ENGINEERING SERVICES
INFRASTRUCTURE & BUILDING SERVICES
CONCEPT DESIGN REPORT

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103 Fisher Street Fullarton SA

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Report Register

The following report register documents the development and issue of this report as undertaken by BCA Engineers (BCAE) in accordance with our Quality Assurance policy.

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Introduction

BCA Engineers have been engaged by Living Choice Australia (LCA) for the proposed development of 103 Fisher Street Fullarton SA.

The development fundamentally comprises:

Highgate Building Redevelopment

Opal Healthcare

- Basement Level approx. 440m² refurbished internal area
- Ground Level approx. 2,080m² refurbished internal area
- Opal Healthcare Ground Level Village Centre (Retail / Commercial / Child-care / Medical)
- Offices & Administration
- Levels 1-4 approx. 2,000m² each equal to approx. ~ 8,000m² subtotal refurbished internal area
- Opal Healthcare High Density Accommodation (comprises Fit-out of approx. 162 Beds from Ground to Fourth floors / Class 9c Accommodation for the Aged)
- External terraces and balconies
- Vertical Transportation for Passengers (3)
- Good Lift / Service lift (1)

Living Choice Australia

- Basement Level approx. 2,310m² area for basement carparking incorporating provisions for electric vehicle charging
- Ground Level approx. 1,010m² refurbished internal area
- Living Choice Australia Ground Level Residential Amenity (Offices & Administration / Function Room & Amenities, Gym / Yoga & Pool)
- Offices & Administration
- Levels 5-9 approx. 2,000m² each equal to approx. ~ 10,000m² subtotal refurbished internal area
- Living Choice Australia component comprising approx. 75 premium Class 2 residential apartments

Apartment Building Development (ILUs)

- Future Construction of new separate Living Choice Australia Apartment Building (5 Levels including Car Parking) incorporating approx. 63 independent living units (ILUs) / or premium residential apartments

Townhouses

- Future Construction of sixteen (16) new two-storey Townhouses plus 2 (two) 2-Storey Houses

It is understood both these future developments will form part of separate land title(s); all utility and authority applications and approvals will be separate.

Background

This report expands on our previously issued Infrastructure Concept Report for Planning (*9571.240805.G.1 Infrastructure Report For Planning Rev 2*), provided for application purposes with the aims to present the design parameters for the Electrical, Hydraulic & Fire Protection Services infrastructure. Also demonstrating relevant liaison with utilities / authorities, and confirm the ability and strategy to service the proposed development.

Infrastructure information presented within this report is fundamentally based upon:

- Dial Before You Dig results
- Available documentation records of existing infrastructure and Building Engineering Services
- Preliminary Liaison with utility / authority
- Site concept design plans

As presented in earlier revisions, this report includes a summary points list of our anticipated site infrastructure works directly necessary to serve the proposed redevelopment:

Electrical Services

- High Voltage (SAPN)
- Low Voltage (Private Site LV Infrastructure)

  In particular it is noted that Electrical Services infrastructure design shall consider the implications of photovoltaic energy generation systems on Independent Living Units and Central Community Facilities in an arrangement that addresses client's expectations in respect to small, embedded generation application / mitigates large scale embedded generation requirements / eliminates any triggers for implementation of authority enforced supervisory control and data acquisition systems.
- NBNCo incoming lead-in conduits for fibre optic cabling infrastructure.

Hydraulic Services

- Utility / Authority Sewer Infrastructure (SA Water)
- Site Sewer Infrastructure reticulation
- Utility / Authority Domestic Water Infrastructure (SA Water)
- Site Domestic Water Infrastructure reticulation
- Utility / Authority Natural Gas Infrastructure (APA/AGIG)

Fire Protection Services

- Utility / Authority Connections (SA Water)
- Site Fire Water Reticulation

Staging & Sequencing

It is generally acknowledged that all design parameters, liaison with utilities / authorities, and infrastructure design strategies have been developed on the basis that the redevelopment of the main "Highgate Building" (ex. Julia Farr Centre) shall occur in Stage 1.

Remainder of Independent Living Units (ILUs) and Townhouses / Houses shall be constructed in future stages.

Notes / Risks:

BCA Engineers present our proposed infrastructure solution on the basis that all utility / authority infrastructure is delivered via new Public Road. This is generally considered to be the most expensive

infrastructure solution although offers the highest confidence of successful approvals from stakeholders ie. Council, relevant utility / authority, and ultimately Office of the Technical Regulator.

Proposed infrastructure via new Green Open Space is presented where considered technically advantageous and less expensive than via Public Road. There is foreseeable risk of interrogation / challenge by stakeholders ie. Council, relevant utility / authority, and may ultimately not be granted the necessary approvals from the Office of the Technical Regulator.

Land Titles and definition of public vs. open space will influence stakeholders considerations, negotiations, and outcomes of approvals.

In each of the above scenarios, although especially relevant for infrastructure via new Green Open Space, the responsibilities for the necessary design and associated construction, as well as the final ownership and therefore responsibilities for maintenance of each of these proposed assets remains to be determined. For example, each asset proposed in the scenario to traverse Green Open Space is yet to be determined as an Authority asset or as a Private asset.

Also in any scenario, Land Titles boundaries are to be determined. The relevant Electricity Act of South Australia 1996, Water Industry Act of South Australia 2012, Gas Act of South Australia 1997, other industry legislation and regulations, each utility / authority requirements, and ultimately The Office of the Technical Regulator having jurisdiction in these matters will determine whether elements of private infrastructure may or may not traverse Green Open Space or other such Land Titles boundaries.

- Land Title Arrangements
- Council Approvals
- Utility Authority Approvals
- The Office Of The Technical Regulator Approvals

Risk: Any one or more such approvals may or may not be granted to the discretion of the Council / relevant Utility / Authority or by OTR.

Refer Appendix C.

Expanded Content

In line with concept progression of the Highgate House project, this report has been expanded to include preliminary Basis of Design information for Mechanical, Electrical, Hydraulic, Fire Protection and Vertical Transportation services design to suit the 103 Fisher Street site.

This content is separated to Opal specific, Living Choice Australia (LCA) floor specific and shared/combined services.

The information provided serves as BCA Engineers initial Concept Design Report for stakeholder comment.

1.0 Electrical Services

1.1 High voltage infrastructure

Existing Conditions

Existing High Voltage powerline infrastructure originates from Highgate Street and enters the premises basement and serves existing SA Power Networks 1500kVA Substation Transformer installed in 1975. It is in maintained and operational condition, although non-compliant to current edition of SAPN TS 108 and has limited electrical capacity to service the proposed redevelopment. This asset will be removed and replaced in context of the proposed redevelopment.

The existing incoming underground High Voltage powerline asset has been identified as an impediment to the commencement of civil activity on site in particular construction of new ramp.

BCA Engineers has requested a contract for early alterations and diversion of this High Voltage powerline cabling infrastructure, enabling works for the commencement of substantial civil activity on site. Alterations and diversion will re-energise the existing basement level substation transformer in the interim period, until such time as new High Voltage substation(s) connections are established to serve the development.

Contractor shall provide safe work method statement for any civil or other works in proximity to existing or new powerlines to stakeholder and authority approvals:

- Safe work method statement (SWMS)
- Office of the Technical Regulator (OTR) Building Safely Near Powerlines
- Office of the Technical Regulator (OTR) Working Safely Near Powerlines
- SA Power Networks (SAPN) Service & Installation Rules
- SA Power Networks (SAPN) NICC 404
- SA Power Networks (SAPN) Network Access Permit (NAP)

New Substation Transformers

BCA Engineers are in liaison with SA Power Networks for early procurement of Substation Transformer assets to serve the overall Highgate Building Redevelopment.

We have initiated application to SA Power Networks for new connections.

Scenario 1

- Two (2) x 1,500 kVA nameplate rated parallel substation transformer(s) installed outdoors.
- The premises shall be connected by two (2) incoming parallel consumers mains feeding into a single common Main Switchboard.

Scenario 2

BCA Engineers are also seeking Power Supply Authority initial commentary / acceptance-in-principle / formal endorsement of separation of the Low Voltage installation ie. alternative arrangement as follows:

- Transformer A: to serve Opal comprising partial Basement, partial Ground Floor, Level 1 to Level 4, Opal's Lifts, Roof PV, and also Fire Pump which is common to the building.
- Transformer B: to serve LCA comprising partial Basement, partial Ground Floor, Level 5 to Level 9, LCA Lifts and Roof PV.

We have requested for confirmation of any special conditions or design parameters that may be enforced in this scenario: Main Switchboards locations (ie. main switches in a common location vs. separate main switch rooms), MENs, common neutral or earthing arrangements, any other particular earthing requirements that may arise. BCA Engineers are awaiting SAPN and Office of the Technical Regulator advice in this respect.

Substation transformer asset(s) and all necessary street infrastructure alterations shall be provided and installed by SA Power Networks.

Current edition of relevant Authority Technical Standards enforces a higher degree of reliability of power supply for customers with substantial loads, typically dictating a dual high voltage feeder arrangement. On this basis it is anticipated that significant high voltage street network alterations and upgrades will occur in back-streets of Highgate to achieve this connection requirement.

Negotiations remain in progress for associated augmentation and extent of high voltage street network alterations.

1.2 Electrical maximum demand

BCA Engineers have undertaken a preliminary assessment of electrical maximum demand (EMD) to the method prescribed in AS NZS 3000 Table C1 for domestic type installations, Table C2 for non-domestic type installations and Table C3 where applied for other general areas.

Summary of preliminary electrical maximum demand (EMD) is as follows:

Description of Loads	Subtotal kVA	Subtotal Amps/Ph
Opal Healthcare	1110	1608
Living Choice Australia	923	1337
Common Elements	104	150
Subtotals	**2136**	**3095**

High Voltage / Low Voltage electrical infrastructure shall in general be designed to accommodate preliminary EMD plus min. ~20% spare physical and electrical capacity.

1.3 Low voltage infrastructure

Main Switch Room

Main Switch Room shall be dedicated two-hour fire-rated construction to NCC and AS NZS 3000 Wiring Rules.

