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UOW - Western Building
University of Wollongong
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State Significant Development Application Report

Mechanical Services Design Report

State Significant Development Application Report

Mechanical Services Design Report

Client: University of Wollongong

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1.0 Introduction

1.1 Project Description

The new Western Building will be a landmark development for the University of Wollongong (UoW) campus. It will be located adjacent the campus Ring Road at the western end of the campus. The proposed project will accommodate the diverse functions of The Arts English and Media (TAEM) School and the Health and Society (HAS) School and the School of Geography and Sustainable Communities (SGSC) into a collaborative and engaging hub that will support the ambitions of next generation research and learning. Functions accommodated include specialist teaching spaces, academic and professional staff workplace, informal collaboration spaces as well as other support spaces. The proposed building will be circa 10,000m^2 gross floor area across four levels plus a plant level

The proposed project at the University of Wollongong campus and the new Western Building is intended to provide a new facility to accommodate.

- Social Sciences (SOC) and
- Law, Humanities and Arts (LHA) faculties.

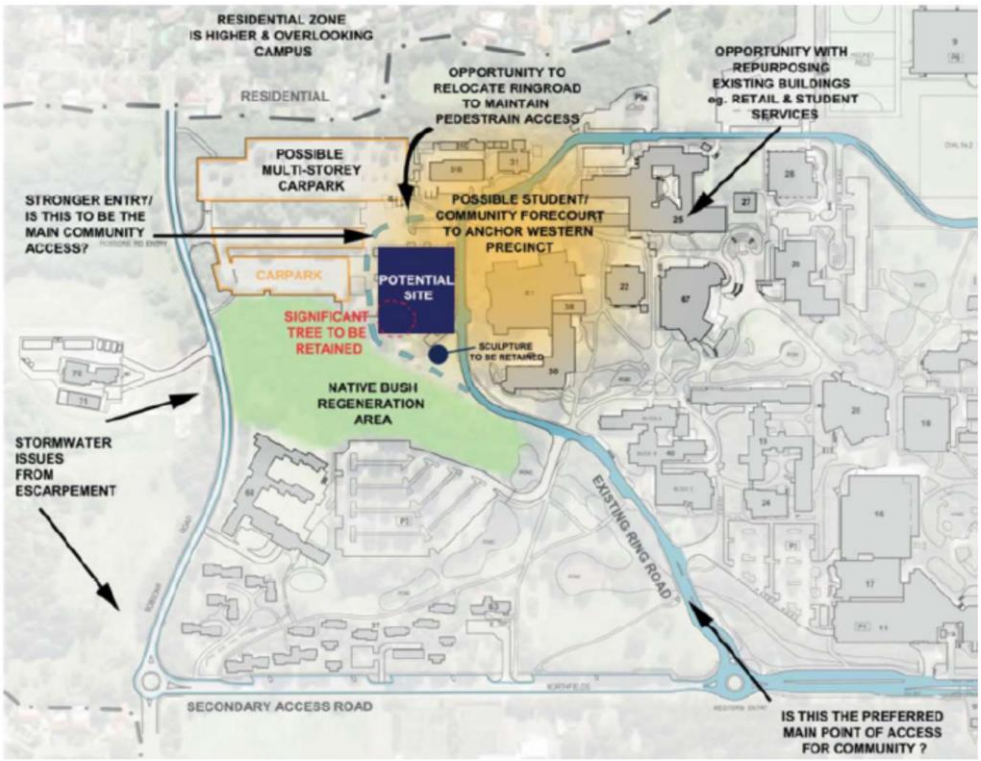
Within the building, there will be common areas, lobbies, storage rooms, teaching spaces including performance spaces, rehearsal spaces, green rooms, visual media rooms (including simulated newsrooms), staff zones, end of trip facilities and a loading dock.

The various areas are generally broken down below.

- Common Areas
- Laws, Humanities and the Arts
- Social Sciences
- Circulation/Plant and Equipment

1.2 Site Location

The proposed building site is within the Western Precinct of the UOW Wollongong Campus and opposite Building 21 Early Start Facility on the Campus Ring Road. The site currently houses teaching space and general purpose demountable the majority of which are assigned for relocation prior to this development.


RESIDENTIAL ZONE IS HIGHER & OVERLOOKING CAMPUS
RESIDENTIAL
OPPORTUNITY TO RELOCATE RINGROAD TO MAINTAIN PEDESTRAIN ACCESS
OPPORTUNITY WITH REPURPOSING EXISTING BUILDINGS eg. RETAIL & STUDENT SERVICES
POSSIBLE MULTI-STOREY CARPARK
STRONGER ENTRY/ IS THIS TO BE THE MAIN COMMUNITY ACCESS?
POSSIBLE STUDENT/ COMMUNITY FORECOURT TO ANCHOR WESTERN PRECINCT
CARPARK
POTENTIAL SITE
SIGNIFICANT TREE TO BE RETAINED
SCULPTURE TO BE RETAINED
NATIVE BUSH REGENERATION AREA
STORMWATER ISSUES FROM ESCARPEMENT
EXISTING RING ROAD
SECONDARY ACCESS ROAD
IS THIS THE PREFERRED MAIN POINT OF ACCESS FOR COMMUNITY ?

1.3 Purpose of Report

This report outlines the schematic design (SD) that has been undertaken by AECOM together with UOW and the various services consultants.

The contents of the SD report are designed to be a high level guide to understand the design philosophy of the mechanical services.

The schematic design is intended to show the key elements of the design, main systems, plant spaces, preliminary capacities, services routes etc.

The general intent of main mechanical plant system configuration shall be developed in further detail as the design progresses to detailed design stage. Note as part of the detailed design a Chiller Options Report shall be provided for UOW Facilities Management team for review.

2.0 Referenced Documents

Details of documents applicable to this project include:

Numbering Reference	Description
AS 1170.4	Structural Design Actions – Earthquake Actions in Australia
AS 1210	Pressure Vessels
AS 1324.1	Air filters for use in general ventilation and air-conditioning - Application, performance and construction
AS 1324.2	Air filters for use in general ventilation and air conditioning - Methods of test
AS 1345	Identification of the contents of pipes, conduits and ducts
AS 1432	Copper tubes for plumbing, gas fitting and drainage applications
AS 1530.1	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS 1682.1	Fire, smoke and air dampers – Part 1: Specification
AS 1682.2	Fire, smoke and air dampers – Part 2: Installation
AS/NZS 1668.1	The use of ventilation and air conditioning in buildings - Fire and smoke control in multi-compartment buildings
AS 1668.2	The use of mechanical ventilation and air-conditioning in buildings - Mechanical ventilation for acceptable indoor-air quality
AS/NZS 1677.1	Refrigerating systems – Refrigerant classification
AS/NZS 1677.2	Refrigerating systems – Safety requirements for fixed applications
AS/NZS 1680.0-	Safe Movement
AS 1894	Storage and handling of non-flammable cryogenic and refrigerated liquids
AS 1930	Circuit Breakers for Distribution Circuits
AS 1940	The storage and handling of flammable and combustible liquids
AS 2107	Acoustics – Recommended design sound levels and reverberation times for building interiors
AS 2184	Low Voltage Switchgear & Control Gear – Moulded Case Circuit Breakers
AS 2417.1	Pumps – The international acceptance test codes – Application
AS 2430	Classification of Hazardous Areas
AS 2625.1	Mechanical Vibration – Evaluation of machine vibration by measurements on non-rotating parts – General guidelines
AS 3000	Electrical Installations – Buildings, structures and premises.
AS 3008	Electrical installations – Selection of cables.
AS 3013	Classification of the Fire and Mechanical Performance of Wiring Systems
AS/NZS 3439 Series	Low-voltage switchgear and controlgear assemblies - Type-tested and partially type-tested assemblies.
AS 3500	National plumbing and drainage - Water supply - Performance requirements
AS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
AS/NZS 3947	Low-voltage switchgear and controlgear - Switches, disconnectors, switch-disconnectors and fuse-combination units

Numbering Reference	Description
AS/NZS 3666.1	Air-handling and water systems of buildings – Microbial control – Design, installation and commissioning
AS/NZS 3666.2	Air-handling and water systems of buildings – Microbial control – Operation and maintenance
AS 4041	Pressure piping
AS 4072.1	Components for the protection of openings in fire-resistant separating elements - Service penetrations and control joints
AS 4254.1	Ductwork for air handling systems in buildings - Part 1: Flexible duct
AS 4254.2	Ductwork for air handling systems in buildings - Part 2: Rigid duct
AS4260	High efficiency particulate air filter (HEPA) – Classification, construction and performance
AS 4332	The storage and handling of cylinders
AS 4508	Thermal resistance of insulation for ductwork used in building air conditioning
AS 5601	Gas Installation
AS/NZS ISO 14644	Cleanrooms and associated controlled environments
AS / NZS ISO 9001	Quality systems – model for quality assurance in design, development, production, installation and servicing
NCC (BCA 2016)	Building Code of Australia
	NSW Service Rules, Regulations and Requirements and Requirements of the local Electrical Supply Authority
	WH&S authority requirements and CHAIR (Safety-in-Design)
	Local council regulations with jurisdiction on this project
	Environmental consideration documents
	NSW Fire and Rescue requirements

The latest and current edition with amendments of referenced documents shall be used except where other editions or amendments are required by statutory authorities or the client.

- University of Wollongong Mechanical Services and Building Monitoring and Control Systems Design Standards.
- Hassell Schematic Design architectural and layout drawings
- ARUP Ecologically Sustainable Design (ESD) report
- Group DLA BCA Design Report
- ABS Fire Safety Fire Engineering report
- ARUP Electrical Design Report
- ARUP Acoustic Design Report

All systems shall comply with the above except where otherwise stated.

2.1 External Design Criteria

The external ambient design conditions shall be in accordance with AIRAH; Application Manual DA09 'Load Estimation & Psychometrics'.

