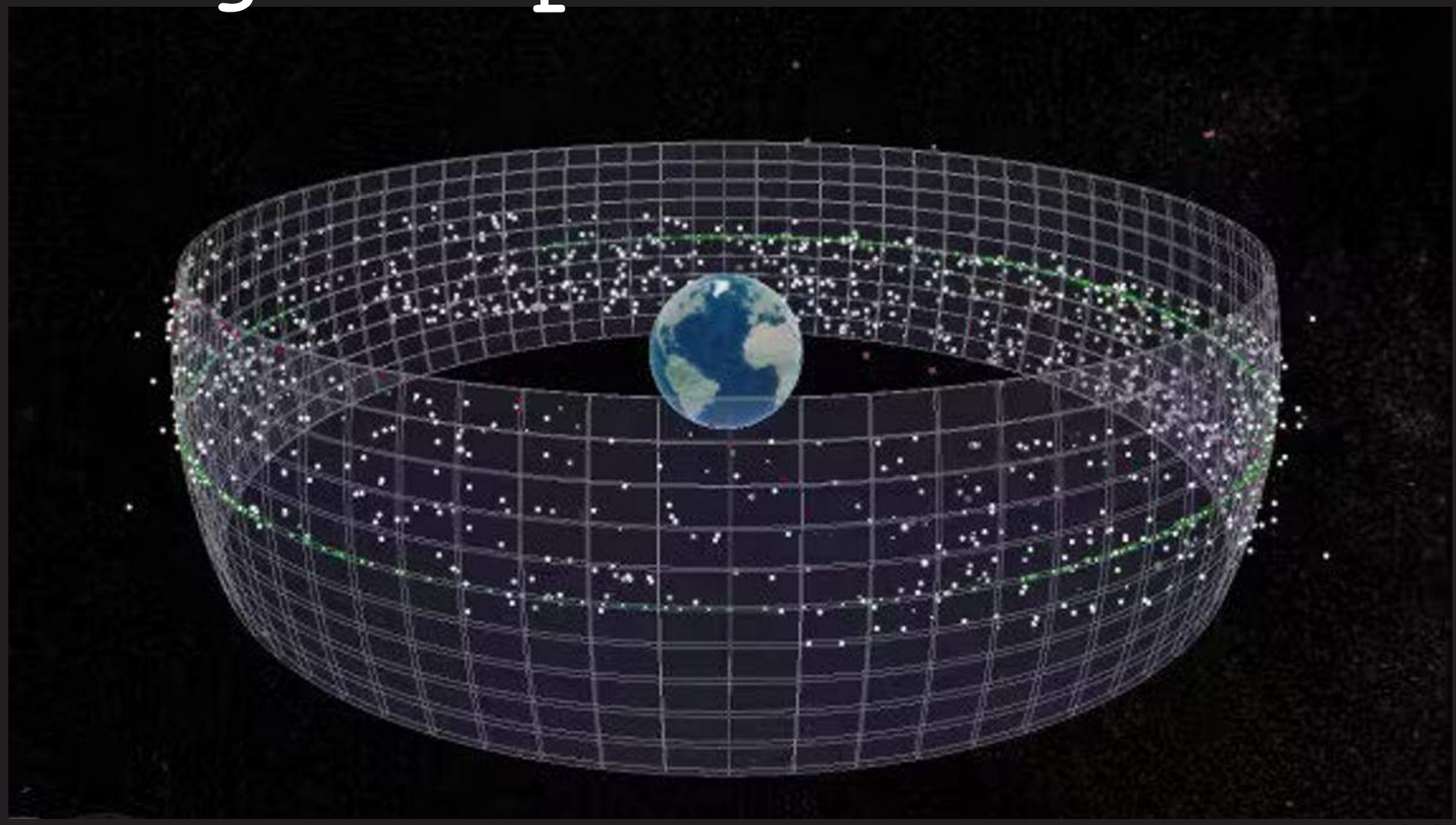
ProjectSpace



ARC330

Maya Angelus

Spaceports of the World

- Spaceport Cornwall
- Active Spaceports
- Orbital Human Launch

CORNWALL SPACE CLUSTER

SPACE AND SUPPLY CHAIN BUSINESSES IN CORNWALL

Cornwall is home to many innovative space and supply chain businesses across the space spectrum; from high precision engineering and software, to launch, tracking, Earth Observation and use of satellite data.



SPACEPORT CORNWALL

- Aerohub
- Cornwall Airport Newquay
- Spaceport Cornwall
- Virgin Orbit
- CNC Design
- RAF St Mawgan
- Blue Abyss
- D-Orbit
- Space Engine Systems
- Bennamann

NEWQUAY

CAMBORNE, POOL AND REDRUTH

- Packetship
- Headforwards
- Engine House VFX
- Gyllytech
- Bluefruit Software
- Mining Searches
- NSSLGlobal
- Gould Electronics
- Ram Gaskets
- Carrak Consulting
- Cornish Metals
- DP Engineering
- Smiths Metals
- Net Zero Plant
- AeroSpace Cornwall
- Cornwall Space
- Bildr
- Now & Then

ST AUSTELL

- Teddington
- British Lithium
- Assentech Sales Ltd
- Observerly

WADEBRIDGE

- Piran Composites

LAUNCESTON

- PV3 Technologies
- J Supplied

BODMIN

- Flann Microwave

LISKEARD

- Conex Portal

SALTASH

- Cardopoint
- Far out Thinking Company

TRURO

- Ivstitia (myRJ)
- Stephens Scown LLP
- Foot Anstey LLP
- Remeody
- North Coast Consulting
- Simsage
- Truro & Penwith College
- MyCoast
- Aegis Veterinary Technology

FALMOUTH & PENRYN

- South West Centre of Excellence in Satellite Applications
- Cool Earth
- Cornish Lithium
- Vital Spark
- Navimeteo
- Hirst Magnetics
- Glas Data
- Data Duopoly
- Paddle Logger
- Mojo Maritime
- Minviro Ltd
- Aspia Space
- 4 Earth Intelligence
- Exobotics
- Cloud Digital
- Feritech Global
- Touchbyte
- Falmouth University
- University of Exeter
- Pelory

RNAS CULDROSE

ST IVES

- Mayes Creative

PENZANCE

- Hi9
- Design79

HAYLE

- Unmanned Survey Solutions
- Ultrabeam Hydrographic
- CEFAS

GOONHILLY

GOONHILLY EARTH STATION LTD

- Goonhilly Earth Station Ltd
- Avanti Communications

Aerohub
Business Park
Newquay

GOONHILLY

CATAPULT
Satellite Applications

Blue Abyss

UK SPACE AGENCY



SLINGSHOT AEROSPACE

CORNWALL SPACE CLUSTER

intelligentai

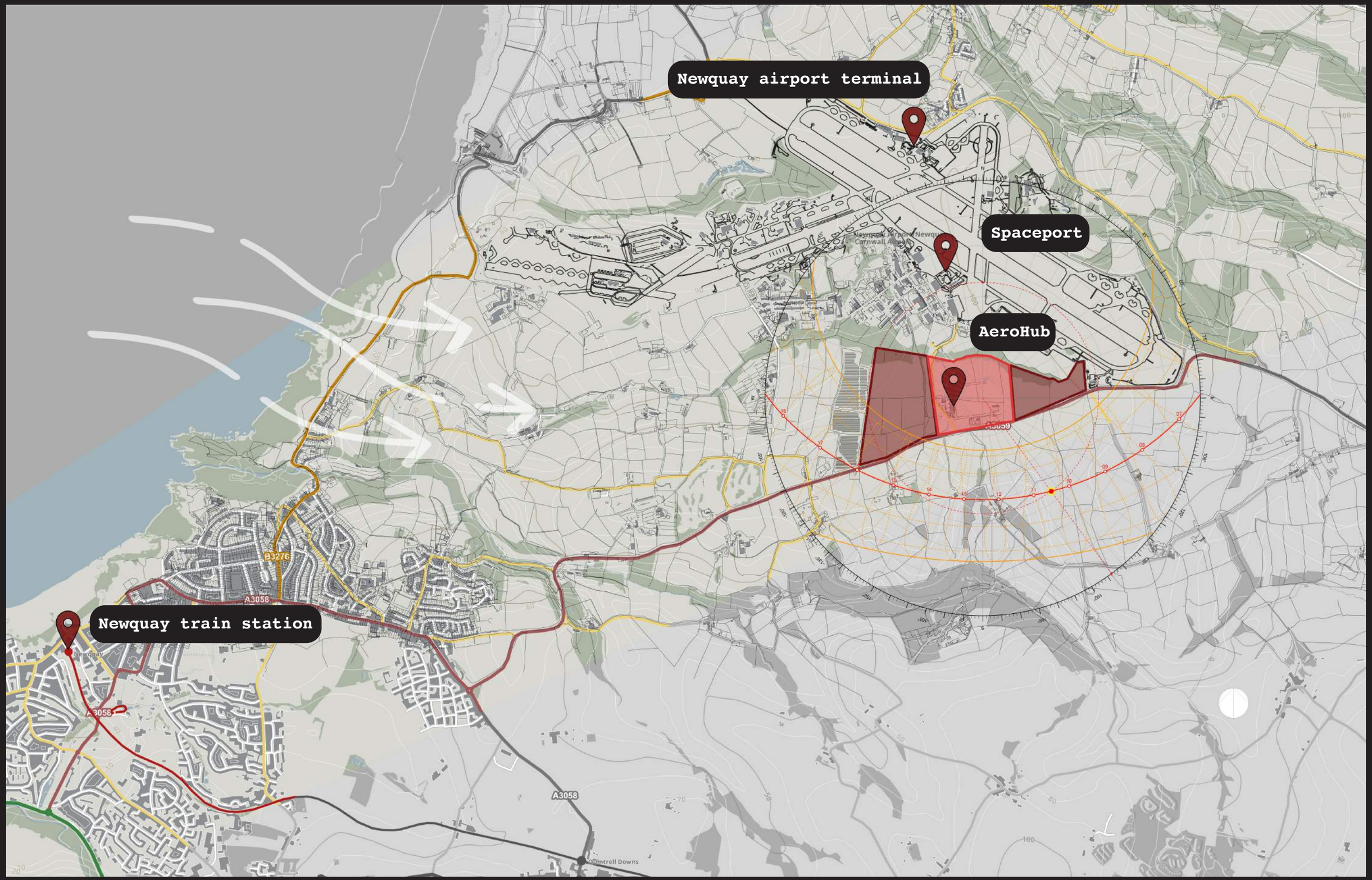
GVL Geospatial Ventures Ltd

Space Professionals

AeroHub Businesspark



Site Analysis



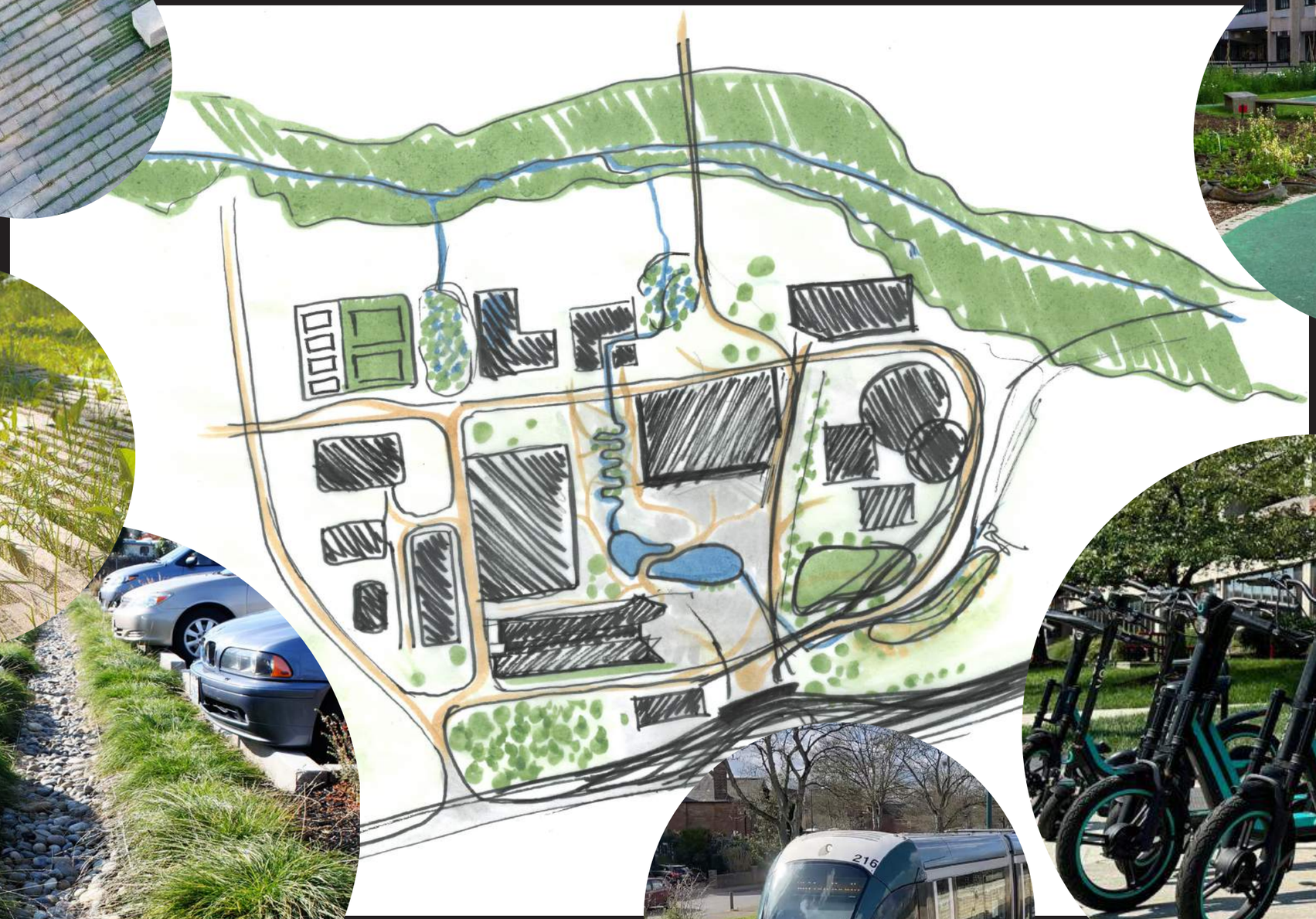
Masterplan - Movement strategy



Permeable pavement



Green carpark



Running and cycling tracks



Local tram



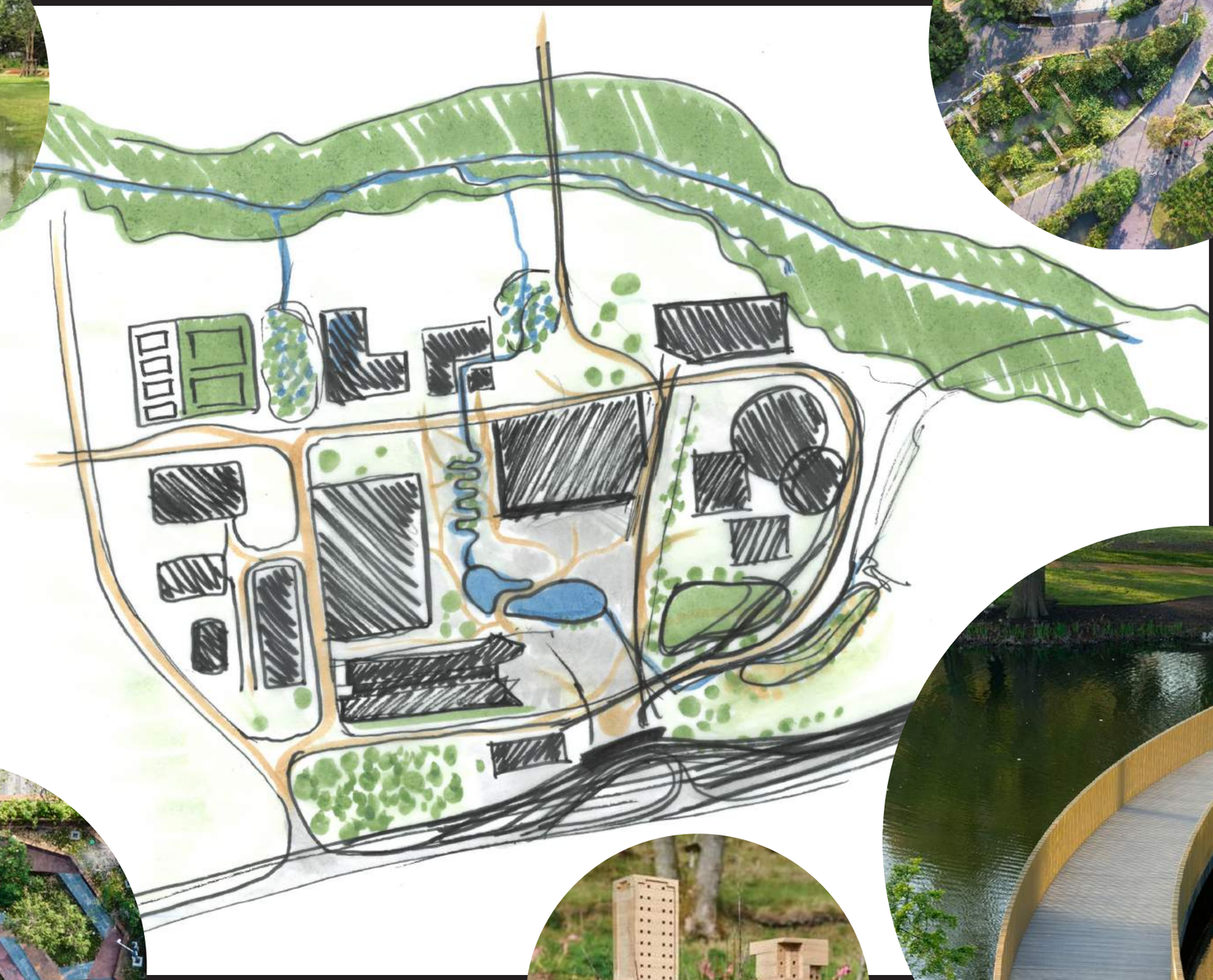
Bike share on campus



Masterplan - Water management



Retention pond





Retarder stream



Constructed wetland



Outdoor study spaces



Bee medow

Seamless bridge



Masterplan - Energy strategy



Data Centre

Data centre’s waste heat can provide sustainable energy source to

Swimming pool

Water is an ideal heat storage medium due to the water’s high thermal capacity



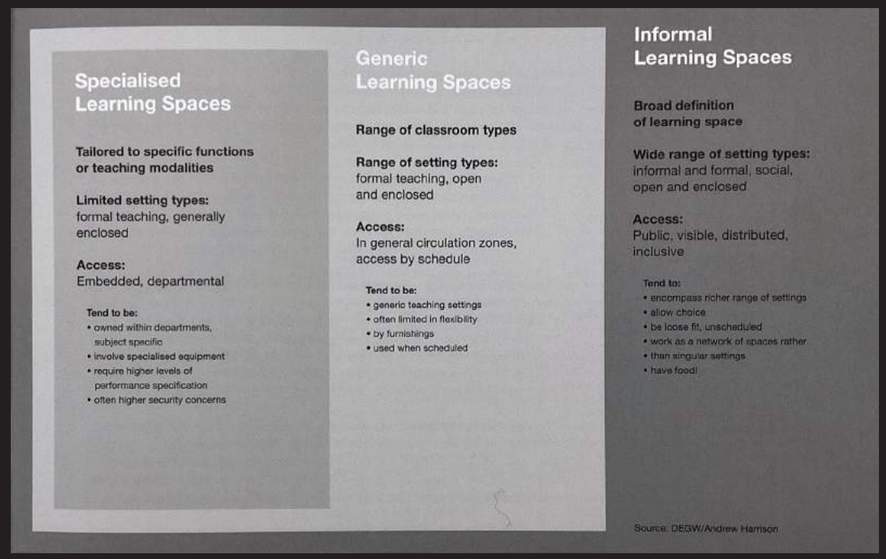
Area schedule for Department of Aerospace engineering