Main Switchboard (MSB)

Subject to outcomes of Section 1.1 above, New Main Switchboard (MSB) shall be provided comprising minimum specification as follows:

- Nominal 3000A/4000A 400V 3Ph 4 Wire 50Hz
- IP52 for interior application
- Form 3bih
- minimum 30% spare physical chassis / pole capacity

A main switch device / current limit circuit breaker device / meter isolator device shall be provided in accordance with current edition of relevant Standards and Guidelines including SAPN S&IR. MSB design shall also have all facilities for Retail Authority metering, private embedded network metering, and power quality and energy management submetering. MSB design shall incorporate automatic transfer switches where relevant as well distribution chassis / circuit breakers for each main distribution board and sub-distribution board accordingly.

Electricity Metering

This MSB shall fundamentally be designed to accommodate the following metering:

- Main switch / meter isolator / Circuit breaker / Electricity meter to serve MDB.OPAL (for Opal Main Distribution Board)

- Main switch / meter isolator / Circuit breaker / Electricity meter to serve MDB.LCA (for Living Choice Australia Main Distribution Board)
- Main switch / meter isolator / Circuit breaker / Electricity meter to serve MDB.COMMON (localised Distribution Board for any common elements)

Provisions for embedded-network metering shall be implemented to serve the independent Living Choice Australia apartments.

Energy Management Systems (EMS)

Power Quality & Energy Management Systems (EMS) shall also be provided to the following elements where necessary for compliance to NCC Section J:

- Residential component of building overall
- Common areas
- Plant and equipment
- Fire pump room
- Hydraulic pump room
- Hot water plant and equipment
- Vertical Transportation

OPAL Main Distribution Board

New Main Distribution Board designated MDB.OPAL shall be provided and installed as follows:

- Nominal 2000A 400V 3Ph 4 Wire 50Hz
- IP52 for interior application
- Form 3bih
- minimum 25% spare physical chassis / pole capacity

LCA Main Distribution Board

Existing site main switchboard was constructed in 2016 and is anticipated to be repurposed if possible to serve Living Choice Main Distribution Board designated MDB.LCA as follows:

- Nominal 2000A 400V 3Ph 4 Wire 50Hz
- IP52 for interior application
- Form 3bih
- minimum 25% spare physical chassis / pole capacity

Floor Main Distribution Board(s)

Floor Main Distribution Board(s) shall be provided to suit architectural building design, physical layouts, technical parameters and accounting and billing requirements.

Floor MDBs shall typically comprise specification as follows:

- 400A 400V 3Ph 4 Wire 50Hz to suit capacity / functional load requirements
- IP52 for interior application
- Form 2
- minimum 30% spare physical chassis / pole capacity

Note: Sub-distribution board(s) shall typically be physically located in riser closets to suit the building architectural and logical / functional layout.

Exact quantity and final locations of any other sub-distribution boards shall be determined in Design Development.

Sub-distribution board(s) from which general lighting circuits originate shall be complete with evacuation lighting push-button-on timer-delay-off testing facility.

Sub-distribution board(s) shall be integral with controls compartment for housing of relays and contactors for automatic lighting control.

Final power and lighting circuits shall be provided complete with combined RCD/MCB protective devices in accordance with AZ NZS 3000.

Dedicated sub-distribution board(s) shall typically be provided for the following:

- Pressurisation Systems
- Lift(s)
- Fire Pump Room
- Photovoltaic Energy Generation System(s)
- Power Factor Correction (PFC) System(s)
- Communications Room(s)
- Hydraulic Pump Room
- Hot Water Plant

Other dedicated sub-distribution board(s) may be provided as required to suit building architectural and logical / functional layout.

Patient Areas

Body Protection Wiring to AS NZS 3003 shall be provided in accordance with Opal_EL-BR_002_Electrical Services Technical Brief v5 to any area defined as a Patient Treatment Rooms.

Patient Treatment Rooms shall be defined by Room Data Sheets.

1.4 Earthing

An M.E.N. Earthing system shall be provided and installed to AS NZS 3000 Wiring Rules at the low voltage electrical main switchboard(MSB).

Separate communications earth terminals (CETs) will be located within each respective floor distributor / communications room aligned vertically throughout the building and shall form part of a communications earthing system as defined in AS ACIF S009.

1.5 Power Factor Correction

Power Factor Correction shall be provided and installed as follows:

- PFC.OPAL Unit will be provided in the Building Main Switchroom or Opal Electrical Switchroom in accordance with Opal_EL-BR_002_Electrical Services Technical Brief v5.
- PFC.LCA Unit will be provided in the Building Main Switchroom for LCA

1.6 Diesel engine driven power generation systems

The existing Tide Power Generator Set is of 396kW Rated Capacity which supports less than half the theoretical assessment of Opal's electrical maximum demand. On this basis, it has been determined that the existing diesel generator is of insufficient size to suit project stakeholder's requirements.

Initially options for consideration are:

- Re-use and re-purpose existing Generator and supplement with an additional new generator
- Provide one (1) new Generator of capacity to cater for Full-Load operation

Re-use existing Generator

- Re-use and re-purpose existing Generator for Low-load operation / provide and install one (1) new Generator for Medium-load operation / run both Generators in parallel state for High-Load operation.
- There is technical complexity and cost associated with re-use this generator in parallel with a new larger capacity generator.
- In simple terms the existing low voltage output distribution switchgear components and control systems for the existing generator would have to be completely replaced with new modern motorised circuit breaker sets and associated components, as well as modern synchronisation controls to enable re-use and re-purpose and utilization to occur.

- This is highly likely to be problematic from perspectives of spatial limitations within the existing generator enclosure and there is complexity in ensuring safe and reliable synchronisation and paralleling controls interfaces between two different old and new systems.
- On the basis of above, the existing diesel generator is not recommended for re-use.

Provide one (1) new Generator

It is recommended that a new Diesel engine driven Generator is provided of nominal ~1110kVA rated to support 100% of Opal premises loads including Opal Lifts.

An additional ~ 20% spare capacity may be considered appropriate for Opal, and other premises loads may be added to this generator distribution system as follows:

- 100% of Opal premises load
- Including Opal Lifts
- plus LCA Lifts
- & Telecommunications Carrier equipment room on roof top
- Fire Pump Room and or other essential safety services

On this basis, it is our preliminary recommendation that a single new Generator Set of nominal ~ 1350kVA Rated Capacity may be considered appropriate.

If electric fire pumps are used, this may trigger demand management and load-shed of non-essential mechanical services for example unless additional capacity is provided.

Diesel Storage

Conventional specification of a Sub-Base Skid-Mounted Diesel Storage Tank would be able to support 70% of Generator Rated Capacity for approx. ~ 8Hours. It is our understanding that min. ~ 12Hours extended duration run-time is required by stakeholders, and on assumption that this is to support loads on average of 70% of max. Generator Capacity over this duration, then a Remote Bulk Diesel Storage Tank would be necessary and storage volume of approx. ~3000L would be appropriate.

Diesel engine driven power generation systems are otherwise excluded from supporting any other general Living Choice Australia premises / apartments loads.

Load Bank

In addition to the above, a Load Bank is proposed for client consideration as it facilitates testing the generator without interruption of power supply to the premises. Recommended minimum Load Bank Rating is typically approx. 70% of Generator Specification ie. min. 950kW. Associated dimensions are anticipated to be in the order of 2.5m x 2.5m with banks installed back-to-back.

Each manufacturer/supplier will have different increments so please accept the above as indicative only and so next practical size-up may ultimately be selected for tender/procurement.

1.7 Photovoltaic energy generation systems

It is initially suggested that LCA's Photovoltaic (PV) energy generation systems shall be limited to ~ 99kW. In this manner, Small Scale Generation Certificates (STCs) will apply and it is our understanding that this scenario offers an immediate capital rebates.

Opal's Photovoltaic (PV) energy generation system shall be sized to maximise capacity with available roof space. It is anticipated that such system capacity could be in the order of +/- 130kW although this will be subject to final panel performance / efficiency. Fuerther to this there may be potential reduction of LCA's installed capacity in which scenario that Opal's capacity me increase accordingly. It is important to note that PV systems in excess of 100kW will trigger Large Scale Generation Certificates (LGCs) in which rebates are paid over time.

Formal lodgement and approvals by SAPN remain necessary prior to finalisation of concept; ie. it is anticipated that such PV system(s) installation will trigger requirements for Network Protection Unit(s) within MSB/MDBs and export limitations to eliminate requirements for SCADA.

1.8 Uninterruptable Power Supply (UPS) Systems

Opal Health Care will supply an appropriately sized Eaton 9PX UPS with maintenance bypass.

BCA Engineers Specification shall include for the Electrical Contractor to provide and install input/ output distribution infrastructure and each Rack shall be fed from a direct UPS feed.

1.9 Electric vehicle charging systems

Low voltage electrical infrastructure shall include provisions for distribution boards, circuits and terminations for the following:

- provisions for Two (2) x 40kW 3-Phase Medium Rate EV Chargers in external car park for OPAL
- provisions for Sixty-Nine (69) x 7kW Single-Phase Slow Rate EV Chargers in basement car park for LCA Apartments

EV Chargers are excluded.

Provisions shall be included to enable Demand Limitation / Demand Management System(s) in order to mitigate peak electrical max. demand / mitigate high augmentation costs and network access charges, mitigate trip events due to overload. Provisions shall be included to enable Demand Limitation / Demand Management System(s) to interface into the building EMS.

1.10 Lightning protection

A Lightning Protection assessment shall be conducted to AS NZS 1768:2021. The results of such assessment provide recommendations for lighting protection measures that may be implemented on a discretionary basis. BCA Engineers will not document any lighting protection system design measures unless specifically requested by Stakeholders.

1.11 Interior lighting

General

Energy efficient luminaires shall be selected to suit functional areas and tasks. Automatic and manual lighting controls shall be implemented to suit practical use of interior spaces and minimize energy consumption. External lighting controls shall incorporate photoelectric cell controls.

Illumination power density shall satisfy the performance parameters defined by Section J of the National Construction Code 2022.

Lighting for safe movement shall be provided to any area that is typically not occupied for any extended period: not less than 20 lux average.

