

PRESENTED BY

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UWATERLOO

ENGINEERING 8

DIDACTIC BY DESIGN



**ARCHITECTURE +
ENGINEERING**

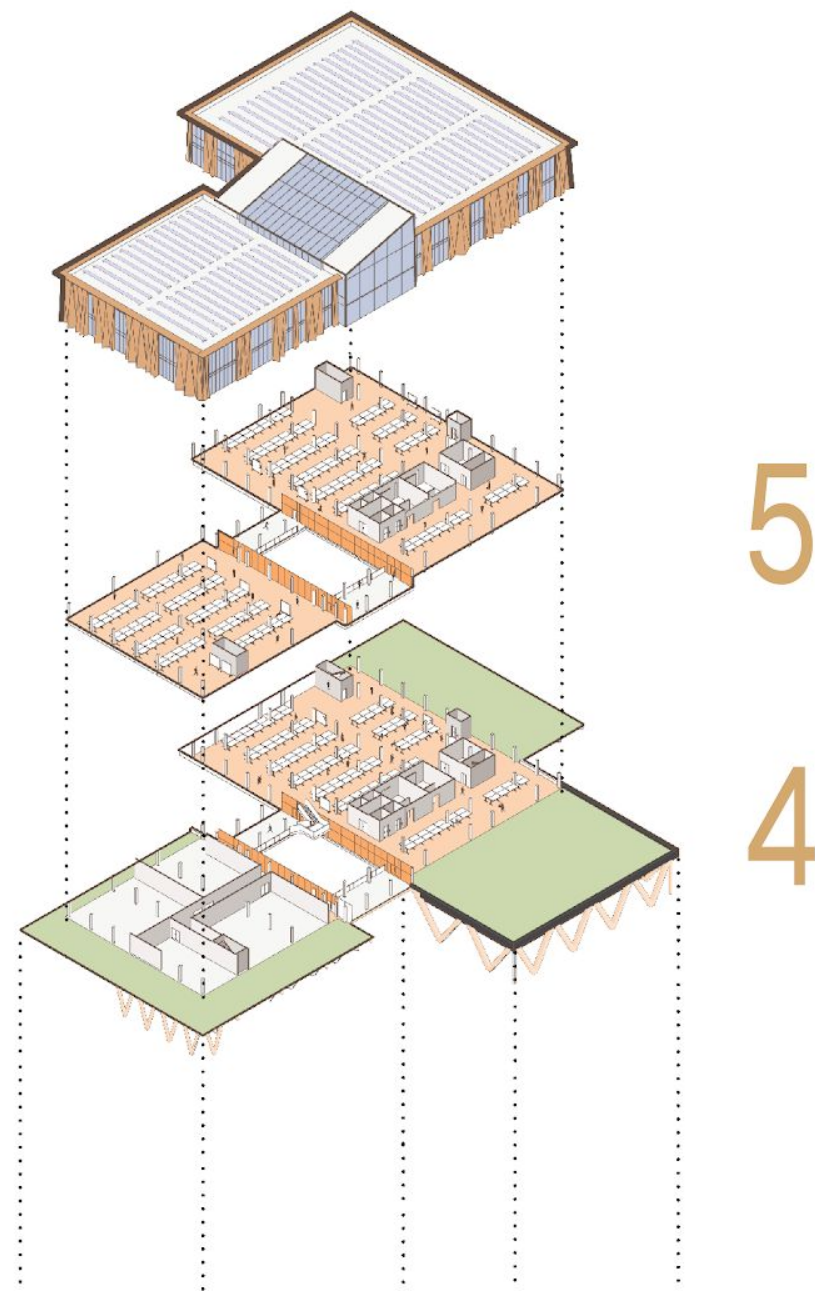
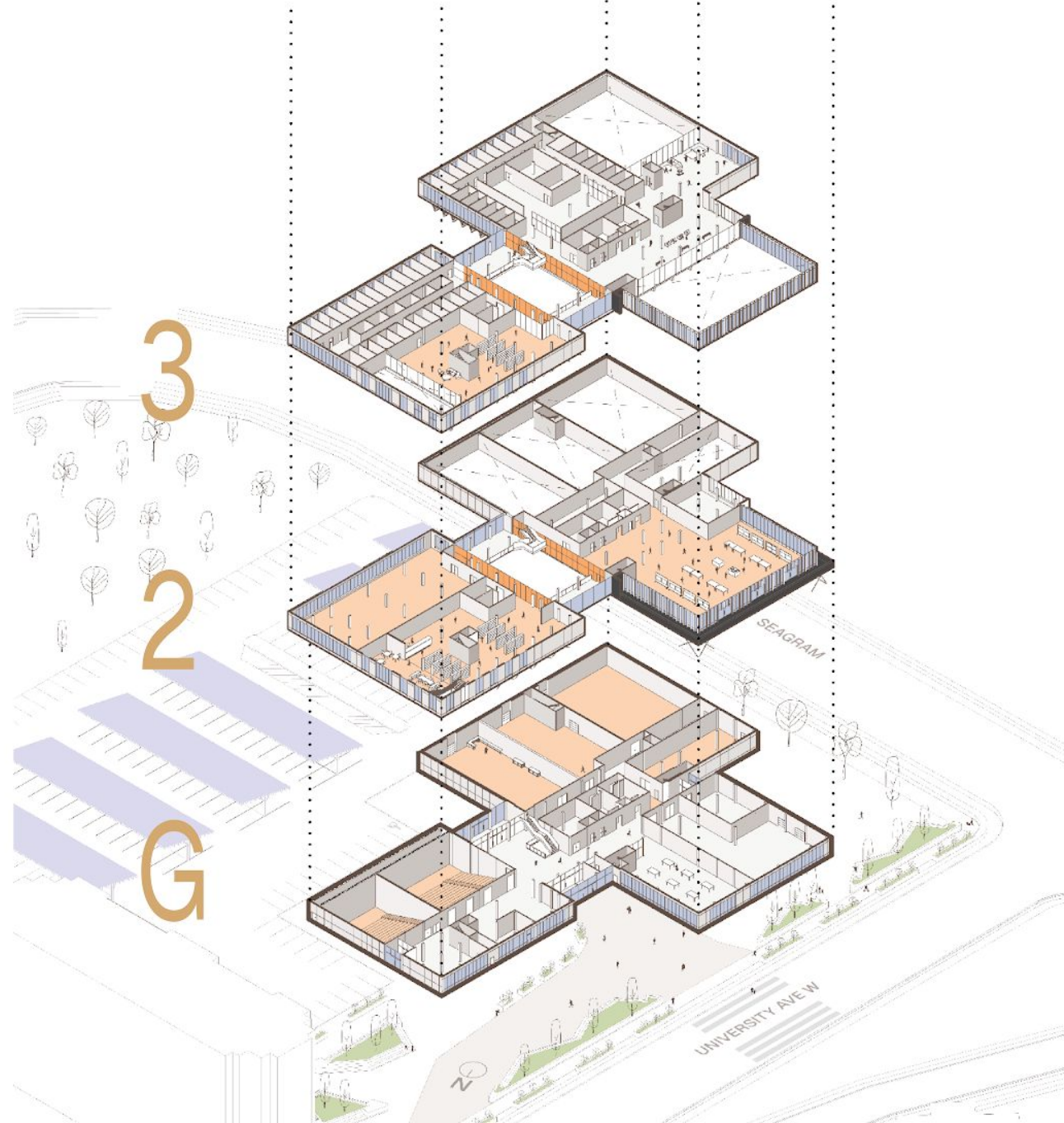
INTEGRATION
COLLABORATION
EXPANSION
INNOVATION

The image shows a spacious, modern interior, likely a museum or exhibition hall. The ceiling is high with a grid of recessed lights. Large windows on the right side offer a view of the outdoors. People are seen interacting with various displays, including large wall-mounted panels and tables with informational materials. A central text overlay is present.

