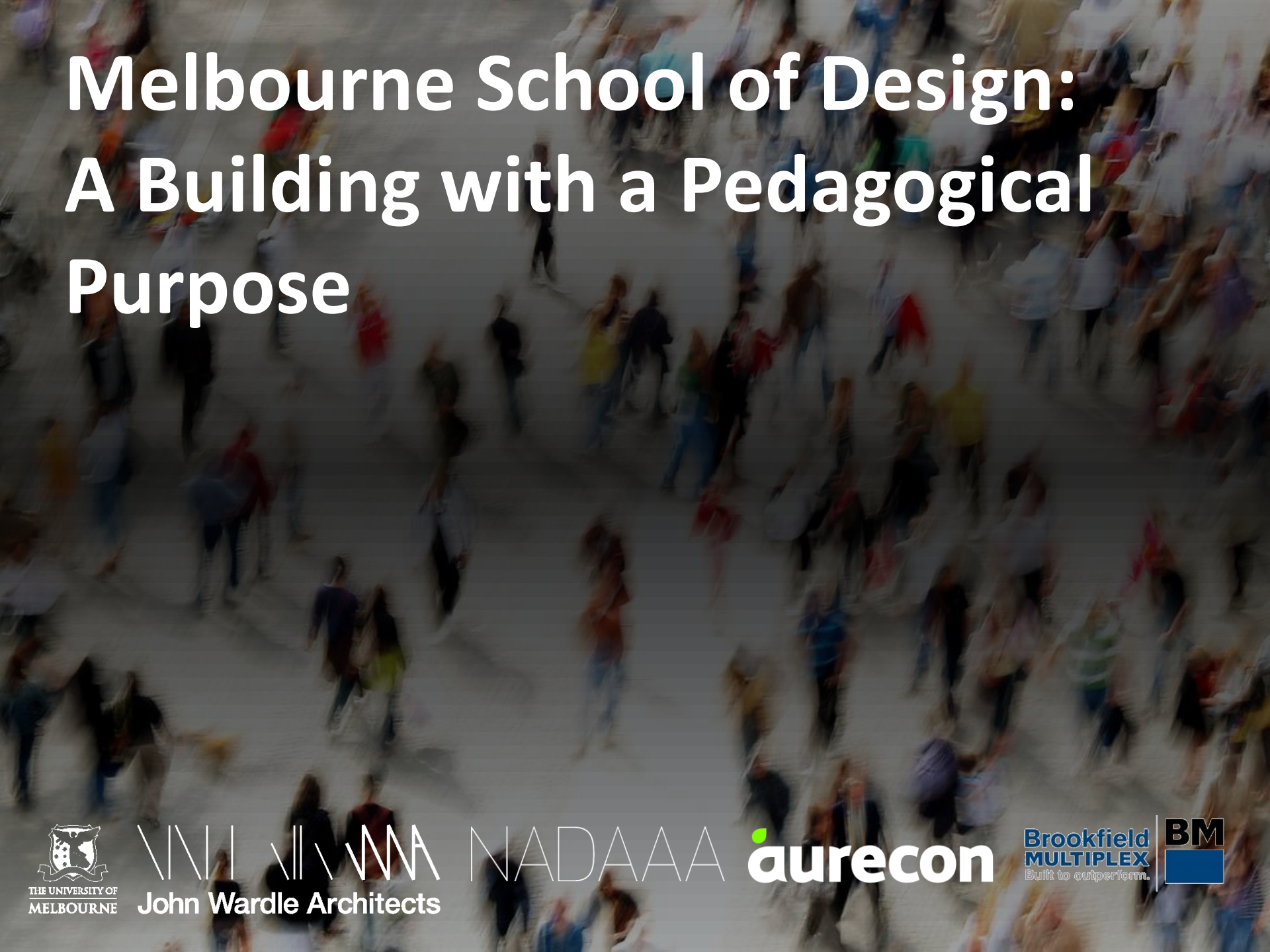
Melbourne School of Design: A Building with a Pedagogical Purpose



THE UNIVERSITY OF MELBOURNE

John Wardle Architects

NADAAA

aurecon

Brookfield MULTIPLEX
Built to outperform.

BM

Introducing Team Members

Project Manager	**Aurecon** **Pippa Stockfeld**
Architect	**John Wardle Architects** **Meaghan Dwyer**
Contractor	**Brookfield Multiplex** **Andrew Deveson**

Focus of our talk today:

Collaboration
A building/a project with a pedagogical purpose

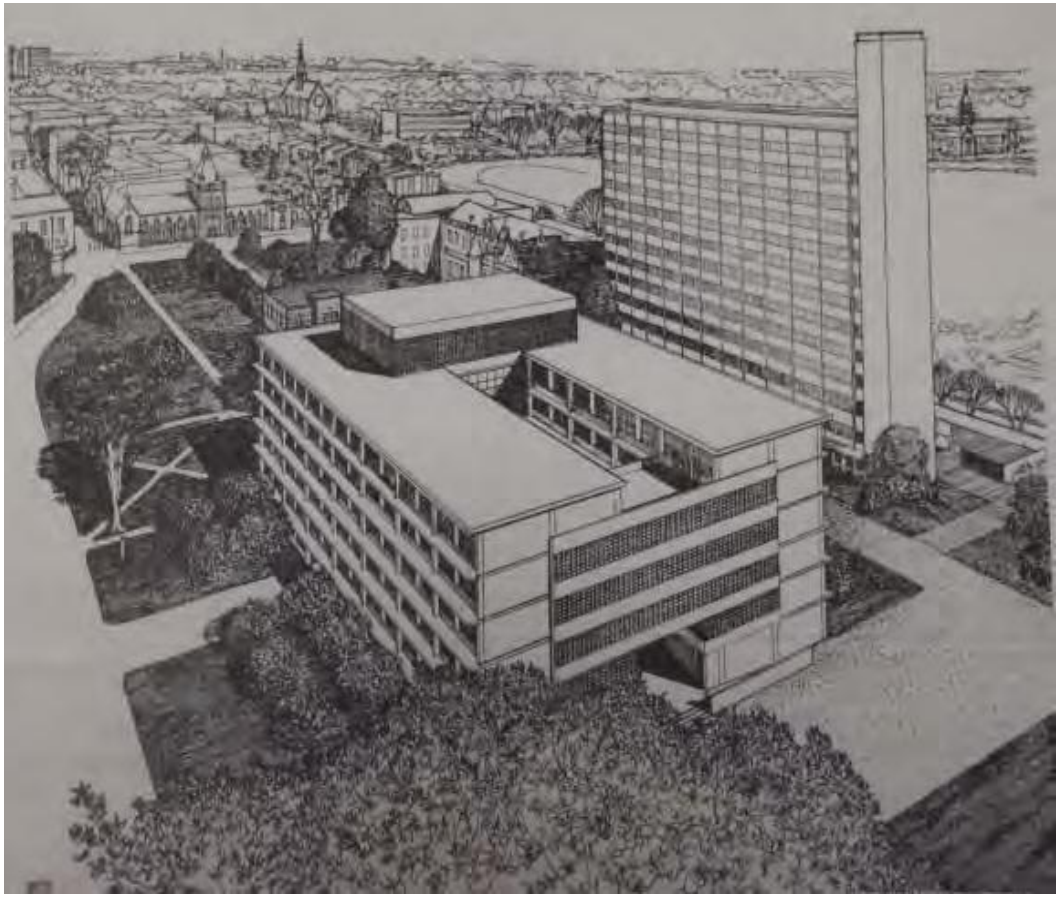
The Need

Original faculty building designed by the first Chair of Architecture (Brian Lewis) in 1960

Completed in 1964

Underfunded & constructed from a range of new and donated materials

Alterations & additions in 1989 and again in the late 1990's



The Need

By 2000:

Faculty bursting at the seams
Building in poor condition, at the end of its life cycle

Push in early 2000's for new building
Open international design competition in April 2009

John Wardle Architects/NADAAA appointed in September 2009

McBride Charles Ryan

Denton Corker Marshall

Diller Scofidio & Renfro & BVN

Koning Eizenberg & William J Mitchell & Gehry Technologies

Sauerbruch & Hutton

Facts & Figures

Budget approved in late 2010:

Project Budget	**$129.35M**
Construction Cost	**$102M**
Procurement Methodology:	
Early Works	**Construction Management**
Main Works	**Design & Construct (100% Contract Documentation)**
Nominated end date:	**December 2014**

And the results

Budget of $129.35	**Maintained ($5,415 m/2)**
Program:	
Early Works	**January 2013 - April 2013 (4mths)** **Met program**
Main Works	**May 2013 – August 2014 (16mths)** **4 months early**
Green star certification	**Uplifted from 5 to 6 green star**
The Client & Team	**Delighted at handover!** **To be evaluated again in 12 mths**

Setting Project Culture

Setting Project Culture

Architect and client selected the core consultants

Robust governance structure adhered to

Effective resourcing of the project (by Property Campus Services & the Faculty)

Key selection criteria: support for the design intent, strong design management capability and the “fit” of the consultants and contractor with each other and the client

Culture of Collaboration

We may have all come on different ships, but we're all in the same boat now.
- Martin Luther King Jr.

Call for research papers

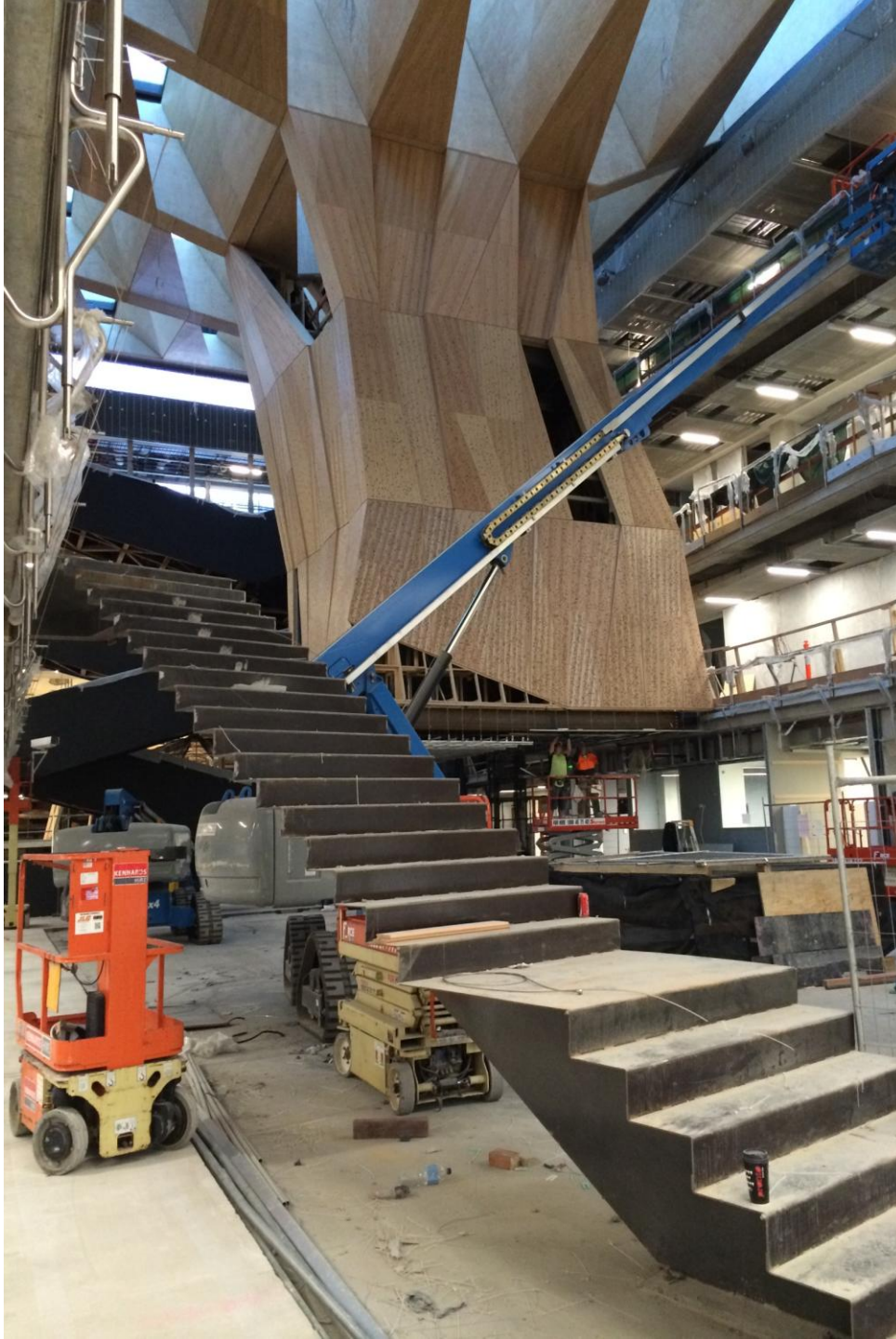
- Aurecon treated the academic research opportunities as a related project
- Technologies integrated into the fabric of the building - sensors, geothermal piles
- Team configuration and process – cross platform design collaboration
- Aspects of procurement – zero carbon supply chains
- Retrospective study of project archives – photographic documentation and design archive


Research
Cross Laminated Timber

Research

Laminated Veneer Lumber


65 TRAX



Teaching & Learning

A demonstration project

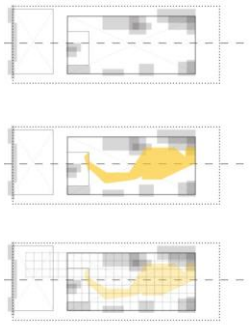
Full team involved delivering classes to the faculty / undertaking extensive tours

Classes include:
- Design Studios
- Procurement
- Engineering
- Cost Management
- Construction
- Project Management

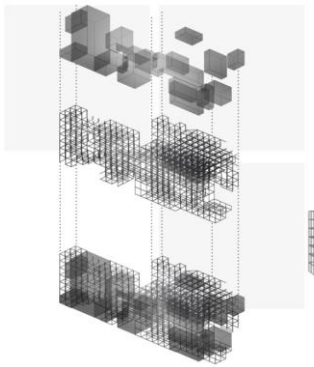
Provides a model for how Universities can leverage projects

Provides students access to real world learnings

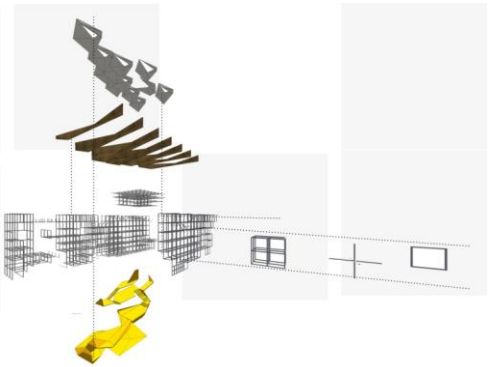
Educates consultants about the nature of teaching and learning



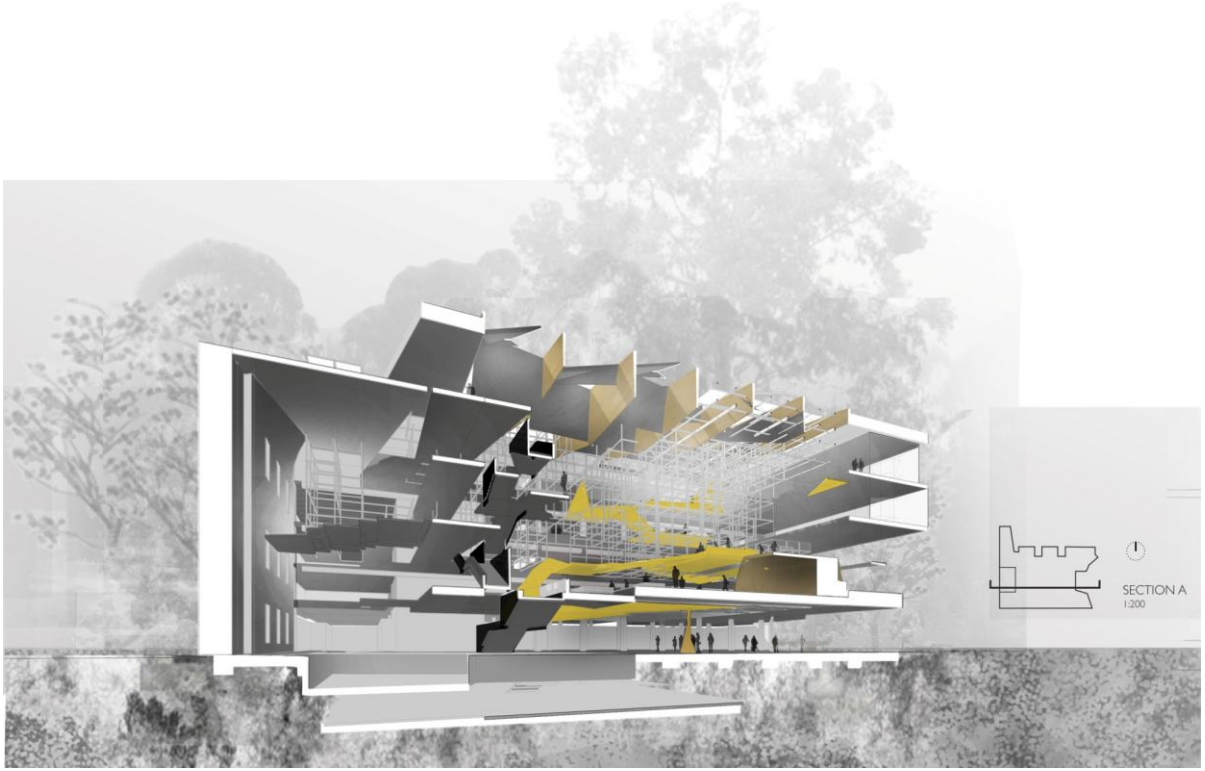
PARTI DIAGRAM:
Concept of pockets of informal space within a universal grid, interrupted throughout void by a platform ribbon



POCKETS OF SPACE / VOID vs. UNIVERSAL GRID FRAME



CONCEPT COMPONENTS

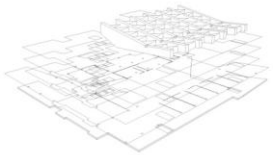


SECTION A
1:200

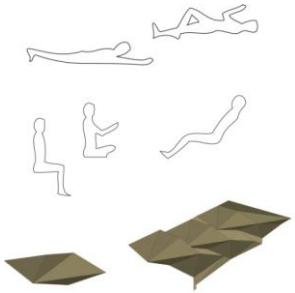
View from Level 02 Studios

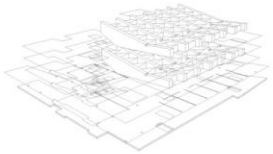
View from Level 00 Exhibition Space, Joseph Reed Facade

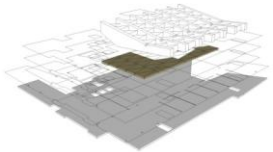
the process



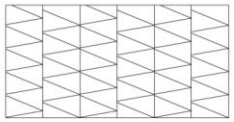
Extend narrative of roof structure along vertical axis.

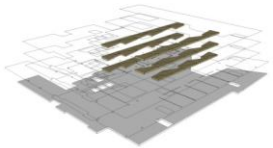




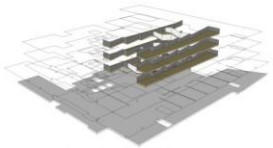


Use roof grid to create multiple platforms forming 'pockets of space'.

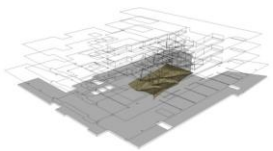




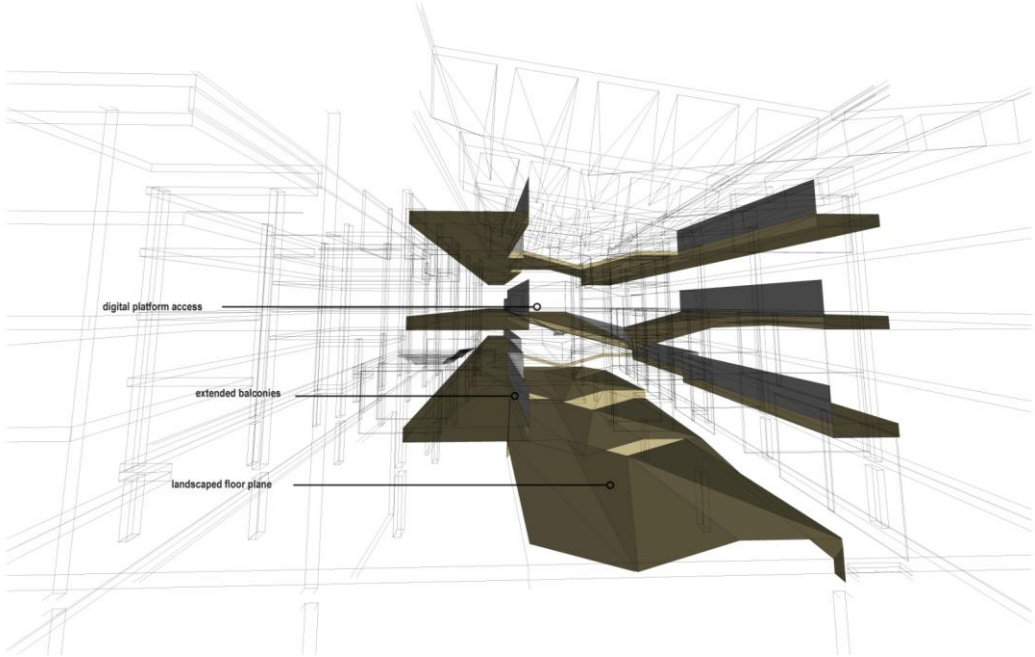
Creation of new balcony extensions.

