Infrastructure Management Plan

Engineering & Technology Precinct - Stage 1

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1. INTRODUCTION

This Infrastructure Management Report has been prepared by Laing O'Rourke and the University of Sydney in response to the Secretary's Environmental Assessment Requirements (SEARS) for SSDA for the University of Sydney Engineering and Technology Precinct Stage 1 building, Item 11, "Utilities", and Stage 1 (CIP) Consent (SSD 6123) Condition B28.

1.1 REFERENCE DOCUMENTS

The following documents have been referenced in the preparation of this Infrastructure Management Report:

(i) Architectural Drawings prepared by Cox Architecture

(ii) The University of Sydney Design Standards

(iii) The University of Sydney Design Brief as published, including Addenda, and site infrastructure information

(iv) Survey Information and Dial Before You Dig Information.

1.2 EXISTING SERVICES

The faculty grounds are located on the Darlington Campus. The Precinct is bound by Shepherd St and Cleveland St externally and the University's internal road of Maze Crescent. The campus spans an area of 69,140m2 and has eleven buildings housing the faculty's 5 schools. These school buildings were constructed between 1945 and 2006.

Figure 1 - Engineering and Technology Preinct

All existing services affected by the construction of the ETP stage 1 development will be:

(v) Identified, capped, sealed, made safe, and removed if redundant; or

(vi) Identified, isolated and relocated if the services is to be removed.

(vii) Coordinated with the Precinct Masterplan for services

All works associated with the diversion, capping, connecting or modification to the existing Utility or University services infrastructure will be coordinated with Campus Infrastructure Services (CIS) or the relevant Authority or Utility prior to any works proceeding.

Further information regarding the major Utility and Authority routes and their proposed modification and augmentation is detailed in later sections of this report.

2. ELECTRICAL INFRASTRUCTURE

The existing Building J03 houses the School of Electrical and Information Engineering. The J03 Building Main Switchboard is supplied via 800A consumers mains from an adjacent Building J05 Regional Main Switchboard.

The ETP Stage 1 Building project involves partial demolition of the existing Building J03 and new construction that is integrated with the remaining building requiring additions and alterations to the electrical installation. The preliminary maximum electrical demand for the new ETP Stage 1 Building is estimated at 1500kVA. The electrical infrastructure required to meet this increased demand is proposed to be delivered in 2 stages.

In Stage 1, 2 x 1000kVA Ausgrid Type L Kiosk Substations are to be connected to the HV network near Blackwattle Creek Lane. Underground consumers mains cables are to be run to a new Regional Main Switchboard (RMSB) constructed in the refurbished Level 2 location. The Switchroom also incorporates a new Main Switchboard (BSMB1) that is principally to supply the electrical installation in the new building.

The existing Main Switchboard is to be retained to maintain supply the residual existing J03 electrical installation and is to be migrated (as BMSB2) from the J05 supply to the RMSB after completion of the Main Switchroom.

In future stage it is proposed to construct a new Ausgrid 3x1500kVA transformer chamber substation alongside the Main Switchroom on Level 2. The substation would supply the RMSB which in turn supplies the ETP Stage 1 Building Main Switchboards BMSB1 and BMSB2. The RMSB is to be extended to allow the addition of future buildings that are modified in later stages of the Engineering and Technology Precinct upgrade.

The general arrangement is depicted in figure 2 below.

