



POLITECNICO DI MILANO
School of Architecture and Society
Master course in Sustainable Architecture of Large-Scale Project

Urban Seed

In search of the enrichment and integration between city and countryside



Juliana D'Amico 763455
Supervisor Roberto Spagnolo

Piacenza
2013

I would like to thank my supervisor Roberto Spagnolo, that not only taught me a lot about architecture, but guided and believed in me.

I would like to thank all the professors that I have during this course. They all taught me a lot, sometimes not what I was expecting to learn, I have to say, but life is like this, sometimes you learn something that you not even knew you needed to learn.

I would like to thank my classmates and friends that I met in Piacenza. They also taught me about architecture and much beyond that. They taught me about food, language, religion, dance, society, geography, love... Unforgettable.

For last, I would like to thank my family, with their support and love, made me believe that dreams can become true.

Thank you.

ABSTRACT

Many cities around the world were grown near the rivers because of the convenience of having the water close for the people's necessities. With the evolution of the infrastructure, the rivers in Brazil, the country where I was born, lost their importance and many of them were channeled or became just an open wastepipe, while in Europe they continue to be one of the main points of tourist attraction or leisure for the population and are normally located in the center of the city. In Piacenza, province of Emilia Romagna, we have a different case. Located near to the most important river of Italy, the "Po", the city grew opposite to it. Besides this fact, during the centuries many barriers were created between Piacenza and the river, starting from the renaissance wall and further on the road infrastructure, making very difficult and dangerous for pedestrian and bikes to arrive near the river. The growth of the city opposite the river also made the largest monument in the city, Farnese Palace, remain sidelined, although it is one of the main touristic attraction of the city, its surrounding is not attractive at all.

Analyzing the global scale, Slow Food Movement is a non-profit member-supported association that started in Italy in 1989 and now is spread in 150 countries around the world. In opposition to the fast food and fast life that most of the people are used in the modern society, the organization try to valorize the local food traditions, the interest of the people in the food they eat, where it comes from, how it taste and to educate the people how their food choices affect the rest of the world. When we go to the country scale we see that the universal exposition of 2015 has the theme of "feeding the planet, energy for life", therefore will include technology, innovation, culture, tradition and creativity related to food and diet. Parallel to the main site of the Expo there is a project that is taking place at Politecnico di Milano to widespread the Expo in the Italian territory through sustainable interventions in general and local scale. Coming to the regional scale, we can observe that Italy is one of the countries that receive more tourists in the world and has the biggest number of UNESCO world heritage, but while millions people go to Toscana to visit Florence or Pisa, the "food-loving" travelers go to Emilia Romagna. And because food is a very important part of a culture, Emilia Romagna has nothing less than 19 museums dedicated to it.

Taking advantage of this moment of attention that the world is giving to the issue of food and sustainability and mainly if we consider the region where the city of Piacenza is located, the idea was to create a center of research, experimentation, vocational training, dissemination and development assistance in the areas of agriculture, food, and environment. The project would be located in the sites between Palazzo Farnese and the river for a requalification of these areas.

The project was named "Urban Seed" due to some reasons. First is the idea of bringing to the city the knowledge, consciousness and more contact with the countryside. And secondly is the metaphor of "planting" the building in this border between the city and the countryside as a seed that, as it grows, spread its roots and branches bringing benefits to both sides.

CONTENTS

1. The trait p. X
2. The reference
3. The strategy
4. The project

FIGURES INDEX

Figure 01: Maps with cities in Europe and Italy with their rivers.

Figure 02: Po river in Italy.

Figure 03: Po river in Piacenza.

Figure 04: Historical evolution of Piacenza.

Figure 05: Urban road network.

Figure 06: Schematic urban section.

Figure 07: Area of the intervention.

Figure 08: Photos of the area

Figure 09: Photos of the area

Figure 10: Photos of the area

.....

1. THE TRAIT

THE TRAIT

Many cities around the world were grown near the rivers because of the convenience of having the water close for the people's necessities. With the evolution of the infrastructure, the rivers in Brazil, the country were I was born, lost their importance and many of them were channeled or became just an open wastepipe, while in Europe they continue to be one of the main points of tourist attraction or leisure for the population and are normally located in the center of the city.



Spree river_Berlin_Germany



Tibre river_Rome_Italy



Sena river_Paris_France



Arno river_Florence_Italy



Douro river_Porto_Portugal



Po river_Torino_Italy

Figure 1: Maps with cities in Europe and Italy with their rivers.

In Piacenza, one of the 8 provinces of Emilia Romagna region, we have a different case. Located near to the most important river of Italy, the "Po", the city grew opposite to it.



Figure 2: Po river in Italy



Figure 3: Po river in Piacenza

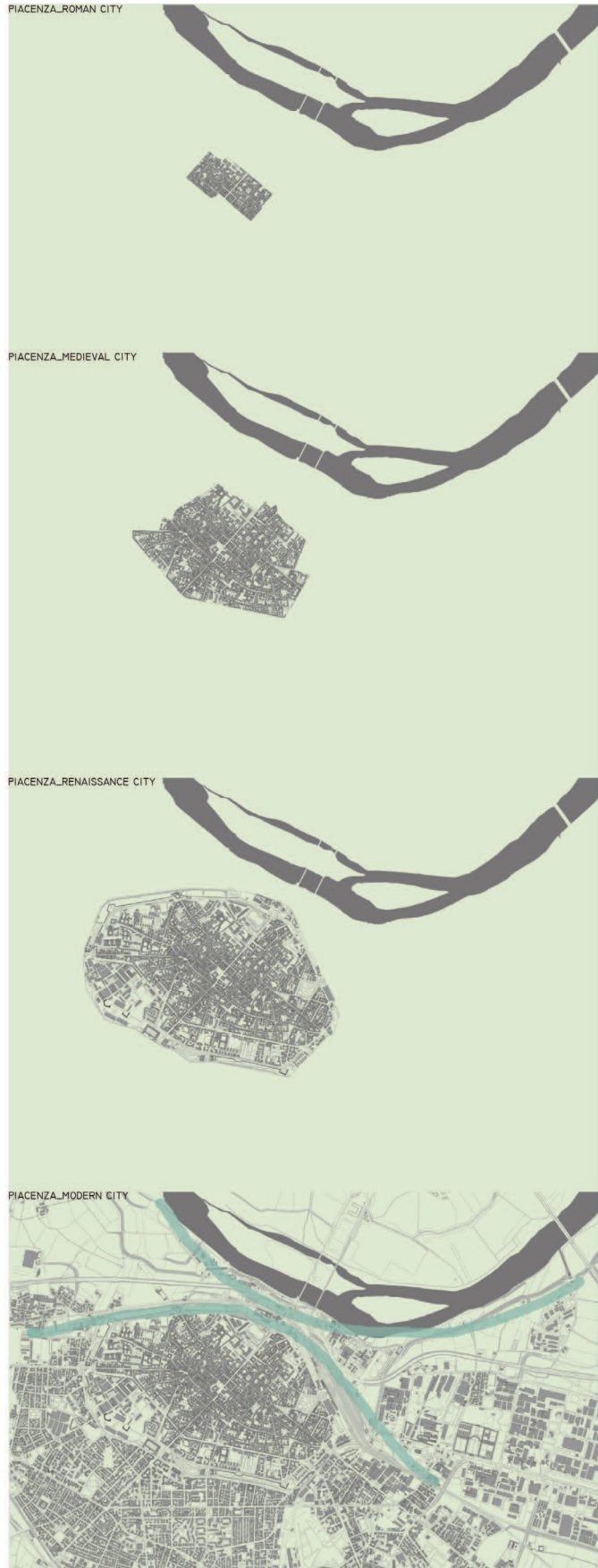


Figure 4: Historical evolution of Piacenza (Roman period, Medieval period, Renaissance period and Modern period) and its relation with the river.

And besides the fact that the city developed opposite to the river, during the centuries many barriers were created between Piacenza and the river, starting from the renaissance wall and further on the road infrastructure as an expressway, railway and highway.

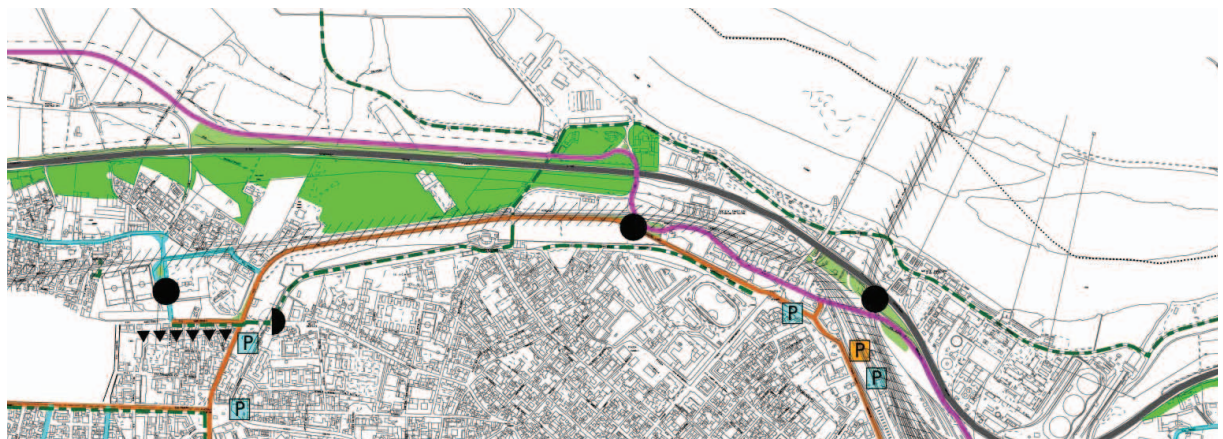


Figure 5: Urban road network.

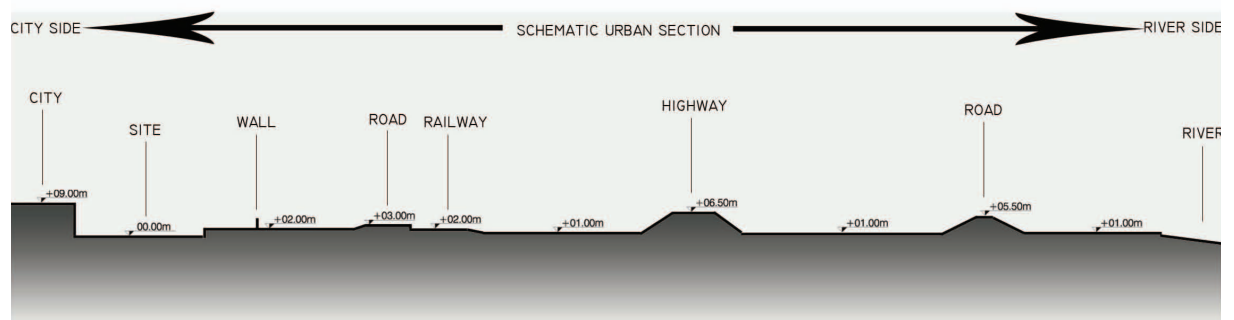


Figure 6: Schematic urban section in the area between the city and the river.

These barriers created between them a junk space as Rem Koolhaas explain as “what remains after modernization has run its course or, more precisely, what coagulates while modernization is in progress, its fall-out.” (KOOLHAS, 2002, p.175). The rest of the Rem Koolhaas’s explanation about junk space in his article may be excessive for this case, but the fact is that these road infrastructures divided the land and created many underused and graceless spaces, apart from the difficulty of pedestrian and bikes to arrive near the river, since the few roads that arrive there have no sidewalks or bike paths in most of the way, and once they are able to arrive, there is no infrastructure as restrooms, restaurants or even benches.

