



Umow Lai

Macquarie University – 8-12 University Avenue

Mechanical Services Report

Main Works Planning Application

REPORT AUTHORISATION

**PROJECT: MACQUARIE UNIVERSITY – 8-12 UNIVERSITY AVENUE
MAIN WORKS PLANNING APPLICATION**

REPORT NO: S.MQU-0129/R002

Date	Rev	Comment	Prepared by	Checked by	Authorised by
27.01.2017	A	Preliminary – Outline Report	AA/PR		
17.02.2017	B	Preliminary – Draft Report	AA/PR		
11.05.2017	C	Planning Application Report	AA	HW	PE
13.10.2017	D	Planning Application Report	AA	HW	PE
30.01.2018	E	Planning Application Report	AA	HW	PE

This document contains commercial information which has been prepared for the attention of the Client on this project. It is confidential and no information contained in this document shall be released in part or whole to any third party without the approval of Umow Lai.

Melbourne Office
10 Yarra Street
South Yarra VIC 3141
Australia
Tel: +61 3 9249 0288
Fax: + 61 3 9249 0299
Email: ulmelb@umowlai.com.au
Web: www.umowlai.com.au
ABN: 29 143 564 738

Sydney Office
L7, 657 Pacific Highway
St Leonards NSW 2065
Australia
Tel: +61 2 9431 9431
Fax: +61 2 9437 3120
Email: ulsyd@umowlai.com.au
Web: www.umowlai.com.au
ABN: 99 150 174 782

Brisbane Office
123 Charlotte Street
Brisbane QLD 4000
Australia
Tel: +61 7 3210 1800
Fax: +61 7 3210 1799
Email: ulbris@umowlai.com.au
Web: www.umowlai.com.au
ABN: 91 142 668 773



EXECUTIVE SUMMARY

This report has been developed to form part of the Main Works Planning Application. Umow Lai has undertaken an assessment of the Mechanical services requirements of the buildings and this report summarises the concept design approach.

In summary, the following is noted:

- The mechanical thermal plant comprises of a series of chillers in the order of 7 MW cooling capacity installed in the basement of Building 8 with the corresponding induced draft cooling towers installed on the rooftop of Building 12. A series of condensing boiler on the rooftop of each building serve the heating requirement of the building.
- Base building air conditioning for the office and collaboration areas is via floor by floor plant zoned and serving each wing independently through a mid-temperature VAV system.
- The Laboratory Space within Building 8 is proposed to include Constant Volume air handling units thermally zoned. A variable general exhaust and fume cupboard exhaust riser will also be provided complete with take offs of in each floor for tenant connection.
- Allocation for tenant plant space on the roof and in the basement as well as riser space for tenants to reticulate their own Laboratory Gases will be provided.
- Tenant Supplementary Services provided in accordance with the Property Council of Australia (PCA) A Grade building guidelines including retail provisions
- Carpark exhaust running from North perimeter to South perimeter of the space to be provided in accordance with AS1668.2.
- Zone smoke pressurisation strategy to be utilised for the buildings in accordance with AS1668.1.
- A comprehensive BMCS system will be included allowing for monitoring and control of the building.



CONTENTS

1.0	INTRODUCTION	9
2.0	MECHANICAL SERVICES	10
3.0	CONCLUSION	13



1.0 INTRODUCTION

1.1 GENERAL

Umow Lai has undertaken an assessment of the Mechanical Services requirements for the buildings and this report summarises the preliminary design approach.

1.2 SITE DESCRIPTION

The Macquarie University site at 8-12 University Avenue sits within the University's valuable Southern Precinct. \

Proposal is for a new commercial building with approximately 50,000m² GFA that provides A-Grade office, laboratory and commercial spaces.

