

**HEALTHY  
BUILDINGS  
DESIGN  
COMPETITION  
2025**

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**TRANSFORMING SCHOOLS  
FOR A SUSTAINABLE FUTURE**

# **FIRST WEBINAR HBDC 2025**

**27 NOVEMBER 2024**

# AGENDA:

- Presentation of the competition
- 

Atze Boerstra

- Presentation of the renovation project
- 

Livio Mazzarella

- Questions and answers



**Launch of the first  
Edition sponsored by  
VELUX**

**Launch of the second  
Edition sponsored by  
SMAY**

2021

2022

2024

2025

**Final during CLIMA  
2022, in Rotterdam**

**Final during CLIMA  
2025, in Milan**



**3 TEAMS WILL BE  
SELECTED TO JOIN  
AND DEFEND THEIR  
PROJECT**

**Presentation of the competition**

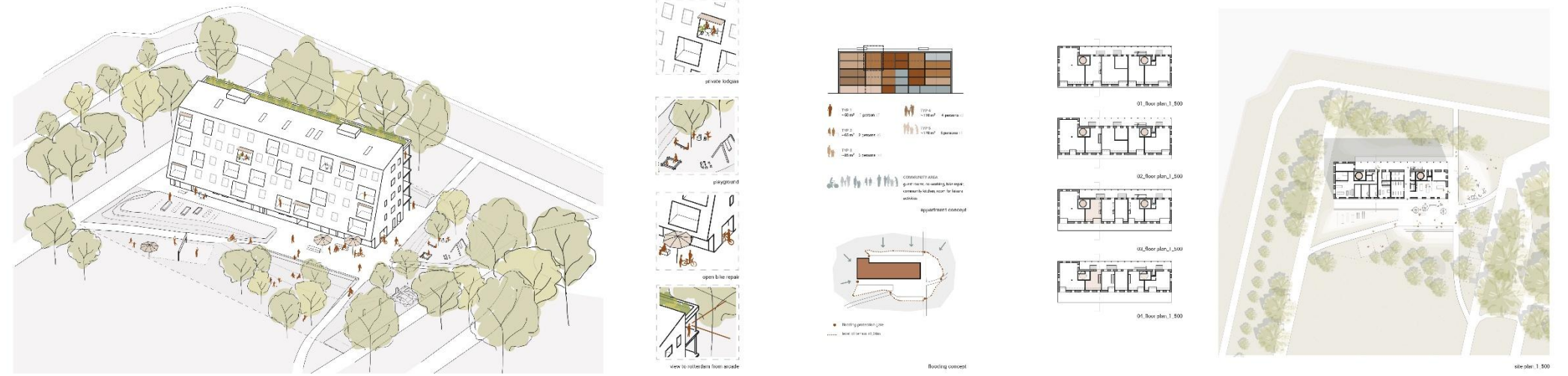
**Atze Boerstra**



# 2022 Edition winners

top 3 projects available here:

<https://www.healthybuildingsdesigncompetition.com/edition-2022-winners-presentations>

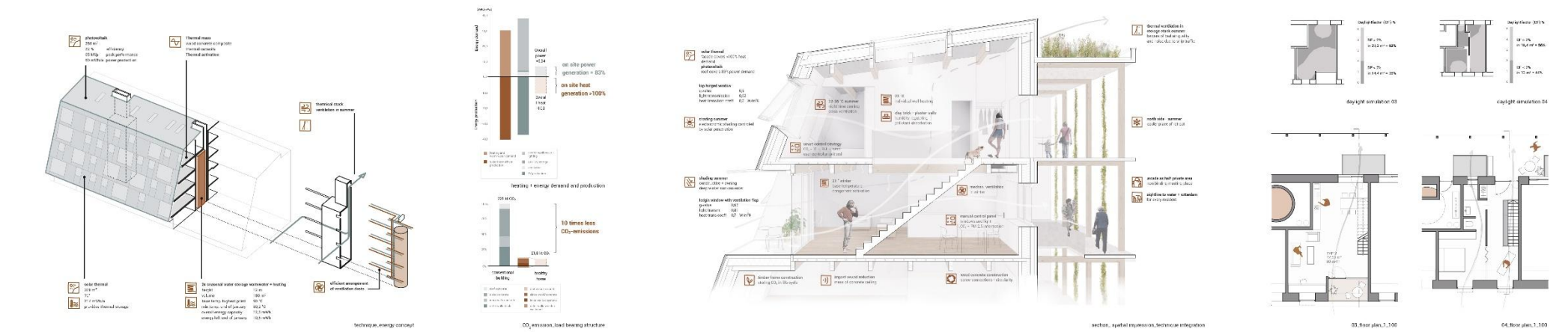


## HORIZONTAL LIVING

HEALTHY HOMES DESIGN COMPETITION

levin kimmerle\_martina heilig\_LKMH

- air quality** 100% fresh air supply, 100% fresh air volume, 100% fresh air volume, 100% fresh air volume
- control** 100% control, 100% control, 100% control, 100% control
- sight lines** 100% sight lines, 100% sight lines, 100% sight lines, 100% sight lines
- daylight** 100% daylight, 100% daylight, 100% daylight, 100% daylight
- climate** 100% climate, 100% climate, 100% climate, 100% climate
- energy** 100% energy, 100% energy, 100% energy, 100% energy
- social** 100% social, 100% social, 100% social, 100% social
- heating** 100% heating, 100% heating, 100% heating, 100% heating
- noise** 100% noise, 100% noise, 100% noise, 100% noise
- overheating** 100% overheating, 100% overheating, 100% overheating, 100% overheating
- ventilation** 100% ventilation, 100% ventilation, 100% ventilation, 100% ventilation



