Umow Lai

Macquarie University – 8-12 University Avenue

Electrical & Communication Services Report

Main Works Planning Application

Report No S.MQU-0129/R005
Date 12/11/18

engineering sustainable environments

REPORT AUTHORISATION

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

REPORT NO: **S.MQU-0129/R005**

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		
15.05.2017	C	Planning Application Report	PR	LW	PE
13.10.2017	D	Planning Application Report	PR	LW	PE
31.1.2018	E	Updated Planning Application Report	PR	LW	PE
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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
Levl7, 200 Creek Street
Brisbane QLD 4000
Australia
Tel: +61 7 3917 8888
Fax: +61 7 3917 8887
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 Electrical services requirements of the buildings and this report summarises the concept design approach.

In summary, the following is noted:

- The site electrical demand has been calculated to be in the order of 5.15 MVA and applications have been made to Ausgrid for the provision of supply.
- Substations are proposed for each building to provide the required electrical supply.
- Diesel generators will be provided for each building will back up the essential services in accordance with the Property Council A Grade Building requirements.
- Communications services provisions will be cognisant with the requirements of a technology focussed building. Main communications rooms and separate Carrier services rooms will be provided in the basement areas below each building with dedicated risers to the tenanted floors. The installation will accommodate external Telecommunications Carrier services such as NBN and Fibre as well as connection gateways to the existing campus Wide Area Network.

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1.0 INTRODUCTION

1.1 GENERAL

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

Note that an Electrical Early Works Planning Application Report (S.MQU-0129/R004) was submitted previously which summarises that there are no significant encroachments of existing electrical services to the proposed footprint of the site. Minor services augmentation will be undertaken in the existing services tunnel being modified. The existing electrical and communications infrastructure will be augmented to service the new buildings, as directed by the Utility providers.

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 50,000m^2 GFA that provides A-Grade office, laboratory and commercial spaces.

2.0 ELECTRICAL SERVICES

2.1 GENERAL

The electrical services for Buildings 8 and 12 will be designed to ensure high energy efficiency, flexible operation and reduced maintenance costs.

2.2 SYSTEM DESCRIPTION

The building's anticipated electrical maximum demands have been calculated to be in the order of the following:

- Basement car parks and service areas 0.25 MVA
- Building 8 2.1 MVA
- Building 12 2.8 MVA

In summary, the proposed power supply systems, communications systems and other base building system requirements will be provided as follows:

- Electrical supply to the development will be provided from the Ausgrid 11KV underground network in the vicinity of the site. Easements will be established for the new cabling from the existing network connection point to each building. Applications for supply have been lodged with Ausgrid and we are awaiting their response

- Each building will be supplied from Ausgrid high voltage substations. The development will provide the necessary capital contributions to Ausgrid for establish the electrical supply connections/

- Diesel standby generator units will be installed to power essential services, as required for the Property Council of Australia (PCA) A Grade building classification. Diesel fill points and pumping facilities will be provided in the loading docks. Twelve hours run time of diesel fuel storage will be provided in under belly day tanks for each packaged generator unit.

Figure 1 – Typical Generator Arrangement Per Building

- Each building will be provided with a dedicated main switchroom to distribute power for base building and tenant services, via dedicated building risers and distribution boards.

  The main switchrooms will be located to minimise transmission losses. Each main switchboard will be provided with a Power Factor Correction Unit (PFC) to improve the energy efficiency of the installation.

- Each tenanted space will be provided with separate Authority energy meters. Lighting, power, vertical transportation and mechanical services will be provided with separate energy meters connected to a dedicated Energy Monitoring System, in accordance with the requirements of NCC Section J.

- The Laboratory building will be provided with unmetered tenant distribution boards on each floor in core riser cupboards. Flexible metering and distribution arrangements will be provided to allow the installation to be adapted to suit the number of tenants per floor and their load requirements.

- Configurable tenant distribution boards with meter bases will be provided to the office building, ready for tenants to connect their lighting and power fitout circuits. Cable reticulation paths will be provided through ceilings from the core riser cupboards to the tenant spaces.

- Lighting throughout the facility will comprise energy efficient LED luminaires. Lighting will be controlled by a CBUS energy management control system.

  Occupancy sensing facilities will be provided with circulation areas, car parks and infrequently occupied utility areas to ensure that lighting is switched off when the spaces are not in use.

  Photocell control will be provided to perimeter zones to ensure that lighting is switched off when sufficient daylight is present. The lighting control system will also incorporate zoning and time scheduling to further enhance energy efficiency.

- LED Exit and Emergency lighting will be provided throughout the facility to the Building Code of Australia (BCA) and Australian Standards (AS) requirements. The Exit and emergency lightings will be centrally monitored by a computerised system to provide automated periodic testing and reporting to the requirements of AS 2293.

- Separate main communications rooms will be provided in the basement for each building. Additional dedicated rooms will be provided to accommodate the incoming carrier services including NBN and commercial fibre services.

  Additionally the main communications rooms will be connected to the University's Wide Area Network (WAN). Dedicated communications rises will distribute fibre links from the basement main communications rooms to the tenancy floors.

  Fibre communications patch panels will be installed within the riser cupboards on each floor. Tenants will connect from the fibre patch panels to their local communications racks within their tenancies.

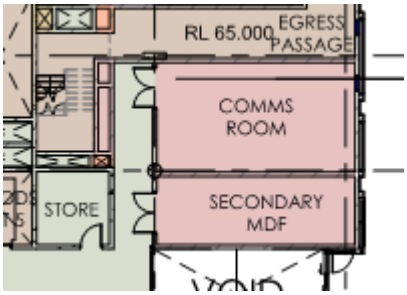

Figure 2 – Typical Basement Communications and Carrier Room Arrangement

- Electric car charging provisions will be provided to selected basement parking bay locations. The substation and main switchboards will be designed with additional capacity to accommodate the load of the vehicle charging facilities. The quantities and extent of the charging facilities proposed is currently under development with Macquarie University.

3.0 CONCLUSION

In summary, the main works package comprises of the following for electrical and communications services:

- Supply of the required building power from Ausgrid substations
- Dedicated main switchrooms for each building with automatic transfer switching for standby generator operation to PCA A-Grade Building requirements.
- Electric vehicle charging facilities to selected basement parking bays.
- Power and communications reticulation facilities including risers, cable pathways and separate facilities for base building and tenant use.
- Energy efficient LED lighting and automated controls including occupant sensing and daylight harvesting.
- Exit and Emergency Lighting to Code requirements with an automated computer monitoring facility.
- Telecommunications facilities including main computer rooms, Carrier services accommodation, tenant risers and fibre distribution facilities. The installation shall accommodate NBN services, commercial fibre services and connections to the campus Wide Area Network.