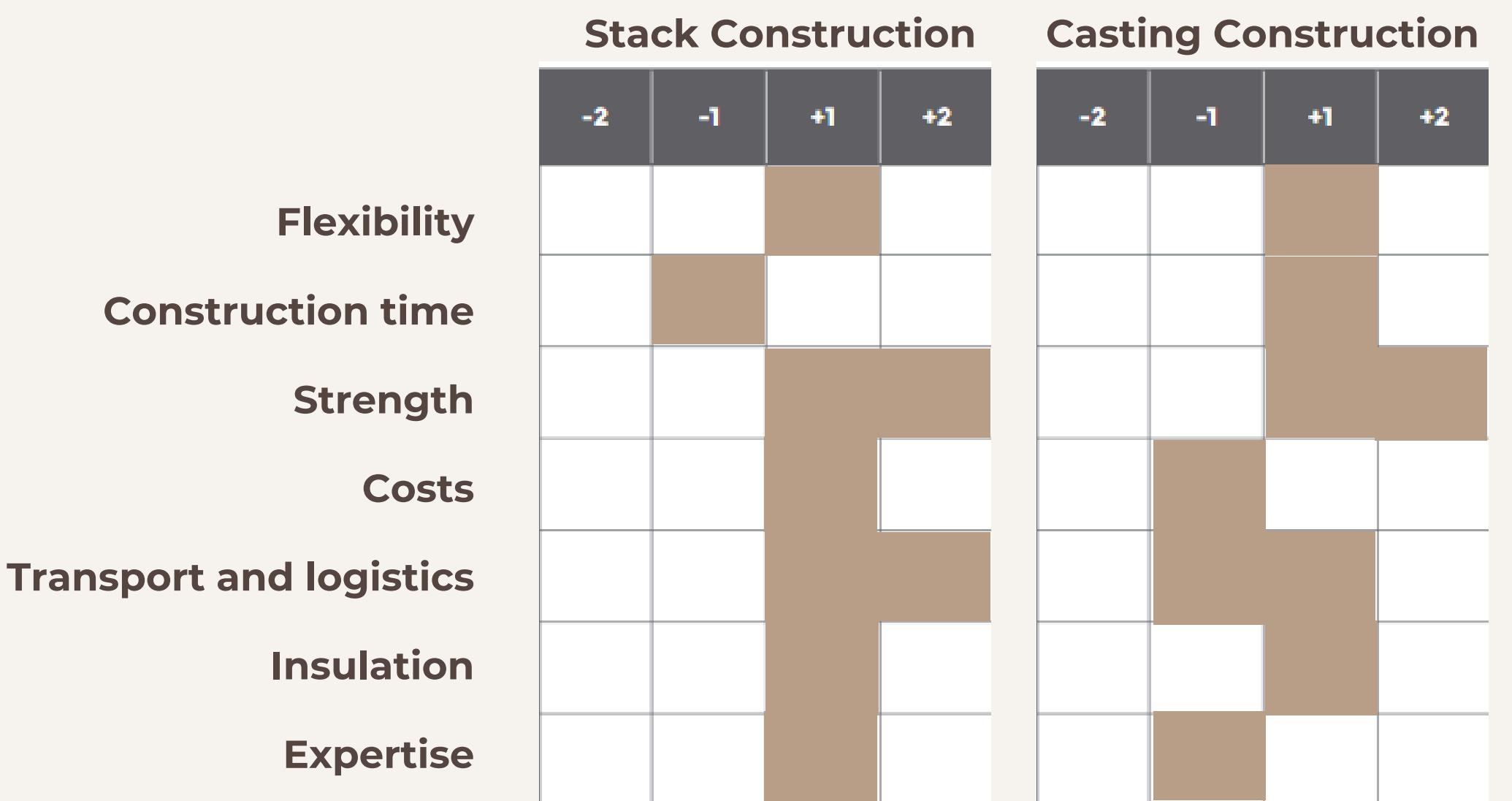




# Construction methodology



# Criteria points Harris Profile

**Flexibility:** Is the method flexible enough to make adjustments

**Construction time:** How long are you building on site with the method

**Strength:** How strong is the construction of the method

**Costs:** How much will the method cost in terms of material and equipment

**Transport and logistics:** Is it easy to transport and with as few trucks as possible

**Insulation:** How good is the thermal and sound insulation

**Expertise:** How much expertise is needed to build this method

Conclusion: Using this method of comparison, it can be seen that stack construction is better to use. This picks up the best points on the main criteria.

# Building materials



Reference: Goethe-Institut Dakar (Kéré | Work, z.d.-c)

## Stacking aerated concrete

Stacking aerated concrete is lightweight and therefore easy to handle, simplifies transport and installation, less load on the foundation and support of the structure. Aerated concrete has good insulating properties, which saves on energy costs, and ensures a stable indoor climate.

The structure of aerated concrete also provides good sound insulation, which is useful for a school. It's non-combustible thus giving it good fire resistance, which helps to improve safety. It also has a long lifespan

Aerated concrete is easy to get in Turkey. Since that's not too far away from northern Syria, we can get aerated concrete from there. Aerated concrete is not much cheaper or more expensive than normal concrete, so we don't have to worry about much higher costs.

(ConversieWebsite, 2023)

## polycarbonate sheet

A material that will be used instead of glass inside window frames, which is easily bendable and transparent.

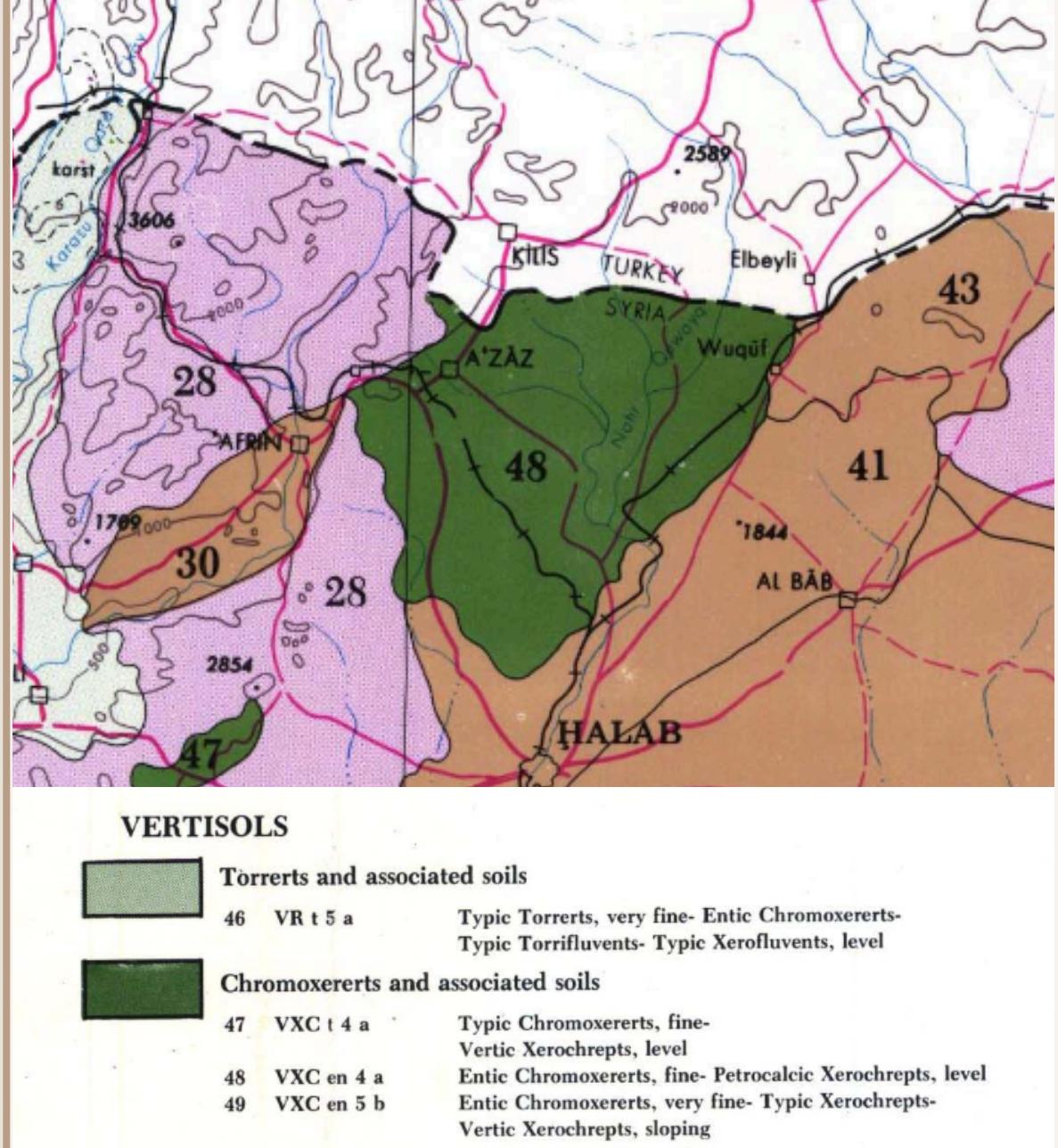


(Polycarbonaat Kanaalplaat Helder op Maat | Plexiglas.nl, 2024)

# Logistics



# Construction foundation



We are building in area 48. The legend of the picture shows that the ground where we are to build belongs to chromoxererts. Chromoxererts in turn falls under vertisols. Vertisols are soils made of clay. This makes it difficult to work with, because the soil is very poorly permeable. Xererts are the vertisols of Mediterranean climates, characterised by cool, wet winters and hot, dry summers. They have cracks that regularly close and reopen each year. Because these soils become dry every summer and moist in winter, damage to structures and roads is very significant. The native vegetation consists mainly of grasses and herbs. Because of this, it seems convenient to drill the piles. This ensures that the vibrations from piling on the dry soil are best avoided. (Vertisols, z.d.)

