POLITECNICO DI MILANO - SEDE PIACENZA

MASTER THESIS IN ARCHITECTURE

SUSTAINABLE SOCIAL HOUSING

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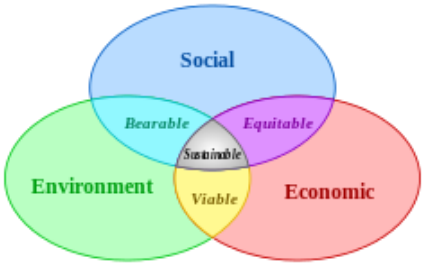
1.GENERAL

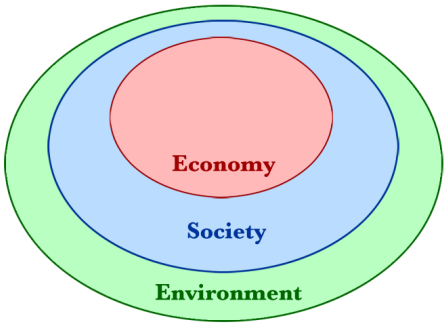
The title of the Thesis project is giving us the idea of the two main development directions on the whole project, namely sustainable and social. These two words are main issue for our society in present days as well as the near future. But let's try to give a clarification on what exactly is "sustainable" and what exactly is "social".

Sustainability in a general sense is the capacity to support, maintain or endure. Since the 1980s human sustainability has been related to the integration of environmental, economic, and social dimensions towards global stewardship and responsible management of resources. In ecology, sustainability describes how biological systems remain diverse, robust, and productive over time, a necessary precondition for the well-being of humans and other organisms. Long-lived and healthy wetlands and forests are examples of sustainable biological systems.

Sustainable ecosystems and environments provide vital resources and processes (known as "ecosystem service"). There are two major ways of managing human impact on ecosystem services. One approach is "environmental management" this approach is based largely on information gained from educated professionals in earth science, environmental science, and conservation biology. Another approach is management of consumption of resources, which is based largely on information gained from educated professionals in economics.



Euler diagram of sustainable development: at the confluence of three constituent parts



A diagram indicating the relationship between the three pillars of sustainability suggesting that both economy and society are constrained by environmental limit

Human sustainability interfaces with economics through the voluntary trade consequences of economic activity. Moving towards sustainability (or applied sustainability) while keeping the quality life high is a social challenge that entails, among other factors, international and national law, urban planning and transport, local and individual lifestyle and ethnical consumerism. Ways of living more sustainably can take many forms from controlling living conditions (e.g., eco villages, eco-municipalities and sustainable cities), to reappraising work practices (e.g., using perm culture, green building, sustainable agriculture), or developing and using new technologies that reduce the consumption of resources such as renewable energy technologies.

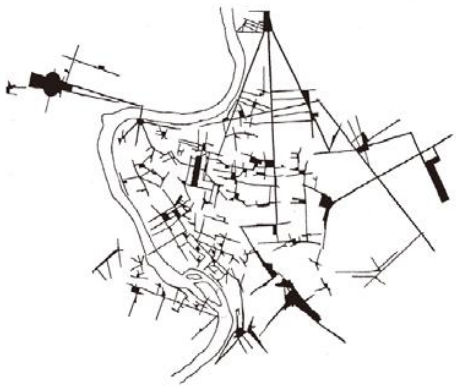
The term **social** refers to the characteristic of living organisms as applied to populations of humans and other animals. It always refers to the interaction of organisms with other organisms and to their collective co-existence, irrespective of whether they are aware of it or not, and irrespective of whether the interaction is voluntary or involuntary.
The housing is an "element" which will be discussed later in this thesis report.
Sustainability from architectural point of view could refer to several things. First and most obvious are the materials which are going to be used in a project. The criteria to evaluate one material is sustainable or not are a lot, but here it will be mentioned just a several of the such as: origins of the material,way of producing,transportation,resourceinvolve d to to produce that material, coast of maintenance and atc. So as much less resources are involved to produce one material so much the material is "sustainable".

Our cities today are the main consumers of energy and every year the population of them is growing faster and faster. And the problems are multiplying in parallel way.

A city is usually considered from the perspective of space, environment and place. From the morphology study of cities, a general approach by the academic would relate definitions such as axis, roads, monuments, voids and solids with the urban form.From the perspective of anthropology, a city consists of various settings, as different canvases for events.
The aspect which is more interesting herein is the fact that collective events would inter-act and shaped the city-form. Compared with an all a sudden event that only happened once in a time, collective anthropologic activities are continuous and enduring in time. There is a mutual and time-consuming process between the city and activities, instead of a simple front-figure and *background relationship*.

Louis Kahn considers that the origin of architectural form shoud be reflected from the aspect of *institution* and *convention, and only through the recognition and* revolution in the *institution of human, could there be new* forms. Since the autonomy of architecture depends on the autonomy of urban forms, would his comments also make sense when applies to city? Take medieval cities for example: from the technical point of view, most medieval cities works quite well because it was very difficult to do something awful at that time. Every artifact is constructed with stone hence every dimension is restricted by reasonable proportion and human measure. However, if we consider anthropology in the urban form, it would be very interesting to notice the bi-meaning of the word "church", as it could mean both the *building and the organization. This linguistic* phenomenon happens also for "chiesa" in Italian and "eglise" in French. The importance of churches in urban form is self-evident.

The hierarchy of the church system in urban form again reminds people their hierarchy in organization, but it is too hasty to draw the conclusion that they coincide. In the medieval society, Catholic power was the center of human activity and this centric role is universal for Europe. The role of Catholic events naturally should be public and very easy to be accessed by the people. At the same time the secular regime or power tends to be more local oriented, private and secondary compared with the Catholic. This might helps to illustrate the fact that the cathedrals and adjacent piazzas are always dominant in the urban form, and they form a system with small churches & piazzas together. This *church-piazza system* acts as cement to weave and adhere other pieces of city all together[1.2]. This mechanism is not only about the medieval city, but a long process before 19th century. This is very comprehensible, as religious dominance acted as the driving force in forming a hierarchic society, so does it in forming a organized urban pattern.



[1.2]Piazza systems of Rome. *Space is the Machine. Bill Hillier. P115*

Since religious space/place is very important in this scheme, it might be especially helpful to compare it with another dramatically different relationship in urbanism.

2.Social Organization and Urban Forms

2.1 Church and Parishes

The parish was from the Middle Ages until late in the nineteenth century the basic territorial unit in the organization of major Catholic countries. The geographical pattern of parishes was fluid, as large parishes broke up and smaller and poorer merged with their neighbors. In origin the parish was a unit of ecclesiastical administration and pastoral care. It was an area large enough in population and resources to support a church and its priest, and yet small enough for its parishioners to gather at its focal church, although this ideal was difficult to achieve and impossible to sustain. The basic units in Medieval societies are parishes and dioceses, which are crucial base for other social bodings and co-operations. This un-materialized zoning system as a hierarchy is never clearly articulated in a plan, but each parish has a group of public buildings as the focus of faith, and a spiritual leader as representative of the Pope.

For sure, the division of parishes has a secular basis, as was pointed out, "*The parish is the original secular division of the land . . . there were by no means origin ally churches and priests to every parish. These were things of much later introduction.*" *[ref.1 Toulmin Smith2]. And as the religious* order keeps growing, the authority of parish gradually replaced secular organizing system.

The reason for discussing some ideologies and organization strategies of the Medieval era is due to the fact that they have major impact on urban form and urban development. Therefore, it is impossible to explain the significance number of buildings for various religious rituals and activities without understanding the ideology hidden behind. After the decline of Roman Empire, the church became the only powerful and universal social organization. Theoretically the participation is voluntarily, but compulsory in reality. Being banished from the church is an extremely serve punishment even for the kings. Hence, even the smallest village has its chiesa. From urban to rural, the church was everywhere. The spire was the first thing that people could see from far away, and the cross was the last thing people could see in the end of his life. This universality was comparable or even stronger compared with the Roman system in the Empire era. The Catholic church in Rome enabled a shared ideal for each citizen regardless of his location. This universality, however, has stimulated the diversity between communities rather than hindered it. The church was a multifarious organization by itself, so did the religious buildings. These different usages and functions might be specialized later. Even in the poorest urban parish, the church was still the focus of the community, both in religious sense and in secular sense. One of the key elements in Medieval cities is the fact that church and communities are closely interrelated, for a shared ideal in Christianity. Although this connection itself lacks the articulation of Christianity, it still has provided a basis of ideology for other related organization and artifacts. For instance, markets were organized under the protection of church, usually once or twice a week. This explains the location of these marketsare even now adjacent to the major duomo churches.

