

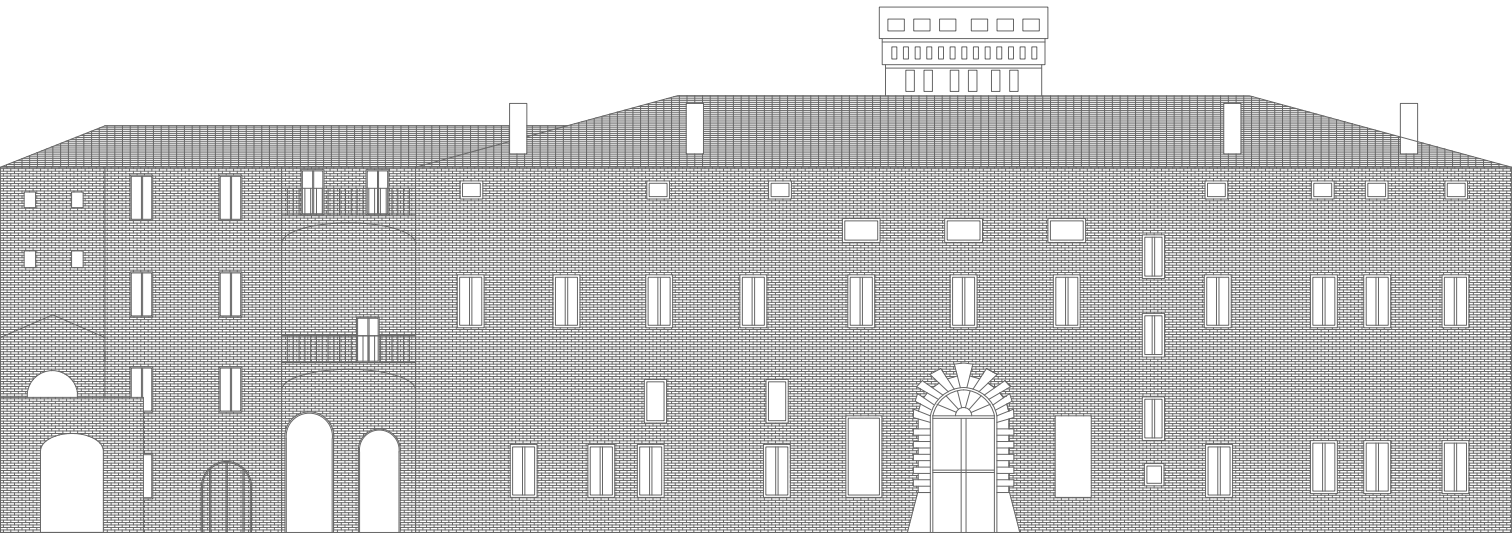
# POLITECNICO MILANO 1863

POLITECNICO DI MILANO  
MASTER OF SCIENCE  
SUSTAINABLE ARCHITECTURE AND LANDSCAPE DESIGN  
2021-2023

## Re-designing the ancient garden of Ducal Palace in Guastalla

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Students: Kuan Chang, Xin Ding



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## Abstract

Along with the development of city today, Open Space have become one of the most important component in urban environment, and its design is widely concerned. Open space refers to areas of the city that have been preserved or restored to their natural landscape, for example, recreational area, conservation areas, scenic areas, or land set aside for the adjustment of urban construction. It has recreational value, natural resource conservation value, historical and cultural value, and scenic value. A vibrant open space, in form, it is a place of transition between the different functional areas of the city, like a chain. Functionally, it is an important meeting place for the people of the city, a place for festivals, a place where people can relax and energise the city.

In Italy, many cities still keep Renaissance palaces and gardens, as this is not only a sign of respect for history but also a way of preserving people's memories. At the same times, the restoration of listed buildings in Italy is regulated by the 1972 Restoration Charter, whose regulations, 'to be defined as gold', consist of 12 articles according to which the Superintendencies approve the relevant projects and supervise their execution. These historic buildings and gardens have witnessed the history and development of the city, and their function and form have changed over time. Some serve as museums, some are used as libraries or art centres, and perhaps some have become derelict buildings.

This site is located in Guastalla, a small city located in the Italian region of Emilia Romagna, near Po River. The Palazzo Ducale in the centre of the city has witnessed the development and evolution of this historic city. As times have changed, the Palazzo Ducale has gone from being a palace to a private space, to being used for government offices. And the open space behind the palace, which was once a bustling piazza as an urban center, has now become a deserted and uninhabited area and car park, losing its former vibrancy.

This project, we will start from studying the history evolution and discuss the meaning of the garden of Palazzo Ducale as it exists, exploring its relationship with the city from a historical perspective and how to restore its value and vitality and consider the ancient garden as a Chain of surrounding space, enhancing the aesthetic value and practical value of it. The study of the rhythm of palazzo ducale façade and plan has led to a new design language that redefines the function and form of the ancient garden.

By redesigning this ancient garden, we hope to make this old garden the centre of the city again in a more sustainable way, based on respecting and preserving its history and bringing a better living environment for the inhabitants.

**Keywords:** Memories; Transformation; Open Space; Regeneration; Sustainability; Urban Center

# 01. Background



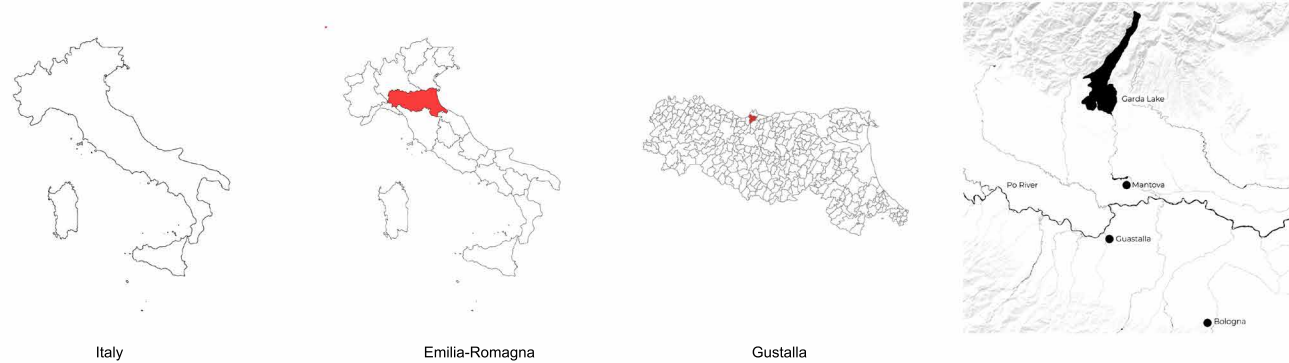
The requirements include the redesign of the area between the palace and the linear building which closes the square to the east and which today contains medical clinics and a pharmacy. This large urban space is today experienced as a generic transit area for which it is necessary to identify new functions and a new identity.

Redesign the large space through a sensitive design that is aware of the historical value of the place. The projects involve limited alterations to the morphology of the land and evaluate the construction of new volumes, and propose new functions to be hosted inside or outside the building. The design actions will aim to regenerate the lost identity of the ancient garden and square complex, through tactical enhancement of the public space, based on a clear design strategy and in continuity with the characteristics and development of the historic city.



Site Area

## Location

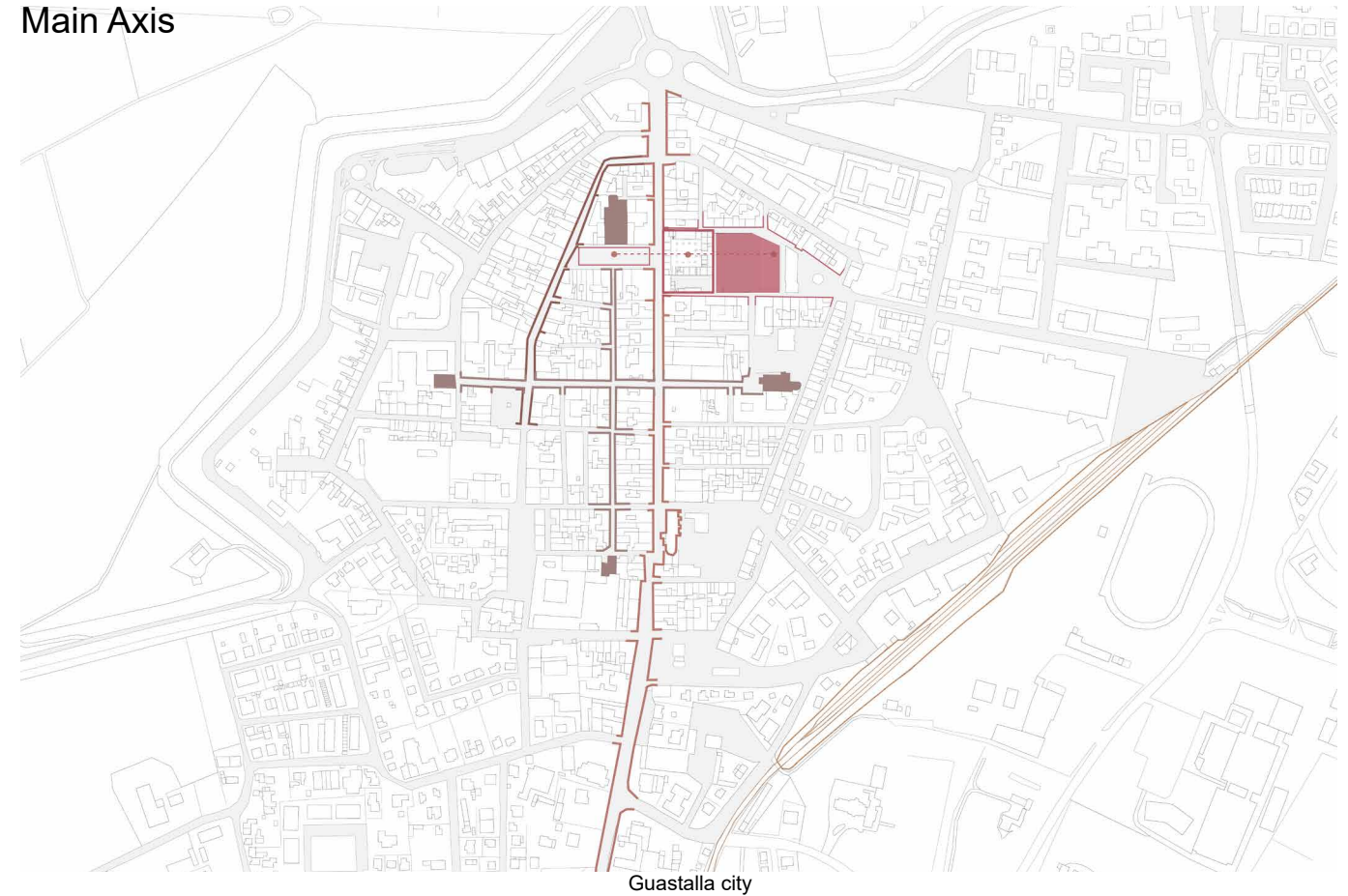


Guastalla is the capital of Baja Reggiana, situated in the Llanura Padana, not far from the right bank of the Po River, about 30 km from the cities of Reggio Emilia, Parma and Mantua<sup>1</sup>. The city was an important military fortification in the 16th century. Although some of the previous history walls were destroyed or demolished, we can still see the shape of the walls in the boundaries of the old city. The boundary of the city still looks like a fortification. In its streets, palaces, churches and monuments, Guastalla retains the discreet charm of an ancient capital. The 16th-century urban layout is still substantially visible<sup>2</sup>.

The site we designed is located in Via Gonzaga, the ancient Garden of Palazzo Ducale.

The axis in Guastalla is really clear and important for the morphology of the city. The one is Via Gonzaga, which connects the south residential area and north farmland area of the city. Now it is the main road connecting the existing parts of the city with new Renaissance-style areas such as Piazza Maggiore and the Palazzo Ducale. Today, it is filled with various shops and businesses, and when there is festival or a market, this road will become a pedestrian only.

## Main Axis



The ancient Via Gonzaga is a system of chequered streets leading to the square which in the heart of the city, dominated by the beautiful statue of Ferrante Gonzaga by Leone Leoni. Palazzo Ducale, the 16th-century palace, also located on Via Gonzaga, now it is used for government office.

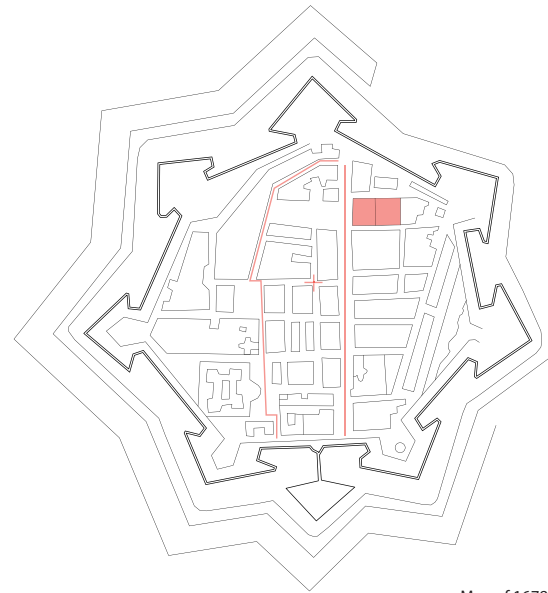
Corso Garibaldi is another main axis in Guastalla. Maldotti Library is on that road, a valuable example of an 18th-century scholar's library, which holds incunabula and medieval manuscripts.

The other main axis Croce del Volterra, in each direction, there is a church at the end of the road. The axis also very clear in our site, palazzo mzzini, palazzo ducale, and the open space connected by one road.

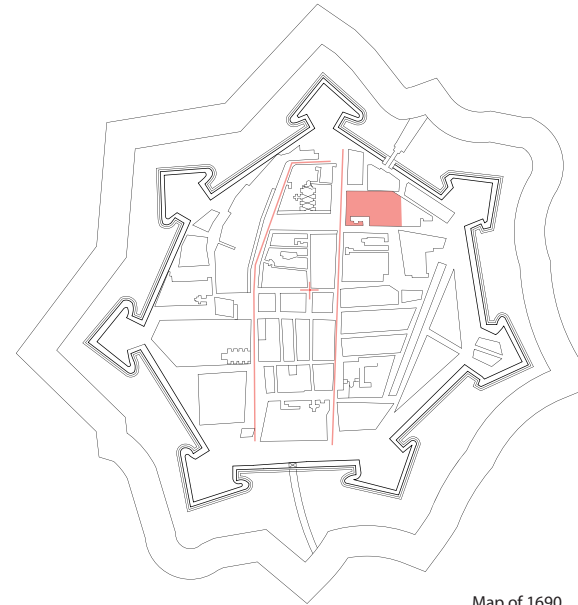
# History Development of Guastalla

## Via Gonzaga

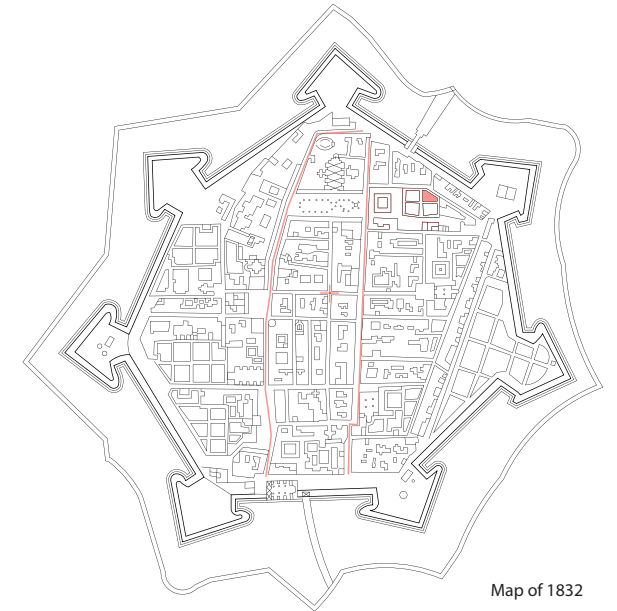
The main street of the historic centre, it is named after the dynasty that ruled the city of Guastalla from 1539 to 1746. Via Gonzaga runs north-south, opening from Largo dei Mille to the south and ending at Largo Gramsci to the north. This major thoroughfare had been present since Domenico Giunti's project for Guastalla, commissioned by Ferrante Gonzaga, in 1549. As the urban redevelopment of the city progressed, Via Gonzaga became the main road connecting the pre-existing part of the city with the new Renaissance-style areas



Map of 1678



Map of 1690



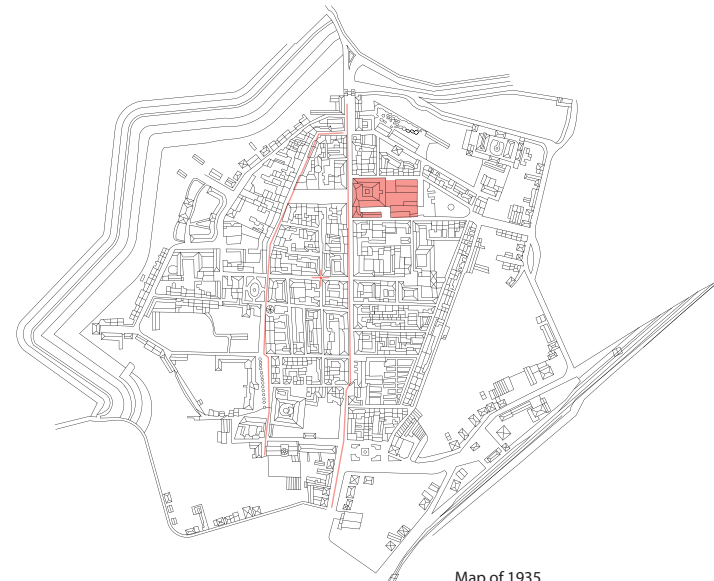
Map of 1832

## Corso Garibaldi

The causeway, on the side of the square in front of the Ducal Palace, is evidence of part of the ancient medieval village. It connected the ancient fortress, located where the municipal tower now stands, to the village and was originally a river embankment. To the north of the same street was the Jewish ghetto with the Synagogue, still present, but used for private use. Along Corso Garibaldi are the Church of Santa Croce and the Maldotti Library.

