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TEMPORARY SHELTER PROJECT

MODULAR HOUSING DESIGN FOR POST-DISASTER SETTLEMENTS

DIPLOMA PROJECT

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INTRO	8
ANALYSIS	16
PROJECT	30
REFERENCE	64



Czech Technical University in Prague, Faculty of Architecture

ASSIGNMENT of the Diploma project

Master degree ARCHITECTURE and URBANISM

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Diploma Project Theme:

See the Application Form for DP

Assignment of the Diploma Project:


1/description of the project assignment and the expected solution objective

2/description of the final result, outputs and elaboration scales


3/list of further agreed-upon parts of the project (model)

To this list further attachments can be added according if necessary.

(Described in the attached sheet)

Date and Signature of the Student: 23.02.2023 

Date and Signature of the Diploma Project Tutor: 

Date and Signature of the Dean of FA CTU: 



1/ Description of the project assignment and the expected solution objective

TEMPORARY SHELTER PROJECT: MODULAR HOUSING DESIGN FOR POST-DISASTER SETTLEMENTS

Purpose of the thesis project is to find a solution to housing crisis in post disaster/ post-war areas by installing modular, portable housing units in order to create more livable and sustainable settlements for people in need. Thus it is intended to provide users emotional and physical support with communal areas and care units.

There are mainly three kinds of shelters required after a disaster in a populated area, namely emergency shelters, temporary shelters, and permanent shelters. This project is an attempt to explore ways of creating a transitional shelter, a mid-term response which focuses on upgradable, reusable, relocatable, and recyclable shelter. Planned use is during the time between the emergency and the permanent solutions, usually from 6 months to 2 years after the disaster.

Temporary shelters do not need to follow the permanent housing standards on the one hand, since they are not permanent and should be demolished after a year or so, but on the other hand, they should provide the residents with some minimum living standards requirements, of which some are exactly same as the permanent housing.

2/ Description of the final result, outputs and elaboration scales

A. ANALYSIS

Although the aim of this project is to provide shelters across the world for any place in need; an exemplary project is designed to show possible outcomes. Recent earthquake in Turkey has been chosen as a disaster example which has failed to provide shelters to on time and left many people homeless in the street for days; showing us the importance of providing temporary shelters immediately after the earthquake. Project's aim is to show an alternative approach to managing the aftermath of earthquakes so that an adequate settlement with the essential qualities of a domestic environment will be provided to all the sufferers.

Project site has been chosen Erzin which is a district of Hatay, and it is the only place that hasn't been affected from the earthquake. Therefore it is a safe space to construct temporary residences as well as providing the required infrastructure and public amenities.

B. DESIGN

1: 500- 1:1000 Site Plan	1:10- 1:50 System Details
1: 100- 1: 200 Floor Plans	Explanatory Diagrams and Visuals

Modular architecture is chosen as a method in order to:

- Provide immediate temporary houses to victims by fast assembled structures.
- Use affordable materials and methods due to low budget in hard conditions.
- Design flexible spaces through modifying the attachments of modules.
- Create an additive design method, respond to the change in population through adding, subtracting and remodeling.
- Obtain low carbon footprint due to the highly efficient use of resources in factory setup

Based on a demand shelters system can be divided into three sub-systems as follow:

- Temporary housing
- Temporary social elements
- Temporary common services/ facilities

Units are planned based on the following measures:

Providing comfort and welfare as well as mental support for refugees, following the standards for various functions of spaces, organizing the spaces based on their pre-planned functions, considering the local and environmental factors and sustainable development principles, considering multi-functioning for some spaces.

3/ List of further agreed-upon parts of the project (model)

Physical model of units and their assemblance
Portfolio and Poster (according to the CTU FA model)





about
architect's role
scope
modular architecture
shipping containers

introduction

about



Natural and unnatural disasters and wars are catastrophic events that cause loss of life, extensive property damage and environmental degradation. Number of natural disasters are drastically increasing in recent decades, causing a great impact on natural and built environment. Most of the buildings are collapsing or becoming unusable due to damage; leaving thousands of people homeless over night.

Post-disaster shelter programmes provide durable housing that successfully meet the humanitarian needs and protect the vulnerable after disasters. Housing provision plays a crucial role while reconstructing the damaged areas since it's one of the most important needs for people and essential for their well-being (Barakat, 2003) Successful post-disaster architecture must meet both short-term need for immediate shelter and long-term needs for reconstruction and stability.

Current temporary settlements have the sole purpose of accommodating displaced people due to conflicts. Focusing on providing only basic humanitarian requirements and assuming the situation is temporary, these settlements failed to address a sustainable aid, tailored to the needs of refugees and host communities. These almost unlivable dwellings with huge infrastructural strain in hosting countries cannot allow the refugees to create a new life for themselves.



Humanitarian organizations put minimum requirements to units, intended for fast development and low cost. Comfort and design of the shelters is the last requirement to fulfill, for this reason many shelters do not succeed to provide the essential qualities of a domestic environment.

Disasters cause much more than just physical damage and destruction of property to those who live in affected areas. The affected population is reminded of the fragility of human existence and will endure a tough, emotional, recovery, facing a loss of comfort, security and control over their surrounding environment. It is important to acknowledge the necessity for the physical housing unit to provide qualities beyond the minimum of living requirements, creating a space that could be called home. A place appropriate to feel safe in, enabling an expression of identity, customs and traditions.

Markowitz, 1995

Architect's Role

"The right to adequate housing... is intended to ensure that everyone has a safe and secure place to live in peace and dignity."

(UN OHCHR & UN- Habitat, 2005)



Architecture and urban planning can have a significant impact on post-disaster recovery efforts, as they are critical in the design and rebuilding of communities affected by disasters

Post-disaster reconstruction revolves around the needs of the users of the built environments, as well as the needs of the communities and cities decimated by the disaster. It requires us to take into account cultural, social and environmental contexts.

The spaces approach used by architects must be justified by the present and future reality of the aimed population. However, the decisions taken in project design and development processes not only have immediate effect on society, but also directly affect the impact on the natural environment as well as buildings environmental quality. (Carlos, 2017)

scope

This project is an attempt to find a solution to housing crisis in post disaster/post-war cities by installing modular portable housing units to create more livable, sustainable places for people in need. Moreover providing the users with emotional and physical support with additional common areas is intended.

Recovery takes years after disasters, making it particularly difficult to shelter affected populations during the reconstruction period. To understand the architect's role in the reconstruction process, various stages of this process and the problems and potential solutions should be considered.

One way to expedite the post-disaster reconstruction process is to not depend solely on relief and foreign aid but to also involve local residents, builders, and materials, which also provides a much-needed boost to the local economy.

There are mainly two approaches to post-disaster reconstruction: transitional shelter and multi-phased.

This project will explore ways to create a transitional shelter, a mid-term response which focuses on upgradable, reusable, relocatable, resalable and recyclable shelter. Planned use is during the time between the emergency and the permanent solutions, usually from 6 months to 2 years after the disaster.

Planning of community shelters will take into account occupant safety, privacy and dignity, as well as access to essential services. Sustainability plays a vital role with it's 3 spheres: economic, social and environmental which may be in conjunction with widely accepted Humanitarian Logistics: humanity, impartiality and neutrality.

Thus, vulnerability plays a decisive role in sustainable development (UNDP, 2004). When governed by human activity, vulnerability should not be considered independently of development activities.

MODULAR ARCHITECTURE



HABITAT 67, MOSHE SAFDIE

History of modular design dates back to ancient Rome; when armies prefabricated their forts in sections small enough to be carried to their desired destination for a quick and easy installation. By the 19th and 20th centuries, architects across the world had experimented widely to test the limits of modular architecture.

Modular architecture is a method of construction in which interior materials, machinery, and electricity are first constructed based on unit modules in the factory, ready to assemble.

American Institute of Architects defines modular architecture as “the process by which components of a building are prefabricated off-site in a controlled setting and then shipped to the project site and assembled.” In a modern setting, the prefabrication process of the modules of a building is done in a quality-controlled environment without compromising design intent. Process results in a higher-quality building, delivered in a shorter time frame, with more predictable costs, and fewer environmental costs such as reduced material use and waste.”

With housing modules its intended to achieve:

- Providing immediate temporary houses to victims by fast assembled structures.
- Using affordable materials and methods due to low budget in hard conditions.
- Flexibility in design through modifying the attachments of modules according to site specific needs.
- Additive design method, change in structure through the time as the population increases or decreases since it is easier to add, subtract, remodel, restructure modular house than traditionally designed houses.
- Environmentally friendly and if possible self-sufficient settlements. Modules have low carbon footprint due to the highly efficient use of resources in factory setup.

Shipping containers provide an intermodal standard regarding dimensions for easy transportation however it's not necessary to utilize the actual containers during construction. Different materials such as timber or steel can be used to create same sized modules.

STACKING

"Stacking instinct is universal among children and ancient builders alike. Construct by stacking seems hardwired into eye-hand-mind connection. A modular masonry unit allows us to erect a wall. Stacked structures are balancing acts, a mass here counterbalancing a mass there.

Stacked structures can be improvisational when constructed over extended periods, evolving organically. Form and structure in stacked construction are one and the same which is different from contemporary architecture notion; which perceives form as autonomous, independent from structural principles. However, pre-industrial architect conceived of form and structure as a unity." (Wallance)



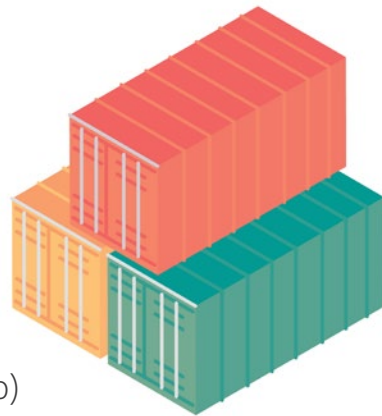
NAKAGIN CAPSULE TOWER, KISHO KUROKAWA

SHIPPING CONTAINERS

Modular containers, once serving the sole purpose of product transport, can now be used architecturally as building blocks... Indeed shipping container homes have grown to become a more affordable, cost-effective, sustainable and unique form of housing. (Moto)

Shipping containers are built from reinforced steel that allows them to function in harsh conditions and carry heavy loads. This in mind, they are durable and strong; built to last.

Eventhough a shipping container is smaller in size and the area provided may be limited, it allows modifications which allows a flexible and adaptive design.



ADVANTAGES

- Affordable and cost- effective
- Environmental friendly, recycled material
- Fast Assembly, minimized labour
- Off-site Construction, pre-fabrication
- Structural Strength and Durability
- Easy Transportation

DISADVANTAGES

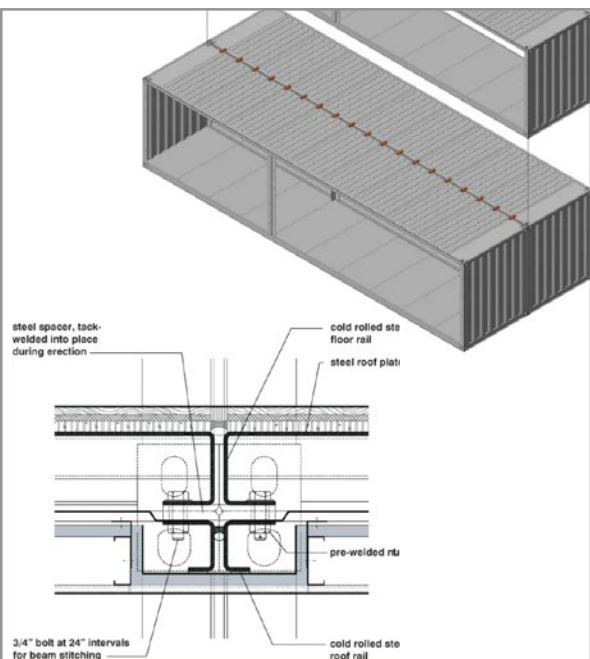
- Temperature and Humidity Control
- Additional Floor Treatments
- Structural Damage needs to be checked

Assembly

Containers will be stacked on top of other through beam stitching. "Stiffness of a beam is proportional to the square of its depth, by combining floor and roof members to nearly double the effective beam depth, 4 times the stiffness with no sacrifice in ceiling height is gained." (Wallance)

Unlike I- beams, cold forming helps to devise profiles to bolt the top rail to the bottom of stacked container which creates a composite beam.

By post tensioning, steel cable is threaded through corners of the modules. Thus, with a rigid corrugated metal shell, resistance to wind and seismic loads will be maximised.



location
site
guidelines
privacy & co-presence

analysis

location

Although the aim of this project to provide shelters across the world (except for extreme climates); an exemplary project is designed to show possible outcomes.



On 06.02.23, southern part of Turkey struck by two 7.8 magnitude earthquakes, killed thousands of people from 11 cities. It has been declared the biggest earthquake from the invention of seismic measurement tools.

Thousands of buildings have been destroyed or rendered unstable, leaving all the citizens without shelter in extreme colds. Millions were in need of aid, waiting for help from the government to meet their essential needs. However due to the inorganization of the country, help arrived too late, people left on their own; saved ones had to spend days outside in the streets, in cold, dark conditions without any food or sanitation.

This inorganisation in managing the emergency needs of people showed the importance of providing shelters immediately to disaster areas. Also it is important to consider that people will not be able to restore their lives overnights; therefore shelters are considered as a transitional settlements where people can occupy 1-2 years. Speed is crucial in post-disaster cities. Therefore 3 main principles will be followed in the design of shelters: fast assembly, flexibility, minimalism.



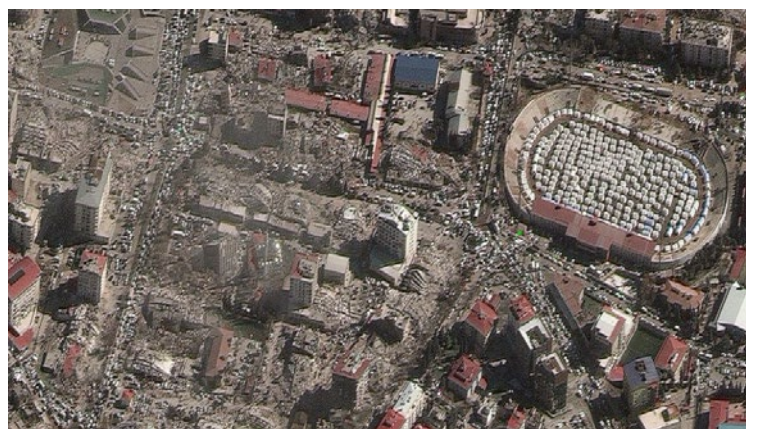
Most affected city at the earthquake was Hatay due to the geographical position of the city; which has been chosen the project site of this thesis.

Hatay is a city known to be at risk for decades because of strong earthquakes occurring in the area, and different soil conditions that can produce variation of the ground motion amplification.

Hatay is an ethnically and culturally diverse border city; with a rich history dating back to bronze age. Currently Turkish-Syrian people are in majority however Greek and Armenian communities can be found as well. City is next to the Levantine sea but alsomost prominent feature is the N-S leading Nur Mountains.

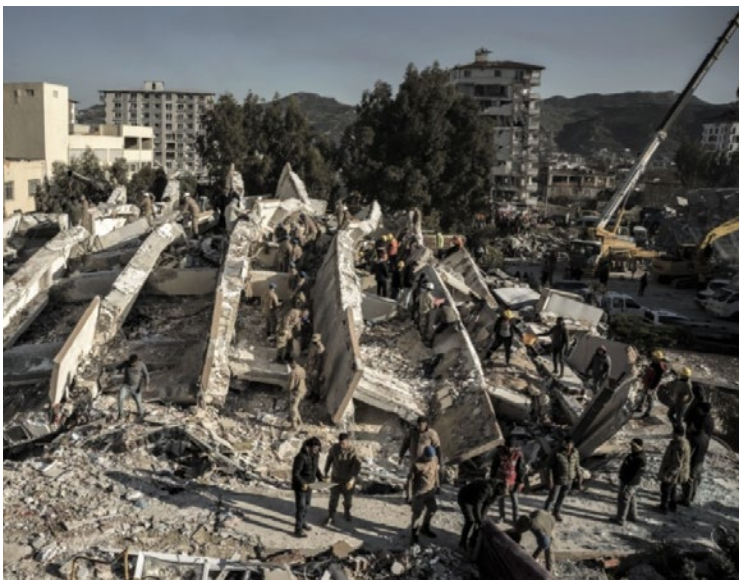


HATAY | JULY 26, 2022



HATAY | FEB 8, 2023

World's second-largest collection of Roman mosaics are located in the Hatay Archaeology Museum at Antakya. Also many castles and a rock-carved Christian pilgrimage can be found. Titus Tunnel of Vespasian is famous for building as a water channel in the 2nd century, in Samandag.



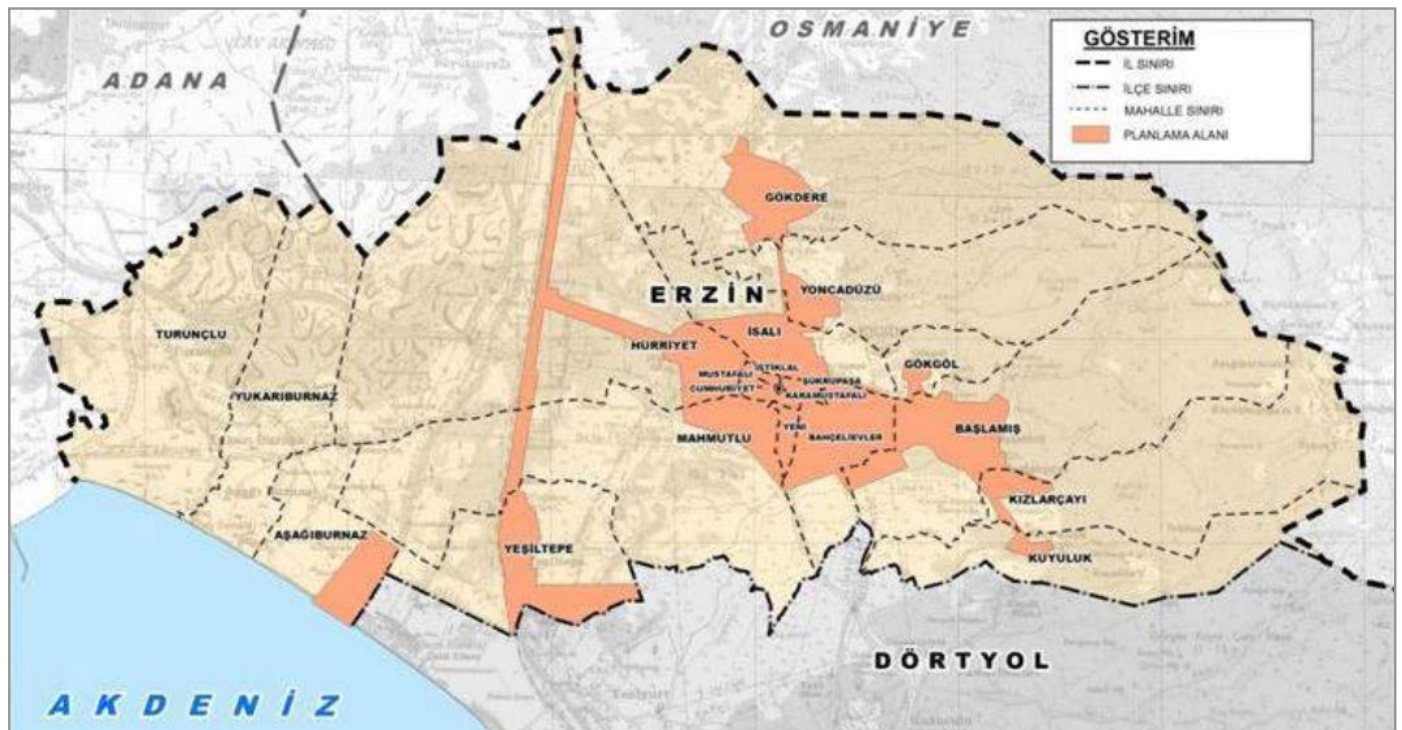
site

Project site has been chosen Erzin also know as Yesilkent (Greencity) is a district of Hatay. Erzin is the only district that hasn't been affected from the earthquake. Therefore it is a safe space to construct temporary residences as well as providing the opportunity to benefit from urban amenities.