# Presentation of the competition

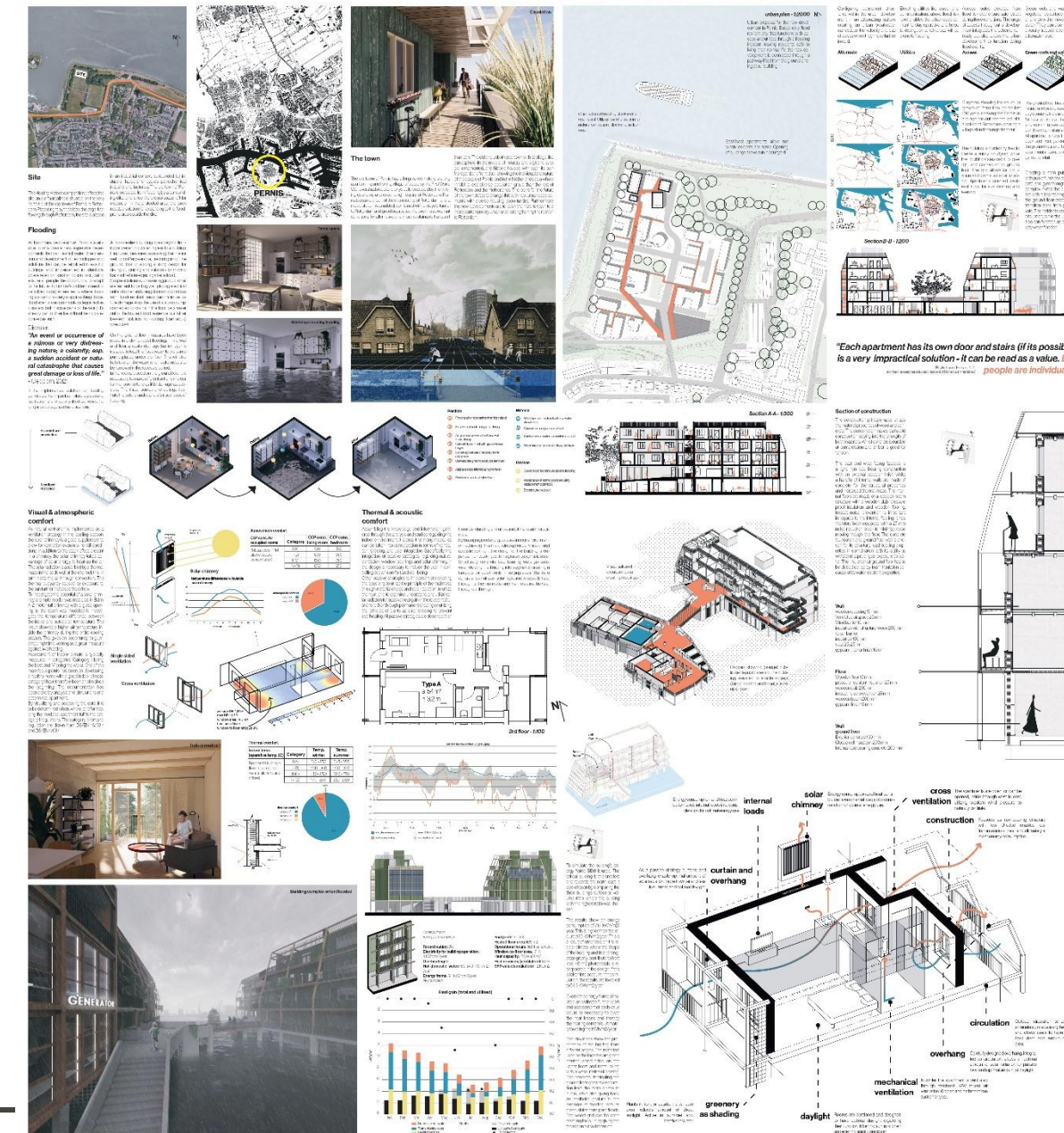
# Atze Boerstra

## 2022 Edition winners

top 3 projects available here:

<https://www.healthybuildingsdesigncompetition.com/edition-2022-winners-presentations>

# HEALTHY AND RESILIENT HOMES



## Presentation of the competition

## Atze Boerstra

# Competition challenges & focus points

## HBDC objectives:

- Health, Comfort, Sustainability, and Resilience
- Optimal Learning Conditions
- Quality of Life and Wellbeing

CHALLENGE	MAXIMUM POINTS
Architecture, engineering, and construction	25
Energy performance	25
IEQ and health	35
Thermal comfort - 30%	
IAQ - 30%	
Lighting - 30%	
Acoustics-Noise - 10%	
Affordability and viability	10
Innovation	5
<b>TOTAL</b>	<b>100</b>

Presentation of the competition

Atze Boerstra

# Main points in the Design brief:

For the IEQ & Health (p.14-15), focus on:

- Thermal comfort (operative temperature)
- Indoor Air Quality: exposure to bioeffluents/CO<sub>2</sub>, fine particles, chemicals, etc'
- Daylight Factor (solar shading, windows,...)
- Noise & sound

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Presentation of the competition

Atze Boerstra



## Main points in the Design brief:

For the Energy Performance (p.16-17), focus on:

- Calculated annual energy use for the following services: space heating, space cooling, domestic hot water, ventilation, and built-in lighting.
- Total CO<sub>2</sub> Emissions with and without compensation and exported energy

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Presentation of the competition

Atze Boerstra



# Main points in the Design brief:

For the Economic viability (p.18), focus on:

- Construction cost
- Enhancement of the quality of life while staying affordable?

+ INNOVATION (p.19-23)

- Out of the box indoor climate concepts
- Advanced lighting solutions
- New hybrid ventilation approaches

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Presentation of the competition

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# Submission summary & timeline

Two documents needed: Technical Volume & Summary for Public Release (=Poster)

## Technical volume requirements

- Written in English
- Documents in PDF
- The URN number (ID code) should be indicated
- Max 40 pages

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Presentation of the competition

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# Submission summary & timeline

## Summary for Public Release (=Poster)

- If any drawings are mandated, the details will be shared in an updated Brief

### Summary for Public Release

Applicants must submit a one-page summary of their project, serving as a concise overview suitable for public dissemination. This self-contained document should distinctly identify:

- The Team's Name;
- The Institution's Name;
- The Project Title;
- The objectives of the project;
- A description of the renovation project, focusing on the modifications to the existing state and describing the methods and tools to be employed;
- The potential impact of the project (i.e., benefits, outcomes); Supporting visual resources (e.g., sketch, schematics, drawing, rendering, etc.) are to be included.

A0 Poster



Importantly, this document should refrain from including any proprietary or sensitive business information, as REHVA and the HBDC25 Organisers may choose to make it publicly available post the selection process. The project summary must adhere to a one-page limit when printed on standard DIN A4 paper with 1 cm margins (top, bottom, left, and right), utilizing a typeface not smaller than 11 points.

Presentation of the competition

Atze Boerstra

HEALTHY BUILDINGS  
design competition

# Deadline for Submission

28 Feb 2025

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Presentation of the competition

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## WINNERS Prizes

The winning team will receive € 5000\*

2<sup>nd</sup> place € 3000\*

3<sup>rd</sup> place € 1500\*

All nominee teams will get **free access to the CLIMA 2025** conference (a maximum of two team members) as well as up to three nights of hotel accommodation. Travel costs to and from Milan are not covered.

Furthermore, the nominee teams will earn a chance of seeing their project **featured in the REHVA Journal**.

