GEORGE TOWN COUNCIL - George Town Swimming Pool Upgrade

PROPOSED SERVICES REPORT

Project No: 5895.001
Document No: 5895.001-PSR01
Revision: B
27 May 2024

DOCUMENT ISSUE AUTHORISATION

PROJECT: George Town Swimming Pool Upgrade
PROJECT NO: 5895.001
DOCUMENT NO: 5895.001-PSR01
AUTHOR: Nathan Brailey (Services Design Lead)

DATE	PURPOSE OF ISSUE/NATURE OF REVISION	REV	REVIEWED BY	ISSUE AUTHORISED BY
24.05.2025	Tender Issue	A	JK	JK
27.05.2025	Tender Issue (*Amendment to Sec. 6.1 & 6.6*)	B	JK	JK

COVA Thinking Pty Ltd
Suite 5, 40 Molle St, Hobart, TAS 7000 AU
ACN 117 492 814 ABN 24 117 492 814

Telephone: (03) 6212 4400
Email: cova@covathinking.com

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1. EXECUTIVE SUMMARY

This Summary of Proposed Services report has been prepared to summarise the proposed building services design for the proposed George Town Swimming Pool upgrade project.

The project must be delivered within the $16M construction budget. It is noted that this project budget is extremely tight, and therefore innovation and nuanced design initiatives are critical such as to deliver the project outcomes.

The services noted in this report are based on the following documentation:

- George Town Redevelopment Project Functional Design Brief May; 2024, as provided to COVA at date of report.
- Verbal advice from client (George Town Council) as provide at project kick-off meeting held Thursday 23rd of May 2024.
- Dial Before You Dig findings as completed Thursday 23rd of May 2024.
- Lessons leant finding from recent projects, Including but not limited to:
  - The Launceston Aquatic Centre Air Handling Unit Upgrade Project
  - The Port Huon Sports and Aquatic Centre Pool Ventilation System Upgrade Project
  - The Oatlands Aquatic Centre Redevelopment Project
  - AVEO Derwent Waters Clubhouse Redevelopment

The building and engineering requirements described here in aim to provide a thoroughly engineered project which is economical to construct, operate and maintain, has the requisite quality for aesthetics and function, and provides a practical level of adaptability for future changes and potential expansion in accordance with project requirements.

Aspects covered by this brief include:

- Existing conditions
- Design criteria
- Code requirements related to the project.
- Descriptions of the proposed services systems
-

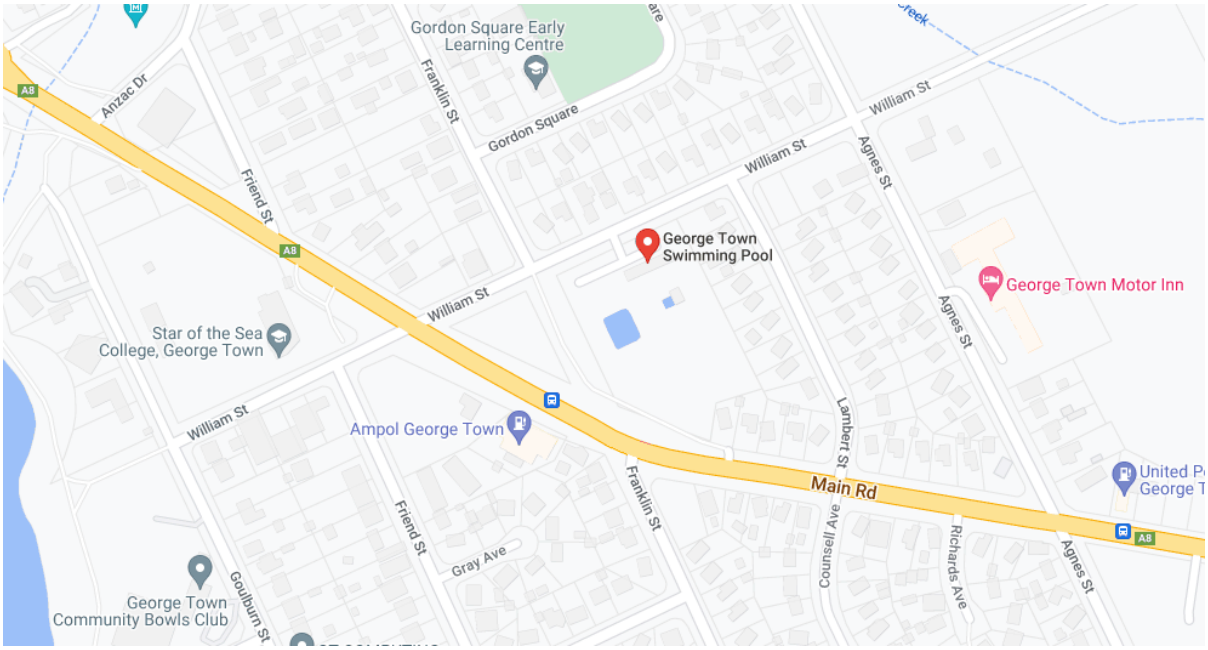
The scope of building services works for this project is proposed to be, but not held or limited to the following:

- Mechanical services including air conditioning, ventilation and outside air supply,
- General light and power systems,
- Phone, NBN and data systems,
- Dry fire and emergency lighting systems,
- Security systems,
- Public Address and AV systems
- Potable water systems
- Sewer and storm water systems (above ground),
- Fire safety services such as Fire Sprinklers, hose reels, extinguishers, and the like.

It is not expected that the project shall include vertical transport system at this stage.

2. SITE DETAILS

The George Town Swimming Pool is located on William Street George Town.



George Town Swimming Pool - William Street George Town

3. INFRASTRUCTURE CONNECTIONS

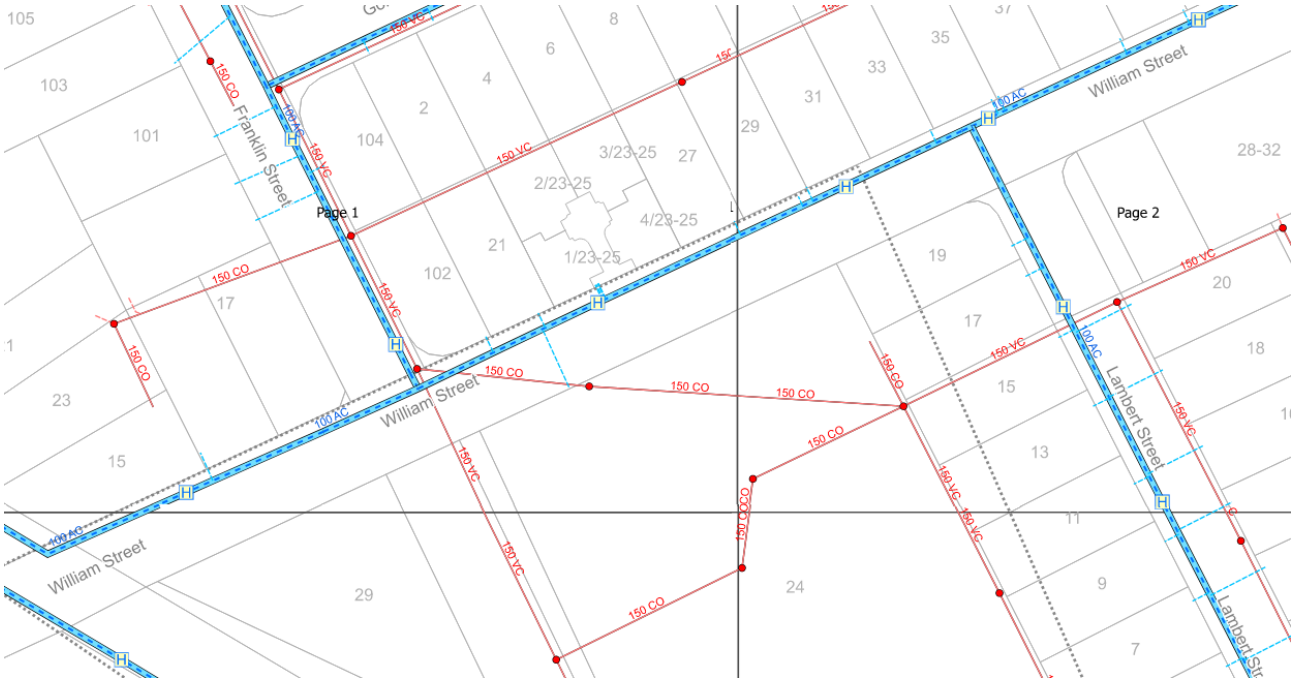
Authority connections are typically provided from the William Street Side of the Property.

