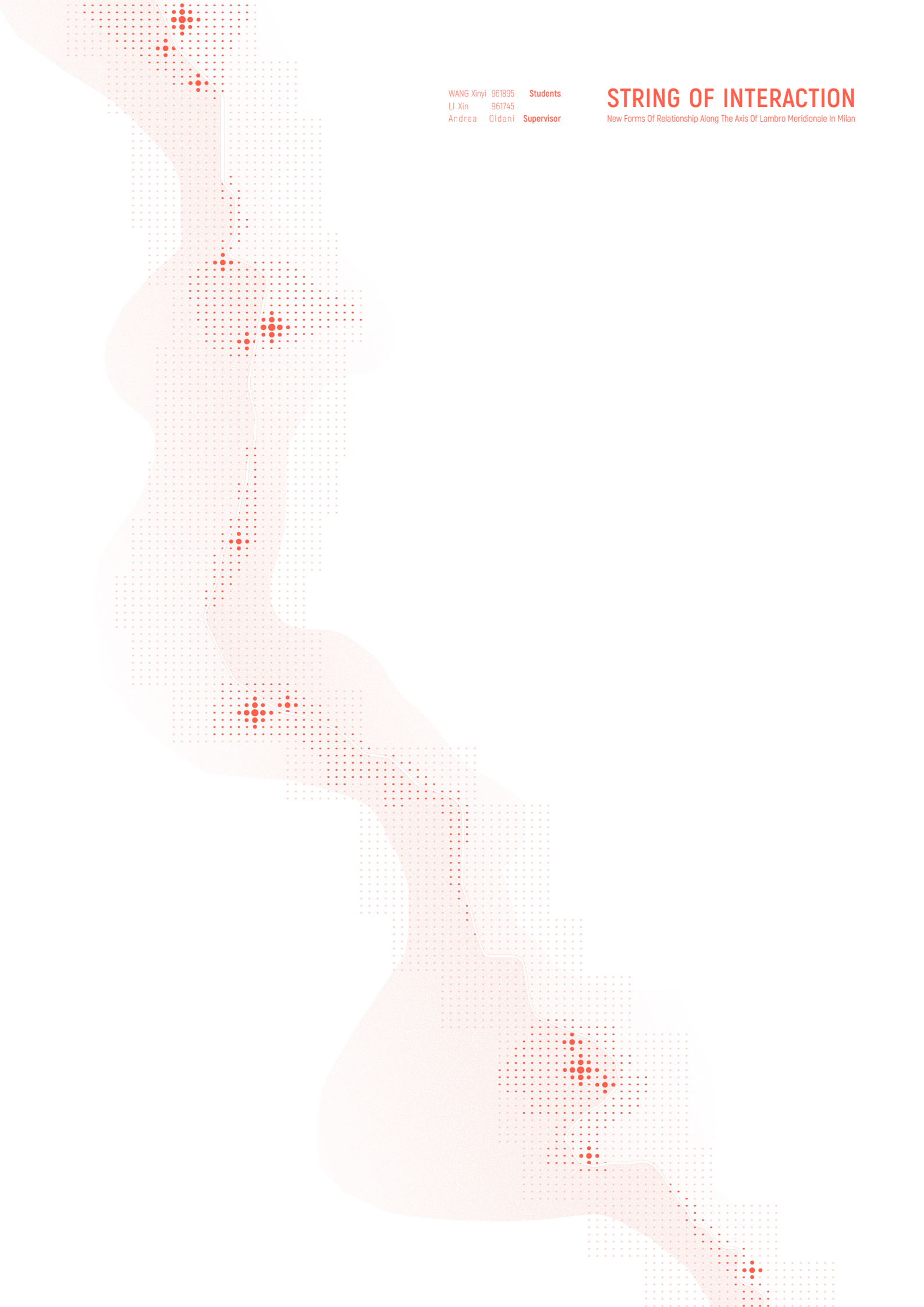


WANG Xinyi 961895 **Students**
LI Xin 961745
Andrea Oldani **Supervisor**

STRING OF INTERACTION

New Forms Of Relationship Along The Axis Of Lambro Meridionale In Milan



A B S T R A C T .

As we know, waterways are important parts of the urban fabric of Milan. Among this network of large or small waterways, Lambro Meridionale, the subject of our study, is one of the oldest. Today, however, with the expansion of the city, this waterway is now hidden in the architecture of Milan in an imperceptible state.