The growth of the city opposite the river also made the largest monument in the city remain sidelined. A symbol of the Dukedoms of Parma and Piacenza’s ancient splendor is the magnificent Farnese Palace. It was built in the Renaissance period and although is one of the main touristic attraction of the city its surrounding is not attractive at all. Surrounded by a military zone where the people cannot access, a bus station and an avenue, the only free space around is a cinder path where the students from the schools nearby go to exercise, surrounded by a fence with a small stair entrance in the corner.



Figure 7: Area of the intervention.



Photo A: Bus station.



Photo B: Military area.



Photo C: Parking area and Farnese palace in the back.



Photo D: Avenue and Farnese palace in the back.



Photo E: Cinder path and Farnese palace in the back.

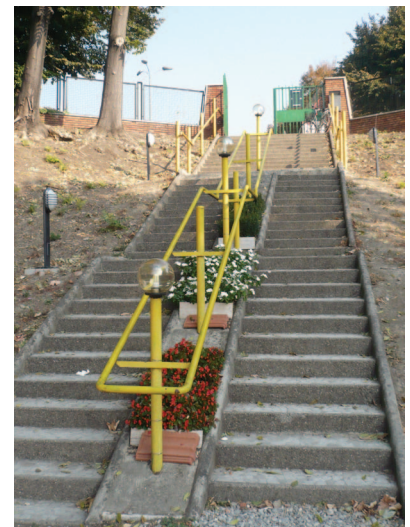


Photo F: Entrance for the cinder path.

Figure 8: Photos of the area.



Photo G: Military area.



Photo H: Renaissance wall.



Photo I: Under pass to cross the road and railway.



Photo J: The railway.



Photo L: Pass under the highway.



Photo M: Area between the highway and the river.



Photo N: Road that arrive near the river. No sidewalk.



Photo O: Military area near the river. Access denied.

Figure 9: Photos of the area.



Photo P: Sheds in the military area near the river.



Photo Q: Road aside the river. No sidewalk or bike path.



Photo R: Po river seen from the road.



Photo N: River Po with the railway bridge in the back, the road in the right side and one of the few small path that arrive to the river.

Figure 10: Photos of the area.

2. THE REFERENCE

SLOW FOOD MOVEMENT

We arrived in a time of globalization that in the fields in Italy where the *peperoni quadrati d'Asti* were grown are now used to grow tulip bulbs to later be sent to Holland, and the pepper that used to grow there, is now being imported from Holland! Carlo Petrini, the founder of the international Slow Food Movement explains in his book "Buono, Pulito e Giusto" that it was after eating a peperonata from a friend and sensing tasteless, that he found out about this contradiction and decided "in that day it was the official starting date of eco-gastronomy: the raw material must be grown and produced in a sustainable manner, biodiversity and food traditions and local production must be protected at all costs." [free translation](PETRINI; 2005, p.4).



Figure X: Logo and map of the countries where there are the Slow Food movement operates.

Slow Food is a non-profit member-supported association that started in Italy in 1989 and now is spread in 150 countries around the world who are "linking the pleasure of good food with a commitment to their community and the environment"(Slow Food, 2013). In opposition to the fast food and fast life that most of the people are used in the modern society, the organization try to valorize the

local food traditions, the interest of the people in the food they eat, where it comes, how it taste and to educate the people how their food choices affect the rest of the world. Through projects, events and activities in the regional and global level, the movement approach the defense of food biodiversity; promote food and taste education; create connection between producers and consumers; develop networks between small-scale farmers and food producers and bring them together with cooks, academics and youth to discuss how to improve the food system collaboratively.



Figure X: Comic about the Slow Food Movement.

EXPO 2015

From the middle of the nineteenth century the term “Expo” refers to exposures of global dimensions on different themes. The Bureau International des Expositions (BIE) is the international body that manages the organization of exhibitions, defines and establishes the validity of the frequency. Exposures can be of two different types: universal and specialized. The universal Expos have a minimum duration of 6 months, a frequency of 5 years and cover topics of a general nature. The first Expo was held in London in 1851, in the Chrystal palace, and since then the World’s fairs have introduced many products and services to large audiences, as the elevator (Dublin, 1853), the telephone (Philadelphia, 1876), television (New York, 1939), advances in robotics (Tsukuba, 1985) and new energy-efficient transit, green building techniques (Aichi, 2005; also Shanghai, 2010) (EXPO Q&A, 2013).



Figure X: Logo of the EXPO

The universal exposition of 2015 has the theme of “feeding the planet, energy for life”, therefore will include technology, innovation, culture, tradition and creativity related to food and diet. The focus of the fair is the right to healthy, secure and sufficient food for all the world’s inhabitants.

Parallel to the main site of the expo there is a project that is taking place at Politecnico di Milano to widespread the expo in the Italian territory through sustainable interventions in general and local scale. The initiative for a sustainable and widespread Expo was the starting point of four meetings organized by the Order of Architects of Milan to document the condition of the sites of Expo organized in recent years in Lisbon, Hannover, Seville and what still remains of abandoned spaces and pavilions in ruins. (EDS, 2013).

Emilio Battisti explains that to be able to have a sustainable and widespread Expo is important to not limit the event in one single site, since “a fundamental condition of sustainability consists in the spread of the event on a regional scale and beyond, in order to dilute, control and minimize unavoidable impacts and distribute in the territory of the possible positive effects of the interventions.” [free translation](BATTISTI et al, 2011 p.6).



Figure X: Logo of the project EXPO Diffusa e Sostenibile.

The project of the sustainable and widespread Expo formulated eleven territorial lines:

1. Milano – Varese _ Lugano
2. Milano – Saronno – Varese – Laveno
3. Milano – Como – Chiasso
4. Milano – Monza – Lecco – Sondrio
5. Milano – Trezzo sull’Adda – Bergamo
6. Milano – Brescia – Venezia
7. **Milano – Lodi – Piacenza**
8. Milano – Cremona – Mantova
9. Milano – Pavia – Tortona – Genova
10. Milano – Vigevano – Mortara
11. Milano – Magenta – Novara – Torino

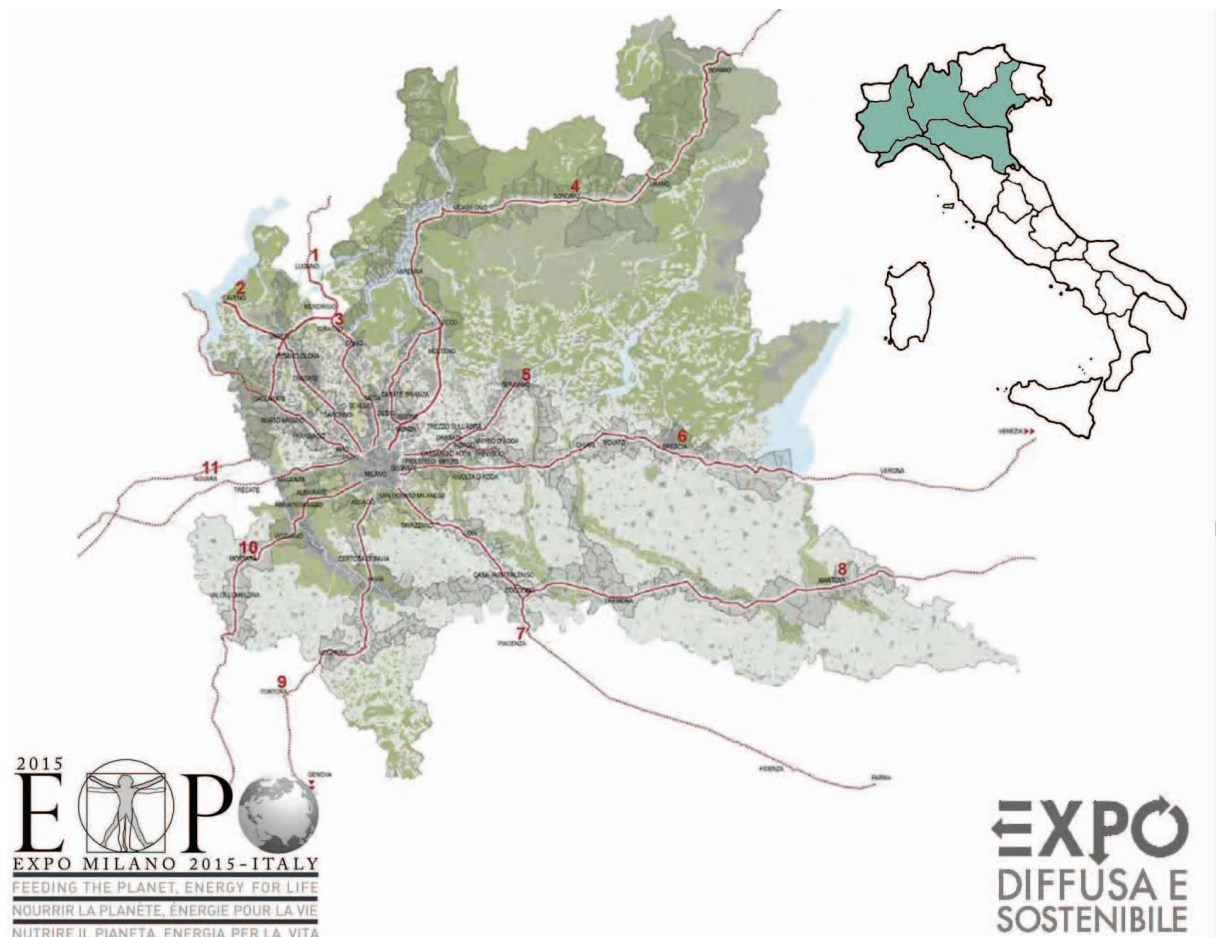


Figure X: Map of the territorial lines and map of the regions of Italy that this lines would include in the Expo.

About the line Milano – Lodi – Piacenza, the author explain:

[It is] an area which is characterized by a long tradition of crops and livestock, and where he meets the most significant of metadistrict production of food biotechnology, the most recent technological and scientific openness to innovation. The issues of safety and innovation in the food chain are linked to those of a mending of the relationship with the water attentive to the quality of the environment and the reduction and control of anthropogenic loads on the rise. [free translation] (BATTISTI et al, 2011, p.48)

And suggest that this line could extend until Parma, because of its important food tradition and its recent attribution to be the host of the European Food Safety Authority (EFSA), as we will explain further on.



Figure X: Peasants in the Emilia Romagna region.

THE EMILIA ROMAGNA REGION

Italy is one of the countries that receive more tourists in the world and has the biggest number of Unesco world heritage (UNESCO, 2013), but while millions of people go to Tuscany to visit Florence or Pisa, the food-loving travelers go to Emilia Romagna. “The real milestones of Emilia since at least middle ages are its iconic artisanal foods.”(DOWNIE, 2011, p.128) And the journalists and book writers continue saying that the people from this region identify their historical and regional identity with their cooking, “It’s the cult of *la cucina* that unites Emilians” (DOWNIE, 2011, p.128).

According to the Italian official tourism website, the region that is located between the River Po to its north and the Apennine Mountains to its south, “it is one of the most fertile and productive regions of Italy” (ITALIA, 2013).

