

SUBSTANTIATION DOBRINJA

LOCATION RESEARCH

Location Study: Dobrinja, Sarajevo

Dobrinja is a vibrant neighborhood in Sarajevo where people from diverse backgrounds live together. Despite ethnic and religious differences, there is a strong sense of community. (Daragahi, 2022) Children play together in the streets regardless of their heritage, symbolizing the inclusive atmosphere of the area.

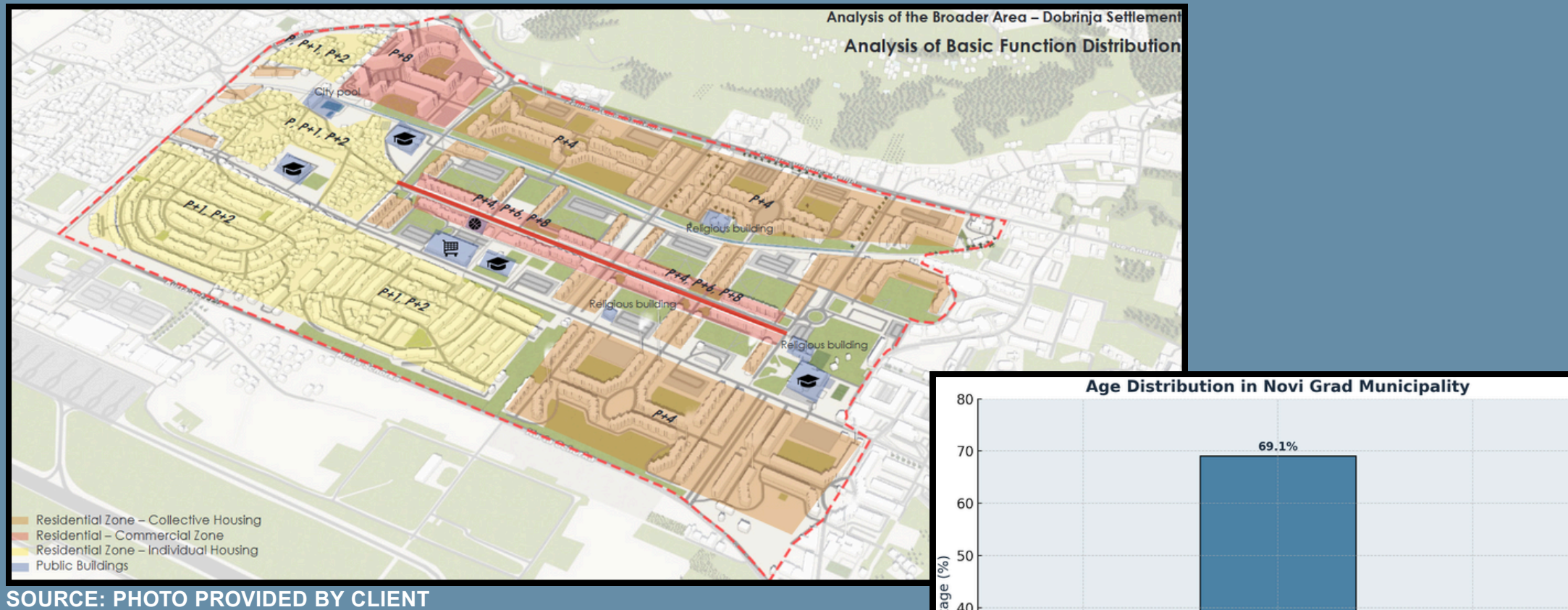
Today, Dobrinja mainly attracts young families and working city residents, with a strong presence of tech-savvy professionals. The neighborhood is known for its green spaces, wide streets, ample parking, and child-friendly amenities such as sports facilities and schools. This makes Dobrinja appealing to young households seeking a modern and livable environment. (Rupert, 2024)

Dobrinja is part of the municipality of Novi Grad, where the average age is 39. The population is relatively young: (Age Classes By Gender Municipality Of NOVI GRAD SARAJEVO, z.d.)

The neighborhood also visibly bears the marks of its past. Street art is a prominent feature of the urban landscape, with many murals referencing war experiences and collective trauma. This form of art serves both as a remembrance and a way to process the past, giving Dobrinja a unique cultural identity. (Sarajevo Street Art And Graffiti | Get Rad Creative Space, z.d.)

Building Purpose and Surrounding Area

The Dobrinja neighborhood is well-equipped with a wide range of facilities. In the immediate vicinity, there are supermarkets, shops, banks, pharmacies, and hospitality venues such as cafés, restaurants, and buregdžinicas (traditional pastry shops). There are also several schools, kindergartens, and training rooms, as well as a health center and a polyclinic. In terms of religious institutions, the area includes three mosques and a Catholic church. In Dobrinja, there is also a cultural center. It hosts exhibitions, film nights, poetry readings, concerts, and workshops. However, it is very small. In addition to this cultural center, there is also an art school. (Biography | Mihadžan Kulenović Mimica, z.d.) Dobrinja is developing into a breeding ground where art and culture actively contribute to social cohesion. The neighborhood connects heritage with contemporary expression. The cultural center already hosts studio-like activities, but there is no dedicated space for them. An additional cultural center with room for studios and ateliers would therefore be a welcome addition. For recreation, there are sports facilities, an outdoor swimming pool, and various parks—though some are in moderate condition. The largest park, Veliko igralište Dobrinja, features a playground and sports fields. Possible new uses for the building include a library, open-air cinema, artisan workshops, or studios and a cultural center.



FUNCTION SUBSTANTIATION

Artisanal Shops

With a focus on bringing back traditional stores, we propose the introduction of artisanal shops such as butchers, bakeries, textile workers, and coppersmiths. These align with our goal of renewing the past and traditional functions and they differentiate themselves from the nearby shopping center.

Market

A shopping mall has been built in the area, which has largely displaced the existing shops. However, a traditional market is something the mall lacks. There is still a strong demand for a traditional market offering local products. By renovating the old market building, we can meet this need. Products sold here could include fruits and vegetables from local farms, as well as other locally made goods, see: artisanal shops.

Library

Sarajevo has a library system with 17 locations, one of which is located near the old market building. This branch is small and outdated. With the renovation of the old market building, we can provide a new space for the library, offering a larger catalog, study areas, and computers. This would enrich the neighborhood in terms of knowledge and development. It would also pair well with the nearby “Gimnazija Dobrinja” (a secondary school), offering students an additional space to further their development.

Studios

Our goal is for this center to serve more than just commerce and information. We aim to achieve this by adding cultural value through the creation of studio spaces. These studios would provide young artists with opportunities to improve their craft. In combination with the nearby secondary school, would make this the ideal location for workshops, inspiring young people to engage with the arts. Think pottery, woodworking, painting, photography—you name it. These types of facilities are also currently lacking in the area.