Minimum illumination parameters for other areas shall generally be target as follows:

- not less than 80 lux for corridors and ramps.
- not less than 80 lux for Bin and Bike Storages;
- not less than 80 lux for stairs;
- not less than 160 lux for residential and penthouse lobbies;
- not less than 160 lux for plant / maintenance rooms;
- not less than 160 lux at electrical / control / switchboard etc;
- not less than 0.5 uniformity.
- in accordance with AS NZS 1680.2.1.

Opal have requested increased lux levels in resident areas, particularly resident bedrooms, resident corridors, resident lounge and dining room. OHC to advise.

Interior lighting

Contractor shall provide and install Interior lighting systems selections to maximise energy efficiency and to suit aesthetics, function and costs.

Lighting selections shall include combinations of recessed, surface mounted, suspended or pendant style luminaires.

Feature interior lighting shall be designed and selected in consultation with architect and client.

Car park lighting

Indoor basement car park lighting shall comply with AS NZS 1680.

Minimum illumination parameters for indoor carpark areas shall generally be target as follows:

- not less than 800 lux for first 15m during daytime
- not less than 160 lux for the next 4m during daytime
- not less than 160 lux for first 19m during night-time
- not less than 40 lux for aisles, ramps, circulating roads & pedestrian crossing
- not less than 40 lux for normal car parking spaces

Outdoor car park lighting shall comply with AS NZS 1158.

1.12 Exterior lighting

Contractor shall provide and install Exterior lighting systems comprising LED technology to maximise energy efficiency and to suit aesthetics, function and costs:

- All exterior lighting shall be diffused, impact resistant and weatherproof
- minimum IP44 rated for mounting below covered canopies
- minimum IP65 rated surface mounted on walls or free standing poles/bollards

Lighting for safe movement and security purposes shall be provided where appropriate to building perimeters.

Feature exterior lighting shall be designed and selected in consultation with architect and client.

The principles of control of the obtrusive effects of lighting to AS NZS 4282 shall be considered.

1.13 Lighting controls

Lighting controls shall fundamentally comprise standard On / Off switches together with motion-sensor-on / delay-timer-off facilities where practical to prevent lighting fixtures left on for extended durations when not in use.

Lighting controls shall also incorporate time-clock on/off facilities wherever practical such as for feature lighting or illuminated signage, and photoelectric-switch on/off for any exterior lighting.

It is not anticipated that any Digital Addressable Lighting Interface or other intelligent control systems shall be implemented.

1.14 Evacuation lighting systems

Contractor shall provide and install Evacuation lighting throughout to AS NZS 2293.

1.15 Aviation Lighting

It is not anticipated that any design considerations for lighting in proximity to aerodromes is relevant for this project unless advised by Planning Authority.

1.16 Telecommunications infrastructure

Telecommunications network infrastructure pits, pipes and conduits will be provided to requirements of G645:2017 Fibre Ready Pit and Pipe Specification for Real Estate Development Projects.

Nominal 2 x 50mm dia. white communications Lead-In Conduits shall enter each premises Main Communications Room ie. (one for Opal and one for LCA). Communications Room(s) shall accommodate:

- National Broadband Network Premises Distribution Hub (PDH)

- Main Communications Cabinet(s)
- Structured telecommunications systems comprising Category 6A passive termination equipment and cabling infrastructure
- Nurse Call system head-end
- Security system head-end
- Access control system head-end
- CCTV system head-end

All active equipment / PABX or VOIP telephone equipment / wireless access points (WAPs) / and any other active digital ICT networking equipment or software is considered the responsibility of third-party client, operator, or end-user.

Each Living Choice Australia Apartment will be provided with a Fibre Network Termination Device (NTD) facilitating establishment of separate telecommunications retail accounts for activation of private voice and data networks.

1.17 Structured telecommunications systems

Structured telecommunications systems shall be provided and installed in accordance with Opal-ICT-14-012 OAC Home ICT Standard v 4.5.3.

Structured telecommunications systems comprising Category 6A passive termination equipment and cabling infrastructure.

All active equipment / PABX or VOIP telephone equipment / wireless access points (WAPs) / and any other active digital ICT networking equipment or software is considered the responsibility of third-party client, operator, end-user or resident/owner.

1.18 Free-to-air and PAY-television

Television systems shall be provided and installed in accordance with Opal-ICT-14-012 OAC Home ICT Standard v 4.5.3.

Free-to-air (FTA) and PAY-television (PTV) distribution systems shall be provided comprising digital antenna and satellite dish on the roof.

Receiving antennae / dishes shall be interconnected to integrated RG6 passive cabling infrastructure and active amplified television distribution system.

Any active equipment associated with subscription / receiving of PAY-television services is deemed the responsibility of client, operator, end-user or resident/owner.

1.19 Audio visual systems

It is not anticipated that any specialist audio-visual systems provisions are relevant for this project.

1.20 Car parking management & systems

Car Parking Management & Systems are excluded.

1.21 Nurse call System

Nurse Call Systems shall generally be provided and installed in accordance with Opal-ICT-14-012 OAC Home ICT Standard v 4.5.3.

It is noted however that converse to Opal-ICT-14-012 OAC Home ICT Standard v 4.5.3, the Nurse Call Systems shall actually be a ‘Group 1’ item ie. not ‘Group 2’.

1.22 Access control systems

Access Control Systems shall be provided and installed in accordance with Opal-ICT-14-012 OAC Home ICT Standard v 4.5.3.

Living Choice Australia apartments shall be provided with access control systems to building main entry and interface to Vertical Transport operations.

It is proposed that Residential apartments are fitted with basic architectural door hardware without Electronic Access Control.

1.23 Intercom systems

Intercom Systems shall be provided and installed in accordance with Opal-ICT-14-012 OAC Home ICT Standard v 4.5.3.

Living Choice Australia apartments shall be provided with intercom stations to building main entry and interface to Vertical Transport operations.

Intercom systems shall generally be provided to all Living Choice Australia apartments comprising:

- Entrance station (Audio / visual)
- Residential Apartments station (Audio / visual)
- Interface to Access Control system for release of secure perimeter and time-activation of residential lift

1.24 Closed circuit television (CCTV) systems

Closed-Circuit Television (CCTV) Systems shall be provided and installed in accordance with Opal-ICT-14-012 OAC Home ICT Standard v 4.5.3.

Living Choice Australia floors shall also be provided with Closed-Circuit Television (CCTV) Systems.

Closed-Circuit Television (CCTV) Systems shall generally serve common areas and provide video coverage of the following areas:

- Car park entry / exits / roof;
- All building entrances / exits; such as entrance lobbies, lift lobbies
- Interface to Lifts for CCTV inside Lift Cars;
- Stairs and ramps;
- Other common areas which may be mechanically / electrically locked.

The systems shall be capable of stand-alone operation, and also capable of being integrated to a centralised monitoring facility. IP based Closed Circuit Television (CCTV) Systems shall be provided.

The system shall comprise:

- Network based DVR unit, rack-mounted, with sufficient recording-time for 7 days storage; over-write allowed
- Network / Power rack unit for power over ethernet to cameras
- Indoor cameras, IP based, fixed angle, in black dome housings
- Outdoor IP65 cameras, suitable for security/night vision, IP based, fixed angle, in black dome housings; all mountings, brackets and accessories
- Other particular specification parameters may apply

IP based Closed Circuit Television (CCTV) Systems shall be enabled, configured, connected, programmed and commissioned to facilitate remote log-in, monitoring and visibility of cameras by building operators / managers.

2.0 Hydraulic Services

2.1 Overview of Existing Hydraulic Services

All existing inground and above ground hydraulic services such as sanitary, trade waste, water, gas and storm water will be made redundant.

The above ground services will be removed off site. The in-ground services will likely remain but will be removed as required to suit the site works.

New hydraulic system will include the following:

- Sanitary services
- Sewer pumping station
- Domestic cold and hot water services
- Hot water plants
- Trade waste services
- Grease arrestor
- Trade waste pumping station
- Natural gas services tbc
- Rainwater system

2.2 Design Criteria

Design criteria associated with the installation are listed below.

Item	**Design Criteria**
Sanitary Plumbing and Drainage	AS/NZS 3500.2-2021
Sanitary Plumbing and Drainage	S.A Water Amendments and Regulations
Trade Waste	S.A Water Amendments and Regulations
Domestic Cold Water Reticulation	AS/NZS 3500.1- 2021
Pipe Sizing (Water)	The Institute of Plumbing Australia 'Selection and Sizing of Copper Tubes for Water Piping Systems' Parameters: • Velocity: Approximately 1.8 metres per second above ground • Velocity: Approximately 1.8 metres per second below ground • Velocity: Approximately 1.2 metres per second hot water circulating loop
Water Pressure	Parameters: • Maximum Pressure 500 kPa • Minimum Flow Pressure at most disadvantaged fixture: 150 kPa.

Item	Design Criteria
Water Isolation Points	Parameters: • Main building isolation (external isolation valve) • Group fixture isolation (in-ceiling isolation valves) • Localised fixture isolation (mini cistern cocks)
Backflow Prevention	AS/NZS 3500.1- 2021
Hot Water Temperatures	Parameters: • Maximum delivery temperature to Ablution Fixtures: 45°C (via thermostatic mixing valves) • Minimum delivery temperature to Food Preparation Area: 60-65° C. • Minimum hot water storage temperature: 60°C
Hot Water Pipe Insulation	To AS/NZS 3500.4 • External: Minimum R Value 0.6 • Internal: Minimum R Value 0.3
Pipework Testing	Parameters: • Drainage: Hydrostatic Water Test • Reticulation: Hydrostatic Water Test at 1500 kPa.
Water Efficiency (WELS Rating)	5 stars

2.3 Authorities

The South Australian Authorities linked to the developments are:

- SA Water
- APA and AGIG group
- The Office of the Technical Regulator (OTR)
- Unley City Council

2.4 Site Authority Sewer Infrastructure

The below information has been provided via email -dated 25/10/2024. Client and stakeholder direction is required to confirm the most suitable option for the project to finalise the infrastructure services connection location.

Highgate Building Re-Development

In accordance with the Water Act 2012, BCA Engineers have approached the Technical Regulator for dispensation on the technical, practical and cost merits of this development.