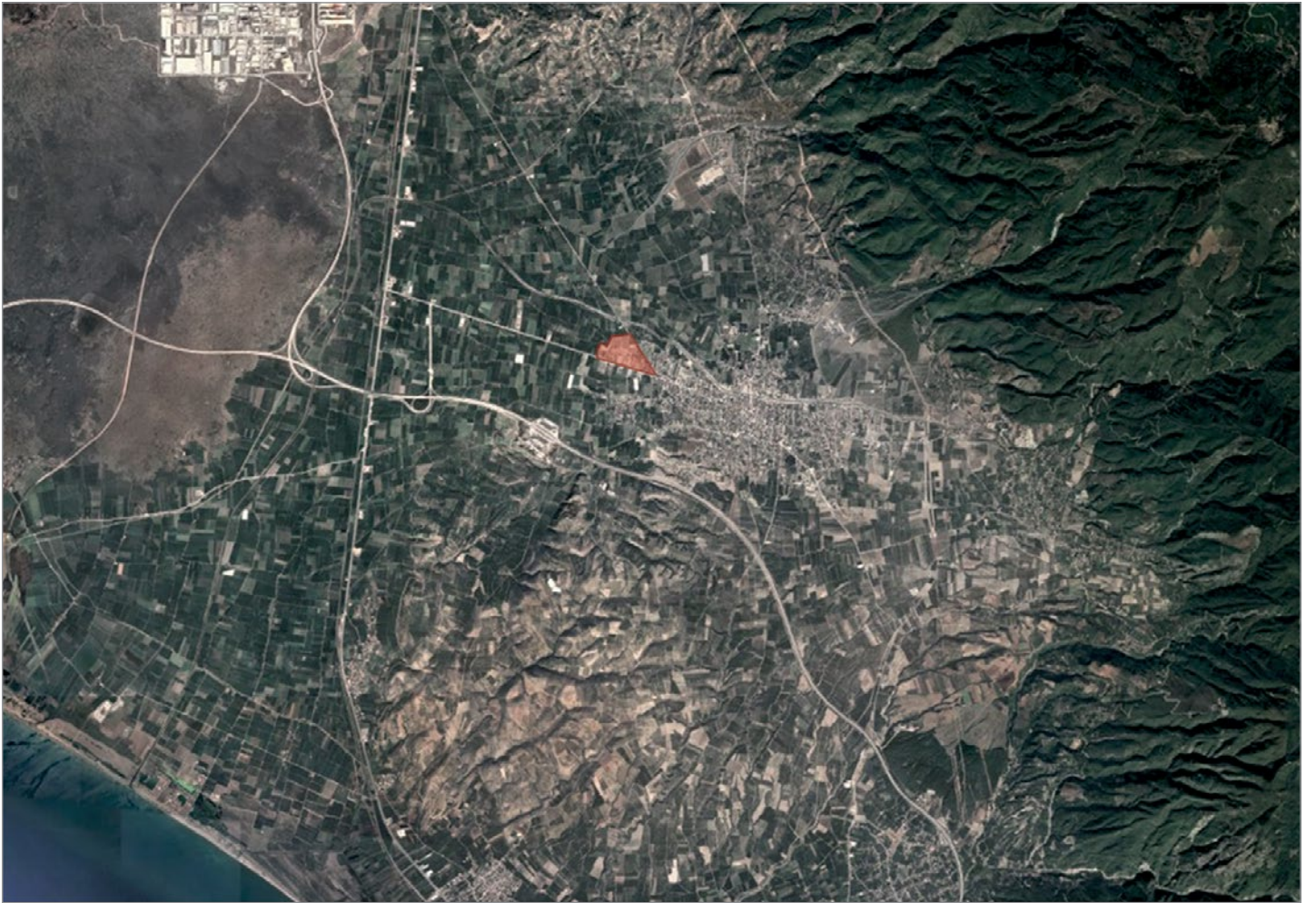


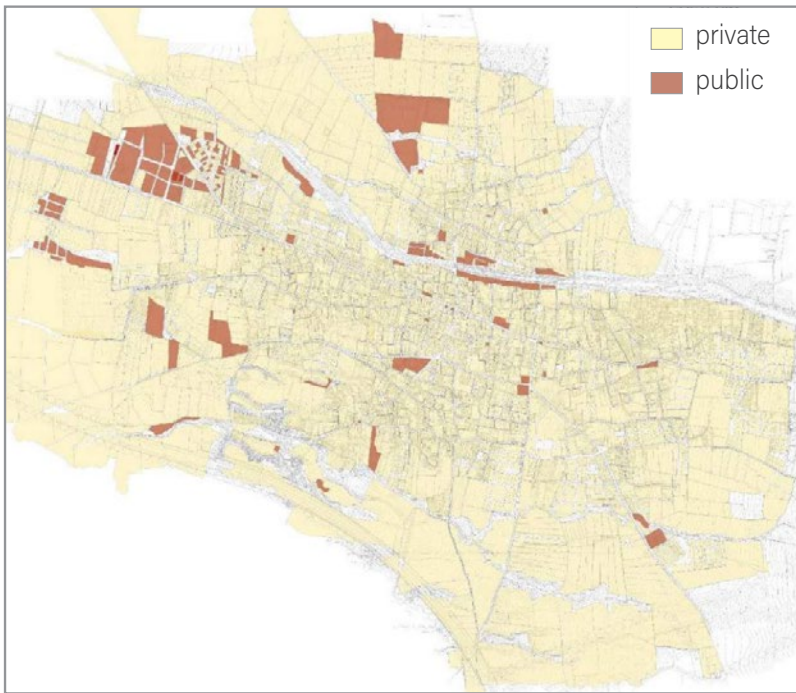
Population: 31.092 (urban) Area: 358 km² Elevation: 178 m

- ⊗ The climate is cold and wet in winter, hot and humid in summer.
- ⊗ Main economy is tourism or agriculture, mostly citrus fruits or grains.
- ⊗ Erzin is mostly consisted of low-rise concrete apartment buildings or single houses.
- ⊗ The ancient settlement Issos was found inside the borders; meaning the history Erzin dates back to 333. BC and further and has been a home to many different civilizations.



- - Subprovince
- - - District
- Neighborhood





According to the Municipality of Erzin's latest report, city is consisted of areas of private ownership. In order to construct a shelter in collaboration with the government, a public area has been searched.

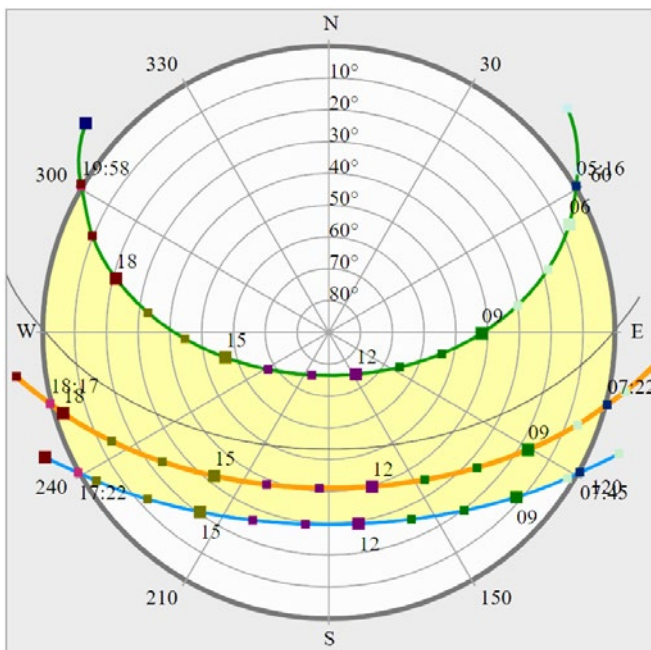
Thus in a small rural town which is economy is based on agriculture; it is crucial to locate the shelters in close proximity to all kind of public ameni-





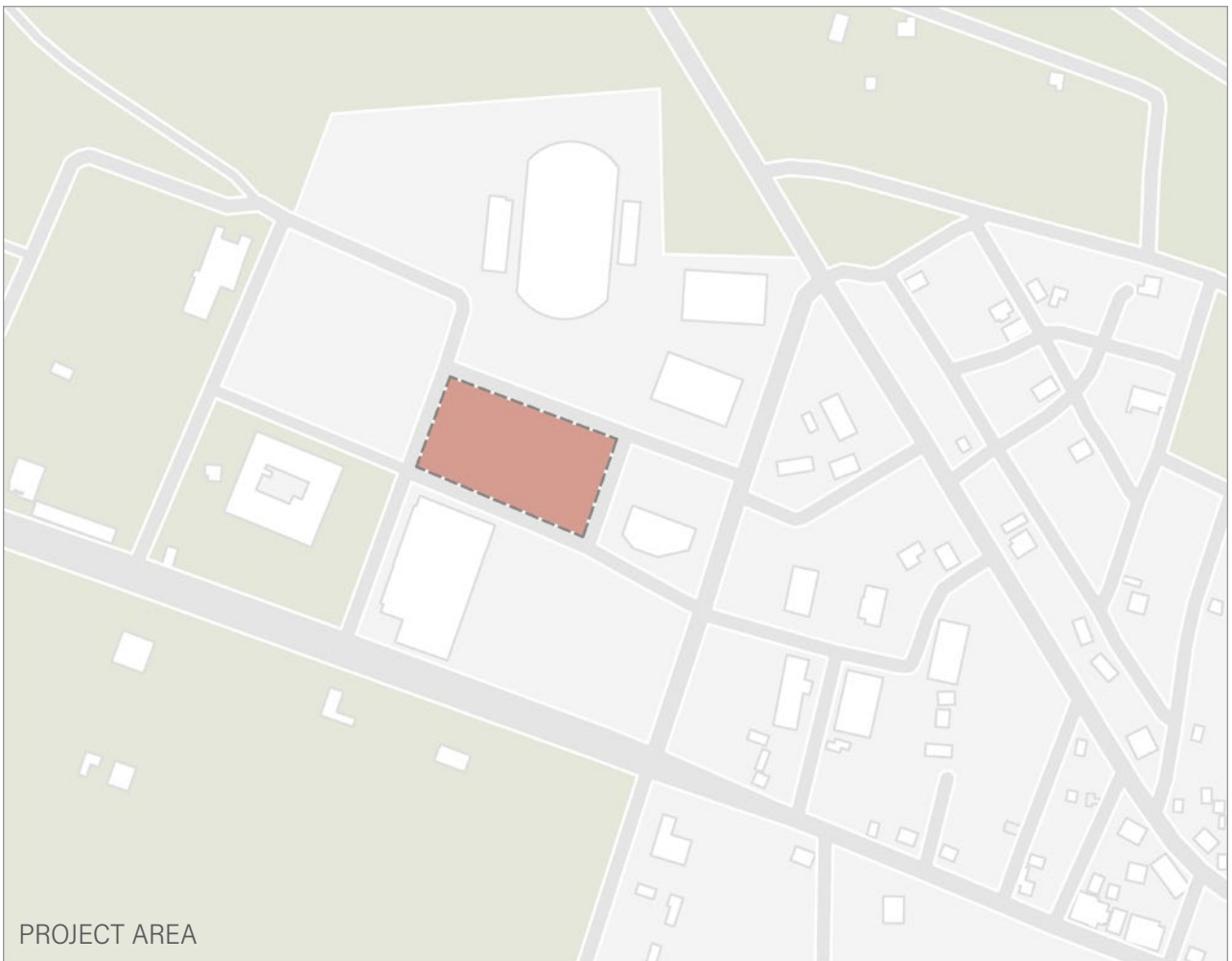
**Proposal Area:
10.000 m²**

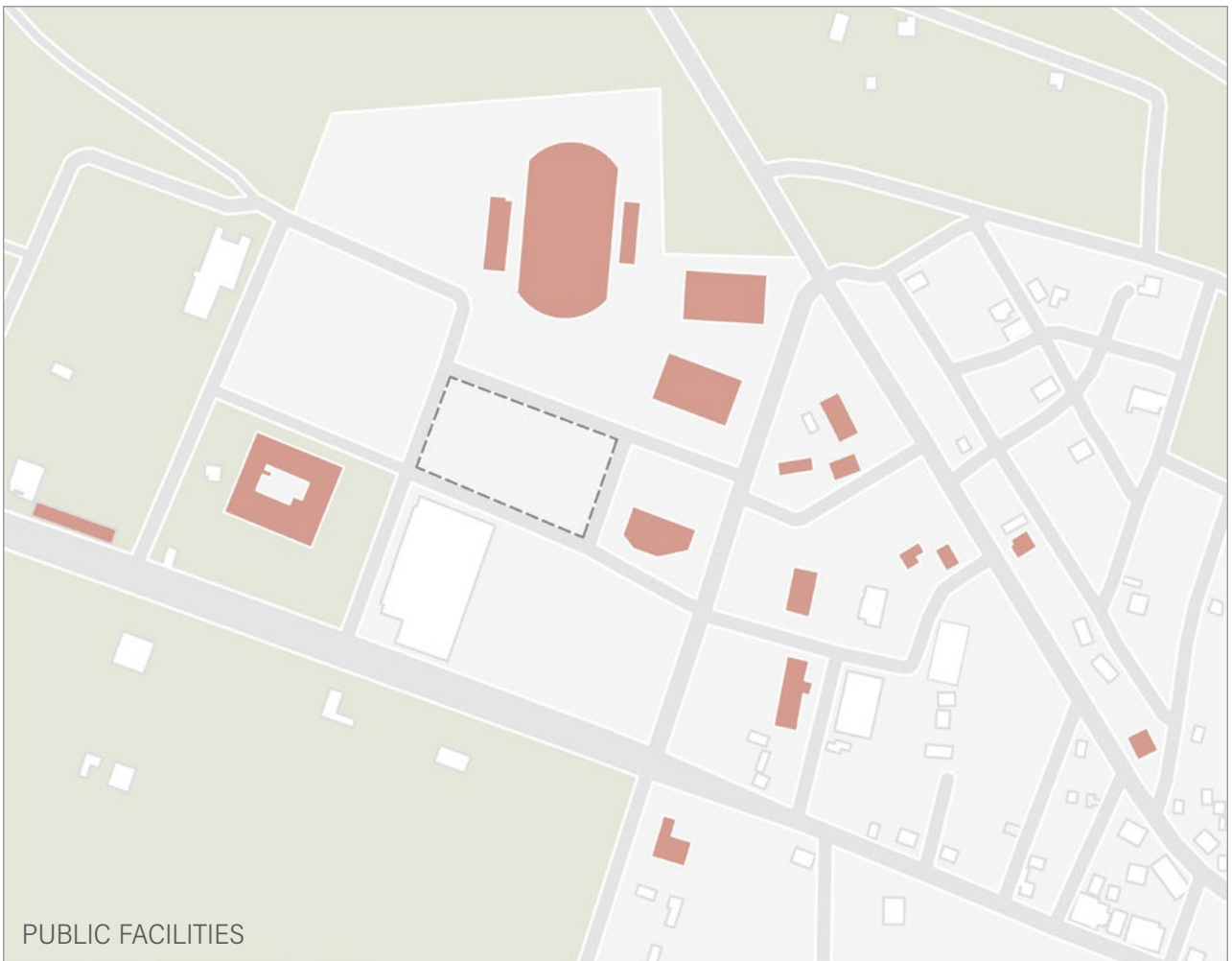
- | | | |
|--------------------------------|--------------------|------------------|
| 1 Restaurant | 5 Community Centre | 9 High School |
| 2 Municipality | 6 Public Library | 10 Gas Station |
| 3 Stadium | 7 Police Station | 11 Health Clinic |
| 4 Ministry of Youth and Sports | 8 Middle School | 12 Pharmacy |
| | | 13 Market |



Project site is located in a rural area however most of the civic amenities of the city are located nearby. Which creates a great opportunity for future development and to use in long term hosting. Thus the site is next to the main road of the town which provides easy access to other provinces as well as the seashore.

In case of future growth and increase in inhabitants number, there are two empty plots next to the chosen site, providing a 40.000 m² area.





guidelines

According to several researches about earthquake shelter design guidelines with respect to World Conferences and Earthquake specialists are given below.

"Of the three kinds of shelters required after the occurrence of a destructive earthquake in a populated area, namely emergency shelters, temporary shelters, and permanent shelters, design of the 2nd group is problematic. In fact, temporary shelters do not need to follow the permanent housing standards on the one hand, since they are not permanent and should be demolished after a year or so, but on the other hand, they should provide the residents with some minimum living standards requirements, of which some are exactly same as the permanent housing. Therefore, architectural design of temporary shelters needs special attention."

Site Selection

To select an appropriate site for temporary shelters several criteria has been suggested by various scholars (OCHA). These criteria can be summarized as:

1. Number of refugees
2. Functionality of the site
3. Infrastructures available at the site
4. Configuration of the site
5. Accessibility

Number of Refugees

With regard to number of refugees two main issues should be considered which are number of people in different settlement groups, or the aggregation, and the maximum capacity of each complex. Bologna has suggested three numbers of 100, 250, and 400 as appropriate one for the maximum number of people in settlement groups, depending on the situation of the stricken city, the total number of homeless people, the number of aid workers and resources.

Functionality

Relatively high efficiency, minimum adverse interaction with other components of the city with various functions, and existence of open areas for required development are the issues which should be considered with regard to functionality of the site.

Infrastructure

Water and wastewater systems, energy supply system, surface water drainage system, and communication system are the issues related to the infrastructures. Parks and public green areas, parking lots are potentially good places, which usually have enough infrastructures. Camping areas are the best place for temporary shelters.

Configuration

With regard to the site configuration the land geometry, ground slope, and orientation should be taken into consideration. In the case of limited spaces for temporary shelters the architectural design roles will be much important to make the best use of the limited available area.

Accessibility

Closeness to the main highways or avenues, as well as closeness to the essential facilities, like hospitals, are important issues with regard to accessibility. Other important issues in this regard are the width of access ways, and the traffic current in the aftermath of earthquake.

SYSTEMS

Based on a demand shelters system can be divided into three sub-systems as follow:

- Temporary housing
- Temporary social elements
- Temporary common services or facilities

It is suggested that these units are planned based on the following measures:

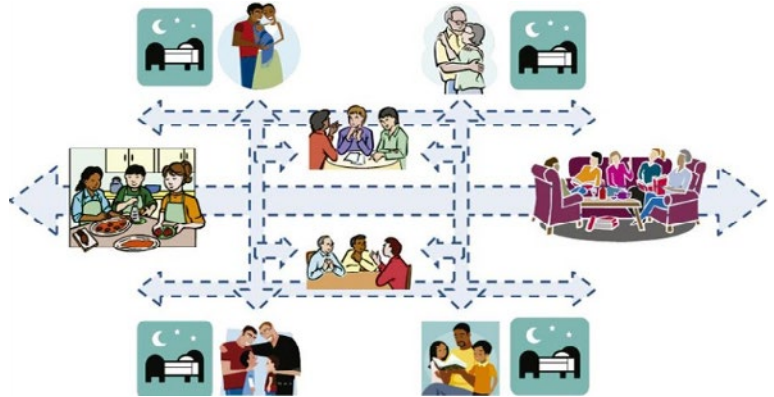
Providing a minimum level of comfort and welfare as well as mental support for refugees, following the standards for various functions of spaces, organizing the spaces based on their pre-planned functions, considering the local and environmental factors and sustainable development principles, considering multi-functioning for some spaces.

Settlement Model

Selection of settlement model is dependent on land conditions, climate, and other affecting factors, mentioned in the previous sections. However, the very important factor which should not be overseen is the will of the people, and their contribution in planning process. Whenever, the will of people has not been considered in a proper manner, they have abandoned the provided temporary shelters. It has happened in many past earthquake that the people of different cultures, backgrounds and life styles, and even different ethnicities have had to live together in one complex, and this have resulted in dissatisfaction of various groups. People with urban background, which had used to live near their working places, have had to utilize the transportation system much more than before. Also people with rural background, which had used to live near their farms, have gotten in trouble for reaching their farms.

Privacy and Co-Presence

Design of the temporary shelters has to include areas of co-existence, socializing-meeting and to each family a safe, private sheltered area.