(Cafés/Restaurants)

Currently, the north side of the building offers space for restaurants. We aim to retain these, as there is ample room and they can continue to benefit from the grassy area north of the building. Renovating the building will breathe new life into these restaurants by attracting more visitors drawn by the market, library, or arts. More people means more sales and more potential customers.

Open-Air Theater

We intend to use the open space north of the building as an open-air theater. It is already being used informally in this way. By installing a simple structure and organizing events, we can enhance the experiences already taking place there. This addition would also promote cultural life in a way that is currently unavailable in the area.

REQUIREMENTS SPECIFICATION

Space / Section	Function / Description	Area (Indicative)	Special Requirements / Notes
Open reading area	Freely accessible book collection and reading tables	approx. 200 m ²	Flexible layout, access to natural daylight
Silent zone / study room	Quiet areas for study, work or reading	approx. 80 m ²	Acoustically insulated, power outlets, Wi-Fi
Multipurpose room	For lectures, storytelling sessions, small events	approx. 70 m ²	Lockable, projection possible, flexible layout
Reception desk & entrance	Information point, visitor reception	approx. 30 m ²	Centrally located at the entrance
Toilets	Visitor restrooms incl. wheelchair-accessible toilet	approx. 25 m ²	In accordance with building accessibility regulations
Staff area / office	For staff, storage, printer, workspace	approx. 40 m ²	Separate entrance not required
Circulation / corridors	Circulation space between functions	approx. 45 m ²	Threshold-free, wide enough for wheelchairs (min. 1.5 meters)

Space / Section	Function / Description	Area (Indicative)	Special Requirements / Notes
Shop units (4-5 units)	Small units for artisan sales	approx. 180 m ²	Flexible partitions, display possibilities, power outlets
Storage per unit	Internal storage behind or next to shop space	included in units	For materials and products
Corridors / access	Internal circulation	approx. 40 m ²	Clear routing, natural light where possible
Shared restrooms	No sanitary facilities inside the building	-	Central sanitary facilities are located in buildings A, C, and D

Space / Section	Function / Description	Area (Indicative)	Special Requirements / Notes
Studios (individual)	Workspaces for artists / creators (25–40 m ² per studio)	approx. 200 m ²	Sound insulation between units, daylight, water in some units
Open studio area	Shared creative space or workshop zone	approx. 120 m ²	Flexible use, sufficient height (min. 3 m)
Internal exhibition area	Temporary exhibitions or presentations	approx. 50 m ²	Good lighting, walls suitable for hanging
Storage & materials cabinet	For materials, tools, artworks	approx. 30 m ²	Secured and ventilated
Toilets	Shared sanitary facilities	approx. 25 m ²	Includes accessible toilet
Circulation / entrance zone	Hallways and movement spaces	approx. 65 m ²	Threshold-free, wide passages (min. 1.5 meters)

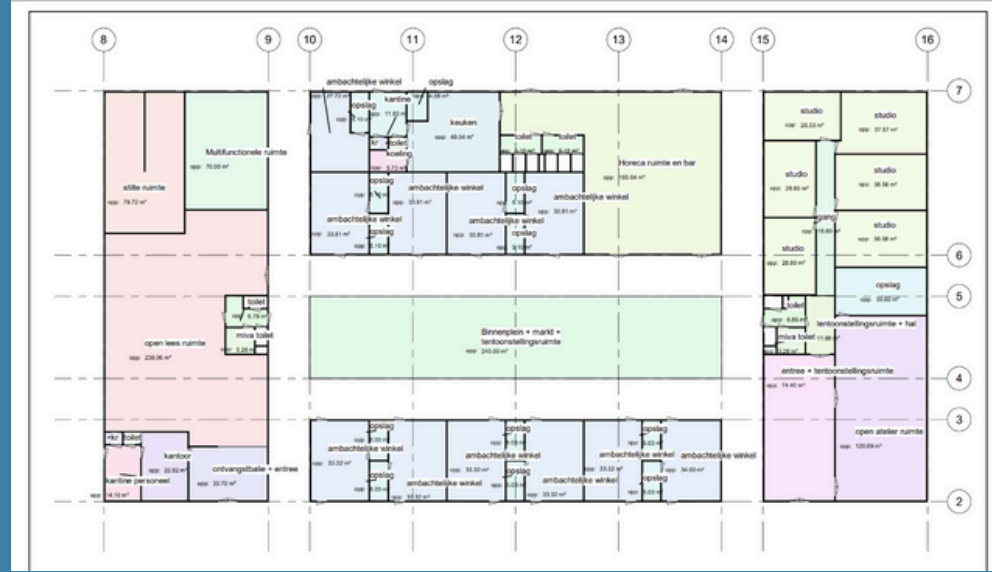
Space / Section	Function / Description	Area (Indicative)	Special Requirements / Notes
Artisan shop units	Sales of small crafts (similar to Building B)	approx. 180 m ²	Artisan shop units integrated with hospitality area
Corridors	Circulation	-	Threshold-free, wide passages (min. 1.5 meters)
Indoor hospitality area	Seating area + bar	approx. 120 m ²	Flexible layout, view of lawn/stage
Kitchen & storage	Food preparation, storage, dishwashing	approx. 100 m ²	Ventilation, grease trap required, refrigeration
Toilets (hospitality)	Sanitary facilities for guests	approx. 25 m ²	Includes 1 accessible toilet
Terrace (outdoor)	Outdoor seating near lawn	approx. 40 m ²	Visual connection with open-air theatre and covered square

Space / Section	Function / Description	Area (Indicative)	Special Requirements / Notes
Indoor square	Market, seating area, art exhibitions	approx. 490 m ²	Paved, with power/water points, seating elements, covered
Glass canopies	Covered connection between buildings	-	Transparent, weather-resistant, with lighting

Space / Section	Function / Description	Area / Dimensions	Special Requirements / Notes
Stage	Elevated platform for performances	approx. 8 x 5 m = 40 m ²	Non-slip finish, optionally permanently covered
Backstage / setup area	Setup space for artists, equipment/decor storage	approx. 10 m ²	Lockable, visually shielded
Audience area (lawn)	Space for spectators	approx. 250–400 m ²	Seating for ≈100–150 people, grass or seating ledges
Access and walkways	Access for public and technical crew	approx. 40–60 m ²	Wheelchair accessible, paved, lighting for evening use
Technical installations	Power zones, optional light/sound connection	part of stage/backstage	Min. 3 outlets (230V/380V), splash-proof (IP65), close to main building
Storage cabinet	Storage for chairs, cables, temporary materials	approx. 4–6 m ²	Weather-resistant, lockable, near backstage
Terrace zone at hospitality	Transition area hospitality–theatre	integrated	Visual and functional connection with hospitality, seating with view of stage
Seating edges / elements	Natural or designed seating borders	integrated in audience area	Wooden, concrete, or grass benches