ARC 330 Final Project

Area Schedule Indicative- Tailor to your project and conduct your own research

Internal Areas

Room Type	Floor preference	m2	Number	Total m2 Net	capacity (pp	total capacity (	room catego	Notes
	GF/1/2/R							
Draught lobby		18	1	18		0	services	Include to reduce heat loss
Lobby, Reception	GF	100	1	100		0	social	Will vary and there may be more than one entrance could be manned or not.
WCs		2,2	36	79,2	1	36	services	
AWCs		3,6	3	10,8	1	3	services	1 per floor minimum and 1 for every non accessible set of WCs
Social space cafe		120	2	240	60	120	social	
Breakout spaces		36	5	180	12	60		
Lecture Theatre large		300	1	300	300	300	teaching facility	Metric handbook size according to layout
~~Projector room~~		~~15~~	~~5~~	~~75~~		~~0~~	~~services~~	~~Number depends on how many larger Lecture Theatres~~
A/V room		12	5	60		0	services	If number of lecture theatres increases more rooms required
Med Lecture theatres		120	1	120	120	120	teaching facility	
Small Lecture theatres / flexible teaching		48	2	96	48	96	teaching facility	
Seminar/ Classrooms large		45	2	90	24	48	teaching facility	
Seminar/ Classrooms small		25	4	100	12	48	teaching facility	
Tutorial rooms 5-6pp		20	6	120	6	36	teaching facility	4m2 pp
IT Teaching Rooms		36	2	72	20	40	teaching facility	20pp per room
individual study spaces		2	24	48	1	24	teaching facility	
flexible group study spaces		44	2	88	12	24	teaching facility	flexible study space 6-12 pp
Teaching Store		24	1	24		0	staff	
Teaching Staff room		30	6	180		0	staff	Consider how many teams there might be
Teaching kitchenettes		24	2	48		0	staff	Add per floor if split consider department splits
Admin office		45	2	90	10	20	staff	10pp admin staff space
Small Library / resource		60	1	60		0	teaching facility	connect with social space
Staff Showers /Lockers		36	1	36		0	staff	Allowance consider staff numbers
Meeting room large		44	1	44	12	12	staff	Assumes other spaces can be booked
Meeting room small		22	2	44	6	12	staff	
Technical facilities								
Teaching labs		50	1	50	24	24	teaching facility	
Laboratories		72	2	144	12	24	laboratory	Laboratory Space 6 sq m pp base on 12 people
Propulsin and Aerodynamics Computation		36	1	36	6	6	laboratory	
Composit Research Lab		36	1	36	6	6	laboratory	
Material Research Lab		36	1	36	6	6	laboratory	
Material Testing Lab		36	1	36	6	6	laboratory	
Structural Research and Testing lab		36	1	36	6	6	laboratory	
~~Thermal Lab.~~		36		0	6	0		
Environmental teaching lab		36	1	36	6	6	laboratory	
~~Artificial sky lab~~		36		0	6	0		
Environmental Chambers and Testing rig		36	1	36	6	6	workshop	
Wind Tunnel		36	1	36	6	6	workshop	
Scanning Electron Microscope		24	1	24	4	4	laboratory	
Office write up shared		16	2	32		0		Office/write up shared 4 sq m pp based on 4pp
Lab Office		9	4	36		0	staff	Office cellular 9 sq m pp 4 pp
Clean Rooms large		81	0	0		0	spaceport	9mx9m allowed depends on the function
Clean Rooms medium		36	2	72		0	workshop	6 x 6m
~~Clean Rooms small~~		~~16~~	~~1~~	~~16~~		0		~~4 x 4m~~
Clean Stores		8	2	16		0	services	per clean room
Dirty Stores		8	2	16		0	services	per clean room
Shower /Changing rooms		24	1	24		0	services	estimate the number of staff (4pp)
Stores		12	2	24		0	services	General Stores
Control Rooms		12	2	24		0	services	Transition rooms
EGSE rooms for clean rooms		12	2	24		0	services	Electrical Ground Support Equipment (EGSE) room
Large fabrication/workshop space		120	1	120		0	workshop	60x 20m
Medium Workshop		80	1	80		0	workshop	40x20m
Small Workshop		36	1	36		0	workshop	30x20m
Robotics Bay		80	1	80		0	workshop	
3D Tracking and Scanning		80	1	80		0	workshop	
Wet trades and Curing room		36	1	36		0	workshop	
Micro and Nano scale robotics		36	1	36		0	workshop	
Studio space for individual and group work		120	1	120		0	workshop	
Stores		20	2	40		0		5 x4m
Net Area Subtotal				**3741**		804		Total without circulation and wall thicknesses
Allowance for circulation @20%				748				Allowance - this can vary n a very technical building this would be higher
Allowance for plant and MEP@15% of accommodation exc. Plant				561				Allowance - this can vary n a very technical building this would be higher
Estimate Gross Internal Area (GIA)m2				**5050**				This figure is a starting point for your brief. Consider the distribution across differ



Estimated numbers

Student: 1000
Faculty: 130

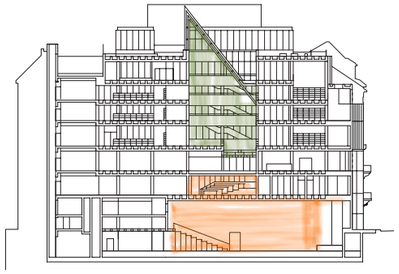
Engineering and techology estimation of space allowance space/student:

Postgraduate course 13.1 m2/student
Postgraduate research 14.2 m2/student
(2003 estimation, Engineering and techology. SMG)

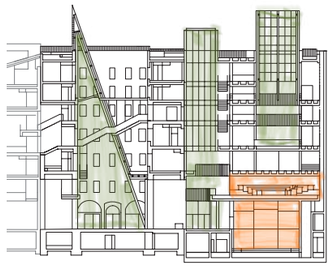
Net area: 10 000 m2
GIA: 15 000 m2

Circulation analysis

CEU Budapest - O'Donnell + Tuomey



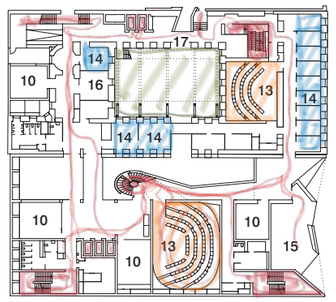
aa



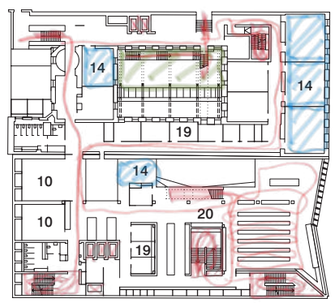
bb

Schnitte • Grundrisse
Maßstab 1:1000
1 Vorplatz
2 Haupteingang
3 Pförtner
4 Garderobe
5 Rezeption
6 Café
7 Auditorium
8 Innenhof überdeckt
9 Event-, Raum-, Betriebsmittel-management
10 Seminarraum
11 Rückzugsraum
12 Verwaltung
13 kleiner Hörsaal
14 Büro
15 Sitzungssaal
16 Doktorand
17 Übergang zu Nádor 11
18 Zugangskontrolle Bibliothek
19 Besprechungs-raum
20 Bibliothek
21 Technik
22 Lichthof
23 Dachterrasse

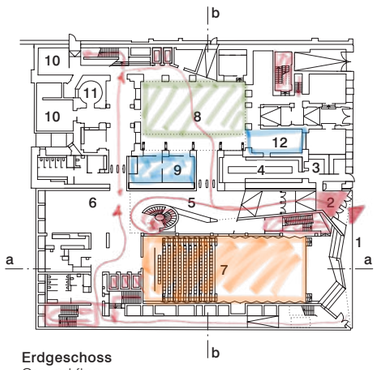
Sections • Floor plans
scale 1:1000
1 Entrance court
2 Main entrance
3 Porter
4 Cloakroom
5 Reception
6 Cafe
7 Auditorium
8 Covered courtyard
9 Office for events management
10 Seminar room
11 Retreat
12 Administration
13 Small lecture hall
14 Office
15 Conference space
16 PhD students
17 Link to Nádor 11
18 Controlled access to library
19 Discussion space
20 Library
21 Mechanical services
22 Atrium
23 Roof terrace



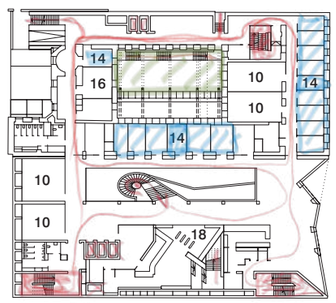
1. Obergeschoss
First floor



3. Obergeschoss
Third floor



Erdgeschoss
Ground floor

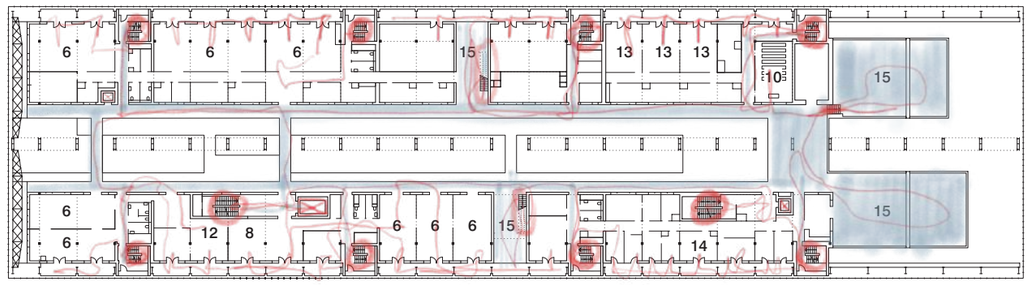


2. Obergeschoss
Second floor

School of Fine Art in Nantes - Franklin Azzi Architecture



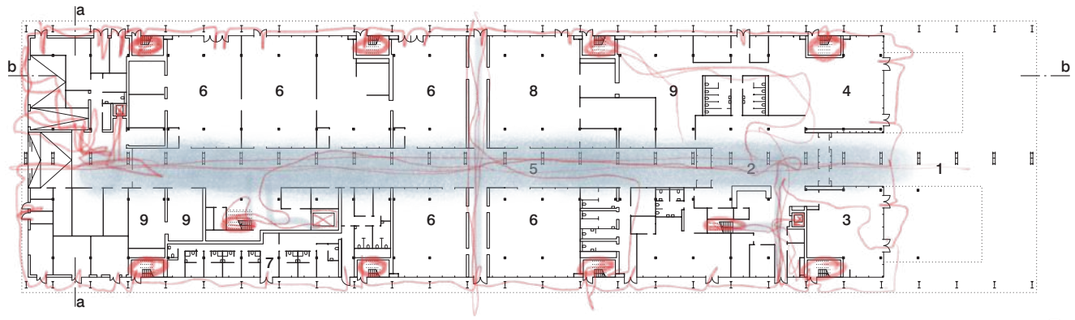
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2. Obergeschoss
Second floor



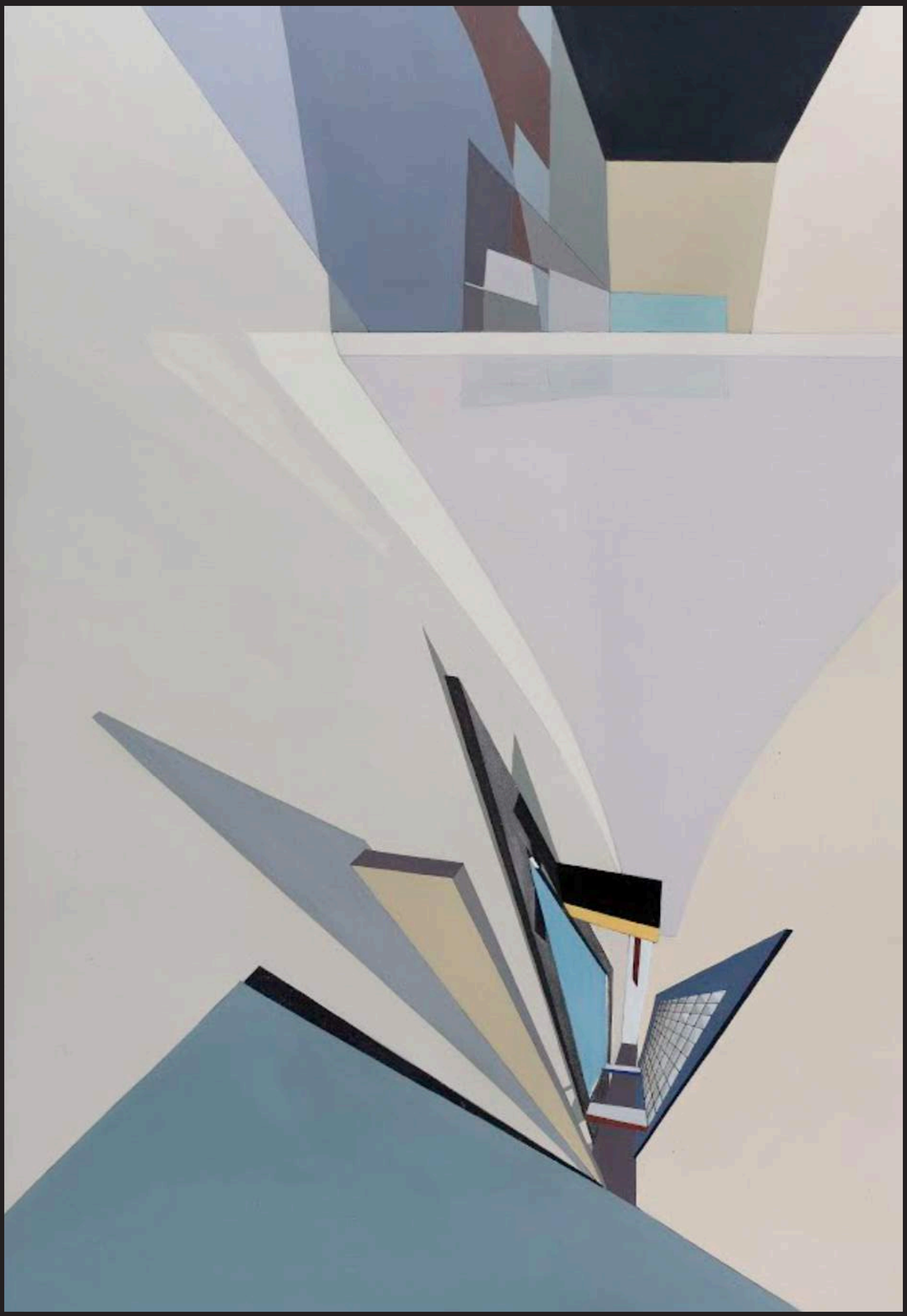
1. Obergeschoss
First floor



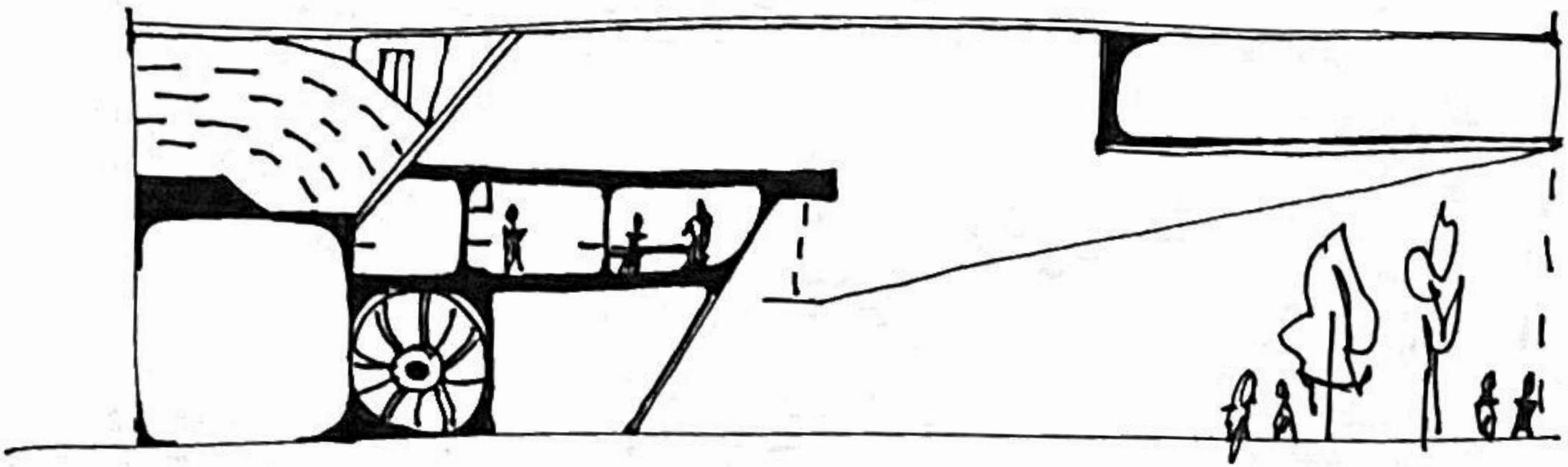
Erdgeschoss
Ground floor

Schnitte • Grundrisse
Maßstab 1:1000
1 überdachter Vorbereich
2 Eingangshalle
3 Lesesesaal
4 Ausstellungsraum
5 Erschließungs-bereich
6 Werkstatt/Atelier
7 Gästezimmer
8 Mehrzweckraum
9 Magazin
10 Auditorium
11 Bibliothek
12 Computerraum
13 Seminarraum
14 Büros
15 Dachterrasse