This again partly contributes to the relationship between
major churches, major piazzas and major economic places.
Talking about the relationship between sociological behavior and
urban/architectural forms, lazy observers try to understand it only through seeing pictures, or through the plan attempting to find connections between blocks and axis. Without observation of anthropological or sociological behavior of the city, even the appreciation of city's aesthetic value would be difficult. The key element about the physical setting of a city, especially those Medieval parts, lies on the understanding of collective rituals and marches, *inside* the city. Dramatic religious marches used to happen in various parishes, streets and valleys, eventually entering chapels or cathedrals for the climax of religious ceremony. There is no static building, nor static street.
With the movement of subject, the scenario in front of people's eyes keeps changing. When approaching or leaving the buildings, they enlarge, shrink, distorts and disappear. They are mutually background and front figure. Even a few steps would change dramatically the relationship and proportions. The profiles of buildings integrate with each other, forming a continuous space experience for the continuous religious ritual process.

2.2 the Changing of Social Patterns.
Compared with the universal attention for Catholic
church, the secular communities in Medieval era was based on social class and hierarchy. Individual, no matter
if he was banished by the church or not, would be on the edge of death. As long as one need to survive, he had to belong to a certain group. In this case, apart from the church, the most common case for a secular group was the guild.
The guild was a quite universal group as well, it controlled and organized the economic situation inside.

[2.1.2]14th-century Marseille (France) showing districts and neighborhoods. Not all of the neighborhoods are shown. Drawing by Miriam Cox, based on maps in Smail (2000:46–47, 172–73).

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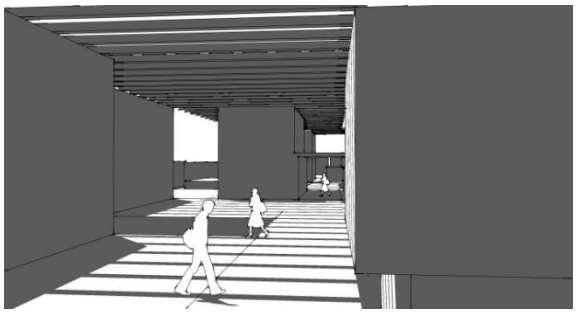
The guild was a quite universal group as well, it controlled and organized the economic situation inside a town. The selling condition was adjusted according
to market information and consumers were protected from unfair trade. The local economy was protected in this introvert system and ensured that they would not
break under external forces. On the other hand, the guild is also an organization of craftsman and workers. This organization went hand on hand with the social order
of Medieval cities. After 16th century, once differences between the rich and poor was enlarged and incomes of different social classes varied dramatically, a invisible
barrier was formed. This kind of barrier gradually became even more important than the *shared interest* between the citizens and the *protective boundary of the city,* which exactly was the basis for the organic composition of the Medieval cities. This social transition was actually quite subtle yet very important for us. Although the Medieval society was relatively conservative compared to our society now, the relationship within the family was actually quite open, as a habitation unit. Not only were blood-based relatives considered as family members, so were the employees and servants. This applied to several social classes. Apprentices lived in masters' apartment, treated as a family member. In this relationship, a same room was used as working place and dining place in the day time, as bedroom during night, even praying place when necessary. Nowadays this might only happen in some very small shops and craftsman's houses. In Medieval times it was the usual case. As far as we know, Michelangelo used to sleep with other craftsmen in the same room, or in the same big bed, even in his time of *il Rinascimento. This social pattern of sharing space* inside the apartment, however, was undergoing a subtle change. In 1362, William Langland mentioned in *Piers Plowman that the gentlewomen no longer shared dinner* or entertain with other servants together, they started to prefer enjoy their dinner alone, in a private space. This could be envisioned as a signal of the cruel exploit, as once you can not directly see the object, it becomes much easier for abuse.

As mentioned before, movement of people is a key element for the city. In the book of *Space is the machine[4]* by Bill Hillier, he even considers the movement of people is the driving force in shaping the city form and closely related to the security condition of a urban space: Bill Hillier analyzed an example of housing estate, in which the open space is not secure and has many problems. It could be seen from Fig. 3.1.5 that the area is pretty much a stagnant pool from the general connection of the city. The lighter the grey color, the less movement is expected. Although it seems to be a quite normal solid and void relationship with the city. The real situation is quite different. The author is summary is clear:

...We can now see that the formula for urban safety must depend, for simple numerical reasons, on the presence of strangers as well as inhabitants, and is therefore a little more complex than 'defensible space'. We need to replace a static conception of space by a movement-based one. The main idea behind defensible space was that inhabitants who were static and in their dwellings had to be put into a position, by design, to have natural surveillance of the spaces leading to their doors in order to see and deter potential wrongdoers, who were strangers and moving. Our results suggest that what really happens is that the natural movement of moving strangers maintains natural surveillance on space, while the static inhabitants, through their dwelling entrances and windows, maintain natural surveillance of moving strangers. This formula clearly depends on the spatial configuration creating a strong probabilistic interface between inhabitants and strangers. In short, it is the mix of inhabitants and strangers in space that is the source of safety. Environments will tend to lack of safety and environmental fear to the extent that they separate the two. Put more succinctly, the formula for urban safety is a certain aspect of the structure of the virtual community — that same scale.



Sustainable Social Housing by Lyubomir Bashov

Fig. 3.1.6 Figure ground of space of the housing estate in Barnsbury. Space is the Machine. Bill Hillier.

Fig. 3.1.5 Global integration of housing estate within its urban context. Space is the Machine. Bill Hillier.

...In this estate, as in most others, entrances only occur on certain lines, and most of these are relatively deep from the outside. Each line will have perhaps ten or twelve dwellings opening onto it, and it will be connected to the outside not by other lines with dwellings opening onto them, but in general by lines without dwellings. In other words, even lines with dwellings will only have the movement on them generated by the dwellings themselves.

p.146 Space is the machine. Bill Hillier

Bill Hillier obviously holds the view that for sure bad design would result in bad space and bad urban conditions. The problem of this estate is quite common for all similar settings in the close-gate communities and other types of space which are similar although not clearly defined. One could see that the structure is damaged although one urban cell still has the "small pieces" to sustain enough surface/volume ratio. In the case of life cell analogy, the cell membrane is not only an abstract surface to separate the two, but also a permeable membrane to allow and provide a place wherein both sides could inter-act effectively. Hence, the problem about permeability is on two scales. Firstly, the open spaces left by the voids should be distinguishable and mutually permeable. It means that those open spaces without integrating with each other in the city would be of low quality and possibly, of high crime rate. Notice that Camillo Sitte once considered that a picturesque effect could be obtained if one record the passage routine of a person in a medieval city. The gradually unfolding curved street view is actually a continuous landscape(Fig. 3.1.6, Fig. 3.1.7). This tradition is haunting Le Corbusier when he wrote the *Law of Meander.*

Fig. 3.1.6 The Street of Lubeck (Camillo S i t te. De r Sta d t b au nach s e i n en kunstlerischen Grundsatzen, Vienna, 1889)

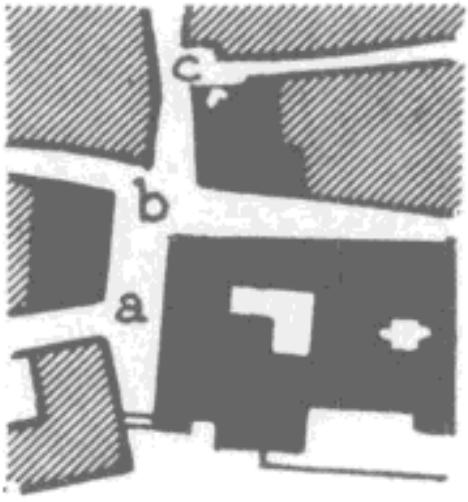


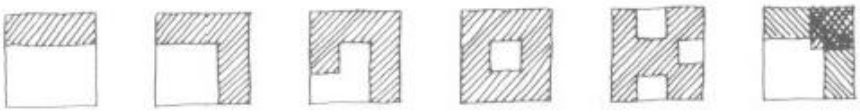
Fig. 3.1.7 street view from different points. (Camillo Sitte. Der Stadtbau nach seinen kunstlerischen Grundsatzen, Vienna, 1889)

Fig. 3.1.8 Amsterdam, Workers' life in 19th century. (From Herman Hertzberger. Lessons for Students in Archtiecture)

However, one might neglect a prerequisite: the existence of the picturesque strolling of pedestrian and the appreciation of the urban cape requires a fact that this routine should be there first, and there should be no dead end for a path. It means the urban space is permeable in a organized order. This is of no doubt for Roman cities or Medieval cities, when the religious procession happened inside the streets, as mentioned in chapter 1. Once this activity no longer exist, and the contemporary society enables people to have the home-working place point to point movement in a car, it makes the permeability of urban structure especially vulnerable.