## Croce del Volterra

The design was created by the Tuscan architect Francesco Capriani, known as Volterra. At the end of each arm is a church: to the north is the Co-cathedral, to the south the Church of St Charles, to the west the Church of the Holy Cross, to the east the Church of the Servants.<sup>3</sup>



Map of 1935



2023

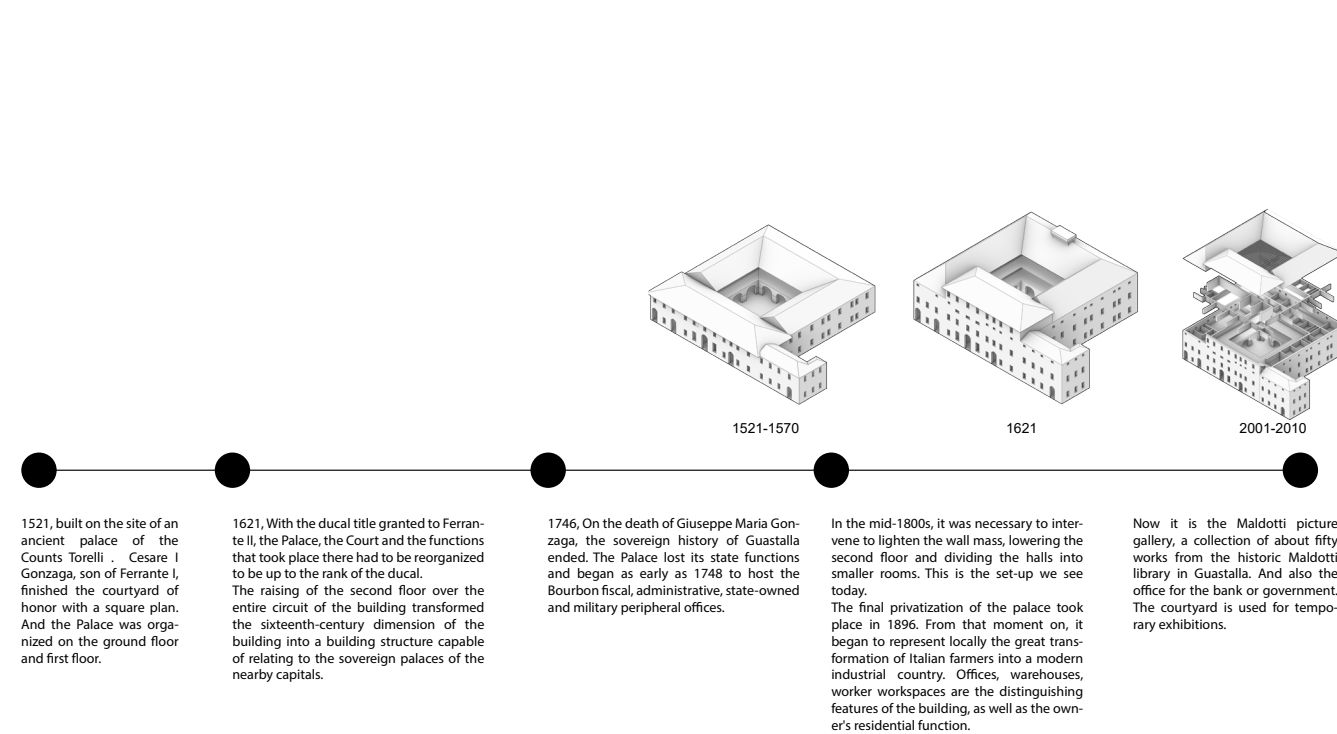
## Railway

1886-1887, railway was built.



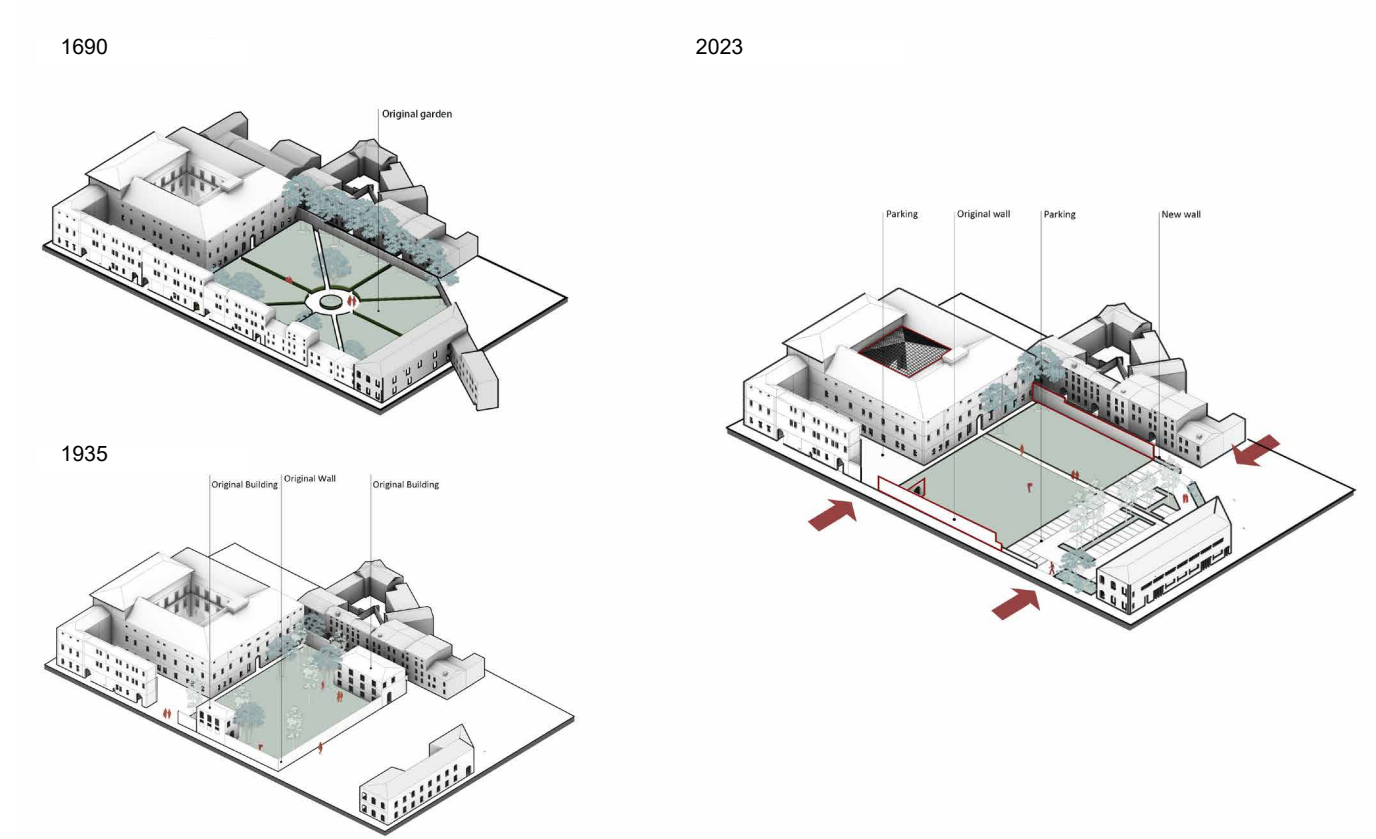
# History of Palazzo Ducale

The Three Stages of Historical Changes in the Palazzo Ducale  
From Palce-Private-Public



# Historical of ancient garden of Palazzo Ducale

Three stages of changes in the garden of Palazzo Ducale  
From private to open



It is difficult to know exactly in which year the garden was designed by whom. From the old maps we can see how the garden has changed over the history. One of the earliest maps with the style of the garden, dating back to 1690, is simply a Renaissance-style garden, a style that can still be found in the city of Guastalla. In the 1935 map, we can see that the original garden no longer exists and has been replaced by two low-rise buildings. We guess that it was because Palazzo Ducale lost its palatial function and was converted to private use. The two newly added buildings may have been used for storage functions. The garden, which we can now see, is a large lawn with a clear main path in the middle, connecting the atrium of the Palazzo Ducale. The buildings in the garden were demolished, leaving only part of the broken ancient wall. This garden is now used for important local events, and when there are no events, few residents or visitors stop here<sup>4</sup>.

# The Restoration of Palazzo Ducale

By Carmassi studio di Architettura from 2001-2010

Regeneration of Palazzo Ducale by Carmassi studio di Architettura: A series of small interventions such as the restoration of ancient inserted openings, the removal of unstable additions and recent false ceilings, the uncovering of ancient floors hidden by recent ones, made the original spaces visible, thus restoring the old proposals as well as the unexpected effect of transparency. In particular, the closed porch on the ground floor around the central courtyard has been reopened, restoring the iron and glass roof and wooden balconies built in the early 1900s. Particular care was taken with this aspect of heritage conservation, which is extremely important, in the design of new contemporary elements such as toilets, lifts and book towers. necessary for the new use of the building. In fact, most of the rooms are used for museum functions and the public library, while the ground floor houses the bank, restaurant, bar and information offices, gathered around the courtyard and designed as a covered public square<sup>5</sup>.



Figure1-Coutyard of Palazzo Ducale ©Mario Ciampi

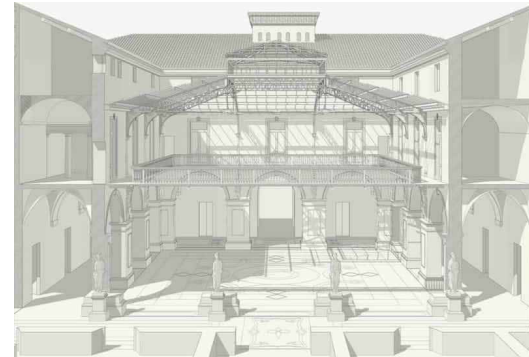


Figure2-Coutyard of Palazzo Ducale ©Carmassi studio di Architettura



Figure3-Stairs ©Mario Ciampi

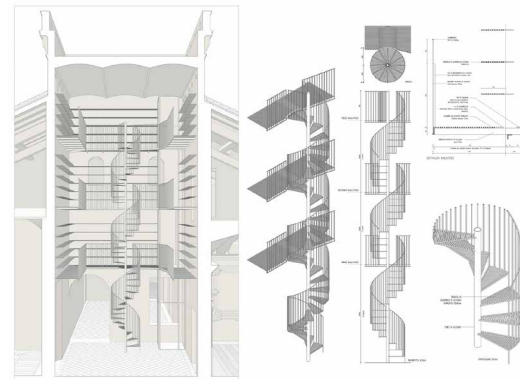


Figure2-stairs ©Carmassi studio di Architettura

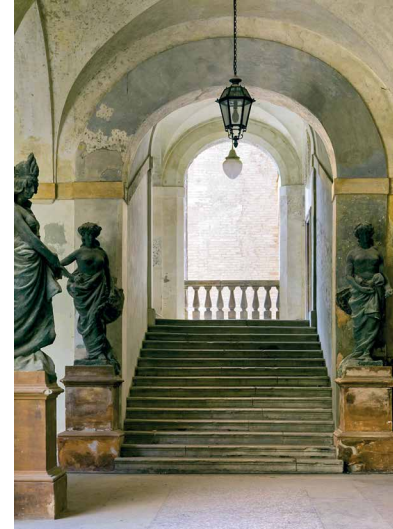


Figure5-Stair to first floor ©Mario Ciampi

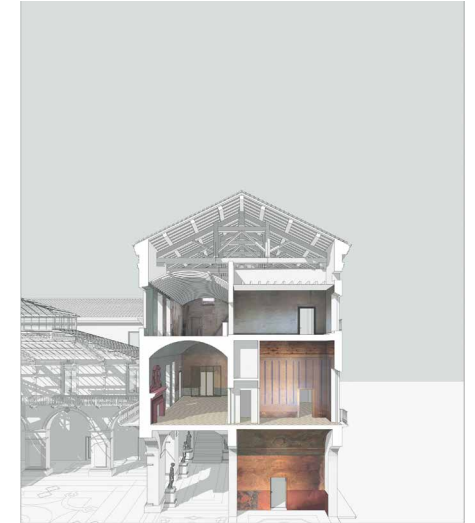


Figure6-Section of indoor area of Palazzo Ducale ©Carmassi studio di Architettura



