

Shayher Developments Pty Ltd

Remora Road Hamilton - Site C & D

Mechanical, Electrical, Hydraulics
and Lift Services DA Report

Issue 01

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 27 / 6 / 12

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This report takes into account the particular
instructions and requirements of our client.

It is not intended for and should not be relied
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Job number 223458-00

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1 Introduction

Arup have been commissioned by Shayher Developments Pty Ltd to design the Mechanical, Hydraulic and Electrical Services for Sites C & D on Remora Road, Hamilton, Brisbane. This development comprises 8 buildings with the largest being a 12 storey residential tower located at Hamilton, Brisbane.

This report is intended to advise Shayher Development Pty Ltd on the preliminary concepts and spatial information in support of the Development Application.

2 Building Form

Building	Levels	Site	Type
1	12	D	Retail (Ground) Residential (above ground levels)
2	4	D	Retail (Ground) Commercial (above ground levels)
3	12	D	Community use (Ground) Residential (above ground levels)
4	6	D	Community/Residential use (Ground) Residential (above ground levels)
5A	8	C	Retail (Ground) Residential (above ground levels)
5B	8	C	Retail (Ground) Residential (above ground levels)
6A	8	C	Residential (all levels)
6B	8	C	Community/Residential use (Ground) Residential (above ground levels)

The buildings are generally planned to be self sufficient in all above ground services. It is intended that Site C & D will be served by:

- Substations for electrical power – 1 per site,
- Site-wide water supply for potable purposes,
- Site wide sprinkler and fire risers systems - Two connections for Grade 1 supply,
- Site wide drainage,
- Site wide rainwater systems – 1 storage tank per site,
- Sprinkler water tank for fire services,
- Mechanical car park exhaust ventilation,
- Stair/lift pressurisation (as required),
- Centralised domestic hot water system – 1 per Site

3 Mechanical Services

3.1 Proposed Concept

The intent of the mechanical systems will be to provide efficient and cost effective air systems for the building including basement car park ventilation and cooling systems to each of the apartments and commercial spaces. Best practice will be used in the design with consideration given to maintenance and running costs of the systems.

3.1.1 External Conditions

Summer

Dry Bulb : 32°C

Wet Bulb : 25°C

Winter

Dry Bulb : 10°C (saturated)

3.1.2 Internal Conditions

Summer : 24 +/- 2°C, RH uncontrolled

Winter : 21 +/- 2°C

Noise rating : 35dBA maximum in sleeping areas

40dBA in living areas

50dBA on the ground floor

3.2 Codes and Standards

All work will meet the requirements of national and local Statutory Authorities and will be in accordance with the following:

- National Construction Code (NCC) and Building Permit conditions
- AS1668 Parts 1 and 2, the use of Ventilation and Air Conditioning in Buildings
- AS3666 Air Handling and Water Systems of Buildings
- AS/NZS 3000 (including amendments)
- Australian Communications Authority (ACA)
- Work-Cover requirements
- OHS Regulations
- Electricity Supply Authorities
- Fire brigade requirements
- Local council regulations including ULDA

3.3 Space Cooling System

The commercial and residential elements of Site C & D are proposed to be air-conditioned using energy efficient, individual variable refrigerant flow (VRF) systems with ducted terminal units in the living room and bed-rooms of each apartment. Each apartment will be provided with multiple fan coil units to serve individual areas with the external condenser plant to be located on the roof. The plant space will depend upon the system and equipment chosen. Indicative spatial requirements have been shown on the relevant architectural drawings. Apartment owners will pay for the energy they consume with a common component to be apportioned to each apartment for common services.

Retail shall be provided with both riser and roof level spatial provisions to allow each retail unit to install their own air conditioning equipment.

3.4 Space Heating System

Space heating will be provided via the VRF system as per section 3.3.

3.5 Air permeability

The buildings will be designed for an air permeability of $5\text{m}^3/\text{hr}/\text{m}^2$ @ 50Pa. This will help to reduce the amount of conditioned air lost through the building fabric in leakage, thus conserving energy.

3.6 Outdoor Air Supply Systems

The buildings will rely on natural ventilation through openable windows in compliance with NCC. This shall ensure all openings are located away from local sources of ventilation exhaust discharge.

3.7 Toilet/Domestic Kitchen Exhaust Systems

Each apartment will be provided by mechanical exhaust ventilation to the bathrooms and utility spaces. Discharge will be located away from openable windows to meet with the acceptance of the Building certifier. Fans will be controlled by the light switch.

