

IUAV: MASTERS IN ARCHITECTURE - MICHAELLA HADJIHANNA

CHIESA DELLE TERESE
VENEZIA

INTERIOR DESIGN AND STAGING - *PROFESSOR: MARCO MAGNI*

BUILDING PHYSICS AND ENERGY SYSTEMS - *PROFESSOR: MASSIMILIANO SCARPA*

ARCHITECTURAL TECHNOLOGY - *PROFESSOR: DARIO TRABUCCO*

Date: 1688

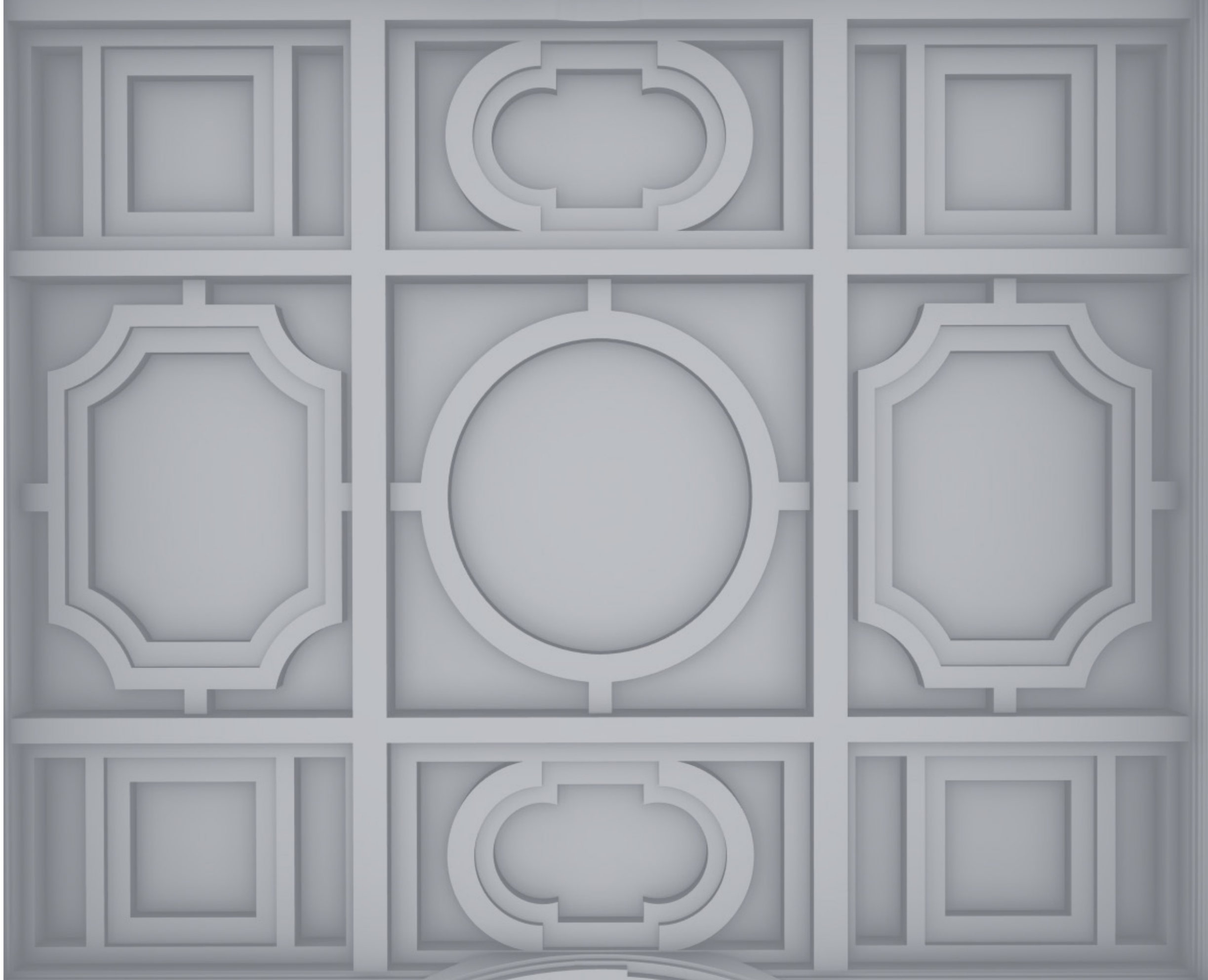
Architect: Cominelli, Andrea

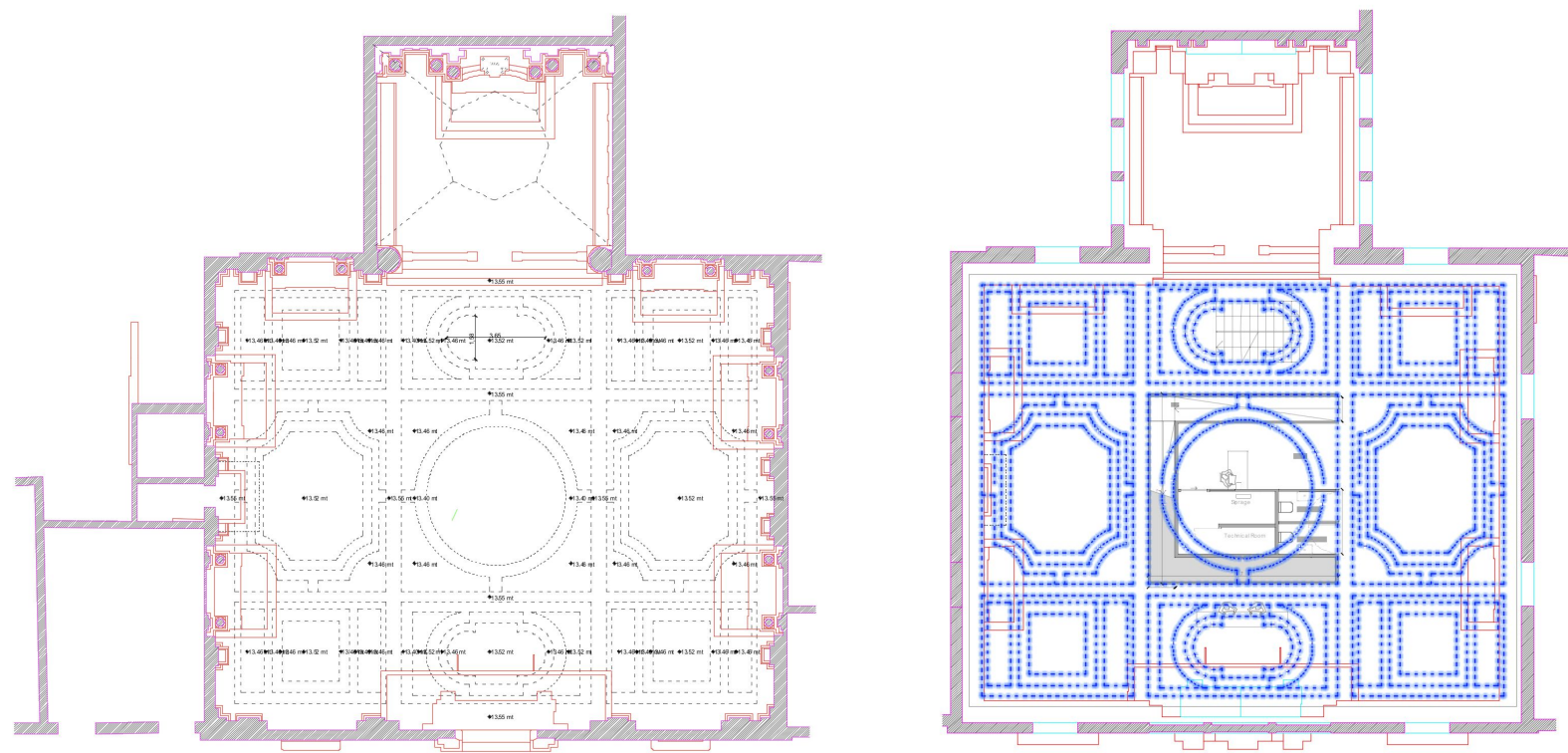
Location: Venice, Dorsoduro

Architectural Style: Italian Baroque

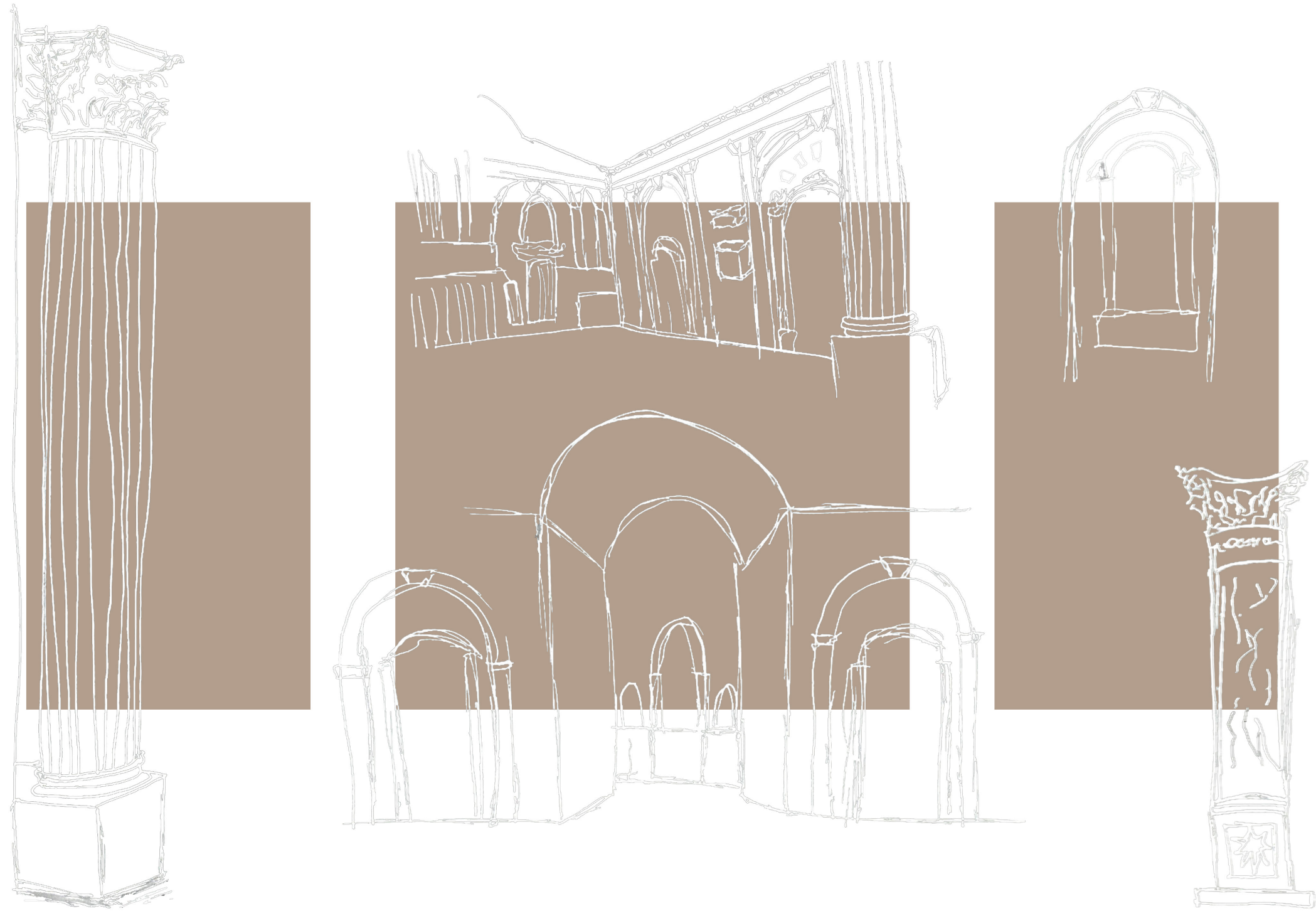


Church of Santa Teresa, Venice:
Longitudinal section: RIBA





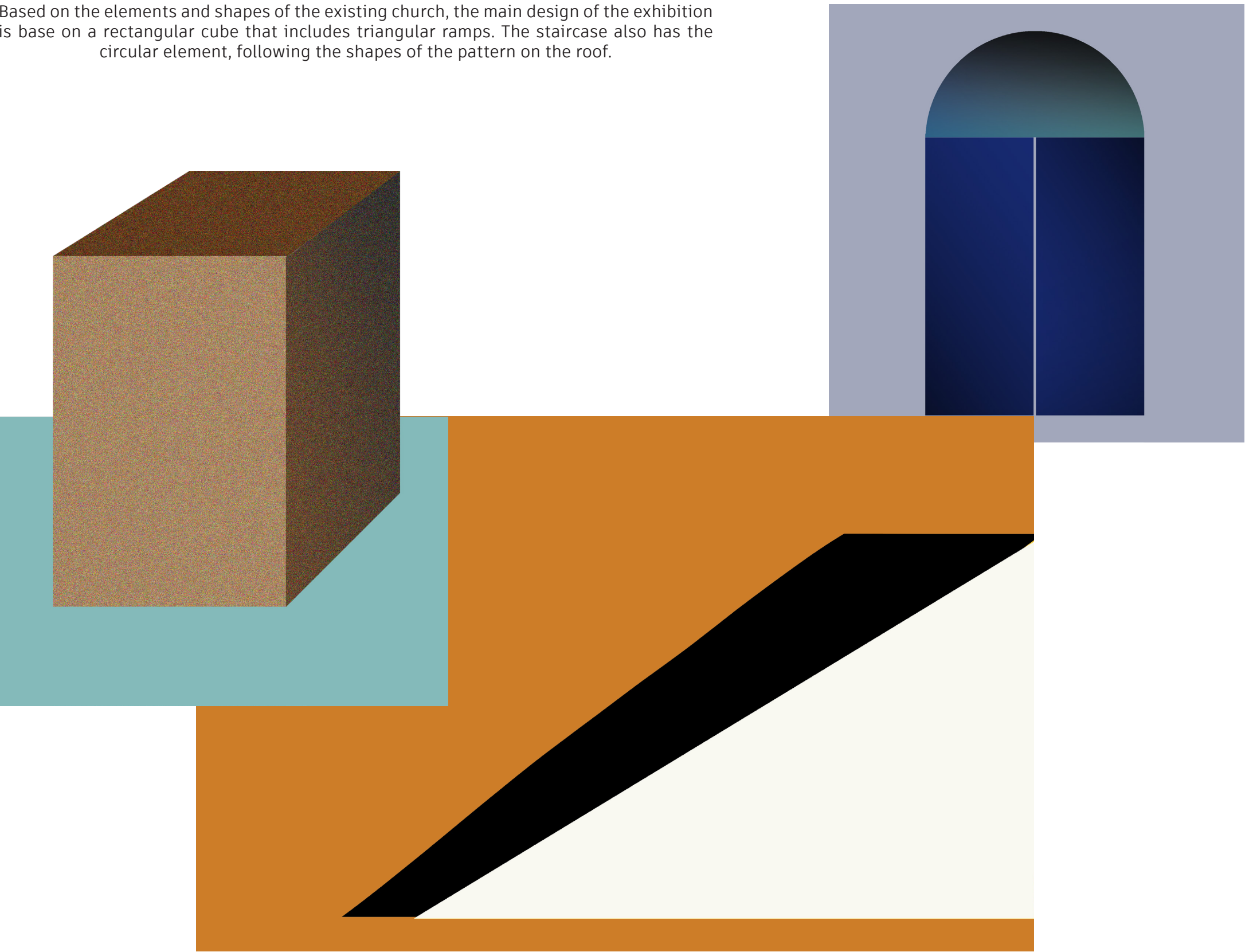
The concept is based on the idea to highlight the decorative pattern of the roof by following the dimensions of the existing roof and designing based on those dimensions and shapes.



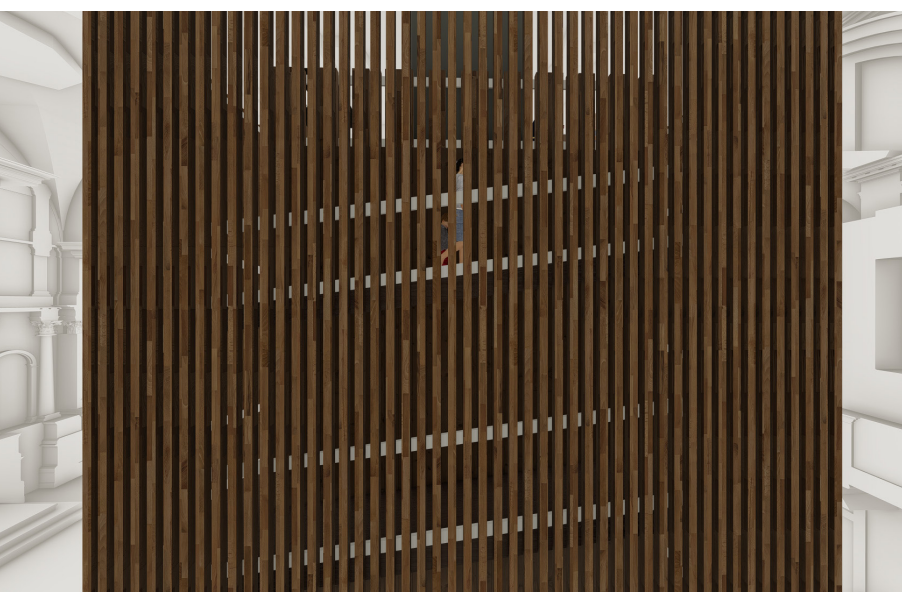
Sketches of architectural elements in the existing church. The brown rectangular shapes in the background represent the roof pattern.,

Shape

Based on the elements and shapes of the existing church, the main design of the exhibition is base on a rectangular cube that includes triangular ramps. The staircase also has the circular element, following the shapes of the pattern on the roof.



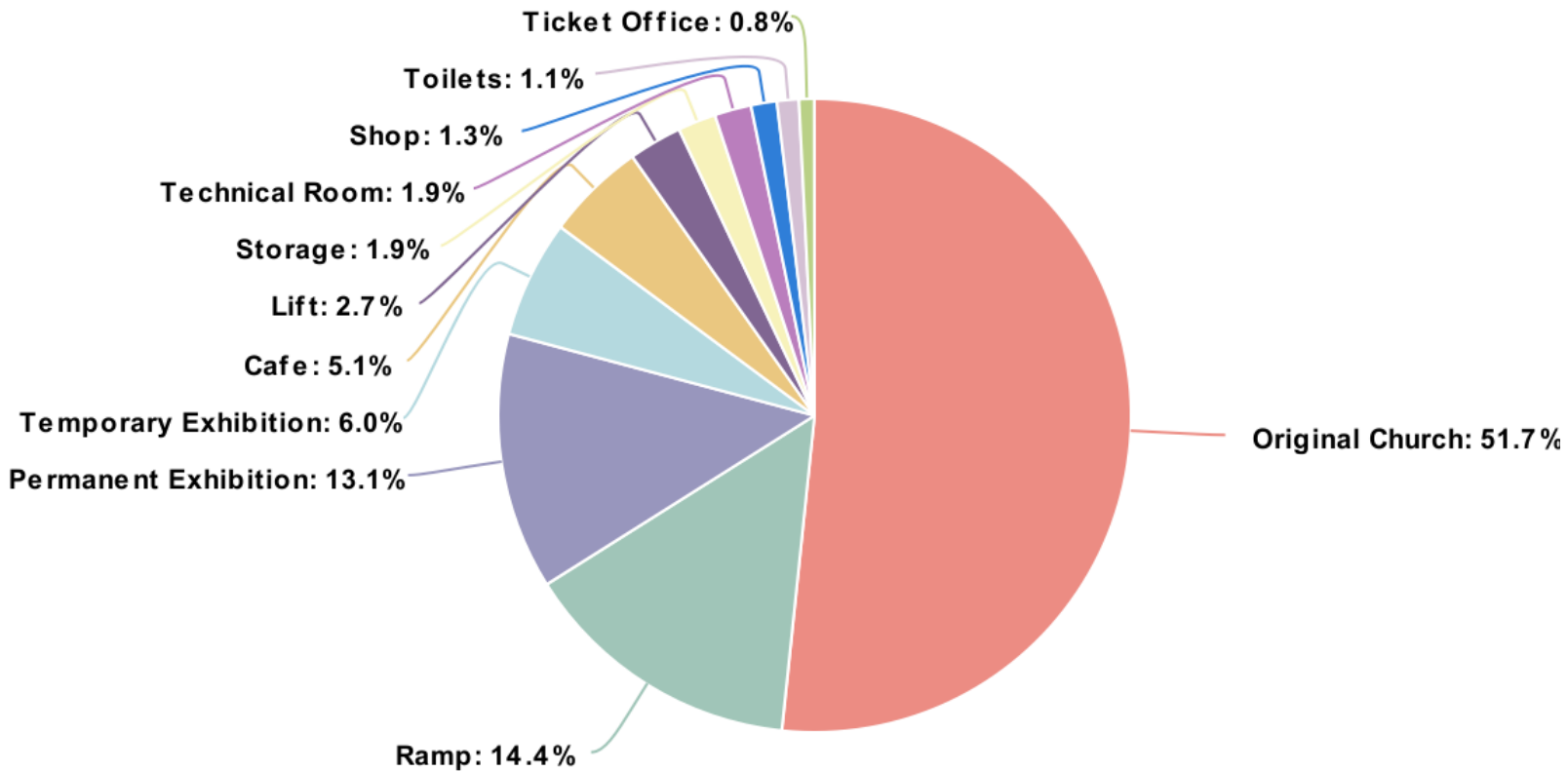
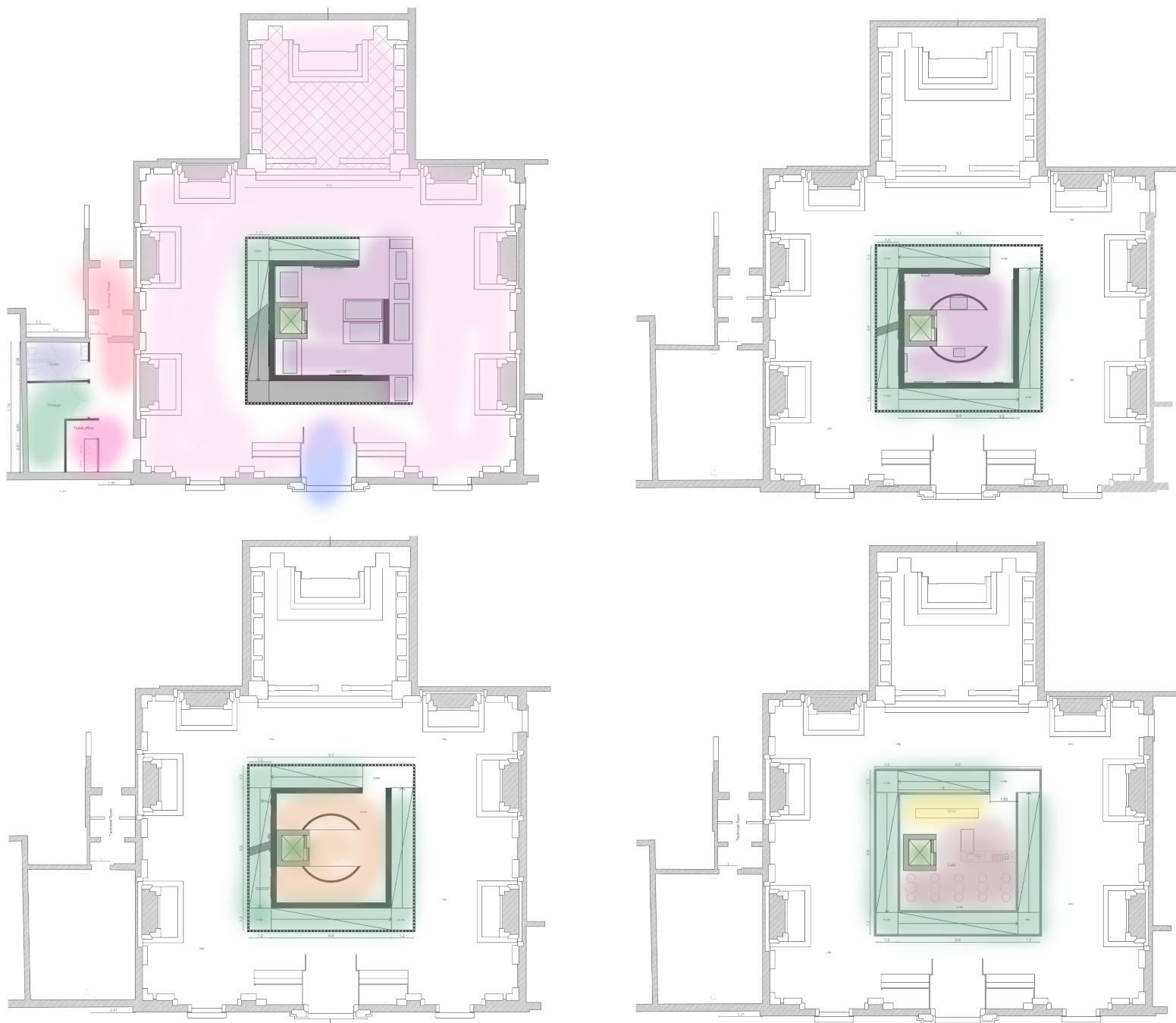
Materiality