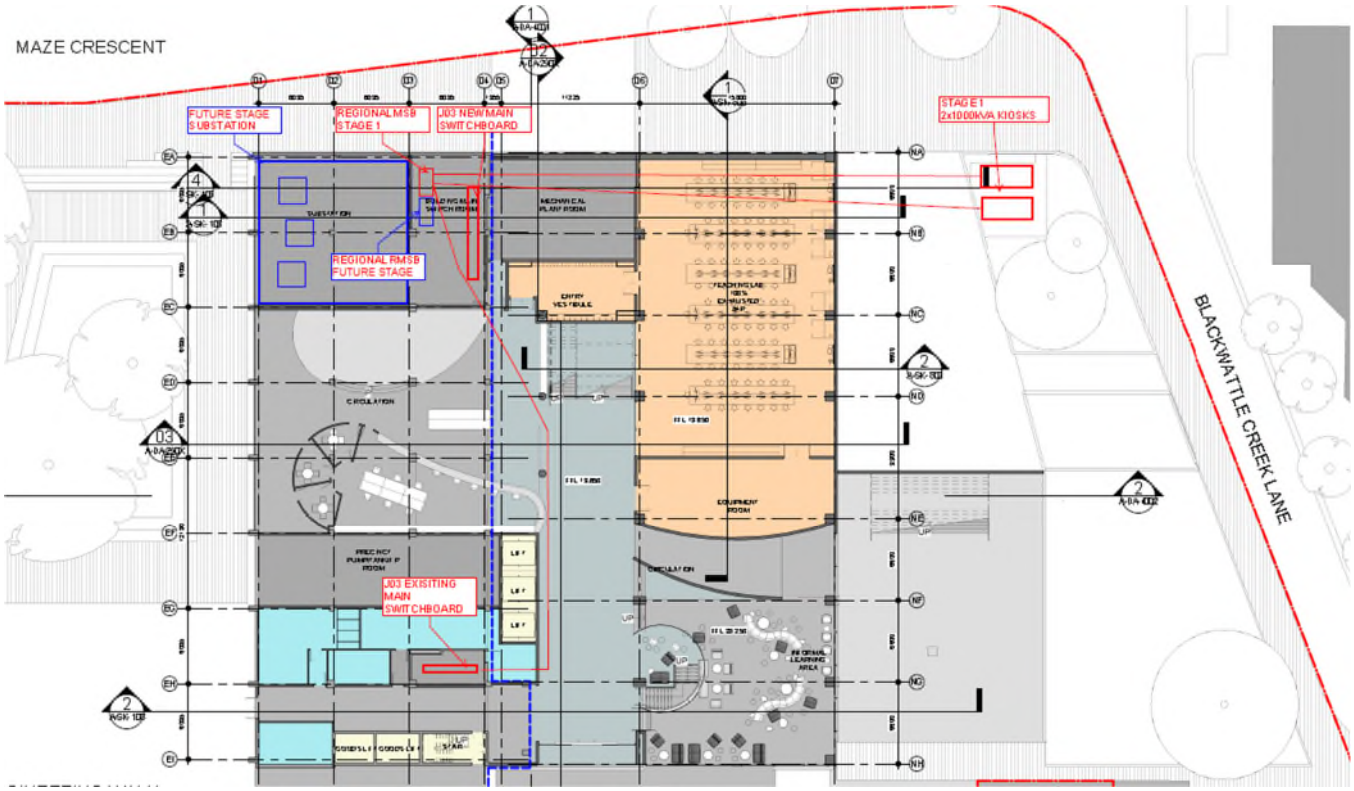

Figure 2 - Stage 1 Electrical layout

In addition the ETP Stage 1 Building is to incorporate the following energy sources:

- Standby Diesel Generator (400kVA) to maintain supply to safety services, communications and critical facilities that would be adversely affected by extended loss of supply;

- Facility for connection of mobile generator to provide temporary supply or backup support in the event of planned supply outages during future works affecting the network;

- Photovoltaic system (60kW) to provide a sustainable energy source for consumption within the building.

3. COMMUNICATIONS

The communications infrastructure is an extension of the University owned and operated ICT system that comprises optical fibre and copper cabling reticulated through an extensive underground conduit and pit system.

The delivery of all optical fibre and copper cabling lead-ins and ties is undertaken by the University of Sydney ICT Department, entering the new facility via physically diverse conduit access points -primary and redundant secondary feeds - which connect to the respective the Main and Secondary Communications Rooms. The Main Communications Room is presently located in Level 4 (Room 428) and is to be retained and protected during construction. The Secondary Communications Room is to be located on Level 9 in the new construction. The existing system is depicted below showing separate entry points.