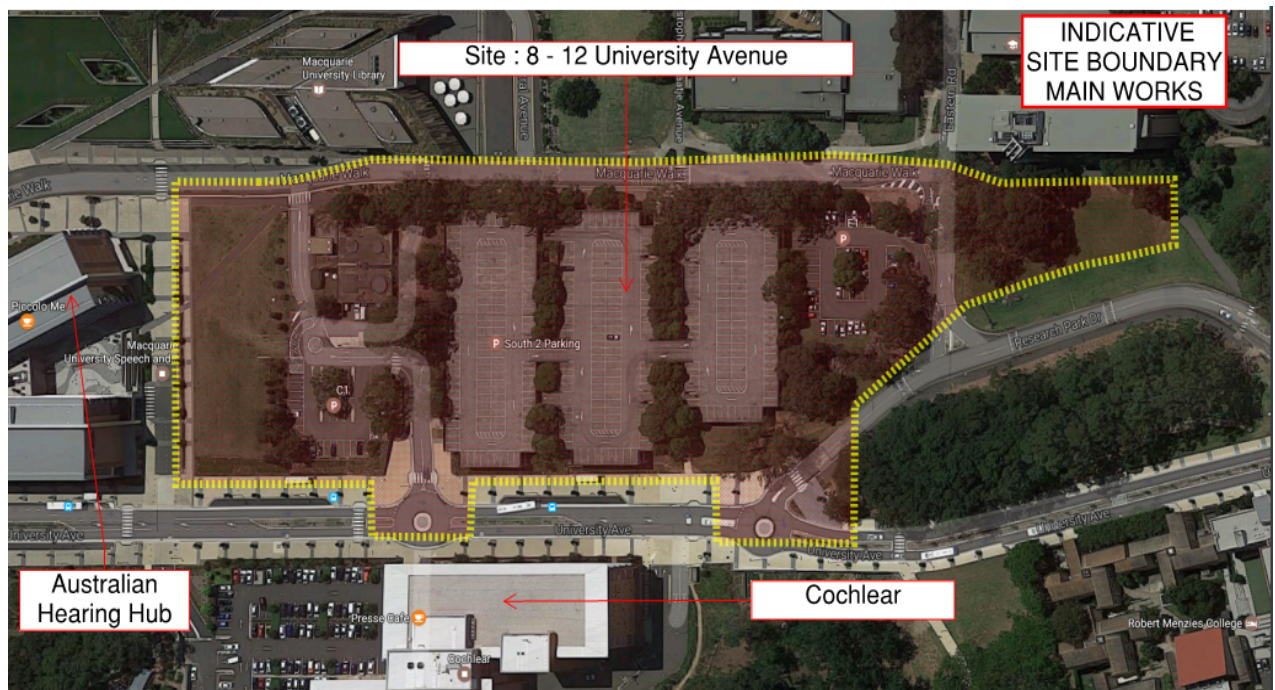


Figure 1 Site Boundary Main Works



2.0 MECHANICAL SERVICES

2.1 GENERAL

Building 12 is primarily a commercial office space.

Building 8 includes a collaboration space, a laboratory area and laboratory support spaces.

With lab spaces to be completed out as a warm shell for tenant fitout, it is essential that mechanical services provision provide flexibility for use by tenants and achieve a PC2 rating.

2.2 SYSTEM DESCRIPTION

In summary, the proposed thermal plant requirements and other base building system requirements include the following:

- Base building chilled water system in the order of 7MW located in Basement Level 2 underneath Building 8 including; high efficiency variable speed drive chillers and primary side chilled water system including pumps, heat exchangers, expansion tank and all associated piping, valves and fittings

