RETURN SERVICES BRIEF

8-18 JAMIESON ST BOWEN HILLS

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Document Information

Project name	8-18 JAMIESON STREET
Project number	WBQ3183-001-24
Site address	8-18 Jamieson St Bowen Hills 4006 QLD
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Prepared for	New Urban Villages
Prepared by	WalkerBai Consulting
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Date of issue	18/12/2024

Revision History

Revision	Reason for Issue	Issue Date
A	Preliminary	03/12/2024
B	Final Report	19/12/2024

Table 1 – Document Revision History

Document Authorisation

Reviewed By	RP
Approved By	JW

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Table of Contents

EXECUTIVE SUMMARY

The site is located in the Brisbane suburb of Bowen Hills on the corner of Jamieson Street and Edgar Street, approximately 3 kilometres north of the city centre. The council street address is 8-18 Jamieson Street, Bowen Hill 4006 QLD.

The Project incorporates:

- Ground Level containing main lobby, car park, loading dock and services area.
- Level 01 open offices, base building amenities and catering kitchen.
- Level 02 to 06 open offices and base building amenities.
- Roof top plant room.

This return services brief herein outlines and describes the proposed building services provisions for the following:

- Electrical
- Mechanical
- Hydraulics
- Fire
- ESD

The location of the project is shown below:

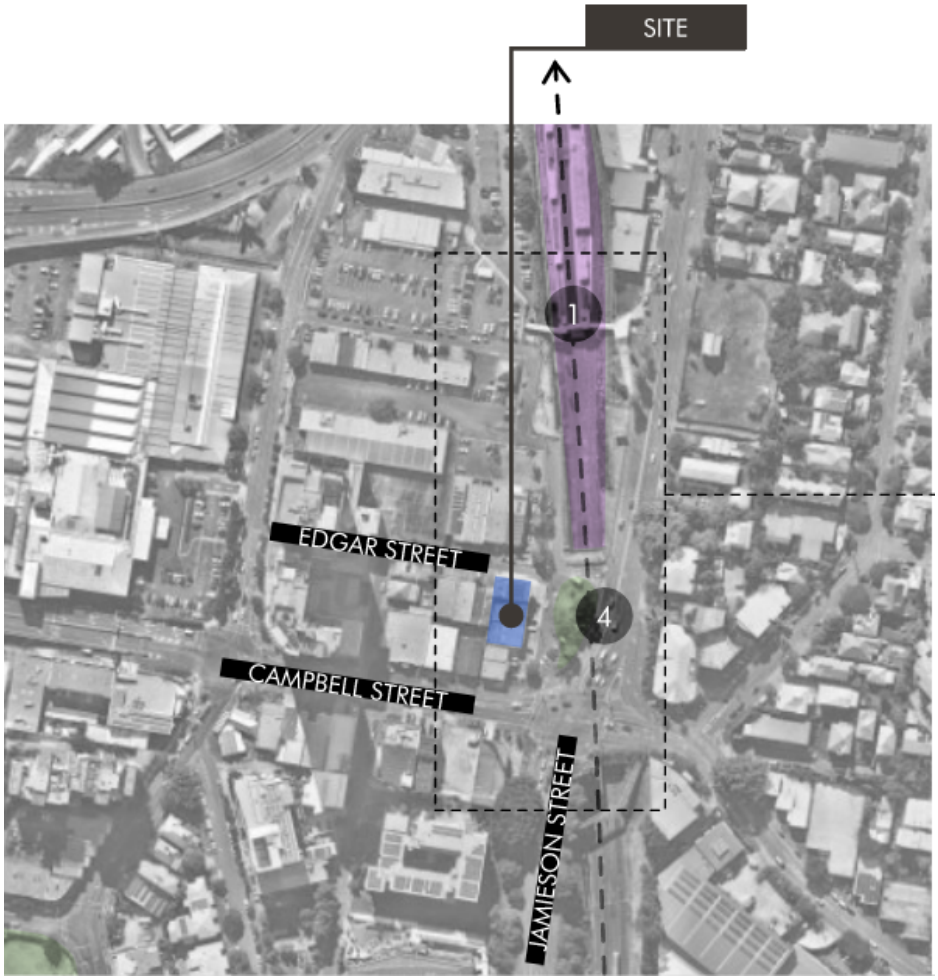


Figure 1 Nettleton Tribe Architectural Design Report

1 INTRODUCTION

1.1 PRE-AMBLE

This return services brief has been prepared by WalkerBai Consulting on behalf of New Urban Villages.

The relative building services are outlined for the information and approval of the whole design team.

The services concepts stated within this design brief shall be used as the basis of further detailed design.

1.2 OBJECTIVE

The objective of this return services brief is to:

- Outline the extent of the building services proposed;
- Outline the design approach and solutions to be employed in the building services design;
- Enable the client to consider the building services proposed, review and finally sign off;
- Assist with cost planning for the development.

1.3 SIGN OFF / APPROVAL

Client sign off is required via to confirm the design approach and record of information contained within the Return Services Brief provided by WalkerBai Consulting.

Note: Should WalkerBai Consulting not received a signed or amended return of this brief, it shall be accepted that the contents are accurate and that no amendments are necessary.

Client Signature (or Representative)	Date
Client Name (or Representative)	

2 INFORMATION

2.1 PROJECT TEAM

The current project team for the development are.

Development Management	:	New Urban Villagers
Architect	:	Nettleton Tribe
Structural Engineer	:	ADG Engineers
Services and ESD Engineers	:	WalkerBai Consulting
Civil Engineers	:	ADG Engineers

2.2 INFORMATION RECEIVED

The following information was received and assessed as part of this brief:

	TITLE & REVISION	DATE RECEIVED
ARCHITECTURAL DRAWINGS	14217 - Jamieson Street Architectural Plans 241210 (Final DA Draft)	10/12/2024
BCA REPORT	Not Received	

2.3 BUILDING ASSESSMENT DATA

It is noted that a building certifiers report is yet to be provided.
It has been assumed that the building will be assessed against NCC 2022.

3 ELECTRICAL SERVICES

3.1 GENERAL

3.1.1 SCOPE OF WORKS

The Electrical Services will comprise the following:

- Consumer Mains
- Main Switchboard
- Submains
- Distribution Boards and Metering Panels
- Surge Protection
- Energy Metering (section J)
- Internal Light Fittings
- External Light Fittings
- Lighting Control
- Exit and Emergency Light Fittings
- General lighting and power sub-circuits cabling
- EV charging
- Solar PV (Performance Solution, by Specialist Contractor)
- Site Communications infrastructure with NBN fibre connections
- MATV / PayTV System; and
- Site Security/Access Control and CCTV Headend & out field devices

3.1.2 DESIGN CRITERIA

Item	Design Criteria
Site Supply	Site to be supplied via new Pad Mount Transformer / Internal Substation. The design of the substation is by the HV Consultant. The preliminary Maximum Demand for this site is 350kVA (505 A).
Main Switchboard	Form 4 (Safety Services Section), Form 3B(ih) (Remaining Section) Busbars sized (current / fault) for maximum supply capacity Surge Protected 25% Spare Capacity Supply Authority Metering Minimum IP42 for internal. IP5X for internal within path of egress, and Minimum IP56 for external
Distribution Boards	General Lighting and Power DBs Distribution boards to be Form 1 with 25% spare space/capacity. Minimum IP42 for internal. IP5X for internal within path of egress, and Minimum IP56 for external
Consumer Mains	Fire rated cables shall be used for consumer mains

Submains	Minimum XLPE cables shall be used for submains and fire-rated cables for safety services The following growth allowance shall be factored when cable sizing • 15% for mechanical services submains. • 15% for hydraulic services submains. • 15% for general lighting and power submains.
Metering (Authority)	Authority network proposed. Embedded network not desired.
Cable Containment	Cable tray / ladders shall be sized for 20% spare space.
Power Supplies	• One per 20m for cleaning • As required for Hydraulic, Mechanical, Vertical Transport and Pool equipment • As required for security / access control / CCTV equipment • As required for communications equipment • As required for auto-sliding & roller doors • As required for amenities equipment. • As required for office and common space. • All outlets shall be provided as required
Lighting	Lighting levels shall be in accordance with AS 1680 and Illumination power density in accordance to NCC Section J6. • Energy efficient LED luminaires • LED Life: min 50,000 hrs @ L80:B10 • Colour Rendering: CRI > 80 • Warranty: 5 Year replacement warranty (fitting and control gear) • Internal lights to be controlled via adjustable timeclock, motion detectors and switches as required. • Selected 24hr lighting for security and safe movement. • External lights to be controlled by timer and PE cell.
Emergency Lighting Systems	Self-contained emergency lights with central monitoring system.
Lightning Protection	Performance specification if required. Conventional system utilising air terminals, strapping and down conductors.
Communications	Fibre to The Premises (FTTP) – NBN (to be confirmed) Communications Earthing System Provide all backbone reticulation to NBN Co Standards
CCTV System	CCTV Coverage: Refer section 5.4.
Security / Access Control	Security / Access Control Perimeters - IP Based

	- Workstation / software for programming with all licensing - Final locations to be confirmed in conjunction with client.
Preferred Supplier / Equipment List	Client to confirm any preferred supplier / equipment list (or preferred brand) for the following. - Lighting - Security - CCTV - Communications/Data - RFID Gates

3.2 SUPPLY AND INFRASTRUCTURE

3.2.1 CONSUMER MAINS AND SUBMAINS

Fire Rated consumer mains from the substation to the MSBs shall be provided and installed on fire rated cable tray.
Submains from MSB to all other services (hydraulic, mechanical, vertical transport and pool) new DBs as required.