The OTR has rejected the application for dispensation to cross allotment boundaries.

34—Pipes must not lie across allotment boundaries

(1) Subject to this regulation, a pipe connected to any water/sewerage infrastructure must not lie across the boundary between adjoining allotments and accordingly—

(a) a person must not—

(i) lay a pipe that is, or is to be, connected to any water/sewerage infrastructure across the boundary of adjoining allotments; or

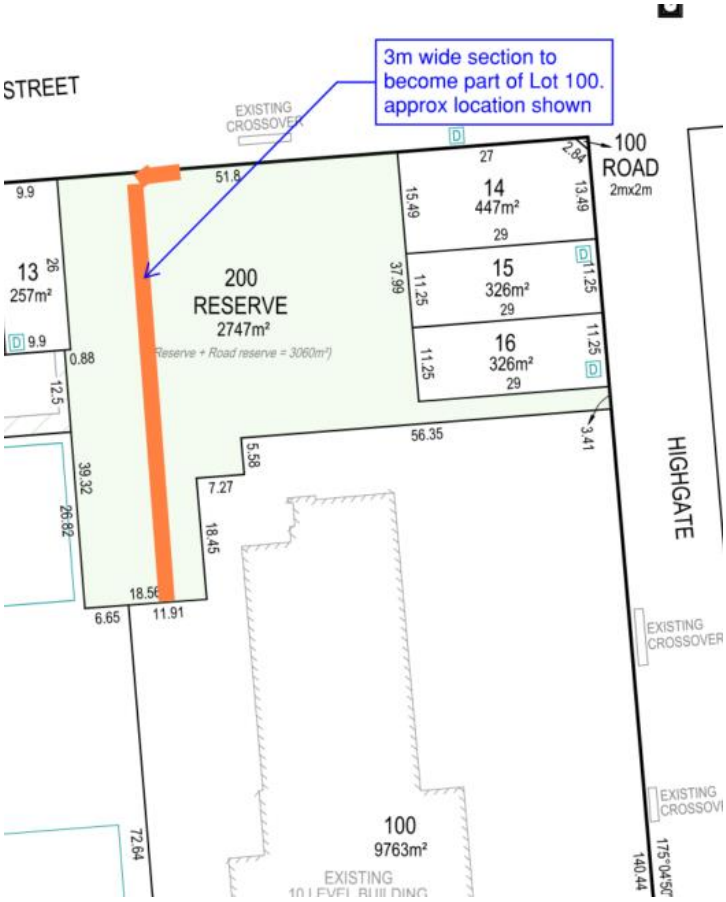
(ii) connect a pipe that has been laid across the boundary of adjoining allotments to any water/sewerage infrastructure; and

(b) if, on the division of land, the boundary of adjoining allotments intersects the line on which a pipe connected to any water/sewerage infrastructure has been laid, the owner or occupier of each allotment may be directed by the Technical Regulator or a water industry entity under this regulation to disconnect the pipe from the water/sewerage infrastructure.

In consideration of the above, we present options as follows:

Option A (amendment to Land Title 200):

Title arrangement to be modified to include a 3m (approx.) wide section of the reserve to become part of lot 100. Refer indicative sketch below



This option will allow the existing and new services located on Fisher street to service the building in Lot 100.

Option B (SA Water Authority Easement over Green Open Space):

Consider application to SA Water and Council to establish sewer extension and easement via Green Open Space.

Option C (Highgate Street Extension):

A sewer extension along Highgate St will be required from the new 150mm sewer connection on Highgate St up to the closest 225mm SA Water sewer main on Fisher St. As per WSAA code requirements.

2.5 Site Authority Water Infrastructure

Existing Infrastructure

The site is serviced via an existing 100mm Authority domestic cold-water meter off Fisher Street. Refer mark-up below.

Current SA Water regulations require a water connection to a minimum 150mm authority water main for building 4 or more storeys in height and a connection to a minimum 200mm authority water main for building 8 storeys or more.

The authority water mains available in Fisher Street and Highgate Street are both 150mm.

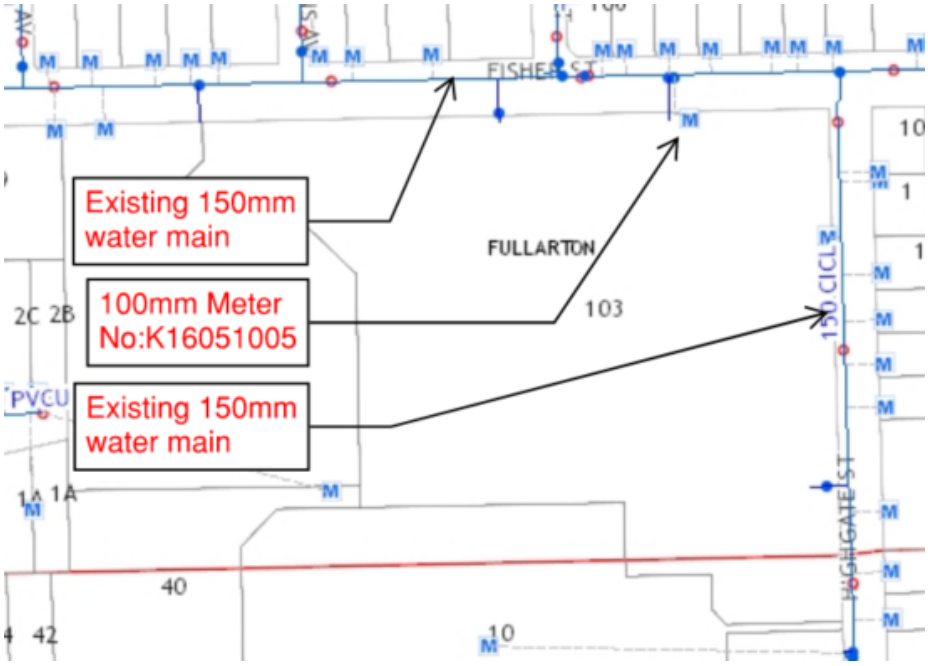


Figure 2 – Existing Authority Water Mains Infrastructure

Highgate Building Re-Development

In accordance with the Water Act 2012, BCA Engineers have approached the Technical Regulator for dispensation on the technical, practical and cost merits of this development.

The OTR has rejected the application for dispensation to cross allotment boundaries.

34—Pipes must not lie across allotment boundaries

(1) Subject to this regulation, a pipe connected to any water/sewerage infrastructure must not lie across the boundary between adjoining allotments and accordingly—

(a) a person must not—

(i) lay a pipe that is, or is to be, connected to any water/sewerage infrastructure across the boundary of adjoining allotments; or

(ii) connect a pipe that has been laid across the boundary of adjoining allotments to any water/sewerage infrastructure; and

(b) if, on the division of land, the boundary of adjoining allotments intersects the line on which a pipe connected to any water/sewerage infrastructure has been laid, the owner or occupier of each allotment may be directed by the Technical Regulator or a water industry entity under this regulation to disconnect the pipe from the water/sewerage infrastructure.

In consideration of the above, we present options as follows:

Option A (amendment to Land Title 200):

Title arrangement to be modified to include a 3m (approx.) wide section of the reserve to become part of lot 100. As per below



This option will allow the existing services (fire and domestic water) located on Fisher Street to service the building in Lot 100. The existing 100mm water meter will be fitted with a new dual RPZ backflow device to service the Opal side of the building.

A new water connection and a dual RPZ backflow device will be required to service LCA tenancy.

Note: the refurbished building new water demand for Opal and LCA is to be finalised to confirm the water meter sizes.

As a new water connection will be required this will trigger the upgrade of the water main due to the building been more than 8 storeys. The current SA Water regulations require a water connection to a minimum 150mm authority water main for building 4 or more storeys in height and a connection to a minimum 200mm authority water main for building 8 storeys or more.

Pending the final total water demand calculation for the entire building, the existing 100mm water meter may suffice. It will still need to be fitted with a dual above ground RPZ (backflow device).

Option B (SA Water Authority Easement over Green Open Space):

New water meters and backflow devices located in Lot 100 from a SA Water Authority supply crossing lot 200.

Consider application to SA Water and Council to establish water extension and easement via Green Open Space.

Current SA Water regulations require a water connection to a minimum 150mm authority water main for building 4 or more storeys in height and a connection to a minimum 200mm authority water main for building 8 storeys or more. Therefore, the existing 150m water main will need to be upgraded to 200mm up to the closest 200mm or 300mm water main which is in Fullarton road.

These has several complexities including establishing agreements for Authority Easement over Green Open Space and navigating civil excavation in vicinity of trees.

Option C (Highgate Street Extension):

New water connections, water meters and backflow devices located in Lot 100 from new connection on Highgate St.

Current SA Water regulations require a water connection to a minimum 150mm authority water main for building 4 or more storeys in height and a connection to a minimum 200mm authority water main for building 8 storeys or more. Therefore, the existing 150m water main will need to be upgraded to 200mm up to the closest 200mm or 300mm water main which is in Fullarton Road.

2.6 Site Authority Natural Gas Infrastructure

Existing Infrastructure

The site is currently services via an existing high pressure natural gas assembly located near the building. this assembly will be made redundant as not suitable for the existing building refurbishment

A second gas meter assembly was previously located of Highgate Street (identified in April 2024) but it has been removed from site (August 2024)

Highgate Building Re-Development

Opal: Confirmed as not required.