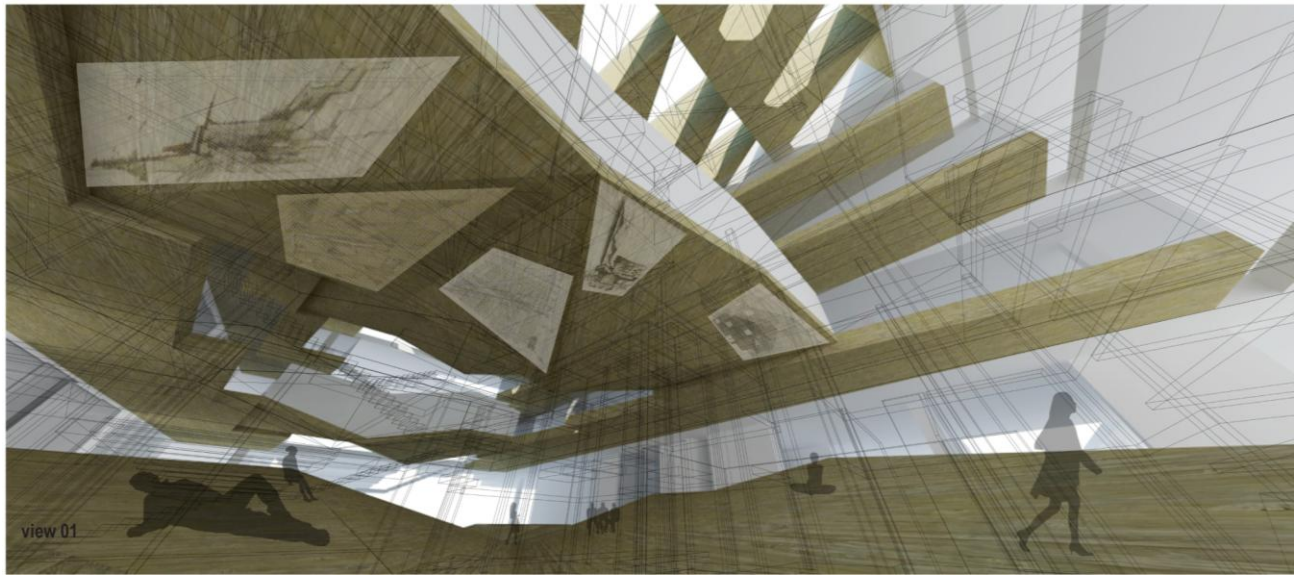


Intergration of digital platforms.



Landscaped floor plane, modelled from abstracting the grid of the roof as well as taking the physcial human body into consideration





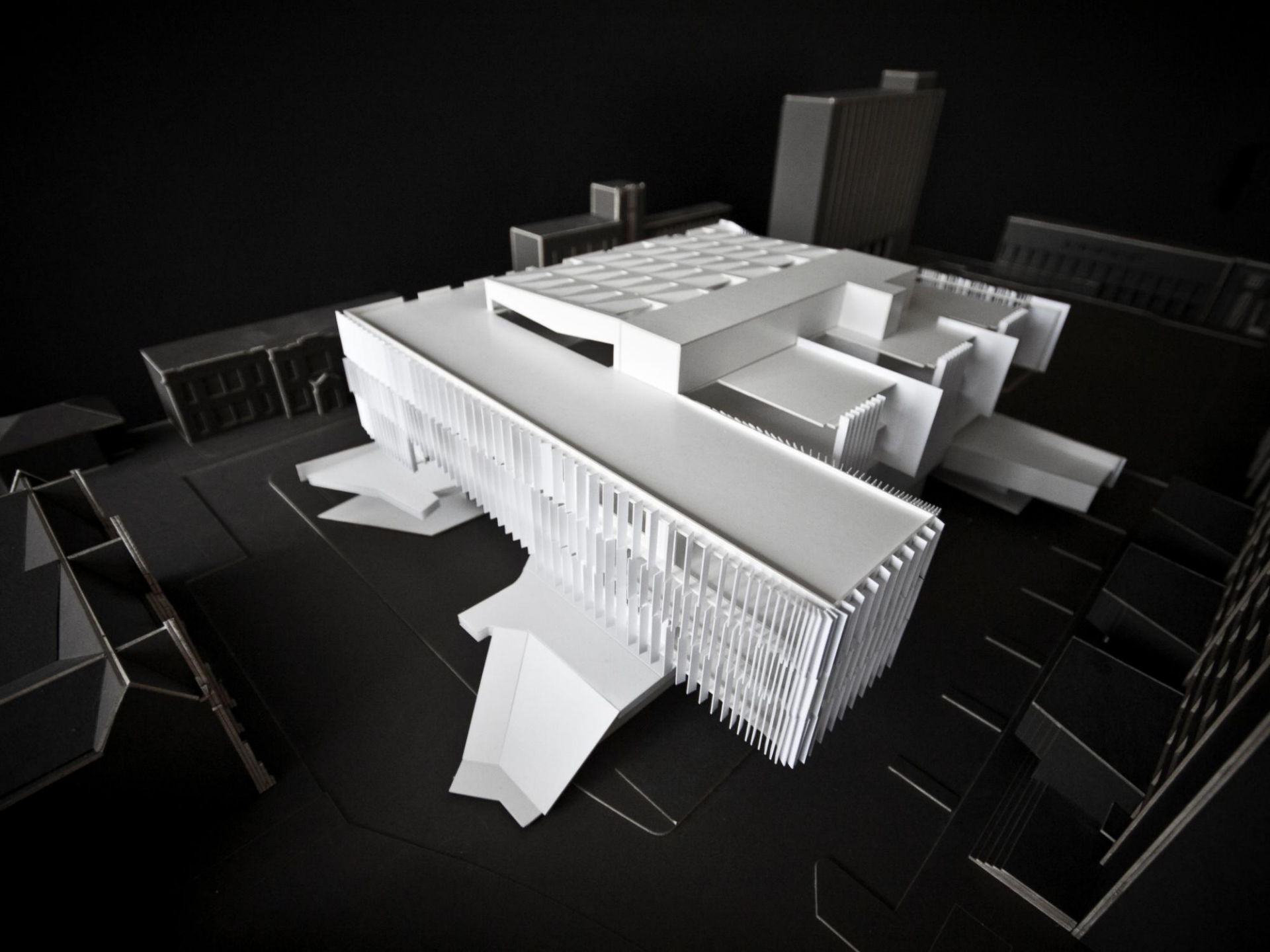
Engagement

Design stage:

Exhibitions at the faculty
International exhibitions

During the build:

Open House Melbourne (over two thousand visitors)
Talks and presentations to whole of faculty
Extensive stakeholder communication during construction
Viewing platform and panels, time lapse photography

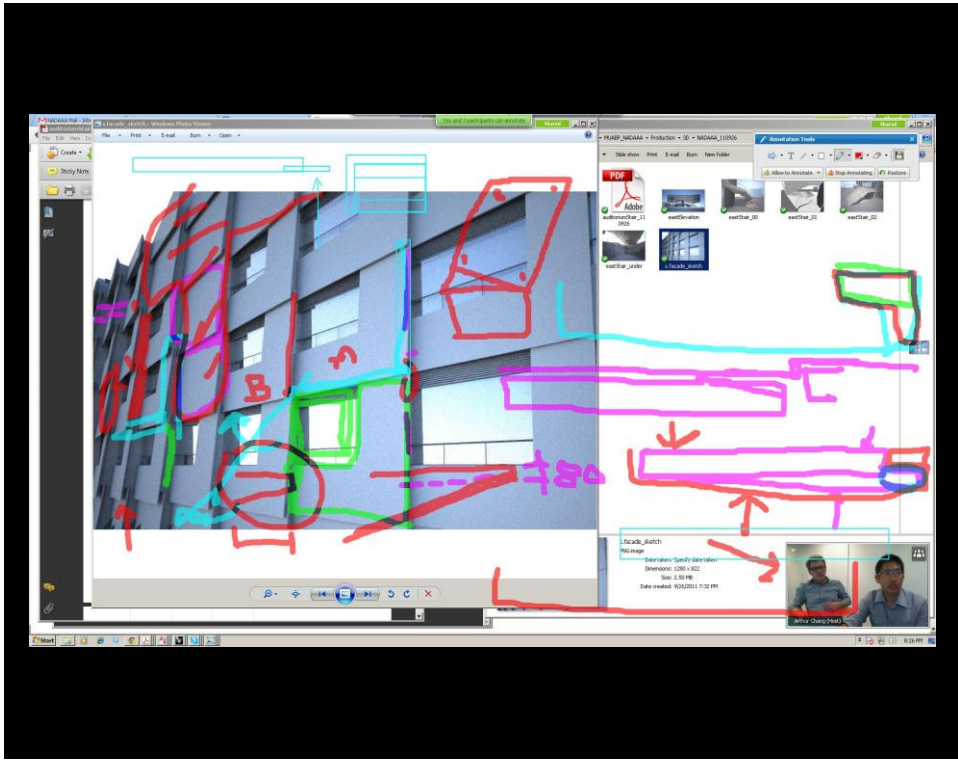



ATLAS OF
THE UNBUILT
WORLD


ATLAS OF
THE UNBUILT
WORLD

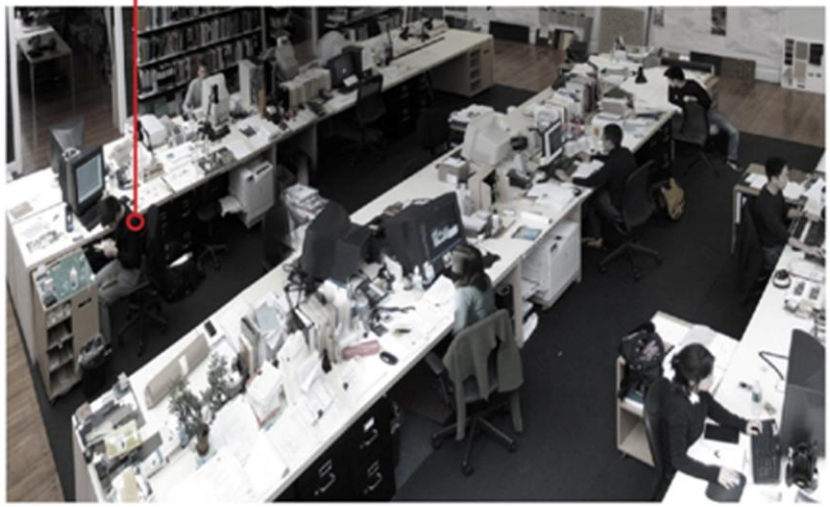
Process, Program & Pedagogy

A Creative Partnership



1:00am 2:00am 3:00am 4:00am 5:00am 6:00am 7:00am 8:00am 9:00am 10:00am 11:00am 12 noon 1:00pm 2:00pm 3:00pm 4:00pm 5:00pm 6:00pm 7:00pm 8:00pm 9:00pm 10:00pm 11:00pm 12 night

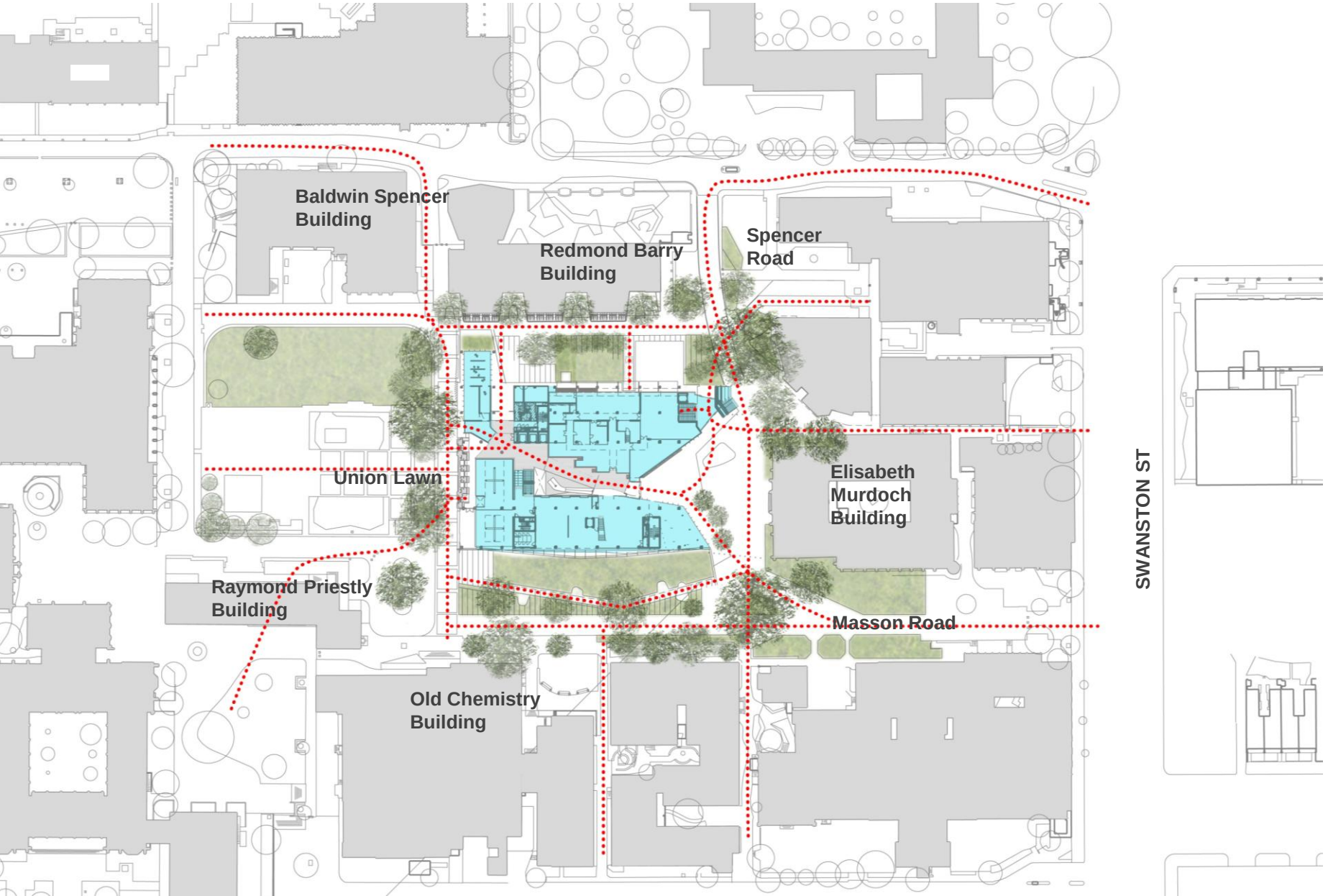
9:00am 10:00am 11:00am 12 noon 1:00pm 2:00pm 3:00pm 4:00pm 5:00pm 6:00pm 7:00pm 8:00pm 9:00pm 10:00pm 11:00pm 12 night 1:00am 2:00am 3:00am 4:00am 5:00am 6:00am 7:00am 8:00am

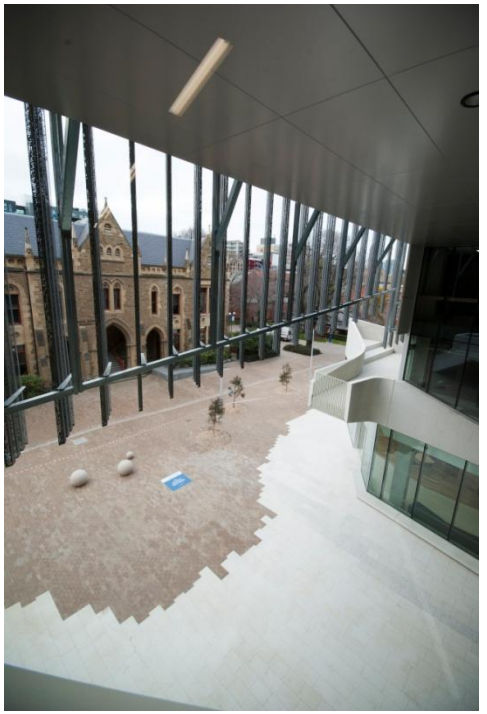


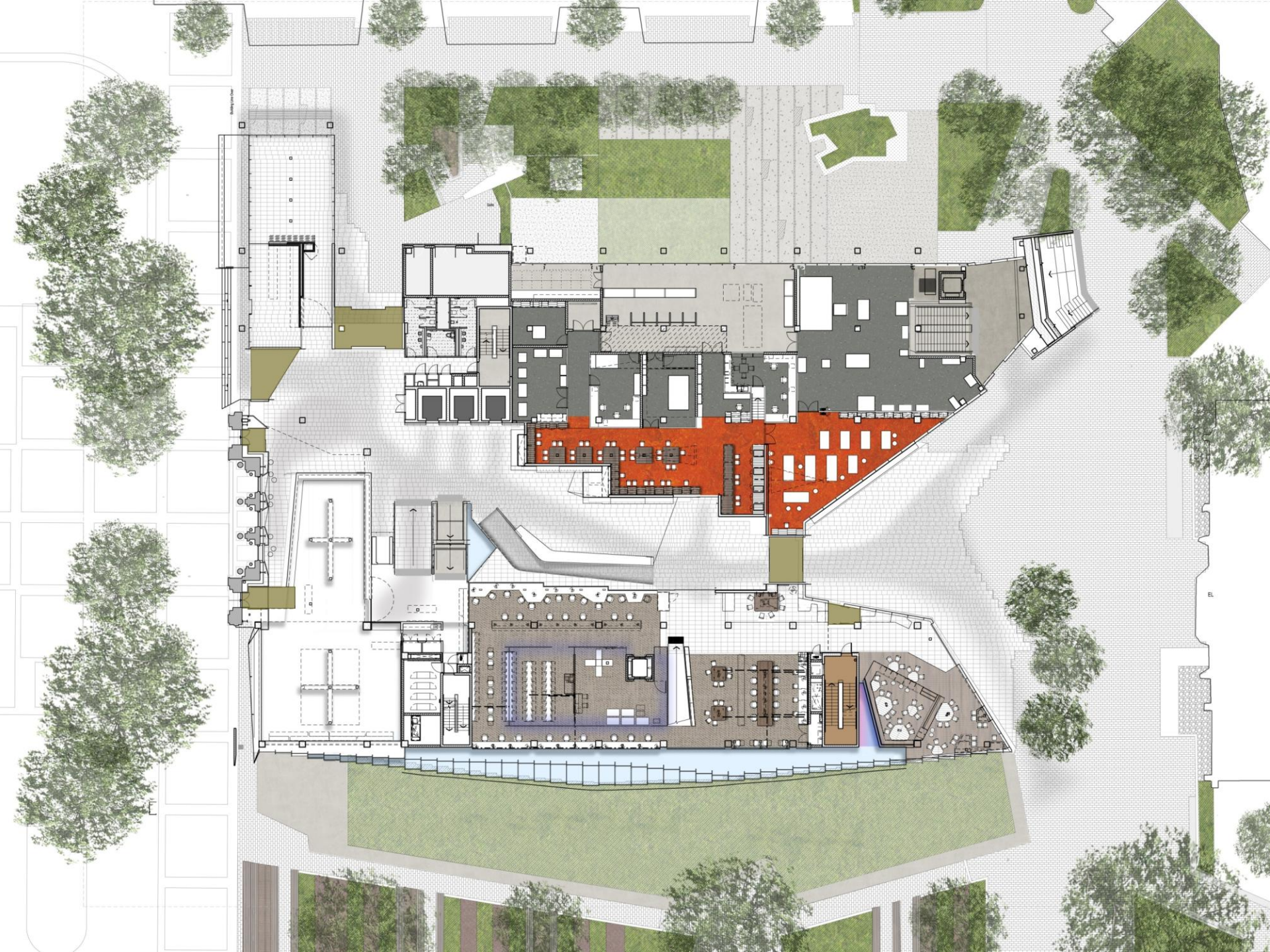
Summary of Accommodation

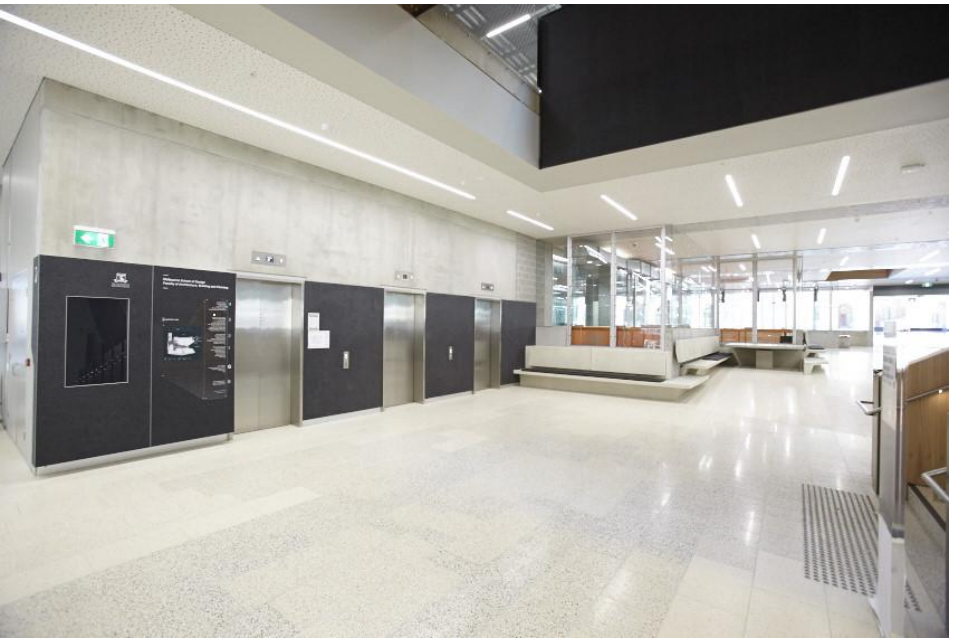
Teaching Spaces	**3,538m²**
26 Studios @ 54m²	
2 Seminar Rooms @ 75m²	
2 Lecture Theatres 125 Seats (2 @ 175m²)	
1 Lecture Theatre 500 Seats (650m²)	
(Centrally timetabled)	
2 Computer Labs	
Japanese Room	
Workshop	**757m²**
Library	**1,297m²**
Research Higher Degree Students	**640m²**
Academic Workspace	**2,300m²**
Professional Workspace	**638m²**
Exhibition	**210m²**
GFA (FECA + UCA)	**14,870m²**
Efficiency	**73%**