3.2.2 SURGE PROTECTION

Surge protection required at MSB and all other electrical DBs.

3.2.3 SUBSTATION

A pad mount transformer is currently being proposed. The size and final requirements of this transformer shall be confirmed by the HV Consultant and is subject to Energex acceptance.

The preliminary maximum demand for this building is 350kVA (505A).

3.2.4 BACKUP GENERATOR

A backup generator is not proposed for this development.

3.2.5 ACTIVE HARMONIC FILTER

No provision for AHF is proposed.

3.3 ELECTRIC VEHICLE CHARGING

Dedicated EV Switchboards shall be provided in accordance with NCC 2022 requirements. Including allowance for active/dynamic load management system, Schneider EVlink, or approved equal.

Provision for two (2) fast chargers, 22kW, 3 phase.

Client to please confirm whether any EV chargers need to be provided as part of the initial construction, and if so, allocate EV charger bays accordingly.

3.4 SWITCHBOARDS

3.4.1 MAIN SWITCHBOARD

Main Switchboard (MSB) shall be provided for the site to be located in a room and readily accessible by Energex and Meter Reader.

3.5 SWITCHBOARDS

Switchboards shall be provided as required to provide power supply to general lighting and power throughout the building. Allow EV distribution boards per NCC 2022 table J9D4.

3.6 FLOOR METERING PANELS

Allowance for a three (3) tenancy provision per floor. The final locations of these Metering Panels shall be coordinated in conjunction with the architect.

3.7 METERING AND ENERGY MANAGEMENT

3.7.1 AUTHORITY METERING

Provide supply authority metering to serve the site in accordance with Energy Queensland QECM requirements. Conventional authority metering is proposed for this site. Not allowance for Embedded metering. Metering panels shall be located on each floor services the office spaces.

3.8 LIGHTING

3.8.1 GENERAL

New LED lighting shall be provided throughout the areas marked in the scope. All lighting shall be in accordance with relevant AS1680, NCC Section J6 & recommendations. Detailing lighting sketches will be provided by WBC for review and commentary.

Generally lighting shall be as follows:

- Troffers shall be installed in office spaces to a warm shell fitout.
- Downlights and / or troffers and /or battens will be installed within all areas to provide general lighting and compliance.
- Downlights will be installed in amenities and common areas.
- Surface mounted LED batten will be provided to carparks and storages.
- Downlights / wall lights will be provided to entry foyer/lobby.

The following table indicated the recommended average light levels (from AS 1680) to be achieved in the respective area.

AREA	ILLUMINATION LEVEL (LUX)
General/Common Areas	
Entrance/Foyer/Lobby	160
Office Areas/	320
Carpark	40
Carpark Entry (Transition zone)	800 per AS1680 requirements
MSB / Communications Room	160
Corridors, Staircases	80
Storerooms	80
Kitchen Counter	240

Loading Dock	80
Amenities	80
PWD Amenities	200

Lighting shall be selected at 4000K colour temperature. This will be rationalised with the architect during the design stage.

3.8.2 BASE BUILDING LIGHTING CONTROLS

The base building lighting control system shall be a combination of motion sensors & lighting control panels. Refer below control systems & associated spaces.

- Localised controls as required
- Motion Sensors. – Occupancy senses shall be provided to the below areas
    - Offices
    - Amenities
    - Corridors
    - Storerooms
    - Carpark
- PE Cells / Time Clock – PE / Timeclock shall be coordinated the Clients' requirements to control external lighting & security access lighting
- Adjustable Time Clock – for offices

3.9 EXIT AND EMERGENCY LIGHTING

Emergency and Exit lighting throughout the building as per AS2293 requirements.

It's proposed that all exit and emergency lighting is on a central monitoring system (Such as Clevertronics Hive) which allows for easier maintenance.

3.10 GENERAL POWER

3.10.1 CABLING

The minimum circuit wiring for lighting & power is 2.5mm^2 for a maximum of 25 metres unless design engineer has calculated otherwise. All cabling sizes over 2.5mm^2 shall be indicated on the design drawings and shall be calculated with due consideration given to the Australian Standard AS 3008.

All wires and cables except where otherwise specified shall be TPI in conduit or TPS V75 grade stranded copper conductors. TPS wiring shall not be run where exposed to view throughout the installation.

All wiring shall be concealed in the walls, floors or ceilings unless otherwise specified or shown on the drawings.

3.10.2 OUTLETS

New power outlets shall be provided throughout the site to suit equipment/client/joinery requirements.

- Common area outlets shall be Clispal Pro. Outlet plate finish shall be coordinated with architectural finishes.
- All external outlets shall be Clipsal IP56
- All outlets shall have suitable IP rating to suit location & weather/water exposure

- Large Rocker outlets shall be provided within PWD's
- All outlets shall be provided as required.

3.11 SOLAR PV

A solar PV system is proposed to be installed on the roof, which will connect into the main switchboard. The solar design is by others and sizing is subject to balance of roof space.

4 COMMUNICATIONS

4.1 GENERAL

4.1.1 SCOPE OF WORKS

The building will include the following major telecommunication system and components:

- New NBN lead-in conduits and infrastructure for NBN equipment.
- Provision for a new comms rack and patch panels.
- Provision for CAT6A outlets & associated cabling throughout.
- MATV /PayTV connection & associated outlets.

4.1.2 DESIGN CRITERIA

All systems will be designed in accordance with the requirements of the BCA and relative Australian Standards.

4.2 EXISTING TELSTRA PIT

Existing pits require 15m separation from a padmount transformer in accordance with NBN/ Telstra requirements.

4.3 SUPPLY

Underground conduit from the street NBN pit to the Main communications room. The main communications room shall have spatial provision for the following:

- Base Building Communications Racks
- NBN Headend Equipment
- MATV Head End
- Electronic Security Systems , including access control and CCTV
- UPS system (if required, client to advise)

4.4 DISTRIBUTION

All new cabling shall be provided for the new devices.

4.4.1 RACKS

New Comms Racks shall be provided for the new building. One 45RU rack shall be provided within the main communications room, to house all base building communications equipment.

4.4.2 PATCHING

It is proposed to supply 24 Port Cat 6A patch panels to connect the new horizontal cabling as required.

4.5 FIELD SERVICES

4.5.1 CABLE TYPE

Horizontal cabling shall be provided to each outlet using Category 6A UTP cabling.

4.5.2 OUTLETS

All data outlets shall be Clipsal Pro Series. Patch & Rack labels shall be provided to suit. All data outlets shall be provided as required.

4.5.3 DISTRIBUTION

All cabling shall be supported within ceiling spaces via cable tray / catenary.

4.5.4 WIRELESS

It's proposed to provide Wireless Access Points to the following areas:

- Common Areas confirmed by the client
- Internal office spaces are by others.

4.6 MATV / PayTV

New MATV /PayTV headend shall be provided. MATV / PayTV connection points shall be provided at each TV and projector location.

If an alternative fibre/communications solution is implemented (alternative to NBNCo), then the MATV/FTA shall operate over the communications backbone in lieu of a separate COAX cabling riser backbone.

Client to confirm if NBN or an alternate provider is commissioned.

5 SECURITY

5.1 GENERAL

The Security Services will comprise the following:

- Access Control
- CCTV System

5.2 DESIGN CRITERIA

The security design will be provided in accordance with the relevant Australian Standards.

5.3 ACCESS CONTROL SYSTEM

An electronic access control system is proposed to be provided throughout the building. Swipe access is proposed for the following areas:

- Main Building Entries
- Office Spaces
- Lifts
- Amenity Areas (including pool PWD access)

5.4 CCTV

It's proposed to provide base building CCTV coverage to the following areas:

- Site points of entry and exit
- Floor lift lobbies
- General carparks
- Within lift cars
- Common Areas

An IP (Internet Protocol) based system is proposed, with PoE digital cameras and a Digital Video Recorder (DVR) located within the main communications room.