*\*REHVA is not liable for tax payments etc. in the participant's local country*

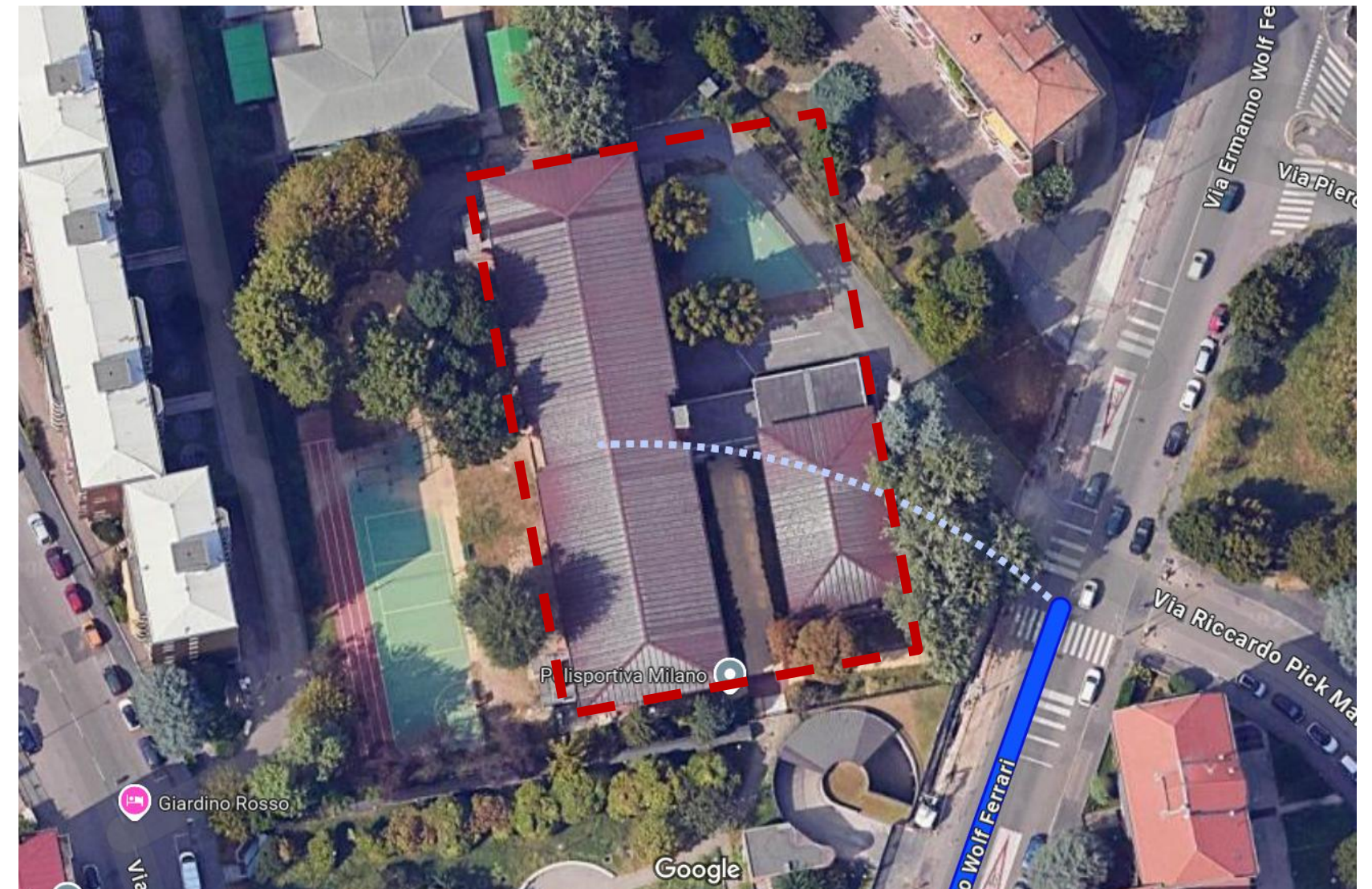
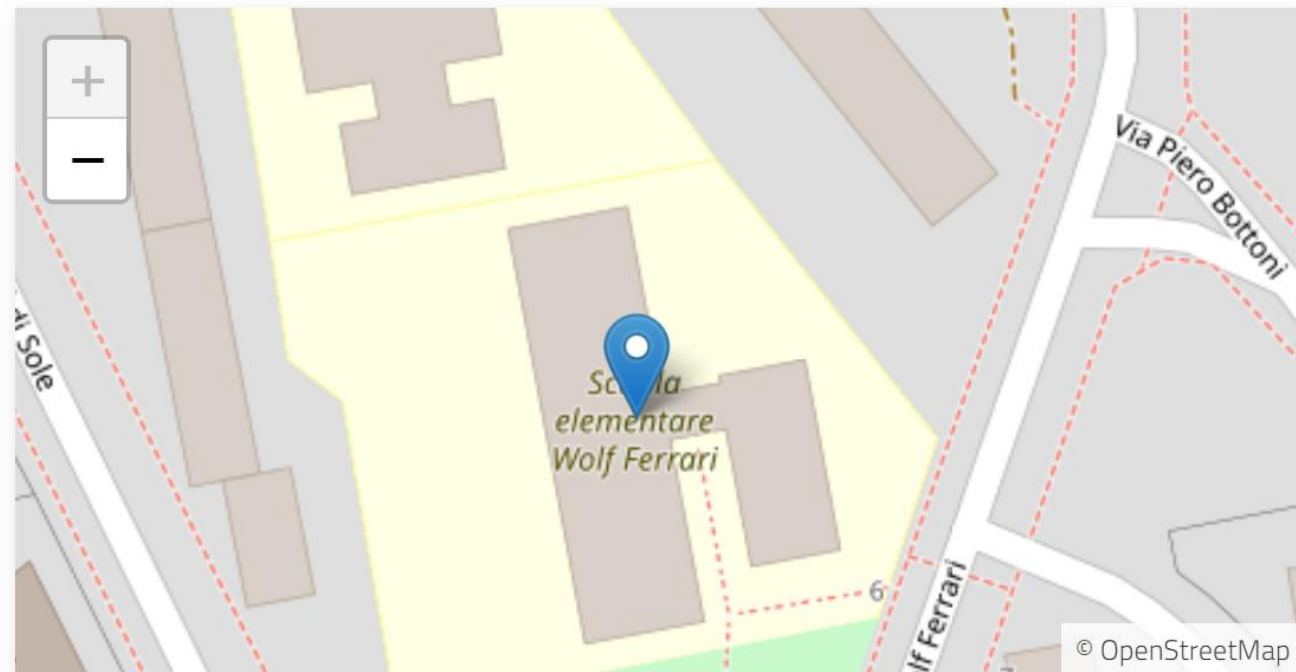
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**Presentation of the competition**

**Atze Boerstra**

# Design challenges

- Redesign of ICS Fabio Filzi -School Primary Wolf Ferrari (Milano)
- Italian school system, primary school
- Two buildings in the complex



Presentation of the renovation project **Livio Mazzarella**

# Design challenges

The district in which the school building is located (Municipality 5), is mainly residential.



## PRIMARY WOLF FERRARI

MIEE8CX022 - Primary School

Number of students	507
Number of classes	25
Average pupils/classes	20.28

Presentation of the renovation project **Livio Mazzarella**

# Description

Year of construction: 1972

Refurbishments done up to know:

- asbestos removal;
- fire prevention.