Because food is a very important part of a culture, Emilia Romagna has nothing less than 19 museums dedicated to it.

3. THE STRATEGY

THE STRATEGY

Taking advantage of this moment of attention that the world is giving to the issue of food and sustainability and mainly if we consider the region where the city of Piacenza is located, the idea was to create a center of research, experimentation, vocational training, dissemination and development assistance in the areas of agriculture, food, and environment. The project would be located in the sites between Palazzo Farnese and the river for a requalification of these areas.

In addition to the empty areas that are going to be used, it was decided to demolish few building, ninety percent of them with just one floor, which their location were considered to be inappropriate, such as the military ones and the bus station.



Figure X: Removed building for the project.



Figure X: The official masterplan of the city considered for the demolition of the buildings.

As we saw before, this space between the palace and the river has many barriers and differences of levels (see image X page X) so the idea was to connect this different areas through:

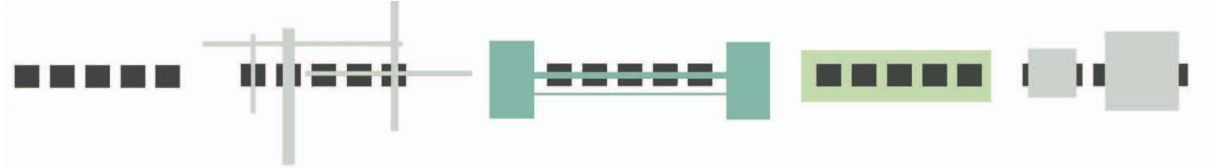
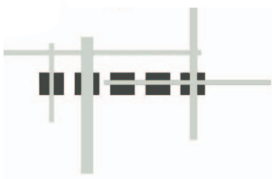


Figure X: The connection between the different areas of the intervention would be made through different elements.



The Path

The project has many paths that, through ramps and stairs, try to connect the different levels that we have in the area, mainly for the pedestrian and bicycles. There are two main paths that arrive to the river. One starts in the level we considered the zero one, it is the level that connects the main building of the project to the river, passing through the experimental fields. The other starts on the level of the city, that we consider level nine, and crosses in the middle of the building dividing it in two parts and continues as a bridge until it arrives to the river.

Our increasing reliance upon private vehicles and the road systems they require has enormous impacts on the health of our air, water, wildlife and public realms, as well as on our individual corporeal well-being. In contrast, active transport systems provide opportunities for alternative modes of transportation, such as cycling and walking. These active modes tend to have fewer associated environmental consequences, while enhancing the physical and mental health of users, and often promoting strong social connections. Therefore, the networks that support active transport, including enhanced pedestrian environments, are considered a system of green infrastructure. Along these lines, many municipalities and communities are requiring a more complete approach to street design that provides facilities for cyclists and pedestrians within the road and associated right-of-way. (ROTTLE, YOCOM, 2010, p. 52)



The Water

Since one of the points of the project was to create the connection between city and countryside, nature and artificial, the idea was to induce the people to the river, but also bring the river to the people. In front of Farnese, in the site where is located our building, there are two big ponds and a stream connecting them to the river. As Gianni Scudo e José Manuel Ochoa de la Torre explain in their book "Spazi verdi urbani" (2003, p. 139) the use of the thermal inertia of the mass of the water helps to moderate the temperature. There are also

small ponds that cross the main building connecting the two ponds that, besides the figurative representation of the river, helps to regulate the temperature and humidity of the the internal spaces.

Water is essential to all life and urbanization significantly affects the flow and distribution of water resources across a landscape. Sustainable hydrological approaches, sometimes called 'green stormwater infrastructure', use natural processes to treat stormwater and wastewater so as not to adversely affect aquatic habitats or groundwater sources. This approach to water management ideally harvest and cleans water for reuse, thereby reducing demands upon drinking water supply. In the form of rain gardens, wetlands, biofiltration swales, green roofs, cisterns and stormwater planters, hydrological system components may also provide habitat and enhance the condition of public open spaces. (ROTTLE, YOCOM, 2010, p. 50)

The Green



As we explained before, the intervention area had many empty or underused spaces. Since one of the point of the project is to allow the people to have more contact with nature, the project create many plazas spread along the intervention area. The plazas intercalate paved and green areas, that so to allow events, as street market, presentations and others to happen at the same time create shadow and pleasant spaces for the people to enjoy the open areas.

First is the impact on the human health and wellbeing. For most of its existence and evolution, the human species has depended upon and lived in close proximity to the natural world. Biologist EO Wilson theorizes that humans have a predisposed affinity for nature, which he terms *biophilia*. Scientific studies overwhelmingly document the benefits of contact with nature, including recovery from illness, mental health, relaxation, concentration, lowered crime rates and higher learning performance. (ROTTLE, YOCOM, 2010, p. 59)

The Functions



The master plan is divided in 3 main areas. The one closer to the river have a sport and recreation point. As we discussed before, currently the city has none infrastructure near the river to allow the people to enjoy it. In the middle of the masterplan, between the road infrastructure, we have the experimental fields. We choose to put this function there because we want to have the fields closer to the city, but at the same time we need a big area to have them.

It is a more private area, because the road infrastructure make more difficult to access, but at the same time is close the research building and is possible to the people that are using the bridge to have a interesting and educative view on their way, since during the year they we have the opportunity to see the whole process of the plantation. There, is also located a big greenhouse, used by the researches but mainly used as an exhibition space that has an entrance in the groundfloor and also one entrance from the level of the bridge. The third area is the one closer to the city where we would have the main building of the project. There we would have the research centre, the offices, the vocational training, dissemination and development assistance in the areas of agriculture, food, and environment. The building has also some functions that can be used also for the public, as the agricultural market, the exhibition centre, the bar, the restaurant with a view to Farnese palace, the library, the media and conference hall.

Although these are the more public areas, most of the floors and spaces are opened or transparent, because the idea is to have the knowledge closer and accessible to the public. To be coherent with the propose of its function, we also tried to bring the nature inside the building, either by green areas, water or natural light.

Cities are products and sources of human ingenuity, cultural transformations and creativity. They reflect the vitality of our global society and epitomize social and economic progress. Cities are also part of the solution to our global environmental crisis. Urban areas that balance density with amenities can provide a high quality of life while lowering each person's ecological footprint. When citizens are able to walk, use public transit and bicycles, use neighbourhood outdoor space and access local food sources, their fossil fuel consumptions and carbon dioxide emissions can be reduced. (ROTTLE, YO-COM, 2010, p. 20)

STRATEGIC MAP

[...] But what now is manifest and clear is, that neither are there future nor past things. Nor is it fitly said “there are 3 times, past, present and future”; but perchance it might be fitly to say “there are 3 times: a present of things past, a present of things present and a present of things future”. For these 3 do somehow exist in the soul [...].

The confessions of Saint Augustine, Book XI

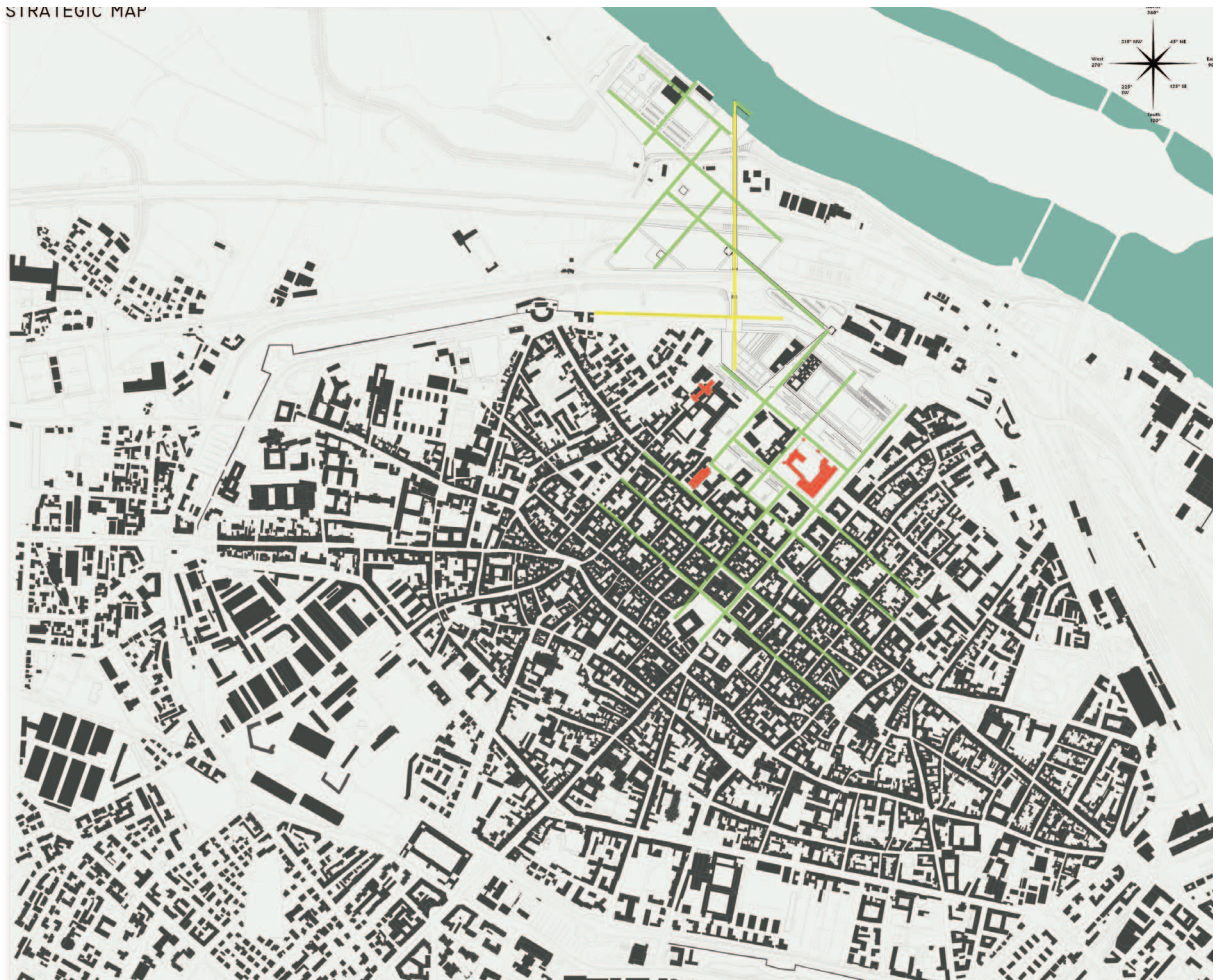
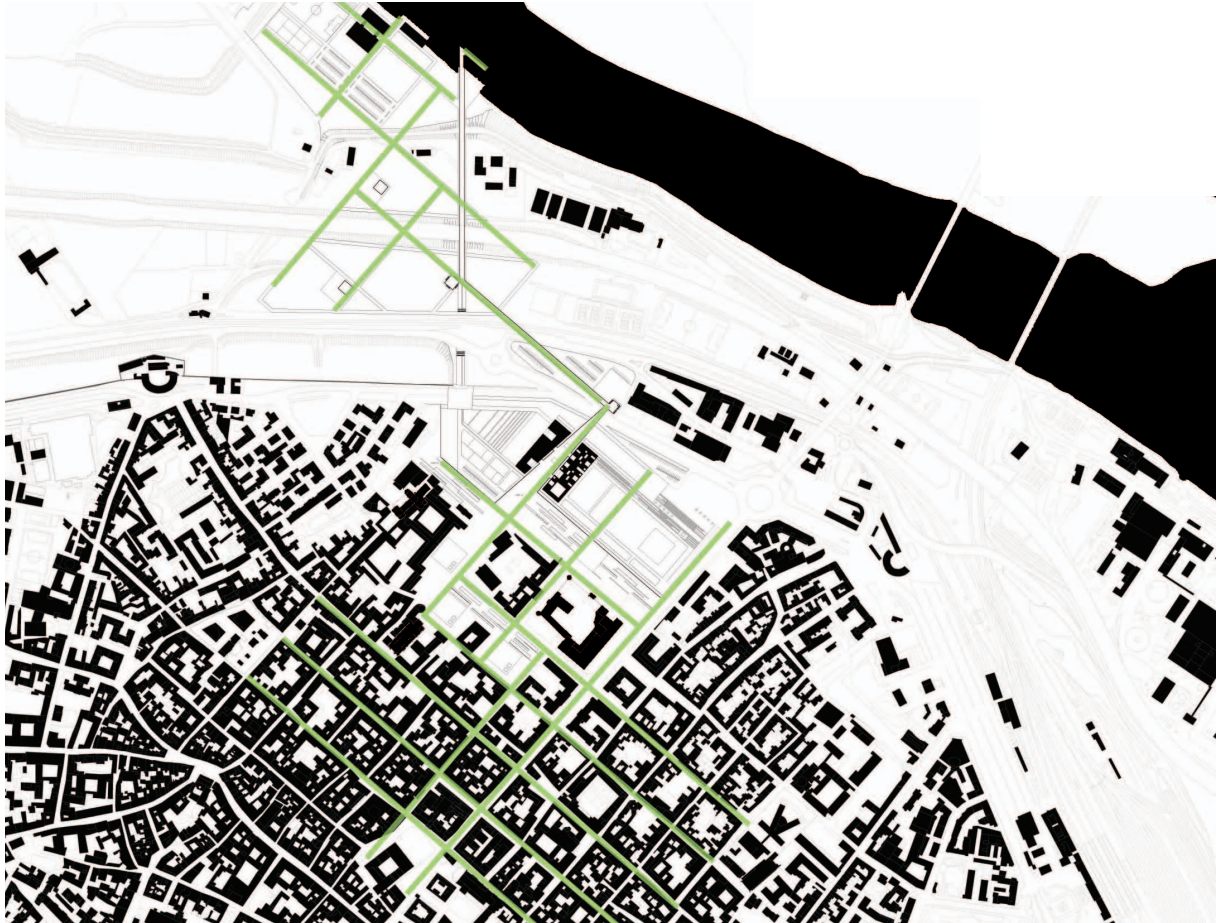