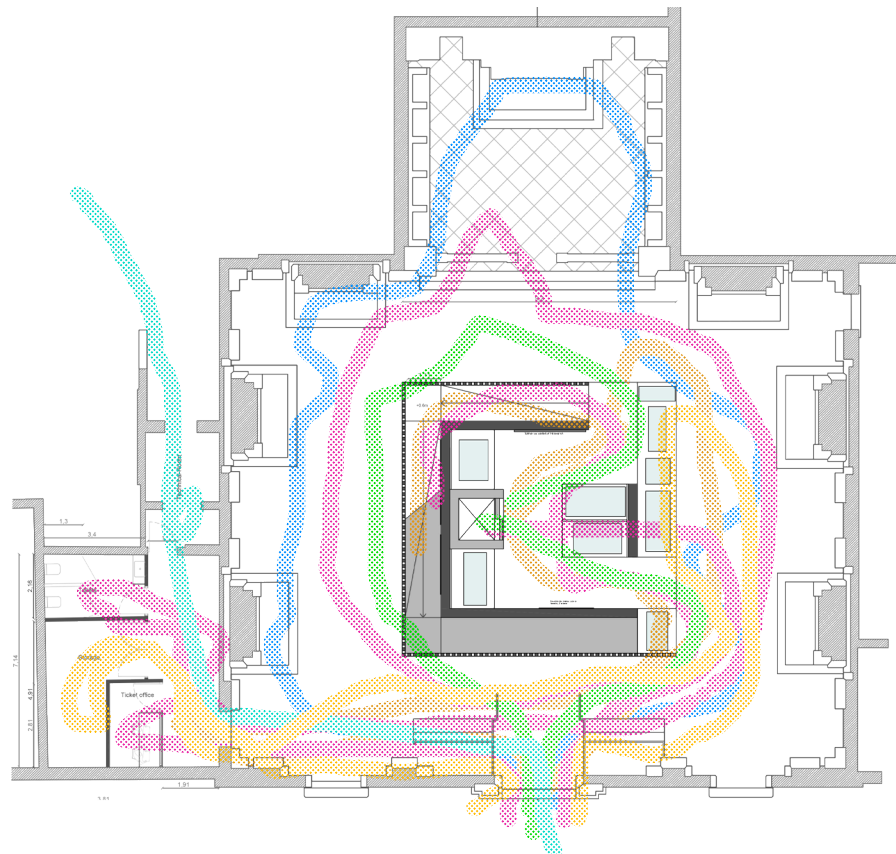
Following the roof materiality, the material for the design is wood



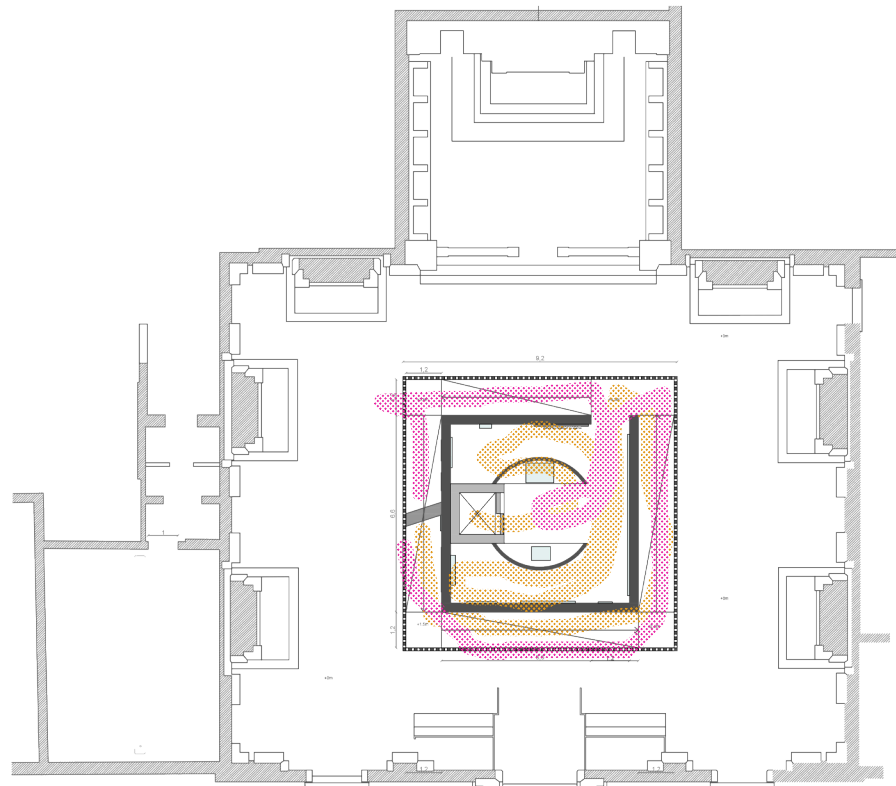
- Entrance
- Ticket office
- Storage
- Viewing Church
- Staircase
- WC
- Technical Room
- Shop
- Lift
- Ramp
- Exhibition
- Temporary Exhibition
- Cafe



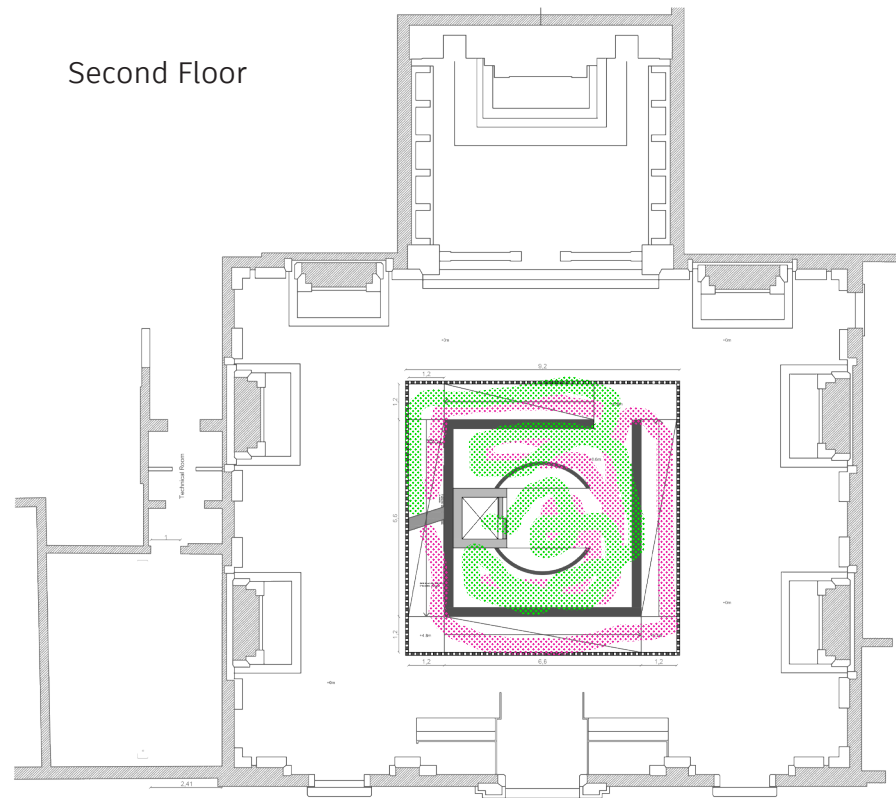
Ground Floor



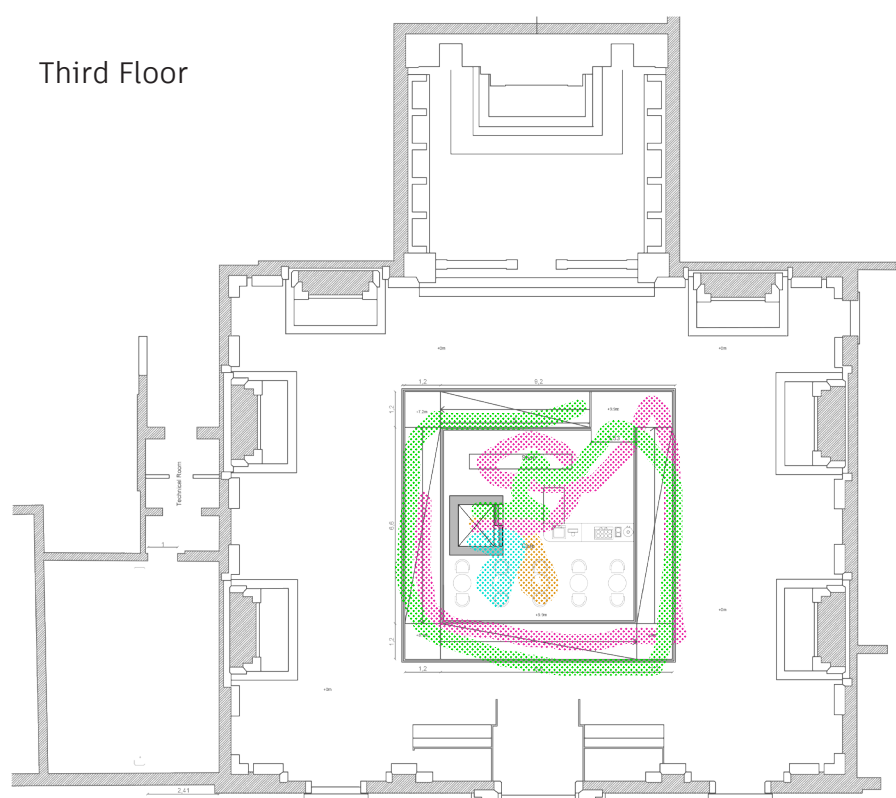
First Floor

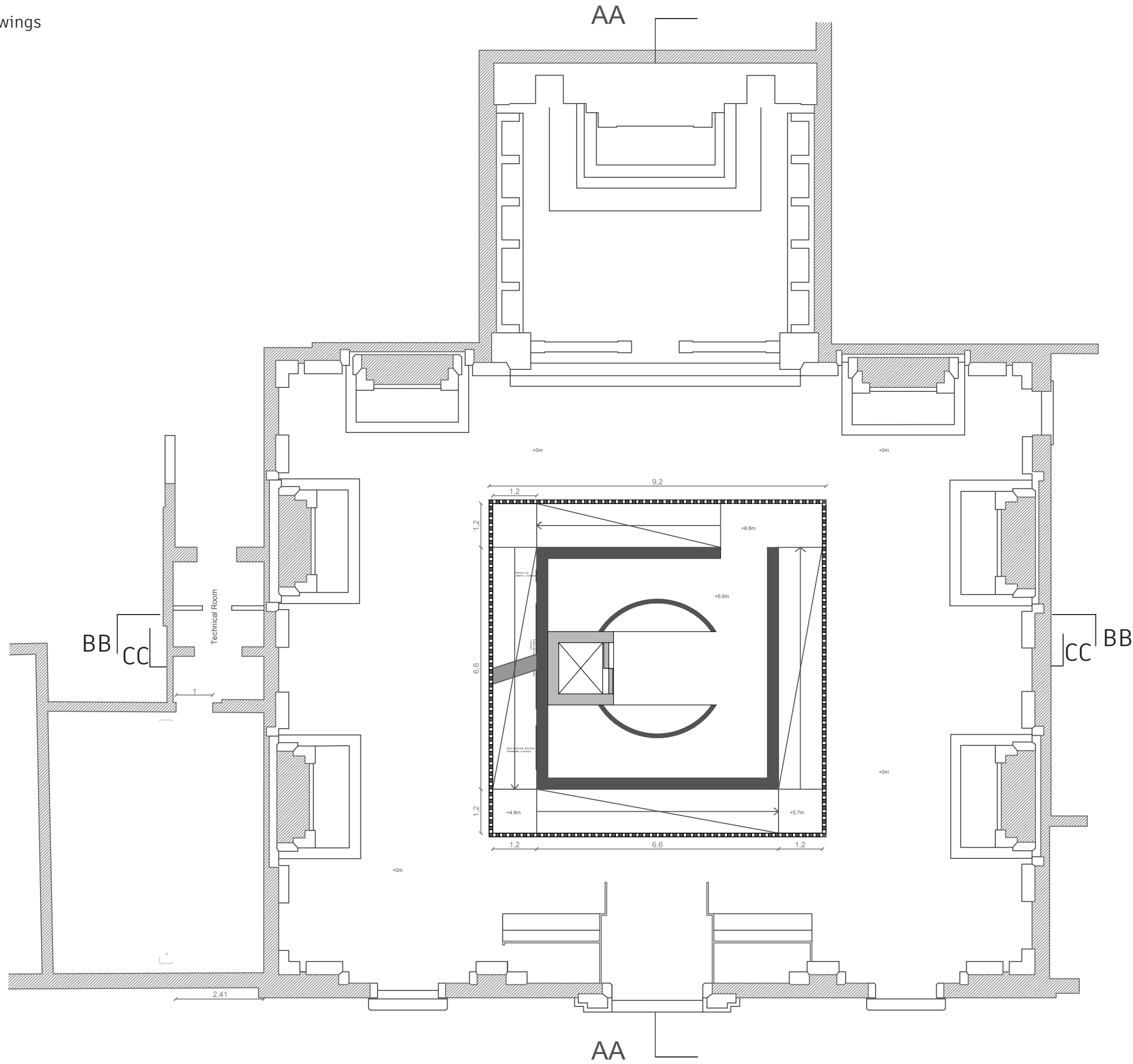


Second Floor



Third Floor





ARCHITECTURE, INTERIOR AND
CREATIVE EXHIBITION DESIGN

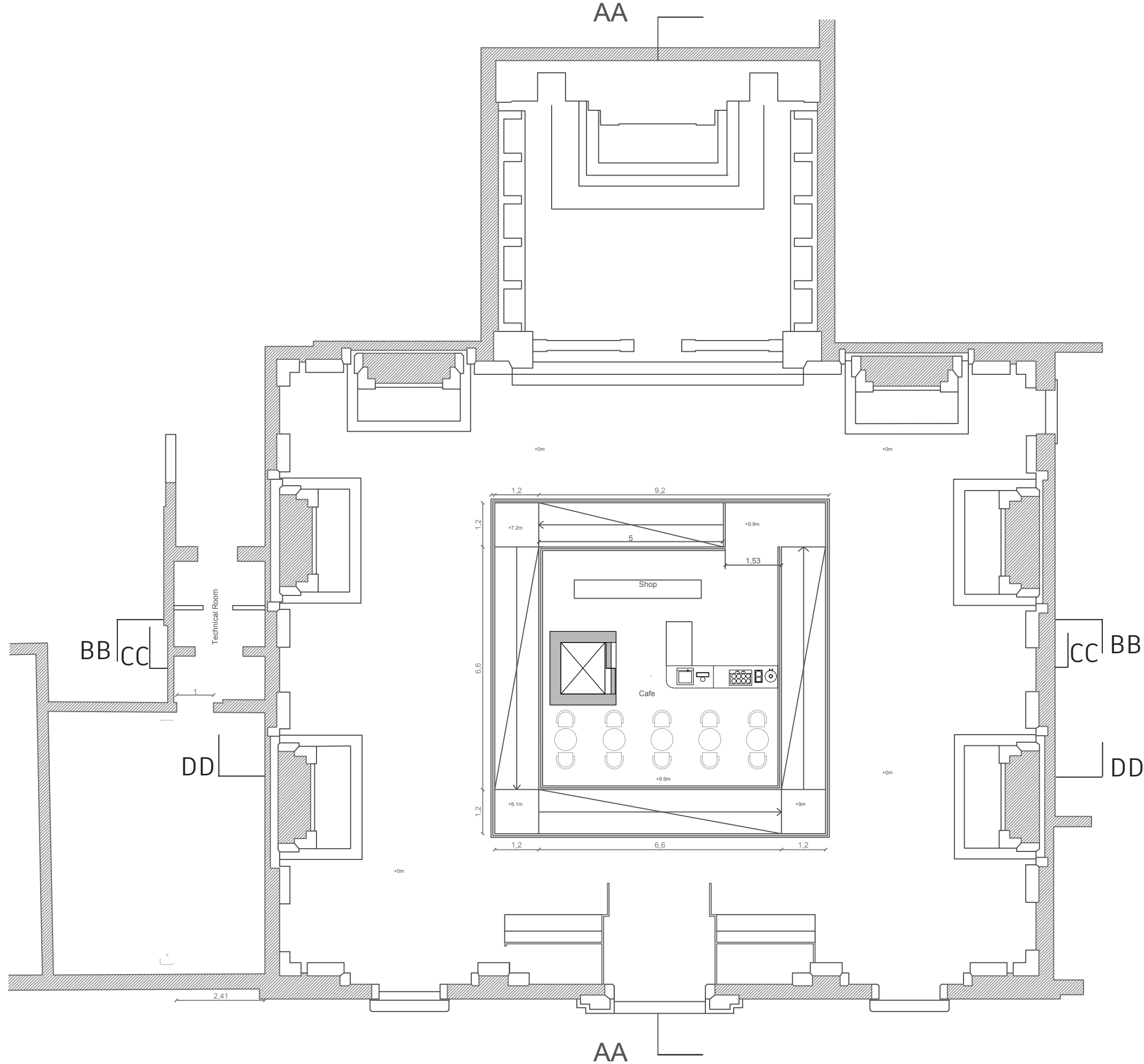
EXHIBITION PROJECT
Chiesa delle Terese, Venezia

Disegni della Chiesa di Santa Teresa in Venezia
realizzati nel 2021 sotto la supervisione del Prof.
Guido Morpurgo dall'Arch. Matteo Isacco, sulla
base dei rilievi effettuati dal Prof. Giuseppe
Cristinelli nel 1992 •
Student: Michaela Hadjilhamia

Second Floor PLAN +6.60m
1:100



0 1 5 m



ARCHITECTURE, INTERIOR AND
CREATIVE EXHIBITION DESIGN

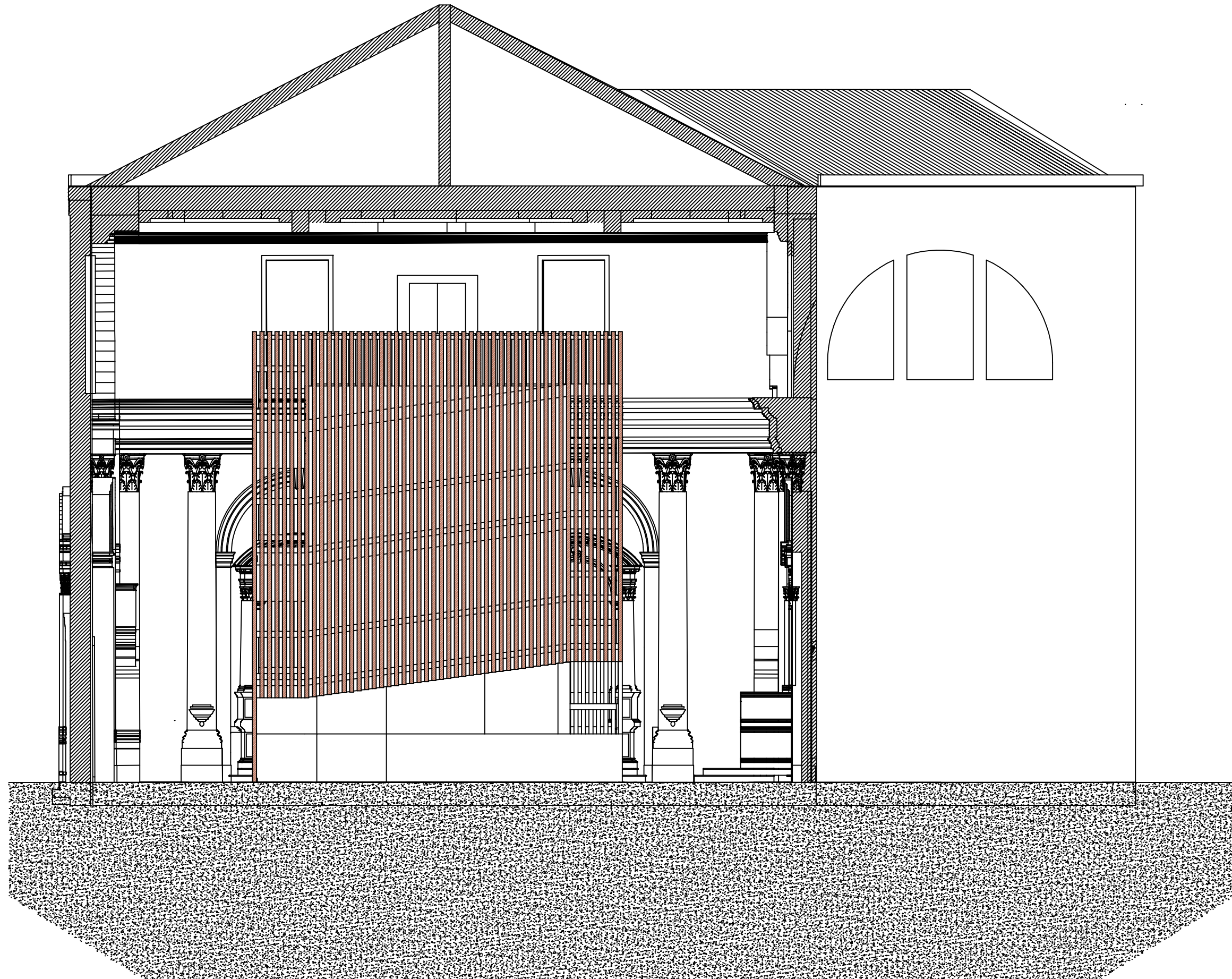
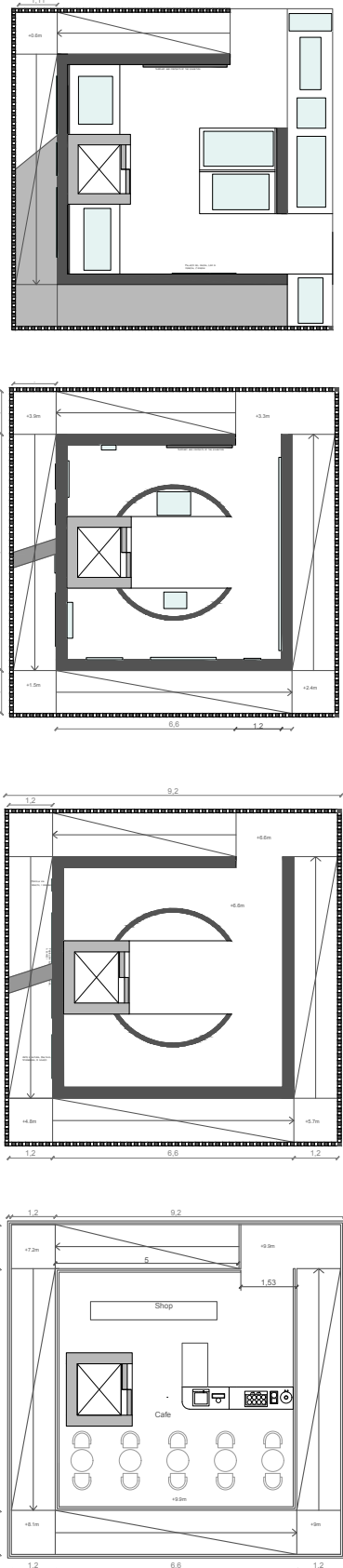
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Third Floor PLAN +9.90m
1:100