The upper part of this waterway is the Olona river, which, after entering Milan as an underground river, reappears on the surface and is directly connected to the Lambro Meridionale. Downstream, this waterway joins the Lambro river.

So, although it may be so inconspicuous on the surface, it actually connects the two main natural rivers of Milan and occupies an important position in the structure of Milan's water network.

It emerges from the developed areas of the city and proceeds all the way down to the agricultural areas of the suburban of Milan. It crosses urban spaces of various densities and characteristics. However, probably due to some internal reason, this waterway seems to be unappreciated by the surrounding cities in each sector.

It is surrounded by unplanned green spaces, high-speed motorways, and illegal suburban agricultural activities. It is even partially covered by roads and is no longer visible on the surface.

It is true that fragments of greenways appear around some sections of this waterway, but these efforts regarding the landscape aspects of the waterway are clearly not an effective system. And, even in these places, this waterway is still not perceptible to us.

Water, is something supposed to be the element that attracts people and creates activity. While Lambro Meridionale seems to be the back of this urban area, cut off from the lives of the people around it. Perhaps the city has adapted and accepted the status quo, but can the illegal, the chaotic, the hidden, become a valuable system in the tandem of this waterway? After several months of research and design, we tried to show a possible future along that waterway. And this book is a compilation and sharing of our work.

The book is divided into six main chapters.

The first two chapters are devoted to the research and perception of the waterway, the perception of the waterway at the scale of the whole Milanese water network system, and the research of its own history and status.

The 3rd chapter is the elaboration of our overall design strategy.

Chapters 4 and 5 are the expression of the specific design of two representative sites, each of which has two areas for more detailed design work and presentation.

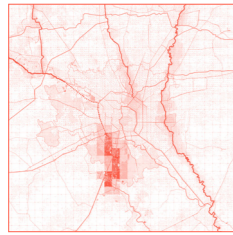
Chapter 6 is an articulation of our planting design logic.

At the end of the book is our summary and a record of the references designed.

We sincerely believe that such a waterway will have a more positive impact on its surrounding cities in the future.

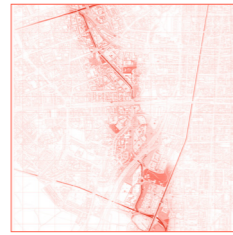
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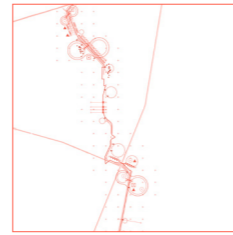
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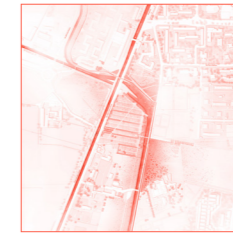
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Until the end of the 19th century, Milan was a city of only a few hundred thousand inhabitants. However, in the twentieth century, Milan entered a period of rapid change due to a process of urban expansion. In less than 40 years, its inhabitants grew by leaps and bounds and, in contrast, the city expanded outward at an unprecedented rate. In this rapidly evolving urban context, some elements of the Milanese city's landscape underwent a transformation in identity and physical attributes.

The subject of our study, Lambro Meridionale, is one of the waterways wrapped in the urban sprawl. If we look at a map of this area of Milan in 1860. We will see that there are still only a few villages scattered here and there. However, in the 20th century, we start to see some industrial construction intervening in this site. An essential element was the construction of the railroad. The new railroad loop was planned to bring the viaducts that cut through the area. This was followed by roads, factories, or other infrastructure. These new constructions redefine the feeling of the area. The river itself, the Lambro Meridionale, has lost its natural form due to the demands of urban construction. Since the middle of the 20th century, it has been regulated to a shape with a clear geometry. The land around it has been made more suitable for the construction and planning of the city. The Lambro Meridionale is now an artificially created waterway that is neither a river nor a canal, but some kind of in-between element.

This intense urban construction has led to the division of Lambro Meridionale and the spaces along it into multiple zones with different physical characteristics. And this differentiation is not only at the physical level. The different physical spatial contexts bring about different urban functions and lifestyles in different sections.