Ground floor area: about 1 400 m<sup>2</sup>

2024 Occupation data:

- 553 students; 21 classes
- about 26 students/classroom

Building Site: Milan

Degree days: 2404

Heating season: 15<sup>th</sup> October till 15<sup>th</sup> April



Useful floor area	4 352	m <sup>2</sup>
Gross floor area	4 748	m <sup>2</sup>
Net volume	13 929	m <sup>3</sup>
Gross volume	16 770	m <sup>3</sup>
Shape Factor	0.47	m <sup>-1</sup>

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Presentation of the renovation project **Livio Mazzarella**

# Description

## SISTEM:

- Heating plant service room: gas boiler total 700 kW<sub>th</sub>
- Heat distribution system: water pipes
- Heat emitters: radiators
- DHW: electric boiler in each toilet

## BUILDING FABRIC

- the load-bearing structure is made of reinforced concrete
- walls made by masonry blocks
- roof made of slightly sloping sheet metal pitches
- windows with aluminum frame and single or double glass

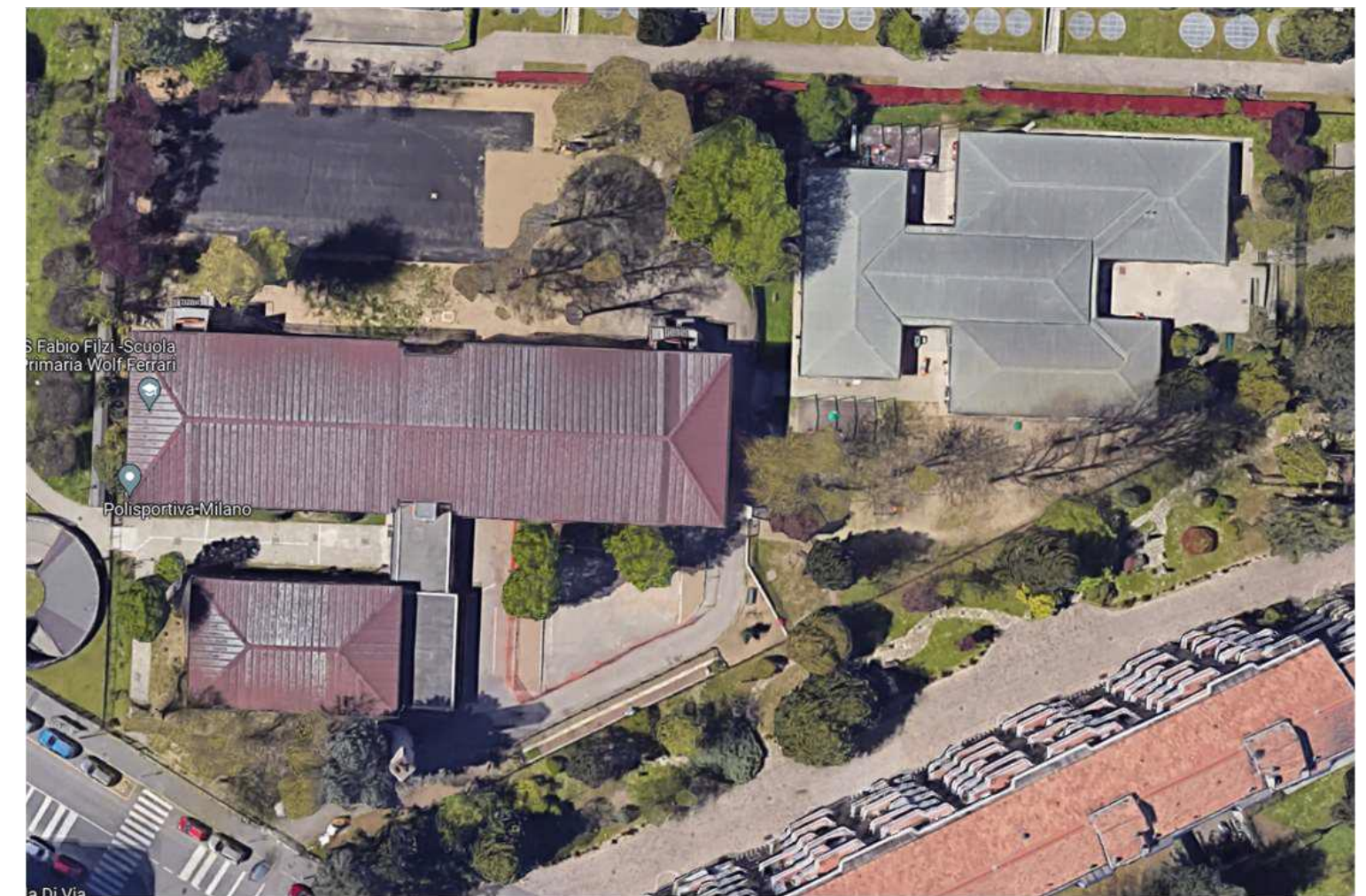


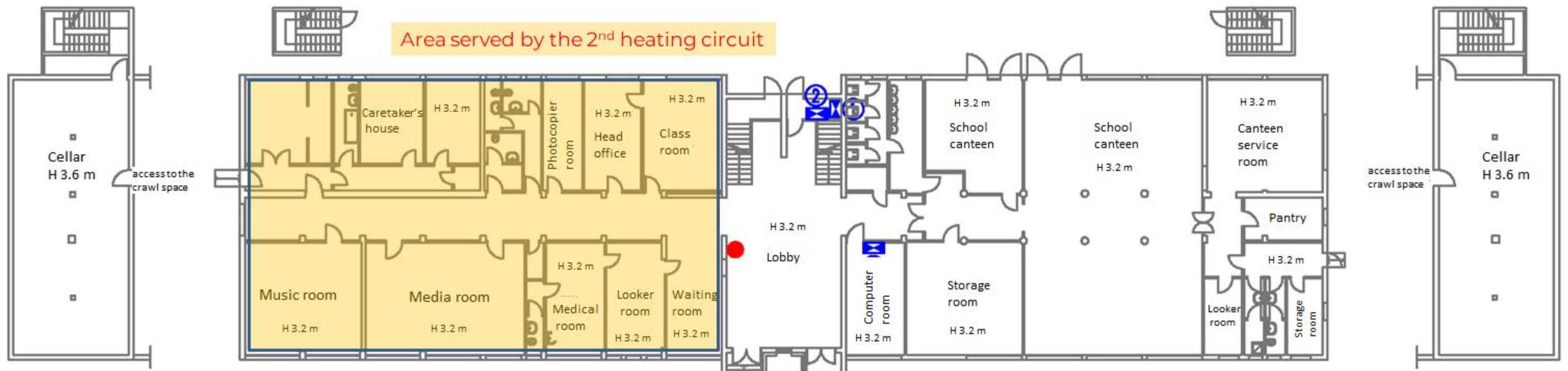
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Presentation of the renovation project **Livio Mazzarella**

## Heat generators data

- 1 condensing gas boiler of capacity 382,5 kW serving the school classrooms and services → 1<sup>st</sup> heating circuit
- 1 gas boiler of capacity 76,7 kW serving school secretariat and caretaker's house → 2<sup>nd</sup> heating circuit
- 1 gas boiler of capacity 393 kW (old as back up)