3.8 Car Park Ventilation System

The car park ventilation system will provide provisions for outside air intake to and exhaust air from the car park. The ventilation system will aim to maximise the potential of natural ventilation where openings allow a reduction to mechanical fan operation.

3.9 Minor Supply/Exhaust Systems

Garbage rooms and Fire Control room will be ventilated via local fans, discharging to atmosphere.

3.10 Condensate Drains

Condensate drains will be provided to each terminal unit and will terminate into a dedicated condensate drainage system. The condensate system will run to the rain water tanks located within the basement.

3.11 Stair Pressurisation

Internal stairs will be provided with stair pressurisation fans to operate in conjunction with a lobby relief system in compliance with the NCC (where required). Stairs on the external facade will be naturally ventilated via louvres at each level.

3.12 Electrical Power and Control Systems for the Mechanical Plant

All mechanical systems within each apartment will be powered from within the apartment while the roof mounted plant will be powered by the dedicated mechanical switchboards located adjacent to the plant.

3.13 Building Management Control System

A Building Management Control System is proposed to incorporate the following:

- Safe and routine operation of Body Corporate mechanical services
- Monitoring and control of the terminal units in Body Corporate areas
- Monitoring and reporting of energy consumption by each building including common plant
- Control of Body Corporate area lighting
- Exterior lighting
- Water consumption

4 Hydraulic Services

4.1 Proposed Concept

The intent of the hydraulic services design is to provide efficient, cost effective hydraulic services utilizing best practice and environmentally sustainable design in order to reduce potable water consumption, with consideration given to future maintenance of all systems. The design will include sanitary plumbing and drainage, trade waste drainage, stormwater / roof water drainage, domestic hot and cold water systems, rainwater harvesting for toilet flushing and irrigation purposes, natural gas reticulation, fire hydrant system and a fire hose reel system.

4.2 Design Criteria

The design criteria will include but will not necessarily be limited to the following:

- Stormwater roof drainage will be based on rainfall intensity for a 1:100 year average recurrence interval for a storm event of 5 minute duration.
- Redundant existing services connections to site will be demolished, capped and sealed at point of connection pursuant to the authority requirements.
- A conventional gravity sanitary drainage system shall be provided to all waste fixtures where possible.
- The town's main water supply will be used to serve the proposed new development with fire hydrant and fire sprinkler storage tanks as required.
- Potable hot and cold water shall be provided to all sanitary fixtures and tapware utilised for hygiene applications.
- Potable hot water generation will be delivered at 60 – 65 °C to temperature controlling devices (tempering valve and thermostatic mixing valve) serving each residential, commercial and Body Corporate area.

4.3 Codes and Standards

The hydraulic services will be designed and installed complying with all the requirements of, but not limited to, the following:-

- National Construction Code (NCC)
- AS 3500 - Plumbing and Drainage
- AS 2419 – Fire Hydrant Installations
- AS 2441 – Installation of fire hose reels
- AS 2941 –Fixed Fire Protection Installations – Pumpset Systems
- AS 5601- Gas Installations
- Urban Utilities requirements
- Brisbane City Council By Laws
- Manufacturer's Guidelines
- Fire and Rescue of Queensland

4.4 Water Conservation

Water conservation issues on the Remora Road development, sites C and D, include:

- Reducing the demand on the town's main water supply where available.
- Provide a rainwater harvesting system which shall be utilised for toilet flushing and irrigation r-use purposes.
- Reducing water usage in toilets by the use of dual flush type with 4.3L/3L flush capacity (minimum 3 star WELS rated, 4 star targeted)
- Reducing water usage by utilising flow restrictive devices at sanitary fixtures and tapware.

Flows to basins, sinks, showers, etc shall be restricted to the followings flow rates;

- Showers – 9L/min Minimum 3 star WELS rated
- Basins – 6L/min Minimum 5 star WELS rated
- Sinks – 9L/min Minimum 4 star WELS rated (5 star targeted)
- Dishwashing Machines – Minimum 3 star

4.5 Potable Water Supply System

Provide 2 x domestic water site connections to supply site C & D separately. These connections shall be supplied by the existing/proposed authority water main infrastructure located in the roadway.

Domestic water meters and backflow prevention devices shall be provided at each connection pursuant to the authority requirements.