The transitional process will involve -

- disconnecting redundant parts of the system associated with the parts of the building to be demolished;
- securing and protecting the parts of the system within the existing building being retained;
- installation of new cable pathways including pits and risers;
- diversion, extension and addition of SMOF and multipair copper cabling.

Existing Communications Infrastructure and Entry Points to Building J03

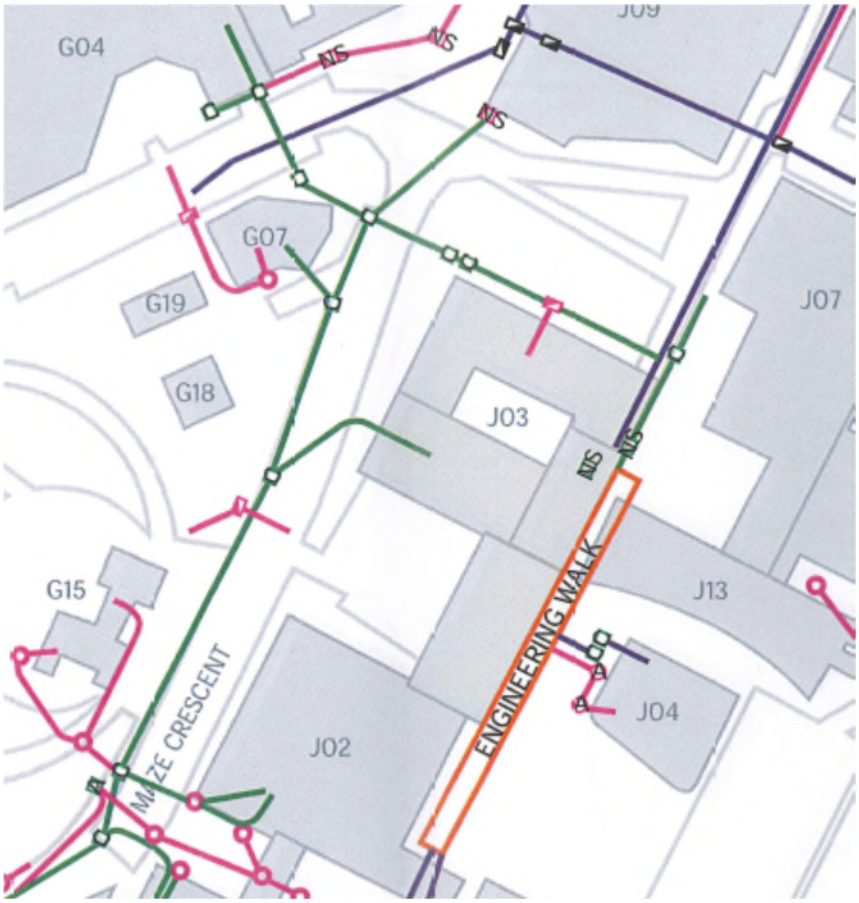

Figure 3 - Engineering and Technology Precinct - Communications

4. WATER, SEWER AND GAS SERVICES

4.1 WATER SERVICE

A 200mm diameter CICL Sydney Water water main is located within Maze Crescent adjacent to the proposed Engineering and Technology Precinct Stage 1 Building generally as indicated in Figure 5 below. Initial flow assessment indicates that with this valve closed and the water feed currently from Shepherd Street & Cleveland St., the required pressure and volumes for the development cannot be achieved. Sydney Water have confirmed (Case No.165960PW) that adequate pressure and flow from the Maze Crescent water main can be achieved for the proposed development by opening a stop valve located in Maze Crescent South and closing valves in Cleveland St. and Shepherd St. This will enable the development to be fed from the Petersham Reservoir which will enable adequate pressure and flow.

Additional assessment is to be undertaken by an approved Sydney Water services co-coordinator to determine the full extent of the masterplan with respect to the Sydney Water infrastructure for the precinct. Initial works and master planning for the precinct has been undertaken by Warren and Smith Consultants.