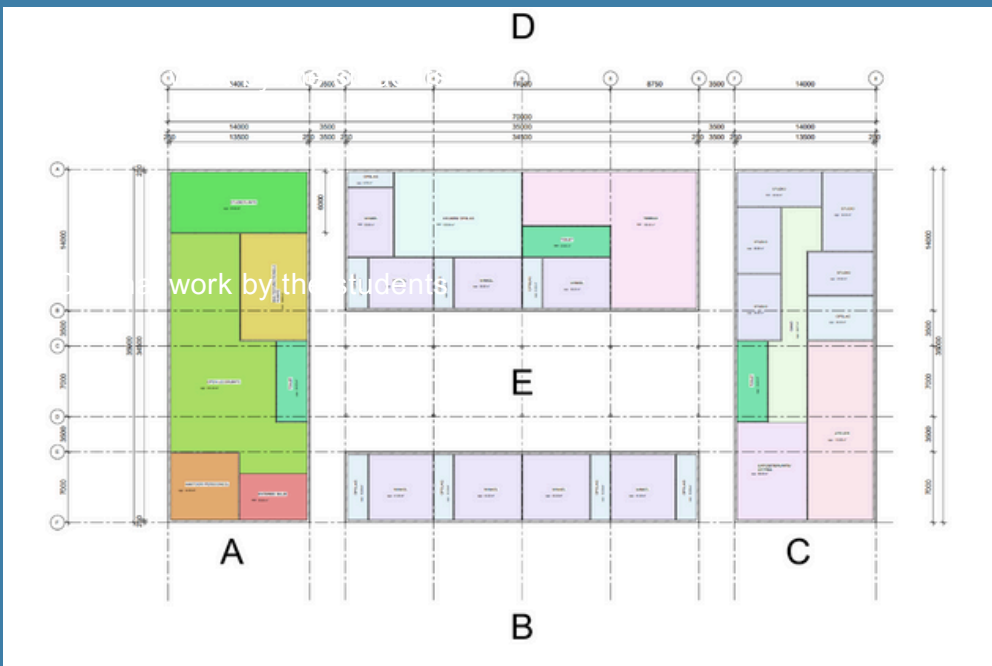
HARRIS PROFILE

Harris profile: Ferro	--	-	+	++
logistiek				
optimaal ruimtegebruik				
plaatsing functies				
voldoet aan PVE				
Original work by the students				



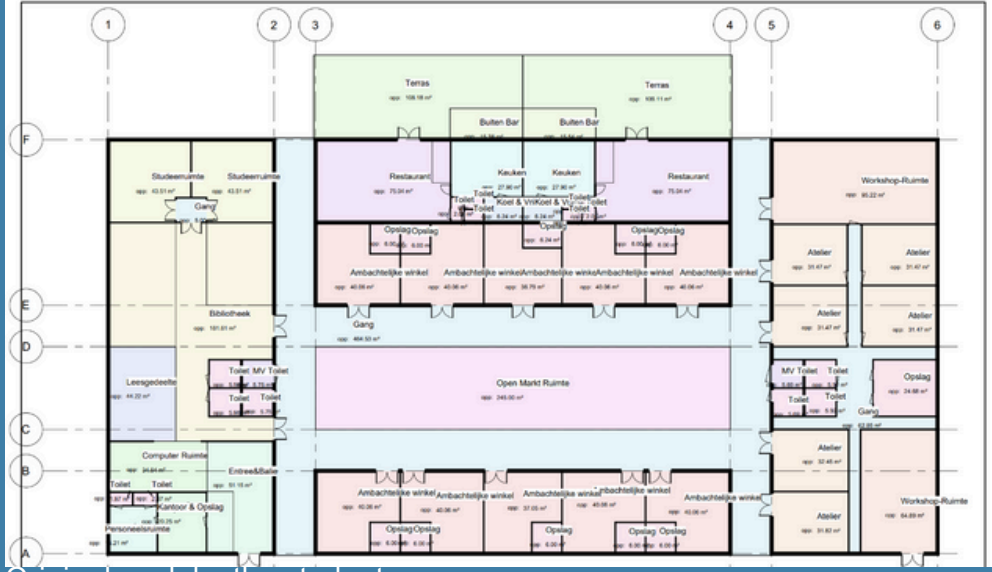
Original work by the students

Harris profile: Tahir	--	-	+	++
logistiek				
optimaal ruimtegebruik				
plaatsing functies				
voldoet aan PVE				
Original work by the students				



Original work by the students

Harris profile: Guilherme	--	-	+	++
logistiek				
optimaal ruimtegebruik				
plaatsing functies				
voldoet aan PVE				
Original work by the students				



Original work by the students

Argumentation Harris Profile

Logistics:

- Tahir and Guilherme have limitations in accessibility to toilets, restaurant, or studios.
- Ferro scores best here with good accessibility to the restaurant, shops, and toilets, although the studios are not accessible via the indoor courtyard.

Optimal Use of Space:

- Tahir and Guilherme have unnecessary or wasted spaces, such as wide or illogical corridors.
- Ferro makes good use of space, but the exhibition area near the studios lacks a clear function when not in use.

Placement of Functions:

- Tahir lacks functions such as a staff area near the kitchen and has fewer shops/studios.
- Guilherme offers the most functions, such as extra restaurants and multifunctional rooms, but lacks storage near the kitchen.
- Ferro offers more shops, but with smaller surface areas.

Compliance with Program Requirements (Requirement specification):

- Tahir and Ferro fully comply with the (Requirement specification).
- Guilherme largely complies but has shortcomings in kitchen space and storage.

Conclusion Harris Profile

Based on the Harris profiles, the Ferro variant scores best due to its strong logistics and full compliance with the Program Requirements. However, there are points to consider, such as the limited function of the exhibition space and the accessibility of the studios. To achieve an optimal design, we plan to combine strong elements from other variants. For example, the entrance to the studios can be adapted based on the approach in Guilherme, and spatial functions from Tahir can be incorporated to strengthen the overall design.