Table 1 External Ambient Design Criteria

For all general areas (offices, teaching spaces, lecture theatres and laboratories) the outdoor design condition shall be:

Summer: 29.6°C db/23°C wb

Winter: 7.8°C db

For critical areas (such as IT server rooms) the outdoor design condition shall be:

Summer: 35°C db/28°C wb

Winter: 4.0°C db

Note: All critical areas must be agreed with the UOW Project Manager.

For selection of air cooled and evaporated heat rejection plant the outdoor condition shall be:

Summer: 32°C db/23°C wb

Extract from UOW Design Standards Rev 5 – 6 June 2013

2.2 Internal Design Temperatures and Relative Humidity

All internal design temperatures and relative humidity shall be in accordance with the below table

Table 2 Internal Design Temperatures and Relative Humidity

Space Name	Temperature dB (˚C dB)	Relative Humidity (%)
Main Lobby	Tempered conditioning	Not Controlled
Main Reception	Tempered conditioning	Not Controlled
General circulation areas	Naturally ventilated	Not Controlled
Student Print	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Informal Learning Spaces	Tempered conditioning	Not controlled
CTA (Common Teaching Area)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Staff Multipurpose Room	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Kitchen	Tempered conditioning	Not controlled
Edit Post Production Suites	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Tech Services Office & Loans Counter	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Tech Workshop	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Utility (Print Room)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Large Performance Space	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Small Performance Space	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Performance Space Control Room 1	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Performance Space Control Room 2	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)

Space Name	Temperature dB (˚C dB)	Relative Humidity (%)
Performance Storage Area	Ventilation Only	Not controlled
Storage cages	Ventilation Only	Not controlled
Unisex Dressing Rooms	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Unisex Change Rooms	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Workshop (Theatre)	Mechanically ventilated	Not controlled
Rehearsal Space	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Rack Room	22degC +/- 1.5DegC (TBC depending on equipment)	40% - 60% ((TBC depending on equipment)
Dimmer Room	22degC +/- 1.5DegC (TBC depending on equipment)	40% - 60% (TBC depending on equipment)
Music Edit Suite	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Sound Recording Rooms	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Large Sound Recording Control Room (Studio A)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Small Sound Recording Control Room (Studio B)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Music Computer Lab	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Small Rehearsal/ Breakout Spaces	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Teaching and Performance Space	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
3D Audio Studio	22degC +/- 1.5DegC	40% - 60% (Not controlled)
Music Store	Ventilation Only	Not controlled
Video (Screen) Production Studio (Includes Director's Suite + Store)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Radio Studio 2	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Radio Studio 1	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Radio Studio Directors Suite	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Multimedia Visual Communications Design Digital Lab	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Digital Lab	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
News Room (Multimedia Digital Production) Space	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Maker Space	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Design Studio	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Project Room	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)

Space Name	Temperature dB (˚C dB)	Relative Humidity (%)
Gallery	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Gallery Store	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Meeting Room (Medium)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Community Project Room / Meeting Room	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Community Project Room / Meeting Room - Store Room	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Social Work Simulation Space	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
WHS + Ergonomics Lab Store	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
WHS Lab (Wet Lab)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Ergonomics Lab	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Social Sciences Digital Lab	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Human Geography Lab (Collaboratory)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Office -Academic (Individual)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
HoS Office	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
School Office	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Fit factor	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Research Assistance	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Office-Professional Staff (Individual)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Professional Staff	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Casual Staff + HDR Students workplace	22degC +/- 1.5DegC	40% - 60% (Not controlled)
Office-Visiting Fellows	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Utility (Print Room)	22degC +/- 1.5DegC	40% - 60% (Not controlled)
Geography Store room	Ventilation Only	Not controlled
Office-Academic (Individual)	22degC +/- 1.5DegC	40% - 60% (Not controlled)
HoS Office	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
School Office	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Fit factor (including for preferred option C planning approach)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Research Assistant	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Offices- Professional Staff (Individual)	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)

Space Name	Temperature dB (˚C dB)	Relative Humidity (%)
Professional Staff workplace	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Office- Casual Staff	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
HDR Student Offices	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Visiting Fellow	22.5degC +/- 1.5DegC	40% - 60% (Not controlled)
Utility (Print Room)	22degC +/- 1.5DegC	40% - 60% (Not controlled)
Plantrooms	Ventilation Only	Not controlled

Notes:

- *Areas above will not be provided with active humidity control and shall generally be maintained between the figures shown annually, inherently through the air conditioning process.

2.3 Minimum Ventilation Rates and Filtration Grades

The figures tabulated below are considered to be minimum values, these values may be exceeded if it is found during air balancing that additional outside air or exhaust air is required.

Table 3 Minimum Ventilation Rates & Filtration Grades

Space Design	Assumed space type from AS 1668.2 -2012	Net Floor Area Per Person (m^2/p)	O/A Quantity	Units	Ventilation Rate	Filtration Grade
Main Lobby	N/A	N/A	N/A	N/A	-	N/A
Main Reception	N/A	N/A	N/A	N/A	-	N/A
General circulation areas	N/A	N/A	N/A	N/A	-	N/A
Student Print	Document copying process	N/A	N/A	N/A	5 l/s per m2	
Informal Learning Spaces	N/A	N/A	N/A	N/A	-	N/A
CTA (Common Teaching Area)	Lecture halls	0.6	7.5	L/s.person	N/A	G4- Pre filter – F6 or F7
Staff Multipurpose Room	Lounges	1.5	7.5	L/s.person	N/A	G4- Pre filter – F6 or F7
Kitchen	N/A	N/A	N/A	N/A	-5 l/s per m2	N/A
Edit Post Production Suites	N/A	Based on Arch seating plan	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Tech Services Office & Loans Counter	Training Room	10	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Tech Workshop	Training Room	10	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Utility (Print Room)	Document copying process	N/A	N/A	N/A	5 l/s per m2	
Large Performance Space	Auditoriums	0.6	7.5	L/s.person		G4- Pre filter – F6 or F7
Small Performance Space	Auditoriums	0.6	7.5	L/s.person		G4- Pre filter – F6 or F7
Performance Space Control Room 1	Office Areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Performance Space Control Room	Office Areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7

Space Design	Assumed space type from AS 1668.2 -2012	Net Floor Area Per Person (m^2/p)	O/A Quantity	Units	Ventilation Rate	Filtration Grade
2						
Performance Storage Area	Storage areas	N/A	N/A	N/A	5 l/s per m2	G4- Pre filter – F6 or F7
Storage cages	Storage areas	N/A	N/A	N/A	5 l/s per m2	G4- Pre filter – F6 or F7
Unisex Dressing Rooms	Dressing Rooms	2	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Unisex Change Rooms	Dressing Rooms	2	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Workshop (Theatre)	N/A	N/A	1	L/s.m2 floor	N/A	N/A G4- Pre filter – F6 or F7
Rehearsal Space	Training Room	3.5	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Rack Room	N/A	N/A	N/A	L/s.person	-	N/A
Dimmer Room	N/A	Based on Arch seating plan	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Music Edit Suite	N/A	Based on Arch seating plan	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Sound Recording Rooms	N/A	Based on Arch seating plan	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Large Sound Recording Control Room (Studio A)	N/A	Based on Arch seating plan	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Small Sound Recording Control Room (Studio B)	N/A	Based on Arch seating plan	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Music Computer Lab	Computer rooms	25	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Small Rehearsal/ Breakout Spaces	Training Room	3.5	7.5	L/s.person	-	G4- Pre filter – F6 or F7
Teaching and Performance Space	Auditoriums	0.6	7.5	L/s.person		G4- Pre filter – F6 or F7
3D Audio	N/A	Based on	7.5	L/s.person	-	G4- Pre

Space Design	Assumed space type from AS 1668.2 -2012	Net Floor Area Per Person (m^2/p)	O/A Quantity	Units	Ventilation Rate	Filtration Grade
Studio		Arch seating plan				filter – F6 or F7
Music Store	Storage areas	N/A	N/A	N/A	5 l/s per m2	G4- Pre filter – F6 or F7
Video (Screen) Production Studio (Includes Director's Suite + Store)	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Radio Studio 2	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Radio Studio 1	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Radio Studio Directors Suite	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Multimedia Visual Communications Design Digital Lab	Laboratories	3.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Digital Lab	Laboratories	3.5	7.5	L/s.person		G4- Pre filter – F6 or F7
News Room (Multimedia Digital Production) Space	N/A	Based on arch plans	7.5	L/s.person		G4- Pre filter – F6 or F7
Maker Space	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Design Studio	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Project Room	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Gallery	Studios	1.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Gallery Store	Studios	N/A	N/A	N/A	5 l/s per m2	G4- Pre filter – F6 or F7

Space Design	Assumed space type from AS 1668.2 -2012	Net Floor Area Per Person (m^2/p)	O/A Quantity	Units	Ventilation Rate	Filtration Grade
Meeting Room (Medium)	N/A	Based on arch plans	7.5	L/s.person		G4- Pre filter – F6 or F7
Community Project Room / Meeting Room	N/A	Based on arch plans	7.5	L/s.person		G4- Pre filter – F6 or F7
Community Project Room / Meeting Room - Store Room	N/A	Based on arch plans	7.5	L/s.person		G4- Pre filter – F6 or F7
Social Work Simulation Space	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
WHS + Ergonomics Lab Store	Laboratories	3.5	7.5	L/s.person		G4- Pre filter – F6 or F7
WHS Lab (Wet Lab)	Laboratories	3.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Ergonomics Lab	Laboratories	3.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Social Sciences Digital Lab	Laboratories	3.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Human Geography Lab (Collaboratory)	Laboratories	3.5	7.5	L/s.person		G4- Pre filter – F6 or F7
Office - Academic (Individual)	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
HoS Office	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
School Office	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Fit factor	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Research Assistance	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Office- Professional	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or

Space Design	Assumed space type from AS 1668.2 -2012	Net Floor Area Per Person (m^2/p)	O/A Quantity	Units	Ventilation Rate	Filtration Grade
Staff (Individual)						F7
Professional Staff	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Casual Staff + HDR Students workplace	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Office-Visiting Fellows	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Utility (Print Room)	Office areas / Document copy	N/A	N/A	N/A	5l/s per m2	
Geography Store room		N/A	N/A	N/A	5 l/s per m2	G4- Pre filter – F6 or F7
Office-Academic (Individual)	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
HoS Office	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
School Office	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Fit factor (including for prefered option C planning approach)	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Research Assistant	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Offices-Professional Staff (Individual)	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Professional Staff workplace	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Office- Casual Staff	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
HDR Student Offices	Office areas	10	7.5	L/s.person		G4- Pre filter – F6 or F7
Visiting Fellow	Office areas	10	7.5	L/s.person		G4- Pre

Space Design	Assumed space type from AS 1668.2 -2012	Net Floor Area Per Person (m^2/p)	O/A Quantity	Units	Ventilation Rate	Filtration Grade
						filter – F6 or F7
Utility (Print Room)	Document copying process	N/A	N/A	N/A	5 l/s per m2	
Plantroom	Naturally Ventilated					

Note:

1) Minimum outdoor air rate 7.5 l/s based on particulate filtration being provided. Reference AS1668.2-2012 Appendix D.
2) Minimum floor area per person is listed in table above. Throughout detailed design, when architectural plans are developed the higher occupancy rate between minimum AS 1668.2 requirements and architectural seating plans will be used.