Figure X: Masterplan inserted in the city of Piacenza

To do an urban and/or an architecture project it is extremely important that the architect studies and understands the context, the surrounded, the nearby of his intervention, even more if we speak about Italy, a country with so much history and masterpieces. But what is also important to understand, and therefore the Saint Augustine quotation, is that the past do not exist and hence we should not be stuck on it. Thus, more important than looking old maps is to “read” the city and understand the “present of things past”, what are the parts of history that still remain in our present and, with this, to compose the new present, valuing what is important and creating new values for the place.

In the city of Piacenza we can see traces of various periods. To prepare the master plan it was mainly considered:

-The traces of the Roman streets. Piacenza was founded by the Romans in 218a.C. and as so it followed the *Cardo Decumanus* plan, the idea of a grid as a system for planning. This grid it is clearly visible in the map or when someone walks is the center of the city (CARINI, 2012).



-The Renaissance wall. The Farnesiana ring is a sixteenth-century bastioned wall that surrounded completely inhabited city, currently part of the wall remain visible and in this part near Palazzo Farnese is possible to see the wall and one of its gates.



-**The Chiesa di San Sisto.** The church has medieval origins: it was founded in 874, alongside a Benedictine monastery, of which became abbess in 882. At the monastery were attributed rights and privileges of entire areas of northern Italy. On the original medieval complex was built the present church dates back to the first decade of the sixteenth century. For this church Raphael painted the “Sistine Madonna”, now replaced by a copy (Comune di Piacenza, 2013).



-The Chiesa del Carmine. The construction dating back to 1334, but was later partly rebuilt and completed in 1525. The Church has remained intact in the original structures fourteenth century and is full of inputs and layers of later times. In 1746 it was closed to the public and transformed into a military hospital and in 1805 was suppressed along with the adjoining convent and converted to military use. The building was severely damaged in 1945, and then restored as a result of a bombing. Since that date, has not been re-used except as a warehouse (Comune di Piacenza, 2013).



-The Palazzo Farnese. Considered a landmark of the Renaissance period, project of Jacopo Barozzi, known as Vignola, in the middle of the XVI century. It has a severe form in its external façades in opposition to the aircraft elevation of the internal courtyard. It was left unfinished and now hosts the Civic Museums (CARINI, 2012).



3. THE PROJECT

MASTERPLAN

The project was named “Urban Seed”w due to some reasons. First is the idea of bringing to the city the knowledge, consciousness and more contact with the countryside. And secondly is the metaphor of “planting” the building in this border between the city and the countryside as a seed that, as it grows, spread its roots and branches bringing benefits to both sides.

You have to offer visitors, paying particular attention to young people, the opportunity to stay with us to visit the excellence of our territory for a few days living their daily lives made not only of feeding but also of tourism, culture, entertainment, sports, hospitality and all that a young person can imagine doing while on vacation intelligente but at the same time engaging and fun, in the name of sustainability. [free translation] (BATTISTI et al, 2011, p.9)

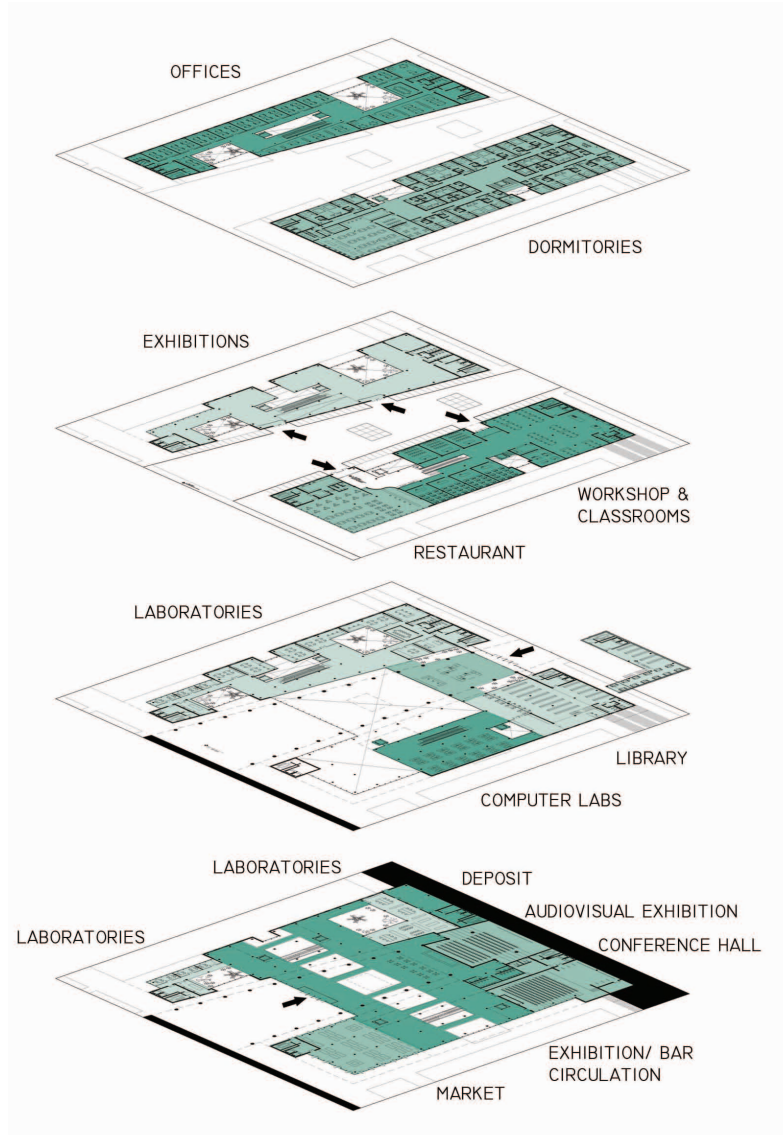




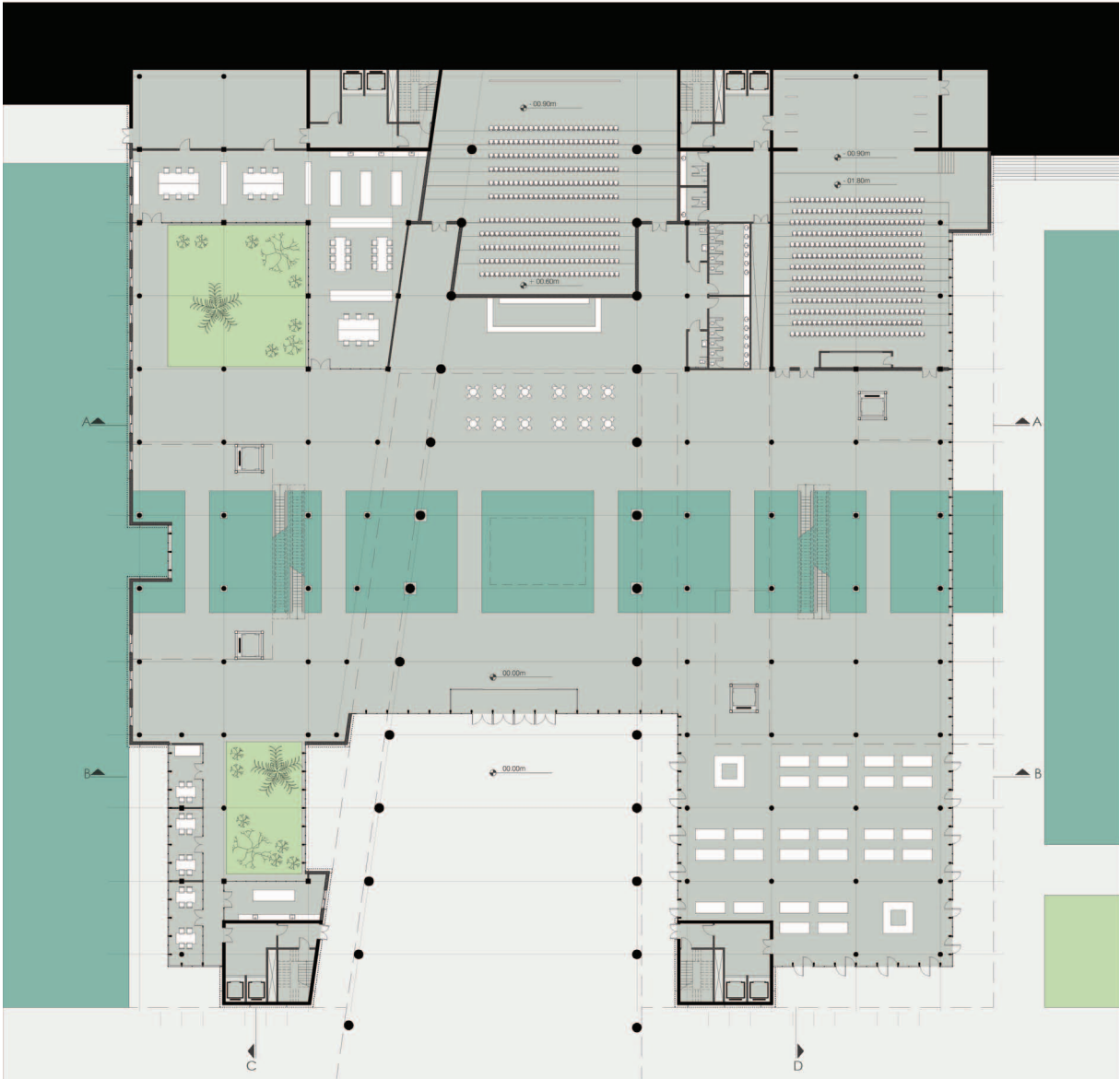
Analysing the map of Italian cities we can notice a difference between the new and old neighbourhoods. The old ones are normally closed to the outside and have many internal courtyards. The new ones happen the opposite, the buildings do not have internal yards anymore but has an open area around it. In our project we tried to combine both typologies, providing green areas and natural light also inside the building and enhancing the cross ventilation of the spaces.