# Daylight

In Northern Syria, there is abundant sunlight during the day, with up to 12 hours of sunlight (refer to the text in poster 1). To take advantage of this, mashrabiya screens are used. A mashrabiya is a wall, door, or window frame with multiple small openings that allow daylight to enter the building.



## 3 GOOD HEALTH AND WELL-BEING



(Unknown, 2024)

(Caballero, 2024)

Additionally, the roof is elevated, allowing sunlight to penetrate between the facade and the roof. To prevent excessive sunlight from causing overheating, the roof extends slightly to provide sufficient shade. This extended roof also provides shade on the schoolyard, offering protection for the children when they are outside.

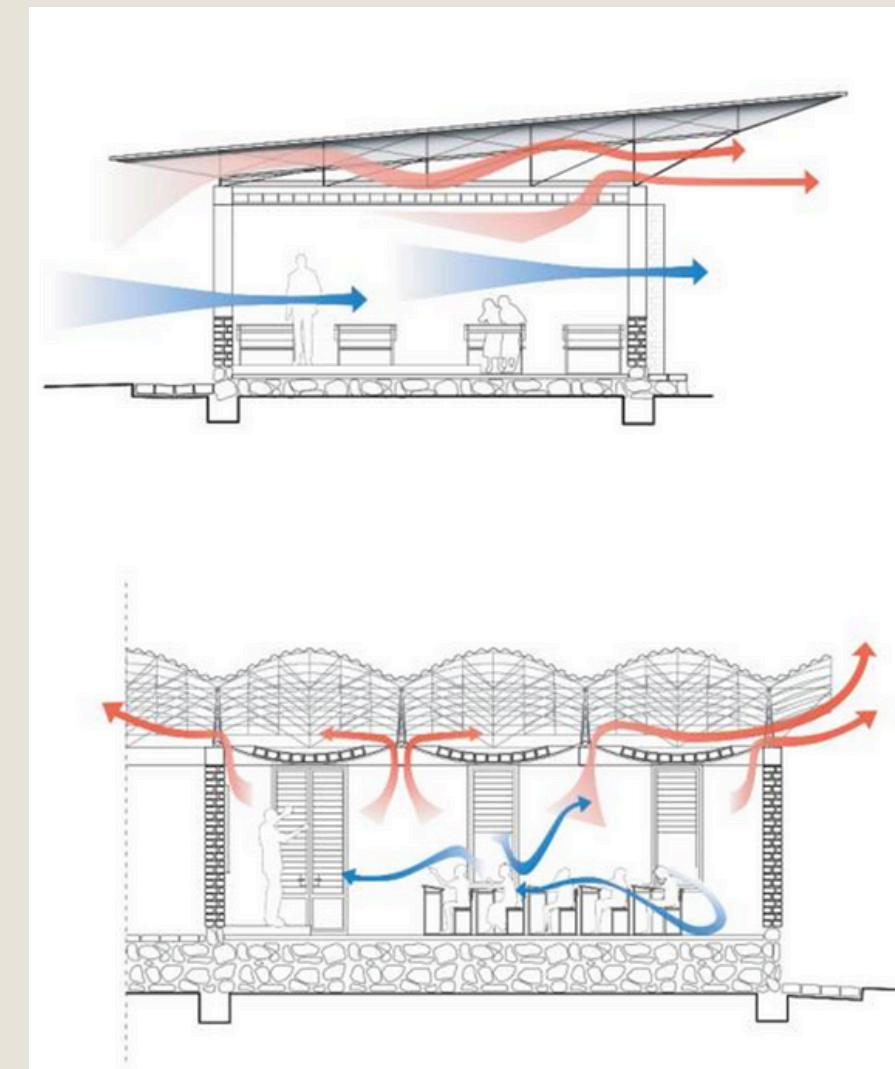
# Ventilation

## Raised roof

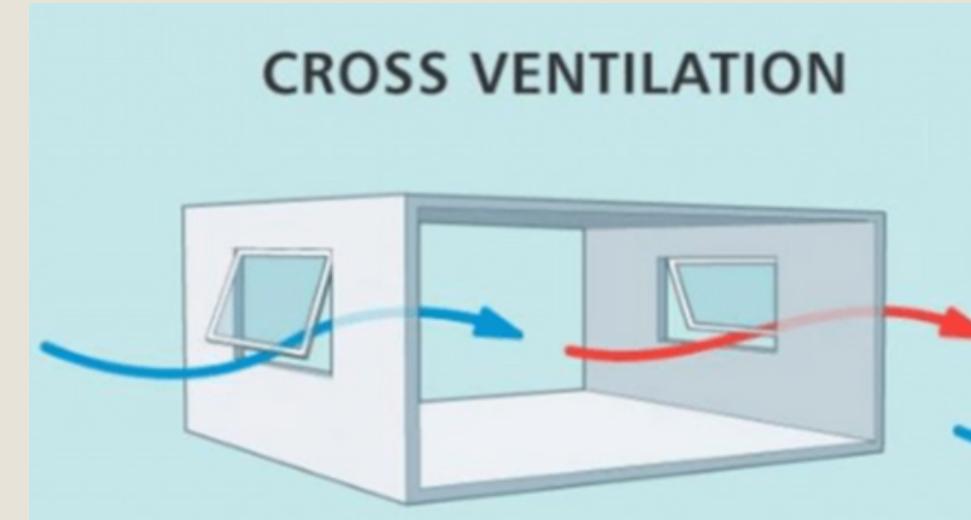
The roof utilizes a construction that creates natural ventilation. This roof is designed to allow fresh air to circulate through the building, facilitating airflow in and out of the structure. Given that the wind direction in Northern Syria is from the north, the building is oriented towards the south to ensure optimal ventilation.

## Airflow

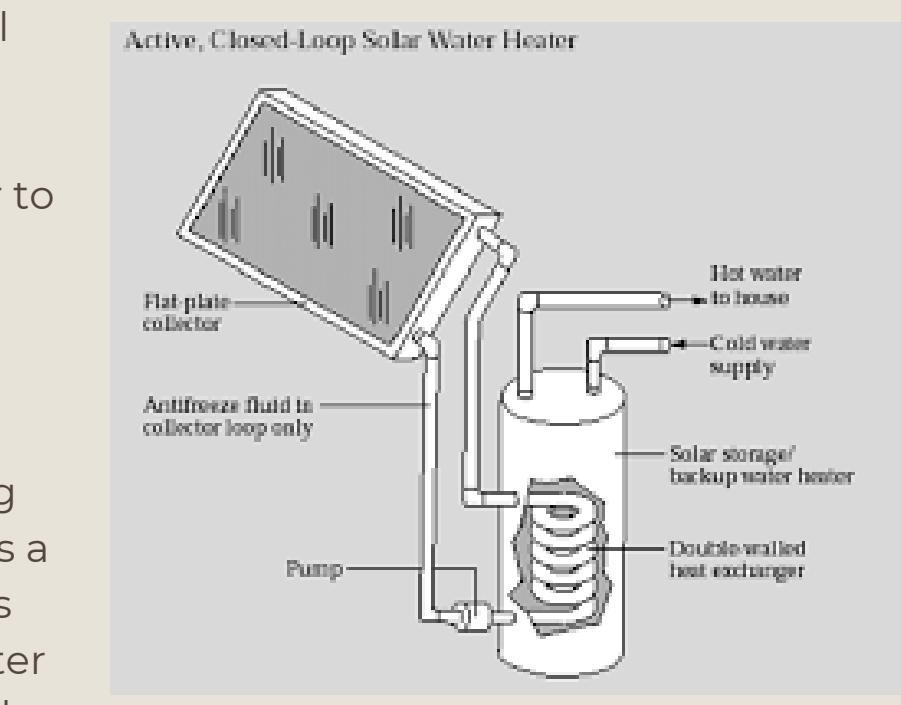
Windows and doors play a crucial role in ventilation. Through cross ventilation, a significant amount of wind can enter the building, allowing it to cool down quickly. Additionally, facades with holes are used. These holes allow a constant breeze to flow through the building, entering on one side and exiting on the other.



(Kéré | Work, z.d.-b)



(Figure 85: Cross Ventilation Direction, z.d.)



# Installations

## 7 AFFORDABLE AND CLEAN ENERGY



To provide the school with electricity, solar panels will be installed on the roof of the school building.