The video recorder shall have remote access capability to review recordings online.

6 MECHANICAL SERVICES

6.1 GENERAL

6.1.1 SCOPE OF WORK

The mechanical services systems scope of work shall consist of the following:

- Ducted air conditioning to Ground Floor Lobby
- Wall-mounted split system air conditioning to Comms Room, Main Switch Room, and Bin Room.
- Air-cooled chilled water plant area on the roof with chilled water riser through the building core.
- Ceiling concealed chilled water fan coil units to the office tenancies. Zoning shall be to PCA grade A requirements
- Central outdoor air supply riser.
- Car Park Exhaust system with non-mechanical relief.
- Fire pump room supply and exhaust
- Plant area exhaust systems
- Exhaust systems for base-building amenities.
- Energy metering of chilled water supply to each floor level.
- Building management system for alarms and fault monitoring.

The mechanical services systems shall be designed and installed to meet the minimum requirements of the PCA-Grade A standards for office building quality.

6.2 DESIGN CRITERIA

The mechanical services shall comply with the following minimum criteria:

Criteria	Design Condition	Measure
Ambient / Outdoor conditions **- Brisbane**	Summer Comfort	29.8°C Dry Bulb / 25.3°C Wet Bulb
	Winter	10.1°C Dry Bulb @ 80%RH
	Air-cooled chiller	45°C Dry Bulb
Internal / Indoor conditions	Cooling in summer	23°C Dry Bulb +/-2°C 60% RH (uncontrolled)
	Heating in winter	21°C Dry Bulb
	Design set point	Typically; 23°C Dry Bulb (adjustable)
Internal heat gains	Power	5 W/m^2
	Lighting	10 W/m^2
	Occupant heat gains	78w.p Sensible, 51W.p Latent
	Infiltration gains	0.35 air changes/hr
Occupant density	Office areas	1 person per 10m^2 for the Office or PCA grade A requirement, whichever is greater
Outdoor air	Grater of PCA Grade A or AS1668.2 requirement	10 l/s per person, in accordance with NCC and AS 1668.2 standards

Noise levels	Office areas Common areas Must comply with conditions of the acoustic report	NR35 NR35 TBC
Ventilation	General - Grater of PCA Grade A or AS1668.2 requirement	In accordance with AS 1668
	Toilet/Amenities	10L/s per m^2 or 25L/s per fixture

Additional Requirements:

- All ceiling, bulkhead, and wall-mounted FCUs will require connection to a local tundish for condensate drainage.

6.3 SYSTEM DESCRIPTION

6.3.1 AIR CONDITIONING

CHILLED WATER GENERATING PLANT

The chilled water plant system shall consist of:

- Two (2) air-cooled chillers on the roof level for chilled water generation
- Dedicate chilled water pumps setup in a variable primary arrangement
- Buffer tanks will be used to maximise the thermal inertia of the plant chilled water loop and sized to accommodate 3 minutes of the largest chiller operating at its design flow rate.
- Motorized two (2) way energy control valves at each FCU for capacity control.
- Energy meter for each chiller, plant loop, Building/Field loop and for each tenant branch supply.

Chilled water distribution throughout the building shall be based on a "Modified Variable Flow Primary" type system employing variable pressure strategies for energy minimisation.

Should any one air-cooled chiller fail, the remaining chiller will provide for 50% (minimum) of the total building cooling load (redundancy).

The chillers will provide chilled water to each air handling system based on a 6°C supply and 14°C return water temperature.

COMMON AREA AIR CONDITIONING

Air conditioning to the Ground floor lobby shall be provided from a chilled water/ electric heating fan coil unit in the respective lobby.

Air filtration within each fan coil unit shall be provided disposable 100mm thick extended surface “Panel Type Filters”.

Conditioned supply air from the FCU shall be delivered to the Lobby area via insulated rigid ductwork. Entry lobby areas shall be supplied via Insulated rigid supply air ductwork located within the ceiling void that will deliver the conditioned air to the respective area via ceiling bulkhead mounted high induction air diffusers specifically designed for supply air delivery from high level.

Return air from the occupied space shall be routed via high-level ceiling return air grilles/slots, return air ductwork, and return air attenuators to the respective fan coil unit.

Wall-mounted split air conditioning systems will be provided to the following areas:

- Main comms room,
- Main Switch Room
- Bin Rooms

GENERAL

Condensate drains are to be fully insulated to a tundish in the laundry cupboard or nearest available location. Condensate pumps are to be avoided.

6.3.2 CARPARK EXHAUST SYSTEM

The car park exhaust system is to include all ductwork, grilles, fans, weatherproof louvres, sensors, VSD's, electrical work and controls. The system is to be integrated into the fire control panel in coordination with the fire contractors.

Exhaust fans will be variable speed type. The speed of fans will be varied according to the Carbon Monoxide (CO) concentration, thus controlled by CO sensor.

Intakes less than 3m to the boundary are to be screened in accordance with the FER.

6.3.3 FIRE PUMP ROOM EXHAUST

Provide all ductwork, grilles, fans, louvres and electrical work for a complete installation. Ventilation rate to provide cooling satisfactory to pump suppliers' recommendations.

Local fan board in pump room to be fed from MSB safety section.

Any ducting outside pump room to be fire rated to the intake and discharge locations.

6.3.4 COMMON AREA EXHAUST SYSTEMS

Provide all fans, grilles, louvres and electrical work. Ducting to be low profile with exhaust grille cast into terrace soffit or fixed into glazing suite.

6.4 FIRE ALARM MODE

The following mechanical service systems operate during fire alarm:

- Fire-isolated passageway pressurization
- Carpark exhaust system
- Pump room exhaust system

The above will be integrated with the controls at the FDCIE for brigade operation.

6.5 MECHANICAL SWITCHBOARDS (MSSBs) and ESSENTIAL SWITCHBOARDS (ESSBs)

Mechanical services switchboards MSSB's and Essential services switchboards ESSB's will be wall-mounted and located under cover in an appropriate and readily accessible location.

- Ground-level MSSB and ESSB
- Roof top MSSB and ESSBs

6.6 BUILDING MANAGEMENT SYSTEM AND AUTOMATIC CONTROLS

A building management control system (BMCS) shall be provided to control and monitor the complete mechanical systems.

The BMCS will automatically start and stop the plant to predetermined time schedules, enable "Web" access for after-hours operation and remote monitoring, provide space temperature control, monitor plant operating status, and implement energy minimisation strategies in conjunction with energy consumption data logging.

A manufacturer's dedicated chilled water-generating plant control system (pre-purchased with the chiller package) shall be provided.

The following automatic control systems shall be provided:

- A central control monitoring system will be provided to control the mechanical services equipment, including direct digital control (DDC) and monitoring of:
    - Common area air conditioning
        - In addition to local control panel
    - Common area mechanical ventilation systems.

6.7 MECHANICAL SERVICES INTERFACE WORKS

The below table summarises the interface requirements of the mechanical services with other relevant trades and parties.

Mechanical Works in Connection with Electrical Services	Electrical Services Works
▪ Supply and installation of Mechanical Services switchboards, complete with suitable lugs, gland plates, connectors, isolators, etc.	▪ Provide supply to mechanical services switchboards/equipment.
▪ Final connection of power supplies to Mechanical switchboards and equipment.	▪ All cables to be dressed and prepared for termination of Electrical Works.
▪ Cable Terminations complete with connectors, etc.	▪ Fire alarm cabling from the FIP to the MSSB, including all required provisions on the FIP for same.
Mechanical Works in Connection with Hydraulic Services	Hydraulic Services Works
▪ Condensate pumps and piping to tundishes.	▪ Provision of tundishes.
Mechanical Works in Connection with Fire Services	Fire Services Works
▪ Termination of fire trip cabling ▪ FIP interface control wiring	▪ Provision of fire trip signal and control wiring to MSSB's ▪ FFCP provisions in the FIP for fan controls
Mechanical Works in Connection with Building Works	Building Works
▪ Structural Steel	▪ Ground Works

▪ Supply and install all lifting beams, building structure for securing mechanical components. ▪ Metalwork ▪ Supply and install all platforms and walkways required for maintenance to equipment. Shop drawings indicating size and location to be provided Mechanical Works. ▪ Fire Rated Building Elements ▪ Seal all penetrations using a system to AS 4072.1. ▪ Non-Fire Rated Building Elements ▪ Seal penetrations around conduits and sleeves. Seal around cables within sleeves. If the building element is acoustic rated, maintain the rating. ▪ Concrete ▪ Undertake all placing, casting in and protection of conduct sleeves and conduits.	▪ Services trenches; excavation and backfilling. ▪ Masonry ▪ All chasing, coring, cutting and making good. ▪ Doors ▪ Access doors and hatches for maintenance. ▪ ▪ Concrete ▪ Bases and plinths for equipment ▪ Cupboards for electrical switchboards. ▪ Undertake all coring, cutting and making good, subject to approval from the Structural Engineer.
▪ Roof ▪ Supply and install all overflashings.	▪ Roof ▪ All opening underflashings.
▪ Ceiling ▪ Set out all required penetrations in ceilings for Mechanical Services (diffusers, grilles etc.).	▪ Ceiling ▪ Cutouts and trimming of openings for diffuser and grilles. ▪ Removal and replacement of ceiling tiles. ▪ Openings in plasterboard ceilings and ceiling tiles. ▪ Co-ordination of penetrations.
Mechanical Works in Connection with the Client	Client Works
▪ Training of end users	▪ Maintenance contracts post first year of the maintenance period.
▪ Coordination of potential shutdowns.	