Among the regular analysis of open space structure for the city and the reversed black and white drawing. It is interesting to notice that the cement which glues the two together is left unnoticed. The permeability of the interface itself is especially important in that if it is well organized, it allows active inter-action, if not, it becomes a separation. The commonly analyzed "street life" itself is a condition wherein it street surface has organized openings: windows and doors, the existence of which ensures the working of "street eyes" and the mutual activitys(*Fig. 3.1.8)*.

3.Historical development of housing plans



1

3.1.High-density low-rise

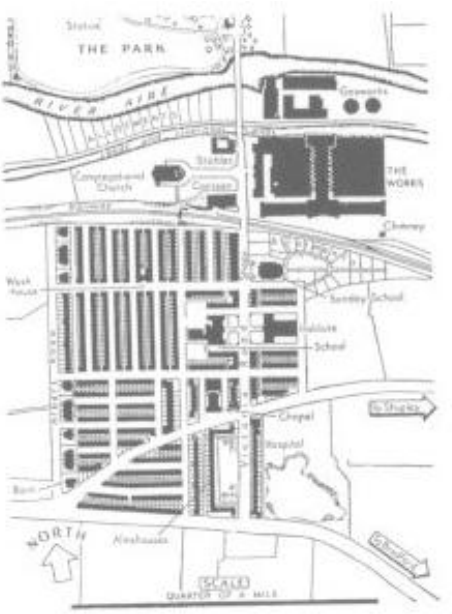
In the the following we use "High-density low-rise" to designate one – to three-story structures built in rows or other groups. One may define row houses as a succession of dwellings in linear ,staggered, or other form of addition – usually along the street. By grouping, introverted patio houses can also similar produced a flat-configured structures.

3.2.1850-1918: Urban misery and company-built housing developments

The historical development of row houses in Europe may be studied as a phenomenon closely connected with the growth of company-built workers' housing developments. And the small gardens could serve as important source of vegetables in time of need.

In the middle of the 19th century ,conditions In Europe were not propitious within cities for building company developments with gardens. As detailed in the famous book of Friederich Engles, "Conditions of the working class in England (1948),entire street sections on Manschester were newly constructed with back –to- back types,in small and dirty courtyards.

Between 1850-1863,Titus Salt,a manufacturer of alpaca wool ,built a rectangular, dense housing development in the open country side wihich futured such facitilies for the residential as a school,church,hospital,park and train station .



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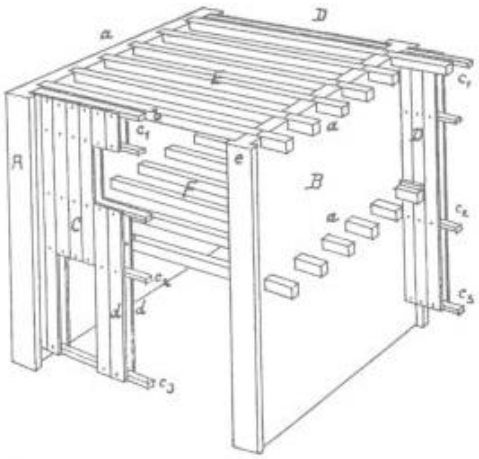
3

3.3. 1918-1945: "Building Economically"

Early in this century ,Peter Bahrens an H de Fiers published an influantial essay called "Building Economically" 1918, in which they advocated grouped configurations and back-to-back types in order to reduce property coast.In Viena ,Adolf Loos worked with a row house type economical by virtue of its structural design .He named his hoes "the house with one wall" and patented it.



3.4.Muti-story housing

Coast effective utilization of the expensive property in cities led to widespread construction of apartment buildings.This led to likewise cost-effective common access to individual apartments

1805-1933: Period of critical housing shortage

In European cities ,the 19th century represented the period of greatest overcrowding and worse housing conditions. The housing plans of this time reflected changing social structure .

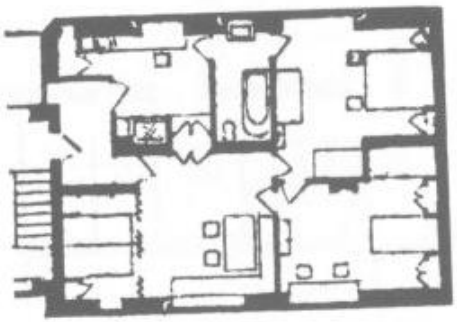
If one considers the multitude ot projects carried out in the 1920's the majority of housing-plan ideas were already developed by then.

Reconstruction in Germany was not able to commence immediately after the end of the Firs World War,a situation positive for development of new housing concepts.

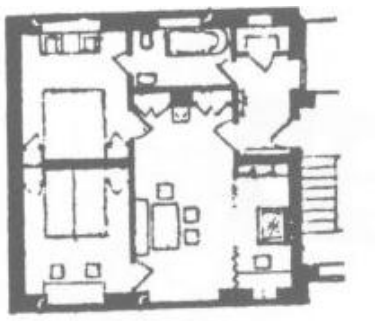
Clusture plans

Already in St Petersburge Klein had postulated his "…definite division of the rooms of an apartment into tree groups: for living,for sleeping and for functional activities.The family can then perform their functions in these groups without disturbance.

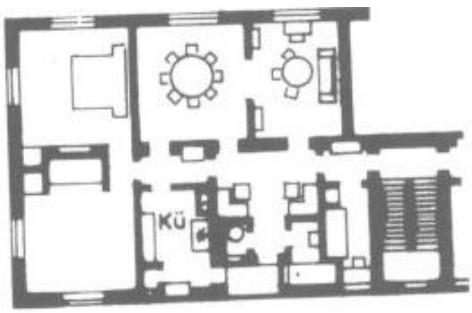
Klein's types provided the basis for great variety of further developments especially for the cluster floor plan.

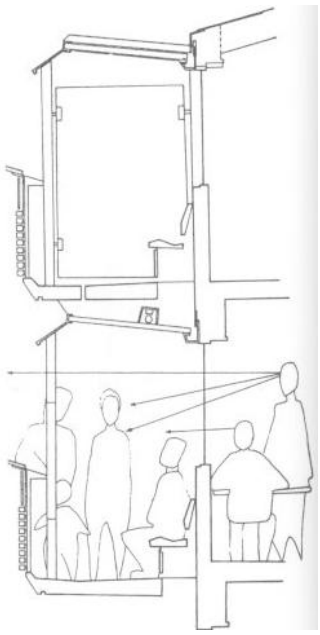


Acht Betten, 64 m²



Wohntyp I: Vier Betten, 43,6 m²





3.4.Muti-story and low-rise plans during the post-war period 1945-1955

Construction in the extensively destroyed European cities began again very during the first post war years..During this period devoid of ideas ,Le Corbusier built the Unite d'Habitaston in Marseilles form 1946 to 1952.The type realized here was originally intended as an urban-design element: with ten unitsLe Corbusier wanted to replace an entire city destroyed by the war .

1955-1965

The housing shortege had still not been overcome by this time.The need for fast production of dwellings led to industrial construction techniques.The period of major urban expansion began.

Prefabricated and large panel construction was applied everywehere . Posisibly inspired by the Unite in Marseilles ,the Interbau housing exhibition was opened in Berlin,in the Hansaviertel in 1957.High-rise apartmen buildings were placed in spacious green surroundings ,rows were configured fishbone-wise to their streets .

1965-1975

This period was characterized by major urban expansion and by construction of high-rise apartments and terrace buildings.A young generation of architects rejected the urban desigh approaches of Le Corbusier and further developed by Hasn Sahroun's idea of courtyards in large scale.

Angled –off ,staggered,terraced and rhythmically structured buildings characterized the image of apartment projects during this period.

Almost at the same time ,horizontal density also became a matter of involvement.During this period ,architects once again pursued Le Corbusier's and van der Rohe's concept of separating the supporting structure from the finishing elements .

1975-1985

Urban expansion was interrupted in favor of urban renewal.At the same time the labor costs in the prefabricated-component industry rose to such extend that conventional construction again became competative.The oil crisis of 1974 furthermore provided incentives for exploitations of natural energy from solar and geothermal sources.The combination of brick and overall thermal insulation became the preference for exterior wall construction. With influence from postmodernism,facede design attained new importance.

The main task during these years was to fill gaps between buildings left by the war-which left leeway for schematic conception of apartment plans owing to the strict constraints imposed by the surroundings. The same applied to the floor-plan orientation and building depth which played such important roles earlier .