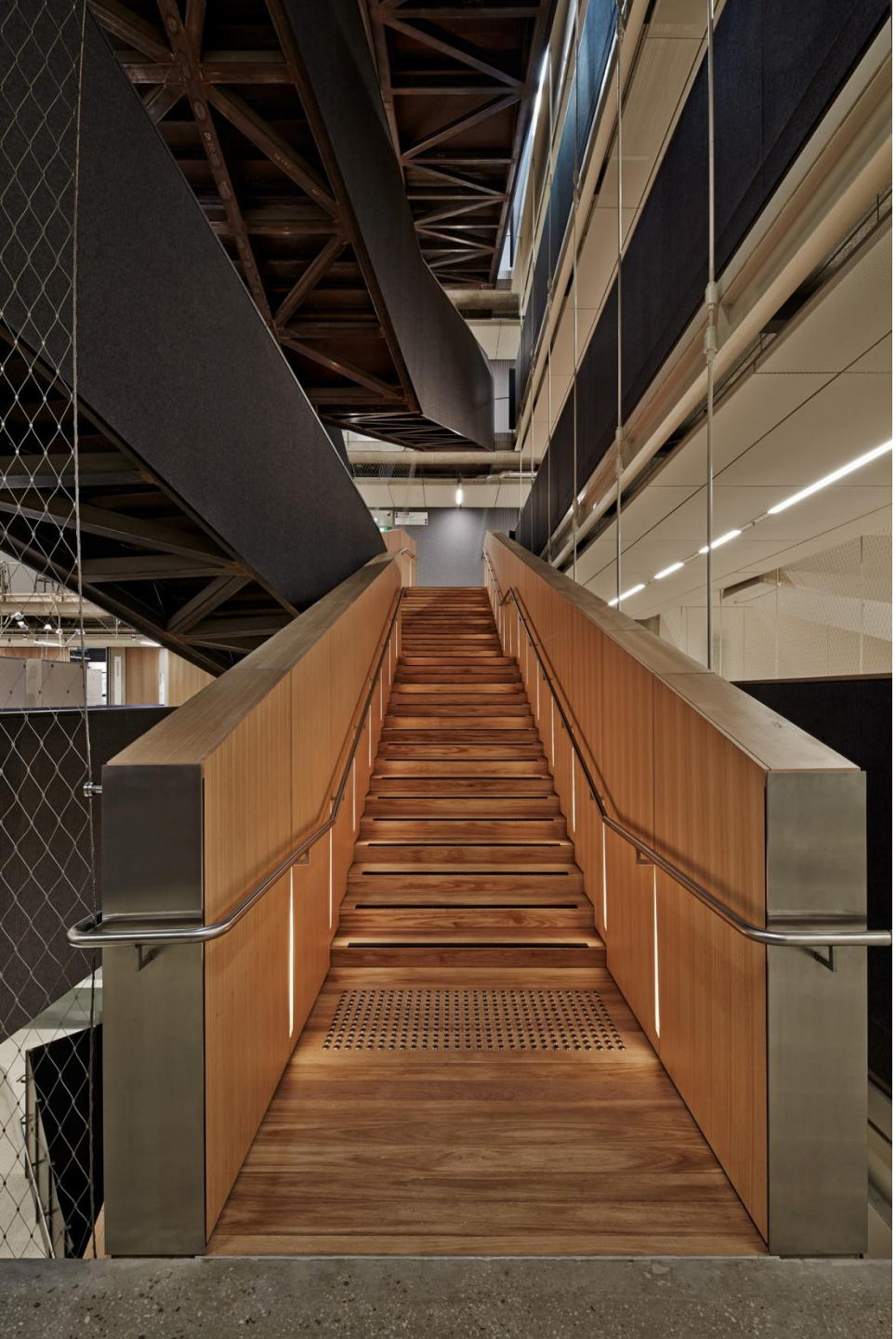
Tour

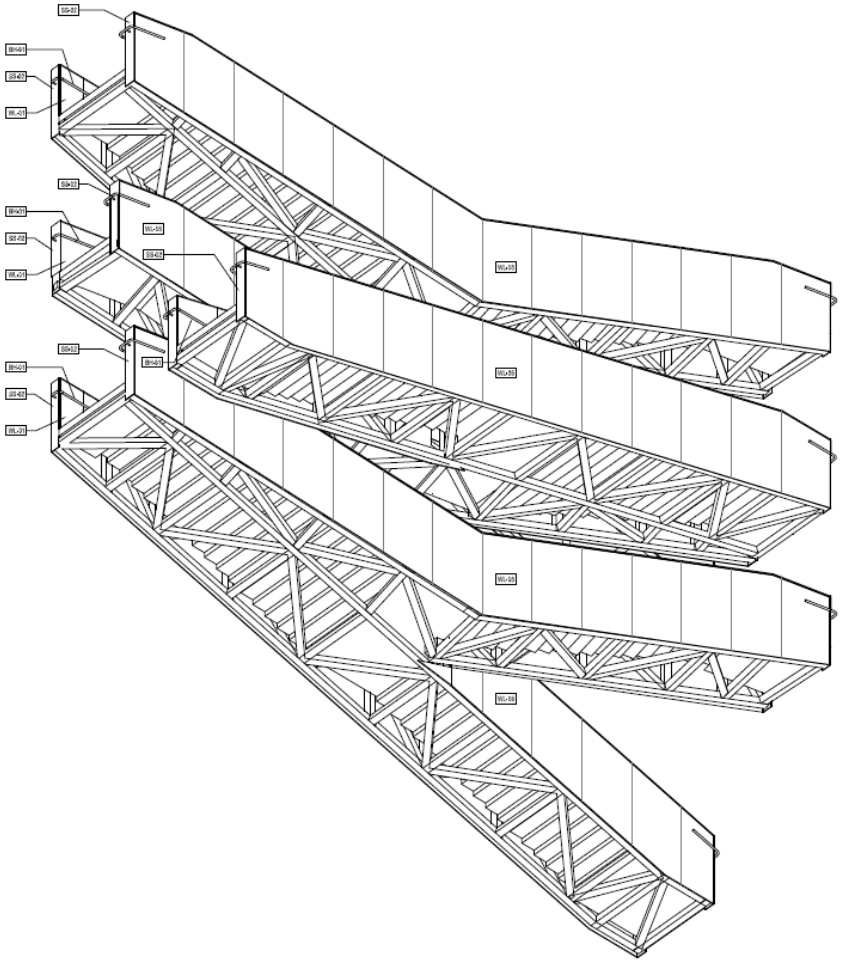

Baldwin Spencer Building
Redmond Barry Building
Spencer Road
Union Lawn
Elisabeth Murdoch Building
SWANSTON ST
Raymond Priestly Building
Masson Road
Old Chemistry Building










SS-01
BR-01
SB-01
BL-01
SS-02
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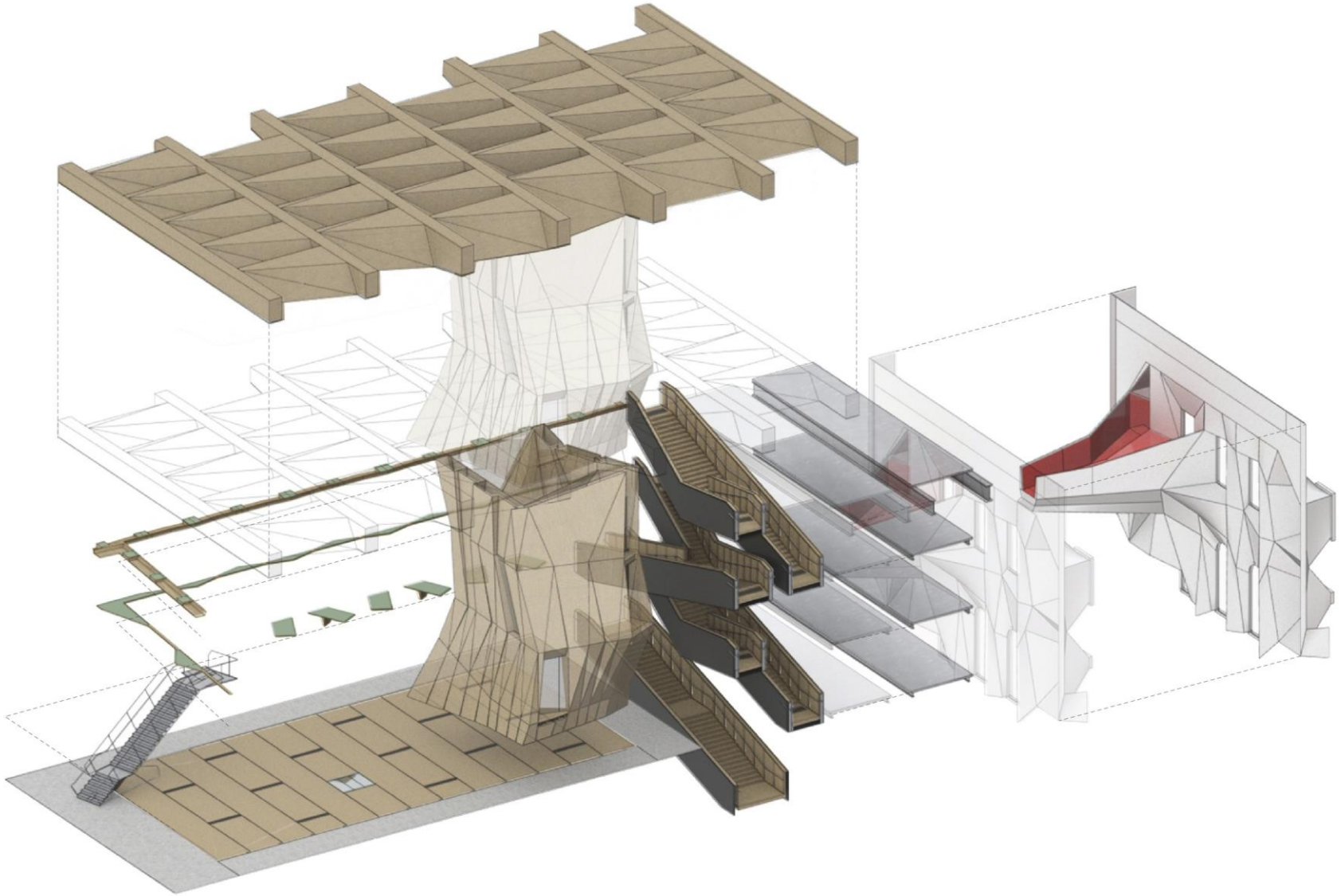
WL-01
WL-02
WL-03
WL-04



All day crowds moved and milled, in, out and around all sides of the building, engaged by extraordinary student displays, gazing up at Harry Potter-esque stairways and taking selfies on the concrete globes.

- Glyn Davis, Vice Chancellor University of Melbourne

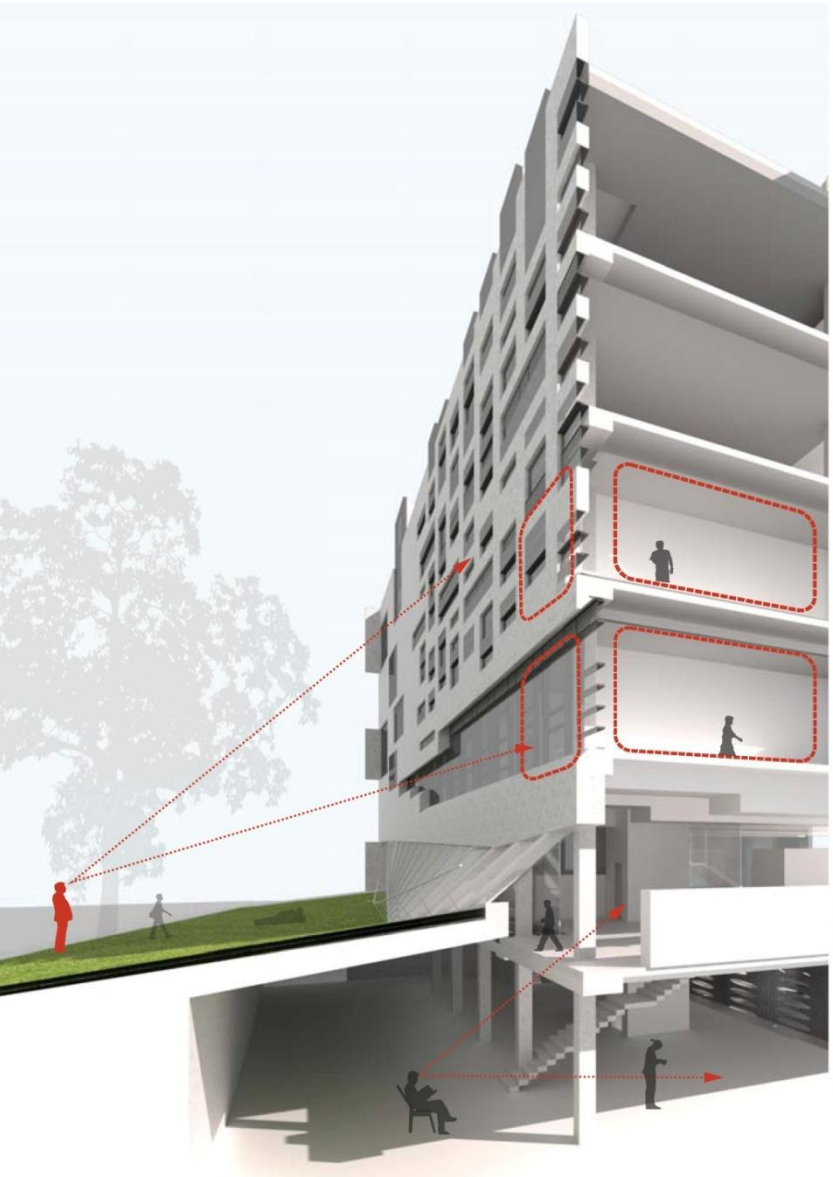
Themes

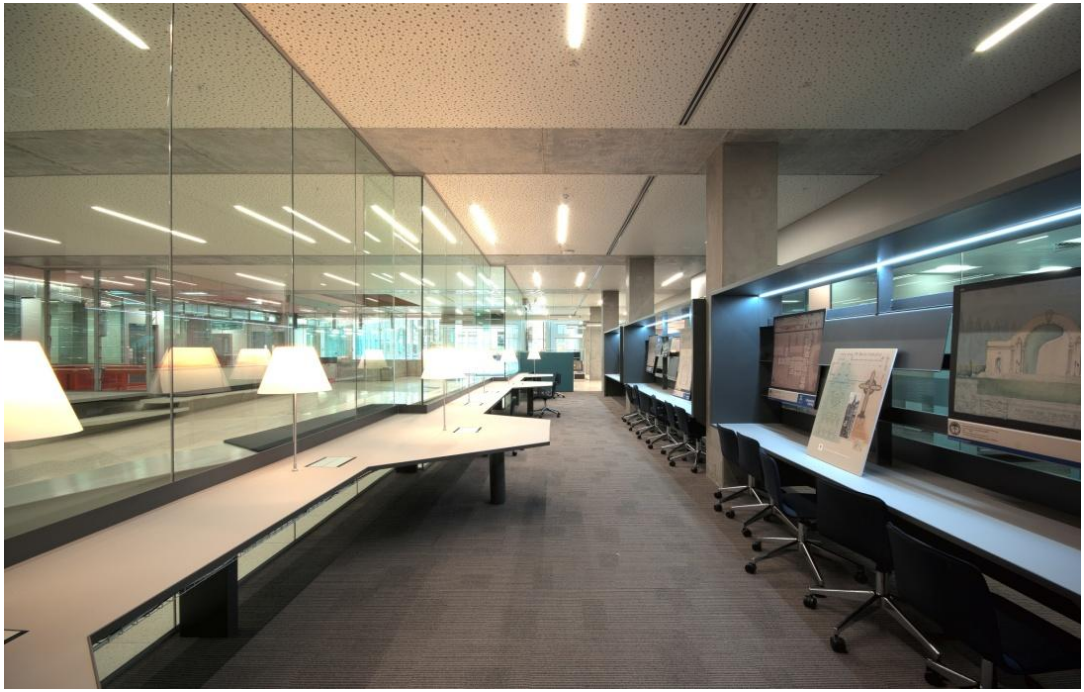
The Academic Environment
The Studio
The Living Building
Built Pedagogy