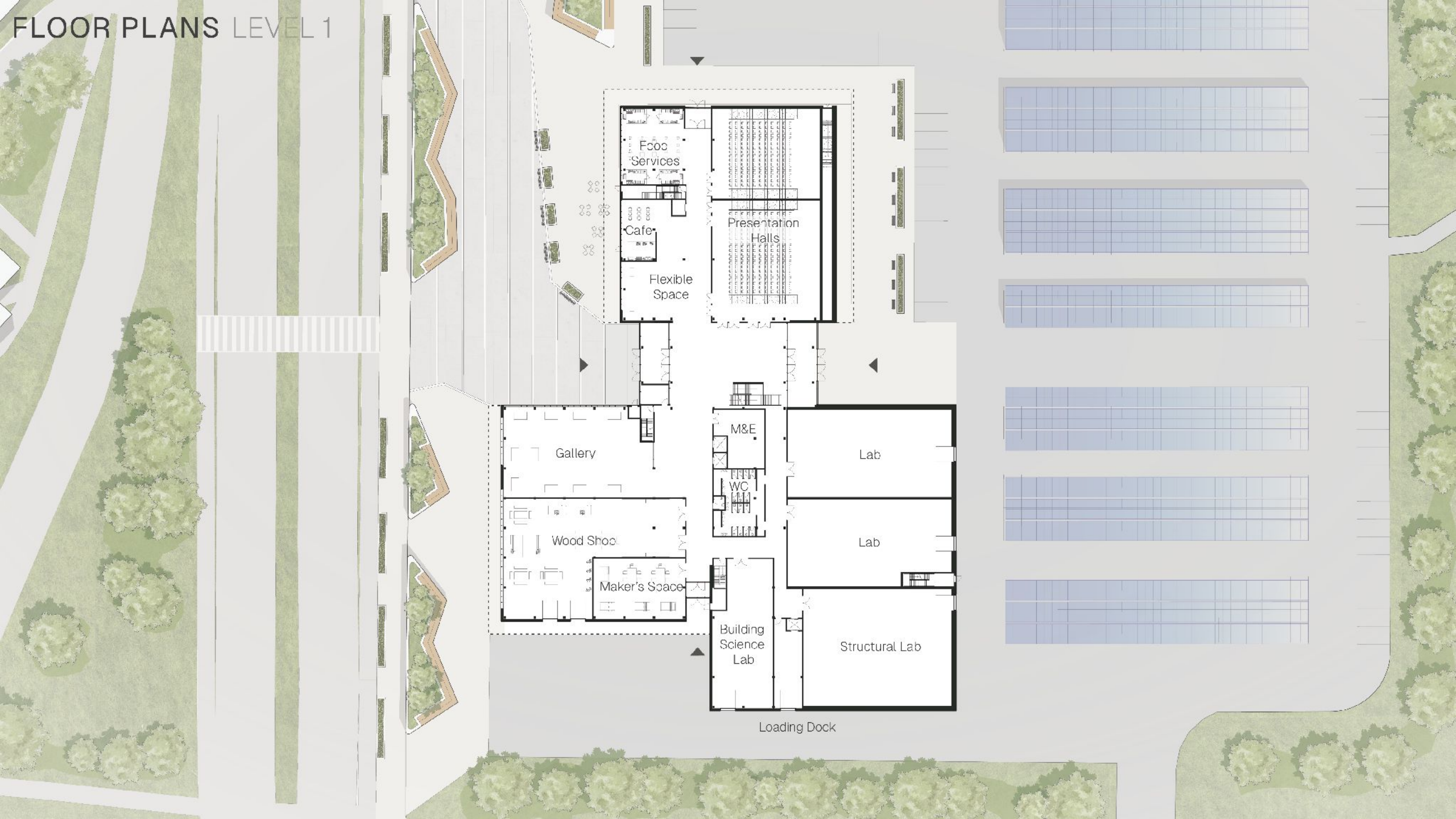
“DIDACTIC DESIGN”

A showcase of a building's architecture, structure, and mechanical systems to inform and foster learning