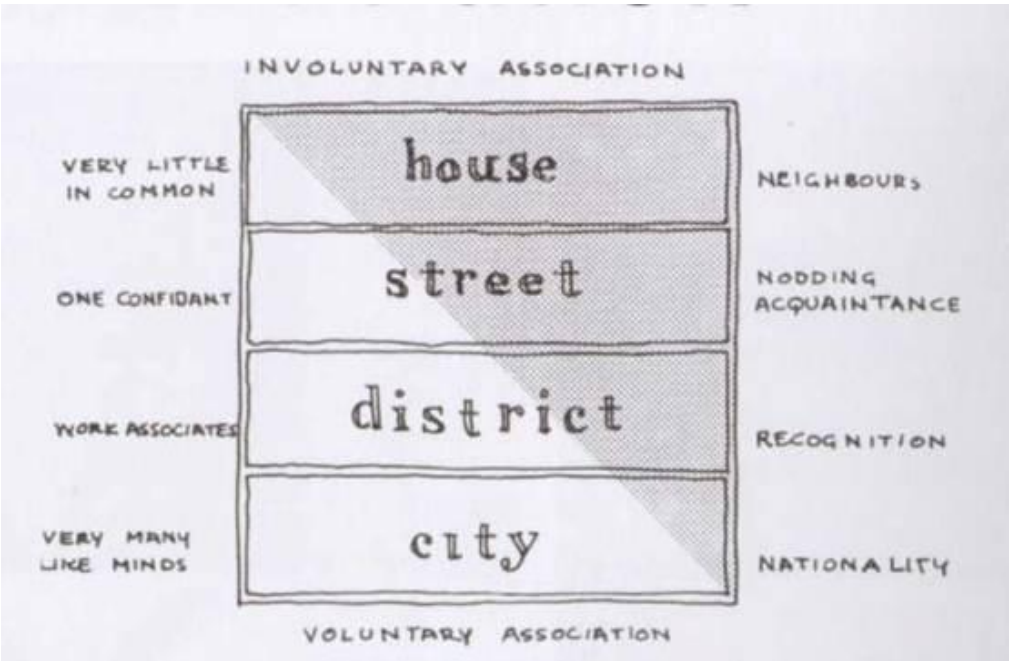
The " Internationale Bauausstellung" (IBA) conducted in Berlin before and after 1984 served as a model for these new trends.

During this period ,the row house-through widening of unit spacing, as well greater variety in types-became popularly accepted among the middle class. A number of low-rise communal-type housing models were realized during this period ,dwellings occupied by several families who wish to live under one roof.

1985-1995

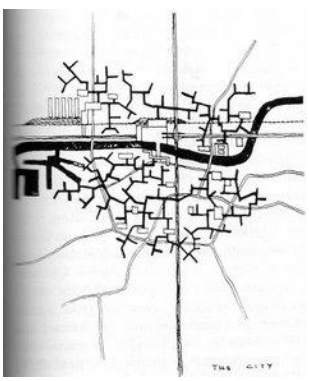
By now,gaps left by the war having been filled and urban renewal programs are practically complete.First priority has shifted to improving housing developments built between wars or after the last war.The attempt is made to combine small apartments built during 30's .And housing projects are again being built on the outskirts of the city .Multy-story apartment buildings now attain only moderate heights..Postmodernism has made it exit ,tha facede has been expediently designed ,and is generally no longer as important as the structure of the floor plan.Flexibilitiy became has become an essential factor in apartment plans,since it has become increasingly difficult to predict the type of the future tenants.

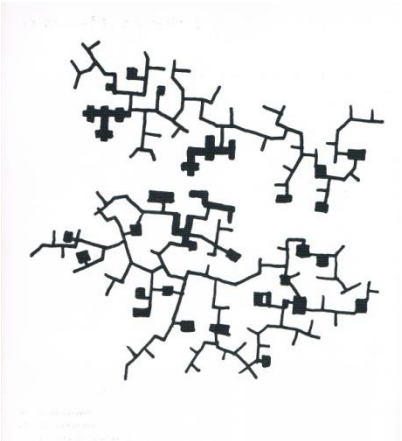
As a sequence of the previous research statements I would like to develop dipper the idea of TEAM X.Genaraly talking they defense the opposite idea of Le Corbusier namely everything is open from inside to outside .The way how they put the human interaction as a priority is the main issue which attract me to their theories.

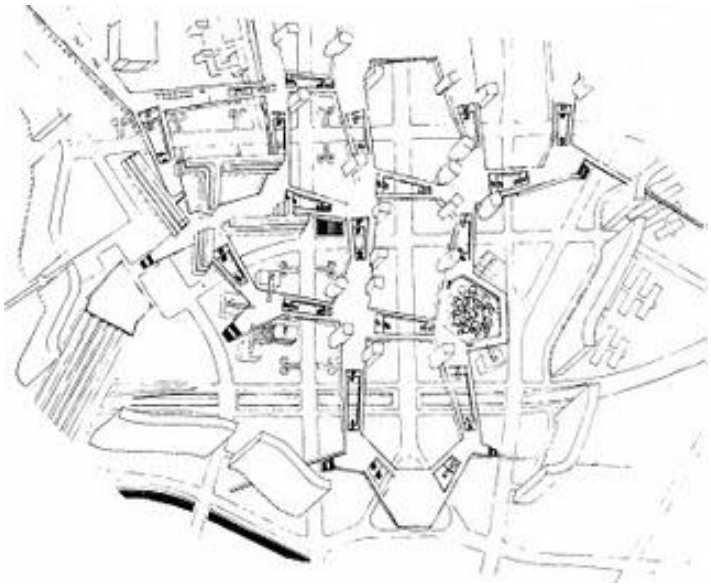


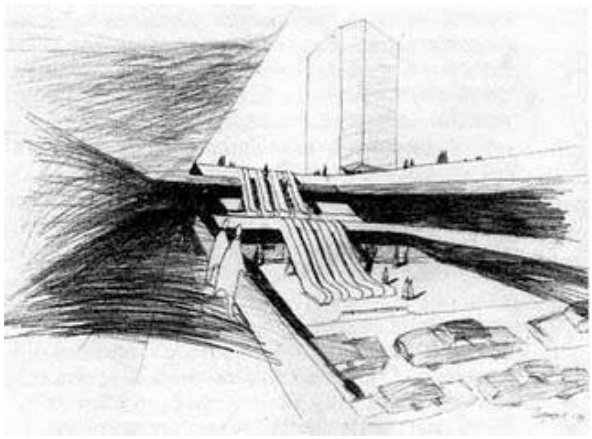
A & P Smithson, scale of association diagram Dubrovnik, 1956
House, street, district and city versus living, working, recreation and circulation

Cluster City. Diagrammatic Plan for a small City
1952-53
In this diagrams is obviouse the concept of taking everything from inside to outside even in the scale of entire city.

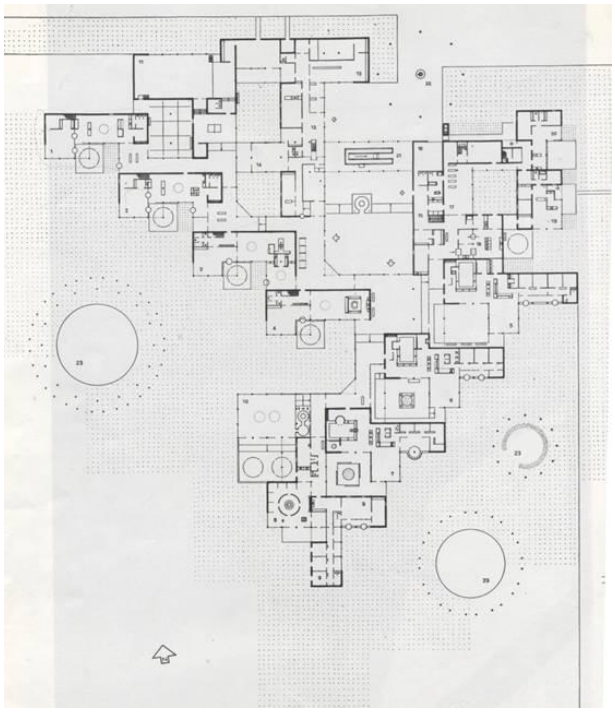


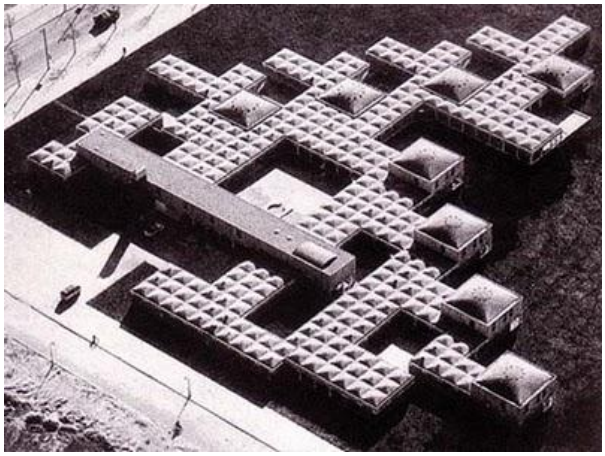


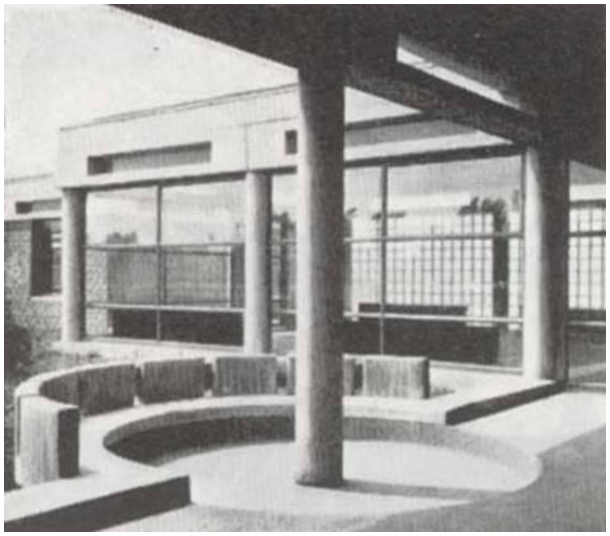




Alison+Peter Smithson: Plan for Berlin-Haupstadt, 1958







Aldo van Eyck, Orphanage, Amsterdam, 1957-62
"labyrinthic clearness"

