

“Street In The Sky”
Master Degree Thesis

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Abstract

The study presents a possible solution for a deep revitalization of the San Siro district in Milan by redesigning common and private spaces by filtering the facades. This social housing district, one of the largest in Milan, has been designed by many architects, including Franco Albini, Giancarlo Piretti and Laslo Kovacs, since the mid-30s of last century. Today it presents many fragilities due to the poor maintenance of the heritage, the change of the inhabitants and the ways of living together (new poverty, migration, ageing population). The new interventions result from researching the existing architecture potential and developing it to meet the present needs of greater sharing and connection with the city. At the architectural scale, the buildings will be again articulated by a Street In The Sky, referring to Alison & Peter Smithson's idea of public space in social housing, which will gather sharing spaces structured on principles of flexibility, interconnection and passage of natural light. In the interiors, light and mobile partitions define the boundary between public and private spaces that offer more fruition possibilities. These new features open the built environment to the city, increasing safety, equity, sustainability for the community, which has become stronger in San Siro.

Lo studio propone una possibile soluzione per una profonda rivitalizzazione del quartiere di San Siro a Milano, attraverso il ridisegno degli spazi comuni e di quelli privati, attraverso il filtro delle facciate. Questo quartiere di edilizia popolare, uno dei maggiori a Milano, è stato disegnato da molti architetti, tra cui Franco Albini, Giancarlo Piretti e Laslo Kovacs, a partire dalla metà degli anni '30 del secolo scorso. Oggi presenta molte fragilità, dovute alla scarsa manutenzione del patrimonio, al cambiamento degli abitanti e dei modi della convivenza (nuove povertà, migrazioni, invecchiamento della popolazione). I nuovi interventi si fondano sulle potenzialità dell'architettura esistente, e ne sviluppano alcuni tratti per rispondere alle esigenze attuali di maggiore condivisione e connessione con la città. A scala architettonica, gli edifici saranno nuovamente articolati da una Street In The Sky, riferita all'idea di Alison & Peter Smithson di spazio pubblico nell'edilizia sociale, che raccoglierà spazi di condivisione strutturati su principi di flessibilità, interconnessione e passaggio della luce naturale. Negli interni, il confine tra spazi pubblici e privati sarà definito da una partizione leggera e mobile che offre maggiori possibilità di fruizione. Questi nuovi tratti aprono il costruito alla città, aumentando sicurezza, equità, sostenibilità per la comunità, divenuta più forte a San Siro.

Keywords : San Siro, Street In The Sky, Urban Planning, Reconstruction, Architecture, Social Housing, Interior Design, Transparency, Flexibility, Milan, Shared Housing

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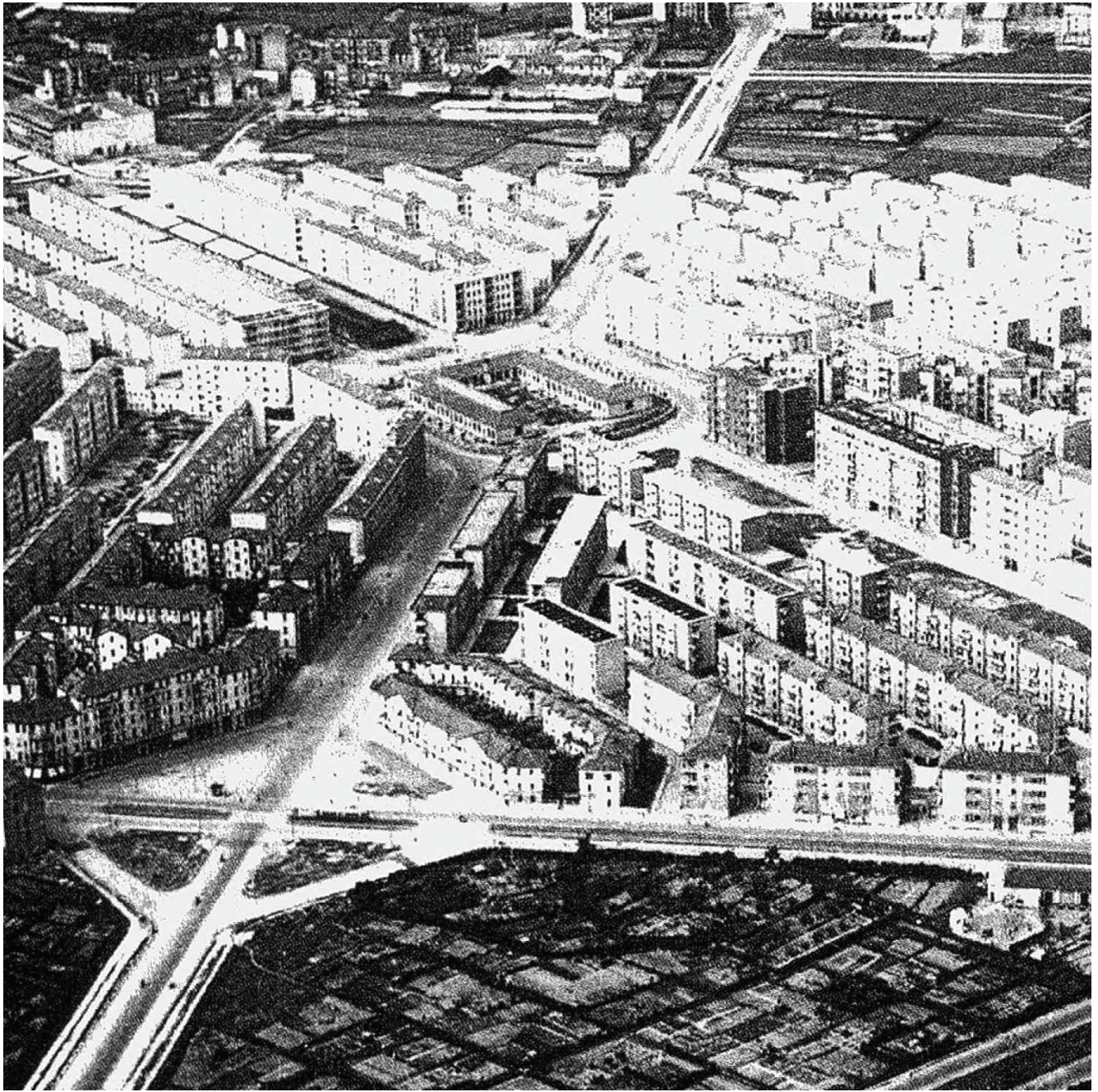
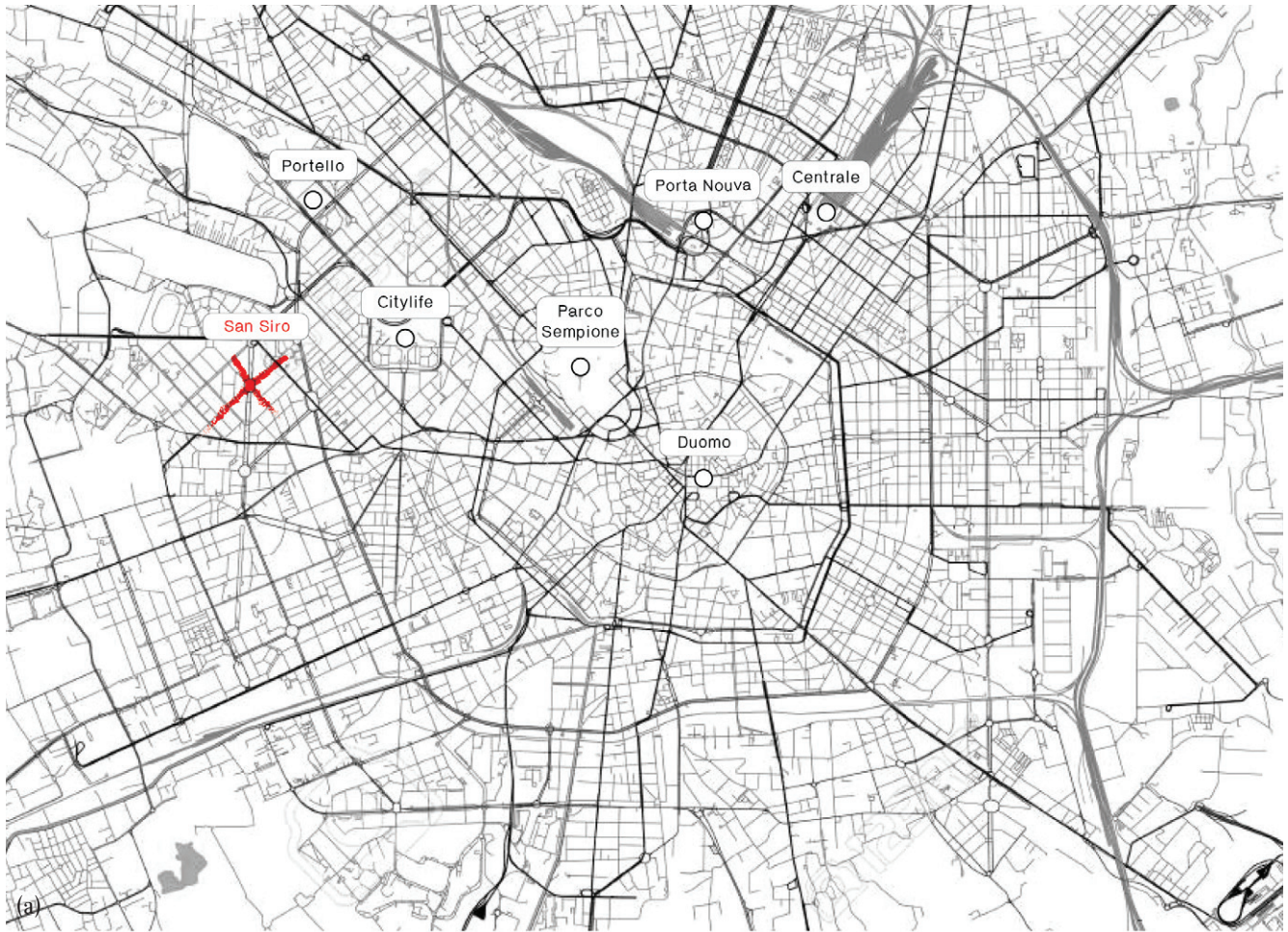


Figure 1. Aerial view of San Siro estate in the last year of construction.

Introduction

Social housing is an important building type for the metropolis, it contains a series of relationships between the architecture and the city resulted in the character of the neighborhood. They are designed for mass-cohabitation, for the people who migrate to the big city for finding jobs which is an urban phenomenon of a modern city. These peripheral but “proudly workers” areas contributed to the innovation of the Italian cities [1]. In the past (1963–1998), their construction and care were guaranteed by a dedicated national fund provided by the GesCAL agency (Gestione Case per i Lavoratori). This fund was abolished after its closure in 1998 [1]. This creates “slums” with decay, lack of maintenance, destitution, and thieves. In the last decades, these districts suffered a strong physical and social transformation, with widespread impoverishment due to the lack of funding and maintenance [2]. The neighborhood of public housings acquired a negative meaning, as homes for those who cannot afford a mortgage [7]. Actually, they are frequently subject to criminal activity, social disorders, internal conflicts, drug-taking, racketeering, dealing, vandalism, and military intervention for the illegally occupied home [3,2]. In Italy, the problem is huge. There are approximately 1 million of public housing neighborhood [7] that represent 4% of Italian homes, in a country with a higher European (hereafter, EU) share of private houses (75-80%) [6]. Nevertheless, social housing has a high potential to create a project that impacts from the domestic to the urban level, thanks to the size and its position. The project develops the forms and physical environment by equipping original buildings with extra structures called “street in the sky”. The “streets” supplement lightness and transparency to the existing architectures substituting their closeness and heaviness. The ground is elevated and open up to the street, visitors could now connect with local people making San Siro more alive and fresh in a beautiful neighborhood.



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Figure 2. (a) San Siro in Milan Map, historical photo of (b) Piazzale Selinunte, (c) Via Carlo Dolci, (d) Via Giacinto Gigante.

San Siro Estate

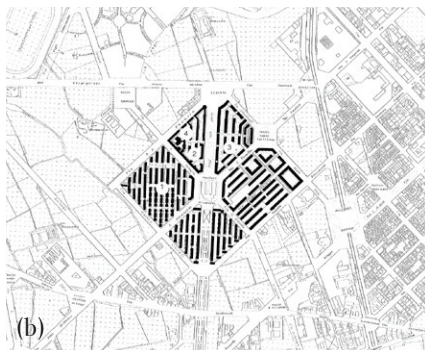
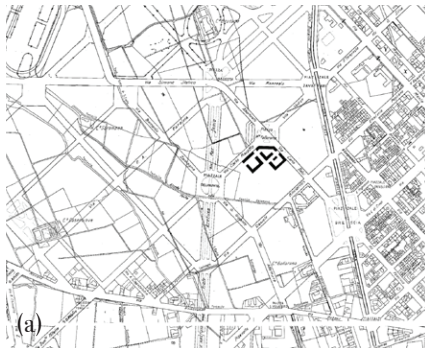


Figure 3. San Siro Town Planning
(a) in 1930, (b) in 1946.

San Siro is a social and affordable housing estate in the western outskirts of Milan, built between 1931 and 1949. Its geometrical shape, a rhombus cut by two major axis of distribution, first appears in the Pavia Masera town plan in 1910, but its buildings were designed and realised a few years later. Due to its long construction history, 20 years crossed by the Second World War and its bombings, it summarises the events of council housing in Milan, both from the design and the management point of view. [26]

The first contest for its design was launched in 1920, and its first buildings, around Monte Falterona Square, were designed under the control of Giovanni Broglio, director of the technical office of IACPM (Istituto Autonomo Case Popolari di Milano) from 1913. The agency was established in 1908, after the approval of the Testo Unico sull'Edilizia Popolare the 27th of February of the same year, and it is still existing, with some changes in its management and a different name: ALER, the acronym of Agenzia Lombarda per l'Edilizia Popolare).[26] Also the other quarter of the estate were assigned, in the following years up to 30ies, after contests; it was generally missing a unique hand managing the design and process. One of the architectural firms mostly involved in the overall design and in the realization of a group of building was the Albini Camus Palanti one, supported by several other professionals: Morone, Natoli, Angilella, etc. Part of the quadrilateral was destroyed during bombings, and rebuilt identical after the end of the WWII.[6]

The neighbourhood is one of the largest public housing estates in the periphery of Milan. It is characterised by strong socio-spatial inequalities, intercultural/intergenerational conflicts and a progressive lack of maintenance of the housing stock, in large part due to public property owners' financial problems. [4]

For these reasons, even though San Siro is located in a quite central and well-connected part of the city, it is a marginal and problematic area in terms of living conditions: urban decay and blight exasperate already existing problems like disadvantage, poverty and the coexistence of different populations.[4] The neighbourhood, built on a unitary urban plan, was realized by separate lots, each representing changes in time of the concept of public action in housing: from the large green courtyards of the first settlements of high architectural and building quality, to the bars along the heliothermic axes and green corridors of modernity. [4] Along its long life the estate has also passed through different models of public housing management and different targeting of the social profile of the addressees of the policy. [4] Thus, if at first glance the neighbourhood seems to be a homogeneous part of the city, with a highly defined urban and architectonic structure, it is indeed a spatially and socially fragmented space. [4] A constellation of different formal and informal ways of inhabiting and using common spaces, as well as social relationships - a context far away from the static, homogeneous, stereotyped image commonly attributed to public housing estates. [4] For all these reasons the neighbourhood represents a paradigmatic situation to address both some challenges of the contemporary city (how to make a city) and some contemporary issues of housing policy (how to provide accessible housing).[4]



Figure 4. present photo of (a) Via Aretusa, (b) Inner courtyard (c) Via Matteo Civitali.

San Siro estate is constructed in several phases due to its size and complexity, the first, was built during world war 1 and carried on until it finished. Some quarters have been destroyed during world war 2 and reconstructed as it was in 1952. The development is still going on even in 21th century.



Figure 5. (a) Construction Phase Diagram, (b) Shwartz Plan.



Figure 6. M.Mazzochi, V.Columbo, Baracca District, North-East sector, Padre R Giulani.

Inhabitants



Figure 7. Ownership Diagram, Data from Mapping San Siro.

Apart from the built environment, inhabitant and asset management are also the key factors in shaping the character of the neighborhood. In San Siro estate, ... in the first place, the relatively recent settlement in the neighborhood of a ‘large number of migrants’. More than 40% of inhabitants are not Italian, reaching peaks of over 60% in some blocks. These arrivals, which occurred in a short lapse of time mainly in the last decade, with little support from public institutions (except local schools) in terms of promoting cohesion and coexistence between different population groups, largely changed the profile of inhabitants.[4] With ambivalent consequences, on the one hand, defensive attitudes and sometimes latent conflicts, but on the other also the recognition of the arrival of new energies and unexpected forms of solidarities in a neighborhood with a high incidence of aging people.[4] Another important element is the “process of privatization of public housing”. there is a mix of ownership between private and public, and each category defines the capability for taking care of the area. according to the range of modalities offered by current laws.[4] In 2013, 23% of San Siro dwellings appeared privatized. The public stock owner (ALER) is facing a financial crisis caused by economic mismanagement in the past years. The lack of financial resources leads the agency, when possible, to sell its properties encouraging the right to buy.[4] The consequence is the shrinking of public housing stock, while economic gains are very poor: the selling of three dwellings hardly covers the cost of a new dwelling. Still, privatizing attracts new energies, young singles, and couples to the area. [4] In terms of maintenance, the study of sociological data corresponds to the on-site observation, it shows that the private owner could afford better care of the architecture thanks to the higher rent from the tenants. In contrast, poor maintenance and degenerated area occur to most buildings owned by the public (in this case, ALER).