2.4 Internal Lighting, Equipment & Occupancy Heat Loads

Internal Lighting, Equipment and Occupancy heat loads are as follows.

The lighting loads tabulated below are for general house lighting. Additional specialist lighting loads for performance and theatre areas will be coordinated with the Performance and Theatre Consultant during detailed design.

Table 4 General Preliminary Lighting Loads by ARUP Rev July 2017

Area	Space Name	Lighting (W/m²)
Common Facilities	Main Lobby	15
Common Facilities	Main Reception	10
Common Facilities	Small Meeting Room	10
Common Facilities	Student Print	9
Common Facilities	Informal Learning Spaces	8
Common Teaching Facilities	CTA (Common Teaching Area)	8
Common Office Facilities	Staff Multipurpose Room	6
Common Office Facilities	Kitchen	8
TAEM Common Facilities	Edit Post Production Suites	9
TAEM Common Facilities	Tech Services Office & Loans Counter	9
TAEM Common Facilities	Tech Services Office & Loans Counter	9
TAEM Common Facilities	Tech Workshop	10
TAEM Offices	Academic Office	9
TAEM Offices	Hot Desk Office Space	9
TAEM Offices	Utility (Print Room)	9
TAEM Performance & Theatre	Large Performance Space	10
TAEM Performance & Theatre	Small Performance Space	10
TAEM Performance & Theatre	Performance Space Control Room 1	10
TAEM Performance & Theatre	Performance Space Control Room 2	10
TAEM Performance & Theatre	Performance Storage Area	8
TAEM Performance & Theatre	Storage cages	8
TAEM Performance & Theatre	Unisex Dressing Rooms	10
TAEM Performance & Theatre	Unisex Change Rooms	10
TAEM Performance & Theatre	Workshop (theatre)	9
TAEM Performance & Theatre	Rehearsal Space	9
TAEM Performance & Theatre	Rack Room	12
TAEM Performance & Theatre	Dimmer Room	12
TAEM Music	Music Edit Suite	12
TAEM Music	Sound Recording Rooms	12
TAEM Music	Large Sound Recording Control Room (Studio A)	12
TAEM Music	Small Sound Recording Control Room (Studio B)	12
TAEM Music	Music Computer Lab	12
TAEM Music	Small Rehearsal/ Breakout Spaces	9

Area	Space Name	Lighting (W/m²)
TAEM Music	Teaching and Performance Space	10
TAEM Music	3D Audio Studio	12
TAEM Music	Music Store	12
TAEM Communication & Media Production	Video (Screen) Production Studio (Includes Director's Suite + Store)	12
TAEM Communication & Media Production	Video Production store	10
TAEM Communication & Media Production	Radio Studio	12
TAEM Communication & Media Production	Radio Studio (TBC)	12
TAEM Communication & Media Production	Radio Studio Directors Suite	12
TAEM Communication & Media Production	Multimedia Visual Communications Design Digital Lab	12
TAEM Communication & Media Production	Digital Lab	12
TAEM Communication & Media Production	News Room (Multimedia Digital Production) Space	12
TAEM Visual Communication Design	Maker Space	12
TAEM Visual Communication Design	Design Studio	12
TAEM Visual Communication Design	Project Room	9
TAEM Visual Arts	Gallery	12
TAEM Visual Arts	Gallery Store	8
SOC common spaces	Meeting Room (Medium)	10
SOC common spaces	Community Project Room / Meeting Room	10
SOC common spaces	Community Project Room / Meeting Room - Store Room	10
Specialised Teaching Facilities	Social Work Simulation Space	9
Specialised Teaching Facilities	WHS + Ergonomics Lab Store	8
Specialised Teaching Facilities	WHS Lab (Wet Lab)	12
Specialised Teaching Facilities	Ergonomics Lab	12
Specialised Teaching Facilities	Social Sciences Digital Lab	12
Specialised Teaching Facilities	Human Geography Lab (Collaboratory)	12
SGSC Workplace	Office -Academic (Individual)	9
SGSC Workplace	Hos Office	9
SGSC Workplace	School office	9
SGSC Workplace	Fit factor (including for prefered option C planning approach)	9
SGSC Workplace	Office-Research Assistance (Shared)	9
SGSC Workplace	Office-Professional Staff (Individual)	9
SGSC Workplace	Office-Professional Staff (Shared)	9
SGSC Workplace	Office-Casual Staff + HDR Students	9
SGSC Workplace	Office-Visiting Fellows	9

Area	Space Name	Lighting (W/m²)
SGSC Workplace	Utility (Print Room)	9
SGSC Workplace	Geography Store room	8
HAS Workplace	Office-Academic (Individual)	9
HAS Workplace	Hos Office	9
HAS Workplace	School office	9
HAS Workplace	Fit factor (including for prefered option C planning approach)	9
HAS Workplace	Office-Research Assistant (Shared)	9
HAS Workplace	Offices- Professional Staff (Individual + Shared)	9
HAS Workplace	Office- Casual Staff	9
HAS Workplace	Office-HDR Student Offices (Shared)	9
HAS Workplace	Office-Visiting Fellow (Shared)	9
HAS Workplace	Utility (Print Room)	9
Circulation Plant	Circulation / Plant Equipment / Fire Escapes / Walls and structure/ Amenities – Approx. 30% Allowance	8
Circulation Plant	FMD Store	8

Table 5 General Equipment Loads

Equipment loads shall be coordinated during detailed design.

Table 6 Internal Heat Gains from People

Degree of Activity	Typical Application	Metabolic Rate (watts)	Room Dry Bulb Temperature	
			24deg°C	
			Watts	Watts
			Sensible	Latent
Seated, Standing	Offices	140	70	60

Notes: 1) Reference AIRAH DA09 – Table 45 – Heat Gain from People

3.0 Mechanical Engineering Services

3.1 Central Chilled Water Plant

3.1.1 System Type

Central refrigeration cooling plant for air conditioning systems of the Western Building shall be provided by dedicated chiller plant. Allowance for SDR is for two (2) water cooled chillers to be located on the roof on the North East end of the roof plantroom utilising the vapour compression cycle to generate chilled water.

A chiller options report shall be prepared during detailed design to justify final selection of chiller type and arrangement. This is in accordance with University of Wollongong Mechanical Services Design Standards.

3.1.2 Chiller Arrangement

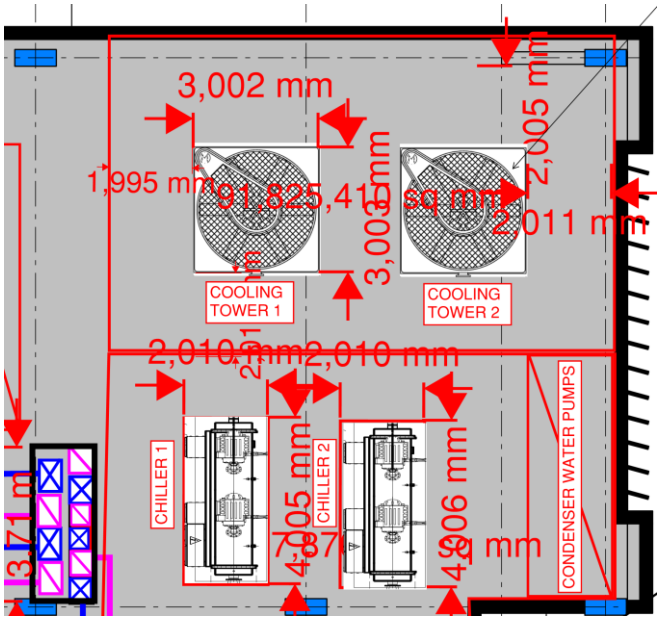
A preliminary chiller capacity calculated based on space cooling load requirements utilising general watts per m2 allowances is estimated to be 1400 kWr. This peak estimated chiller load includes cooling of all areas identified within this report.

Proposed arrangement is to select 2 chillers at approximately 65% of this load to provide optimum chiller performance, good capacity staging control for other load scenarios throughout the year inclusive of low load operation, and to provide a degree of redundancy in event of failure of one chiller.

The chiller sequencing and operational control strategy shall be designed and implemented to maximise overall operational efficiency.