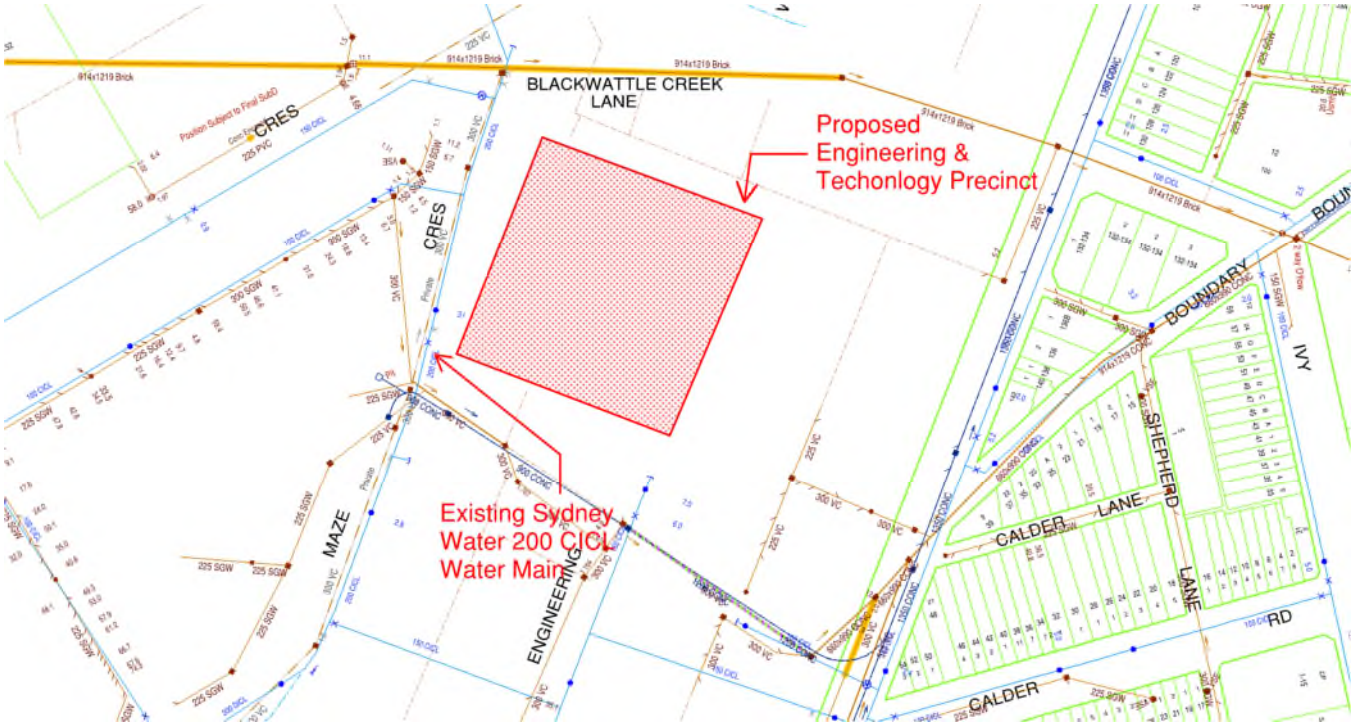

Figure 4 Existing 200mm Sydney Water Main

The Warren and Smith documentation indicates that a new 150mm fire service water supply tapping and 150mm diameter potable water main tapping extending from the 200mm Sydney Water main located in Maze Crescent will be needed to service part of the new precinct fire system infrastructure delivered as part of stage 1.

5. FIRE WATER SUPPLY INFRASTRUCTURE

A Grade 1 water supply will be provided to serve the fire services system throughout the building. The water supply will comprise a primary water supply as noted above from the existing water main, and a secondary water supply from fire tanks and associated pumps located in Level 2 of the Stage 1 building and provided with compliant Fire & Rescue NSW access.l

The primary fire service water supply will be from a 150mm diameter take-off from the 200mm diameter University water main in Maze Crescent. The 200mm water main will be supplied from the Peterhsam Reservoir via the existing 200mm diameter DICL Sydney Water main in Maze Crescent South as shown in Figure 4 above.