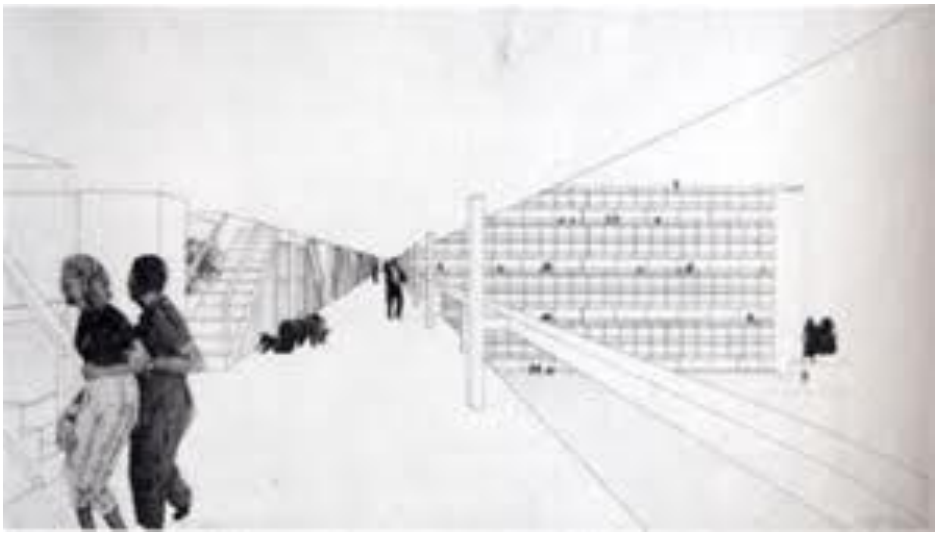
Jacob Bakema, Johannes van den Broek, Lijnbaan, Rotterdam, 1952-54

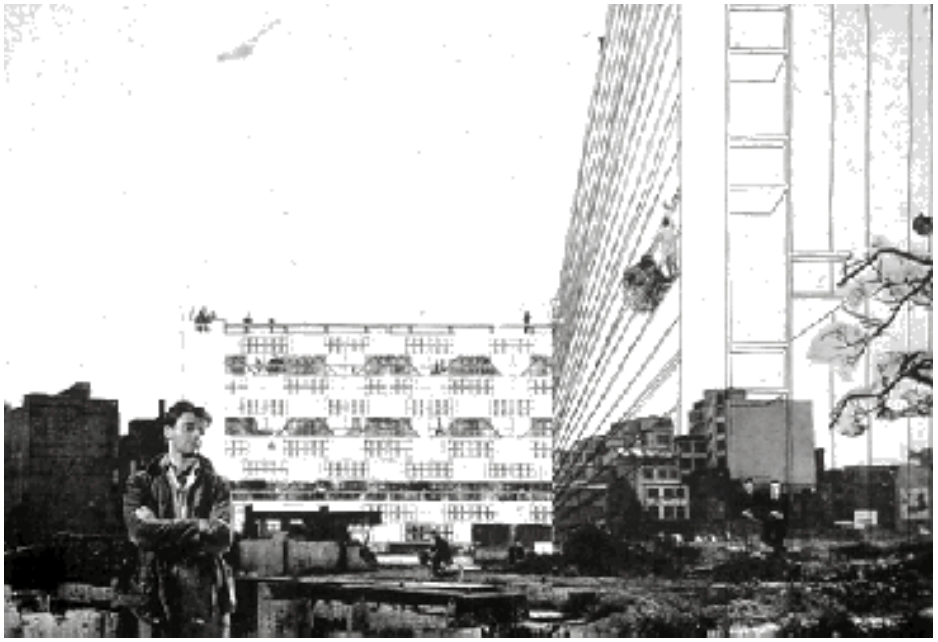
On this example we can see clearly the free pedestrian zone and the direct aproach to the buldings.Realizing a "live" connection between inside-outside.

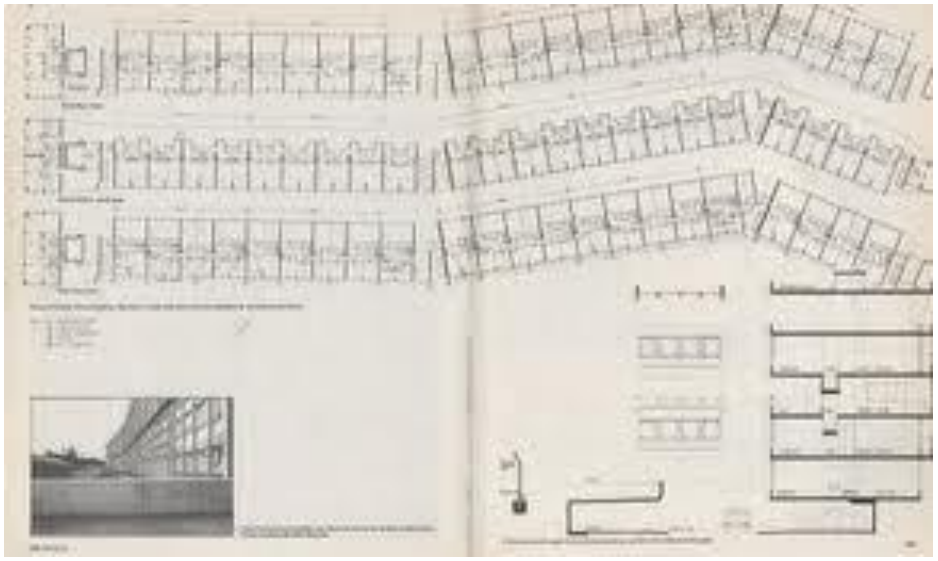
«Our intention has always been – consciosly since the Doorn Manifesto in 1954 – to turn architecture towards particularity…of place, person, activity: the form to arise from these…»

A+P Smithson, *The Charged Void*

The "Street in the air"
New spaces for aggregation







Smithsons, Golden Lane, London, 1952

Conclusion

Following the main concepts and ideas ot TEAM X I reach the conclusion that the interaction of the human being with each other and also with the surounding is extremely important for realy sustainable society.The social element of interaction and comunication is making the "body " of the society healthy.
Providing more open spaces allowing direct interaction,more visual connections the people use to feel close eachother.Example for this phenomenon is the comparison between one small village and a magapolis. We will notice totaly different way of comunication.In the small village everybody are like one family in the big city nobody nows his neighbour on next door.Regarding to that the crimes in a village are olmost 0% and this is incomparable with the mega-polis crime environment. This is just one of the positive elements if we follow these ideas and concepts.
Our society is in need of regeneration in need of humanization, we are starting to forget our origin.As a architects we are "key elements" in our society and we are responsible for the future sustainable development of it.