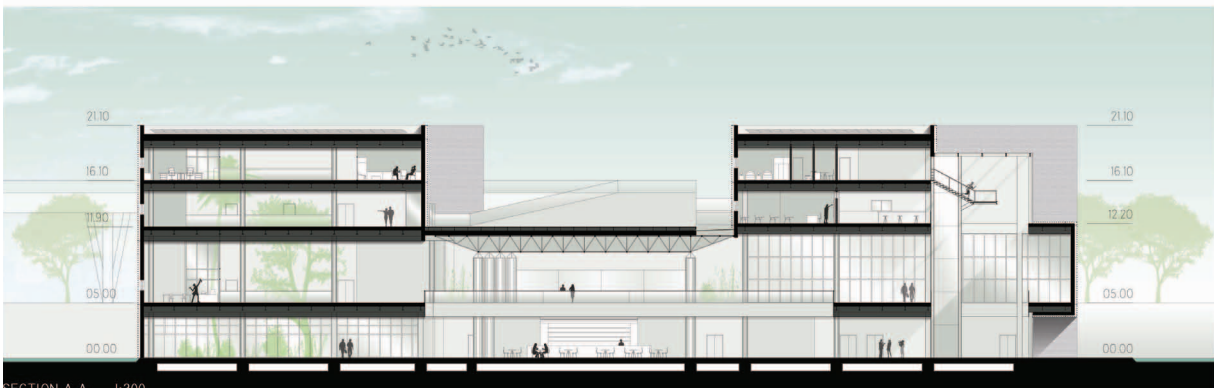
Due to the position the building, we created a more solid and closed walls in the façade that is facing north and where we have more noise due to the road, and a more open and transparent façade there is facing south. The schematic drawing shows the inclination of the sun at midday in the winter (22°) and summer (68°). In the roof of the building and also in parts of the bridge, we have solar panels facing south with the inclination of 37° , that according to MACS Lab, an environmental testing laboratory, it is the optimum inclination for this region latitude (approx. 45°).



As we spoke before, the most of the floors and spaces are opened or transparent, because the idea is to have the knowledge closer and accessible to the public. The building is a place of work and learning but we want that the common citizens feel comfortable to enter and learn or feel more familiar about food and environment, watching the research working in the laboratories that are closed by glass wall, or seeing the exhibition, using the library, watching videos, conference and plays. For these reason we want to make the building easy to access through the different levels that we have in the site. So we have entrance in the zero level in one side, another entrance in the level five, in the opposite direction and other entrances in the level of the bridge.

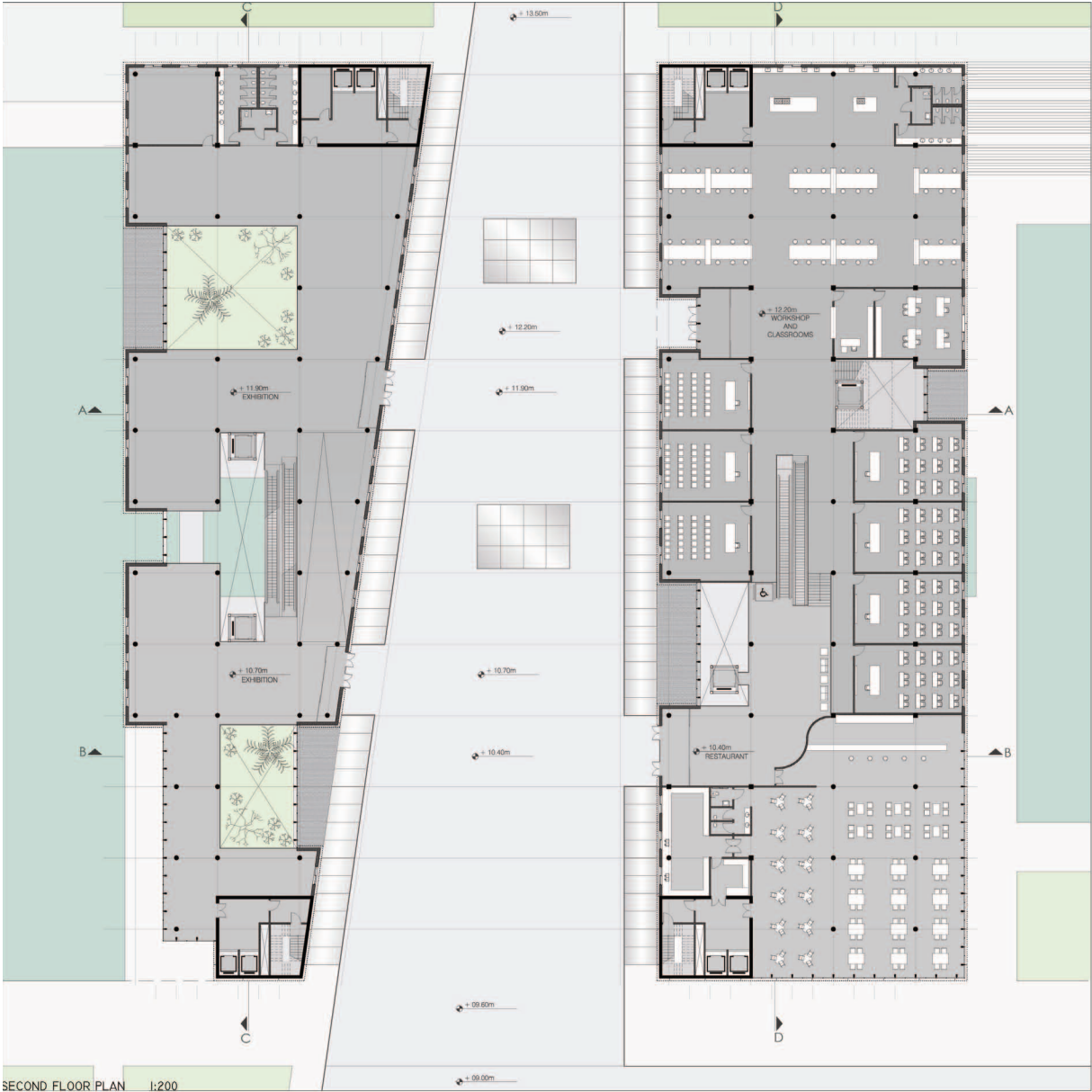


GROUND FLOOR PLAN 1:200



SECTION A-A 1:200



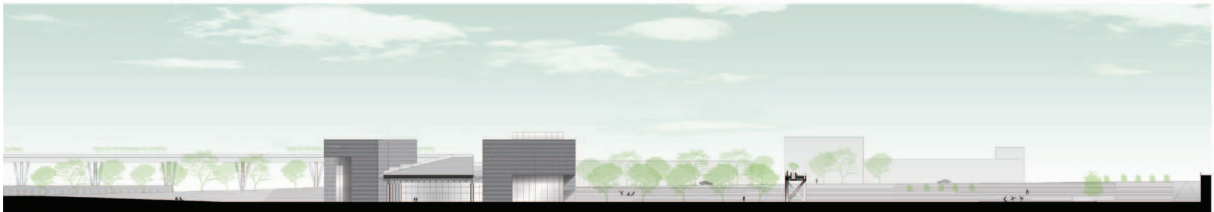
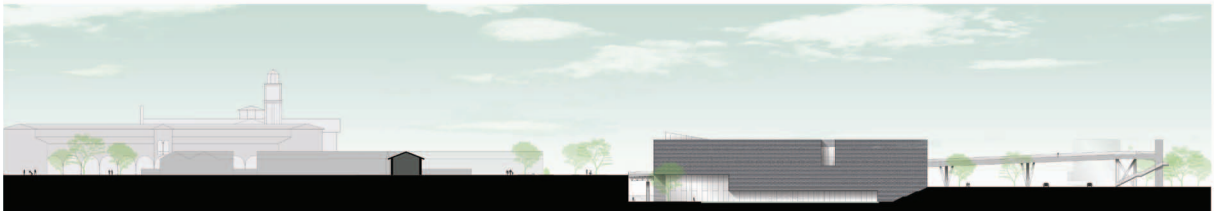
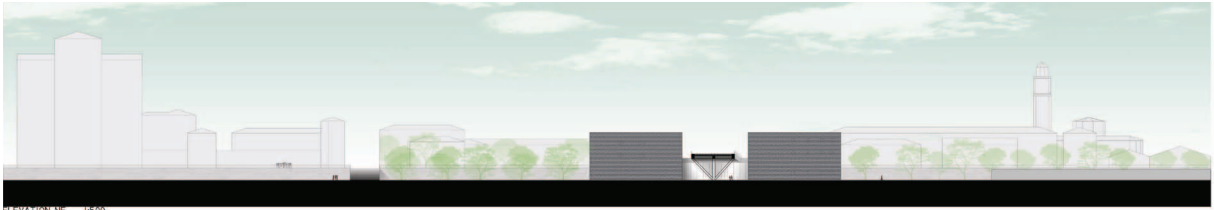


SECOND FLOOR PLAN 1:200



SECTION C-C 1:200





MATERIALS

To choose the materials that were used in the building it was consulted the book of Roberto Giordano "I prodotti per l'edilizia sostenibile" (2010). We gave a special attention to the external walls because is the element of the construction that has the bigger surface, comparing to the floor and roof, so we made a table to compare the different options of material and decide which ones would be more sustainable to be used.

TABLE ANALYSIS OF MATERIALS FOR THE EXTERNAL WALL OF THE BUILDING.		DENSITY (kg/m³)	SPECIFIC HEAT (kJ/kgK)	CONDUCTIVITY (W/mK)	PRIMARY ENERGY CONTENT (CEP)(MJ/kg)	CARBON DIOXIDE (Co₂/kg)	THERMAL RESISTENCE (m²k/W)
EXTERNAL RENDER E= 15mm	PLASTER CEMENT BASE	2.000	0,67	1,40	6 - 8,5	> 0,5	0,011
	PLASTER MADE OF LIME	1.300	0,91	0,75	< 3	0,5 – 0,4	0,020
ISOLATION E= 100mm	CELLULOSE FIBER	60	1,2	0,040	< 10	< 0,75	2,500
	POLYURETHANE FOAM	25	1,6	0,024	> 70	3,01 – 3,75	4,167
	SHEEP WOOL	20	1,5	0,040	10 – 25	0,75 – 1,50	2,500
MASONRY E=200mm	BRICK SEMI-SOLID CARRIER	900	0,84	0,23	< 3	0,19 – 0,10	0,870
	CONCRETE SEMI-SOLID CARRIER	1500	0,88	0,34	< 3	0,39 – 0,20	0,588
INTERNAL LINING E=30mm	CLAY-BASED PLASTER	1.800	0,85	0,47	< 3	0,19 – 0,10	0,064
	GYPSUM-BASED PLASTER	1.200	1,09	0,35	8,6 – 10	0,29 – 0,20	0,086

* The data of Density, Specific Heat, Conductivity, Primary Energy Content and Carbon Dioxide were taken from the book: "I prodotti per l'edilizia sostenibile" di Roberto Giordano, Esselibri S.p.A., Napoli, 2010.