Proposed chiller arrangement is as follows;

- Duty Chiller 1 (CH-1) – 900 kW
- Duty Chiller 2 (CH-2) – 900 kW



The chilled water and condenser water system shall be complete with all associated chilled water flow and return headers, reticulation pipework, an ultrasonic flow measuring meter, differential pressure and temperature sensors, a pressurised expansion and make-up tank, valves, actuators, power, controls, fixtures, fittings and associated work required for the satisfactory installation, commissioning and operation of the chilled water system

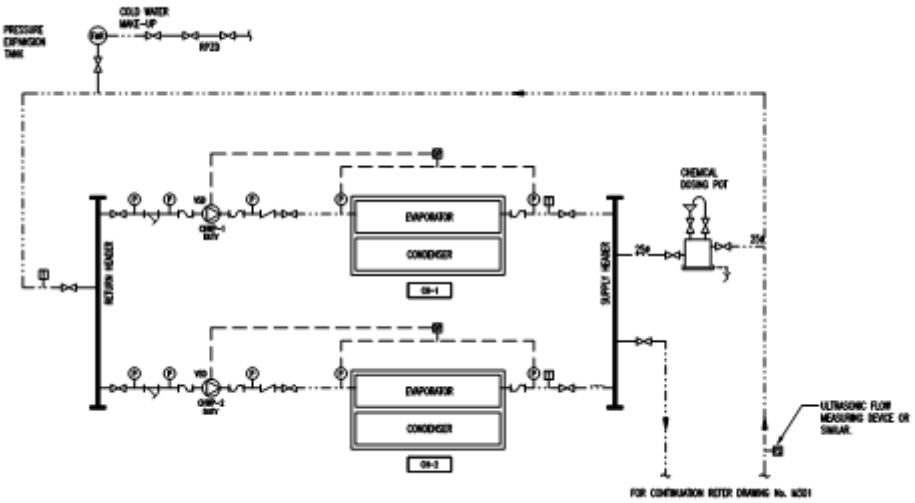
A detailed Chiller Options Report shall be developed in the detailed design stage. The aim of the Chiller Options report shall be to review and assess options for central chilled water plant to provide the cooling requirements of the building based on results of heat load calculation, capital cost, operational and maintenance costs, and life cycle cost analysis for both air and water cooled chiller plant options.

3.1.3 Chilled Water Pumping & Circuit Arrangement

A primary only system shall be implemented. Chiller 1 and Chiller 2 shall be provided with a dedicated duty Chilled water pump.

All chilled water pumps shall be configured for variable flow via variable frequency drives (VFDs). Thermal expansion shall be implemented into the circuit alongside an air and dirt separator which will be located on the return chilled water line.

The chilled water primary variable flow system will incorporate field bypasses with modulating control valve(s) in parallel (The size and quantity of valves shall be determined based on minimum pump flow rate required). As the control valves out in the system close, the bypass control valves will begin to modulate open to maintain the minimum required pump flow when only a single pump/chiller is required to meet the load.



The associated chilled and condenser water pumps shall be located in an enclosed plant area adjacent to the chillers.

3.1.4 Central Chilled Water Plant Location & Accessibility

The chillers shall be located in roof plantroom together with associated chilled water pumps, alongside the mechanical switchboard serving these items. Good spatial access shall be provided for chiller maintenance to be performed safely and to comply with recommended manufacturers' clearances. Access to the plantroom for routine maintenance is via lift or stairs to the roof plantroom. The chiller plantroom shall be mechanically or naturally ventilated to be determined during detail design.

3.2 Central Heat Rejection Plant

3.2.1 System Type

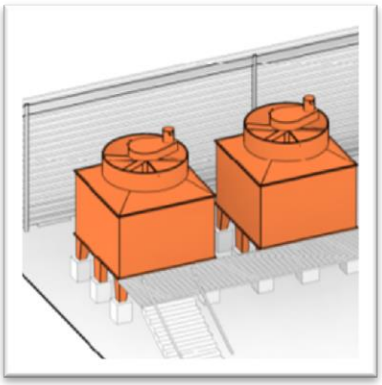
Allowance in SDR is for the central heat rejection plant to be provided by two equally sized induced draft, single cell cooling towers.

3.2.2 Cooling Tower Arrangement

Two cooling towers will operate to supply the total heat rejection requirements of the above chiller plant as follows;

- 2 off cooling towers at Nominal 1100 kWr heat rejection capacity
- CDW Entering and Leaving water temperatures = 36°C/29°C (to be confirmed during detailed design)
- Ambient Design 35°C DB / 25°C WB

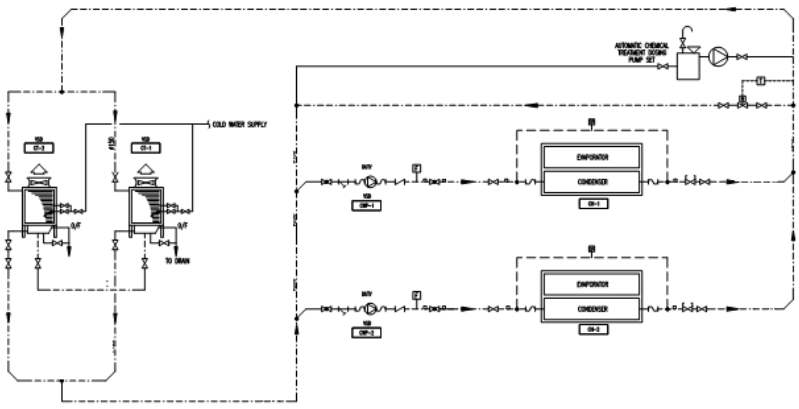
All cooling tower fans shall be provided with variable speed drives (VSDs). The cooling towers will operate in parallel configuration with staging of cooling towers and fan speeds controlled by the chiller optimisation controller to maximise operational efficiency of the chillers and cooling towers. A condenser water bypass line with modulating valve shall be provided for low load operation.



3.2.3 Condenser Water pumping arrangement

Each chiller shall be provided with a dedicated duty condenser water pump located at roof level. All condenser water pumps shall be configured for variable flow via variable frequency drives (VFDs).

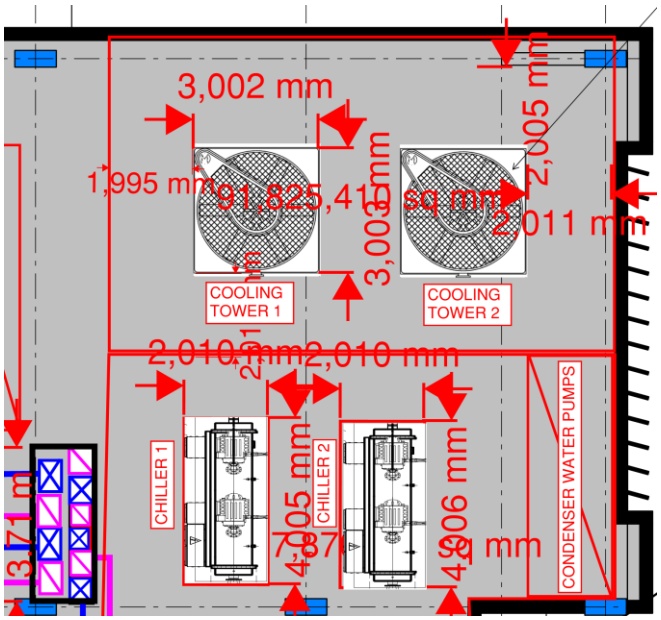
Proposed condenser water schematic is shown below.



3.2.4 Central Heat Rejection Plant Location & Accessibility

The cooling towers shall be located on roof level within an open plant area on the north east side of the building. Good spatial access complete with suitable OH&S compliant platforms and ladders shall be provided for safe maintenance and cleaning of the cooling towers and access to fans and motors. Minimum manufacturer's recommended clearances around the cooling towers shall be provided.

A proposed layout of cooling towers is shown below.



3.3 Central Heating Plant

3.3.1 System Type

The central space heating for the building shall be provided by two (2) natural gas fired space heating hot water generators.

3.3.2 Hot Water Generator Arrangement

The facilities total space heating load demand is dynamic, based on internal occupancy, area usage and external ambient temperature.

The heating water plant shall comprise gas fired forced draft hot water generators located in the main roof plantroom within a separate enclosure. A dedicated heating hot water pump shall be provided for each hot water generator in the Plantroom.

The roof plant area where the water heaters are to be located shall be naturally ventilated to the requirements of AS 5601.

The site gas operating pressure shall be checked and confirmed as being suitable for the proposed water heater burner type during detailed design.

Based on SDR estimate of 600 kW total heating requirement, the proposed configuration of the two gas hot water generators is as follows;

- Space Heating Hot Water Generator 1 (HWG - 1) – 400kW
- Space Heating Hot Water Generator 2 (HWG - 2) – 400 kW

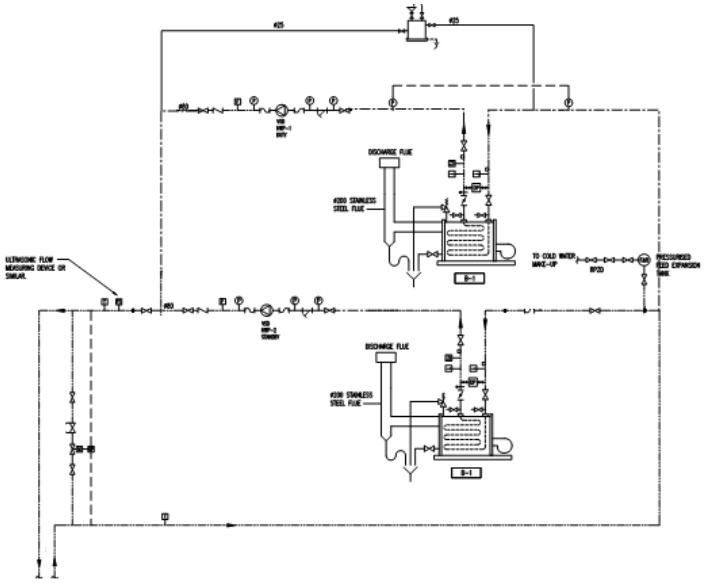
The hot water generators have been selected at approximately 65% of the total required capacity to operate in parallel configuration with a bypass line and associated modulating valve for efficient low load operation and to provide some redundancy (to be confirmed during detailed design).

3.3.3 Pumping & Circuit Arrangement

A primary pumping system shall be implemented where each space heating hot water generator will have a dedicated variable speed pump located downstream of each generator in a parallel arrangement as shown below. Thermal expansion shall be incorporated into the circuit alongside an air and dirt separator.