REGULATIONS NETHERLANDS-BOSNIA

Thermal Insulation: Netherlands vs. Bosnia and Herzegovina

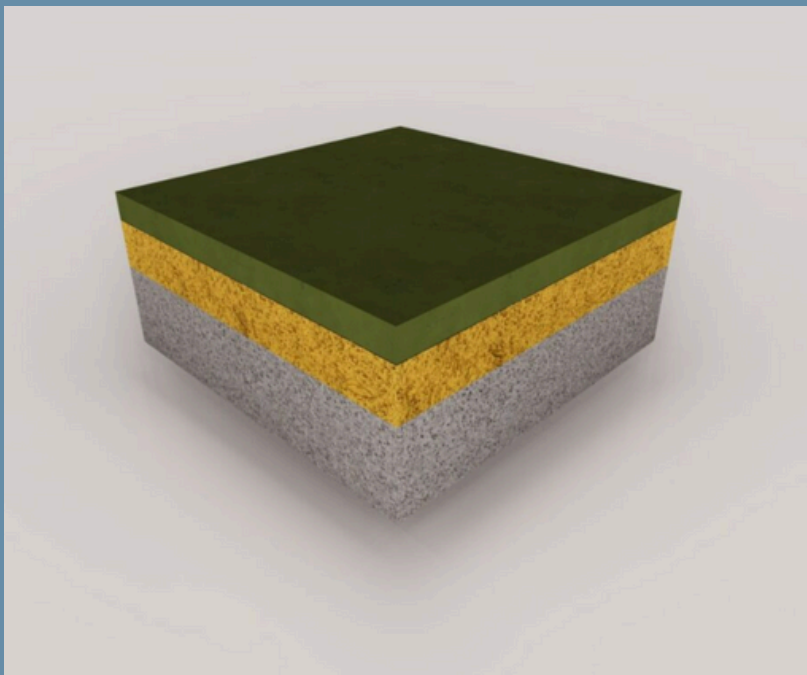
Aspect	Netherlands (BBL / BENG)	Bosnia and Herzegovina
Mandatory insulation standards	Yes, established in Building Decree (Bouwbesluit/BouwBBL) and BENG standards	Yes, but less strict; depends on region (canton or entity)
Rc-value external walls	Minimum 4.7 m ² K/W (from 2021, BENG level)	Typically between 1.5 and 2.5 m ² K/W (depending on region and budget)
Rc-value roof	Minimum 6.3 m ² K/W	Often 2.0–3.0 m ² K/W, unless passive or luxury construction
Rc-value floor	Minimum 3.7 m ² K/W	Average 1.5–2.5 m ² K/W
U-value windows	Maximum 1.65 W/m ² K, mostly HR++ or triple glazing	Usually between 1.4–2.8 W/m ² K, often double glazing (HR+ or standard)
Thermal bridges (cold bridges)	Must be demonstrably avoided (part of BENG)	Not always addressed; less focus on cold-bridge-free building

2. Technical Building Regulations

Subject	Netherlands (BBL)	Bosnia and Herzegovina
Structural safety	Eurocodes mandatory	Eurocodes not mandatory but partly applied; local standards prevail
Fire safety	Very strict regulations (escape routes, fire compartments, smoke resistance)	Less strict, often depending on building type and local requirements
Sound requirements	High demands for sound insulation, both airborne and impact noise	Few uniform standards; usually lower requirements than in the Netherlands
Daylight access	Mandatory minimum daylight factor and window area per living space	Less strictly regulated, although urban planning regulations sometimes impose limits
Accessibility	Strict accessibility requirements (disabled access)	Rarely applied unless public building



Original work by the students



Original work by the students

SUBSTANTIATION DOBRINJA

CHOSEN BUILDING METHOD

Construction

The existing concrete frame structure of the building will be retained, forming the basis for the renovation. The intervention mainly focuses on renewing non-load-bearing façade elements, such as façade finishes and insulation, without affecting the main structure.

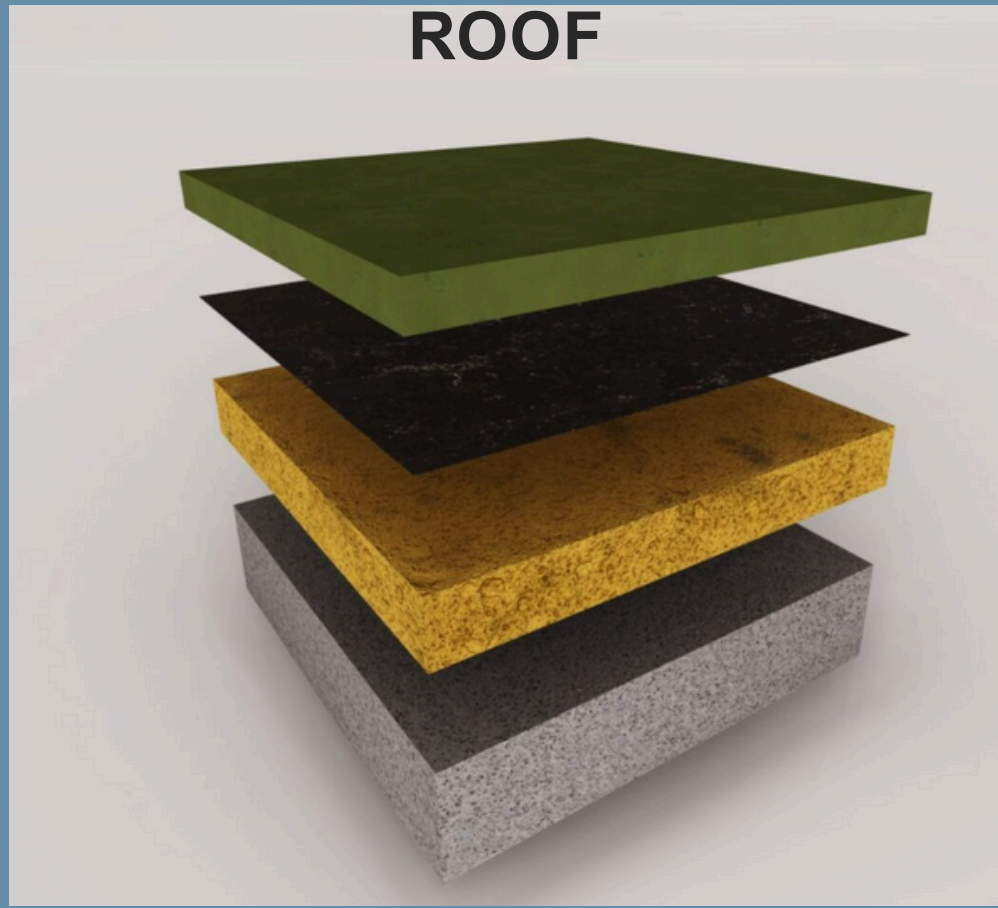
Chosen Construction Methods

For the façade renovation, timber frame construction (wooden skeleton construction) has been chosen. This is a lightweight and fast building method that offers flexibility and disassemblability, making it highly suitable for circular construction. Sheep wool is used as insulation material due to its natural, breathable, and moisture-regulating properties. Additionally, reused façade cladding, such as bricks, will be applied, contributing to a low ecological footprint and a circular aesthetic. For the roof structure, a warm roof with EPDM roofing membrane has been selected. This durable, low-maintenance, and UV-resistant solution has a lifespan of 40 to 50 years and is suitable for the Bosnian climate. Moreover, this type of roof optionally allows for the addition of a green roof or solar panels.

