided and fixed by others.

The Plumbing Contractor shall familiarize themselves with the requirements of the other subcontractor’s works requiring co-ordination and shall examine the plans covering each of these services.

It shall be the responsibility of the Plumbing Contractor to schedule work closely so that the work may be installed at the proper time and without delaying the completion of the entire project.

The Plumbing Contractor shall carefully check space requirements with other Subcontractors to ensure that the equipment, piping, etc., can be installed in the spaces allotted for same.

Where typical arrangements occur for multiple installations, such as core toilets on typical floors, the Plumbing Contractor shall complete one arrangement and obtain approval before duplicating same.

When equipment and/or installations associated with the work of the contract are installed by other Subcontractors, the Plumbing Contractor shall attend and co-ordinate as necessary.

Associated fittings required to prevent clashes with other trades shall be deemed to have been included in the tender price.

Check all dimensions on site prior to commencing work

The design drawings do not relieve the Plumbing Contractor of the co-ordination or buildability responsibility

All design changes occurring after the letting of the Plumbing Contract, by other trades including architectural, structural and mechanical services, shall be co-ordinated into the installation by the Plumbing Contractor as necessary

The Plumbing Contractor shall be responsible for the installation of all services elements associated with this subcontract, within the ceiling, duct and plants spaces provided in accordance and co-ordinated with all other services trade designs.

1.34 ACOUSTIC PIPE SUPPORTS

Refer to the Fixture and Fittings section.

1.35 ACOUSTIC LAGGING OF PIPE & FITTINGS

Refer to the Fixture and Fittings section.

1.36 INSPECTION & FLUSHING OUT OF SERVICES – GRAVITY SYSTEMS

On completion of the installation of all services and before application for Certificate of Practical Completion, allow to lift all access chamber covers and major access gates and inspect gravity lines. Clear out any debris from lines and flush entire system to ensure clean bore. Replace access chamber covers and access gates after inspection, clearing and flushing. Provide Superintendent with a minimum of 48 hours notice prior to inspection and flushing procedures.

1.37 INSPECTION & FLUSHING OUT OF SERVICES - PRESSURE SYSTEMS

On completion of the installation of all pressure systems and before application for Certificate of Practical Completion, allow to flush out all piping installations to clean sand, copper filings and foreign matter from the system.

Prior to flushing operation, disconnect all thermostatic mixing valves, tempering valves, filters, screens, ball float valve inlets, backflow preventers and other appliances which may be subjected to damage due to foreign materials. Ensure that the final installation is totally clear of any foreign matter and that all valves, filters, screens and outlets are not affected by such material. Replace any and all damaged items of equipment, make all necessary reconnections. Provide Superintendent with a minimum of 48 hours notice prior to inspection and flushing procedures.

1.38 MP52 AUTHORISATION

All plumbing and drainage products shall be approved in accordance with ATS 5200 Technical Specification for Plumbing and Drainage products and shall be watermarked.

1.39 PIPEWORK UNDER SLAB

Water services pipework located below ground under concrete floor slabs shall be installed in a conduit of compatible material so that the pipe can be removed and replaced.

1.40 TENDER DOCUMENTS

The drawings as scheduled are issued as a guide only and shall be considered to be diagrammatic and approximate. The drawings and Specification are intended to be mutually explanatory and complete, but all work called for by one, even if not by the other, shall be fully executed. Should the documents be in conflict, the Plumbing Contractor shall be deemed to have included for the larger quantity and / or the more expensive components, as applicable.

Should the drawings and specifications indicate ambiguities the requirements of the Specification shall take priority. Unless the Plumbing Contractor advises regarding ambiguities or conflicts at the time of tender the requirements of the Specification will be expected as fulfilment of the Plumbing Contract.

1.41 DOCUMENTS BEFORE PRACTICAL COMPLETION

Before practical completion provide:

1. As built drawings
2. Workshop manuals
3. Detailed certificates of compliance
4. Test information and certificates for each
    a) Thermostatic Mixing Valve
    b) Backflow prevention device
5. Form 15 including test information data
    a) Fire Hydrant System
6. Access cover lifting keys
7. Hose tap operating keys

1.42 PROTECTION OF PIPELINES BY ENCASEMENT IN POLYETHYLENE

Scope

Where installed under ground all new metallic pipelines, pipe fittings, valves and areas of existing branch pipelines of any material joining new pipelines for the distance specified, shall be provided with a protective encasement of polyethylene tubing.

Such tubing shall be provided additional to, but not as a substitute for, any corrosion protection that may be specified elsewhere.

Materials

Polyethylene - shall be manufactured of virgin polyethylene material conforming to the requirements of ASTM Standard Specification D-1248-74 Polyethylene Plastics moulding and Extrusion Materials.

Thickness - Polyethylene film shall have a minimum nominal thickness of 250 microns.

Tube Size or Sheet Width - Tube or sheet size for each pipe diameter shall be in accordance with manufacturer's recommendation for size of pipeline.

Adhesive Tape - Adhesive tape shall be plastic 50 mm wide adhesive tape not less quality than polyethylene film specified above and shall have the ability to bond to metal surfaces and also to polyethylene sleeving material.

Certification - Tenderers shall lodge certificates from approved N.A.T.A. Testing Laboratory or Laboratories that the materials proposed have been tested and conform to A.S.T.M. Standard Specification D1248-68 and the strengths and thickness requirements of this specification.

Installation

General - The polyethylene encasement shall prevent contact between the pipe and the surrounding backfill and bedding material but is not intended to be a completely air and water tight enclosure. Overlaps shall be secured by the use of adhesive tape, capable of holding the polyethylene encasement in place until backfilling operations are completed. Polyethylene encasement shall be protected by precautions to prevent exposure to direct sunlight for any total period more than 48 hours. Junctions - between wrapped and unwrapped pipe - Where polyethylene wrapped pipe joins an adjacent pipe that is not wrapped, extend the polyethylene wrap to cover the adjacent pipe for a distance of at least 600mm.

Secure the end with three circumferential turns of tape.

Backfill - for polyethylene wrapped pipe - polyethylene sleeved pipe shall be backfilled for a height of 150mm over the pipe and fittings with sand as specified in clause "BACKFILLING". Every care shall be taken to prevent damage to the polyethylene wrapping when placing backfill.

Protection of Polyethylene encasement - Any damage to the polyethylene before or after backfilling shall be made good by the Plumbing Contractor, to the satisfaction of the Superintendent.

2 – DRAWINGS - AS BUILTS AND MANUALS

2.1 SHOP DRAWINGS

In addition to those considered necessary for fabrication, attend all necessary meetings to co-ordinate services and prepare core hole and co-ordination drawings, based upon those meetings, for the whole of the Hydraulic Services work. Drawings shall be submitted on approved transparency material and drawn to a minimum scale of 1:50 ratio. Quality shall be at least equal to the Tender drawings and show all co-ordination elements, such as structural elements, other services at, and adjacent to, the point of co-ordination, together with sufficient information to ensure that pipework will be installed within false ceiling and duct areas. The Plumbing Contractor shall have the complete responsibility for the detailed drawings, co-ordination and final installation.

Drawings shall be submitted to the Building Contractor for checking prior to submission to the Superintendent for review and approval. As a guide in assessing the amount and extent of Workshop Drawings, the following requirements should be considered as minimum requirements to be detailed:

a) All areas detailed in the contract documents
b) All Plumbing Ducts
c) All false ceiling areas where co-ordination with other services is required.
d) Other areas deemed to require drawings for co-ordination and execution of the work.
e) All access panel requirements, which are not already detailed or suitable on architectural drawings.

Manufacture and/or installation as applicable shall not be commenced prior to review of the drawings by the Superintendent.

Submit drawings to the Superintendent at least fourteen days prior to fabrication or installation of equipment and services.