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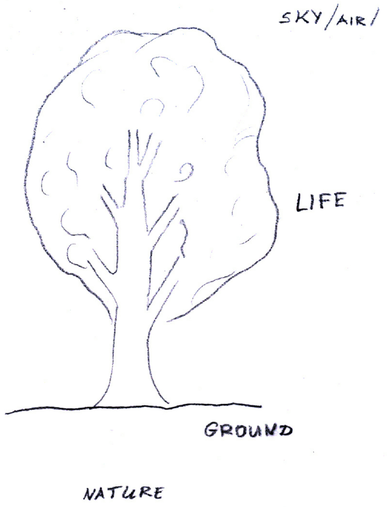
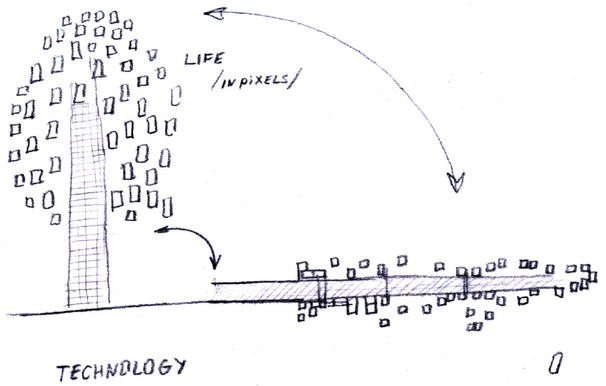
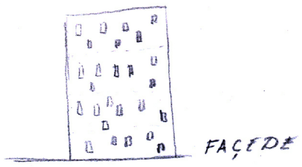
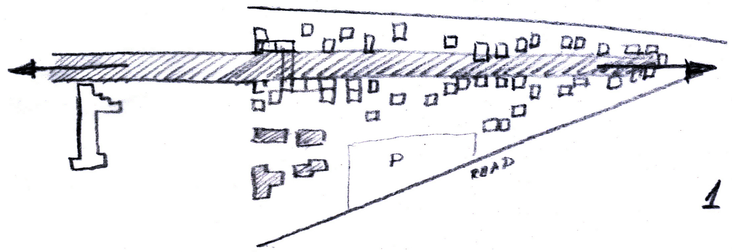
3. Schneider, F. & Meyer-Bohe, W. 1994, 'Grundrissatlas - Wohnungsbau Floor plan atlas - housing'



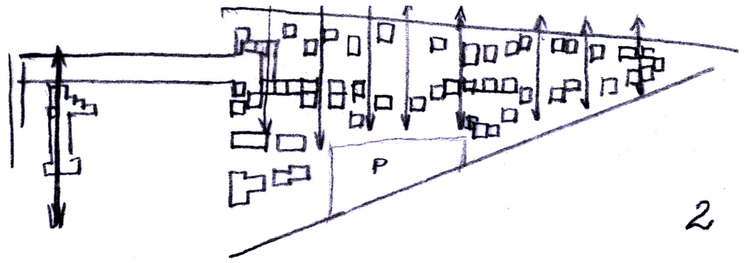


THE BEGINNING

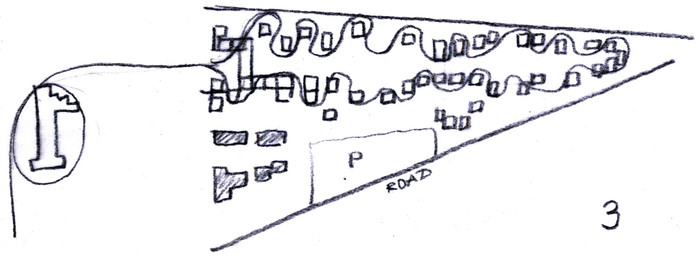




Visual and physical connection North-South



Visual and physical connection East-West



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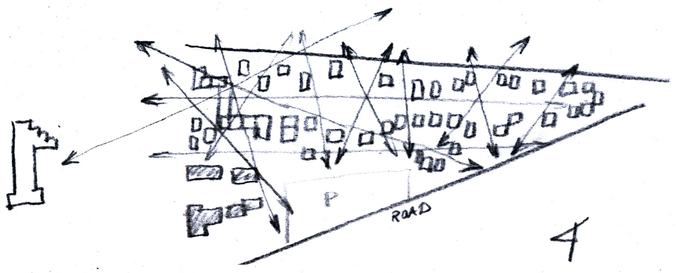
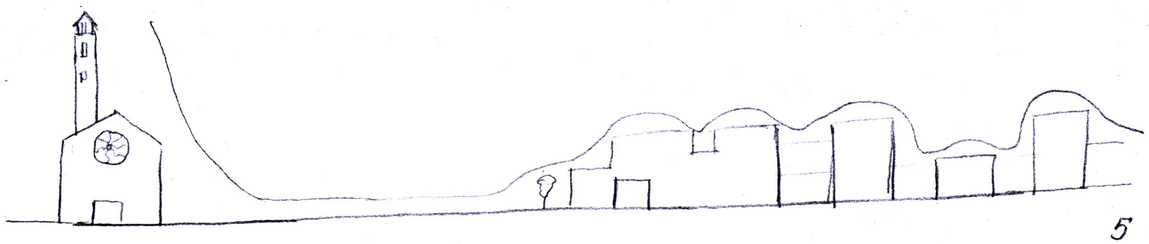
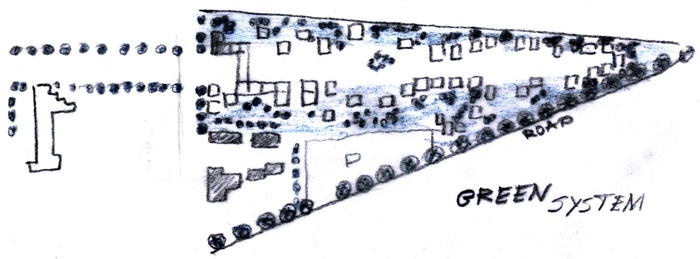
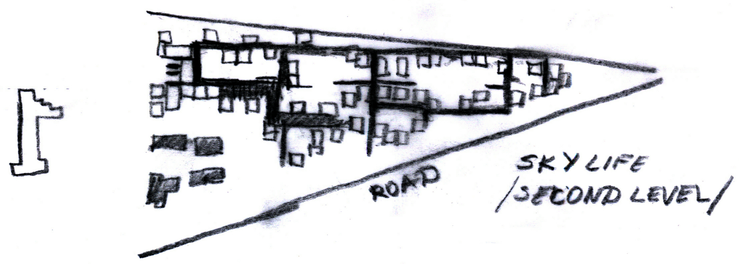


Free direction



Skyline





Politechnico di Milano - Sede Piacenza

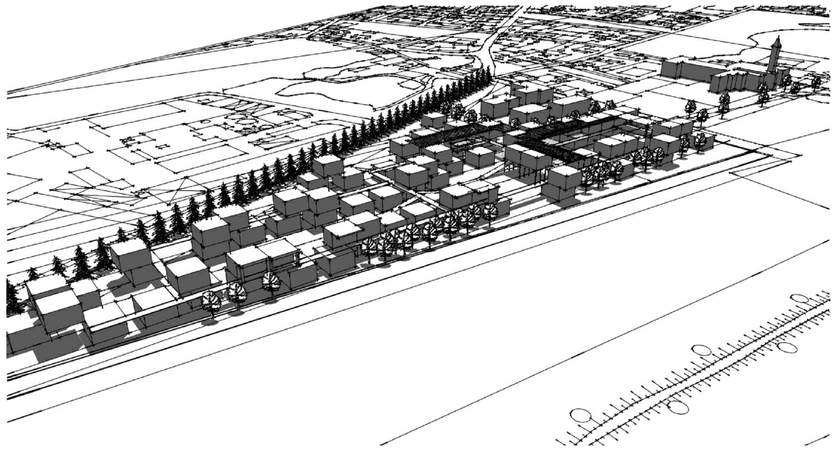
Sustainable Social Housing

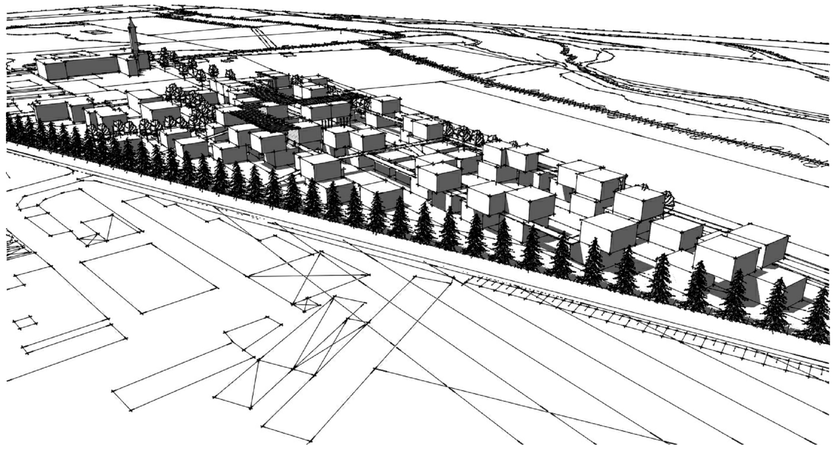
Concept

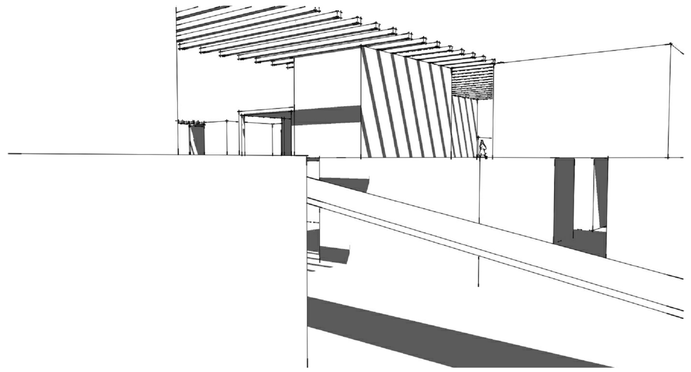
Date	20.12.2012
Drawn by	Bashov Lyubomir
Professor	Albini Marco