Figure7-Facade of Palazzo Ducale ©Mario Ciampi

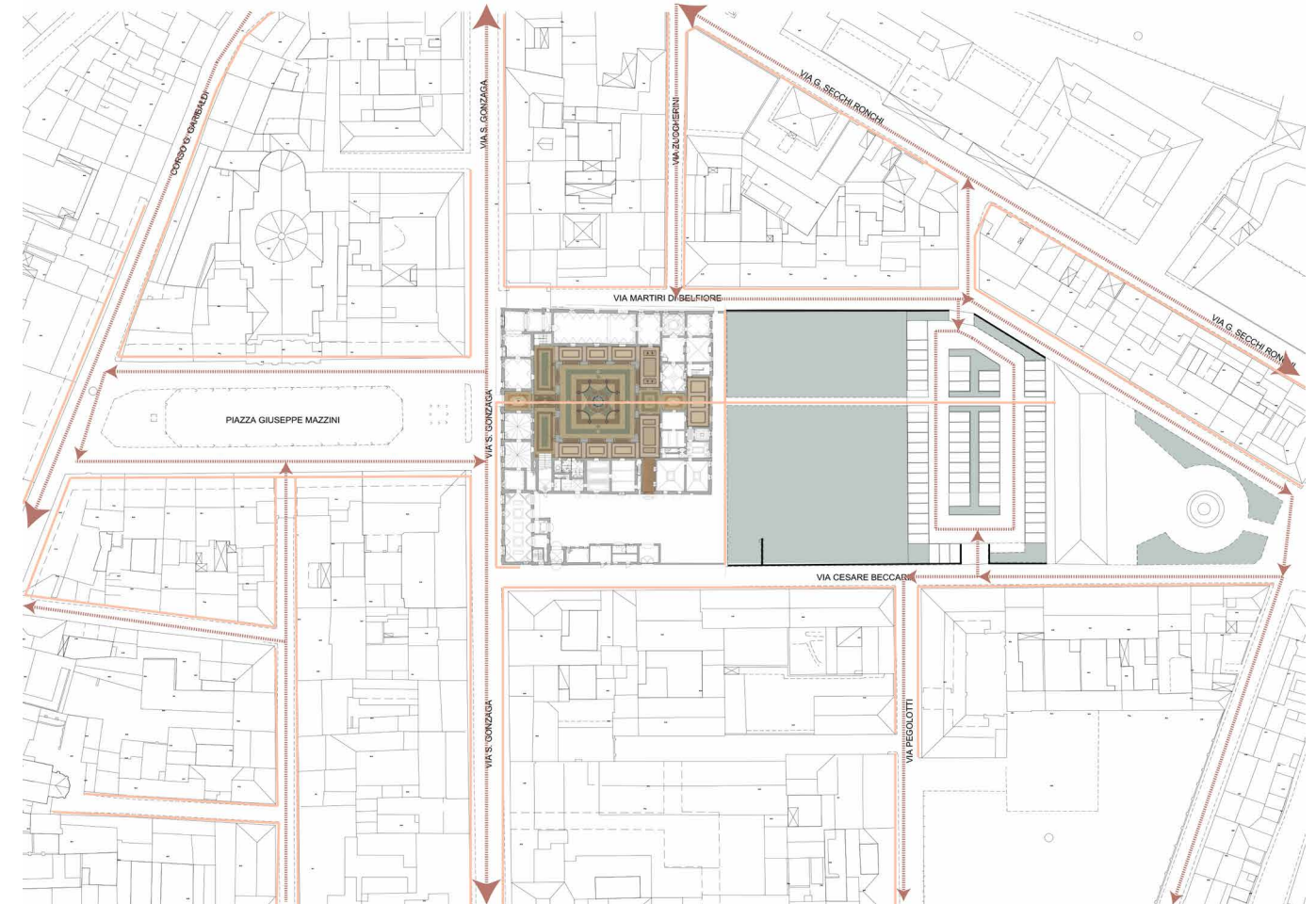


Figure8-Facade of Palazzo Ducale ©Carmassi studio di Architettura

## **02. Pre-analysis**

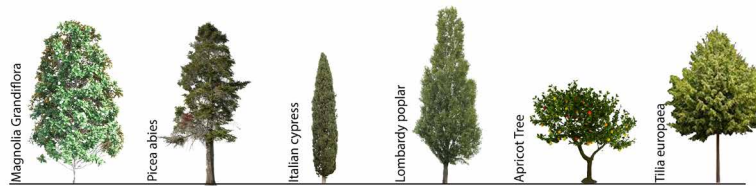
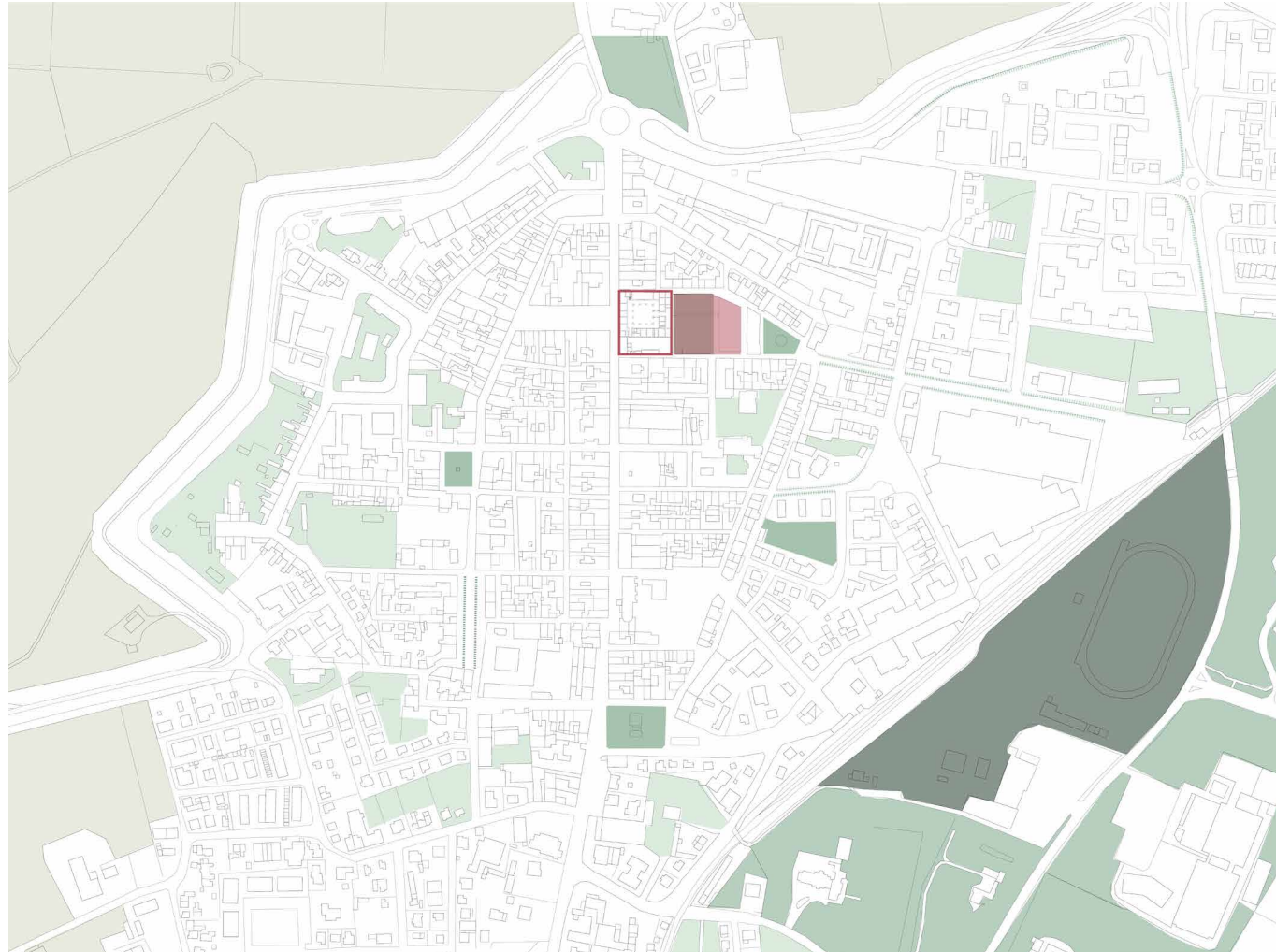
# Urban Scale Analysis

## Accessibility

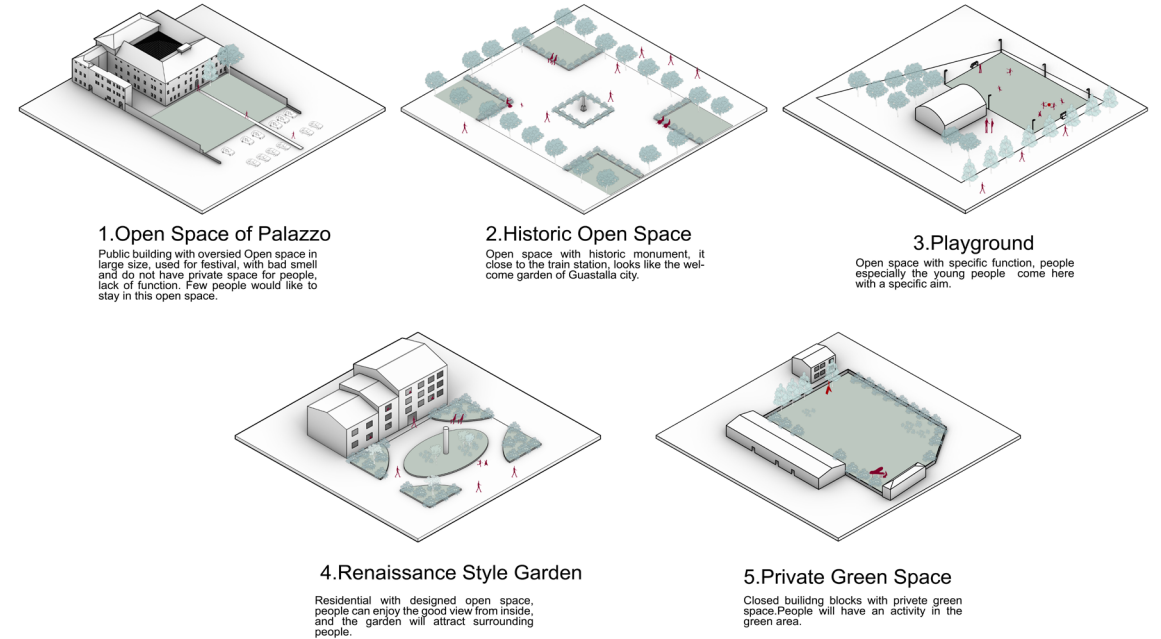




# Open space



Type of the Plants in the site



Different type of Open Space in Guastalla

The open space, we want to find the relationship between open space, architecture and people's activities, according to current uses. For example, the Historic open space, where close to train station and it has a historic monument, so it will attract the tourists. The playground, which is an open space with a specific function, local people especially the young people, will come here. The Renaissance style garden which is designed well, people not only can stay here for a while, and also can enjoy the view from their house. And there are also the huge private Green space in a close block.

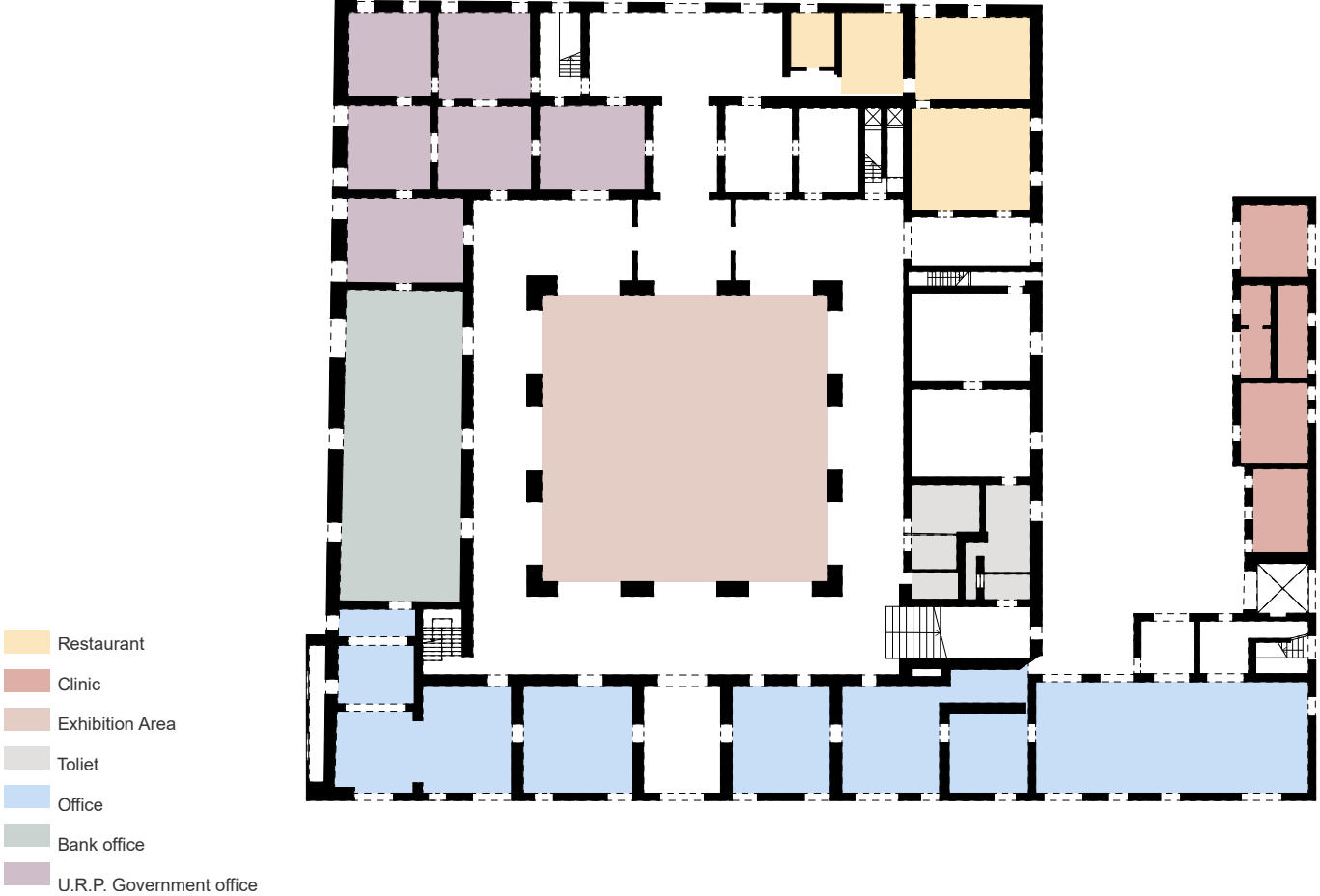
We found that compared with the other open spaces, our site is lack of the functions. One of the local people, she lived there for 20 years, but she thought the important palazzo ducale and green area did not leave her deep impression, she only crosses this open space and the palazzo ducale, from the main road, because it is very convenient from the other side to the via Gonzaga. When we visit the site, no one stays in this large green space, because it is too open to have a private area for people to stay, the local people only use the big space for the festival like animal festival.



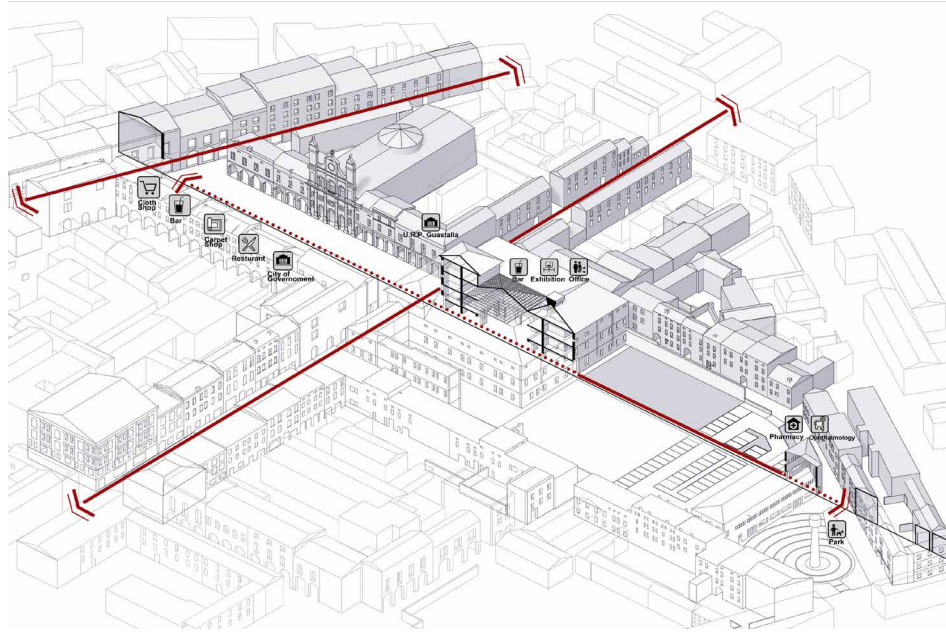
Parking Area



Plan of Palazzo Ducale

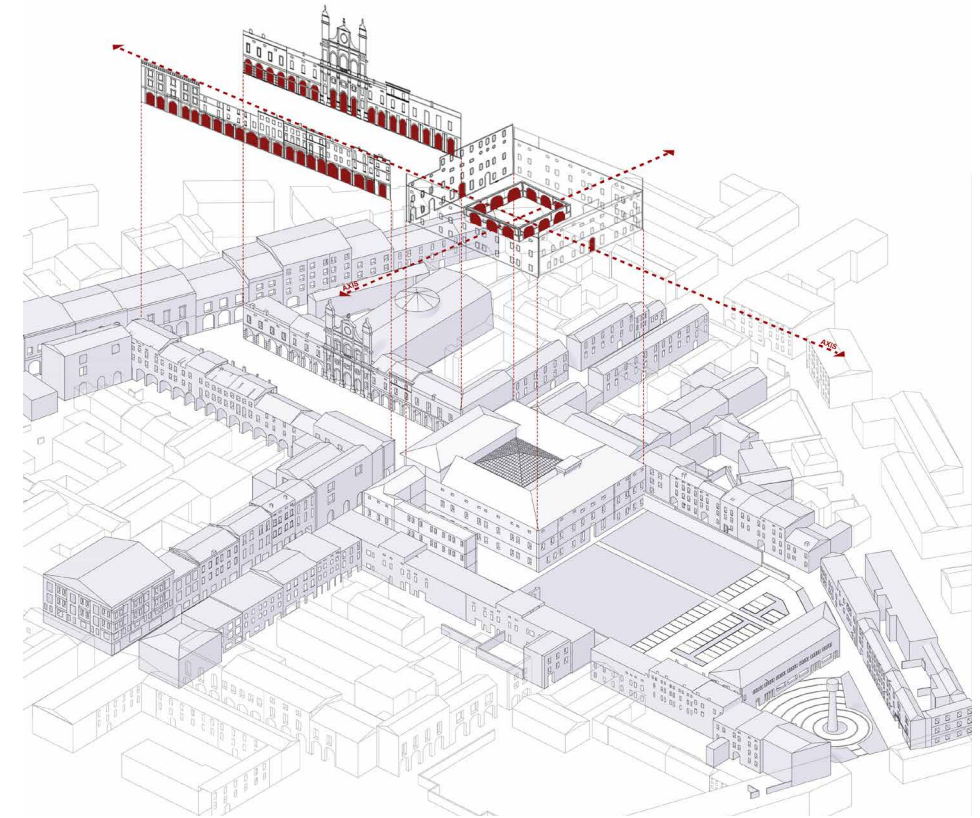


## Transformation



Spatial Transformation

From Corso Garibaldi, then cross Piazza Mazzini, Via Gonzaga, the facade of Palazzo Ducale is in front of us. Then cross the courtyard of Palazzo, there is an ancient garden in the back of Palazzo Ducale. The axis will bring people from the ancient residential area and the bank of river Po, to our site. There are shops under the portico of piazza mazzini, and every Wednesday, via Gonzaga will be the pedestrian only.