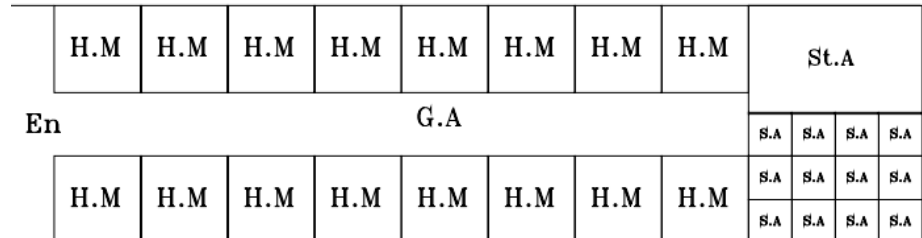
- ⊗ The shelter space division must minimize the disruption of family cohesion, through providing proximity for intimate activities (sleeping, sanitizing) and supporting group activities (preparation and consumption of meals, leisure and entertainment).
- ⊗ The communities affected by disaster must be provided with at least 3.5 squared meters of sheltered area per person, since a smaller area may affect negatively one's health, privacy and dignity.
- ⊗ The temporary shelter must have vast living areas adequate to the total number of users, as well as smaller areas, for the coexistence of members of the same neighborhood or family.
- ⊗ It also must have not only a clear axis of integration where to locate coexistence areas but also more secreted axles to provide exclusive areas for smaller groups of families.
- ⊗ The temporary shelters must follow the original neighborhood logic and maintain family cohesion, promoting the maintenance of bonds of affection through the creation of areas with high degree of constitutivity and on the more segregated axis, promoting the access and cohabitation of the families gathered in groups.
- ⊗ The areas for the coexistence of family group must be sensorially closed off, trending to social aggregation (convexity). There must be as well as areas for entertainment, preferably with equipment for movies reproduction, stereos, sofas and views to external areas (windows that look out onto green areas, etc.).
- ⊗ The dormitories, separated by families, with a high degree of privacy, must be located in end of the axes where there is little circulation (more segregated)

Three various settings can be considered for residential units:

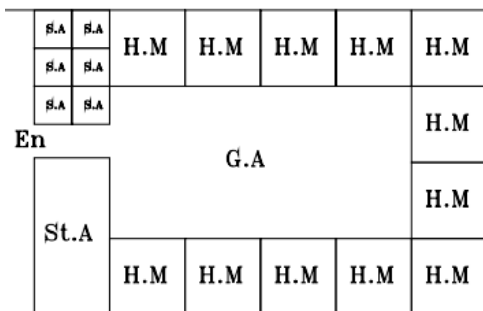
1. Linear

2. Central

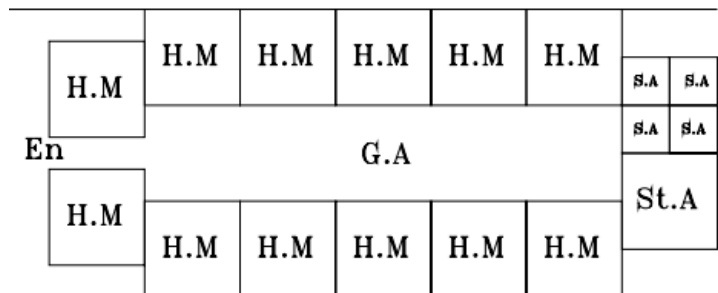
3. Linear-Central



Linear Settlement Model



Central Settlement Model



Linear - Central Settlement Model

For attracting the community participation following points shall be considered:

- ⊗ Designing the houses based on the family size
- ⊗ Including entertainment spaces with easy access in the complex
- ⊗ Creating some spaces to meet community's cultural needs
- ⊗ Paying attention to the tendency of the people to have easy access to the places of their permanent residences
- ⊗ Telling to people about the costs of temporary shelters of various styles

It is believed that the community participation is not only very important in successful construction of temporary shelters, this participation is also very helpful for mental and spiritual restoration of the stricken community.





concept
typology
master plan
buildings
visuals
reflection

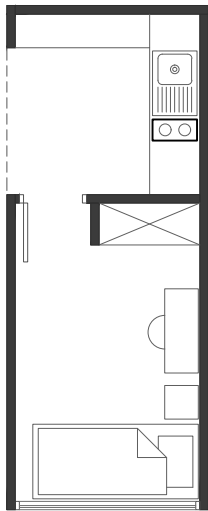
project

concept

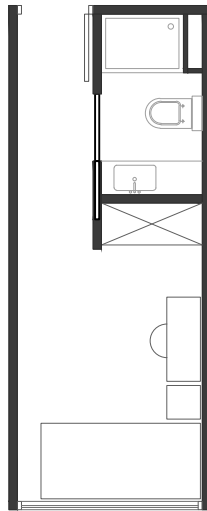
The project is created to meet the urgent need of people who were affected by natural or humanitarian crises. Following that, the concept is generated after considering the economic realities, immediate timing and available materials.

Therefore creating "ready to assemble modules" have chosen as methodology. Following modules are designed in order to be prefabricated and attach to each other in order to form flats or common areas.

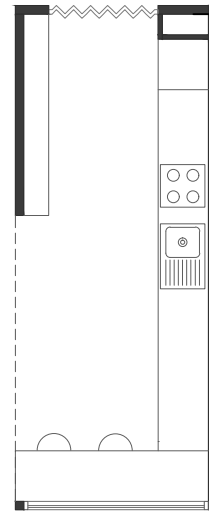
Although these modules opened the way to form flats in further design process, as the flexible nature of the project, it is important to state that there are countless ways to offer prefabricated solutions. The objective is to obtain easy assembly-dissassembly to enable constant development throughout the time.



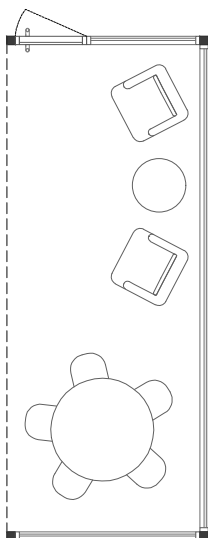
Double Unit Room



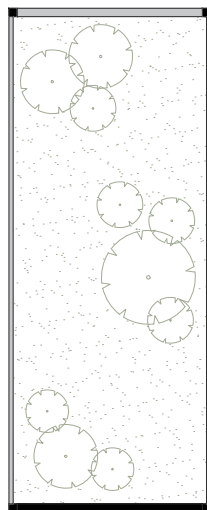
Single Unit



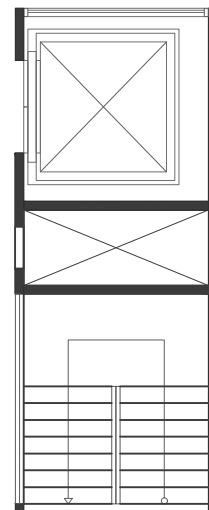
Shared Kitchen



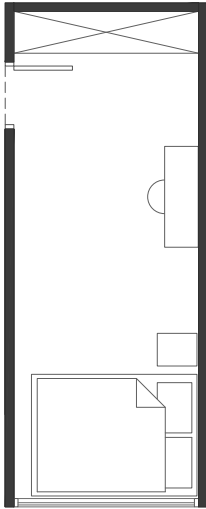
Shared Living



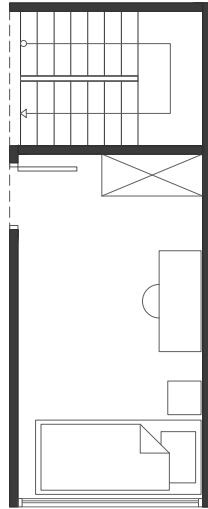
Landscape



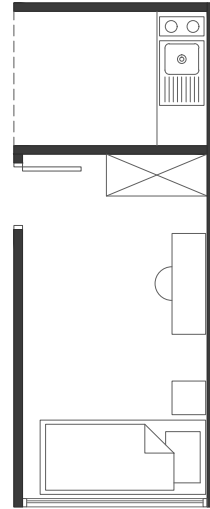
Circulation



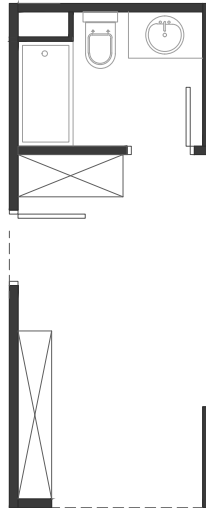
Bedroom



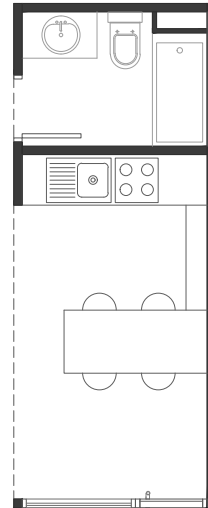
Bedroom+ Stair



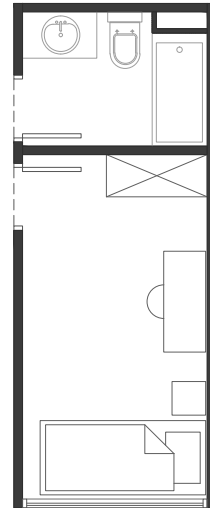
Bedroom+ Kitchen



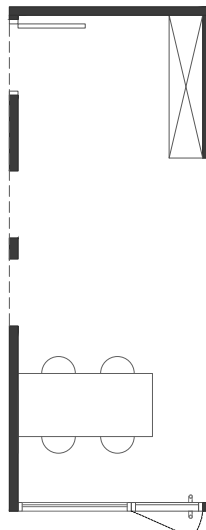
Hall + Bath



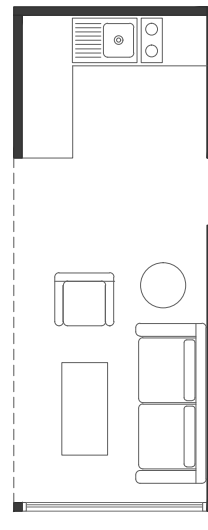
Kitchen + Bath



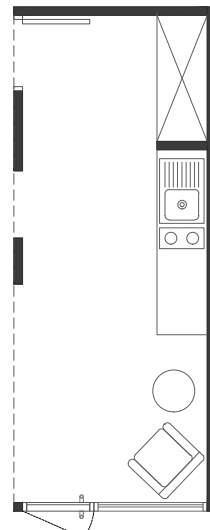
Bedroom+ Bath



Hall + Dining



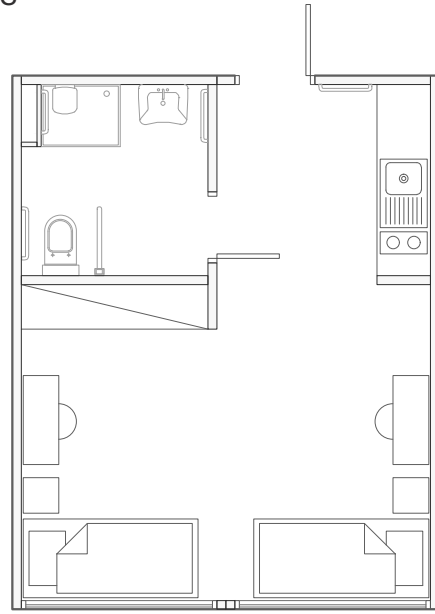
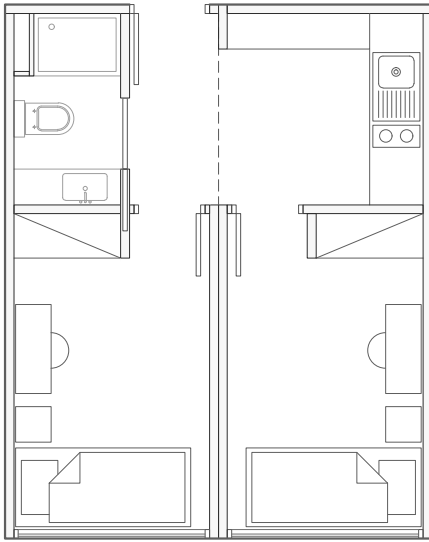
Kitchen + Living



Hall + Living

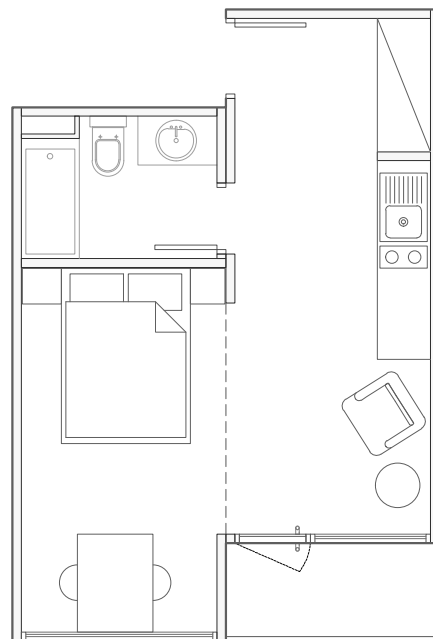
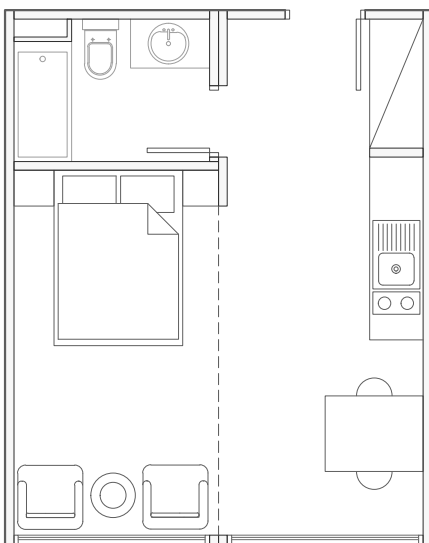
typology

Student- Elderly Housing Flat Types

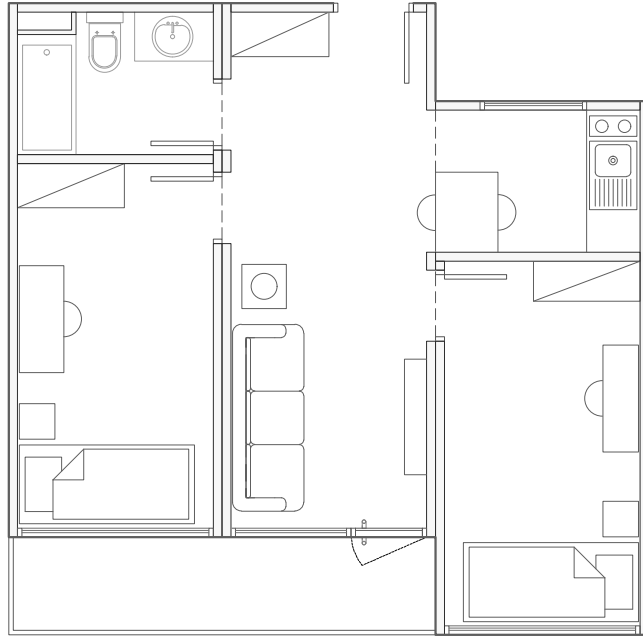


**variations with double bed*

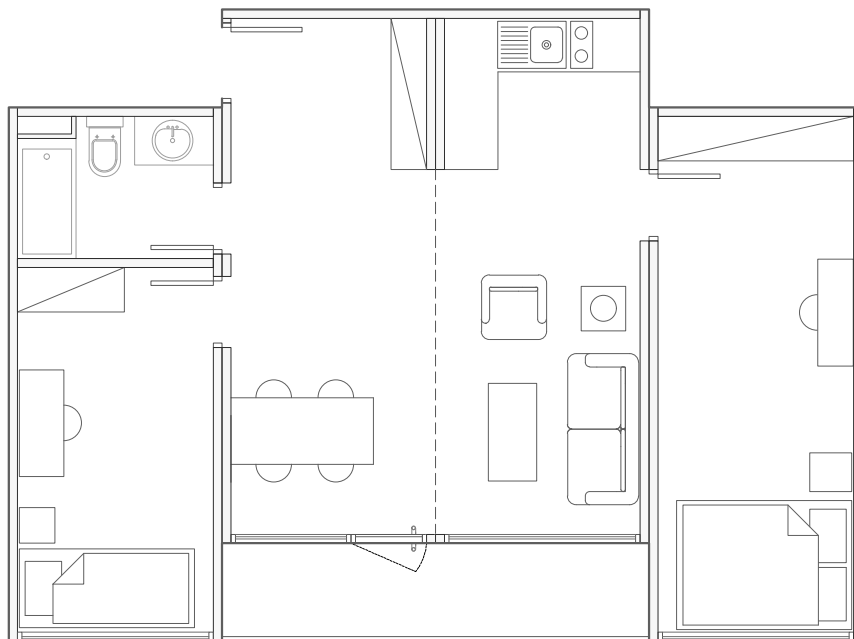
Studio [2p]



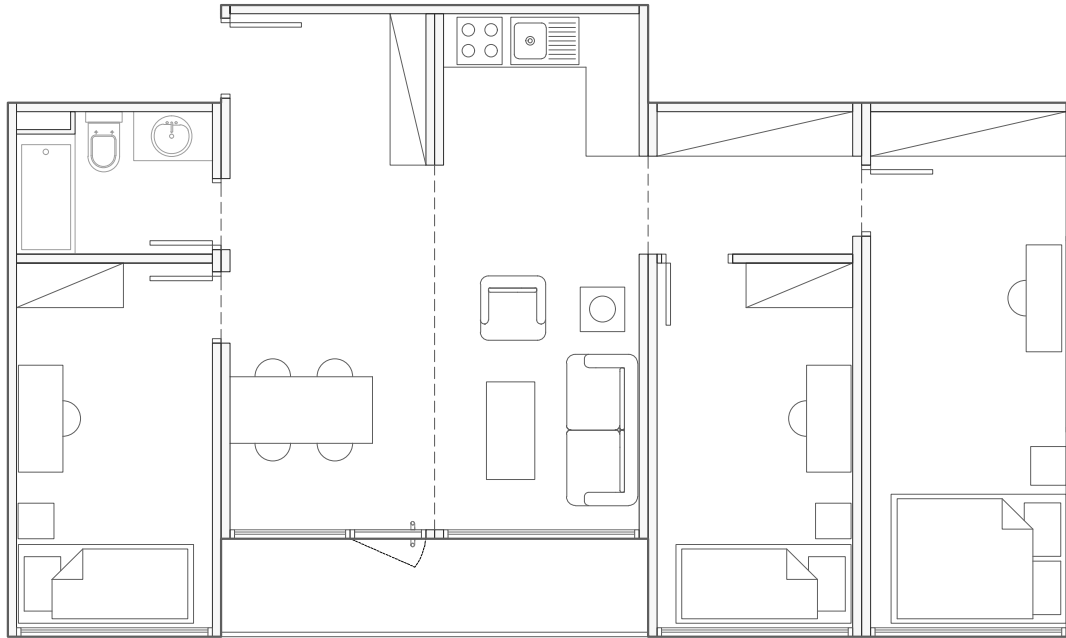
2 + 1 Flat [2p]



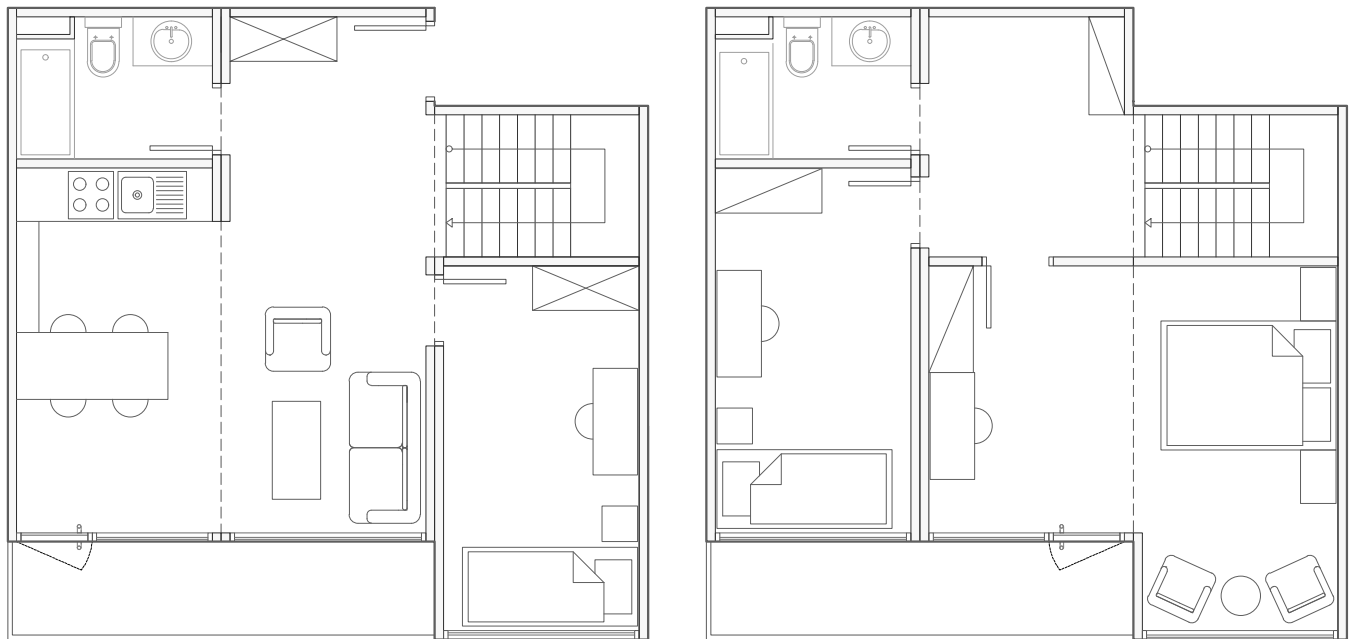
2 + 1 Flat [3p]