3.1 AUTHORITY POWER CONNECTION

Authority Pole Mounted Sub-Station on William Street

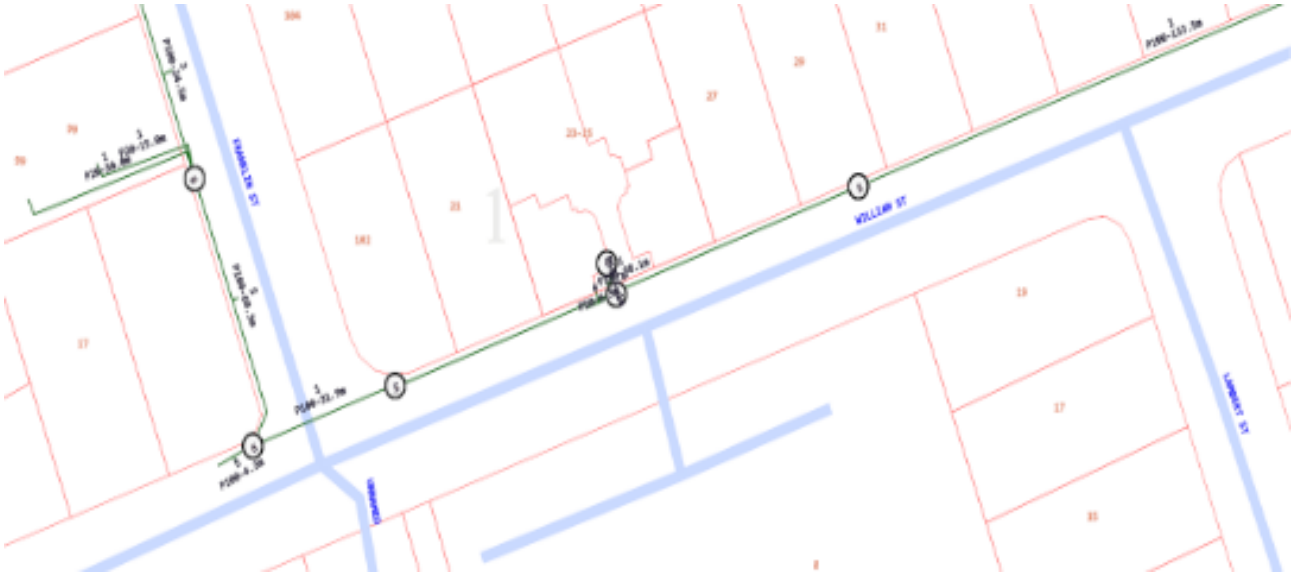
3.2 AUTHORITY WATER CONNECTION

Authority Water Meter from William Street



Preliminary TasWater site Investigation (ASSET 239590905)

3.3 NBN CONNECTION



Preliminary NBN Investigation (36742679)

4. PROPOSED UPGRADE PRIORITIES

Please that the following is largely excerpts from the master brief, provided here for completeness:

The following upgrades to the existing pool complex have been proposed, ranked in importance as prioritised by the client (George Town Council):

COUNCIL PRIORITY ELEMENTS	RANKING OF IMPORTANCE
Warm water program pool	1
Areas for learning to swim	2
Indoor lap swimming pool	3
Gymnasium and group fitness rooms	4
Café	5
Health consulting suits	6
Outdoor water play	7
Spa, sauna steam	8
Outdoor 50m pool	9

Councilor Priority Elements

5. DESIGN CONSIDERATIONS

5.1 GENERAL DESIGN CONSIDERATIONS

From a wholistic perspective, the design shall be developed in accordance with the following strategic principles as developed by the client, George Town Council:

- Innovation
- Viability
- Affordability
- Community Hub
- Creating a healthy George Town

Further to the above, the design shall be developed in accordance with the following table of project objectives, as also outlined by the client, George Town Council:

COUNCILOR OBJECTIVES FOR THE CENTRE	RANKING OF IMPORTANCE
Providing gentle exercise and rehabilitation opportunities to people with a disability, older adults, and those with mobility issues.	1
Financial sustainability	2
Access for all	3
Helping children develop swimming skills	4
Year-round lap swimming opportunities	5
Minimal impact on the environment - Environmentally sustainable design	6
Opportunities for swim squads	7
Elite swimming programs	8

Council Objectives for the Centre

5.2 ENERGY CONSERVATION CONSIDERATIONS

The following outlines energy conservation and environmentally sustainable design (ESD) design considerations for the project.