Provide sufficient copies of the drawings to all other disciplines to ensure co-ordination with all other sections of the work.

2.2 PENETRATION DRAWINGS

The Sub-Contractor shall provide the necessary quantity of Penetration Drawings to adequately reflect and illustrate the scope of work under this contract.

Penetration Drawings shall be submitted at a minimum scale of 1:100 on either A1, A0 or B1 sheets. The Drawings shall be produced with the aid of a suitable CAD program, with electronic copies of all Drawings to be supplied in AutoCAD 2013 and PDF format.

Allow for the appropriate number of copies of Drawings to be available to all design team members, such that a quick and successful exchange of information is affected. The Sub-Contractor must allow for email facilities to allow electronic transfer of Drawings as required.

Penetration Drawings shall include the following information as a minimum;

- Dimension floor plans at a scale of 1:100 to indicate the size and type of all core holes and penetrations proposed throughout the building.

All Penetration Drawings shall be submitted in accordance with program requirements for structural engineer approval prior to installation. Approval shall be granted from the structural engineer in principle only. Such approval does not relieve the Sub-Contractor of his responsibility to comply with the requirements and intent of this Technical Specification. Specifically the Sub-Contractor remains responsible for;

- Complying with all relevant codes and regulations.
- Confirming and correcting all quantities and dimensions.
- Fabrication and construction techniques.
- Coordination with other trades and building structure.
- Performing all works in a safe and satisfactory manner.

The Sub-Contractor shall produce and maintain a penetration drawing submission program and register for approval by the Authorised Person.

2.3 AS BUILT DRAWINGS & OPERATION AND MAINTENANCE MANUALS

A set of drawings shall be kept on site and progressively marked up by the Plumbing Contractor as the work proceeds to record the locations, inverts and details of all installed services, equipment and valves.

Before applying for the Certificate of Practical Completion, a set of "As Built" drawings (comprising all floor plans, Diagrammatics and Details) prepared by the Plumbing Contractor to a minimum scale of 1:100 and relevant bound manuals indicating all items of service or equipment shall be submitted to the superintendent for review. Standard of drafting and minimum scales shall be equal to design documents, accurately plotted, showing dimensions of pipes, valves and services.

The hydraulic services drawings are available in AutoCAD .dwg format from the hydraulic consultant.

During construction when existing inground services are uncovered their exact locations and IL's shall be measured and included in the As-Built documents.

2.3.1 Submission Requirements

Contract Documentation must include submission requirements as follows:

1. 'As-Built' drawings must be progressively marked and completed and reviewed on a monthly basis during the construction stage. Progress prints must be submitted at 50% and 70% complete stages.
2. One final draft copy of As-Builts and Manuals must be submitted for final review by the Superintendent prior to Practical Completion.
3. Two copies of final documentation must be submitted for approval within 4 weeks of Practical Completion.
4. 10% of the Hydraulic Services Contract Value will not be paid until final approved 'As-Builts' & Operating & Maintenance Manuals documentation is received

2.3.2 As-Built Drawings – Content and Format

As Built Drawings shall show dimensions, types and locations of equipment, piping and ductwork in relation to permanent site features and other underground services. Show the 'as installed' locations of building elements, plant and equipment. Show off-the-grid dimensions where applicable. Include relationship to building structure and other services, and changes made during commissioning and the maintenance period. Include diagrammatic drawings of each system and all items of equipment.

Use the same border and title block as the contract drawings. Drawings to be submitted in AUTOCAD format and 3 hard copies, USB copy. Architectural backgrounds to be updated to the latest architectural.

2.3.3 Operation & Maintenance Manuals

The Operation and Maintenance manuals shall include:

1.	A total of Three (3) copies of the manuals are to be supplied to the superintendent upon completion of the works.
2.	Directory: a) Plumbing Contractors information including Plumbers License number b) Hydraulic consultants information c) Architects information d) Project managers information Include: Name, address, telephone and facsimile numbers, email address and. Names of responsible parties.
Contents	
3.	Drawing and Technical Data: As necessary for the efficient operation and maintenance of the installation.
4.	Table of Contents: For each volume. Title to match cover.
5.	Installation description: General description of installation.
6.	System description: Technical description of the system installed, written to ensure that the clients staff fully understand the scope and facilities provided. Identify function, normal operating characteristics, and limiting conditions.
7.	System performance: Technical description of the mode of operation of the system installed.
8.	Installed fixtures and fittings list
Service / Maintenance	
9.	A list of annual service requirements for the completed works.
10.	A list of items that require annual service agreements with pump suppliers, filter suppliers, thermostatic mixing valves, backflow preventers, etc
11.	Manufacturer's technical literature as appropriate. Register with manufacturer as necessary. Retain copies delivered with equipment.
12.	Detailed recommendations for preventative maintenance frequency and procedures which should be adopted by the principal to ensure the most efficient operation of the systems installed.
13.	Schedule of spares recommended to be held on site, being those items subject to wear or deterioration and which may involve the principal in extended deliveries when replacements are required. Included complete manufacture and model numbers, and local sources of supply.
14.	Schedule of normal consumable items, local sources of supply, and expected replacement intervals.
15.	Instructions for use of Lifting tools etc
16.	Emergency procedures, including telephone numbers for service, and procedures for faultfinding.
Instructions	
17.	A copy of manufacturers technical literature, installation and commissioning instructions
18.	A copy of manufacturer's service and/ or maintenance instructions.
19.	Safe starting up, running-in, operating and shutting down procedure for systems installed. Include logical step-by-step sequence of instructions for each procedure.
20.	Procedures for seasonal changes.
Warranties	
21.	A copy of manufacturers warranties
Valve Schedule	
22.	Prepare and show a comprehensive schedule of control valves - Valve schedule shall include A – Position B - Size C – Function D - Valve number
23.	Valve settings
Approvals	

24.	Water Authority Approval
25.	Sewer Authority approval
26.	Authorities approvals.
Emergency	
27.	Emergency contact numbers – for installing Plumbing Contractor
28.	Emergency procedures
Certificates	
29.	Form 15
30.	A copy of the completed commissioning and test report for all pipework and equipment.
31.	Test and balancing reports
32.	Copy of test certificate for the installation and equipment.
33.	Fire Hydrant Flow Test results
34.	Bench test certificate from the supplier of the Hydrant Pumps in accordance with AS 2941
35.	Certification of TMV's
36.	Certification of Backflow Devices
Drawings	
37.	A paper set of the "As Built" drawings in A3 reduced size and in full scale size folded to fit into each Manual
38.	A ÚSB copy of the "As Built" drawings in AutoCad (.dwg) format in each manual
39.	Charts of value tag numbers, with locations and function of each valve, keyed to flow and control diagrams.
Equipment description	
40.	Name, address, telephone & facsimile numbers, email address and Web Address of the manufacturer and supplier of items of equipment installed, together with catalogue list numbers.
41.	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.
42.	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 installation, and data applicable to the installation.
43.	Supplements to product data to illustrate relations of component parts. Include typed text as necessary.
44.	Hot water heater suppliers information
45.	Pump suppliers information
46.	Manufacturers and suppliers of items of equipment installed
47.	Any sub contractors engaged in the works.
48.	A USB copy of the Manual in PDF version.

Training

General: Operation and maintenance manuals: Use Items and Procedures listed in the final draft operation and maintenance manuals as the basis for instruction.

Format: Conduct training at agreed time, at system or equipment location.

Operation: Immediately after practical completion and prior to occupation explain and demonstrate to the person as nominated by the Superintendent prior to Practical Completion the purpose, function and operation of the installations.

Maintenance: Immediately after practical completion, explain and demonstrate to the Maintenance Manager or nominee the purpose, function and maintenance of the installations.