6. SEWER DRAINAGE

There is currently one significant main sewer system with 2 other additional smaller side lines that traverse the site. The sewer drains are indicated on the part plan below.

To the north of the new building is a nominal 914x990 brick sewer main with one 300mm Vitrified Clay and another 225mm Vitrified Clay sewer branch lines which is what will be utilised for connection to the new building.

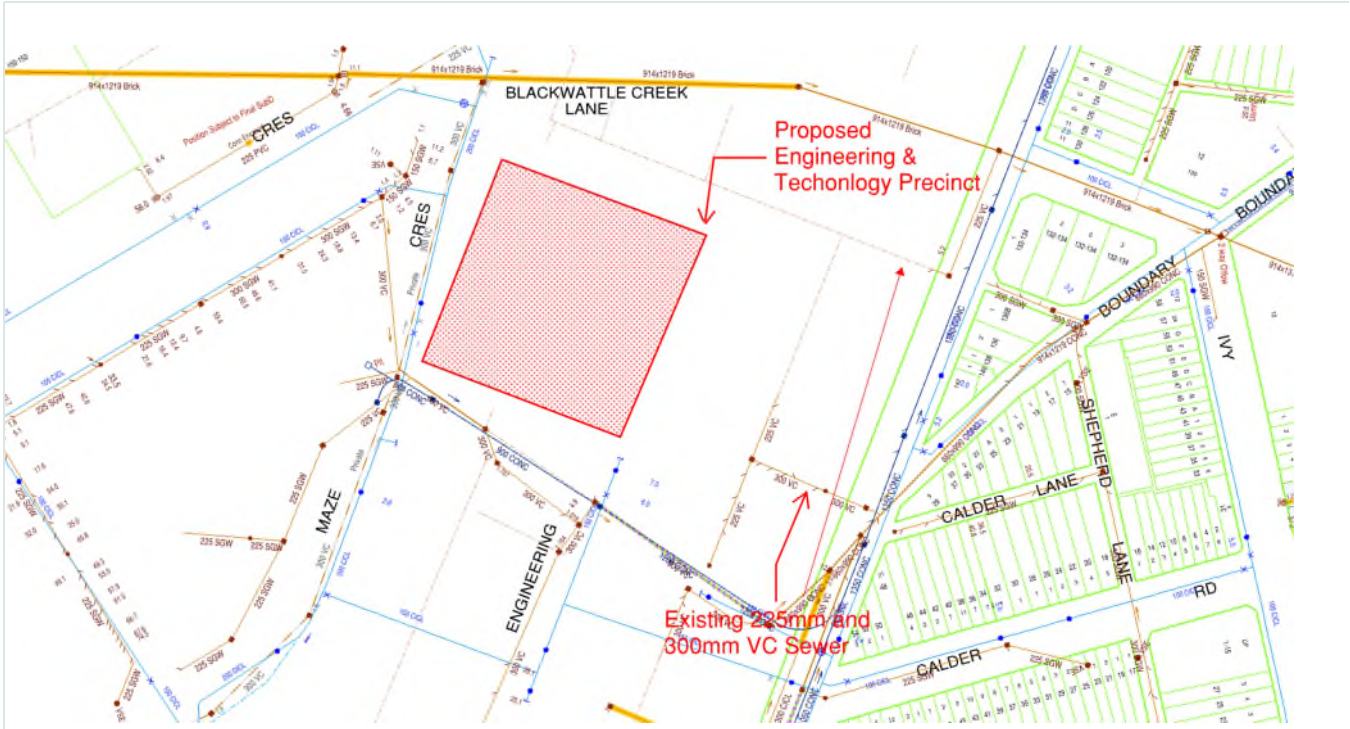

Figure 5 Location of Existing Sewer Infrastructure

It is noted that a Sydney Water-Approved Design Engineer has been consulted in relation to the alignment of the building footprint to avoid the build over of any sewers and structures (pits). The current alignment of the building envelope in relation to the sewer mains has been set out to meet the Sydney Water guidelines for sewer infrastructure as advised by the Engineer.