Community facilities such as pools are rarely able to be independently profitable, as the infrastructure and energy costs often exceed the potential revenue for paying visitors. As such, minimising energy usage through all available opportunities shall be considered, including but not limited to the following:

- Electrification of mechanical services systems: In keeping with Tasmanian industry best practice, all mechanical services shall be electrical in nature. Gas systems specifically are to be expressly excluded from the design, with heating to be provided primarily from air source heat-pumps using heat recovery from humid exhaust air streams.
- Pool Covers: Although now mandatory under NCC 2019, pool covers remain the single most cost effective method for reducing pool water heating costs in all pools. It is crucial that all pools be designed to include covers.

- Variable Speed Pool Circulation: Variable speed pool circulation filtration pumps shall match flow rates with required duties based on current occupancy and heating / filtration system loads.
- BMS Controls: Smart BMS Controls shall be used to optimise heat pump heating output to ambient air conditions (heat pumps are more efficient in warmer ambient temperatures) and allow pool water temperature float to match energy, and also correlate with peak / off peak or demand-based electricity tariff structures.
- Photovoltaic Systems: Solar Photovoltaic (PV) systems integrated with BMS control shall be incorporated such that excess solar energy can be used to provide supplementary pool heating, rather than feed back to the electricity grid at poor energy buy back rates.
- Variable outside air control: ventilation systems shall modulate fresh air rates such as to suit occupancy and ambient temperature / humidity conditions, preventing an excessively dry indoor environment and associated pool evaporation losses.
- Backwash Heat Recovery: Heat Recovery from backwash systems shall be used to pre-heat makeup water.

5.3 ESD CONSIDERATIONS

While it is understood that the exact Environmentally Sustainable Design (ESD) scope for the project is yet to be determined, the following considerations are provided as optional scope

- Building Orientation and Roof Design: For the optimum installation of solar panel technologies, a trafficable north facing roof is highly recommended.
- Insulation: roof and wall insulation equal to or above best practice levels is highly recommended.
- Glass selections: The selection of equal to or above best practice double glazed glasses for facades is highly recommended.
- Air-tight Construction Methods: The use of equal to or above best practice airtight construction methods is highly recommended.
- Thermal Energy Modelling
- Solar PV Modelling
- Daylight Modelling
- Green Star accreditation or design in keeping with Green Star principles.
- Life cycle analysis

5.4 DESIGN LIFE CONSIDERATIONS

Building services are to be designed with consideration of the following design life requirements, subject also to functional suitability, long term maintenance performance and sustainability characteristics:

- Building structure – 50 years.
- External wall cladding – 25 years.
- Roof cladding – 25 to 50 years (subject to manufacturer's warranty).
- Building services equipment – 20 to 25 years.
- Hydraulic pipework – 50 years.
- Internal fit-out (walls, partitions, joinery) – 20 years.
- Doors and window frames – 20+ years.
- Reception joinery – 20+ years.

5.5 ACOUSTIC CONSIDERATIONS

To date an acoustic analyses report for the project has not been generated, however one is anticipated, to be coordinated with as required.

Acceptable levels of noise at neighbouring boundaries and the instruments and methods to assess these are defined by the Environmental Protection Authority (EPA) and/or Noise Control Legislation relevant to the particular locality.

6. MECHANICAL SERVICES

6.1 GENERAL

This section of the summary identifies general strategies and principles for mechanical services design, in order to provide an economic, healthy, and comfortable indoor environment. The mechanical services generally cover the following active systems:

- Centralised pool water heating system goals which include a combination of solar, air-water source heat pumps and heat recovery technologies.
    - Review of heating / cooling loads in conjunction with MEP and ESD Engineer
    - Concept level design including layout and indicative group loop and heat pump selections.
    - Basic energy and financial comparison to air-source heat pump
- Specialist Pool Air Conditioning / Air Handling and Moisture with heat recovery.
- General Comfort Air conditioning strategy.
- Key BMS functional requirements.

Please note that the mechanical scope of works does not cover the design of pool water filtration and pumping systems. *This is to be conducted by a pool filtration & treatment specialist with expertise in commercial aquatics*, of engagement yet to be confirmed.

Mechanical systems shall be designed to reasonably limit the infrastructure expenditure. Ventilation rates are to be prioritized to ensure a healthy and productive living environment, in keeping with AS1668 code requirements.

6.2 STANDARDS AND REGULATIONS

The mechanical services design, installation and operation will comply with all relevant standards and codes, including:

The National Construction Code2022 and Australian Standards including:

- AS1668.1 – 2015 The use of ventilation and Air Conditioning in Buildings- Fire and smoke control in buildings
- AS1668.2 – 2012 The use of ventilation and Air Conditioning in Buildings- Mechanical Ventilation of Buildings
- AS1668.4 – 2012 The use of ventilation and Air Conditioning in Buildings- Natural Ventilation of Buildings
- AS/NZS3000 – SAA Wiring Rules.