These not only provide electricity, but are also connected to the water pump. The violence in Syria 11 years ago severely damaged the water systems, leaving many Syrians without clean water.

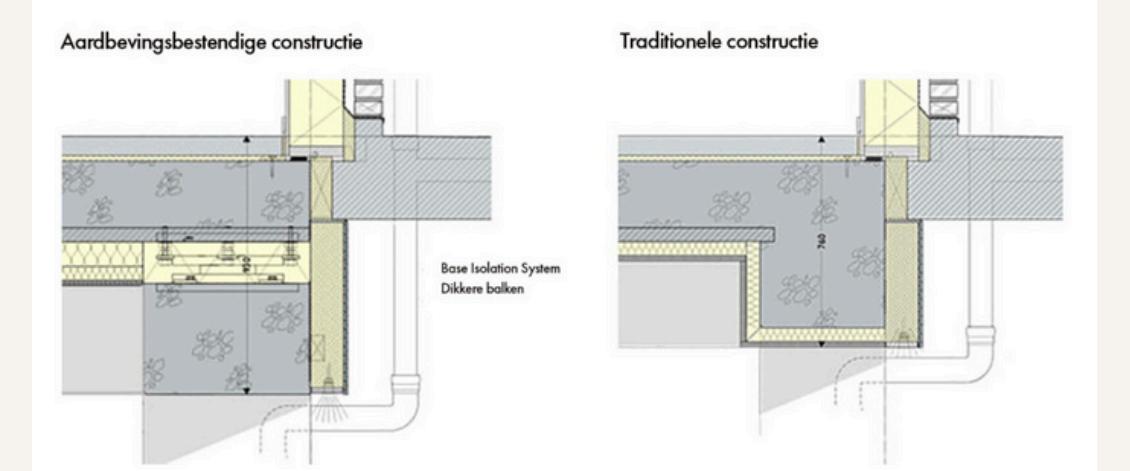
In parts of Syria there is also only 1 hour of electricity per day, which means that the water supply cannot function.

By connecting the water pump to the solar panels, energy is continuously generated, so that the water can be cleaned.



(Thwaites, z.d.)

## Earthquake resistance



We will use the Base Isolation system. In this system, dampers are used between the foundation and the building. These dampers ensure that the foundation moves with the earthquake without any problems, while the building itself stays in place. (10 Tips Voor een Aardbevingsbestendig Gebouw | Architect | KAW, 2022)

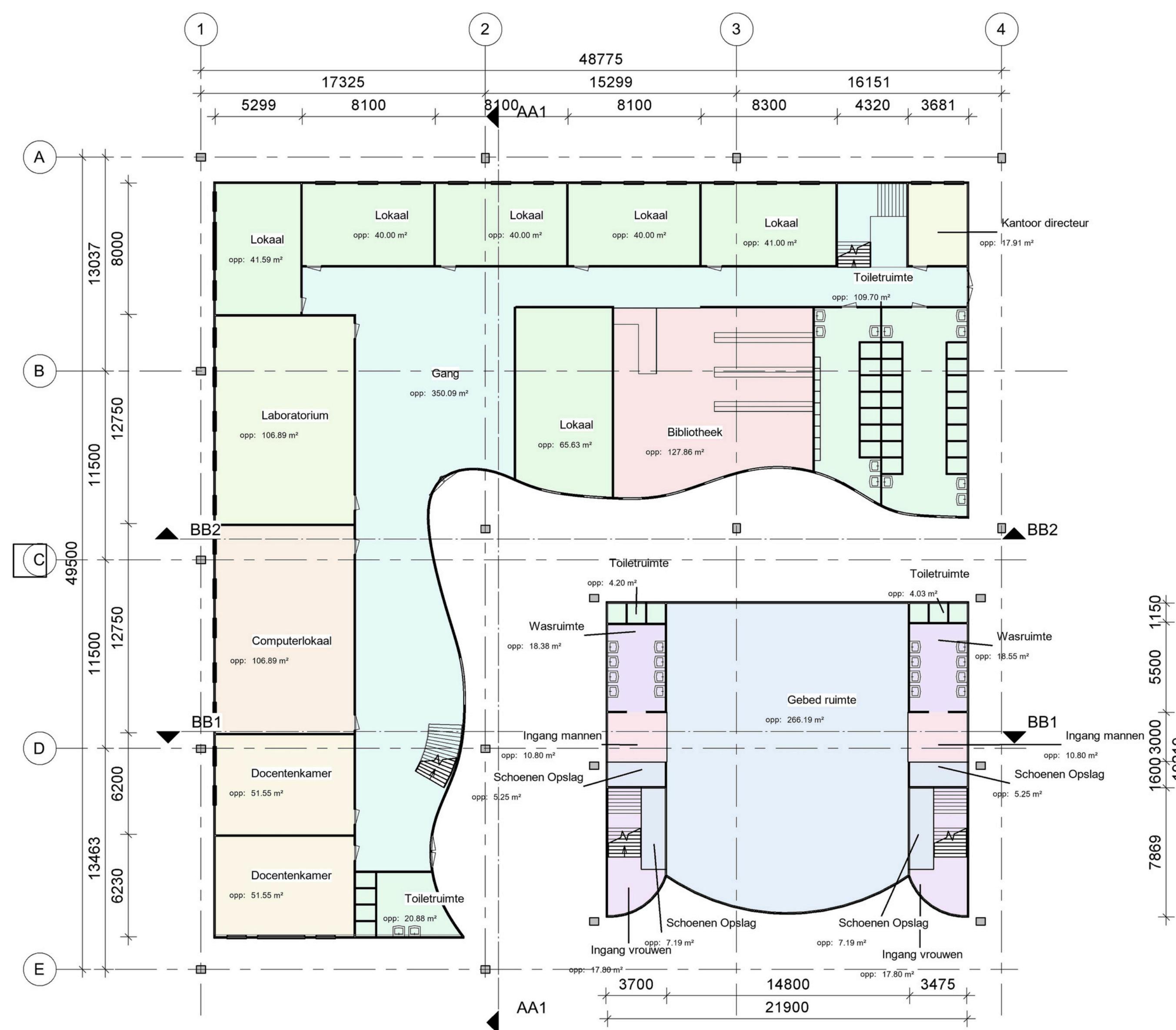
## 6 CLEAN WATER AND SANITATION



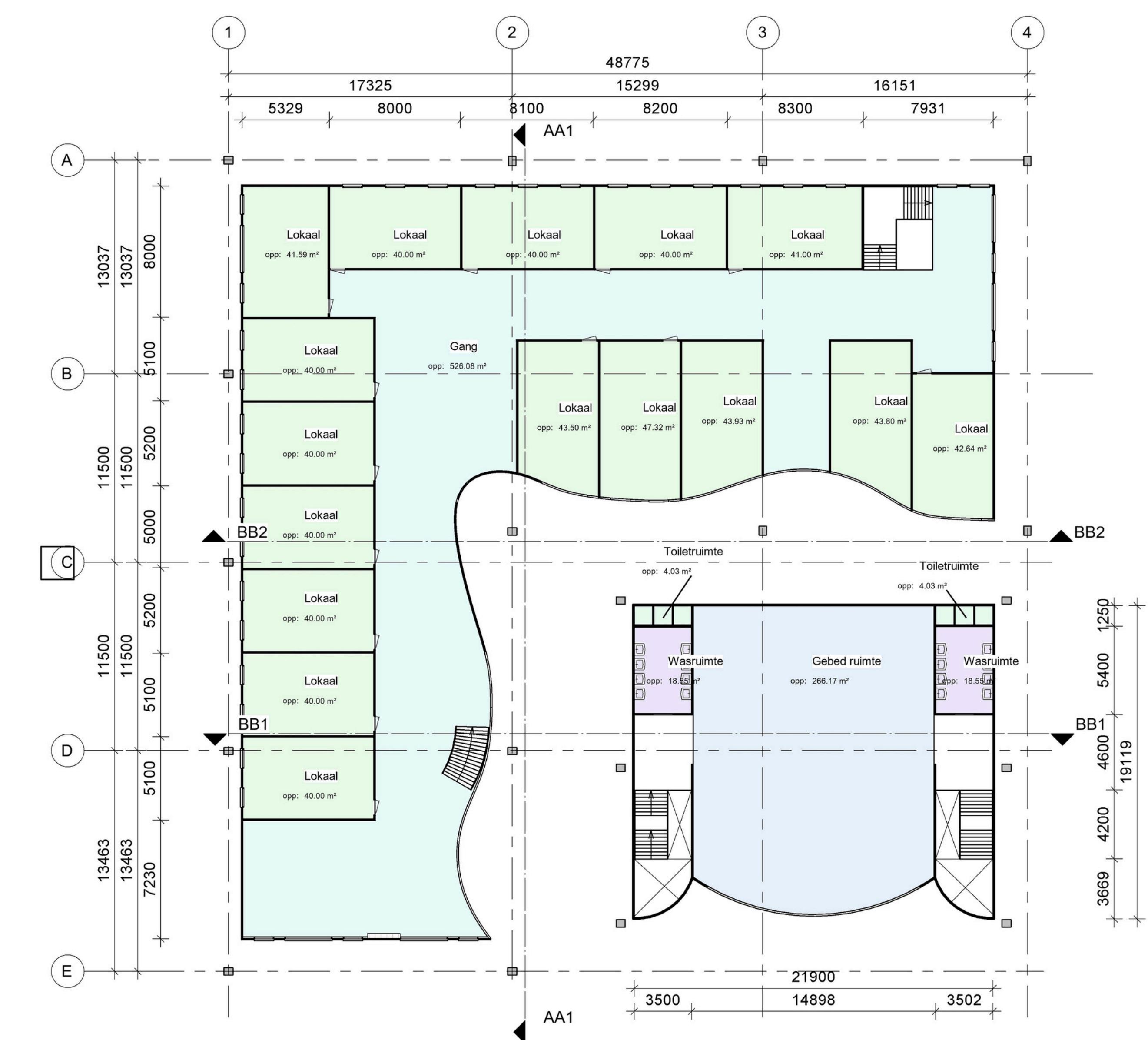
(Macy, 2022)