Conclusion

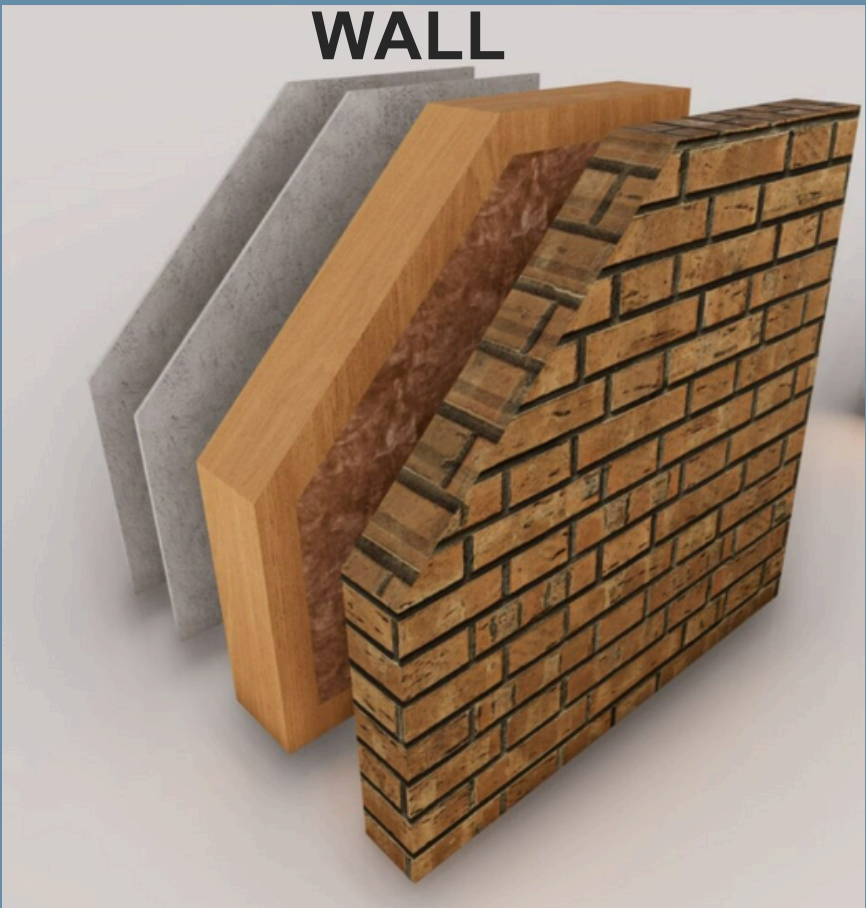
The applied construction methods focus on sustainability, circularity, and environmentally responsible building, while preserving the existing concrete structure. Timber frame construction with sheep wool insulation proves to be the most suitable façade solution due to its low environmental impact, excellent thermal and acoustic performance, and the possibility of full disassembly and reuse. For the roof structure, EPDM offers an optimal combination of long lifespan, good performance, and minimal maintenance, despite higher initial costs and limited local experience. Overall, this approach forms a forward-looking and circular solution for the sustainable renovation of the existing concrete frame building.

ROOF



ORIGINAL WORK BY THE STUDENTS

WALL



ORIGINAL WORK BY THE STUDENTS

BUILDING PHYSICS

Application of Dutch Building Physics Requirements in the Design of the Sarajevo Shopping Center.

For the design of the shopping center in Sarajevo, the building physics principles and performance requirements are based on Dutch legislation and regulations, as laid down in the Besluit bouwwerken leefomgeving (BBL) and associated standards (such as NEN 1087, NEN 7120, and NTA 8800). This choice was made because Dutch building regulations are known for their strict and well-founded requirements regarding energy performance, indoor climate, ventilation, moisture control, and fire safety. By using this high standard as a starting point, it ensures that the building is sustainable, comfortable, and future-proof, even in Sarajevo's climate. Additionally, it provides a reliable framework to technically support design choices with calculations and performance criteria.

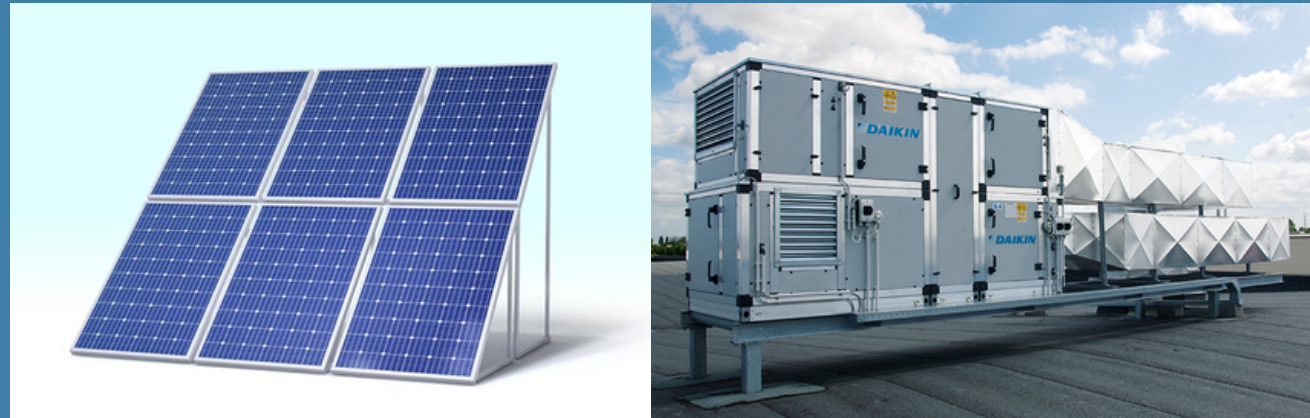
Energy Installations

The shopping center consists of four building sections, each with its own technical installation. For heating, each section is equipped with an HR107 gas boiler (approx. 45–60 kW), with wall-mounted radiators in shops and studios, and floor convectors in the hospitality and exhibition areas.

Cooling is provided by four rooftop units (25–35 kW each) installed on the roof, using a VRF system to cool large spaces efficiently. A total of 60 m² of solar panels (375 Wp each) are installed across the rooftops of the building sections, generating approximately 22.5 kWp with an annual yield of around 9,000–10,000 kWh. Each building section also includes an inverter for converting the generated electricity.

Ventilation

A general ventilation concept has been developed for the shopping center in Sarajevo. Each room was analyzed based on its function and the corresponding ventilation needs per person or per surface area. To maintain an optimal indoor climate while minimizing energy loss, a mechanical ventilation system with heat recovery (HRV) was chosen. This system provides both the mechanical supply of fresh outdoor air and the extraction of polluted indoor air. By using an HRV unit, heat from the extracted air is reused to preheat the incoming air, thereby reducing energy consumption and increasing comfort. The airflows are balanced, preventing over- or underpressure in the building and avoiding drafts or unwanted air infiltration. The system consists of four air handling units (AHUs), each processing approximately 1,900 m³/h of air. These AHUs are placed on the roof and connected to a ducting system with fire dampers at compartment transitions for fire safety. Additionally, nine extraction points are provided for air removal from toilets and the kitchen.