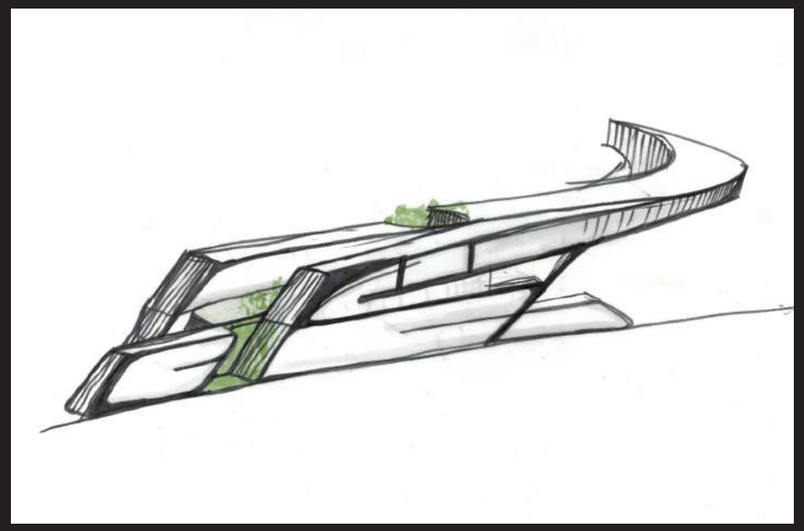
Sections • Floor plans
scale 1:1000
1 Covered forecourt
2 Entrance hall
3 Reading room
4 Exhibition space
5 Circulation area
6 Workshop/Studio
7 Guest rooms
8 Multipurpose space
9 Store
10 Auditorium
11 Library
12 Computer room
13 Seminar space
14 Offices
15 Roof terrace