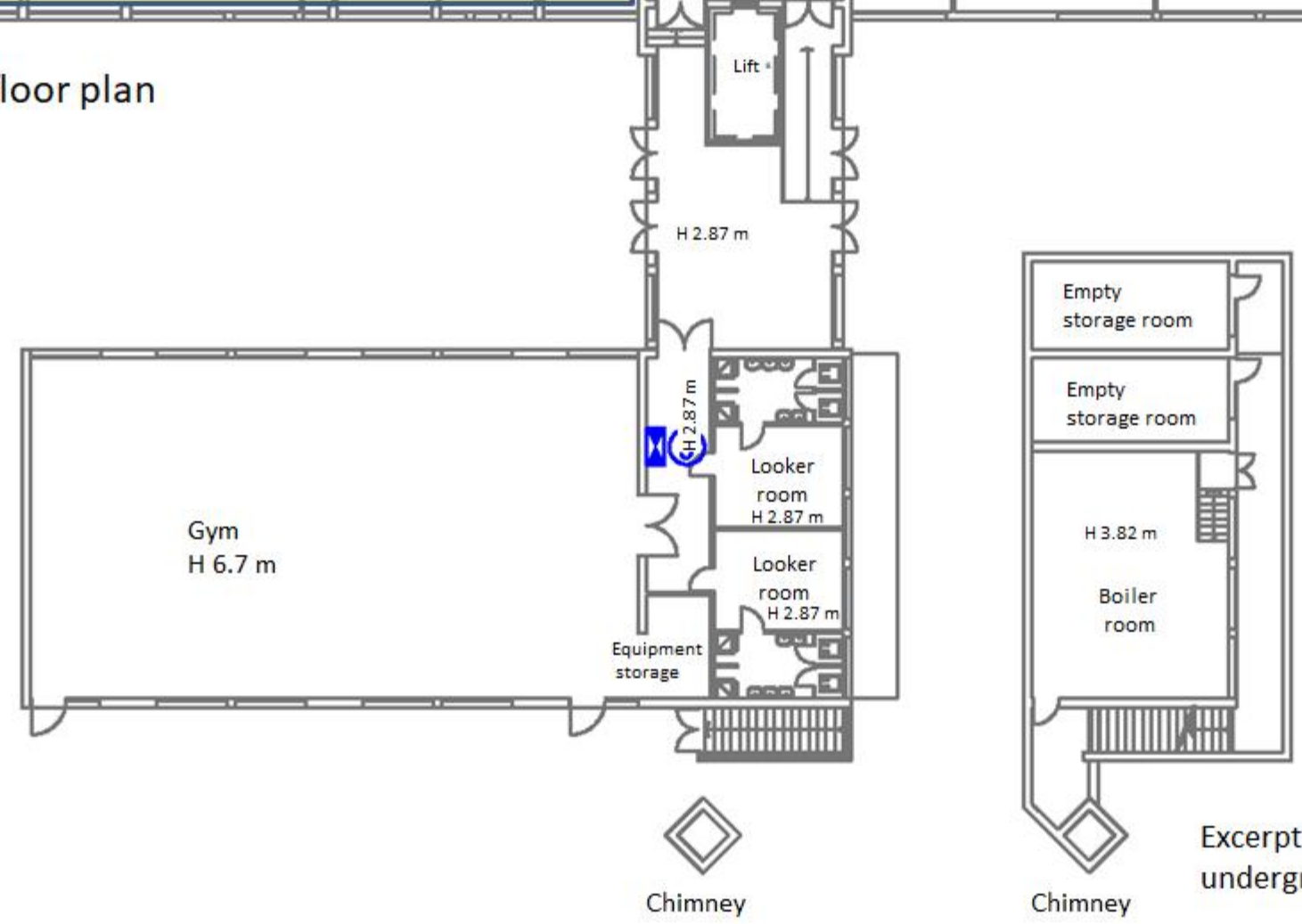


Area served by the 2<sup>nd</sup> heating circuit

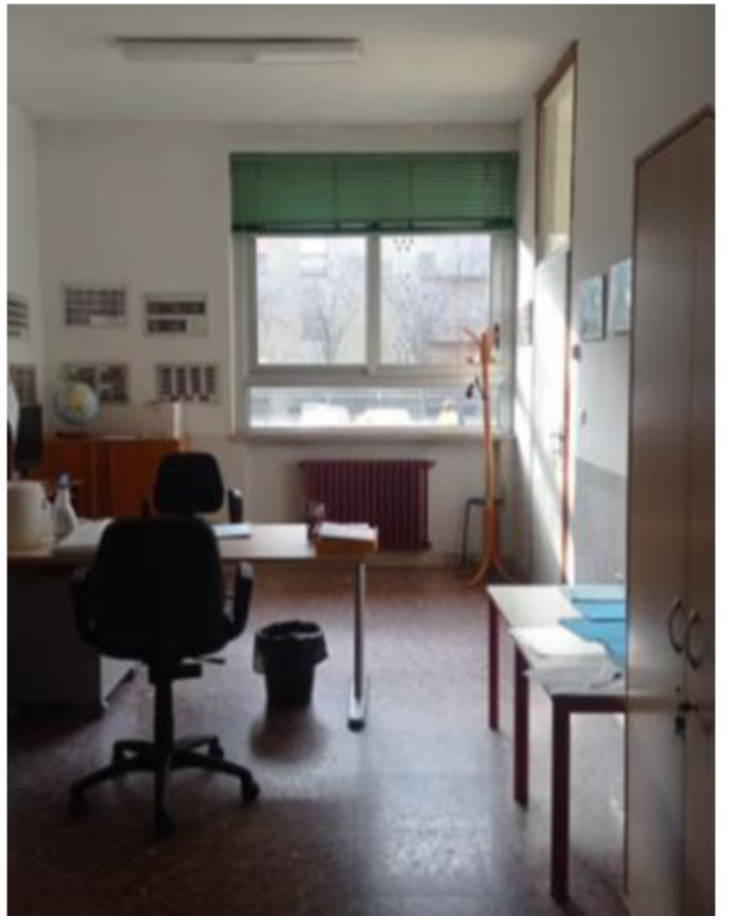
Ground floor plan

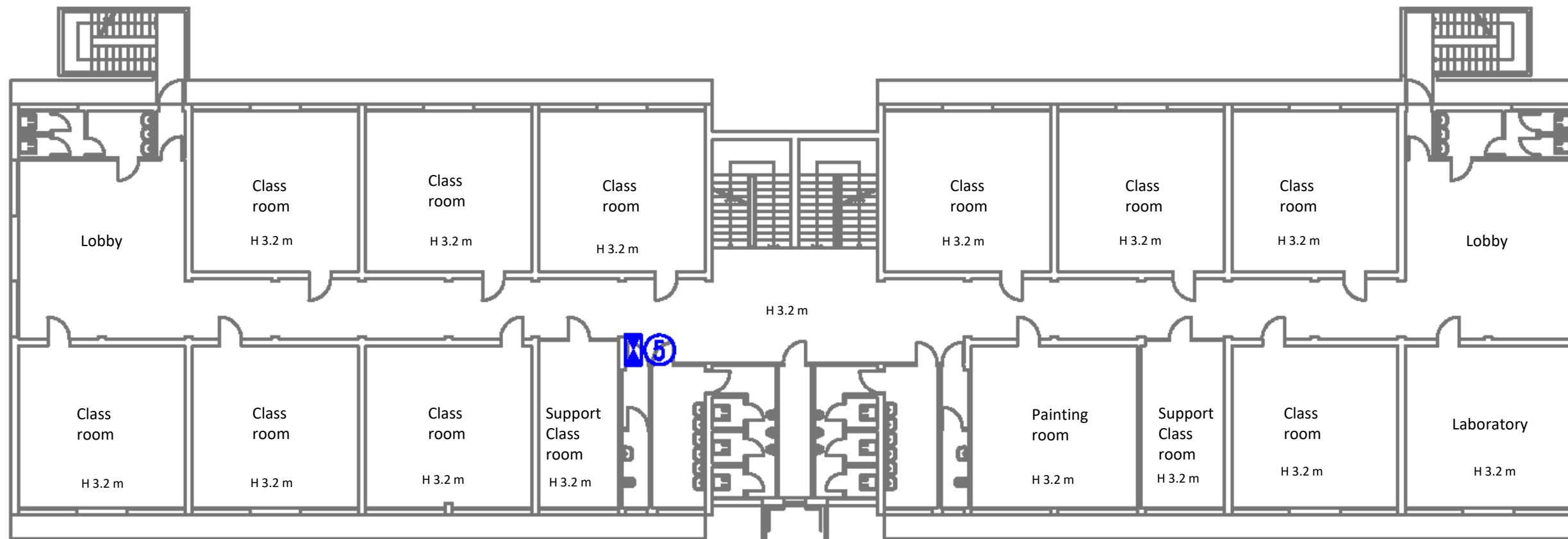
Excerpt of underground floor plan

Excerpt of underground floor plan

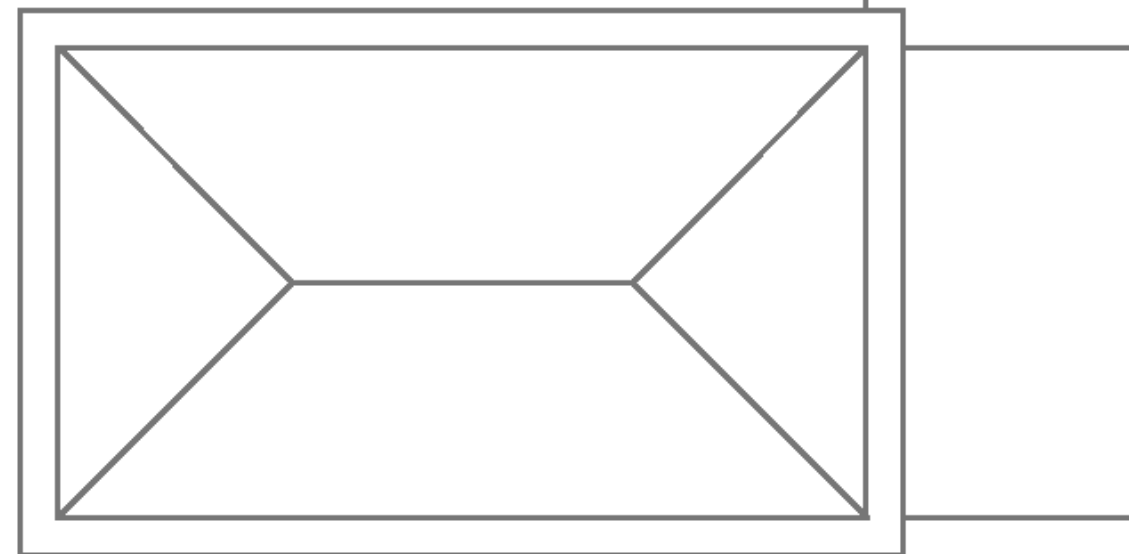


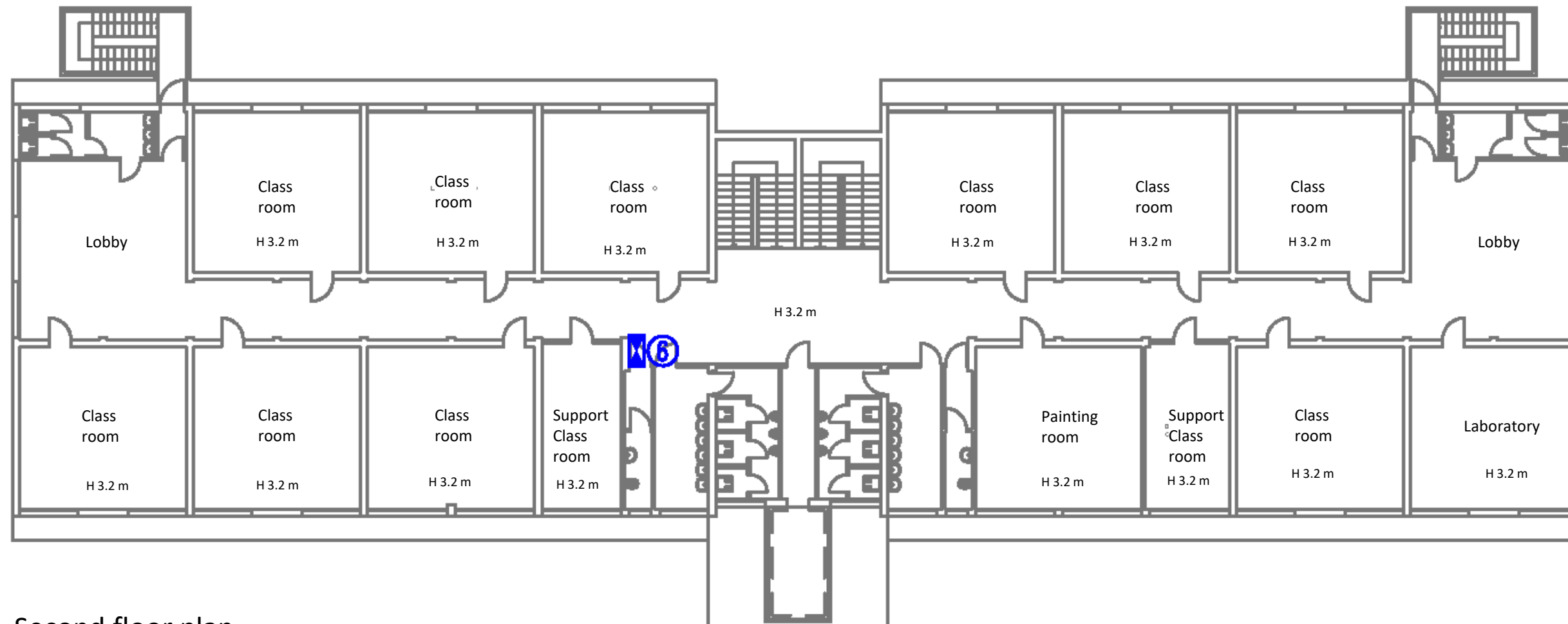
Excerpt of underground floor plan



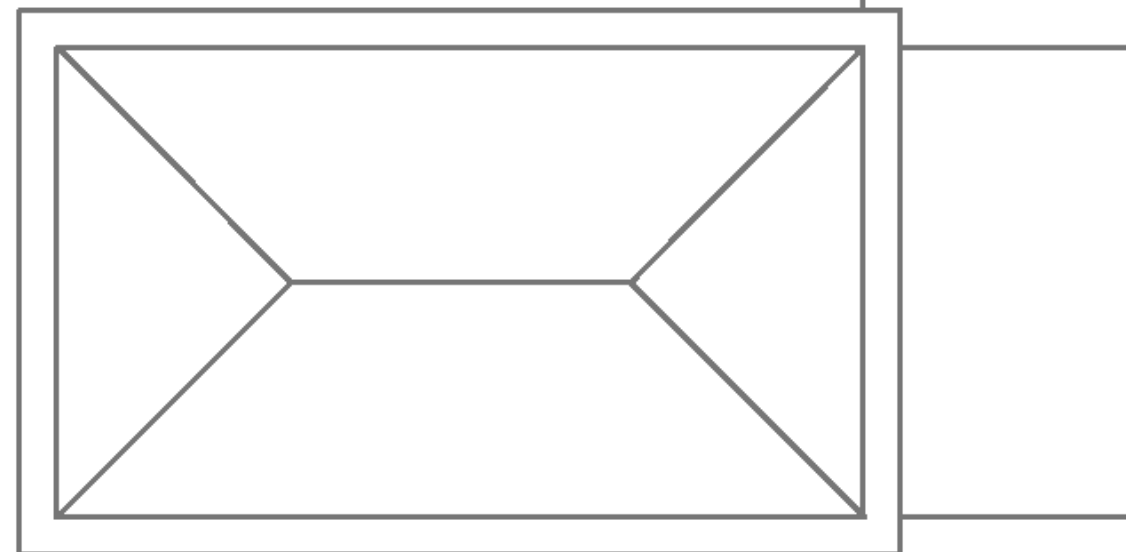


First floor plan

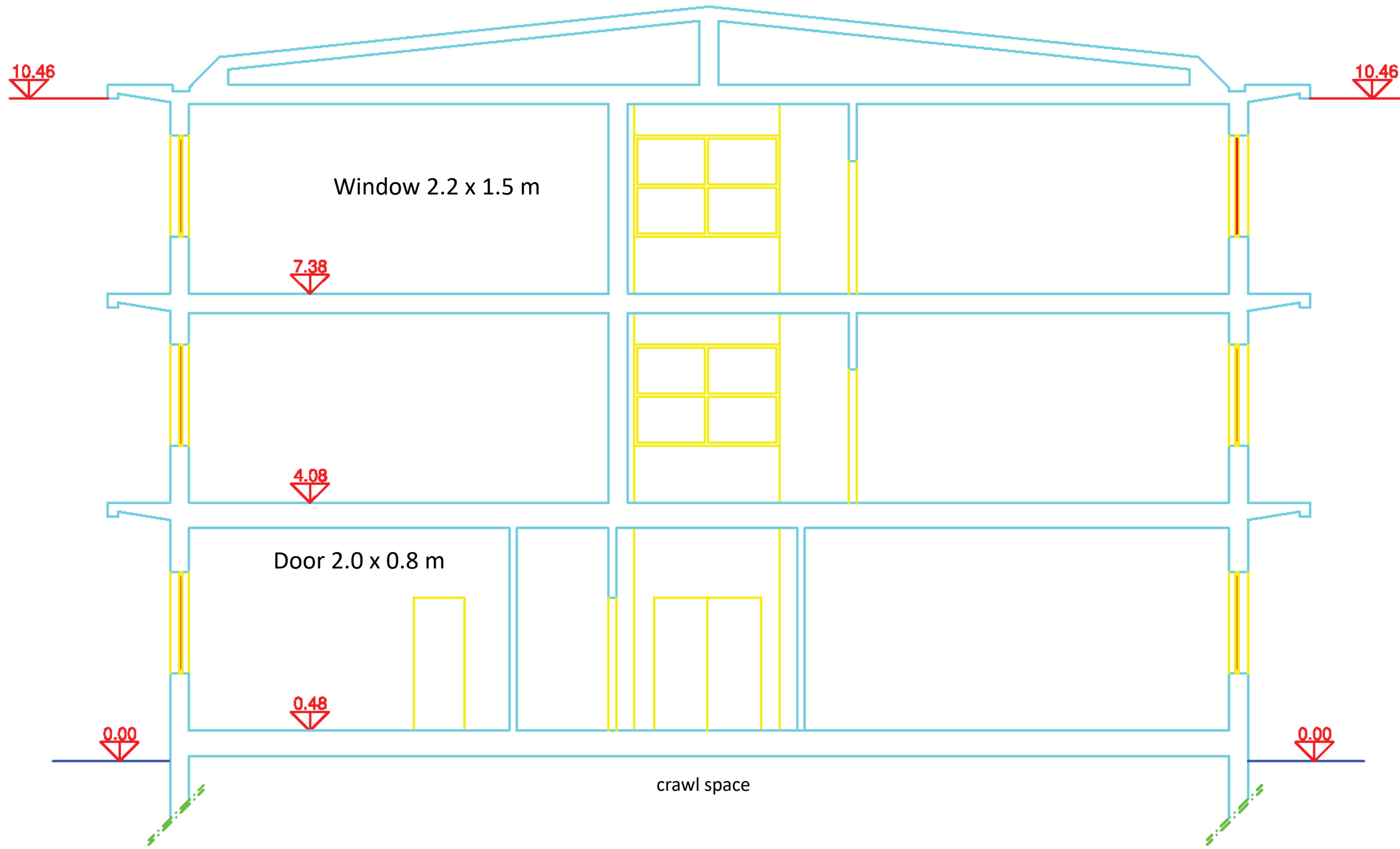




Second floor plan







## Some questions to answer

- How many students are there in each classroom?
- Do you have a view of each facade of the buildings to attribute correctly the windows?
- What is the angle made by the roof with the horizontal plan? → **7°**
- What is the detailed composition of the partition walls to tackle the acoustic problems?  
→ **Hollowed bricks 8 cm + 1 cm +1 cm plaster on both sides**
- Is there a ventilation system in the school currently? → **NO**
- What is the exact compositions of each wall (exterior), floor and roof?
- What is the type of room between the two rooms A32 (cantina and cantina abbandonata)? An under-floor vacuum? → **slab on ground**
- Is there an under-floor vacuum under the rooms A32 and the room between or is it a floor on platform for these rooms? → **slab on ground**
- What is the current heating scenario (heated rooms, unheated rooms, the heating setpoint temperatures, the reduced heating temperature, the heating schedule)? → **heating from 7 to 14 h, heating off for 14 to 7, indoor air temperature 20°C, all heated except the underground spaces**