The Academic Environment

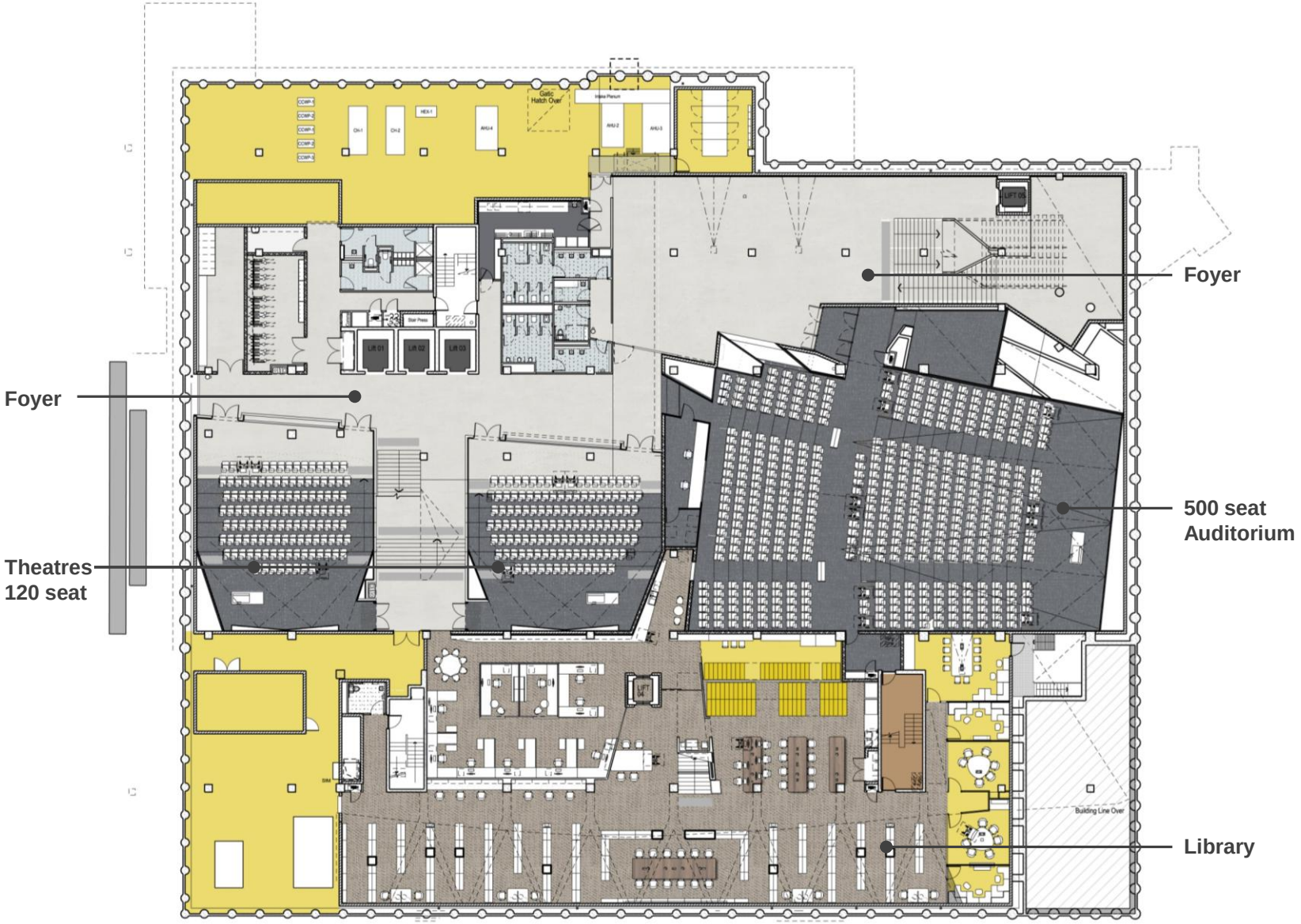
Library
Lecture Theatres
Workspace

Library





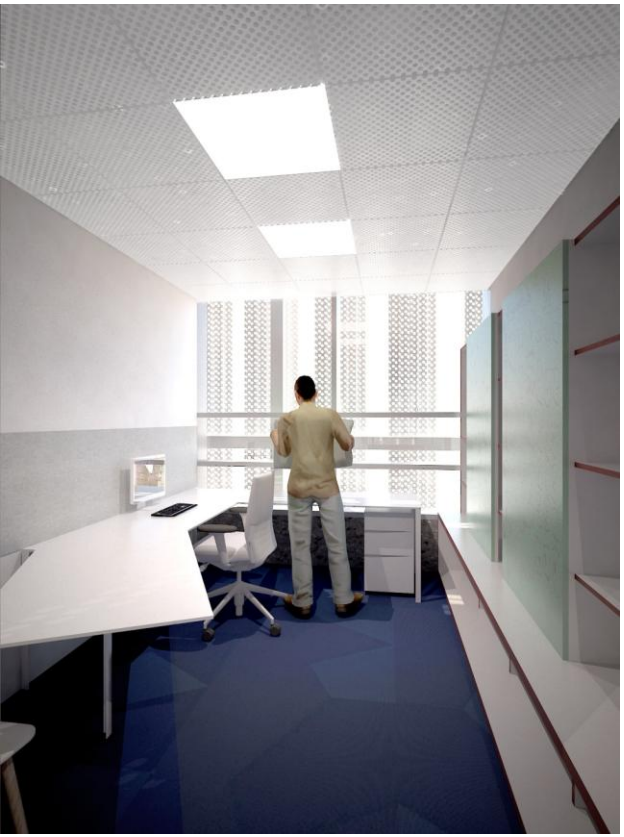
Lecture Theatres

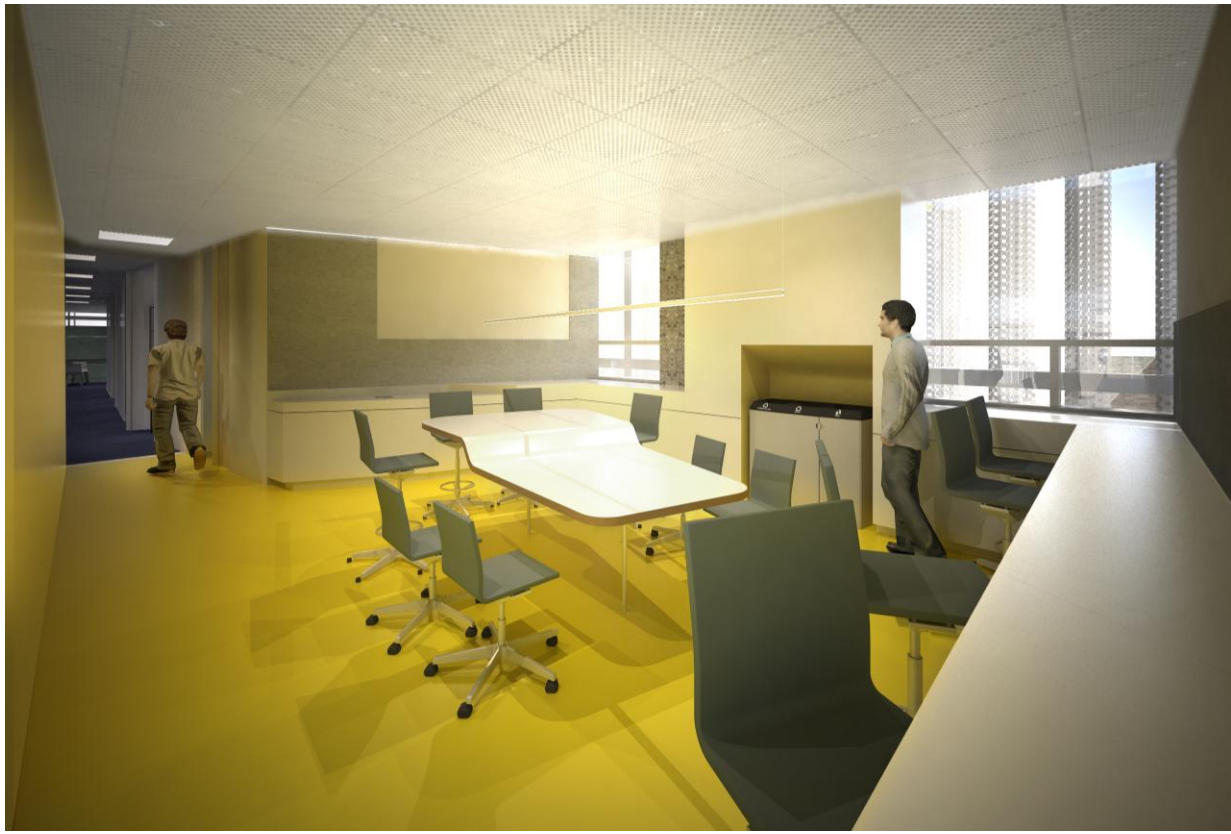


Lecture Theatres

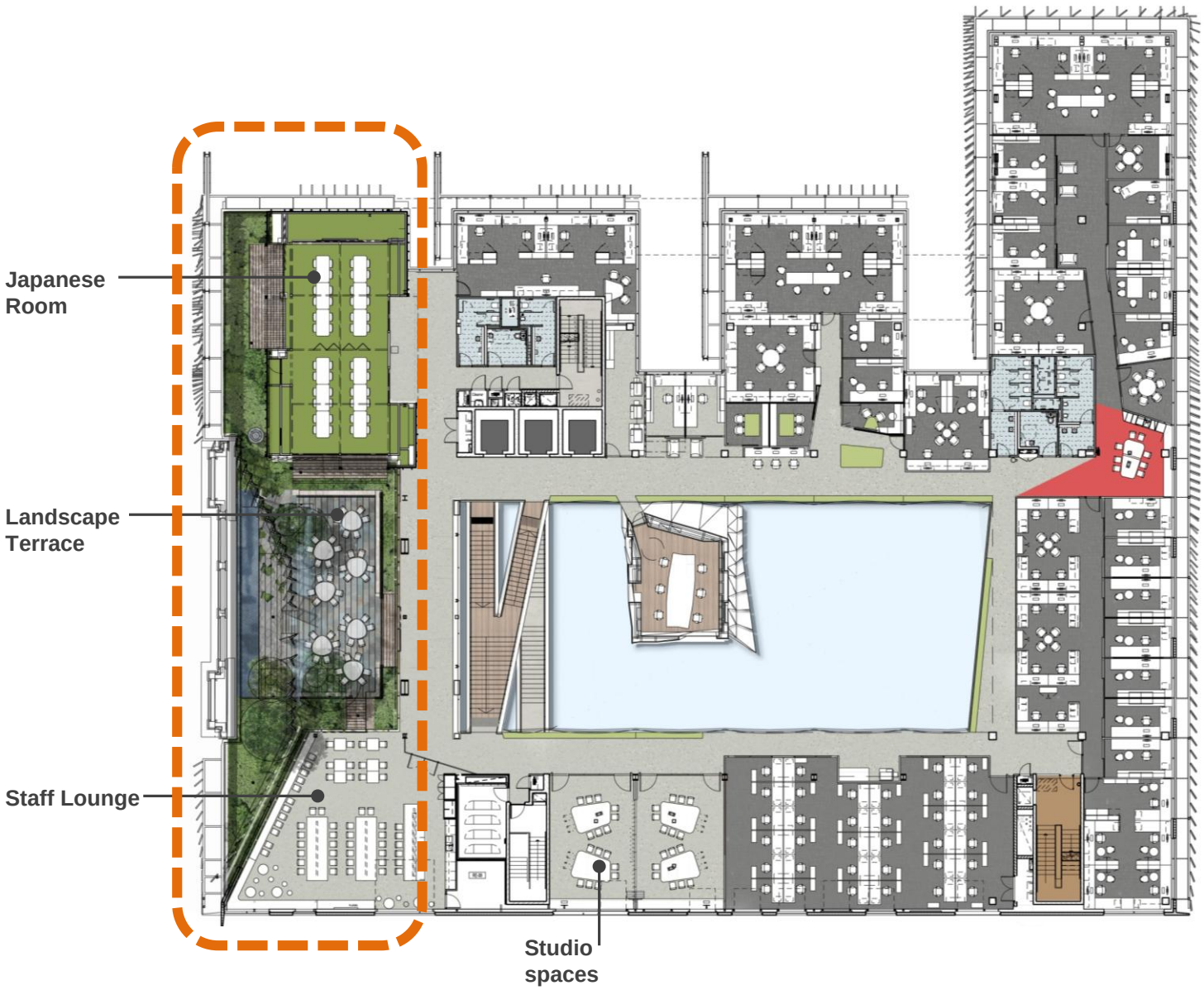
Workspace

Workspace





Workspace


Japanese Room
Landscape Terrace
Staff Lounge
Studio spaces

The Studio

Design Hall
Suspended Studio

The Studio

L04
Symposium Studios
* Fully operable for symposium flexibility

L02
Discreet Studios
* Seminar mode
* Paired mode (operable wall)

Large Studio

Discreet Studios

Hanging Studio

Social Space

L02
Social Space
* Collaborative space

Social Space

Discreet Studios
* No interconnection of studios

CAD enabled studio
* Collaborative space
* Provision of power
* Data for 16 laptops

L01
CAD enabled Studios
* Collaborative space
* Provision of power & data for 16 students

Discreet Studios

Hall Studio
* Informal study
* Non-bookable

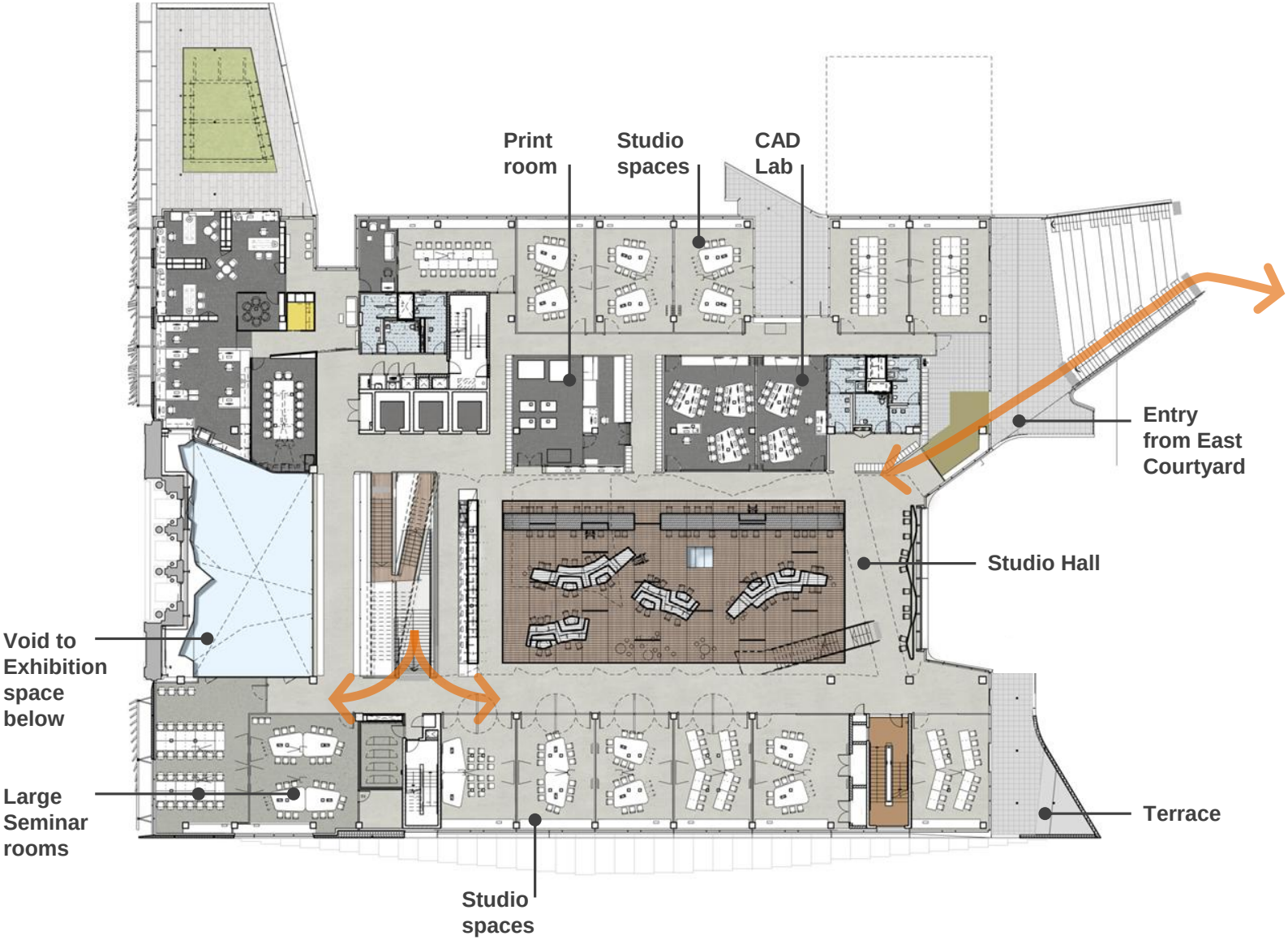
L01

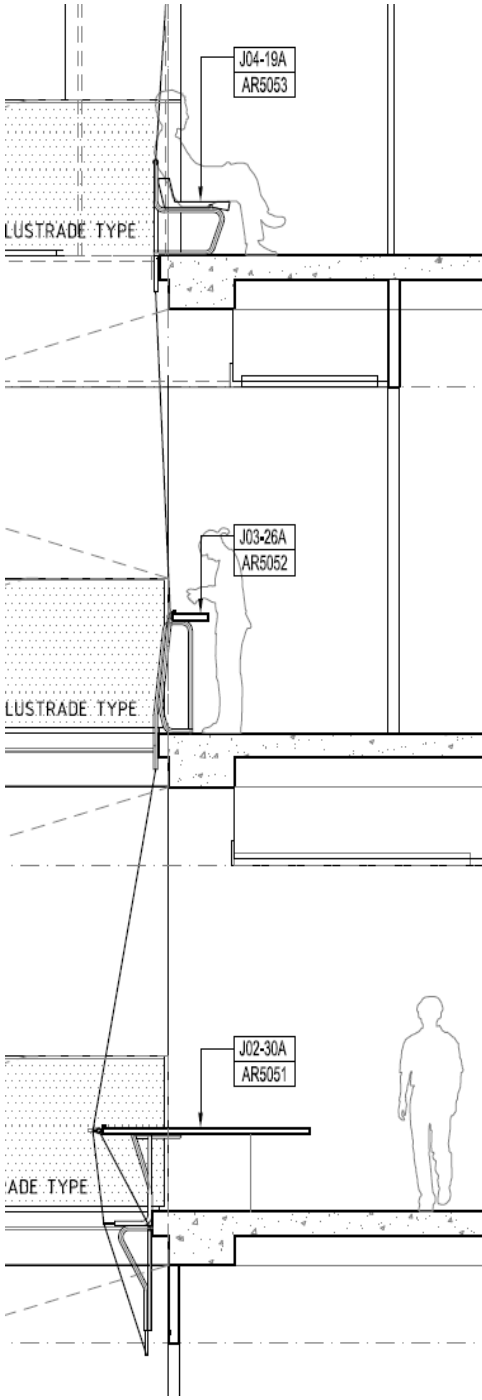
Terrace Studio

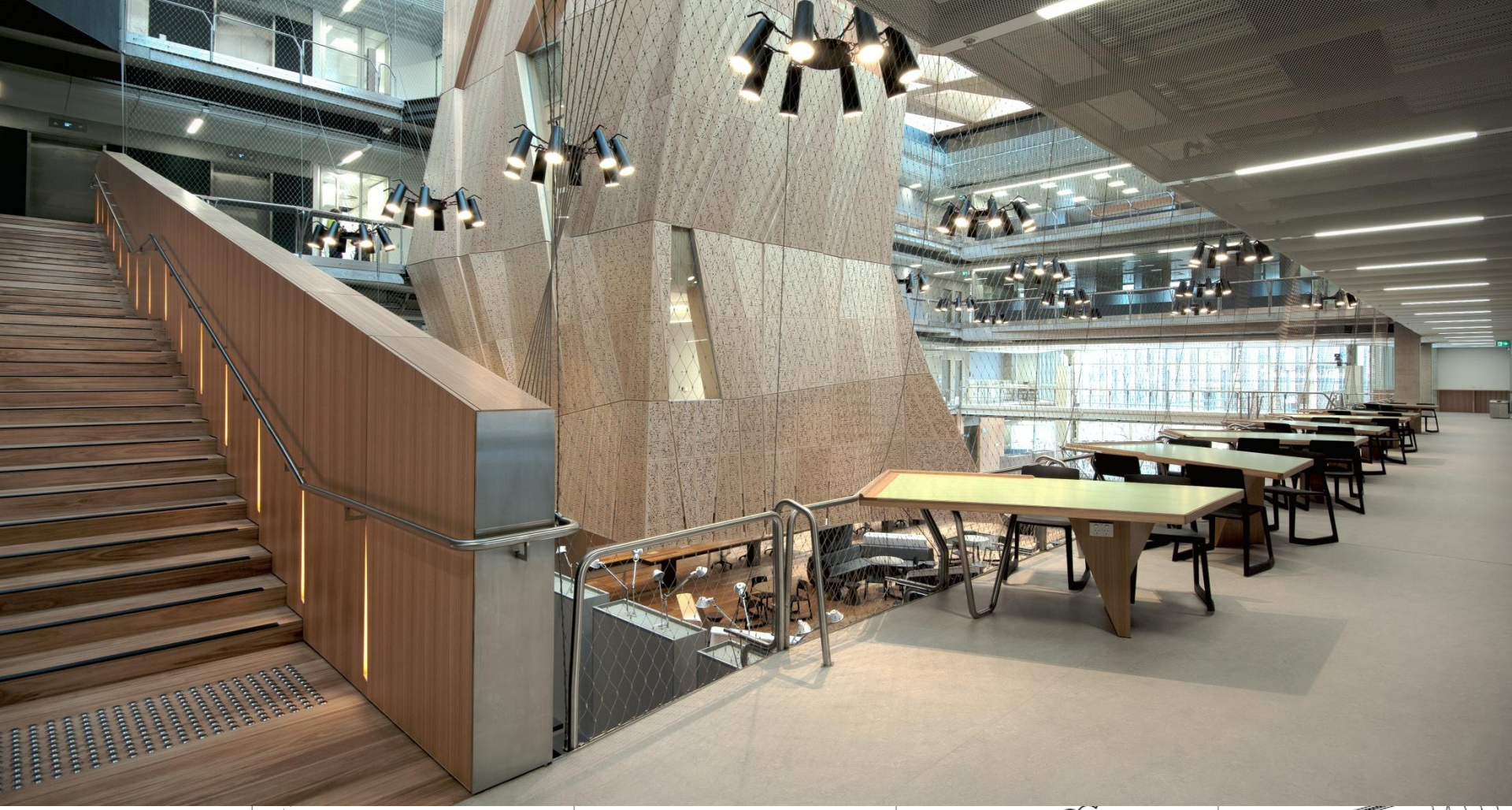
Discreet Studio

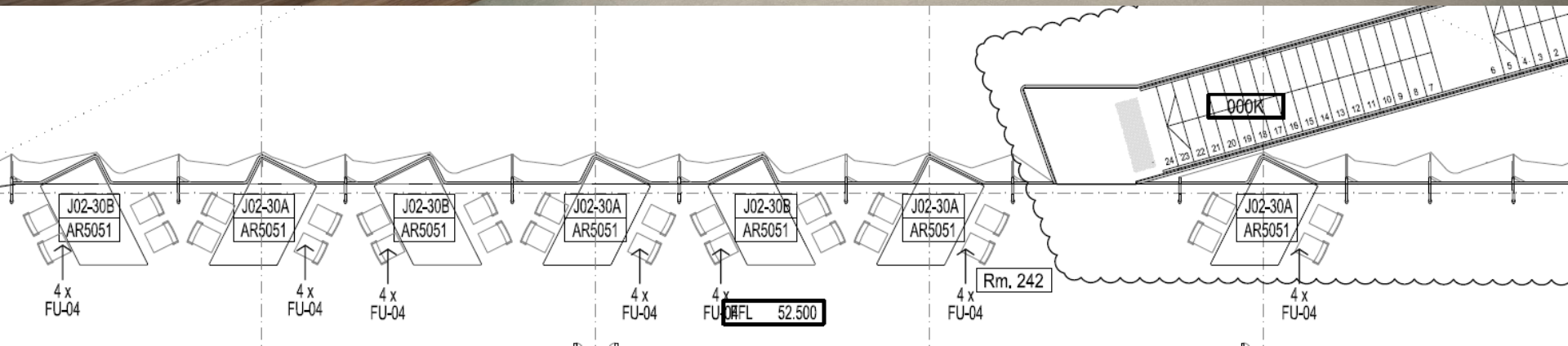
Active Studios
* Seminar mode
* Breakout mode
* Exhibition mode
* CAD enabled mode

The Studio


Print room
Studio spaces
CAD Lab
Entry from East Courtyard
Studio Hall
Void to Exhibition space below
Large Seminar rooms
Terrace
Studio spaces


J04-19A
AR5053
LUSTRADE TYPE
J03-26A
AR5052
LUSTRADE TYPE
J02-30A
AR5051
ADE TYPE




J02-30B
AR5051
J02-30A
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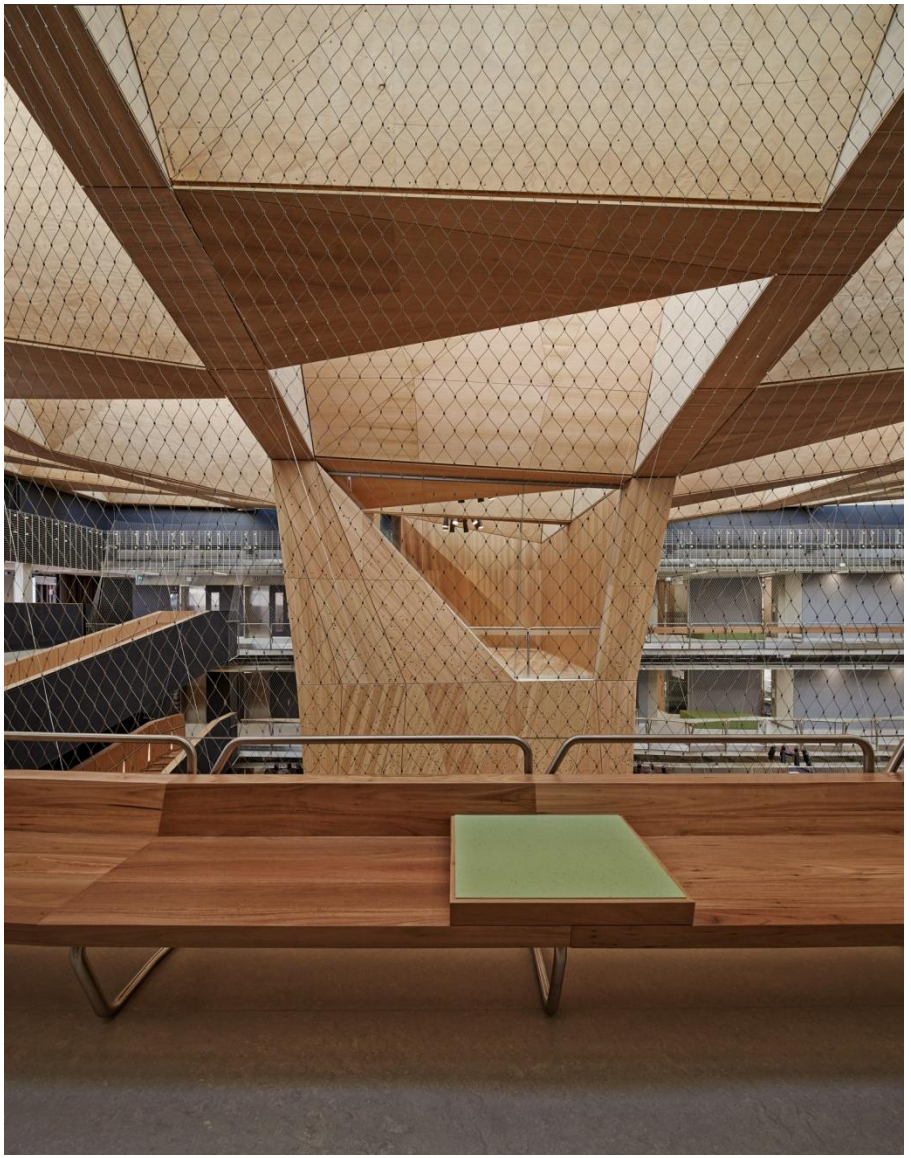
AFL 52.500