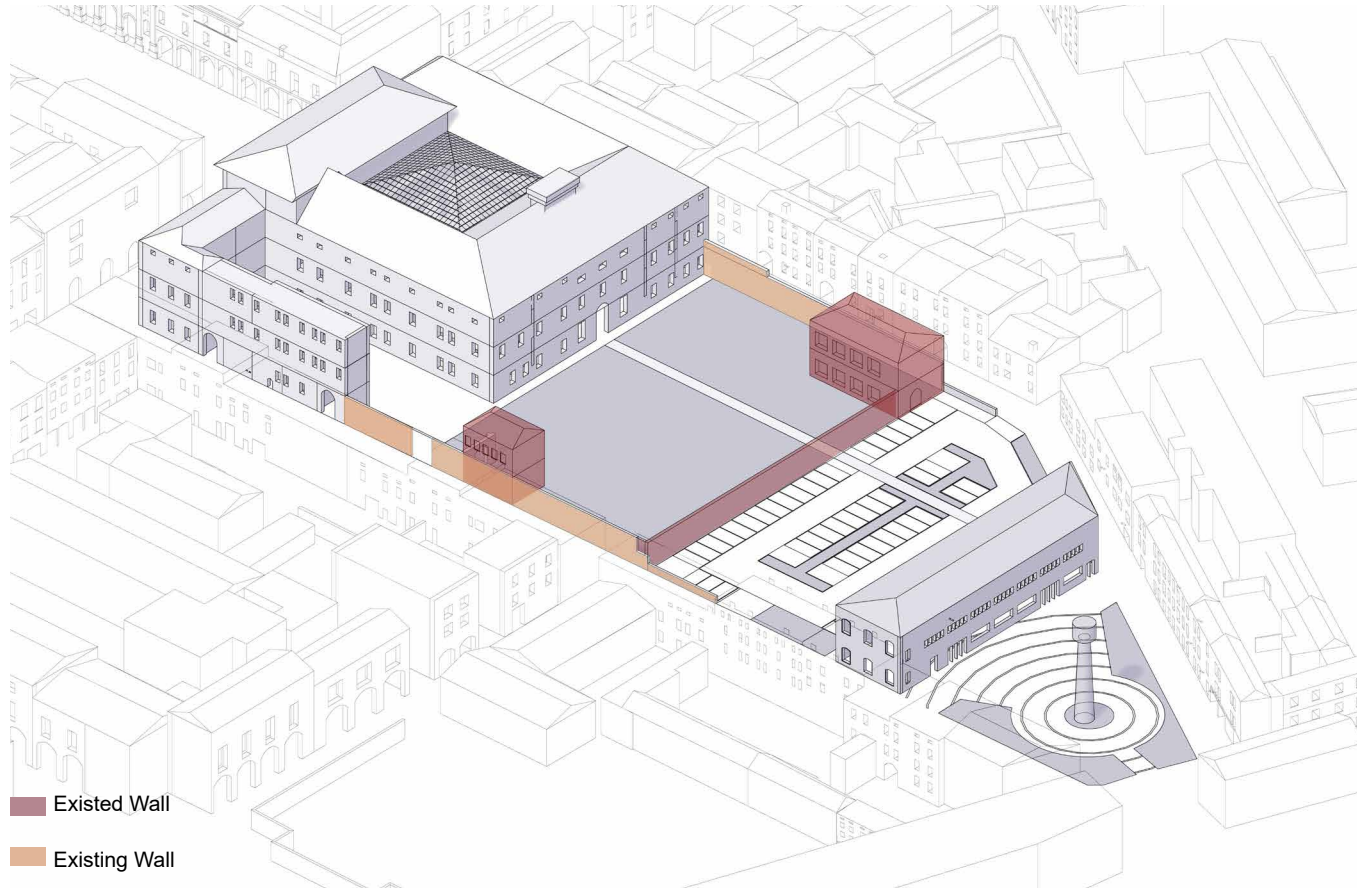


Axis Analysis

When the visitors pass through this axis from Corso Garibaldi to the ancient garden, first passes through an open piazza with symmetrical arcades, then through the central symmetrical layout of the courtyard with the Renaissance-style carved palazzo ducale, and then through the corridor to an open lawn. Along the main axis, people will pass through open spaces, semi-open spaces and then another open space transformation. Meanwhile, the light and smell also have changed.

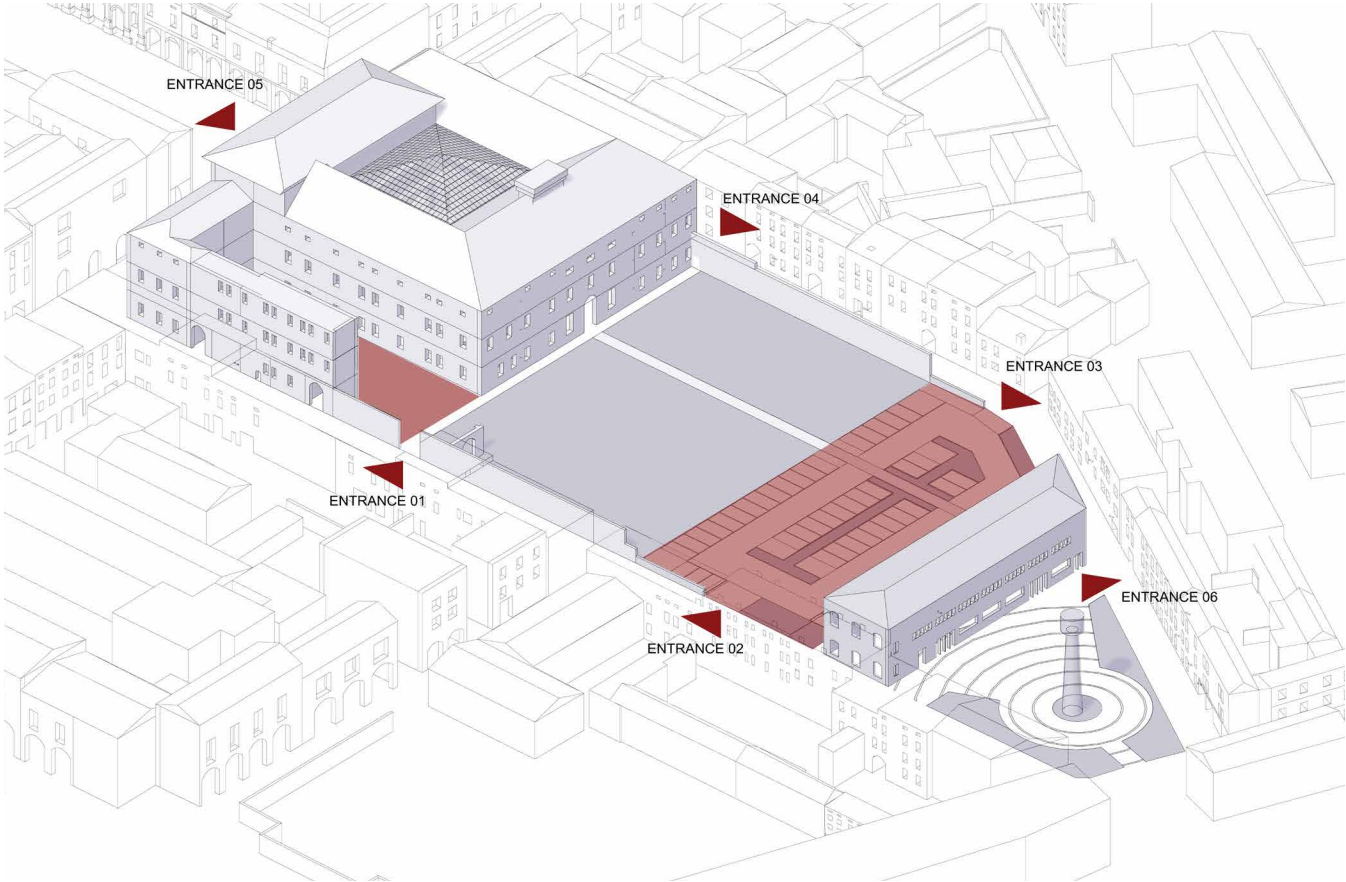
# Small Scale Analysis

## Historical elements

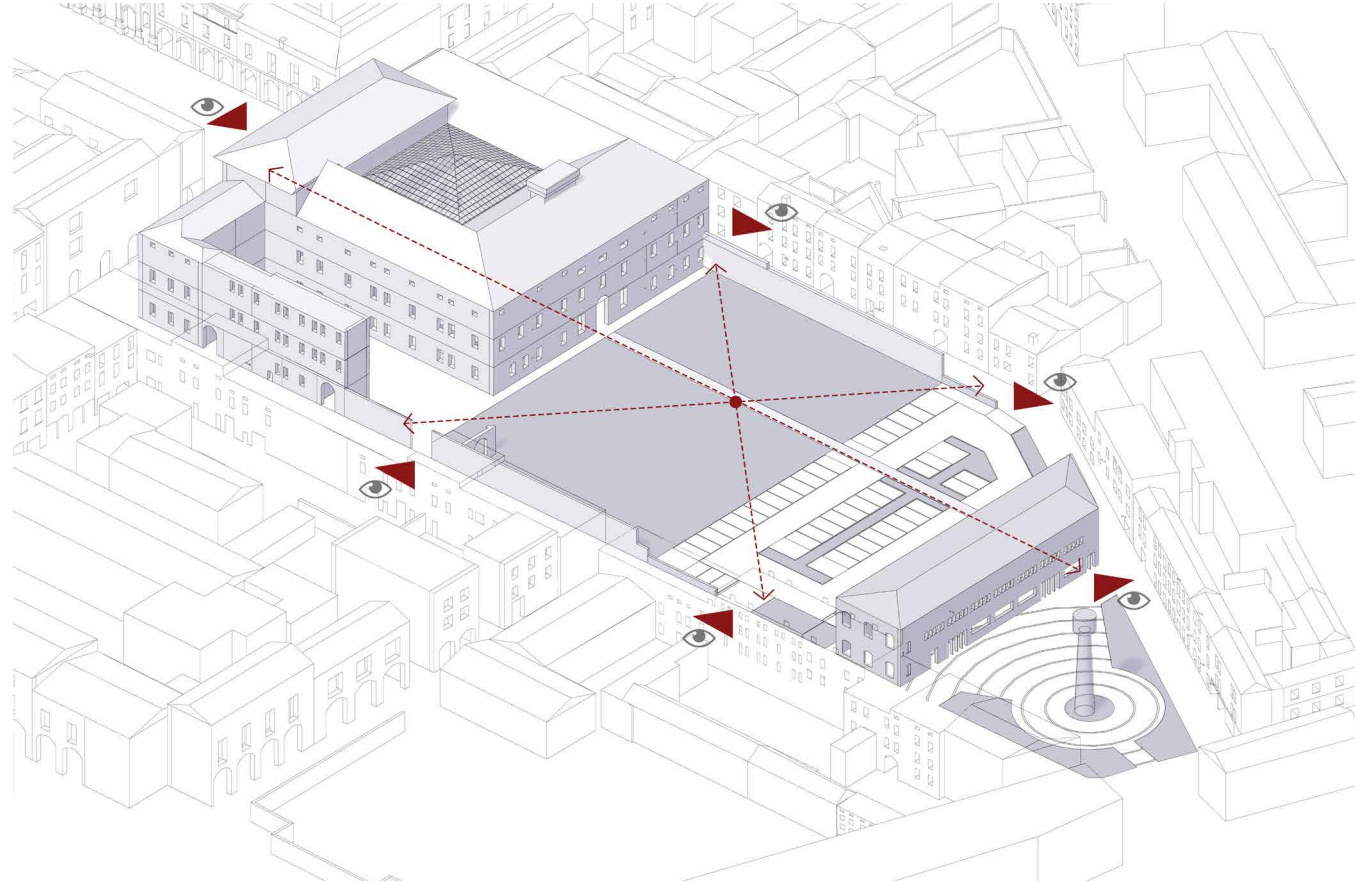




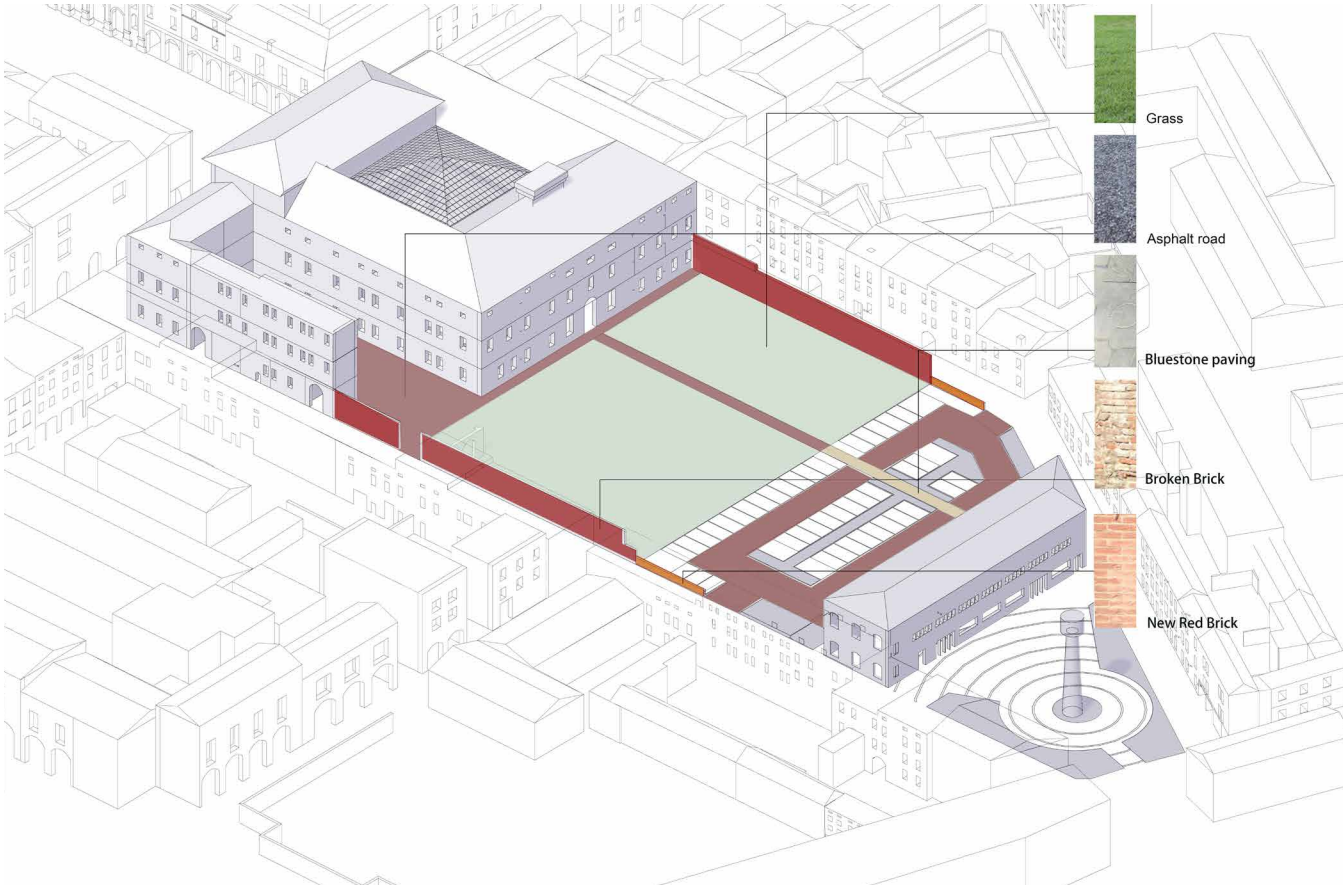
Entrance



Line of sight



# Pavements and materials

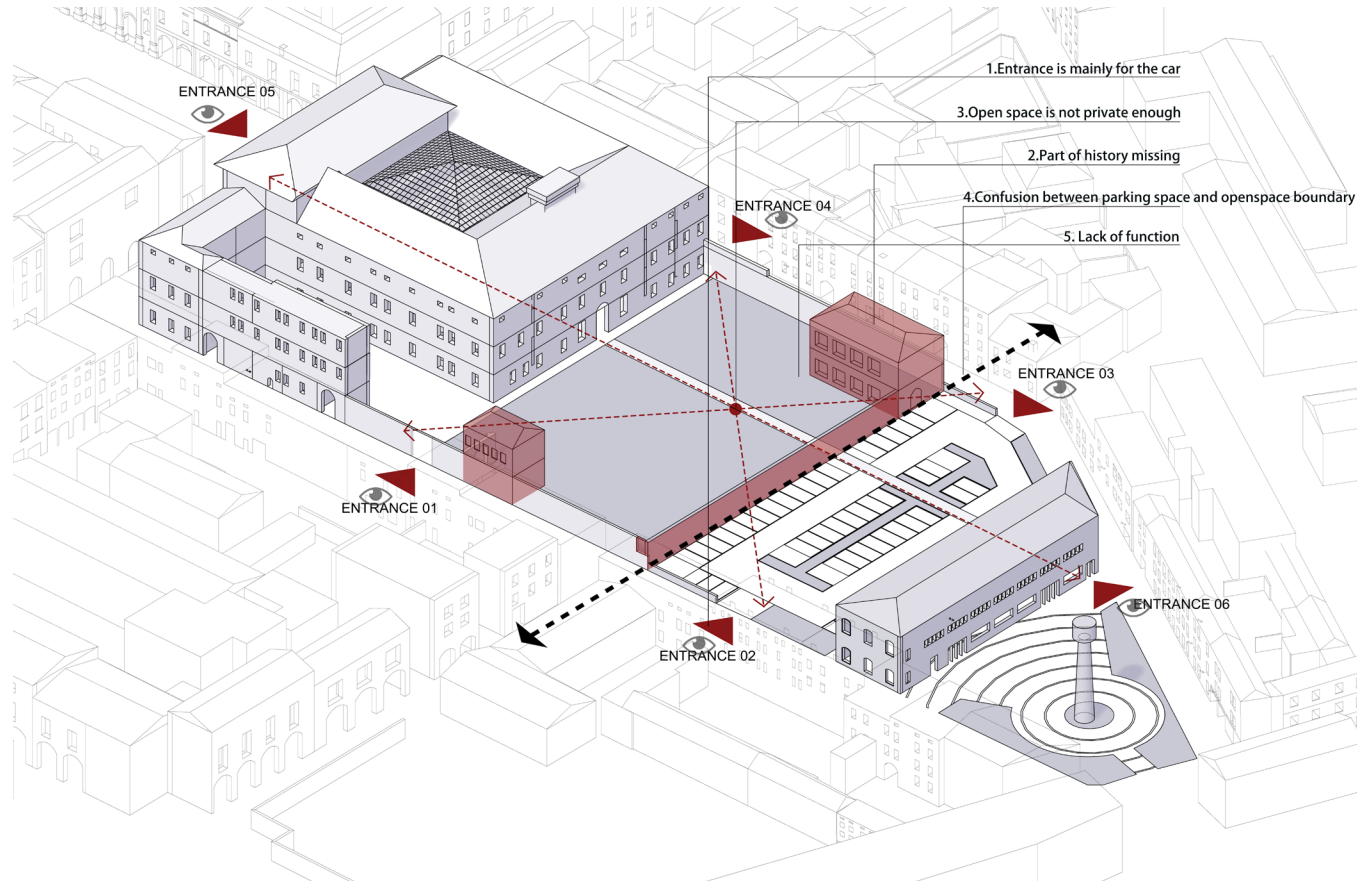


# Plants





# Main Problem



# Collage

**Private garden**  
According to the analysis, in the last it's a private puacle and its garden.

**Open the private garden**

**piante e animali perduti**  
Every three years, during the month of May, King Serbo XIII of Gnocchi r- returns to Guastala with all his court