# DESIGN

Ground floor 1:200



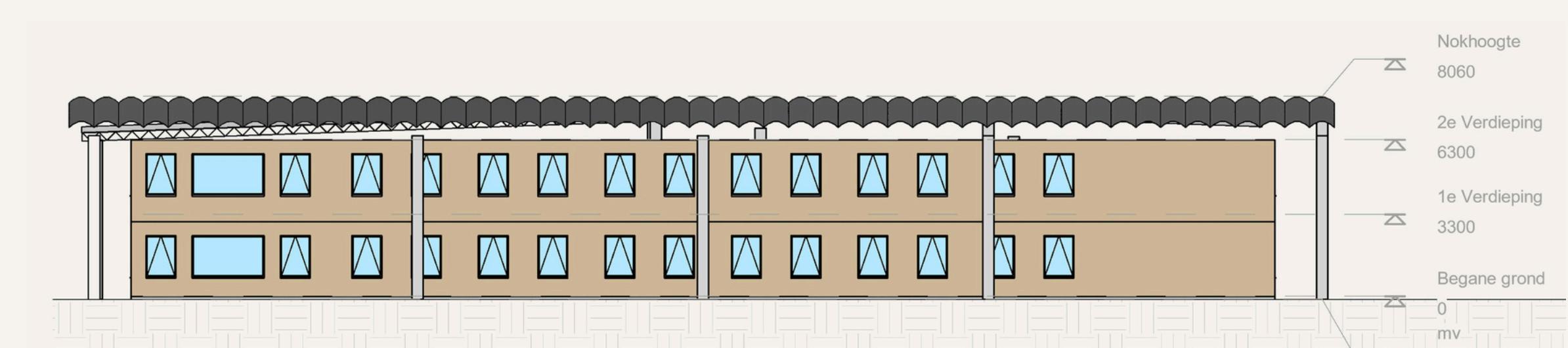
1st floor 1:200



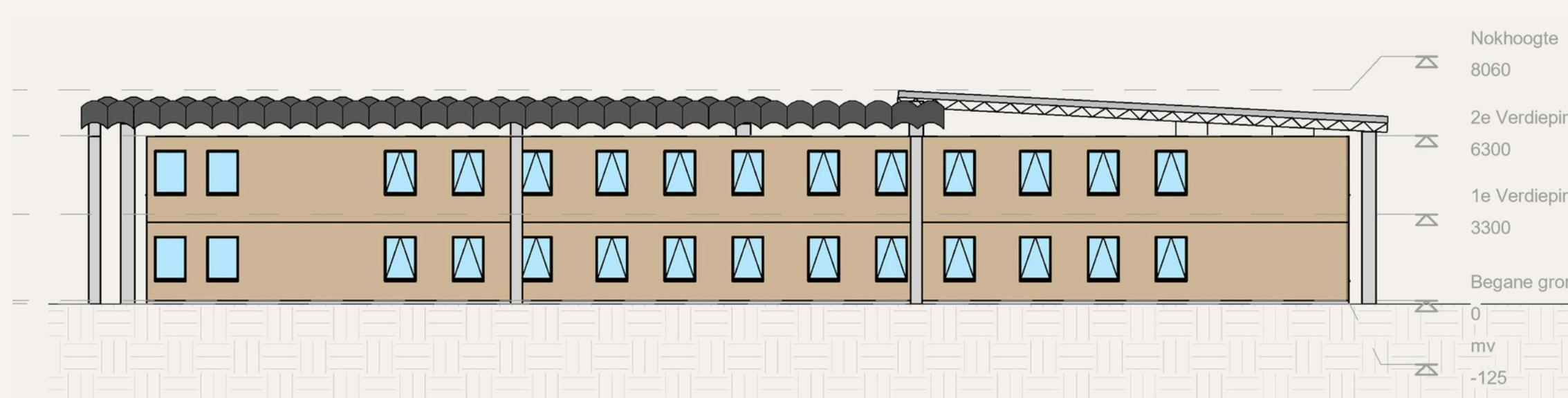
Front view 1:200



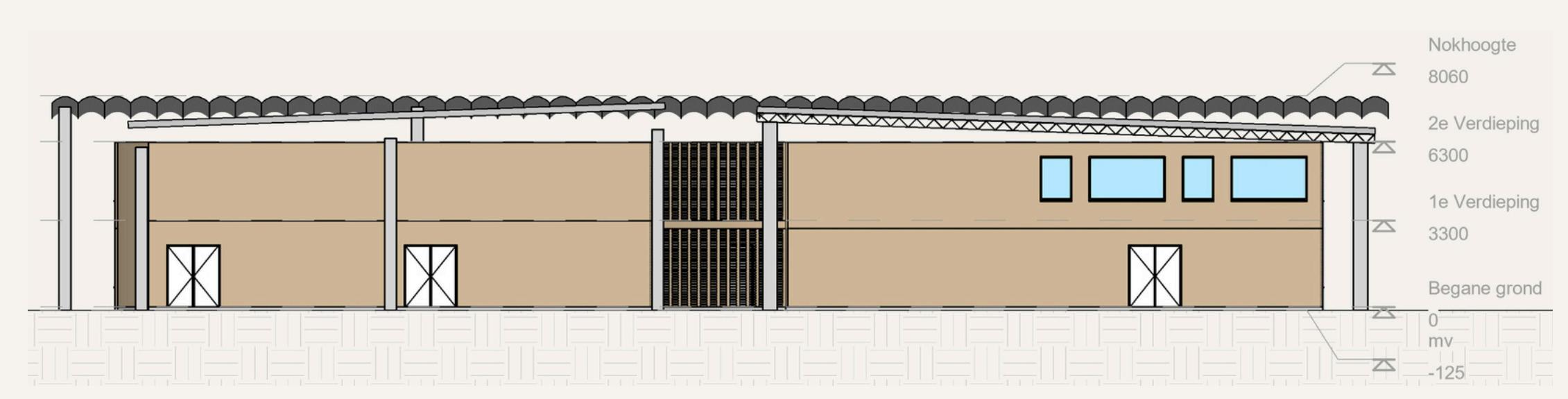
Left view 1:200



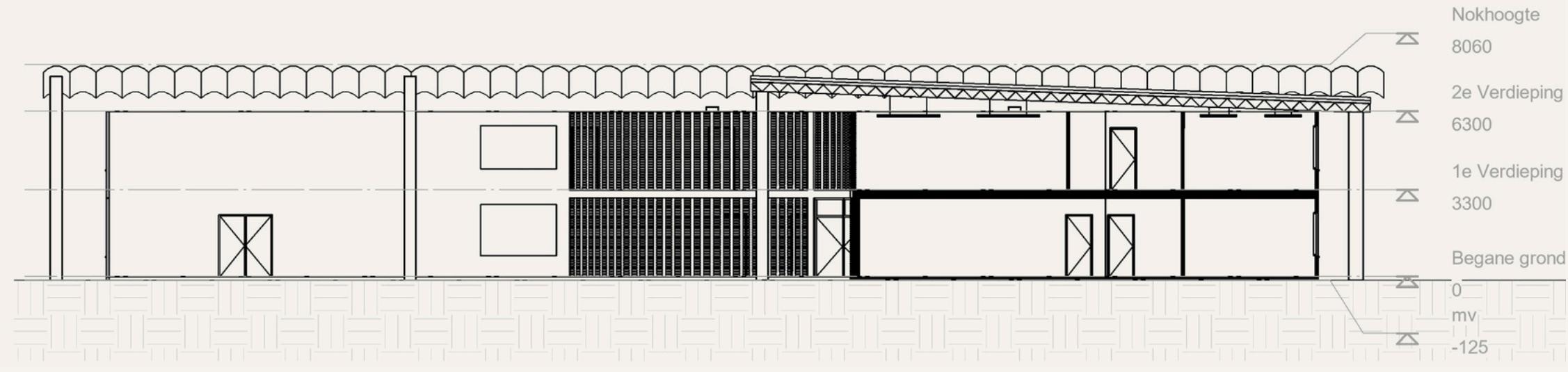
Rear view 1:200



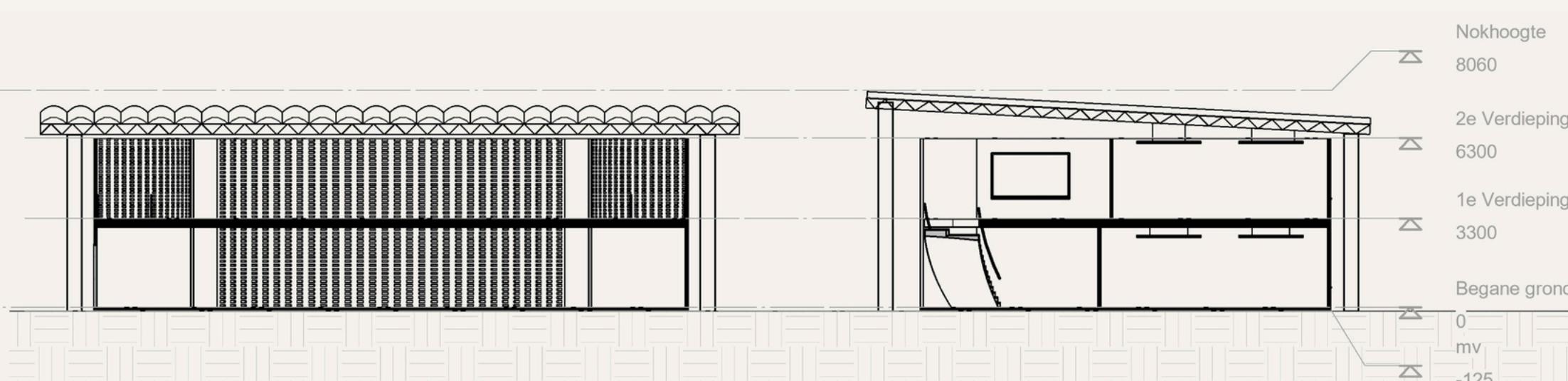
Right view 1:200



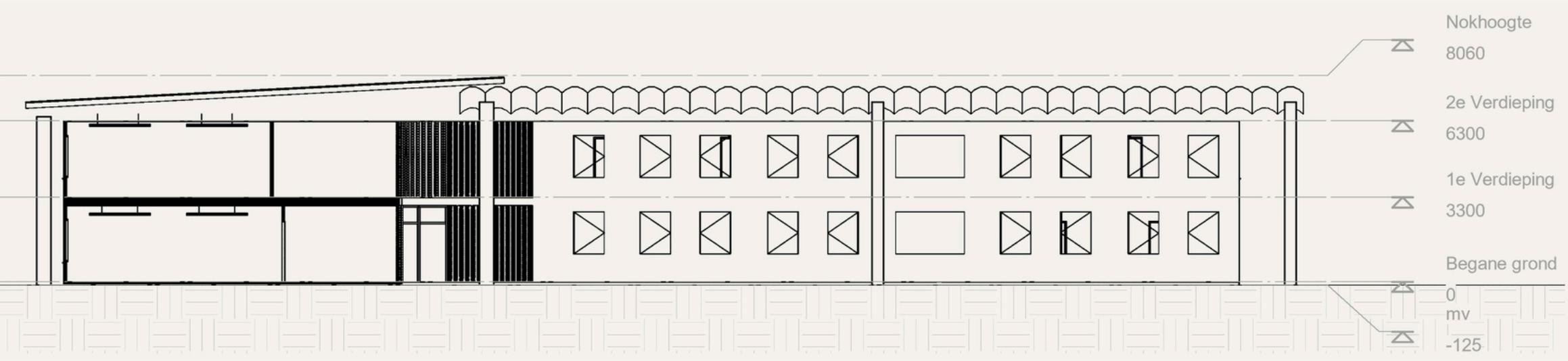
## Section AA1 1:200



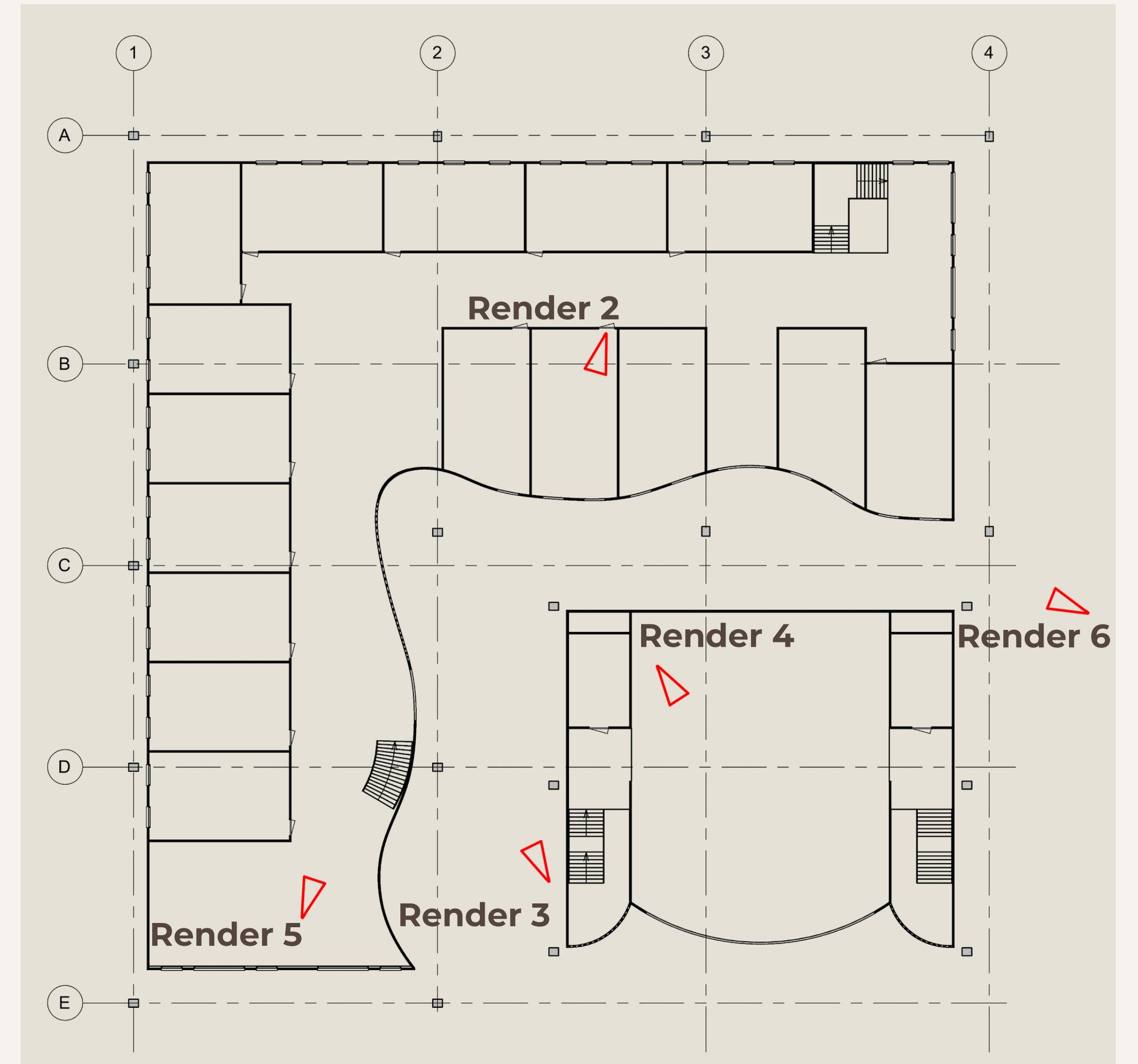