EXPLODED AXONOMETRIC

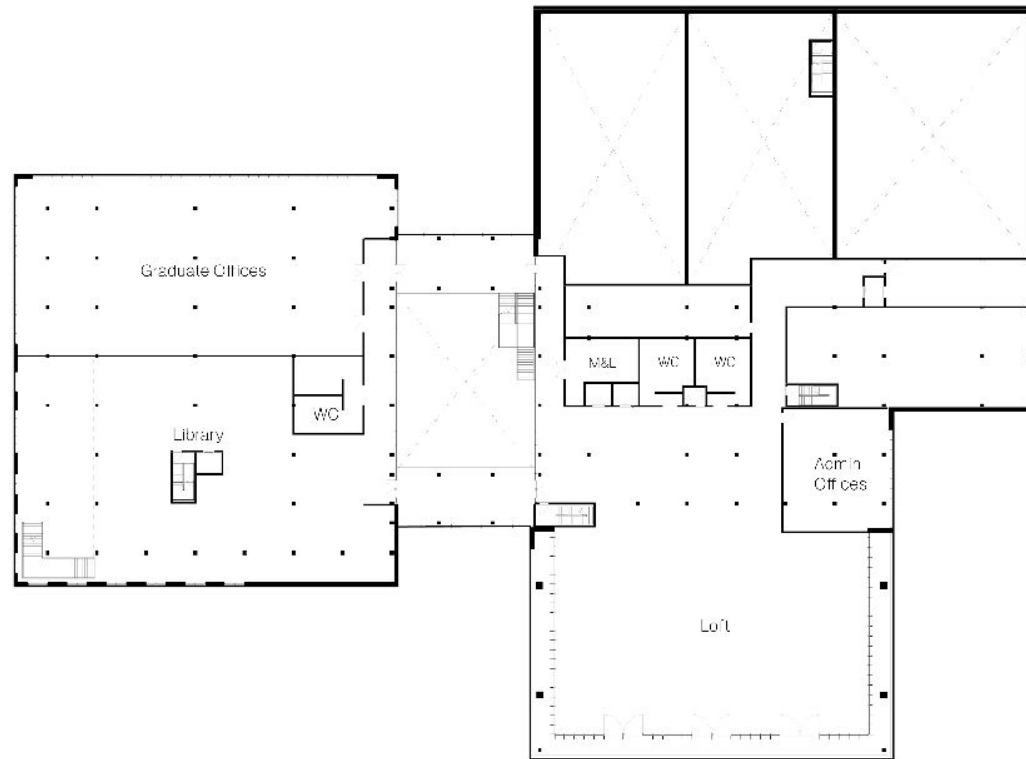


FLOOR PLANS LEVEL 1

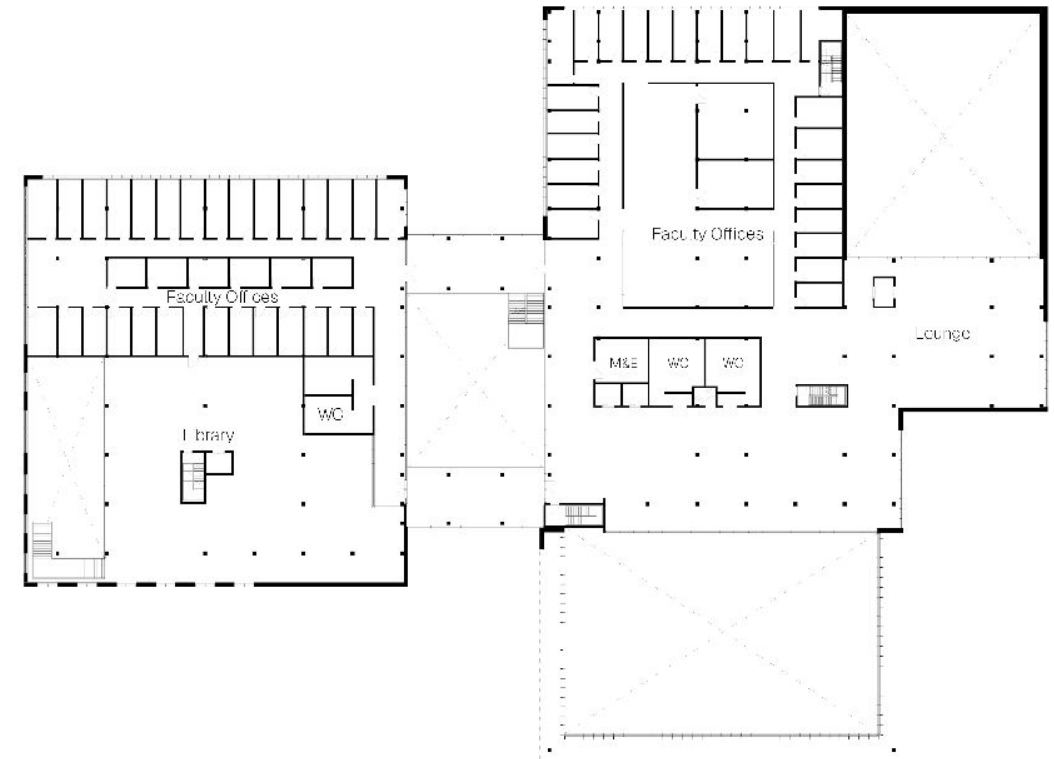


FLOOR PLANS

LEVEL 2

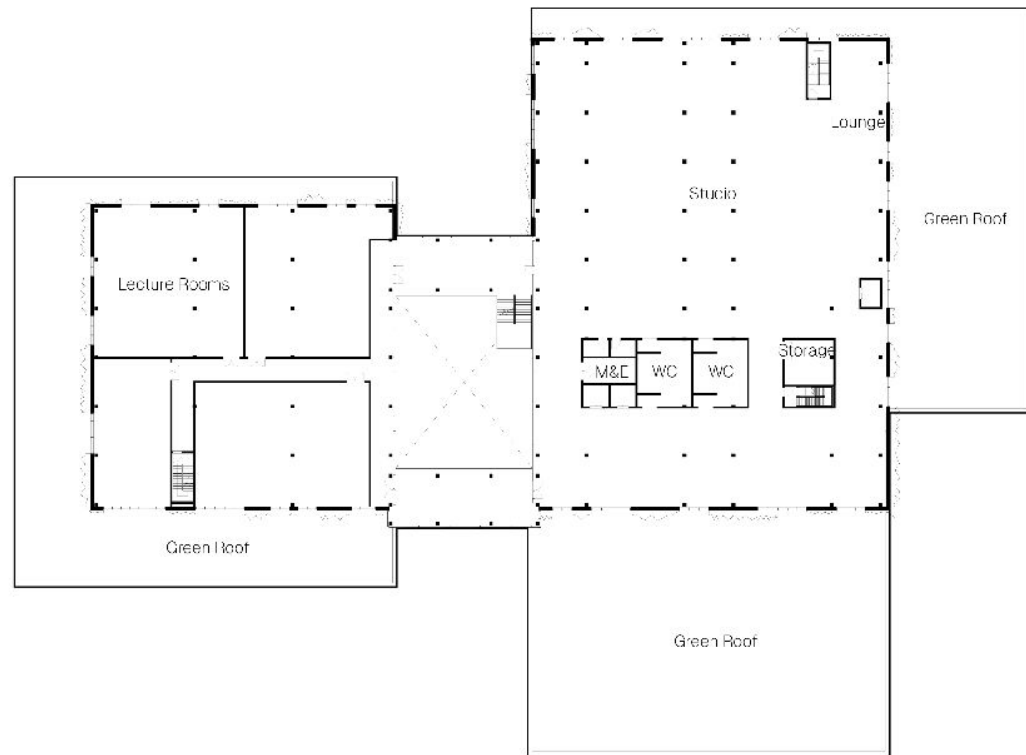


LEVEL 3



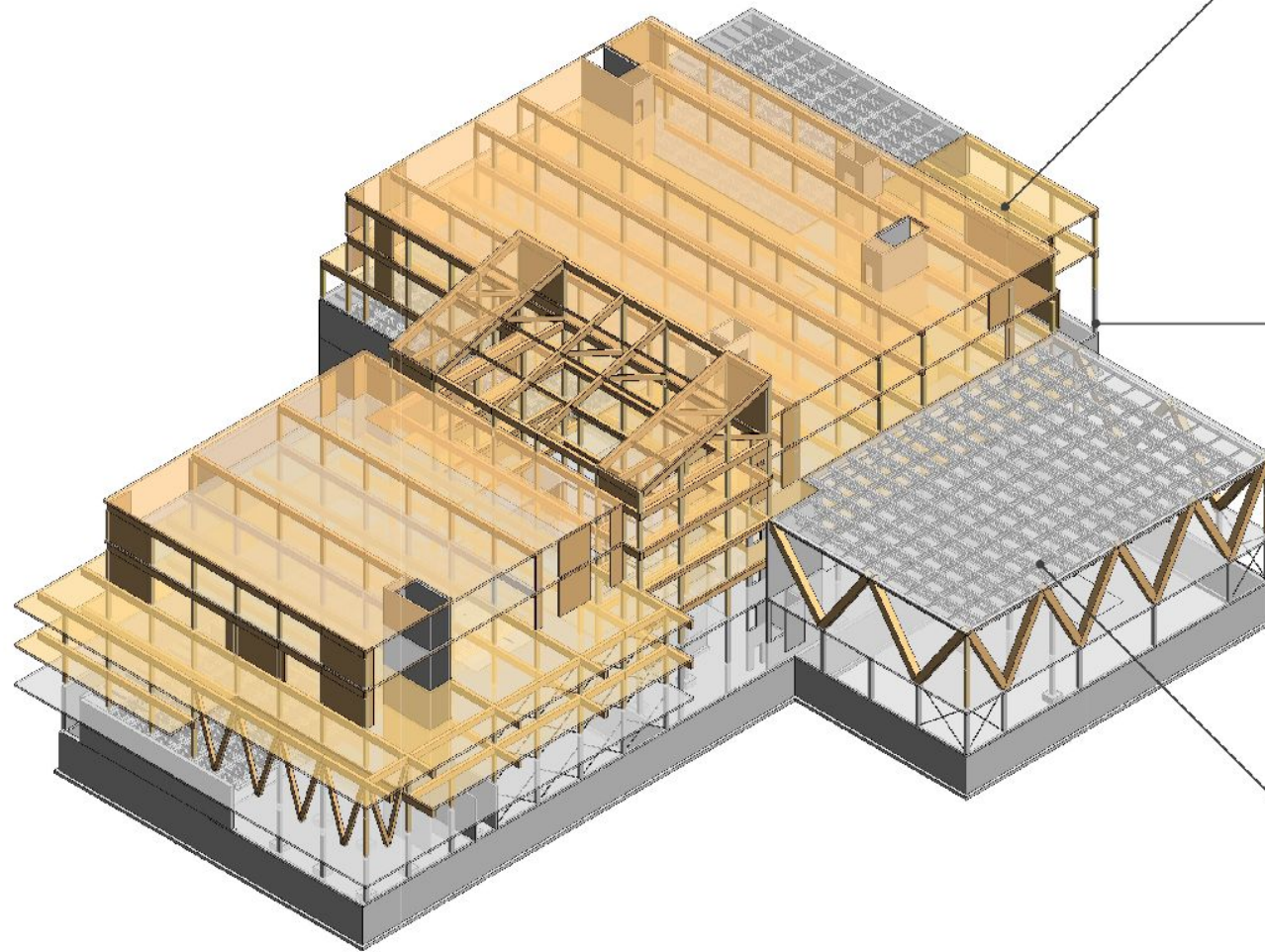
FLOOR PLANS

LEVEL 4



LEVEL 5





HOLLOWCORE MASS TIMBER

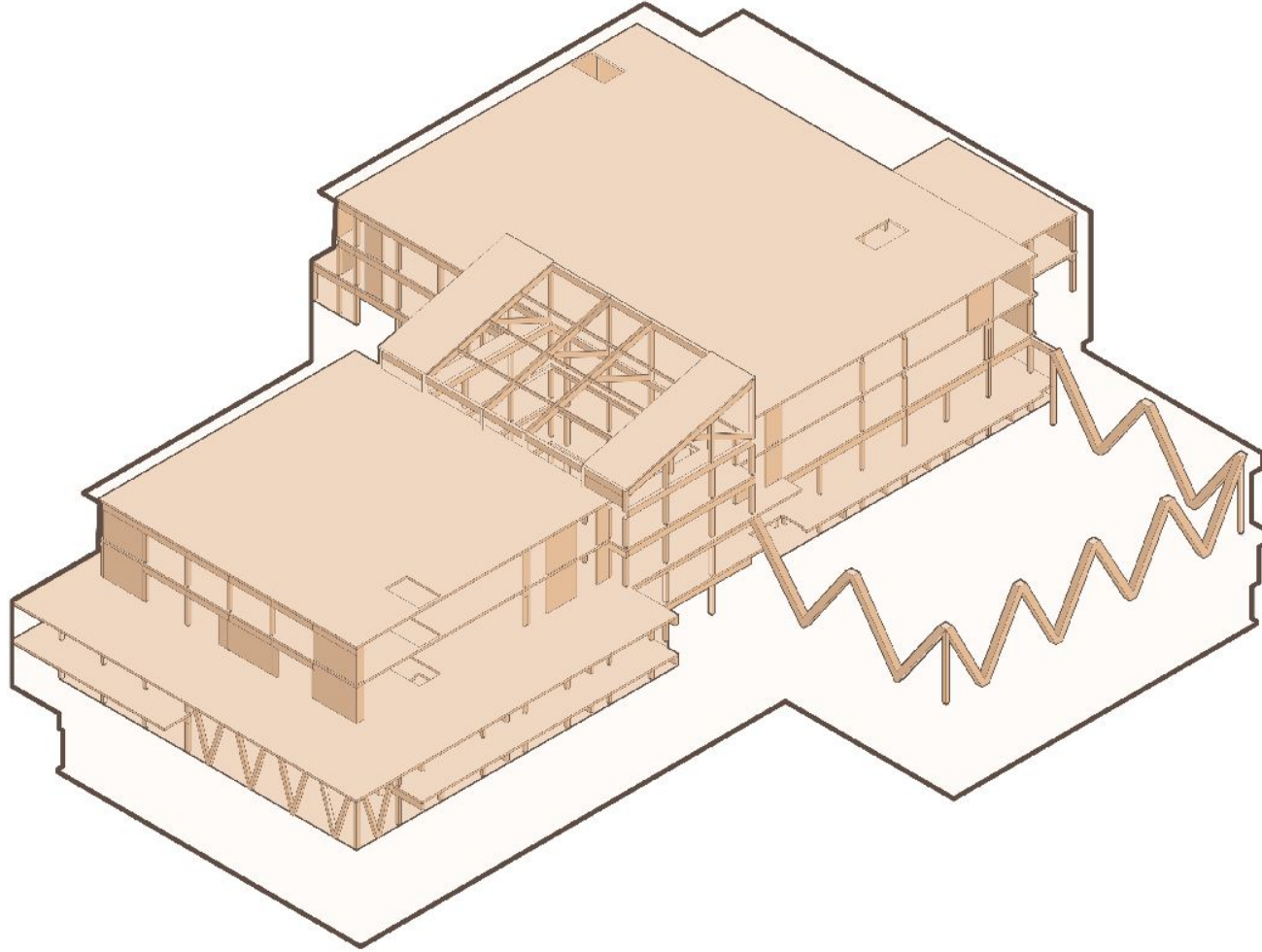
Hollowcore mass timber (HMT) slabs are used along with a typical glulam girder and column system. HMT slabs are used to meet the long span demands, and are favoured due to the efficient use of wood, light weight composition, and ease of on-site construction.