**la gnocciata**  
The event is one of the most popular in Italy, dedicated to gardening, biod- iversity, food and wine.

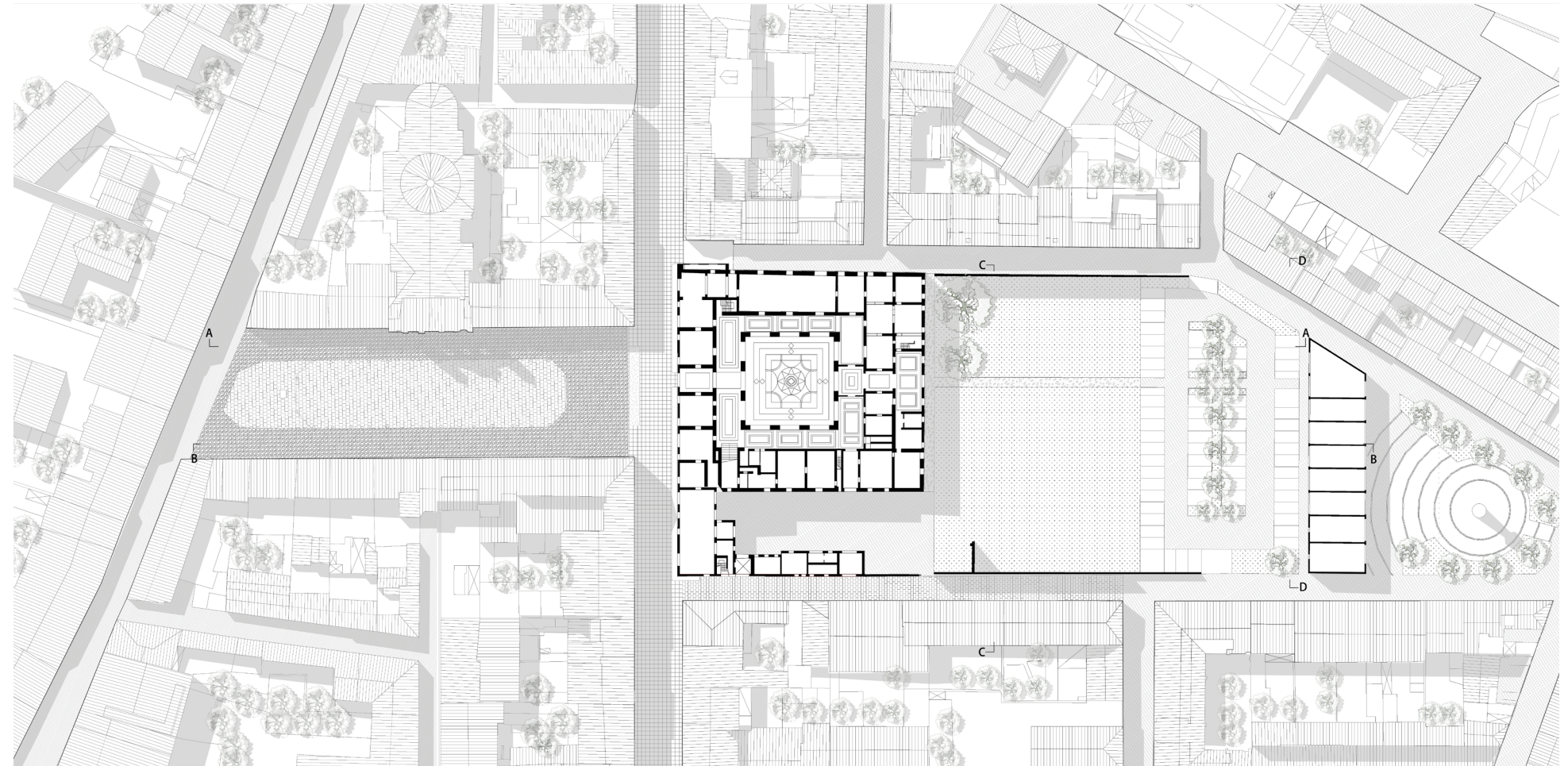
**Open space**  
There is less people have a relax here most of them only go through the open space.

## Current Situation Plan

The gardens are flanked to the north and south by residential areas, separated by narrow roads. The eastern side of the site is a clinic of brick elevations and a triangular open space, while the western side of the site is adjacent to the eastern elevation of the palazzo ducale.

The garden was originally a private garden belonging to the palazzo ducale enclosed by a wall all around, but now only the northern and southern sides remain with brick walls around 5m.

This garden currently consists of two parts. One is the parking area, consisting of 59 parking spaces, including two disabled parking spaces. The other is a low quality lack of treatment lawn. In the middle of the grounds there is a distinctly stone-paved path that connects the car park with the courtyard of the palazzo ducale. The garden has two tall trees near the façade of palazzo ducale and a few shorter trees in the middle of the car park.





Urban Section



Section AA'



Section BB'



Section CC'



Section DD'



## **03. Study Cases**

# Barcelona Pavilion

Mies Van der Rohe 1929

-Modern Architecture, Material Innovation

## Material Innovations: Steel, Glass and Marble<sup>67</sup>

- Leaving the structural demands to the slender columns allows for an open floor plan that creates a new spatial quality - a flowing space.
- The Wall can divide the flowing space Guide Visitors' sightseeing as well as a load bearing elements.
- Through the interplay of transparency and reflection created by the glass partitions, the scheme presents a unique perception of the interior

Introducing modern elements, materials and geometry figure to our site, combined with the surrounding historic buildings and elements, Blurring of internal and external boundaries<sup>8</sup>.

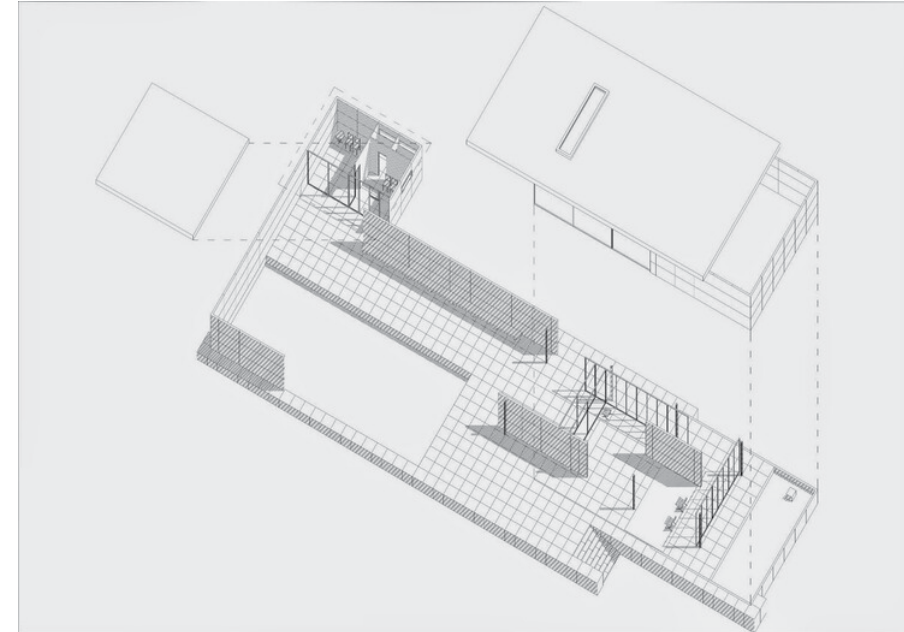


Figure9-Exploded view of Barcelona Pavilion ©Hande Sigin



Figure10-Barcelona Pavilion ©Todamo

## Israels Plads

COBE, Sweco Architects 2014

-Transformation of the City Open Space.

The historical development of Israel Square mirrors the transformation of the city of Copenhagen<sup>9</sup>. This central square was once a circular fortification at the end of the city. As the city expanded, the square became a vibrant marketplace. By the 1950s, it had been transformed into a lifeless car park. The new square was built above the existing street level and overhangs the once dominant element of the square, the parked cars, which are now located in an underground car park.

- Underground Parking. These vehicles are covered by a new urban 'carpet'.
- The square is used as a transition area between the two worlds of the city and the surrounding park.
- The sculptural expression references its own history as a fortification.
- The functional design of the square is in line with contemporary habits, with spaces for rest and activities<sup>10</sup>.

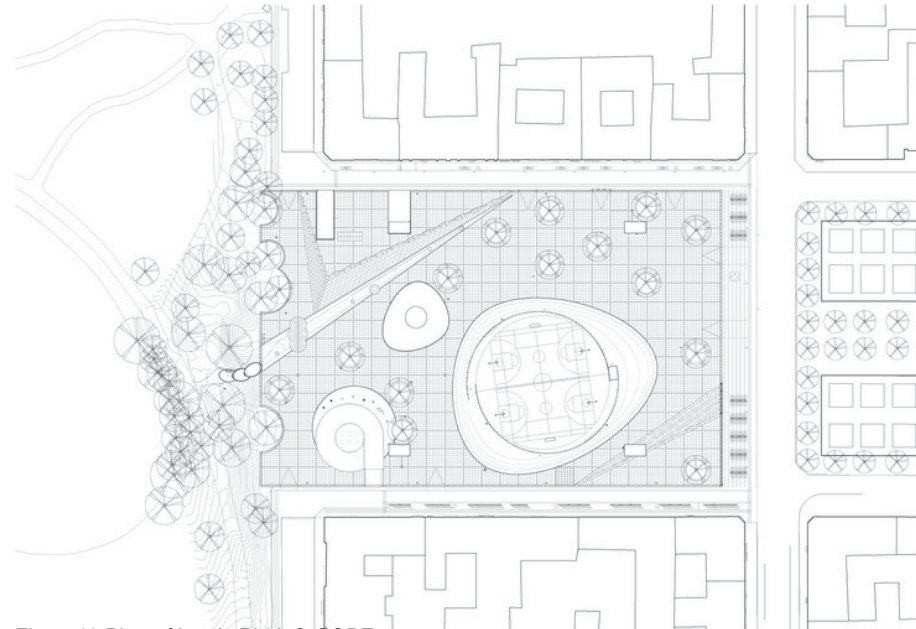


Figure11-Plan of Israels Plads© COBE



Figure12-SQUARE COPENHAGENK, DENMARK © Rasmus Hjortshøj - COAST

# Serpentine Gallery Pavilion

Peter Zumthor 2011

—Transformation of the city open space

At the heart of Zumthor's Pavilion was a garden that the architect hoped would inspire visitors to become observers. Zumthor said his design aimed "to help its audience take the time to relax, to observe and then, perhaps, start to talk again – maybe not"<sup>11</sup>. The design emphasised the role the senses and emotions play in our experience of architecture. With a refined selection of materials, Zumthor created contemplative spaces that evoked the spiritual dimension of our physical environment. As always, Zumthor's aesthetic goal was to customise the building precisely to its purpose as a physical body and an object of emotional experience<sup>12</sup>.



Figure13- Serpentine Gallery Pavilion 2011 Designed by Peter Zumthor, Serpentine Gallery, London (1 July - 16 October 2011) © 2011 John Offenbach

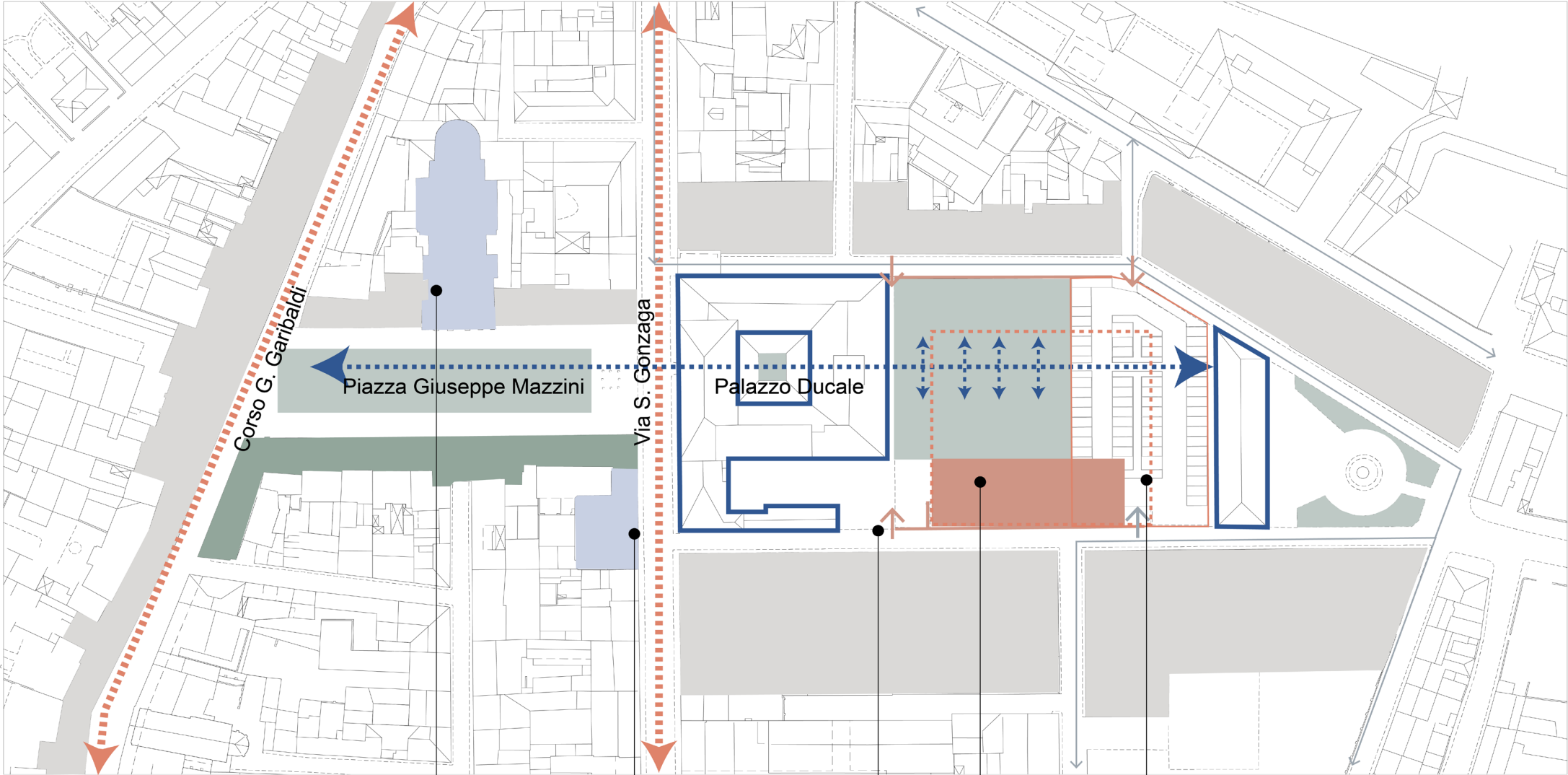


Figure14- Photo of Serpentine Gallery Pavilion © Hufton & Crow

## **04. Concept & Strategy**

-The chain of open spaces in Guastalla





Duomo

Comune di Guastalla

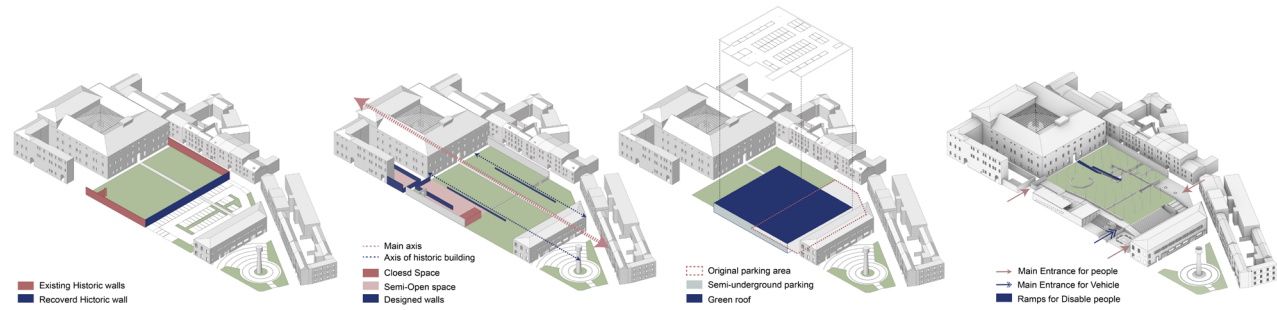
Main Entrance

Exhibition Area & Coffee Bar

Remove the parking area to semi-Underground

- Existing Historic walls
- Open Space
- Public Building
- Commerical Building
- Residential Building

# Generation of Strategy



## 1. Preserve and Recover Historic wall

The historic walls have been preserved and restored to their historical original form. Not only does it respect the history, but it also preserves the memory of the city's inhabitants of this open space.