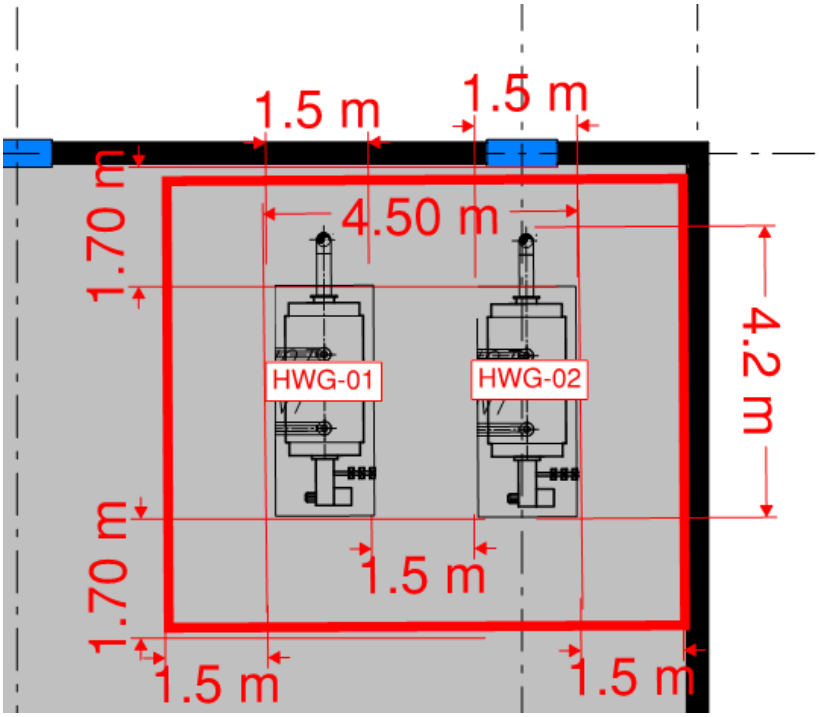
The heating water variable flow system will incorporate a bypass with modulating control valve. As the control valves out in the system close, the bypass control valve will begin to modulate open to maintain the minimum required flow when only a single pump/hot water generator is required to meet the load.

A hot water generator schematic is shown below.



3.3.4 Central Heating Plant Location & Accessibility

The space heating hot water generators (HWGs) shall be located on roof level together with their associated heating hot water pumps in a dedicated naturally ventilated enclosure. Good spatial access shall be provided around the central heating plant and pumps for maintenance tasks to be carried out safely and to comply with manufacturer's recommended clearances.



3.3.5 Fluing Arrangements

Each generator shall be provided with a dedicated flue that rises vertically above the roof Space Heating Hot Water Generator Plantroom roof to discharge in compliance with AS 1668.2 requirements for an obnoxious discharge. The flues shall terminate a minimum of 1 m above the highest point of the roof (subject to confirmation by the local Gas Authority Inspector) and be located a minimum of 6 m away from any outside air intakes.

3.3.6 Domestic Hot Water Interface

Domestic hot water will be delivered by separate standalone hydraulic services plant with no integration provided to the space heating hot water generators.

3.3.7 Heating Hot Water ΔT

A heating water differential of 20K that being the difference in temperature of the heating water leaving the hot water generator and the water entering the hot water generator is proposed (HHWF of 80°C and HHWR of 60°C) for increased efficiency in the HHW reticulation and pumping energy.

3.4 General Air Conditioning & Ventilation

3.4.1 Air Conditioning System Design – General Occupied Areas (Theatres, Offices, Laboratories)

Air handling units (AHUs) located in the main roof plantroom and Level 1 plantrooms serve levels Ground to 3. Each AHU shall comprise supply air fan with high efficiency motor in accordance with BCA Section J requirements, cooling and heating coils, deep bed filters, all housed in sandwich panel construction or alternatively double skin insulated sheet metal casing. Outdoor air economiser cycles shall be provided for air handling systems in accordance with BCA Section J requirements, equipment schedules, and as shown on the drawings. AHUs shall be complete as applicable with variable speed drives, return/relief fan, ductwork, internal and external insulation, attenuators, motorised dampers, variable air volume boxes, electric trim heating, valves, actuators, diffusers, variable volume diffusers (thermafusers), grilles, power, temperature sensors, controls, fixtures, fittings, condensate drains, and associated work required for the satisfactory operation of the systems. Installation of all AHUs shall be in accordance with manufacturer's specification and BCA Section J requirements. Air handling units serving the occupied spaces will be one of the following configurations:

i. Constant volume with central chilled and heating water coils.

ii. Constant Volume as above but also provided with Variable Speed Drives (VSD's) for easy of commissioning and future flexibility.

iii. Variable speed drive (VSD) AHUs where on floor variable air volume boxes (VAV's) are used to cater for thermal zoning or variable occupancy loads.

iv. Variable speed drive (VSD) AHUs serving larger labs or teaching spaces provided with variable volume diffusers (thermafusers) and trim re-heaters for perimeter zone to cater for variability in solar loads and internal people and equipment heat gains.

FCUs (fan coil units) shall be provided with high efficiency motors in accordance with BCA Section J requirements, cooling and heating coils, disposable panel filters, and complete as applicable with variable speed drives, ductwork, attenuators, internal and external insulation, variable air volume boxes, electric trim heating, valves, actuators, diffusers, grilles, power, temperature sensors, controls, fixtures, fittings, condensate drains, and associated work required for the satisfactory operation of the systems. Installation of all FCUs shall be in accordance with the manufacturer's specification.

3.4.1.1 Project Acoustic Requirements

The building comprises of spaces where stringent acoustic requirements are required. These rooms include

- Performance and Theatre Spaces
- Music Spaces
    - Teaching and Performance
    - Rehearsal Room
    - Recording Studios and 3D Audio Studio
- Communications and Media Production Spaces
    - Video Production
    - Radio Studios, Director Suite and Edit Suites
    - Visual Arts and Digital Media
- Workplace Health and Safety Labs
- Common Teaching Spaces and Workspaces

The mechanical systems shall be designed to achieve the noise criteria recommended by the Acoustic consultant. This includes detailed selection of plant and attenuators, and design of low air velocity ductwork and terminal air diffusion.

Plant and equipment may need to be located in specific areas to achieve the required background noise levels.

These measures shall be developed throughout the detailed design stage together with the acoustic consultant.

3.4.1.2 Plant Location & Reticulation

All FCUs and AHUs shall be located on the L4 roof and Level 1 plantrooms. There may be some localised CHW FCUs serving Comms and Electrical equipment rooms on the floor.

Outdoor air shall be provided via plantroom external louvres and via louvres on external walls as required.

3.4.1.3 Plant Control

In cooling mode, each VAV zone will have a dedicated temperature sensor which will send a signal to the DDC calling for cooling, the cooling coil motorised chilled water valve will regulate based on high select whilst those zones which require less cooling will modulate back the VAV to ensure these areas are not over cooled. Heating Control is based on the same principle as cooling.

For constant volume systems, temperature control shall be via the respective space temperature sensor.

3.4.2 Air Conditioning System Design – Circulation Spaces

A natural ventilation system shall be incorporated for the general circulation spaces.

Circulation areas where there will be high people load (e.g. Main lobby area and Inter spaces), localised tempered cooling/heating shall be provided to cater for ventilation to the areas.

In all circulation areas, temperature and humidity are not actively controlled.

Operable louvres shall be provided were necessary to promote natural ventilation of circulation spaces and provide acceptable internal conditions.

The BMCS will have a roof mounted weather monitoring station with an extreme weather override function to close the louvres when external ambient conditions are not suitable for natural ventilation, or to protect the building against damage during heavy rainfall or high wind speeds.

3.4.1 Exhaust Air Systems Design – General Toilet areas

Toilets will be exhausted by central exhaust systems at a higher rate of 10 L/s per m^2 or 25L/s per fixture. A common exhaust riser system will be ducted to each toilet on respective levels and the exhaust fan shall be installed on the roof or in designated mechanical spaces and discharged to the exterior. Make-up air will be transferred from adjacent conditioned areas.

Exhaust and makeup airflow rates shall be in accordance with AS 1668.2.

3.4.2 Exhaust Air Systems Design – WHS Wet Lab (Fume Cupboards)

WHS Wet Lab Fume Cupboard system complete with fume cupboard, PVC exhaust ductwork and exhaust fan and all services connections, safety interlocks power, controls, fixtures, fittings and associated work required for the satisfactory installation and commissioning of the fume cupboard systems in accordance with AS/NZS 2243.8 and AS/NZS 2982 requirements.

Discharge from fume cupboard exhaust fan shall be ducted in circular fibreglass reinforced PVC ductwork to discharge 3 metres above the roof of the plantroom.

The fume cupboard exhaust fan and discharge ductwork shall be located in a naturally ventilated plantroom separated from the main roof plantroom.

3.4.3 Electrical / Comms Equipment Rooms

Each electrical equipment room will be provided with an air conditioning unit or general exhaust fans to protect against overheating of the electrical equipment and maintain space temperatures below 27°C. Fan coil units will be ducted units located external to the electrical rooms where possible.

3.4.4 Mechanical Ventilation Installation

Various mechanical ventilation systems shall be provided to serve the various areas, including mechanical plant rooms, switch rooms, pump rooms, electrical and hydraulic plant rooms, etc.

3.4.5 Condensate Drainage Installation

A comprehensive condensate drainage system shall be provided and connected in general to the sanitary drainage system.

Proper air trap shall be provided to avoid back-flow of foul odours to air handling equipment via the condensate drainage system.

Use of pumped condensate waste will be avoided wherever possible.

3.5 Fire and Smoke Management

All mechanical services plant and equipment shall shutdown in the event of a fire trip signal with the exception of fume cupboard exhaust fans operating at the time of the fire trip in accordance with AS/NZS 2243.8 requirements.

Fire trip signal wiring shall be provided by the Fire Services trade to terminate adjacent to all Mechanical Services Switchboards (MSSBs) and Mechanical Control Panels (MCPs) required to be tripped in Fire Mode.

The facility shall be provided with appropriate smoke management systems to meet the specific needs of the various Entertainment venues in accordance with AS 1668.1, NCC 2016 and any fire engineered solutions.

Smoke exhaust shall also be provided to the main entry Atrium to comply with the fire engineering requirements.