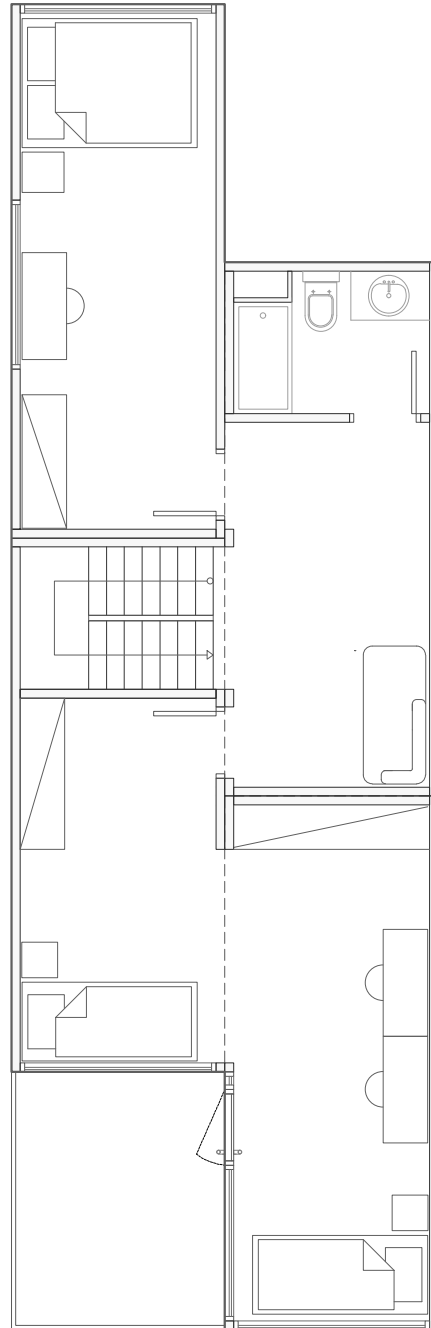
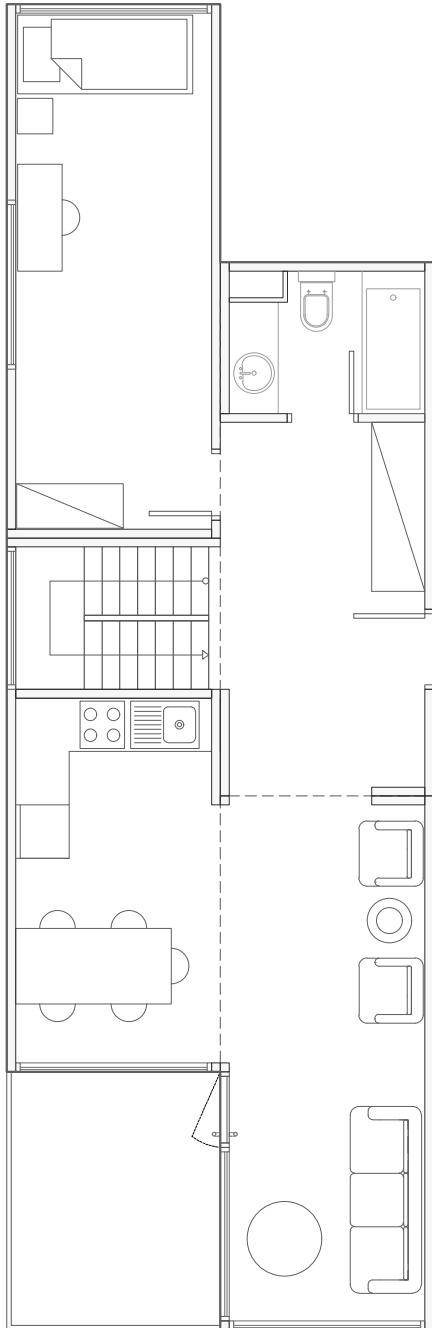
3 + 1 Flat [4p]

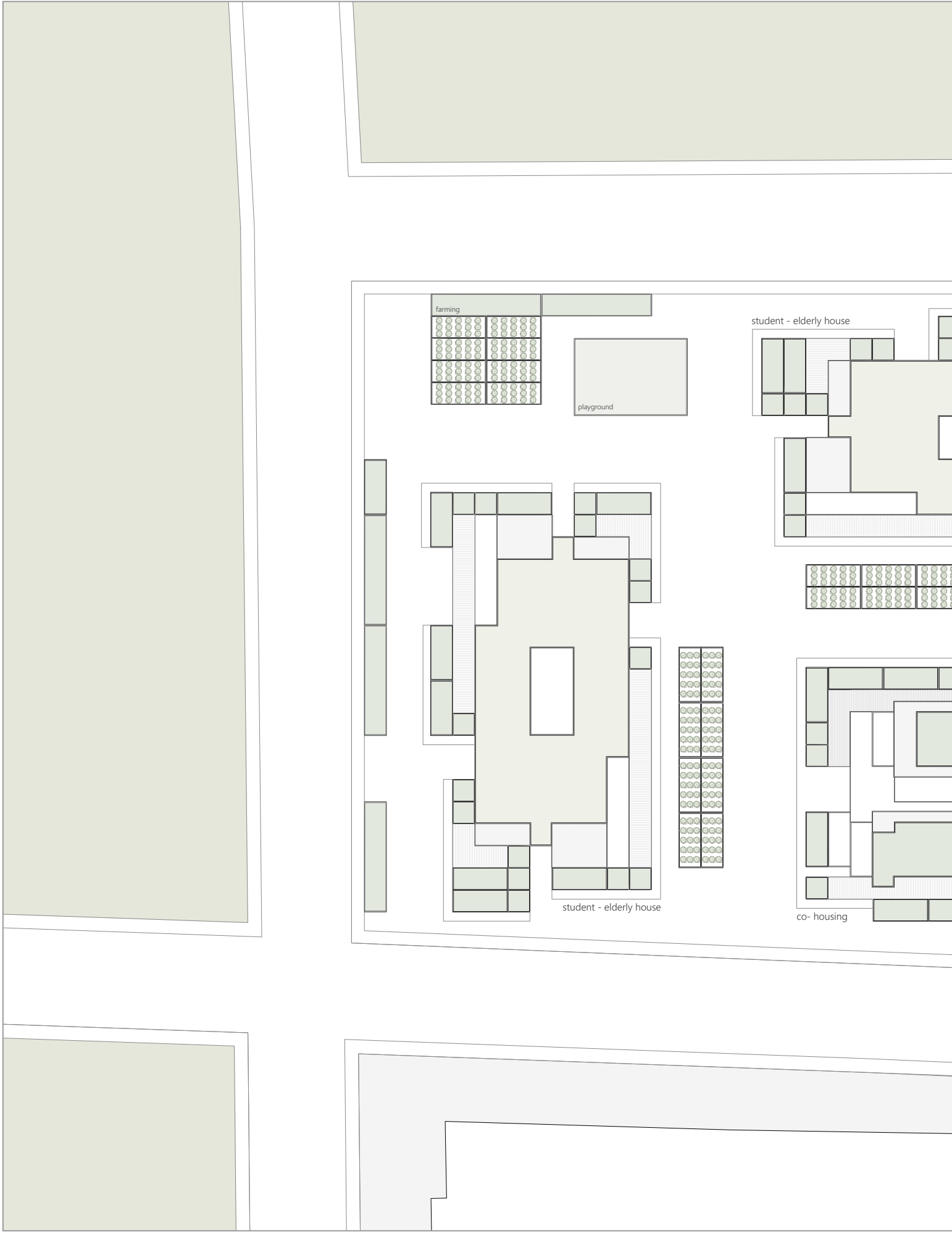


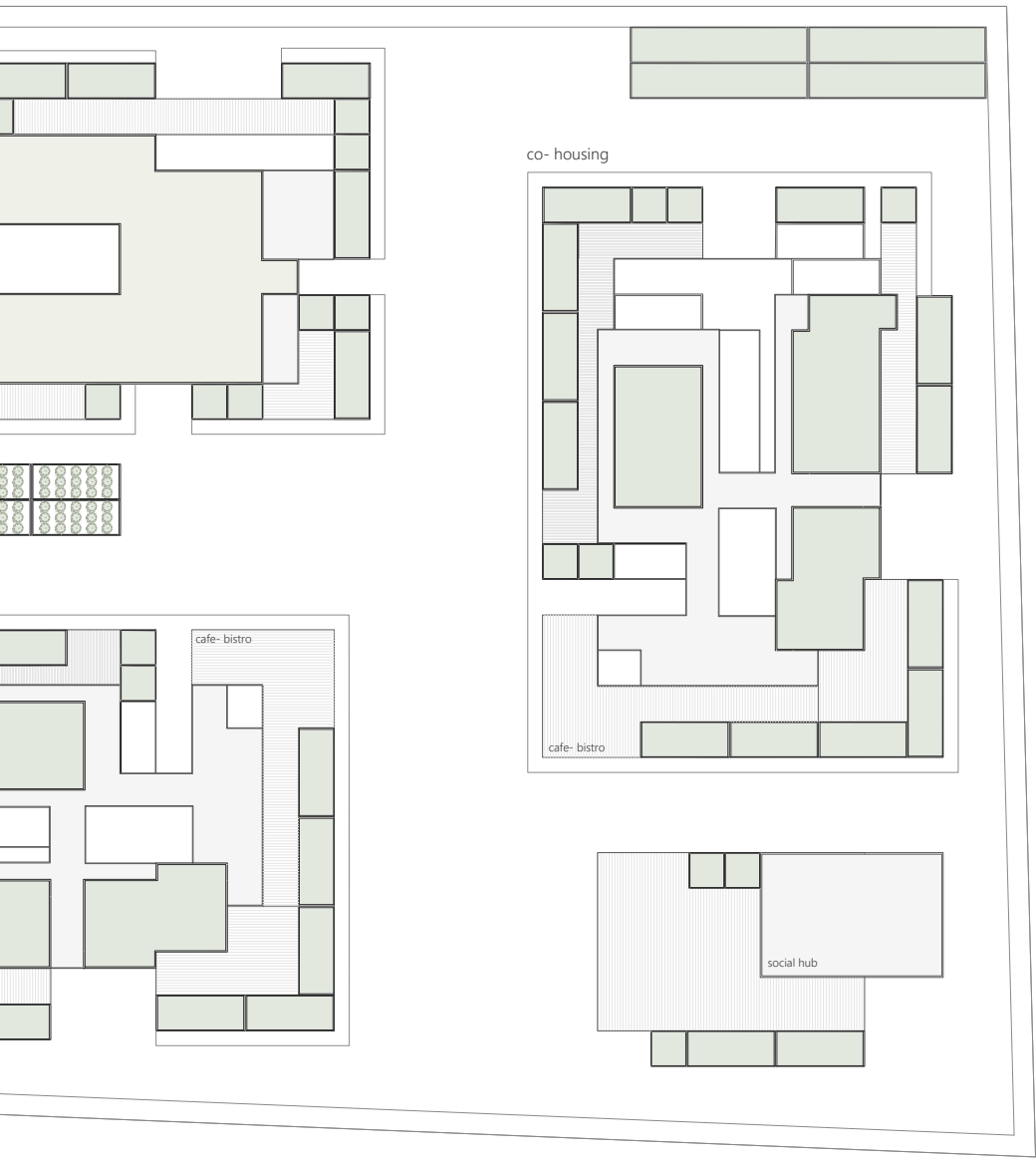
3 + 1 Dublex [4p]



3 + 1 Dublex [5p]