MASS TIMBER

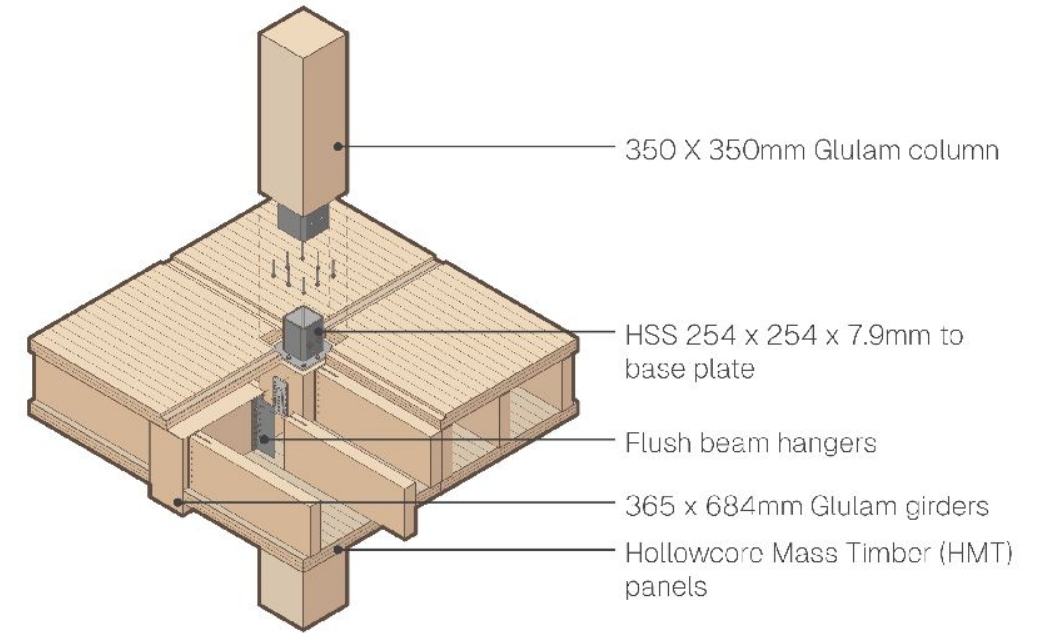
The building's primary structural system is composed of mass timber using girders and columns. A diagrid structural system is used in two areas of the building: the loft and the library. This diagrid structural system is around the perimeter of the space for lateral resistance.

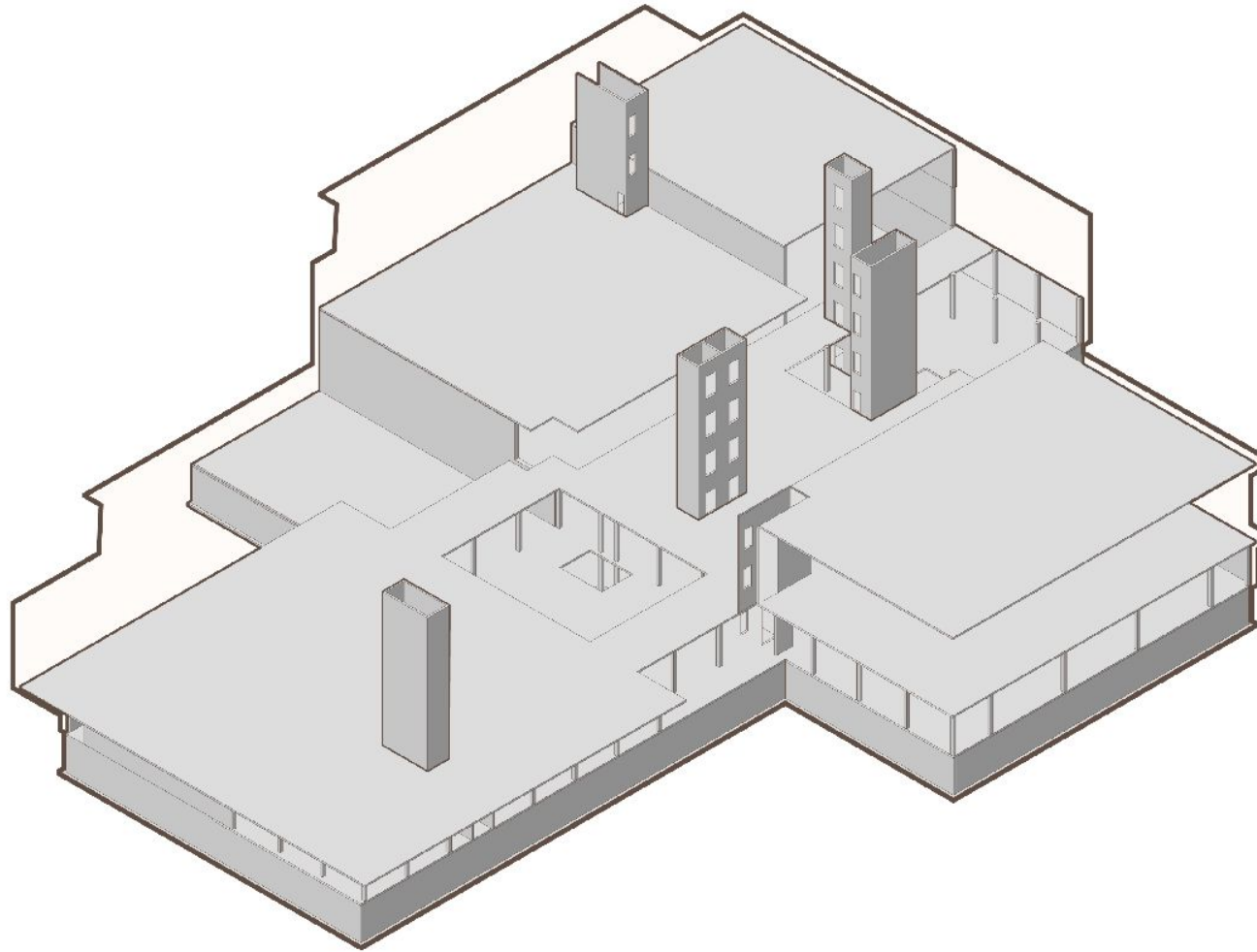
STEEL + CONCRETE

Large open spaces use W-sections for the top and bottom chord of the truss. Single L-angles are used for the webs along with concrete walls around the perimeter for increased durability and stability.