LCA: to be confirmed if required- should it be required, a new gas connection and gas meter assembly from Highgate Street will be included in the design

2.7 Opal Healthcare Sanitary Plumbing and Drainage

The sanitary drainage services design will follow the Opal Design Brief

- appendix E – OAC Foodservice Operational brief
- appendix F – OAC Laundry Operational brief

- appendix I – OAC Hydraulic Fixtures & fittings schedule V7
- Opal – Hy-01 Hydraulic & Wet Fire services technical brief – Rev 4

Scope of works:

The scope of works included, but not limited to:

- Site
  - In ground gravity 150mm sanitary pipe. Connection location TBC pending section 2.4 above outcomes
  - Traceable tape over sewer pipes
  - Coordination with other in-ground services
- Basement
  - Suspended above existing slab sanitary pipes due to the existing slab not been authorised to core/cut
  - Sanitary pumping station for the cleaner's room
  - External in ground sewer pumping station
  - External in ground sewer pumping station
  - Venting
- Ground Floor
  - Sanitary drainage
  - Fully vented modified drainage system
  - Venting
- Level 1 to Level 4
  - Sanitary drainage
  - Fully vented modified drainage system
  - Venting
  - Mechanical drainage and water supply

2.8 Opal Healthcare Water Services

The domestic water services design will follow the Opal Design Brief

- appendix E – OAC Foodservice Operational brief
- appendix F – OAC Laundry Operational brief
- appendix I – OAC Hydraulic Fixtures & fittings schedule V7
- Opal – Hy-01 Hydraulic & Wet Fire services technical brief – Rev 4

The scope of works included, but not limited to:

- Site
  - Water supply from authority connection point via water meter and dual backflow devices
  - Traceable tape over sewer pipes
  - Coordination with other in-ground services
- Basement
  - Flow and return hot water system
  - Domestic cold and hot water supply to all fixtures.
  - Isolation valves to isolate group of fixtures
  - Backflow devices as required
- Ground Floor
  - Flow and return hot water system
  - Heat pump hot water system for kitchen, laundry, residents' amenities and all other fixtures
  - Water pipes for LCA supply
  - Backflow devices as required
- Level 1 to Level 4
  - Flow and return hot water system
  - Water pipes for LCA supply

2.9 Opal Healthcare Natural Gas

- Not required

2.10 Opal Healthcare Trade Waste

The scope of works included, but not limited to:

- Site
  - External in ground trade waste pumping station
  - Grease arrestor
- Basement
  - Suspended above existing slab trade waste pipe due to the existing slab not been authorised to core/cut
  - Above ground channel and/or cooling pit located behind the commercial washing machine. SA Water to confirm final requirement to complete channel and pit sizing and impact on the raised slab height
  - Floor waste, bucket trap in the laundry and commercial kitchen
  - Venting
- Ground floor, Level 1 to Level 4
  - Trade waste system
  - Venting

2.11 Opal Healthcare Stormwater

The scope of works included, but not limited to:

- Site
  - Connection of above ground rainwater down pipes to site storm water system
- Basement
  - By Civil team
- Ground floor, Level 1 to Level 4
  - Roof catchment down pipes system including 100% capacity overflow system
  - Balconies catchment down pipes system

2.12 Living Choice Australia Sanitary Plumbing and Drainage

The scope of works included, but not limited to:

- Site
  - In ground gravity 150mm sanitary pipe. Connection location TBC pending section 2.4 above outcomes
  - Traceable tape over sewer pipes
  - Coordination with other in-ground services
- Basement
  - None
- Ground Floor
  - Sanitary drainage
  - Fully vented modified drainage system
  - Venting
- Level 5 to Level 9
  - Sanitary drainage
  - Fully vented modified drainage system
  - Venting
- Roof
  - Venting

2.13 Living Choice Australia Water Services

The scope of works included, but not limited to:

- Site
  - Water supply from authority connection point via water meter and dual backflow devices
  - Traceable tape over sewer pipes
  - Coordination with other in-ground services
- Basement
  - Cold water pipe reticulation
- Ground Floor
  - Flow and return hot water system
  - Water supply to swimming pool completed with backflow device
- Level 5 to Level 9
  - Flow and return hot water system
  - Sub water meters TBC
- Roof
  - Header tanks and associated dual pump set
  - Heat pump hot water system servicing all appartements (L5 to L9)
  - Water points for PV panels wash down
  - Backflow devices as required

2.14 Living Choice Australia Natural Gas

- Natural gas supply for the pool heating – tbc if required

2.15 Living Choice Australia Trade Waste

- Not required

2.16 Living Choice Australia Stormwater

The scope of works included, but not limited to:

- Site
  - Connection of above ground rainwater down pipes to site storm water system
- Basement
- none
- Ground floor, Level 5 to Level 9
  - Roof catchment down pipes system including 100% capacity overflow system
  - Balconies catchment down pipes system
- Roof
  - Roof catchment system
  - Box gutters completed with overflow systems

3.0 Fire Protection Services

3.1 Overview of Fire Protection Services

Highgate Building Redevelopment - Opal & LCA

Given the existing building has effective building height of more than 25m, the NCC will require the following fire protection systems:

- Site water infrastructure - Dual water supply
  - Two fire connections or combination of fire tanks and a fire connection
- Fire pumps and tanks
  - One duty and one standby diesel fire pumpsets
  - Two fire tanks, size subject to final town main connections and SA Water/SAMFS approval
  - (Fire tanks may be omitted, subject to SA Water in-line pumping approval and fire brigade approval)
- Combined fire hydrant and sprinkler system
- Fire hose reel system
- Fire detection and alarm system
- Fire extinguishers
- Smoke hazard management system – zone smoke control and stair pressurisation systems to be undertaken in mechanical scope incorporating building fire strategy

Apartment Building Development – 5 Levels

Given the building is greater than 4 storeys the NCC will require the following fire protection system, as follows:

- Site water infrastructure - Single fire connection
- Fire pumps and tanks
  - One duty and one standby diesel fire pumpsets
  - Two fire tanks, size subject to final town main connections and SA Water/SAMFS approval
  - (Fire tanks may be omitted, subject to SA Water in-line pumping approval and fire brigade approval)
- Combined fire hydrant and sprinkler system
- Fire hose reel system
- Fire detection and alarm system
- Fire extinguishers

Townhouses (2 Levels)

Assuming townhouses to be classified as Class 1 building, as such there will be no fire protection system requirements.

3.2 Codes and Standards

AS 1530-2018	Methods for fire tests on building materials, components and structures	
AS/NZS 1668	The use of ventilation and air conditioning in buildings.	
	Part 1 (2015)	Fire and smoke control in multi-compartment buildings.
	Part 2 (2012)	Mechanical ventilation for acceptable indoor-air quality
AS 1670	Fire detection, warning, control and intercom systems - Systems design, installation and commissioning.	
	Part 1 (2018)	Fire
	Part 4 (2018)	Sound systems and intercom systems for emergency purposes.

AS/NZSA 1905	Components for the protection of openings in fire-resistant walls	
	Part 1 (2015)	Fire-resistant doorsets
	Part 2 (2005)	Fire-resistant roller shutters
AS 2118	Automatic fire sprinkler systems	
	Part 1 (2017)	General requirements
	Part 2 (2010)	Drencher Systems
	Part 4 (2012)	Residential
	Part 6 (2012)	Combined sprinkler and hydrant
	Part 9 (1995)	Piping Support and Installation
	Part 10 (1995)	Approval Documentation
AS 2419	Fire hydrant installations	
	Part 1 (2021)	System design, installation and commissioning
AS 2441-2015	Installation of fire hose reels	
AS 2444-2001	Portable fire extinguishers and fire blankets - Selection and location	
AS 7240-2018	Fire Detection and Alarm Systems *replacing AS4428*	
AS 4428-2020	Fire detection, warning, control and intercom systems - Control and indicating equipment	

3.3 Site Fire Water Infrastructure

Existing Conditions

The existing premise is served via two (2) fire connections.

Fisher Street

- Existing 100mm dia. fire water connection
- Backflow assembly is non-compliant and located underground
- Connection currently serves an onsite feed hydrant and fire transfer tanks in the Highgate Building

Highgate Street

- Existing 150mm dia. fire water connection
- Compliant backflow assembly incorporated in the booster cabinet
- Connection currently serves the Highgate building Combined Fire Hydrant & Sprinkler system

As mentioned under the Water Infrastructure Section above, current edition of SA Water Standards & Regulations requires a water connection from a minimum 150mm dia Town Main for buildings of 4 storeys or more in height, and a water connection from a minimum 200mm dia Town Main for buildings of 8 storeys or more in height.

This applies to both domestic water connections and fire water connections.

The Authority Town Mains available in Fisher Street and Highgate Street are both only 150mm.

Highgate Building Redevelopment - Opal & LCA

Retain the existing 100mm fire connection on Fisher Street and the 150mm fire connection on Highgate Street. A portion of the land adjacent to Fisher St is to be council land, however there are existing fire, water and sewer connection, and associated underground pipe reticulating through the future council land. **Land title management agreement or authority easement are required to be undertaken by client to ensure the existing connections can be reticulated through the future council land.**

Note: Remains subject to title arrangements and detailed design, including discussions with Private Certifier and SAMFS. The existing fire water infrastructure does not comply with current standards. Larger tanks and pumps are required to provide a compliant “dual supply” arrangement to the site. New fire connection/s may be required as part of this compliant arrangement.

Highgate Building Fire Water Infrastructure Risks

The existing fire water infrastructure may not comply with current standards. New fire connection/s may be required as part of this compliant arrangement. This subsequently may trigger an infrastructure upgrade to 200mm, if a new fire connections are required.

The infrastructure upgrade could consist of upgrading approximately 500 metres of pipework at an indicative cost of from $1000/m equivalent to approx. $500K.

If an upgrade is required to street water mains for either Hydraulic Infrastructure OR for Fire Infrastructure, it is the same asset and the upgrade would only occur once.

Also, construction of Fire Water infrastructure in Green Open Space realms remain to be determined.

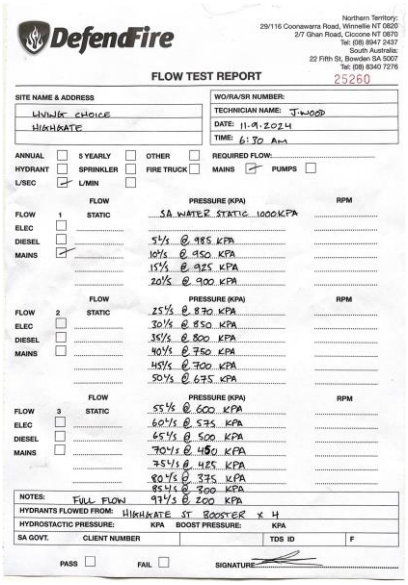
Apartment Building Development

New 150mm fire connection proposed from new public road adjacent development or via Fisher Street.