## 2. Rethink the the relationship of Open space, Semi-Open space & Closed space

The site is re-divided along the main axes and in accordance with the axes formed by the façades of the important historic buildings surrounding the site. It is difficult to stay long time in an overly open space, so this space provides a place that surrounded by walls to rest and meet.

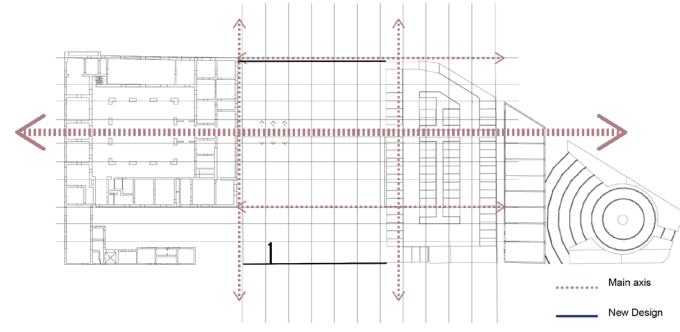
## 3. Rebuild Semi-underground parking & Green roof

Placing the original parking area in a semi-underground position, leaving more design to the ground space. Allows for a high quality environment to be appreciated from all directions of the site. The green roof will increase biodiversity and reduce CO2 pollution. At the same time, we will use it to collect and purify rainwater, recycle it used for the fountains and plants on the site.

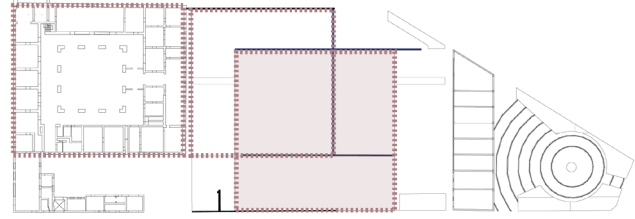
## 4. Reorganized the circulation of people & vehicle

The pedestrian has been re-routed as well as the entrance and exit to the car park. The separation of pedestrian and vehicle traffic ensures safe passage of people. Several ramps for the disabled have been added to the site to provide maximum comfort for those who are not handicapped.

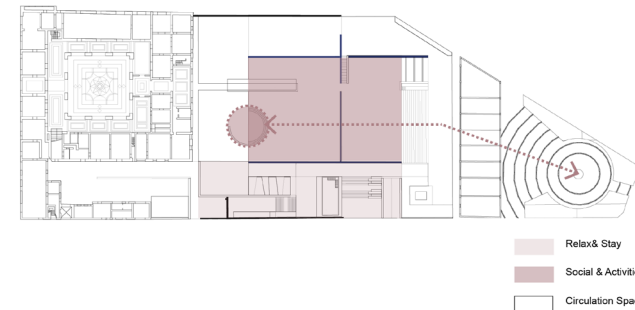
# Generation of Masterplan



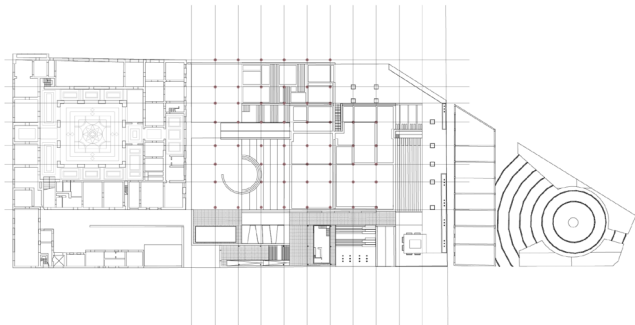
## 1. Emphasize the Main Axes & Grids reflect rythm of palazzo plan



## 2. The generative shapes as Palazzo Ducale for Underground Parking



## 3. Add Geometric Figure & Discover original historic walls



## 4. The node of the grid & Micro Design

## **05. The project**



## Masterplan

The garden of palazzo ducale is a historically significant garden located in the centre of Guastalla. The change in the appearance of the garden is linked to the functional and formal transformation of the palazzo ducale.

At the same time, the garden is on the same axis as the piazza mazzini in front of the palazzo ducale. The garden acts as a chain that links or transitions the different functional areas around it. So we have designed the piazza with coherence and continuity in mind.

For example, in the unity of style, the choice of materials and the emphasis on the central axis to strengthen the link between this piazza and the surrounding city.

- |                                |                          |
|--------------------------------|--------------------------|
| 1. South Entrance              | 11. Underpass entrance 1 |
| 2. Outdoor restaurant area     | 12. Green Roof           |
| 3. Outdoor coffee area         | 13. Steps and rest area  |
| 4. Water pool                  | 14. Grassy terrain       |
| 5. Coffee bar                  | 15. Underpass entrance 2 |
| 6. Pool                        | 16. North Entrance       |
| 7. Underground garage entrance |                          |
| 8. Garden                      |                          |
| 9. Square                      |                          |
| 10. Stairs                     |                          |



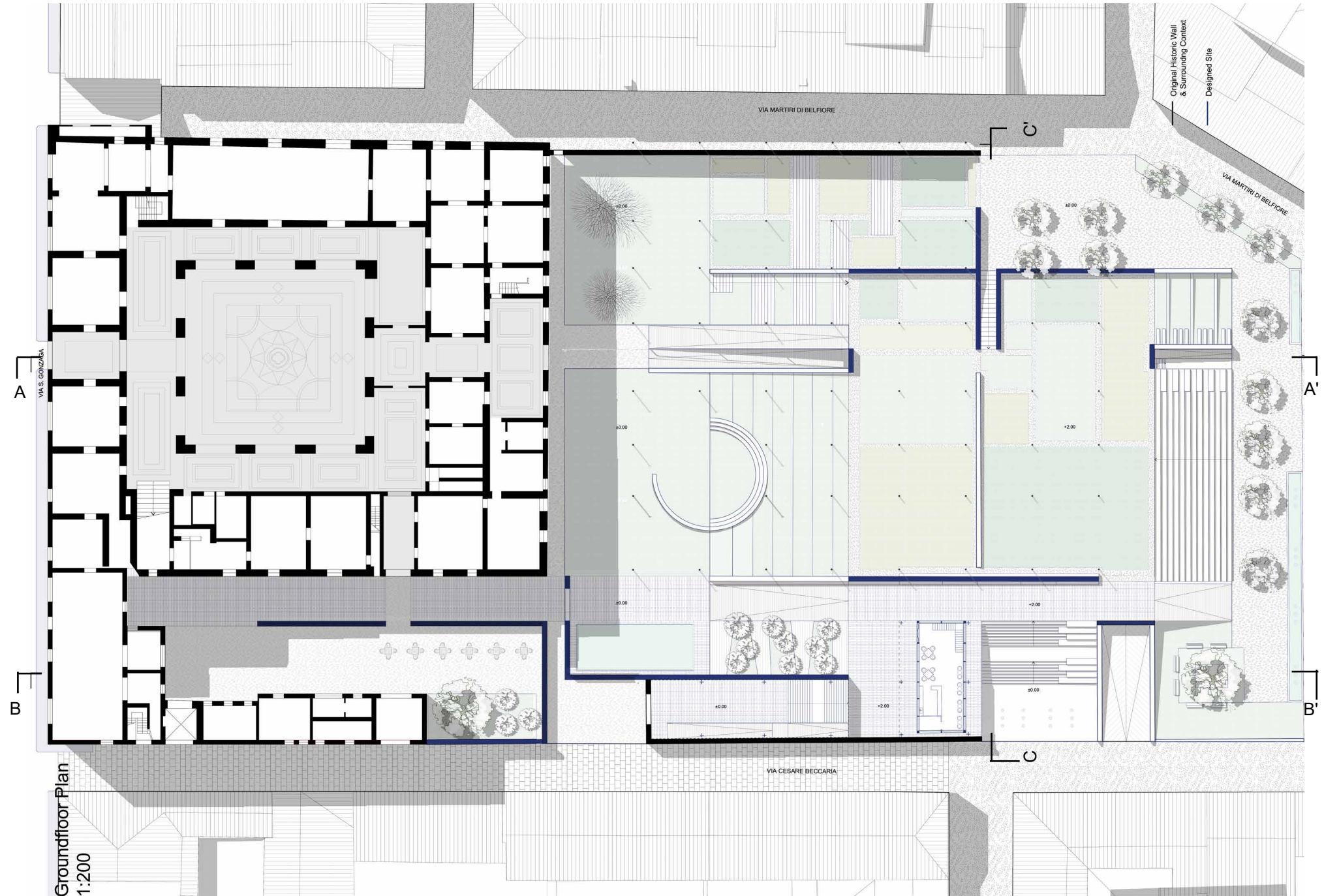


## Ground Floor Plan

From the plan, we have largely retained the function of this open space as a place for people to hold festival events, and have moved the car parking to a semi-underground location, on the top, there is a green roof, with the above-ground space being fully returned to the surrounding residents, to provide them a high quality environment.

The entire site provides two main pedestrian entrances, as well as a vehicular entrance. The central axis is clearly visible and leads the visitor to the atrium of the palazzo ducale. The ancient walls have been restored and instead of a high wall, we have set up a low wall in its original position where people can sit and rest.

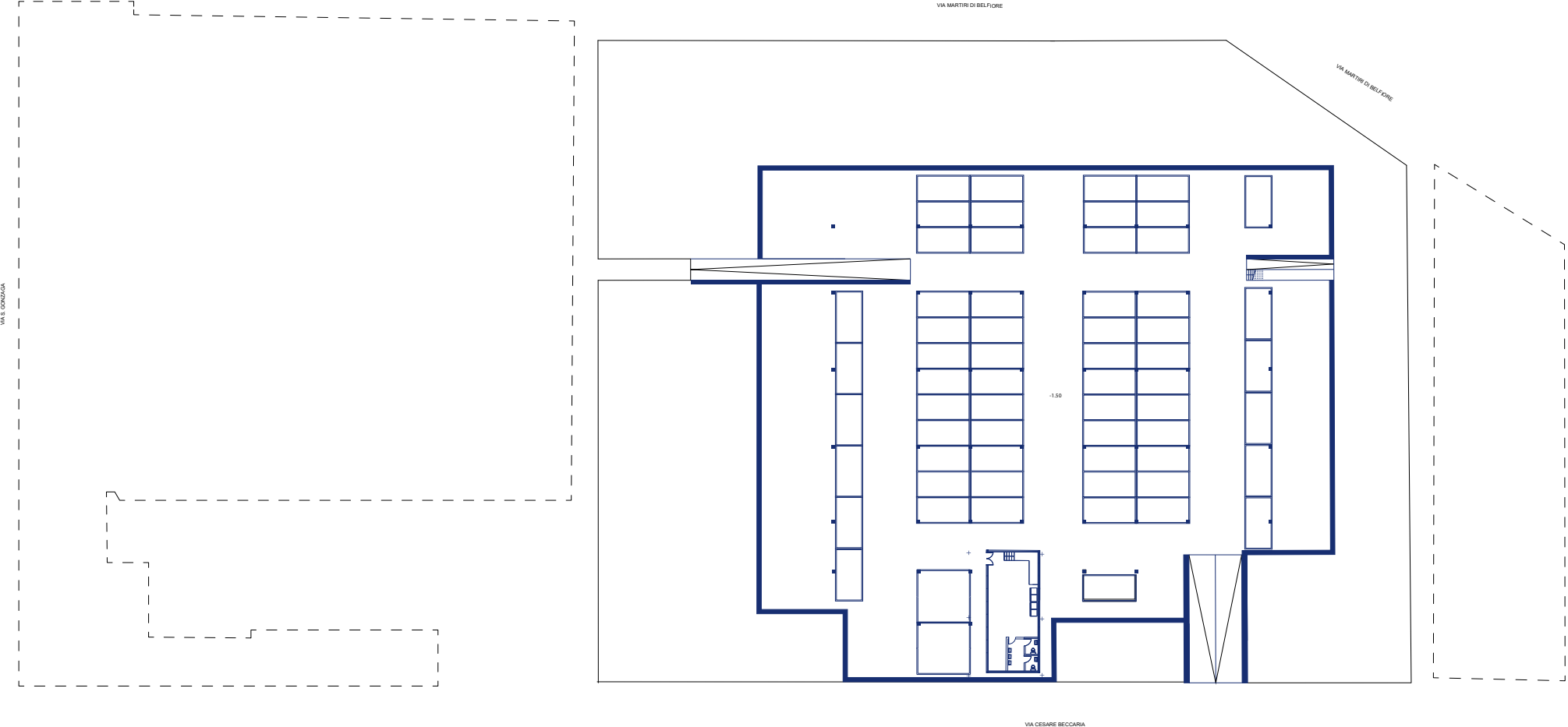
The sunken square, the outdoor restaurant area, the café, the fountain, the whole open space consists of many interesting points where people can appreciate the quality of the environment, no matter where he is and from what angle.



# Basement Plan

On the Semi-underground parking area(-1.5m), we have designed 62 parking spaces plus two disabled parking spaces. The number of parking spaces is greater than the original 59. So it can fully satisfy the parking needs of the surrounding residents or visitors.

The path underground also follow the main axis as ground floor. And we add the ramp for disable people.





## Axonometric Drawing

The design of this project make a reference on the design approach of the Israel Square and the plan of the German Pavilion in Barcelona.

The choice of materials was informed by the city's architecture, we wanted to use more local materials and to be in harmony with the surroundings. For the new walls we used the same red bricks as for the façade of the palazzo ducale and the walls around the site, despite their decay, still exude a fascinating historical atmosphere. For the paving we have continued with the piazza mazzini, which uses cobblestones.

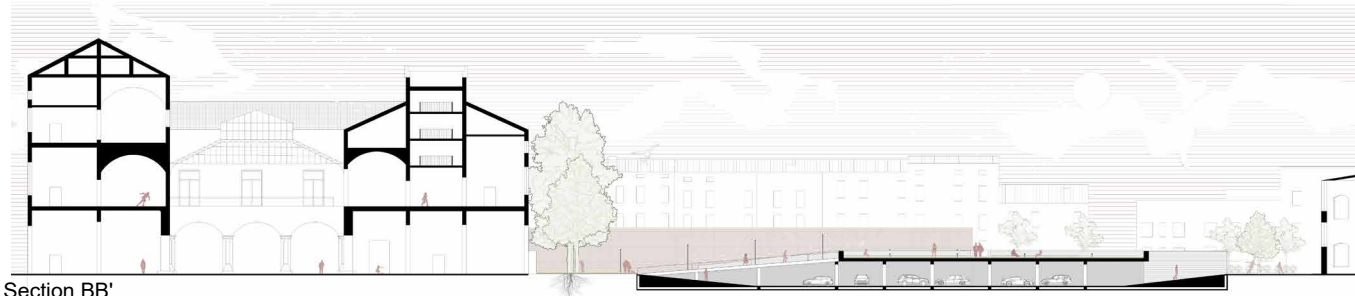




# Section



Section AA'



Section BB'



Section CC'



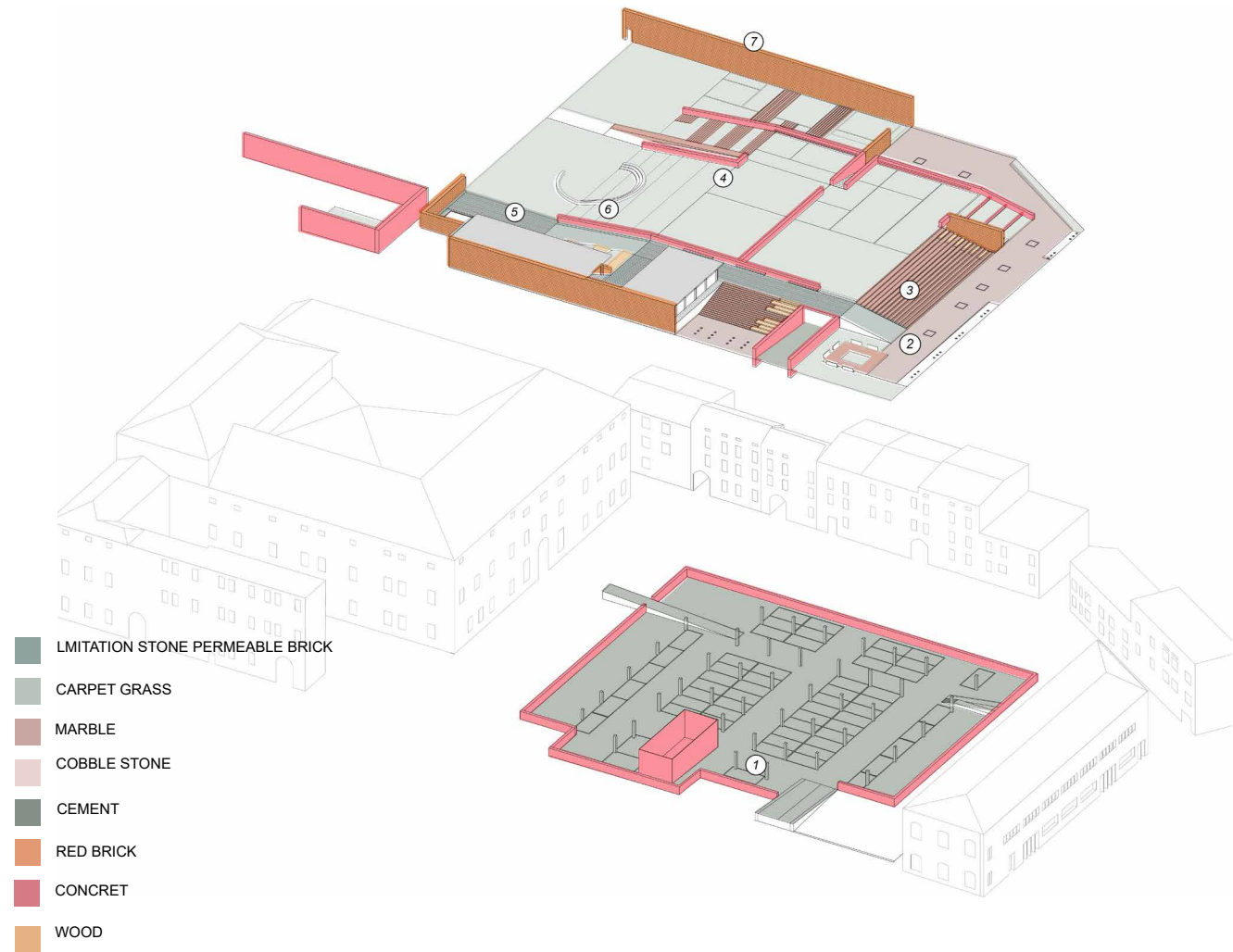
## Old Local Material



## New Local Material

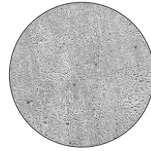


# Material Analysis



## 1.CEMENT

Relatively low price, high strength and high durability, suitable for parking



## 2.COBBLESTONE

Choose local cobblestone stone processing to get new stone. Contrast with the old material