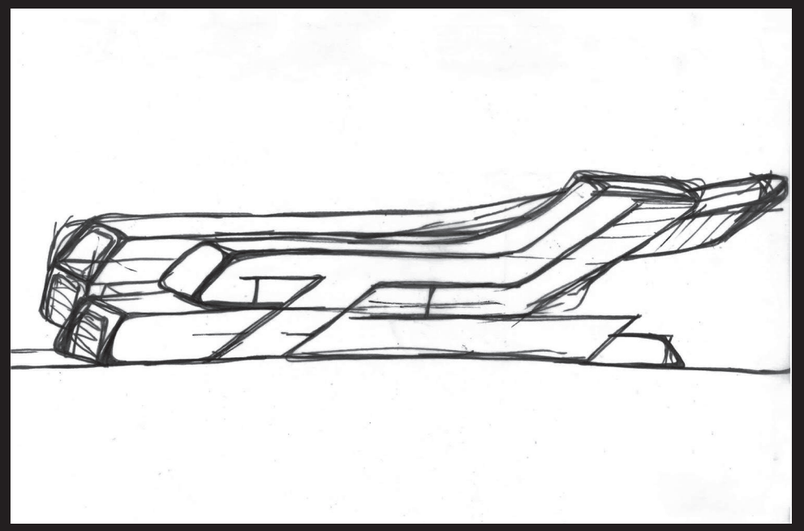


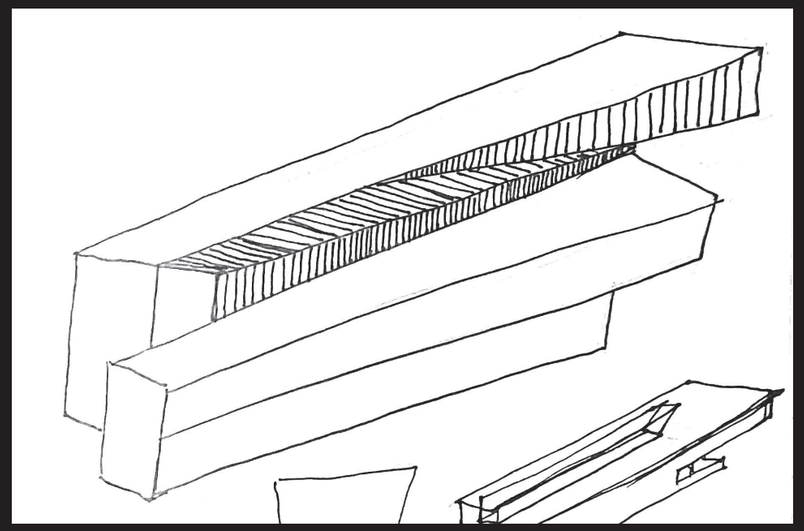
Initial sketch

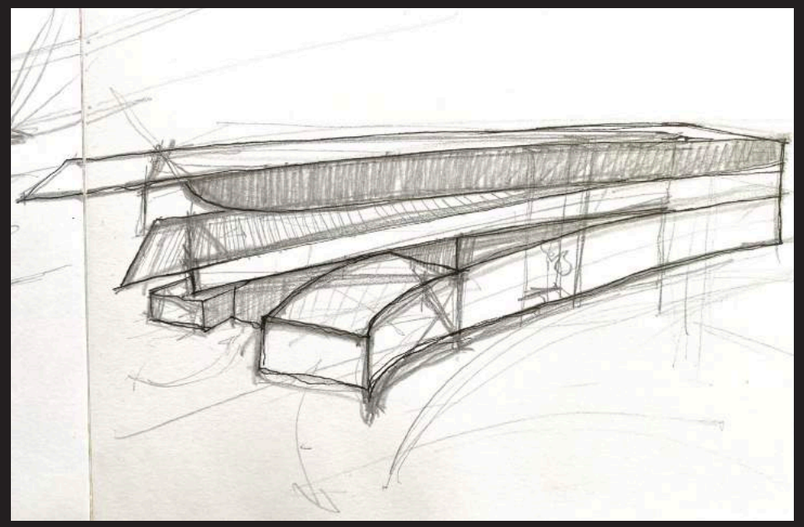


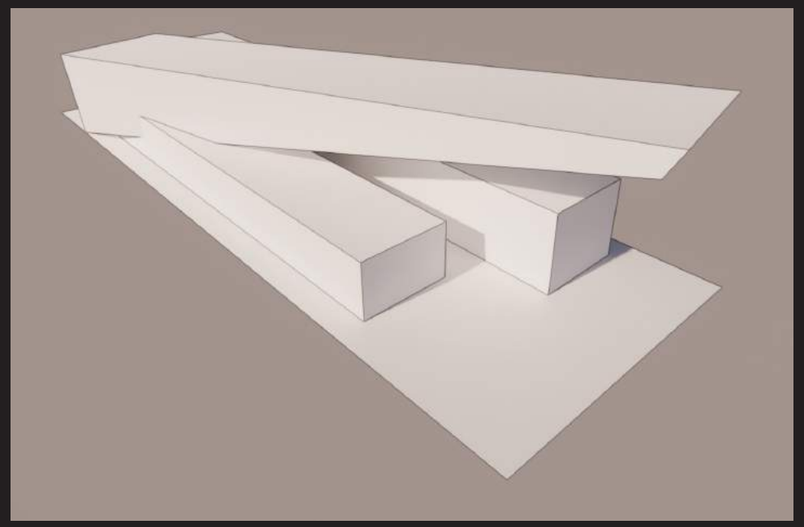
Initial design iterations

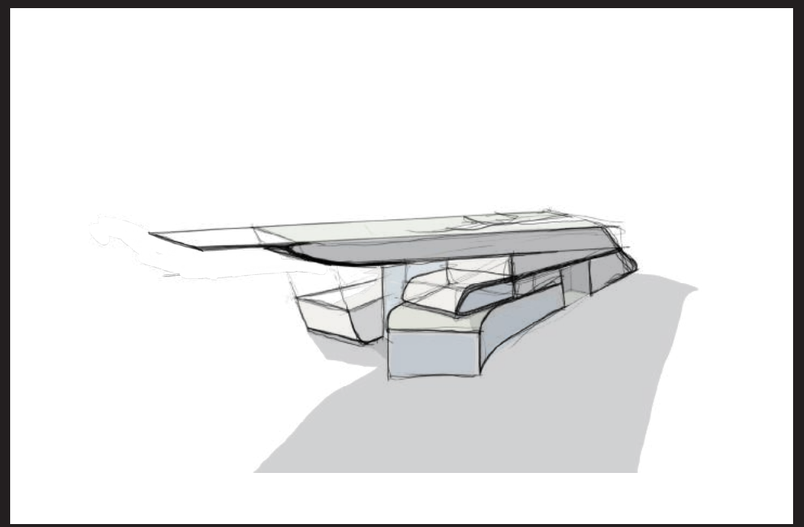


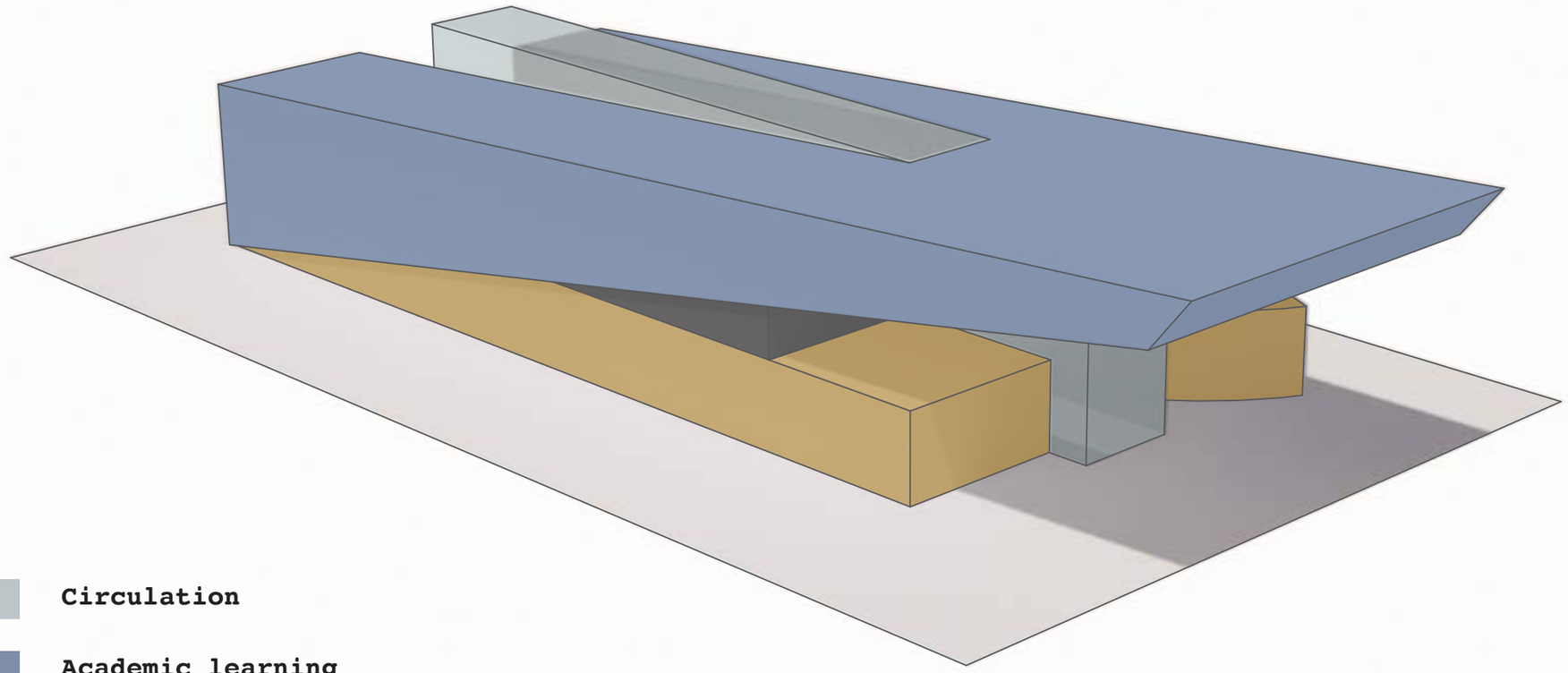












Circulation

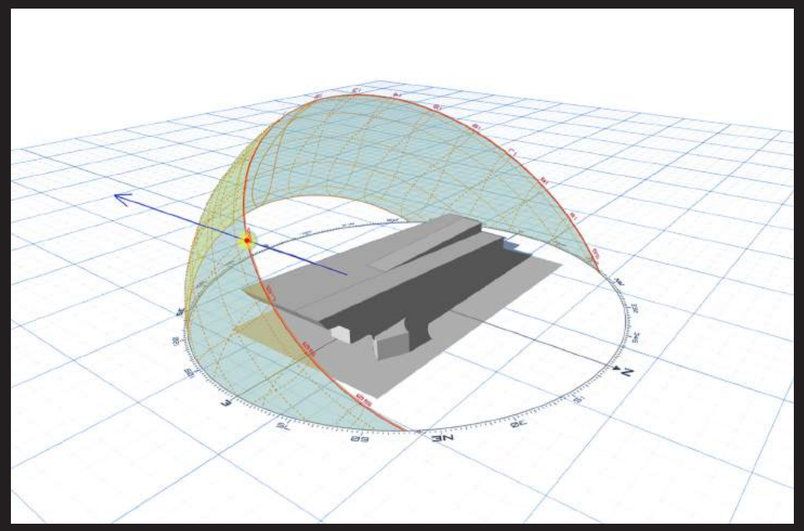
Academic learning

Laboratories

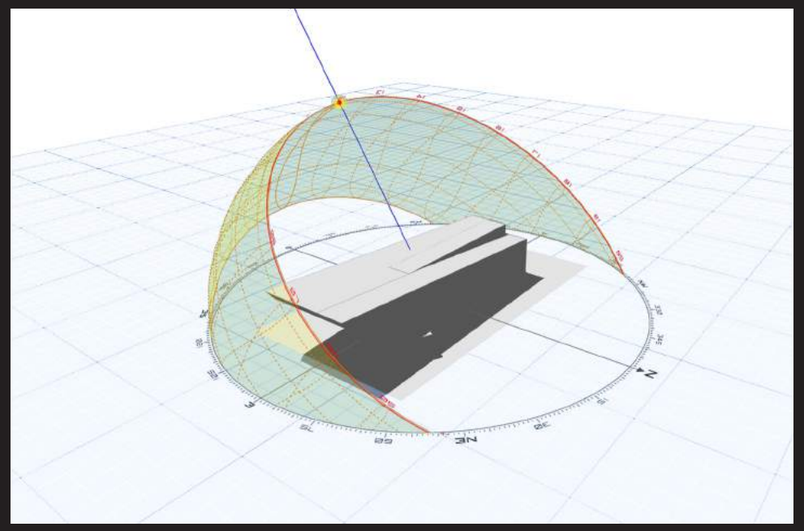
Fabrication and testing

Sun path analysis - testing the design

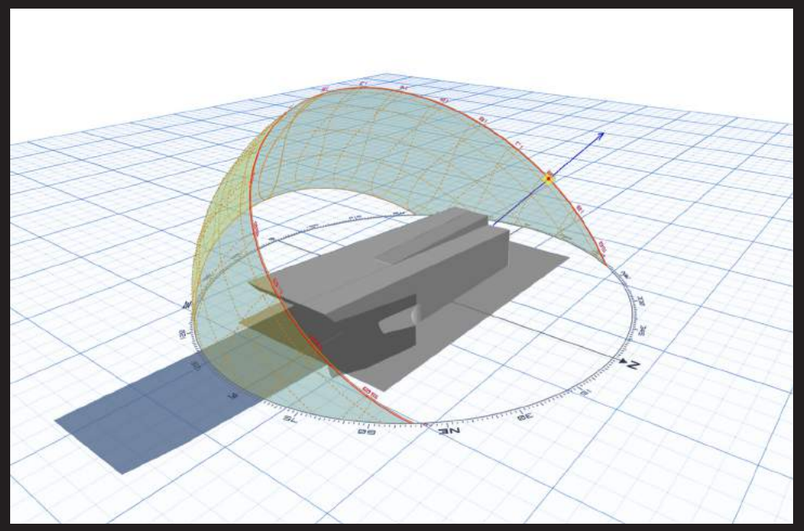
12th June 8am

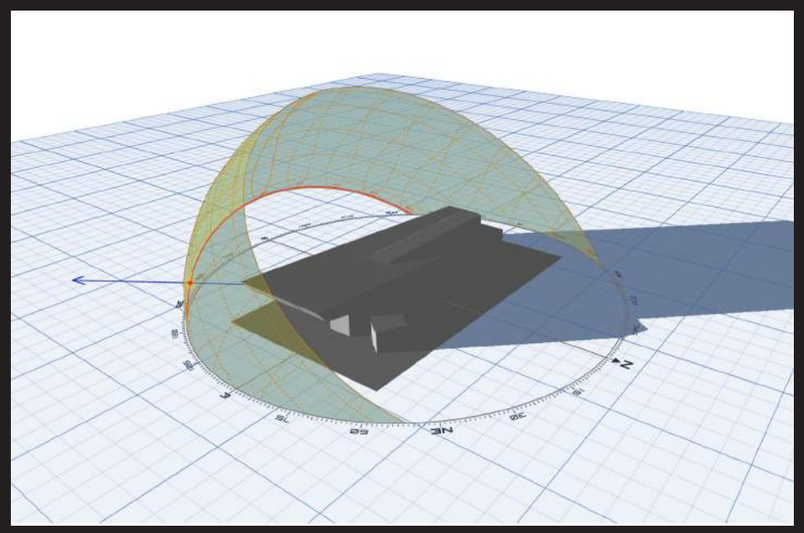


12th June noon

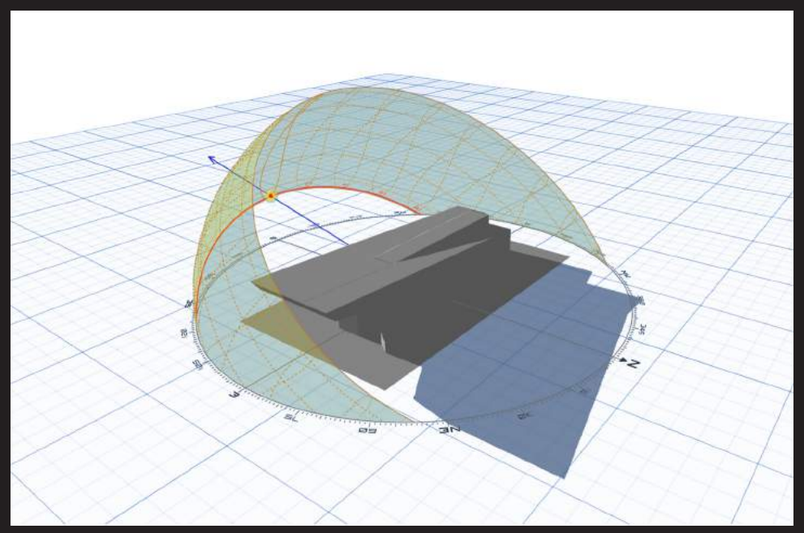


12th June 6pm

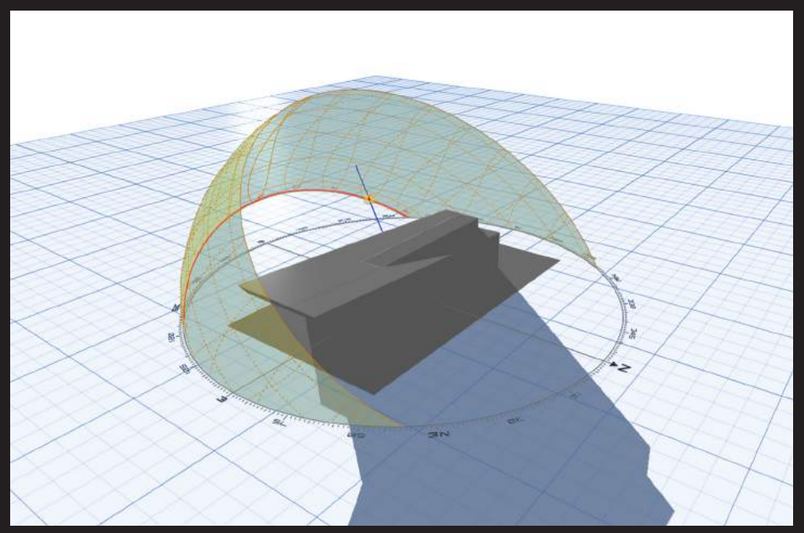




12th Dec 9am



12th Dec noon



12th Dec 3pm

Environmental strategy

Connection to green

- mental health
- well being
- creativity boost





Solar energy harvesting

- roof solar panels
- large roof surface





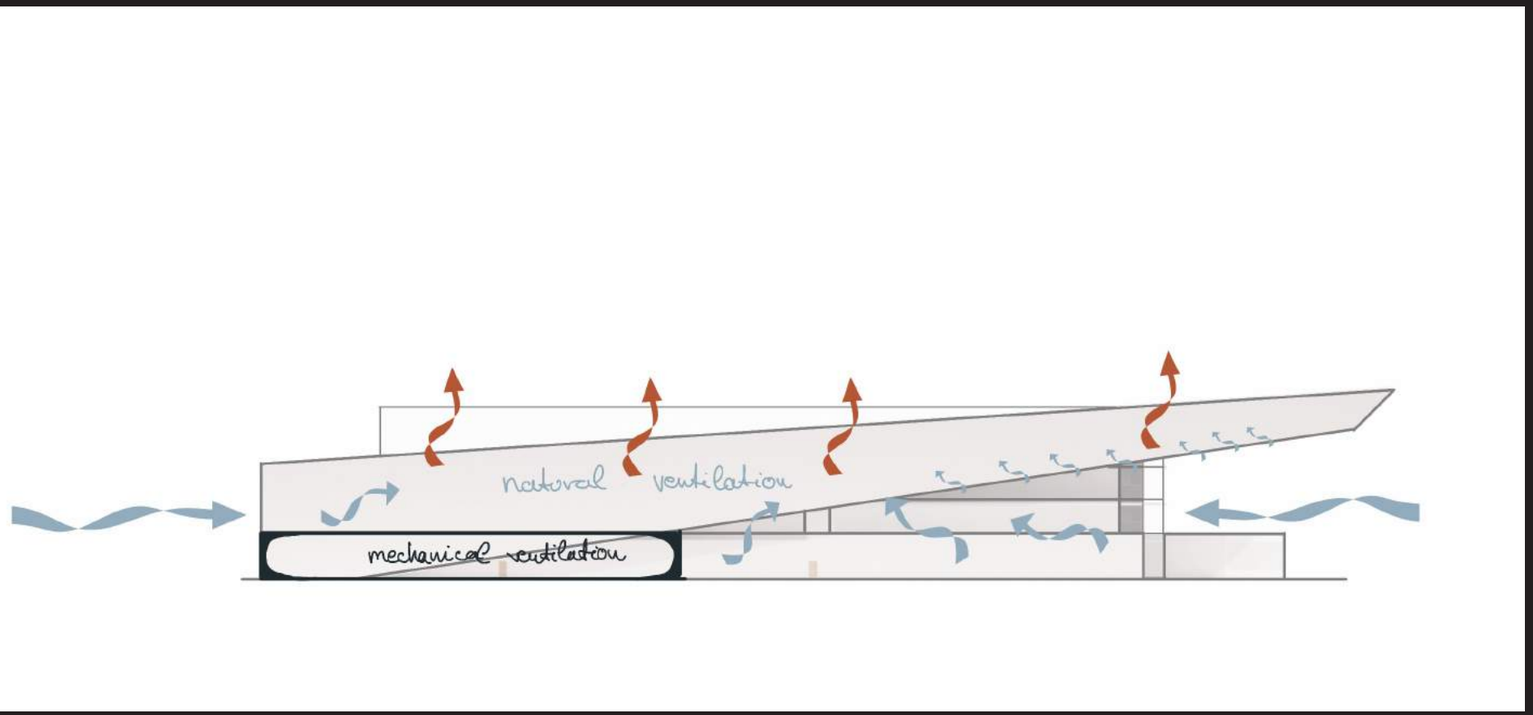
Pond and suds

- rainwater harvesting
- groundwater drainage
- enhancing biodiversity



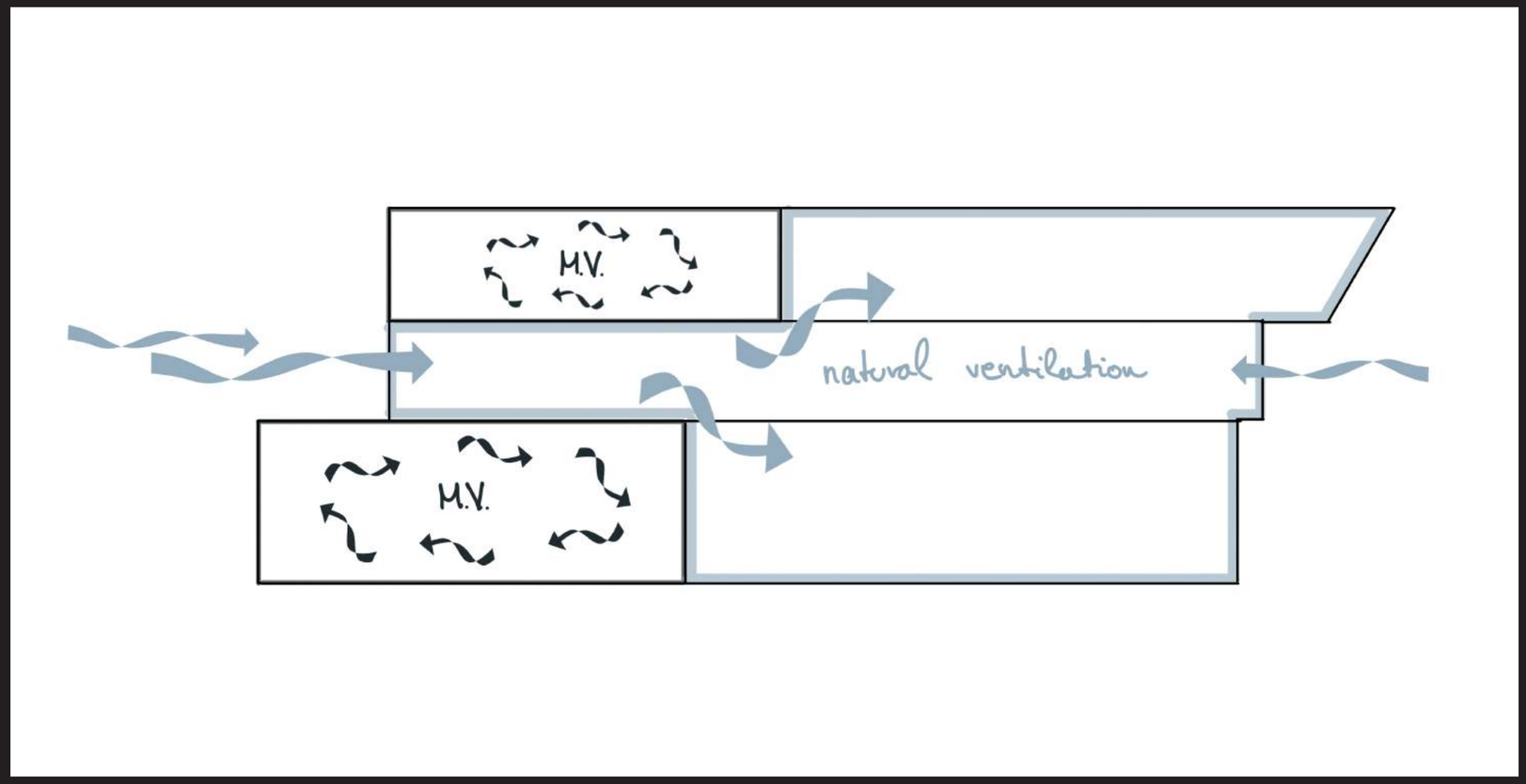


Ventillation strategy

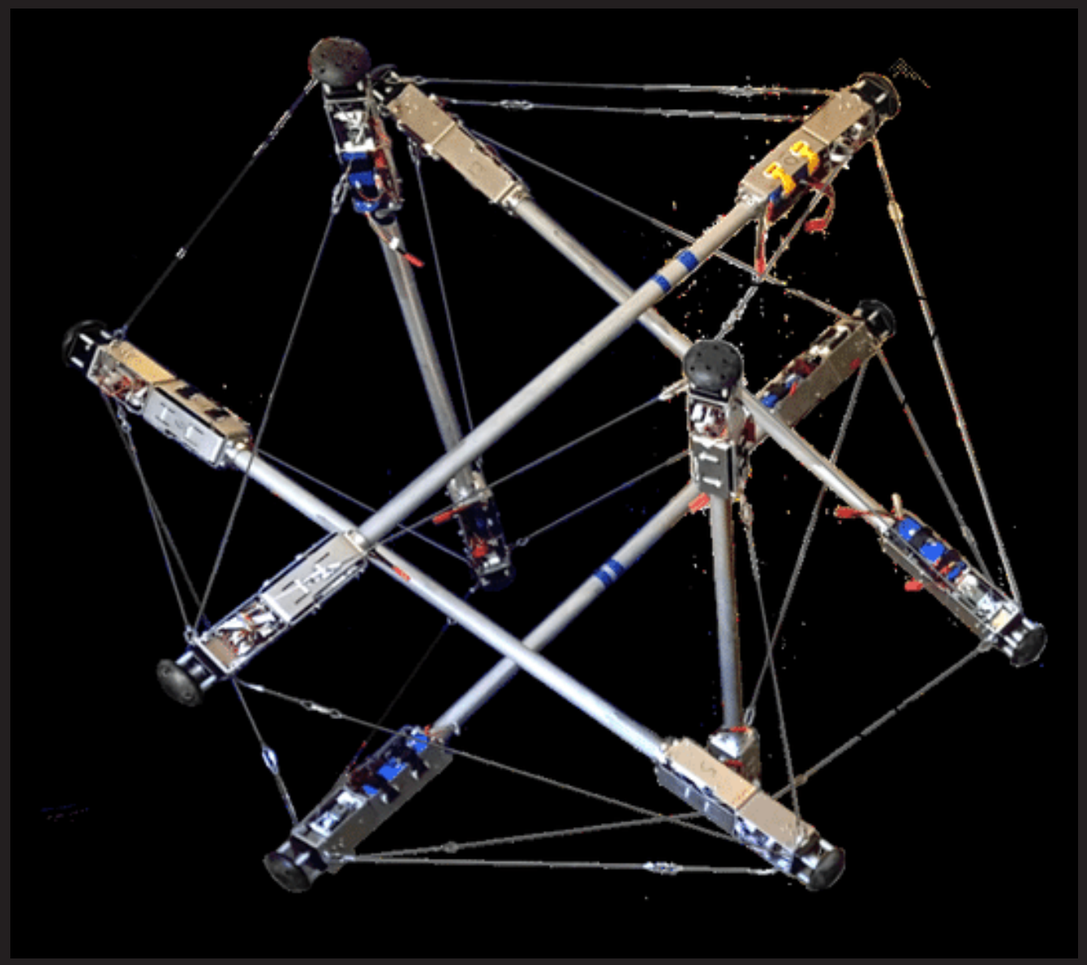


The building is naturally ventilated expect the technical facility which is mechanically ventilated to sustain a controlled environment

The longitudinal circulation permitts cross-ventillation. The central infrastructure also helps to drive air up to the roof airways.