This capacity of the sewer mains on initial discussions with the Sydney Water Design Engineer appear adequate to serve the proposed precinct. A feasibility assessment however is to be undertaken by an approved Sydney Water Services Engineering Co-coordinator to confirm adequacy and building works in proximity to the sewers.

7. NATURAL GAS

Natural gas will be extended from the University of Sydney private gas service network supply located in Maze Crescent for the proposed Stage 1 building.

The incoming supply will incorporate a gas meter assembly and regulator system to control gas pressures. Isolation valves will be installed to all main lines and branches for maintenance purposes prior to any appliance.

The anticipated loading of the proposed Natural Gas system for the new Engineering and Technology Precinct Stage 1 building has been calculated at nominally 12,000 MJ/hr.

The private gas system network operated by the University will be assessed in conjunction with University of Sydney facility management and Jemena to confirm adequacy of capacity.

This gas load for the new facility is made up of:

Mechanical/ Heating Hot Water

Domestic Hot Water Heating

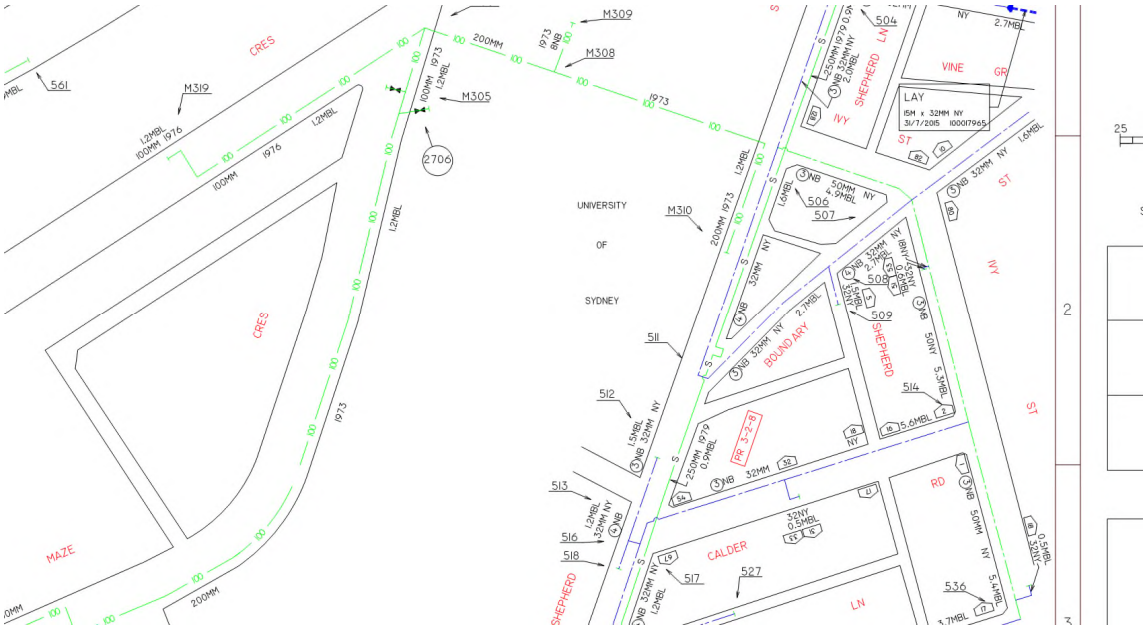

Figure 6 Jemena Gas Main Network around Maze Crescent and Shepherd Street

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2nd November 2017

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Attn:- Mr Luke Hoy

Dear Luke,

University of Sydney – Engineering and Technology Precinct Stage 1
Engineering and Technology Precinct SSDA Submission
SECTION 13, UTILITIES – INTEGRATED WATER MANAGEMENT PLAN

The following information describes the relevant Infrastructure Management Plan associated with Sewer and Water Services.