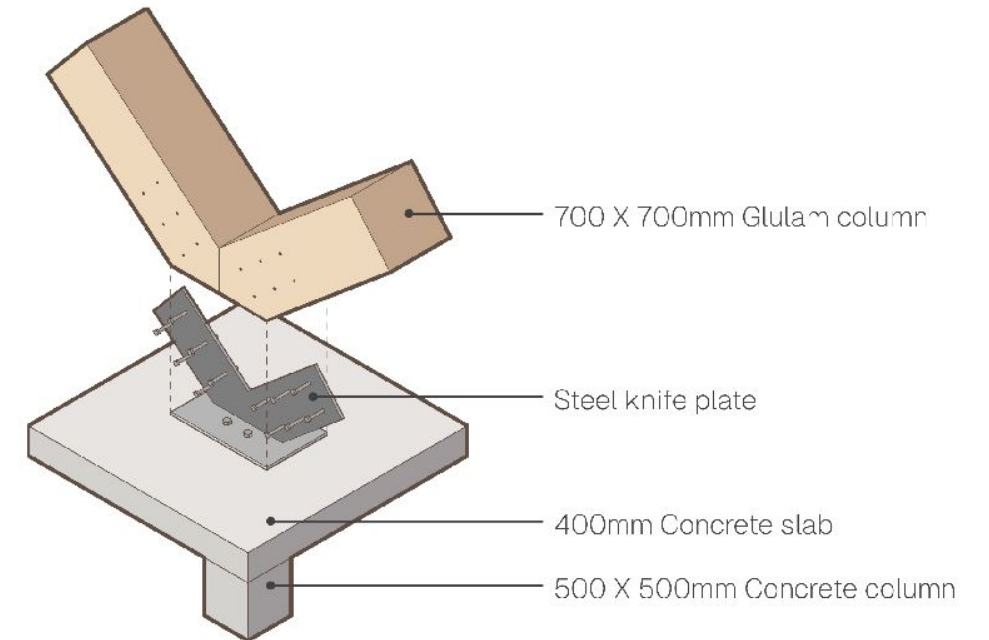


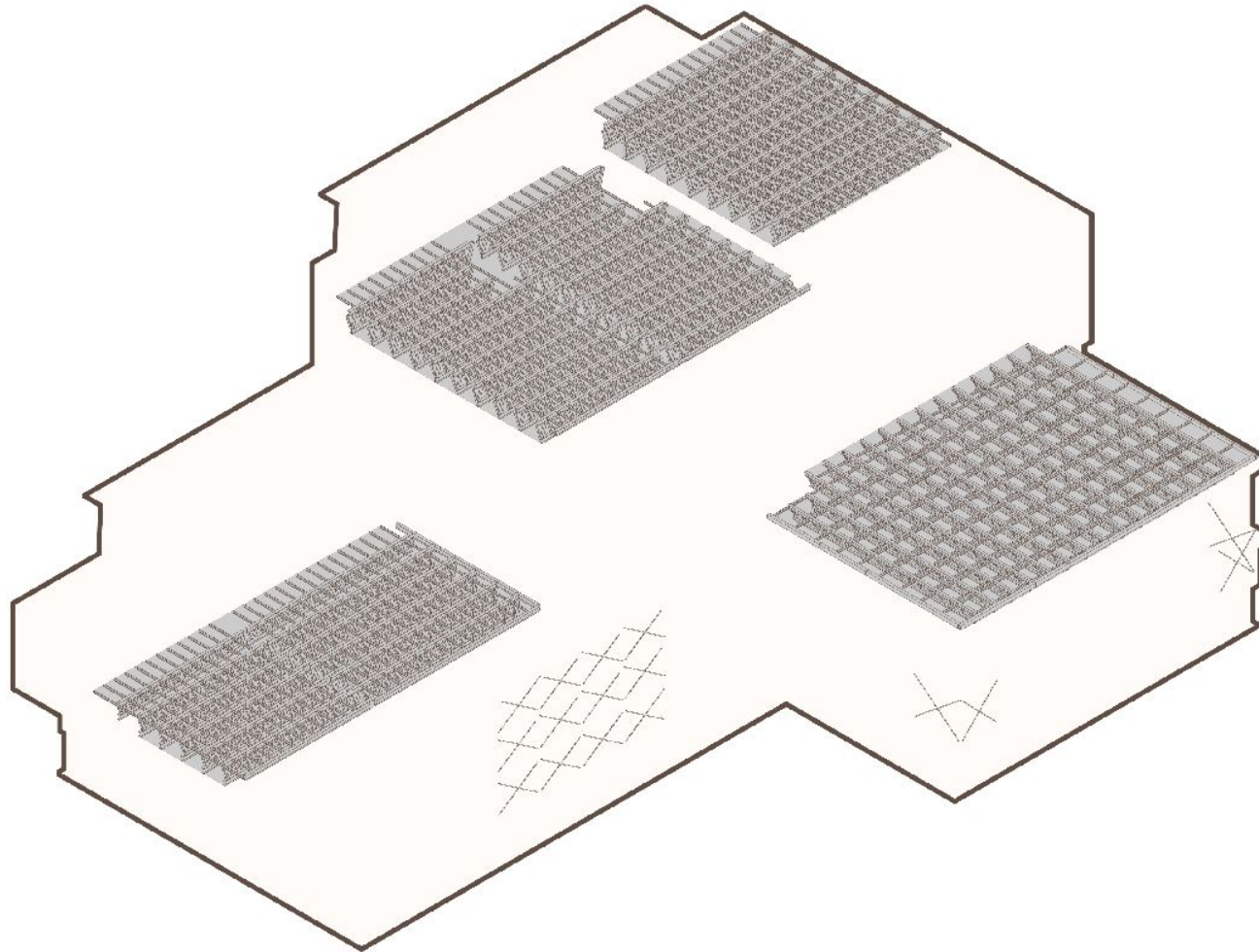
TYPICAL HOLLOWCORE MASS TIMBER SLAB





CONCRETE-MASS TIMBER BRACING

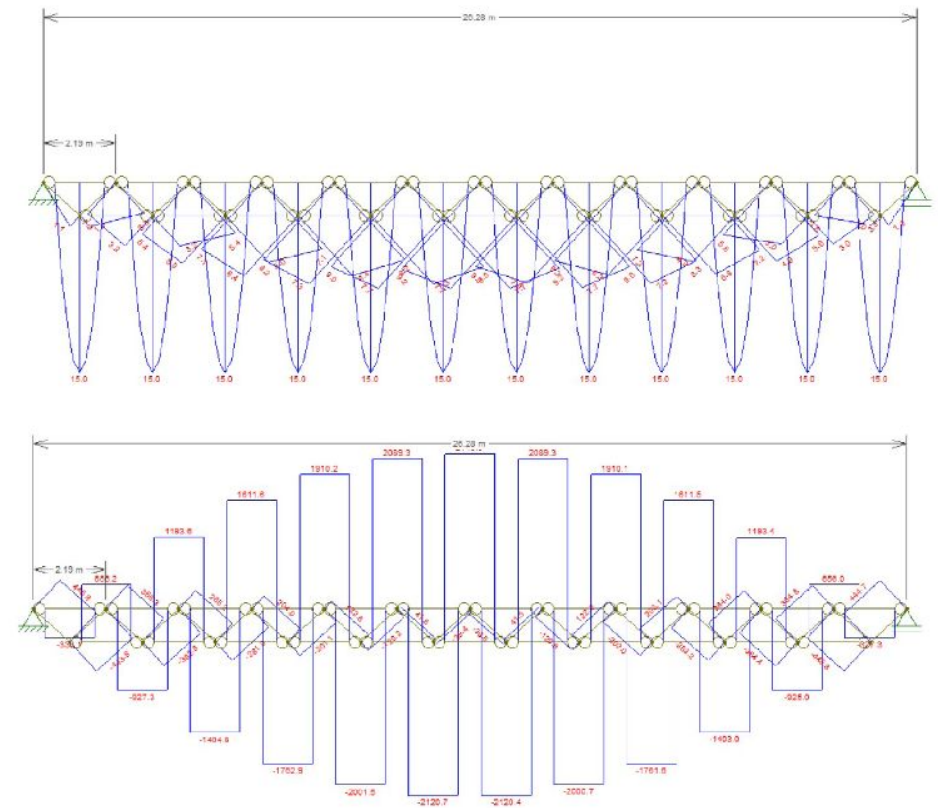