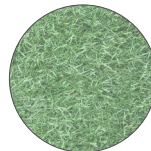
## 3.MARBLE

renewable and sustainable, natural safety. Sandstone is actually very reliable in both indoor and outdoor applications



## 4.CARPET GRASS

A common ground grass. The price and viewing are relatively strong



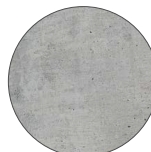
## 5.LMITATION STONE PERMEABLE BRICK

The contrast between artificial bricks and dilapidated red bricks. Reflecting the contrast between modernity and history



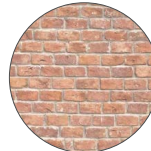
## 6.CONCRET

Very modern textures can be a great contrast to worn bricks



## 7.RED BRICK

The original red ancient walls in the site are preserved and combined with new red bricks



## 8.WOOD

The original red ancient walls in the site are preserved and combined with new red bricks

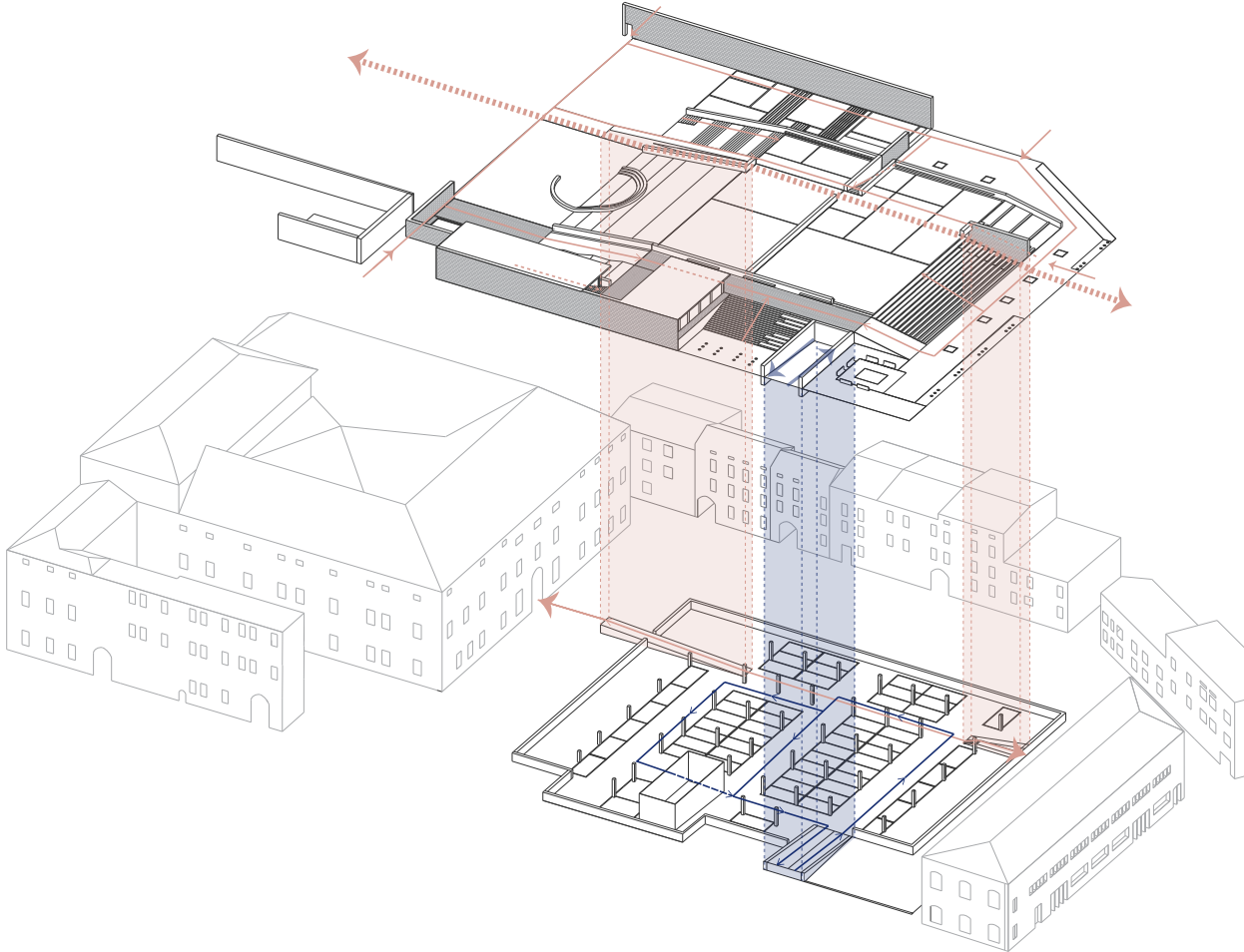


For the choice of materials, we have chosen local stones. For example, cobblestones, bricks and marble.

In this way the site and its surroundings are kept in continuity. Piazza Mazzini uses cobblestones and bricks for its extensive paving, and the courtyard of Palazzo Ducale has a very beautiful carved floor by marble. Especially in a place with such a strong historical atmosphere, it is important and necessary to respect history. So we chose to use cobblestone paving in the pathway adjacent to the palazzo ducale, and brick and wood strips as the main paving material in the semi-open lounge space.

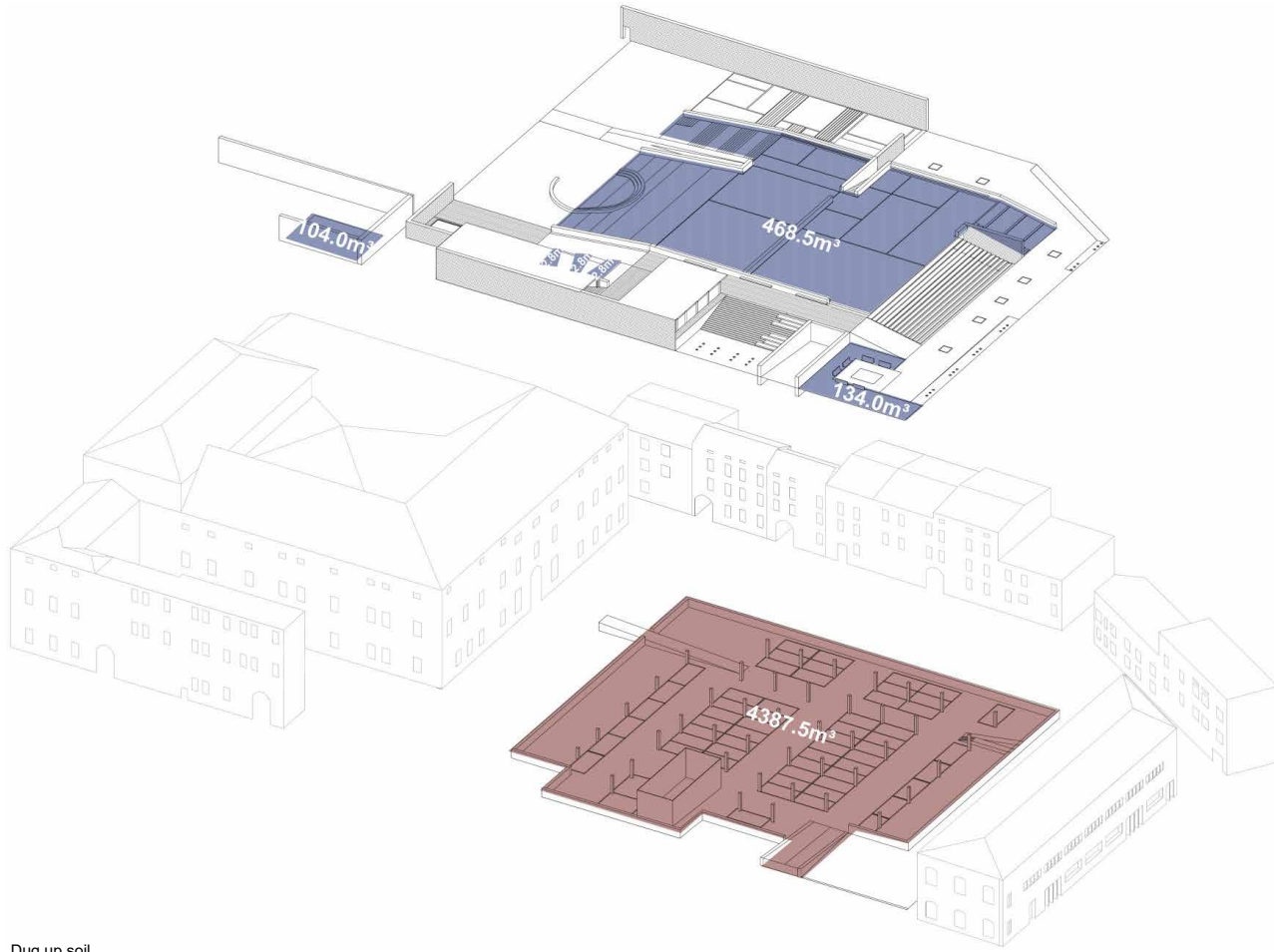


# Circulation Analysis



- Pedestrian flow
- Vehicle Circulation
- ..... Ramp for disable

# Soil balance Analysis

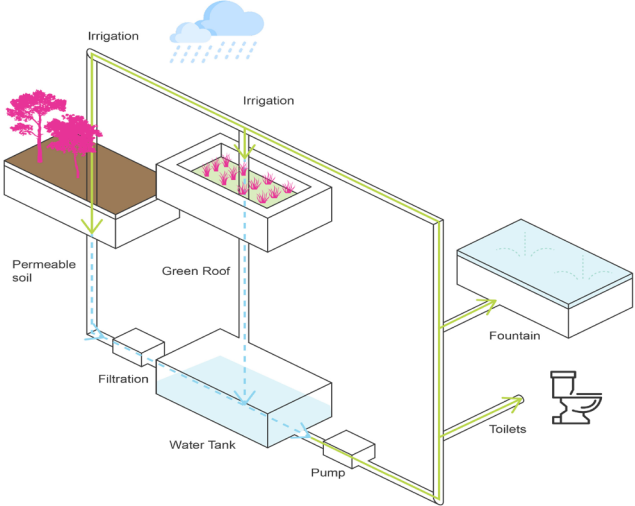


- Dug up soil
- Filled Soil

# Collect&Reuse Rain Water

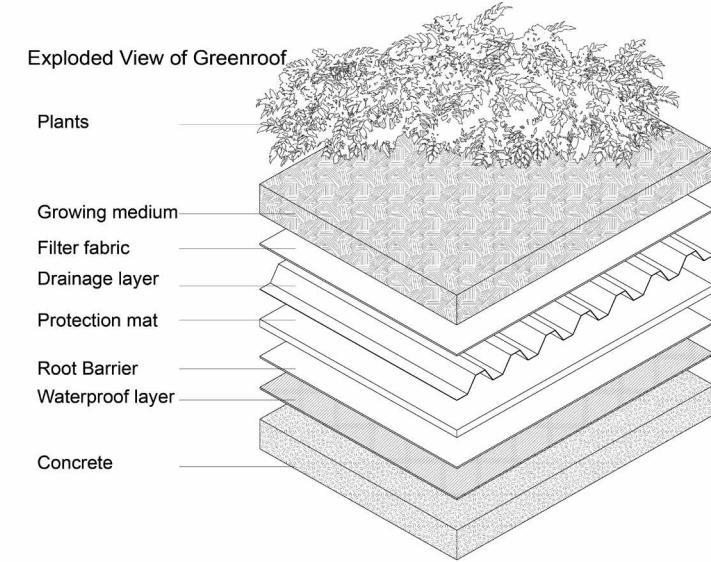
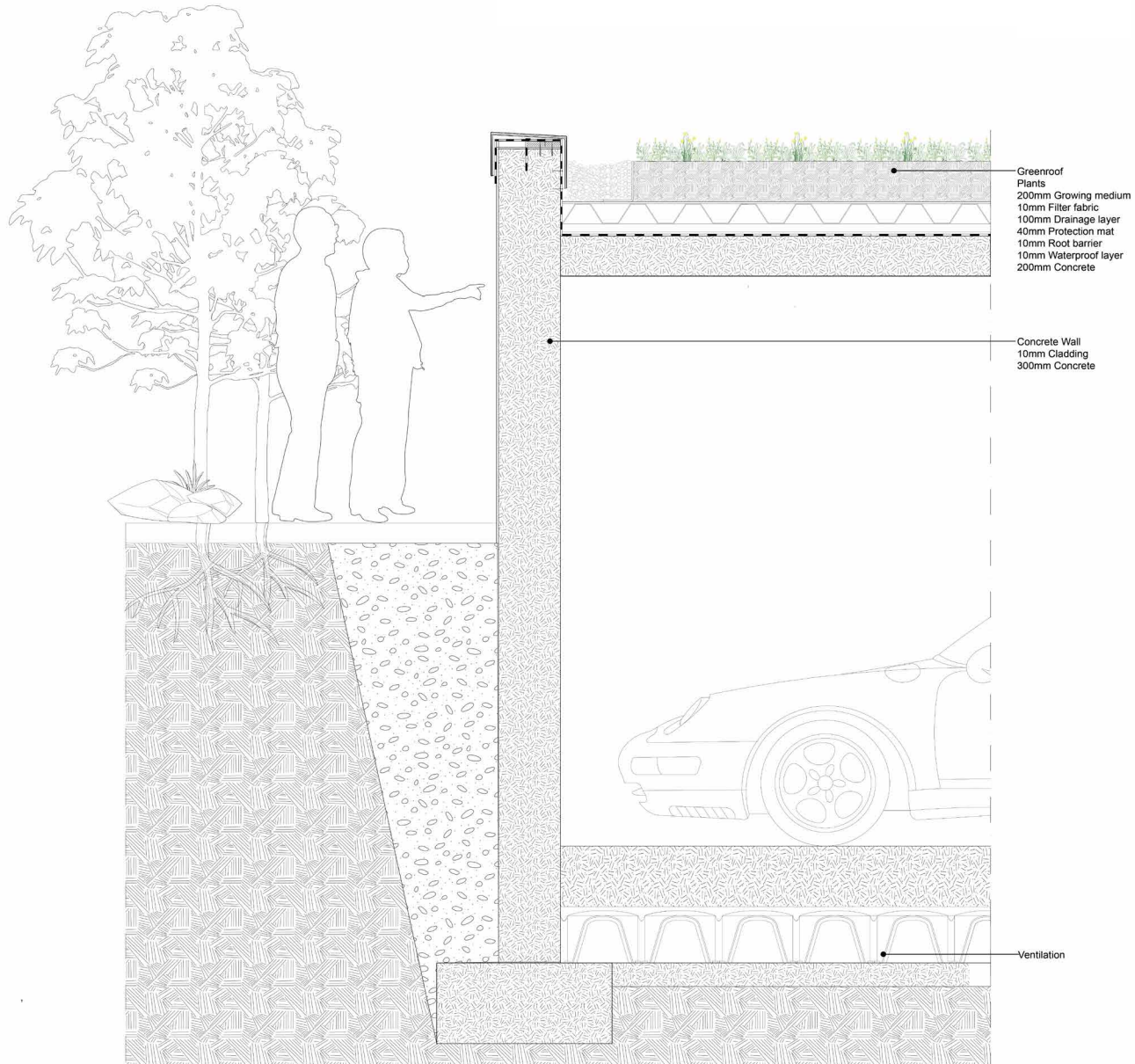
We want to use the roof of the parking area as a green roof to bring additional benefits to the whole built environment. Reduced CO2 emissions, increased Bio-diversity and also the ability to collect and reuse rainwater. Water quality can be improved when a green roof is installed on a building.<sup>13</sup> Pollutants within the atmosphere and from roofs can cause run off from roofs to have poor water quality. Many studies in Europe and North America have shown that green roofs can improve the water quality of the stormwater that leaves a roof with vegetation and substrates on it.<sup>14 15</sup>

Firstly, rainwater can be filtered by the green roof and permeable soil and collected in the underground water tank, where it is stored. Then recycled for the site's fountains, toilets and irrigation of plants.