Structural strategy - tensegrity structure

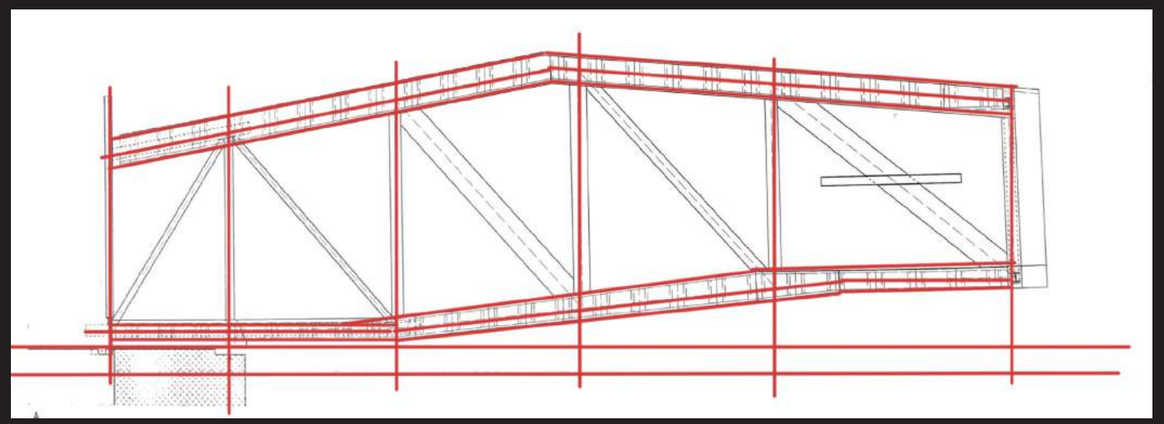


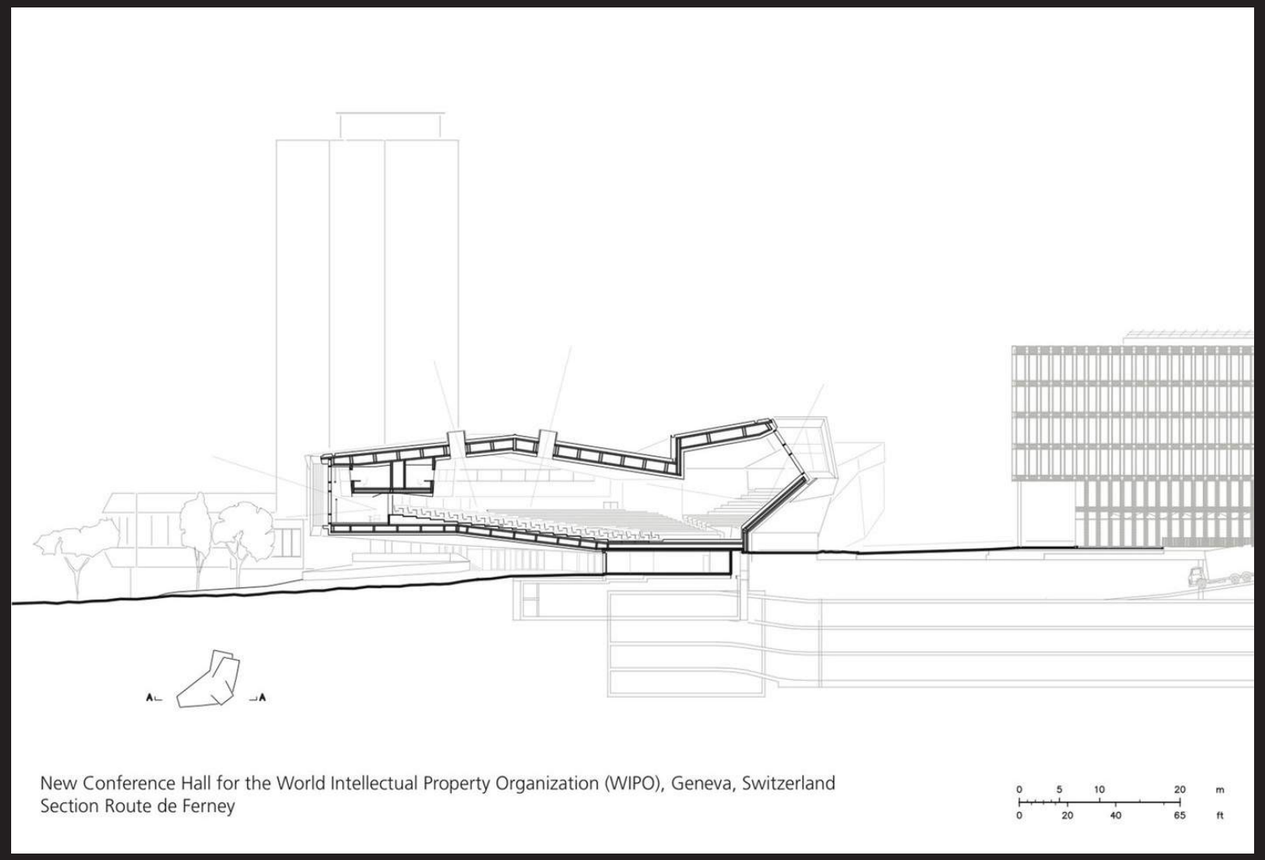
Elements under tension or compression only