** The building has a total area of the external was of about 6.500m²

It was chosen the material with lower Primary Energy Content (CEP) and Carbon Dioxide (Co₂) and then with a table provide by the Eng. Prof. of Politecnico di Milano Massimiliano Manfren (ISO 13786) it was made the analysis if the combination of these materials and their thickness was appropriate to covered the building. But it is important to say that the analysis of the CEP and CO₂ did not consider the phase of transportation of the material to the site.

Input
Output

Component name	W 4
Component type	External wall
Period of thermal load variation T	24
Period of thermal load variation T	86400
Angular frequency w	7,27221E-05
Thermal resistance of interior layer R _{si}	0,13
Thermal resistance of exterior layer R _{se}	0,04

Layer	Material	Air layer	Thickness [m]	Conductivity [W/mK]	Density [kg/m³]	Material Specific heat (c) [J/kgK]	Thermal resistance of layer [kg/m]
R _{si}							
1	Internal surface resistance						
2	Plaster (lighthouse) argilla	Yes	0,030	0,470	1800	850	0,064
3	Brick protected		0,00				0,000
4	Air gap	Yes	0,200	0,230	900	840	0,870
5	Cellulose fiber		0,00				0,000
6	Waterproof Covering - Bitumen		0,100	0,040	60	1200	2,500
7							-
8	External render (calce)	Yes	0,015	0,750	1300	910	0,000
9							0,020
10							-
11							-
12							-
R _{se}	External surface resistance		0,345				0,04
							3,623

Steady-state analysis	Symbol	Unit	Value
Superficial mass	M _s	[kg/m²]	259,500
Thermal resistance	R _t	[m²K/W]	3,623
Transmittance	U	[W/m²K]	0,276
Conductance of component	C	[W/m²K]	0,290
Areal heat capacity	C _{th}	[kJ/m²K]	222,045
Time constant	τ	[h]	223,488

Dynamic (sinusoidal) analysis	Symbol	Unit	Value (modulus)	Value (phase)
Decrement factor (attenuation)	f	[-]	0,157	
Time shift (delay)	Δt _t	[h]	11,767	
Periodic thermal transmittance	Y _{rel}	[W/m²K]	0,043	0,233
Internal thermal admittance	Y _{in}	[W/m²K] , [h]	3,615	2,254
External thermal admittance	Y _{ex}	[W/m²K] , [h]	1,515	4,739
Internal areal heat capacity	k ₁	[kJ/m²K]	50,228	
External areal heat capacity	k ₂	[kJ/m²K]	21,064	

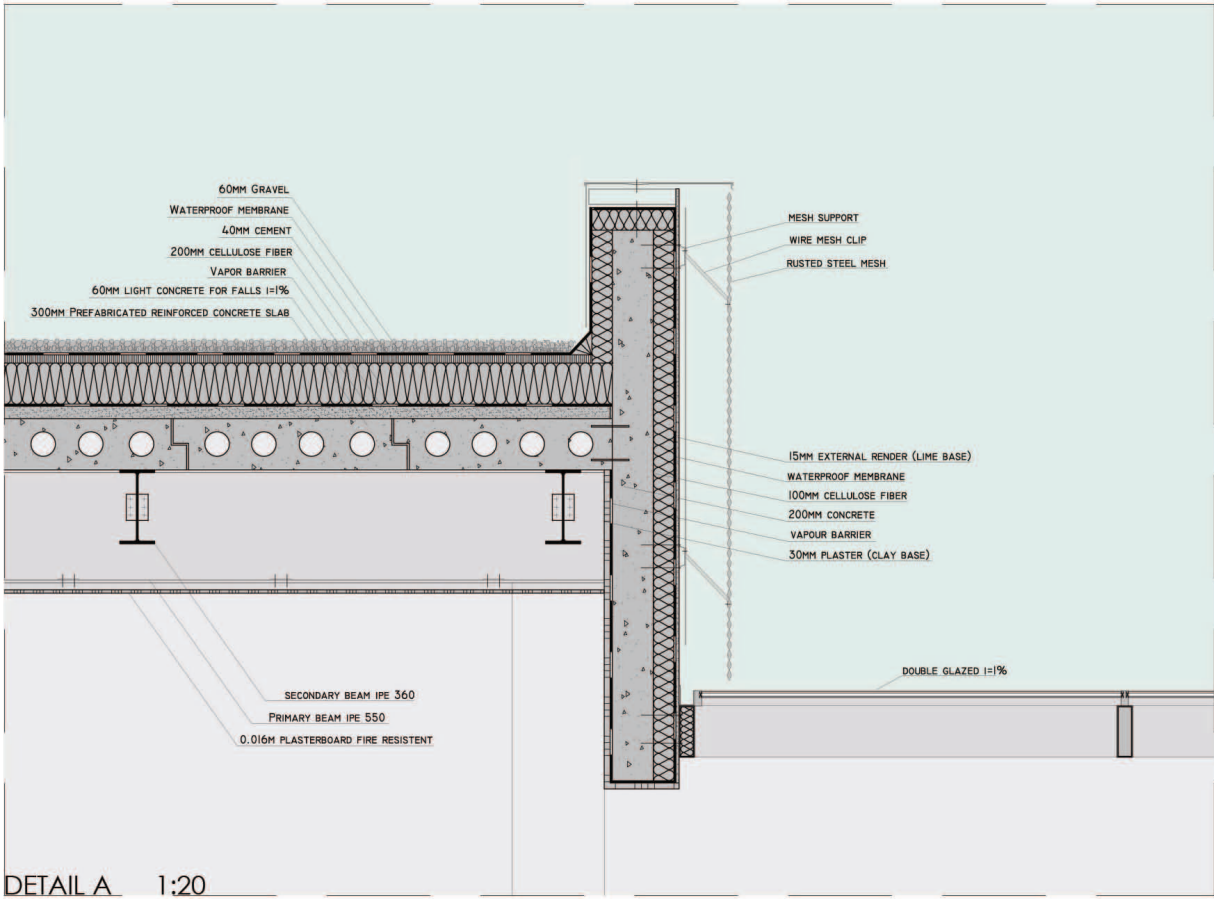
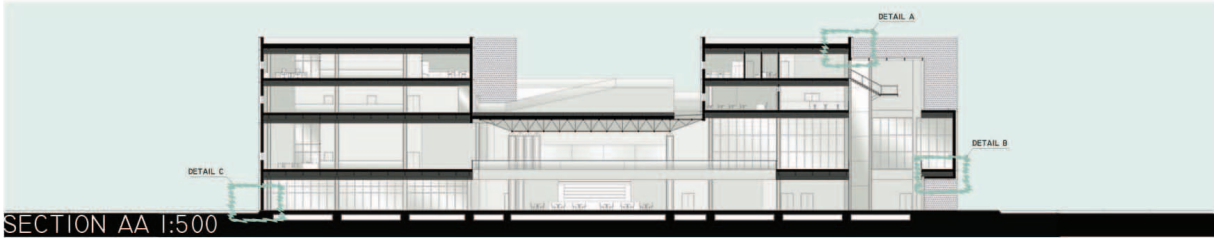
The most important values we should look in the preview table is the Transmittance (U value) and the time shift delay (h). The U values are important because they form the basis of any energy or carbon reduction standard. It is a measure of heat loss in a building element such as a wall, floor or roof. It can also be referred to as an overall heat transfer coefficient and measures how well parts of a building transfer heat. (RIBA, 2011). As we can see the U value reached is good (0,276) since the higher value allowed in Italy for external wall is 0,30 W/m²K. The Time delay shows how long it takes for the temperature that is inside regulate with the external temperature. As we can see the result was also good, because the minimum value should be 8 hours and in our case we have more than 11 hours delay.

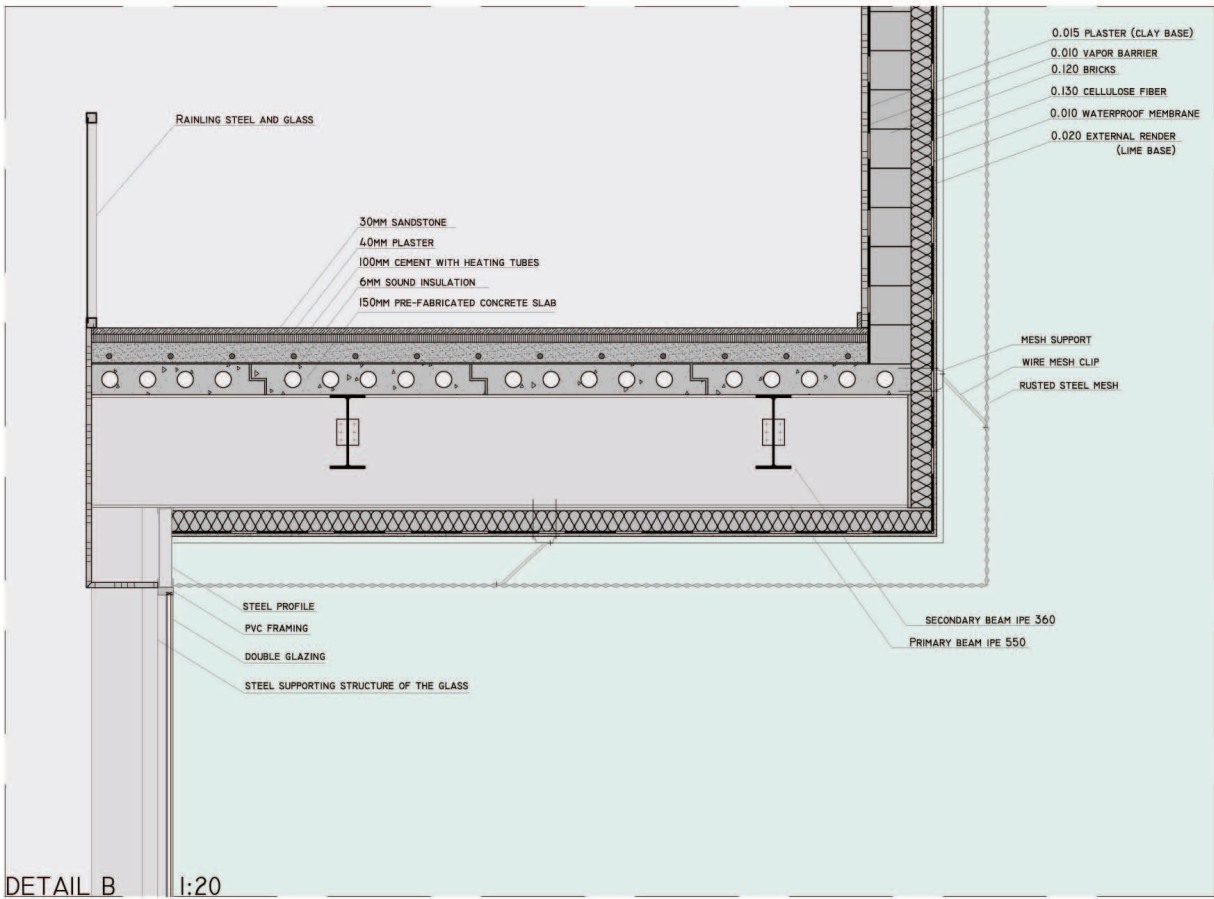
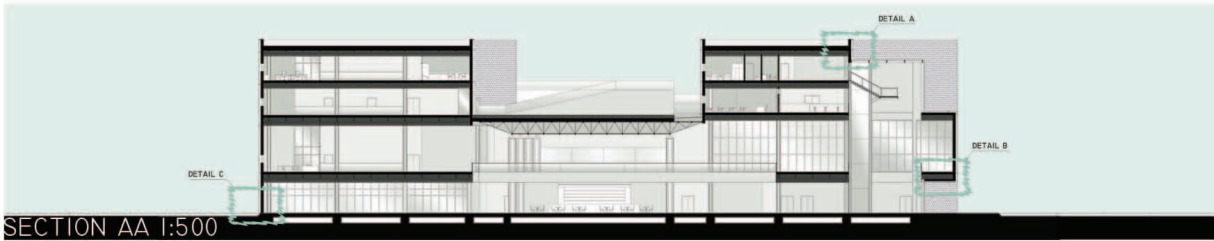
The cellulose fiber used for the thermal insulation contributes doubly to save the environment because has a lower CEP and CO₂ values and it is made from recycling paper. The product initially was imported from Germany but now there are Italian companies that do the whole process of the production and installation (ISOLARE, 2012).