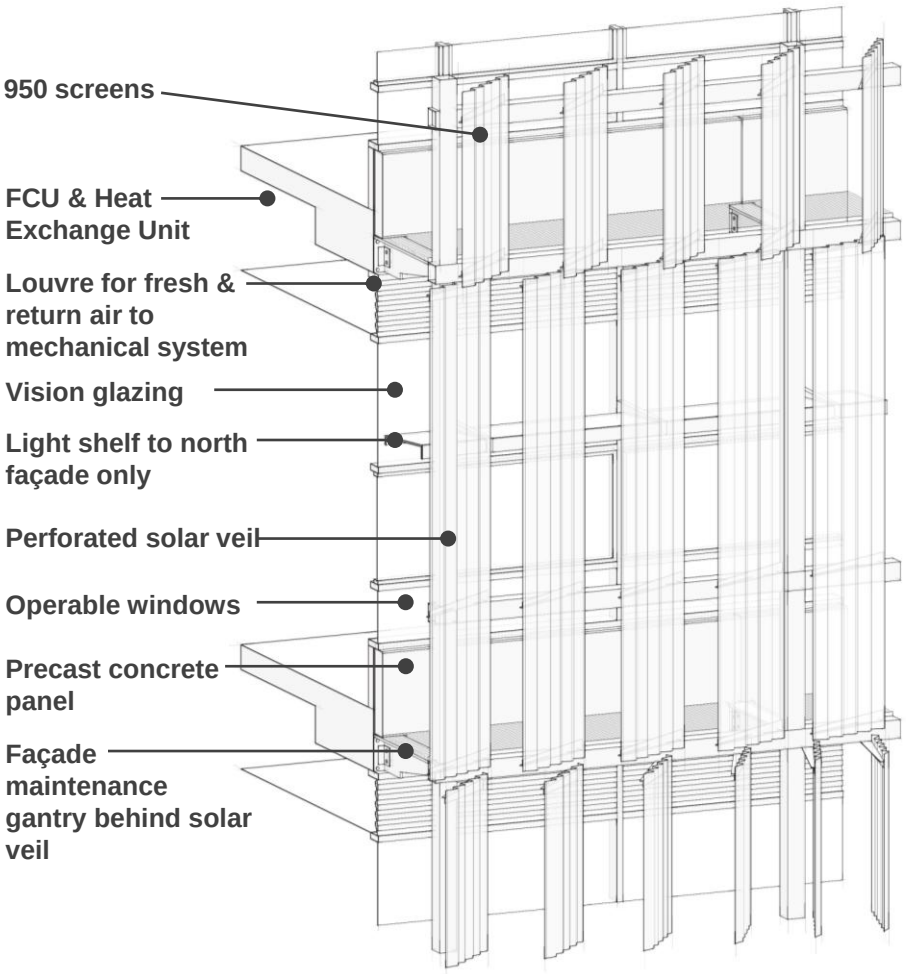


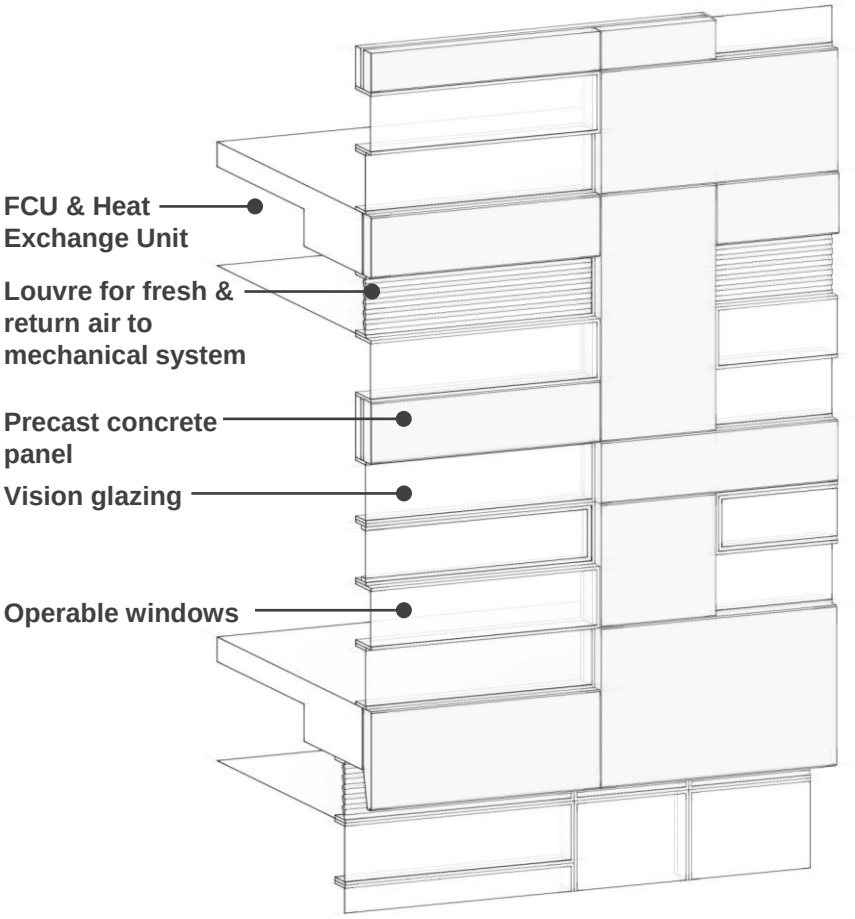
The Living Building

New Facade

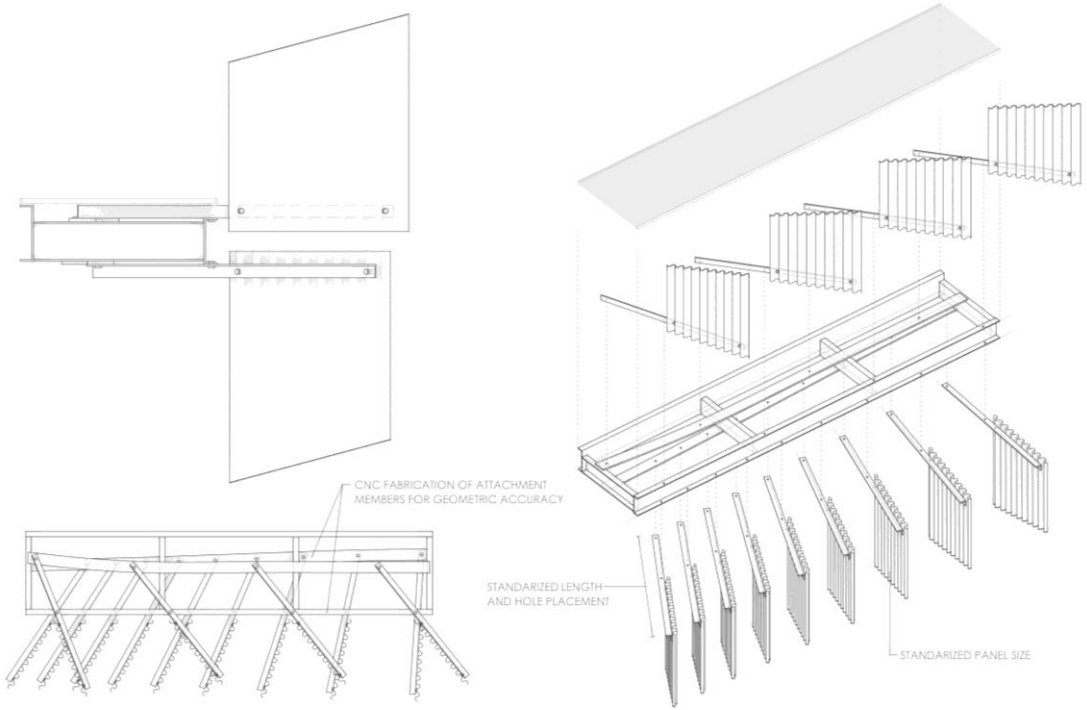
New Facade

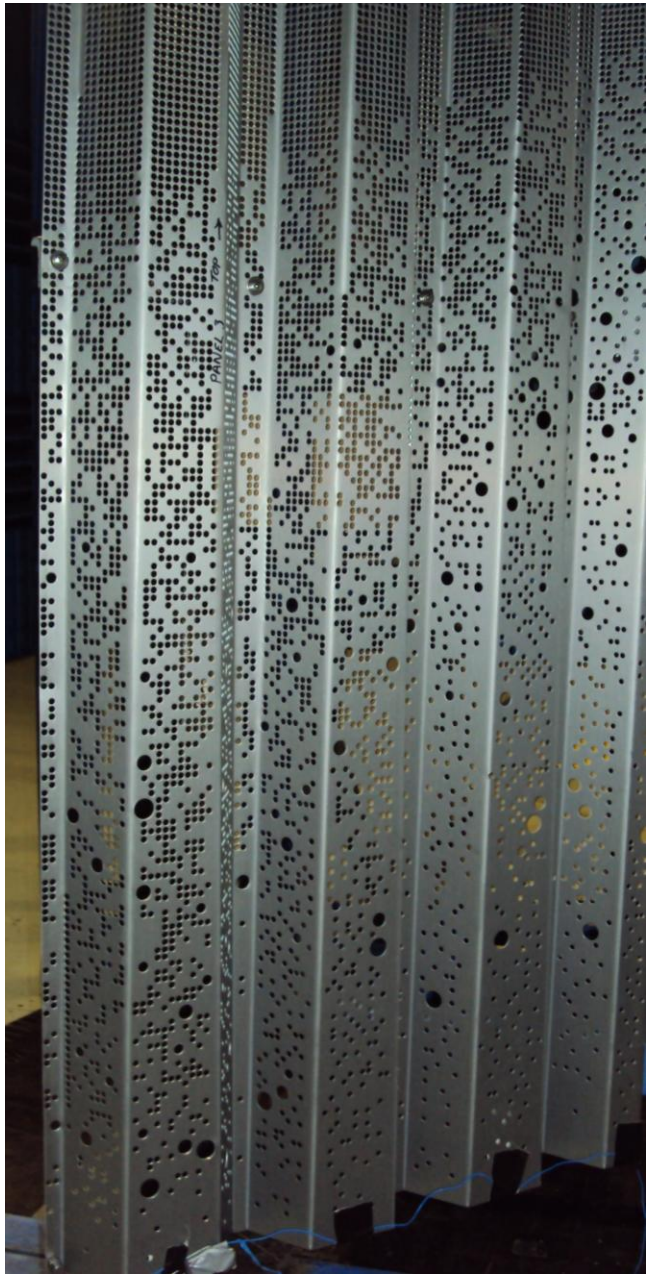
New Facade

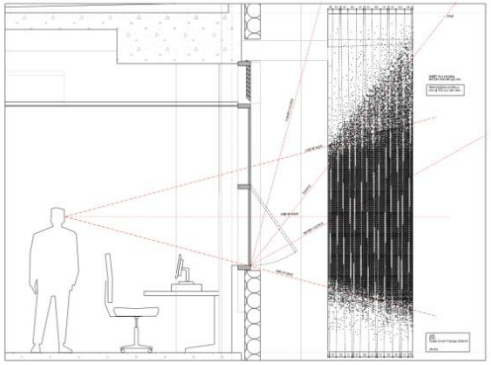

950 screens
FCU & Heat Exchange Unit
Louvre for fresh & return air to mechanical system
Vision glazing
Light shelf to north façade only
Perforated solar veil
Operable windows
Precast concrete panel
Façade maintenance gantry behind solar veil


FCU & Heat Exchange Unit
Louvre for fresh & return air to mechanical system
Precast concrete panel
Vision glazing
Operable windows

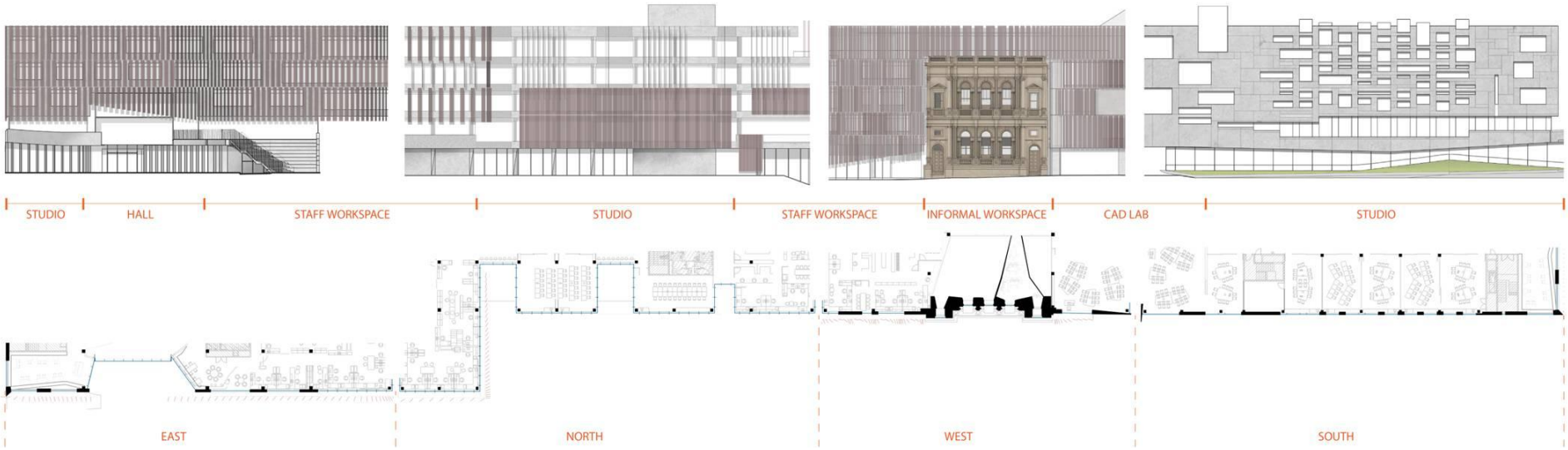
New Facade

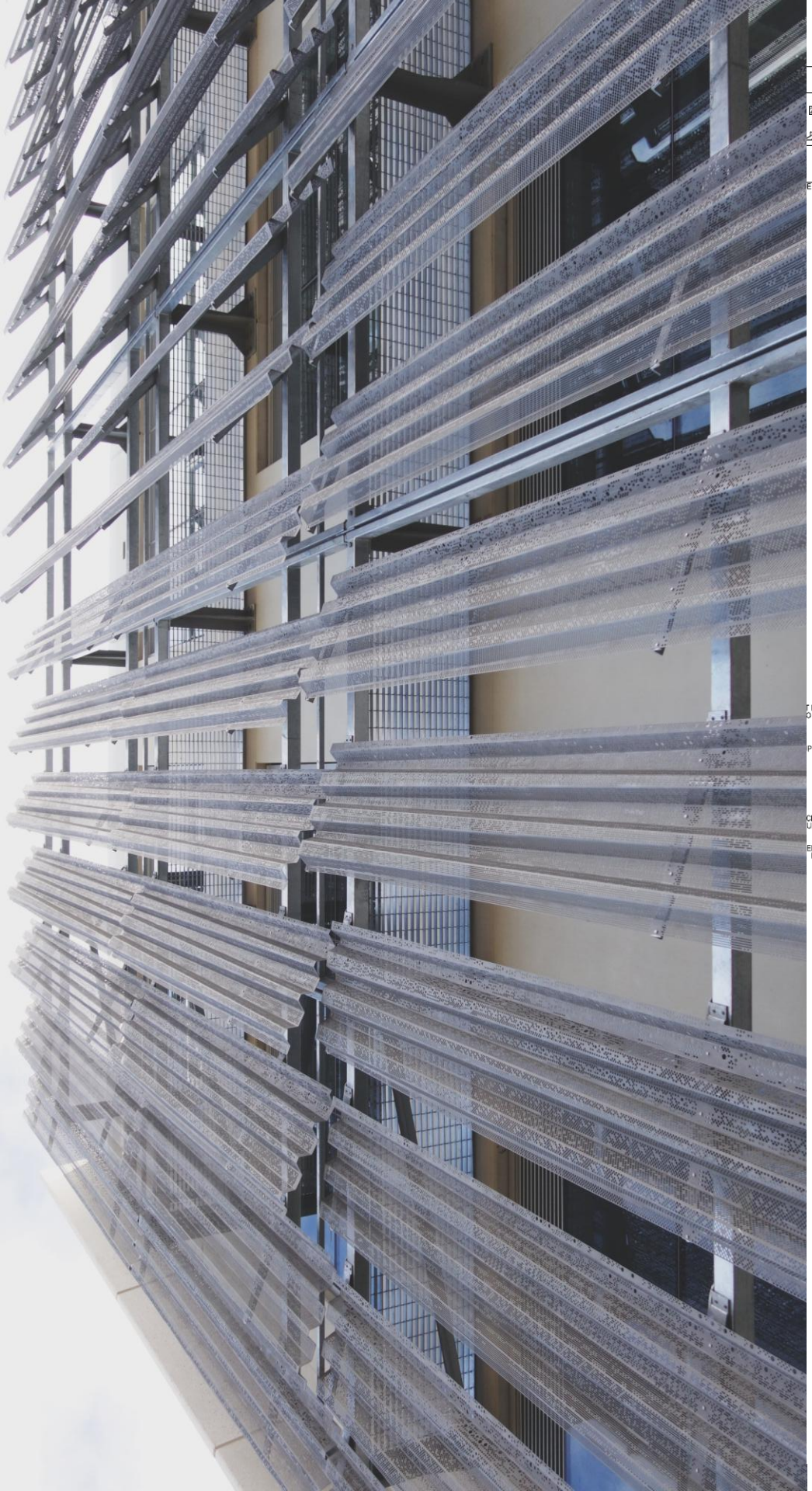

CNC FABRICATION OF ATTACHMENT
MEMBERS FOR GEOMETRIC ACCURACY
STANDARIZED LENGTH
AND HOLE PLACEMENT
STANDARIZED PANEL SIZE

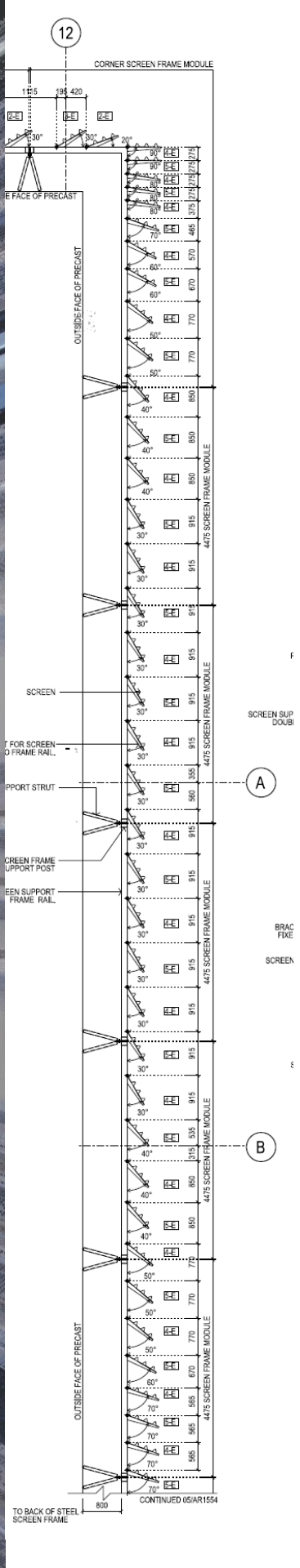

PANEL 3
TOP



New Facade

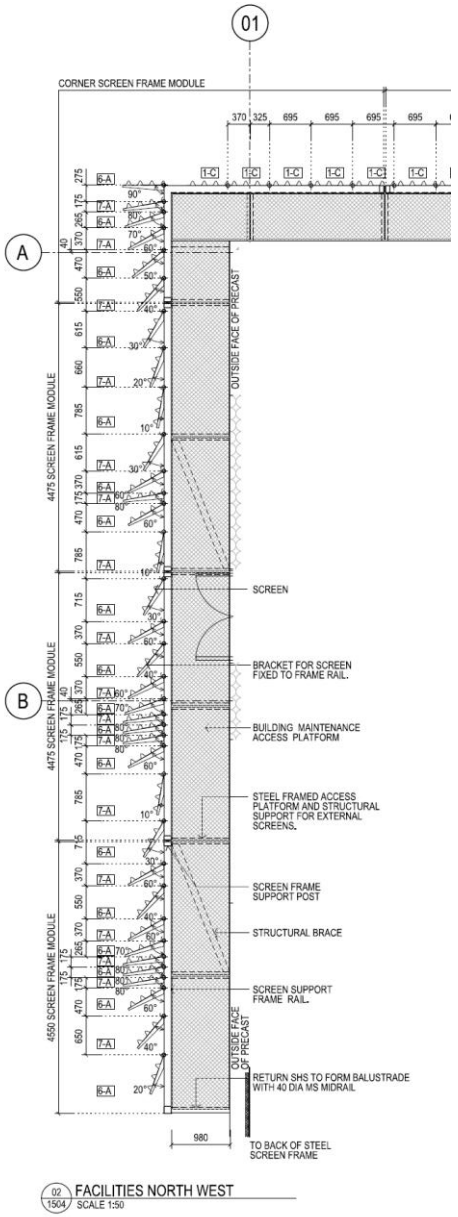

STUDIO
HALL
STAFF WORKSPACE
STUDIO
STAFF WORKSPACE
INFORMAL WORKSPACE
CAD LAB
STUDIO
EAST
NORTH
WEST
SOUTH



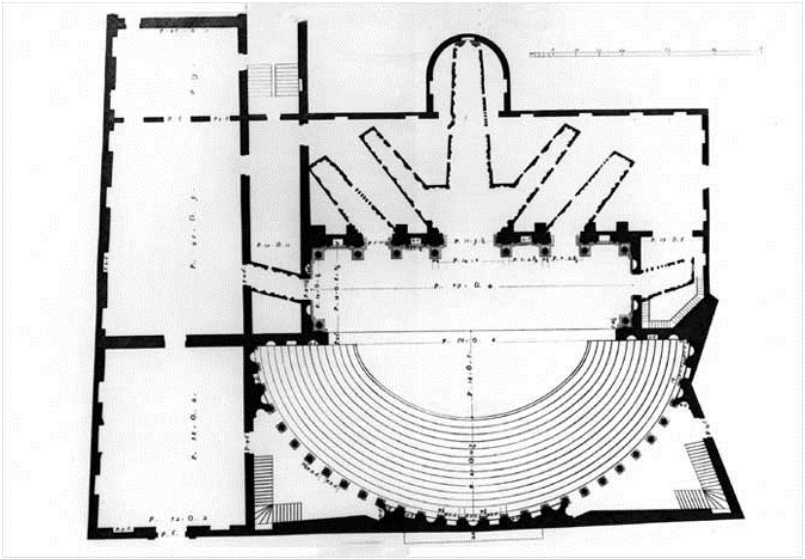

12
CORNER SCREEN FRAME MODULE
1115
195
420
OUTSIDE FACE OF PRECAST
SCREEN
A
B
4475 SCREEN FRAME MODULE
OUTSIDE FACE OF PRECAST
CONTINUED 05/AR1554
800
TO BACK OF STEEL SCREEN FRAME