Privatization also has a positive side, it shows private interest in the potential of the place. The new incomers have alternative channels to connect with San Siro thanks to the new investment. This means that local people get more opportunities and jobs to attract new business, the area required to develop the neighborhood to meet new demands. The potential inhabitants could also benefit from dynamic multicultural and mixed users which have been defined as the place's essence. It displays a larger variety of social profiles and ways of life than the ones considered by the waiting lists for access to social public housing. A 'social mix' as an unintended outcome of a multiplicity of concomitant disjointed factors (evictions from the market, public housing allocation criteria, public housing management models, social policies); a range of temporary or permanent situations of social distress covering a variety of social strata. This multiplicity of life profiles expresses itself in 'forced forms of living together' asking the inhabitants to muster high capabilities in the task of living among 'divers'. [4]

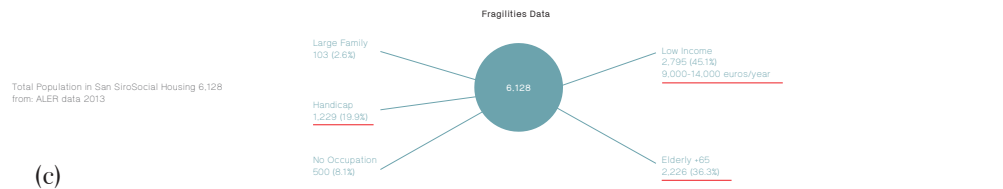
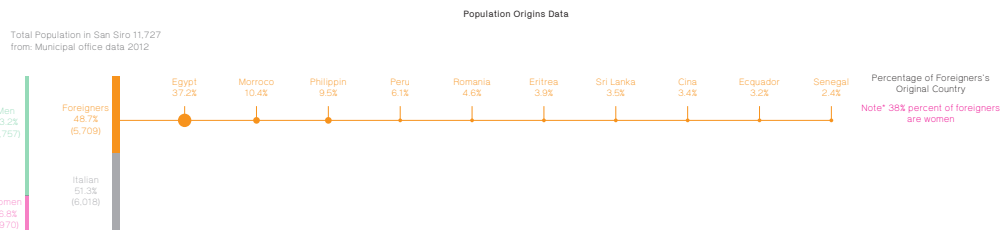
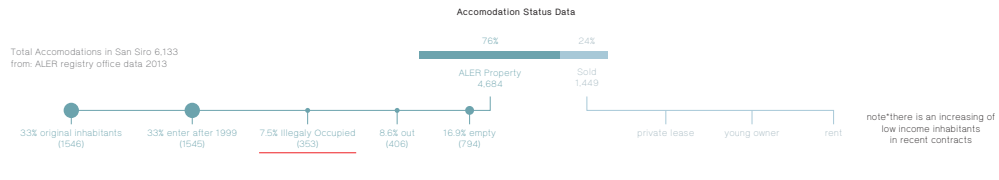
San Siro is composed of various types of inhabitants living together. Some parts are occupied by middle-class families which are organized by the private sector and some are occupied with immigrants, low-income families, the elderly, and handicaps. The latter has fewer opportunities to maintain the building's status due to their condition, and it influences the poor public spaces in the neighborhood.

This project aims to develop the poor part of the campus with new programs that reflect existing needs together with an opportunity to have new users in order to create well-being to all San Siro residents.



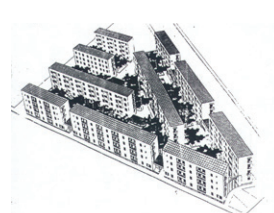
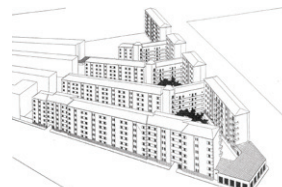
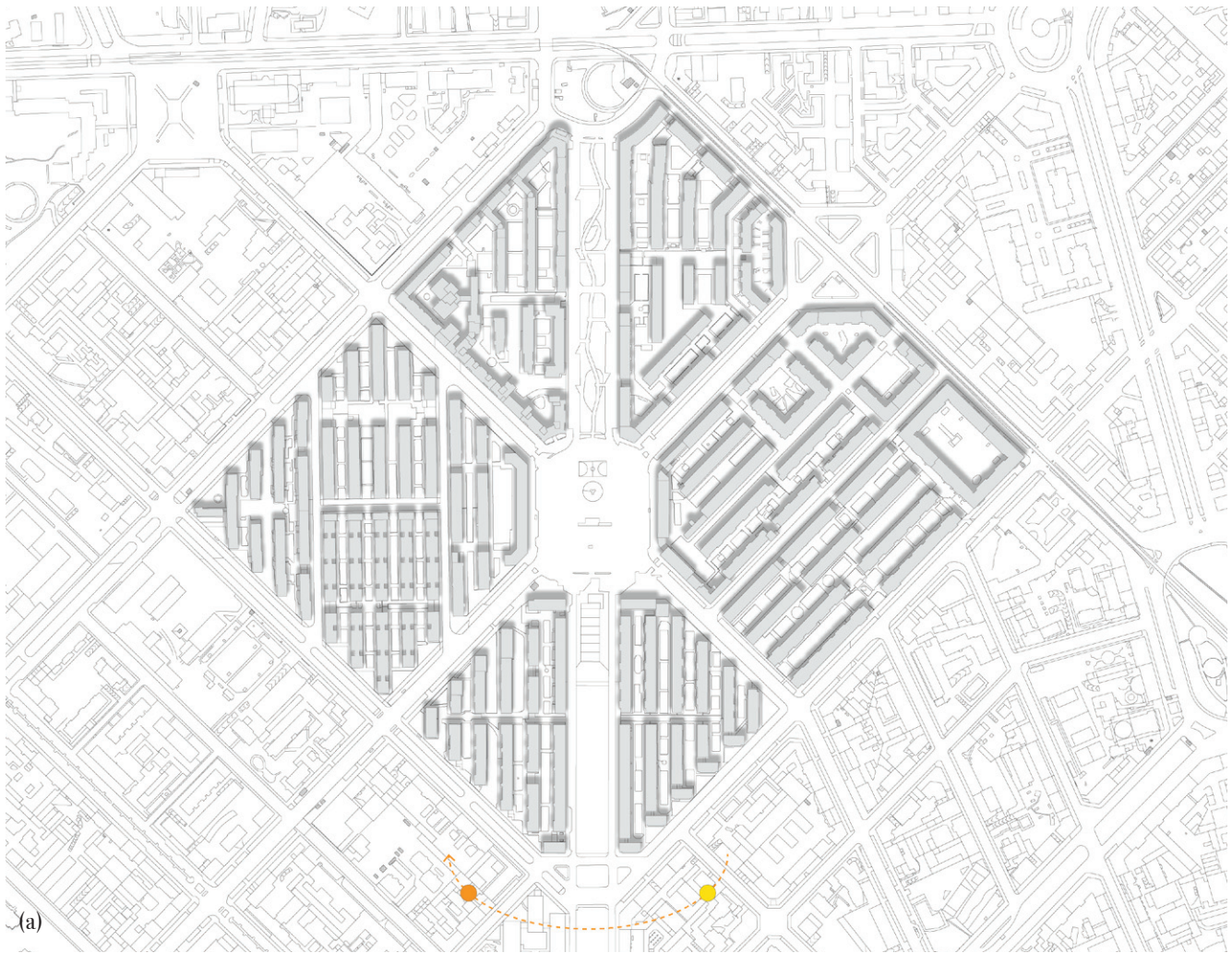
Figure 8. User analysis.

Concerning the users, it is important to mention the city where San Siro is situated, Milan is the capital of design and exhibition where most of the high-performance businesses run around. It generates many short-term contracts jobs for designers, developers, and workers especially when it hosts the world's biggest event. Moreover, education in Italy attracts a lot of students and professors around the world to come. These temporary workers are countable for improving and changing some living standards of the project. Finally, to include all users, it is mandatory to consider the fragile population San Siro has high numbers of handicap, aged, low income, and unemployed people, they are in the position that requires support from the new project (Figure 8,9).



(c)

Figure 9. (a) Population Diagram, (b) Fragility Diagram, (c) Accommodation and Population Origins Data. Data From Mapping San Siro [27]



(b)

(c)

(d)

(e)

Figure 10. (a) Master Plan Concept of Orientation, (b) Quartiere Milite Ignoto Settore ovest D'annunzio' by F.Albini, G.G. Palanti, R.Camus + G.Angilella, A.Morone, F.Natoli. (c) Quartiere Milite Ignoto Settore Nord Ovest by : A.Morone, F.Natoli. (d) Quartiere Baracca Settore nord-est Padre R Giuliani by : M. Mazzochi, V. Columbo. (e) Quartiere Millite Ignoto Settore Nord Ovest by : A.Morone, F.Natoli., Data From [26]

Site & Architecture

The architecture of San Siro is highly unique due to its scale and strategies. The concept of the project is not only to construct an individual architecture related to urban conditions but to establish a whole new neighborhood including residence, public program, commercial space, and urban space. Even though it took several years to realize the completed work, we could notice a single idea that applied to all execution in its variation of design (Figure 5). The idea is a master plan strategy to deal with an orientation by providing sufficient natural light to the whole complex, it is reasonable because it did react to *tabula rasa* conditions at that time. The rows of the building follow the solar order in the name of a hygienic and thermal efficiency criterion: their elevations reject the compositional principle of symmetry to accommodate the distributive and hygienic needs dictated by the housing plans, addressing the city a severe, conveyed aspect by the hardness of volumes cut out against panorama, by the flat roofs and by the uniformity of the facades, in which loggias are conceived as subtraction of matter from pure volume. [8]

The design resulted in strong and bold lines of mass (building) with the interruption of green lines (inner garden) running to the whole neighborhood, this scale is very unique and suggests another urban scale. The process of selecting the site is by considering the area with the most potential to affect the whole neighborhood. Taking into account the streets of San Siro, they could be categorized into 2 types. The first is the primary street, they are large-scale thoroughfare (about 25 meters) and have beautiful parallel greenery in their entire length, they run to surrounding intersections and work properly as the main circulation of the neighborhood. The second is the secondary street, they are smaller (12.50 meters) they have the same length as the primary street but without any trees and plants.

The latter case generates unwelcoming urban space since the quality of space relies on the connection of architecture with the street. The absence of connectivity from architecture creates narrow and long circulations pinched with the high and massive wall, unsafety and uncomfortable feeling might occur when one passing the street and this condition could be improved by the project. Another criterion is the level of connection to neighbor's active program such as commercial street to stimulate local area activities. By using the data from Mapping San Siro combined with on-site observation, "the urban programming map" (Figure 12,b) is produced as a tool to analyze the possible project site. The map shows that the secondary street connected to active programs are Via Privata Filippo Abbiati and Via Privata Preneste (Figure 12, a), the primer is considered to be developed due to its position and dimension together with the availability of building information. Although, the proposal should be able to apply to both cases as a concept since they share similar conditions.

The street is approximately 303 meters in length and 13 meters in width, both sides (north and south) are surrounded by rows of 20-meter height housing, it connects Via Giacinto Gigante with Via Carlo Dolci. The northern rows have more potential to be upgraded thanks to the cornered shape at one end which is facing primary street and they are chosen as a project site.

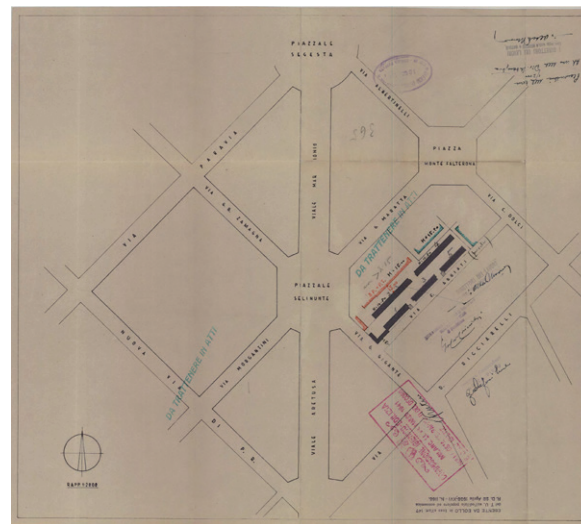


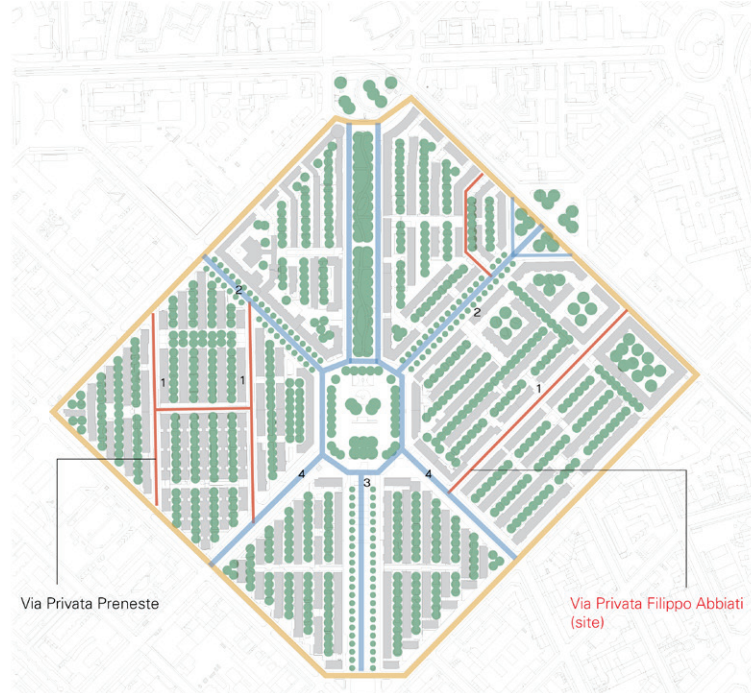
Figure 11. original drawing of building complex in Via Filippo Abbiati 4-6 by A.Morone & F.Natoli. @ Cittadella degli Archivi, Milano



3
Primary Street View (Viale Aretusa)
- green space • no commercial
building align to street



4
Primary Street View (Via Mario Morgantini)
- green space • no commercial
building perpendicular to street



(a)



1
Secondary Street
(Via Abbiati)



2
Primary Street
(Via Carlo Maratta)

- primary street
- secondary street
- active program



(b)

- commercial
- education
- medical
- unused
- association
- public
- church

Figure 12. (a) Street Analysis, (b) Urban Programming Map. Data From Mapping San Siro [27]

The architecture of San Siro estate in Via Filippo Abbiati 4-6 is designed by A.Morone and F.Natoli. They are composed of 5 oblong and 1 corner-shaped building oriented south-west to north-east with a line of greenery in the middle. (Figure 13) Their characteristic is sharp and clean form, 20 meters height together with modern geometrical openings and additional small balconies facing both garden and urban side. All five stories apart from the underground are designed to be residences, ground floor is elevated 0.80 meters from the ground providing privacy to the inhabitants. Although, the design disconnected the whole street from the architecture and create difficulty for having a public program.

After the war, low volumes (one or two floors) were added along the streets within the rows of flats, to host additional services and shops.[26] Most of the communal spaces now linger unused: changes occurred during the years, in the social composition of inhabitants, in the buying power, the increased rent for commercial spaces forced shops to close. Only in these years, Aler been trying to reopen them, asking for them controlled fees, in a change of renovation works.[26] (figure 14,b)

The residence planning corresponds to structure typology, center wall bearing situates in every floor defining clear division for each room, the condition limits flexibility and expansibility of planning to nowadays needs. The challenge of the new proposal is to respect the existing status of the buildings on every scale and at the same time, bring the architecture to be accessible, public, and more flexible.

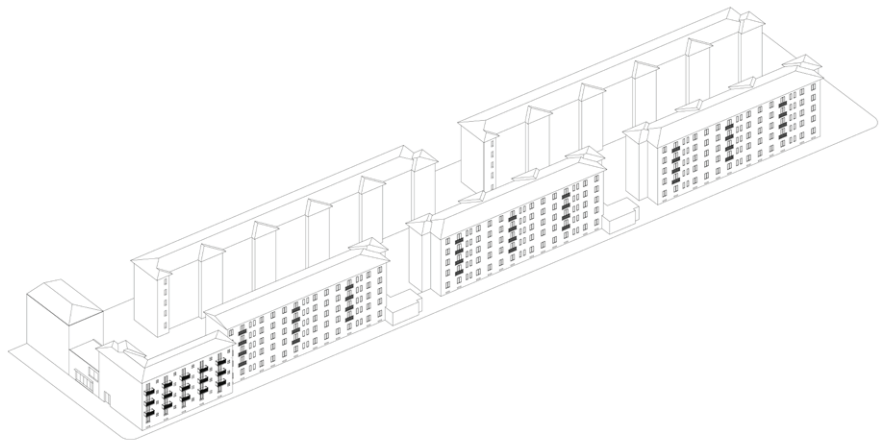
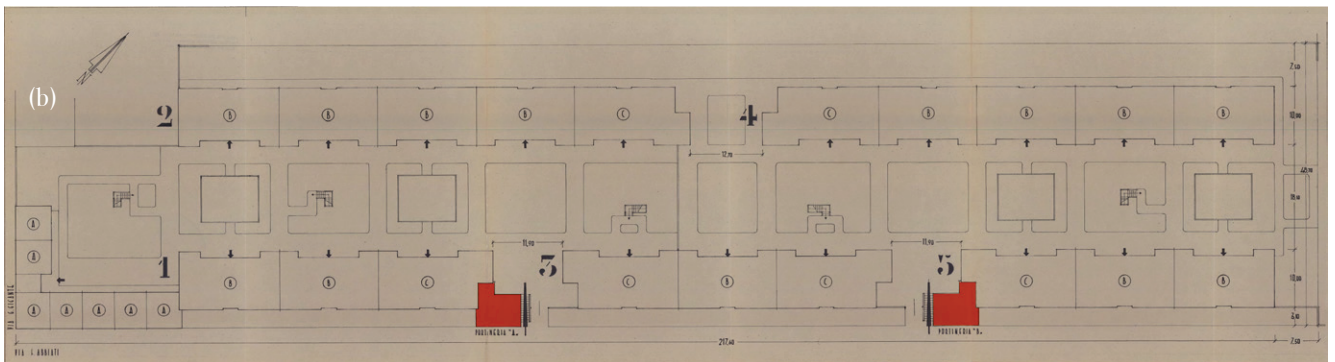
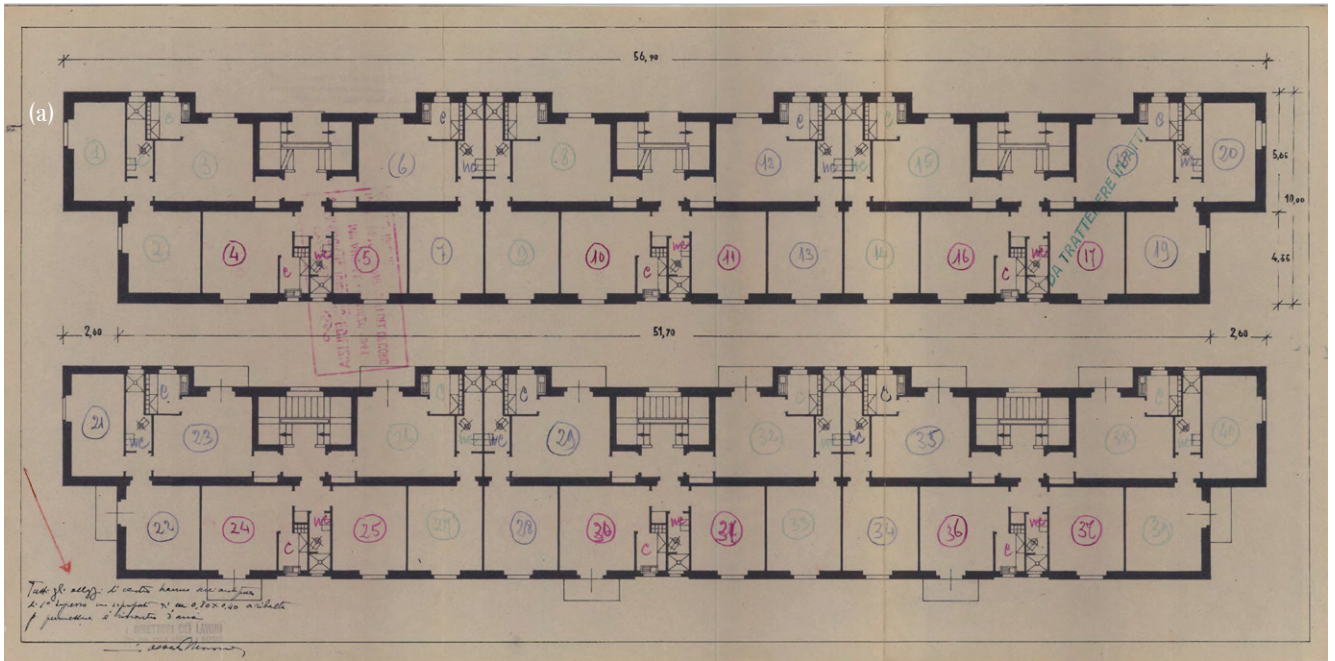


Figure 13. Isometric of project site, via F.Abbiati 4-6.



additional low building for commercial purposes.