7 HYDRAULIC SERVICES

7.1 GENERAL

7.1.1 SCOPE OF WORKS

The Hydraulic Services scope of works will comprise of the following:

- Sanitary plumbing and drainage
- Stormwater drainage and surface drainage (within the building footprint)
- Domestic potable water services
- Non-potable water
- Domestic hot water supply

7.1.2 DESIGN CRITERIA

Hydraulic services to comply with all current statutory requirements and guidelines including relevant Australian Standards and local authority requirements, including Brisbane City Council (BCC), Urban Utilities (UU), Queensland Plumbing and Drainage Regulations.

The Hydraulic System design will be generally designed and developed in accordance with but, not limited to the applicable standards listed below.

- National Construction Code (NCC) 2022
- AS 3500.1-2021 - Plumbing and Drainage Part 1: Water Services
- AS 3500.2-2021 - Plumbing and Drainage Part 2: Sanitary Plumbing and Drainage
- AS 3500.3-2021 - Plumbing and Drainage Part 3: Stormwater Drainage
- AS 3500.4-2021 - Plumbing and Drainage Part 4: Heated Water Services

7.2 SANITARY PLUMBING AND DRAINAGE

7.2.1 Existing Services

The proposed site is made up of multiple lots, each is serviced by several uPVC connections ranging from 100Ø to 150Ø. There are 3x. 150Ø authority trunk mains located on Jamieson, Edgar, Campbell and Hazelmount street, based on UU information available each main relies on gravity and is 150Ø.

Figure 7.1: Existing Sewer Servicing the Site

7.2.2 Proposed Services

The sanitary drainage and plumbing systems are to be designed such that the sanitary waste from fixtures & fittings will be conveyed to the site sewer connection via gravity.

Based on the current information and build form, it is understood that the proposed development will comprise approx. 670 fixture units, **which will require a 150Ø sewer connection**. The site is currently serviced via 3x. 150Ø sewer trunk mains (as mentioned above) once the connection location is confirmed **by Civil**, we can confirm if a 150Ø site connection is viable. Service connection subject to change pending further design progression.

The site sanitary plumbing and drainage system will comprise the following:

- In-ground drainage up to podium level 03 will utilize sanitary drainage / elevated drainage principles,
- Podium level 4 up to the last level of office floors shall utilise a sanitary plumbing system, we recommend a Reduced Velocity Aerator Stack system (RVASS) is considered, we would be happy to provide an overview of the options available if required.
- The upper floor of the building will transition back to drainage principles and terminate to atmosphere via stack vents.

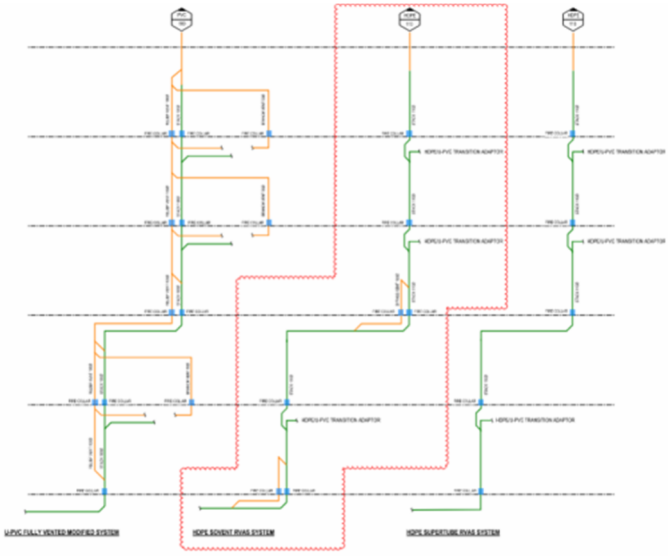


Figure 7.2: Sanitary Plumbing & Drainage System

The installations will be designed and installed such that the systems will be entirely accessible for easy maintenance. Horizontal pipe runs will be installed with sufficient gradients to achieve self-cleansing velocities to avoid potential problems with blockages.

Sanitary fixtures and tapware shall be specified by the architect to meet the required WELS ratings.

Pipework to be uPVC DWV or HDPE.

7.3 ROOF DRAINAGE SYSTEM AND STORMWATER

7.3.1 Proposed services

Based on the dial before you dig (DBYD) in-ground survey, we note there appears to be 150Ø stormwater infrastructure Locate on Jamieson and Hudd St, the depth, material and condition of this pipework is unknown. At this stage SW detention tanks are not expected confirmation will form part of the Civil Consultants scope of works.

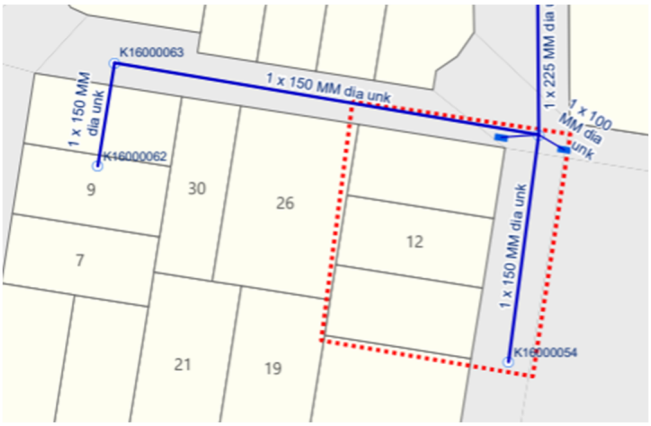


Figure 2 DBYD In-Ground Survey

7.3.2 Roof Water

The recreational deck is considered a non-trafficable area and therefore, rainwater captured shall be reused for irrigation purpose. Rainwater captured shall be conveyed to a dedicated rainwater tank located on one of the lower podium levels

7.3.3 Terraces

The public access terraces are considered a trafficable area and therefore, rainwater captured shall not be reused for irrigation purpose.

7.3.4 Stormwater Drainage

The site stormwater drainage system will comprise a conventional drainage system and include.

- Terrace drainage will comprise a system of vertically stacked (where possible) downpipes located externally (on Terrace externally). Pipework will either be exposed on terraces or concealed withing a glazing mullion, or similar. Rainwater outlets will be provided to terraces to capture the receipt of wind driven rain, based on similar projects we expect all rainwater outlet drainage to be cast into the slab to eliminate visible drainage from the terrace below. Typically, structure will determine how the pipework can be installed (length of pipe/orientation), which will govern the location of the rainwater outlets. It is recommended that all cast-in drainage is constructed of HDPE to minimize structural impacts and protect pipework from shearing. In significant rain events the terrace overflow strategy will rely on spitters discharging to the building façade.
- Carpark drainage system will capture the receipt of upper floor levels that cannot connect to the site Civil connection point via gravity and cater for surface water captured from within the carpark.

- Site stormwater / roof drainage system shall be designed to cater for 1% AEP (1 in 100 storm) and shall be provided 100% overflow provision that will direct water to building façade via spitters located on parapet wall.

All drainage shall be acoustically lagged through noise sensitive areas. Acoustic treatment to downpipes shall apply only to noise-sensitive areas.

7.3.5 System Performance Requirements

- Eaves Gutter Design ARI - 1:20 year-storm
- Box Gutter and Surface Drainage Design ARI - 1:100-year storm
- Open to atmosphere roof terrace – 1:100-year storm
- Pipe Sizing Method: Colebrook White
- Maximum Horizontal Pipe Velocity: 2.0m/sec
- Eaves Gutter Gradient: 1:500
- Box Gutter Gradient: 1:200
- Overflow Provision Capacity: 100% of system design flow

7.4 DOMESTIC POTABLE WATER SERVCIES

7.4.1 Existing Services

The site is serviced by a Ø150 cast iron (CI) water main that runs within the road of Campbell St before extending to Jamieson St, the age, depth and condition is unknown. As the site is currently comprised of 4x. separate lots, there are 3x. individual water connections ranging from 20-25mm.