2.3.4 Format

A4 size loose leaf, in commercial quality, 4 ring binders with hard covers, each indexed, divided and titled. Include the following features:

1. Pagination: Number pages consecutively.

2. Cover and Spine: Identify each binder with typed or printed title “OPERATION AND MAINTENANCE MANUAL”. Identify title of project, volume number, volume subject matter, and date of issue.
3. Ring size: 50mm maximum, with composer bars.
4. Text: Manufacturers printed data, including associated diagrams, or typewritten, single sided on bond paper, in clear concise English.
5. Dividers: Durable divider for each separate element, with typed description of system and major equipment components. Clearly print short titles under laminated plastic tabs.
6. Drawings: fold drawings to A4 size and accommodate them in the binders so that they may be unfolded without being detached from the rings. Provide with reinforced punched binder tabs.

3 – WORKS BY OTHER TRADES

3.1 BUILDING CONTRACTOR

The following works shall be undertaken by the building contractor:

Prior to works commencing on-site

1) Erosion & Sediment Control in accordance with Councils requirements and Department of Conservation and Land Management – Urban Erosion & Sediment Control Handbook. (Including Sediment Control Fences, wash bays, straw bale's, etc)
2) Dewatering of Site.
3) Stamping of plans – The Builder shall take to:
   - the original approved DA architectural drawings stamped by council for stamping
   - a copy of the structural drawings
   - a copy of the hydraulic drawings

General

4) Supply and installation of Fire Extinguishers.
5) Duct access panels and inspection panels. (Plumbing Contractor to co-ordinate locations with builder)
6) Inspection panels for all plumbing traps in ceiling areas.
7) The construction of the plumbing ducts in accordance with part F 5.6 of the Building Code of Australia.
8) Fire Rated Bulkheads
9) Replacement of all concrete slabs and bitumen roadways removed for plumbing installation.
10) Supply and installation of the following Sanitary Fixtures:
    a) Sink top and hole penetration
    b) Basin top and hole penetration
    c) Dishwasher machine
11) Irrigation system

Waterproofing

12) Waterproofing of the shower area.
13) Waterproofing of all wet areas.

Protection

14) Bollards to protect external hydrants and gas meters.

Accessible Toilet

15) All accessible toilet & shower grab rails in accordance with AS 1428.
16) The construction and layout of the accessible toilet area in accordance with all parts of AS 1428 (Note: All dimensions in AS 1428 shall be strictly adhered to)

Overflows

17) Overflows from the Terrace / Balcony areas.
18) Sealing between all pipework that pass through the building façade. Including box gutter overflows and downpipes

Plinths / Slabs

19) Plinths to pumps and equipment installations.
20) Concrete slab for hot water heater.
21) Plinths for Hydrant pumps.

3.2 MECHANICAL CONTRACTOR

The following works by others shall be undertaken by the Mechanical contractor:

1. Drainage from condensate units to locations provided by Plumbing Contractor.

3.3 ELECTRICAL CONTRACTOR

The following works by others shall be undertaken by the Electrical Contractor:

	Item	**Location**	**No Off**	**Load kW**
1.	Centralised Hot Water Heat Pump System: 5 x 'Evoheat' EVO315-C Heat Pumps with 4.8kW Electric Boost Element	Heat Pump Plant Room	5	Power input: 1.46kW each Running Current: 6.08A 1Ph
2.	Hot water circulating pump 'Grundfos' model UPS20-60N	Heat Pump Plant Room	2	10amp GPO
3.	Instantaneous Boiling Water Unit Zip Econoboil 5L White w/ concealed electrical connection option	Kitchenette, Kitchen	2	10amp 1Ph
4.	WCSI Urinal Flushsaver Control System With Solenoid Valve	Male Amenities Urinals	2	10amp GPO in ceiling space

4 - MATERIALS

4.1 SUPPLY OF MATERIALS

Supply and fix all materials required to complete the works. All materials shall be first quality and the best of their respective kinds. Second quality or inferior materials shall be rejected. All costs associated with replacement of rejected materials shall be borne by the Plumbing Contractor. All materials shall conform to the latest Australian Standard Specification, Code or Interim Code. If no Australian Standard exists, they shall conform to the latest British Standard or the American Society for Testing and Materials in that order.

4.2 SAMPLES

Supply samples of materials when requested. Samples shall be labelled showing the location of their installation. After approval, all subsequent work shall conform to the quality of the sample.

4.3 MEASUREMENT

Provide measuring or weighing equipment for materials when requested.

4.4 REJECTION OF UNSATISFACTORY MATERIALS

Rejected materials shall be marked by the Plumbing Contractor and removed from the site.

4.5 APPROVAL

All items in this section shall be approved by the local authority and water marked.

4.6 INSTALLATIONS

All materials and fittings shall be installed in accordance with the manufactures instruction and the relevant Australian Standards.

4.7 COPPER TUBE & FITTINGS

Copper tube shall:

a) Conform to AS 1432 - Copper tubes for plumbing, gas fitting and drainage applications.
b) Be installed in and commissioned in accordance with AS 4809
c) Be type A where located under buildings
d) Be type B for Hot & Cold Water.
e) Be type B for Gas
f) Be type B for Hydrant Service main connection
g) Be type B for Hydrant Service and external Hydrants
h) Jointing - Be jointed with silver solder containing not less than:
   5% silver solder and 6 mm lapped joints for pressure supply pipes.
   2% silver solder and 6 mm lapped joints for non-pressure applications.

Fittings for Copper Tube shall:

a) Conform to Australian Standard AS 3688 - Water Supply - Copper and copper alloy compression and capillary fittings and threaded-end connectors.
b) Be dezincified brass or copper suitable for jointing by silver solder.
c) Minimum wall thickness shall be not less than the tube thickness it serves.
d) Be first quality high-pressure fittings for rising mains.

Note: Copper tube shall not be used on urinals, grease arrestor drainage or vents or any photographic equipment / machinery.

4.8 PVC-U PIPES AND FITTINGS

All PVC-U pipes and fittings for sewer and stormwater shall be:

a) Be sewer grade in conformity with AS 1260-PVC-U pipes and fittings for drain, waste and vent applications.
b) Solvent weld jointed in accordance with the manufacturer's instructions.
c) Incorporate fittings of similar manufacture to the pipe used.
d) The Burning out of fittings for reuse is unacceptable.
e) The Heating or annealing of PVC-U pipes and fittings is unacceptable.
f) Jointing - Solvent weld cement (high bond solvent cement) as recommended by manufacturer and approved by authority.
g) Jointing – use fully moulded fittings only. Glue on Boss or saddle type clamp or strapped on joints shall no be used.
h) Be installed in accordance with:
   - AS 3500 Requirements
   - The QLD Code of Practice
   - AS 2032 Code of Practice for installation of uPVC Pipe Systems

4.9 VINYL IRON & FITTINGS

All Vinyl Iron pipe and Fittings shall be:

a) Class 20
b) Rubber ring jointed
c) Incorporate D.I.C.L Fittings (epoxy coated)
d) Installed in accordance with AS/NZS 3500.1

Note: Vinyl Iron shall not be installed under Buildings.

Thrust blocks shall be installed in accordance with manufacturer’s recommendations.

4.10 GALVANISED MALLEABLE IRON FITTINGS

Galvanised malleable iron fittings shall:

a) Conform to BS 1256.
b) Be hot dipped galvanised
c) Be screw jointed with approved compound for the service or patented approved galvanised rolled grooved coupling.
d) Polytec coated or wrapped with approved protective tape where located underground.

Jointing

e) Screwed joints with best quality hemp for water supply
f) Mechanical joint with patented clamp, grooved pipe end and rubber ring equal to Victaulic for water supply.