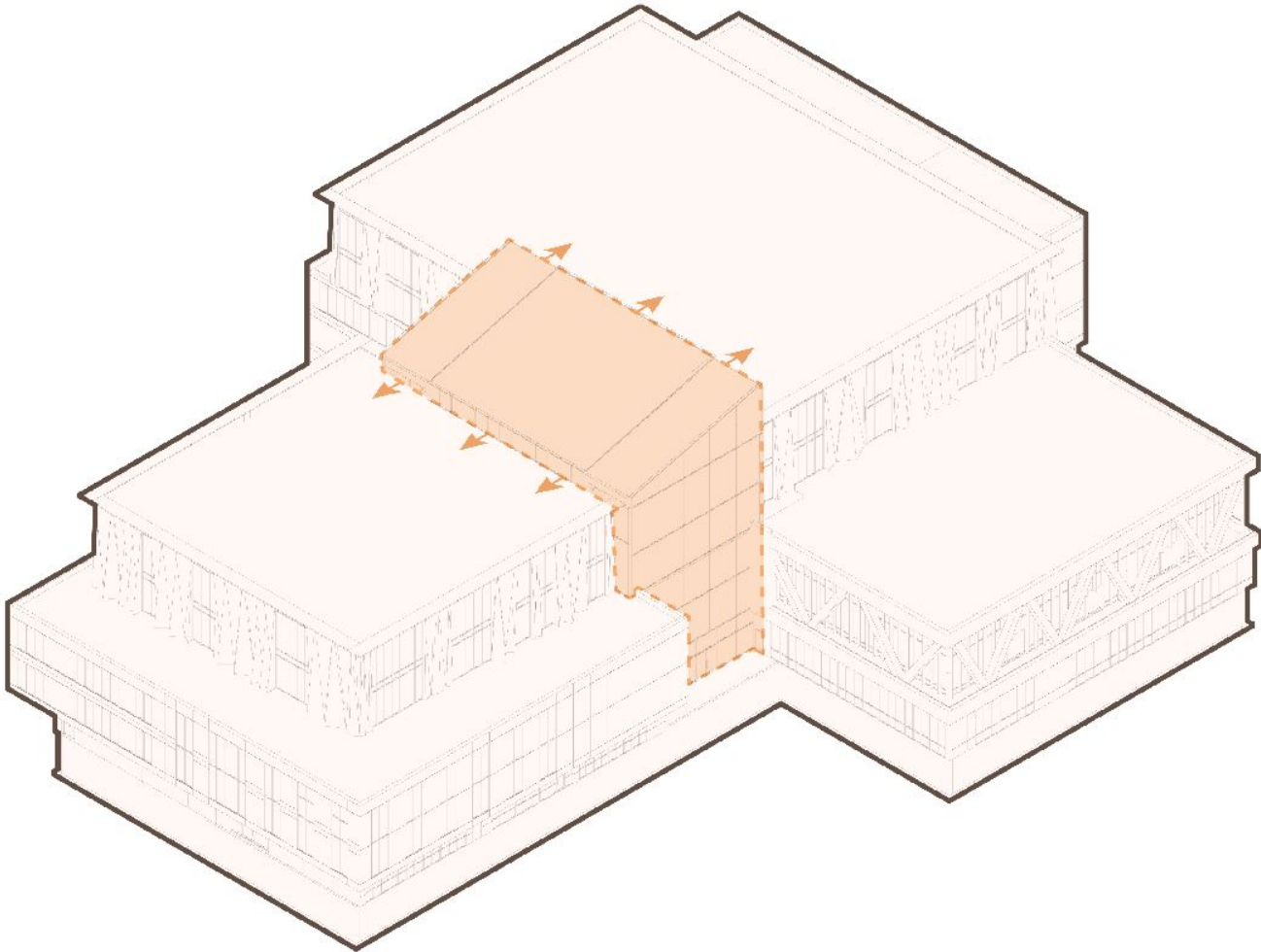


CHORD: W460x128

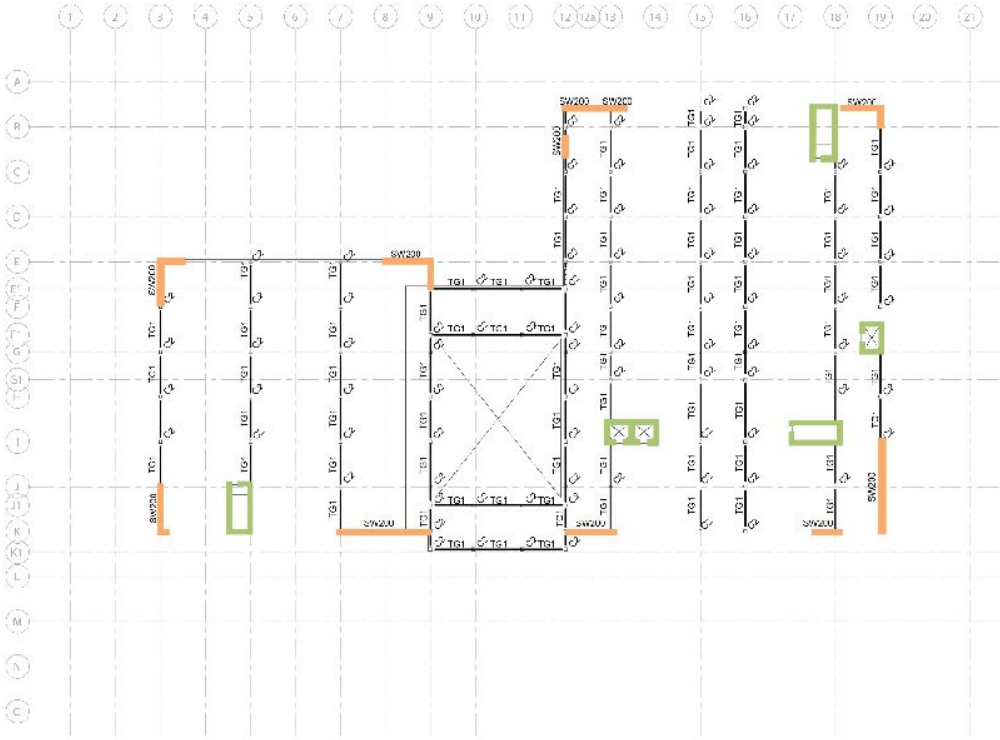
WEB: L203x203x16

PURLIN: W200x22



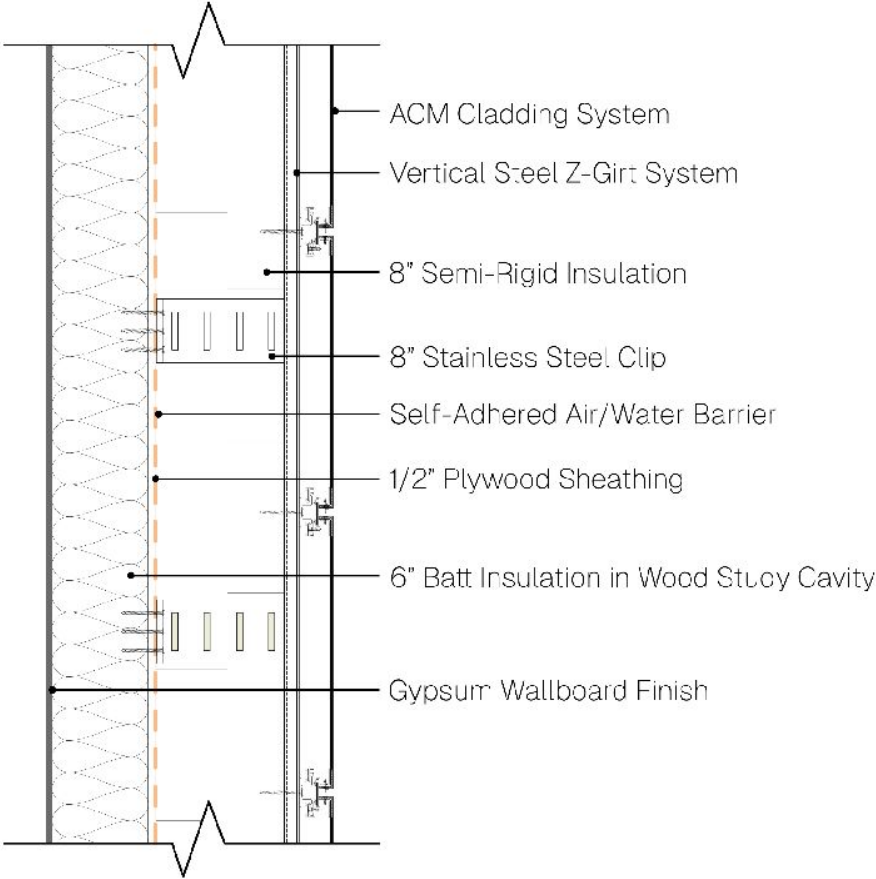


LEVEL 2 FLOOR PLAN

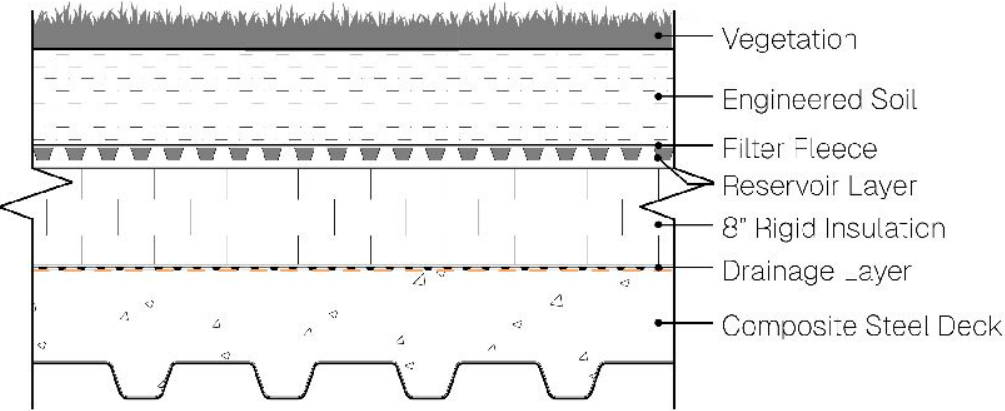