6.3 SCOPE OF WORK

The proposed mechanical scope of work for the project shall include but not be limited to the following:

- Air Conditioning Systems (Comfort Heating and Cooling) – A combination of:
    - Heat recovery ventilators (HRVs),
    - VRV reverse cycle ducted systems, hi-wall and Cassette units
    - Pool Grade package Units

- Outside Air Supply Systems
    - Combination of mechanical and openable doors and windows as appropriate for each of the spaces.

- Toilet Exhaust Systems
- General Exhaust Systems
  - Basic ventilation to the café. It is unknown if the café kitchen will be a reheat only or fully function commercial kitchen. In the even of a fully function commercial kitchen, an associated kitchen exhaust system will be required.
  - Bin Room/Garbage Store ventilation.
- Base Building Mechanical Control System including energy saving features.
- Mechanical Services Switchboards (MSSBs) and associated power and controls reticulation such as to serve mechanical plant operation.

In the even a commercial kitchen is to be included within the design, a kitchen exhaust system shall also be required.

6.4 DESIGN CONDITIONS

Indoor conditions will be designed for 22.5°C (± 1.5°C). Humidity will not be specifically controlled, however, provided outside air flow rates are appropriately managed, the Hobart climate permits reasonable indoor humidity for majority of the year.

Outside dry bulb design temperatures and other ambient conditions are to be determined in accordance with AIRAH (Australian Institute of Refrigeration, Airconditioning and Heating) published data including the Air-conditioning Design Manual.

More generally, the following design data has been used for the calculation of air conditioning equipment duties:

ITEM	DESIGN CRITERIA
Hours of Operation	5am – 9pm Business Days
External Winter Temperature (Comfort / non-critical)	-1.5°C DB
External Temperature Summer (Comfort / non-critical)	28.2°C DB / 18.8°C WB
Design Internal Temperatures	30°C ± 1.5°C – Indoor Pool Areas 22.5°C ± 1.5°C – Habitable Areas back and front of house (Offices, Cafes, Front desk, multi purposes rooms, etc.)
Internal humidity	Indoor Pool Areas – 50-60% RH Habitable Areas - Not controlled (expected to be 30-70% RH in AC areas)
Peak people load	70W sensible / 60W latent
Peak lighting load	10 W/ m^2
Peak equipment load	> = 12 W/ m^2 (Excludes Indoor Pool Areas)
Outside air (where required)	>=7.5 L/s/person
Toilet ventilation	10 L/s/m^2 (or 0.1 l/s/ m^2 to minimum floor plate size)

ITEM	DESIGN CRITERIA
Cooling/Heating Plant Redundancy	Plant to serve pool areas to be designed with a minimum of 40% redundancy, IE 2-off units sized at 70% of total load each, to run duty/duty.
Life Cycle / Maintenance Plan	> = 30 years

6.5 VENTILATION SYSTEMS

It is anticipated that the majority of ventilation systems shall be ducted systems, with the majority of associated plant to be located within the proposed 20m^2 Mechanical Plant Room. It is noted however, that some roof space for cowls, roof mounted fans and the like may be required.

It is further anticipated that louvred external walls shall be available for both exhaust and outside intakes, to be coordinated with the proposed mechanical plant layout.

Where possible ventilation systems shall modulate fresh air rates such as to suit occupancy and ambient temperature / humidity conditions, preventing an excessively dry indoor environment and associated pool evaporation losses.

6.5.1 POOL AREA VENTILATION SYSTEMS

It is typically found that code compliant ventilation rates for enclosed pool areas are significantly higher than the code required outside air quantities or air change rates. Consequently, it is the required ventilation rates that drive the associated make-up outside air flow rates, and typically the use of heat transfer systems to pre-treat that outside air. Plant areas for such system can be significant and must be accounted for.

Pool areas are estimated to include:

- 25m Lap Pool – 330m^2
- Warm Water Pool - 170m^2

It's estimated that approximately 5,000L/S of Pool ventilation will be required, with associated make up air to be pretreat via a heat recovery system.

6.5.2 TOILET EXHAUST SYSTEM

WC, Change Rooms and End of Trip Facility areas are estimated to include:

- First Air Room – 12m^2
- Aquatic Change Rooms – 100m^2
- Accessible Change Rooms – 32m^2
- Changing Places – 14m^2
- Group Change Rooms – 24m^2

It's estimated that approximately 1820L/S of toilet and change room ventilation will be required, with associated make up air to be pretreat via a heat recovery system. It is anticipated that this ventilation will be predominantly rolled into the pool area heat recovery ventilation system.