(Do Solar Panel Sizes Actually Matter? | Facts You Should Know, z.d.) (Luchtbehandelingskasten, z.d.)

Thermal Insulation

Improving the thermal quality of façades is essential for reducing energy consumption and increasing comfort in buildings. Therefore, both the roof and the façade comply with the requirements set out in the BBL. The façade is insulated with 180 mm thick sheep wool insulation, achieving a total Rc value of 4.77 > 4.7. The roof is insulated with 140 mm thick PIR insulation, achieving a total Rc value of 6.55 > 6.3. In addition, HR++ glazing is used to meet the requirement for a maximum U-value of 1.6, thus minimizing heat loss through the windows.

Moisture Control

According to the Glaser calculations, condensation occurs within both the façade and roof constructions. This can lead to significant issues, such as mold formation and wet insulation material, which reduces the insulation performance. Therefore, a vapor control layer is applied in both the roof and façade build-up to mitigate these problems.

Fire Safety

The building is divided into four fire compartments, each with a fire resistance of 60 minutes. Escape routes lead directly to covered outdoor areas with multiple escape options, allowing for safe and rapid evacuation. The façade and roof comply with Fire Class B according to the BBL; materials were carefully selected and treated to prevent fire spread. This ensures a safe environment for both visitors and staff.



(Duurzaam Isoleren met Schapenwol | Isolteam, z.d.)



(EHBO-koffer.nl, 2024)

MATERIALIZATION

For the appearance of the building, we want to incorporate as many features of the original structure as possible. For the façade finish, we will use white brickwork, which was also present in the original building. Since it can get very hot, a light-colored façade is optimal to reduce heat stress. Furthermore, a large portion of the façade will consist of curtain walling, which was also found in the original structure. The curtain wall allows a lot of natural light to enter the building, which is ideal for the library and the studios.



Source: Photo provided by client



(Admin & Admin, 2016)

For the outdoor stage, we looked at references. The stage will be made from the same materials as the rest of the building and will remain permanently in place.



Source: Photo provided by client

The beams/gutters and the glass canopy over the corridors between the buildings will return in the renewed structure. This is an important feature of the original building and an effective way to ensure the building functions well when it rains



(Glass Roof | Add A Stunning Space To Your Home | Sidey, z.d.)

A glass roof, similar to the image above, will be placed over the structure of the inner courtyard. This keeps you dry while still allowing plenty of natural light to enter.



(Sempergreen Solar Groendaksystemen - Sempergreen, z.d.)

The rest of the building's roof will feature a green roof made of sedum. Solar panels will be installed on top of this. These panels will generate green energy that can be used within the building.



Source: Photo provided by client

For the roof finish, the building will have a roof edge similar to those of the surrounding buildings. The roof edge will be constructed using timber frame construction with stucco and will have a minimum height of 10–15 cm. It will also feature an overhang of 200 cm

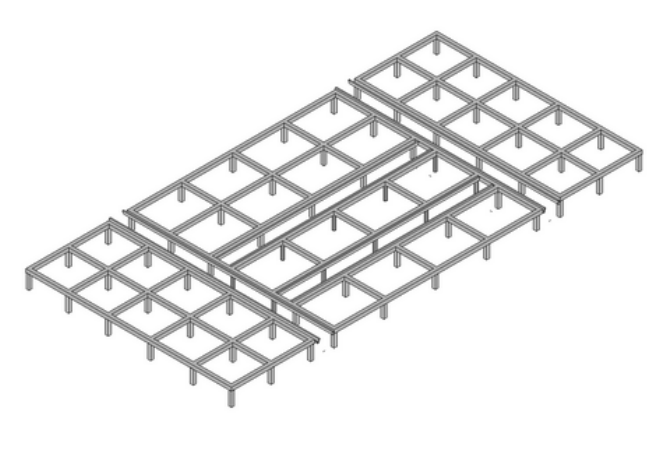
CONSTRUCTION & CALCULATIONS

CURRENT SITUATION

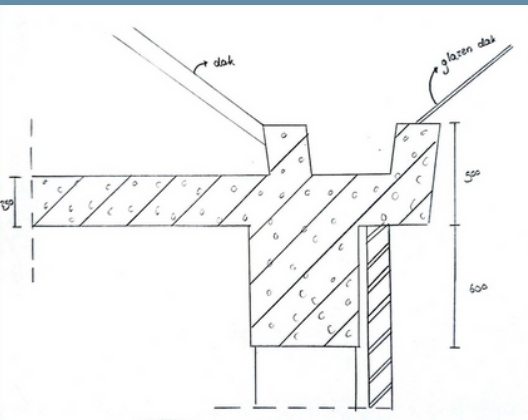
For the construction process, we began by assessing the current condition of the building to understand what we were working with. Due to the lack of available documentation, we estimated the dimensions based on visual observation—these dimensions are shown in the image below. We also estimated that the columns have a head-on-head (h.o.h.) spacing of either 7 meters or 8.75 meters. The structure appears to have brick walls surrounding a concrete frame, but we were unable to determine the construction details of the main roof. Additionally, there are glass ceilings above the corridors, which seem to be connected to a gutter system running along the entire length of the building.



Source: Photo provided by client



Original work by the students



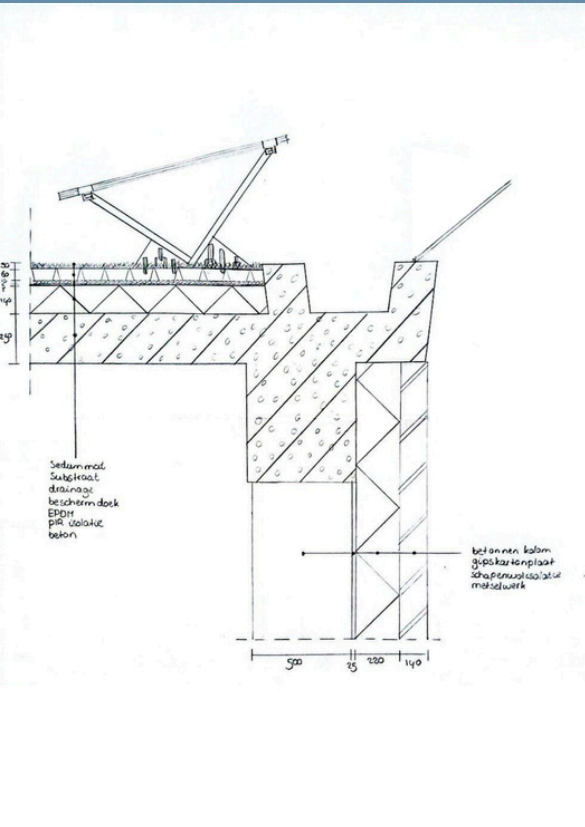
Original work by the students

CONCLUSION:

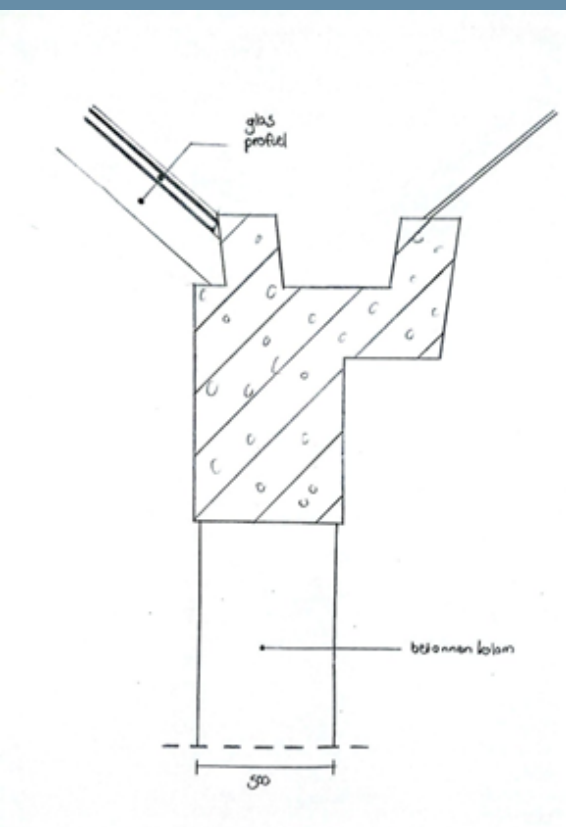
The calculations showed that the current concrete frame needs to be reinforced. To achieve this, 100 mm of additional concrete will be added to the existing beams (see own document).

NEW SITUATION

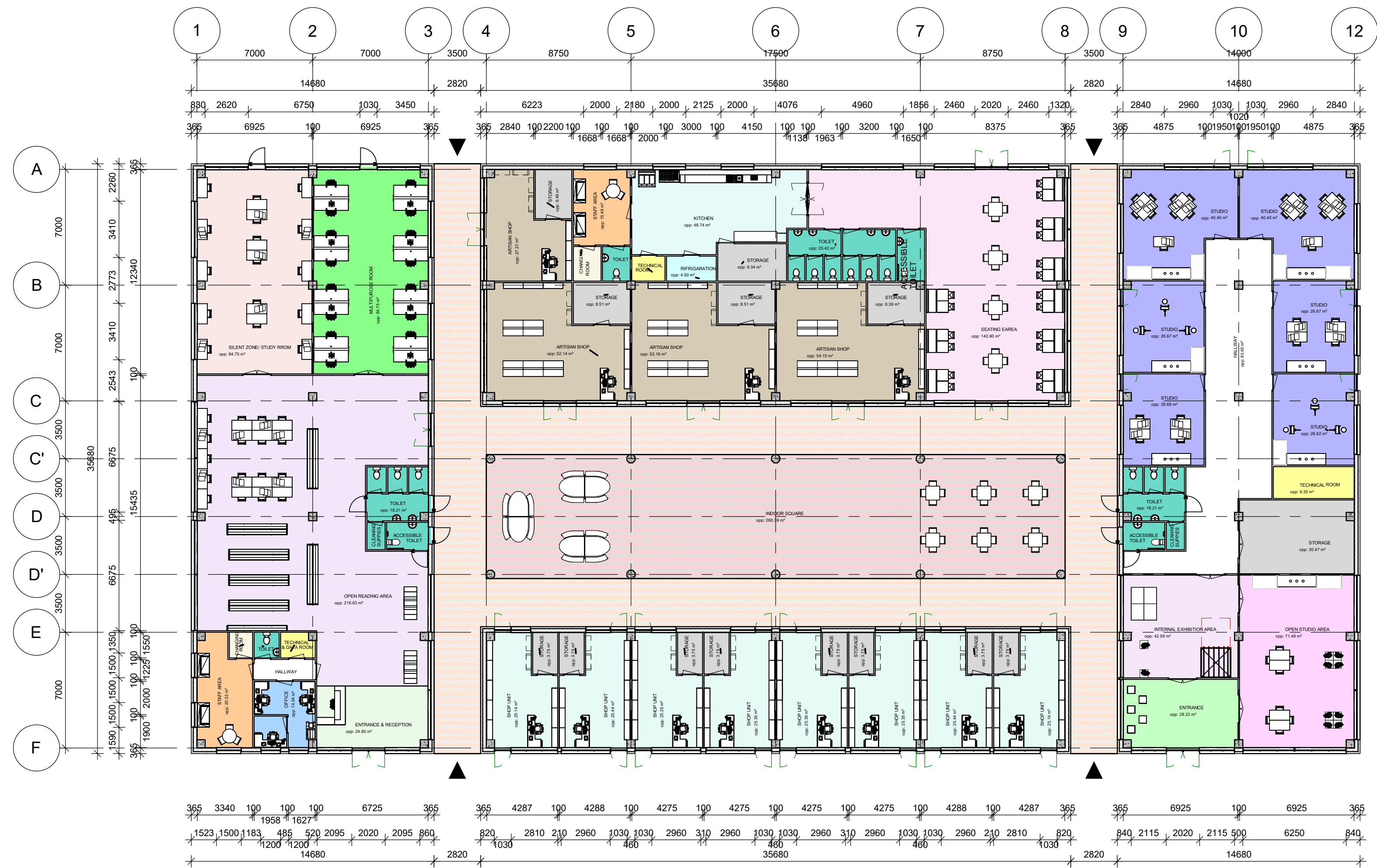
For the new design, we decided to retain the existing concrete frame and add a new roof and insulated exterior walls. The central building will be removed, creating an open square in the middle, which will be covered by a new glass roof placed on top of the concrete frame. Since the new roof will be a green roof equipped with solar panels, it will be significantly heavier than the original structure. To ensure the existing concrete frame can support this additional load, structural calculations were carried out. These calculations indicated that the frame must be reinforced. We plan to do this by adding extra concrete to the existing structure.