## Section BB1 1:200



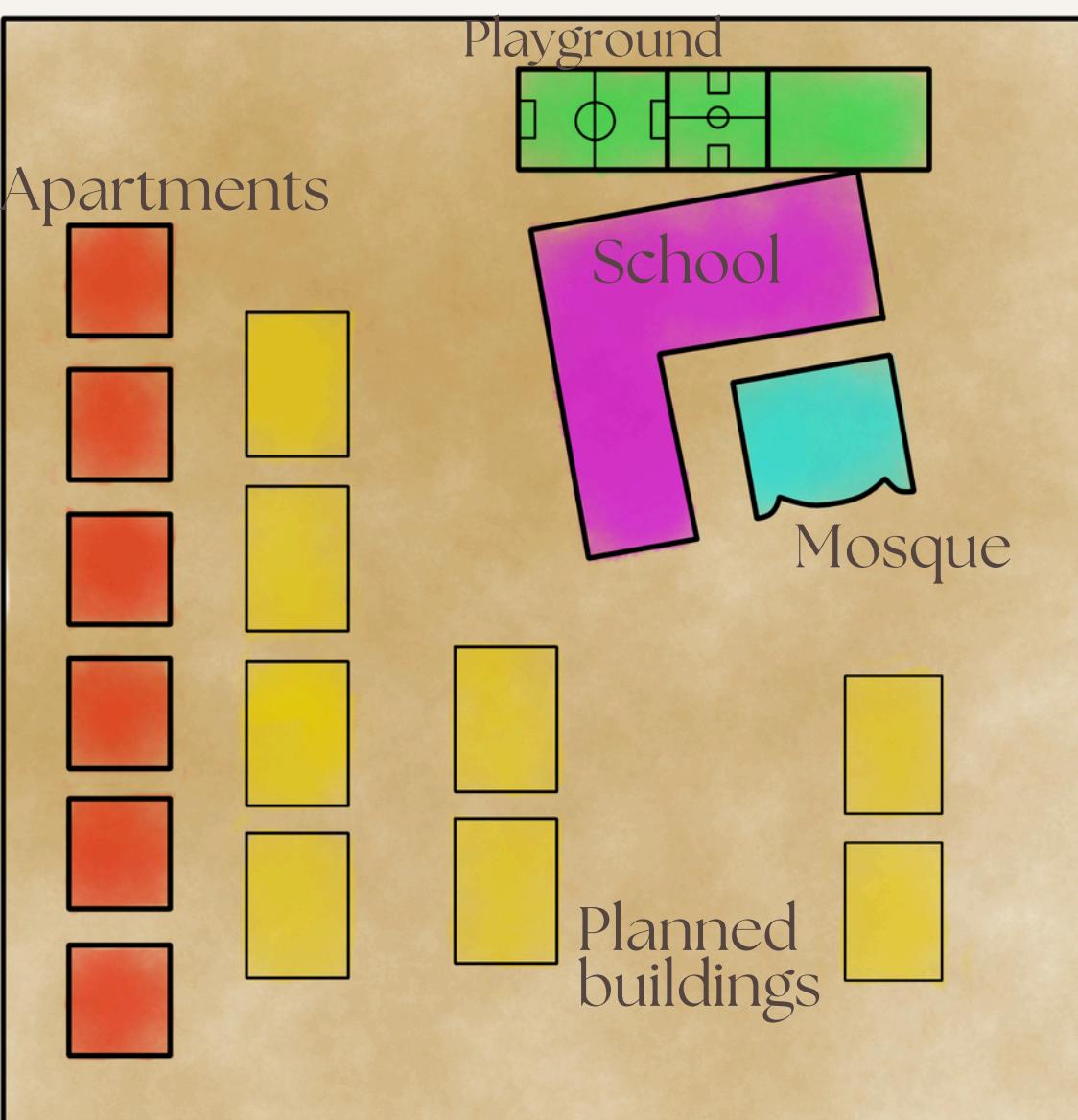
## Section BB2 1:200



## Render locations



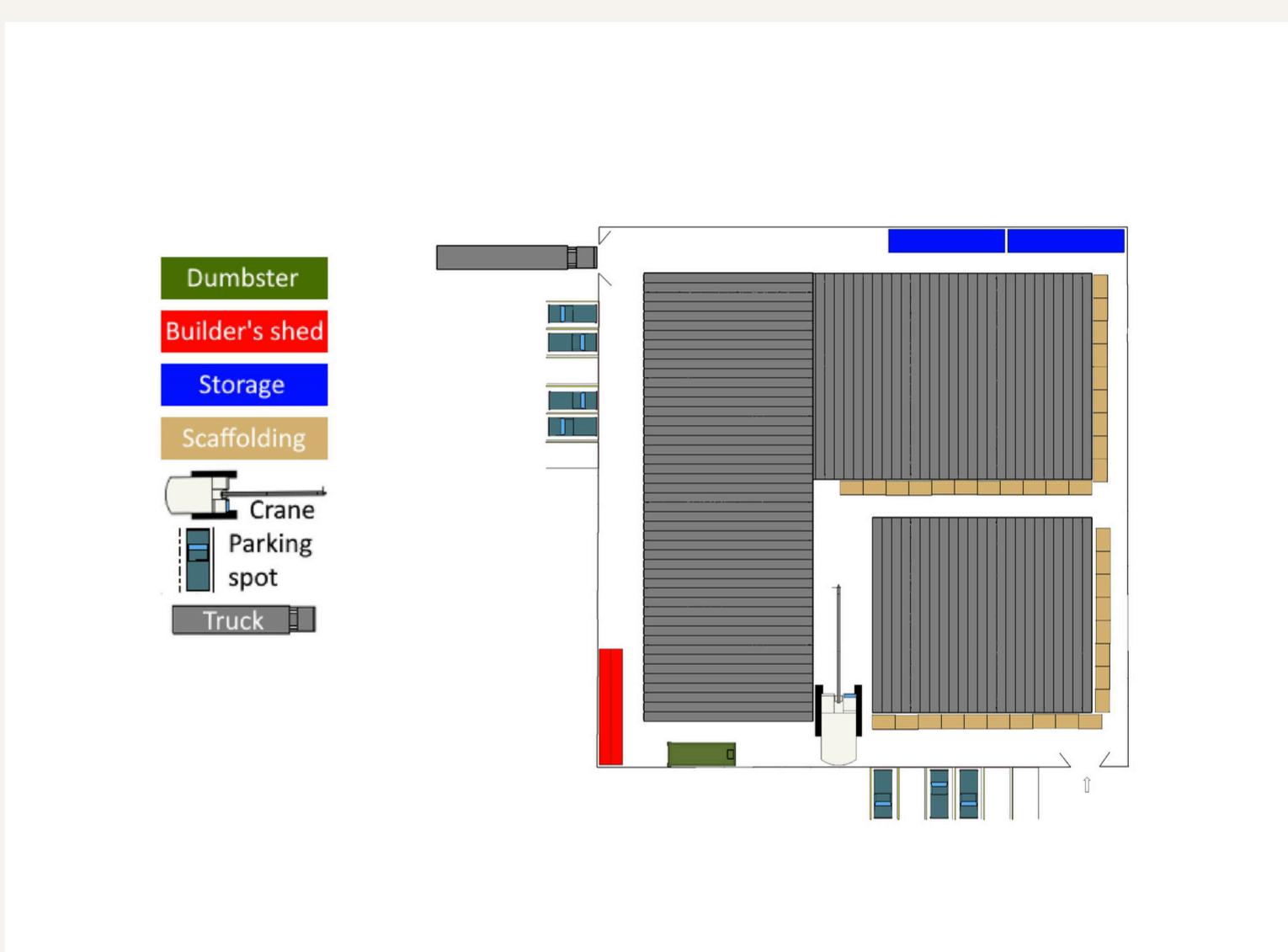
## Area drawing



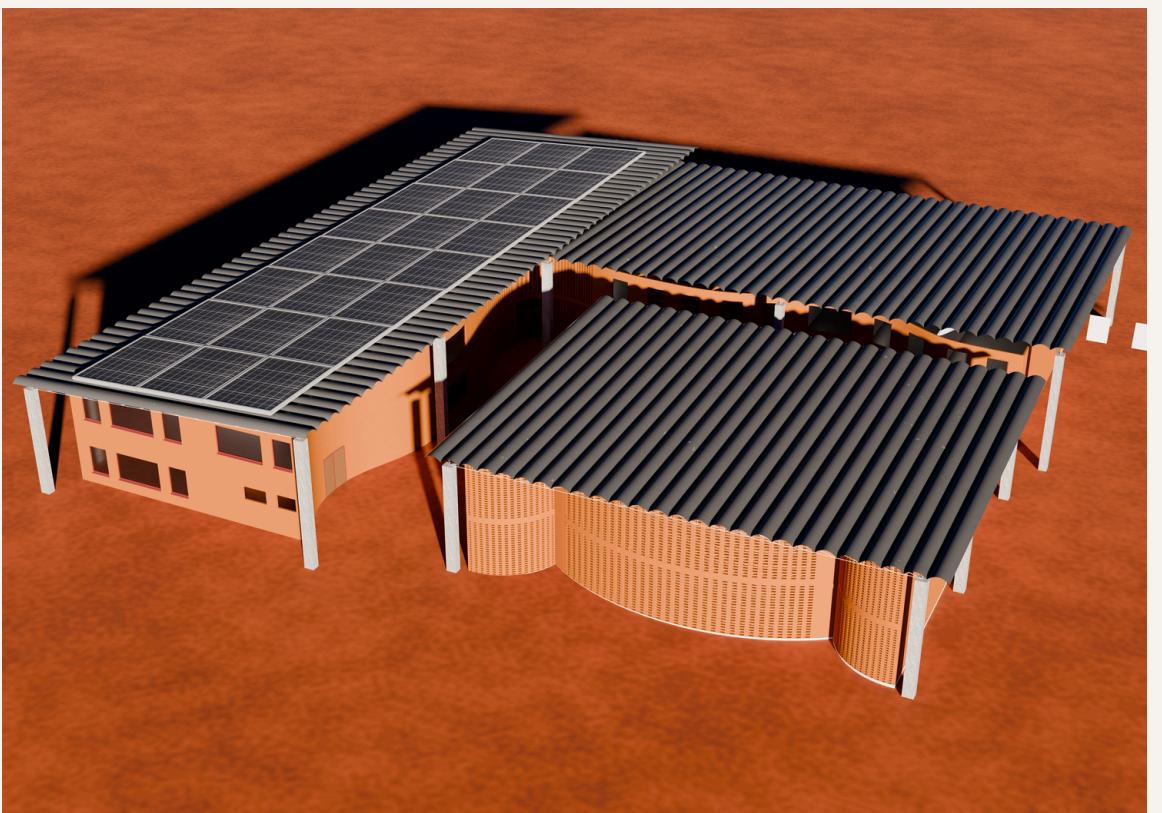
1:1000

## Construction site

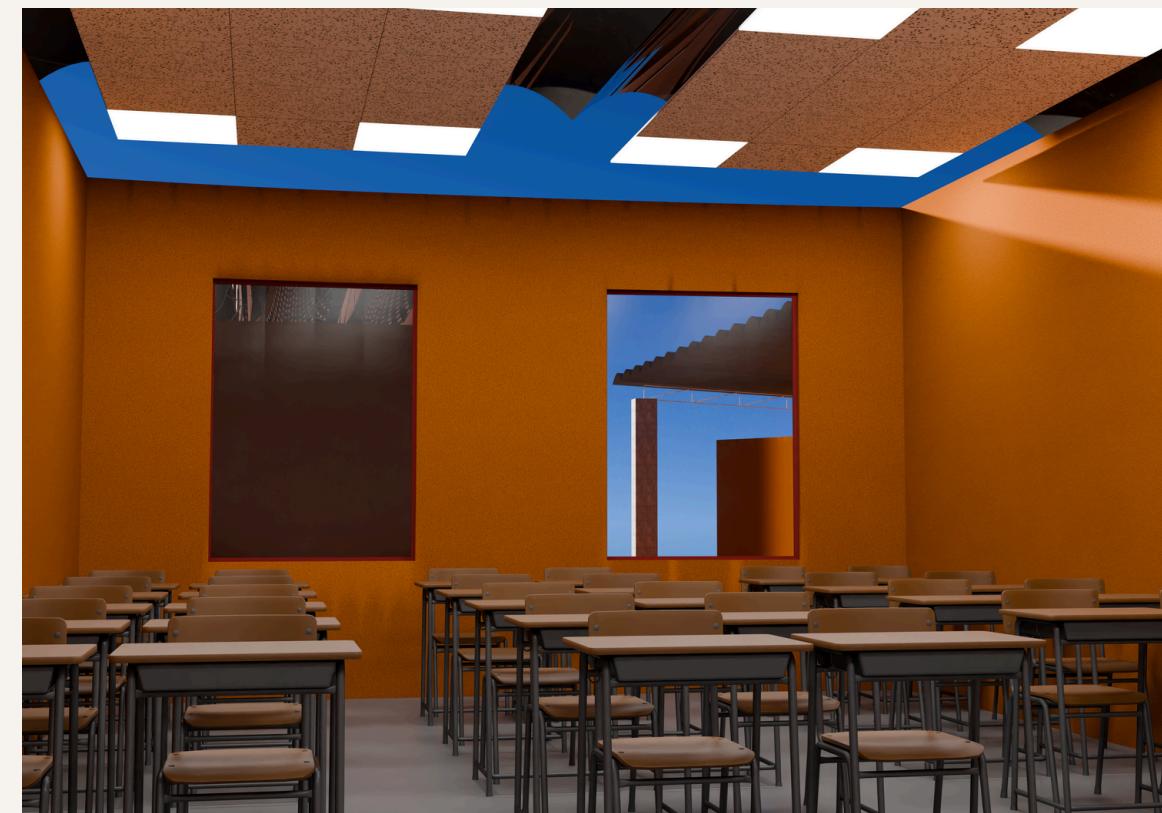
1:500



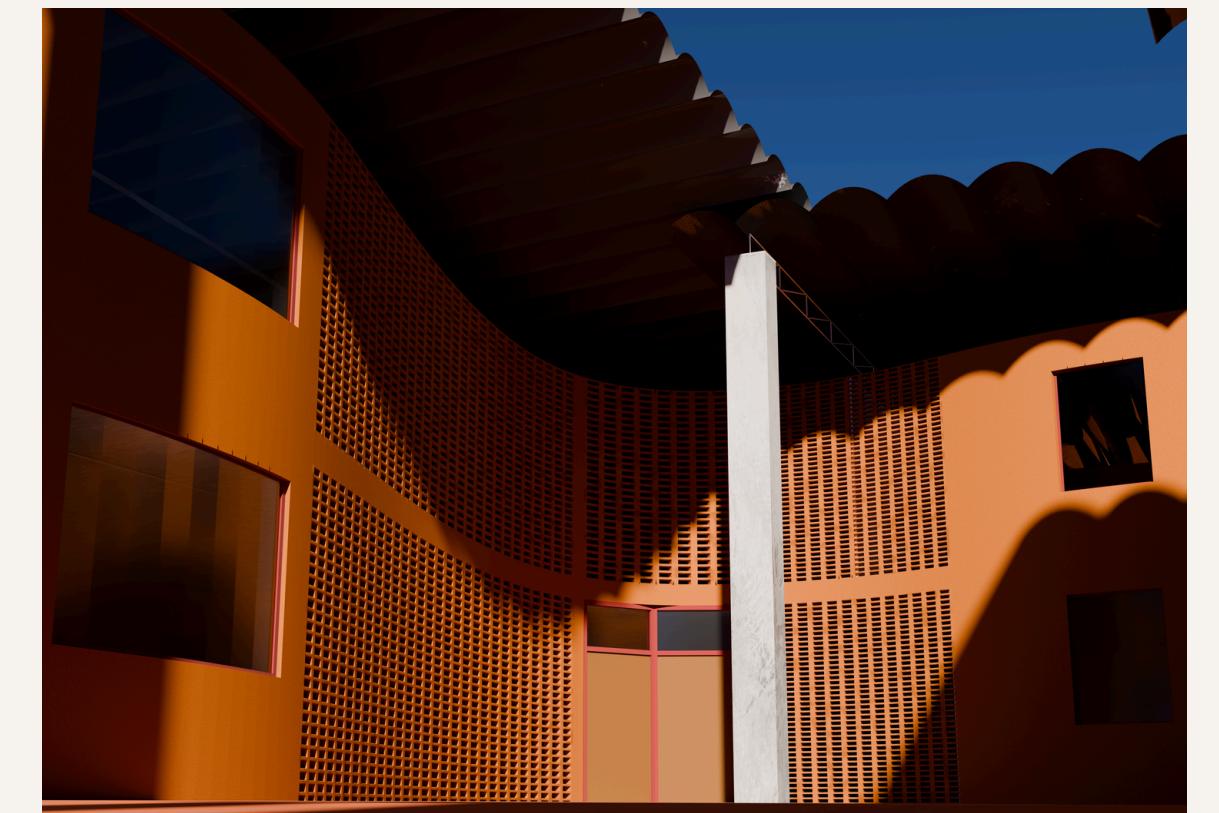
## Renders



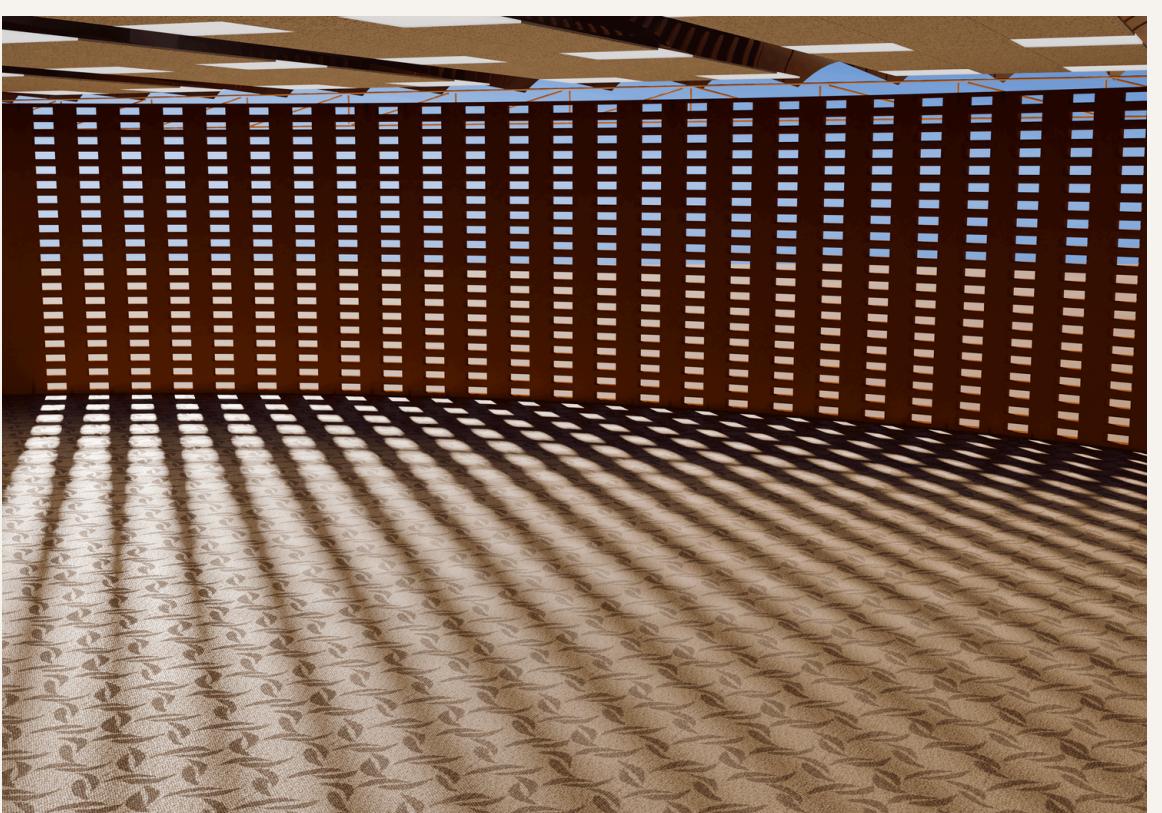