Smoke management system shall be developed in compliance with the project's Fire Engineering Report and BCA consultant.

3.6 Environmentally Sustainable Design

As part of the development there is a clear focus on ESD being included inherently within the design.
In order to achieve the ESD goals of the project, it is important that the design is further developed during the DD Phase to include energy efficient equipment, controls & monitoring to assist in the ongoing energy use of the facility and materials supplied from sustainable sources.

Throughout the design development stage, the mechanical design shall incorporate the agreed ESD initiatives in the ESD report.

4.0 Building Management and Control System (BMCS)

4.1 Building Management and Controls System (BMS)

A DDC BMS installation operating on an open protocol shall be provided to monitor and control the building services installations. The BMS shall include the following features:

- The BMS installation shall be provided with high level interfacing capability to include, but not limited to chiller management system, hot water generators, main LV switchboards etc. The LV switchboard interface shall provide for monitoring capability only.
- The BMS installation shall be provided with Web Browsing (Ethernet) Provisions to enable remote monitoring of the system performance.
- The BMS installation shall be provided with automatic paging system by sending Short Message Services (SMS) to designated receivers with at least four levels of authority.
- The BMS shall operate on an open protocol platform and shall be of fully distributed intelligence type designed to control and monitor building services installations including HVAC installation, electrical installation, security, lifts, plumbing and drainage installation. Common alarms from fire services and security system shall be repeated in BMS monitoring. Trending and logging of data shall be stored for a minimum of 30 days.
- The BMS shall operate on a common fibre backbone with distributed data gathering panels connecting to local controllers.

The BMS installation shall also perform the following operational control and monitoring functions:

- Main air conditioning system, cooling plant and heating plant operational control and monitoring, optimization and trend logging.
- Air conditioning temperature and operational status monitoring, alarm event logging.
- Mechanical ventilation control and status monitoring.
- Smoke extraction system monitoring.
- Electrical system monitoring and energy auditing of incoming switch for main switchboards.
- Interface with and monitoring of mechanical metering. The interface with mechanical metering shall be further evaluated during the design process.
- Status and alarm monitoring of the plumbing and drainage installation.
- Alarm event logging for lift installation, fire services pumps and fire common alarm.
- Monitoring of lighting control
- Other specialist functions, including maintenance services scheduling, spare parts logging, interface to Building / Engineering Manager System etc.

4.2 Mechanical Metering

Energy and water meters will be provided for the various components of the Mechanical systems and will include but not be limited to the following:

- Energy kW meter for the main central plant chilled water system.
- Energy kW meter for space heating hot water system.
- Electrical meters for electrical distribution boards.
- Hydraulic services water meters.

Each meter will have capabilities to connect to the nominated energy monitoring system and building management system (BMS) for monitoring and reporting purposes.

ISO A1 594mm x 841mm

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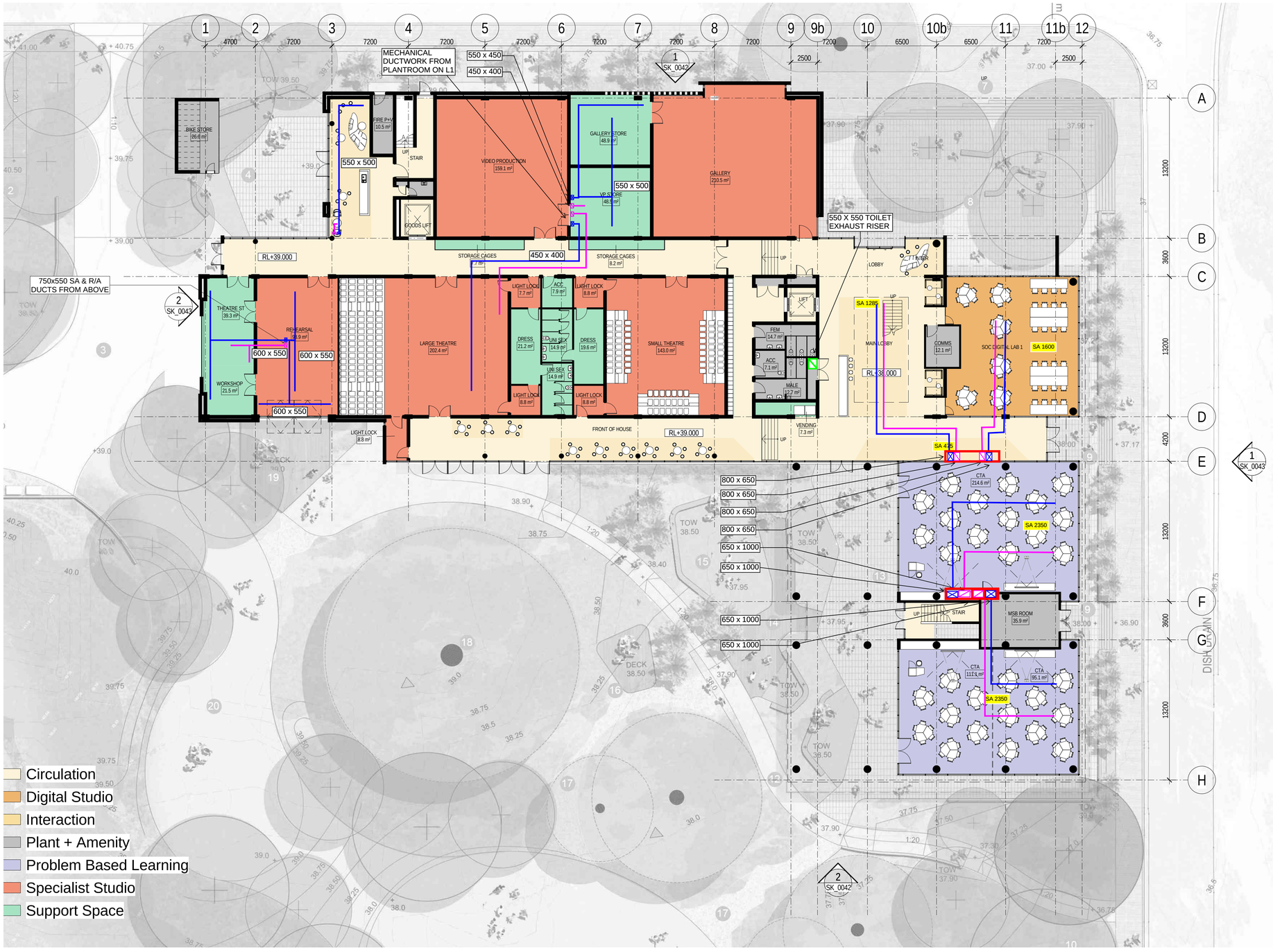

This drawing is confidential and shall only be used for the purpose of this project. The signing of this title block confirms the design and drafting of this project have been prepared and checked in accordance with the AECOM quality assurance system to ISO 9001-2000.

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PROJECT

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CLIENT

UNIVERSITY OF WOLLONGONG AUSTRALIA

PROJECT MANAGER

DONALD CANT WATTS CORKE

PROJECT MANAGEMENT INITIALS

DESIGNER	CHECKED	APPROVED
KI	DS	DS

ISSUE/REVISION

D	04 / 10 / 17	REVISED SD ISSUE
C	13 / 09 / 17	REVISED SD ISSUE
B	01 / 09 / 17	SD ISSUE
A	28 / 08 / 17	SD FOR COORDINATION
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60545235