0 1 5 m

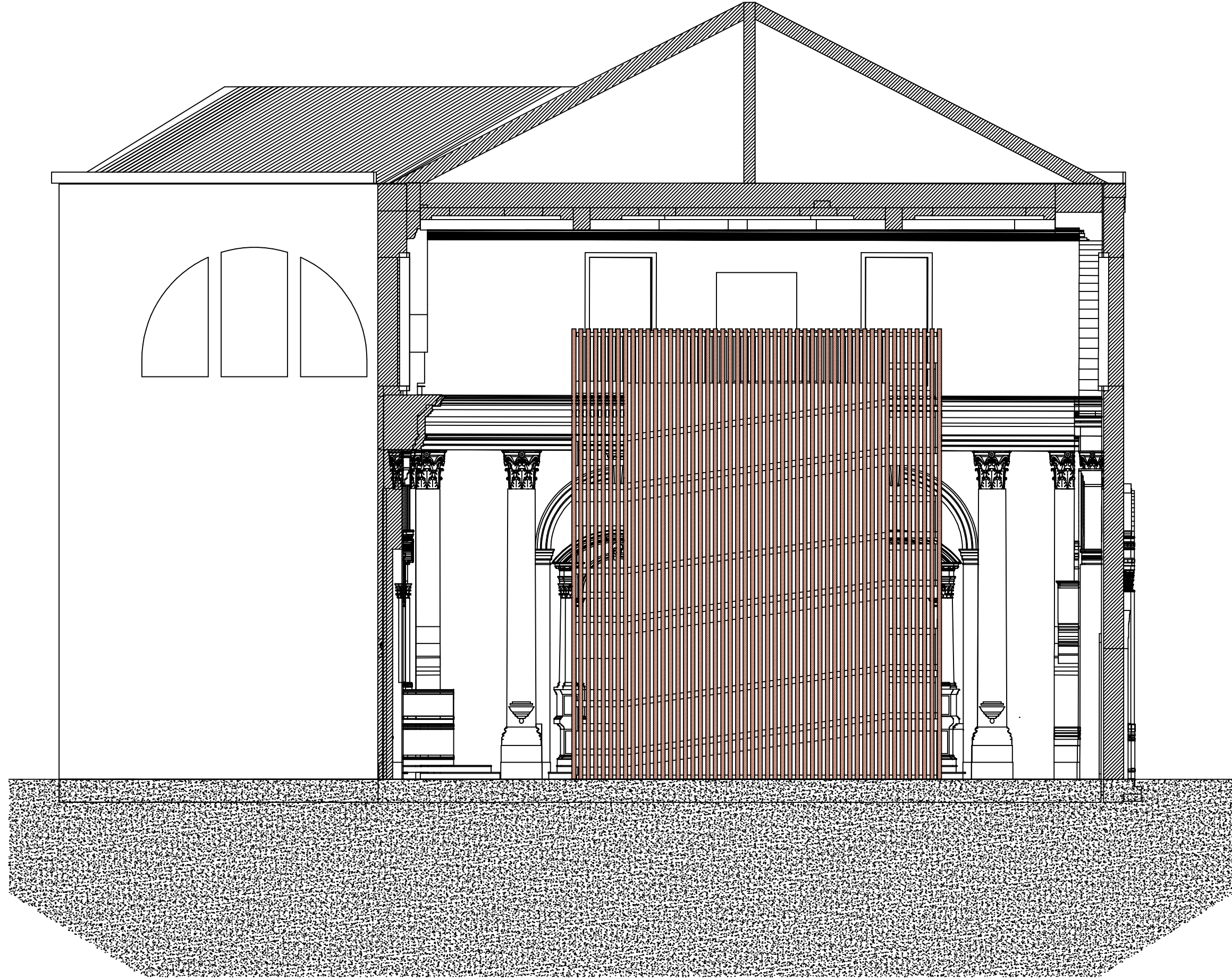
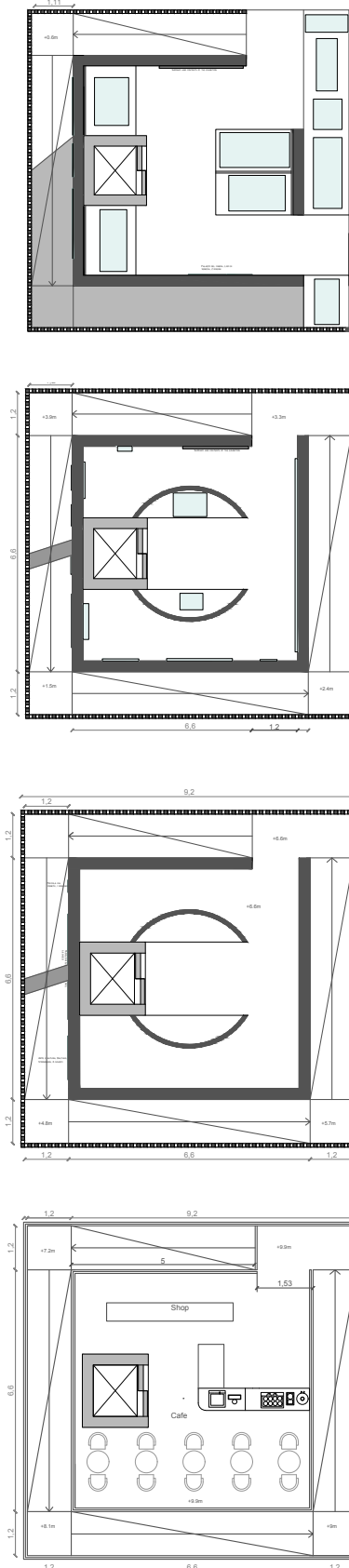


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Right Elevation 1:100



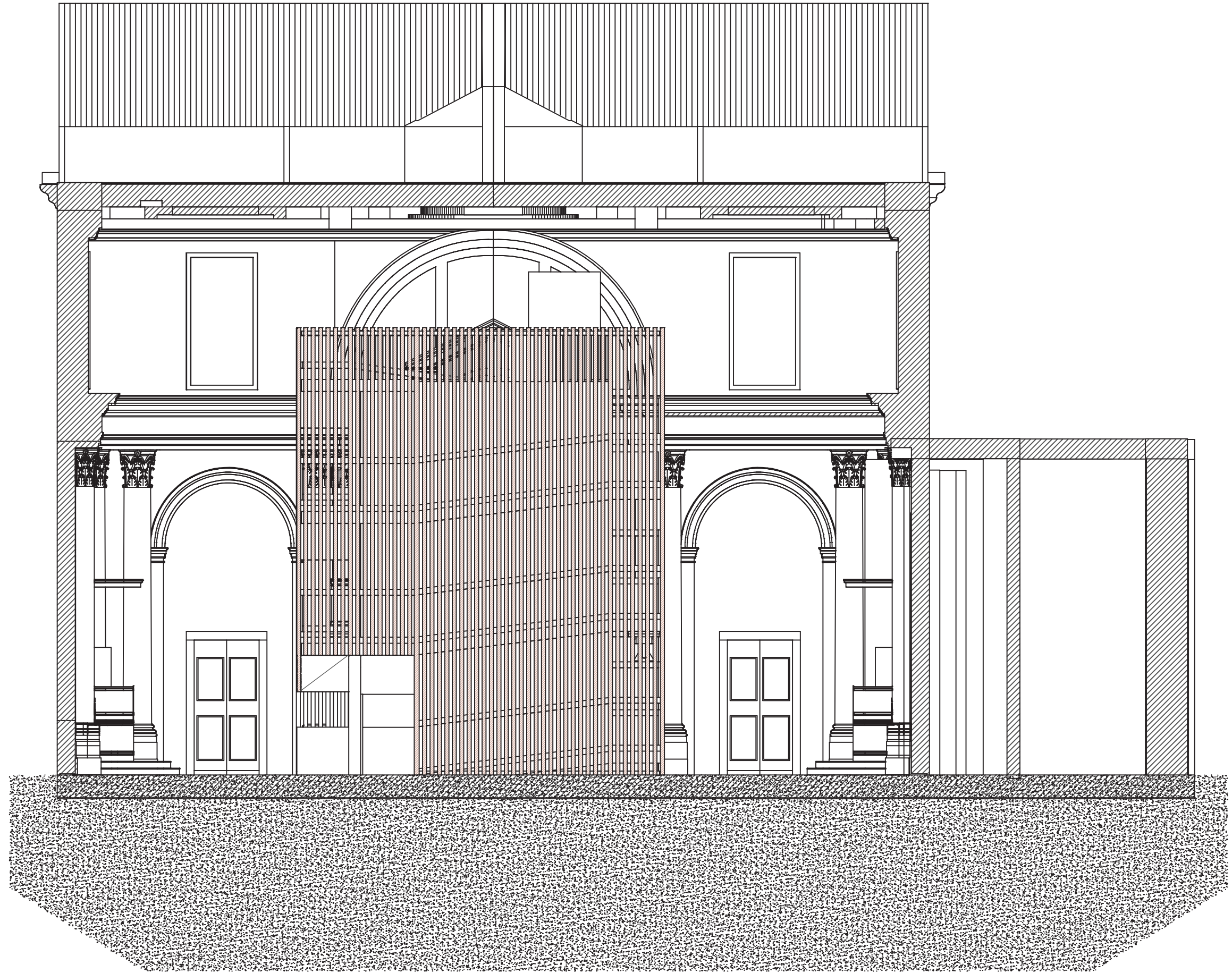
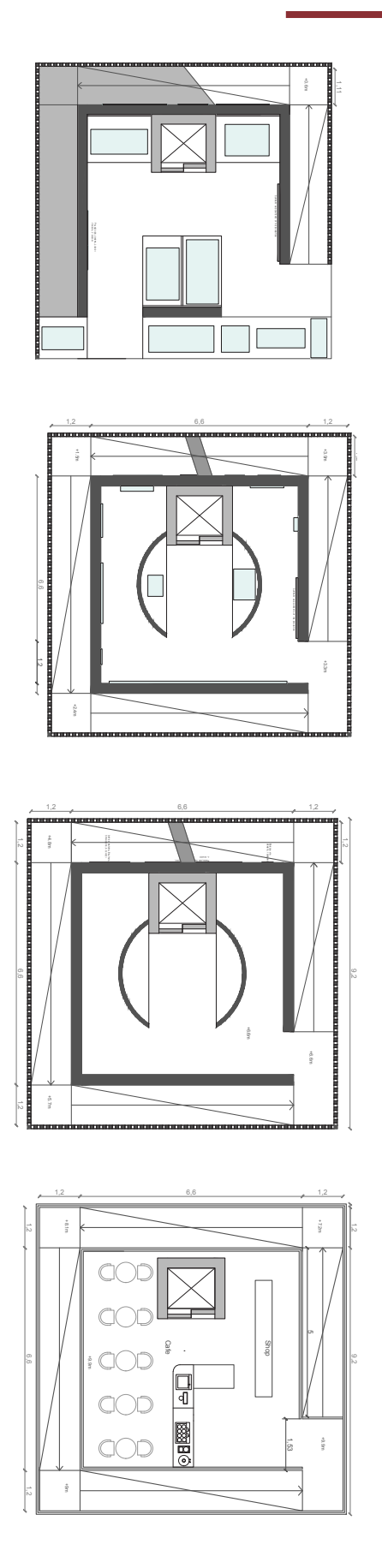
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Left Elevation 1:100



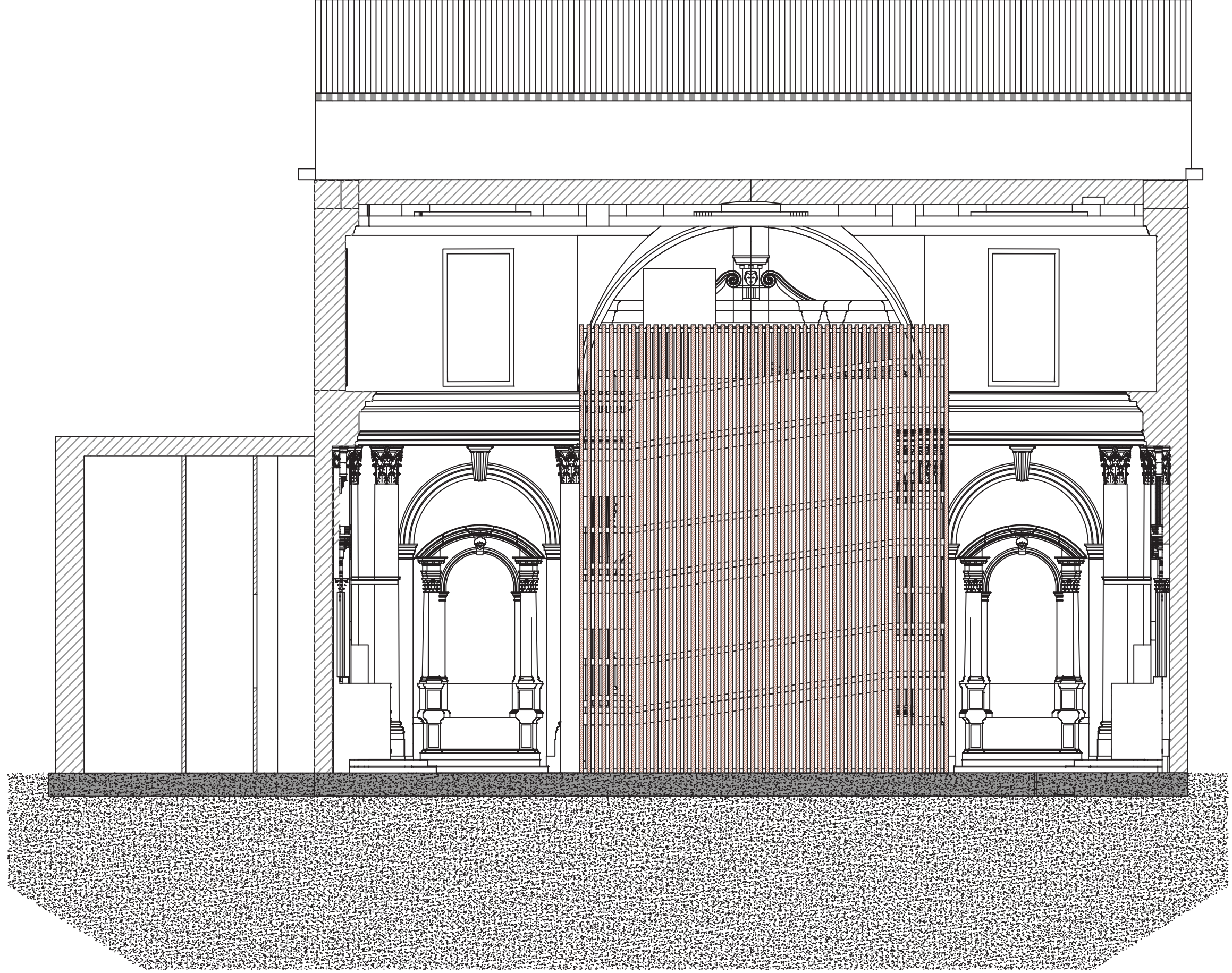
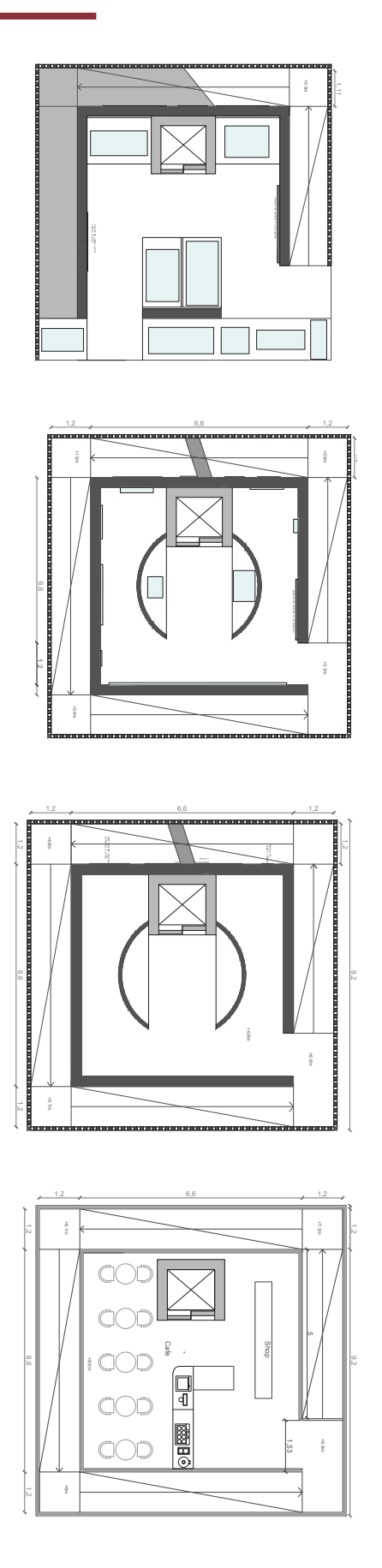


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Student: Michaela Hadjilhamna

Rear Elevation 1:100



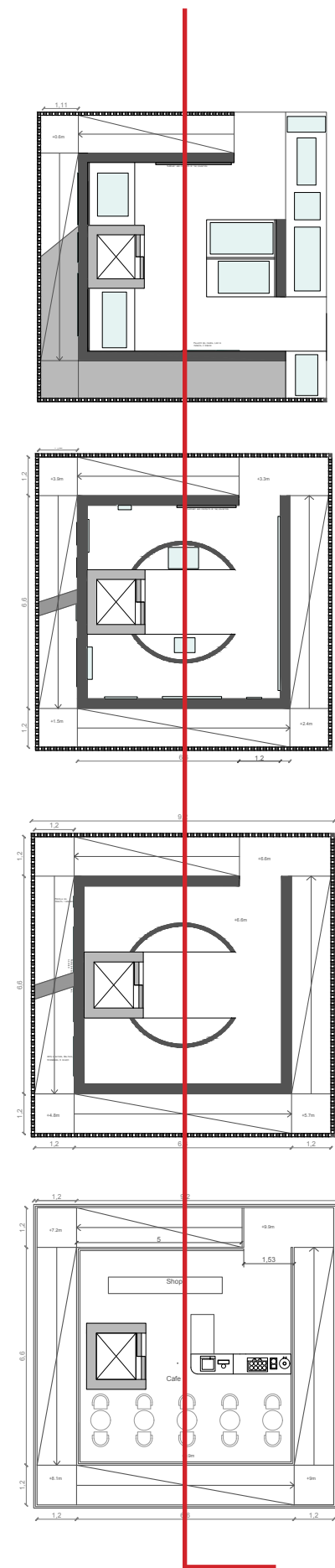
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CREATIVE EXHIBITION DESIGN

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Front Elevation 1:100

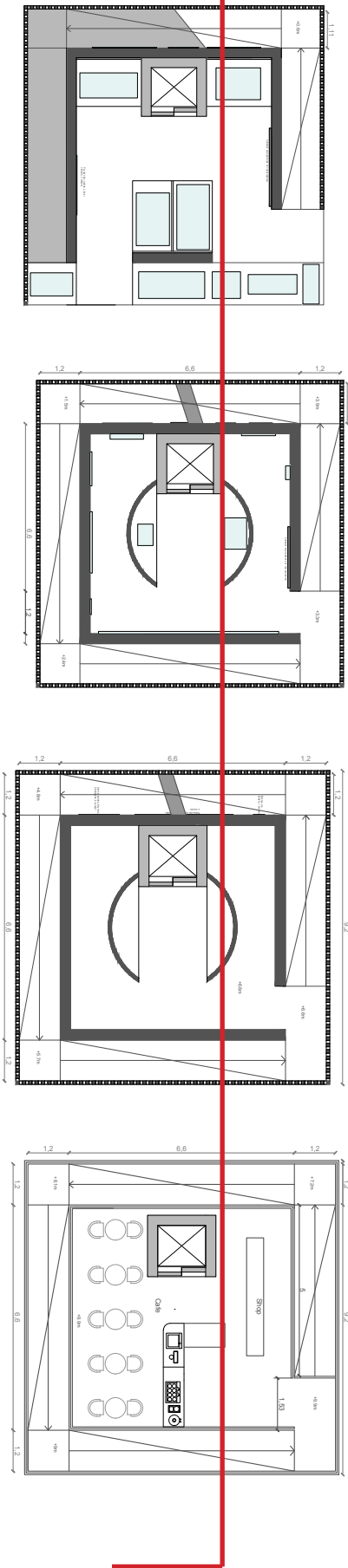


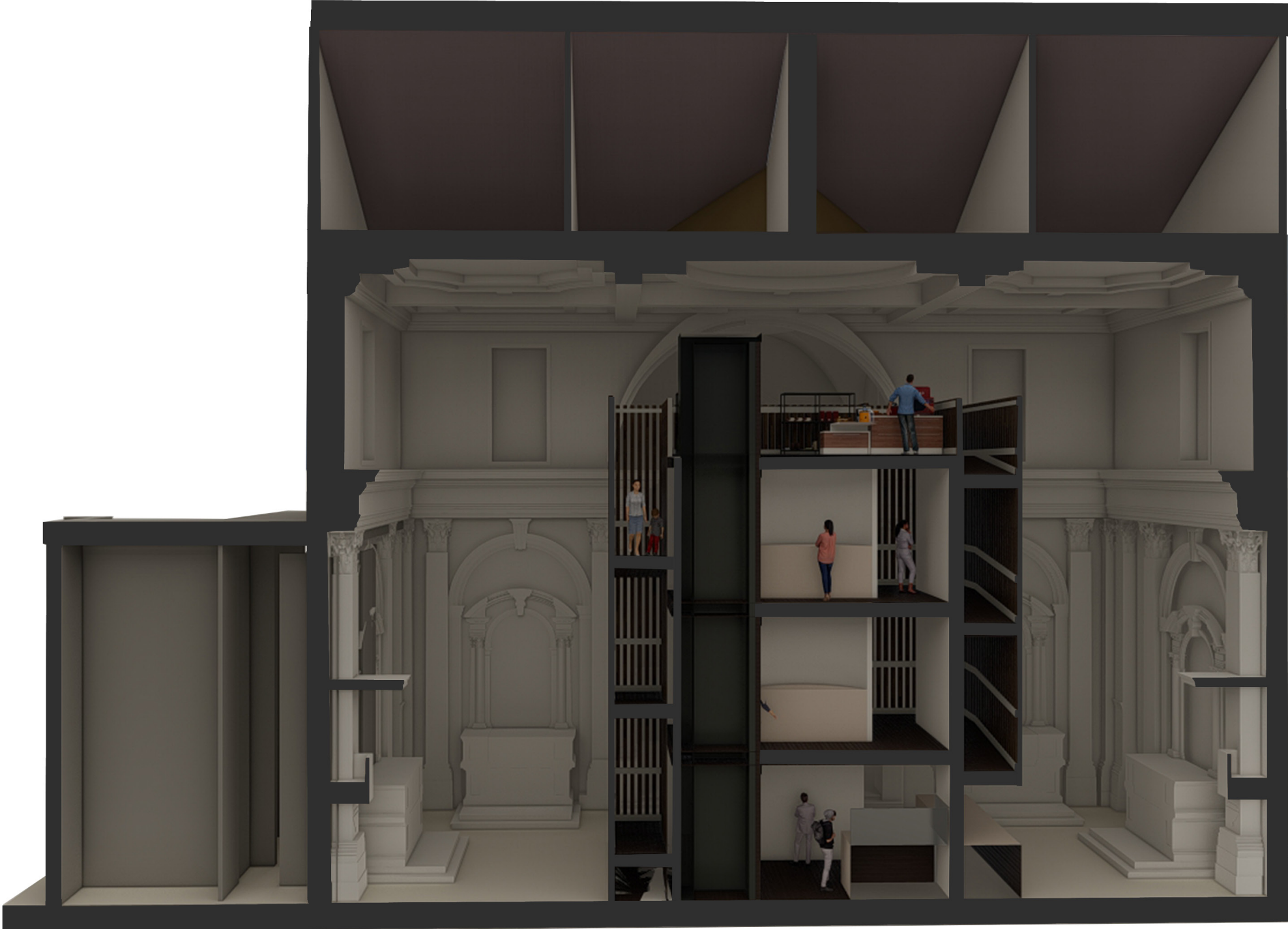
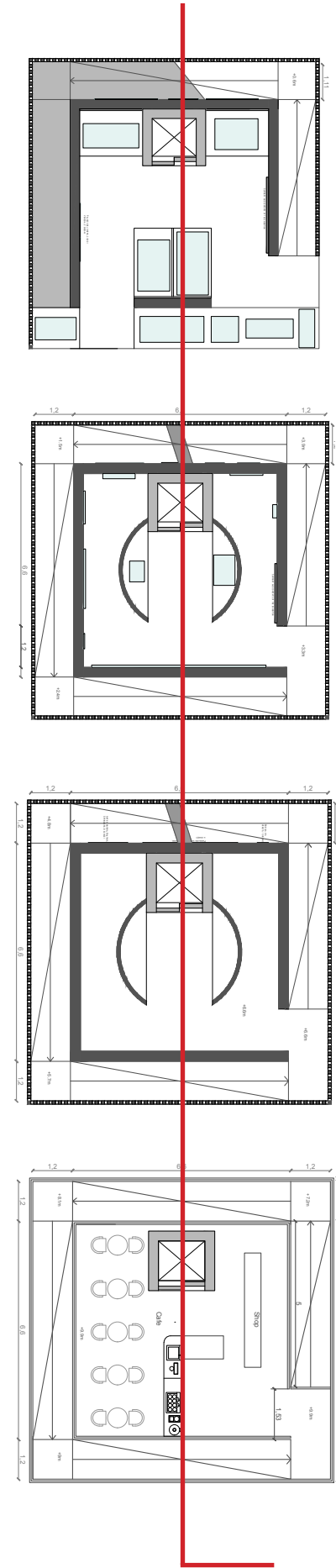