4.11 BRASS TUBES AND FITTINGS

Brass tubes for grease drainage & sanitary plumbing lines to urinals and any associated vent pipes to a minimum height of 300 mm above the floor level shall be

Brass tubes for sanitary plumbing lines shall be round section of 70/30 brass solid drawn having an arsenic component, 1.6 mm minimum wall thickness, complying with AS 1572 - Copper and Copper Alloys - Seamless Tubes for Engineering Purposes and dimensionally with AS 1432 - Copper Tubes for Plumbing, Gas Fitting and Drainage Applications.

Fittings shall comply with AS 1589 - Copper and Copper Alloy waste fittings and shall be dezincification resistant.

Jointing shall be by silver brazing with filler rods complying with AS 1167.1 and AS 11676.2 - Welding and Brazing - Filler Metals and containing not less than 15% silver.

4.12 RECONDITIONED VALVES

Reconditioned / second hand valves of any type shall not be installed.

4.13 VALVES

1) General

Unless otherwise indicated all valves shall be:

a) Manufactured in Australia.
b) In accordance with the respective Australian Standard as noted.
c) Installed in an accessible position for means of operation and/or removal.
d) Of bronze material for valves up to and including 80 mm diameter.
e) Of screwed pattern with a union fitted to the outlet each side of valves up to and including 50mm diameter.
f) Of non-rising spindle pattern, with clockwise closing.

2) Positioning of Valves - Finished Areas & Ducts

The position of Valves shall:

a) Be at a height of approximately 400-mm above floor level adjusted to match the joints, where installed within a finished area.

b) Be at a height of approximately 1500 mm above finished floor level where installed within a duct.
c) Be centrally located within a duct where access is obtained from a small access panel. Valve position shall ensure ease of maintenance and co-ordination with other services.

3) Control Valves - (Cold Water Supply)

Unless otherwise indicated control valves shall be:

a) Loose jumper valve type fitted with "O" ring seals to the spindle.

b) Manufactured and tested in conformity with AS 1718 - Water Supply - Copper Alloy Screw-Down Pattern Taps - Specified by Dimensions.
c) Constructed of brass materials.
d) Fitted with unions on each side of the valve for maintenance/removal. Alternatively one union can be deleted provided an approved screwed joint is substituted.
e) Recessed stop / control valves shall be chromium plated all brass construction, of pattern and finish equal to that specified under Taps and Valves.

4) Non Return Valves

Unless otherwise indicated non return valves shall be:

a) Manufactured and tested in conformity with AS 1718 - Water Supply - Copper Alloy Screw-Down Pattern Taps - Specified by Dimensions.
b) Horizontal pattern with a gunmetal swing check fitted with limit stop to prevent sticking in the open position. [Have a non water hammer characteristic incorporating spring loaded bronze valve and seat.)
c) Body fitted with screw headed inspection cap.
d) Constructed of brass materials.

5) Balancing Valves

Unless otherwise indicated balancing valves shall be:

a) Of the globe type with facilities for measurement, regulation, isolation and venting,
b) Constructed from a metal, arsenically inhibited brass alloy,
c) Able to be pre-set and locked to the required flow rate,
d) Able to be opened and closed without disrupting the pre-set calibration,
e) Fitted with unions on each side of the valve for maintenance/removal.
f) Incorporate setting indicators for reference purposes

4.14 CLEAROUTS

Where “CO.” indicated on plan provide and install clear out inspection fittings.

Internal - riser from pipeline shall extend vertically to finished floor level and terminate with a brass screw out lid and frame – Chrome plated.

External - Riser from pipeline shall extend vertically to ground level and terminate with a brass screw out lid and frame. A 100mm wide concrete surround should be installed around the Clear out.

4.15 FLEXIBLE CONNECTIONS

Flexible connections (braded stainless hoses) shall

- NOT be used in exposed locations
- Shall be minimum required length
- Shall be installed in accordance with manufacturers instructions
- Be approved by Superintendent before installation
- Shall be by one manufacturer throughout the project.

Should flexible connection be proposed – submit full details, including installation details – for approval

5 - EXCAVATION & BACKFILL

5.1 TRENCH EXCAVATION

Keep adequate dewatering equipment on the site at all times and keep excavation free of water.

All excavations shall be carried out in a safe, secure and prudent manner that will prevent any form of collapse, slip or failure of the sides of the excavation.

The ground shall be excavated in the form of trenches to enable the various pipelines to be constructed in the locations shown on the drawings with trench width increased where necessary to permit the construction of access chambers and pits. Trenches shall be excavated at uniform grades and in straight lines.

Upon commencement of excavations a general examination of the trenches shall be made to determine the presence or otherwise of any material considered by the Plumbing Contractor to be detrimental to the life and future condition of the pipeline to be installed.

Wherever such material is located, the Plumbing Contractor shall advise the Superintendent immediately together with a recommendation and costs of remedial action to be taken. No work in regard to this remedial precaution is to commence until written approval to proceed is obtained from the Superintendent.

Remove all excess excavation material from site, pay all cartage and disposal fees wherever applicable to provide a clean neat site devoid of all debris created by this section of works.

5.2 EXCEEDING EXCAVATION

If the Plumbing Contractor has exceeded the section area of excavation, as shown, in consequence of any injudicious working, slips, falls, or for any cause other than by direction of the Superintendent then the Plumbing Contractor shall, at sole cost, remove such extra materials from the site, make good and fill in the extra excavation with concrete, sand or approved filling as may be directed.

No extra payment will be made for excavation in excess of that required by the drawings and specification unless directed in writing by the Superintendent.

5.3 TIMBERING OF EXCAVATION

Subject to any Act of Parliament, Ordinance or Regulation, the Plumbing Contractor shall satisfy himself as to the necessity of timbering any excavation and shall accept the sole responsibility as to its being required and to its use in the works.

Where necessary for safe and efficient completion of the work erect shoring and timbering of sufficient strength and quality to prevent earth and other material slipping of falling in or being shaken from the side of the excavation. As the work proceeds, all shoring and timbering shall be withdrawn except in the cases where the Superintendent has indicated in writing that such shoring and/or timbering shall be left in position. The supply, erection and withdrawal of timber work shall be considered to be included in the cost of excavation.

5.4 PRECAUTIONS & SAFEGUARDS

Carry out the work in a careful, secure, safe and tidy manner and take all precautions against damage whether arising from bad workmanship, breakage or machinery or plant, inefficient timbering, flooding or any other cause whatsoever. Provide, erect and maintain warning signs, temporary fences, barriers and warning lights adjacent to any works such as trenches and excavations or stacks of material which could be considered a danger to persons or traffic of any kind.

The Plumbing Contractor shall obey all directions given to him with regard to the provisions of lighting and barriers, but shall not be relieved of the responsibility to provide adequate lighting and barriers to prevent any accident or damage.

5.5 USE OF EXPLOSIVES

The use of explosives will not be permitted.

5.6 BEDDING MATERIAL

Where trench base is of stable sand material pipe barrels shall be directly supported on the undisturbed natural ground. In all other cases, pipelines shall be supported on either a granular bedding or cement mortar bedding in accordance with AS 3500.2 clause 5.4.

Where compaction of backfill over the pipeline is to be made by the use of mechanical vibrator, a further sparging to a level equal to 1/3rd the pipe barrel shall be made using 6:1 cement mortar. The additional cement mortar shall be placed after the initial setting of the 4:1 sparging takes place.

Where a mechanical vibrator is employed, the lines shall be subjected to a second test upon completion of the compaction.

5.7 BACKFILLING

General

Unless instructed otherwise where a length of trench has been inspected, the bedding material shall be placed and compacted. After a length of pipeline has been constructed, tested and inspected the trench where located under finished surfaces such as concrete, bitumen or paving shall be backfilled with granular material up to underside of the working surface. Granular material shall be in the form of sand, fine sized "run of river" gravel or similar, free of clay and rock. Thoroughly compact the material around and above pipes by flooding, hand tamping or mechanically ramming to not less than 95% compaction as set out below.