Render 1



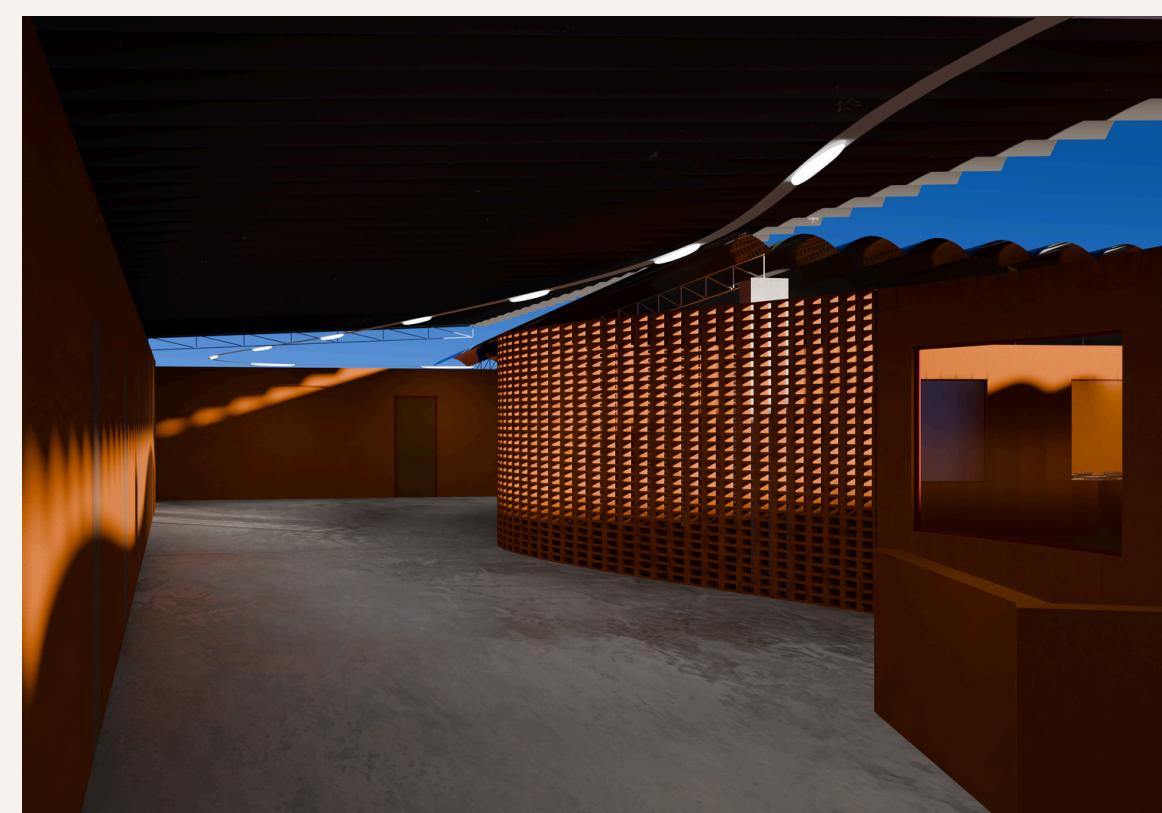
Render 2



Render 3



Render 4



Render 5



Render 6

## Construction model

### Beam Selection

#### School:

- Beam Length: 114.5 + 12000 = 828
- Beam Width: 12 + 828 = 414
- Dimensions: 828 mm (length) x 414 mm (width)

#### Mosque:

- Beam Length: 114.5 + 14900 = 1028
- Beam Width: 12 + 1028 = 514
- Dimensions: 1028 mm (length) x 514 mm (width)