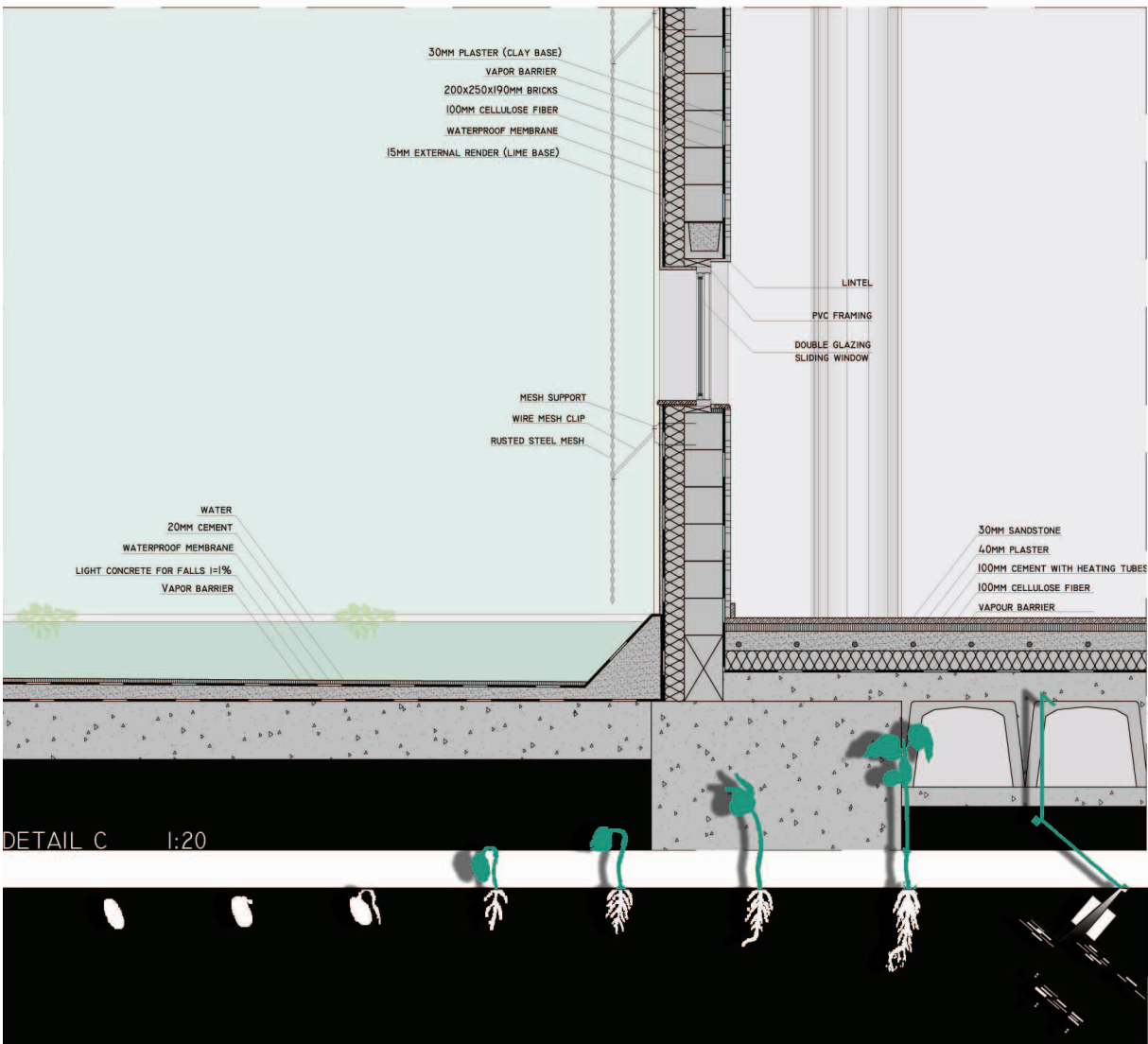
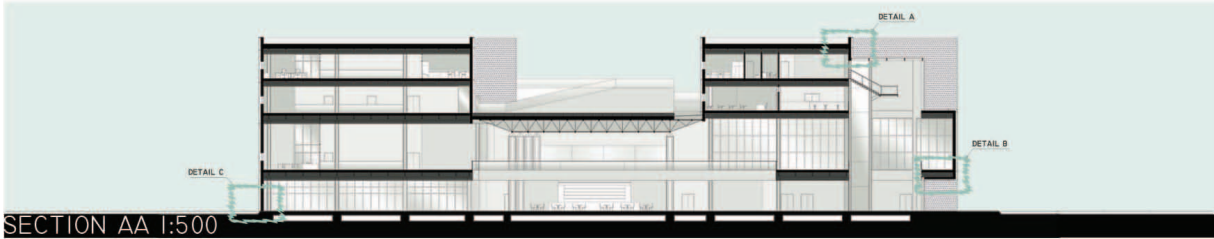
The building is covered by a rusted steel mesh, that gives privacy for who is studding and working in the building while does not block the view from who is inside, and filter the direct solar radiation. The solution of the material and colour was also used because we have the metaphor of the seed that is germinating in the site, and therefore the wire mesh gives this idea of unity of the building at the same time that its colour and texture changes during the time.

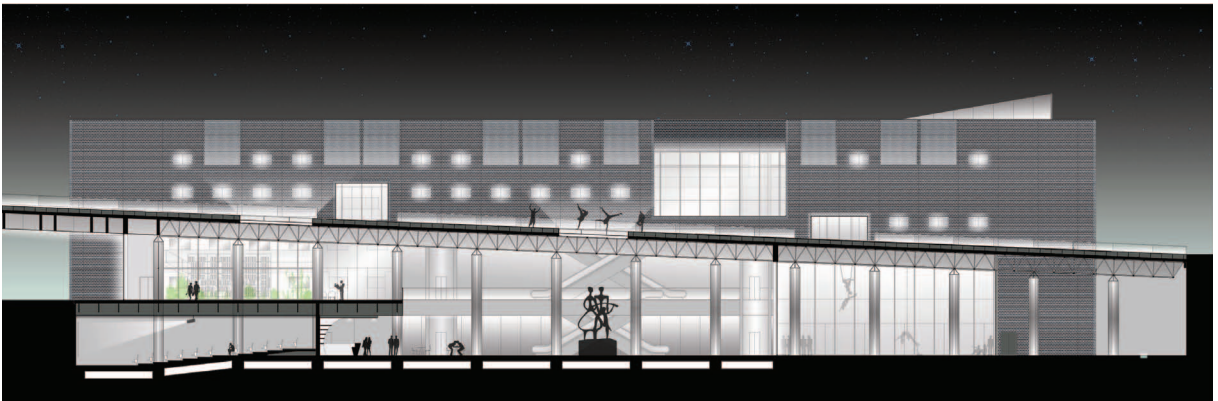
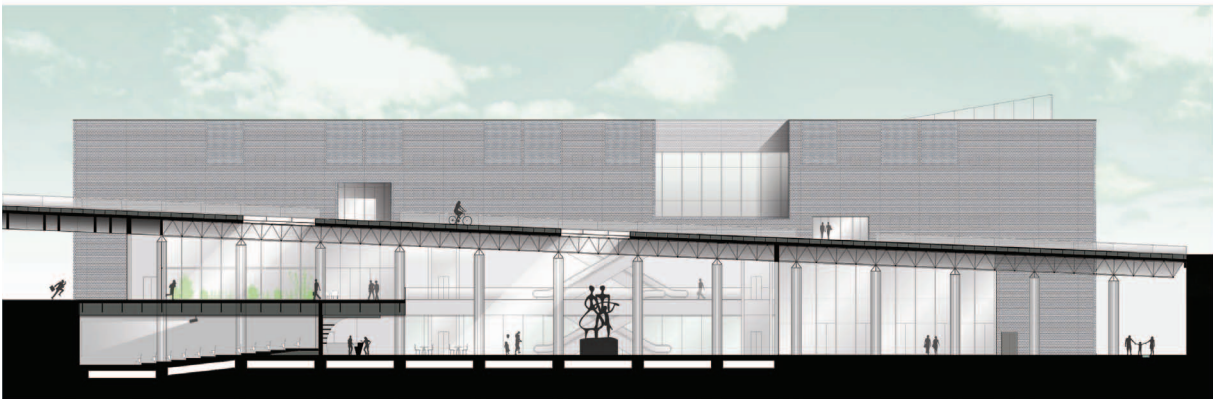
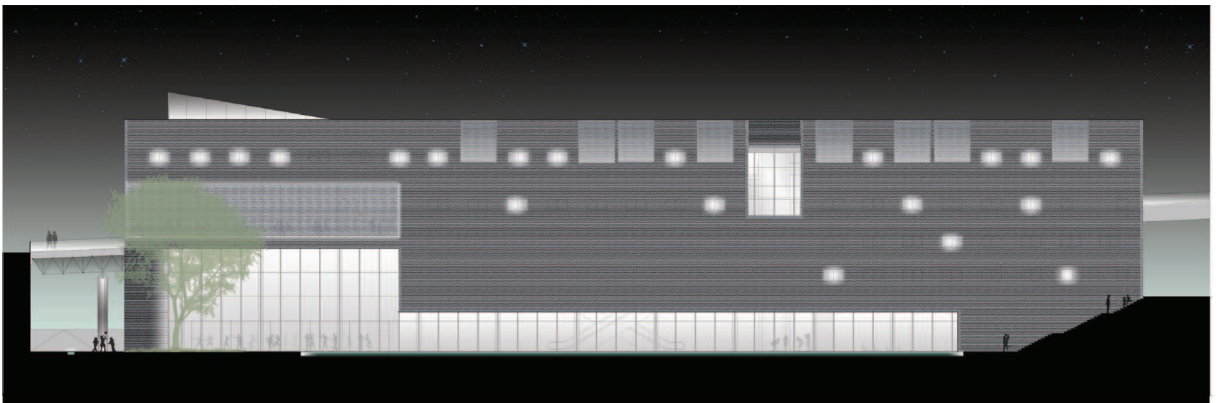
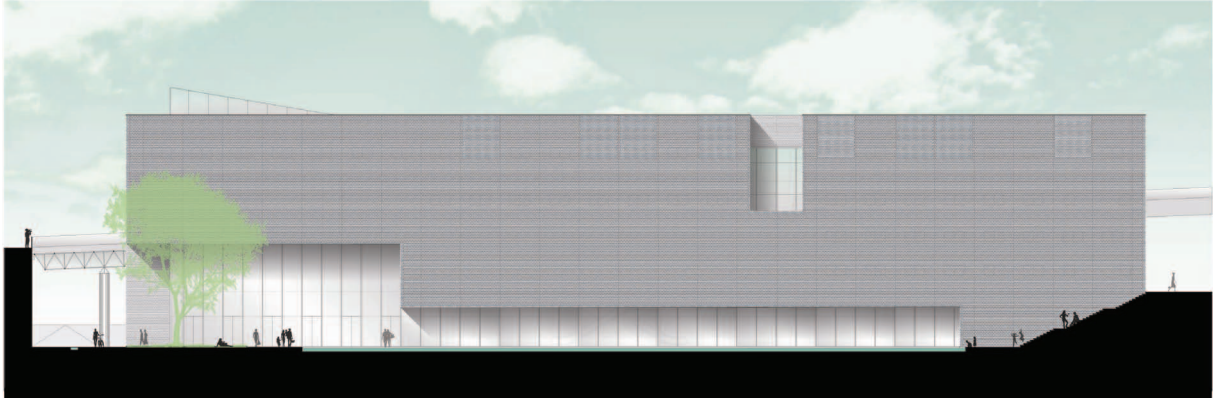
The installation of the mesh was inspired in the project of SANAA for the New York museum. In their project the mesh panels do not have a frame, the structural frame is installed near to the wall, connect with the panel just with small clips. In this way we almost do not see the division of the panels, giving the idea of a homogenous façade.