Section AA
1:100

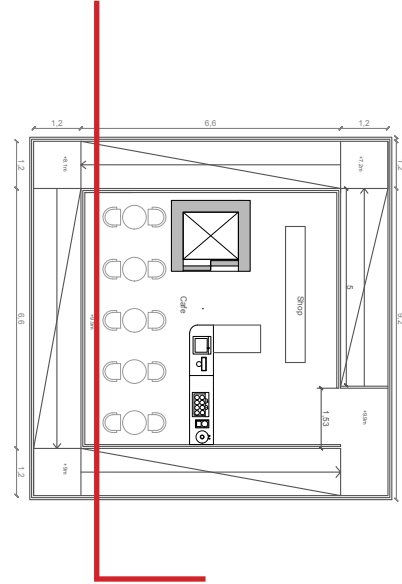


Section BB
1:100





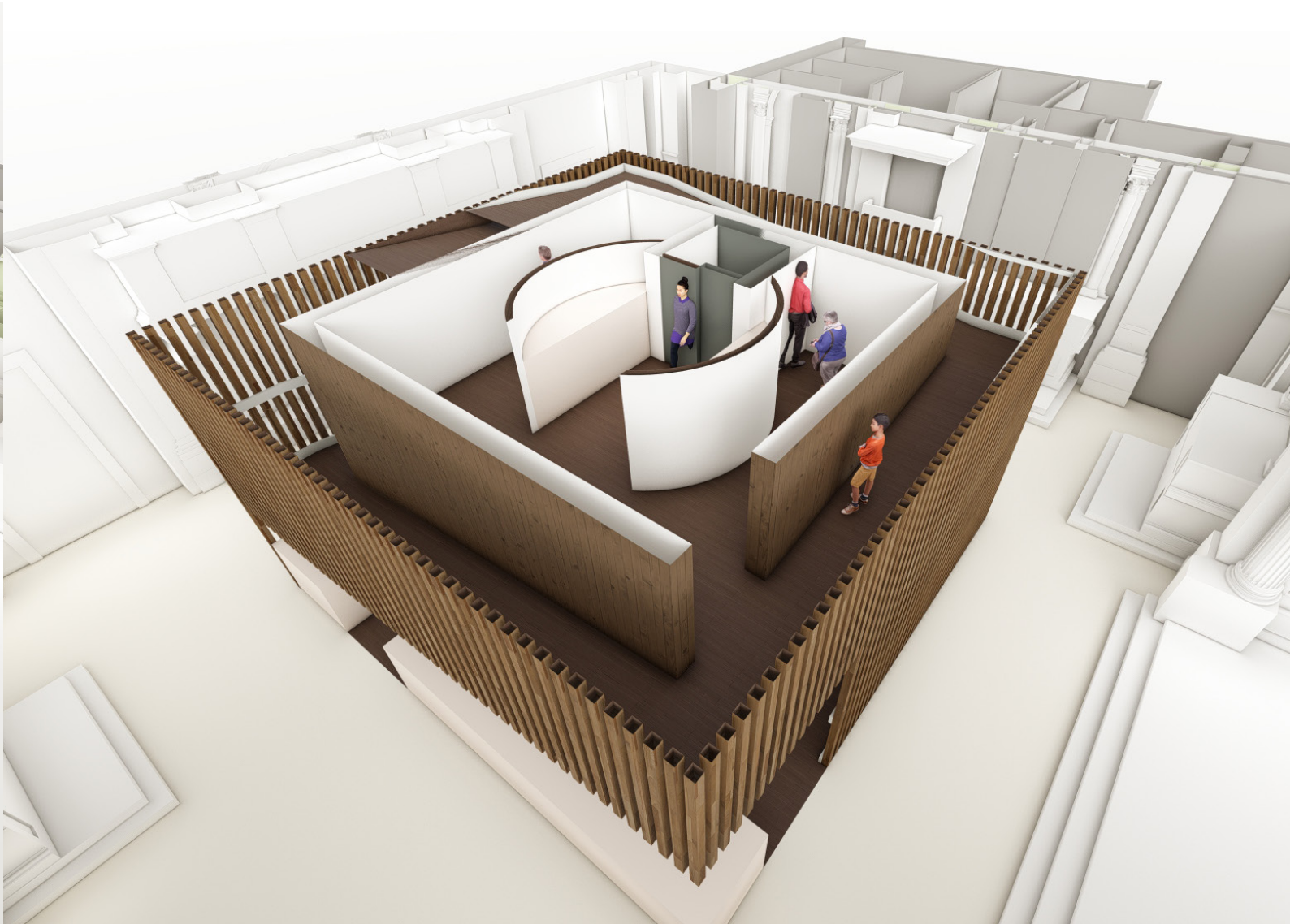
Section CC
1:100



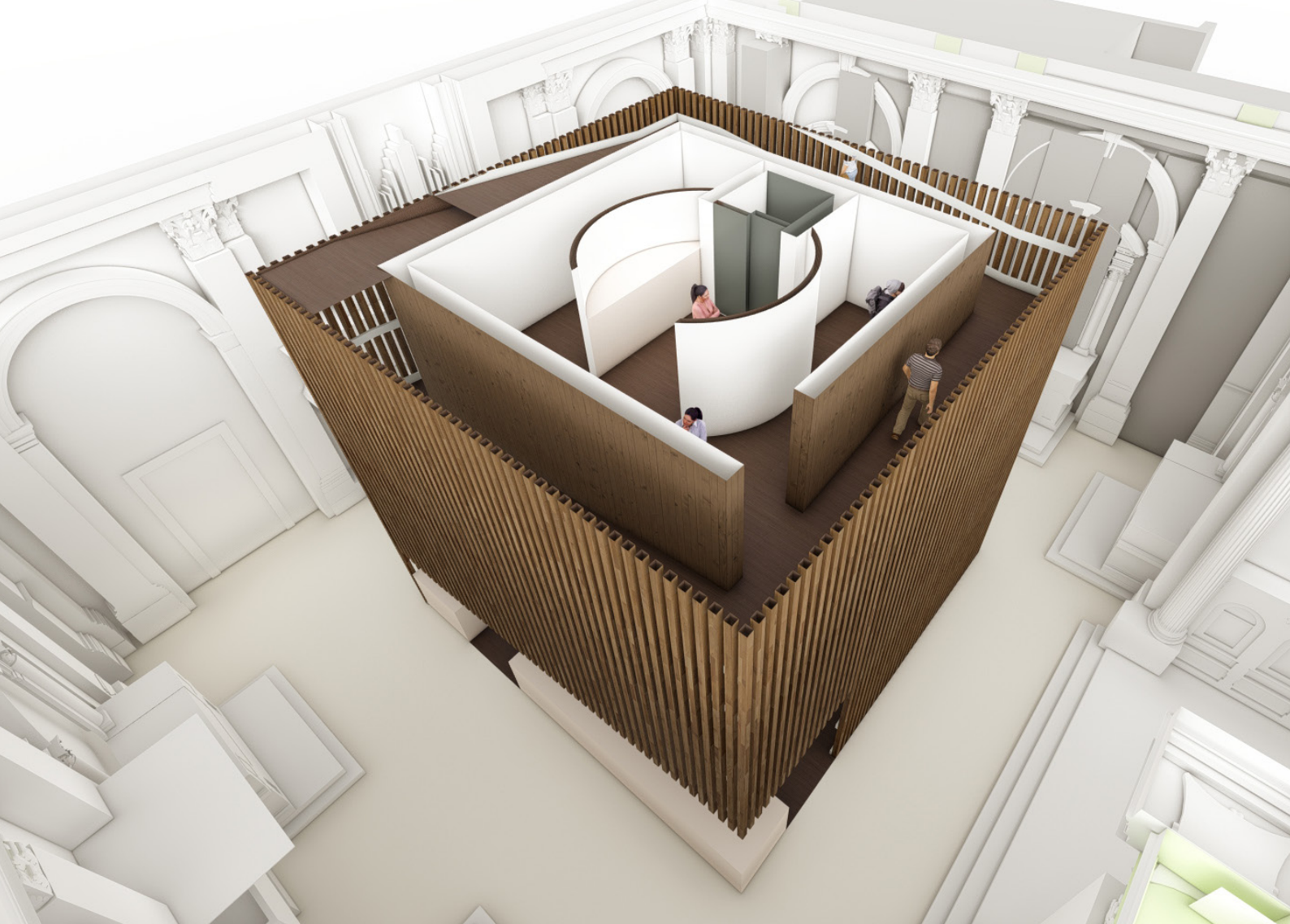
Section DD
1:25



Ground Floor



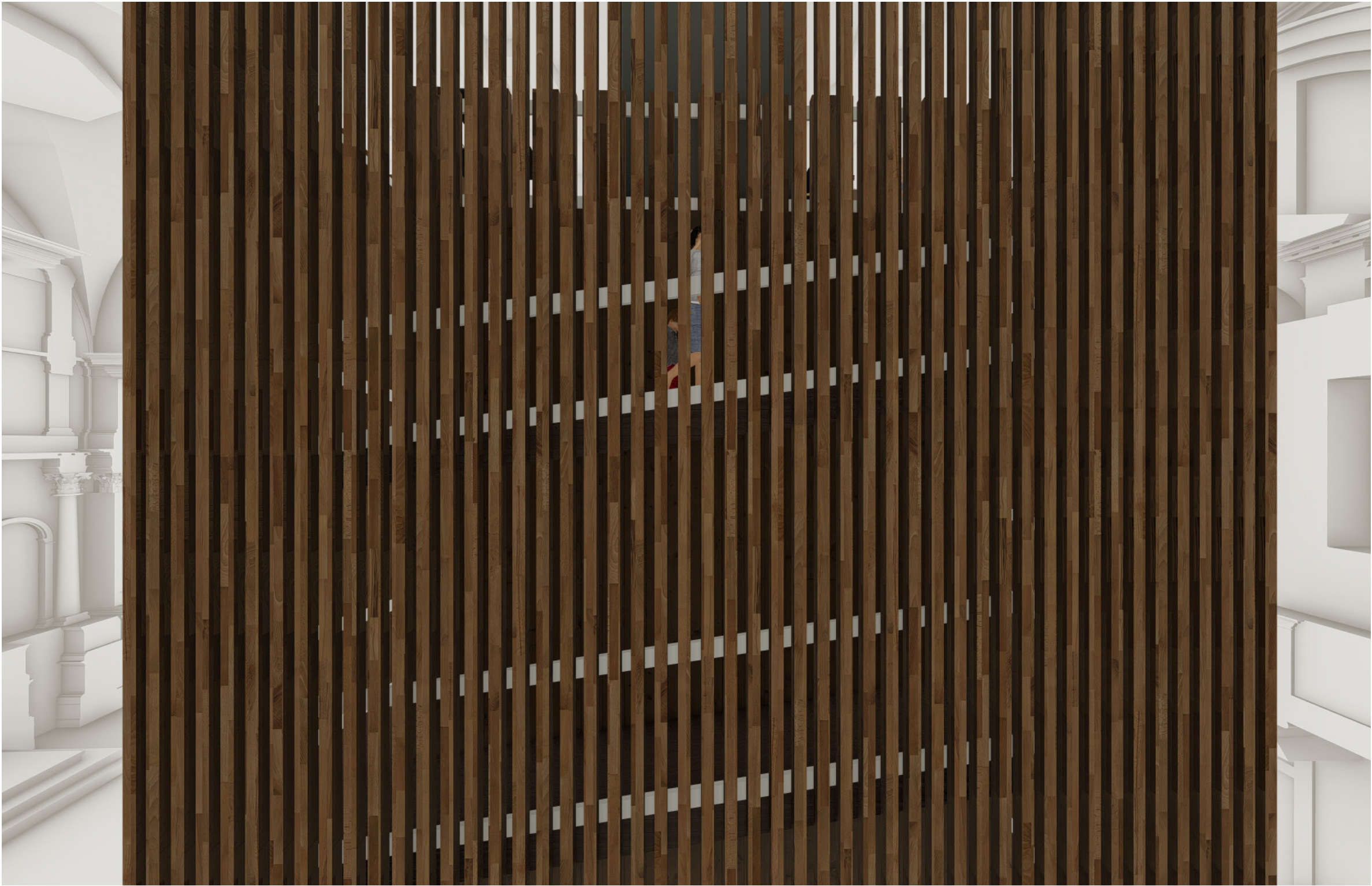
First Floor

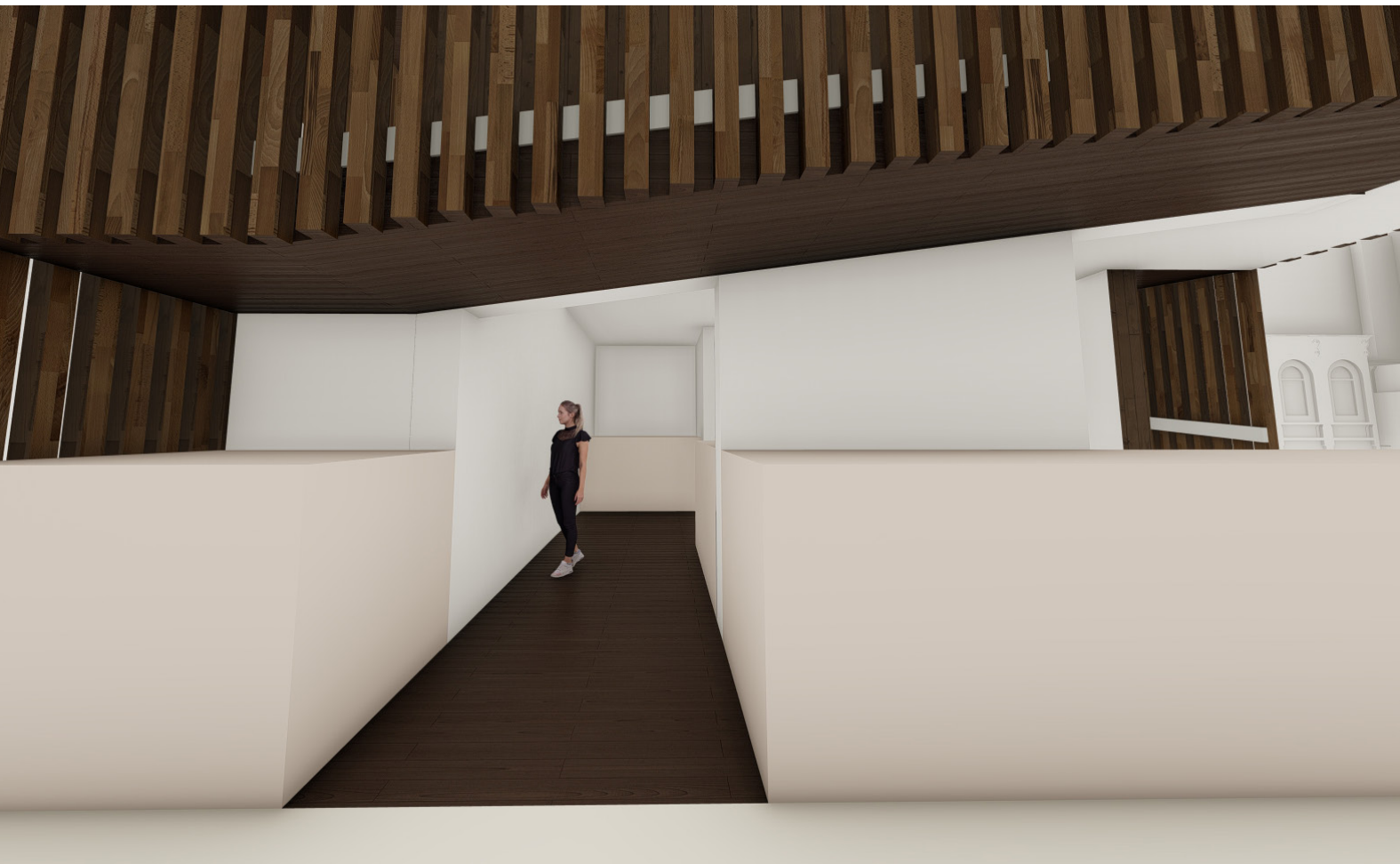
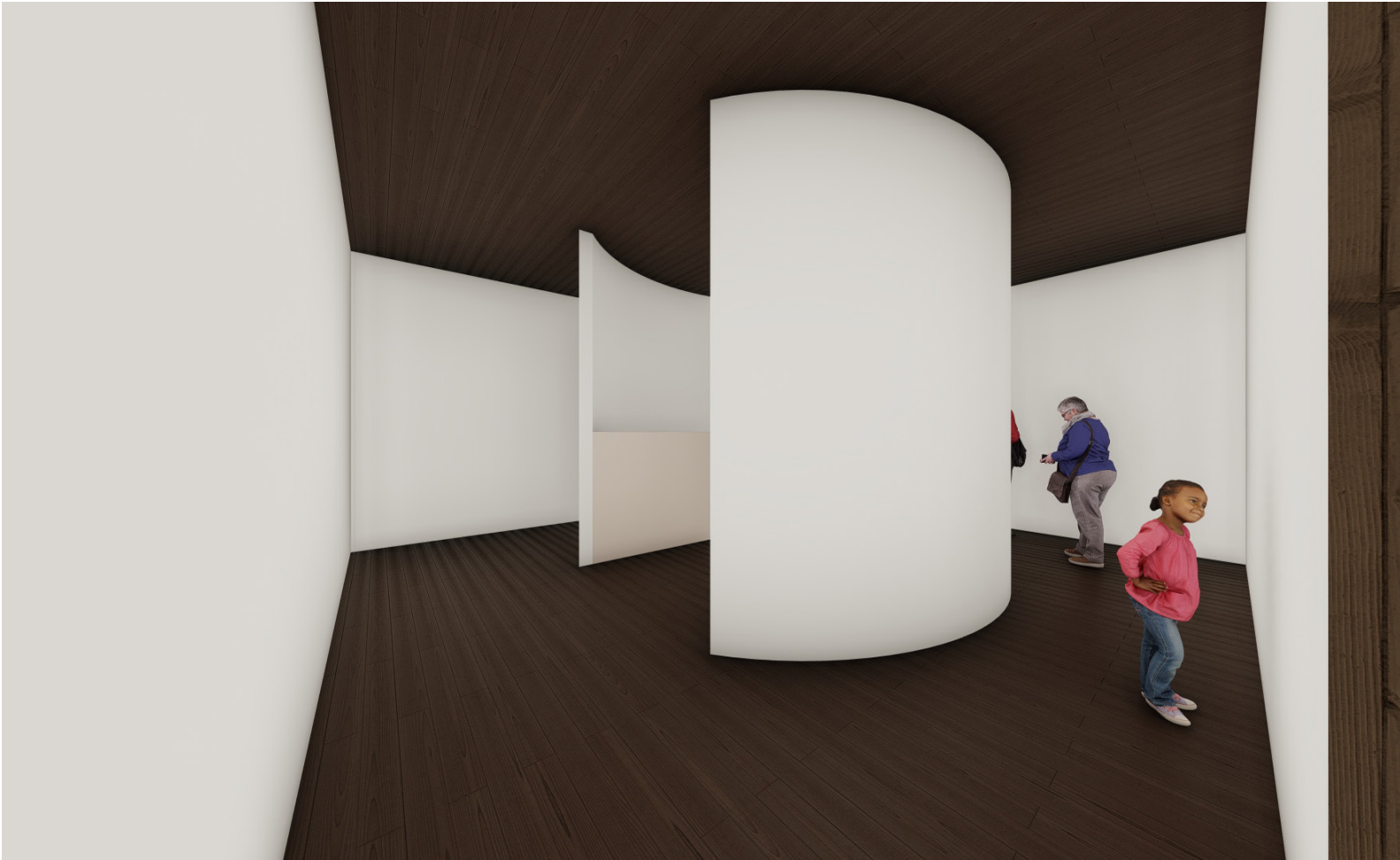