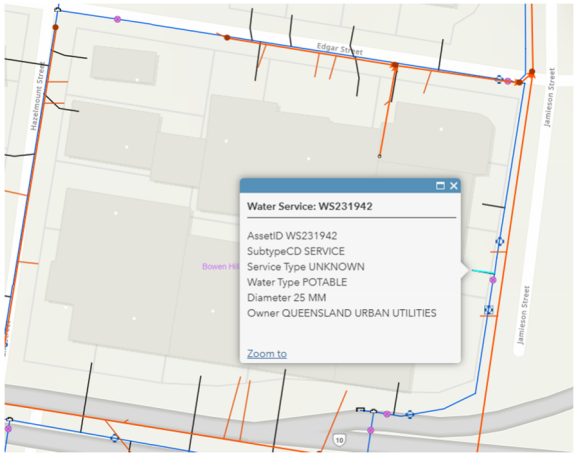


Figure 7.4 Urban Utilities ArcGIS Open Data Map

7.4.2 Proposed Services

Based on current hydraulic calculations, it is expected the site will require a 150-100Ø municipal water supply and shall extend from the existing Urban Utilities infrastructure. Incoming water supply shall be pre-treated via a duty/standby 2 stage filtration system, prior to the potable water storage tank. Due to the size, location and commercial nature of the building, we recommend a 5,000Ltr storage tank is provided to future proof the site and meet PCA A Grade requirement.
System capacity and location is subject to change, pending further design progression. The proposed water storage capacity has been calculated based on spatial availability, expected building population and green start fixture allowances.

Cold water storage tank is currently proposed to be located on roof and shall utilise gravity for system pressurisation (lower floors only), the upper floor water pressure shall be boosted via skid mounted pump booster pump set.
The potable and non-potable cold water systems main pipework and risers shall reticulate in Type 'B' Copper Tube, in-wall water (rough-in) pipework shall be constructed of Cross-linked polyethylene. Generally, the system pressure will not exceed 1000kPa, were this is not possible pipework shall be constructed of stainless-steel.
Individual isolation valves and pressure reduction valves shall be installed where required for plumbing fixtures receiving cold water.
Backflow prevention devices shall be installed to comply with relevant codes.
Reconfirmation will be required from more current flow and pressure test to confirm appropriate incoming town main infill pipework into domestic water storage in accordance with the design criteria requirements of AS/NZS 3500.1:2021.

7.4.3 Provisions

The following cold-water supplies are to be provided in accordance with area requirements and subject to detailed design.

Table 2 Cold Water Provisions

Area	Cold water provision	Notes
Plant rooms, back of house utility areas	Provided to areas requiring wash down provision with appropriate backflow provision	**Metered from body corporate meter.**
Tenancy common external areas	Provided to areas requiring wash down provision with appropriate backflow Provision	**Metered from body corporate meter.**
Common Amenities	Provided	**Metered from body corporate meter.**
Other trade provisions	**Provided as required**	**Irrigation, fire services, mechanical cooling tower etc. Metered from body corporate meter.**

Allowance for additional private meters to be installed in series with Authority meters, subject to subject to further ESD direct.

7.4.4 System Performance Requirements

- All pipework will be sized to achieve a velocity of 1.5 m/s in the pipe.
- Minimum Water Pressure at Fixtures or Outlets: 250 kPa
- Maximum Water Pressure at Fixtures or Outlets: 500 kPa

7.5 DOMESTIC HOT WATER SUPPLY

7.5.1 Proposed Services

It is proposed domestic hot water shall be generated via individual instantaneous hot water heaters, strategically located throughout the site. The hot water systems shall comprise the following.

- End of trip facility – 3x. independent hot water heaters located within each amenity (male, female & PWD), each system will be selected based on the number of fixtures and required maximum temperature.
- Base Build Amenities – independent hot water heaters shall be provided to each floor level, at this stage it is proposed that a single 3Ph instantaneous heater is provided within each respective PWD and supply water to the male, female and PWD basins, complete with temperature control devices to suit each application.
- Commercial tenancies – it is expected commercial tenancies shall provide their own means for hot water generation.

The hot water systems main pipework shall be constructed of Cross-linked polyethylene (Rehau or equal). Hot water pipework shall be thermally insulated (to prevent heat loss).
Backflow prevention devices shall be installed to comply in accordance with the design criteria requirements of AS/NZS 3500.4:2021.
All hot water reticulation shall be lagged with a thermal insulation incorporating a factory applied reinforced aluminium covering for optimum fire performance in accordance with AS 1530.3.
The domestic hot water supply will be extended from the hot water systems to all fixtures, and temperature control will be provided through tempering valves generally and thermostatic mixing valves for PWD areas. These valves will ensure that temperatures at basins and fixtures do not exceed 50 degrees Celsius in general areas and 43 degrees Celsius in PWD amenities.
Provisions for isolation will be made in each area to facilitate maintenance, allowing separate areas to remain operational during maintenance activities.

7.5.2 System Performance Requirements

- Maximum Pipe Velocity Copper Tube: 1.2 m/sec
- Minimum Water Pressure at Fixtures or Outlets: 250 kPa
- Maximum Water Pressure at Fixtures or Outlets: 500 kPa
- Maximum Temperature at Ablution Fixtures or Outlets: 50°C
- Maximum Temperature at Ablution Fixtures or Outlets for the children & accessible toilets: 43°C

7.6 NON-POTABLE COLD-WATER SERVICES

7.6.1 Proposed Services

Based on similar projects, we expect rainwater reuse to be required to irrigate landscape and therefore, propose the rainwater reuse system comprises the following.

- Rainwater is captured from non-trafficable roof areas only (roof top),
- Rainwater is conveyed via a conventional drainage system (gravity) or by a siphonic or conventional (subject to ceiling void depth on upper level) drainage system, to the rainwater tank located on lower podium levels,
- The min. storage capacity is currently unknown however, we recommend a place holder allowance of 50kL is considered.
    - The Landscape Consultant shall advise min. storage allowance based on planter areas and irrigation rates.

Non potable cold-water shall be distributed throughout the building via a combination of gravity (for lower portions of building) and a booster pump for the upper portion of the building.
The non potable cold-water system main pipework and risers shall reticulate in Type 'B' Copper Tube, in-wall water (rough-in) pipework shall be constructed of Cross-linked polyethylene.
Individual isolation valves and pressure reduction valves shall be installed where required, the system shall be complete with an automatic mains water bypass valve should the rainwater tank be unavailable.
Backflow prevention devices shall be installed to comply with relevant codes.

7.6.2 System Performance Requirements

- All pipework will be sized to achieve a velocity of 1.5 m/s in the pipe.
- Minimum Water Pressure at Fixtures or Outlets: 250 kPa
- Maximum Water Pressure at Fixtures or Outlets: 500 kPa

7.7 TRADE WASTE

7.7.1 Proposed Services

At this stage, a 5kL grease arrestor has been allowed and located within the loading dock in-ground. The grease arrestor shall connect to any commercial onsite cooking facilities and extend to the commercial tenancies throughout the building in accordance with PCA A Grade requirement.

The grease arrestor capacity is subject to change pending design progression and stakeholder direction.

The site trade waste plumbing and drainage system will comprise the following:

- In-ground drainage and elevated drainage up to podium level 03 will utilize sanitary drainage / elevated drainage principles,
- Podium level 4 up to the last level of office floors shall utilize a trade waste plumbing system, we recommend a Reduced Velocity Aerator Stack system (RVASS) is considered, we would be happy to provide an overview of the options available if required.
- The upper floor of the building will transition back to drainage principles and terminate to atmosphere via stack vents.

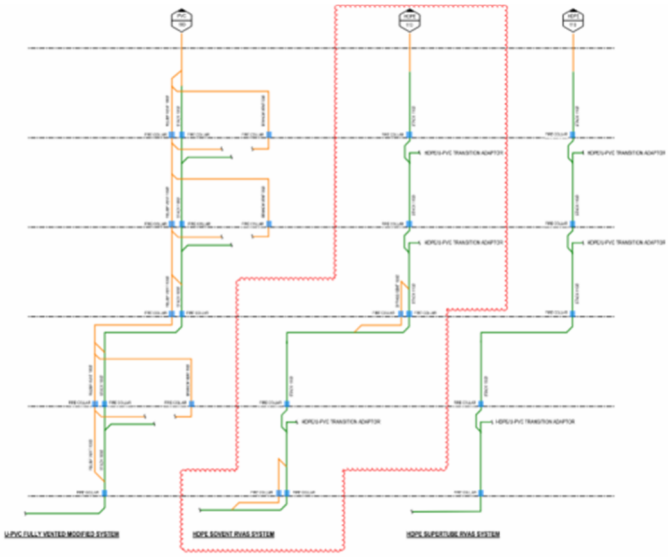


Figure 7.5 Trade Waste Plumbing & Drainage System

The installations will be designed and installed such that they will be entirely accessible for easy maintenance. Horizontal pipe runs will be installed with sufficient gradients to achieve self-cleansing velocities to avoid potential problems with blockages.