At the same time, another surprising underlying situation is that, unlike most of the vibrant situations along the Milan canals. Surrounding the Lambro Meridionale are more abandoned, chaotic, and unintegrated spaces. For example, at the source of the Lambro Meridionale, the space underneath the railroad arches is littered with garbage and part of the arches have to be closed because of the occupation by vagrants. There is a Giardino Nascosto park, but in reality, it is abandoned and closed and practically inaccessible to people. And further south, the green area between Via Dionigi Bussola and Via Enrico Schievano is not even planned at all. It has been completely occupied by homeless people and has even become a permanent residence for some of them. Many sites are unfortunate because they are interesting in their own but simply unknown, for example, on the south side of Milano GreenWay Park, there is an unattractive stretch of grassy slope that is actually the remains of an old riverbed before Lambro Meridionale was regularized. But now that even a park has been built next to it, this interesting element has not received much attention.

In this case Lambro Meridionale can be called a main line that links a series of broken fragments. This may be due to the fact that Lambro Meridionale was not built in the first place, but was incorporated into the city's waterways in the process of urban expansion. Another reason is that the water quality itself is not very good, and the murky and smelly waters greatly reduce the attractiveness of Lambro Meridionale to people.

However, although the status quo is disappointing, these spaces inherently have the potential to be connected to the waterway. Some elements of regional history and culture are also still present on both sides of the waterway. If attention is paid, these promising spaces can become vibrant places in the future. Today, this waterway has also received increasing attention, and in the document VALLE OLONA E LAMBRO MERIDIONALE: PROPOSTE AMBIENTALI E CULTURALI 2020, plans and initiatives have been proposed to systematically improve its water quality. How to improve the current situation of Lambro Meridionale is also one of the topics frequently raised by local politicians and environmental organizations. And we believe that the work and knowledge of landscape architects will play an irreplaceable role in the future development of this waterway.

FROM THE SCALE OF MILAN.

The Lambro Meridionale is an important part of the Milan water system, so it is necessary to understand and analyze its position and function at the whole Milan scale.

Through the review of the water system of Milan, we understand the main components that flow through it: the natural rivers (such as Lambro River, Olona river, Lura river, Seveso river), and a series of 'canals'.

For the water system, we start by looking at the historical and functional aspects of the Lambro Meridionale in order to find its place in the context of its present and possible future development.

Lambro Meridionale is one of the oldest water systems in Milan, after the canal Vettabia, and unlike many other canals that were built with irrigation, transport, and sewage functions, Lambro Meridionale has been a natural river for some time and has a drainage function.

The sewage has become its new main position for the functions it now undertakes. In this regard, we have studied the sewerage facilities, the runoff, and the main accumulation sites of waste within Milan, and found that the Lambro Meridionale in the urban environment is capable of naturally forming waste accumulation sites, posing pollution problems. This speculation was confirmed by our fieldtrip, especially in the context of low water levels in winter, while in summer, the situation improves considerably.

Although the pollution problem is not part of our landscape strategy, our vision and strategy will be based on the background of its improvement through the expected engineering treatment, and will be further improved by us through the ecological approach of the landscape.

Nowadays, in addition to the sewage function, the need for public use has become particularly urgent, and this is the breakthrough of our research and design for Lambro Meridionale.