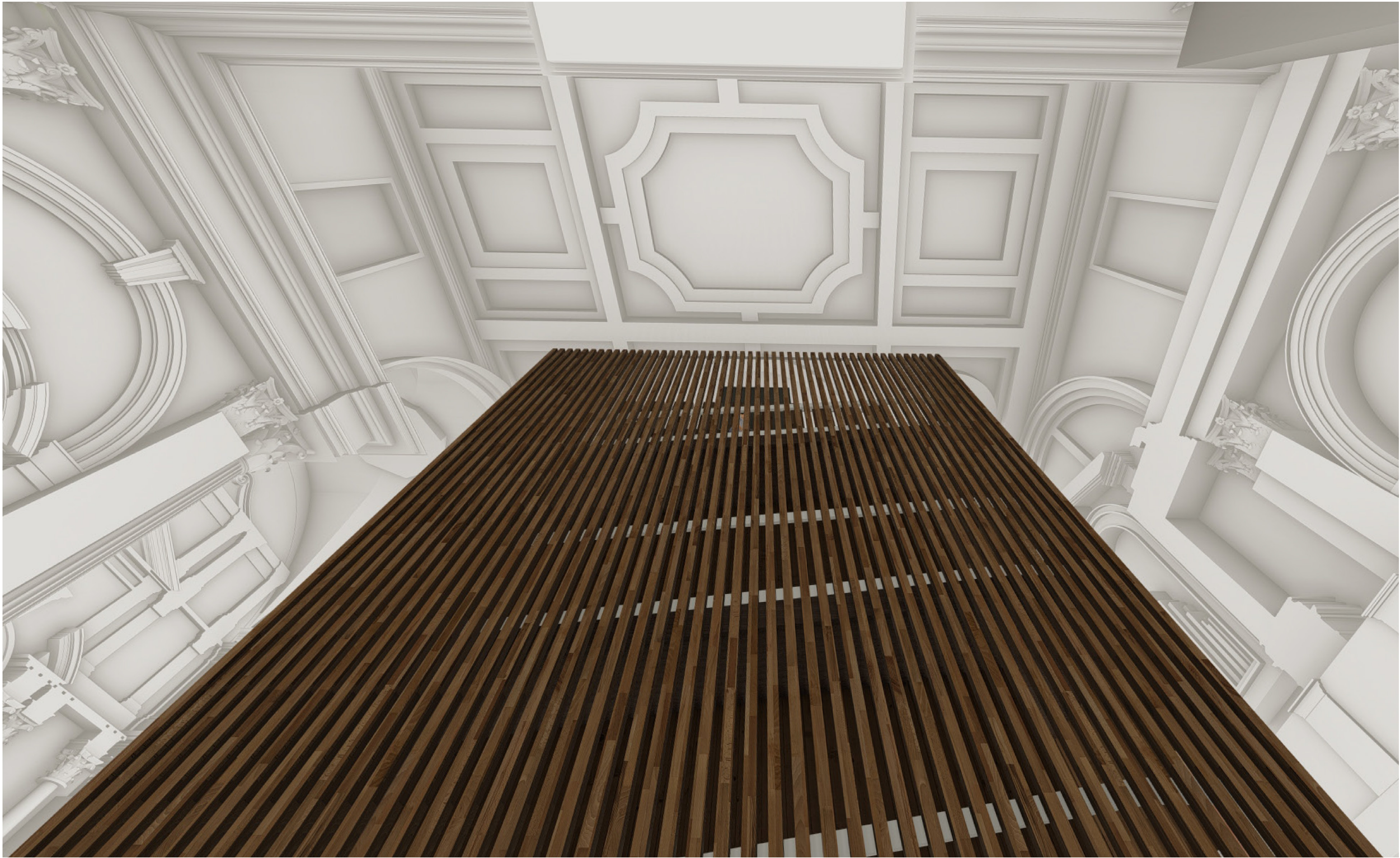
Third Floor



Fourth Floor





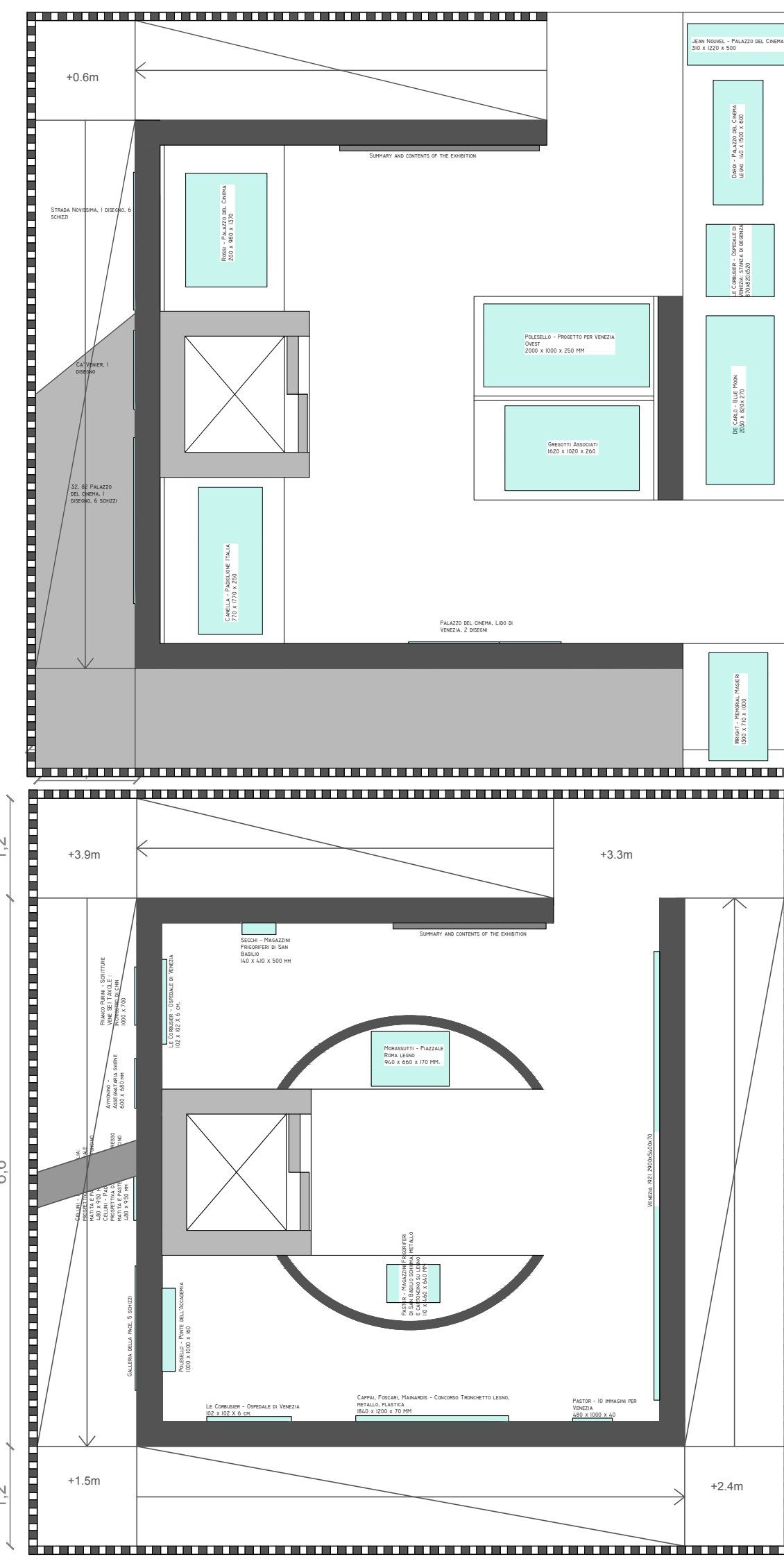




Canella - Padoglione Italia



Exhibition Summary
Dardi - Palazzo del Cinema
Palazzo del Cinema, Lido di Venezia



Venezia 1961



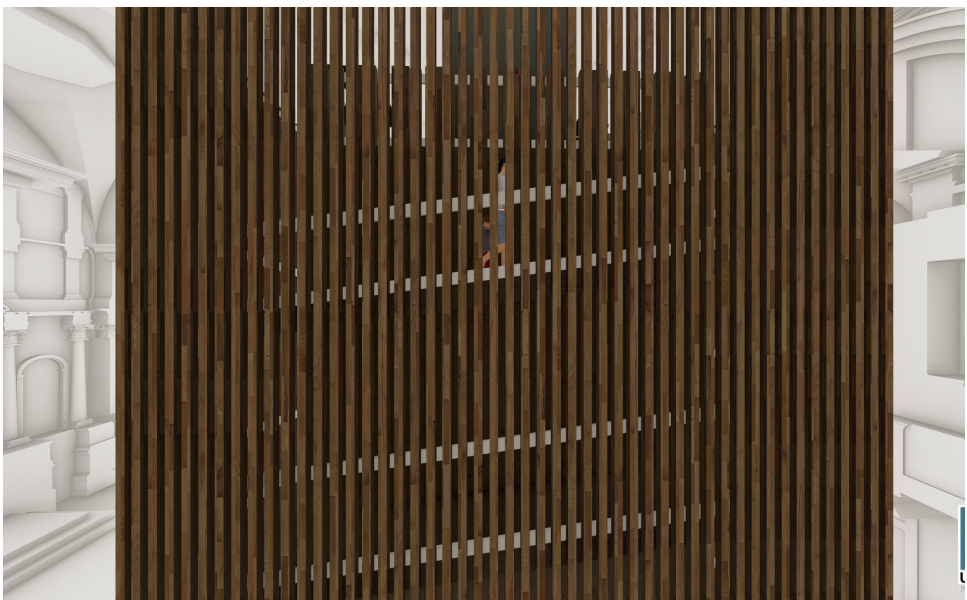
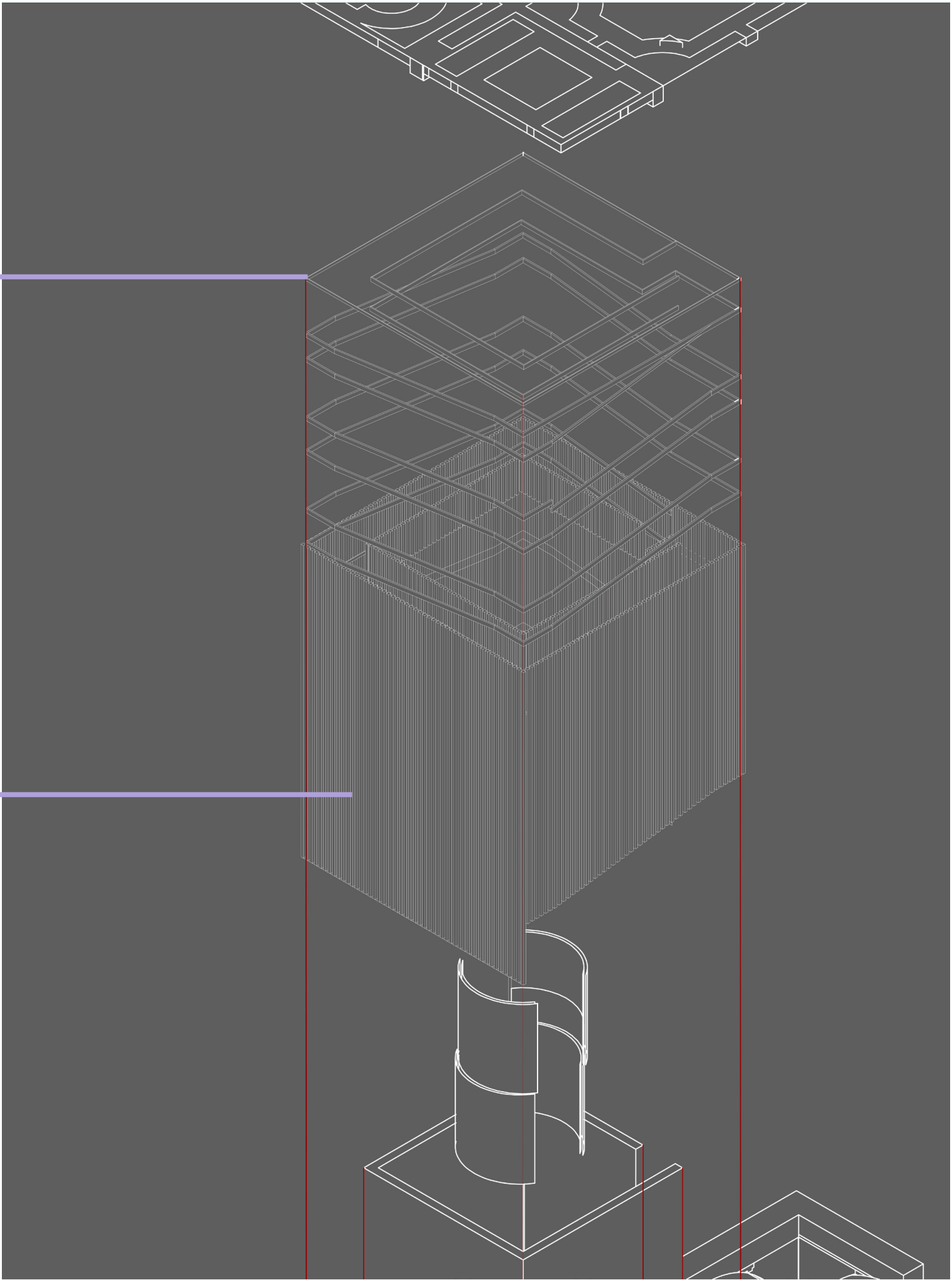
Strada Novissima Venezia / Costantino Dardi

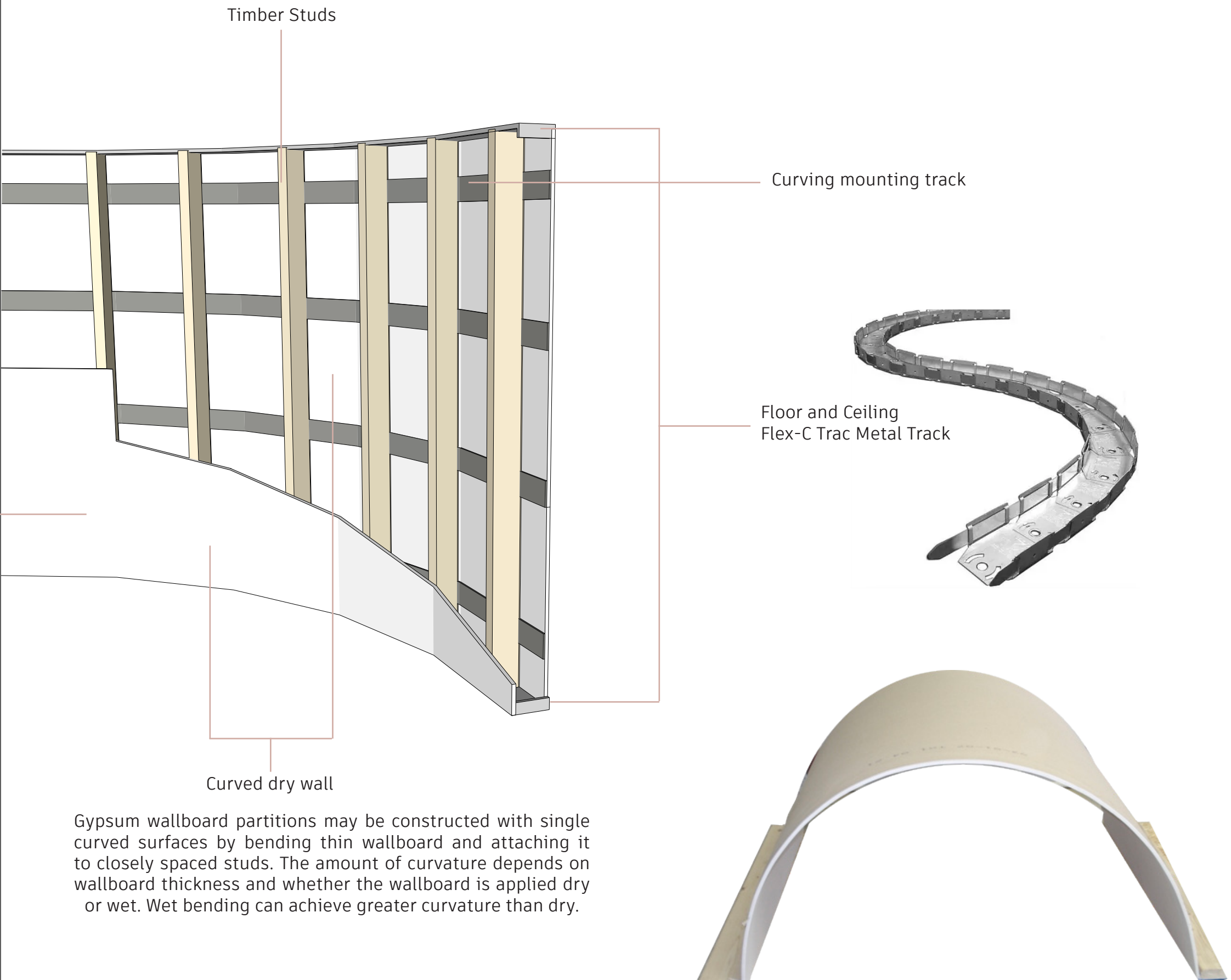
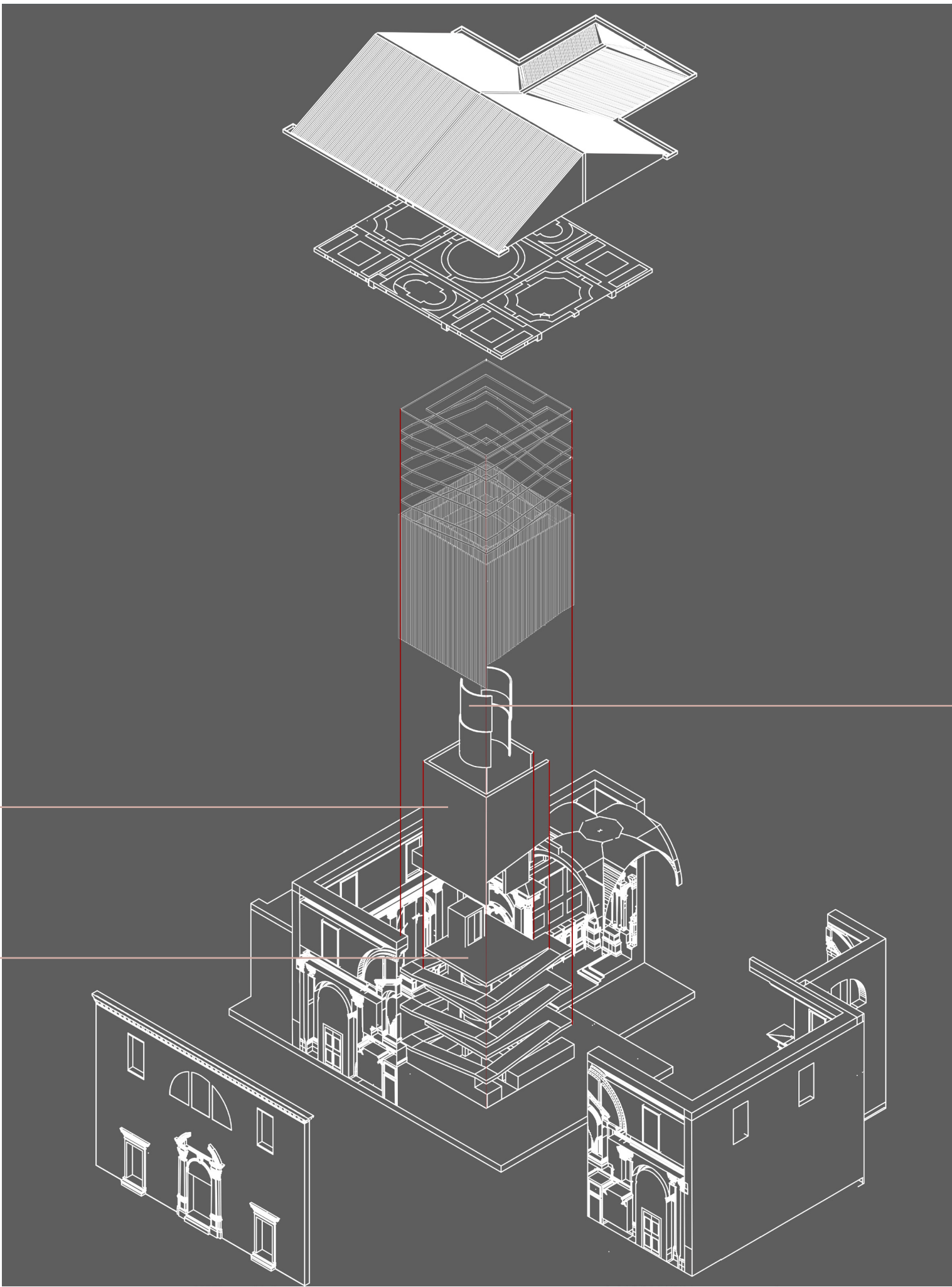
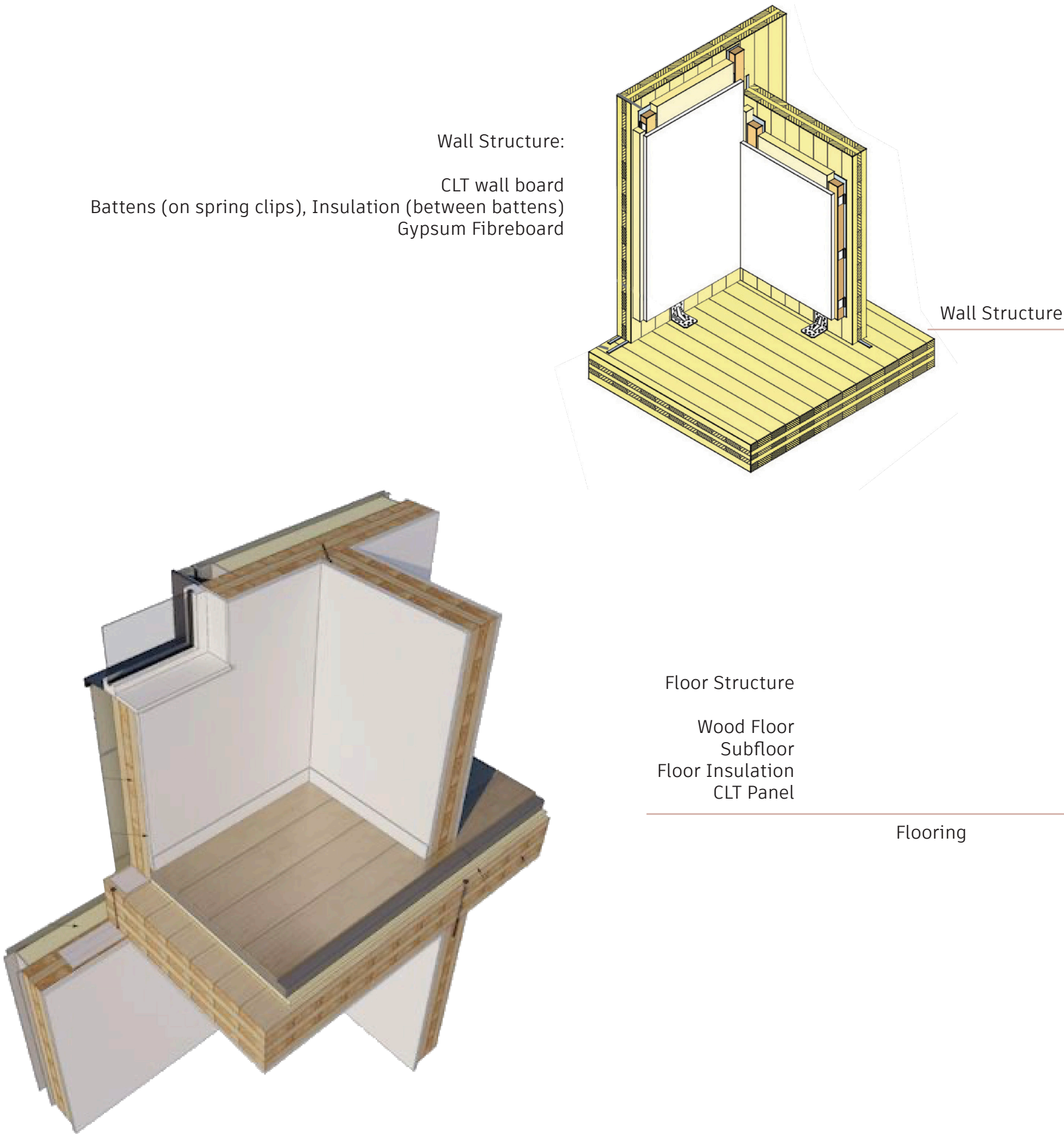
Supportive steel structure

The supportive steel structure aims to hold together the beams. There are two layers of the steel structure placed on every floor. One of the ground attached to the floor and the other one 1m higher so it can also be used as a rail holder for the ramps.

Vertical Spaced Timber slats

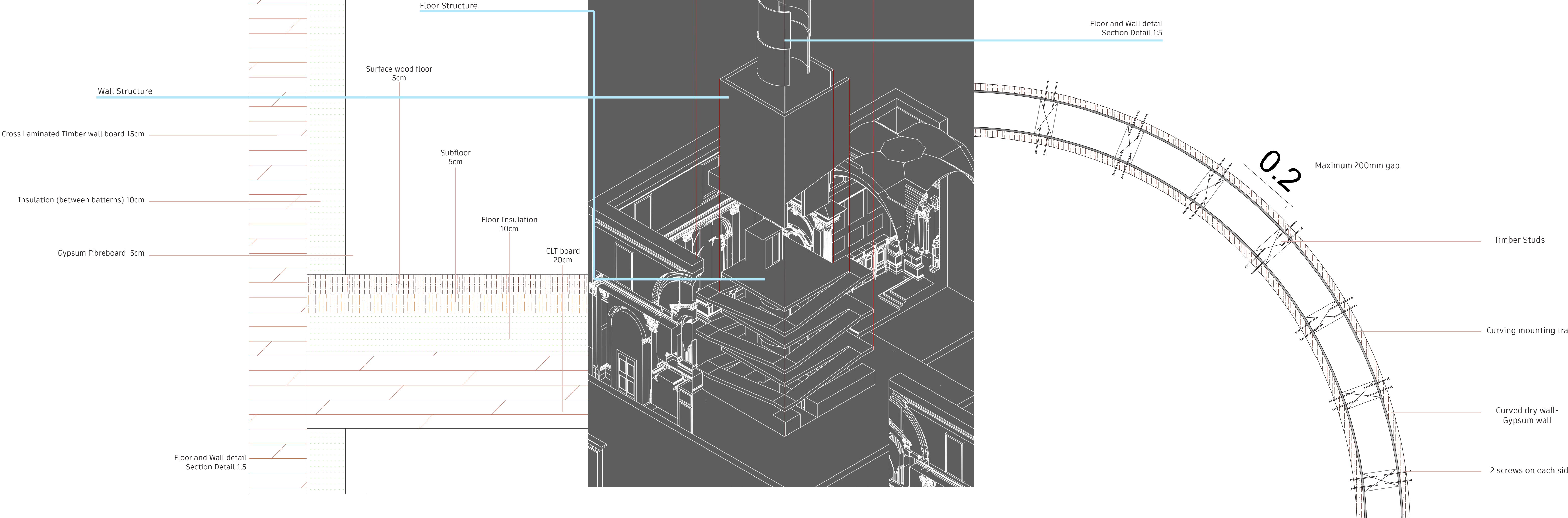
Timber slats 100mmx100mm spaced out with a 100mm gap in between then in order to allow the user of the exhibition to still get views of the church whilst using the ramp, as well as the cafe. The idea was to allow as much of the church to be part of the design experience for the users.