Existing Town Main Capacity

Based on SA Water Flow test result dated 12/9/24, existing town main in Fisher Street can provide 44L/s.

Based on Defend Fire Flow test results dated 11/9/24, the existing town main in Highgate Street can provide 97L/s.



DefendFire

Northern Territory:
29/116 Coonawarra Road, Winnellie NT 0820
2/7 Ghan Road, Alice Springs NT 0870
Tel: (08) 8947 2437
South Australia:
22 Fifth St, Bowden SA 5007
Tel: (08) 8340 7276

FLOW TEST REPORT 25260

SITE NAME & ADDRESS: LIVING CHOICE HIGHGATE

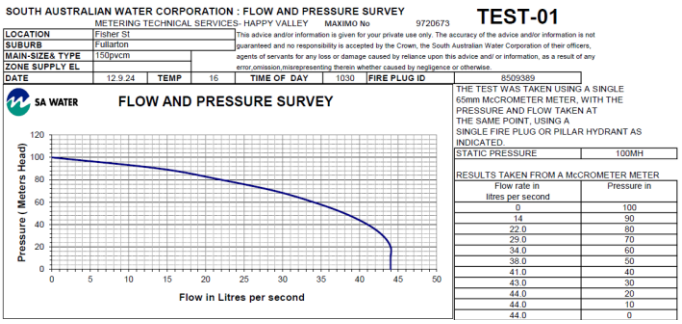
WO/RA/SR NUMBER:
TECHNICIAN NAME: J-WOOD
DATE: 11.9.2024
TIME: 6:30 AM

ANNUAL ☐ 5 YEARLY ☐ OTHER ☐ REQUIRED FLOW:
HYDRANT ☐ SPRINKLER ☐ FIRE TRUCK ☐ MAINS ☑ PUMPS ☐
L/SEC ☑ L/MIN ☐

		FLOW	PRESSURE (KPA)	RPM
FLOW	1	STATIC	SA WATER STATIC 1000KPA	
ELEC	☐			
DIESEL	☐		5½ @ 985 KPA	
MAINS	☑		10½ @ 950 KPA	
			15½ @ 925 KPA	
			20½ @ 900 KPA	
FLOW	2	STATIC	25½ @ 870 KPA	
ELEC	☐		30½ @ 850 KPA	
DIESEL	☐		36½ @ 800 KPA	
MAINS	☐		40½ @ 750 KPA	
			45½ @ 700 KPA	
			50½ @ 675 KPA	
FLOW	3	STATIC	55½ @ 600 KPA	
ELEC	☐		60½ @ 575 KPA	
DIESEL	☐		65½ @ 500 KPA	
MAINS	☐		70½ @ 450 KPA	
			75½ @ 425 KPA	
			80½ @ 375 KPA	
			85½ @ 300 KPA	
			97½ @ 200 KPA	

NOTES: FULL FLOW
HYDRANTS FLOWED FROM: HIGHGATE ST BOOSTER x 4
HYDROSTACTIC PRESSURE: KPA BOOST PRESSURE: KPA
SA GOVT. CLIENT NUMBER TDS ID F

PASS ☐ FAIL ☐ SIGNATURE



SOUTH AUSTRALIAN WATER CORPORATION : FLOW AND PRESSURE SURVEY
METERING TECHNICAL SERVICES- HAPPY VALLEY MAXIMO No 9720673

TEST-01

LOCATION	Fisher St
SUBURB	Fullarton
MAIN-SIZE& TYPE	150pvcm
ZONE SUPPLY EL	
DATE	12.9.24
TEMP	16
TIME OF DAY	1030
FIRE PLUG ID	8509389

This advice and/or information is given for your private use only. The accuracy of the advice and/or information is not guaranteed and no responsibility is accepted by the Crown, the South Australian Water Corporation of their officers, agents of servants for any loss or damage caused by reliance upon this advice and/or information, as a result of any error,omission,misrepresenting therein whether caused by negligence or otherwise.

SA WATER FLOW AND PRESSURE SURVEY

Pressure (Meters Head)
Flow in Litres per second

THE TEST WAS TAKEN USING A SINGLE 65mm McCROMETER METER, WITH THE PRESSURE AND FLOW TAKEN AT THE SAME POINT, USING A SINGLE FIRE PLUG OR PILLAR HYDRANT AS INDICATED.

STATIC PRESSURE	100MH

RESULTS TAKEN FROM A McCROMETER METER

Flow rate in litres per second	Pressure in
0	100
14	90
22.0	80
29.0	70
34.0	60
38.0	50
41.0	40
43.0	30
44.0	20
44.0	10
44.0	0

3.4 Fire pumps and tanks

Highgate Building Redevelopment - Opal & LCA

Based on high level assumption, the combined fire hydrant (20L/s) and sprinkler (Ordinary Hazard 3, 18L/s) demand will be approximately 38L/s.

On this basis, we are proposing to apply for direct draw pump (in-line pumping) to omit the requirement of fire tanks, subject to SA Water approval and fire brigade acceptance.

Proposed new 2-off diesel fire pumps to be located at basement and provided with a direct access from ground floor via existing fire stair, final fire compartmentation to suit new fire pump room. Final pump duties to be confirmed with the fire hydrant and sprinkler system demand, and to allow for town main degradation.

Apartment Building Development

Based on high level assumption, the combined fire hydrant (20L/s) and sprinkler (Ordinary Hazard 3, 18L/s) demand will be approximately 38L/s.

On this basis, we are proposing to apply for direct draw pump (in-line pumping) to omit the requirement of fire tanks, subject to SA Water approval and fire brigade acceptance.

Proposed new 2-off diesel fire pumps to be located at basement and provided with a direct access from ground floor via existing fire stair, final fire compartmentation to suit new fire pump room. Final pump duties to be confirmed with the fire hydrant and sprinkler system demand, and to allow for town main degradation.

3.5 Combined Fire Hydrant and Sprinkler Booster

Highgate Building Redevelopment - Opal & LCA

Utilise existing combined fire hydrant and sprinkler booster located adjacent to Highgate Street. Modify to suit new proposed arrangements to meet the overall combined fire hydrant and sprinkler demand including replace existing cabinet to make new.

Apartment Building Development

New combined fire hydrant and sprinkler booster to be in an area easily accessible by fire brigade. Final location to be confirmed with new building layout and to be discussed with fire brigade. Final configuration of the new combined fire hydrant and sprinkler booster to be confirmed with final demand.

3.6 Fire Hydrant System

Highgate Building Redevelopment - Opal & LCA

Provision of external fire hydrants at ground floor and internal hydrants within fire isolated stairs to serve higher level to provide fire hydrant coverage throughout the buildings in accordance with AS2419.1.

Fire hydrant demand in a sprinkler protected building is maximum of 20L/s.

Apartment Building Development

Provision of external fire hydrants at ground floor and internal hydrants within fire isolated stairs to serve higher level to provide fire hydrant coverage throughout the buildings in accordance with AS2419.1.

Fire hydrant demand in a sprinkler protected building is maximum of 20L/s.

3.7 Fire Sprinkler System

Highgate Building Redevelopment - Opal & LCA & Apartment Building Development

Provision of fast response fire sprinklers throughout the buildings including concealed space in accordance with AS2118.1. Wards and SOUs to be provided with residential sprinklers.

Fire sprinklers demand are as follows:

Areas	Sprinkler Hazard Classification	Demand (L/s)
Apartments and wards	Residential Light Hazard	Approximately 7L/s to meet 4.1mm/min design density
Offices and consultations	Light Hazard	Approximately 7L/s to meet minimum 70kPa
Carpark	Ordinary Hazard 1	6
Plantroom	Ordinary Hazard 2	12
Public space, assembly space	Ordinary Hazard 3	18

Apartment Building Development

Provision of fast response fire sprinklers throughout the buildings including concealed space in accordance with AS2118.1. SOUs to be provided with residential sprinklers.

Fire sprinklers demand are as follows:

Areas	Sprinkler Hazard Classification	Demand (L/s)
Apartments	Residential Light Hazard	Approximately 7L/s to meet 4.1mm/min design density
Carpark	Ordinary Hazard 1	6
Plantroom	Ordinary Hazard 2	12
Public space, assembly space	Ordinary Hazard 3	18

3.8 Fire Hose Reel System

Highgate Building Redevelopment - Opal & LCA

Fire hose reel system is only applicable at carpark and plantroom areas only and proposed to be served from combined fire hydrant and sprinkler system in accordance with AS2444.

Class 2 (apartments) and Class 9c (aged care) do not require fire hose reels in accordance with NCC E1D3.

Apartment Building Development

Fire hose reel system is only applicable at carpark and plantroom areas only and proposed to be served from combined fire hydrant and sprinkler system in accordance with AS2444.

Class 2 (apartments) do not require fire hose reels in accordance with NCC E1D3.

3.9 Fire Detection and Alarm System

Highgate Building Redevelopment - Opal & LCA

The existing building is more than 25m effective height, as such the proposed fire detection and alarm systems for the Highgate Building are as follows:

- Proposed 1-off Fire Indicator Panel and 1-off Emergency Warning Intercom System (EWIS) panel
    - Final configuration to be confirmed with OPAL/LCA and fire brigade
- Proposed to incorporate 180s alarm delay facility in the apartments
- Smoke detectors throughout the building in accordance with AS1670.1 and NCC Specification 20
- Concealed space smoke detectors and thermal detectors to be omitted with the installation of fire sprinklers, to be confirmed with certifier and fire brigade
- Manual call points and warden intercom phones to be installed adjacent to the fire isolated stairs and within each smoke compartment in accordance with AS1670.1 and AS1670.4
- EWIS speakers throughout the building in accordance with AS1670.4
- Fire system to interface with security system – secured doors and mechanical system - stair pressurisation system, zone smoke control and air handling shutdown

Apartment Building Development

The proposed building is not more than 25m effective height, as such the proposed fire detection and alarm systems for the Apartment Building are as follows:

- Proposed 1-off Fire Indicator Panels and 1-off Emergency Warning System (EWS) panels
    - Final configuration to be confirmed with LCA and fire brigade
- Proposed to incorporate 180s alarm delay facility in the apartments
- Smoke detectors throughout the building in accordance with AS1670.1 and NCC Specification 20
- Concealed space smoke detectors and thermal detectors to be omitted with the installation of fire sprinklers, to be confirmed with certifier and fire brigade
- EWS speakers throughout the building in accordance with AS1670.4

3.10 Fire Extinguisher

Highgate Building Redevelopment - Opal & LCA

Provision of fire extinguishers and fire blanket in accordance with AS2444 requirements throughout the building, except in the Class 2 Sole Occupancy Units (SOUs).