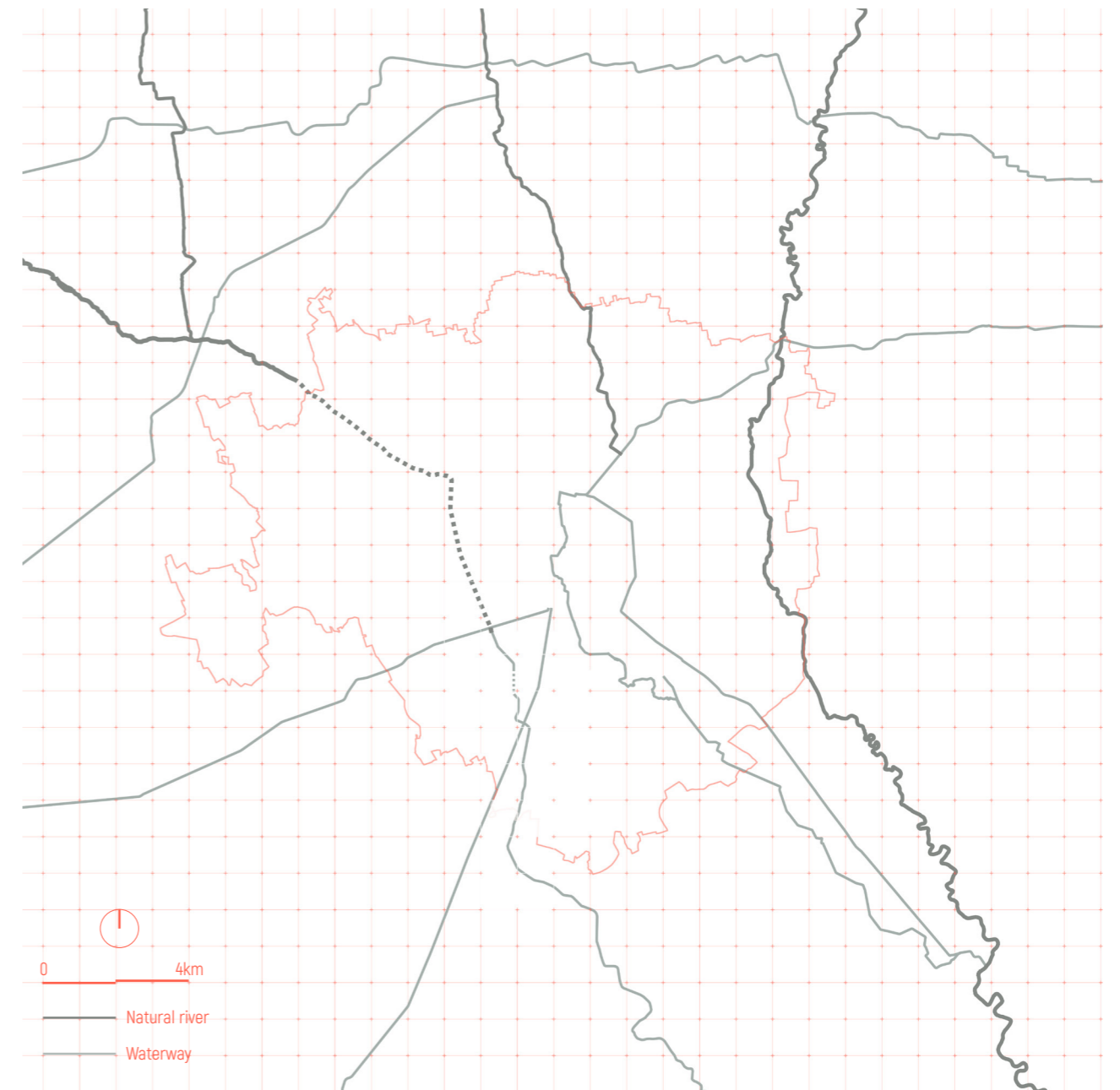
The Lambro Meridionale flows from the old city of Milan to the outskirts of Milan, with dense or large residential areas, such as the famous self-sufficient community Quartiere Sant'Ambrogio. There are also a large number of schools, universities, and corporate offices along Lambro Meridionale. The needs and benefits of the different stakeholders make Lambro Meridionale the focal point of the area. In fact, there are already social calls and feasibility studies for the opening of public green spaces and activities along the Lambro Meridionale.

The proximity of Lambro Meridionale to the Naviglio Grande, Olona river is also worth mentioning. The various commercial activities and fairs along the Naviglio Grande nowadays bring a high tourism value, and this linkage can also benefit Lambro Meridionale in terms of attracting flows; and Lambro Meridionale has a certain urban significance as the source of the underground Olona part returning to the ground.

These contextual conditions add value to our topic and provide a clear direction for our strategy and design: how to enhance the public space transition between Lambro Meridionale and the surrounding urban space? How to bring the public vitality of the Naviglio Grande into our study area? This will be our top priority.