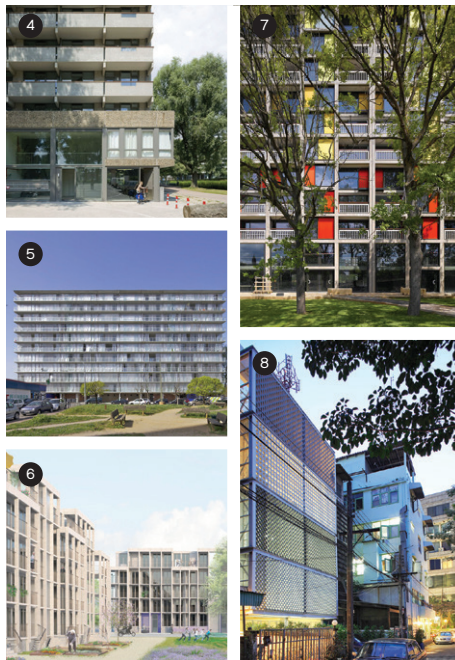
Note* Area/Floor is 510 sq.m. , Total Area = 510 x 5(stories) = 2,550 sq.m.

Figure 14. (a) Ground Floor and Typical Floor plan, (b) Complex Master Plan. @ Cittadella degli Archivi, Milano

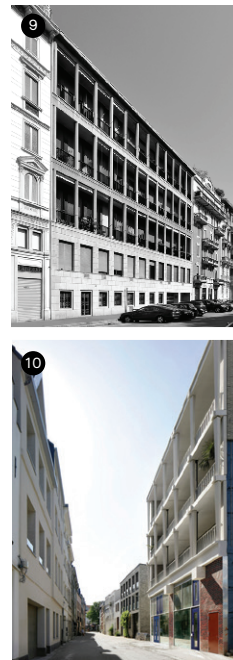
Public Space



Renovation



Urban Light Facade



Unconventional Planning

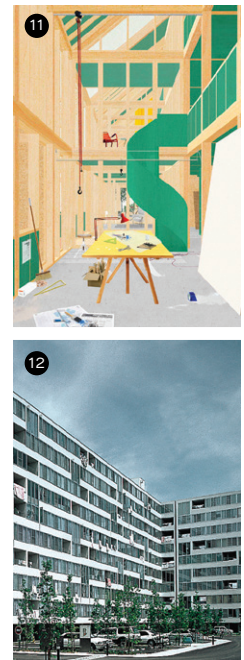


Figure 15. Case study images (12 cases), categorized by focus topics.

Case Studies

The project scope includes all scales of design, starting from urban, landscape, architecture, and interior, hence the range of case study research is wide in order to cover the entire aspects. 12 cases are selected and categorized into 4 sections.

The first is “public space”, focusing on how the building engages with ground level and landscape. The second is “renovation”, all cases exploited existing characteristics and redefined them in a modest way. The third is “urban light facade” related to European urban culture in which the design of the facade always responds to the context respectfully while expressing the modern and light construction of current technology. The last one is “unconventional planning”, to explore different approaches of planning and their influence on architecture. Below is the list of case studies.

Public Space

1. NL architects, Overhoek B1&B2, Amsterdam Noord, Netherland (2017-2019)
- Public Landscape in Residence Architecture
2. Herman Hertzberger, Markafenstrasse Housing, Berlin, Germany (1984-1986)
- Domestic Landscape in Residence Architecture, Variation of Living Units
3. Marco Zanuso, Case Feal, Milan, Italy (1961-1963)
- Architecture in Natural Context

Renovation

4. NL architects+ XVW architectuur, deFlat, Amsterdam- Zuidoost, Netherland (2016)

- Intervention and Solution in Social Housing.

5. Lacaton & Vassal Architects, Grand Parc Bordeaux, France (2017)

- Flexibility and Connectivity of Additional Space.

6. Adam Khan Architects, Ellebo Garden, Copenhagen, Denmark (2017)

- Materiality and Quality of Extra Space.

7. Hawkin / Brown Architects + Studio Egret West, Park Hill Phase 1, Sheffield, England (2011)

- Facade Renovation and Potential of Original Building.

8. All(zone), headquarter building, Bangkok, Thailand (2009)

- Breathing Space and Intervention in Tropical Climate.

Urban Light Facade

9. Giulio Minoletti, Casa Albergo, Milan, Italy (1965-1970)

- Continuity and Contemporaneous of Architecture

10. Caruso St John Architects, Falconhoven Apartment Building, Antwerp, Belgium (2014-2020)

- Facade design of Urban Architecture

Unconventional Planning

11. Dogma, Cooperative Housing, London, England (2017)

- Possibility of Co-Living inhabitation planning

12. SANAA, Gifu Kitagata Apartment, Gifu, Japan (1994-1998)

- Influence of Atypical Planning to Architecture

Analysis

1. NL architects, Overhoek B1&B2, Amsterdam Noord, Netherland (2017-2019)

In this case, there is a similarity between its condition and San Siro project, the greenery in between residences. Landscape design is wild and open for any outdoor activities without controlling it, the interesting element is also the suspended structure that connected two inner facades together. The residences could receive natural light and ventilation to full-length balconies to both inner and outer facades.



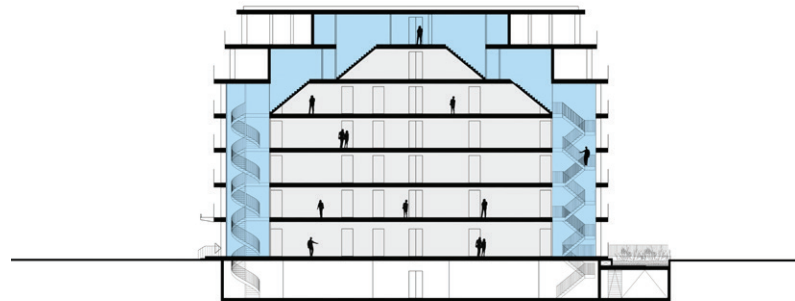
(a)



(b)



(c)



(d)

Figure 16. (a) Perspective of inner garden, (b) Master plan, (c) Elevation, (d) Section

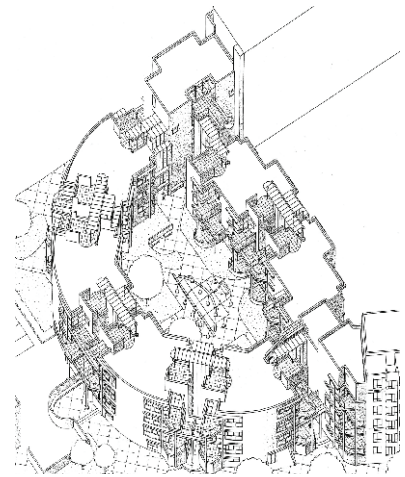
2. Herman Hertzberger, Markafenstrasse Housing, Berlin, Germany (1984-1986)

The project has semi-circular planning in responding to the presence of the church on one side. This form suggests a unique and interesting courtyard space, contrary to the first case, the landscape plays its role as a small semi-private garden instead of a large public garden. Architecture is executed in urban scale outside but domestic scale inside, variation of living unit and balconies generates generous and comfortable spaces for inhabitants.

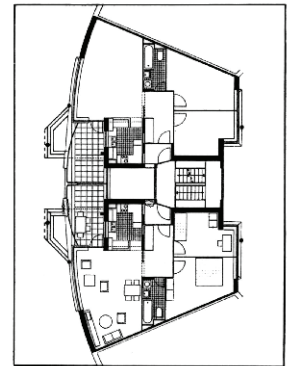
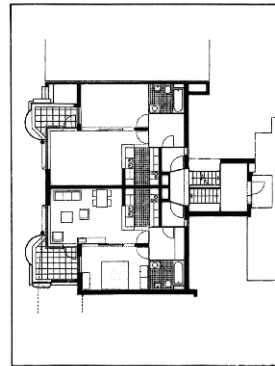
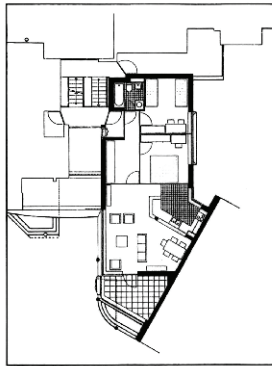


private garden facing public

(a)



(b)



(c)

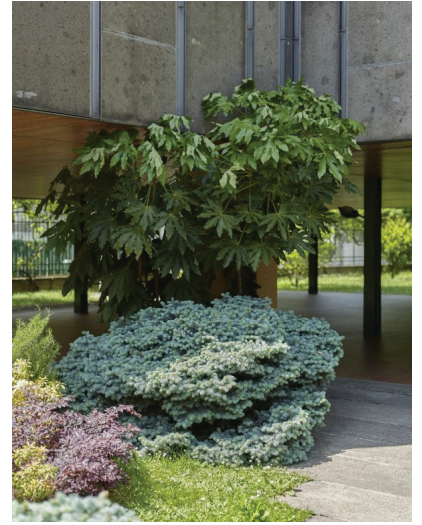
Figure 17. (A) An Image Of Inner Garden, (B) Axonometric, (C) Variation Of Living Unit.

3. Marco Zanuso, Case Feal, Milan, Italy (1961-1963)

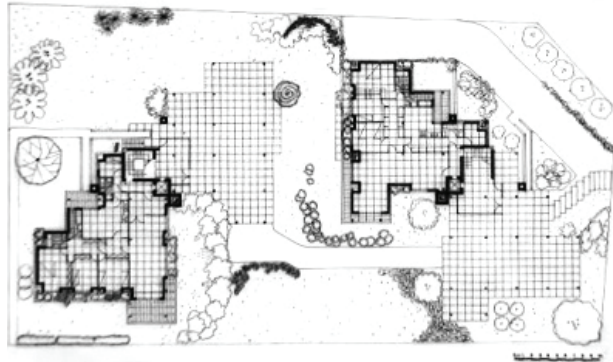
One of the particular residences in Milan because of how it deals with different contexts other than urban condition, the execution compose of uncompromising facades react to nature with large cornered balconies in all directions providing a various view to the inhabitants. It is worth noting that a large garden occupies most of the ground level since half of the covered floor plate is dedicated to outdoor spaces, this allows nature and landscape to contaminate ground areas and make the public space more delightful than other projects.



(a)



(b)



(c)

Figure 13. (a) Exterior View, (b) Landscape, (c) Master Plan.

4. NL architects+ XVW architectuur, deFlat, Amsterdam- Zuidoost, Netherland (2016)

Several aspects are to be discussed in the project, it is a reconstruction project of social housing in Amsterdam, the previous condition was similar to the San Siro estate in terms of the repetitive floor plan and oblong massing but different in context and scale. The new design improves circulation, optimizes residence capacity, and beautifies the architecture.

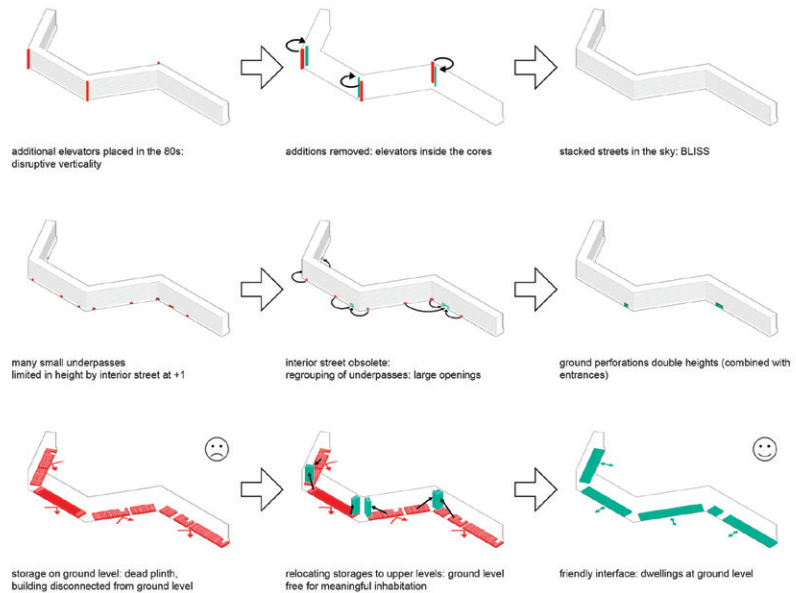


Figure 19. Intervention Diagram.

The intervention provides better flow inside the building by adding vertical circulation outside the facade, this means that the residents could reach the others in a whole building length. On the ground floor, the architects replace numbers of small and dark passages with larger and more welcoming openings, they work as the main entrances for the inhabitation. Storages on a ground floor that used to block the building to the beautiful landscape are redesigned to be residences with garden views. All changes, improve the connectivity of the buildings and residents to have higher quality space.



(a)



(b)



(c)

Figure 20. (a) Exterior view, (b) Window before renovation, (c) window after renovation

Windows are replaced with a transparent material (glass) respected to previous facade pattern, it maximizes degrees of the natural light inside the room while refreshing the look of a massive building in a more contemporary way.

5. Lacaton & Vassal Architects, Grand Parc Bordeaux, France (2017)

The project consists in the transformation of 3 modernist social housing's buildings, fully occupied. It is part of the renovation program of the 'Cité du Grand Parc' in Bordeaux. Built from the early '60s, this modernist district counts more than 4000 dwellings. The 3 buildings G, H and I, 10 to 15 floors high, gather 530 dwellings and needed a renovation after the question of their demolition has been ruled out. By their location and their layout, these buildings give a capacity of transforming into beautiful dwellings with qualities and comfort .[18]



Figure 21. (a) Exterior view, (b) window before renovation, (c) window after renovation

Unconventional intervention called “winter garden” was added to expand the inhabitations area and possibilities...by investing with precision and care the existing qualities, that should be preserved, and what is missing that must be supplemented. The addition of winter gardens and balconies in the extension of the existing give the opportunity, for each apartment, to enjoy more space, more natural light, more mobility of use and more views.[18]

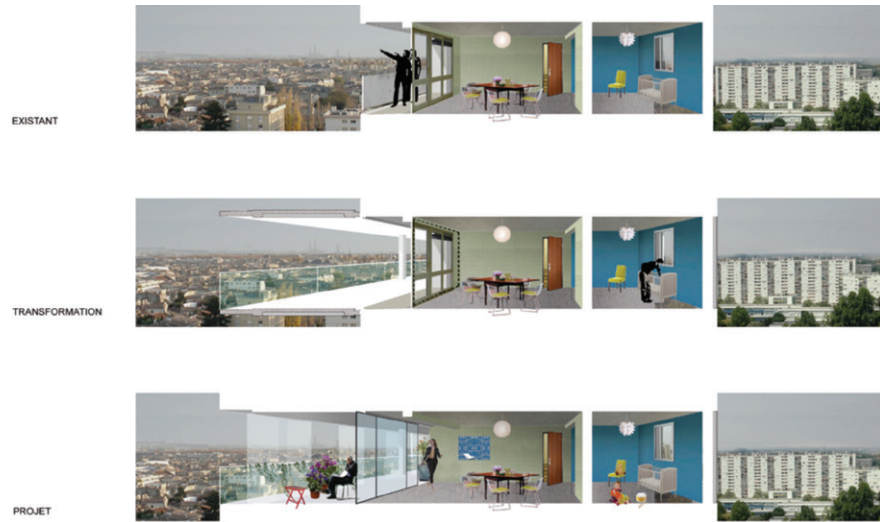


Figure 22. (A) Section Diagram Of Construction Phase : From Up To Down, Before, During Construction And After.

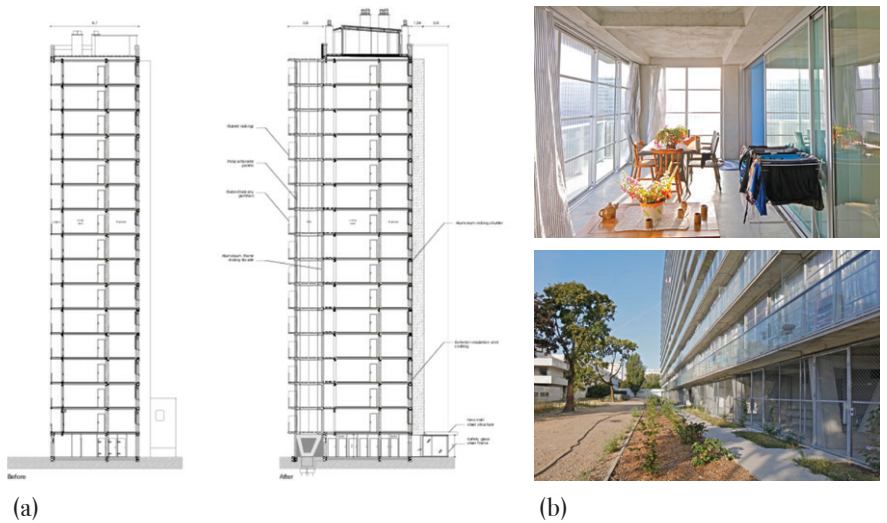


Figure 23. (A) Section, Before(Left), After(Right), (B) Spaces Provided By New Intervention.