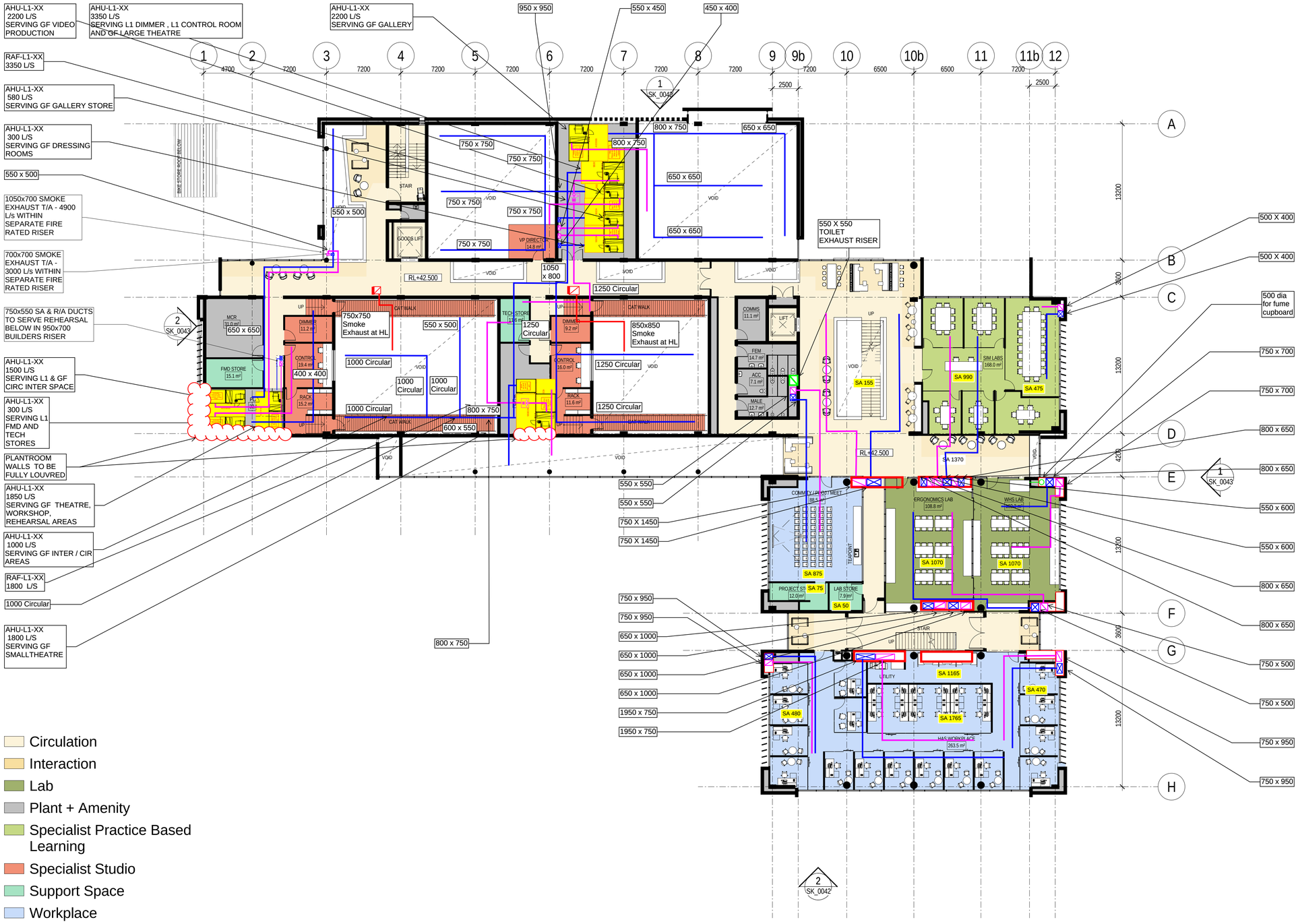
SHEET TITLE

MECHANICAL SERVICES
GROUND FLOOR

SHEET NUMBER

60545235-ME-000

ISO A1 594mm x 841mm



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HASSELL

0 2500 5000 mm
1:200 @ A1

PROJECT

UNIVERSITY OF WOLLONGONG
WESTERN BUILDING

CLIENT

UNIVERSITY OF WOLLONGONG AUSTRALIA

PROJECT MANAGER

DONALD CANT WATTS CORKE

PROJECT MANAGEMENT INITIALS

DESIGNER	CHECKED	APPROVED
KI	DS	DS

ISSUE/REVISION

D	04 / 10 / 17	REVISED SD ISSUE
C	13 / 09 / 17	REVISED SD ISSUE
B	01 / 09 / 17	SD ISSUE
A	28 / 08 / 17	SD FOR COORDINATION
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60545235

SHEET TITLE

MECHANICAL SERVICES
LEVEL 1

SHEET NUMBER

60545235-ME-000

ISO A1 594mm x 841mm

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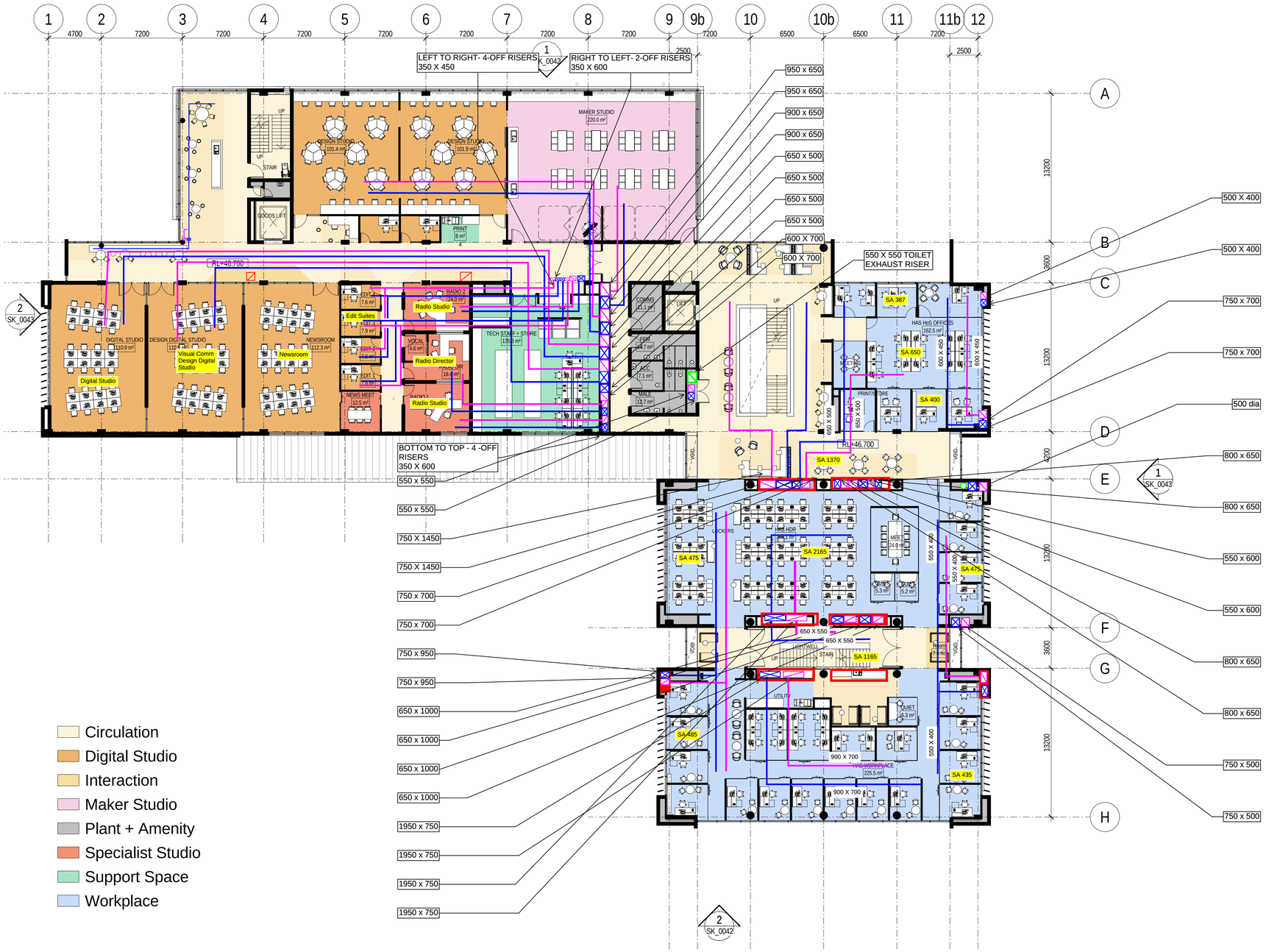

Circulation
Digital Studio
Interaction
Maker Studio
Plant + Amenity
Specialist Studio
Support Space
Workplace

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HASSELL

0 2500 5000 mm
1:200 @ A1

N

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WESTERN BUILDING

CLIENT

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PROJECT NUMBER

60545235

SHEET TITLE

MECHANICAL SERVICES
LEVEL 2

SHEET NUMBER

60545235-ME-000

ISO A1 594mm x 841mm

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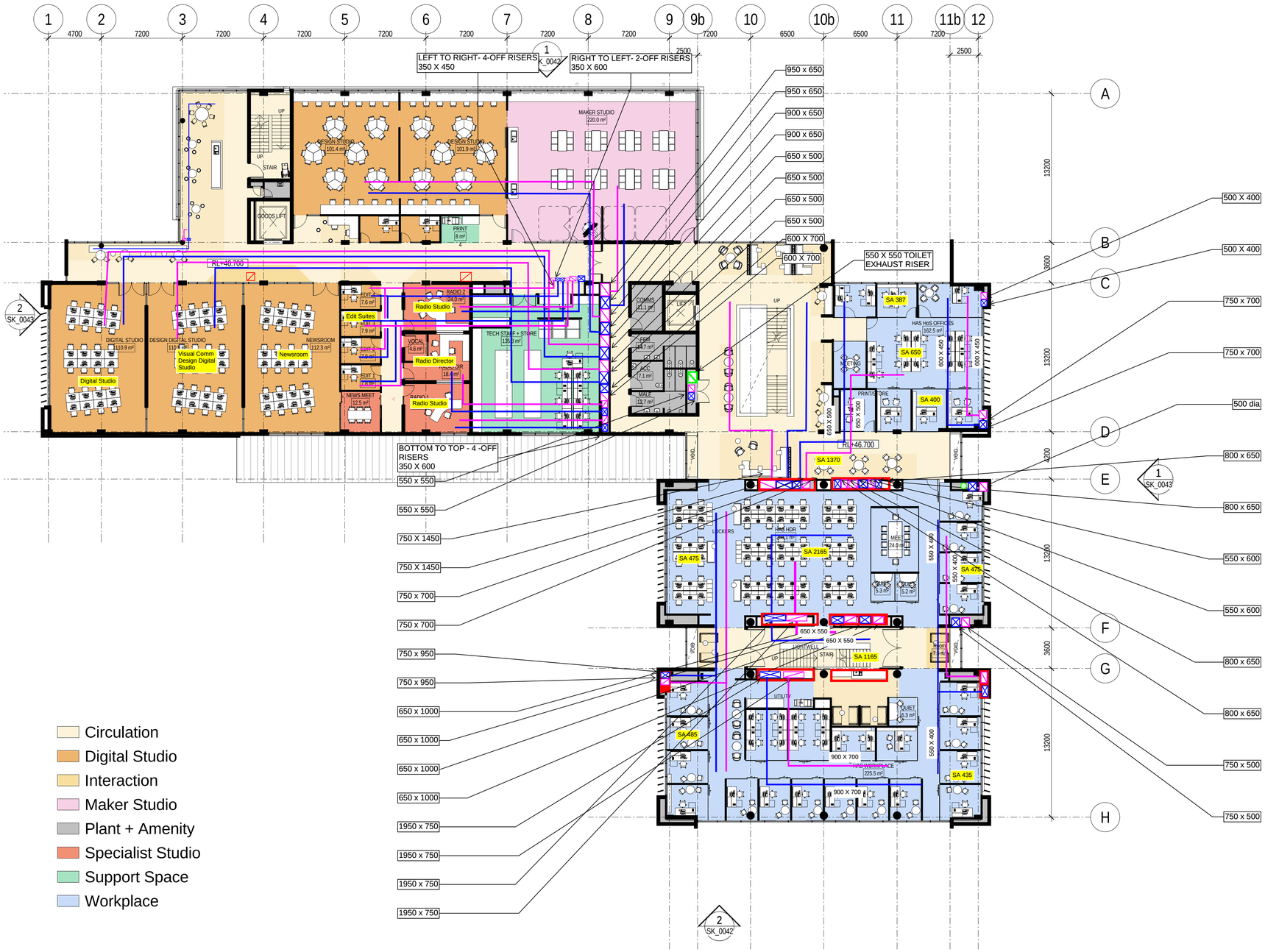

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HASSELL

0 2500 5000 mm
1:200 @ A1

N

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UNIVERSITY OF WOLLONGONG WESTERN BUILDING

CLIENT

UNIVERSITY OF WOLLONGONG AUSTRALIA

PROJECT MANAGER

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PROJECT NUMBER

60545235

SHEET TITLE

MECHANICAL SERVICES
LEVEL 3

SHEET NUMBER

60545235-ME-000

ISO A1 594mm x 841mm

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AHU-L4-XX
500 L/S
SERVING L3 REHEARSAL 1
AND STORE

AHU-L4-XX
320 L/S
SERVING L3 REHEARSAL 2
& 4

AHU-L4-XX
340 L/S
SERVING L3 REHEARSAL 3

AHU-L4-XX
2400 L/S
SERVING L3 DESIGN
DIGITAL STUDIO 1 AND 2

2 x WATER COOLED
CHILLERS - 900 kW EACH.
OPERATING WEIGHT OF
EACH CHILLER - 6700 KG.