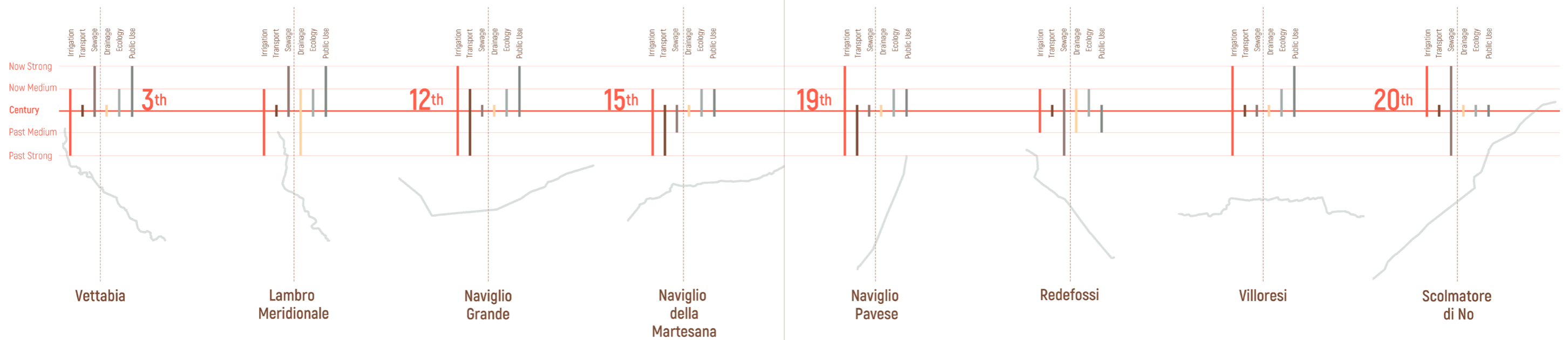
Finally, we integrate these conditions. We visualize the spatial relationship between Lambro Meridionale and the Milan water system, urban sprawl, pollution and stormwater problems in a complex environment from mapping, and provide preliminary data and theoretical basis for our further study of Lambro Meridionale itself.

MILAN WATER SYSTEM.



This map shows the most important natural rivers and canals within the city limits of Milan. Lambro Meridionale gets its water from two waterways, Naviglio Grande and Olona. Downstream of it, it connects to the Lambro River in the south.

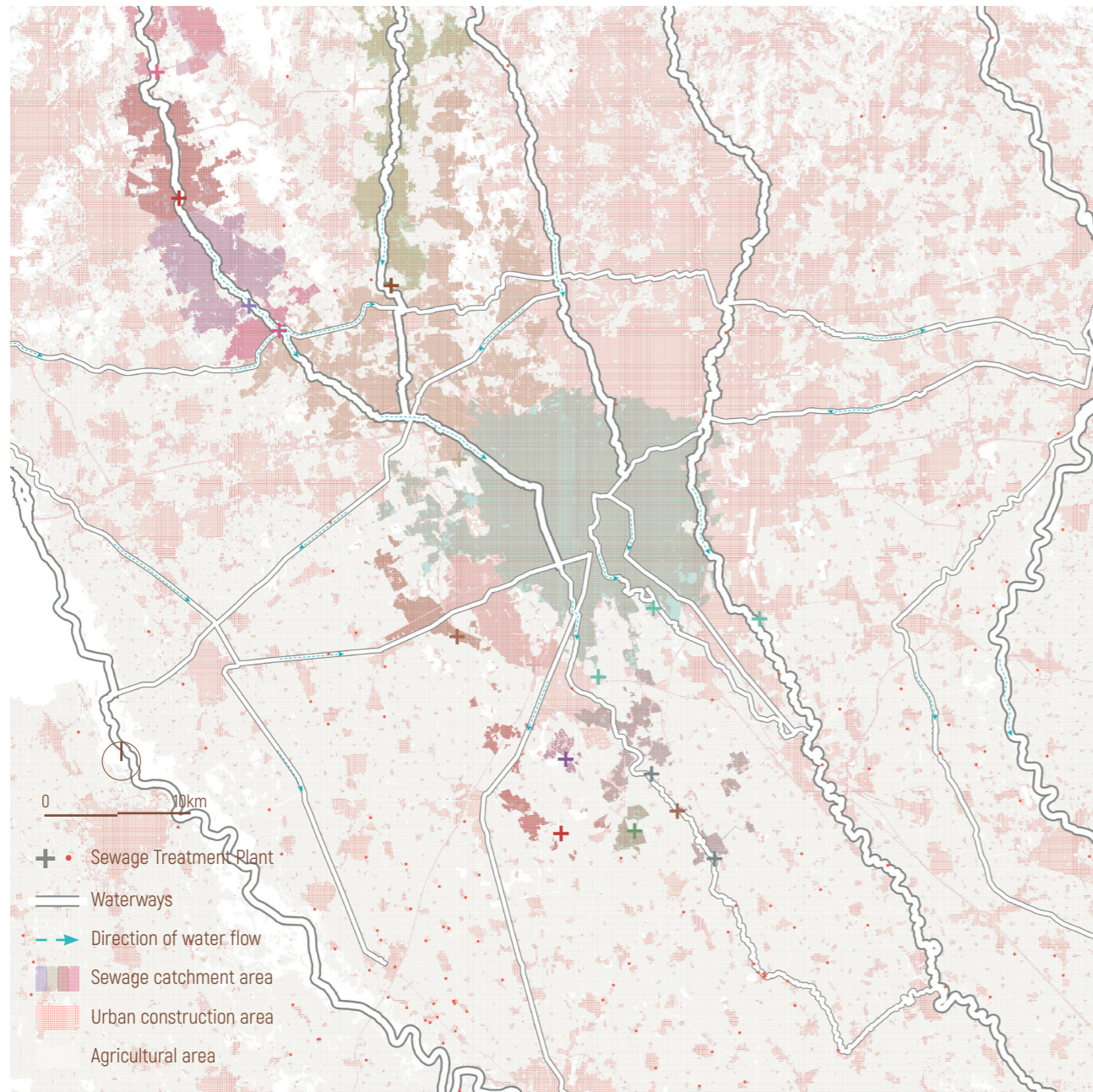
CANAL TIMELINE AND FUNCTION.