ENCLOSURE DETAILS

EXTERIOR ACM WALL R47

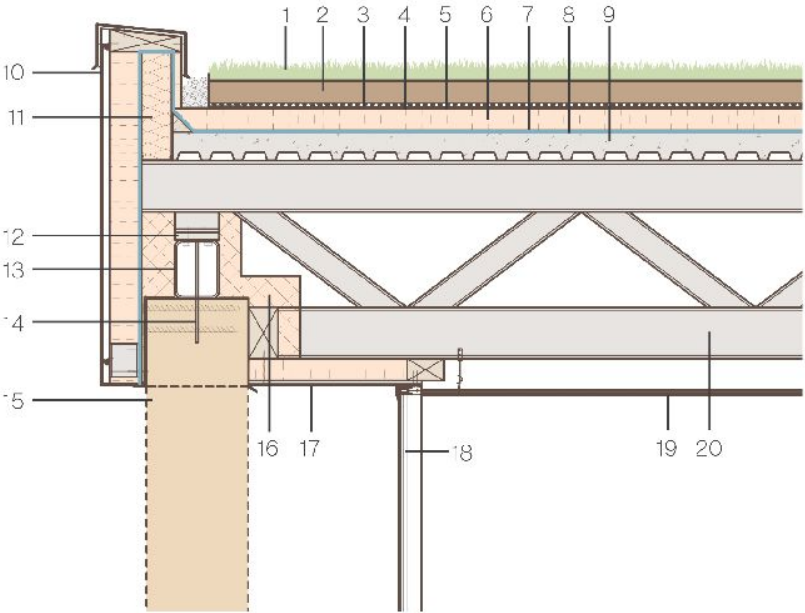


EXTENSIVE GREEN ROOF R55



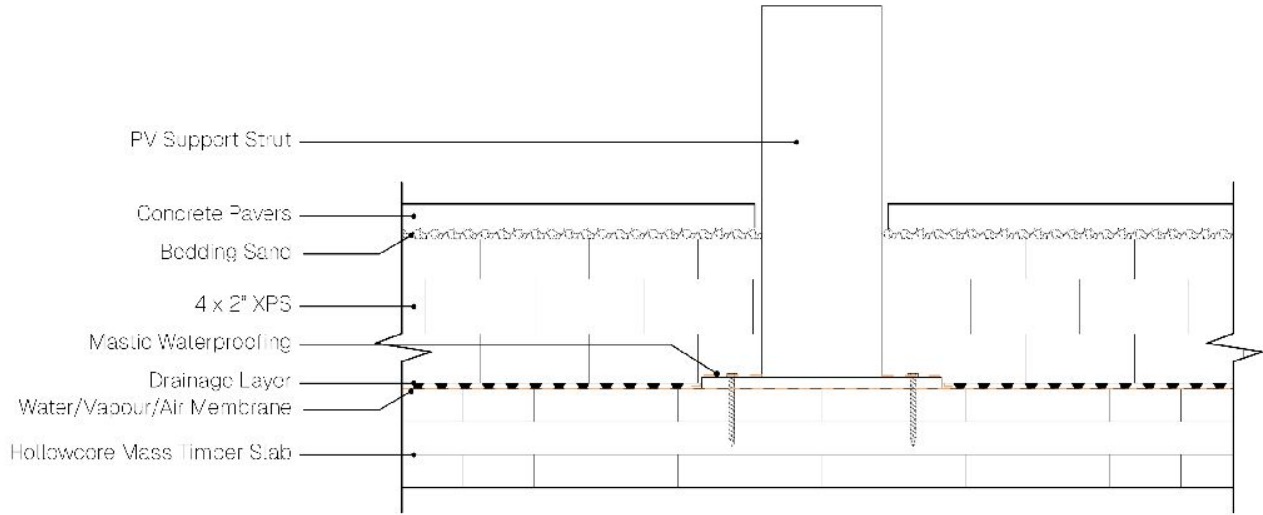
ENCLOSURE DETAILS

SOFFIT + CURTAIN WALL (LOFT)