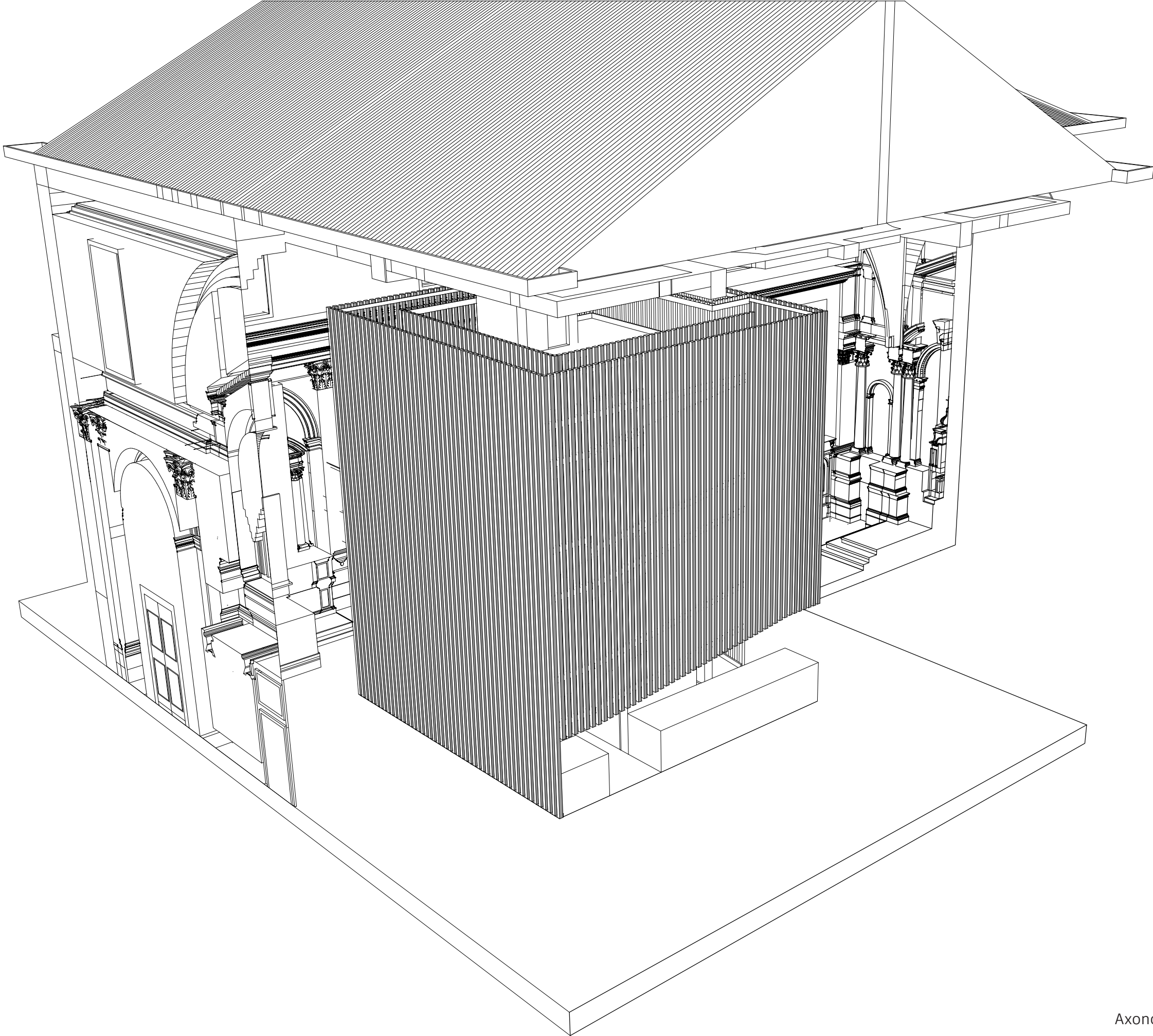




Structure

Structure





Axonometrics 1.200



Heating

ROOM DATA								ROOM HEAT FLOWS	
EnvName	Area_Floor	Area_Floor - Total of similar rooms (this room excluded)	Height	InfiltrationLevel	EnvTint_Des	Infiltration_AirChangesPerHour	n_People	ConductionHeatFlow [W]	85363.2
[Choice]	[m²]	[m²]	[m]	[Choice]	[°C]	[1/h]	[p]	Infiltration + Ventilation HeatFlow [W]	21787.5
Main room	430	0	13.55	Low	20	0.1	105	TotalHeatFlow [W]	107150.7

Assuming that the capacity of our building is up to 105 people.

Phd: 107150.7
PhRef: 107150.7 x 1.4=150010.98W
=150kW

Cooling

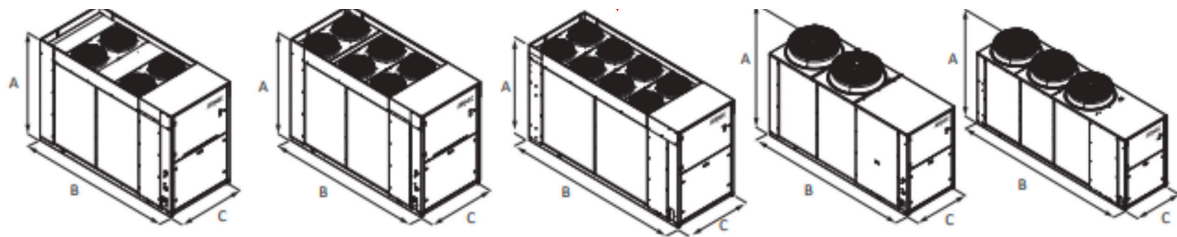
RESUME		
People	12600	W
Lighting	1955	W
Other electrical appliances	1800	W
Opaque surfaces	13290	W
Windows	19065	W
Infiltration	9711	W
Ventilation	16478	W
Total cooling load	74898.8	W
Total cooling load	174.18	W/m²

Pcd: 74898.8
PcRef: 74898.8W
=75kW

NRL HE									
Size		0280	0300	0330	0350	0500	0550	0600	0650
Cooling performance 12 °C / 7 °C (1)									
Cooling capacity	kW	52,9	61,9	68,8	76,8	89,8	94,8	113,8	127,7
Input power	kW	18,1	20,2	23,4	26,9	33,4	36,7	45,4	53,2
Cooling total input current	A	30,0	34,0	37,0	45,0	60,0	64,0	78,0	89,0
EER	W/W	2,93	3,06	2,94	2,86	2,69	2,58	2,51	2,44
Water flow rate system side	l/h	9106	10652	11855	13229	15463	16322	19586	21992
Pressure drop system side	kPa	27	27	51	29	30	32	31	37
Heating performance 40 °C / 45 °C (2)									
Heating capacity	kW	59,1	69,2	76,3	86,2	103,3	110,3	135,4	152,3
Input power	kW	17,5	20,6	23,1	26,1	31,7	34,3	40,8	45,7
Heating total input current	A	35,0	39,0	43,0	49,0	60,0	64,0	79,0	91,0
COP	W/W	3,38	3,36	3,31	3,30	3,26	3,21	3,32	3,33
Water flow rate system side	l/h	10254	11992	13209	14947	17901	19118	23463	26417
Pressure drop system side	kPa	25	34	66	34	40	44	44	52

(1) Data EN 14511:2018; Heat exchanger water (services side) 12°C / 7°C; outside air 35°C
(2) Data EN 14511:2018; System side water heat exchanger 40 °C / 45 °C; Outside air 7 °C d.b. / 6 °C w.b.

Size 0700= 152.3 >150 Phref
127.7 > 75 Pcref



Size		0280	0300	0330	0350	0500	0550	0600	0650	0700
Dimensions and weights										
A	"A	mm	-	-	-	1875	1875	1875	1875	1875
	E.L	mm	1606	1606	1606	1606	1875	1875	1875	1875
B	"A	mm	-	-	-	1100	1100	1100	1100	1100
	E.L	mm	1100	1100	1100	1100	1100	1100	1100	1100
C	"A	mm	-	-	-	3010	3010	3010	3010	3010
	E	mm	-	-	-	3010	3010	3010	3010	4010
L	"A	mm	-	-	-	3010	3010	3010	3010	4010
	E	mm	-	-	-	3010	3010	3010	3010	4010
Weights										
Without hydronic kit	"	kg	-	-	-	913	917	1016	1130	1142
	A	kg	-	-	-	1099	1103	1264	1212	1390
	E	kg	730	795	805	811	1099	1103	1264	1212
	L	kg	713	724	731	740	913	917	1016	1142

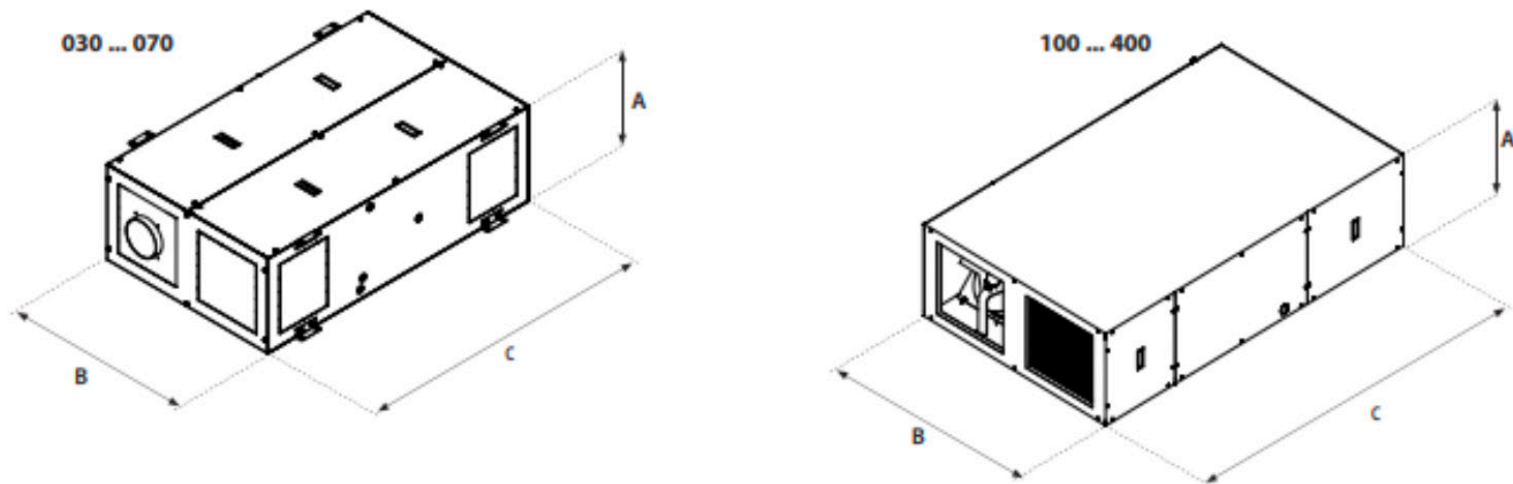
Ventilation

RPLI - L

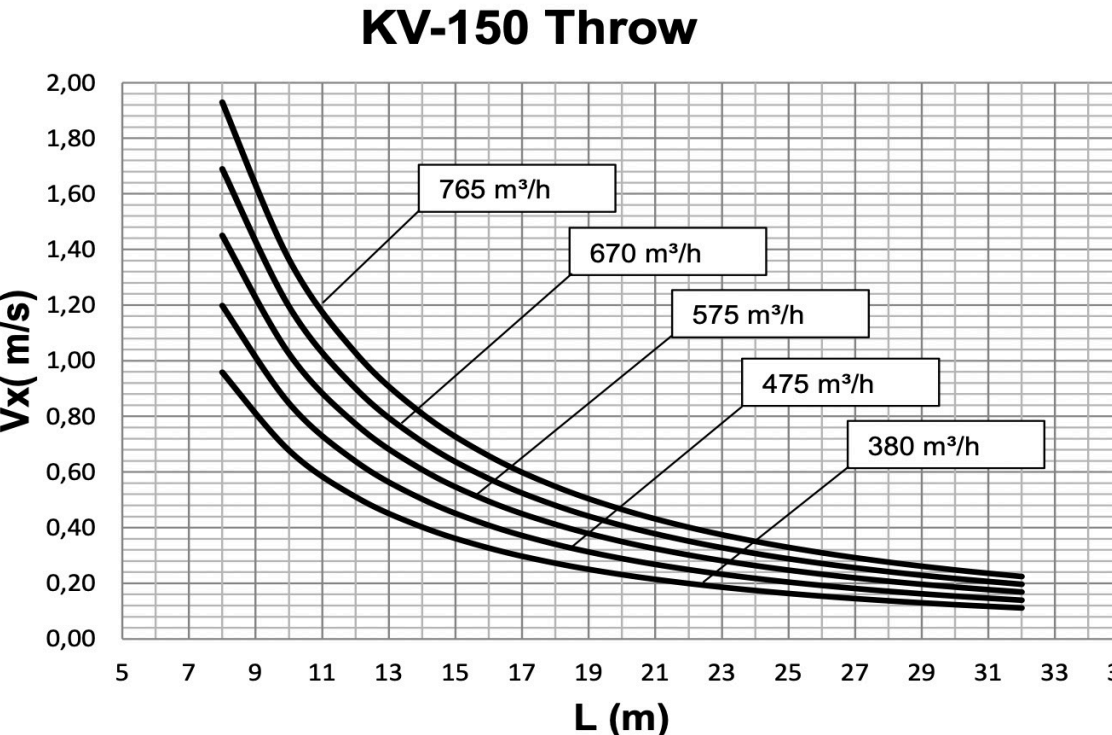
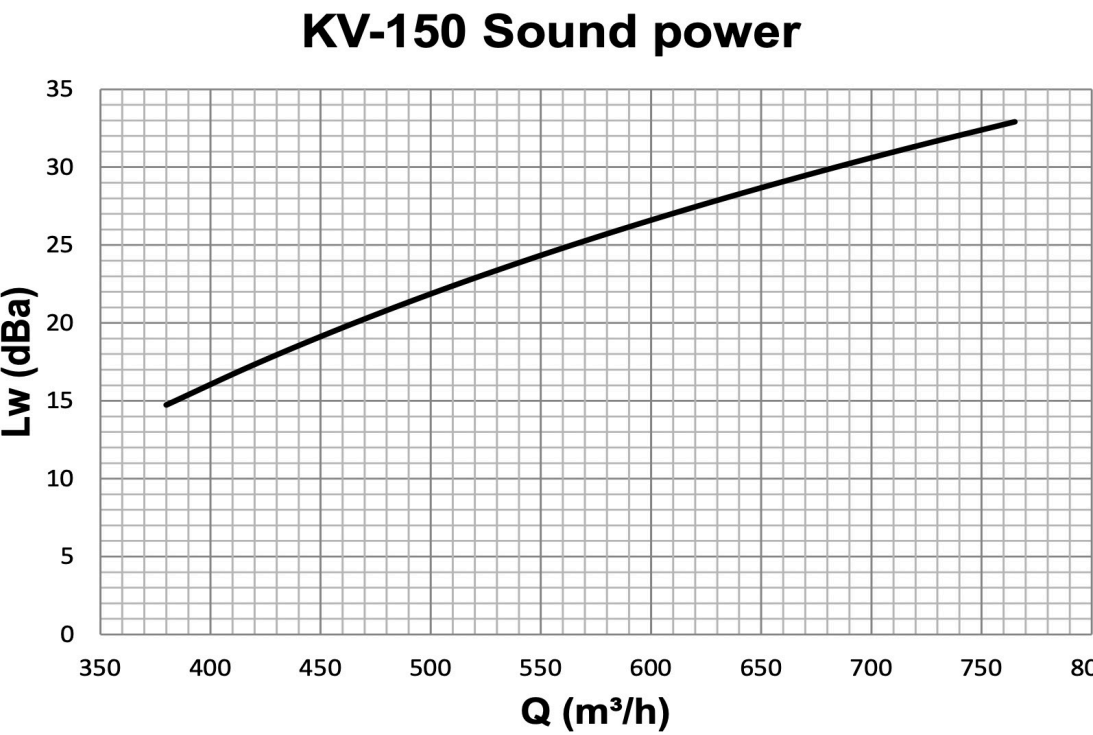
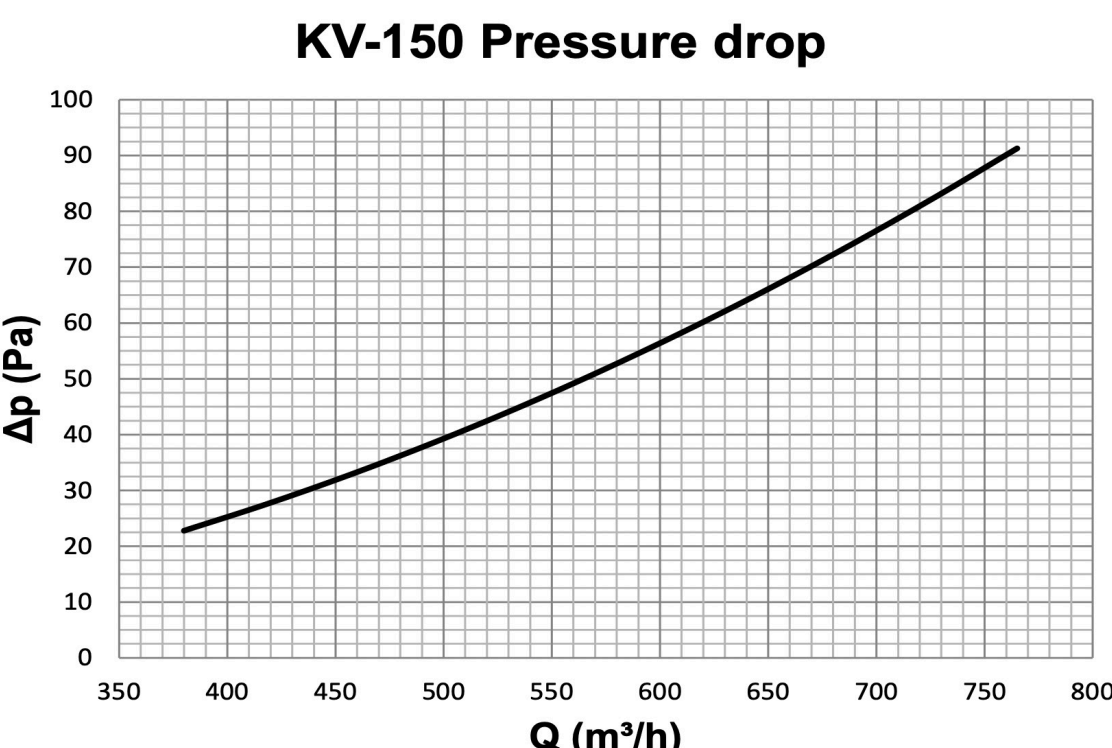
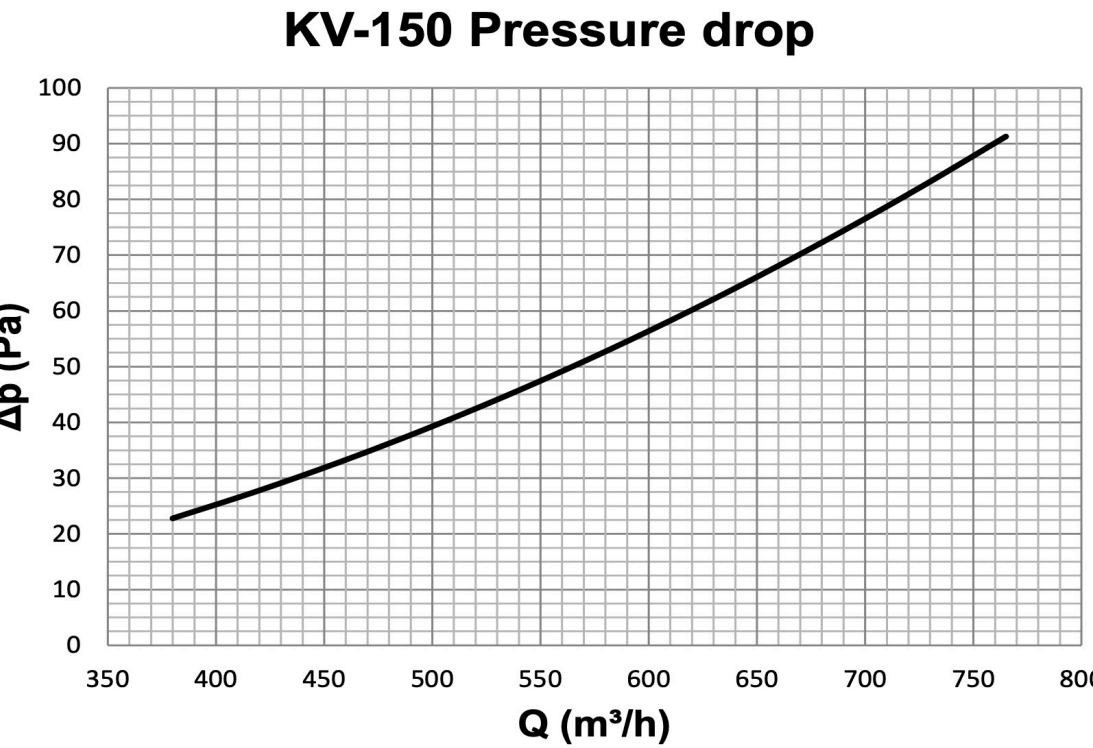
Size	030	050	070	100	140	200	300	400
Heat recovery unit								
Power supply	230V~50Hz	230V~50Hz	230V~50Hz	230V~50Hz	230V~50Hz	230V~50Hz	230V~50Hz	400V 3~50Hz
Unit type	UVNR (non-residential ventilation unit)							
Heat recovery system type	Type/n°	Static at counter-current flow / 1						
Heat capacity recovered (EN308) (1)	kW	1,6	2,4	3,6	4,8	7,1	10,0	14,9
Dry heating efficiency (2)	%	81,1	78,1	76,8	75,3	76,0	76,3	75,5
Information in compliance with Annex V of regulation EU no. 1253/2014								
Nominal air flow rate supply / recovery	m³/s	0,08	0,13	0,19	0,26	0,39	0,54	0,82
Nominal air flow rate supply / recovery	m³/h	300	450	700	950	1400	1950	2950
Minimum air flow rate	m³/h	200	250	400	550	800	1150	1750

VD = 10x105=1050
VD [m3/h] = 1050 x 3.6=3780

Nominal air flow rate supply/recovery of
RPLI-L 400= 3900>3780



Size	030	050	070	100	140	200	300	400
Dimensions and weights								
A	mm	400	400	435	435	460	600	600
B	mm	800	800	945	945	1100	1600	2050
C	mm	1300	1300	1600	1600	1800	2350	2350
Empty weight	kg	95	93	125	123	160	287	340