Kitchen equipment allowance shall be specified by the architect and kitchen consultant.

Pipework to be HDPE.

7.8 GAS SERVICE

7.8.1 Proposed Services

Based on stake holder consultation, a gas service is not required, this is subject to change pending design progression.

8 FIRE PROTECTION

8.1 GENERAL

8.1.1 DESCRIPTION

The building will include the following major fire systems and components:

- Combined Fire Hydrant and Sprinkler System;
- Automatic Fire Detection & Alarm System;
- Emergency Warning and Intercommunication System;
- Portable Fire Extinguishers;
- Fire hose reel system;

8.1.2 DESIGN CRITERIA

The Fire Protection System design will be generally designed and developed in accordance with (but are not limited to) the applicable standards listed below.

Fire protection services to comply with all current statutory requirements and guidelines including relevant Australian Standards and local authority requirements, including Gold Coast Council, Queensland Plumbing and Drainage Regulations, BCA Report, Fire Engineering Report and QFES.

Key standards and codes governing the hydraulic system design and installation include:

- National Construction Code (NCC) 2022
- AS 2419.1-2021 – Fire hydrant installations – System design, installation and commissioning
- AS 2118.1-2017 – Automatic fire sprinkler systems – General systems
- AS 2118.6-2012 – Automatic fire sprinkler systems – Combined sprinkler and hydrant systems in multistorey buildings
- AS 1670.1-2018 – Fire detection, warning, control and intercom systems – System design, installation and commissioning – Fire
- AS 1670.4-2018 – Fire detection, warning, control and intercom systems – System design, installation and commissioning – Emergency warning and intercom systems
- AS 2444-2001 – Portable fire extinguishers and fire blankets – Selection and commissioning
- AS 2441-2005 – Installation of fire hose reels

Where conflict arises between standards, the most onerous is to be selected.

Versions used to be current at date of specification issue.

All equipment will be compliant with the relevant Australian standards and be provided with relevant approval/listing for the purpose intended by testing laboratories.

8.2 COMBINED FIRE HYDRANT AND SPRINKLER SYSTEM

The combined fire hydrant and sprinkler system will be designed in accordance with AS 2118.6, AS 2419.1, AS 2118.1, BCA report and fire engineering reports.

8.2.1 WATER SUPPLY

The water supply connection will be provided by the Civil Services contractor, based on information provided by the Fire Services contractor. The water supply will consist of the following:

- Water Supplies to comply with the Building Code of Australia and the requirements of AS 2118.1 and AS 2419.1 i.e., Dual Water Supply requirement
- 2 x concrete in situ fire water storage tanks with booster Suction assembly, including tank liners, ladders, and all associated fittings
- Provision of two (2)-off Diesel Fire Pumps in Duty / Standby configuration to suit the system demand, complete with piping, valves, fuel, battery, battery charger, controls and control panel
- Final system demand to be based on requirement for simultaneous operation of: -
    - Car Park Ordinary Hazard 2 sprinkler occupancy
    - Hydrants
- Provision of Fire Pump Remote Start Switches (Primary / Standby pumps) at the Booster Cabinet. The fire pump room will have direct access to a road or open space.
- Piping, pipe fittings, valves, pressure gauges, pipe hangers and support for the entire installation
- Fire Brigade booster valve connections. The brigade booster connection is a combined service to provide Fire Brigade connection to the main combined Sprinkler and Hydrant service ring mains and must consist of: -
    - 1 x 4 valve main suction manifold and
    - 1 x 4 valve booster inlet in accordance with Fire Brigade requirements
    - Provision of Valves, Booster outlets etc. as shown on the drawings

An incoming water main connecting from city/site-wide water supply from domestic water supply and shall be brought into the fire storage tank, compartmentalized into 2-sections for operation and maintenance purposes.

A combined fire hydrant and sprinkler system to be provided to protect the entire building. It comprise of ring mains pipework throughout the building with hydrant valves generally located within the fire stairs to provide coverage to all areas.

Fire hydrant protection to the building shall be provided using internal hydrants located strategically in the building in accordance with AS2419.1:2021. The required coverage shall be achieved by using a 30m hose and 10m discharge stream from the hydrant.

The following sprinkler design options will be incorporated:

- Flush mounted sprinklers will be used in specialist areas or feature ceilings;
- Concealed space sprinkler protection will be provided in concealed space deeper than or equal to 200mm.
- Upright pendants in the carpark
- Wire guards to low level sprinklers <2.4m AFFL
- Semi-recessed sprinkler protection

- Pendants sprinkler heads to plant areas
- Flexible droppers to sprinkler heads will be used; and
- Sprinkler control assembly to each level.

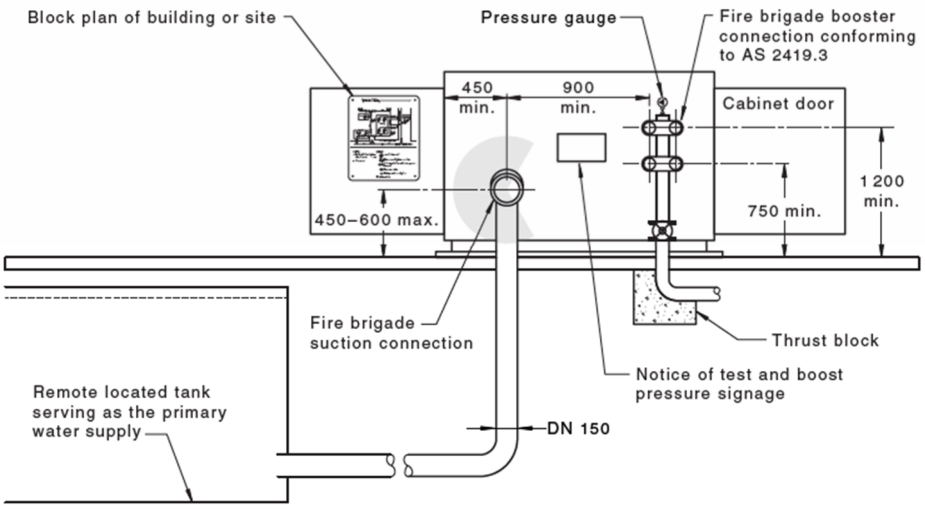
Combined fire hydrant and sprinkler booster assembly to be provided at the site boundary, complete with fire brigade tank suction connection. Booster cabinet to be located within 4.5m from hardstand in accordance with QFES requirements.

Sprinkler Water Demands								
No.	Location	Designation	Occupancy Classification	Design Density (mm/min)	Area Coverage per sprinkler (sq. meter)	Water Demand per sprinkler (L/min)	Min. Head Pressure (KPa)	Sprinkler K- Factor
1	Ground floor - Level 02	Carpark	Ordinary Hazard 2 (K)	5	12	60	70	5.6
2	Level 03	Function Hall	Light Hazard (M)	3.2	19	60	70	5.6
3	Level 04 - 15	Offices	Light Hazard (M)	3.2	19	60	70	5.6

Hydrant Water Demands			
No.	Fire Hydrant Type	Water Demand per sprinkler (L/s)	Min. Required Residual Pressure (KPa)
1	External or Internal attack hydrant	10	350

8.2.2 Combined Fire Hydrant and Sprinkler Booster Assembly

DN 150 Tank Suction Fire Brigade Booster Assembly



Length (mm)	Width (mm)	Height (mm)
3,000	600	1,500

Located within sight of the nominated main entrance to the building;

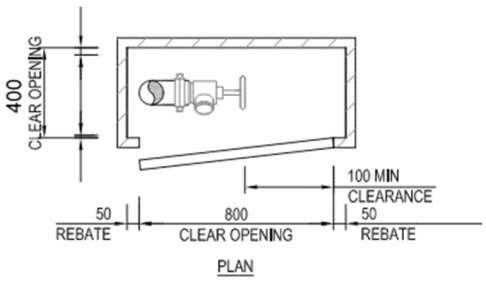
With direct and unrestricted access from the street;

Within 4.5 meters of a hardstand/road – no dead end road permitted;

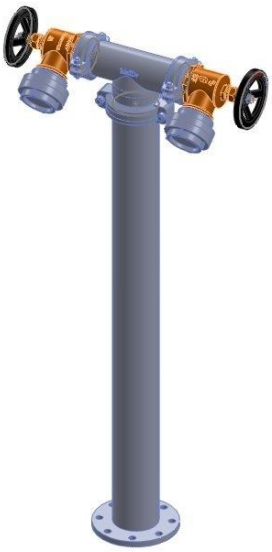
Not less than 10 meters from any high voltage electrical distribution equipment i.e. transformers, substation etc.;