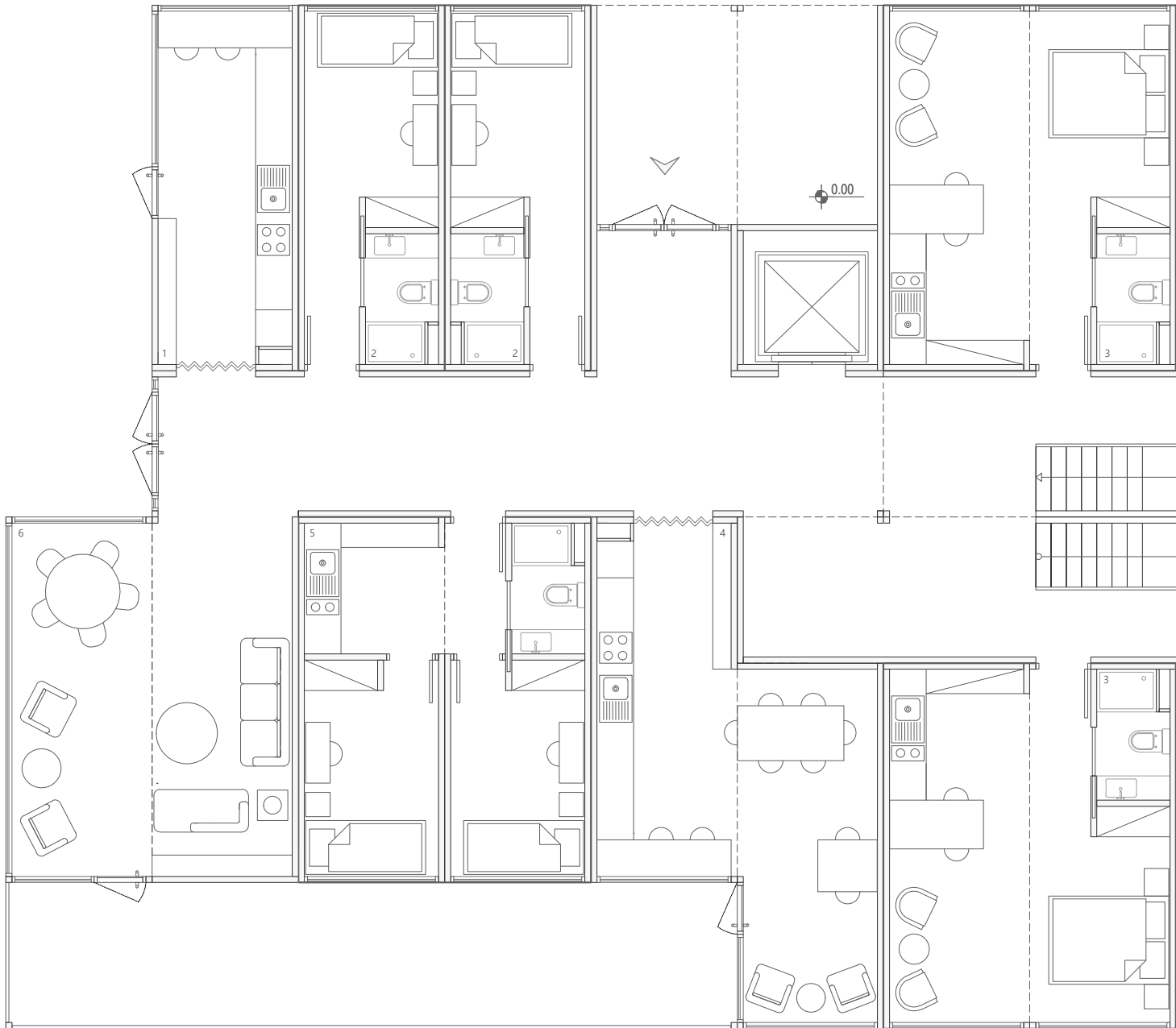




MASTER PLAN
1: 500

buildings

HOUSING FOR STUDENTS - ELDERLY



1 Common Kitchen

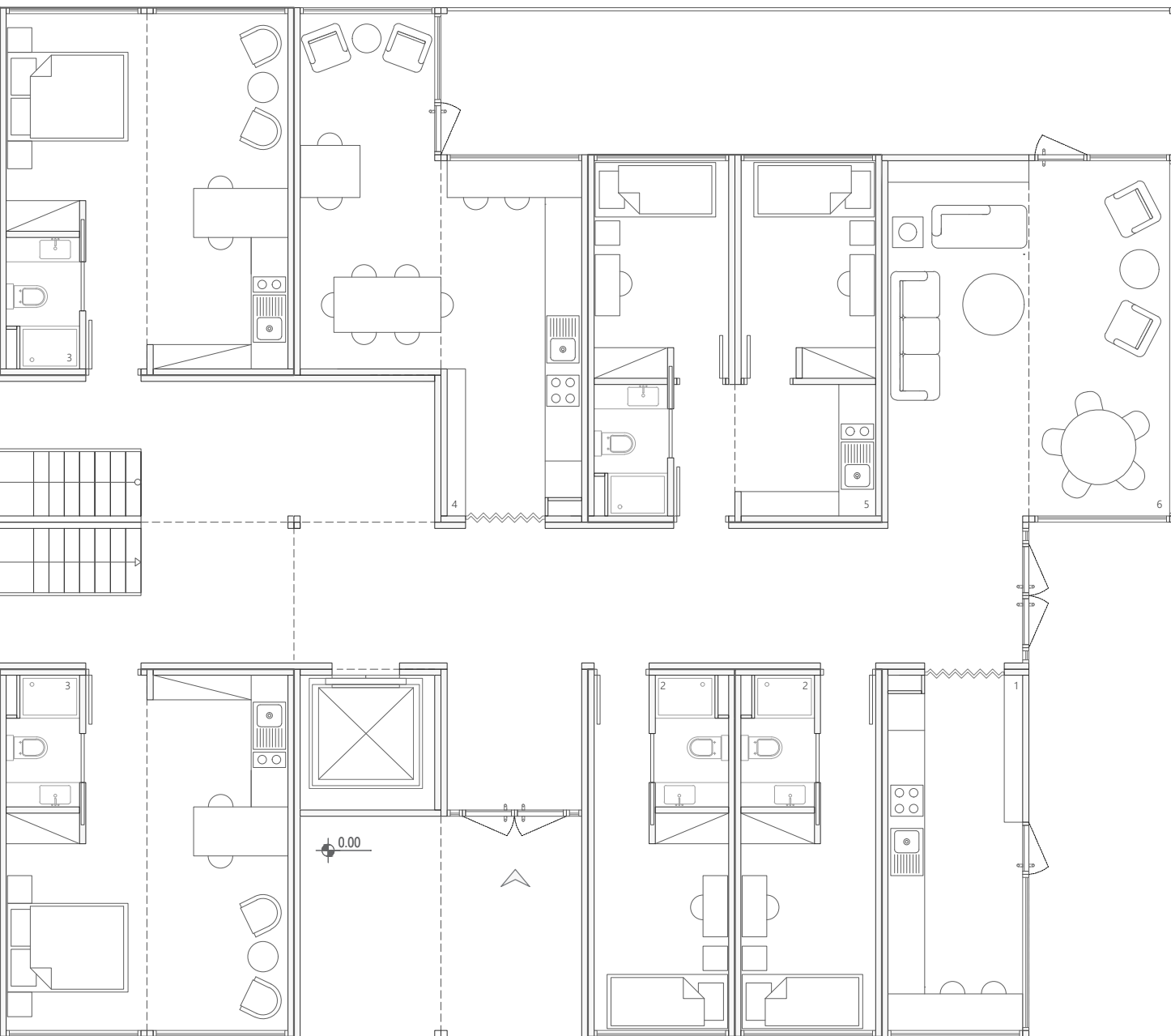
2 Single Unit

3 Double Unit [double bed]

4 Common Kitchen - Dining

5 Double Unit [2 x single bed]

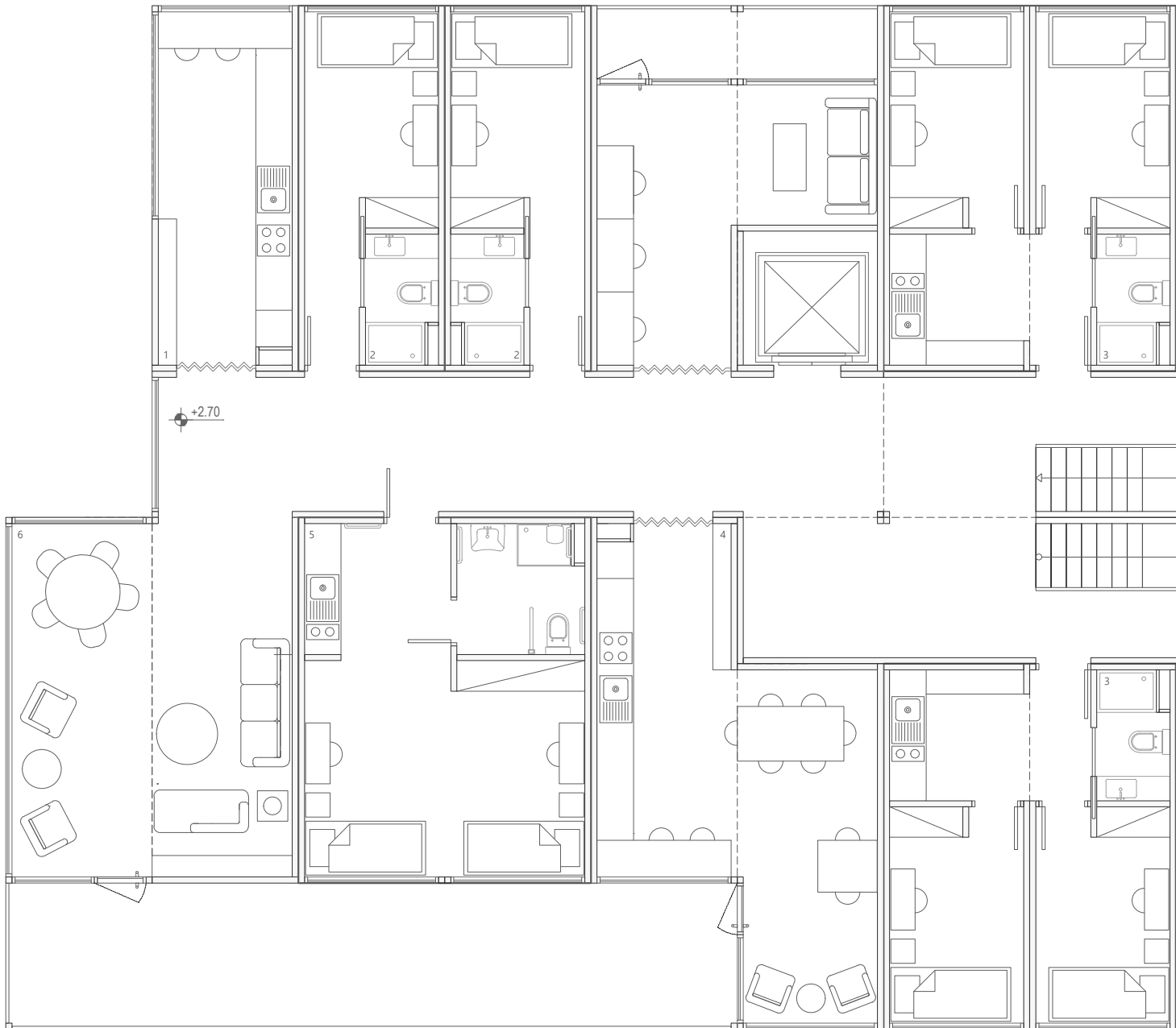
6 Common Living Room



Ground Floor Plan

510 m²

HOUSING FOR STUDENTS - ELDERLY



1 Common Kitchen

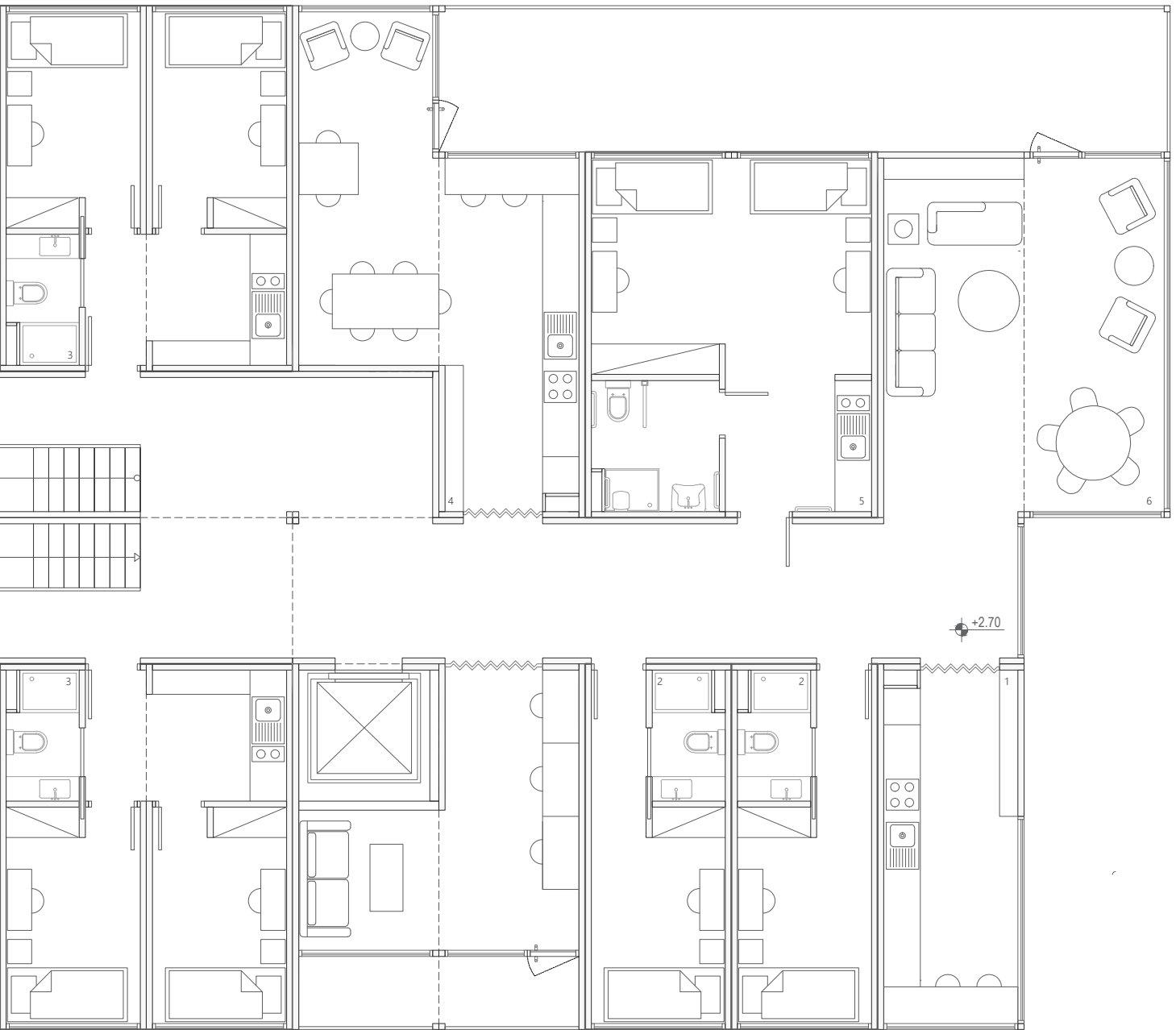
2 Single Unit

3 Double Unit [2 x single bed]

4 Common Kitchen - Dining

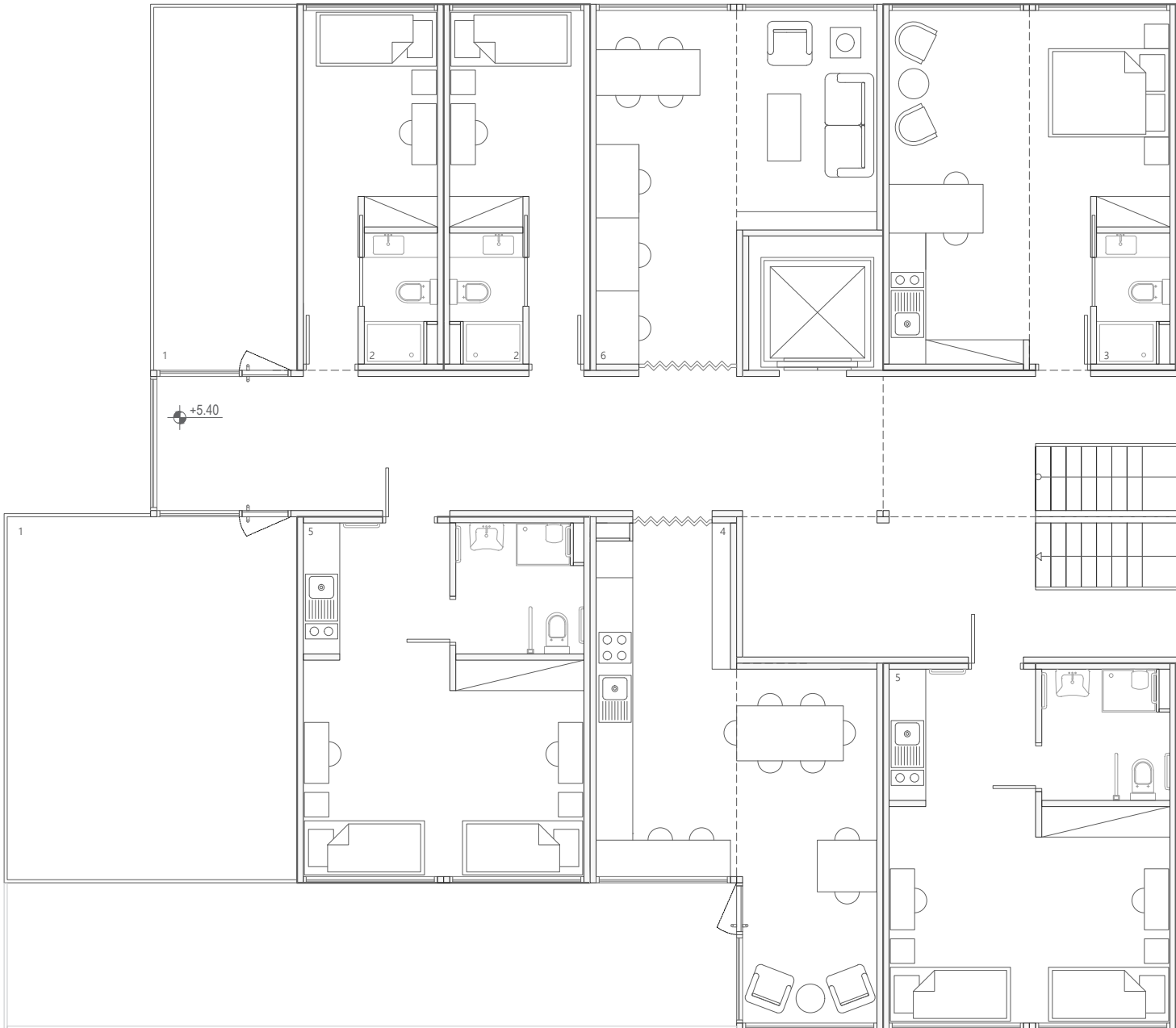
5 Accessible Unit [2 x single bed]

6 Common Living Room



1st Floor Plan
480 m²

HOUSING FOR STUDENTS - ELDERLY



1 Terrace

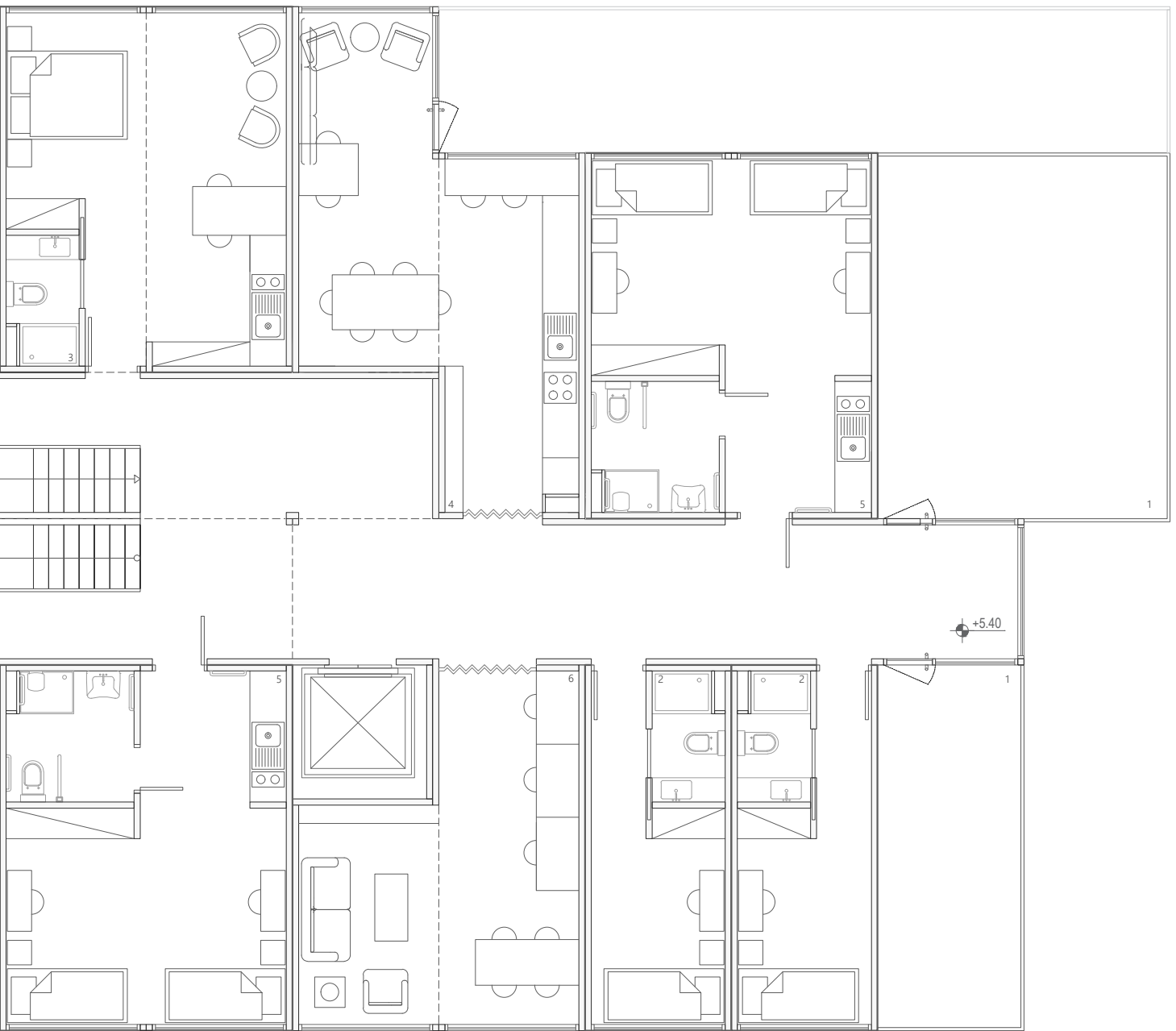
2 Single Unit

3 Double Unit [double bed]

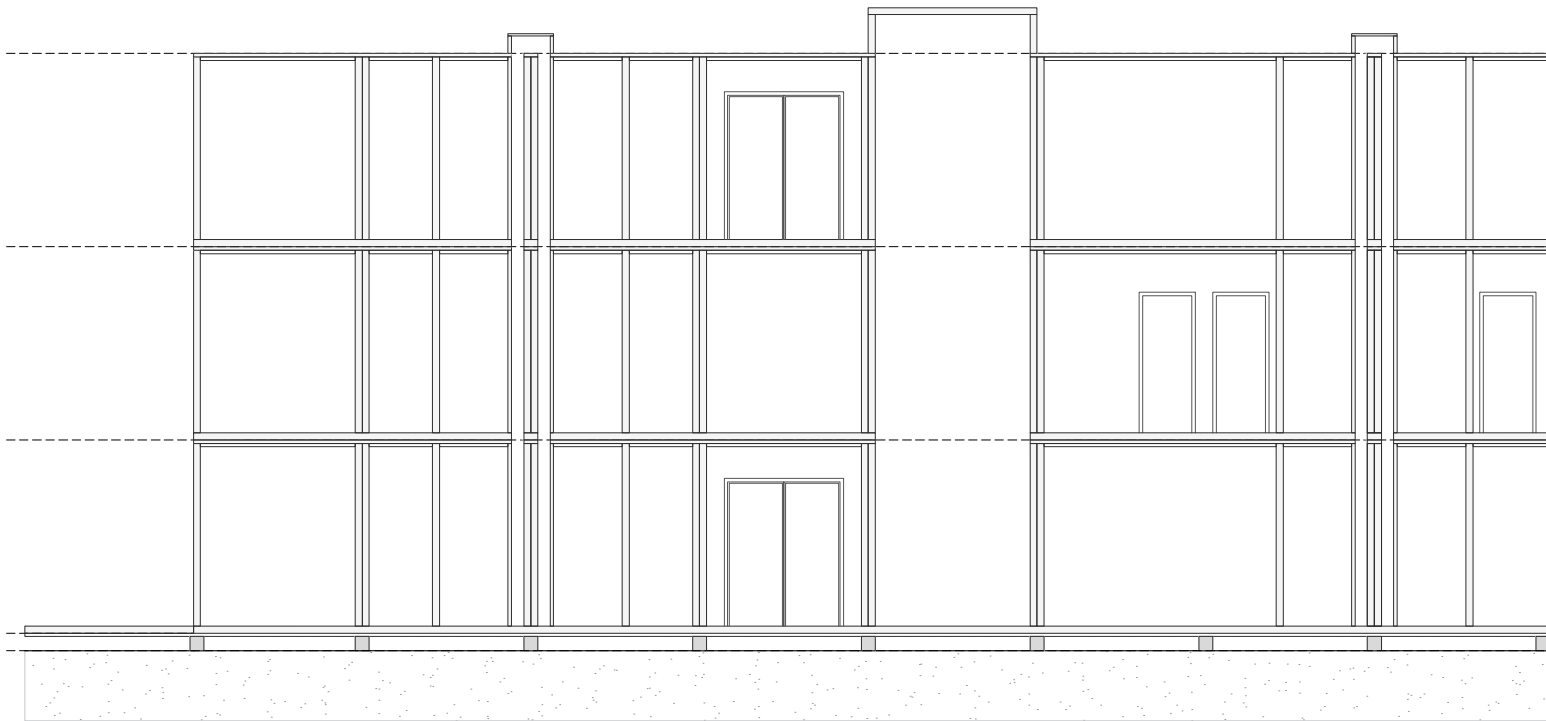
4 Common Kitchen - Dining

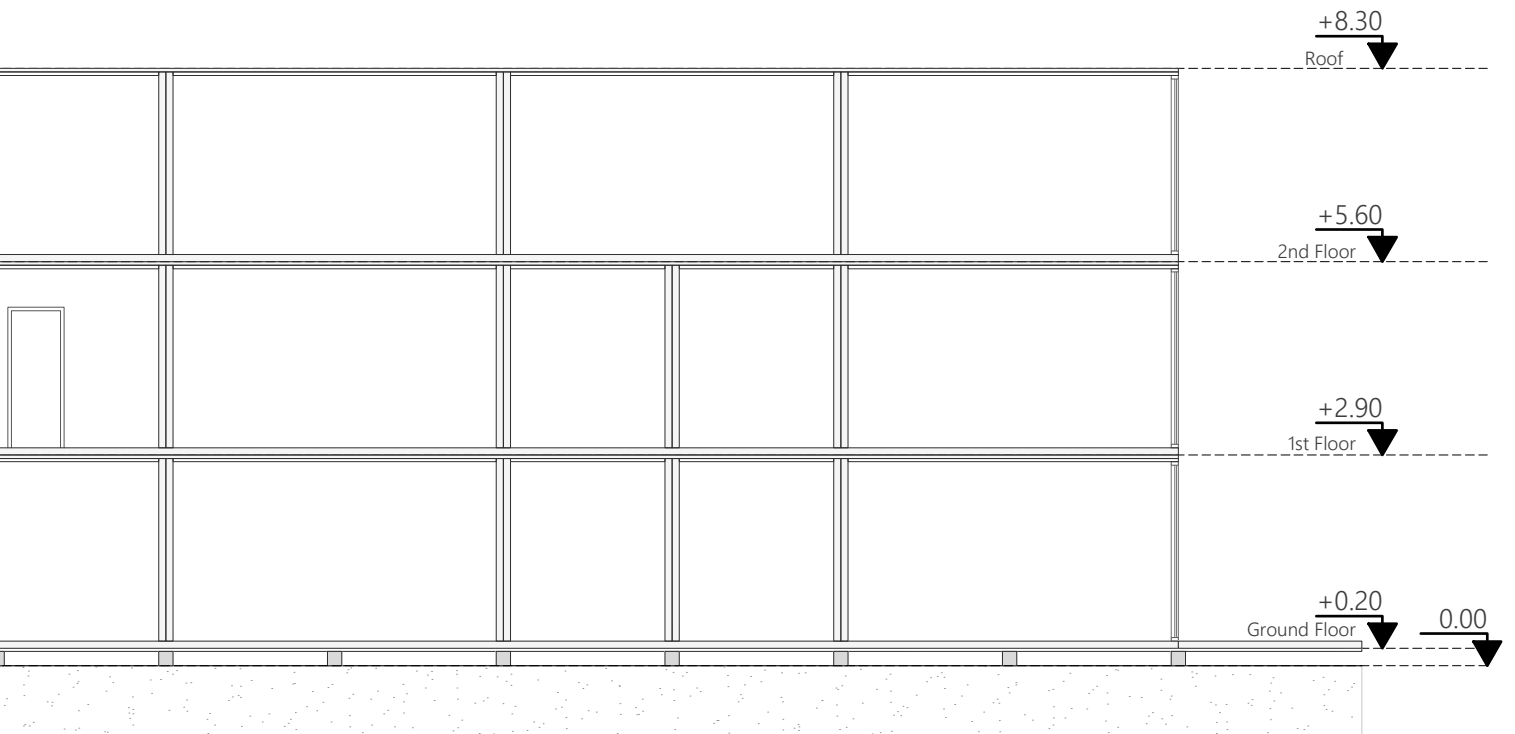
5 Accessible Unit [2 x single bed]