Structural strategy - bird bone struss structure









Structural strategy

Timber Warren and Vierendeel truss structure

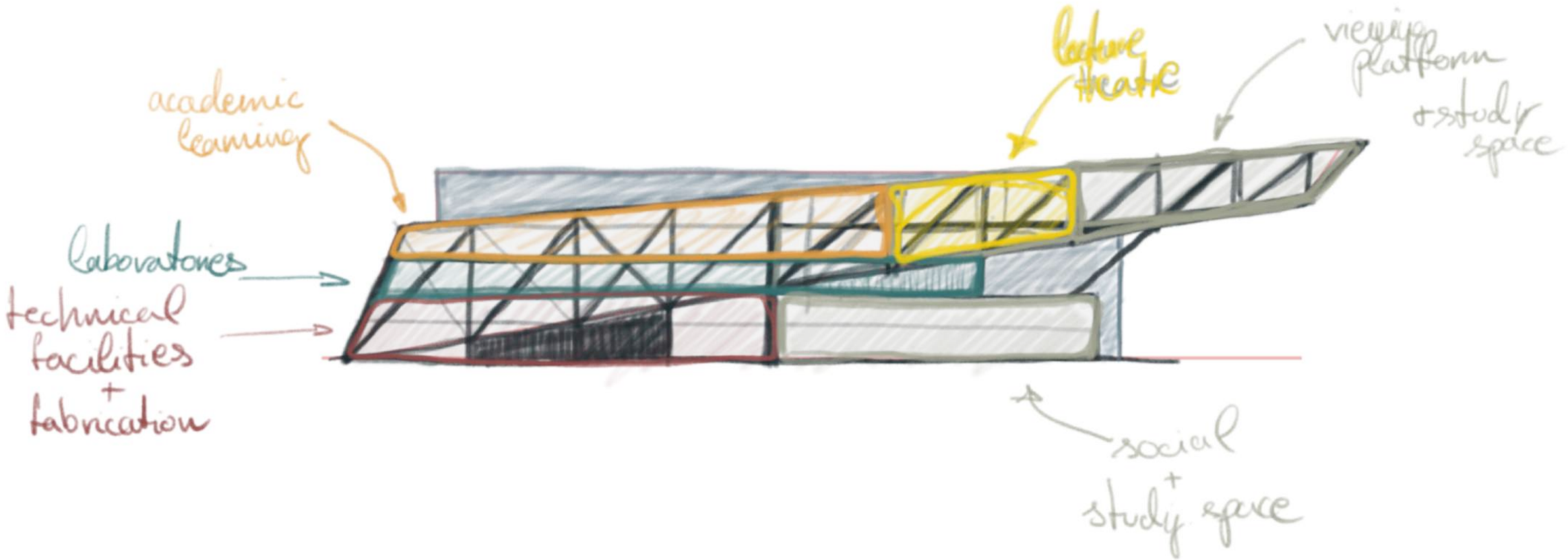
Glulam and steel hybrid system



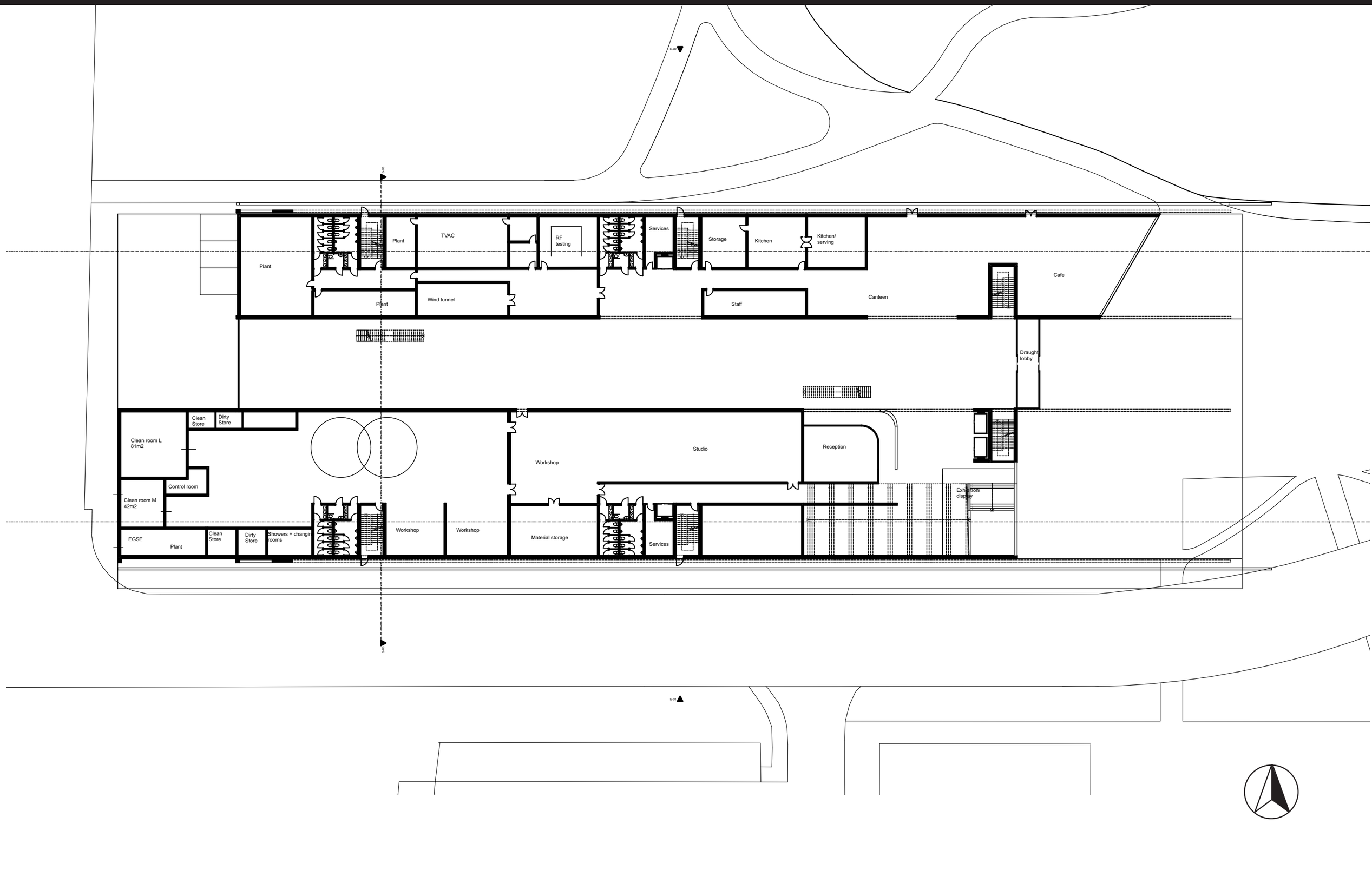




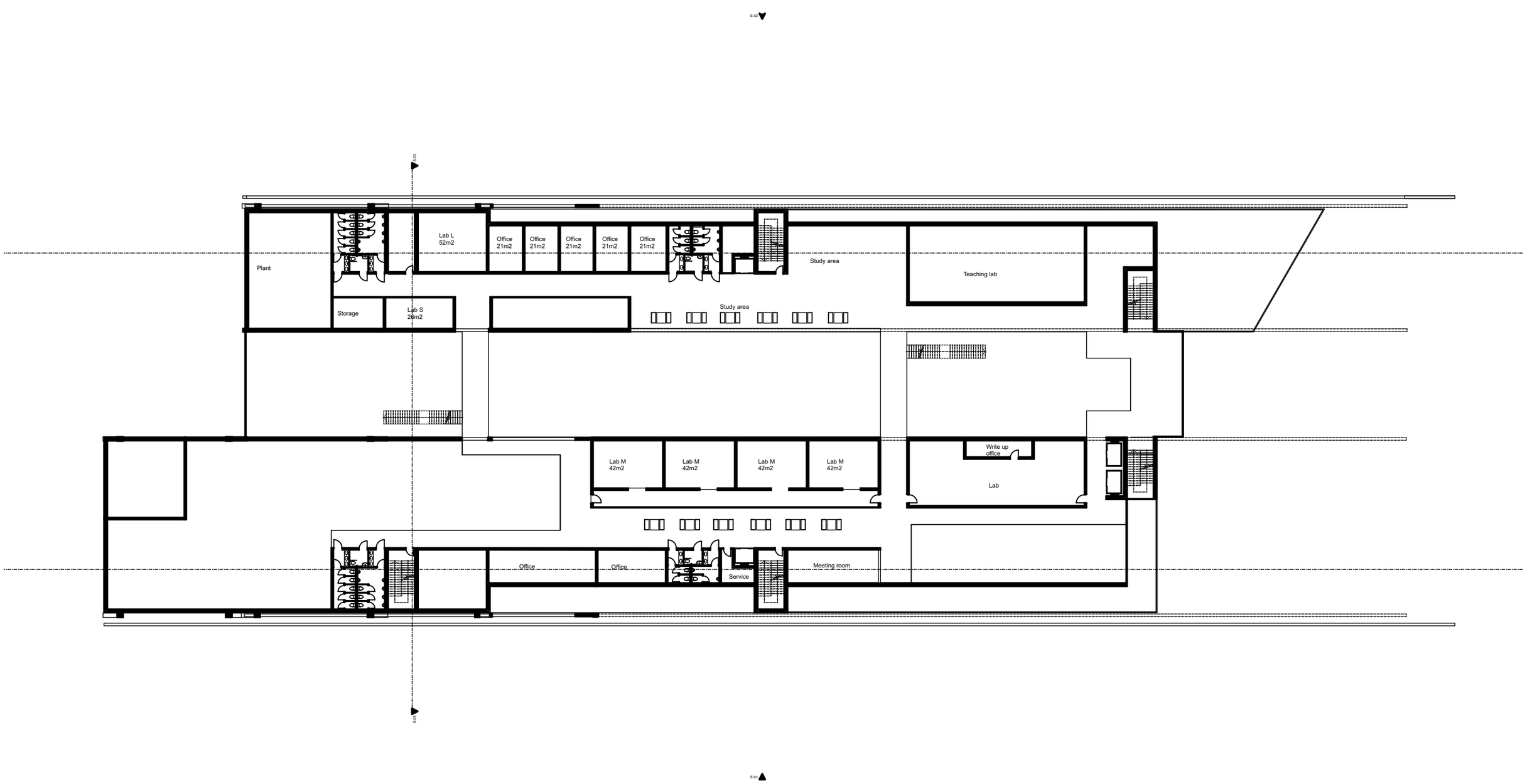
Structural strategy



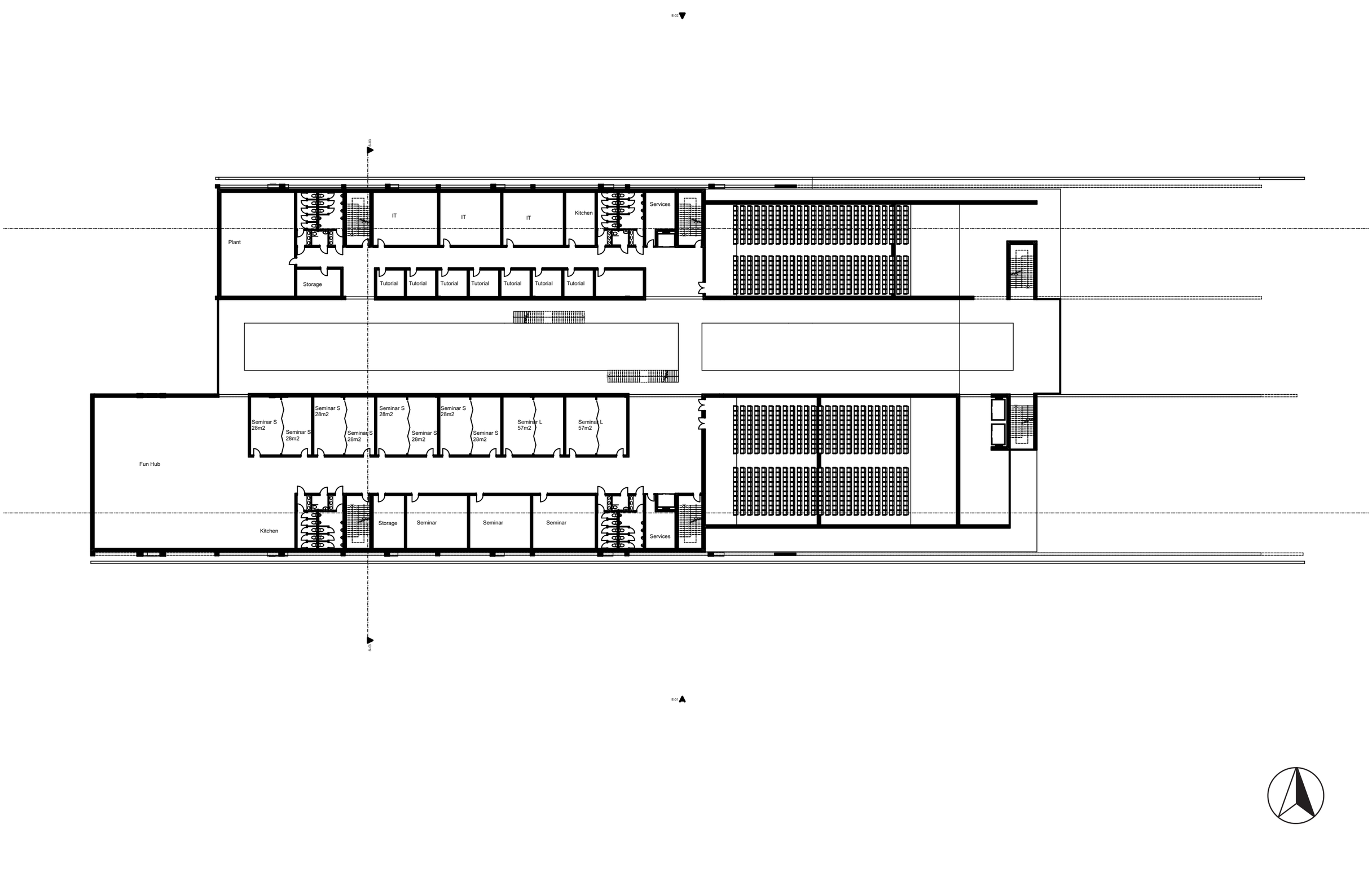
Ground Floor Plan 1:500



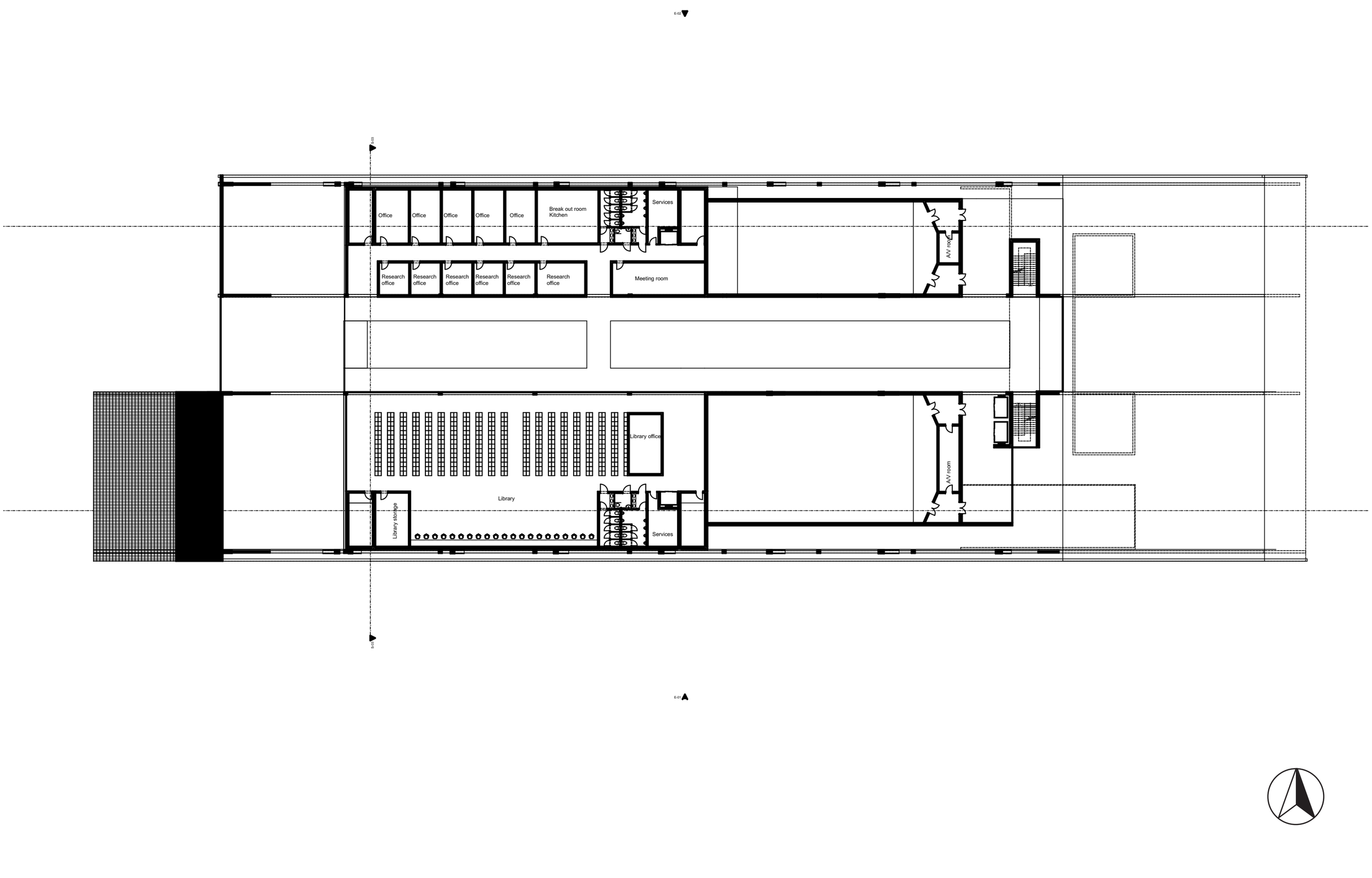
1st Floor Plan 1:500



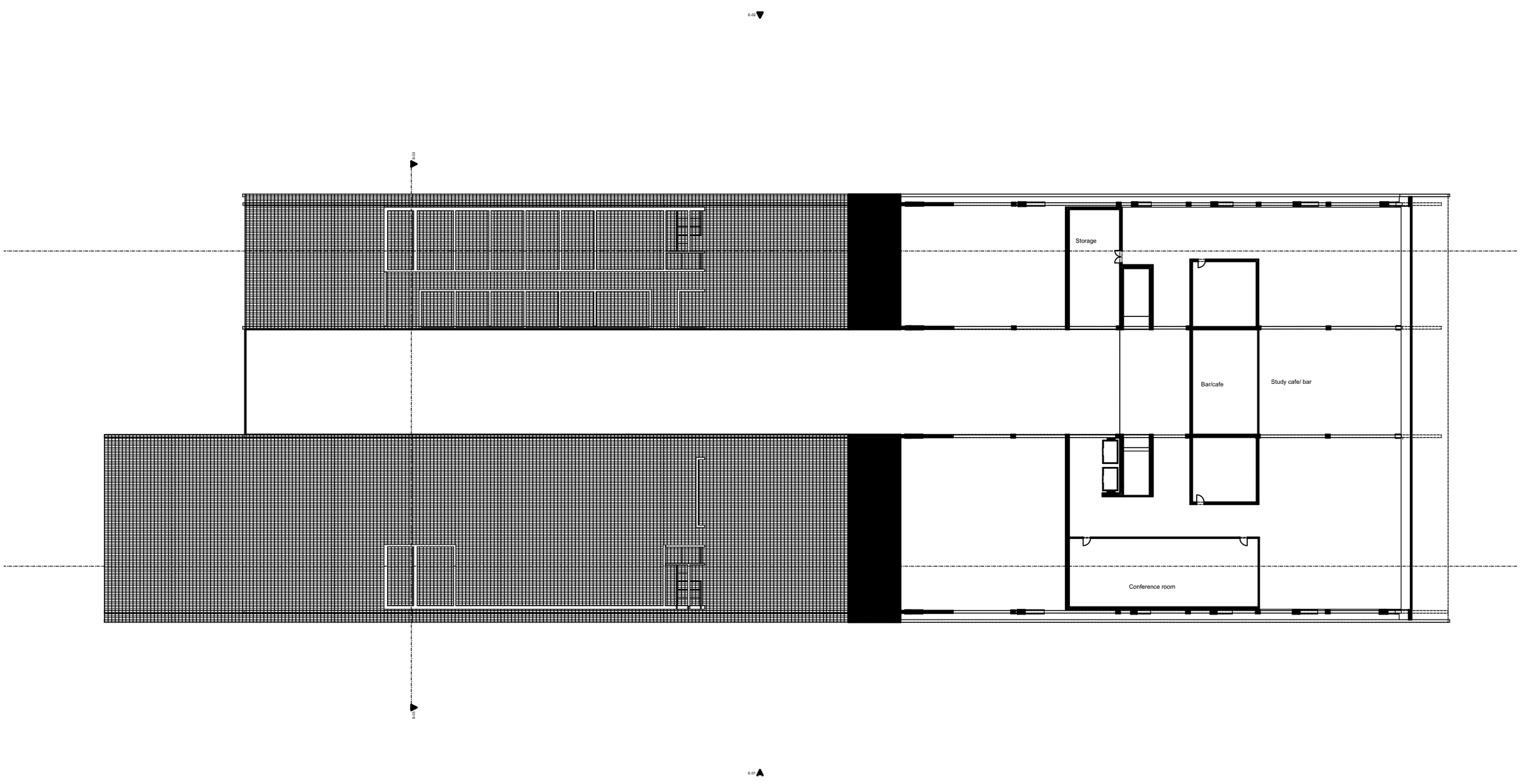
2nd Floor Plan 1:500



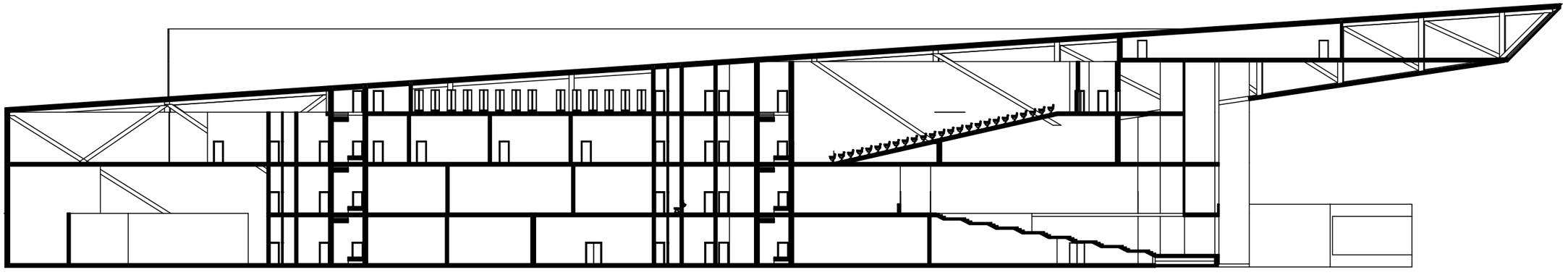
3rd Floor Plan 1:500



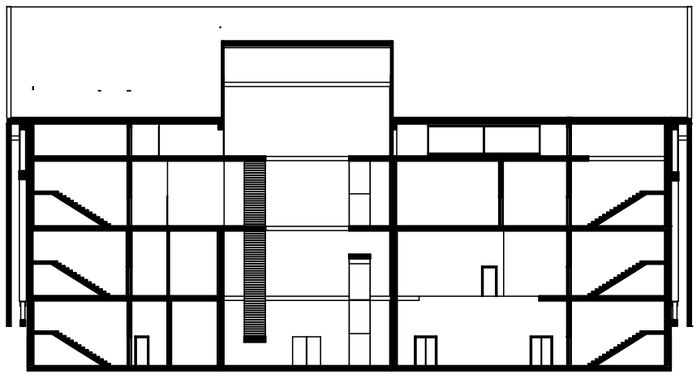
4th Floor Plan 1:500



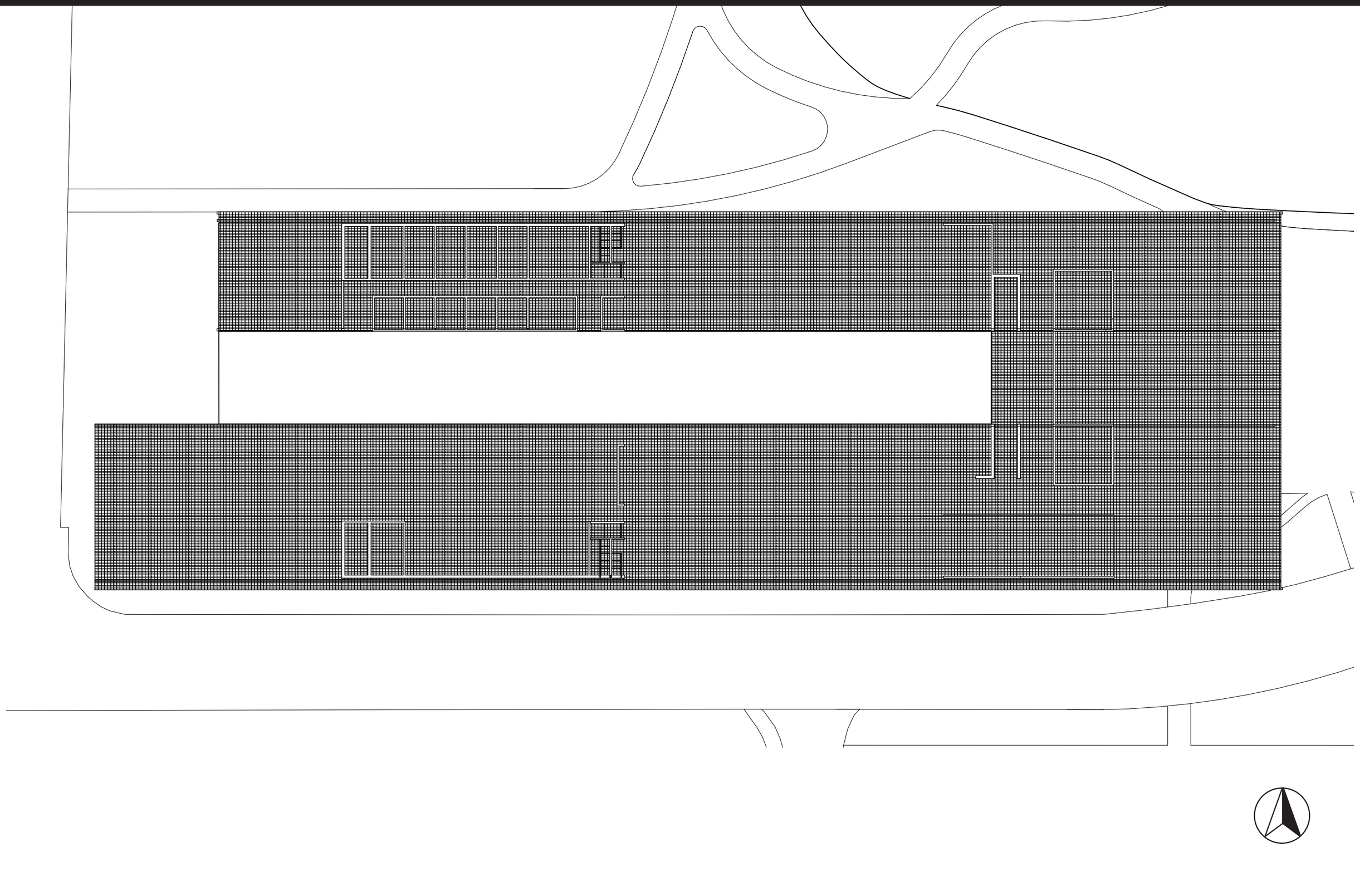
EW Section 1:500



SE Section 1:500

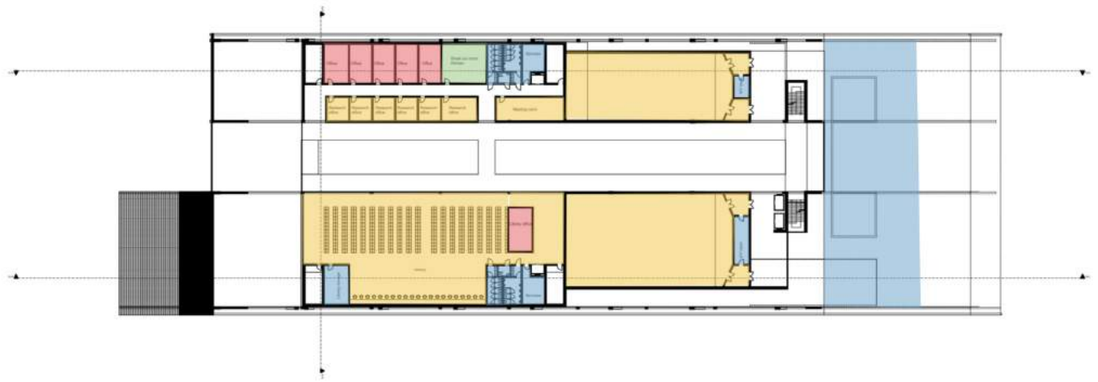


Roof Plan 1:500

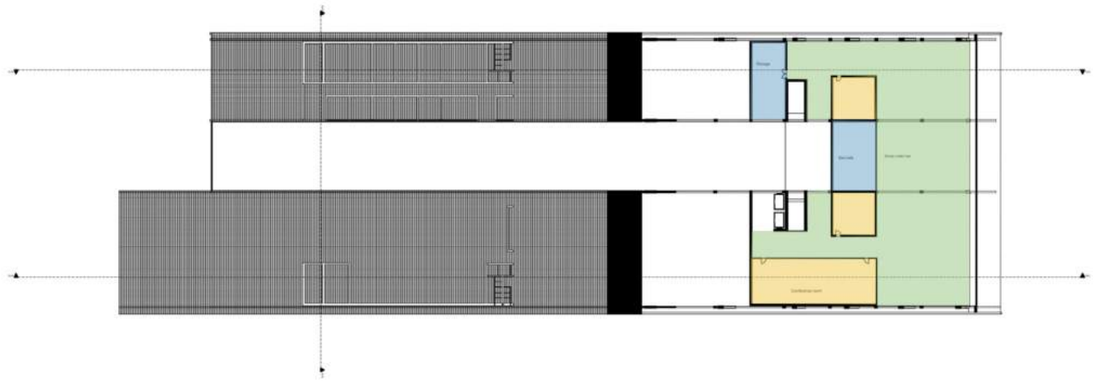


Area schedule











Social space

Teaching facility

Laboratory

Technical facility

Staff

Services

Laboratories vision



Material testing facilities