Thanks to the additional intervention detached from the existing structure, the system allows construction to happen while keeping the tenant inside safely with temporary wall. The work plan is designed to construct the project from outside to inside, and in the last phase is to uncover the interior partition to enjoy the new larger space (Figure 23). The look of the architecture is entirely changed after the project finished, small windows were replaced by horizontal line of glass and transparent material, make the building looks like crystal mountain in the city. Expansion strategy as in this project could also work for San Siro case in reason of having possibilities to share similar social housing issues.

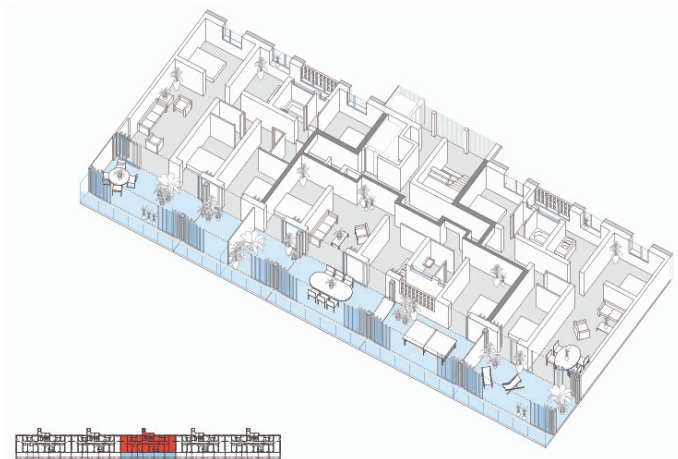


Figure 24. Typical Floor Isometric With New Expansion.

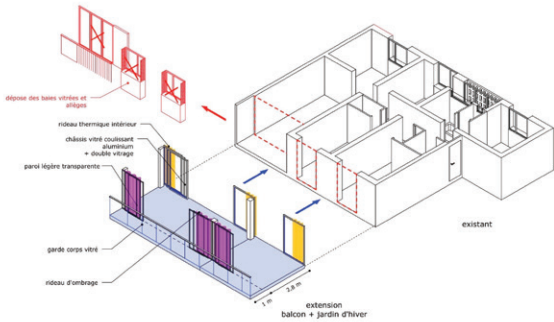


Figure 25. Diagram Of Winter Garden Installation.

6. Adam Khan Architects, Ellebo Garden, Copenhagen, Denmark (2017)

The intervention shares a similar idea to Lacaton & Vassal's Grand Parc Bordeaux case but executes differently. Existing architecture is a group of linear buildings formed a large rectangle inner courtyard, the additional structure is only constructed to the patio side giving extra balconies to the inhabitants (Figure 27). It is worth noting that, the new structure presents architecture materiality by using precast concrete as a facade. The design is sleek and light allowing natural light to pass through while expressing a substantial exterior (Figure 26).



Figure 26. Exterior Perspective

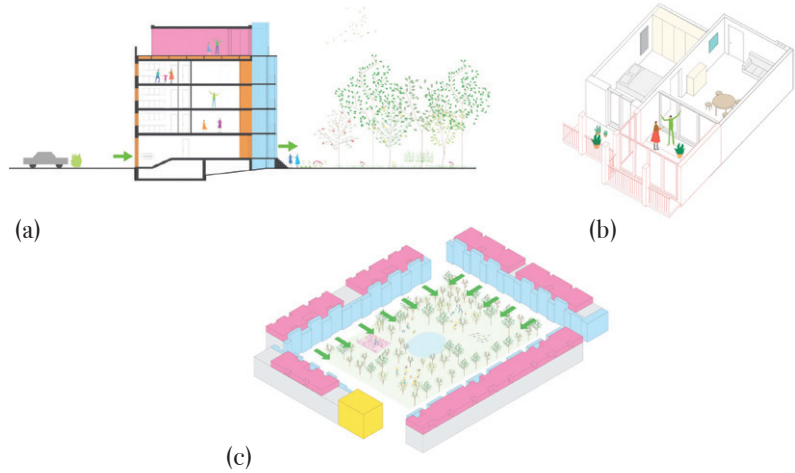


Figure 27. (a) Section Diagram, (b) Additional Balcony, (c) Masterplan Diagram.

7. Hawkin / Brown Architects + Studio Egret West, Park Hill Phase 1, Sheffield, England (2011)

The project shares a similar situation with NL architects + XVW architectuur's deFlat case, massive stripes of social housing situate in a landscape. The degenerated old facade is replaced by vibrant color panels and larger glass openings while keeping the existing building skeleton (Figure 29). New reflective spiral stairs are externally added to improve the circulation inside, refreshing the expression of the facade as new and contemporary (Figure 28).



Figure 28. Exterior View



Figure 29. Facade Changing Process From Left To Right; Before, Construction, After.

8. All(zone), headquarter building, Bangkok, Thailand (2009)

Situated in a tropical country, Thailand. The project is a renovation of two-row houses combined. The row house is one of the urban residence typologies in Asia, it typically has windows on a street-side(front) and the back, the lateral sides are attached to the next buildings sharing the same structure. The architect added metal structure layers to the front and the back called “breathing space” which works as balconies and new facades (Figure 31). The feature is the customized ventilated block on each floor, beautifying the exterior and filtering strong tropical sunlight. Thanks to the intervention, a lower degree of natural light generates comfort brightness to the interior allowing people to enjoy the space without glare (Figure 32).



Figure 30. Exterior Views

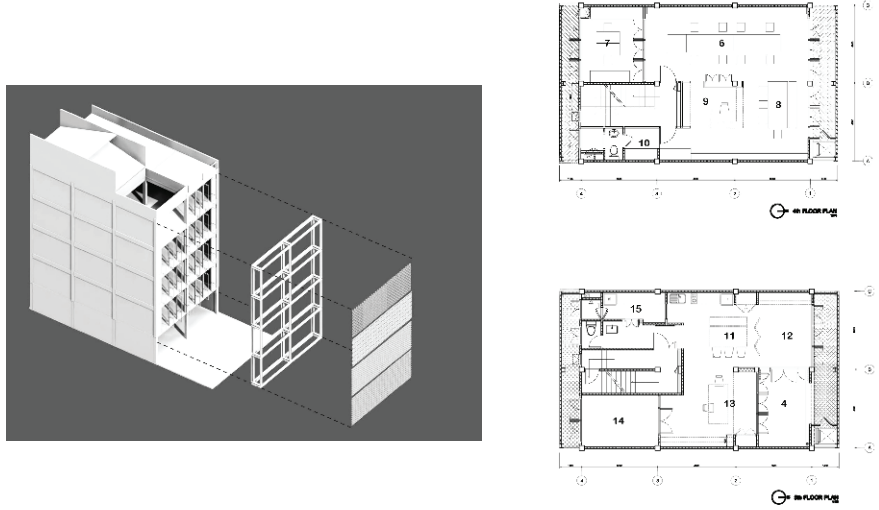


Figure 31. (a) Intervention Diagram, (b) 4th & 5th Floor Plan



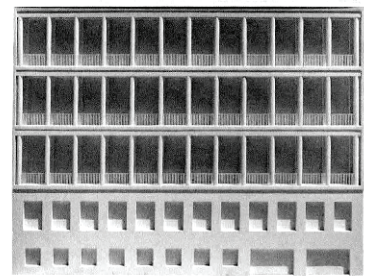
Figure 32. Interior Views Showing Filtered Natural Light.

9. Giulio Minoletti, Casa Albergo, Milan, Italy (1965-1970)

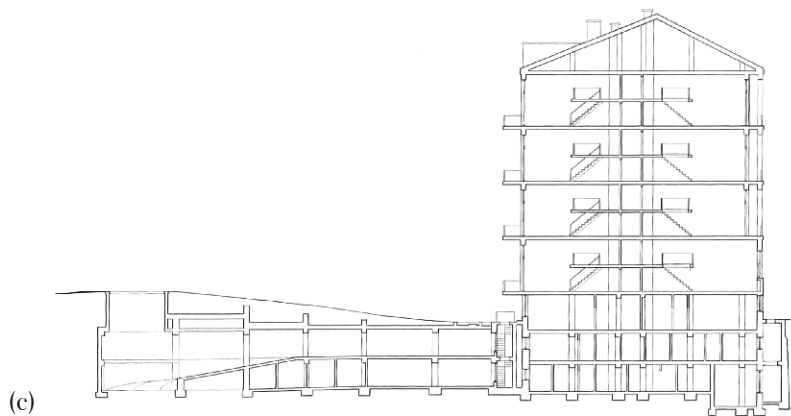
The building locates in front of Parco Sempione, one of the largest public parks in Milan. The lower part of the building is dedicated to the public using while the upper part is residences. Taking into account the stunning greenery view, the inhabitations are designed to have a higher floor to the ceiling than the regular case, expressing the grand size of opening toward the park. The facade embraces the verticality of the high columns with balconies respected to the context proportion. The residences are all duplex type thanks to the special height, compared to the adjacent building, the residences take 3 floors instead of 4 giving higher quality to the rooms (Figure 33, a).



(a)



(b)



(c)

Figure 33. (a) Exterior Views, (b) Urban Elevation, (c) Section.

10. Caruso St John Architects, Falconhoven Apartment Building, Antwerp, Belgium (2014-2020)

Verticality is also highlighted in the project as in Casa Albergo. It is a new building constructed in a historical location, the architect explores alternative facade order by using simple vertical element “columns”. They are made of white precast concrete bearing the cantilever balconies which define the lightness of the building. From distance, the exterior looks simple and respects to European context but it is discreetly inserted double columns element in random positions made it’s subtly dynamic (Figure 34).

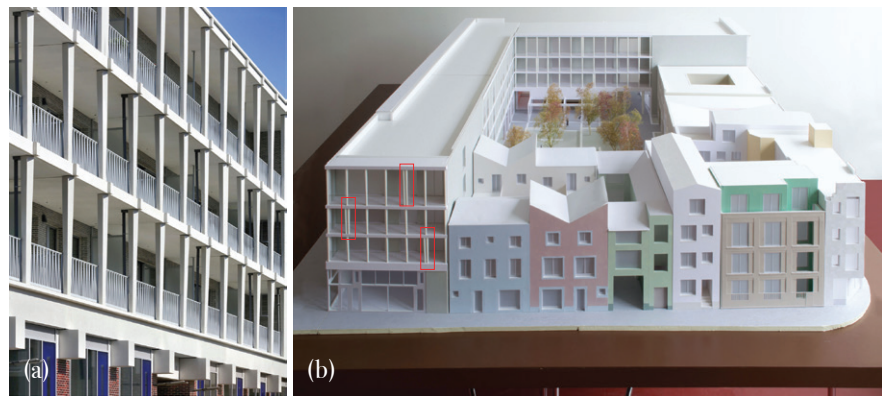


Figure 34. (a) Exterior View, (b) Model Highlighting Double Columns

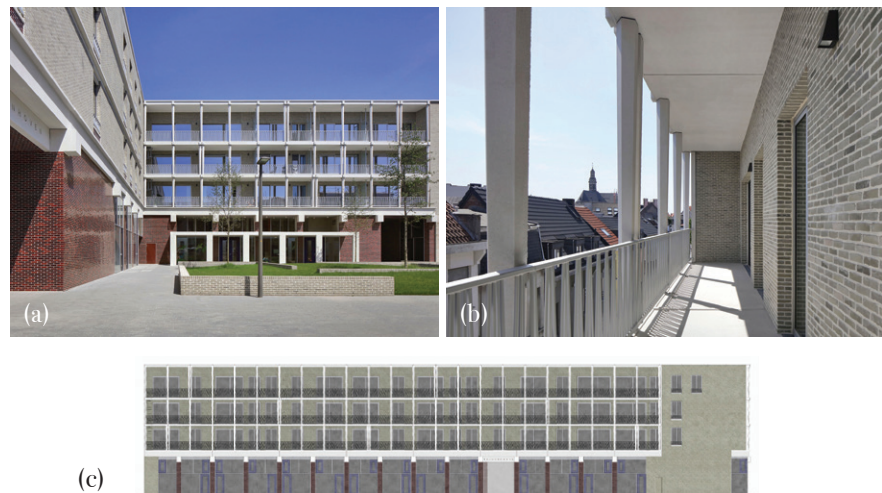


Figure 35. (a) Exterior View, (b) Balcony View, (c) Elevation.

11. Dogma, Cooperative Housing, London, England (2017)

The unrealized project explored the possibilities of residence planning by proposing cooperative housing. The planning attempt to embrace the shared living quality, public spaces merge with the main circulation to maximize shared areas and at the same time, improve connectivity with the inhabitants (Figure 36). The room is composed of a service part (green) and a large co-living space made possible by the elimination of the room division. Expansion and flexibility are planned thanks to the 3D grid skeleton made for filling in the programs (Figure 37).



Figure 36. Collages (a) Exterior, (b) Interior Shared Spaces.

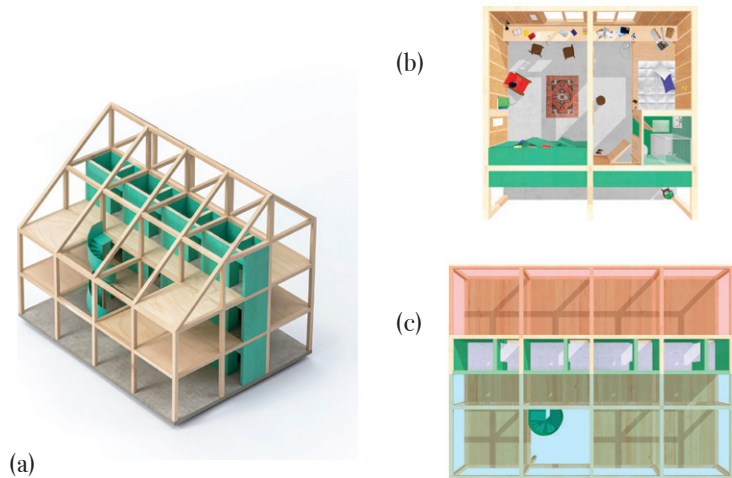


Figure 37. (a) Isometric of Structure and Building Organization, (b) Perspective Room Plan, (c) Perspective Floor plan.

12. SANAA, Gifu Kitagata Apartment, Gifu, Japan (1994-1998)

The experimented housing project proposes unconventional and complex architecture. Residence planning is schematically layered by public circulation and domestic circulation, the scheme gives freedom to the facade design in reason of placing proper functions in the middle (Figure38). The public circulation facade is highlighted by floating stairs and expanded metal giving blur and ephemeral effect on the exterior. Balconies are designed to be shared and generate negative space influencing the abstract silhouette of the building (Figure41). The other side is a fully glazed facade installed to the abstract pattern of reinforced concrete structure designed to accommodate various living units. The interior corridor received maximum sunlight and share it to living areas through movable partitions giving flexibility and higher quality of spaces (Figure 38).



Figure 38. Inhabitation plan and images of each areas.