In open spaces backfill with granular material 150 mm above pipe collars and then backfill with selected excavated material.

Selected excavated material shall be free from rocks or other hard particles, which would be retained on a sieve having 15 mm openings. It may contain compactable clay lumps up to 75 mm in size. The spoil from the excavation if it complies with the above, or can be sieved or broken up to comply, will provide a suitable material and shall be placed in successive layers and compacted to not less than 95% of the density obtainable from the Standard Compaction method in accordance with AS 1289 - Methods of Testing Soil for Engineering Purposes, shall be placed for the remainder of the trench depth up to 150 mm from the finished surface level.

Unless otherwise directed the remainder of the trench filling shall be carried out using the original top soil (where suitable) or approved sand - sandy / loam fill.

Backfilling shall be completed as soon as possible after laying to avoid damage or floating of pipes if trench is flooded by water.

5.8 TRENCHES EXCAVATED IN FILLED GROUND

Provide a schedule of rates in the tender for the items listed below, these items are a suggested means of support only. The local authority shall approve the type of support prior to installation. The plumbing contractor shall allow for a Structural Engineer to design and certify the support system:

a) Where Located Externally:

Laid on concrete beams, with at least three steel rods of not less than 15 mm nominal size laid longitudinally within the beam or two layers of trench mesh (type F8TM) and be not less than 150mm thick with a minimum width of 450 mm for 100 mm and 150 mm pipework, 600 mm minimum width for 225 mm to 450 mm pipework and 750 mm minimum width for pipework over 450 mm. Beams shall be supported by concrete piers of not less than 230 mm x 230 mm founded to a depth of firm natural strata and placed at intervals on not more than 3000 mm with four steel rods of not less than 15 mm nominal size with a minimum of 50 mm cover and tied into the reinforcement of the beam for a distance of 300 mm.

b) Where located internally:

Laid on concrete beams as described in part (a) above, and supported by tie rods of not less than 12 mm diameter reinforcing bar formed to fix the support beam steel to the concrete slab steel situated above the line. Tie rods shall be spaced at not more than 1500 mm and sleeved with 100 mm diameter PVC-U. tube extending from within the support beam and into the concrete slab. The entire length of PVC-U tube shall be filled with concrete in such a manner that no section of the rod shall be exposed. Connect top of tie rod to slab steel with minimum of 300 mm length bend.

c) Line the trench with a permeable fabric equal to "terra firma 700" then back fill to a depth of 450 mm with 10 mm blue metal gravel. The drainage line shall then be laid on the bed of gravel and backfilled with 10-mm blue metal to a height of 150 mm above the collars of the pipework. The trench fabric shall then be turned over the gravel and the remainder of the trench backfilled as previously specified.

Generally, drainage lines are not permitted to be laid in filled ground without additional support. Consideration to waiver the support may be given by the Superintendent and/or the governing authority where the fill is compacted to 98% dry density ratio (Australian Standard AS1289 - Methods of Testing Soil for Engineering Purposes E1.1)
Where additional treatment to achieve a compaction of 98% dry density is carried out using mechanical compacting equipment and the Plumbing Contractor proposes to install pipes and pits in the compacted fill without additional support, comprehensive compaction test results, location plans and "letters of adequacy" from the supervising structural engineer stating that the compacted fill is suitable for the support of pipes and pits is required to be submitted to the Superintendent and the governing authority. Approval in full shall be obtained from both parties before any work proceeds.
All trenches are to be inspected by the Superintendent and governing authority prior to laying of drainage lines; claims for redundant work as a result of failing to do so shall not be considered valid.

5.9 TRENCHES EXCAVATED IN ROCK

It shall be deemed that excavation in rock has been allowed for in the tender where it should have been reasonably anticipated by the Plumbing Contractor, or where test bore results indicate the presence of rock and the test bore results are available for inspection by the Plumbing Contractor, or where inspection of the site and its surroundings would indicate the presence of rock.

Should the Plumbing Contractor encounter rock not previously anticipated during excavations, notify the Superintendent immediately so that the extent, quantity and type of rock excavation can be assessed by the Superintendent prior to commencement of rock excavation. Failure to observe this requirement shall forfeit the Plumbing Contractor's right to reimbursement of additional costs relating to the excavation of rock unless the extent, quantity and type of rock can be assessed later and there was not alternative to the excavated route.
Provide in the tender a schedule of rates, which will be the basis of assessing the cost of additional work associated with excavation in rock. The schedule shall be the Plumbing Contractor's price in cubic metre rates for additional cost (extra over) to excavate trenches in soft rock and in hard rock. The Plumbing Contractor shall also provide cubic metre rates for the additional cost to excavate pits in soft rock and in hard rock.

5.10 SEWER AND STORMWATER DRAINS IN DEEP OR WIDE TRENCHES

Before laying sanitary drainage and stormwater drainage in a deep trench (i.e. depth greater than 3 metres) or a wide trench (i.e. width at top of pipe greater than outside diameter plus 600mm) the following is needed:

1) A certificate of structural adequacy for:

   - class of pipe and
   - bedding, haunch, pipe support and backfill issued by a practicing civil engineer

2) Permission of the relevant Authority.

Note:
Pipes shall be installed in accordance with manufactures instructions / requirements.

6 - SANITARY PLUMBING AND DRAINAGE

6.1 GENERALLY

Supply and install all Sanitary Plumbing and Drainage from soil and wastes fixtures to the existing authority sewer main.

Provide all necessary materials, pipes, junctions, bends, offsets, branches, couplings, brackets, clearouts, floor wastes, excavation, backfilling, testing and sundry equipment required for the installation as indicated on the drawings and to the regulations and requirements of the relevant authority and the satisfaction of the Superintendent

The location of pipelines indicated on the drawings are diagrammatic. Pipeline positions shall be determined on site in conjunction with all other disciplines to ensure adequate co-ordination of all services and elements.

Co-ordination shall be carried out prior to any setting out, excavation and pipe installation taking place.

Execute the works, using only materials and structures as approved by the local Authority and to the satisfaction of the Superintendent.

6.2 SEWER CONNECTION

Make application to the Sewer Authority, ascertain the depth, position and suitability of the sewer drainage connection point prior to the commencement of any work (Pipelaying & excavation) and ensure that the new sewer drainage can gravitate to the proposed connection point. The Superintendent shall be advised immediately should any adjustment be required to execute the work.

No claims for redundant work will be considered due to failure to comply with this requirement.

No pipelaying or excavation shall be undertaken until this has been undertaken.

6.3 MATERIALS

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

Material	Pipeline
PVC-U	for sewer and Sanitary Plumbing and Drainage
all as specified under "Materials".	

Traps and pipework within the kitchen area shall be chrome plated brass.

6.4 EXCAVATION AND BACKFILLING

Carry out all necessary excavation and backfilling as specified under "Excavation" and "Backfilling".

6.5 GRADIENTS

Pipelines shall be laid true to line and bore from point to point.

Unless otherwise indicated on drawings pipelines shall be graded in accordance with the Authorities requirements.

6.6 TESTING

Provide a hydrostatic test to choke level for a minimum period of 15 minutes and as required by the testing authority and the Superintendent.

6.7 LOCATING FLOOR WASTES, TUNDISHES, DRAINAGE POINTS

Co-ordinate the locations of floor wastes, tundishes and drainage points with the architect.

6.8 FLOOR WASTES

Floor wastes with PVC-U pipe – an approved safe waste tray shall be used on all floor and shower wastes.

Use 100 mm riser and 50 mm or 65 mm outlet of self cleansing pattern for Sanitary Plumbing and 100 outlet for sewer drainage.

Grate and surround to be chrome plated brass.

Chrome plated ABS grates or plastic grates are not acceptable

Ensure that all floor wastes are properly supported.
Ensure that all relevant floors are graded to floor wastes – co-ordinate with builder.
Ensure that all floor waste risers are watertight.