# Detail Section

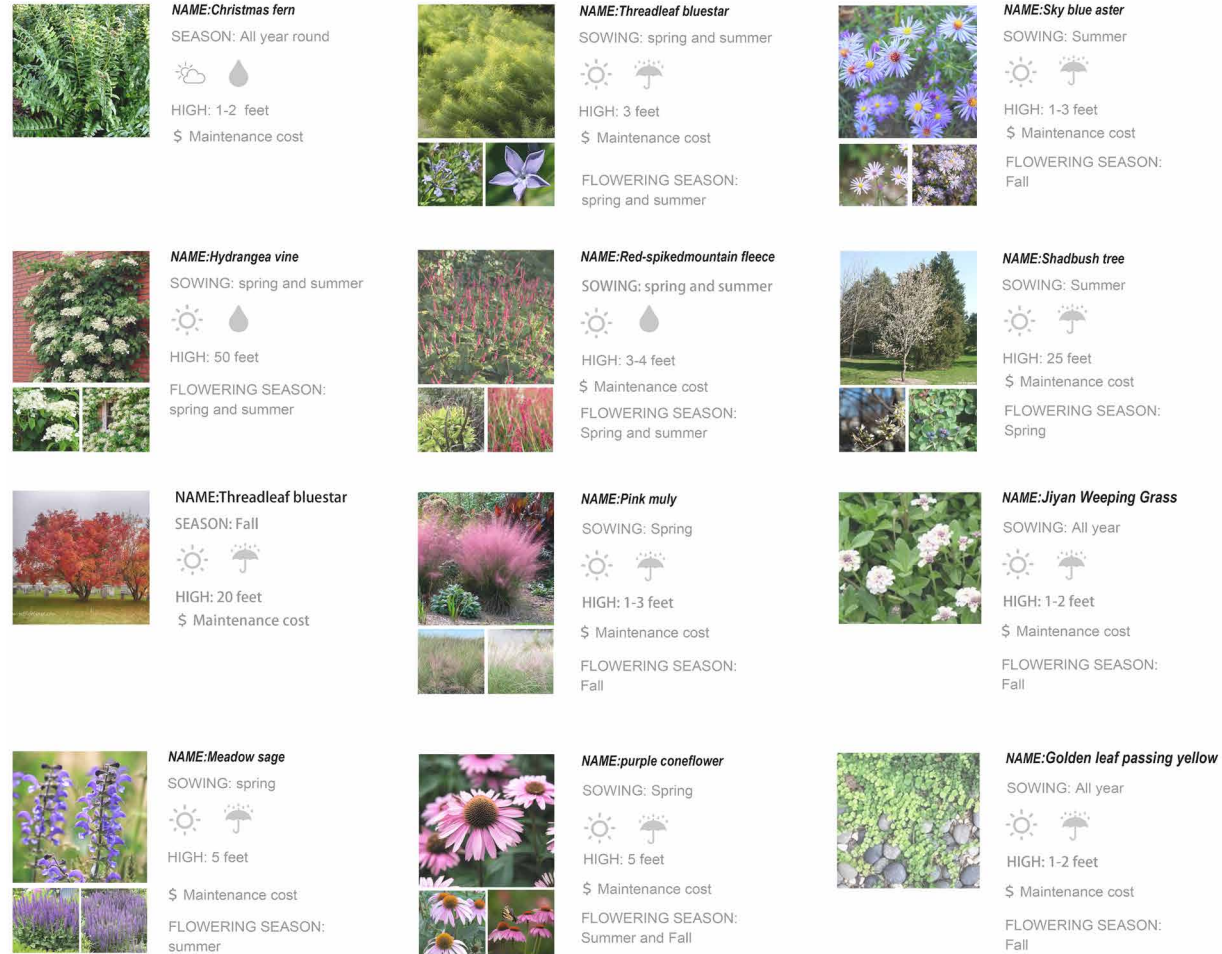


Green roofs serve several purposes for a building, such as absorbing rainwater, providing insulation, creating a habitat for wildlife, increasing benevolence, and decreasing stress of the people around the roof by providing a more aesthetically pleasing landscape, and helping to lower urban air temperatures and mitigate the heat island effect.<sup>16</sup>

The green roof collects a portion of the rainwater that is treated and enters the water collection tank. The other part is directly used to water the plants on the roof.

Green roofs can help to reduce the volume rate of rainwater runoff into the drainage system. Green roofs therefore play an important role in the urban realm. As with other green infrastructure interventions. They can help to increase the resilience of cities, especially as they become increasingly susceptible to flooding.<sup>17</sup>

# Plants Analysis



# Plants Analysis

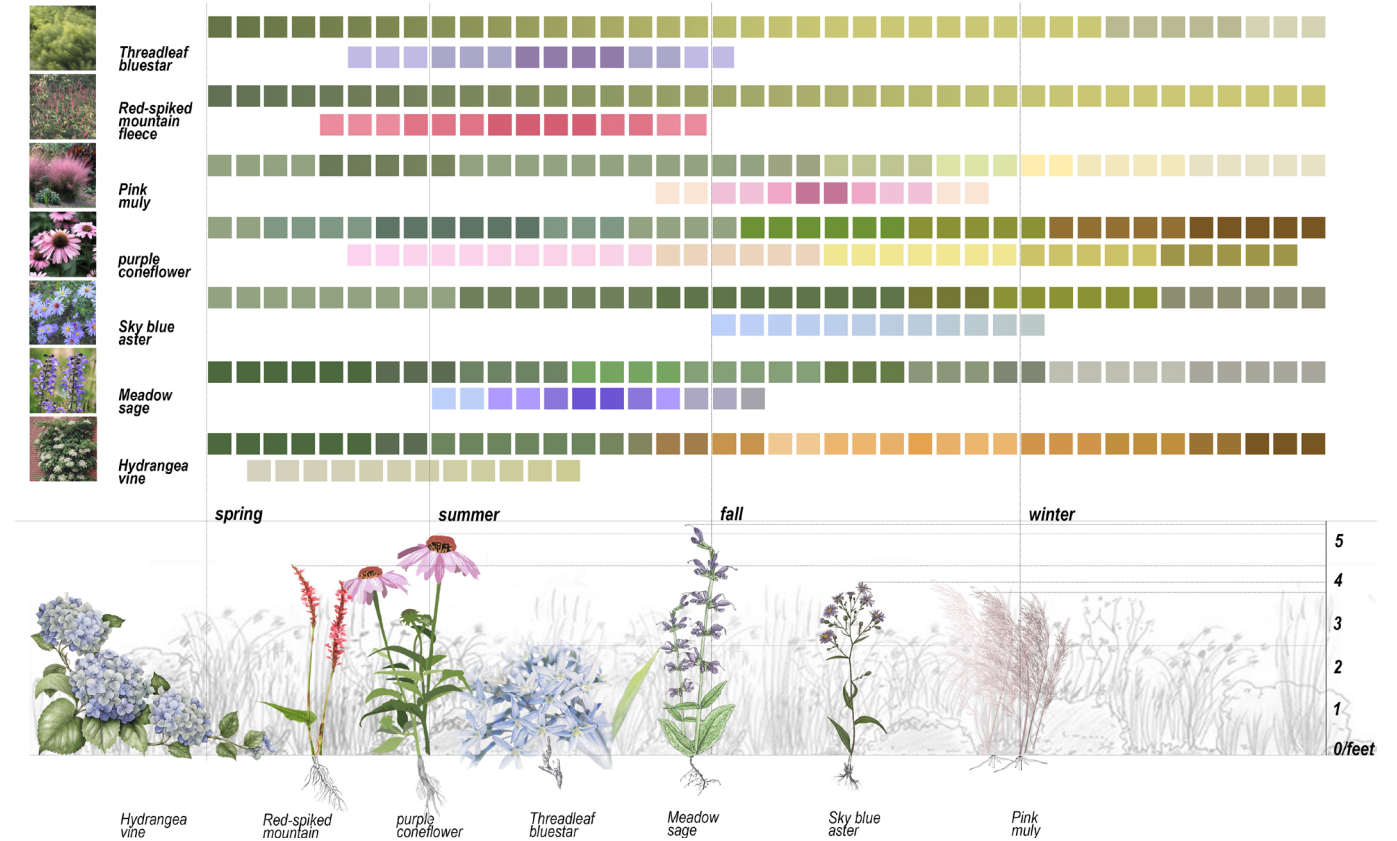
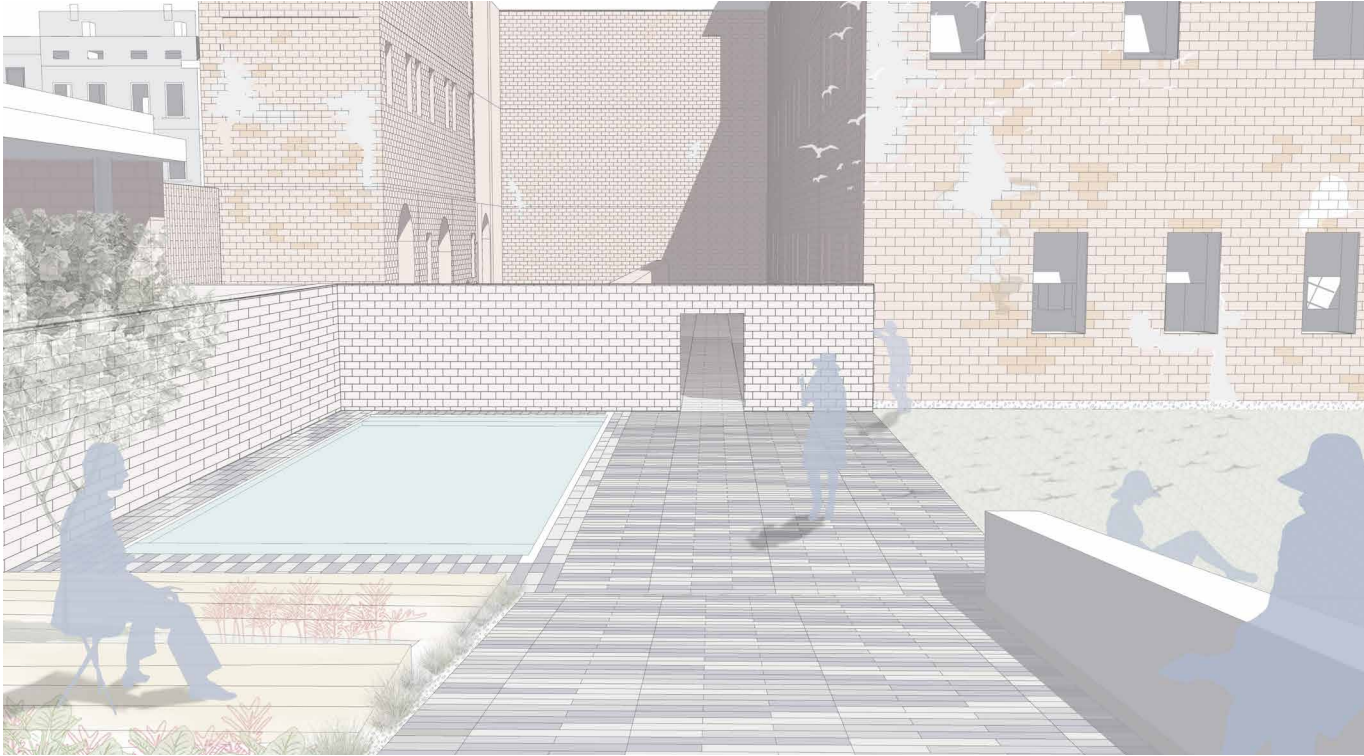


Figure 15 - Plant requirements for humidity, light and season. Source: Oudolf, P., Kingsbury, N. (2016). Planting: A New Perspective. English: Timber Press.



View of Site



View 1

The original ancient wall and the newly designed wall are combined into a semi-enclosed space that provides visitors a comfortable and beautiful space for rest, communication or outdoor exhibition.



View 2

Visitors can sit on the grassy slope and admire the front façade of the Palazzo Ducale, the site is also designed to be accessible to people with disabilities.



View 3

Green and flat open space reserved for local residents and visitors to have events.



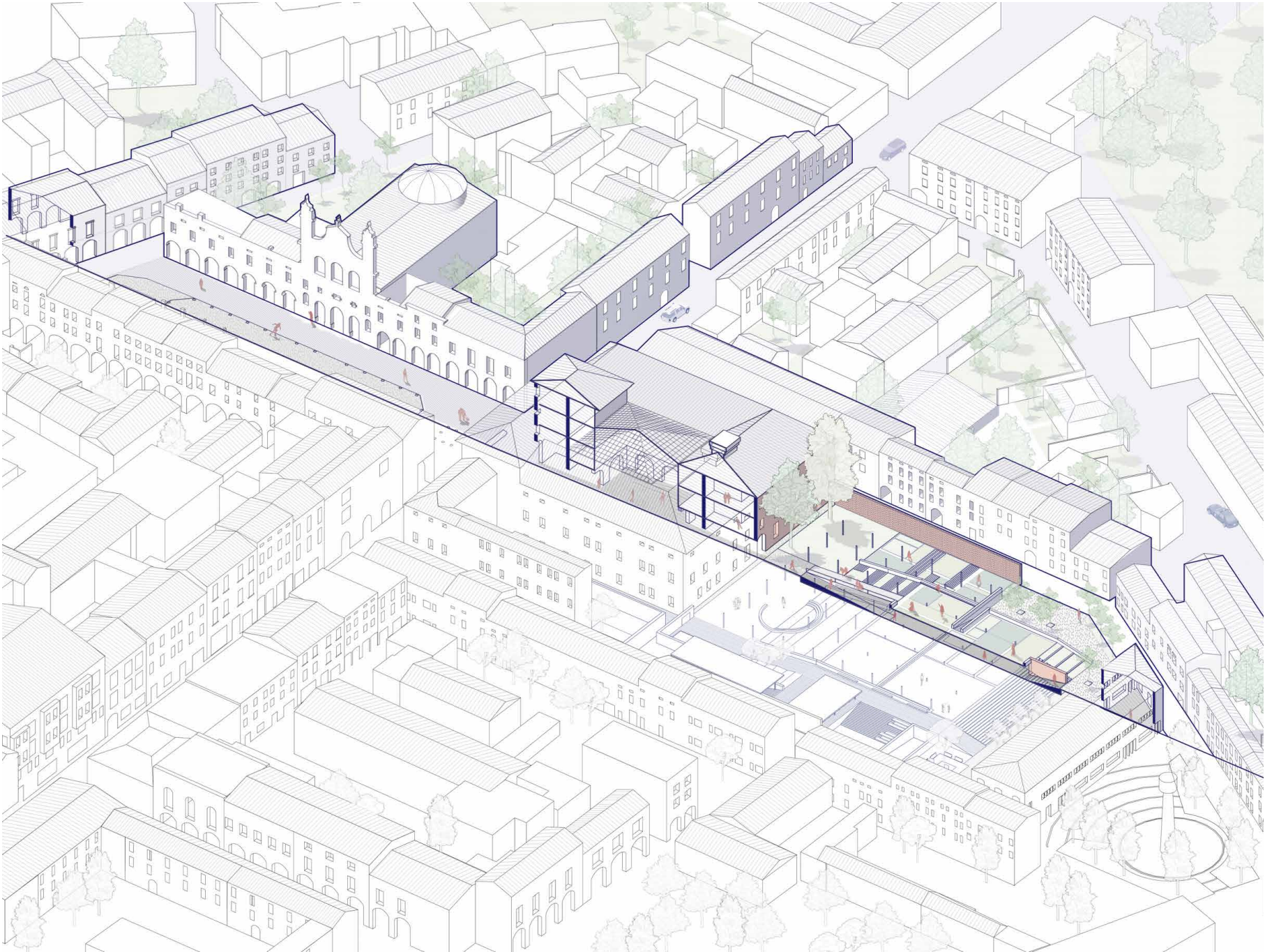
View 4

Small, quiet and private gardens provide a place for people and visitors to chat and relax.



# Urban Section (After Design)

This section of the designed site contrasts with the original undesigned site. We have kept all the historic walls and restored those that existed in history. The central axis is more prominent and links well with the courtyard of palazzo ducale. The choice of materials maintains consistency and harmony with the surrounding space. The car park is covered by a green roof and the whole roof is a wide and beautiful space for activities. Besides, the surrounding provide seats for people to relax and chat. The café is located in a semi-private space in the grounds, separated from the green space by a wall, where people can stay for a long time. The site is also very well connected to the surrounding residential area and can be easily accessed from any direction.



## Conclusion

The ancient garden of Palazzo Ducale, as a historic urban centre, a chain linking the surrounding area and a place for residents to meet, was not only analysed for its functional division, but also for its historical transformation and how to preserve the original historic walls and to connect them with the new architectural design and materials. The combination of old and new materials creates a stark contrast, which is also a way of respecting and preserving history in a modern way.

By redesigning this ancient garden, as a result, people will have access to a higher quality open space with a better environment. People can have a coffee, chat and relax, have social activities, enjoy the historical atmosphere and admire the richness of the plants. At the same time, the historical elements of the area have been highlighted and preserved.

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By Massimo Carmassi