FCU-L4-XX
140 L/S
SERVING L2 EDIT SUITS

2 x COOLING TOWERS -
1,100 kWr EACH.
OPERATING WEIGHT OF
EACH TOWER - 2300 KG.

FCU-L4-XX
140 L/S
SERVING L2 EDIT SUITS

AHU-L4-XX
990 L/S
SERVING L2
VISUAL COMMS

SEF X 3-OFF ATRIUM
SMOKE EXHAUST FANS -
35,000 L/S EACH

REQUIREMENT & DETAILS
TBC BY FIRE ENGINEER

AHU-L4-03
1760 L/S
SERVING GF LOBBY

AHU-L4-13
990 L/S
SERVING L1 INT SIM LABS

AHU-L4-01
1600 L/S
SERVING GF SOC DIGITAL
LABS 1&2

AHU-L4-10
2390 L/S
SERVING L3, L2 AND L1
EAST RESEARCH AND
ACADEMIC STAFF ROOMS

500 X 400

500 X 400

FCU-L4-02
475 L/S
SERVING L1 EAST SIM LAB

AHU-L4-07
5665 L/S
SERVING L3, L2 AND L1
INTERNAL ZONES

AHU-L4-16
1400 L/S
SERVING L2 & L3 EAST
PERIMETER

AHU-L4-09
1100 L/S
SERVING L1 WHS LAB

AHU-L4-XX
5865 L/S
SERVING L3, L2 AND L1
EAST WING - INTERNAL
OPEN AREAS

AHU-L4-12
1100 L/S
SERVING L1 ERG LAB

750 x 700

750 x 700

AHU-L4-06
2350 L/S
SERVING GF CTA

500mm DIA FUME CUPBOARD
FAN LOCATED ON FLOOR

750 x 700

750 x 700

AHU-L4-XX
2000 l/s
SERVING L2&3 EAST INT

800 x 650

800 x 650

550 x 600

550 x 600

800 x 650

800 x 650

750 x 700

750 x 700

750 x 500

750 x 500

750 x 950

750 x 950

650 x 1000

AHU-L4-XX
1000 L/S
SERVING L1
COMM
PROJ/MEET

AHU-L4-XX
2220 L/S
SERVING L2 MAKER STUDIO

AHU-L4-XX
2060 L/S
SERVING L2 DESIGN
STUDIO

AHU-L4-XX
990 L/S
SERVING L2 DIGITAL
STUDIO

AHU-L4-XX
1000 L/S
SERVING L3 AND INTER
SPACE

AHU-L4-XX
120 L/S
SERVING L3 MUSIC EDIT

AHU-L4-XX
340 L/S
SERVING L3 REHEARSAL 3

AHU-L4-XX
600 L/S
SERVING SOUND LOCK

SEF-L04-01 3000 L/s TO
DISCHARGE THROUGH
ROOF VIA FIRE RATED
DUCTWORK

AHU-L4-XX
2400 L/S
SERVING L3 MUSIC TEACH
& PERF

AHU-L4-XX
305 L/S
SERVING L3 3D AUDIO
STUDIO

AHU-L4-XX
340 L/S
SERVING L3 SMALL
CONTROL ROOM

AHU-L4-XX
1000 L/S
SERVING L3 LIVE ROOM

AHU-L4-XX
1000 L/S
SERVING L3 LIVE ROOM

AHU-L4-XX
120 L/S
SERVING L3 MUSIC EDIT

AHU-L4-XX
470 L/S
SERVING L3 LARGE
CONTROL ROOM

SEF-L04-02 - 4900 L/s TO
DISCHARGE THROUGH
ROOF VIA FIRE RATED
DUCTWORK

FCU-L4-XX
240 L/S
SERVING L2 RADIO STUDIO

LEFT TO RIGHT- 4-OFF
RISERS
350 X 450

RIGHT TO LEFT- 2-OFF
RISERS
350 X 600

AHU-L4-XX
120 L/S
SERVING L3 MUSIC EDIT

8 off 350 x 350 Edit Suite S/A
& R/A Droppers

AHU-L4-XX
120 L/S
SERVING L3 MUSIC EDIT

950 x 650

950 x 650

900 x 650

900 x 650

650 x 500

650 x 500

650 x 500

650 x 500

BOTTOM TO TOP - 4
-OFF RISERS 350 X 600

1000 X 13250 RISER

550 X 550 TOILET
EXHAUST WITH
EXHAUST FAN IN
VERTICAL

550 x 550

550 x 550

AHU-L4-04
2350 L/S
SERVING GF CTA

AHU-L4-08
2455 L/S
SERVING L3, L2 AND L1
WEST ZONES

AHU-L4-05
4185 L/S
SERVING L3,2,1
LOBBY AREAS

750 X 1450

750 X 1450

750 x 950

750 x 950

1950 x 750

1950 x 750

1950 x 750

1950 x 750

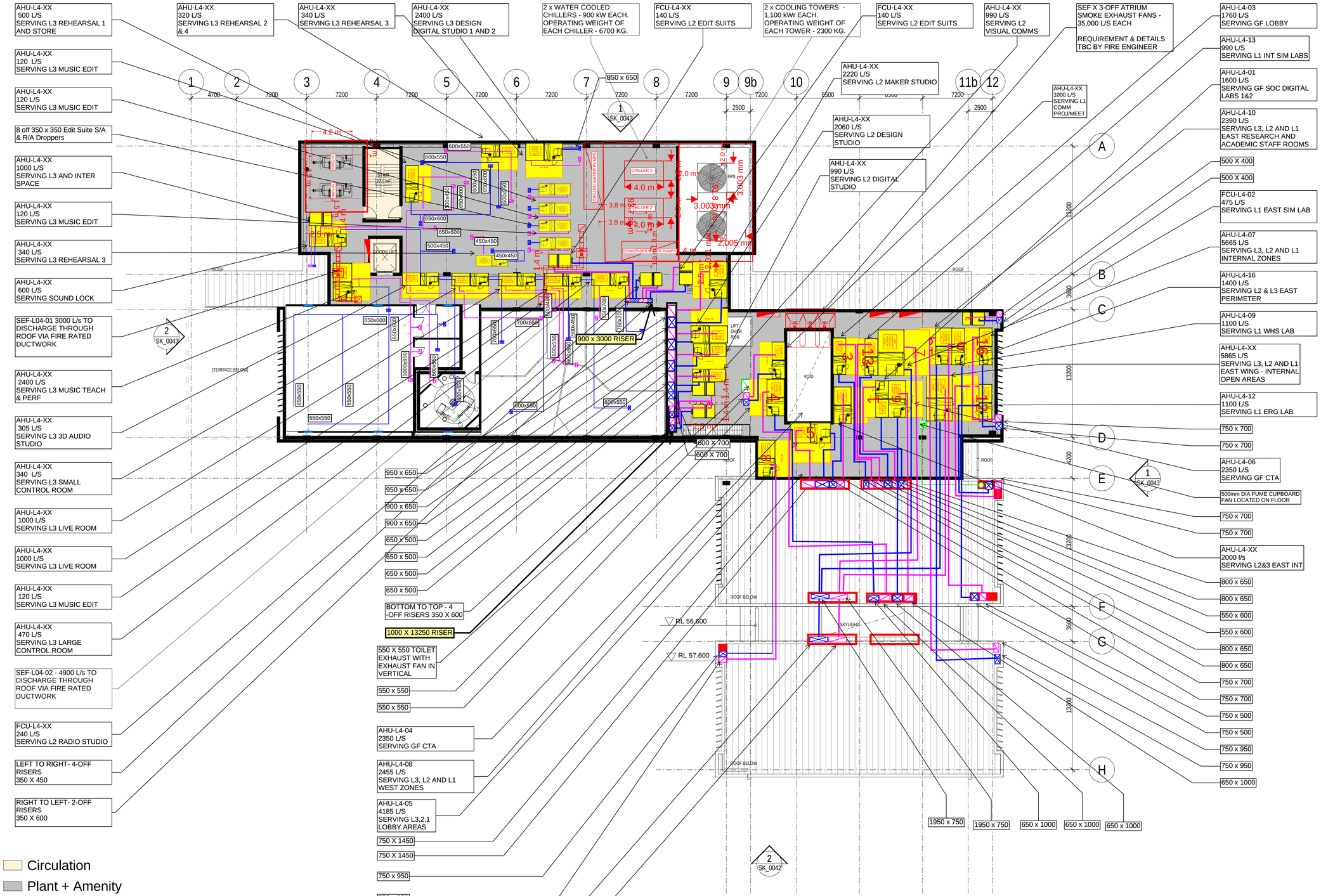
650 x 1000

650 x 1000

650 x 1000

Circulation

Plant + Amenity



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SHEET TITLE

MECHANICAL SERVICES
LEVEL 4

SHEET NUMBER

60545235-ME-000