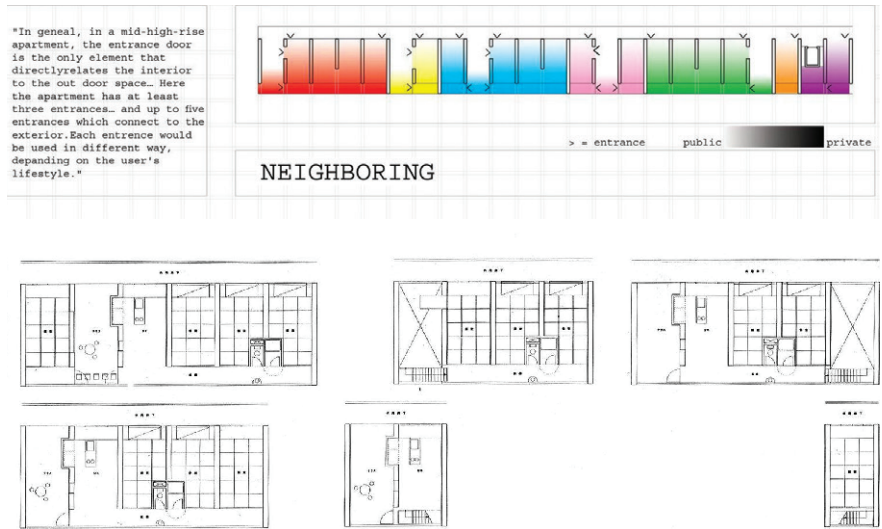


Figure 39. Variation of Room Plans

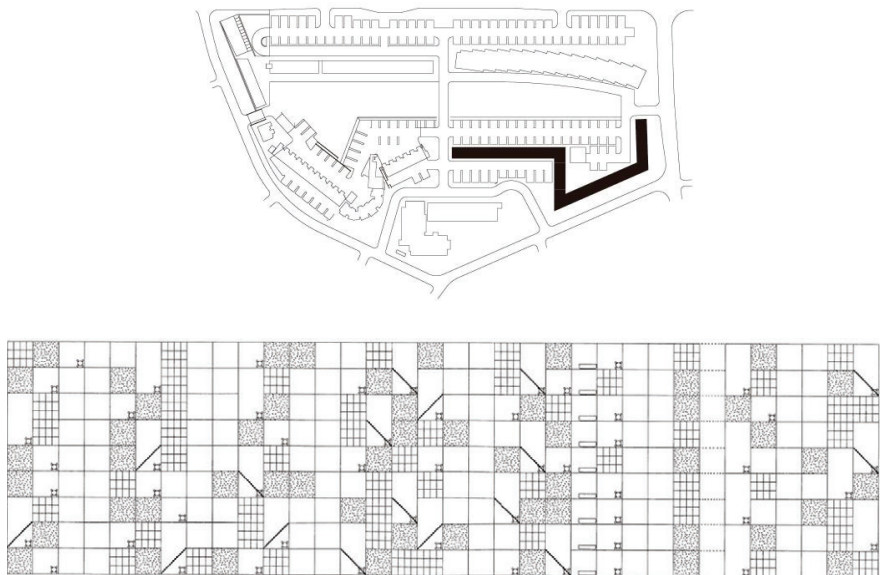


Figure 40. (a) Master Plan, (b) Elevation Diagram



Figure 41. Exterior View



Figure 42. Floor Plans

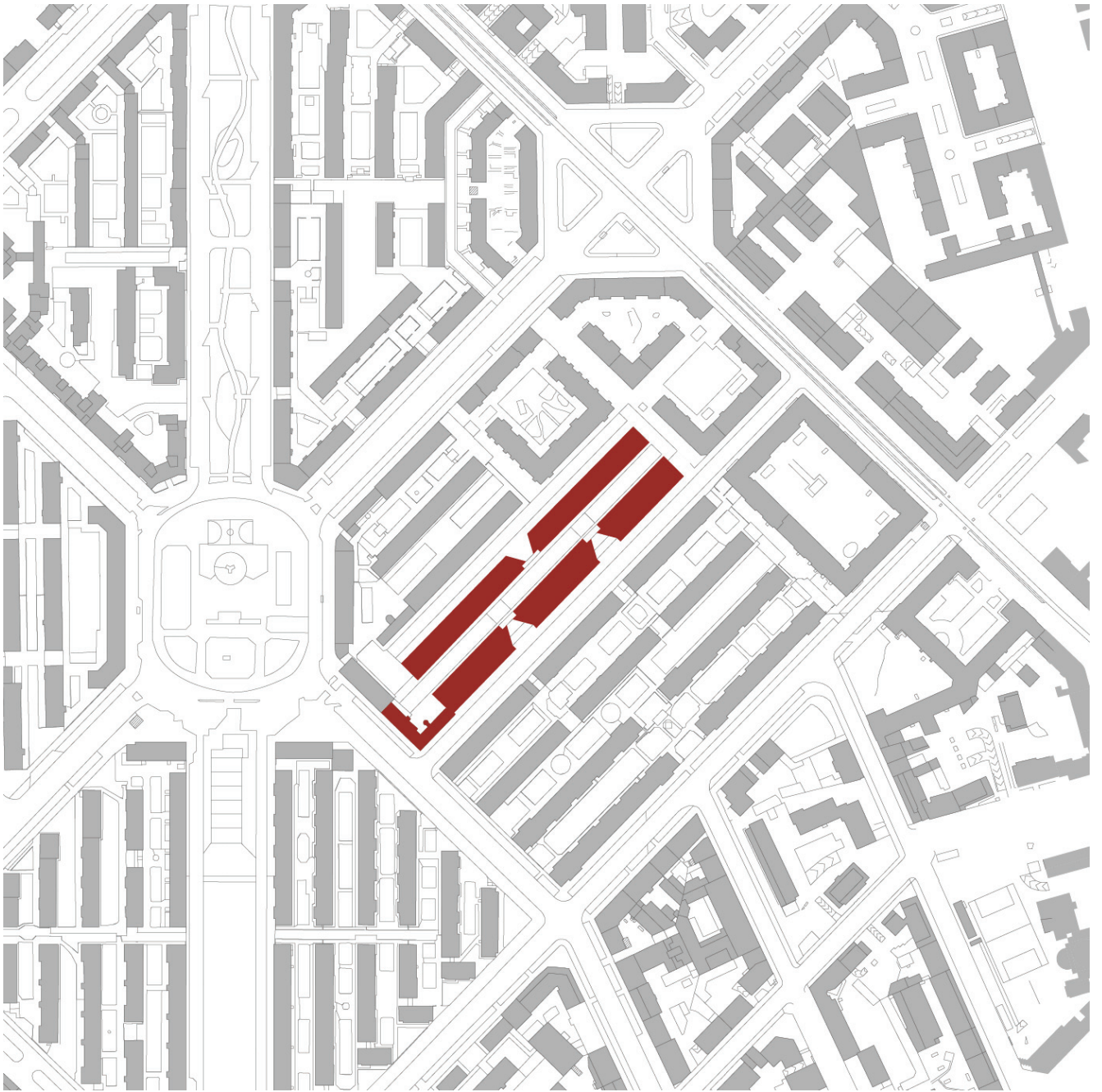


Figure 43. Shwatz Plan.

Intervention & New Accessibility

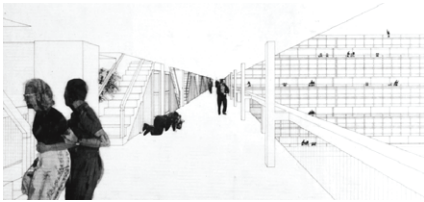


Figure 44. Alison & Peter Smithson, photo-montage of “street in the sky” of the Golden Lane estate.

The project aims to dissolve the existing obstructions and generate better connectivity to the neighborhood on an urban, architectural, and interior scale. The master is developed by adding a more welcoming entrance from Via Filippo Abbiati and Via Giacinto Gigante in order to give the possibility of connecting the inner greenery to the streets. The landscape of the inner garden is replaced by a long and strolling path, the different level of each part is fixed by large ramps on the new entrances. The other disconnection is solved thanks to the new intervention called “Street In The Sky” taken from Alison & Peter Smithson’s idea of communal corridor space in social housing (Figure 44). The intervention has been developed into 3 types, adjusted to different conditions of the problems. They are constructed by steel structure with the light translucent skin, attached to the existing facade with the least modification of the previous opening to limit total demolition (Figure 48).



Figure 45. Aerial view of the project depicting new entrances in red.

The first type is the “entrance streets” they provide a larger and more welcoming entrance thanks to the facade angle that embrace the continuity from the street, canopy and gentle slope circulation are equipped to have more functional accessibilities. The upper facade is an angled canopy for the inhabitants that could be used for observing the passerby or for leisure purposes.

The second is the “urban streets”, on the ground floor, the new portico is created by an animal-like steel structure, it generates characteristics to the street while giving shade for the people. The upper levels are 1.50 meters width full-length balconies, they support the inhabitant’s activities in urban life such as plantings, eating, drinking, and socializing.

The third is the “garden streets”, by exploiting the existing beautiful garden, the new streets provide semi-outdoor communal space looking to the greenery. They contain new circulation and stairs in the brighter space, this solution maximizes the apartment space by substituting the previous stair space (Figure 46)

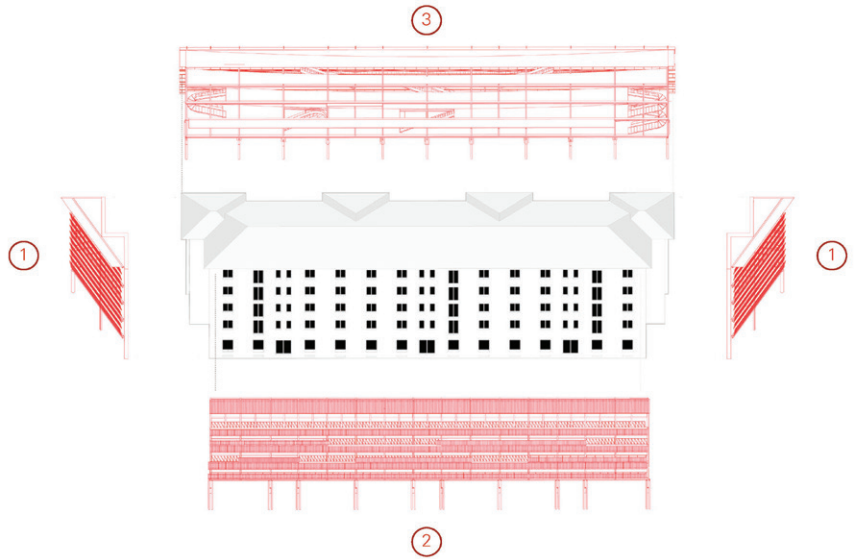


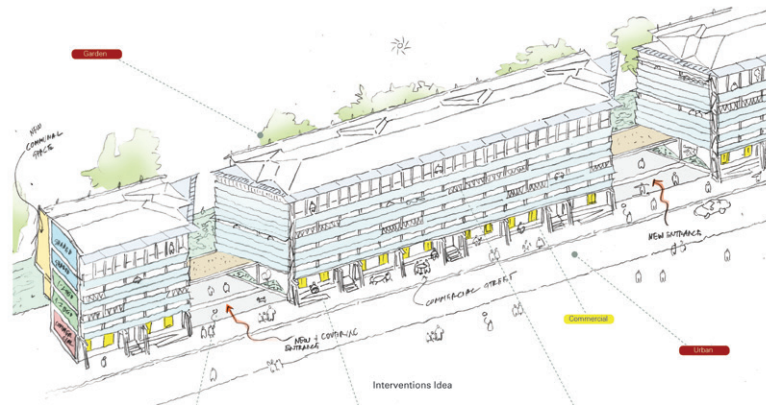
Figure 46. Intervention Diagram.



Figure 47. Visualisation of New Entrance.

The new entrance is now accentuated by angled metal structures giving a small piazza in front with the greenery. It creates more inviting space for inhabitants and visitors to utilize the place, new gentle ramps connect the different ground levels between the

street and the inner garden smoothly. The new translucent fence and upper negative space embrace the trees and plants as they are sculptures in the foyer of this complex.



Existing Residence Entrance

problem : the entrance building obstructs inner garden visibility and creates discontinuity of urban space
 solution : replace with large and light entrance, it creates front piazze, allow more visibilities in all directions.



Existing Ground Floor Facade

problem : no accessibility from the street, the residences disconnected to the city
 solution : enlarge all openings to the limit, create additional stairs and ramp for all accessibilities. Insert commercial and public function to activate urban life.



Existing Urban Facade

problem : Lack of balcony and space to face urban side of the residence
 solution : add extra balconies to every floor, generate new facade with light and large outdoor space.

(a)



(b)

Figure 48. (a) Sketch Idea, (b) New Masterplan.

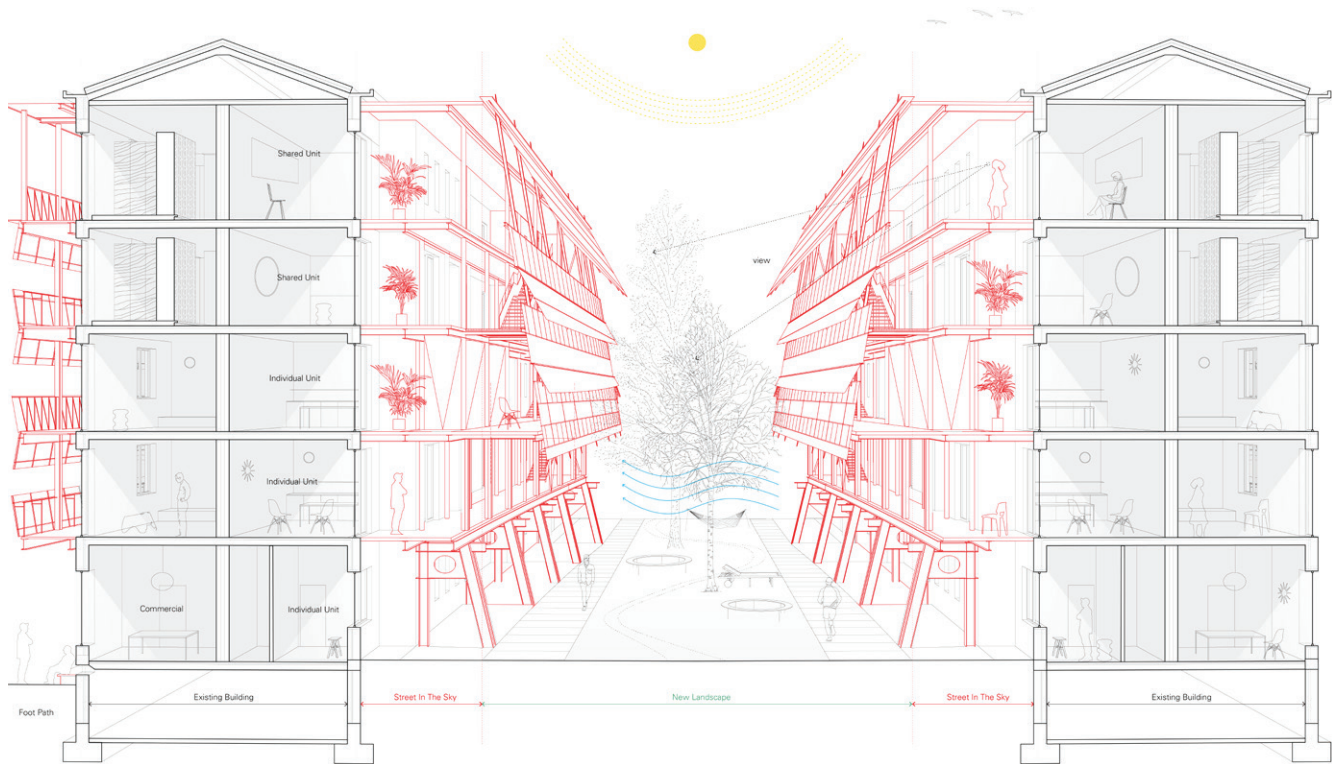


Figure 49. Perspective Section.

The drawing displays how the interventions attach to the existing buildings. The structures are independent and bear their weight. The new facade is openable transparent panels, they could be adjusted to the temperature of a different season.

During winter, they work like a glasshouse, accumulating the solar heat with close skin, and during summer, they work like a pavilion, the openable facade allows ventilation and the breeze from the city to lower interior space temperature (Figure 49).

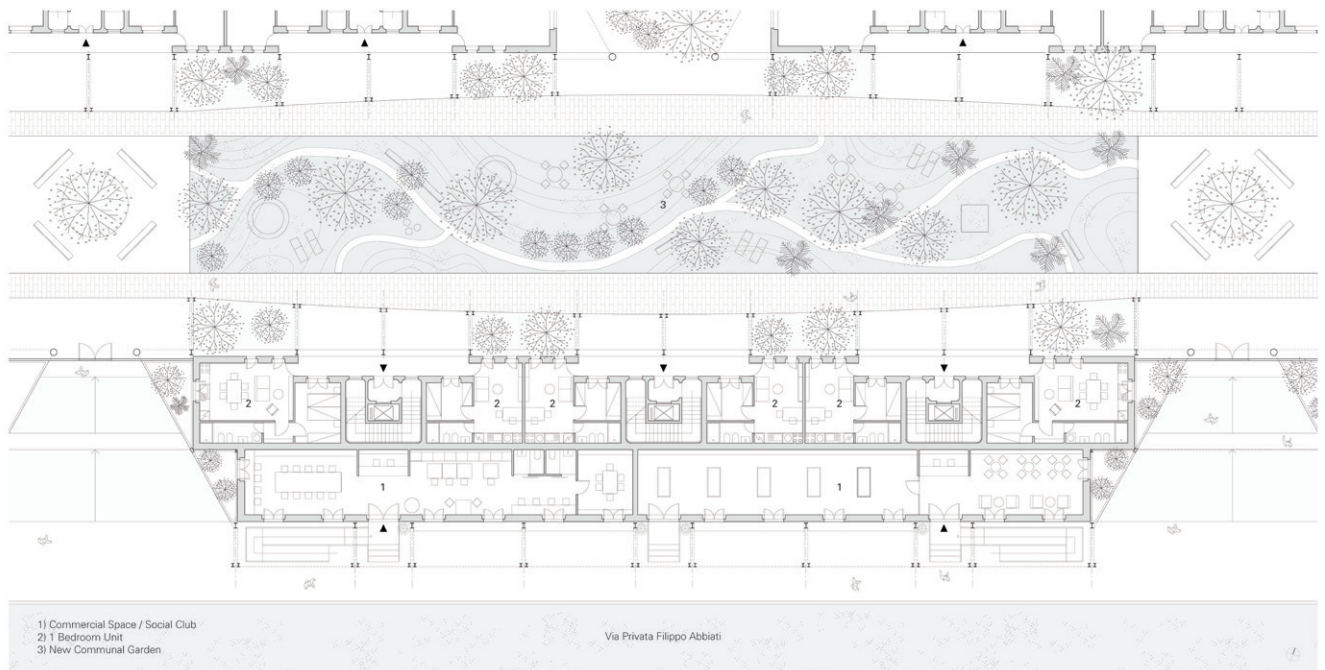


Figure 50. Ground Floor Plan.

On the ground level, the inhabitations on the street side are merged and converted to accommodate larger public programs connected to the city. The programs include social clubs, bars, restaurants, and commercial spaces. The entrance gates are moved at the

end of lateral sides of the building created a wedge-shaped piazza in front. It is pinched by a little garden beautifying the experience of entering the premises. Vertical circulation is improved by inserting elevators into each core of the buildings (Figure 50).