Built Pedagogy

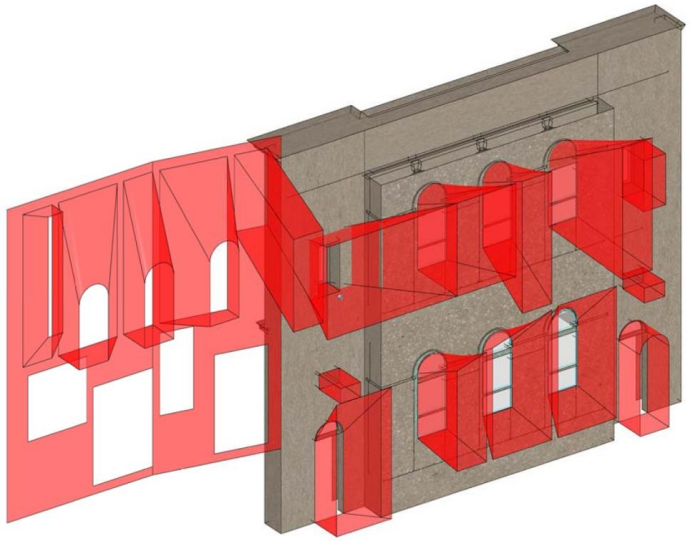
Heritage Facade

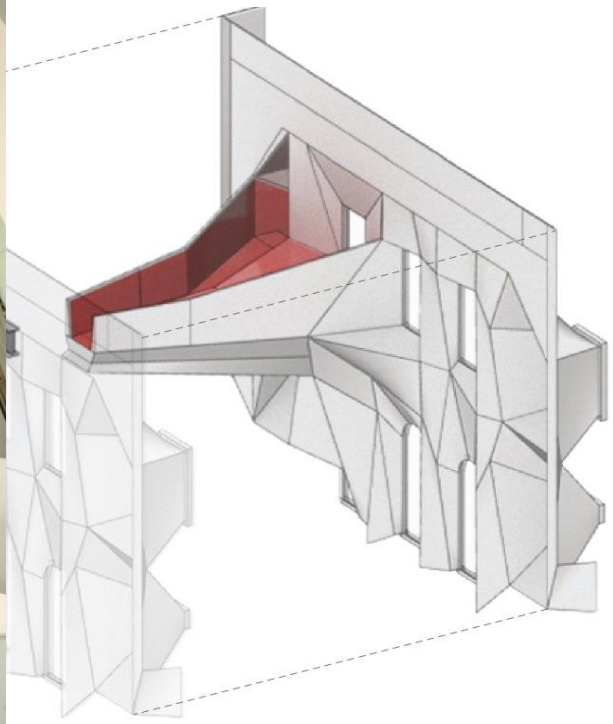


02 / 1504 FACILITIES NORTH WEST
SCALE 1:50



Teatro Olimpico Palladio





Collaboration in Construction

Solving a problem!

The tenders submitted were 10% over pre tender estimate

Brookfield Multiplex offered smart solutions to meet the budget, but sought to protect and even enhance the design

Each changes reviewed and agreed with full team and client

Documented over a 3 month period post novation of the design team prior to works commencing

Key changes included:
Redesign of roof
Rationalisation of basement
Deletion of thermally broken frames
Deletion of mound studio
Deletion of CLT
Precast cores and columns in lieu of insitu concrete
Change from polished to offform on 3 elevations

VM Items

RLB | Rider Levett Bucknall

BROOKFIELD MULTIPLEX LIST OF ADOPTED VE

General Notes:
-All provisions of Fire engineering & BCA Part J (JV3) to be met.
-Provisions to meet Acoustic report
-All substitutions to be subject to ESD requirements,
-Services to be coordinated with all VE revisions
-All adopted VE adopted are deemed accepted by UOM

JWA VM List

No.	Item	Clarification	Documentation Date	Trade
Architectural				
1	Replace CLT to slab soffits to levels 2 and 3 with conventional off form concrete (Class 2 finish)	Also includes the deletion of the PA-17 Lime wash finish. The Alternative Structural Design is as per Option on Structural drawings	Redocumentation required by no later than the 1/3/2013. Decision needs to be made by the 30/3/13, if the CLT is to returned to	
8	Replace 1.5mm thick VM zinc with same thickness Rheinzink alternative without change to steel framing or support. Maintain Design Intent.	BMC will tender both materials, and adopt specified material if required saving can be achieved through that process.	No further documentation required	
11	Delete MET-1 perforated zinc to the plant room enclosure and replace with Alucobond.	As per scope on Addendum 5 Documents	No further documentation required	
11a	Substitute - Alucobond plant enclosure to Spandek	Further saving to substitute Alucobond in item 11 to Spandeck. Acoustic performance to be maintained.	30/03/2013	
12a	Revise Pre-cast to off form (light colour) to North, East and West facades. South facade to remain honed	Concrete mix to remain as documented to all facades. UOM sign off of sample required.	8/03/2013	
15	Revise Tilt-up doors to ground level storage and workshop (D3 no.)	Standard Fold-up doors (single glazed). Scope as per scope indicated on JWA Mark-ups (attachment A)	8/03/2013	
17	Delete the rubber lining to bike store (B102) and replace with painted finish.	Painted finish direct to block walls, coloured concrete sealer to floors.	30/03/2013	
19	Revise wall linings to columns in the library, replace stainless steel polished mirror finish (WL-16) to columns with class 2 finish exposed concrete.	Review any column mounted services controls. Cast in or relocate as required. Nominated skirting to be retained.	8/03/2013	
25	Replace flooring (CP-02) nominated in library with alternative carpet.	Godfrey Hirst landscape carpet tile, with bitumen backing directly adhered to floor. Selection subject to warranty and ESD requirements. UOM sample approval required	30/03/2013	
38	Change balustrade design to fire egress Stairs 0008 and 000E - adopt stairmaster	Standard 3no. fall escape stair detail	30/03/2013	
41	Delete suspended plywood ceiling panels to southern studios on level 1. Adopt plbd and paint	Acoustic, services and natural ventilation performance to be maintained. Access panels to be standard flush trowel in type coordinated with plant.	30/03/2013	
41a	Delete suspended plywood ceiling panels to southern studios on levels 2. Adopt plbd and paint	As above	30/03/2013	
42	Replace the plywood wall finish to the southern studios on level 2. Adopt plbd and paint	As above	30/03/2013	
53	Eliminate all studio pocket doors and sliding doors (keep Level 1 Pivot doors only). Fill in opening with surrounding wall type and lining type in lieu of doors	Scope - Doors: D107, 167, 165, 163, 170, 171, 172, 253, 251	30/03/2013	
56a	GS01 - delete glass floor - replace with adjoining finishes - ceiling and floor.	Deletion includes SS Bulkhead/Reveal surround. - (preference to return this item if budget permits)	30/03/2013	
57	Eliminate Large Exhibition curtain only	Curtain storage to be deleted. Blackout blinds to be retained.	30/03/2013	
61	Delete the mound studio. Allow for alternate stair between Level 1 and Level 2, replacement of custom lockers with off-the-shelf lockers, additional informal furniture to Design Hall, and conversion of informal space at SE corner Level 2 to Studio.	As per scope indicated on JWA Mark-ups (attachment C) $ provisional sum for stair Services provisions to be revised accordingly. Lighting and services assumed to be resolved within current services budget	Slab profile and Structure drawings complete 1/3/2013	
62	Replace off-form concrete slab soffits with Bondek.	As per scope indicated on JWA Mark-ups (attachment D highlighted orange)	1/02/2013	
66	Reduce qty. of glazed tilt-up doors to north @ G01 (workshop/storage) Delete doors DG16, DG15 & DG59 and replace with FS-13	Scope as per scope indicated on JWA Mark-ups (attachment A)	30/03/2013	
67	Revise glass type/size to 'TS09' around small exhibition	As per scope/detail indicated on JWA Mark-up(attachment A)	30/03/2013	
69	L01 NW terrace (Rm 111)- Delete zinc screen and steel support framing to east side of terrace.	As per scope/detail indicated on JWA Mark-up(attachment A)	30/03/2013	
75	Adopt alternate to 'CL13' spray applied acoustic lining	25mm 'light grey' colour Envirospray 300 textured off the gun finish (Exhibition space R1208/R121 to be as specified)	30/03/2013	
92	Delete ceiling panels through the two smaller lecture theatres.	As per scope/detail indicated on Mark-up(attachment B) 25mm 'light grey' colour Envirospray 300 textured off the gun finish. Lighting and services assumed to be resolved with in current services budget. Should flush plasterboard ceiling be required, add back at $/m2 including paint.	30/03/2013	
93	Adopt alternate Ceiling through the basement foyer area	As per scope/detail indicated on Mark-up(Attachment B) 25mm 'light grey' colour Envirospray 300 textured off the gun finish. Lighting and services assumed to be resolved with in current services budget. Should flush plasterboard ceiling be required, add back at $130/m2 including paint.	30/03/2013	
96	Provide alternative to carpet (CP-01)	Godfrey Hirst landscape carpet tile, with bitumen backing directly adhered to floor. Selection subject to warranty and ESD requirements. UOM sample approval required	30/03/2013	
97	Replace rubber flooring (RE04, RE05, RE07, RE08, RE09, RE10, RE11) with Marmoleum	Forbo Marmoleum as scheduled elsewhere on the Project	30/03/2013	
98a	Reduce extent of entry mat	As per scope indicated on JWA Mark-ups (attachment E)	30/03/2013	
99	Provide alternative to architectural louvres	Visual intent to be retained. All mechanical performance to be retained.	30/03/2013	
100	Target reduction in wall tiling (TL02, TL03, TL04) JWA mark up	As per scope indicated on JWA Mark-ups (attachment F) No change to tiles specified, walls painted where tiles omitted, substrate coordinated accordingly.	30/03/2013	
101	Replace atrium roof shading device (AR8230) with fritted glass. Simplify roof to single fall panellised, with no internal gutters, with compliant maintenance system. Design intent retained - LVL beams, coffers under unchanged, glass panel size and shape to be retained.	The proposed alternative atria roof glazing shall be designed to meet the following performance requirements: 1. Annual average direct sunlight glare penetration to the level 1 atria floor usable floor areas shall be not more than provided by the tendered external shading design. 2. The overall alternative building facade and roof design shall meet BCA/NCC Part JV3 performance modelling requirements. 3. A Daylight factor level of 2% or greater shall be achieved for at least 80% of the level 1 atria floor usable floor area. 4. Designed to not adversely affect the mechanical system.	Programme for redocumentation to be developed between BMPX and JWA, target completion date 30/3/2013	
103	Provide alternative MDF substrate to wall linings WL01	Material to meet all Greenstar and regulatory requirements. Tas Ash as specified.	30/03/2013	
104a	WL01,CL15,CL16 - Finish with alternate clear lacquer	subject to sample approval	30/03/2013	
105a	Delete WL-06 to areas as marked on levels 1-4 on JWA markup including north corridors and academic corridors and workspaces. Substrate to wall retained, with paint finish to walls.	As per scope/detail indicated on JWA Mark-up(attachment G)	30/03/2013	

RLB | Rider Levett Bucknall

BROOKFIELD MULTIPLEX LIST OF ADOPTED VE

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JWA VM List

No.	Item	Clarification	Documentation Date	Trade
105b	Reduce extent of WL-11, 12, 13 and 14 fabric panels by 30% and substitute painted plasterboard. For retained panels adopt nominated optional fabric.	Options adopted - Novawall fabrics WL11-13 to Kvadrat Maharam 'Reply', and WL-14 to Maharam 'Kvadrat Maharam 'Moon'	30/03/2013	
105d-g,j	Delete WL-19,20,21,22 and 31) to L1-4 and replace with painted Plasterboard	As per scope/detail indicated on JWA Mark-up(attachment G)	30/03/2013	
105h	~~WL-27 - delete colour back glass to library staff tea point and office area B01 and replace with Pb and paint.~~	Not appropriate in wet area, maintenance issue		
105i	Delete WL-30 and replace with 3mm painted steel plate in lieu.		30/03/2013	
105k	WL-39 - Delete colourback glass to L01 model storage cupboard, replace with P.B. and paint		30/03/2013	
105l	Delete PA-17 Lime wash to CLT exposed ceilings.		30/03/2013	
105m	SK-04, SK-08, SK-15 – Adopt alternative to SS skirtings, ie Aluminium or deleted where feasible.	Adopted as SK-10	30/03/2013	
108	Delete rubber/marmoleum flooring to the circulation zones around the atrium and replace with exposed concrete floors. Additional to item 97	As per scope indicated on JWA Mark-ups (attachment E)	30/03/2013	
112c	JOB-01, JOB-04, JOB-05, JOB-08, JOB-14, JOG-08 - Allow for targeted savings for following joinery Library tables – rationalisation of joinery and change in material		30/03/2013	
112e	JOG-28 THRU JOG-31 - Allow for a targeted cost savings for the workshop work tables.		30/03/2013	
112f	JO1-04 & JO1-06 - Allow for a targeted cost savings for the large N/S running joinery unit to L01 Hall (computer/storage unit)		30/03/2013	
112g	JO1-29 - Deletion of joinery associated with Mound studio.	See item 61	30/03/2013	
112h	JO2-22 AND JO2-23 - Deletion of joinery associated with Mound studio relocation to Rm. 236.	See item 61	30/03/2013	
112i	JO2-25 - Deletion of joinery associated with Mound studio.	See item 61	30/03/2013	
~~112l~~	~~[illegible] - Delete joinery around L01 atrium~~	Not taken up at this time		
ST5	Rationalise of footing sizes	Savings possible due to revised Geotechnical Report - Douglas Partners Report	1/02/2013	
Landscaping 1	Delete Biofilta system to Landscaping	Saving includes walls, infrastructure and planting. Note: Irrigation system retained.	30/03/2013	
LS2	Achieve a targeted budget saving over entire remaining Landscape package		30/05/2013	
LS5	External Pavers to be supplied by UOM	PV-01, and PV-02	1/02/2013	
OT6	Adopt Bonds in lieu of Bank Guarantees			
SV2a	Adopt Standard Lift car interiors	Based on Standard range from selected Contractor.	NA	
SV21	Reduce sensor numbers (to omit research sensors)	Omit 300 No. sensors at $x per sensor The Research Sensors may be reduced. The Web-Based energy management system shall be installed as per specification to relay or 'piggy back' onto specified BMS. This system will repeat energy use data, CO2 levels, room temperatures for use by researchers. Example system by Switch Automation investigated by researchers.	30/03/2013	
SV22	Alternative light fittings	Performance and appearance to meet that of selected fitting, with no impact on; maintenance or significant redesign.	NA sample process with Contractor	
Services savings tenderer				
iii	delete secondary chw pumping	Magnetic flow meters on each chiller, primary pumps - variable speed, pump re-selection required to meet duty	30/03/2013	
viii	Revise design supply air duct to 500 seat theatre to delete floor trench	Duct to be insulated, and waterproofed and meet current performance requirements	1/02/2013	
ix	Adopt standard linear slot diffuser	Air distribution, design temperature, occupant comfort levels, and performance to be equivalent	1/02/2013	
xi	Rationalise sound lagging/attenuators to mech system	To meet requirements of Acoustic report	NA	
b	Alternate BMS contractor/system	Fully conforming to Aurecon Specification	NA	
c	Adopt rationalisation of tundishes / delete condensate pumps	Fully conforming to Aurecon Specification	NA	
d	Alternate Air Handling Units manufacturer	Fully conforming to Aurecon Specification	NA	
i	Delete lightning protection			
Architectural savings tenderer				
b	Delete requirement for thermally broken frames	The proposed alternative non-thermally broken facade glazing shall be designed to meet the following performance requirement: alternative building facade shall meet BCA/NCC Part JV3 performance modelling requirements	NA	
c	Delete insect screens		NA	
e	Delete window testing	Warranty and watertight standard equal to specified system	NA	
f	Alternate metal roof decking	Kliplok 700 HS in standard XRW colourbond colour 0.48 BMT	30/03/2013	
i	Reduce CL05 scope and as per mark up	As per scope indicated on JWA Mark-ups (attachment J - delete Lindner ceiling to passages not on Atrium - Priority 1 areas (retain Acoustic Spray) Lighting and services assumed to be resolved with in current services budget	30/03/2013	
v	Provide alternative MDF substrate to CL-15		NA, sample process	
w	Provide alternative MDF substrate to CL-16		NA, sample process	
UoM	Reduction to Av Equipment		NA	

VM Items

BROOKFIELD MULTIPLEX LIST OF ADOPTED VE

General Notes:
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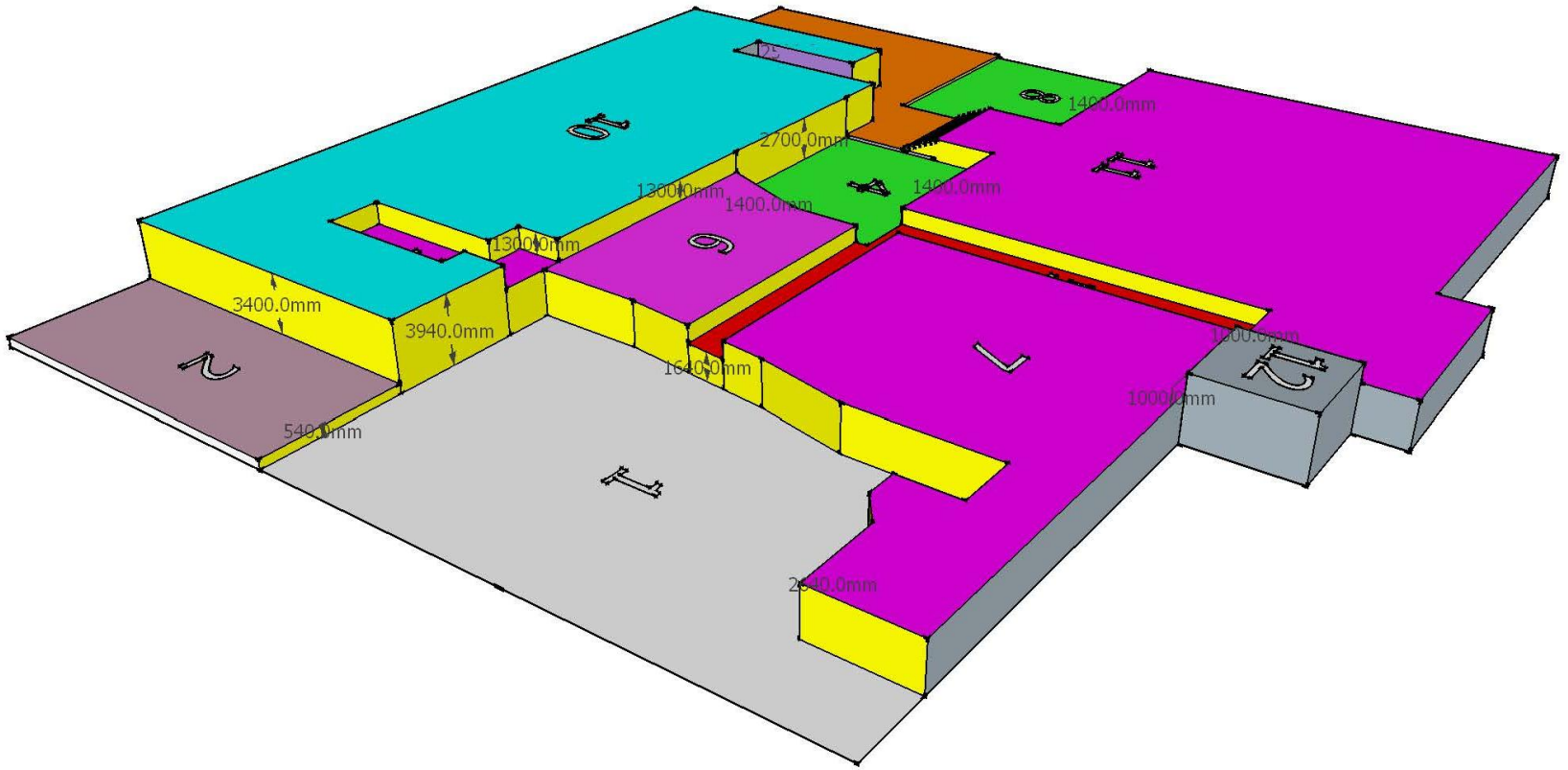
Alternate Basement Design

Rationalised the original basement design by reducing the number of different levels across the floor plate.



Precast Cores and Columns

Introduction of precast cores and columns adopted throughout the building in lieu of insitu concrete elements.