6.5.1 GENERAL VENTILATION

Areas requiring general ventilation are estimated to include:

- Aquatic Plant Room – 125m2
- CO2 Enclosure – 4m2
- Pool Chemical Store – 12m2
- Mechanical Plant Room – 20m2
- Comms Room – 6m2
- Managers Office – 9m2
- Open Planned Office Area – 25m2
- Secure Storage area – 4m2
- Cleaners Cupboard – 12m2
- Foyer – 50m2
- Reception – 15m2
- Café Lounge – 30m2
- Dry Lounge – 340m2
- Waste Room – 2m2

It's estimated that approximately 1425L/S of general ventilation will be required, to be provided via various systems in keeping with AS1668.2 table 3.2. Heat recovery systems to the majority of these spaces are also anticipated.

6.6 POOL WATER HEATING SYSTEMS

Please note that the mechanical scope of works does not cover the design of pool water filtration and pumping or heating systems. *This is to be conducted by a pool filtration & treatment specialist with expertise in commercial aquatics*, of engagement yet to be confirmed. It can be noted however, that the use of a tri-generation system or the like, such as to simultaneously generate heating for the pool and air conditioning systems, is not recommended. Historically the load profile for these systems has not proven to be complimentary and as such the potential efficiencies from such infrastructure often remain unrealised.

6.7 AIR CONDITIONING (AC) - DX HEAT PUMP SYSTEMS

Above and beyond the heat recovered from the various ventilation systems, additional DX heat pump air conditioning shall be provided to the majority of spaces, typically via ducted air conditioning systems. In keeping with the affordability objectives for the project, hi-wall and cassette style fan coil units (FCUs) are proposed for back of house office spaces, café and lounges spaces, as well as the health club areas, and foyer. Further to this, the use of a variable refrigerant volume (VRV) DX air conditioning system is proposed for these areas, accounting for room volume to refrigerant ratios.

It is proposed the that the comms room and first aid rooms be air conditioned via stand alone DX split systems AC systems.

Similarly, it is proposed that the indoor pool areas and associated change rooms also be air conditioned by their own standalone heat pump based air handling unit (AHU) system. This system would work in conjunction with the associated heart recovery systems, potentially in the form of custom built pool grade package unit.

It is anticipated that condensers for the above systems shall be located in the proposed 50m^2 external plant compound.

Systems utilising lower GWP are of specific interest i.e. R32 or R454. Preference will be given to lower GWP solutions, balanced with energy efficiency and acoustic considerations.

Where possible air conditioning systems shall modulate fresh air rates such as to suit occupancy and ambient temperature / humidity conditions, preventing an excessively dry indoor environment and associated pool evaporation losses.

6.8 CONTROLS

A DDC system to monitor, control and operate the proposed mechanical systems is proposed. Electrical Works must comply with AS/NZS 3000 Wiring Rules.

The system shall be based on the ANSI/ASHRAE STANDARD 135-1995 native BACnet protocol to suit all specified requirements for all connected equipment, making provision for expansion, and be capable for seamless integration to third party equipment via BACnet and Modbus. Operation of plant shall be by the BMCS through monitoring, control and alarm functions.

Smart BMS Controls shall be used to optimise heat pump heating output to ambient air conditions (heat pumps are more efficient in warmer ambient temperatures) and allow pool water temperature float to match energy, and also correlate with peak / off peak or demand-based electricity tariff structures. systems shall modulate air rates such as to suit occupancy and ambient temperature / humidity conditions, preventing an excessively dry indoor environment and associated pool evaporation losses.

7. ELECTRICAL SERVICES

7.1 GENERAL

This section identifies general strategies and principles for electrical services design in order to provide a high-quality, healthy, and comfortable indoor environment. The electrical services generally cover the following active systems:

- General Purpose Power Systems
- Internal and External Lighting services.
- Emergency and Exit lighting services.
- Audio & Visual (AV) Systems
- Site Mains connection including Authority Liaison
- Solar PV
- Fire Detection and alarm system services.