6.9 EXPANSION JOINTS

Expansion joints should be installed in accordance with AS 3500 and for PVC-U in accordance with AS 2032 – Code of practice for installation of PVC-U pipe systems.

Supply and install approved expansion joints to all soil, waste, relief and main vent lines.

6.10 INSPECTION OPENINGS & GATES

Install inspection openings in accessible locations so that each section of pipework can be cleaned. Inspection opening sizes shall be in accordance with the authorities requirements.

Note: All inspection openings shall be brass.

6.11 OVERFLOW GULLY

Supply and install an overflow gully to provide a safe release from the connection point. Gully shall be constructed of 100mm diameter "P" trap and 100mm riser. Top of riser shall incorporate 200mm cast iron grate with concrete surround. Terminate gully top to comply with current Authorities regulations.
Provide inlet (fixture) or hose tap to charge gully

6.12 TRAPS

Traps shall be of 'P' or 'S' type, finished to surface all as described under "Sanitary Fixtures".

1. All exposed traps shall be chrome plated copper
2. All concealed traps (i.e. traps located in cupboards) shall be PVC-U
3. Traps subject to temperature discharges above 60^0c shall be copper or Brass.

6.13 SINKS & BASINS

Plumbing Contractor to supply taps, plug and washer (Brass chrome plated) and chrome plated trap and waste in kitchen/servery areas

6.14 VENTS

Vents – All vents penetrating the roof shall be painted to match the roof colour. Where the roof is a Colourbond colour or similar the paint batch number shall be matched and applied to the vents.
Provide approved cowl to each vent; terminate vents at minimum approved heights above roofs.
Flash each vent penetration through the roof with approved EDPM flashing – “Dektite” or approved equal. Install in accordance with manufacturers instructions, ensure neat and watertight installation. Paint flashings to match roof colour.

6.15 PIPEWORK CAST IN SLAB AND BEAMS

All pipework cast in slabs shall be wrapped / protected in accordance with AS 3500 and Authority requirements.

6.16 ACCESSIBLE TOILET & BASIN & SHOWER

The accessible toilet & basin & shower shall be installed in accordance with all dimensions to AS 1428 - Design Access and Mobility, Part 1. and Part 2

Refer to the sanitary fixtures and appliances schedule at the rear of the specification for the manufacturer and model of toilet suite, basin and tapware.
Note: All grab rails specified by architect and supplied by builder and fixed to wall in accordance with AS 1428

7 - COLD WATER

7.1 GENERALLY

Supply and install all cold water pipes from the existing Authorities water main to all fixtures, fittings and taps requiring cold water. Include for all pipework, bends, offsets, brackets, taps and sundry equipment required for the installation.

Pipe materials shall be as follows:

Service	Material
Cold Water	Copper
Fire Hydrant Service Connection	DICL

Note: Check the water Main Maximum pressure – The Safe Working pressure of Type B Copper is:
50∅ - 1,810kPa, 65∅ - 1,440kPa , 80∅ - 1,620kPa,
100∅ - 1,210kPa , 150∅ - 1,000kPa

Note:
Check soil conditions to ensure that it will not corrode the copper tube. If in doubt sleeve pipe or use Inert material
Check water quality to ensure that it will not corrode the pipe.

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

Negotiate with Authority for the supply of all meters, take delivery from Authorities store and install on site as indicated on the drawings, complete with all valves and fittings required.

7.2 WATER MAIN CONNECTION

Make application to the Water Authority, excavate and connect to the Authorities water main for the following services.

Service	Size
Fire Hydrant / Water Service	100 mm

and extend to the reticulation as indicated on the drawings.

7.3 VALVES - (IN-LINE)

To pipelines supplying cold water to each unit supply and install a control valve.

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

Locate valves as indicated on the drawings.

All valves shall be tagged and clearly indicate what areas they serve. Valve location and function shall be referenced in the Operating Manuals.

Valves to be as specified in ‘Materials’

7.4 CONNECTION TO FIXTURES

Provide unions at wall or floor surface and at fixtures appliances to allow removal and replacement without the need to adjust connections.

Exposed basin, cistern connections to be chrome plated copper

7.5 TESTING

Provide a water pressure test of 1500 kPa for a period of two hours.
Disconnect any equipment connected to the service not rated to the test pressure, before testing commences.

7.6 TAPS

Unless indicated otherwise taps shall be Australian made of brass construction.

All taps, connections and cover plates shall be bright chromium plated finish.

Taps shall be fitted with anti-splash nozzles, except for hose taps and/or where otherwise specified.

Hose Taps shall incorporate: Loose Jumper Valve incorporating neoprene washer

7.7 MINI STOP VALVES

At each wall connection for both hot and cold water to all basin and sink mixers, supply and install a chrome plated 15 mm right angled, chrome plated mini stop valves.

7.8 SCHEDULE

Refer to schedule at rear of specification.

7.9 FLUSHING & CLEANING OF WATER SUPPLY SERVICES

All as previously specified under "Flushing - Pressure Systems".

7.10 EXTERNAL HOSE TAPS – VANDAL PROOF

All external hose tap assemblies shall be vandal proof with removable key.

Before practical completion provide 6 no operating keys to Superintendent.

7.11 HOSE TAPS - EXTERNAL

All external hose taps within the garden and turfed areas shall be either screwed to the wall with three brass screws or supported on a hard wood stake. The hard wood stake is to be at least 50mm x 50mm in width and driven into the ground to a minimum depth of 300mm. The hose tap shall be secured to the stake with three brass screws.

8 - FIRE HYDRANT SERVICE

8.1 GENERALLY

Supply and install a Fire Hydrant service to the locations shown on the drawings.

Include for all piping, fittings, valves, and hydrant valves to the locations shown on the drawings and other sundry items of equipment as required for the installation.

The Hydrant system shall be installed in accordance with AS 2419.1 and the Building Code of Australia.

Pipework shall be:

Location	Material
From water main to Non-return valve	Copper Type B as specified under "Materials". Note: The material from the main to the meter must be approved in accordance with **MP52** "Manual of authorization procedures for plumbing and drainage products" and shall be **watermarked.**
Inground (From the Booster)	PE100 High Density Polyethylene Red Line
Above ground	GMS with Victaulic fittings all as specified under "Materials". Note: In ground Risers to Hydrants GMS shall be kept to an absolute minimum. The GMS shall be double wrapped with Denso petroleum Tape

8.2 HYDRANTS

Supply and install Landing Valve hydrants in approved locations with the centre of the valve 750-mm above ground. All hydrant valves and shall be installed to Fire and Rescue NSW requirements

The valves shall be installed "at an angle of not more than 35^0 below the horizontal "as per AS 2419.1

Note: External hydrants shall be 10 metres from the building, unless noted otherwise where installation is against fire rated wall, refer to drawings. The Landing Valves and the booster valve inlet & outlet shall be capable of being used by the local Fire Brigade.

8.3 TESTING OF PIPEWORK

Test all pipework 1700 kPa for a period of two hours in accordance with AS 2419.1.
On completion, test the installation under full supply conditions all to the satisfaction of the Fire Brigade and the Superintendent. Record pressure and flow results and advise in writing to the superintendent.

8.4 PAINTING / IDENTIFICATION

All pipework shall be continuously painted red. All Pipework shall be labelled.

8.5 BOOSTER VALVE AND DOUBLE CHECK VALVE WITH METERED BY-PASS

Provide a 100mm mains fire hydrant booster valve assembly complete with:

- 2 x suction points
- 2 x boost points.
- Isolation Valve
- Check Valve
- Cabinet
- Large Bore Suction point

Booster shall be located and installed in accordance with Authority requirements.