6 Common Living Room



2nd Floor Plan
440 m²

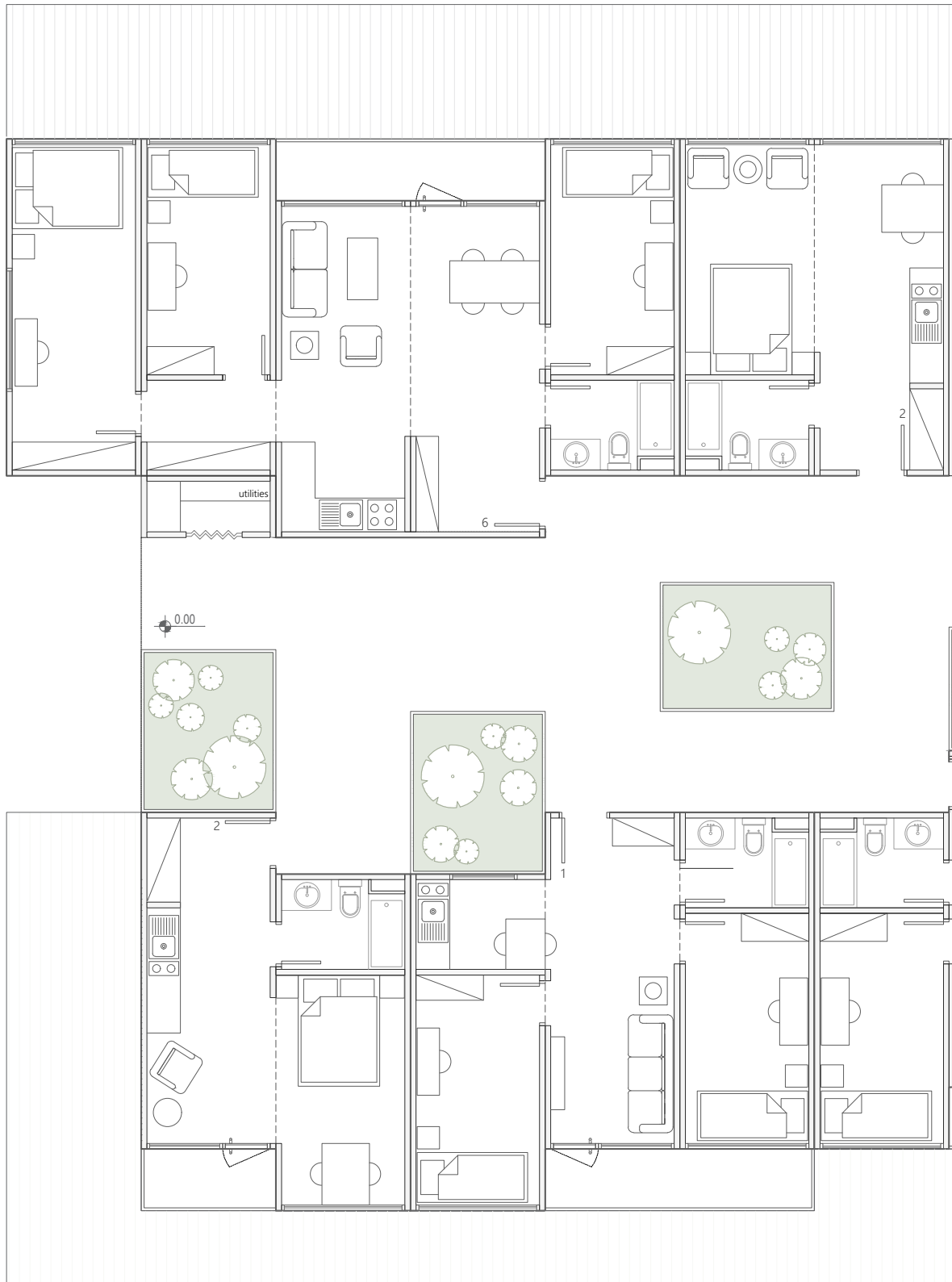




Student- Elderly House Longitudinal Section

CO- HOUSING

open- central layout



1. 2+1 Unit [2-3p]

3. 3+1 Unit [4p]

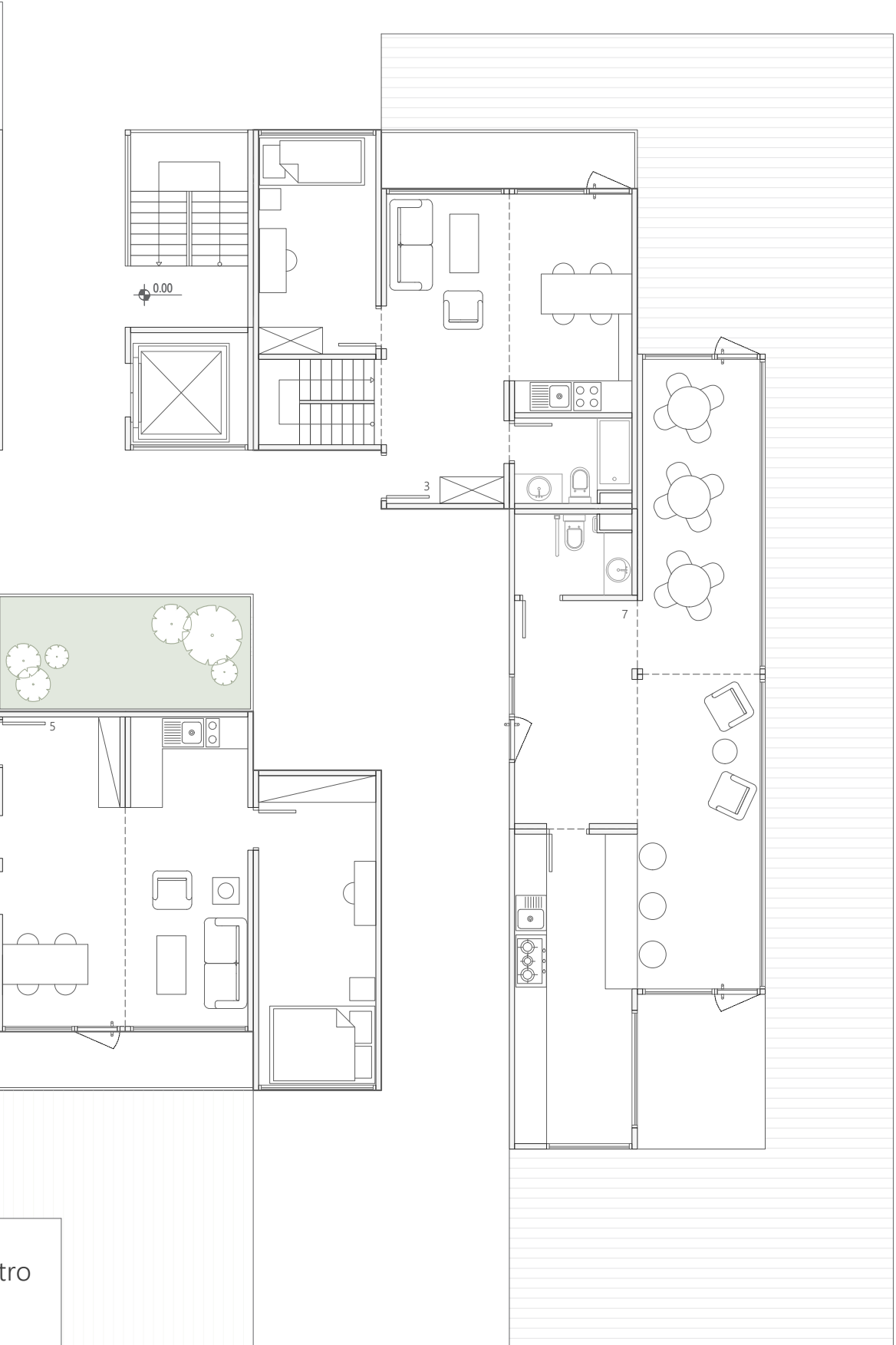
5. 2+1 Unit [3p]

7. Cafe- Bis

2. Studio [2p]

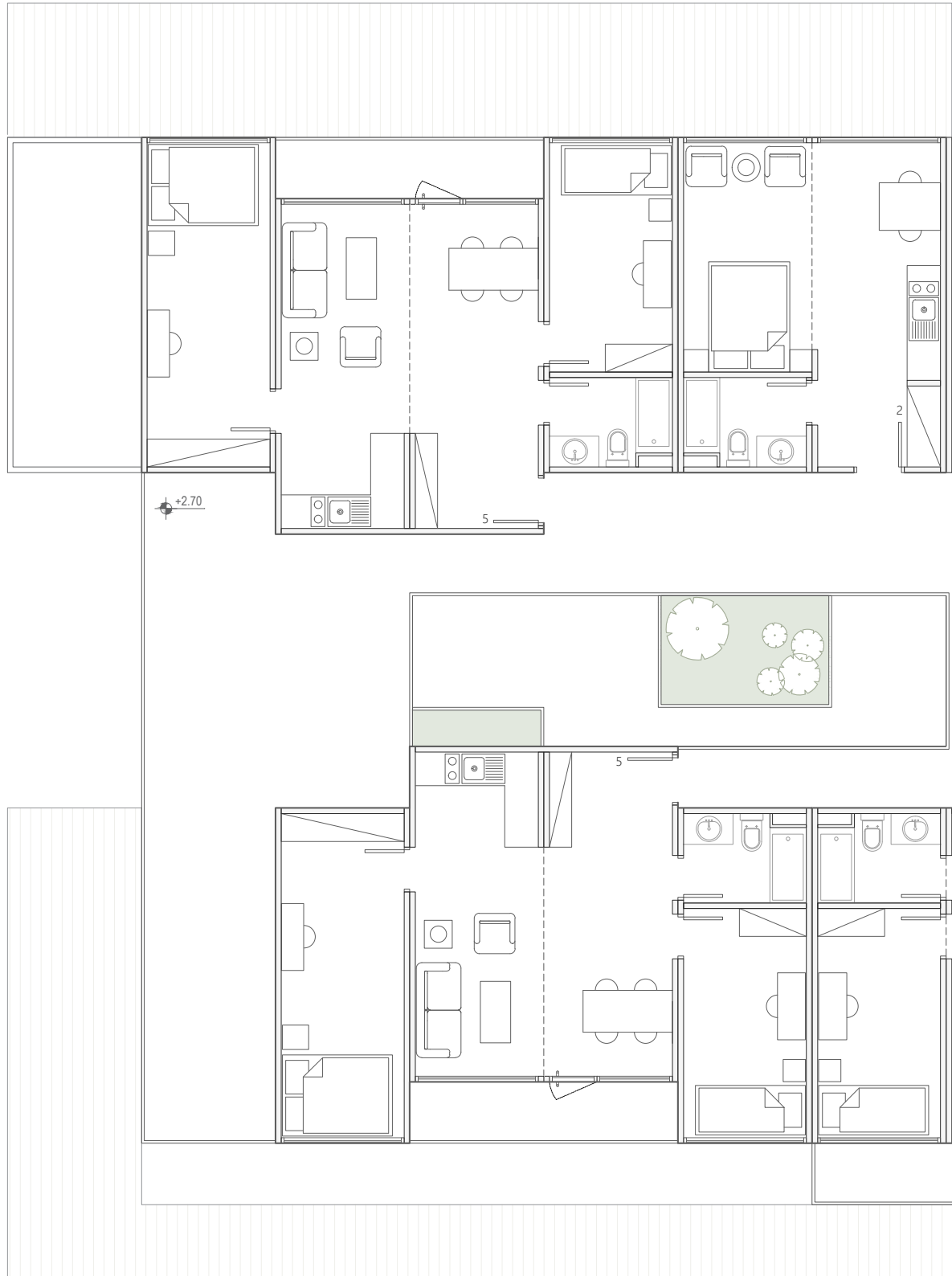
4. 3+1 Unit [5p]

6. 3+1 Unit [4p]



Ground Floor Plan
330 m²

CO- HOUSING
open- central layout



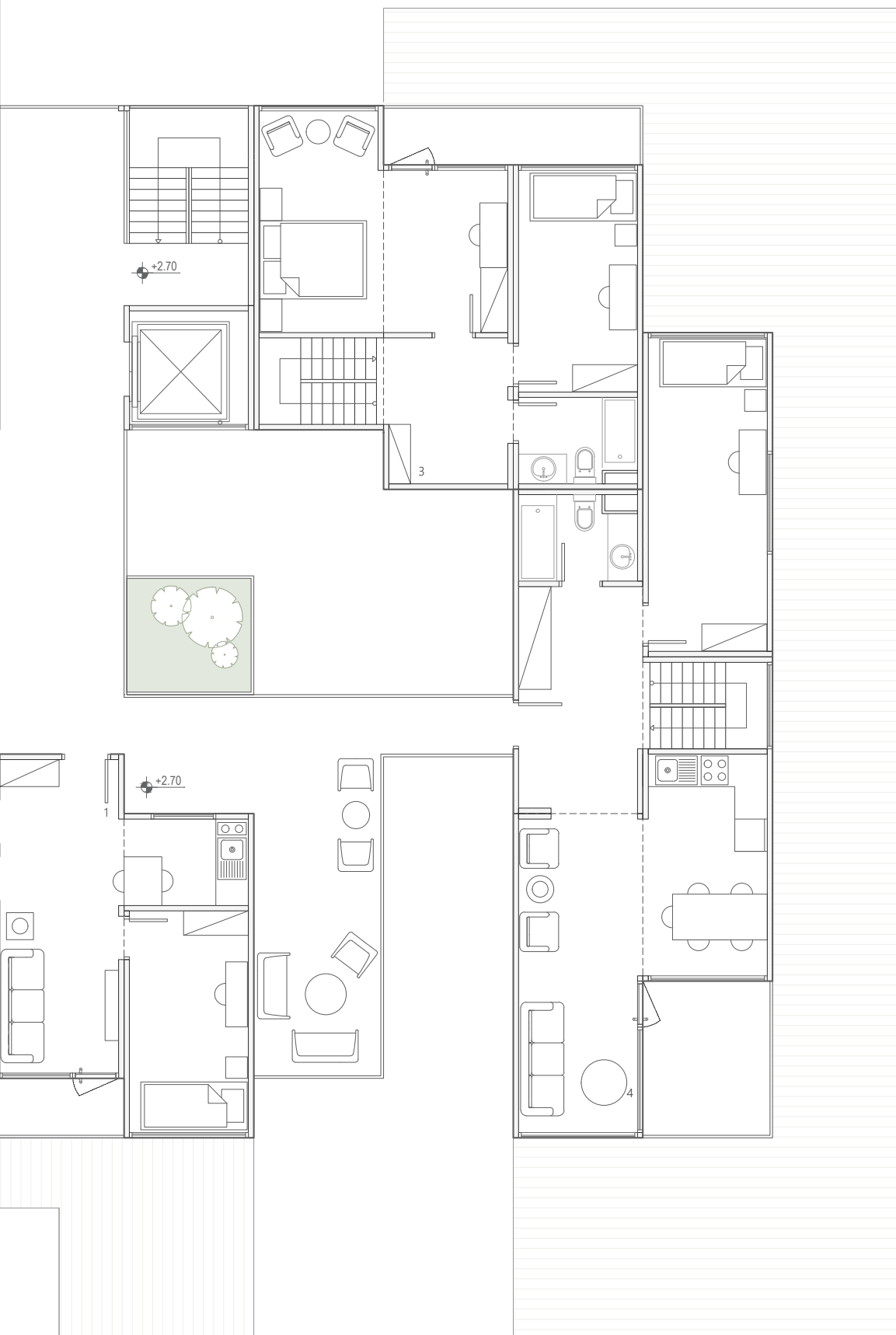
1. 2+1 Unit [2-3p]

3. 3+1 Unit [4p]

5. 2+1 Unit [3p]

2. Studio [2p]

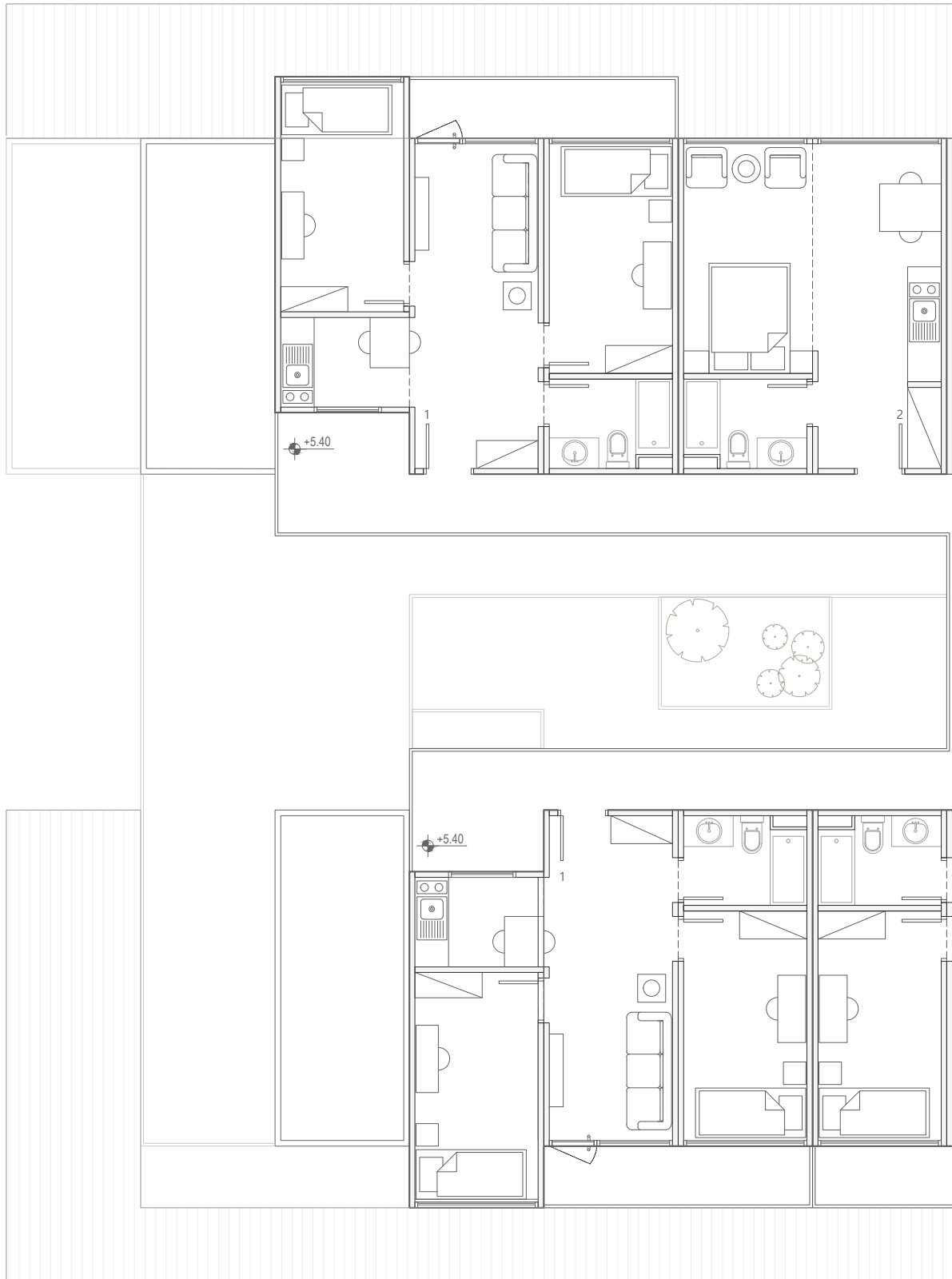
4. 3+1 Unit [5p]