Not obstructed by obstacles such as stored goods, vehicles, vegetation etc.;

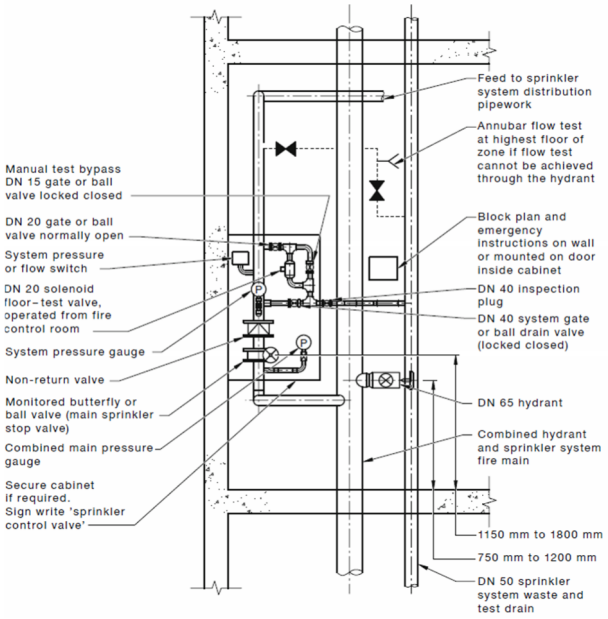
8.2.3 Internal Fire Hydrant

Fire Hydrant – Internal Landing Valve		
		
Length (mm)	**Width (mm)**	**Height (mm)**
900	440	750-1,200
To be located within 4m of the required exit and along path of travel. 1 meter clearance to be provided in front of hydrant to facilitate lay out of hose.		

8.2.4 External Fire Hydrant

Fire Hydrant – External Dual Pillar		
		
Length (mm)	**Width (mm0**	**Height (mm)**
750	450	750-1,200
If remote from the building, not less than 10 meters from the external wall of any building protected; If affixed to a building, the fire hydrant is to be separated by a fire rated wall with FRL 90/90/90 measuring 4.4 m wide x 3 m high; 1 meter clearance to be provided in front of hydrant to facilitate lay out of hose.		

8.2.5 Sprinkler Control Valve Assembly and Fire Hydrant

Fire Hydrant – External Dual Pillar


Length (mm)	Width (mm0	Height (mm)
1,200	450/350	Full Height

To be located within 4m of the required exit and along path of travel.

To be located in stairwells with clearance achieved to AS2419.1.
1 meter clearance to be provided in front of hydrant to facilitate lay out of hose.

8.3 FIRE HOSE REEL SYSTEM

Fire hose reel system will be provided on the carpark levels and the levels with non-residential areas. Fire hose reel system shall be supplied from the combined fire ring main in accordance with AS2441-2005 requirements.

8.3.1 Fire Hose Reel

Fire Hose Reel


Length (mm)	Width (mm)	Height (mm)
900	500	2400

Located within 4 meters of required exits; 1 meter clear space to be provided in front of cupboard to facilitate lay out of hose; Only fire services are permitted to be installed within cupboard;

8.4 AUTOMATIC FIRE DETECTION AND ALARM SYSTEM

The Automatic Fire Detection and Alarm System will be designed to AS 1670.1:2018.

8.4.1 Control and Indicating Equipment (CIE)

The Control & Indication Equipment includes the following:

- Fire Detection Control and Indicating Equipment (FDCIE);
- Emergency Warning Control and Indicating Equipment (EWCIE);

This equipment will be located in the fire control room on Ground Level.

The following services will interface with the FDCIE:

- Mechanical services for smoke hazard management (FFCP);
- Security services for door release;
- Hydraulic services for gas shut-off; and
- BMCS inputs.

Smoke detectors shall be provided throughout the building in accordance with AS1670.1:2018 and BCA requirements.

Smoke alarms shall be provided within SOUs in accordance with AS 3786 to mitigate spurious alarms.

8.4.2 Fire Detection and Alarm System – Fittings

All fittings are to match architectural finish. To be coordinated with the architect and to be noted during the design documentation.

Equipment / Fitting Type	Proposed Location	Image
Smoke/Heat Detector	Carpark, Common Areas	

Equipment / Fitting Type	Proposed Location	Image
Visual Warning Devices	Plant Areas/ Booster Assembly	
Smoke Alarms	Dwellings	
Fire Detection Control and Indicating Equipment	Fire Control Centre	
Manual Call Point	In Escape Paths	

8.5 EMERGENCY WARNING AND INTERCOMMUNICATION SYSTEM

Emergency Warning and Intercommunication System (EWIS) will be designed to AS 1670.4:2018.

EWIS speakers will be installed throughout the building for audible coverage.

EWIS speakers will be recessed within the ceiling space in specialist areas or featured ceilings.

Surfaced mounted EWIS speakers will be provided in areas with exposed ceilings.

Horn speakers will be installed in carpark areas.

Warden Intercom Points (WIP) and Emergency Call Points (ECP) will be installed throughout the building, particularly at egress points.

8.5.1 Emergency Warning and Intercommunication System – Fittings

Equipment / Fitting Type	Proposed Location	Image
Flush Ceiling Speaker	Ceilings throughout	
Surface Mount Speaker	Exposed Soffit, Internal Areas	
Horn Speakers	Carpark / Plant Areas	

Equipment / Fitting Type	Proposed Location	Image
Manual Call Point	In Escape Paths, Plant Rooms and Adjacent WIPs	
EWIS Panel	Fire Control Centre	
Warden Intercom Phone	In Escape Paths, EWIS Panel, One for each detection zone	

8.6 PORTABLE FIRE EXTINGUISHERS

The location of Portable Fire Extinguishers will be designed to AS 2444.

The distribution of extinguishers throughout will suit the hazards. Their final locations will be approved by the architect.

Additional Class E extinguishers will be installed in the comms room.

Fire extinguishers shall be provided within 10m from SOU entrance on residential levels.

Fire Blankets are not a requirement of the BCA but are highly recommended in kitchen areas, breakout areas or tea points.

9 ESD

9.1.1 NABERS Energy

A key consideration for this project is the NABERS Energy rating that may be obtained. The following section provides an overview of the NABERS Base Building framework, including the scope of energy use, and the implications of the different outcomes in terms of operational performance and design impacts.

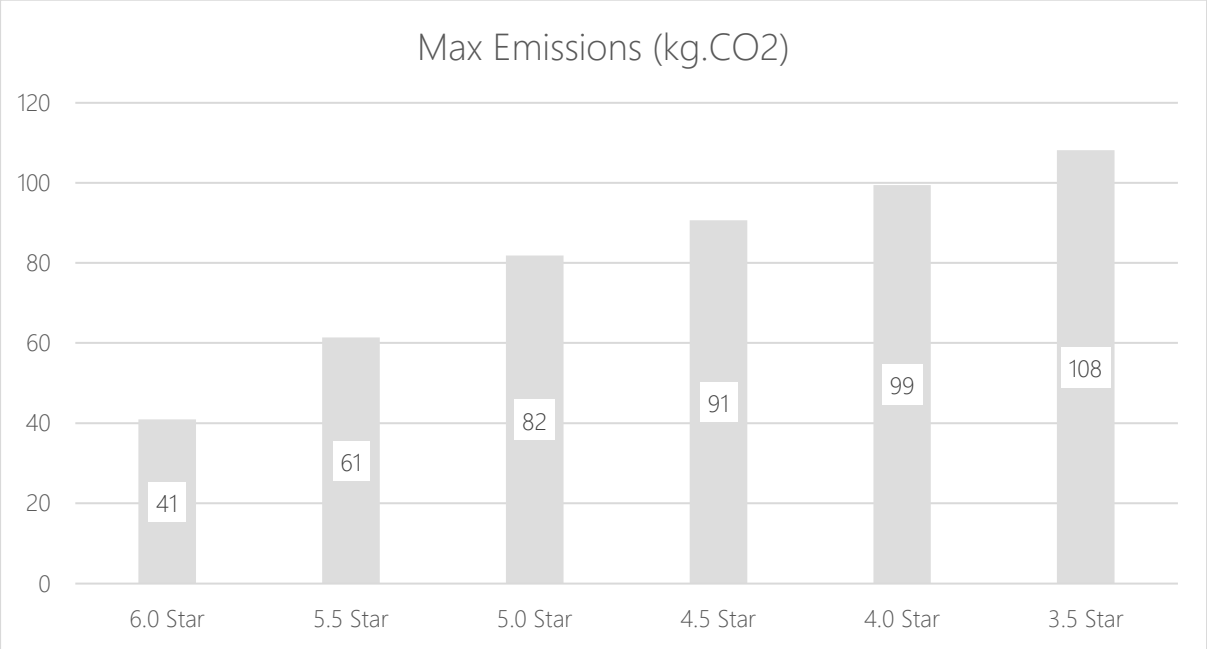
9.1.2 Scope of a NABERS Base Building Rating