The Sub-Contractor shall supply and install a 100mm Double Check Detector Assembly with Metered Bypass. The backflow prevention device immediately upstream of the fire hydrant booster valve. Allow to provide all valves, strainers and drainage for the backflow prevention device assembly in accordance with Authority requirements

Double check valves shall be equal to WILKINS model 350ADA.

The Sub-Contractor shall certify installation and operation of the backflow prevention device installation, and at completion of the Performance Guarantee period.

8.6 FORM 15

A form 15 - flow test shall be undertaken in the presence of the superintendent.

Flow tests shall be with two most hydraulically disadvantaged hydrants operating.

On completion of the flow test, supply the Superintendent with a form 15 and a certificate with the following items:

Flow rate	Pressure	Date	Time	Test Location and RL	Witness name & signature
Static	.....kPa				
5 l/s 1 hydrant flowing	.....kPa				
10 l/s 1 hydrant flowing	.....kPa				
20 l/s 2 hydrants flowing	.....kPa				
Max flow	.....kPa				

8.7 ISOLATING VALVES

The isolating valves on the hydrant system shall be located in accordance with clause 4.4.5 in AS 2419.1 and be in an accessible position.

The locks shall be a 003-type padlock.

8.8 BLOCK PLAN

A block plan shall be provided at the booster location in accordance with AS2419.1

8.9 TAGGING

All Fire Hydrants shall be tagged in accordance with AS 1851.4

The Plumbing Contractor shall maintain the Fire Hydrants for 12 months and shall notify the superintendent that all Fire Hydrants have to be inspected and tagged in accordance with AS 1851.4

An installation log shall be kept on-site for the Fire Hydrants.

8.10 FIRE BRIGADE

NSW Fire and Rescue shall be notified at the completion of the installation to carry out a final inspection. Notification shall be provided 2 weeks before the project completion to allow for sufficient time for the Fire Brigades to attend.

9 - HOT WATER

9.1 GENERALLY

Supply and install the hot water service from the hot water heater plant to the fixtures and appliances. Include for all piping, fittings, supports, insulation, hot water heaters, valves and other sundry items of equipment required for the installation.

All pipes shall be copper tube insulated as specified.

9.2 TESTING

Provide a water pressure test of 1500 kPa for a period of two hours.
Disconnect any equipment connected to the service not rated to the test pressure, before testing commences.

9.3 CONNECTION TO FIXTURES

Provide unions at wall or floor surface and at appliances to allow removal and replacement without the need to adjust connections.

Exposed basin and cistern connections to be chrome plated copper

9.4 CONTROL VALVES

Supply and install control valves to each group of fixtures. Locate behind access panels or within accessible ducts.

9.5 EXPANSION & CONTRACTION

Make adequate provision for expansion and contraction. Pipes located in walls and floors shall be provided with sufficient insulation so that expansion and contraction does not impose a strain on the pipework or finished surfaces.

Hot water supply pipes shall be installed with appropriate allowance for expansion and contraction as per AS 3500.4 clause 3.6.3 and table 3.4.

10 - SANITARY FIXTURES & APPLIANCES

10.1 GENERALLY

Supply and install all sanitary fixtures and appliances connected to the hydraulic services unless specified as "connected only".

Where specified "supply and install" allow to take delivery, store as necessary and install. Provide all fixings, necessary cutting, securing brackets to walls, levelling and connection to various services required for satisfactory operation.

Where specified "connect only" allow to connect to the various services fixtures and appliances installed by others.

All exposed brackets shall be white enamelled.

All exposed connections shall be chrome plated unless specified in white PVC-U.

Fixtures, appliances and brackets shall be first quality.

Allow for caulking joints around sanitary fixtures, pipes, brackets, bolts and nibs.

Obtain a written guarantee from the manufacturer for a period of two years. The guarantee shall cover all costs associated with replacement of a faulty article within the two-year period.

All tap buttons shall be colour coded to indicate cold, hot, warm & tempered water in accordance with AS3500.

All taps, shower roses, fixtures and appliances to be AAA rated.

10.2 SANITARY FIXTURES & FITTING

Supply and install the following fixtures and appliance. Builder is to ensure all fixing noggings are located prior to fixing wall linings, noggings to be min 90 x 45 F5 pine.

All fixtures to be secured to studs or wall noggings

All sanitary fixtures to be in accordance with architects specification & schedules

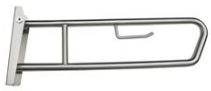
11 FIXTURES & FITTINGS

Location	Item	No.	Detail
ACCESS WC, FEMALE AM, MALE AM 	Side Grab Rails -90° flush Mount Side Wall	X2 LEFT X1RIGHT Confirm on site	Equal to grab rails by METLAM MLR103_X – LH, MLR104_X – RH, 90° flush Mount Side Wall, stainless steel with concealed fixing, installed in accordance with AS1428.1.
MALE AM, FEMALE AM 	90° Ambulant Grab Rail 450 X 450 in Satin S/S	X2 LEFT X2 RIGHT	Equal to METLAM MLR112_1SS, Adjacent nominated WC satin stainless steel with concealed fixing, installed in accordance with AS1428.1.
ADULT CHANGE RM 	AS1428.1 WC Suite	X1	Caroma Care 800 Cleanflush Wall Faced WC with Backrest and Caravelle Care Single Flap Seat - Anthracite Grey 901920BAG Installed in accordance with AS1428.1
ACCESS WC, MALE AMENITIES, FEMALE AMENITIES 	AS1428.1 WC Suite	X3	Caroma Care 200 V2 SNV Suite with Backrest Sorrento Blue Flap Seat 982910BSB
MALE AMENITIES, FEMALE AMENITIES, REFEREE 1, REFEREE 2 	Wall Faced WC Suite Arc SC Seat	X9	Caroma Urbane Wall Faced Toilet Suite – 743500W

Location	Item	No.	Detail
ACCESS WC, MALE AMENITIES, FEMALE AMENITIES 	AS1428.1 Shower Set	X2 LEFT X1RIGHT	CAROMA PLUS STARSAFE II INVERTED T ACCESSIBLE SHOWER SET – Includes Shr Rose +Hose LH- 782740A RH-782741A Installed in accordance with AS1428.1- NOTE: Wall outlet to be positioned min. 1500mm from edge of WC pan.
ACCESS WC, MALE AMENITIES, FEMALE AMENITIES 	shower seat	X3	Equal to ML991CL, Installed in accordance with AS1428.1
ACCESS WC, MALE AMENITIES, FEMALE AMENITIES 	SHOWER WALL MIXER	X3	CAROMA CARE PLUS SHOWER MIXER STANDARD HANDLE HC – 91107C
ACCESS WC 	AS1428.1 Handbasin	X1	CAROMA URBANE II RH SHELF WALL BASIN – 878710W Installed in accordance with AS1428.1
ACCESS WC, ADULT CHANGE 	AS1428.1 Basin Mixer Tap	X1	CAROMA AQUA CARE MIXER TAP 90989C5A

Location	Item	No.	Detail
MALE AM, FEMALE AM, REFEREE 1, REFEREE 2, 1ST AID 	AS1428.1 Handbasin	X15	CAROMA COSMO 1 TAP HOLE 861515W W/ SHROUD 639950
MALE AM, FEMALE AM, REFEREE 1, REFEREE 2, 1ST AID 	AS1428.1 Basin Mixer Tap	X15	CAROMA SARACOM BASIN MIXER 98020C5A
ADULT CHANGE 	AS1428.1 Handbasin	X1	CAROMA OPAL 920 RHS SHELF WALL BASIN
ACCESS WC, FEMALE AM, MALE AM 	toilet paper holder	X3	Equal to Metlam ML113S
ACCES WC, MALE AM, FEMALE AM 	coat hooks to toilet & shower partitions	X6	Equal to Metlam ML202-CBNP
ACCESS WC, MALE AM, FEMALE AM, ADULT CHANGE, REFEREE 1, REFEREE 2	Hand Dryers	X8	Metlam EcoMo Round Black