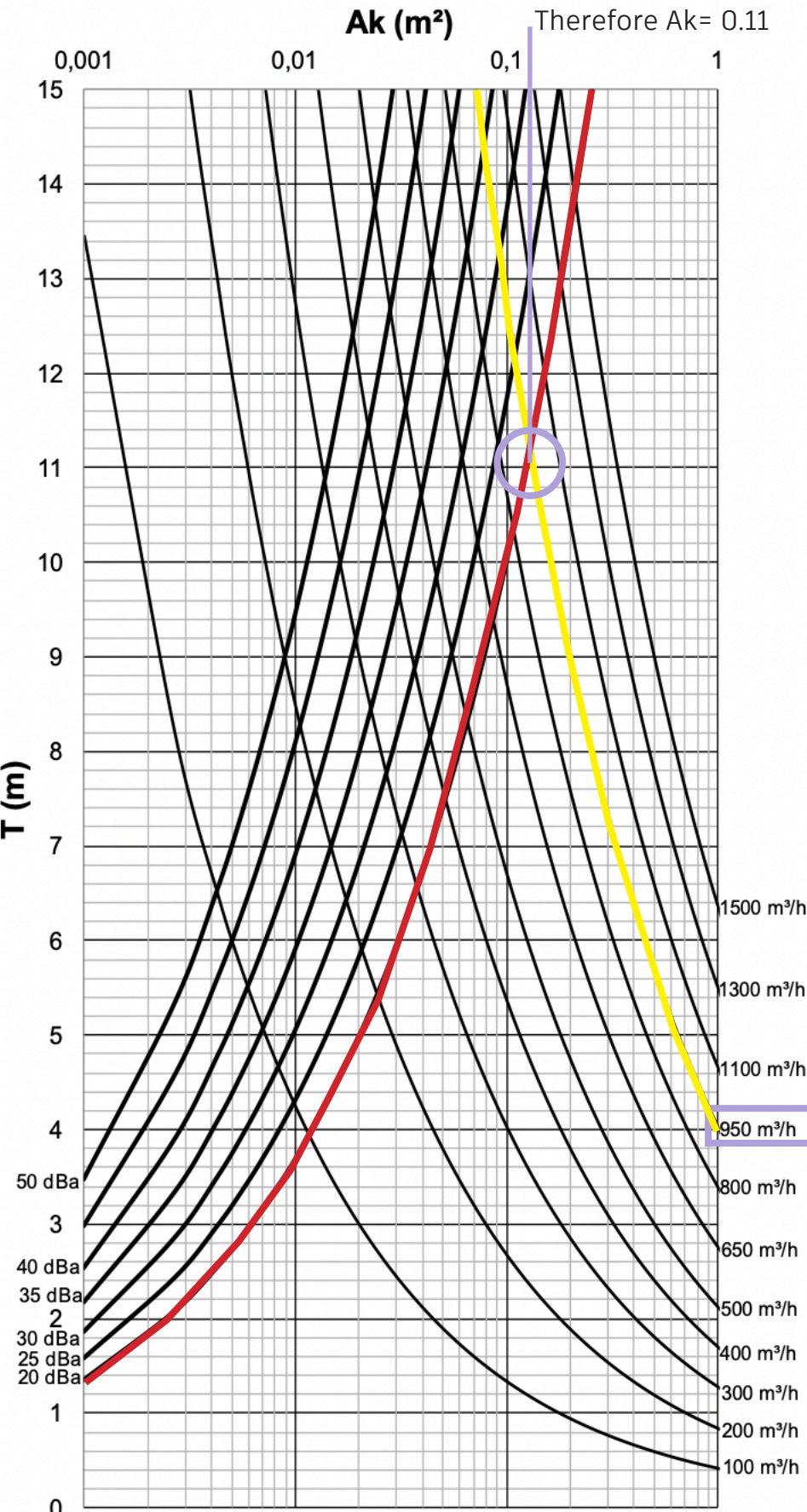


Model	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	R [mm]	regulation damper	swirl deflector
80	80	158	200	258	204	50	38	60	80	yes	yes
110	110	198	215	288	252	60	70	85	100	yes	yes
150	150	313	283	388	352	60	70	85	150	yes	yes
200	200	398	283	488	452	60	70	85	200	yes	yes
230	230	398	283	488	452	60	70	85	200	yes	yes

KV150

VD = 10x105=1050
VD [m3/h] = 1050 x 3.6=3780

Given that we will have 6 air diffuser units:
3780 / 6=630 - air flow



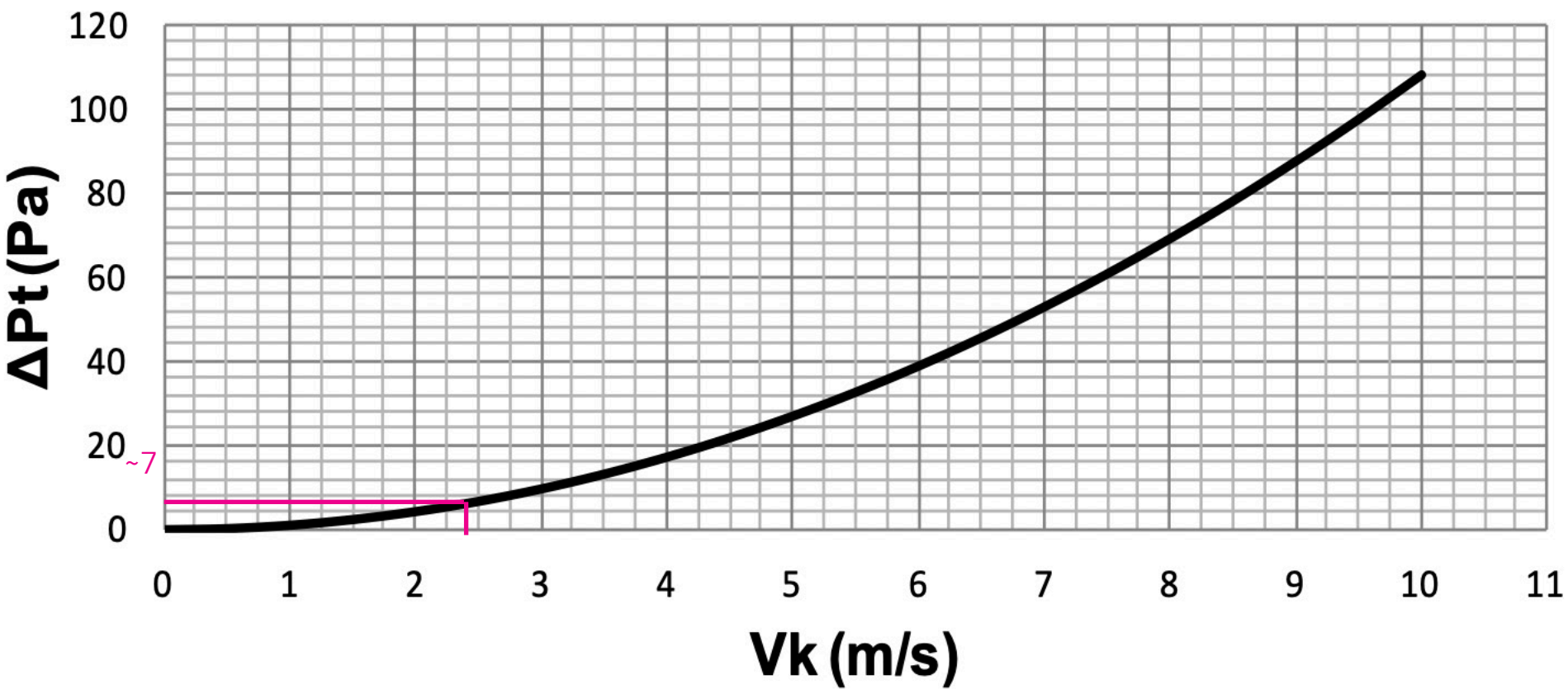
UFO Series:

VD = 10x105=1050
VD [m3/h] = 1050 x 3.6=3780

Given that we will have 4 air grilles
3780/4= 945

If at low noise 20 and 950m3h Ak=0.11
3780 / (4x3600x0.11)= 2.38

At Vkms 2.38 ΔPt(Pa)=~7<40



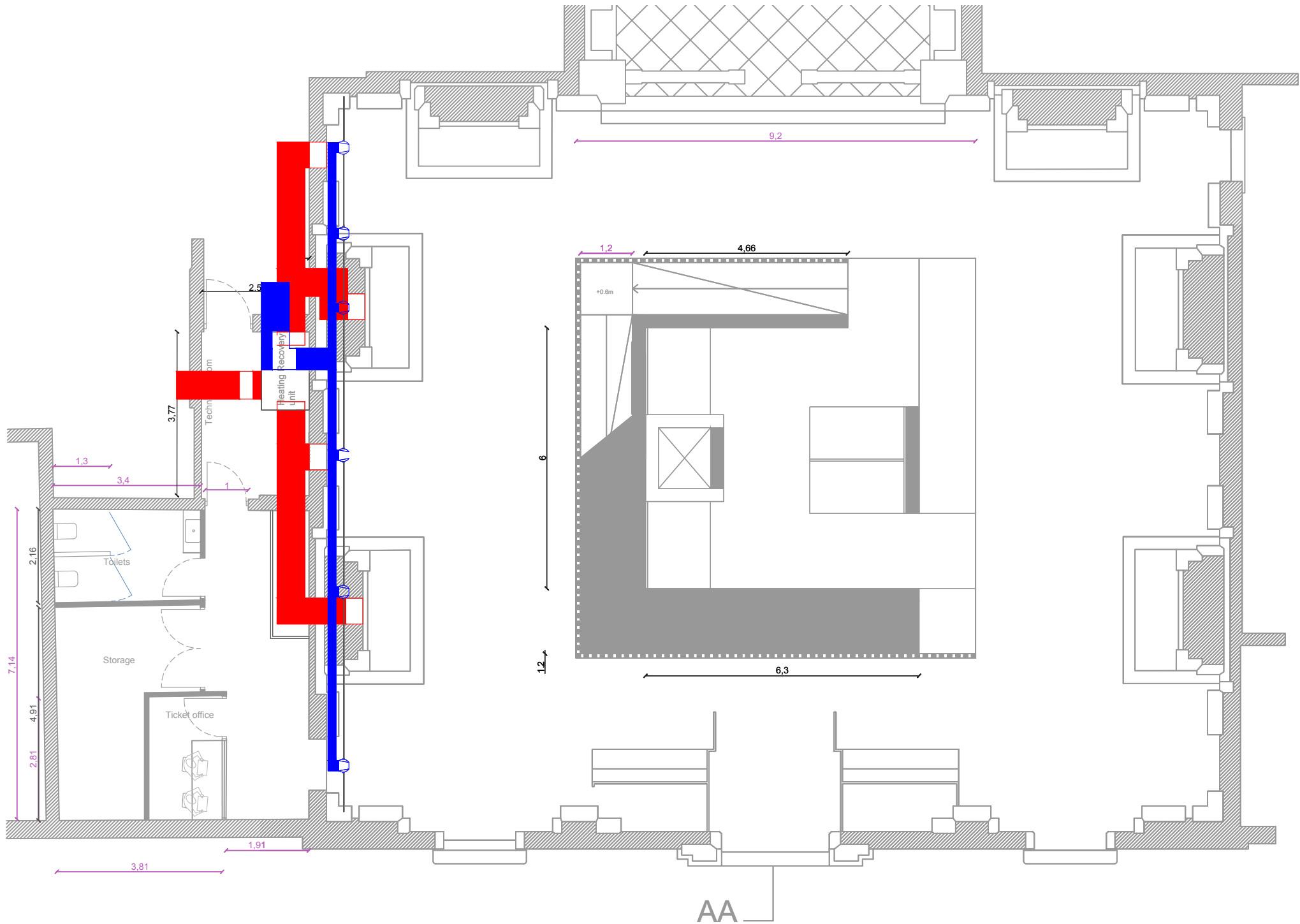
		Base									
Height		200	250	300	350	400	450	500	550	600	650
	75	0,0065	0,0085	0,0104	0,0124	0,0143	0,0163	0,0182	0,0202	0,0221	0,0241
	100	0,0104	0,0135	0,0166	0,0198	0,0229	0,0260	0,0291	0,0322	0,0353	0,0384
	150	0,0182	0,0236	0,0291	0,0345	0,0399	0,0454	0,0508	0,0563	0,0617	0,0671
	200	0,0259	0,0337	0,0415	0,0492	0,0570	0,0648	0,0725	0,0803	0,0881	0,0958
	250	0,0337	0,0438	0,0539	0,0640	0,0741	0,0842	0,0942	0,1043	0,1144	0,1245
	300	0,0415	0,0539	0,0663	0,0787	0,0911	0,1035	0,1160	0,1284	0,1408	0,1532
	350	0,0492	0,0640	0,0787	0,0935	0,1082	0,1229	0,1377	0,1524	0,1672	0,1819
	400	0,0570	0,0741	0,0911	0,1082	0,1253	0,1423	0,1594	0,1765	0,1935	0,2106
	450	0,0648	0,0842	0,1035	0,1229	0,1423	0,1617	0,1811	0,2005	0,2199	0,2393
	500	0,0725	0,0942	0,1160	0,1377	0,1594	0,1811	0,2028	0,2245	0,2463	0,2680
	550	0,0803	0,1043	0,1284	0,1524	0,1765	0,2005	0,2245	0,2486	0,2726	0,2967
	600	0,0881	0,1144	0,1408	0,1672	0,1935	0,2199	0,2463	0,2726	0,2990	0,3254

LINEAR GRILLE WITH FIXED BLADES WITH FRAME

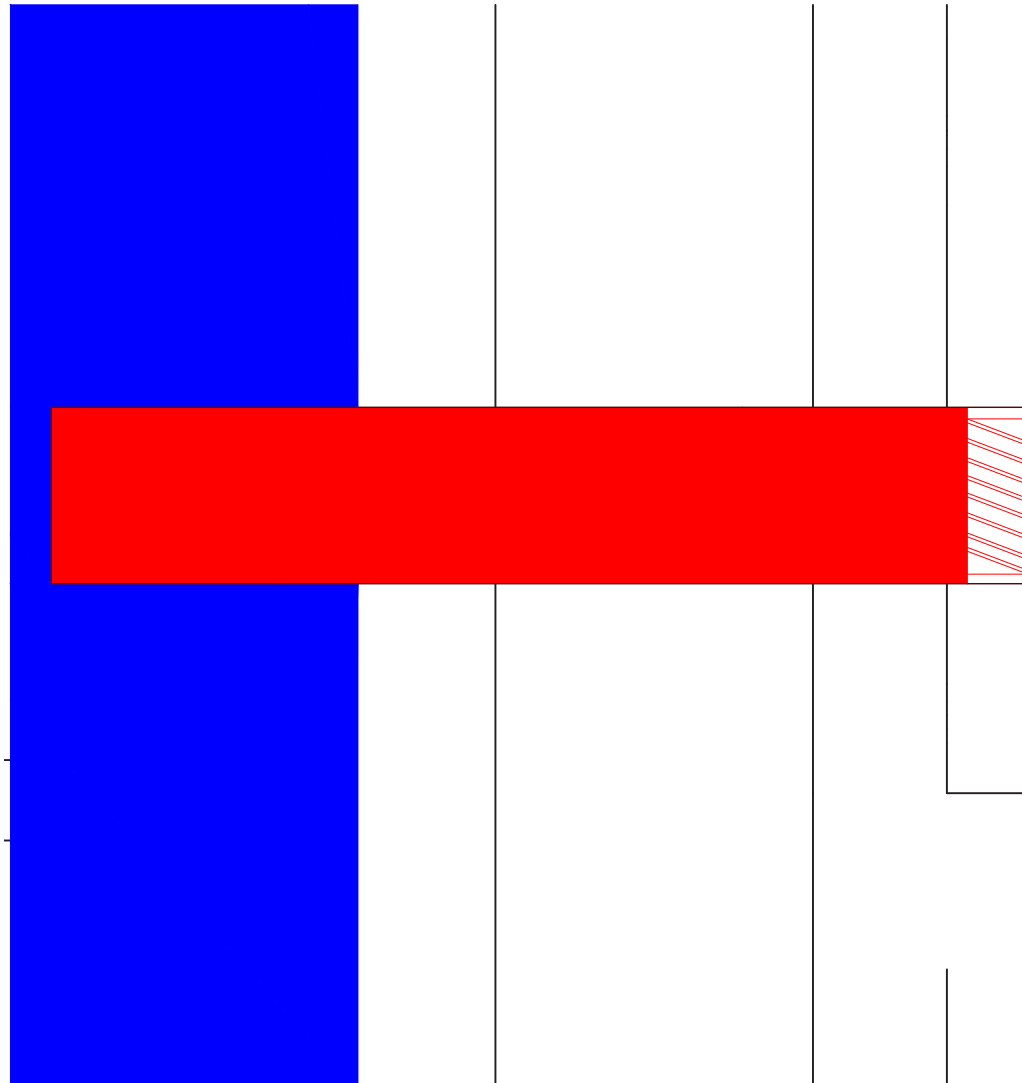
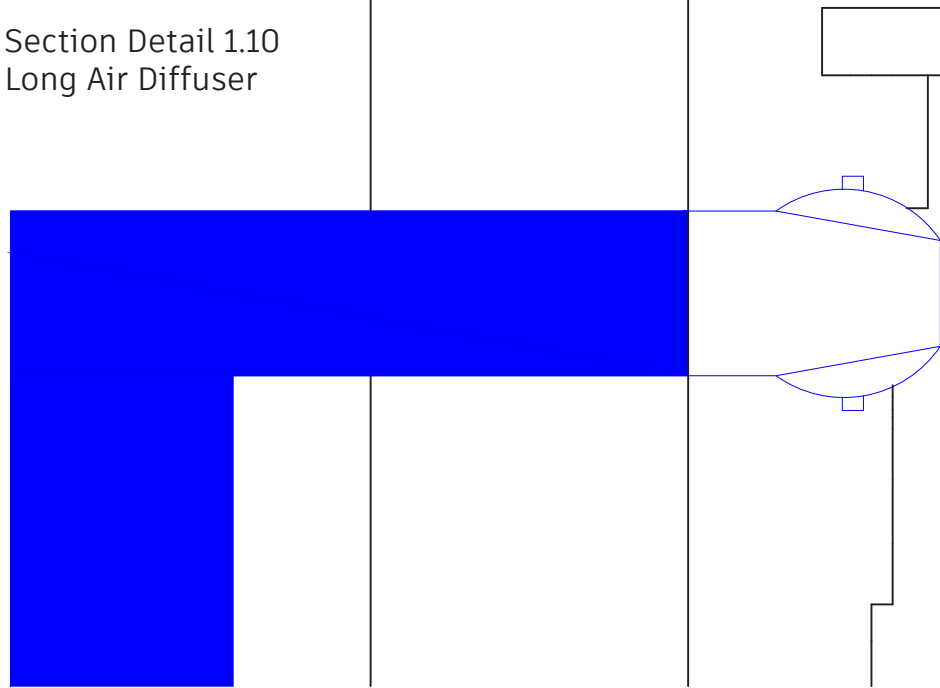
MECHANICAL VENTILATION - DUCT SIZING											
n_People	Air Flow Rate [l/s]	Air speed rate [m/s]	Duct section area [m²]	In case of circular duct			In case of rectangular duct				
				Internal diameter [m]	Insulation layer [m]	Total diameter [m]	Internal Side 1 [m]	Internal Side 2 [m]	Insulation layer [m]	Total Side 1 [m]	Total Side 2 [m]
105	10	5	0.210	0.517	0.06	0.643	0.400	0.525	0.06	0.525	0.650

FULL-AIR HVAC SYSTEM - DUCT SIZING											
Maximum Heating Capacity [W]	Air - Inlet Temperature - Max [°C]	Air speed rate [m/s]	Duct section area [m²]	In case of circular duct			In case of rectangular duct				
				Internal diameter [m]	Insulation layer [m]	Total diameter [m]	Internal Side 1 [m]	Internal Side 2 [m]	Insulation layer [m]	Total Side 1 [m]	Total Side 2 [m]
106000	40	3	1.463	1.365	0.06	1.491	0.100	14.634	0.06	0.225	14.759

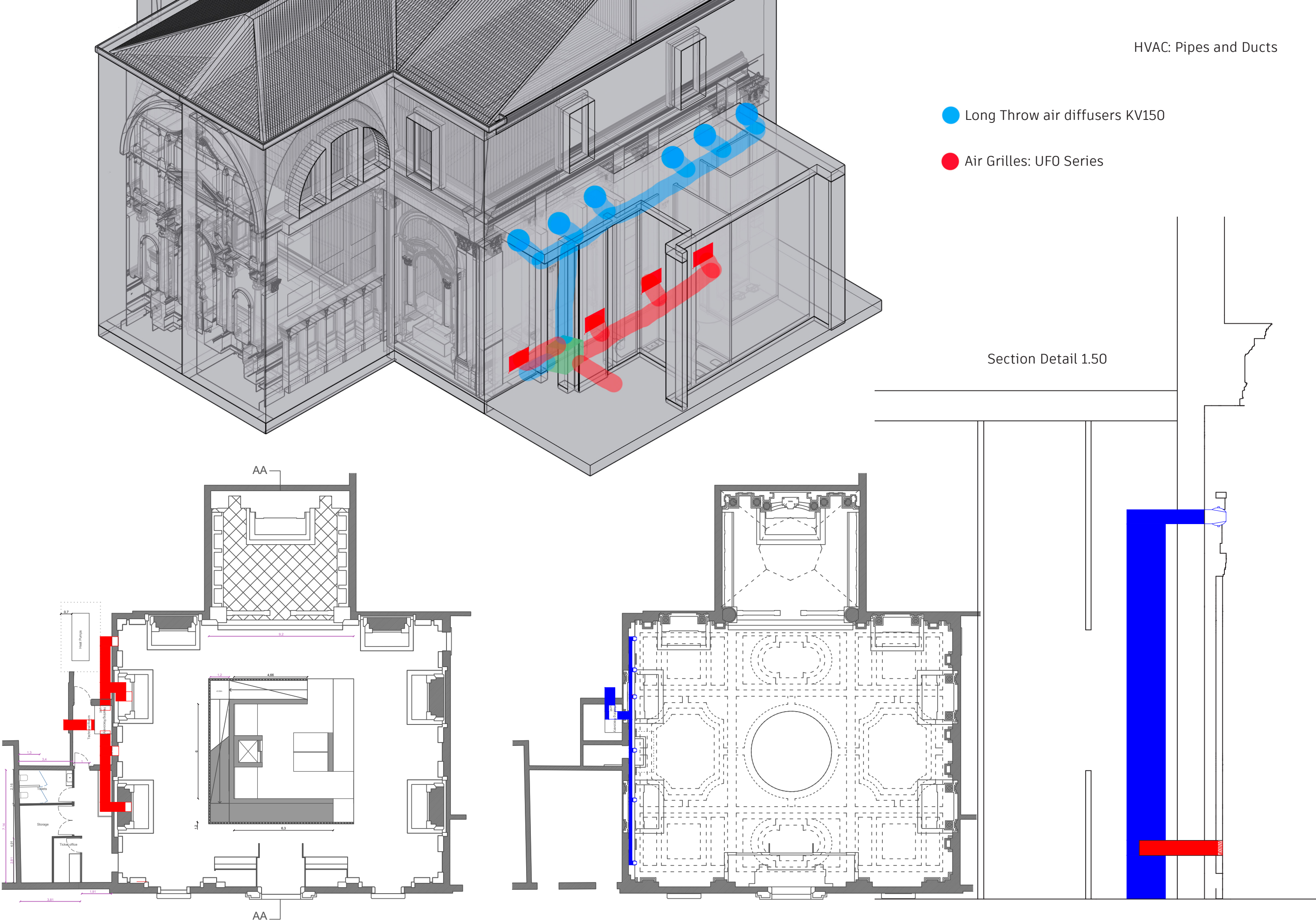
WATER HVAC SYSTEM - PIPE SIZING						
Maximum Heating Capacity [W]	Water - Temperature difference [K]	Water speed rate [m/s]	Duct section area [m²]	Internal diameter [m]	Insulation layer [m]	Total diameter [m]
99000	5	5	0.000943	0.035	0.04	0.120