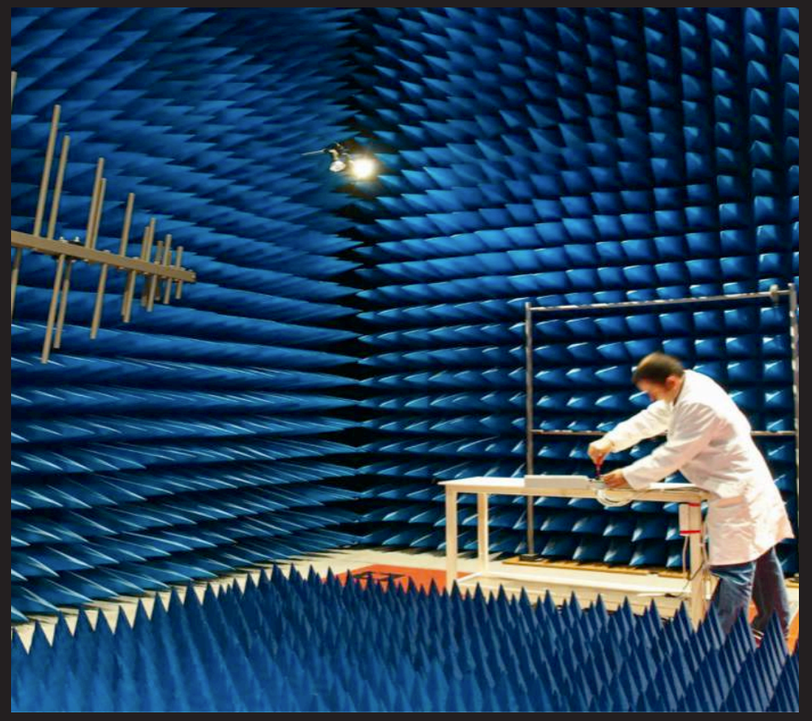


White board partitions walls

Technical facilities vision



Multiple test environment facilityvv
Clean rooms, TVAC and EMC testing

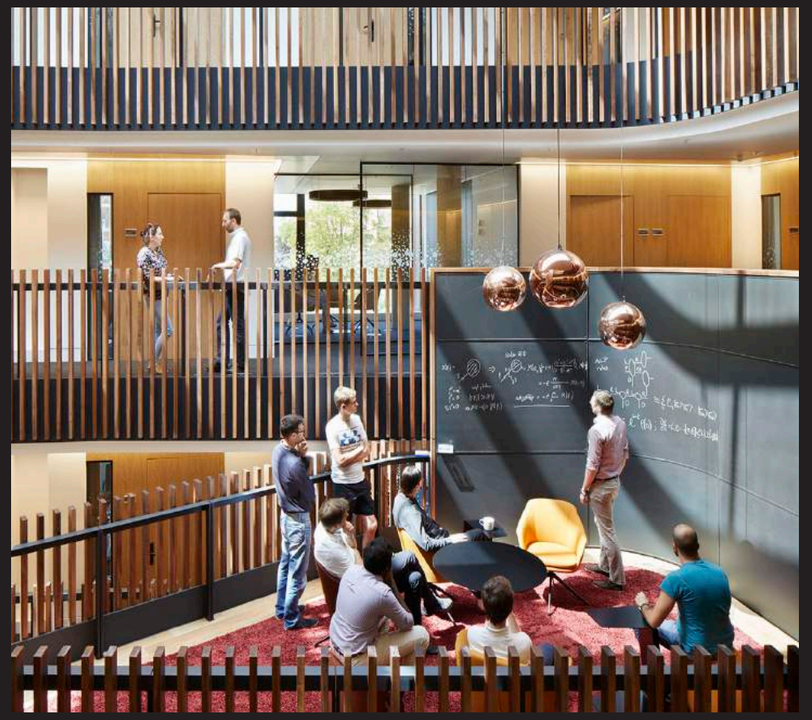






Study spaces vision





Individual and group study spaces scattered around the building

Long term research offices for PHD students and professors



Academic spacial vision

Open studio space





Flexible seminar rooms

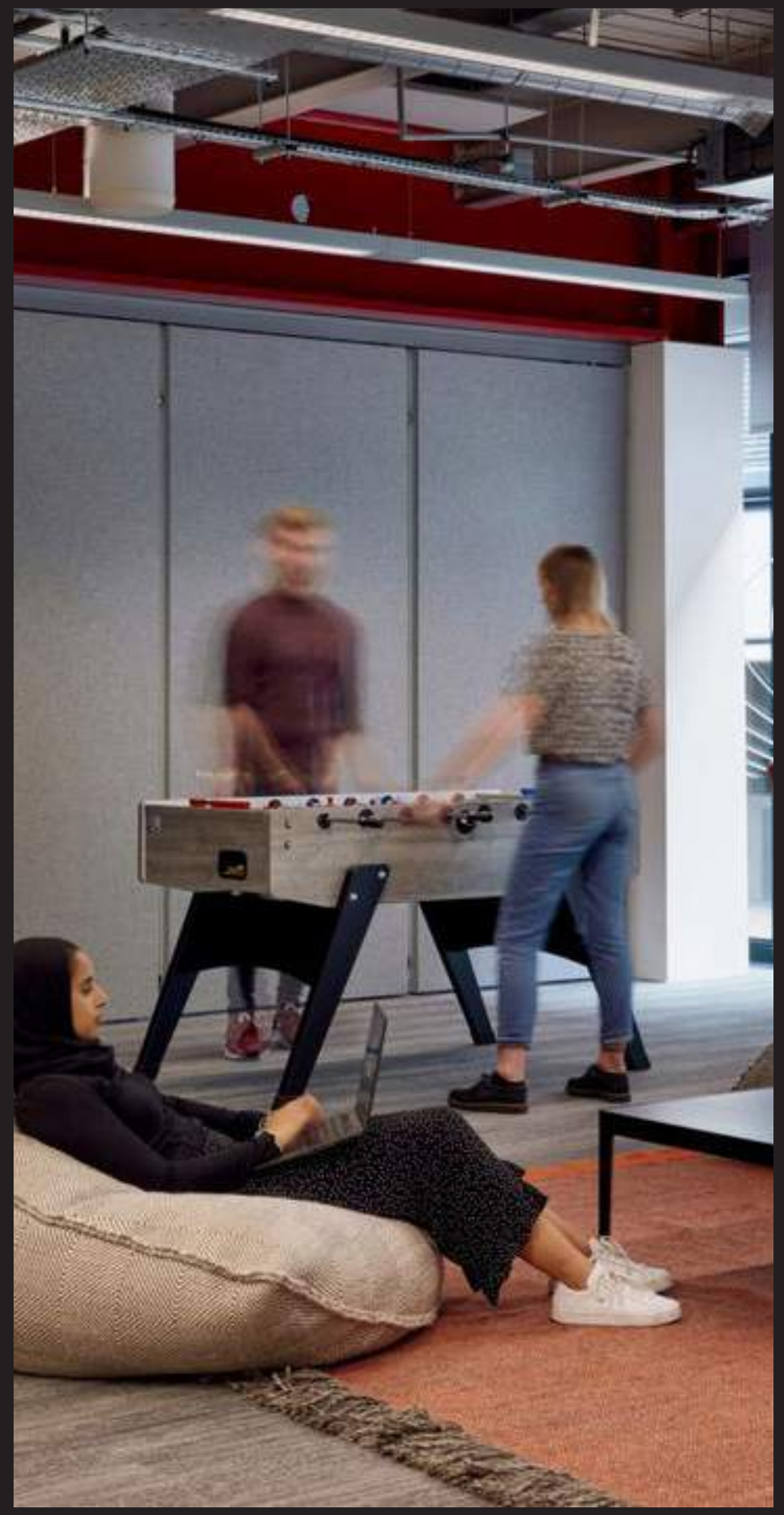
Social spaces vision



Social multifunctional study staircase

Fun hub with pool tables and breakout areas





Viewing platform vision



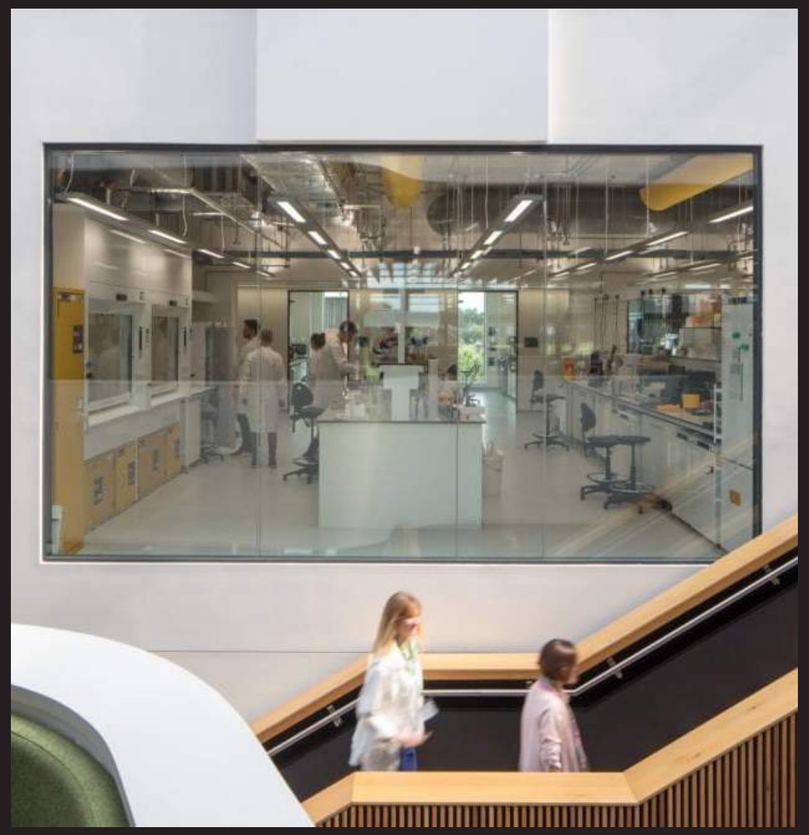


The “Control room”
Viewing platform for launches
Event space and cafe/bar



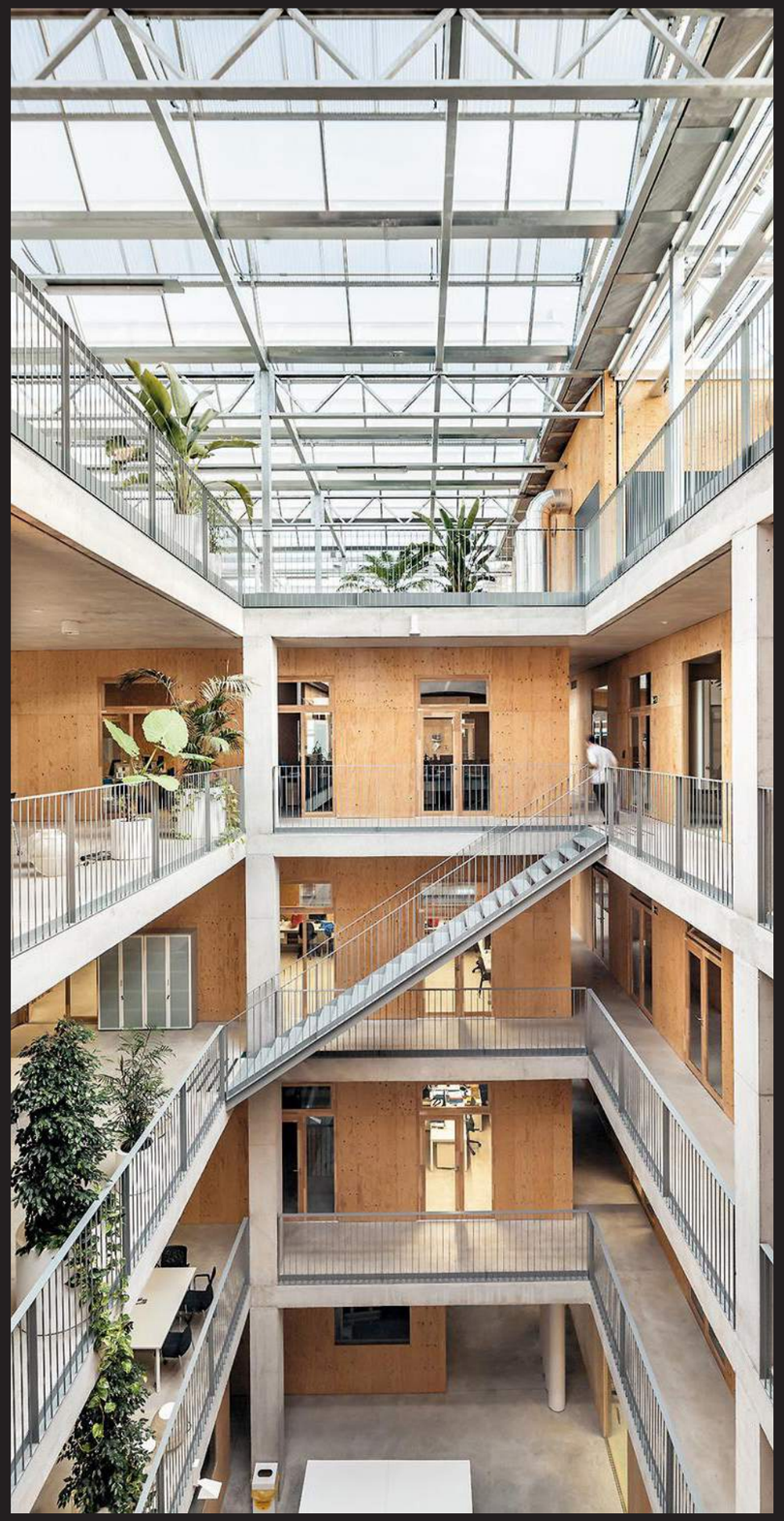
Main circulation vision

Window connection to the technical secured spaces

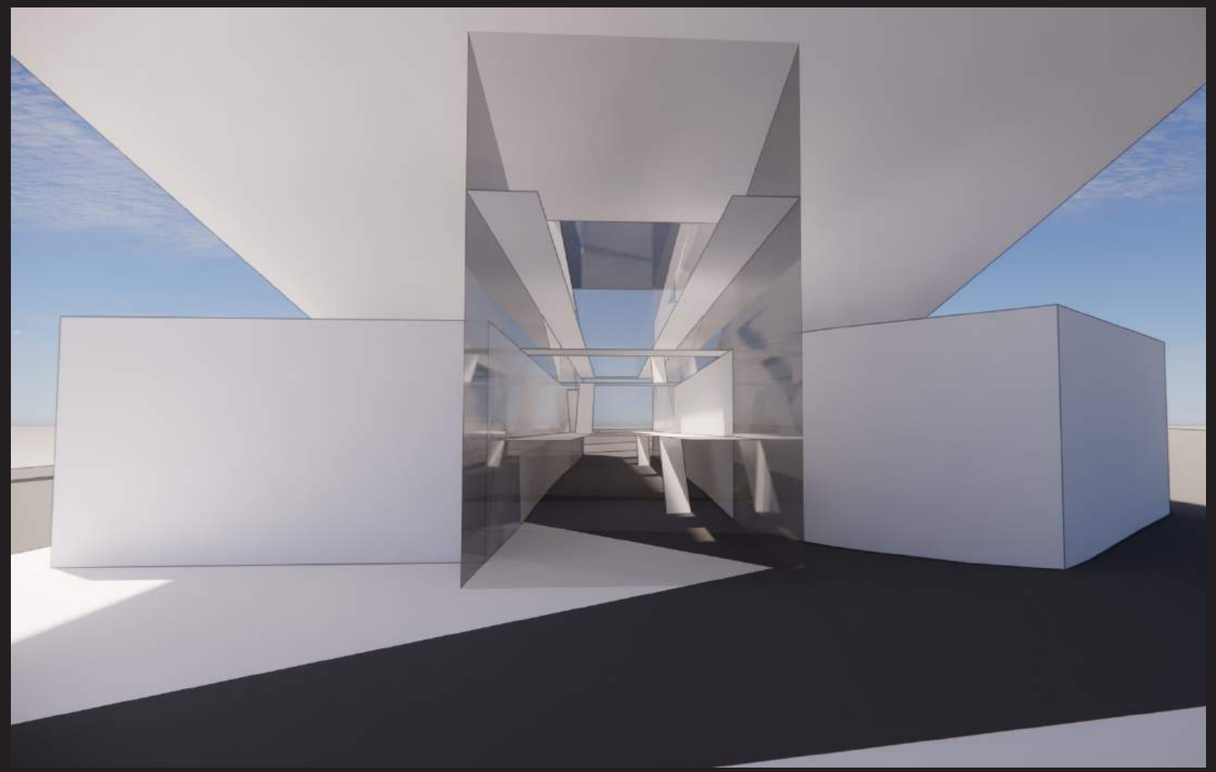


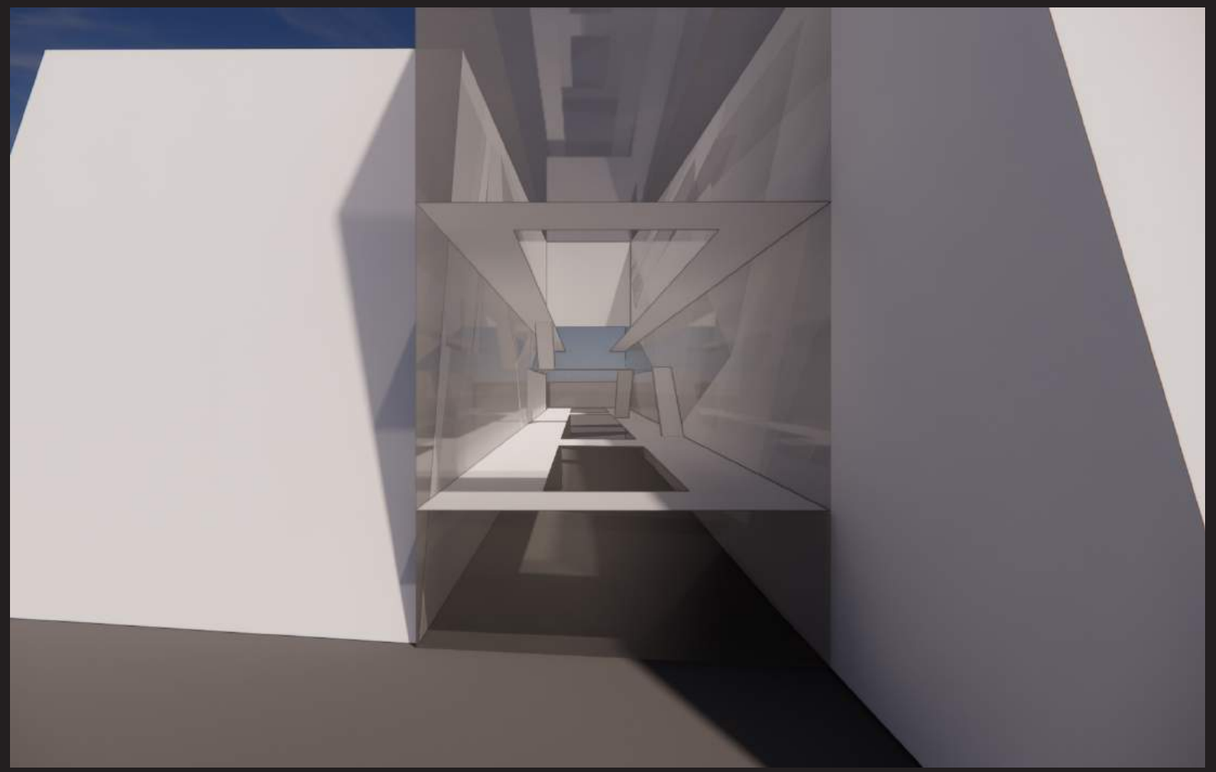
Bright and airy main circulation with vegetation