Location	Item	No.	Detail
			
1ST AID, MALE AM, FEMALE AM, REFEREE 1, REFEREE 2, ACCESS WC, ADULT CHANGE 	Mirror Soap Dispenser	X13	Equal to Britex BTX-05-034. Installed in accordance with AS1428.1
ACCESS WC, MALE AM, FEMALE AM 	Acc Shower Soap Dispenser	X3	Equal to Britex BTX-05-038. Installed in accordance with AS1428.1
CLEANER/STORE/HWS  	Cleaners Sink	1	Caroma Cleaners Sink - 811592W Caroma Tasman II Laundry Tap Set - *992534C4A*
MALE AM, FEMALE AM, REFEREE 1, REFEREE 2 	VANDAL RESISTANT SHOWER ROSE	X12	Rada VR2-RS Vandal Resistant Showerhead – 2.1652.009 Mounted @2000mm from floor level
MALE AM, FEMALE AM, REFEREE 1, REFEREE 2	Timed Flow Shower Tap Mixer	X12	Enware-Delabie Tempostop Shower Valve – Recessed, Easy push button activation, auto shut-off after 30 seconds, cover plate without exposed screws, equal to model TFC749128

Location	Item	No.	Detail
			
ADULT CHANGE RM 	DROP DOWN GRABRAIL + DROP DOWN GRABRAIL WITH TPH	X2	Equal to Metlam MLR50TPH
KITCHENETTE 	KITCHENETTE SINK	X1	CAROMA CLARK EVOLUTION SINK MODEL 4062.1R
KITCHENETTE 	KITCHENETTE TAP MIXER	X1	CAROMA CIRRUS SINK MIXER – LEAD FREE – 95086C4AF
MALE AMENITIES 	URINAL	X4	CAROMA INTEGRA INVISI SERIES II URINAL SUITE – 7431000W
KITCHEN 	KNEE OPERATED HAND BASIN	X1	BRITEX KNEE OPERATED HAND BASIN - HBKO

Location	Item	No.	Detail
KITCHEN, KITCHENETTE 	BOILING HOT WATER UNIT	X2	ZIP ECONOBOIL 5L WHITE INSTANT BOILING WATER APPLIANCE - 405042
ENTRY HALLWAY 	DRINKING FOUNTAIN	X1	BRITEX HEALTH CLUB DRINKING FOUNTAIN - DFRE
EXTERNAL TO STORE 3 	RAINWATER TANK	X4	ROTOPLUS SLIMLINE 5000L RAINWATER STORAGE TANK – SL5000SX (TO ARCH COLOUR SELECTION)
ACCESS WC, MALE AM, FEMALE AM, REFEREE 1, REFEREE 2, ADULT CHANGE 	FLOOR WASTE AND PUDDLE FLANGE	X21	SPS DRAINS 130 mm ROUND FLOOR WASTE WITH 100 mm LO-PROFILE RETRO FIT PUDDLE FLANGE – R130/87S-PF

12 - COLD & HOT WATER FIXTURES & FITTINGS

Item

Pressure Limiting Valves (PLV)	Model	SYR 315 (Pressure Dial up Model) Max 600C Adjustable 150-600kPa (from 15 to 50mm) For Hot Water SYR 6243 Up to 900C Adjustable 400-800kPa (from 15 to 50mm)
	Manufacturer	RMC
	Material	Brass
	Note	
	Location	To the locations shown on the drawings

Solenoid Valve	Model	281-A-20-B-MS ¾-240 volt.
	Manufacturer	Burket solenoid valves
	Note	Power to the electronic solenoid valve shall be supplied by the site electrician.
	Location	Provide to the locations indicated on the drawings

Strainers	Model	LS501
	Manufacturer	RMC.
	Size	15mm
	Note	
	Location	Allow to fit before the meter Line strainers to the potable water service and to the recycled water service.

PROJECT NO: 244117
SHEET 1 OF 4

TENDER FORMS

for

HYDRAULIC SERVICES – Multipurpose and Evacuation Centre

at

Richmond Park, Tumut NSW

This schedule contains a list of all the major work items and the tenderer is required to make his own assessment of the work involved from the drawings and specification and enter the total price for each item. All works in the schedule must be priced separately.

1.	Supply and install sanitary fittings and fixtures	$.....
2.	Supply and install tapware (including flow control)	$.....
3.	Sanitary drainage	
4.	Trade waste drainage	$.....
5.	Fire Hydrant System	$.....
6.	Cold water installation including fire hose reels	$.....
7.	Hot water installation (including hot water systems)	$.....
8.	Gas Installation	$.....
9.	Non-Potable Cold Water System	$.....
10.	Authority fees and charges	$.....
11.	Hydraulic services workshop design documentation	$.....
12.	O&M Manuals	$.....
13.	As Built drawings and block plans	$.....
14.	Temporary site services	$.....
15.	12 months maintenance/Defects Liability	$.....

PC Sum allowance –

1. Provide PC sum for provision of additional geotechnical report on completion of cut and fill stage and provision of performance solution design documentation for “drains in unstable ground” as per Appendix G of AS3500.2-2021, include sum for installation of appropriate Swivel joints, expansion couplings, expansion joints and clay plugs throughout both the sanitary and trade waste drainage pipe network, to satisfy the requirements of AS3500.2-2021.
2. Provide PC sum for provision of hard stand areas in front of hydrant booster assembly and fire brigade suction point.

Sub Total	$.....
Lump Sum Tender Price	$.....
GST	$.....
TOTAL TENDER PRICE	**$.....**

PROJECT NO: 244117
SHEET 2 OF 4

SCHEDULE OF UNIT RATES

The following unit rates are to be used for additions to, or deletions from the specified Contract works (prior to the purchases of affected equipment). **All unit rates given herein shall include all preliminaries and overhead charges and profit.**

For the works associated with Variation to the Contract to which the unit rates given cannot be applied, the variation costs to be submitted for evaluation and approval shall consist of the following subdivisions.

a) The supply costs of materials or equipment.
b) The labour costs involved in the installation of these items of equipment or systems to their approved completion stage.

In determining the value of labour costs, the following charge-out hourly rate shall apply. This unit rate shall be an absolute rate inclusive of any penalty rates and allowances which may form part of the wage award.

LABOUR RATES

Labour rate applicable for work time on site and in factory and shall include all loadings and allowances apart from overhead and profit covered by item below.

	Normal Time	**Rate per Hour Time & Half**	**Double Time**
Supervisor - on site Qualified Plumbing	$	$	$ .....
Tradesman	$	$	$ .....
Plumbing Apprentice	$	$	$ .....
Drawing Office	$	$	$ .....
Maintenance (call out)	$	$	$ .....

SCHEDULE OF DEVIATIONS FROM SPECIFICATION

Any items of equipment or installation methods of installation sequencing proposed to be supplied or carried out by the tenderer, which deviate in any shape or form from the specified requirements, shall be declared in this Statement of Deviations.

For all items of equipment or installation methods or sequencing not declared in this statement, the specified requirements shall be deemed to be offered by the tenderer, without qualifications, and all associated costs shall be deemed to be included in the tender prices. The list of deviations proposed is as follows:

(If insufficient space for the full list, please attached separate insert to the Schedule.)

SCHEDULE OF ALTERNATIVES FROM SPECIFICATION

This schedule shall be submitted at time of tender.

All alternatives from this specification and the tender adjustment price shall be listed and detailed below:

Deviation **Cost Adjustment**

SCHEDULE OF PERSONNEL

Chief Supervisor

Name ..... Time With Firm .....

Experience .....

.....

.....

Foreman — On Site

Name ..... Time With Firm .....

Experience .....

.....

.....