Early Commencement of Project

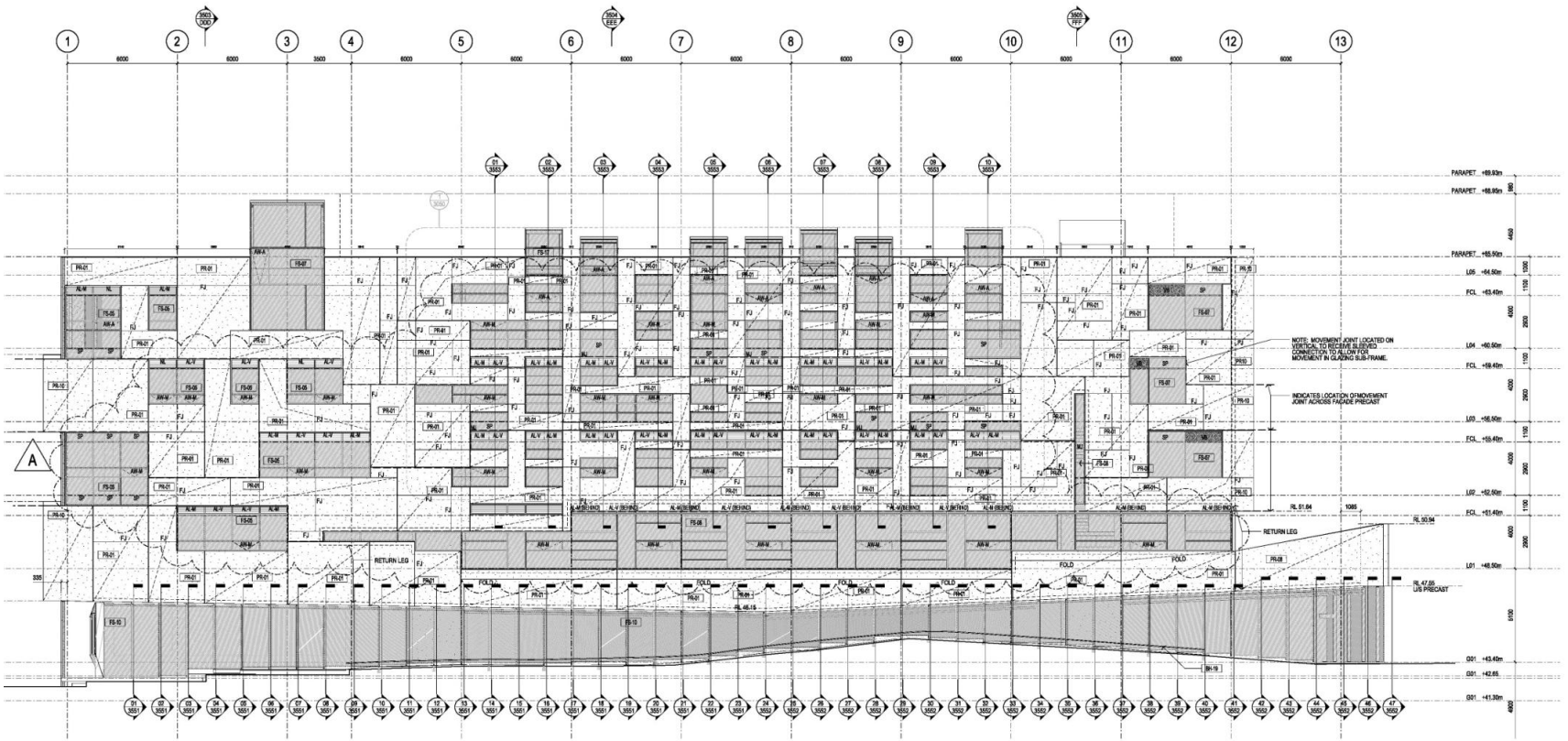
Brookfield Multiplex was provided early access to site, to get a jump on the program

Required a sharing arrangement with the Early Works contractor

Open Design Meetings

Design meetings were held with all stakeholders involved in the project.

This included the client, consultants and PM for the project on a weekly basis.

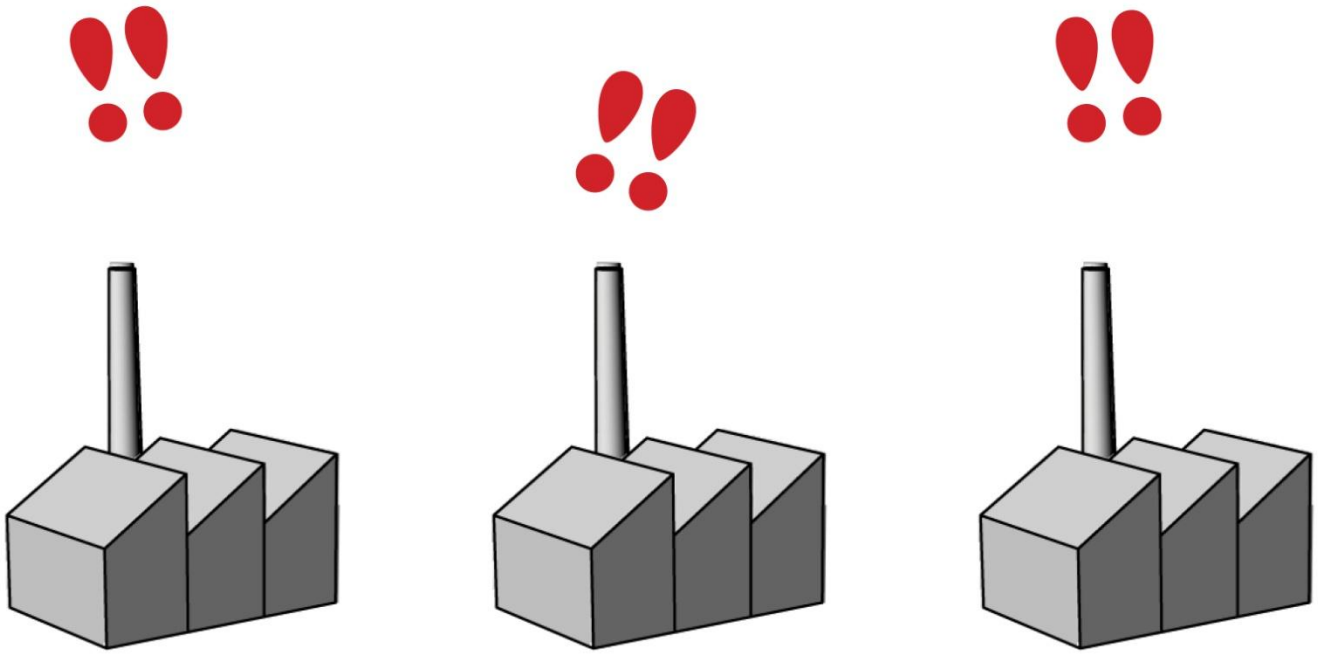


Construction Logistics

Melbourne University provided flexibility with the hoarding line and space allocation during the construction

Spandrel Precast

Change of spandrel precast details in order to delete perimeter PFC.

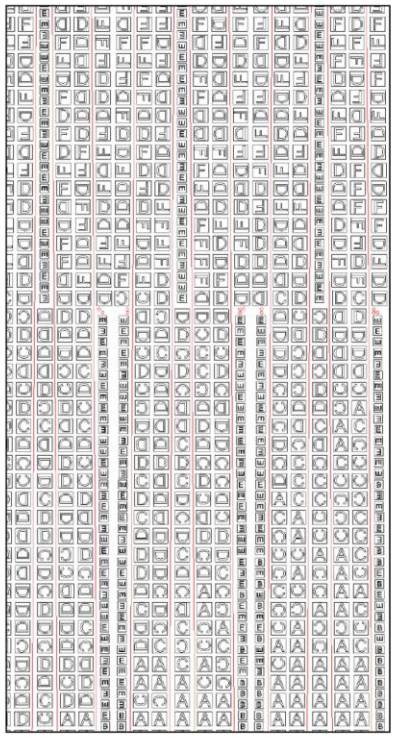


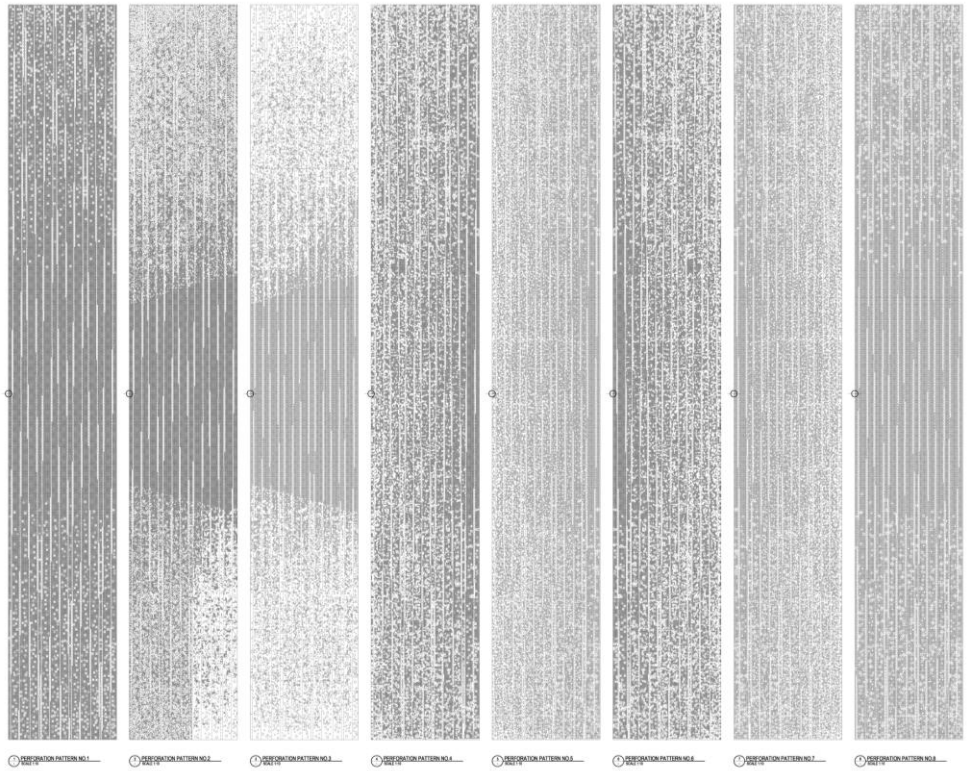
PRODUCTION

DOUBLE SHIFTS for 36 WEEKS

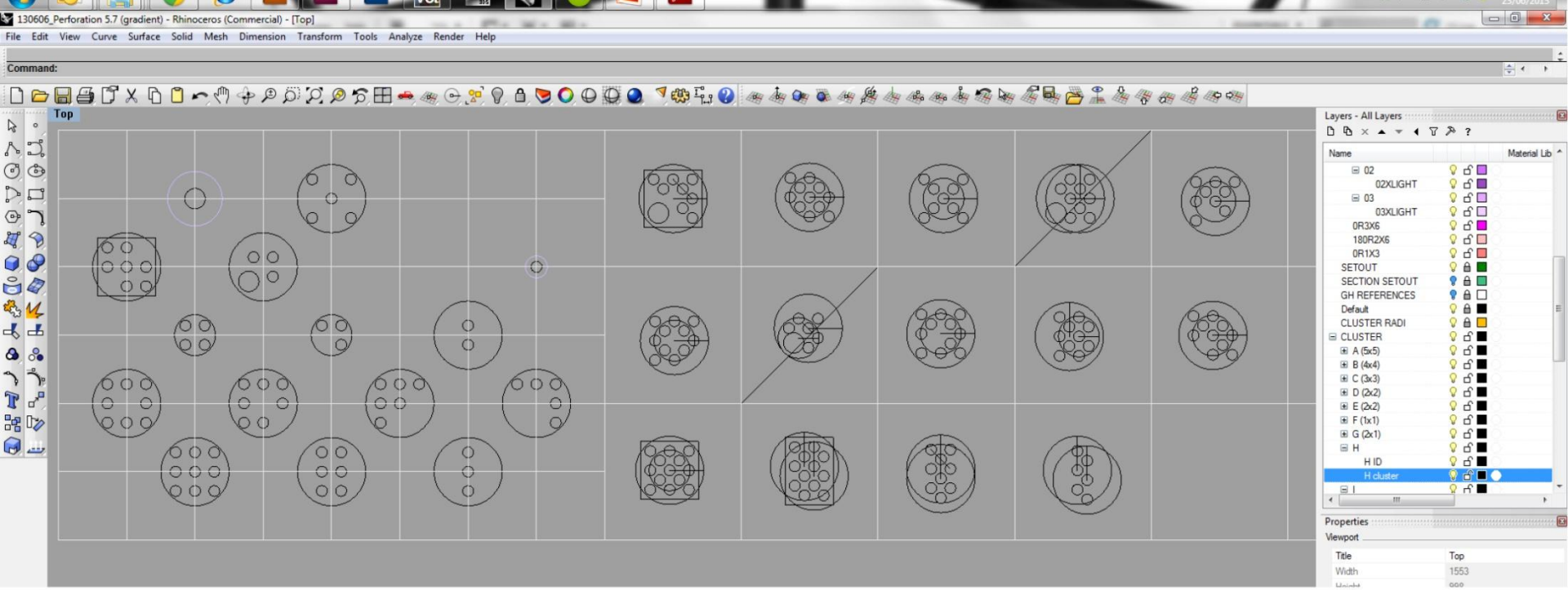
Zinc Screens

The design of the zinc screen pattern was simplified using a preselected layout in order to increase efficiency of punching.





8 Perforation Patterns
89 Panel types
817 Screens


130606_Perforation 5.7 (gradient) - Rhinoceros (Commercial) - [Top]
File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Help
Command:
Top
Layers - All Layers
Name
Material Lib
02
02XLIGHT
03
03XLIGHT
0R3X6
180R2X6
0R1X3
SETOUT
SECTION SETOUT
GH REFERENCES
Default
CLUSTER RADI
CLUSTER
A (5x5)
B (4x4)
C (3x3)
D (2x2)
E (2x2)
F (1x1)
G (2x1)
H
H ID
H cluster
Properties
Viewport
Title
Top
Width
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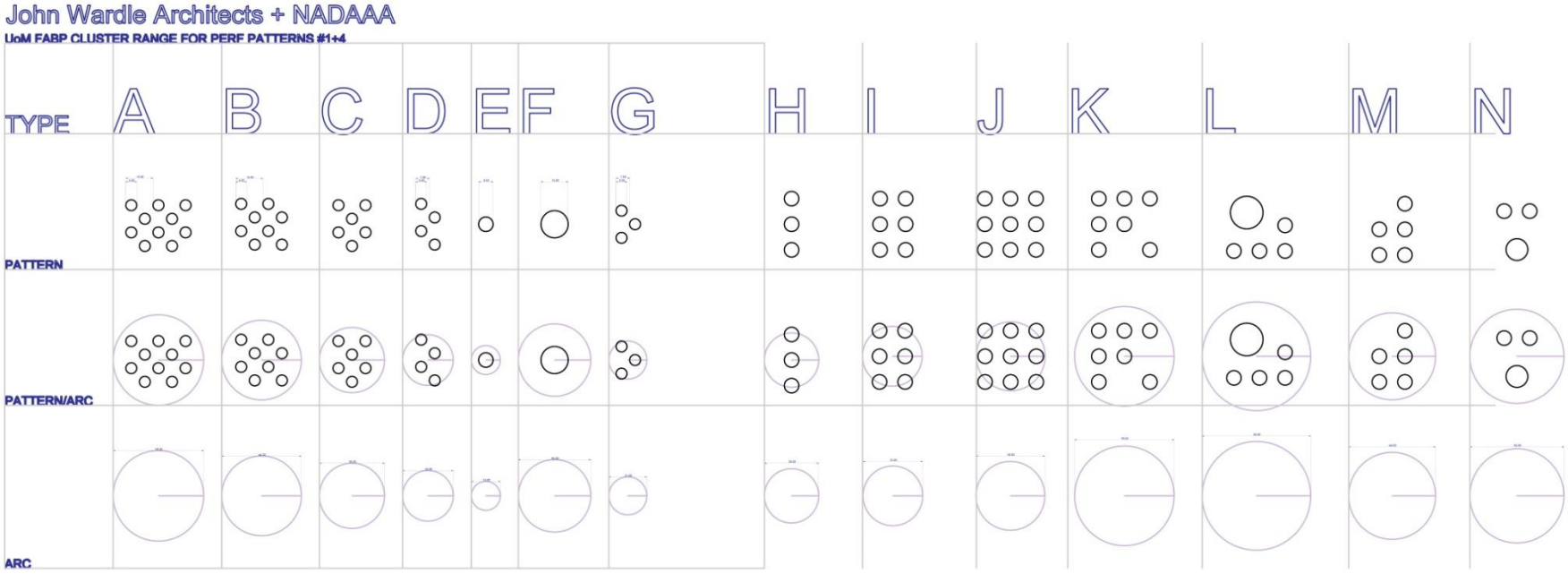
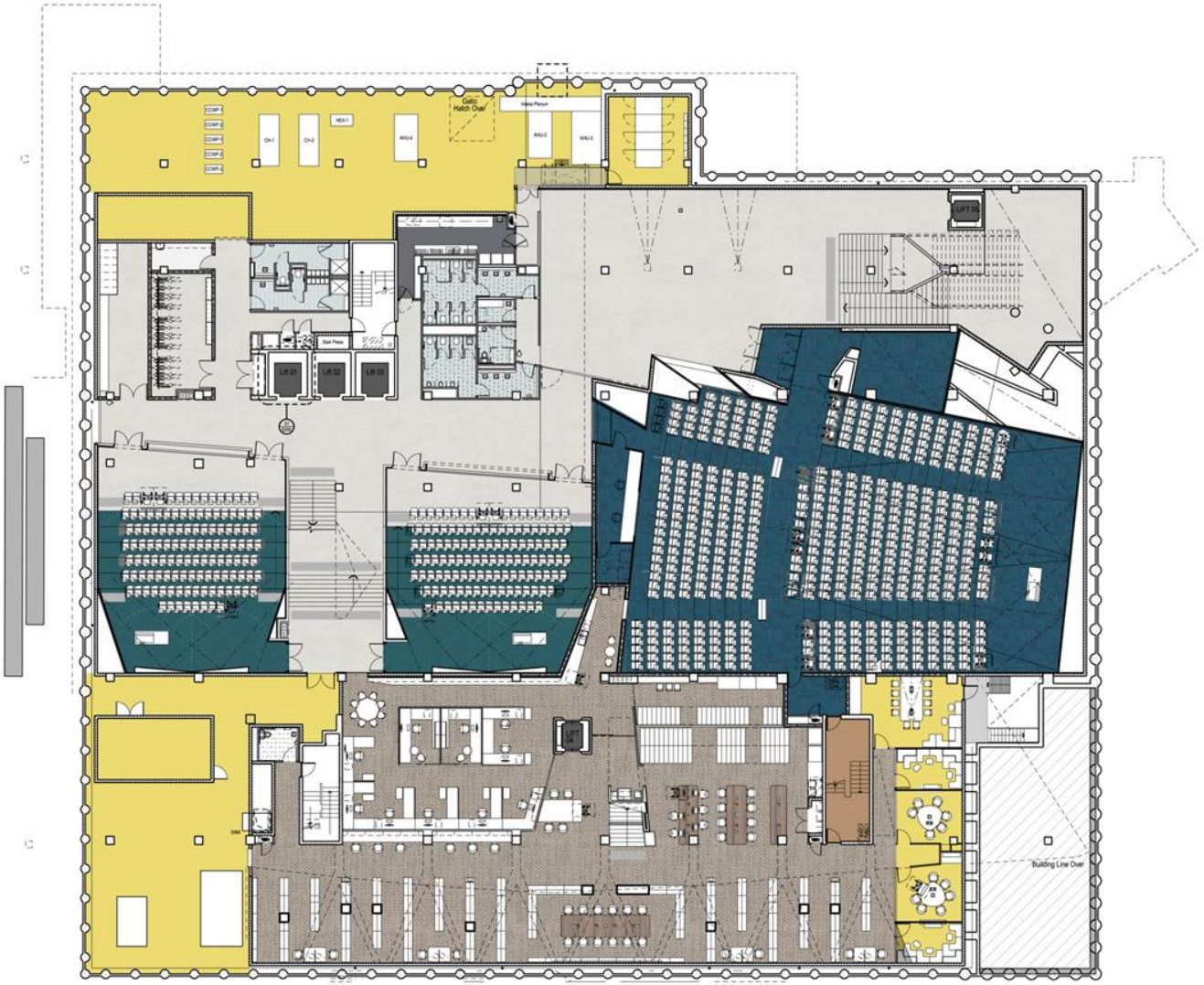
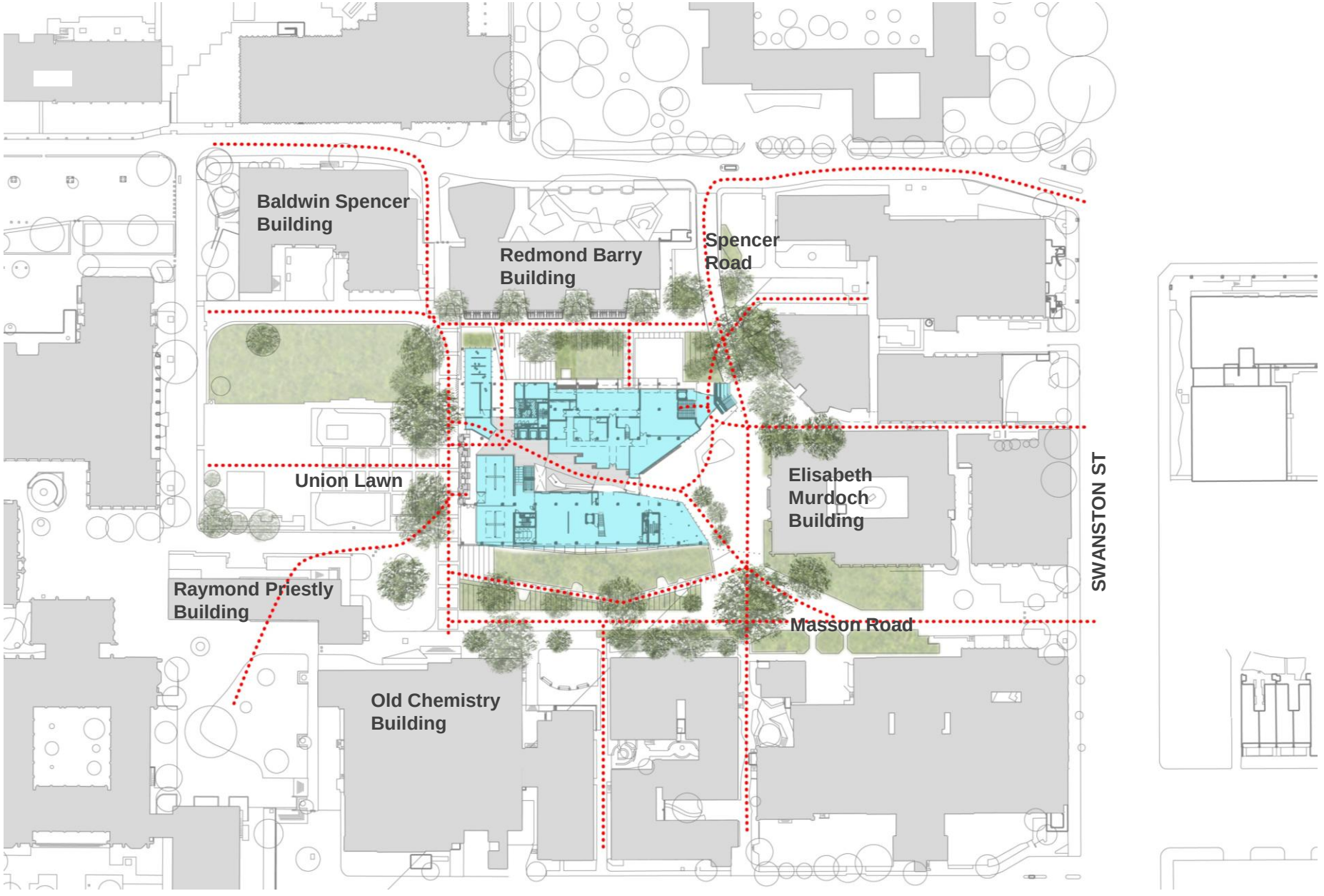