4.6 Sanitary Plumbing and Sewer Drainage System

A gravitational sanitary drainage system shall be provided to collect and convey the sanitary drainage to the authority (council) drainage system. A combination of sanitary drainage and plumbing systems shall be implemented to collect sanitary discharge from all fixtures within the development.

Stacks shall be located to provide coverage to all wet areas within the buildings and be enclosed within a services duct as required. In addition a reduced velocity aerator sanitary stack system shall be assessed as an alternate solution when compared to a conventional two pipe stack system.

All sanitary discharge generated in basement applications and or when connection to the site drainage piping system is not achievable, shall reticulate and discharge to sewer pump station (s) located below the basement slab. Each sewer pump station shall have installed dual stainless steel macerator pumps configured in a duty/standby operation with a rising installed which shall reticulate and connect to the gravity sanitary drainage system.

4.7 Roof Rainwater And Storm Water Drainage System

All roof stormwater run-off from roofs not housing plant equipment shall be captured and stored via a rainwater collection tank for toilet flushing and site irrigation re-use purposes.

All stormwater run-off from pervious and impervious areas housing plant equipment along with trafficable and balcony areas shall be collected by a designated site/building stormwater piping system which shall reticulate and discharge to the authority stormwater network in accordance with the Brisbane City Council requirements. Stormwater run-off from contaminated areas area's not collected for re-use purposes shall be referred to as 'dirty stormwater'.

All collected rainwater shall be treated via 1st stage and 2nd stage micron filtration and UV disinfection prior to re-use as to reduce the risk associated with legionella and other harmful bacteria.

A sub soil drainage system including a perimeter spoon drain shall be provided to the basement level to intercept all subterranean flows. Grated stormwater pits shall also be installed in the basement slab to collect all surface run-off and along with the sub soil drainage system shall reticulate via an underground piping system to multiple stormwater pumping stations located below the basement slab.

All stormwater shall discharge to the approved connection locations in accordance with the site Stormwater Management Plan and be treated accordingly.

5 Electrical and Communication Services

5.1 Proposed Concept

The electrical systems will include the design of efficient, cost effective systems of electrical elements including main electrical supply to the buildings, services reticulation, lighting and general power needs for the building. This includes powering the individual apartments, a secure access system, security system and a lightning protection system.

The following sections will form a preliminary guide on which to further develop the concepts and performance requirements of the design team. These concepts will be developed with the Client and Architect through the detailed design process and be used to produce the final design documentation.

5.2 Codes and Standards

The electrical works will be completed in accordance with the following:

- Energex Standards and Conditions of Supply
- National Construction Code (NCC) and Building Permit conditions
- Queensland Electricity Act and Electrical Safety Act

- Telecommunications Act
- Australian Communications and Media Authority requirements
- Brisbane City Council Development Application requirements
- AS/NZS 3000 Electrical Installations
- AS/NZS 1768 Lightning Protection
- AS/NZS 1680 Interior Lighting
- AS/NZS 1158 Lighting for Roads and Public Spaces
- AS/NZS 3439 Low Voltage Switchgear and Control Assemblies
- AS/NZS 2293 Emergency Escape Lighting and Exit Signs for Buildings
- AS/NZS 4282 Control of the Obtrusive Effects of Outdoor Lighting

5.3 Mains Power Supply

Discussions will be carried out with Energex regarding the site load requirements and to co-ordinate the source of supply to site C & D. Load estimations have shown that two transformers will be required. It is proposed to locate these internally at ground floor level in Building 3 and 6B. Final details of access requirements will be agreed with Energex. The route of the main incoming supply will also be co-ordinated with Energex to suit the existing infrastructure in the area. Incoming services will be to Energex requirements.

5.4 Metering

Supply authority meters for the main incoming supply will be located within the main switchroom.

Individual supply authority meters to each apartment will be required. These can be centrally located within the load centres or they can be located within each apartment.

Check energy metering will be provided for the following main services:

- Mechanical Services
- Lifts
- Provision will be made for lighting and power to be separately metered

All individual meters will have the capability to connect to the BMS system providing the client with instant information on energy usage for each area of the building.

6 Vertical Transportation Services

The development will be provided with a modern high performance elevator system designed and installed in accordance with the relevant requirements of:

- Building Code of Australia

- Lift Code AS1735
- Workcover Authority requirements

The elevator system will incorporate facilities for persons with disabilities, fire brigade operations and stretcher access requirements.