Apartment Building Development

Provision of fire extinguishers and fire blanket in accordance with AS2444 requirements throughout the building, except in the Class 2 Sole Occupancy Units (SOUs).

3.11 Smoke hazard management system

Highgate Building Redevelopment - Opal & LCA

Upon activation of fire alarm, smoke hazard management system to be activated including stair pressurisation system, zone smoke control system and shutdown of air handling system. Final detailed design to be confirmed with mechanical engineer, certifier and client.

4.0 Mechanical Services

4.1 Overview of Mechanical Services

4.1.1 General

Smoke Hazard Management

The NCC requires that the building be provided with stairwell pressurisation systems. Stairwell pressurisation systems provide positive pressurisation between the fire isolated egress stairs and fire affected floors to ensure smoke does not compromised exit pathways. Each stairwell will be provided with stairwell pressurisation system and relief air system. Both systems will include roof mounted fans and dedicated stairwell pressurisation ductwork and relief air ductwork droppers extending from the roof to ground floor ceiling level.

Pending additional commentary from the project certifier smoke exhaust systems may be required to serve the Opal floors due to the classification of the building. Currently dedicated risers are shown per smoke compartment for the Opal floors. We understand pending the certifier's advice that these systems may be able to be removed through a Fire Engineering Performance Solution.

4.1.2 Opal

Typical Resident Rooms

Each Resident Room is proposed to be provided with bulkhead type ducted air conditioning systems located above the entry to each room. Conditioned supply air will be supplied to the space via a linear bar grille in the vertical face of the entry bulkhead, and return air returned to the unit via an eggcrate type grille with washable filter in the underside of the bulkhead. These systems are to be connected to heat recovery variable refrigerant flow condenser located in dedicate plant areas in close proximity to the rooms. The systems will be sized to comply with AS 5149 to ensure the refrigerant concentration limits do not trigger the requirement for refrigerant leak detection.

Outside air to each resident room will be served by common outside air supply fans. These fans will incorporate filter panels for removal of contaminates and be directly connected to the return air plenums of the bulkhead ducted air conditioning systems.

Each of the resident amenities will be served by common toilet exhaust ventilation systems. In compliance with the OPAL brief each individual resident room will include a toilet exhaust 'boost' fan connected to the lighting in the resident amenities.

Typical Resident Corridors

The resident corridors are proposed to be served by ceiling concealed cassette type air conditioning systems. We note this is a departure from the Opal brief, however we note there are significant restrictions in ceiling height due to the low floor-to-floor of the existing building which do not allow for ducted air conditioning to the corridors.

Outside air to these systems will be provided via the common outside air supply systems.

Typical Common Spaces

The larger common spaces are to be provided with ducted type air conditioning systems. The main body of the ducted air conditioning system systems are to be housed above the offices and amenities to allow for reduced ceiling heights to fit the mechanical systems. Conditioned supply air will be provided to the spaces served via swirl type ceiling diffusers or linear type diffusers where applicable. Return air will be returned to the unit via ceiling mounted eggcrate grilles. These systems are to be connected to heat recovery variable refrigerant flow condenser located in dedicate plant areas.

It is proposed that the larger ducted systems serving areas with high occupancies are provided with outside air modulation via in space CO2 sensing to provide a reduction in energy usage. This allows for the amount of outside air introduced into the spaces to be variable and trend in-line with the real time usage of the spaces.

Typical Offices

Offices and other small spaces are proposed to be served by compact / standard ceiling concealed cassette type air conditioning systems. These systems are to be connected to heat recovery variable refrigerant flow condenser located in dedicate plant areas in close proximity to the rooms. The systems will be sized to comply with AS 5149 to ensure the refrigerant concentration limits do not trigger the requirement for refrigerant leak detection.

Outside air is proposed to be provide via dedicated outside air systems to each space, ensuring that outside air is only provided when the space is occupied.

Commercial Kitchen

The commercial kitchen is to be provided with a proprietary engineered kitchen exhaust rangehood of Ecocanopy manufacture (in-line with the Opal requirements). The hood is to be provided with both exhaust and supply air connections, facilitating for lower exhaust rates to be utilised than the minimum prescribed by AS 1668.2. The exhaust from this kitchen is to reticulate to the roof of the building where it will be exhausted vertically. The supply air to the hood is to be provided via indirect evaporative air conditioning systems which will provide conditioned air to the hood.

The kitchen generally is to be provided with a ducted type air conditioning system allowing for both cooling and heating of the kitchen space. The condensers for these systems are to be located wall mounted in the car park .

It is understood the commercial dishwasher will incorporate a proprietary ‘vapour recovery’ system eliminating the requirement for a dedicated dishwasher exhaust system. If the dishwasher selection is to change then an exhaust system will be required.

Commercial Laundry

The commercial laundry is to be provided with ducted type air conditioning systems. The Clean and Dirty sides will be provided with dedicated systems noting their differences in heat loads, and will have condensing units wall mounted within the car park.

General laundry exhaust systems are to be located in both the Clean and Dirty sides of the laundry providing general ventilation of the spaces.

The exhaust flues from the dryers are to be manifolded to form a single flue and are to reticulate to a dedicated exhaust on the roof of the building. A lint filter is to be located in this ductwork within the laundry space to allow for the removal of dust and lint from the exhaust system.

4.1.3 LCA

Typical Apartments Rooms

The LCA apartments generally are to be provided with one-to-one reverse cycle split ducted air conditioning systems. Air cooled condensing units are typically proposed to be located locally within dedicated plant areas on each floor. The condensing units to the top floor are proposed to be located on the roof on dedicated roof platforms.

Conditioned supply is proposed to be provided to each space via side wall type double deflection / linear bar grilles mounted in the vertical faces of ceiling bulkheads. Return air to each unit will be via eggcrate grilles located near the entry to each apartment. Apartments with two or more bedrooms are to be provided with

'zone control' to the ducted air conditioning systems, allowing for air flow rooms to be varied in response to occupancy. The capacity of the proposed air conditioning systems are selected upon 'Day / Night' zoning of the apartments. This describes systems which are sized to match the cooling requirements of rooms which are typically occupied during daylight hours, ie. lounges, kitchens, dining areas and exclude areas such as bedrooms. This is typical for apartment projects of this nature and is designed to minimise mechanical capital and on-going operational costs.

Outside air to each apartment will be provided via natural ventilation in accordance with NCC F4D6 via operable doors and windows.

Amenities areas in each apartment are to be served by dedicated toilet exhaust systems. These systems will discharge the air to the ambient environment via wall mounted grilles in the balcony areas.

The kitchen rangehoods will include rigid ductwork and discharge grilles at the facades of each apartment. It is required that reputable kitchen rangehoods be installed with appropriate external static pressure on the in-built proprietary fan to eliminate the requirement for additional in-line boost fans.

Car Park

The car park is to include a car park exhaust and car park make up air supply system. The carpark exhaust system will include ductwork reticulated around the semi perimeter of the car park with ductwork reticulating up the building riser to be discharged at roof level. Make up air is to be provide on the opposite semi perimeter of the car park with intake fan located at roof level. The flow rates of the fans are to be controlled by a car park exhaust control system and modulate fan speed in response to carbon monoxide concentrations within the car park.

The bin areas in the car park are to be provided with dedicated general exhaust systems reticulating to the ground floor ceiling space to be discharged horizontally from the building.

4.2 Codes and Standards

General

The Mechanical Services Installation shall comply with the relevant rules and requirements as follows;

AS 1170.4	Structural Design Actions Part 4: Earthquake actions in Australia
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS 1324	Air filters for use in general ventilation and air conditioning Part 1 Application, performance and construction Part 2 Methods of test
AS 1345	Identification of the contents of pipes, conduits and ducts
AS 1530	Methods for fire tests on building materials, components and structures
AS1571	Copper –Seamless tubes for air conditioning and refrigeration
AS/NZS 1668	The use of ventilation and air conditioning in buildings Part 1 Fire and smoke control in multi-compartment buildings Part 2 Mechanical ventilation for acceptable indoor-air quality
AS 1682	Fire Dampers Part 1 Specification Part 2 Installation
AS2107	Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors
AS 2670	Evaluation of human exposure to whole body vibration

AS 2913-2000	Evaporative air-conditioning equipment
AS/NZS 3000	Electrical Installations
AS 3500	Plumbing and drainage standard Part 1, 2 and 4
AS/NZS 3666	Air handling and water systems of buildings – Microbial control
AS/NZS 3823.1.2	Performance of electrical appliances – Airconditioners and heat pumps – Test methods – Ducted airconditioners and air-to-air heat pumps – Testing and rating for performance
AS 4041	Pressure Piping
AS 4254.1-2021	Ductwork for air-handling systems in buildings Part 1: Flexible duct
AS 4254.2-2012	Ductwork for air-handling systems in buildings Part 2: Rigid duct
AS 4426	Thermal insulation of pipework, ductwork and equipment – Selection, installation and finish
AS4508	Thermal resistance of insulation for ductwork used in building air conditioning
AS/NZS 4859.1	Materials for the thermal insulation of buildings
AS/NZS 5149	Refrigerating System and Heat Pumps – Safety and Environmental Requirements Part 1 Definitions, Classification and Selection Criteria Part 2 Design, Construction, Testing, Marking and Documentation
AS 5601	Gas installations
HB32	Control of microbial growth in air handling and water systems of buildings
ASHRAE	Guidelines 1-5
SMACNA	Sheet metal and air conditioning contractor's association guidelines

Plant Access

Fixed platforms, walkways, stairways and ladders – Design, construction and installation (SAA Code for Fixed Platforms, Walkways, Stairways and Ladders): AS 1657

Fire Penetrations

AS 1530	Methods for fire tests on building materials, components and structures
AS 4072	Components for the protection of openings in fire resistant separating elements

4.3 Design Criteria

4.3.1 Internal design conditions schedule

Area Served	Internal Design Conditions			Normal Operating Hours	Design Maximum Sound Pressure Level from Mechanical Services (dB(A))
	Summer °C DB	Winter °C DB	% RH		
Opal – Common Areas	23 ± 1	21 ± 1	(A)	8am to 10pm	45
Opal – Kitchen & Laundry	26 ± 1	19 ± 1	(A)	8am to 5pm	45
Opal – Resident Bedrooms	23 ± 1	21 ± 1	(A)	24hrs	45
Opal – General Living Corridors	23 ± 1	21 ± 1	(A)	24hrs	45
LCA - Apartment Bedrooms & Living	23 ± 1	21 ± 1	(A)	24hrs	45
LCA - Corridors / Lift Lobby	-	-	(B)	24hrs	55
Amenities	-	-	(B)	24hrs	55

Key

(A) Denotes no direct humidity control will be provided however inherent psychrometric characteristics will generally limit relative humidity to below 65% under most operating conditions.