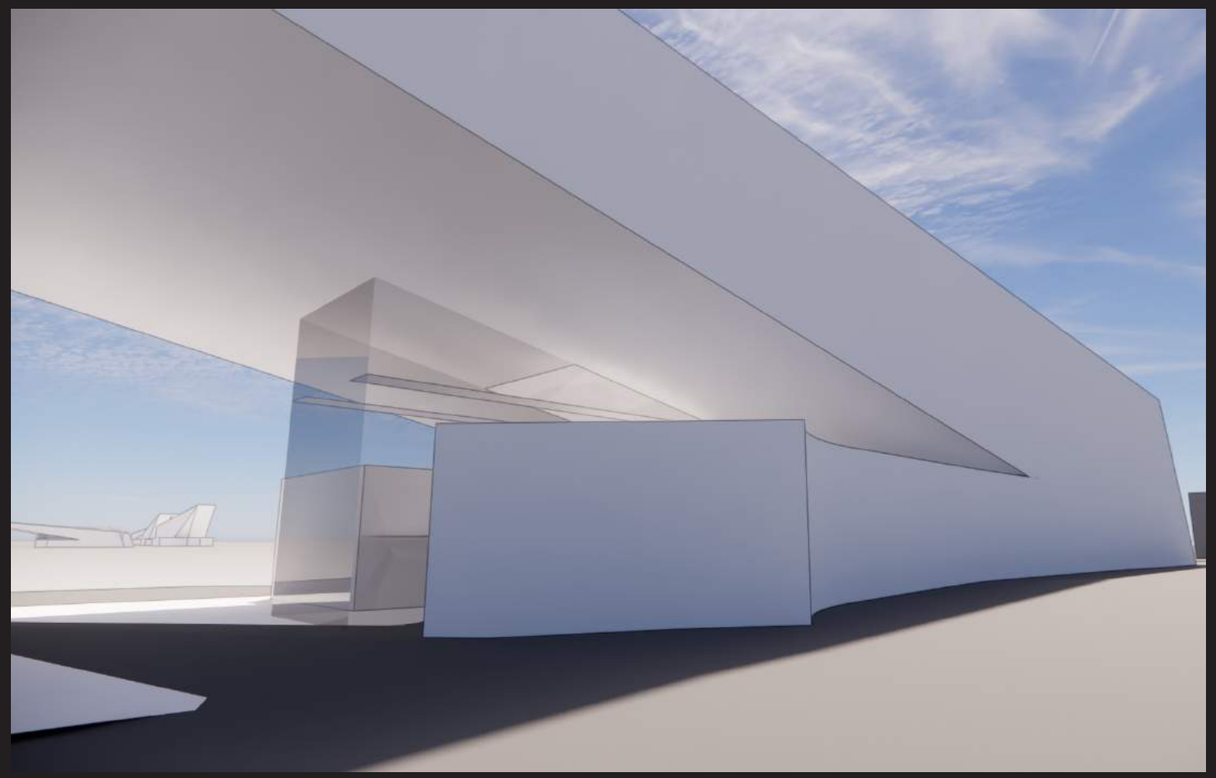


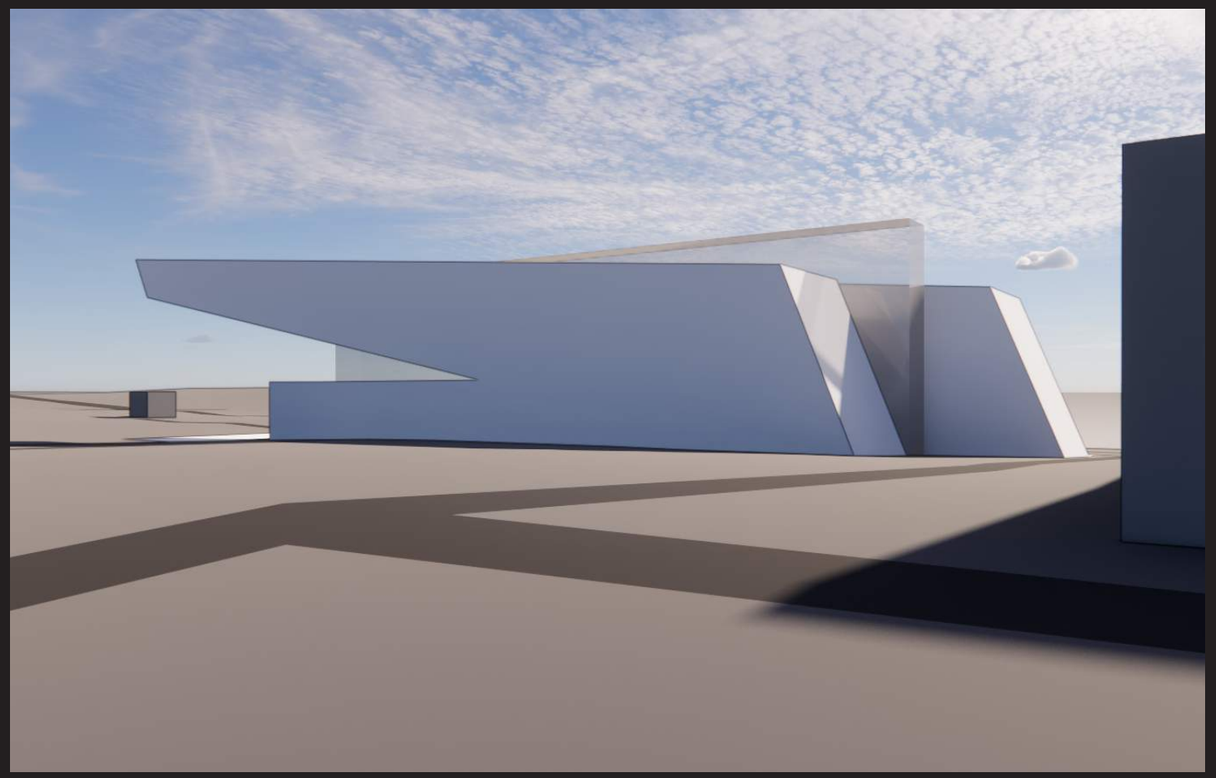


Sketch model





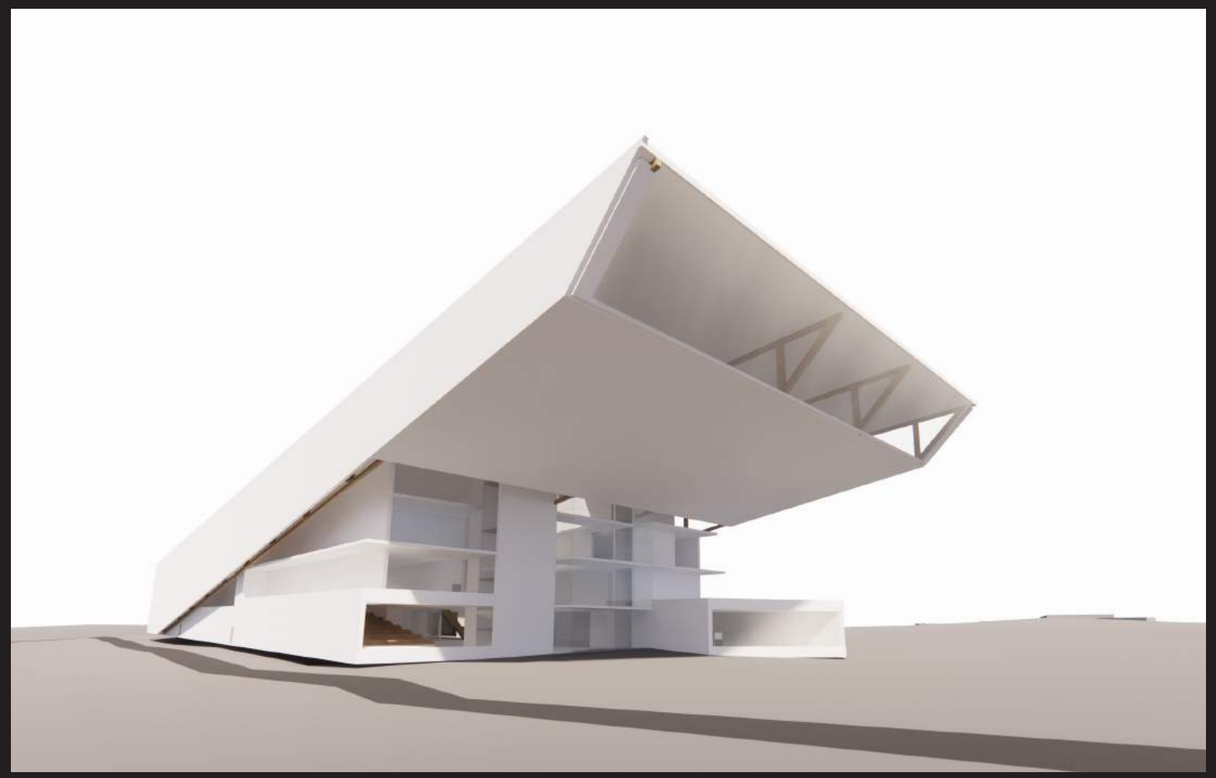




Sketch model



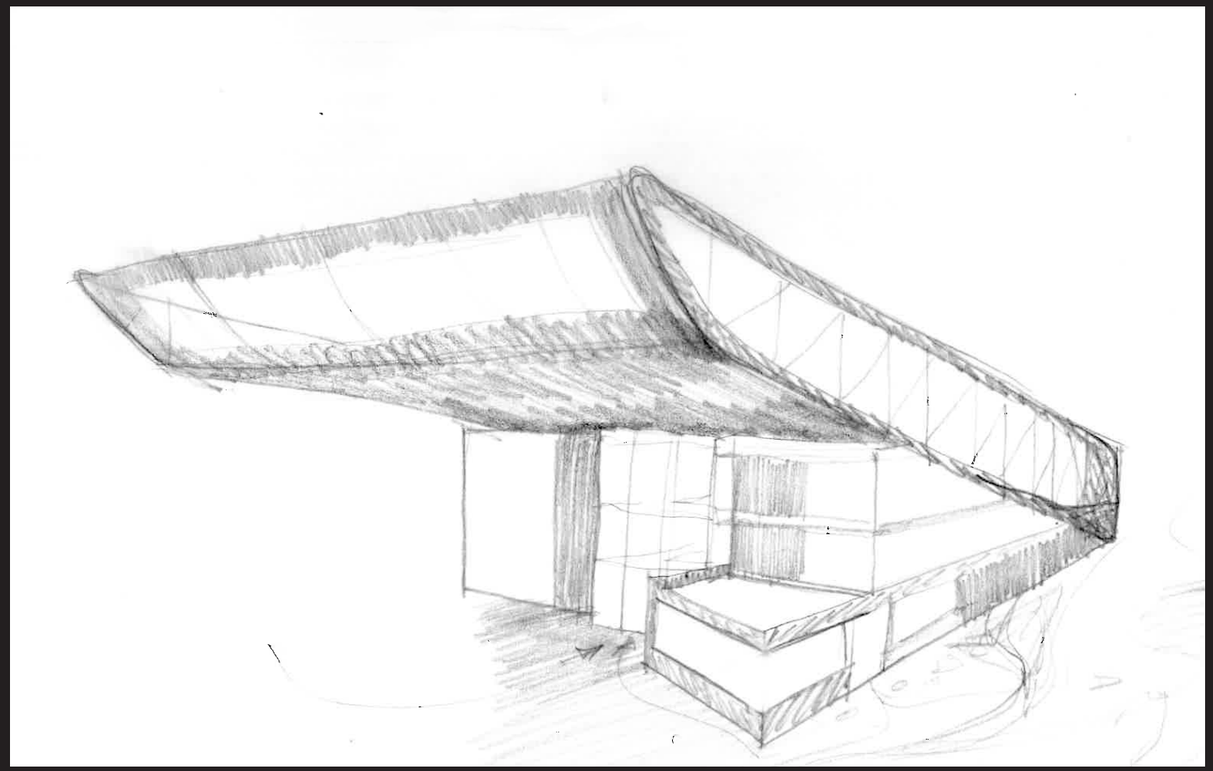




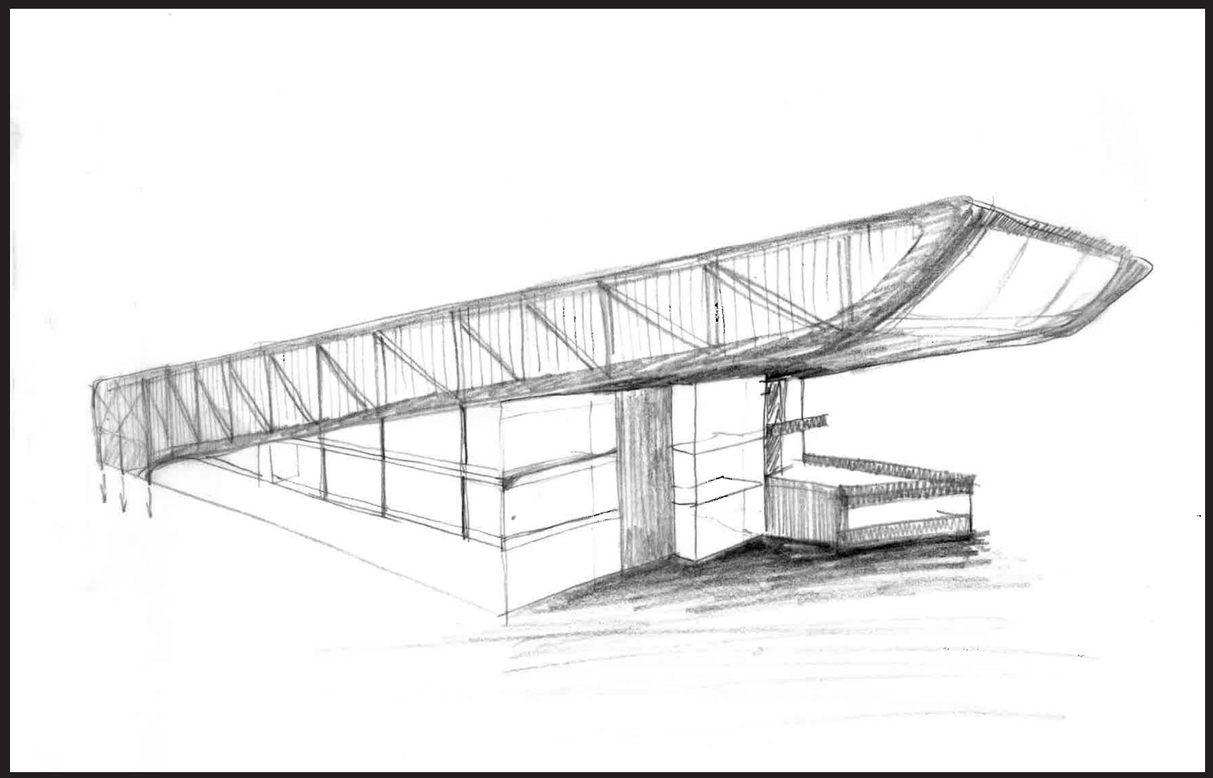


Sketch model










CFM 5C













Further progress:

- structural grid plan
- finished masterplan
- material specification
- facade development
- vision montage
- spacial diagrams
- transition from the outside to the building
- building entrance landscaping

2024.