This chart shows roughly the functions of the various water ways within the city limits of Milan. Most of these waterways were dug as canals for transportation and irrigation.

But the Lambro Meridionale, the subject of our study, is a relatively special one. It started as a natural river and was used as a drainage channel for the city since the Roman period. Today, the natural shape of this river has been regularized in the development of the city.

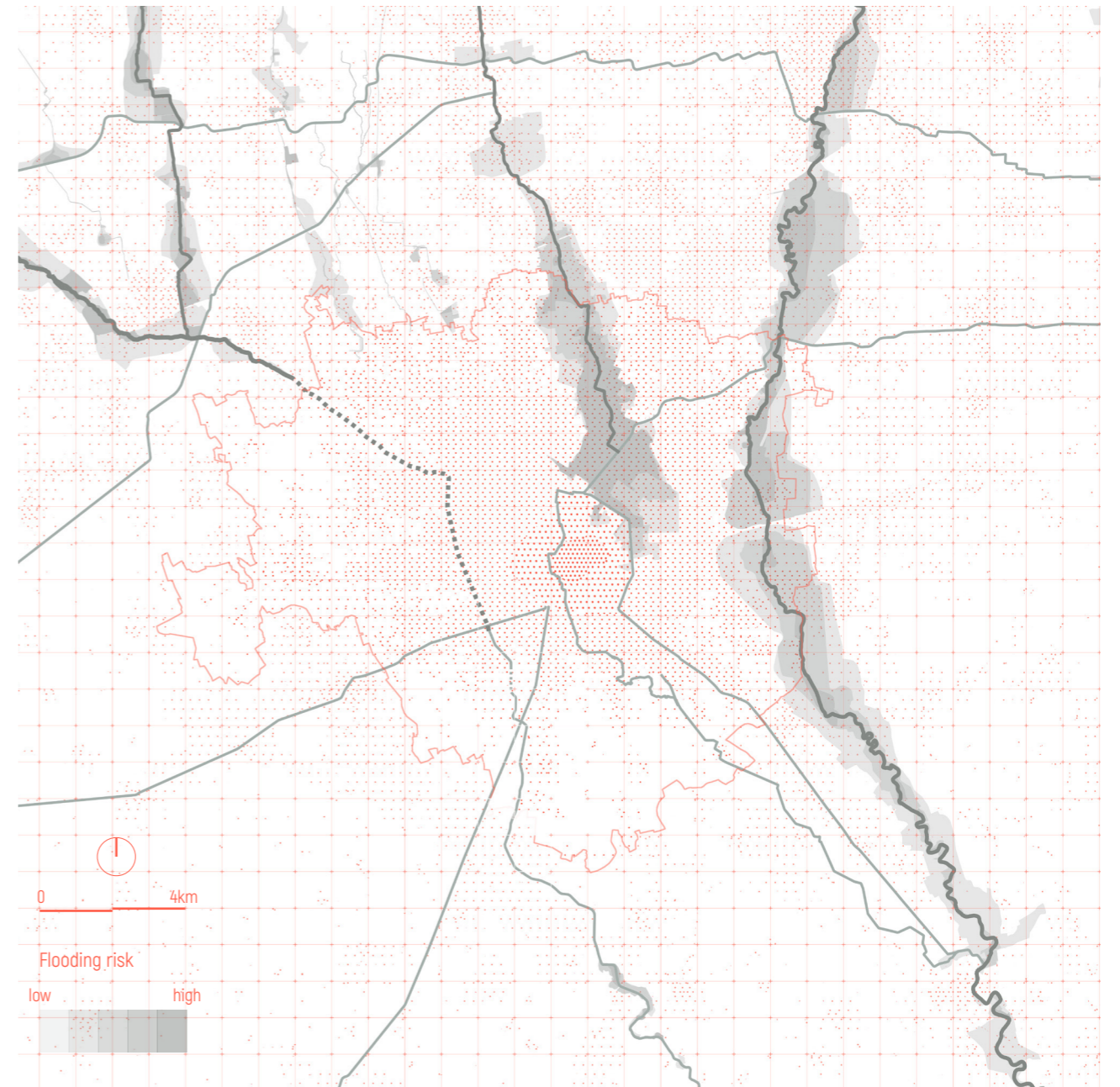
SEWAGE TREATMENT.