(B) Denotes no form of heating will be provided.

4.3.2 Internal Load Allowance Schedule

Area Served	Design Equipment Load W/m²	Design Lighting Load W/m²	Design Occupancy (likely to be sustained over 30 minutes or more)	Minimum Outdoor Air l/s Per Person
Opal – Common Areas	15	10	(1)	7.5 L/s (3)
Opal – Kitchen & Laundry	25	10	Kitchen – 8 People Laundry – 5 People	10 L/s (2)
Opal – Resident Bedrooms	25	10	1 Person	10 L/s (2) (20 L/s total will be provided to balance exh.)
Opal – General Living Corridors	15	10	(1)	10 L/s (2)
LCA - Apartment Bedrooms & Living	10	10	(1)	- (4)

Key

(1) Denotes occupancy rate derived from AS/NZS 1668.2 Table A1 for assumed Occupancy Type
(2) Denotes minimum Outside Air Rate provided via Mechanical Ventilation in accordance with AS/NZS 1668.2 Table A1
(3) Denotes minimum Outside Air Rate reduced from AS/NZS 1668.2 Table A1 requirements, based on:
a. Provision of recirculating air handling system(s) with minimum Filtration Efficiency for particulate removal meeting calculated requirement from AS/NZS 1668.2 Section 2.5
b. Indoor temperatures within zone or area served not to exceed 27°C DB during normal use
(4) Denotes no Mechanical Outside Air Ventilation will be provided. Space to be provided with natural ventilation openings (operable windows) meeting NCC F6D7

4.3.3 Outdoor design conditions schedule

External ambient conditions for selection of air conditioning plant cooling/heating capacities, to achieve "Internal Design Conditions" above

Summer: 39.2°C DB, 21.2°C WB (together with most adverse combination of external solar loading)

Winter: 4.2°C DB

The above criteria is based on AIRAH design conditions for Adelaide SA (Comfort or non-critical processes)

Extreme ambient conditions under which all plant shall remain operational:

Summer: 45.0°C DB, 22.0°C WB

Winter: 0.0°C DB

5.0 Vertical Transportation Services

5.1 Overview of Vertical Transportation Services

Lifts to be provided within the existing lift shaft construction, facilitating total of three (3) new lifts for OHC. LCA lifts proposed to reuse existing where suitable and modernise equipment and refresh internal finishes.

5.2 Codes and Standards

- AS 1735 (particularly AS 1735.11 and AS 1735.12)
- NCC BCA 2022
- AS/NZS 3000
- AS/NZS 3008.1
- AS/NZS 60529
- AS/NZS 61000
- AS/NZS 1428

5.3 Design Objectives and Principals

The proposed lift(s) shall be sized to comply with the requirements of the NCC BCA 2022 and AS1735.12.

The proposed lift(s) shall be Machine Roomless and space efficient.

Car operating panels shall include Braille option for those vision impaired users.

Easily accessible from facility main entry and all floors, including basement carpark.

Operational 24 hours a day.

The proposed lifts shall be centrally located, arranged in duplex.

Opal Health Care specific design requirements:

A larger hospital size lift shall be discussed per facility. OAC (Opal Aged Care) to confirm requirements and approval. Minimum car size: 1700mm wide x 2300mm deep x 2300mm high

A single through-car hospital size lift shall be explored as a possible option where viable

The lift car materials shall be chosen to be durable against scratches and bumps, be easy to clean and easy to maintain. All interior finishes are to be approved and coordinated with the architect, interior designer and lead project managers.

Soft illumination shall be provided to create harmony with the proposed foyer illumination.

Various door configurations to be considered as per each facility design (i.e.: dual front and rear doors, front doors only, etc.).

All lifts to be suitable for dual passenger and service functions.

5.4 Lift Design Criteria

Living Choice:
Reuse of existing lifts, where is suitable condition. Existing dimensions of car sizes and doorways to be retained.

New lighting and communications compliant with latest NCC.

Opal Health Care:

Drive System:	Variable Voltage / Variable Frequency
Machine type:	Gearless. All motors shall be suitable for intensive duty with a minimum rating of 240 starts per hour.
Machine location:	Within shaft

Operating Voltage:	Three phase 400/415V
Rated Load (min.):	2000 kg (26 Passengers)
Rated Speed:	1.0 m/s
Lift Car Size (min.):	1700mmW x 2300mmD
Lift Shaft Dimensions (min.):	2800mmW x 3000mmD
Entrance Type:	Single Entry (BOH entrance & resident area entrance on different levels)
Clear Door Size (min.):	1300mmW x 2100mmH
Door Type:	Centre opening doors
Additional:	- Security (encrypted) Swipe Card/ Keypad within COP on BOH side of car. - CCTV - Battery Backup - Regenerative Drive - Cellular Gateway with SIM and 12 months sim/data charges - Remote elevator monitoring - Pulse monitoring of belts - GPO in lift car for cleaners service

The internal lift car noise level shall not exceed 58 dBA whilst the lift is running at rated speed with shaft ventilation operational assuming a base noise level of 47 dBA within lift lobbies.

The lift lobby noise level shall not exceed 55dBA whilst the lift is running at rated speed and be measured 1m from landing doors at a height of 1.6m assuming a base noise level of 47 dBA. Airborne noise measured from the lift lobby shall not exceed 55 dBA based on a 45 dBA ambient noise level.

The completed installation shall at all times maintain the following performance requirements. Ride quality parameters shall be measured to the following detail and generally in accordance with standard ISO 18738, unless stated to the contrary herein.

Parameter	Method of calculation	Value
Maximum and A95 acceleration and deceleration rate.	10 Hz low pass filter	0.6 to 0.8 m/s²
Maximum jerk (rate of change of acceleration and deceleration).	In the frequency range of 0 to 4 Hertz	1 to 3 m/s³ peak
Maximum horizontal vibration inside lift car measured both front to rear and side to side.	Weighted in accordance with ISO 8041	0.100 m/s² peak to peak
A95 horizontal vibration inside lift car measured both front to rear and side to side.	Weighted in accordance with ISO 8041	0.060 m/s² peak to peak
Maximum vertical vibration inside lift car.	Weighted in accordance with ISO 8041, excluding jerk zones of 0.4 m/ s³ or more	0.120 m/s² peak to peak
A95 vertical vibration inside lift car.	Weighted in accordance with ISO 8041, excluding jerk zones of 0.4 m/ s³ or more	0.080 m/s² peak to peak
Maximum vertical vibration inside lift car.	Weighted in accordance with ISO 8041, including jerk zones of 0.4 m/ s³ or more	0.250 m/s² peak to peak
Maximum velocity.	Integration of measured acceleration	Plus or minus 5% of contract speed
V95 velocity.	Between 95% of maximum velocity during acceleration and deceleration	Plus 5% or minus 7% of contract speed
Floor levelling accuracy.	Direct measurement	Plus or minus 6 mm under all load conditions.
Maximum discrepancy for brake to brake times for travel up and down between the same floors under same load conditions.	Direct measurement	One (1) second
Maximum discrepancy for door open to door open times for travel up and down between the same floors under same load conditions.	Direct measurement	One (1) second

Parameter	Method of calculation	Value
Door Closing Time.	Direct measurement	2.5 to 3.0 seconds
Door Opening Time.	Direct measurement	2.0 to 2.5 seconds
Door Pre-opening Time (time from door commencing to open until lift stopped at floor level)	Direct measurement	1.0 to 1.2 seconds
Door dwell times.	Direct measurement	Adjustable as defined in the Specification.
Passenger-protection monitoring.	Direct measurement	Dwell time to be reduced to 0.5 seconds after re-establishment of passenger-protection device.

5.5 Preliminary Lift Selections

Comply with the NCC BCA 2022: all floor materials, floor coverings, wall and ceiling linings shall comply with BCA Specification 7 and its referenced sub sections and documents.

Living Choice:

Selections from manufacturers standard or premium range to the architect's acceptance.

Opal Health Care

Walls

Durable finish with either Brushed Stainless or Wood pattern look as per manufacturers standard range of finishes.

Ceiling

Ceiling as per manufacturer standard range with LED fittings, warm white on stainless steel.

Floor

TBC with interior specification.

Doors & Frames

Brushed Stainless Steel Doors

Hand Rail

Brushed Silver circular handrails

Car operating panels

From manufacturers standard range.

5.6 Communication and Alarm

This is to be a proprietary telephone system with automatic identification of the origin of the call, operated from the press to speak button on the COP.

Lift to provide audible acknowledgement of when an emergency call is made and/or received.

Emergency communications to be via Dual SIM (4G/5G) cellular module with battery backup (minimum 2hr talk time) to each lift for operation under power outage. Cellular module is the primary & secondary means of emergency communication for lift car.

Cellular module to include self-monitoring and periodic self-testing for system/component failure and loss of signal strength.

Failures are to be reported back via cellular gateway where possible and through lift car annunciation message on doors opening. Additionally allow for optional security interface to report failures back to security system.

5.7 Redundancy

Multiple lifts to be provided to service all accessible levels, providing redundancy when one lift is under maintenance or has a fault/failure.

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