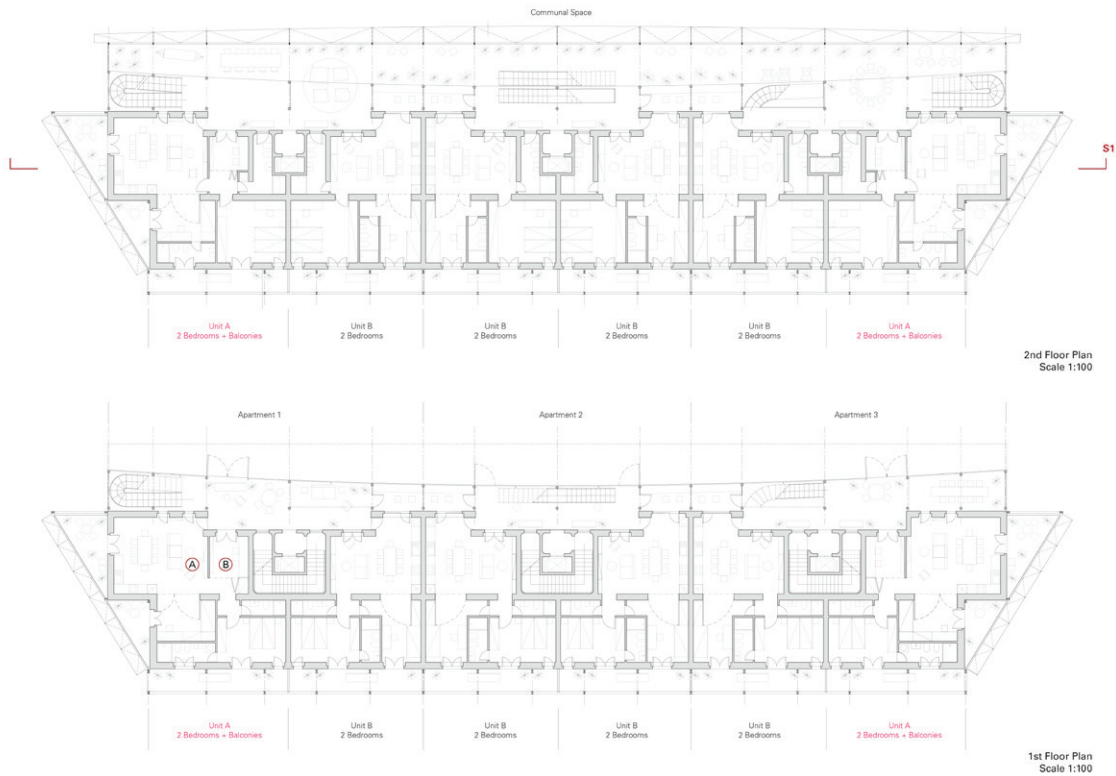
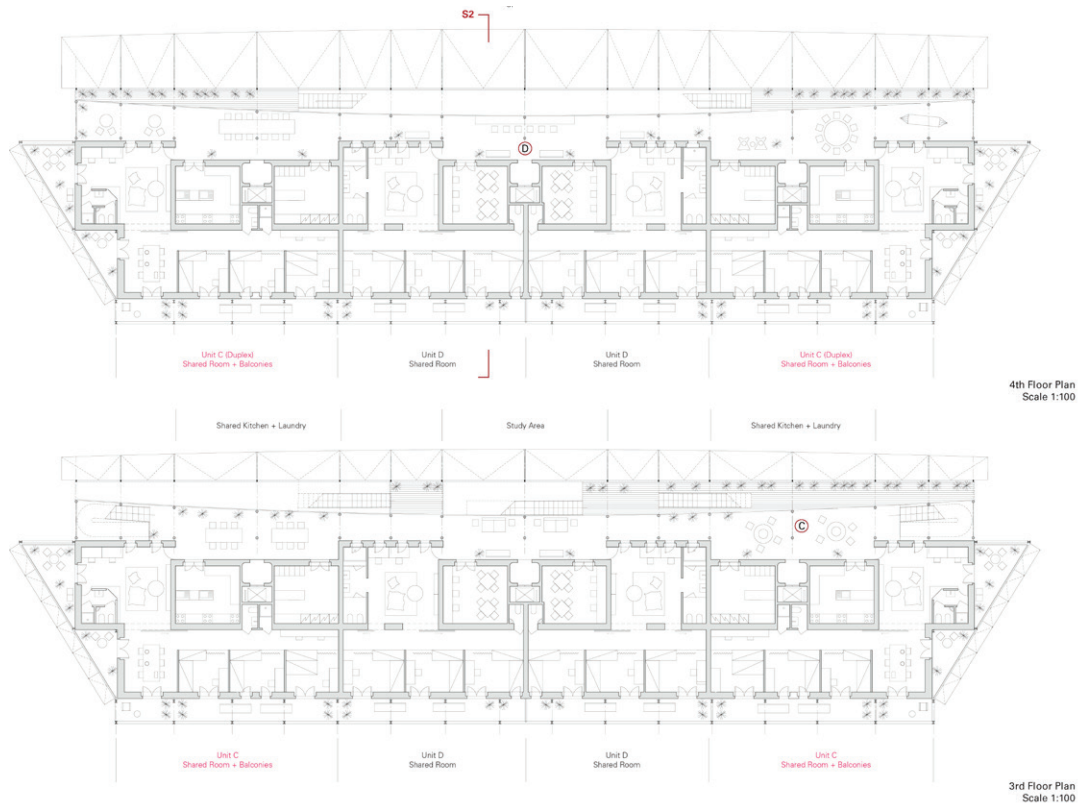


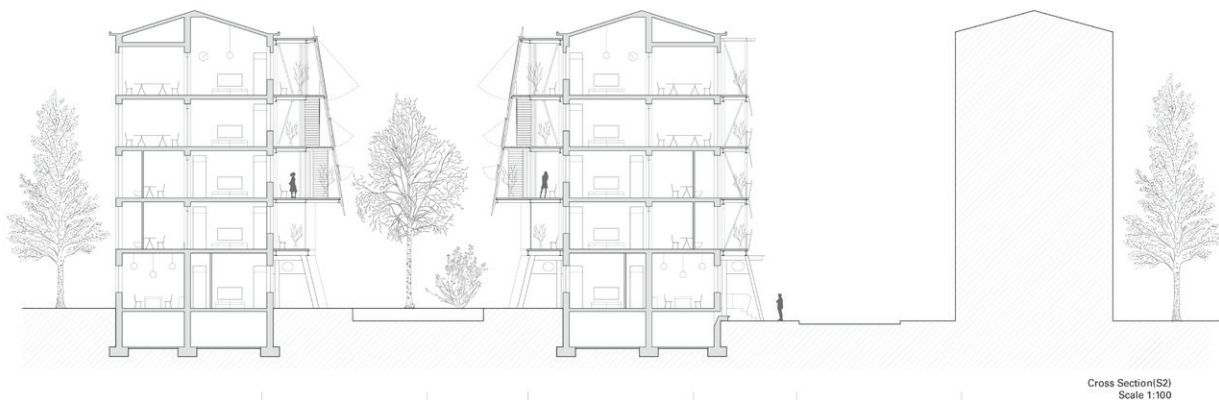
Figure 51. 1st & 2nd Floor Plan.

The upper levels are dedicated to inhabitants, with communal spaces thanks to “garden street”. The first and second floors contain Family type rooms, each unit has 2 bedrooms with a kitchen, dining room, and living area (Figure 51).

The last two floors (3rd and 4th) contain co-living units, composed of communal functions such as laundry, kitchen, and working space, they locate around the building core. Living units on these levels have less partition allowing a more shared way of living.

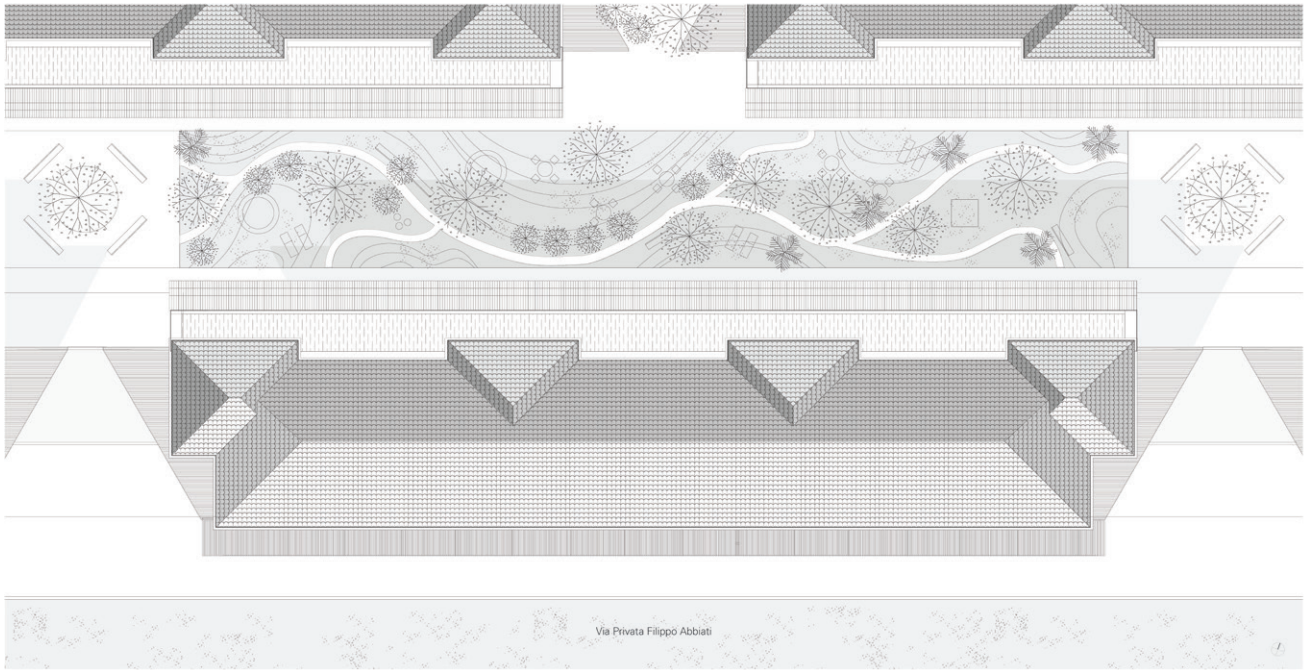


(a)



(b)

Figure 52. (a) 3rd & 4th Floor Plan, (b) Cross Section



(a)



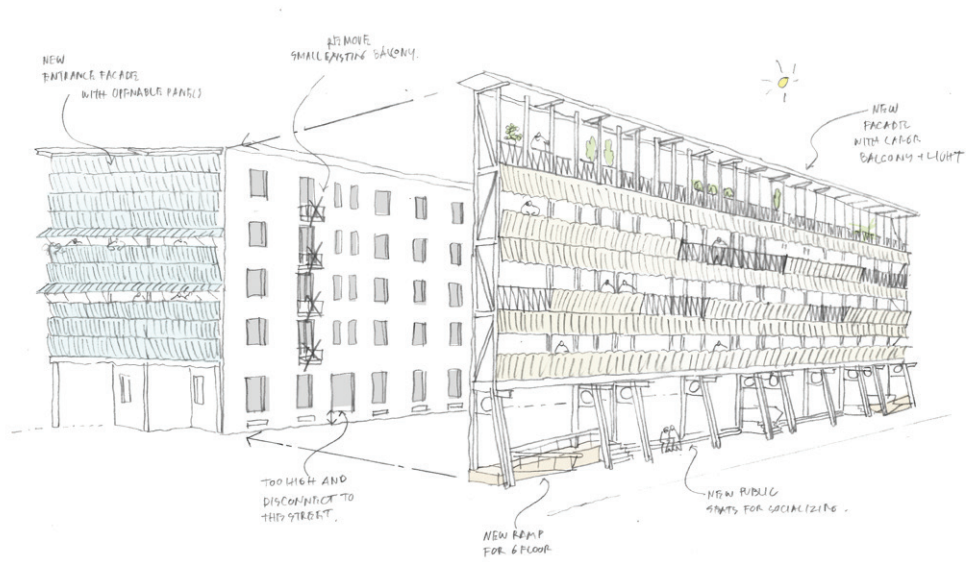
Longitudinal Section (S1)
Scale 1:100

50 (b)

Figure 53. (a) Roof Plan, (b) Longitudinal Section



(a)



(b)

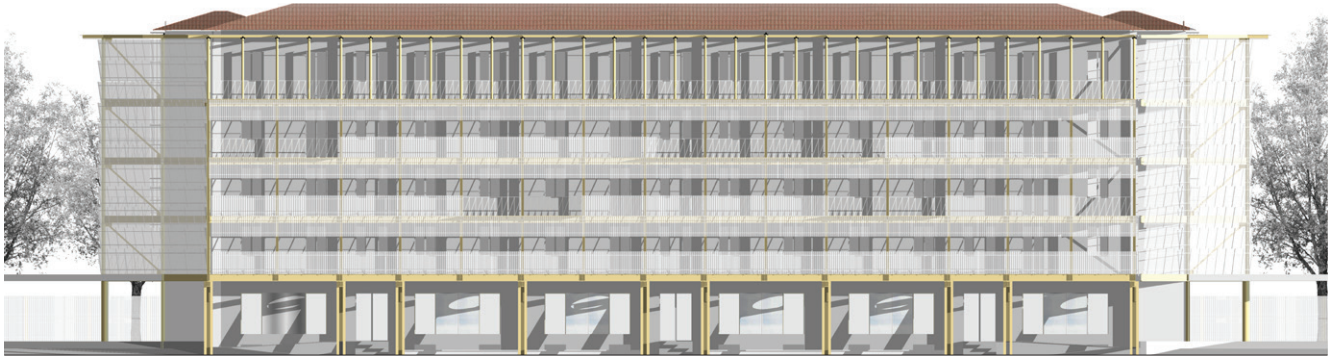
Figure 54. (a) Visualisation of New Urban Facade, (b) Sketch Idea

Urban Facade

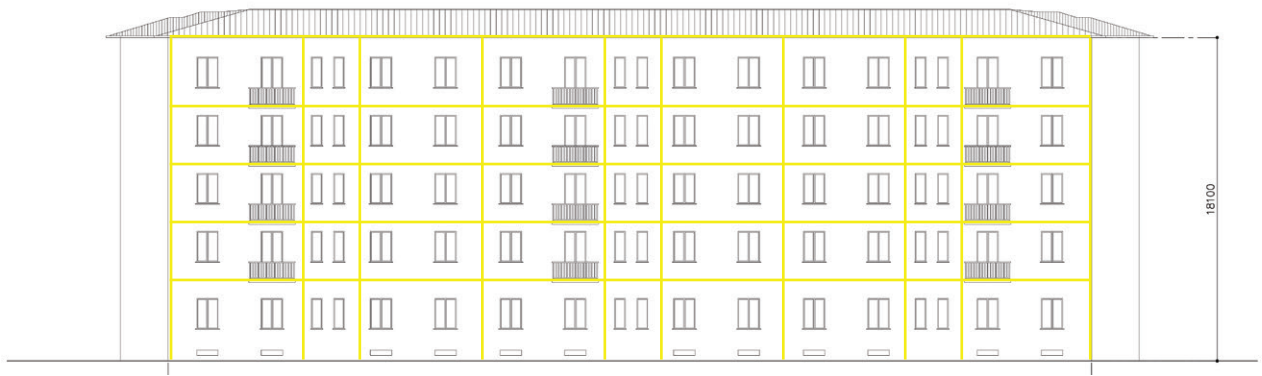


Figure 55. Google current street view of Via Filippo Abbiati.

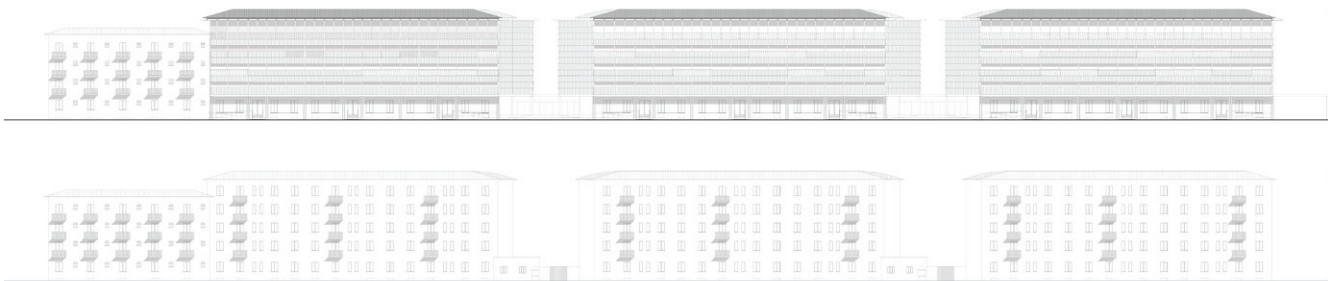
As aforementioned, the new interventions are developed according to the environment they deal with. On Via Filippo Abbiati, the main topics to be dealt with are the urban environment, connection to the street, and pedestrians (Figure 55). Two types of interventions are working here, the “entrance street” improves the complex entrance quality and provides extra balcony space on the lateral sides of the buildings in which could function as the observation deck for the inhabitation. Another is the “urban street”, on the ground floor the metal structures cover additional 1.5 meters from the existing wall, giving shade to the pedestrian. The angled legs are designed to support upper level and lateral force while creating unique characteristics to the structures (Figure 54). Commercial spaces replace the ground-level residences to open the front facade as public space, they are now accessible by stairs and handicap ramps in every door. On the upper level, the small balconies are removed and horizontal stripes of balconies are introduced. The facade design experiment with repetitive structures installed to every building but the pattern and architectural order are different. The street-side pattern is materialized by two main elements, transparent corrugated panels, and a thin metal railing. They are composed together and create shadow plays to the surfaces, the first-floor balcony is covered more to keep some privacy, it gradually less covers the top level which has only a sleek railing and row of small columns. The change of facades in each level demonstrates how the buildings finish with the ground, the city, and the sky.



(a)



(b)



(c)

Figure 56. (a) South Elevation, (b) Original South Elevation & New Structure Position in yellow, (c) New & Original Elevation



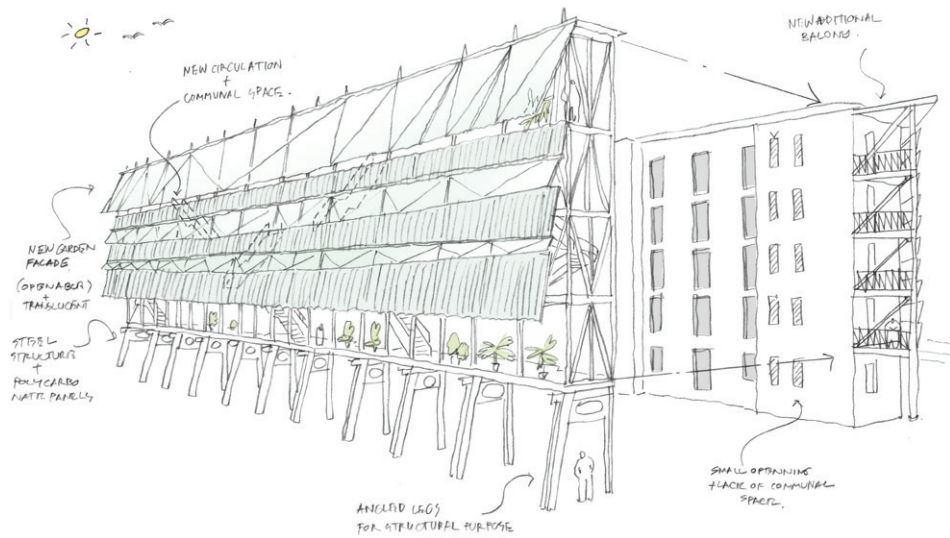
Figure 57. Visualisation of New Balconies

The new intervention structures are placed in a position that is carefully studied. They situate in between the existing openings because of the two reasons, one is to avoid unnecessary demolition for a sustainability point of view, and on the other hand,

to create urban continuity by respecting the scale, dimension, and proportion of the original design (Figure 52).