<b>Walls</b>				
Cod.	Type	Description	U [W <sub>t</sub> /m <sup>2</sup> K]	S <sub>tot</sub> [m <sup>2</sup> ]
M1	T	T - External wall, thickness 300 mm	0,999	1667,48
<b>Total</b>				<b>1667,48</b>

<b>Floors</b>				
Cod.	Type	Description	U [W <sub>t</sub> /m <sup>2</sup> K]	S <sub>tot</sub> [m <sup>2</sup> ]
P2	G	G - Floor on vented crawl space, thickness 210 mm	0,348	1657,29
P4	U	U - Floor on cellar, thickness 210 mm	0,745	402,82
<b>Total</b>				<b>2060,11</b>

<b>Ceiling/Roof</b>				
Cod.	Type	Description	U [W <sub>t</sub> /m <sup>2</sup> K]	S <sub>tot</sub> [m <sup>2</sup> ]
S1	T	T - Flat roof, thickness 205 mm	1,463	173,96
S2	U	U - Pitched Roof with Attic, thickness 200 mm	1,452	1367,15
S3	U	U - Pitched Roof with Attic, thickness 293 mm	1,26	1013,51
<b>Total</b>				<b>2554,62</b>

<b>Thermal bridges</b>				
Cod.	Type	Description	ψ [W <sub>t</sub> /mK]	L <sub>tot</sub> [m]
Z1	-	W - Wall- Window frame	4,687	6,81
Z2	-	GF - Wall - Floor on ground	4,688	6,82
Z3	-	GF - Wall - Floor on crawl space	4,689	6,83
Z4	-	IF - Wall- Floor on heated space	4,690	6,84
Z5	-	R - Wall - Flat roof	4,691	6,85
Z6	-	R - Wall - Pitched Roof 1	4,692	6,86
Z7	-	R - Wall - Pitched Roof 2	4,693	6,87

<b>Windows</b>				
Cod.	Type	Description	U [W <sub>t</sub> /m <sup>2</sup> K]	S <sub>tot</sub> [m <sup>2</sup> ]
W1	T	P - M VS 227*(237+63)	4,687	6,81
W2	T	P - M VS 80*(240*30)	4,634	4,32
W3	T	P - M VD 90*(219*51)	3,343	12,15
W4	T	P - M VD 170*(220*50)	3,340	27,54
W5	T	F - M VD 85*270	3,293	9,20
W6	T	F - M VD 110*270	3,351	5,94
W7	T	F - M VD 175*270	3,304	14,19
W8	T	F - M VS 120*(237+63)	4,570	7,20
W9	T	F - M VS 245*180	4,633	17,64
W10	T	F - M VS 355*180	4,661	25,56
W11	T	F - M VS 265*180	4,645	19,08
W12	T	F - M VS 340*180	4,631	6,12
W13	T	F - M VS 280*180	4,625	5,04
W14	T	F - M VS 470*135	4,677	6,35
W15	T	F - M VS 110*135	4,578	1,49
W16	T	F - M VS 225*135	4,654	3,04
W17	T	F - M VS 135*135	4,618	3,64
W18	T	F - M VS 385*135	4,630	5,20
W19	T	F - M VS 710*135	4,672	19,18
W20	T	F - M VS 200*170	4,674	3,40
W21	T	F - M VS 110*20	4,558	1,32
W22	T	F - M VS 120*20	4,575	5,76
W23	T	F - M VS 230*170	4,646	15,64
W24	T	P - M VD 175*218	2,841	15,28
W25	T	P - M VD 180*(210+90)	2,841	10,80
W26	T	P - M VD 200*210	2,840	8,40
W27	T	F - M VD 245*180	2,966	48,51
W29	T	F - M VD 50*210	2,888	2,10
W30	T	F - M VD 100*80	2,840	8,00
W31	T	F - M VD 326*160	2,969	31,32
W32	T	F - M VD 330*300	2,967	178,20
W33	T	F - M VD 90*20	2,841	24,84
W35	T	F - M VD 80*20	2,842	1,92
W37	T	F - M VD 70*300	2,900	8,40
W38	T	F - M VD 240*300	2,961	288,00
W39	T	F - M VD 230*330	2,963	55,20
W40	T	F - M VD 248*80	2,913	7,92
W41	T	F - M VD 120*20	2,839	2,88
W42	T	F - M VD 100*20	2,840	37,18
<b>Total</b>				<b>919,98</b>

LEGEND	MVD	window with double glass
	MVS	window with single glass

**Montly daily average solar irradiation**

<b>Exposition</b>	<b>u.m.</b>	<b>Gen</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>Mag</b>	<b>Jun</b>	<b>Jul</b>	<b>Agu</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
North	MJ/m <sup>2</sup>	1,6	2,3	3,7	5,3	7,6	10,0	9,4	6,7	4,5	2,6	1,5	1,3
North-East	MJ/m <sup>2</sup>	1,8	3,0	5,3	8,0	10,2	12,7	12,6	9,8	7,1	3,4	1,7	1,4
Esst	MJ/m <sup>2</sup>	4,1	5,8	8,6	11,0	12,5	14,7	15,2	12,9	10,9	6,0	3,4	3,0
South-East	MJ/m <sup>2</sup>	7,4	8,7	10,8	11,7	11,7	13,0	13,6	12,8	12,7	8,3	5,7	5,4
South-East	MJ/m <sup>2</sup>	9,6	10,4	11,4	10,5	9,7	10,4	10,8	11,0	12,4	9,4	7,1	6,9
South-West	MJ/m <sup>2</sup>	7,4	8,7	10,8	11,7	11,7	13,0	13,6	12,8	12,7	8,3	5,7	5,4
West	MJ/m <sup>2</sup>	4,1	5,8	8,6	11,0	12,5	14,7	15,2	12,9	10,9	6,0	3,4	3,0
North-West	MJ/m <sup>2</sup>	1,8	3,0	5,3	8,0	10,2	12,7	12,6	9,8	7,1	3,4	1,7	1,4
Horiz. Diffuse	MJ/m <sup>2</sup>	2,2	3,2	5,0	6,5	8,3	9,8	8,8	7,5	5,8	3,6	2,1	1,9
Horiz. Direct	MJ/m <sup>2</sup>	2,7	4,2	6,8	9,5	10,7	13,1	14,5	11,6	9,4	4,4	2,2	1,7

**Daily average outdoor air temperature and heating days in each month**

<b>Descrizione</b>	<b>u.m.</b>	<b>Gen</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>Mag</b>	<b>Jun</b>	<b>Jul</b>	<b>Agu</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
Temperature	°C	4,0	7,1	10,6	12,8	-	-	-	-	-	12,4	7,5	3,5
N° days	-	31	28	31	15	-	-	-	-	-	17	30	31



## Next Webinar:

- 4 December 2024
- 11 December 2024

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If you haven't already, register for the next ones



# Any questions?

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