This map shows the installation of municipal sewage stations associated with Lambro Meridionale. At one time, the Olona river upstream of him had more serious pollution. However, with the attention paid to ecological issues, a better sewage treatment system has been established.

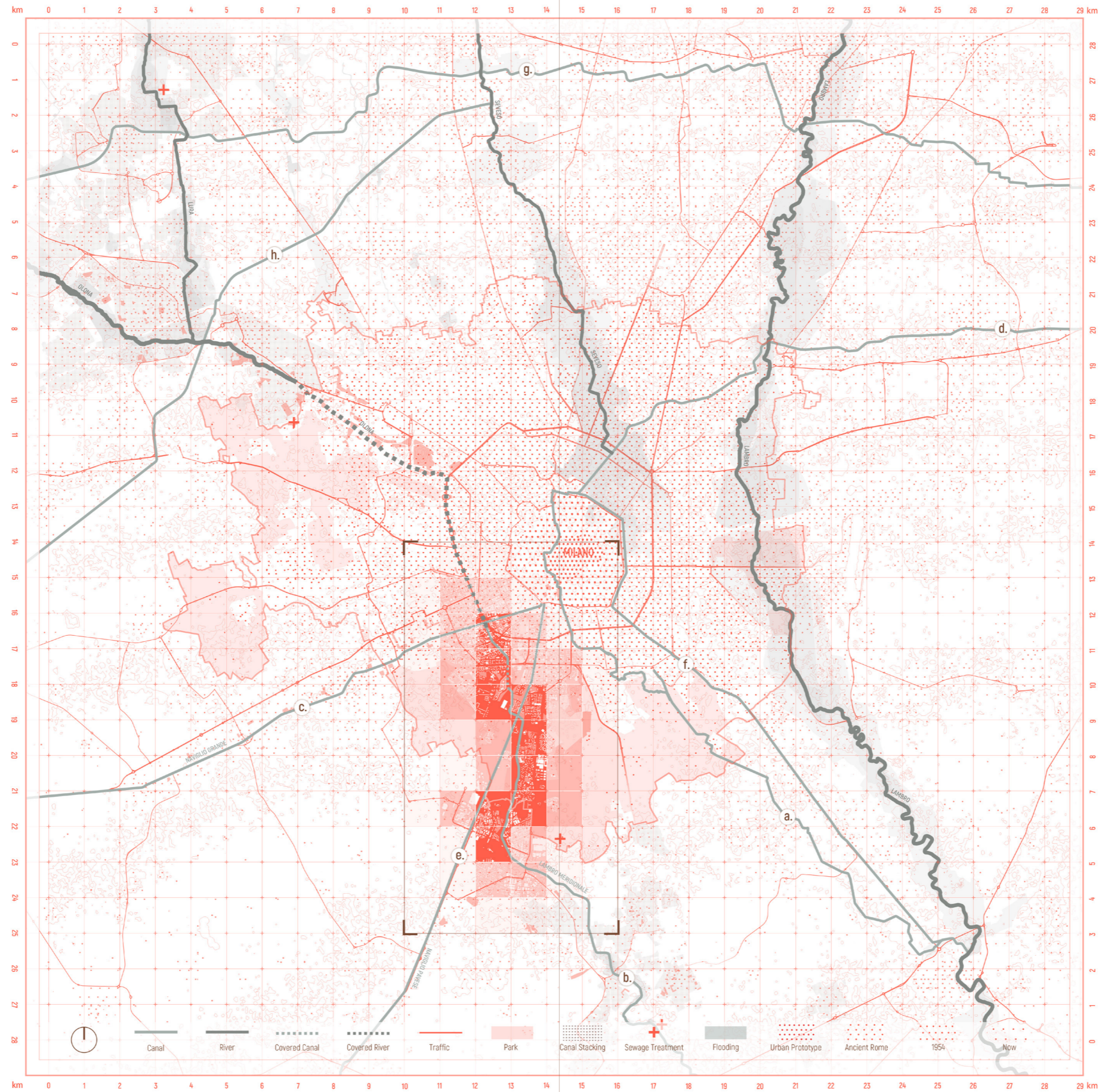
However, he is still affected by the urban sewage discharges in the main city of Milan. This is directly felt in field research on waterways, and greatly affects the attractiveness of rivers to people.