7.2 CODES AND STANDARDS

The codes and standards used to develop the design of the electrical services will be as follows:

ITEM	STANDARDS	DESIGN CRITERIA
All	AS/NZS 3000:2018 NCC 2019	All electrical work
External lighting	AS 1158 Series AS 4282	Lighting to footpaths and external access roads
Security and Access control	AS 2201	Security system to cater for: - Smart Phone App Access Control - Intrusion Detection - CCTV surveillance
Reticulation Design	AS/NZS 3000:2018 AS/NZS 3008.1.1	Volt Drop criteria: - Consumer mains 0.5-1.0% - Submains approx. 2.5% - Final sub-circuits 1.5%
Main switchboards	AS 3439.1:2002	Type Tested 20% Spare space Main busbar rated to transformer capacity. Moulded case circuit breakers Form of separation 3Bih
Distribution Boards	AS 3439.1:2002	Miniature CB's ≤ 125A RCBO's for final circuits ≤ 20A or in accordance with AS3000 Form 1 Construction
Sub-mains	AS/NZS 3000:2018 AS/NZS 3008.1.1 AS/NZS 3013	Submains for Essential Services will be 2 hr fire rated
Final sub circuits	AS/NZS 3000:2018 AS/NZS 3008.1.1	Power 2.5 mm2 min TPS Lighting 2.5mm2 min TPS
Communication	AS 7528	Data and Communication System

7.3 SCOPE OF WORKS

The proposed electrical scope of work for the project shall include but not be limited to the following:

- Main and Distribution Switchboards and associated sub-mains cabling
- Final circuit cabling
- Cable management
- General power (Existing authority connection to be retained)
- Liaison with NBN regarding NBN connection (Existing connection to be retained)
- Interior lighting
- Exterior lighting including car park lighting
- Fire detection systems (To be confirmed by Fire Engineer & Building Surveyor)
- Emergency and exit lighting.
- Security and CCTV Systems
- Solar PV systems

The inclusion of a Solar PV system is recommended for this project, noting that roof access, rood orientation and structural adequacy must first be confirmed.

7.4 LIGHTING

7.4.1 INTERNAL LIGHTING

Internal lighting shall be coordinated with the architectural design, using fixtures of quality and cost in keeping the with the project design principles, objectives, and priorities. Special consideration will of course be given to fixtures in wet areas.

7.4.1 EXTERNAL LIGHTING

External lighting shall be coordinated with the architectural and landscape designs, using fixtures of quality and cost in keeping the with the project design principles, objectives, and priorities. Special consideration will of course be given to fixtures in wet areas.

7.4.1 EMERGENCY & EXIT LIGHTING

Emergency and exit lighting throughout will be designed to suit the requirements of the NCC and AS2293. Emergency lighting will in enclosed common area generally consist of:

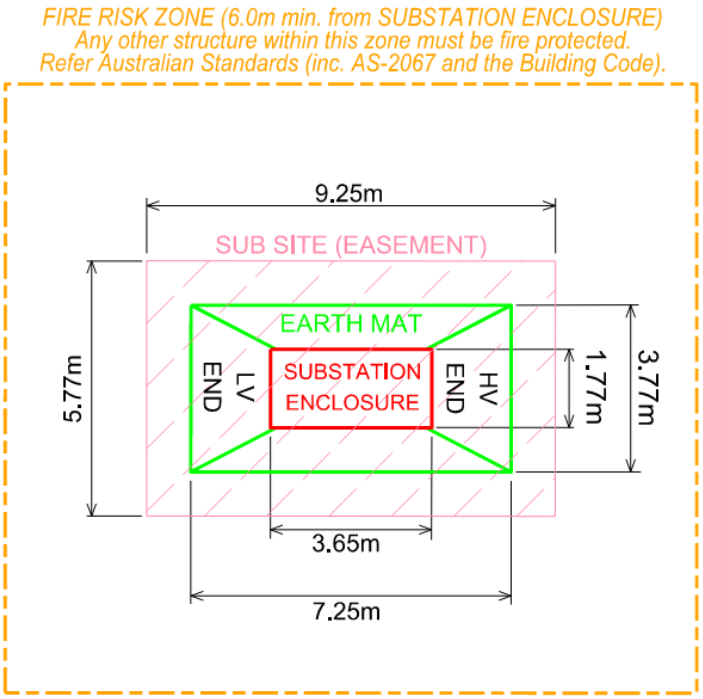
- Single point non-maintained LED throughout.
- Automatic test switch provided in the nearest switchboard.

Exit lighting will be LED type “running man” and are of surface mounted type.

7.5 POWER

7.5.1 AUTHORITY POWER CONNECTION

Preliminary investigations suggest that the planned upgrade of the George Town Swimming Pool will require an associated upgrade of the site authority power supply agreement, including an upgrade of the associated authority submain that serve the site. Further to this, it is highly probably that the local pole mounted substation shall need to be upgraded to a larger Kiosk style substation. This is in keeping with the historic outcomes at a range of similar jobs recently completed, however further investigation is required to confirm.