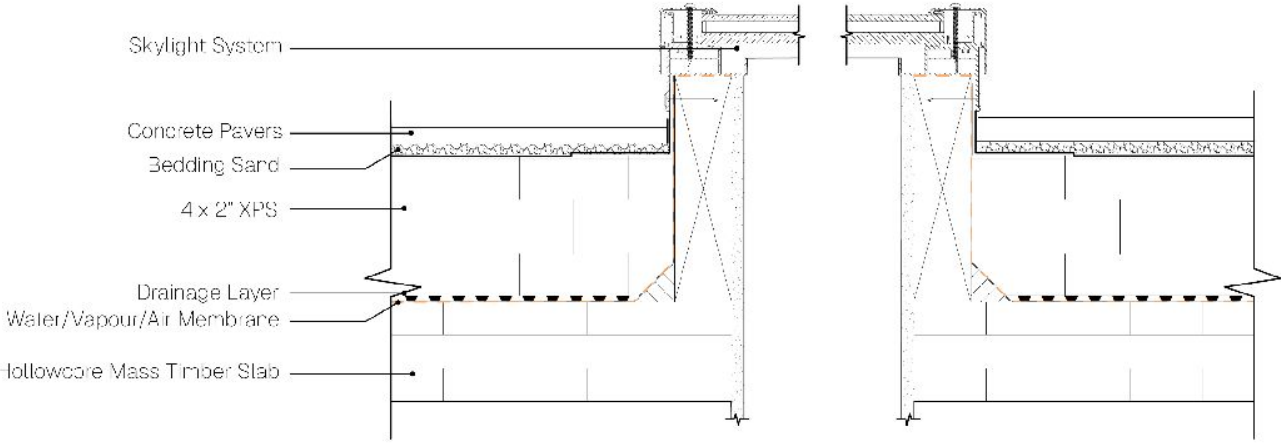


- | | |
|-----------------------------|-----------------------------------|
| 1. Vegetation | 11. 8" Fibreglass batt insulation |
| 2. Engineered soil | 12. Fibreglass thermal break |
| 3. Filter fabric | 13. I SS 406 x 305 x 19mm |
| 4. Reservoir layer | 14. Steel knife plate |
| 5. Root barrier | 15. 700 x 700mm glulam column |
| 6. 4 x 2" staggered XPS | 16. Closed-cell spray foam |
| 7. Drainage board | 17. ACM soffit |
| 8. Water/air/vapour barrier | 18. Triple-paned curtain wal. |
| 9. Composite steel deck | 19. Suspended ceiling (GWB) |
| 10. ACM rainscreen system | 20. Steel truss |

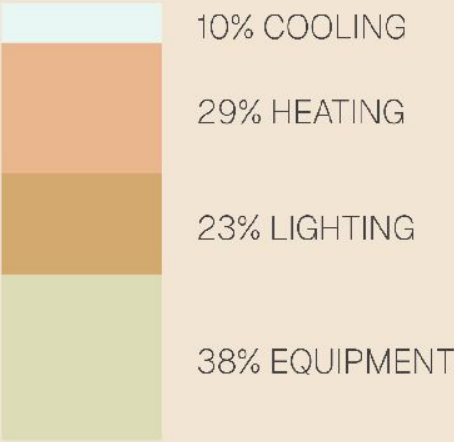
PV SUPPORT PENETRATION



SKYLIGHT DETAIL



PERFORMANCE BREAKDOWN



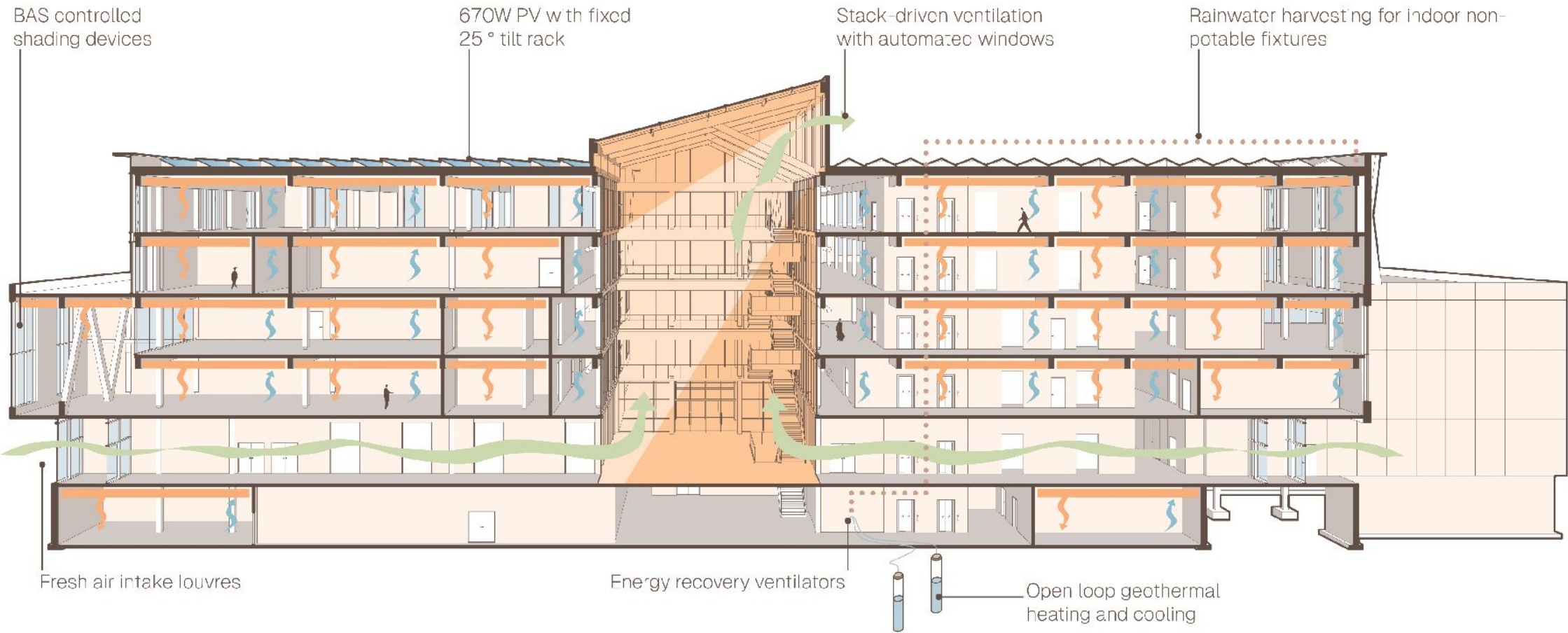
ENERGY USE INTENSITY

107 kWh/m²
62% lower than the EnergyStar standard

ENERGY CONSUMPTION

1.7M kWh/yr
14% lower than previous iteration

MECHANICAL | PASSIVE STRATEGIES

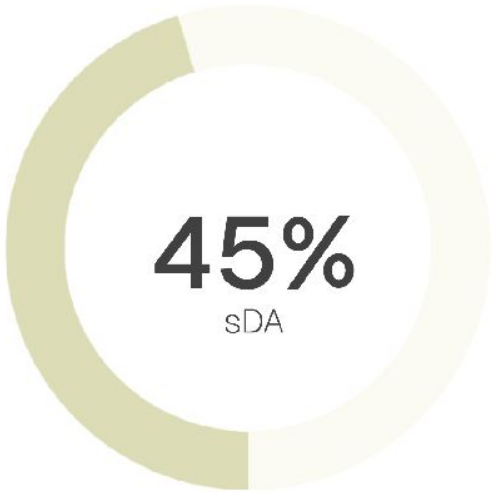
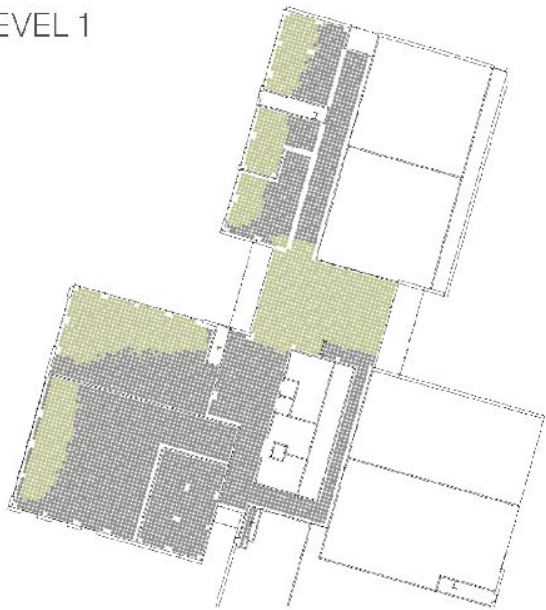


LEED
GOLD 77 points

- OPTIMIZED ENERGY PERFORMANCE
- RENEWABLE ENERGY PRODUCTION
- TARGETING NET-ZERO CARBON
- THERMAL COMFORT
- ACCESS TO QUALITY TRANSIT

DAYLIGHTING ANALYSIS (sDA)

LEVEL 1



2



3



4



5

ENGINEERING 8

DIDACTIC BY DESIGN