The scope of the energy coverage that must be included within the annual rating period includes:

- Common Area Energy Usage
    - Energy consumption for lighting and power in:
        - Lobbies
        - Hallways
        - Lift areas
        - Shared spaces
- HVAC Systems
    - Energy consumed by central air-conditioning systems serving base building areas.
    - Cooling tower energy consumption.
    - Energy used by chillers and pumps in the central plant.
    - Energy used for ventilation in:
        - Car parks
        - Mechanical ventilation systems for common areas
- Lifts and Escalators:
    - Passenger lifts energy
    - Freight lifts energy
    - Escalators serving shared areas energy.
- Exterior and Perimeter Systems
    - External lighting and equipment in:
        - Facades
        - Outdoor common areas.
- Car Parking Areas
    - Energy consumption for lighting and ventilation in car parks that fall under the base building's responsibility.
- Shared Amenities
    - End-of-trip facilities (e.g., showers, lockers).
    - Meeting rooms or spaces managed by the base building.

9.1.3 Carbon Budget

The graph below demonstrates the relationship between NABERS energy star ratings and the maximum emissions (kg.CO_2) produced by the base building. It highlights a clear trend: as the NABERS rating improves, carbon emissions significantly decrease.

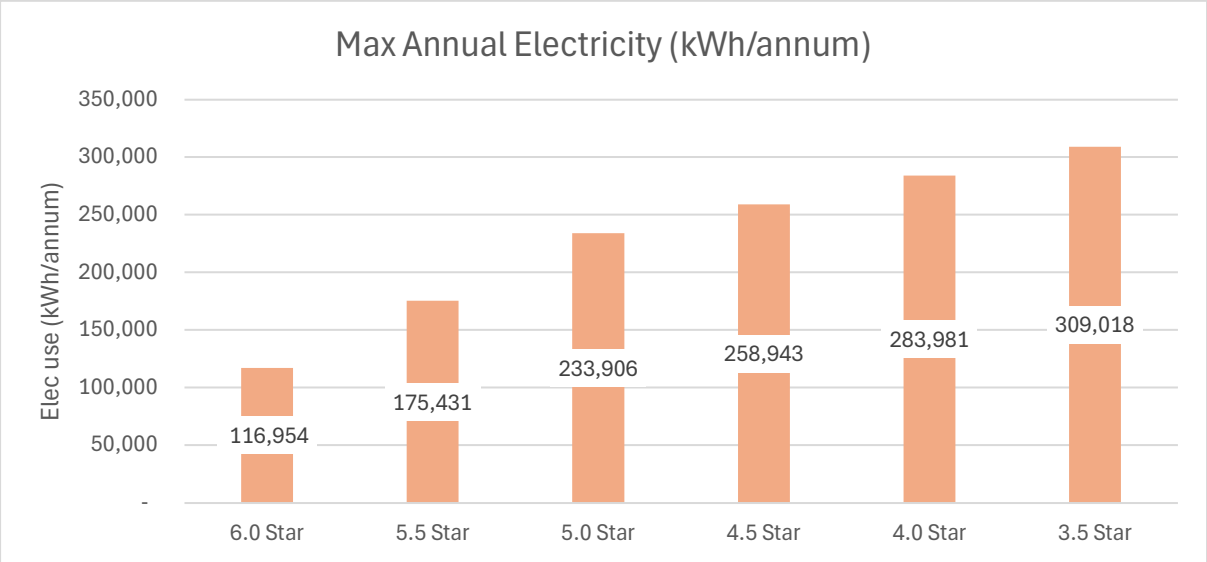


A 6.0 Star rating results in only 41 kg.CO_2, while a 3.5 Star rating emits 108 kg.CO_2, marking a reduction of over 60%.

This data reinforces the importance of aiming for a higher NABERS rating in the design phase to align with sustainability goals, minimise operational carbon footprint, and contribute to broader climate change mitigation targets.

9.1.4 Energy Budget

The graph below showcases the estimate for the maximum annual electricity consumption (kWh) for the project associated with each NABERS energy rating, highlighting the significant operational energy savings achieved with improved ratings. Electricity costs are assumed at $0.22/kWh.



	Indicative Base Building Elec Cost ($/annum)	Cost difference relative to 6 Star
6.0 Star	25,730	$ -
5.5 Star	38,595	$ 12,865
5.0 Star	51,459	$ 25,729
4.5 Star	56,967	$ 31,238
4.0 Star	62,476	$ 36,746
3.5 Star	67,984	$ 42,254

Key observations:

- At 6.0 Stars, electricity consumption is only 116,954 kWh, leading to annual costs of approximately $25,730.
- At the lower 3.5 Star rating, electricity usage climbs to 309,018 kWh, resulting in costs of approximately $67,984.
- The cost difference between 3.5 Stars and 6.0 Stars is $42,254 annually, reflecting a savings potential of nearly 62%.

The data demonstrates the financial benefits of targeting a higher NABERS rating. With rising energy prices and sustainability targets, reducing energy consumption not only lowers costs but also enhances the building's environmental performance and tenant appeal. Note that these estimates are based on electricity usage only, and do not factor in further potential cost savings due to peak demand reduction, depending on the electricity tariff.

Assumptions

The results presented in this analysis are indicative for comparison purposes only and should not be interpreted as precise predictions of actual energy consumption or costs. The calculations are based on the NABERS Reverse Calculator methodology and are derived from the following assumptions and inputs:

- Rated Area: 2666 m^2
- Electricity Allocation: 99% of energy consumption attributed to electricity.
- Diesel Allocation: 1% of energy consumption attributed to diesel.
- Rated Hours of Use: 40 hours per week.

9.1.5 Implications to the project design

The desired NABERS Energy Star Rating will significantly influence the design priorities and technical solutions for the project. Below are examples of some key design implications and considerations for the project team based on potential Star Rating outcomes:

6.0 Star Building:

- Requires high-performance facades (lower Window/Wall ratios, low SHGC, and advanced solar load mitigation).
- Integration of on-site solar PV to offset grid electricity use.
- Mechanical systems to include chilled water plants with high efficiency (COP) and energy recovery features.
- Advanced BMS controls and sub-metering for real-time energy monitoring and optimisation.

5.5 Star Building:

- Good facade performance with efficient glazing and insulation.
- High-efficiency VRF systems with partial on-site solar PV may suffice or potential need for higher efficiency chilled water plant.
- LED lighting with occupancy and daylight controls.

5.0 Star Building:

- Medium to high performance glazing and insulation
- Air-cooled VRF or packaged systems likely sufficient.
- Minimal to no solar PV required.
- Basic lighting systems and building controls.

9.1.6 Next Steps

To align the project with the desired NABERS Energy Rating, the project team should confirm if a target Star Rating applies and conduct preliminary energy analysis to assess the impact of design choices.

Key aspects, such as facades, HVAC, and renewable energy, should be evaluated for performance. A cost-benefit analysis would help balance upfront investments with operational savings, while ensuring NABERS compliance requirements are integrated into the design. Early stakeholder engagement will secure alignment and support for the selected rating outcome.

9.1.7 Section J Compliance

For a Class 5 building, compliance with Section J (Energy Efficiency) of the National Construction Code (NCC), 2022, can be achieved through several pathways for the thermal envelope.

1. Deemed-to-Satisfy (DTS) Provisions:
    - This pathway specifies prescriptive requirements for thermal insulation, glazing performance, and air sealing.
    - Suitable for projects prioritising straightforward compliance with less reliance on detailed modelling or building performance.
2. Verification Method J1V3 (Thermal Modelling):
    - This pathway allows the use of energy modelling to demonstrate compliance.
    - The building must achieve equivalent or better performance compared to a DTS-compliant reference model.
    - Advantages:
        - Flexibility in design choices for glazing, shading, and insulation.
        - Enables innovative solutions such as advanced facade systems.
        - Improved building operational performance and thermal comfort.
    - Typically used when optimising for cost-effectiveness by reducing construction material and improving buildability.
3. J1V1 NABERS Commitment Agreement Pathway
    - Applicable if pursuing a NABERS Energy rating for the building (minimum 5.5 Star required).
    - Focuses on overall building performance, integrating the thermal envelope with HVAC and lighting systems.
    - Key Benefits:
        - Aligns with operational energy efficiency benchmarks.
        - Incentivises renewable energy integration and overall high-performance building systems, not isolated to only façade thermal performance.