Section Detail 1.10
Long Air Diffuser



Section Detail 1.10
Air Grilles



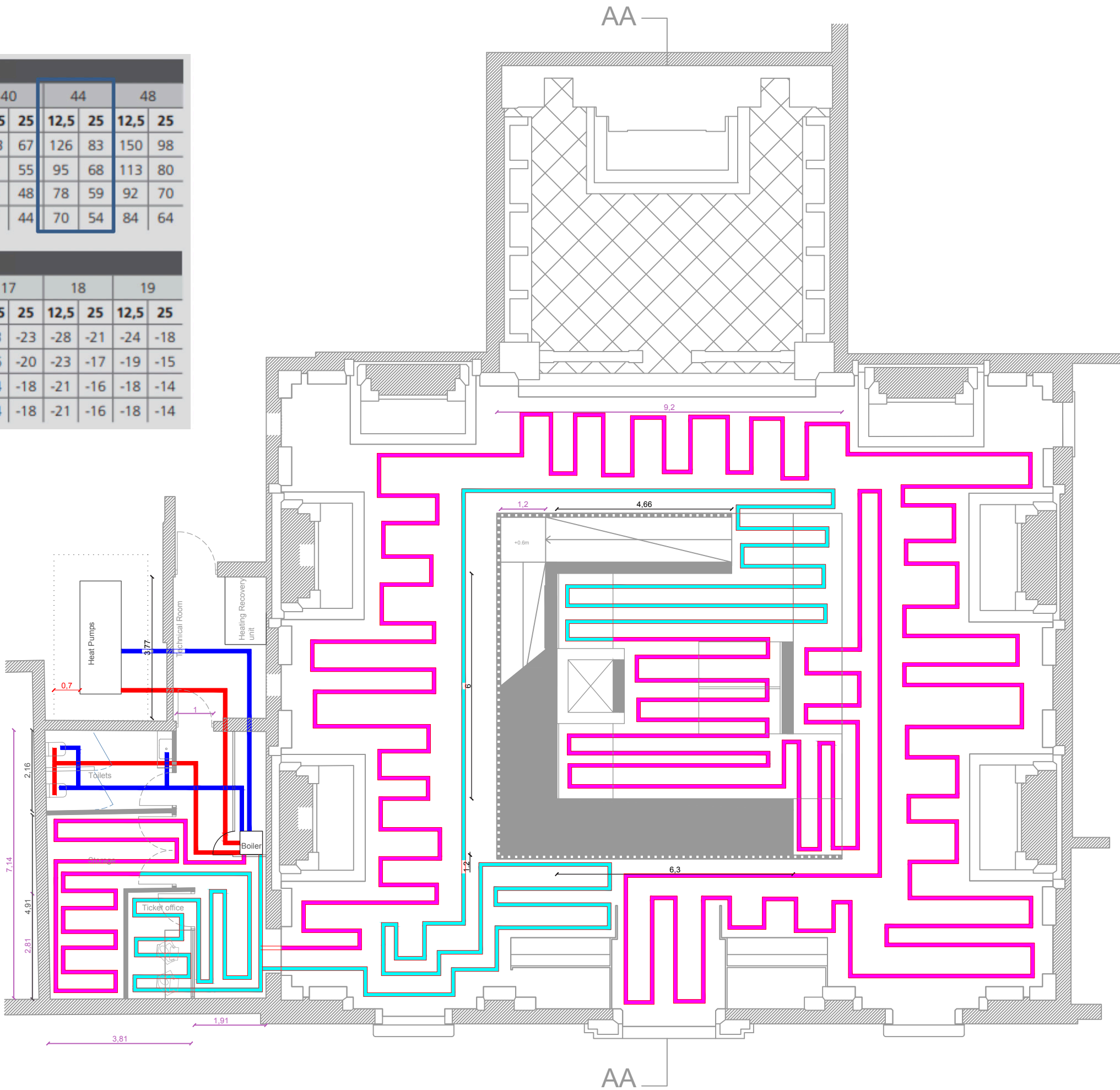
- Long Throw air diffusers KV150
- Air Grilles: UF0 Series

Section Detail 1.50

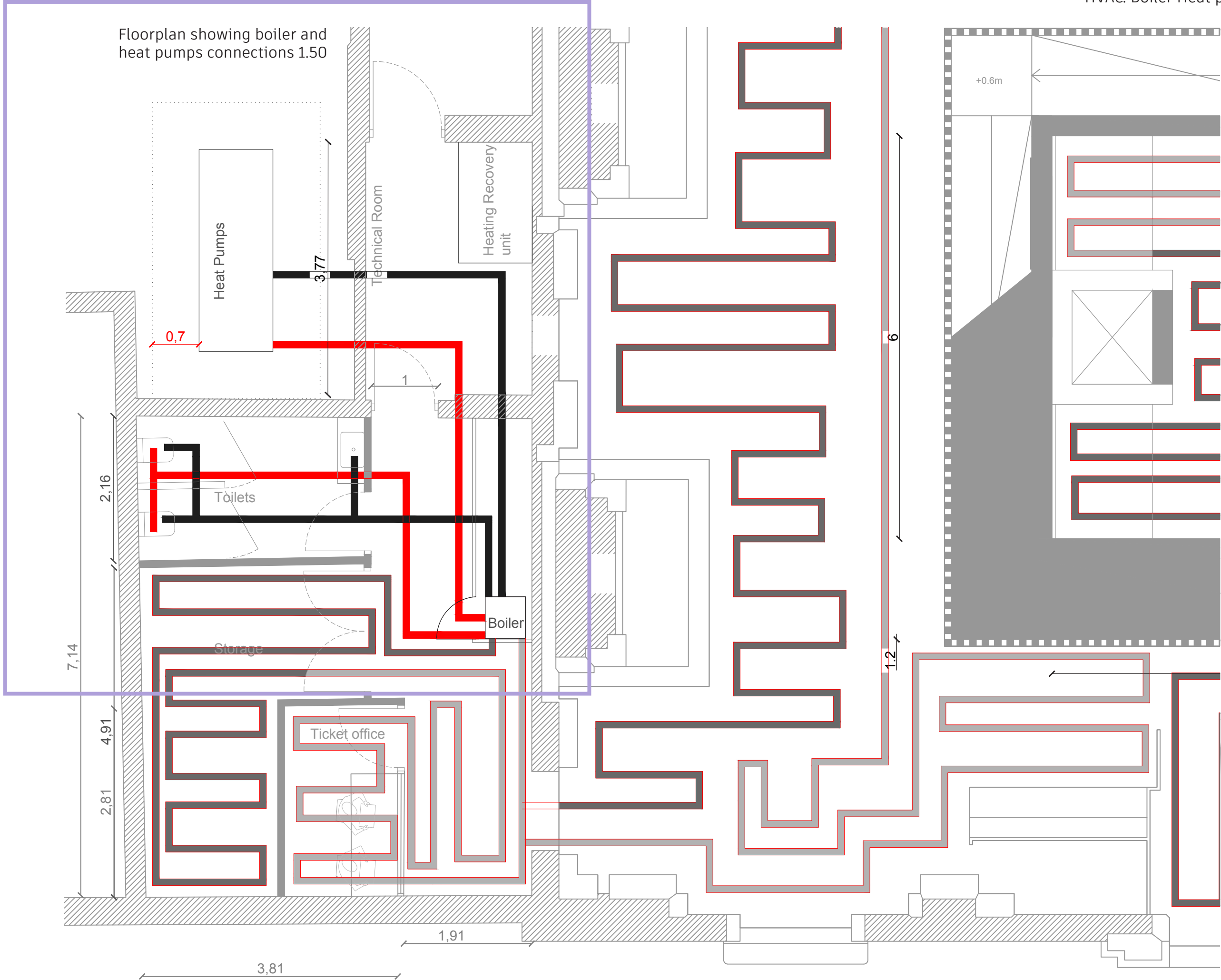
HVAC: Radiant panels Floor Heating

Heating power density [W/m²]														
Water supply temperature [°C]			28		32		36		40		44		48	
Pipe spacing [cm]			R _{s,B} [m²K/W]		12,5	25	12,5	25	12,5	25	12,5	25	12,5	25
Floor tiles	Ceramic	0,01	32	21	56	37	79	52	103	67	126	83	150	98
	Wood 10 mm	0,06	24	17	42	30	60	42	77	55	95	68	113	80
	Wood 16 mm	0,1 (a norma)	20	15	34	26	49	37	63	48	78	59	92	70
	Wood 25 mm	0,125	18	14	31	24	44	34	57	44	70	54	84	64
Cooling power density [W/m²]														
Water supply temperature [°C]			14		15		16		17		18		19	
Pipe spacing [cm]			R _{s,B} [m²K/W]		12,5	25	12,5	25	12,5	25	12,5	25	12,5	25
Floor tiles	Ceramic	0,01	-45	-32	-41	-29	-37	-26	-33	-23	-28	-21	-24	-18
	Wood 10 mm	0,06	-35	-27	-32	-24	-29	-22	-26	-20	-23	-17	-19	-15
	Wood 16 mm	0,1 (a norma)	-33	-25	-30	-23	-27	-21	-24	-18	-21	-16	-18	-14
	Wood 25 mm	0,125	-33	-25	-30	-23	-27	-21	-24	-18	-21	-16	-18	-14

Floorplan showing underheating radiant panels 1.100



Floorplan showing boiler and heat pumps connections 1.50

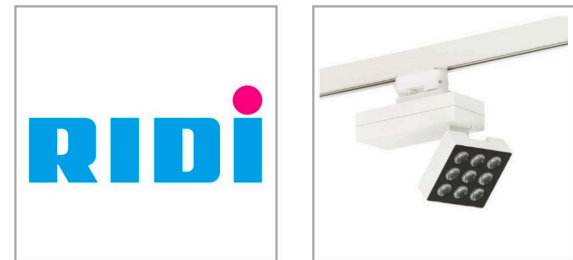


HVAC: Boiler Heat pumps connection.

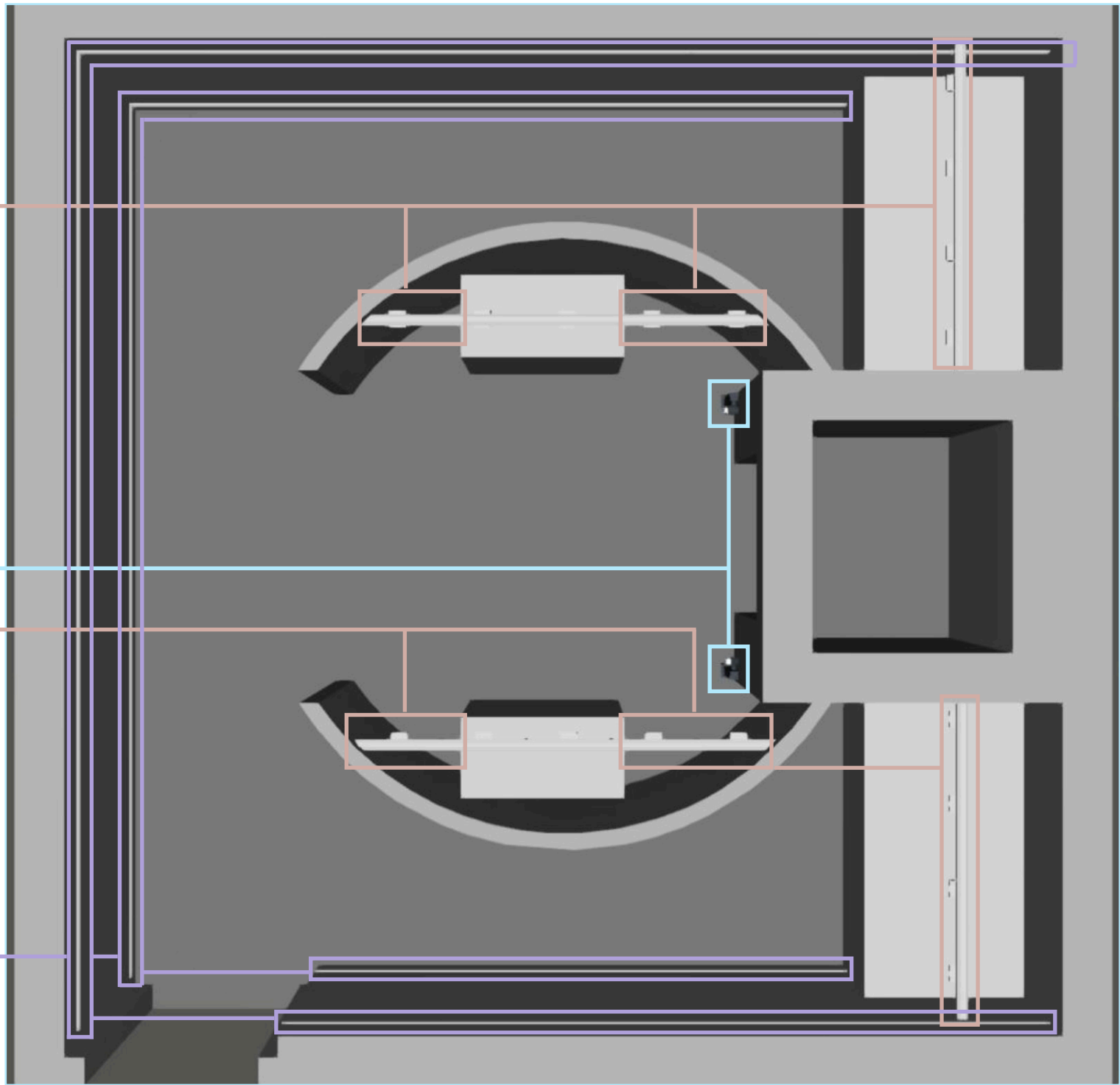
Cooper Lighting - Define LED Wall Mount Luminaire



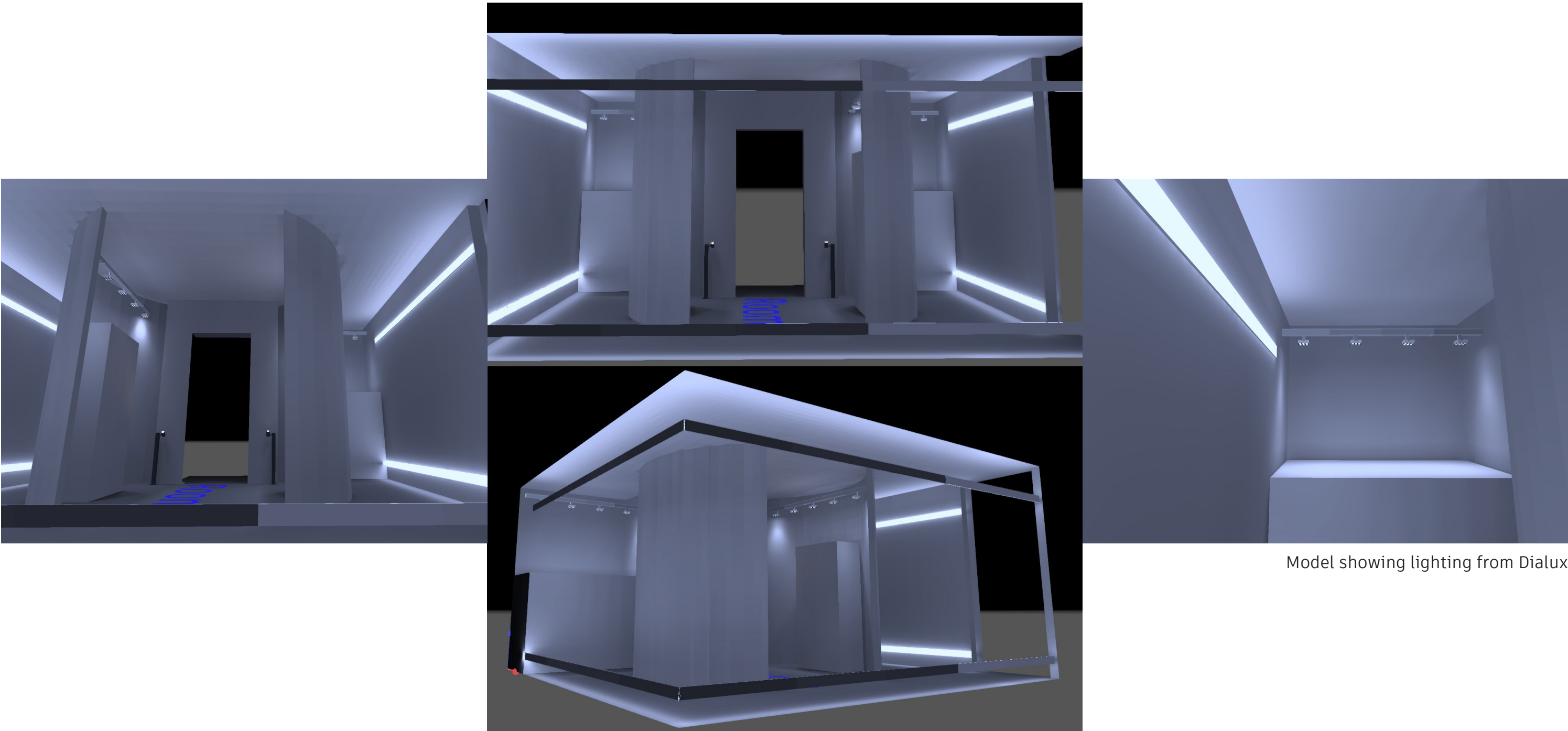
RIDI - VLMF-KARO-S 2500-830 F



SLV - HELIA SENSOR



Second Floor



Model showing lighting from Dialux

BEFORE

Light was too powerfull and shade of light was more warm than what I wanted for the exhibition. Therefore I changed Watts from 69.8W to 20w, the F luminaire from 9553lm to 6000lm, the luminous efficacyfrom 134lm/W to 300lm/W, CCT from 4000K to 3991K and the CRI from 80 to 84.



Cooper Lighting - Define LED Wall Mount Luminaire

			
Article No.	S124DIW-S1020D1340U840-4FO-1E-UDD-A1	Article No.	S124DIW-S1020D1340U840-4FO-1E-UDD-A1
P	69.8 W	P	20.0 W
Φ _{Luminaire}	9353 lm	Φ _{Luminaire}	6000 lm
Luminous efficacy	134.0 lm/W	Luminous efficacy	300.0 lm/W
CCT	4000 K	CCT	3991 K
CRI	80	CRI	84

RIDI - VLMF-KARO-S 2500-830 F



Article No.	0321893//691	Article No.	0321893//691
P	24.0 W	P	27.0 W
Φ _{Lamp}	2500 lm	Φ _{Lamp}	2880 lm
Φ _{Luminaire}	1790 lm	Φ _{Luminaire}	2062 lm
η	71.58 %	η	71.58 %
Luminous efficacy	74.6 lm/W	Luminous efficacy	76.4 lm/W
CCT	3991 K	CCT	3000 K
CRI	84	CRI	80

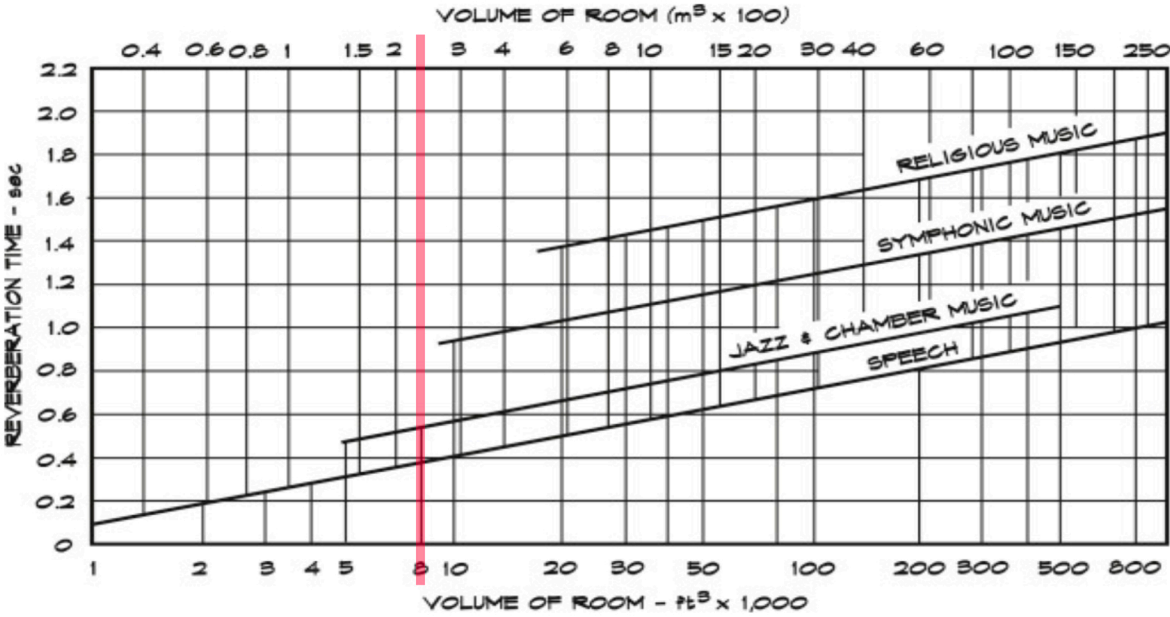
AFTER



Main problem with this light was that the light was too cool white resulting to a more bright/ blue final effect of the exhibition. Also the power was not as high to give the results i wanted for the final lighting. I changed the Watts from 24W to 27W, the F lamp from 2500lm to 2880lm, the F luminaire from 1790lm to 2062lm the CCT from 3991K to 3000K and the CRI from 84 to 80.

Sound propagation in large rooms

Material or acoustical absorber		Area [m2] or Amount [-]	Absorption coefficients [-]					
			Band [Hz]					
			125	250	500	1000	2000	4000
Single chair, padded		15	0.1	0.2	0.25	0.3	0.35	0.35
Wooden door		2	0.12	0.11	0.1	0.09	0.08	0.07
Concrete, bricks plastered		300	0.01	0.01	0.01	0.02	0.02	0.03
Absorbent ceiling		100	0.6	0.95	0.7	0.8	0.85	0.95
Ceramic floor		100	0.01	0.01	0.02	0.02	0.03	0.03
Panels Coloral Rockfon 20 mm, 10 cm from the wall		150	0.2	0.37	0.76	1	0.95	1
Curtains, <0.2 kg/m2; From 0 mm to 200 mm in front of the rigid surface; minimum typical1)		20	0.05	0.06	0.09	0.12	0.18	0.22
Ports (wood)		385.53	0.14	0.1	0.08	0.08	0.08	0.08
The plasterboard		267.03	0.25	0.2	0.1	0.05	0.05	0.1
Absorbent ceiling		203.54	0.6	0.95	0.7	0.8	0.85	0.95
Wooden flooring, parquet on ax		300.76	0.12	0.1	0.06	0.05	0.05	0.06
Bricks, not plastered		300.76	0.02	0.02	0.03	0.04	0.05	0.07
Openings		41.22	1	1	1	1	1	1
Row of people sitting from 0.9 m to 1.2 m (public); maximum typical		10	0.6	0.7	0.8	0.9	0.9	0.9
Individual to a group, seated, 1 every 6 m2 in area; typical maximum		120	0.12	0.45	0.8	0.9	0.95	1
Total		2315.84						
			Total absorption					
			Band [Hz]					
			125	250	500	1000	2000	4000
Single chair, padded		1.5	3	3.75	4.5	5.25	5.25	5.25
Wooden door		0.24	0.22	0.2	0.18	0.16	0.14	0.14
Concrete, bricks plastered		3	3	3	6	6	9	9
Absorbent ceiling		60	95	70	80	85	95	95
Ceramic floor		1	1	2	2	3	3	3
Panels Coloral Rockfon 20 mm, 10 cm from the wall		30	55.5	114	150	142.5	150	150
Curtains, <0.2 kg/m2; From 0 mm to 200 mm in front of the rigid surface; minimum typical1)		1	1.2	1.8	2.4	3.6	4.4	4.4
Ports (wood)		53.9742	38.553	30.8424	30.8424	30.8424	30.8424	30.8424
The plasterboard		66.7575	53.406	26.703	13.3515	13.3515	26.703	26.703
Absorbent ceiling		122.124	193.363	142.478	162.832	173.009	193.363	193.363
Wooden flooring, parquet on ax		36.0912	30.076	18.0456	15.038	15.038	18.0456	18.0456
Bricks, not plastered		6.0152	6.0152	9.0228	12.0304	15.038	21.0532	21.0532
Openings		41.22	41.22	41.22	41.22	41.22	41.22	41.22
Row of people sitting from 0.9 m to 1.2 m (public); maximum typical		6	7	8	9	9	9	9
Individual to a group, seated, 1 every 6 m2 in area; typical maximum		14.4	54	96	108	114	120	120
Total		443.3221	582.5532	567.0618	637.3943	657.0089	727.0172	727.0172
			Air attenuation coefficient					
			0.0001	0.000275	0.00063	0.00115	0.00325	0.01125
			Total absorption					
			Band [Hz]					
Volume [m3]		2500	125	250	500	1000	2000	4000
Average (area-weighted) absorption coefficient			0.19143	0.251552	0.244862	0.275232	0.283702	0.313932
Reverberation time [s]			0.902279	0.686633	0.70539	0.627555	0.60882	0.550193
			0.811212	0.593673	0.609092	0.528416	0.49677	0.406067



IUAV: MASTERS IN ARCHITECTURE - MICHAELLA HADJIHANNA

CHIESA DELLE TERESE
VENEZIA

INTERIOR DESIGN AND STAGING - *PROFESSOR: MARCO MAGNI*

BUILDING PHYSICS AND ENERGY SYSTEMS - *PROFESSOR: MASSIMILIANO SCARPA*

ARCHITECTURAL TECHNOLOGY - *PROFESSOR: DARIO TRABUCCO*