(a)



(b)

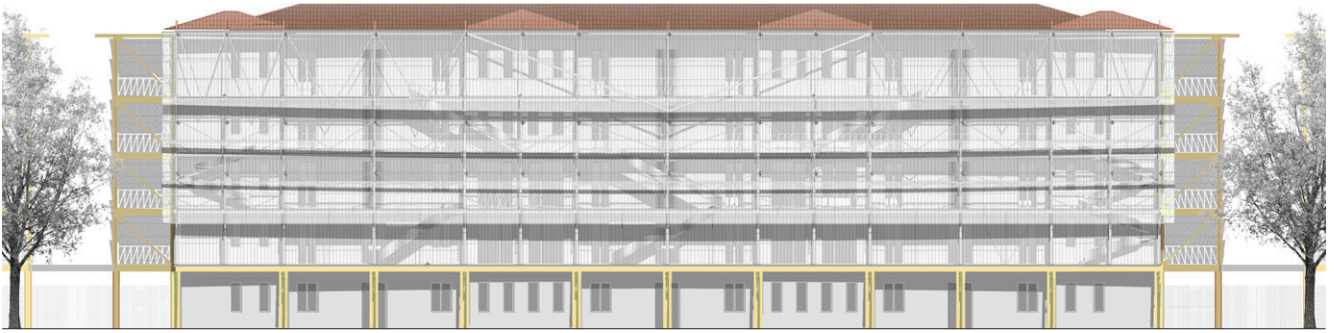
Figure 58. (a) Visualisation of New Urban Facade, (b) Sketch Idea

Garden Facade

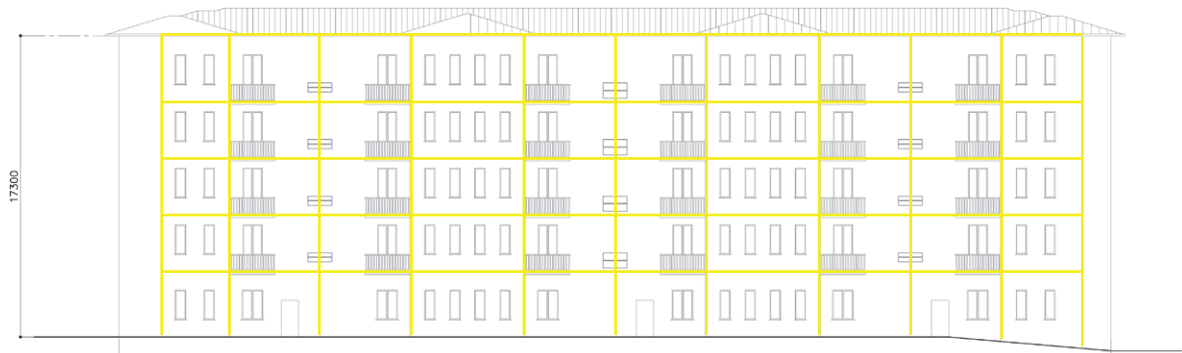


Figure 59. New Skin, Made From Corrugated Transparent Polycarbonate Panel.

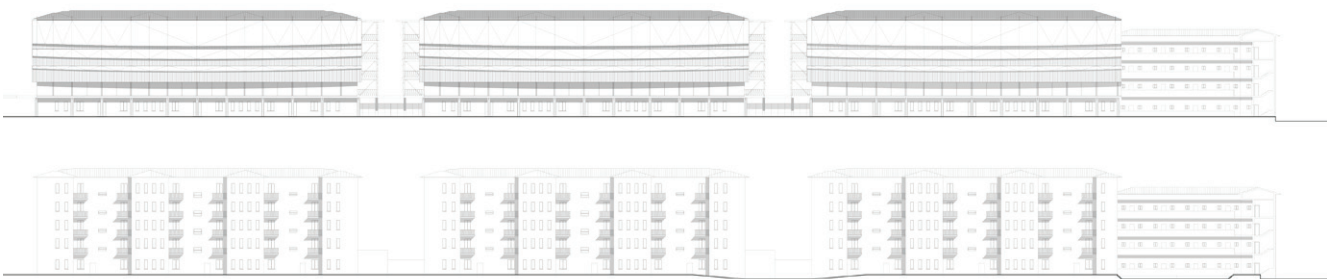
A different approach is applied to the other side of the project. Greenery, natural light, and ventilation are the major topics of this situation. On the street side, the facade dimension corresponds to the scale of surrounding buildings while on this side, the exterior has more freedom to explore the expression of abstract form. Since the interventions are installed in the whole complex, it is very important to be concerned about the form that is gentle but substantial enough to deal with the scale of the inner courtyard. In order to domesticate the overall elevation, the design of the facade resulted from contracting the exterior proportion by extending the structure from the second floor, leaving the ground and the 1st floor behind it. The outcome is elevated horizontal bands floating around the complex with the lower parts working as the small domestic buildings perceived from the pedestrian (Figure 58, 60). Following to other sides, the ground level is left entirely free, it becomes a canopy of inhabitation's entrance embraced with small welcome gardens as the continuation of large greenery in the courtyard. The skin is made from a transparent material (Figure 59) refreshing the look of the original building and providing visibility from the outside. Activities and mobilities inside can now be seen among the inhabitants giving the place to be more alive. The new surfaces could be openable starting with two ideas, the first is the expression of facade abstraction, the pattern of facade could be alternated by the inhabitant's choices of skin opening. The second is the adaptability to climate, in the hot season, it could breathe and get ventilation while in the cold season, it could collect the solar heat as it works in the agricultural glasshouse.



(a)



(b)



(c)

Figure 60. (a) North Elevation, (b) Original North Elevation & New Structure Position in yellow, (c) New & Original Elevation



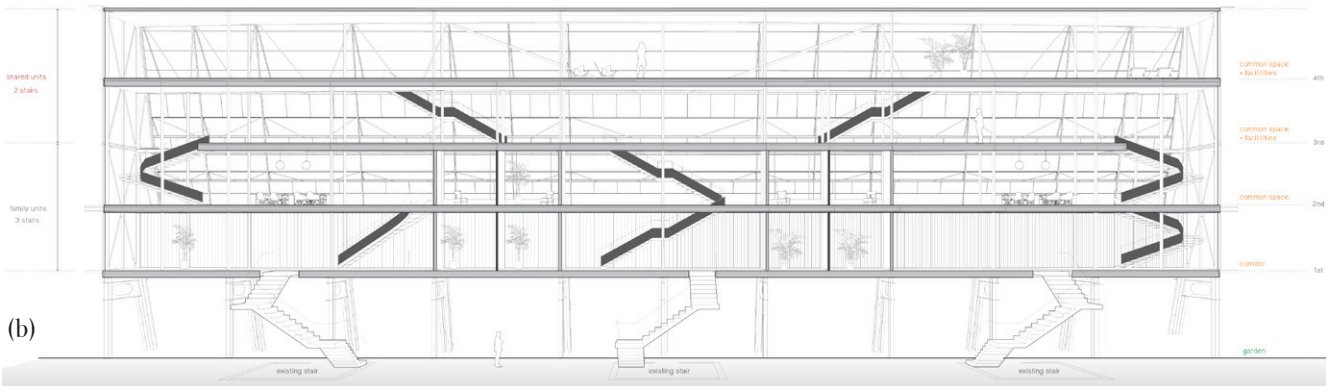
Figure 61. Visualisation of 2nd Floor of Street In The Sky.

The image demonstrates how the interior of the garden facade works (Figure 61). The space is enlightened with natural light giving higher quality to the space, the corrugated material provides the filtered illusion to the view creating more abstract quality to the

space. The openings are structured by diagonal metal rods in reason of the stiffening of the frame and presenting abstract quality (Figure 60).



(a)



(b)

Figure 62. (a) Visualisation of 3rd Floor of Street in The Sky, (b) Circulation Diagram

Communal Space & Circulation

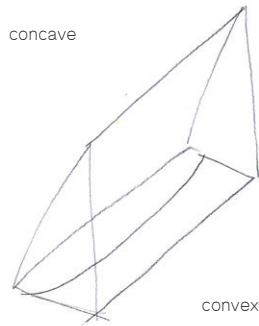


Figure 63. Street In The Sky, Geometry Diagram.

The “Street in the Sky” on the garden side is the key element of this project, it was made to solve the problems of the original building such as limitation of space and the disconnection between inhabitation while proposing the alternative way of living as co-habitation. The existing plan is designed to accommodate 3 individual residential buildings, they share the same structures but are cut off in terms of function (Figure 14). On the ground floor, the original stairs are kept and work as per the previous condition to free the new structure off the ground. From the 1st floor to 2nd Floor, the intervention is equipped with new 3 stairs in the brighter and vibrant space, they lead to family types unit of each story. On the 3rd and 4th floors, the inhabitation changes to the co-living type, the stairs are reduced into two and connect the residence from one end to another, they are now working as one unified building (Figure 62, b). The entire new spaces are dedicated to semi-outdoor communal spaces, used for leisure activities, reading, eating, working, and socializing. The geometry of the new space is designed to support those functions, it is composed of two connected parts, a convex corridor as the horizontal circulation and a concave corridor for the greenhouse and vertical circulation, both are covered by vertical tapered volume (Figure 63). The shape gives a dramatic effect to the interior spaces, the row of columns are slightly moved from different angles, the convex floor suggests the activities to share in the center area. Natural light can pass through the perforated floor in the concave parts, providing maximum brightness to the entire building (Figure 62, a).



Figure 64. Visualisation of 4th Floor of Street In The Sky.

The opening skin is gradually enlarged on each floor, starting from the 2nd floor as 0.60 meters height striped openings, 1.5 meters on the 3rd floor, and 3.5 meters on the 4th floor. The design allows residents to have different experiences when they

move through the building. Pavilion-like space is created when the skin is opened on the last floor. The construction detail is repeated on each floor by metal structures and prefabricated concrete planks together with corrugated polycarbonate panels (Figure 64,

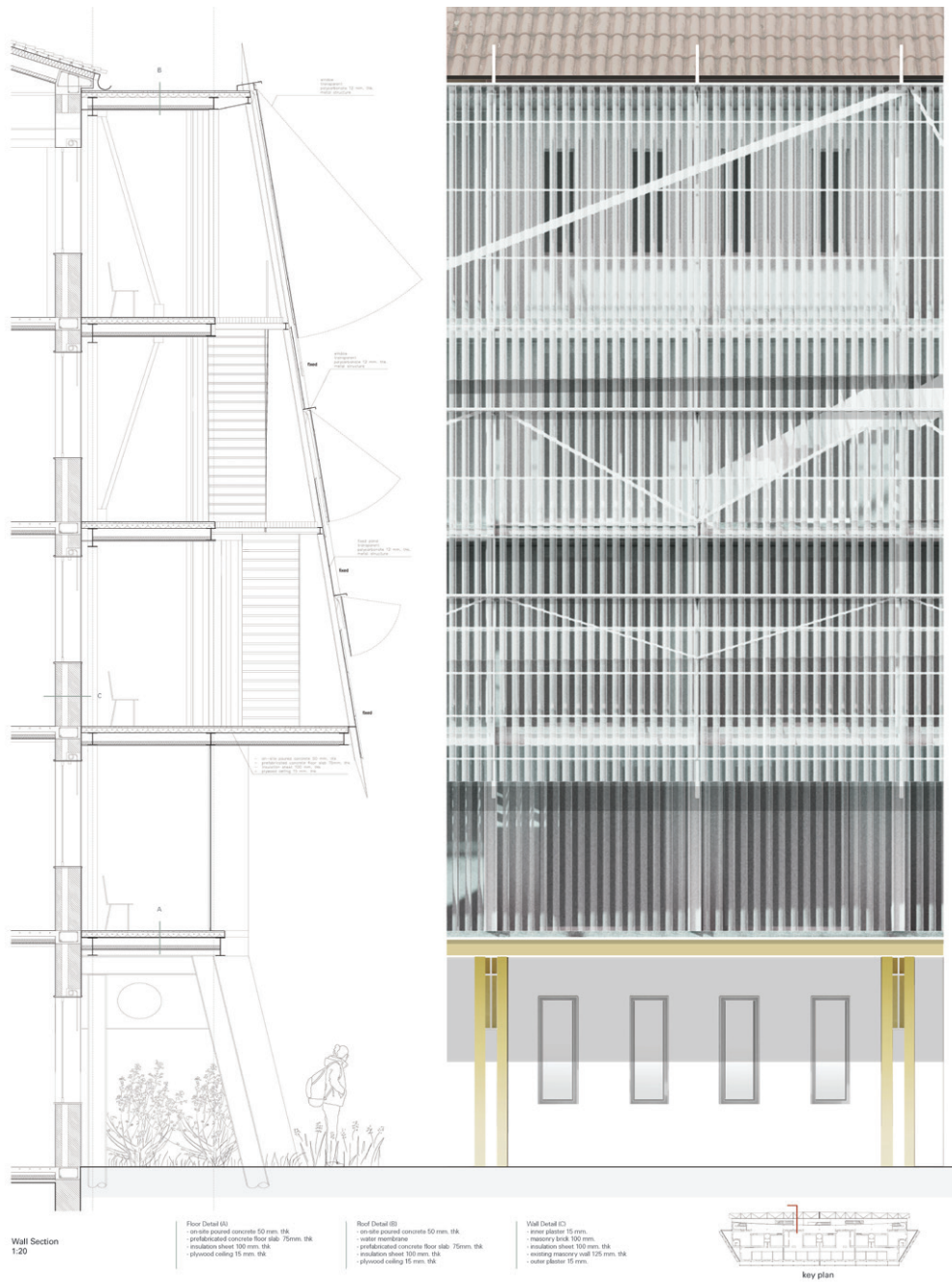


Figure 65. Wall Section of Garden Facade.

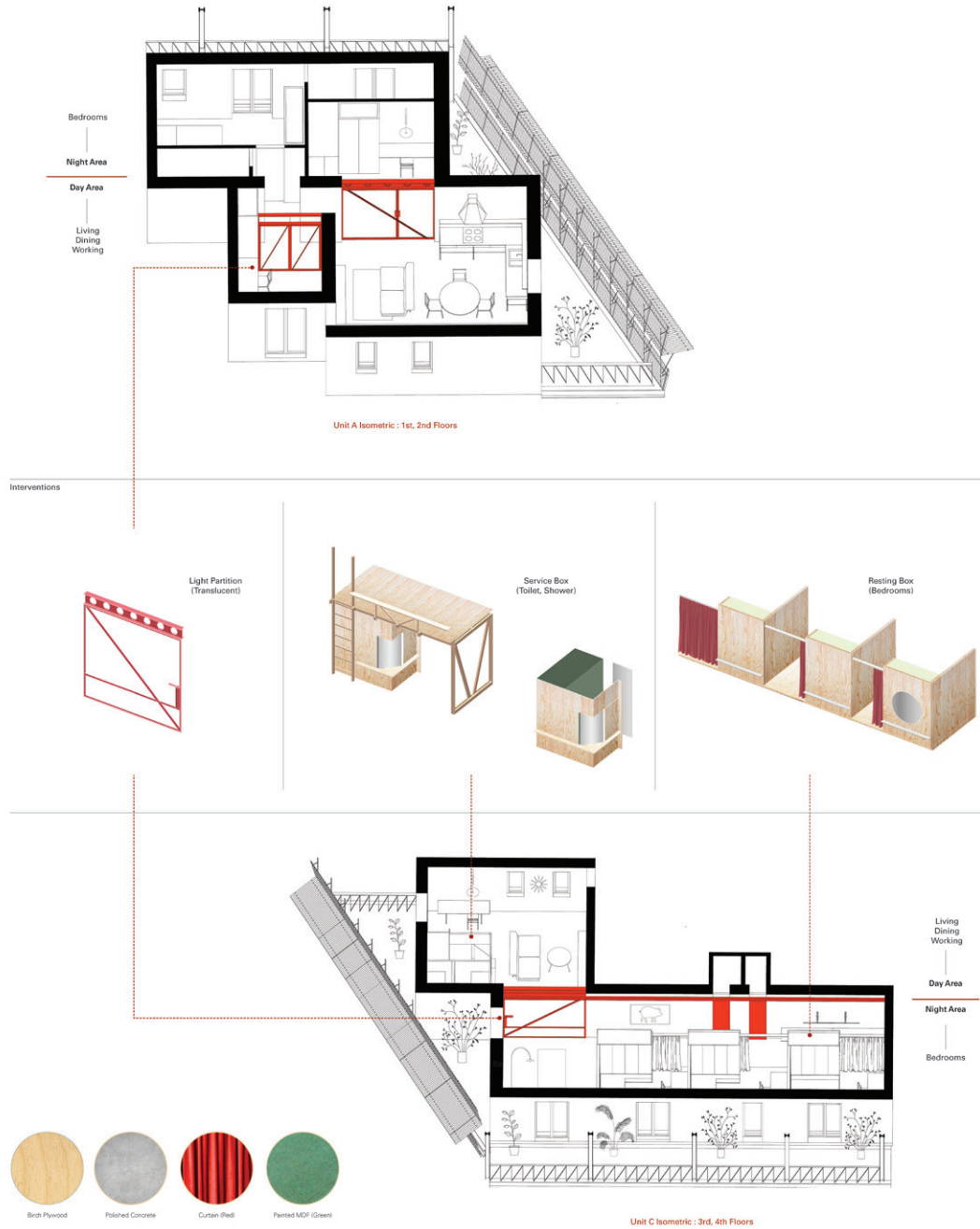


Figure 66. Intervention Idea For Interior.

Interior & New Boundary

Following a similar idea of the exterior intervention, the interior idea attempts to give better connectivity and flexibility to the inhabitants. The crucial element of the building is the central walls, they divide rooms into two separated sides as shown in the original drawing (Figure 67). In order to expand the possibility of planning, the larger openings were made on the wall and consolidated by a steel structure. The intervention allows better flow between two sides, the first side is a “day area” composed of living and dining spaces, the second is a “night area” composed of bedrooms. The opening is installed with a large translucent movable partition made from semitransparent glass on metal-framed, it provides the extension of each area according to the needs that change faster nowadays. The project developed two rooms, one is the family type from the 1st and 2nd floors and the other is the co-living type from the 3rd and 4th floors.

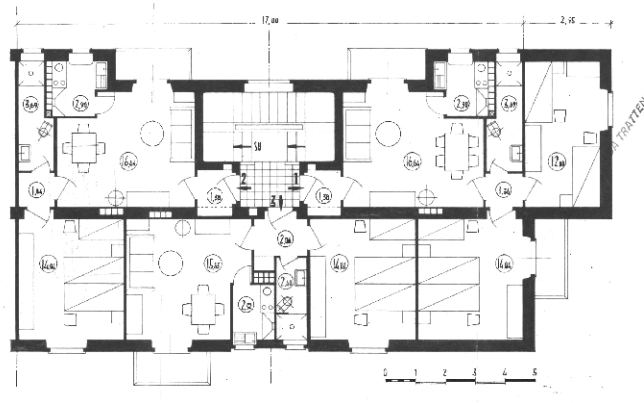


Figure 67. Original Apartment Plan.