John Wardle Architects + NADAAA
UoM FABP CLUSTER RANGE FOR PERF PATTERNS #1+4
TYPE
A
B
C
D
E
F
G
H
I
J
K
L
M
N
PATTERN
PATTERN/ARC
ARC

Roof Design

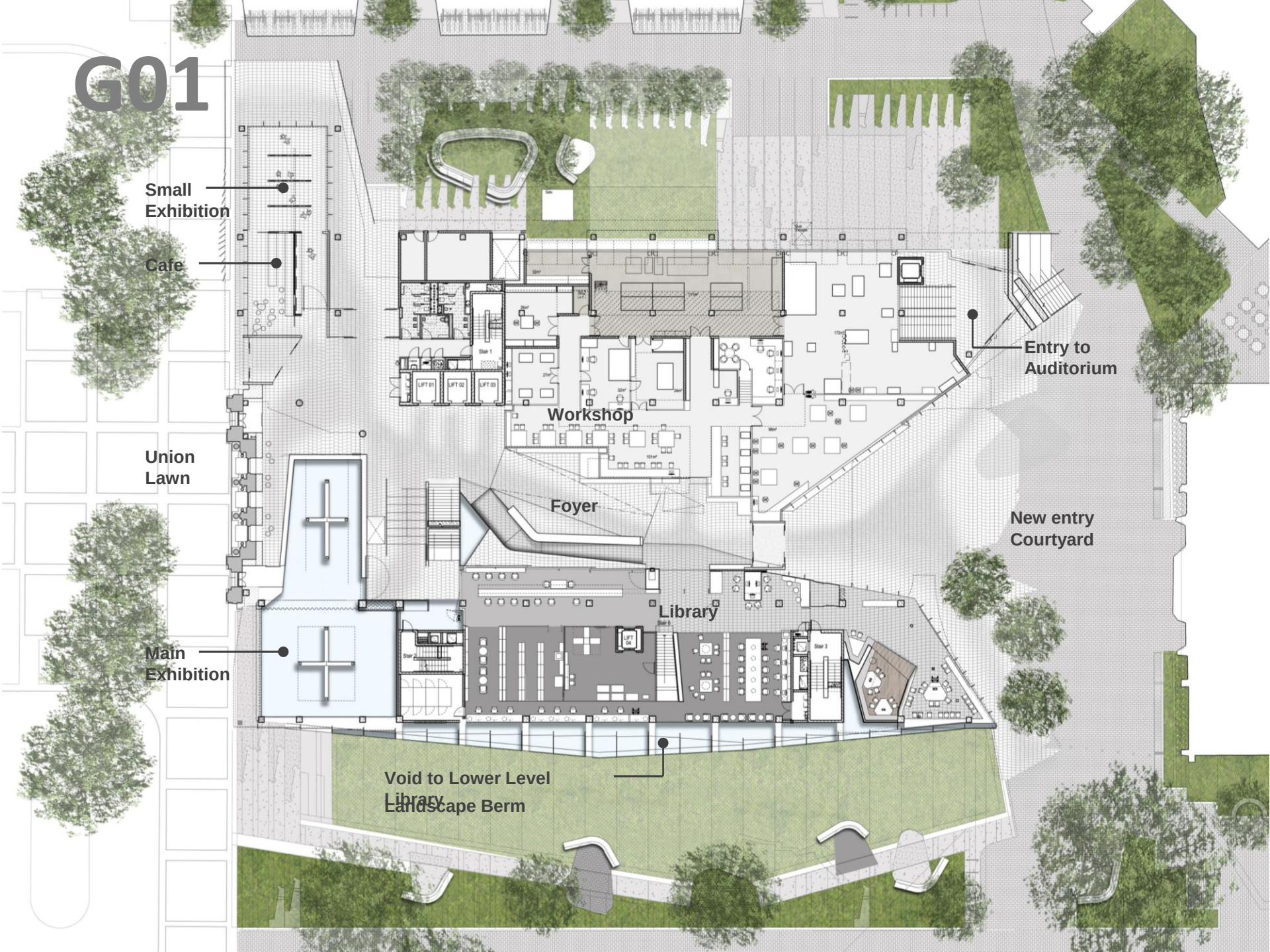
The redesign of the roof allowed for the glazed modules to be prefabricated off site.

B01

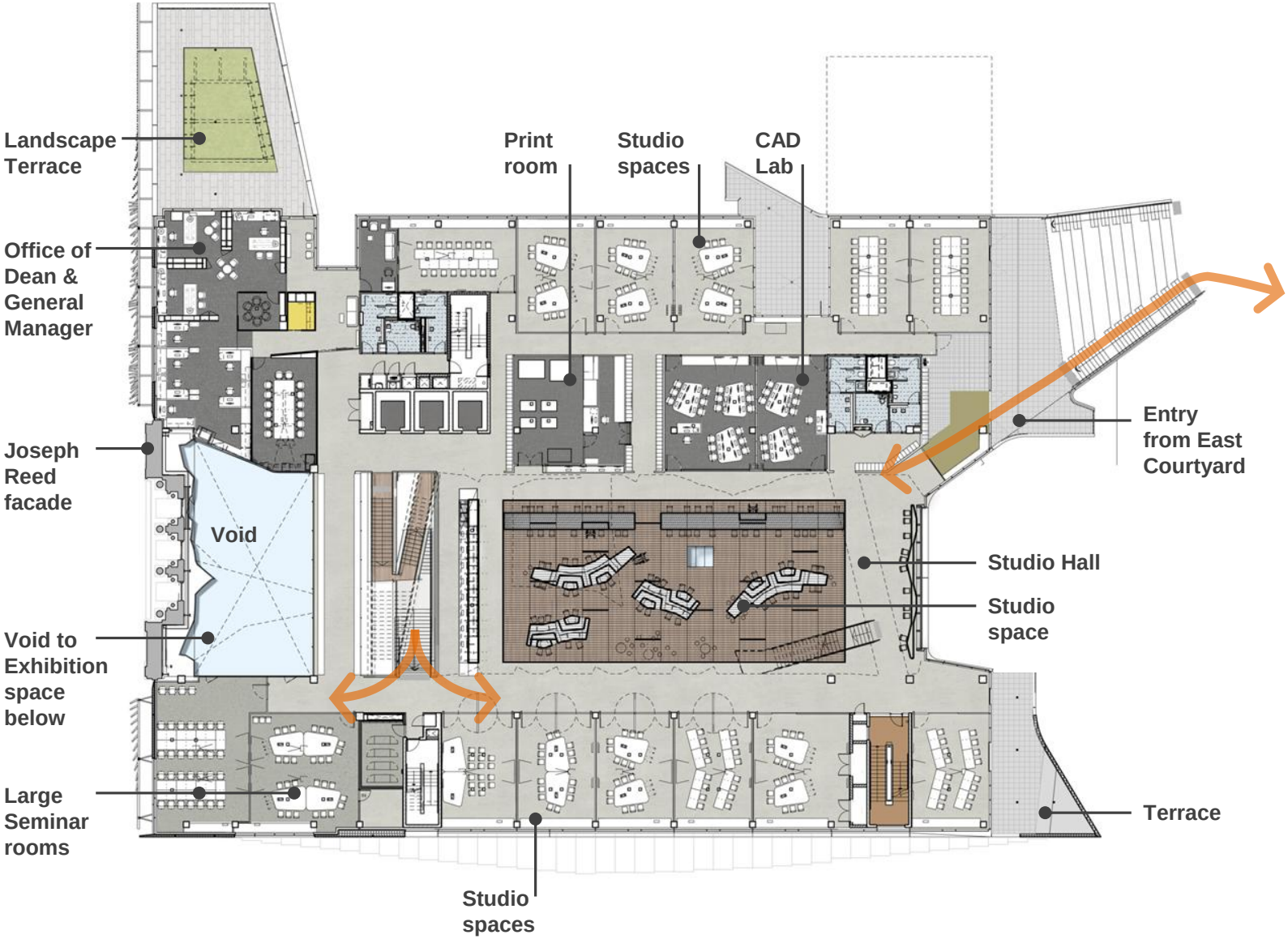



Baldwin Spencer Building
Redmond Barry Building
Spencer Road
Union Lawn
Elisabeth Murdoch Building
SWANSTON ST
Raymond Priestly Building
Masson Road
Old Chemistry Building

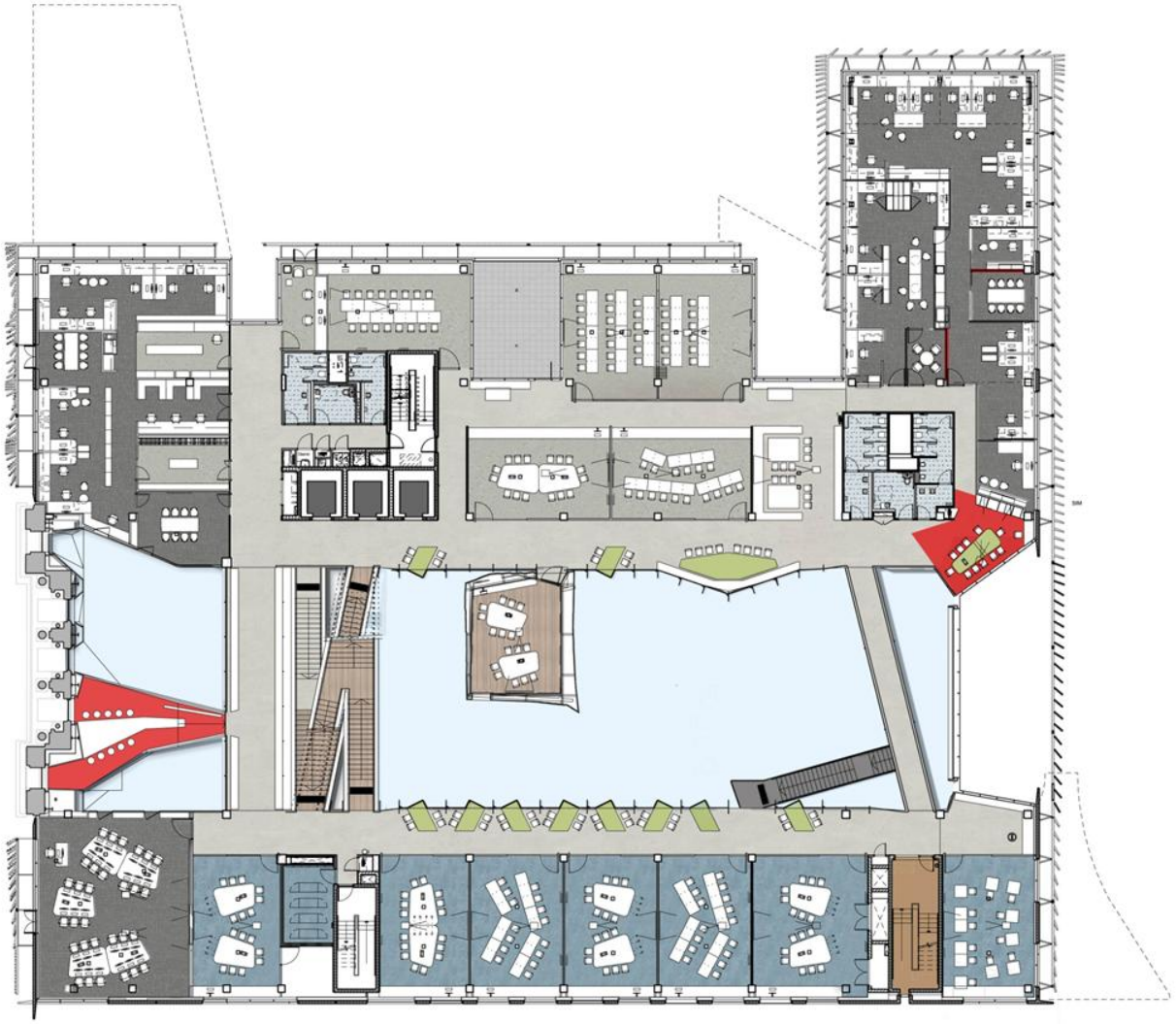
G01


Small Exhibition
Cafe
Union Lawn
Main Exhibition
Workshop
Foyer
Library
Void to Lower Level Library
Landscape Berm
Entry to Auditorium
New entry Courtyard

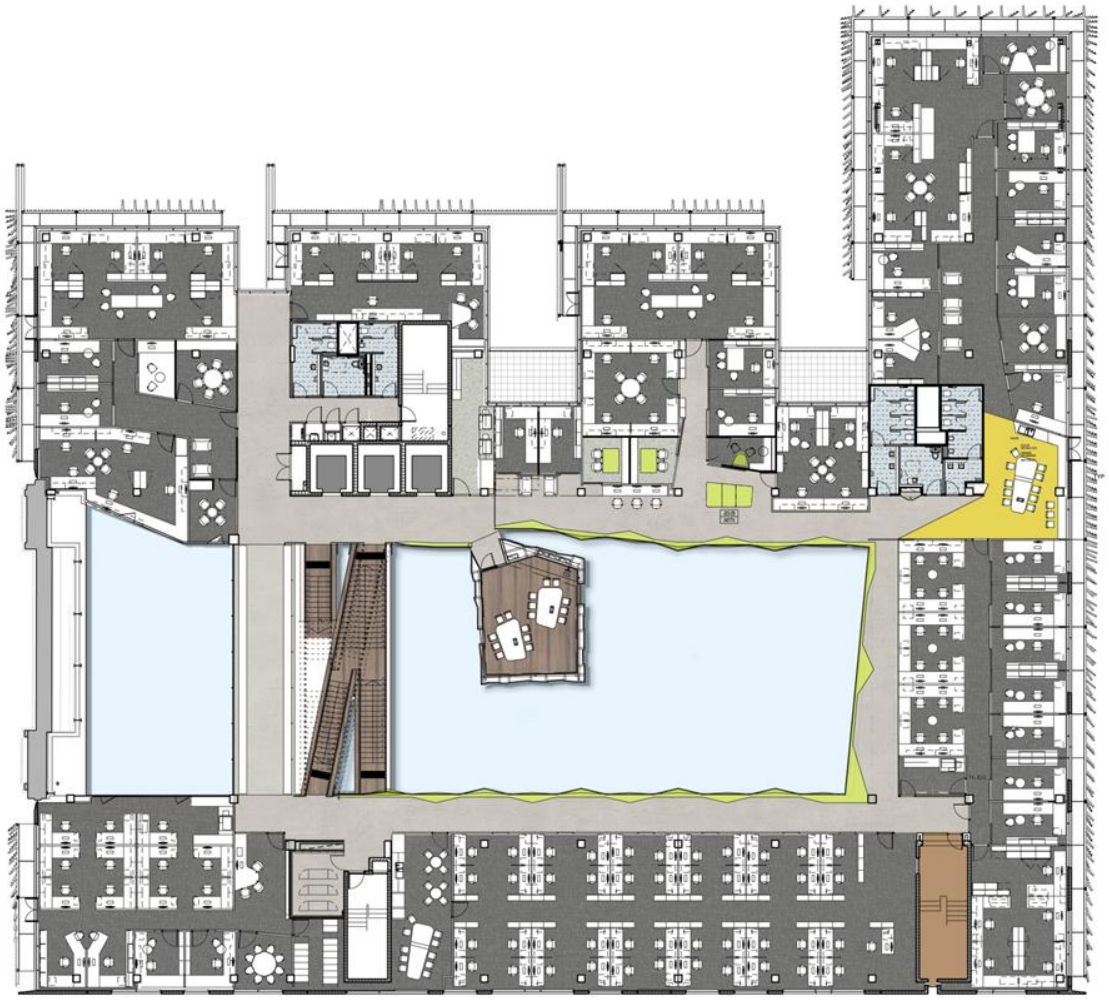
L01


Landscape Terrace
Print room
Studio spaces
CAD Lab
Office of Dean & General Manager
Joseph Reed facade
Void
Entry from East Courtyard
Studio Hall
Studio space
Void to Exhibition space below
Large Seminar rooms
Terrace
Studio spaces

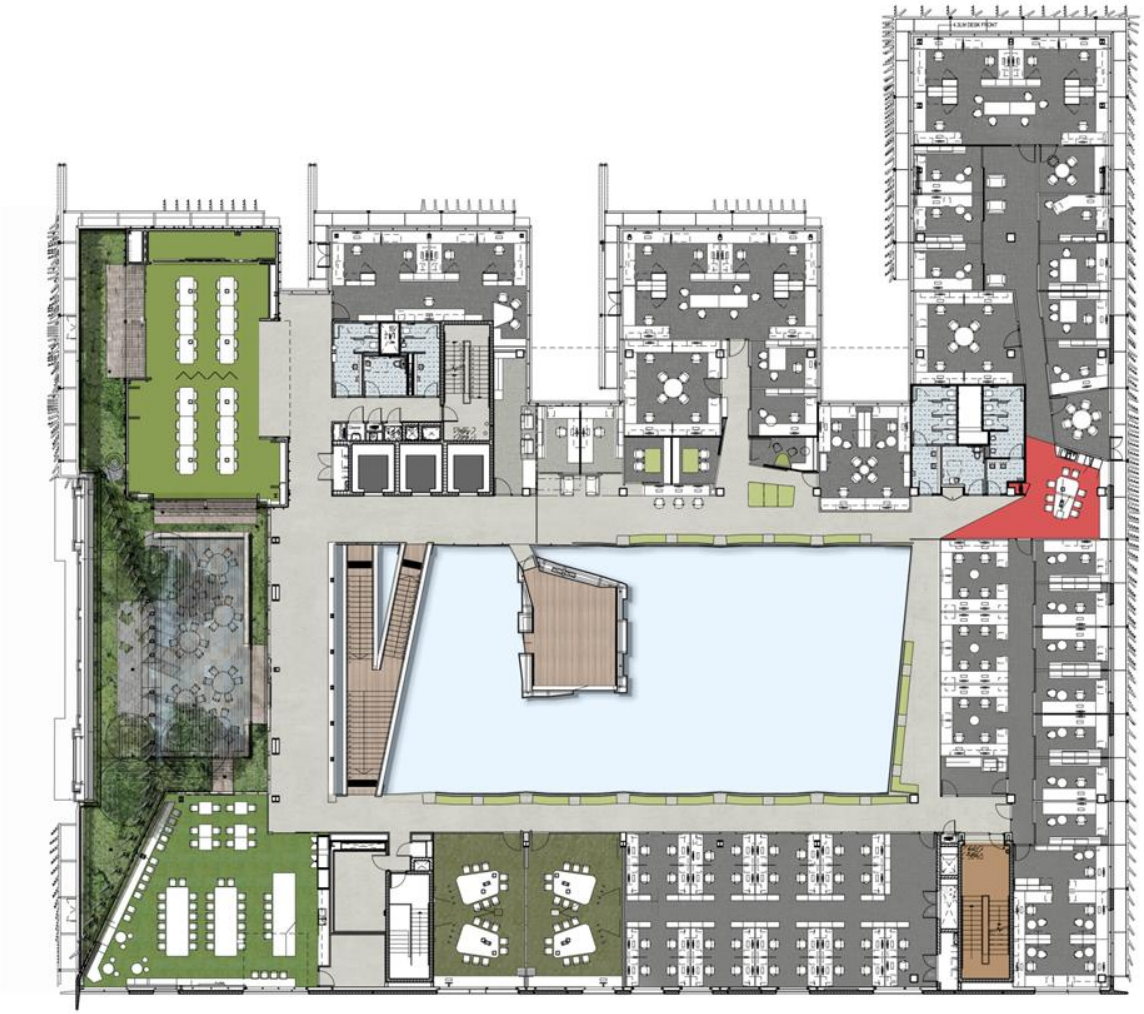
L02



L03



L04



Benchmarking

UNIVERSITY BENCHMARKING

Project		Construction Cost $ / m2
Project A	UoM, Faculty of Business and Economics	4,815
Project B	UoM, Neurosciences, Parkville	5,424
Project C	RMIT Design Hub Melbourne	5,713
Project D	UoSA, Hawke Building (Wardle + Hassell)	5,628
Project E	UoSA, City West Library	5,551
Project F	UoM, Faculty of Architecture	5,414
Project G	UoA, Faculty of Engineering	6,973
Project H	UoM, Peter Doherty Institute	7,097
Project I	QUT Science and Technology	4,093
Project J	QUT Creative Industries Precinct 2	5,980
Project K	UQ Global Change Institute	7,743
Project L	UQ Advanced Engineering Building	5,617
Project M	UQ Oral Health	6,837
Project N	UQ Brain Institute	5,128
Project O	UQ Centre for Advanced Imaging	6,569
Project P	UQ LIB	5,081
Project Q	University of Adelaide "The Braggs"	7,396
Project R	UoM, Arts West	6,220
Project S	La Trobe Institute of Molecular Science (LIMS)	6,316
Project T	University of Sydney, School of Business	4,550
Project U	UTS School of Business	7,556