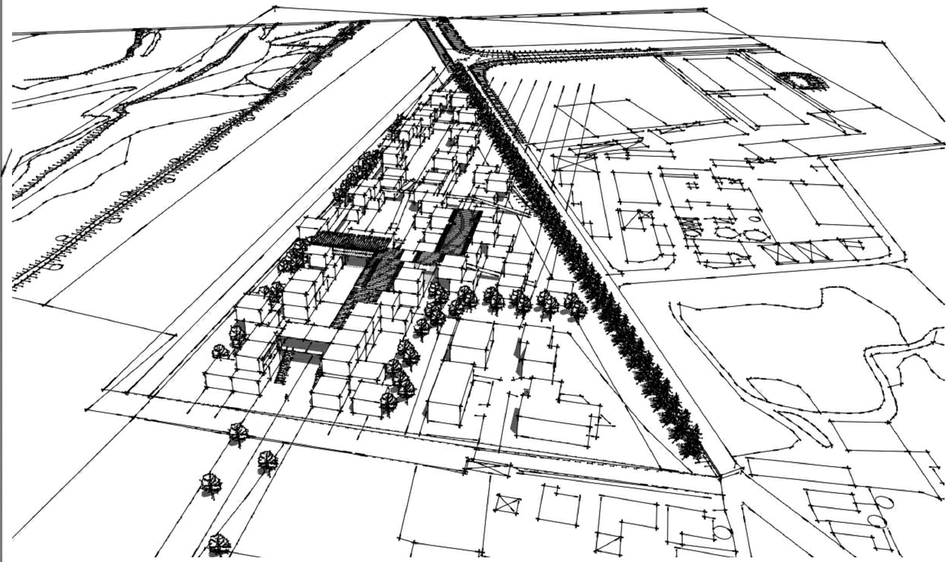
A000

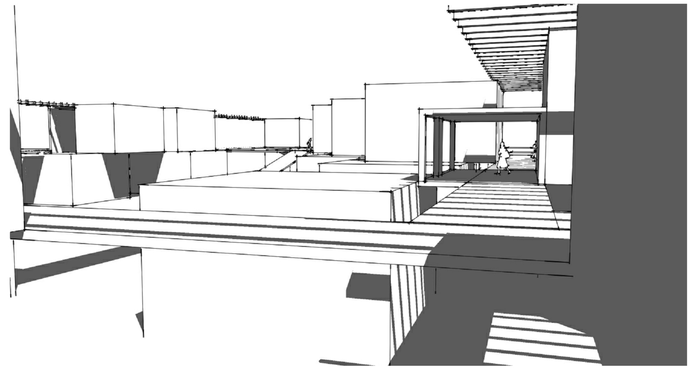
Scale

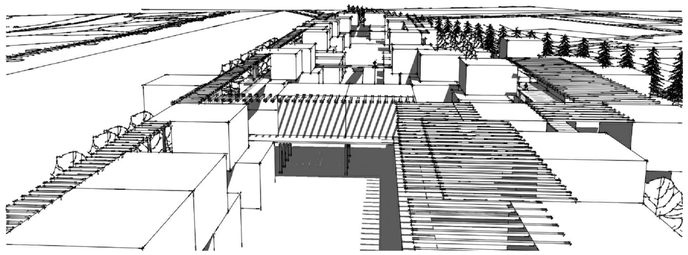


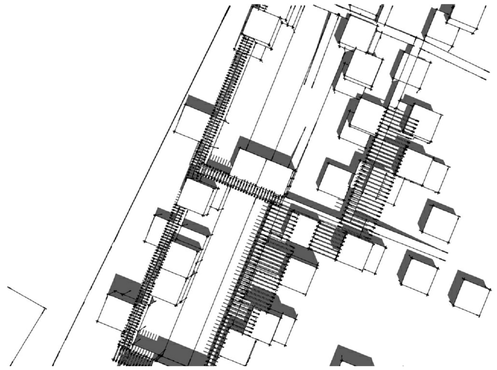


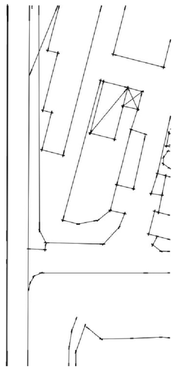


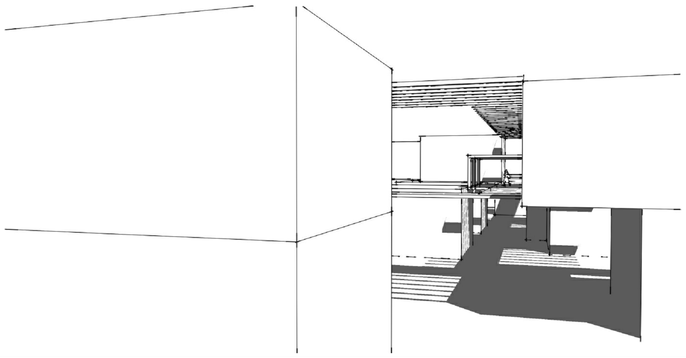


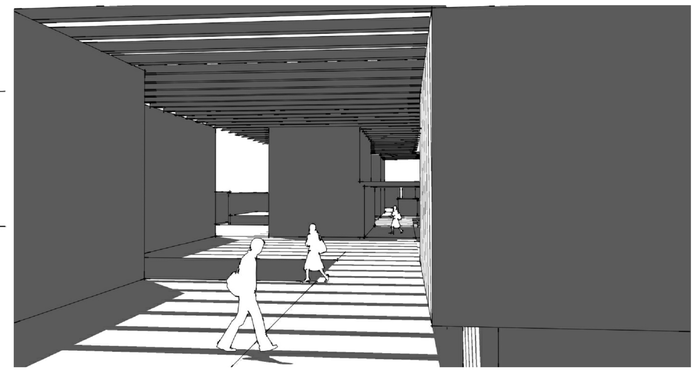












Politechnico di Milano - Sede Piacenza

Sustainable Social Housing

Masterplan

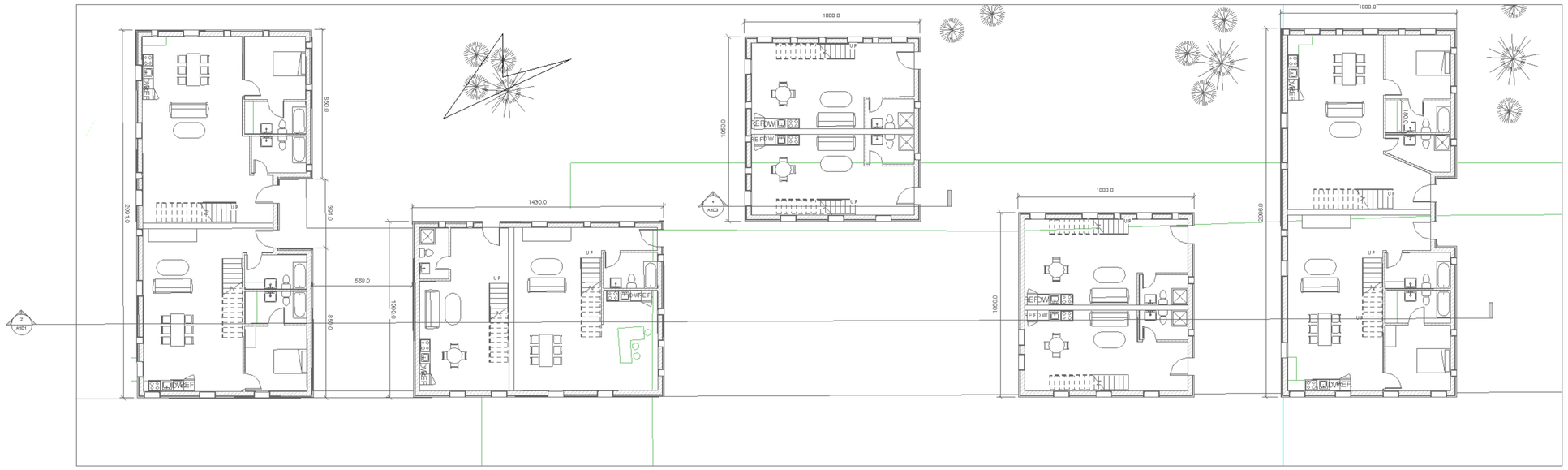
Date: 20.12.2012

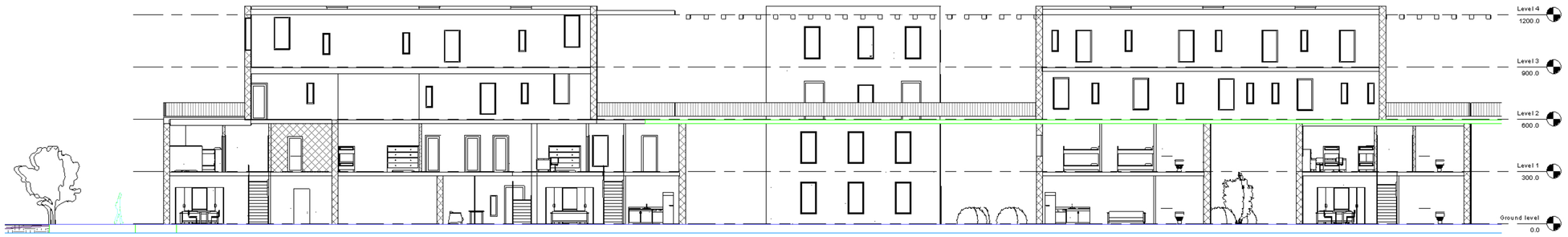
Drawn by: Bashov Lyubomir

Professor: Albini Marco

A100

Scale:





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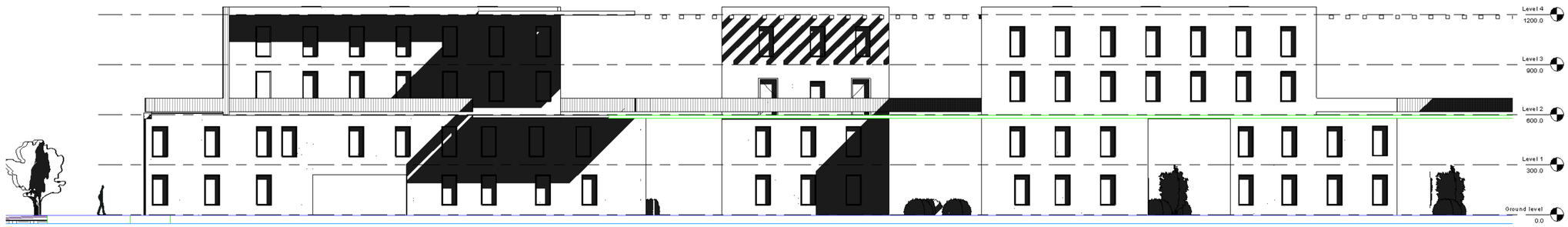

3 Elevation 4 - a
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Politechnico di Milano - Sede Piacenza

Sustainable Social Housing

West Side

Date	20.12.2012
Drawn by	Bashov Lyubomir