#### Conclusion:

- For the School we are using the beam with dimensions of 828 mm x 414 mm.
- For the mosque we are using the beam with dimensions of 1028 mm x 514 mm.

beton	ter plaatse gestort betonnen vloerleggers	enkel veld:	1/10 x lengte	breedte = 1/2 à 1/3 x hoogte
		doorgaand:	1/14,5 x lengte	
	voorgespannen betonnen vloerleggers	enkel veld:	1/20 x lengte	breedte = 1/2 à 1/3 x hoogte

(TU delft, 2013)

### Column selection

The height of roof is 7.8 meters

- Column side: 7.8 / 5 = 0.52 - 520mm

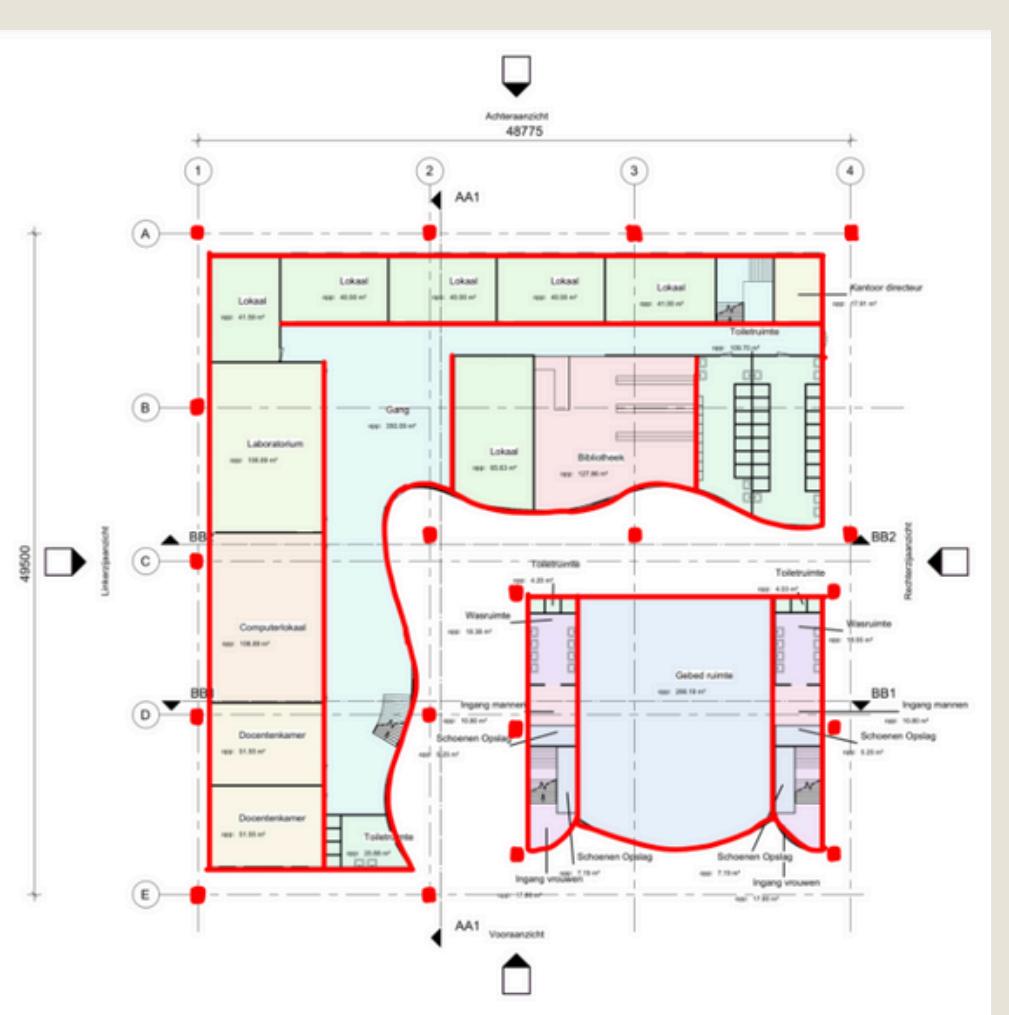
#### Conclusion:

For the School and the mosque we are using columns with dimensions of 520x520mm.

Kolommen ( = lengte per verdieping)		
Beton	1 bouwlaag	$l \leq 8 \text{ m}$
	Meerdere bouwlagen	$l \leq 4 \text{ m}$

(TU delft, 2013)

## Load bearing walls and columns



1:1000