Nominal Substation footprint (Based on recent system upgrade at Launceston Aquatic Centre)

7.5.2 GENERAL POWER

It is anticipated that that upgrade of the George Town Swimming Pool will require an associated upgrade of the Main Switchboard (MSB), distribution boards (DBs), Mechanical services switchboards (MSSBs) and associated site power reticulation sub-mains. The upgrade of the MSB should be coordinated with the authority power supply upgrade.

General power outlets (GPOs) will be provided throughout, with quantities, finish, and supply arrangements dependant on final area use in keeping with the final architectural layout. Three (3) phase power is anticipated to be required in plant areas only.

7.6 FIRE ALARM SYSTEM

It is anticipated that a fire detection system shall be required though-out both the front and bock of house areas, with specific details to be confirmed by the building surveyor and Fire Engineer on engagement.

7.7 NBN & COMMUNICATIONS

It is expected that the existing Telstra and NBN connections to site shall be retained and re-used.

While backbone cabling and infrastructure shall be designed to and from the Comms room, it is anticipated the client will provide their own ICT racks and hardware.

Wireless Access points (WAP) are anticipated though-out both the front and back of house areas.

7.8 MATV & AV SYSTEMS

Both an MATV system and public address system are anticipated as part of this project. It is understood that hardware for both front and back of house systems, TVs, Stereos, Projectors and the like, shall be provided by the client and detailed on the FF&E schedule in due course.

8. HYDRAULIC SERVICES

8.1 GENERAL

This section identifies general strategies and principles for Hydraulic services design in order to provide a high-quality, healthy, and comfortable indoor environment. The electrical services generally cover the following active systems:

- Potable water site mains connection including Authority Liaison
- Potable water site reticulation
- Domestic hot water generation strategy
- Sewer site reticulation and authority connection including Authority Liaison
- Wet Fire Services strategy including Fire Hydrants and Hose Reels. water storage and pumping if required.

8.2 CODES AND STANDARDS

The codes and standards used to develop the design of the electrical services will be as follows:

ITEM	STANDARDS
All	AS/NZS 3000:2018 NCC 2019
External lighting	AS 1158 Series AS 4282
Reticulation Design	AS/NZS 3000:2018 AS/NZS 3008.1.1
Final sub circuits	AS/NZS 3000:2018 AS/NZS 3008.1.1
MATV	AS1417:2015 IEC 60728-2
Communication	AS 7528

8.3 SCOPE OF WORKS

The following items have been taken as base building assets above and beyond the scope of works the Tas Hydro Tenancy Fit-out:

Hydraulic Services shall include but not be limited to the following:

- Modifications to potable water reticulation from existing site connection, including modification to the existing valve and meter arrangement in the event a sprinkler system is required (To be confirmed by the Fire Engineer and Building Surveyor).
- Domestic hot water generation & storage, distribution, and tempering. Type will be selected based on ESD goals and budget. May include solar / evacuated tube, electric, heat pump, or a combination, but we recommend against using gas if possible.
- Sanitary plumbing and drainage connecting to existing site reticulation.

- Roof drainage design including gutters and downpipes (Storm water drainage design is to ground only, to be coordinated with civil design).
- Fire Extinguishers, Fire Hydrant Coverage and Hose Reels.
- Fire Sprinklers if required by Fire Safety Performance Solution. (To be confirmed by the Fire Engineer and Building Surveyor)

In the even a commercial kitchen is to be included within the design, a waste pit (grease interceptor trap), pipework and connection to existing site shall also be required.

Please note that roof drainage systems to ground only have been included within the hydraulic scope of works. Please note that generally any stormwater treatment, in-ground works, detention etc. would be considered civil engineering works.

8.4 AUTHORITY POTABLE WATER CONNECTION

Preliminary investigations suggest that the planned upgrade of the George Town Swimming Pool will require an associated upgrade of the site authority potable water supply, to serve both the pools increased potable water demand and highly probable fire hydrant requirements. This is in keeping with the historic outcomes at a range of similar jobs recently completed, however further investigation is required to confirm.

8.1 AUTHORITY SEWER CONNECTION

Preliminary investigations suggest that the planned upgrade of the George Town Swimming Pool may require an associated upgrade of the site authority sewer connection, although further investigation is required to confirm.

END OF DOCUMENT