Professor	Albini Marco
	A101
Scale	1 : 100

2 Section 6
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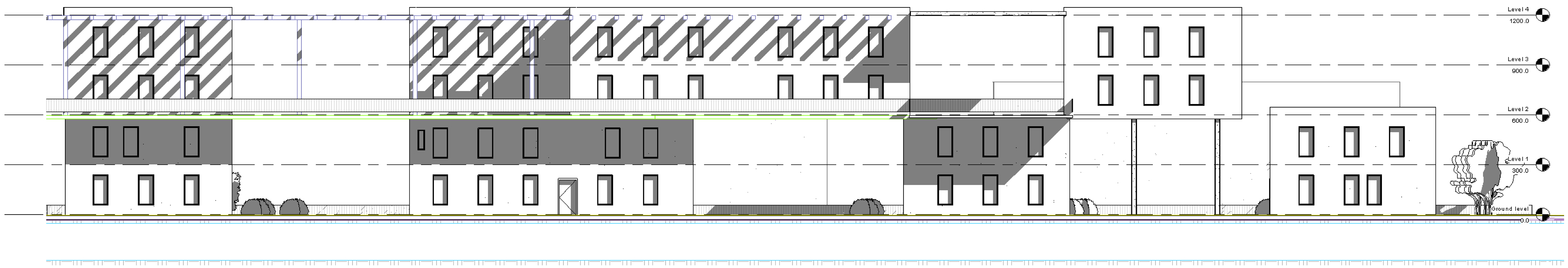

3 Section 2
1 : 100

Politechnico di Milano - Sede Piacenza

Sustainable Social Housing

East Side

Date 20.12.2012

Drawn by Bashov Lyubomir

Professor Albini Marco

A102

Scale 1 : 100

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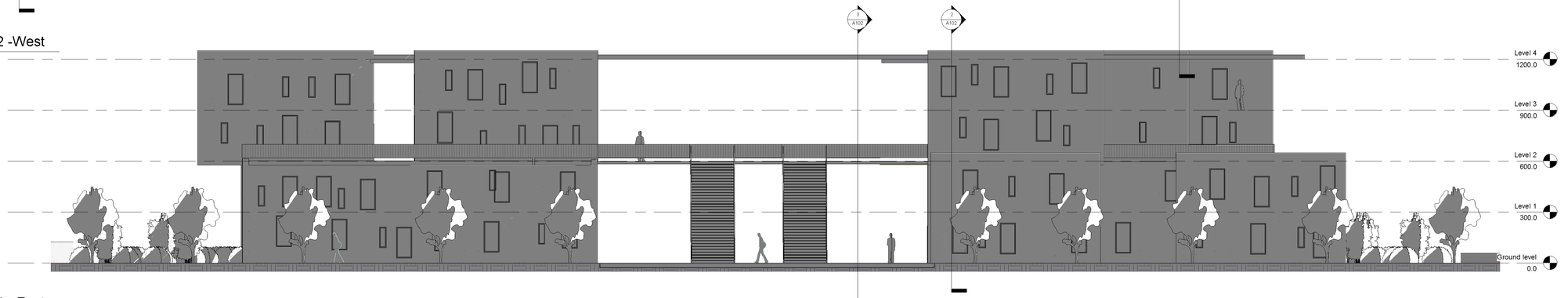

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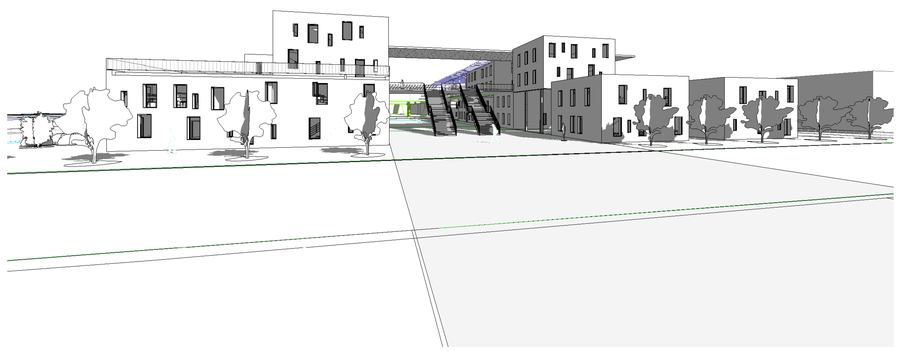

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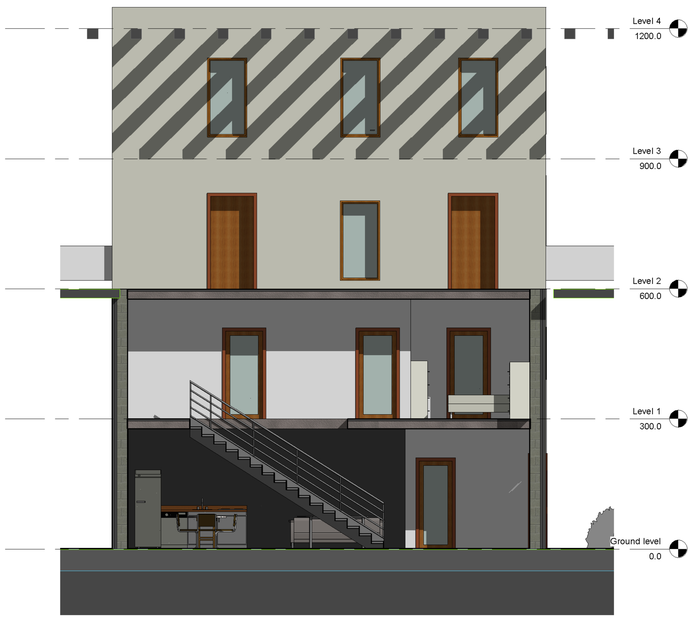

4 Section 4
1 : 50

Politechnico di Milano - Sede Piacenza

Sustainable Social Housing

Facedes

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Professor	Albini Marco
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Scale	As indicated