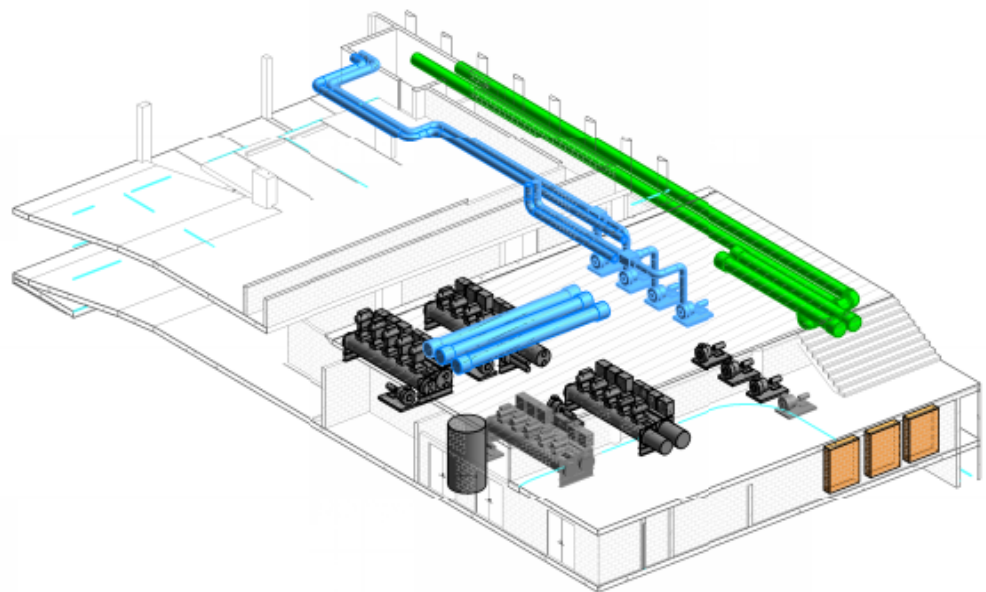


Figure 2 Isometric View of Chiller Plant Room

- Secondary chilled water for each building from the central chiller plant including pump, pipework and all associated valves and fittings
- Base building condenser water system including; cooling towers on the roof of Building 12, pumps, heat exchangers, and all associated piping, valves and fittings



- Tenant supplementary condenser water system including cooling towers on the roof of each building, pumps, heat exchangers, and all associated piping, valves and fittings
- Base building heating hot water system within plantroom on the rooftop of each building, including gas fired condensing hot water boilers, pumps, heat exchangers, expansion tank and make up unit, and all associated piping, valves and fittings to associated heating coils. Heating for each building, unlike cooling, will be completely separate for each building.
- Base building air conditioning for offices and collaboration spaces via floor by floor plant zoned and serving each wing independently through a mid-temperature VAV system
- Laboratory Space – Constant Volume air handling units thermally zoned. A variable general exhaust and fume cupboard exhaust riser will also be provided complete with take offs in each floor for tenant connection. The associated strobic fans will be located on the roof.

The laboratory floors will include 100% fresh air supply with no recirculation - ensuring that the risk of cross contamination through air conditioning is eliminated.

Heat recovery from the exhaust system will be utilised to improve the energy efficiency of the supply air system.

- Retail Tenancies air conditioning – provision of condenser water into the nearest riser with take off valves
- Retail Tenancies kitchen exhaust – provision of kitchen exhaust risers. One separate riser for each tenancy with local on-floor duct and rooftop fan provided by tenant.
- Miscellaneous area air conditioning serving;
 - MDF Rooms
 - Base Building Security Room
 - Tenant Security Room
 - Security Equipment Room
 - IBMS Room
 - UPS Room
 - Base Building Mail Room
 - Tenant Mail Room
 - Lift Motor Rooms
- Tenant Supplementary Services provided in accordance with the Property Council of Australia (PCA) A Grade building guidelines including the following:
 - Outside Air
 - General Exhaust
 - Toilet Exhaust
 - Kitchen Exhaust



- Dishwasher Exhaust
- Condenser Cooling Water Loop
- Ventilation systems including all ventilation fans, ductwork, grilles, dampers and other accessories.
- Carpark exhaust running from North perimeter to South perimeter of the space to be provided in accordance with AS1668.2.
- Zone Smoke Pressurisation system strategy to be used in accordance with AS1668.1.
- Water treatment of all chilled water, condenser water and heating water systems.
- Electrical power supplies to all mechanical services plant, including mechanical services switchboards, wiring, cable trays, conduits and all associated ancillaries.
- Plinth surrounds for mechanical services equipment.
- Labelling of all equipment and services.
- Building Management and Control System (BMCS)



3.0 CONCLUSION

In summary, the main works package comprises of the following for mechanical services:

- The mechanical thermal plant comprises of a series of chillers in the order of 7 MW cooling capacity installed in the basement of Building 8 with the corresponding induced draft cooling towers installed on the rooftop of Building 12. A series of condensing boiler on the rooftop of each building serve the heating requirement of the building.
- Base building air conditioning for the office and collaboration areas is via floor by floor plant zoned and serving each wing independently through a mid-temperature VAV system.
- The Laboratory Space within Building 8 is proposed to include Constant Volume air handling units thermally zoned. A variable general exhaust and fume cupboard exhaust riser will also be provided complete with take offs of in each floor for tenant connection.
- Allocation for tenant plant space on the roof and in the basement as well as riser space for tenants to reticulate their own Laboratory Gases will be provided.
- Tenant Supplementary Services provided in accordance with the Property Council of Australia (PCA) A Grade building guidelines including retail provisions
- Carpark exhaust running from North perimeter to South perimeter of the space to be provided in accordance with AS1668.2.
- Zone smoke pressurisation strategy to be utilised for the buildings in accordance with AS1668.1.
- A comprehensive BMCS system will be included allowing for monitoring and control of the building.