Sewer Drainage

Existing external sewer mains surround the new portion of the proposed building and the footprint has been co-ordinated and arranged to suit Sydney Water sewer main infrastructure guidelines. In addition the new building will be connected to the existing sewer main system. Sydney Water are to be approached in regard to feasibility review of their sewer assets and new connections prior to an official Section 73 application that would be submitted post DA approval.

The internal sewer drainage installation will be designed and installed throughout generally as a gravity drainage system connecting to the external sewer main in accordance with the requirements set out in accordance with Australian Standard AS3500.2, Sydney Water, Sydney University CIS hydraulic services standards, all relevant Australian Standards, National Construction Code and the requirements of all controlling authorities to ensure full completion of the works.

Domestic Potable Water Services

The potable water mains installation is to be extended to the site from an adjacent water main located within Maze Crescent to the west of the new facility with a new meter assembly located on the property to serve the new building. Sydney Water are to be approached in regard to feasibility review of their water mains assets and new connections prior to an official Section 73 application that would be submitted post DA approval. Sydney Water have made comment to the University via case number 165960PW that the Existing Closed stop valve in Maze Crescent can be opened for increased pressure flow that will be required for the fire systems.

The internal potable water supply installation will be designed and installed throughout in accordance with the requirements set out in accordance with Australian Standard AS3500.1, Sydney Water, Sydney University CIS hydraulic services standards, all relevant Australian Standards, National Construction Code and the requirements of all controlling authorities to ensure full completion of the works.

The domestic water supply is to be boosted via inline dual computer controlled variable speed drive pump sets with internal pipelines reticulated throughout to all points of demand complete with necessary isolation and pressure control valves to ensure supplies do not exceed 500kPa at tap outlets.

Tap ware throughout the facility is to be compliant with the WELS tap ware labelling scheme.

Recycled Water and Re-use Water Systems

A recycled rainwater installation is to be provided throughout that will be designed and installed throughout in accordance with the requirements set out in accordance with Australian Standard AS3500.1 and AS3500.3, Sydney Water, Sydney University CIS hydraulic services standards, all relevant Australian Standards, National Construction Code and the requirements of all controlling authorities to ensure full completion of the works.

Rainwater is to be collected for various roof area catchments and conveyed to connect and discharge into a storage tank of adequate capacity to suit the balance between the catchment areas collected and the supply of treated rain water to flush toilets, and supply irrigation watering.

The collected drainage is to connect to the storage tank via a first flush management device to control and prevent debris and material entering the tank. Recycled water supply from the storage tank will pass through a filter system comprising bag filtration and UV disinfection. Overflow from the tank will connect to the Civil drainage system and be conveyed to the point of discharge as detailed on the civil documents.

The treated supply is to be boosted via inline dual computer controlled variable speed drive pump sets with internal pipelines reticulated throughout to all points of demand complete with necessary isolation and pressure control valves to ensure supplies do not exceed 500kPa at tap outlets.

Recycled water supplies are to be installed with all necessary appropriate signage as well as non-drinking water warning signs at non-potable outlets to ensure cross connection and contamination of potable water systems does not occur.

Fire Service Water Re-use

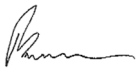
Clean fire service test water will be directed to the storage tank for collection, treatment and re-use. The water will be from fire hydrants and sprinkler annubar testing that will discharge to a drainage system to convey the clean water to the storage tank.

Fire services drain down water system will be connected to the sewer system as the water is dirty, stagnated and not suitable for re-use purposes.

Commissioning and Maintenance

On completion of the works, the hydraulic services sub-contractor will commission the plumbing systems and ensure as part of the handover of operation and maintenance manuals, that the University of Sydney maintenance team are familiar with the operation and maintenance of all plumbing systems installed within the building.

Yours sincerely



Peter Johnson
Managing Director