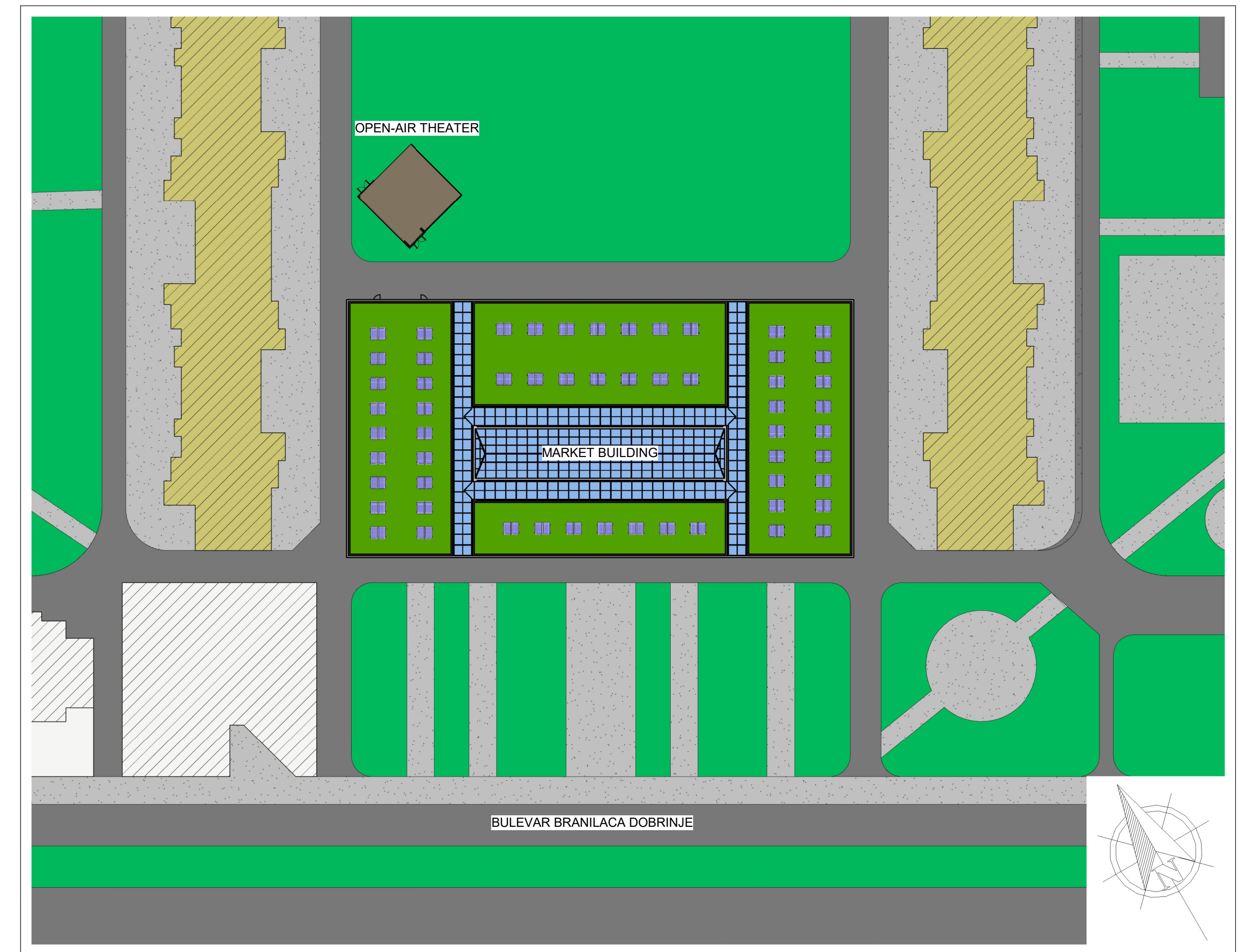
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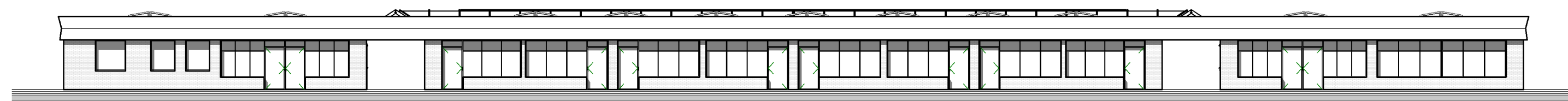
Original work by the students



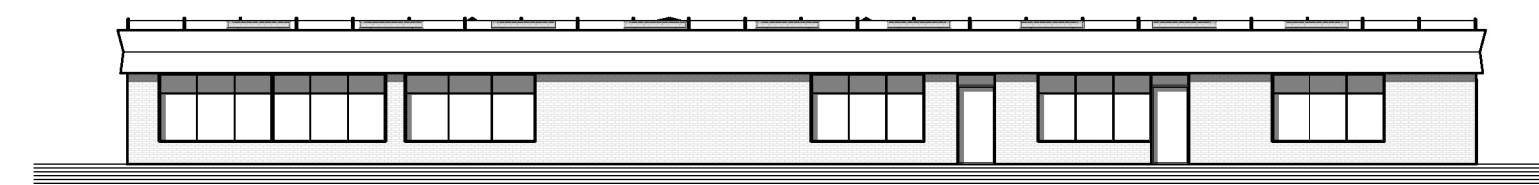
1 FLOOR PLAN
1 : 200



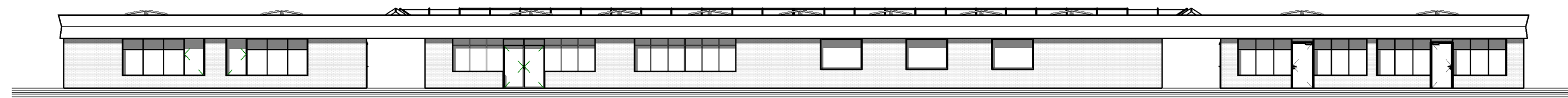
SITE PLAN



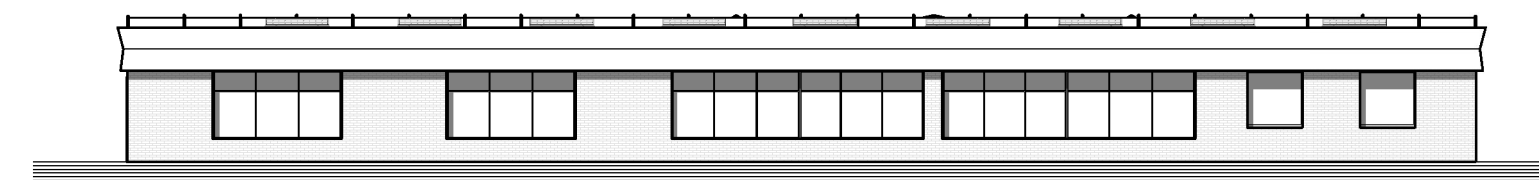
2 FRONT ELEVATION
1 : 200



3 RIGHT ELEVATION
1 : 200



4 REAR ELEVATION
1 : 200



5 LEFT ELEVATION
1 : 200



3D FRONT VIEW



FRONT ENTRANCE



INDOOR SQUARE



RESTAURANT SEATING AREA



OPEN-AIR THEATER