1st Floor Plan
290 m²

CO-HOUSING

open- central layout

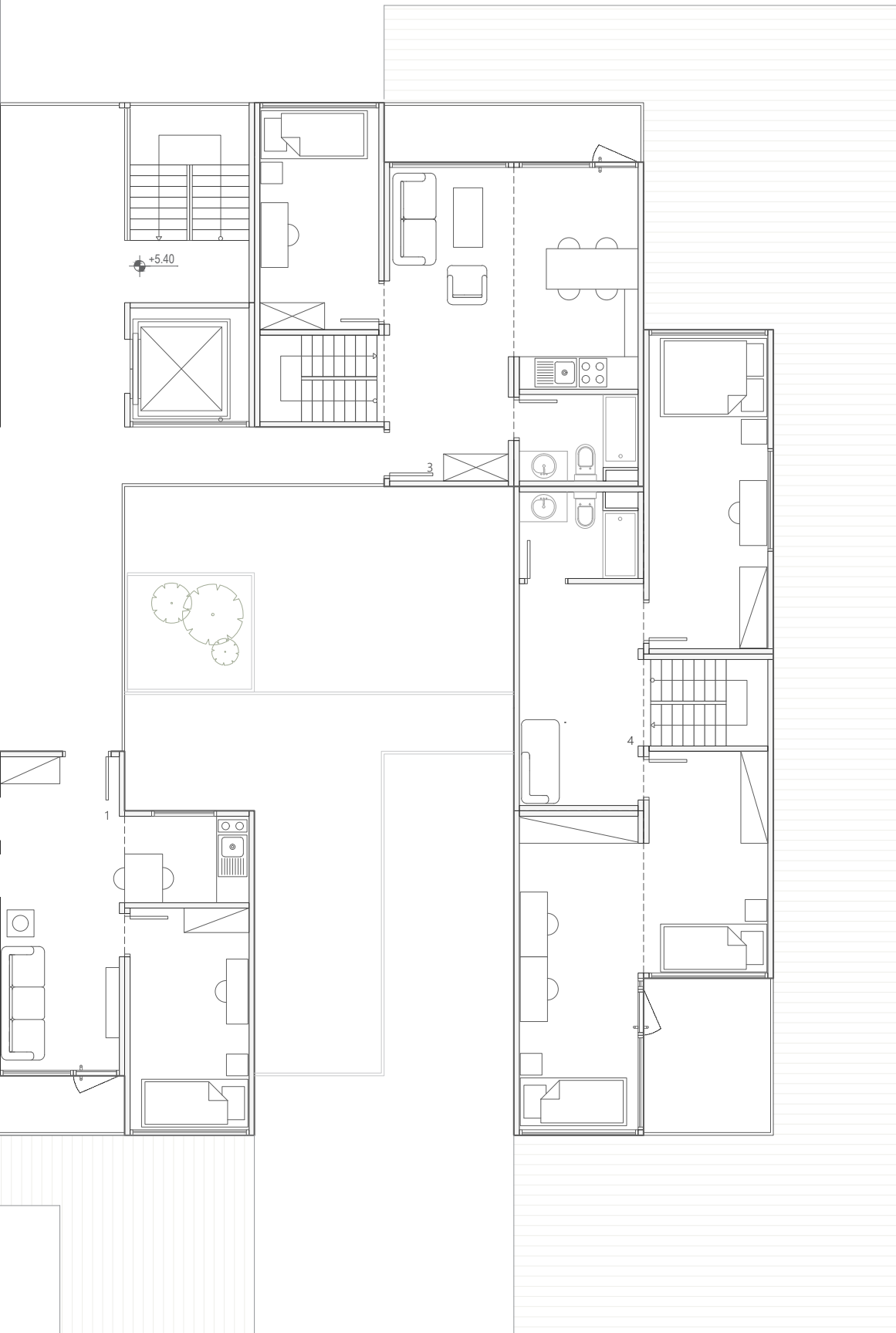


1. 2+1 Unit [2-3p]

3. 3+1 Unit [4p]

2. Studio [2p]

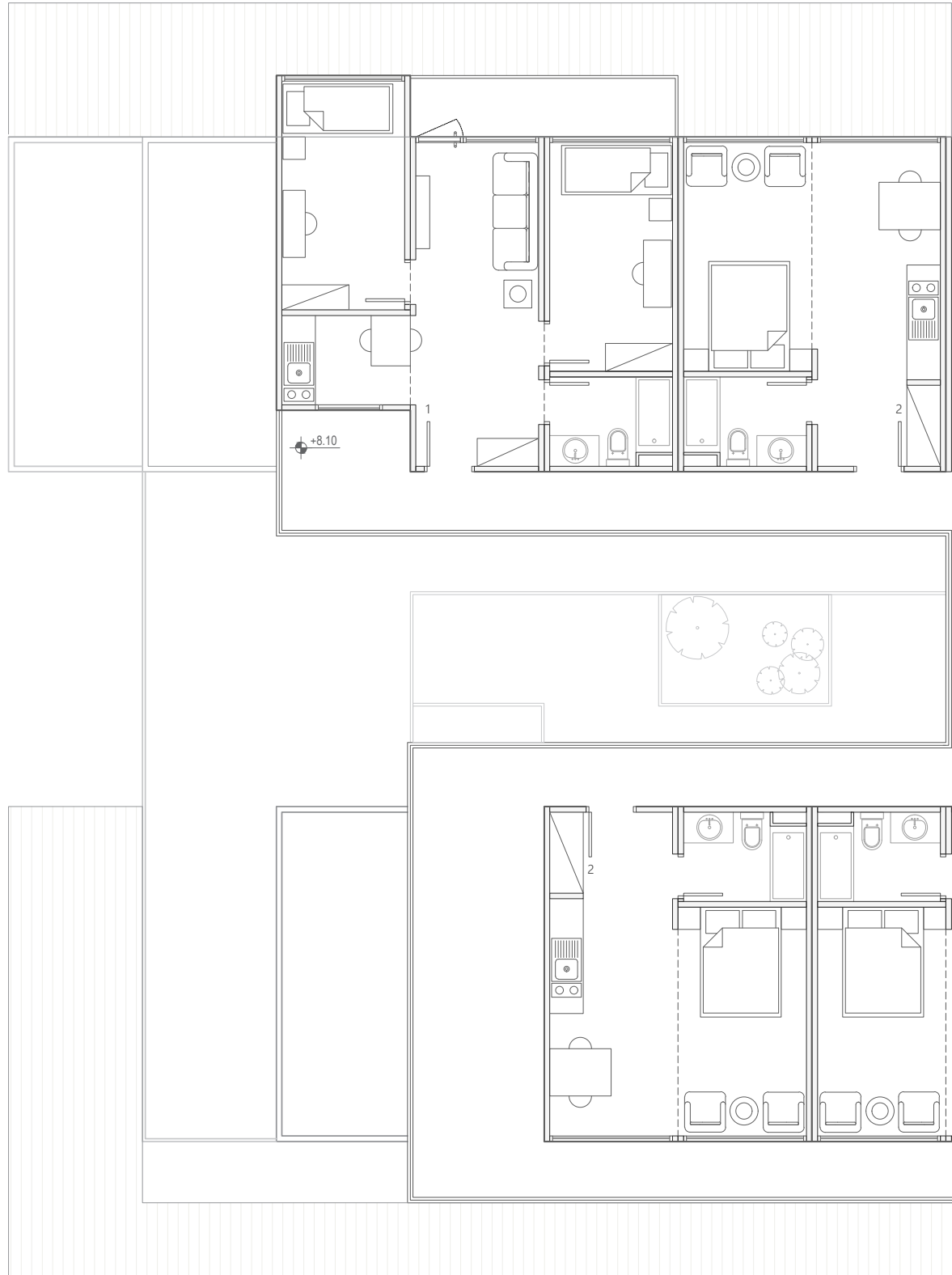
4. 3+1 Unit [5p]



2nd Floor Plan
260 m²

CO-HOUSING

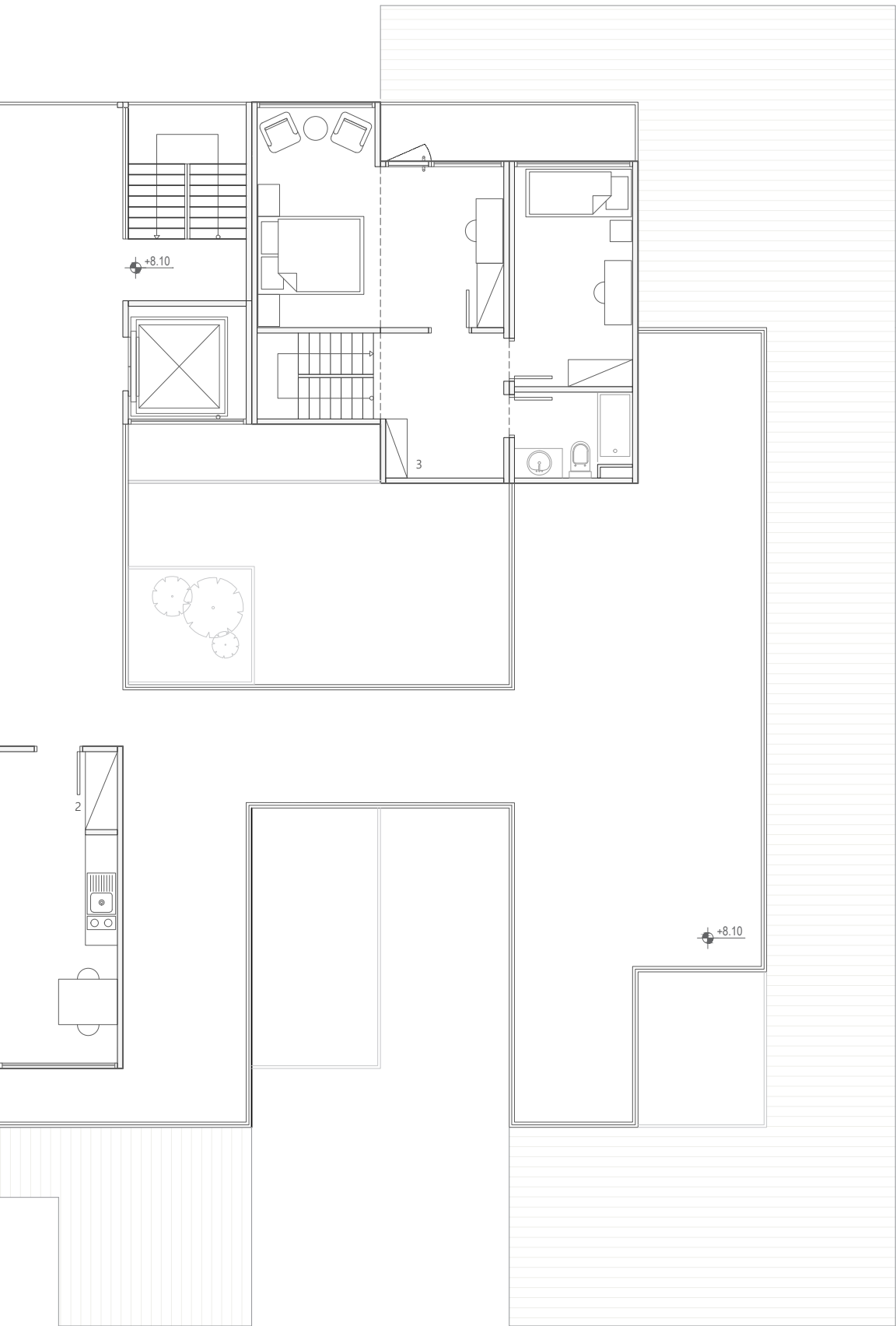
open- central layout



1. 2+1 Unit [2-3p]

3. 3+1 Unit [4p]

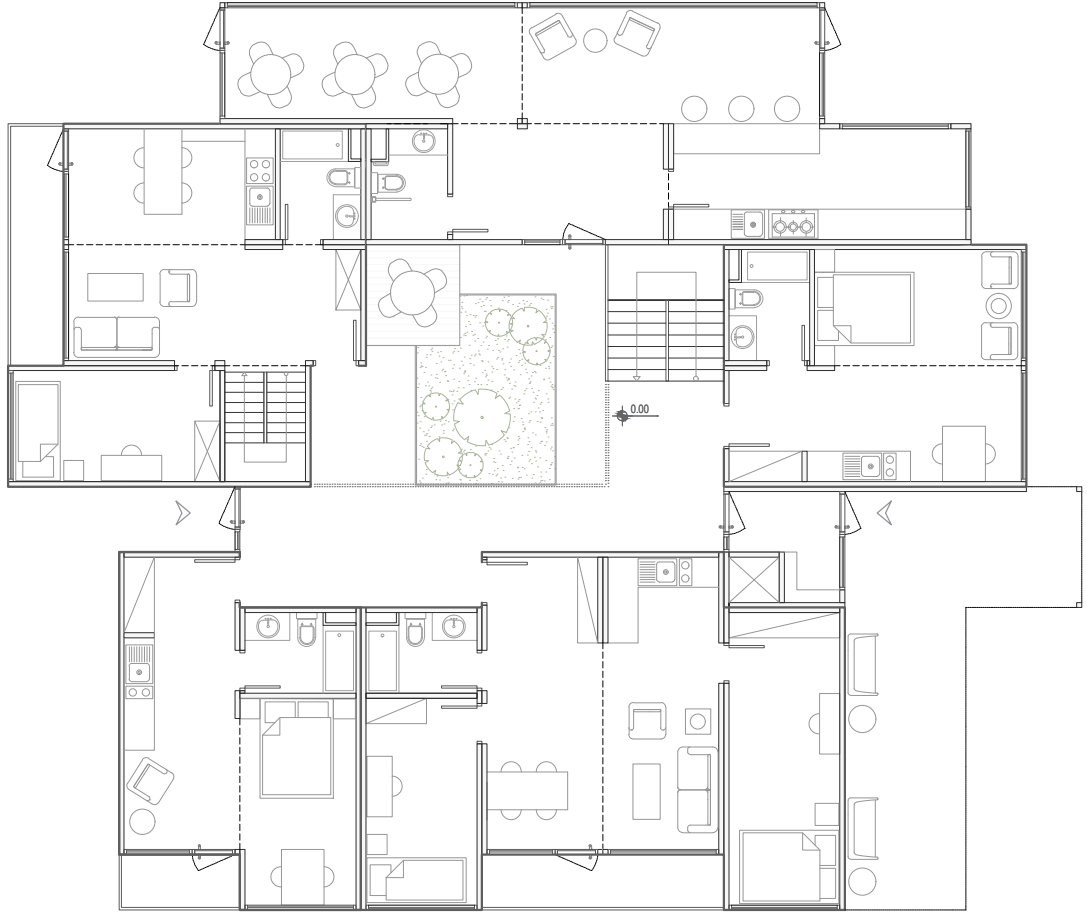
2. Studio [2p]