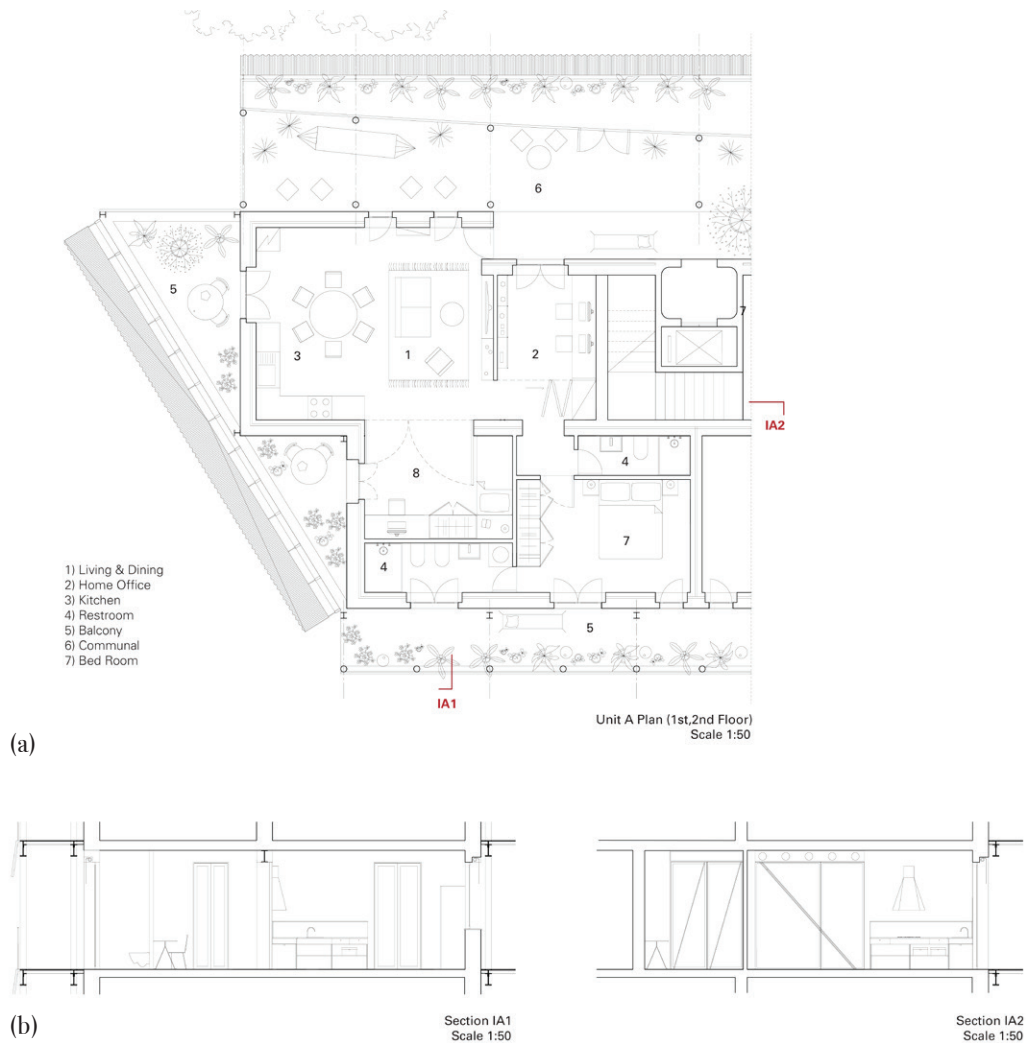


Figure 68. Family Unit Drawing, (a) Plan, (b) Elevations

The Family units exploit the intervention by connecting the living room with a small bedroom, it gives the possibility to turn the bedroom into other functions such as an office or a small lounge thanks to the full-length opening (Figure 68, 69). Due to the

current situation that people are obliged to work from home occasionally, small office are added with separated entrance, allowing the smart working and meeting area to be without disturbing the living unit. Again, a movable partition is here to expand the pos-

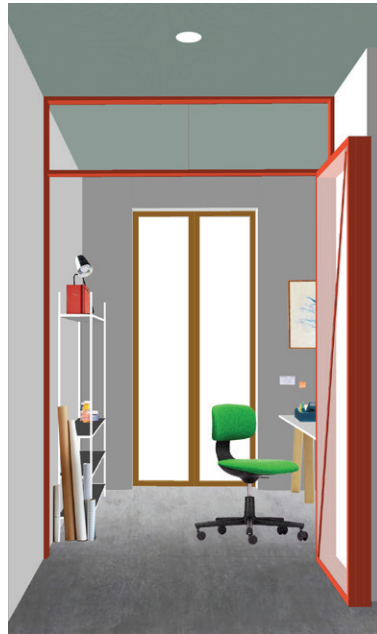


Figure 69. Visualisation of, (a) Additional Office, (b) Living Area.

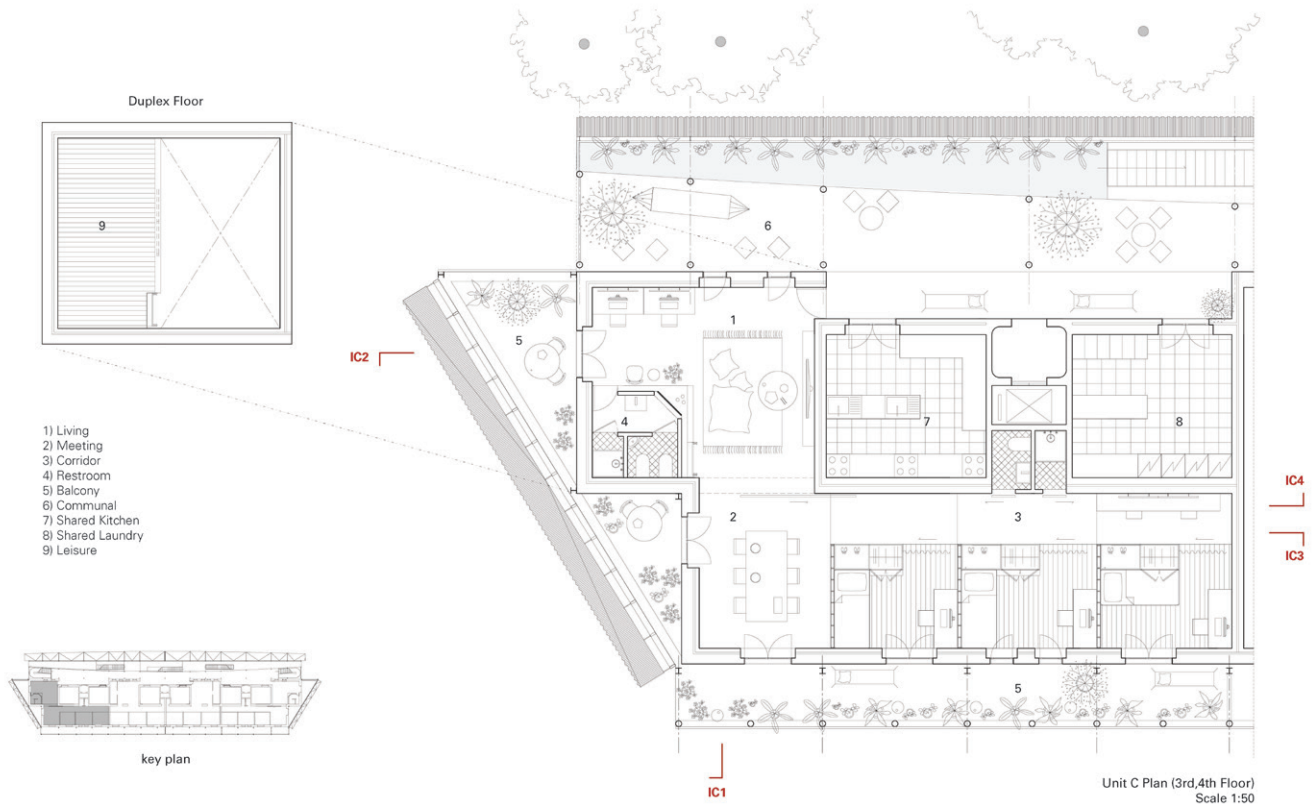
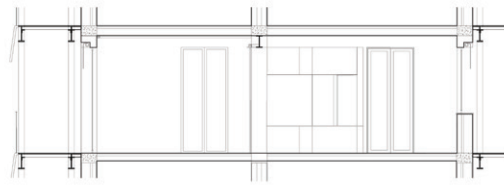


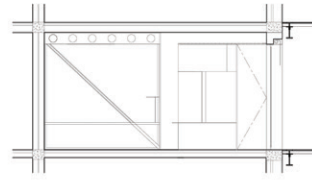
Figure 70. Co-Living Unit Plan

The “Co-Living Unit” has other interventions to support co-habitation (Figure 66). In the day area, “Service Box” is installed to accommodate the toilet and shower room, it is made from the wood structure and plywood finishing to domesticate the living environment. In the duplex type, the service box also works as a

structure for the mezzanine floor. In the night area, “The resting box” is constructed to provide 3 separate sleeping rooms. They are partitioned by plywood furniture and fabric door entrances. Built-in furniture is designed to be used from corridor and bed sides in order to optimize the function (Figure 74).

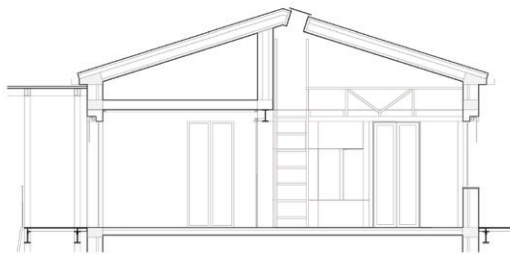


Section IC1
Scale 1:50

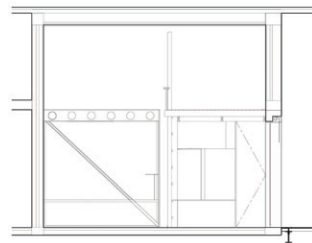


Section IC2
Scale 1:50

Day Area

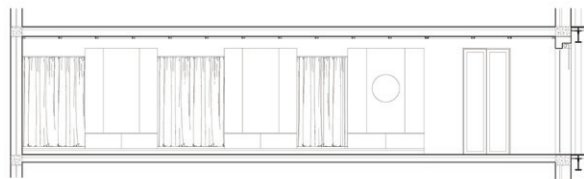


Section IC1 (Duplex)
Scale 1:50

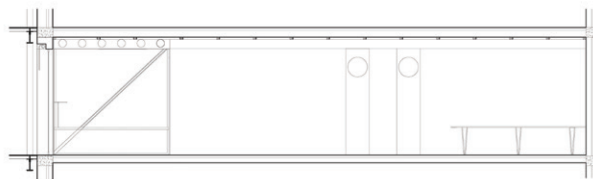


Section IC2 (Duplex)
Scale 1:50

Night Area



Section IC3
Scale 1:50



Section IC4
Scale 1:50

Figure 71. Elevations Day Area & Night Area



Figure 72. Visualisation of Living Area, Service Box and Light Partition (Opened & Closed)



Figure 73. Visualisation of 1st Floor Street In The Sky.

The light partition works in this unit in a different way by the default of different functions. Day and night areas become seamless with full-length sliding doors, the working area can expand to the living area to support more people activities (Figure 72).

The cornered balconies made possible by the “entrance street”, provide large outdoor spaces for leisure and service purposes. The facade could be opened at eye level giving ventilation and view to the inhabitants.

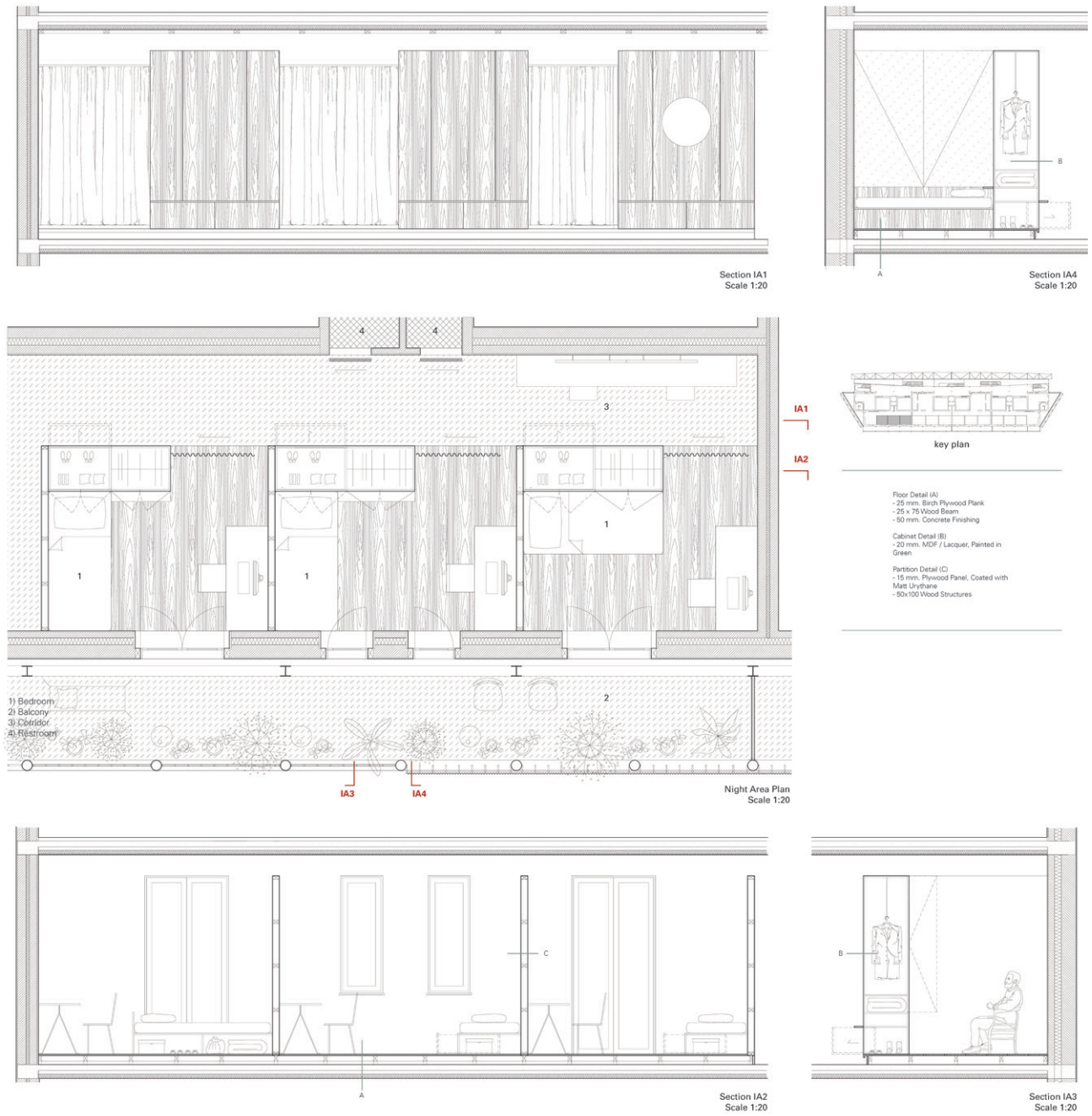


Figure 74. Detail Drawing of Resting Box.



(a)



(b)



(c)

Figure 75. Visualisation of Night Area (a) Corridor, (b) Sleeping Area, (c) Resting Box

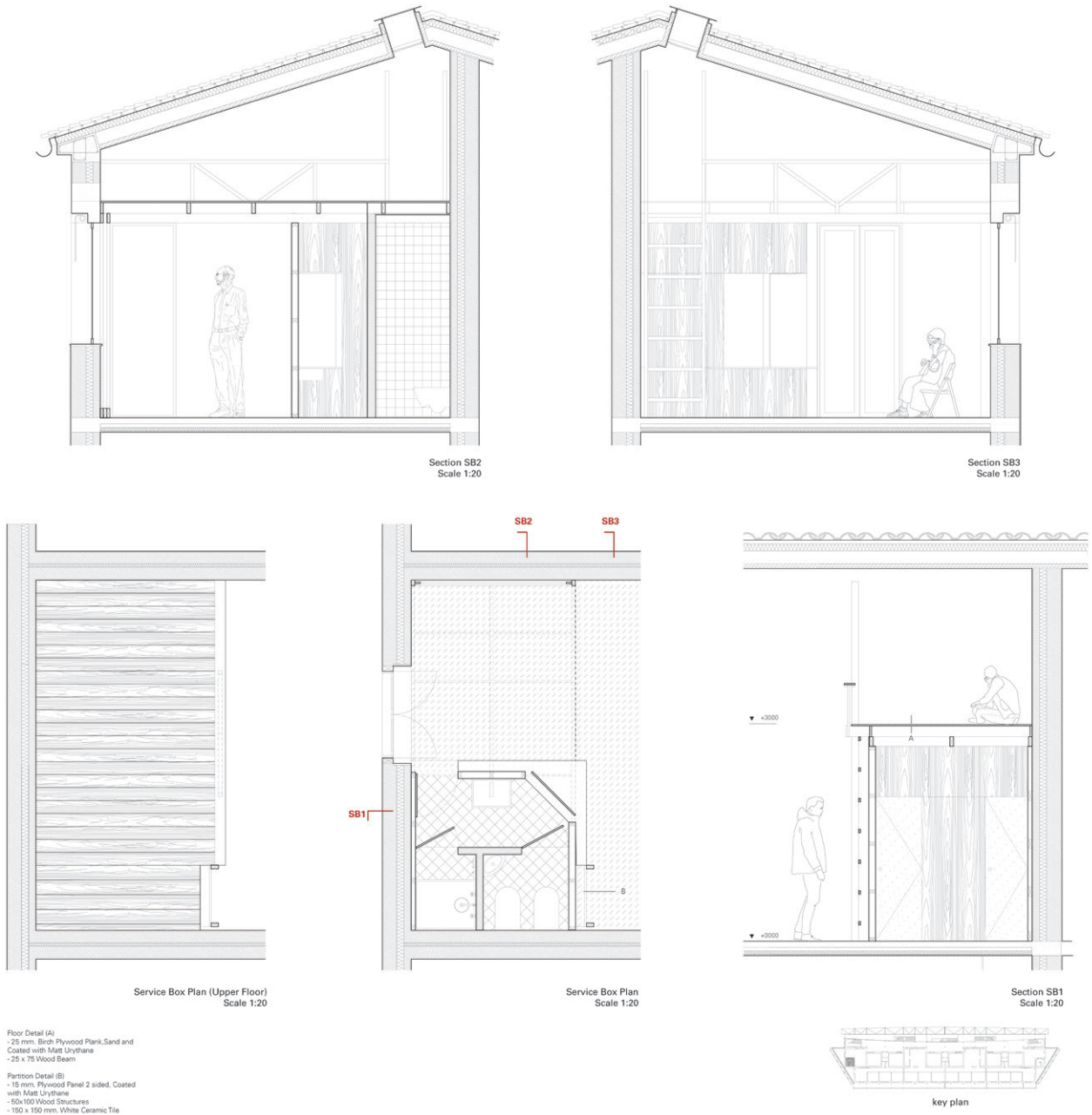


Figure 76. Detail Drawing of Service Box in Duplex Unit



Figure 77. Visualisation of Living Area in Duplex Unit.

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