THE BRIDGE

The idea of having a bridge to connect the people to the river is due to some reasons. The practical reason is that we want a path that would be able to run through all the road infrastructure that we have in the way between city and river. Inspired in the highline of New York, the idea was to create a linear park so the bridge would not just be a “way” but an end itself, where the people can go to run, bike, seat, read, talk, date and admire the view. The bridge starts in the level of the city more like an Italian piazza, larger and with not so many trees, and with a small inclination of 4,5% because the bridge should reach a level that is able to cross the highway, the highest obstacle that we have in the route. The bridge starts to taper as it goes, and reach the width of 7 meters, and continue like this during the rest of the way. As it goes the number of trees and green areas also grows, as a sigh that the river is getting closer.

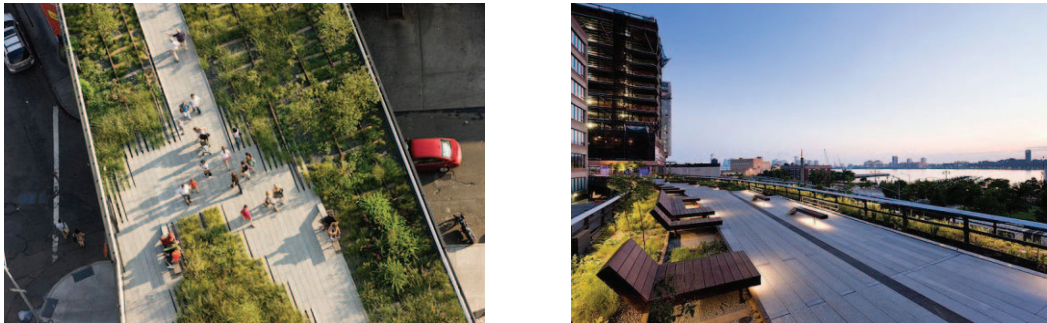


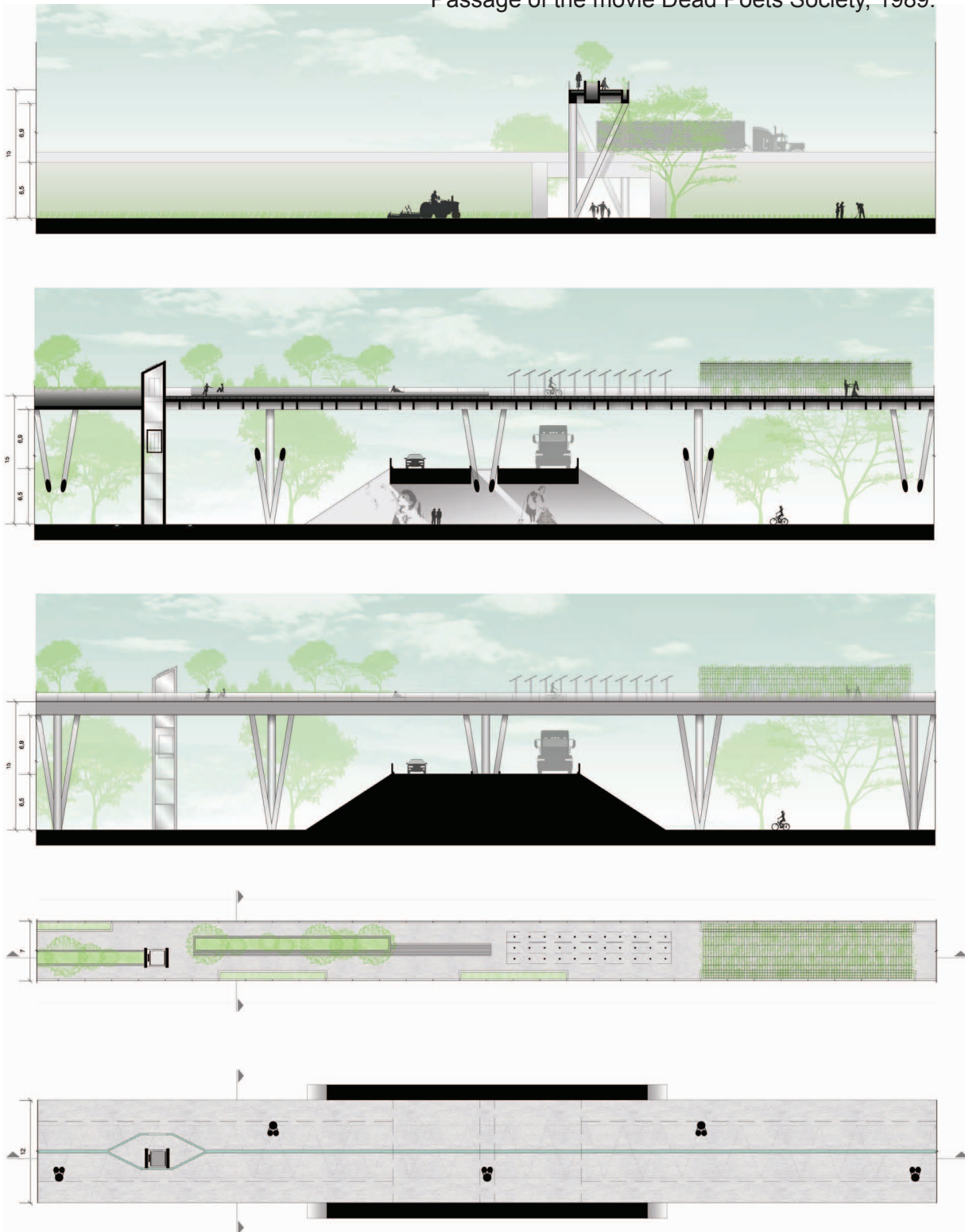
Figure X: Highline New York, project of Diller Scofidio + Renfro.

Also in the part that the position of the bridge is aligned with the north-south direction, there are some parts of the bridge with solar panels that can provide energy for the elevators and the leftover can be transfer to the building. Italy has been one of the most important clean energy markets in the world, ranking fifth in installed generation capacity. While other European countries have significantly reduced incentives for renewable in view of the budget and the pressure of the economic crisis, Italy has protected these incentives with the hope of stimulating economic growth. Most of this was for solar projects, which doubled in capacity reaching 12.4 GW. (EXAME, 2012).

The bridge has a difficult proportion to work with, because it has 7 meters width and, due to the highway, we need to have 15 meters high. To avoid a very heavy structure, it was create pillars that remind a tree, with a horizontal ticker pillar and two other thinner ones that like branches starts together with the horizontal one and grows in the diagonal direction, reaching the other side of the bridge. The position of the horizontal pillar intercalates from one side to the other of the bridge, to make it more stable.

- *Why do I stand up here? Anybody?*
- *To feel taller.*
- *No! But thank you for playing.*
- *I stand upon my desk to remind myself that we must constantly look at things in a different way. See, the world looks very different from up here. You don't believe me? Come see for yourselves. Come on.*

Passage of the movie Dead Poets Society, 1989.



BIBLIOGRAFY

Battisti E., Battisti F., Di Vita S., Guerritore C., Expo diffusa e sostenibile, Politecnico di Milano, Milano, 2011.

Carini, A., Piacere, Piacenza, Comune di Piacenza, Piacenza, 2012.

Downie D., Sometimes more really is more, Bon appétit, May, 2011, p.128-132.

Giordano, R., I Prodotti per l'edilizia sostenibile, Esselibri S.p.A., Napoli, 2010.

Koolhaas R., Junkspace, Obsolescence, October, vol.100, Spring, 2002, pp.175-190.

Montari M., Il sapore della cultura. In: Alberti P, Dell'Aquila F, Ponti F. I musei del gusto dell'Emilia-Romagna , Bologna, Il libri di agricoltora, n.3, undated, p.6

Petrini C., Buono, Pulito e Giusto – Principi di nuova gastronomia, Giulio Eunadi editore s.p.a., Torino, 2005.

Rottle N., Yocom K., Ecological Design, AVA Publishing SA, Lausanne, 2010.

Scudo G., Torre J., Spazi verdi urbani, Esselibri S.p.A., Napoli, 2003.

WEBSITES

Comune di Piacenza,

Available in: <http://web2.comune.piacenza.it/operepubbliche/restauro-manutenzione-edifici/restauro-ex-chiesa-del-carmine>

Comune di Piacenza,

Available in: <http://web.comune.piacenza.it/benvenuti/piacenza-si-presenta/chiese/chiesa-di-san-sisto>

EDS,

Available in: <http://www.expodiffusa.it/>

EFSA,

Available in: <http://www.efsa.europa.eu/>

Exame,

Available in: <http://exame.abril.com.br/meio-ambiente-e-energia/energia/noticias/os-10-paises-lideres-em-energia-limpa-no-mundo#5>

Expo Q&A,

Available in: http://www.worldsfairs.com/Worlds_Fairs/Expos_Q%26A.html

ISOLARE,

Available in: http://www.isolare.it/blog/nuovo-isolante-naturale-da-materia-primaria-italiana_post16.html

Italia,

Available in: http://www.italia.it/en/discover-italy/emilia-romagna.html#box_1

MACS Lab,

Available in: <http://www.macslab.com/optosolar.html>

UNESCO,

Available in: <http://whc.unesco.org/en/list>