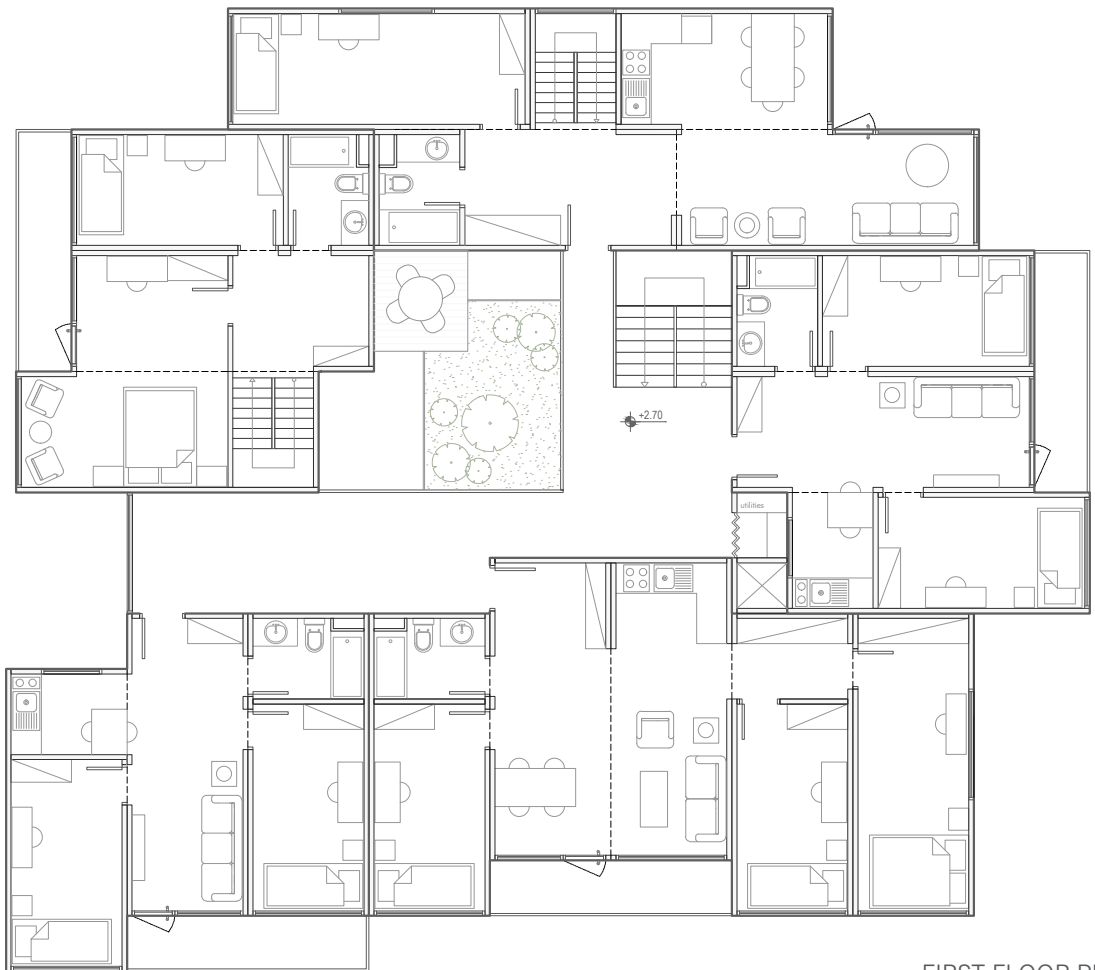
3rd Floor Plan
145 m²

ALTERNATIVE LAYOUT

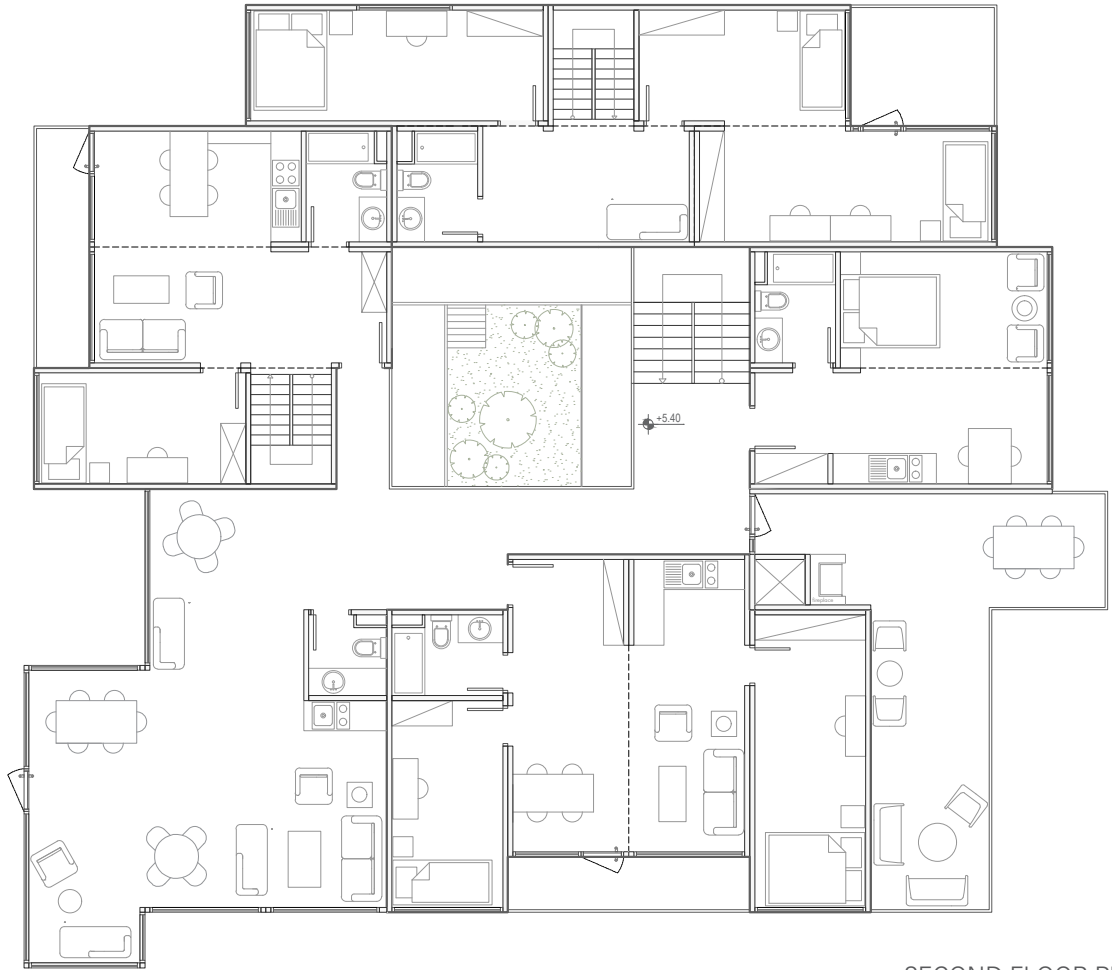
closed- central courtyard



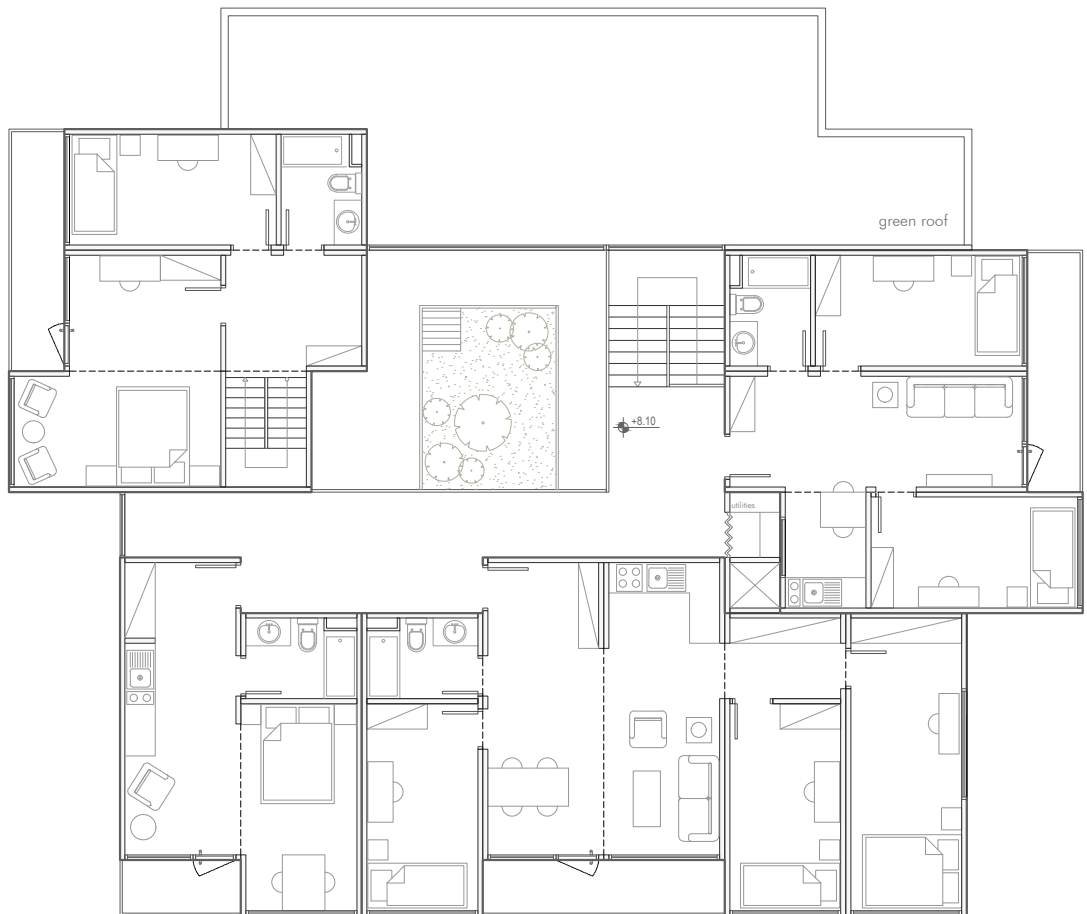
GROUND FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN



THIRD FLOOR PLAN

























reflections

This thesis project was a topic I wanted to work on for a long time, which I had found the chance to dive into in my diploma project. I believe that emergency housing is an urgent issue in the world and even though there are many architect who have works on this topic, It is still hard to see an applied solution in reality. I started this project as a generic modular shelter project, however, during the research phase a very unfortunate earthquake happened in Turkey, where I came from. In order to honor the all the sufferers and at least hypothetically find a solution to the housing crisis there I wanted to dedicate the project to them. Therefore, project had gained a stable location.

Initial goal was to create a small housing village, with all kind of amenities and social spaces. However due to the size of the project It has changed to a research of modular housing only. Several open social spaces are included inside the buildings. To be frank, this is the main aspect that I am unsatisfied with the project and I would like to extend the scope into covering also modular social spaces in the future. However, I believe by focusing solely on housing, the modules and how they work with each other progressed well.

I am well aware that there are countless ways to create houses from containers and there are many examples of it. My challenge was to find ideal, generic houses that can attach to each other in different ways and allow flexibility during time. Therefore, all the houses are created in a way that bedrooms can be subtracted or other modules can be added in time. The reason to create this flexibility to the users was due to the nature of post-disaster situations where the number of people and occupation time is unknown or always in change.

An alternate critic I could give to the project is that it does not have a strong, specific connection to the area it has located. However, it is done purposely in order to create modules that can work also at other places. Thus, initial research wasn't site analysis and other location based researches like one would do in an architectural project, but: it was research of international design and modular design. Master plan has designed after finishing with the arrangement of housing modules. This does not state that climate, orientation and nearby structures haven't considered but it states that a specific culture is not integrated firmly.

In the end the project ended up as a modular co-housing research which I had great pleasure while working on it. I believe that modular design and shared living will be a very common way of dwelling in the future as a consequence of over population. Moreover, I consider it highly important to be able to do this while protecting the privacy of the inhabitants and meet their needs of green areas. Therefore, I have tried to integrate green as much as possible and not create very dense structures. According to the situation after a disaster and the amount of house needed; all of the green roofs or terraces can be replaced with houses; which was one of the most important objectives of the project.





case study
sources

reference

case study

MODULAR TIMBER APARTMENTS

Architects: PPA Architectures

Location: Toulouse, France

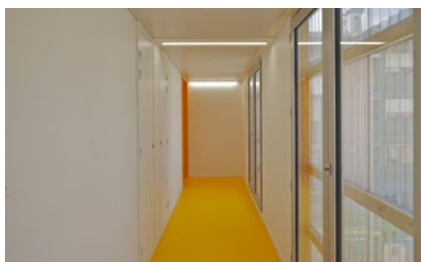
Area: 1500 m² Year: 2015



Building housing for the disadvantaged population of dynamic north conurbations of Toulouse is a part of projects mission – a modest yet active contribution to the development of a more generous and mixed city.



Overlooking and north-oriented apartments are minimized, while efficiently organising internal service paths, the overall compactness and the technical management of the building.



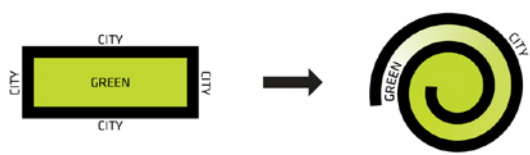
SNEGLEHUSENE AFFORDABLE HOUSING

Architects: Bjarke Ingels Group

Location: Aarhus, Denmark

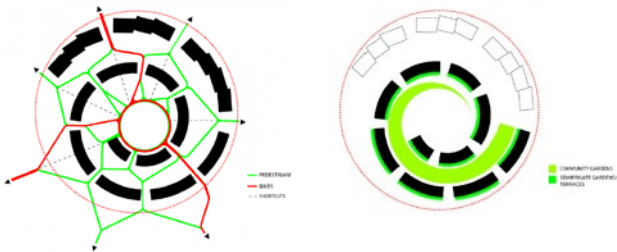
Area: 9500 m²

Year: 2022



Block
The classic perimeter block building is closed off to the city, and has an inner courtyard with green space, accessible only to residents.

Spiral
Our site is not surrounded by urban space but a green, scenic landscape to which each building connects visually and physically. The buildings curve and create a spiral shape, with a green path leading to the heart of the development. The courtyard welcomes visitors and residents of the entire Nye neighborhood.



Circulation
The passages through the buildings allow a crisscross circulation through the area - people can cross from north to south, from east to west, and all paths lead to the central lake. The path system is pulled back from the private front gardens, to which each resident has direct access.

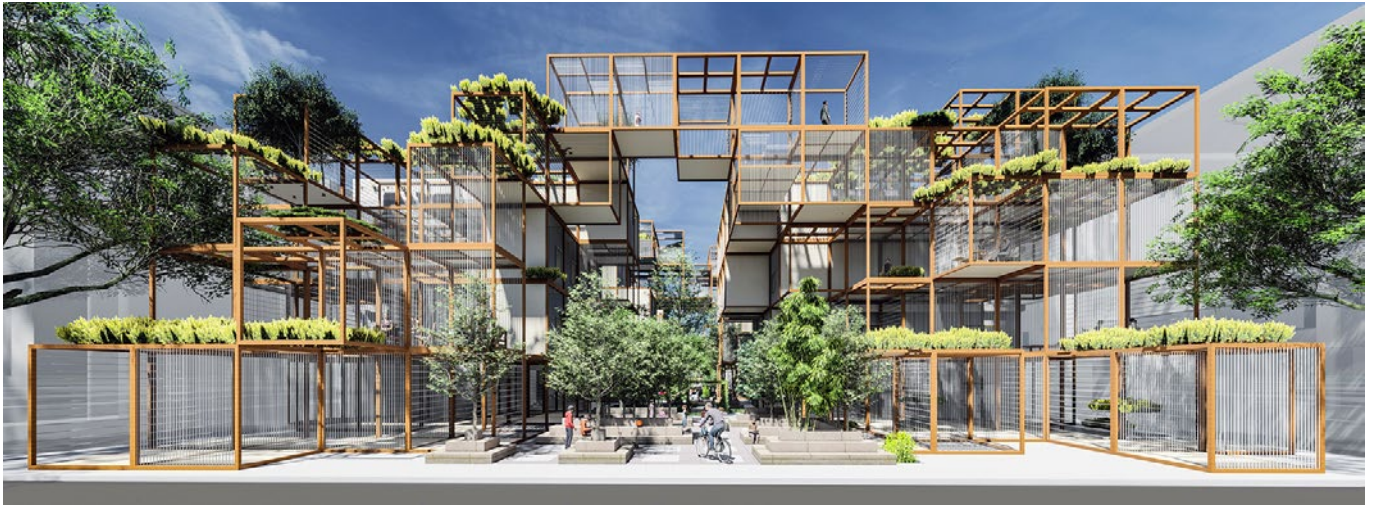
Blurring private and public outdoor areas
All townhouses have a front garden on the ground floor, in extension of the living room. The front gardens are private and open gradually to the public, communal area.

Project consist of two kinds of stacked modules, which are repeated to create checked pattern. Modules have 2,5- and 3,5-meter ceilings and their stacking creates generous indoor spaces, as well as an outdoor terrace in each home.

The pond manages rainwater runoff, which flows to it from canals integrated into the site. The system reuses water, collected from the entire Nye neighborhood, cleans it, and leads it back to all homes to be used.



POST WAR SYRIA



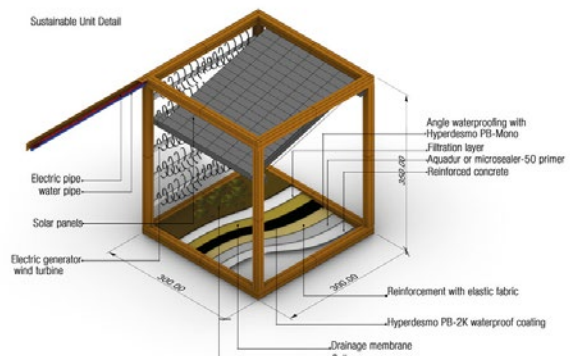
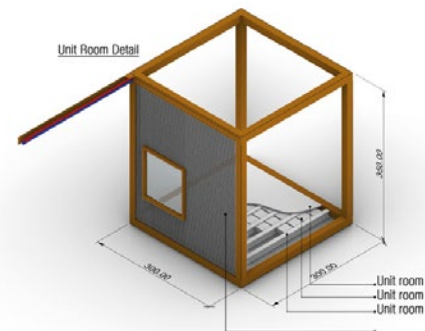
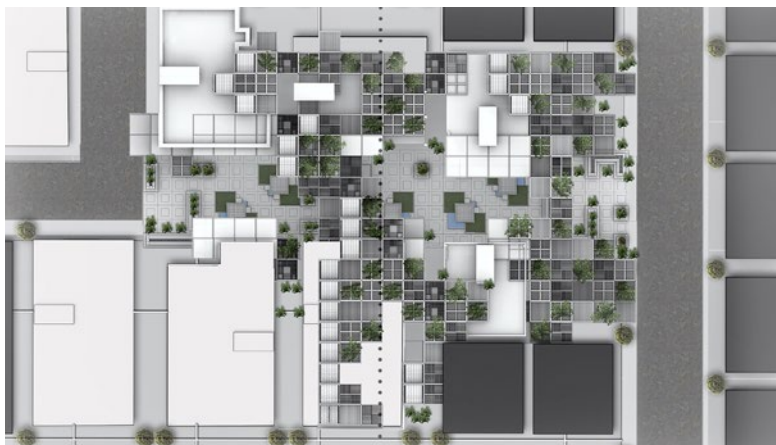
Architects: Reparametrize Studio

Location: Zamalka, Damascus

Studio imagined ECO system for the new post-war city consists of frame box units, a “temporary, adaptive building structures that have the tendency to grow with time”.



Including an electric turbine generator, each unit is self-sufficient. Connected with the neighborhood, the rooftops are linked with a series of intertwined plaza spaces, spreading resources and amenities. Throughout the development, different levels of privacy are generated, and green spaces are a prominent feature. Imagined as an affordable living space for the people of Zamalka.

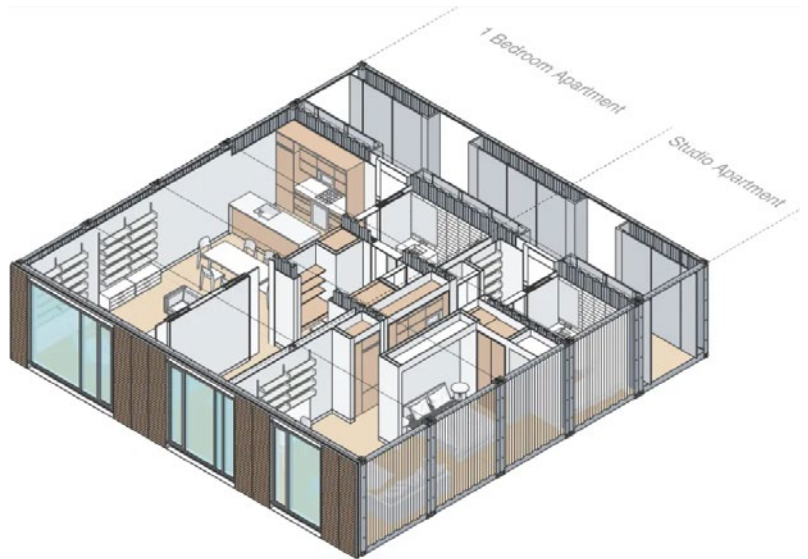


PHILADELPHIA MIXED USE PROJECT

1-Bedroom and Studio Units

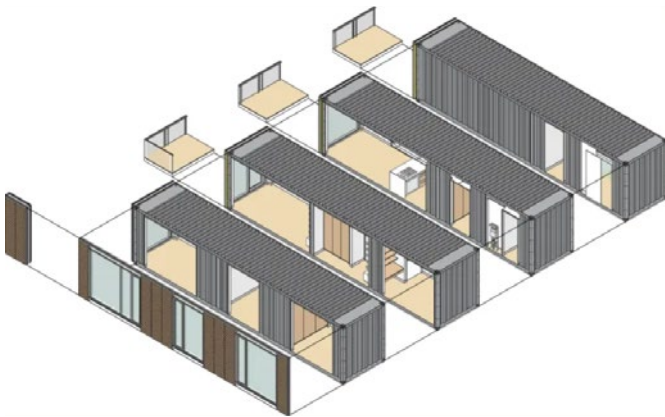


1 Bedroom Exploded Isometric



1 Bedroom- Studio Isometric

2-Bedroom Units

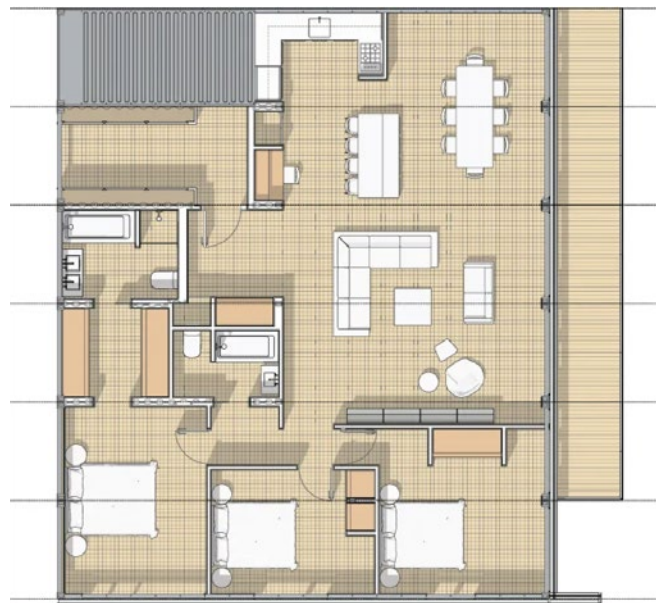


2 Bedroom Exploded Isometric



1 Bedroom-Studio Plan

3-Bedroom Units



sources

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<https://www.archdaily.com/787698/50-modular-timber-apartments-ppa-architectures>
- Archdaily- Reparametrize Studio Envisions the Future of Post-War Smart City
<https://www.archdaily.com/936670/reparametrize-studio-envisions-the-future-of-post-war-smart-city>
- Archdaily- Sneglehusene Affordable Housing-BIG. Article.
https://www.archdaily-com.translate.goog/989940/sneglehusene-housing-big?_x_tr_sl=en&_x_tr_tl=tr&_x_tr_hl=tr&_x_tr_pto=sc