FLOODING.



Flooding is one of the problems faced by the main natural rivers around Milan, but in general this problem is not transmitted to the surrounding area of Lambro Meridionale

OVERALL MAPPING.



- a. Vettabia
- b. Lambro Meridionale
- c. Naviglio Grande
- d. Naviglio della Martesana
- e. Naviglio Pavese
- f. Redefossi
- g. Villoresi
- h. Scolmatore di No

FROM THE SCALE OF LAMBRO MERIDIONALE.

The formation of the Lambro Meridionale dates back to human construction activity in Roman times, and it is one of the oldest waterways within the city of Milan. It occupies a place in the structure of Milan's water network. Once located outside the city, this river has been integrated into the urban fabric of Milan's southwest as the city has expanded.

Over the last hundred years, the river has been regulated from its wanting natural state and has been influenced by more human activities, however, there are still some historical relics lurking in the spaces along the river.

Today, the Lambro Meridionale we studied begins at the beginning of the river (where it joins the Naviglio Grande) and ends when the river leaves the city of Milan and enters the suburban agricultural area. This section of the river can now be roughly divided into five categories. However, throughout the whole process, the city does not seem to have an organic connection with the waterway, and the waterway is neglected as the back of the city. You can see in detail what the waterway looks like today in the pictures and the accompanying text in this chapter.

H I S T O R Y .

By collecting historical maps and photographs from different periods and redrawing them, we have a clearer picture of Lambro Meridionale and its surrounding urban development.

In the 19th century, the Lambro Meridionale existed as a natural river. The city boundaries of Milan at this time covered only its source, and there was only a small amount of infrastructure along the river; the Lambro Meridionale revolved around the Casina and the fields, and the natural riverbed texture was a characteristic of that era.

By 1930 at the head of the river, infrastructure such as the railway viaduct had been established and Lambro Meridionale began to be incorporated into the city's master plan as an artificial waterway. Historical photographs from 1950 show that the source of the Lambro Meridionale has been replaced by concrete, artificial structures have replaced the original Naviglio Grande, the Olona natural diversion, and the railroad bridge has been further consolidated.

By 1965, with the expansion of the city, more infrastructure and architectural texture was developed along the river and Lambro Meridionale was completely artificialized from natural to geometric forms.

By 2006, the city had expanded significantly and the Lambro Meridionale was partially covered with infrastructure, and traffic along the river developed rapidly. However, it is worth noting that the urban space along the waterway has been renewed, but the urban fabric does not correspond well to it, and the Lambro Meridionale has to some extent fragmented the planning and design of the fabric on both sides.

From 2006 to the present, Lambro Meridionale and its banks have been relatively fixed, with only a few renewals taking place.

For more than a century, Lambro Meridionale has undergone a transformation from natural to artificial, and has witnessed the expansion and development within the city, a mutually influential relationship that will provide a palimpsest for our future design plans.

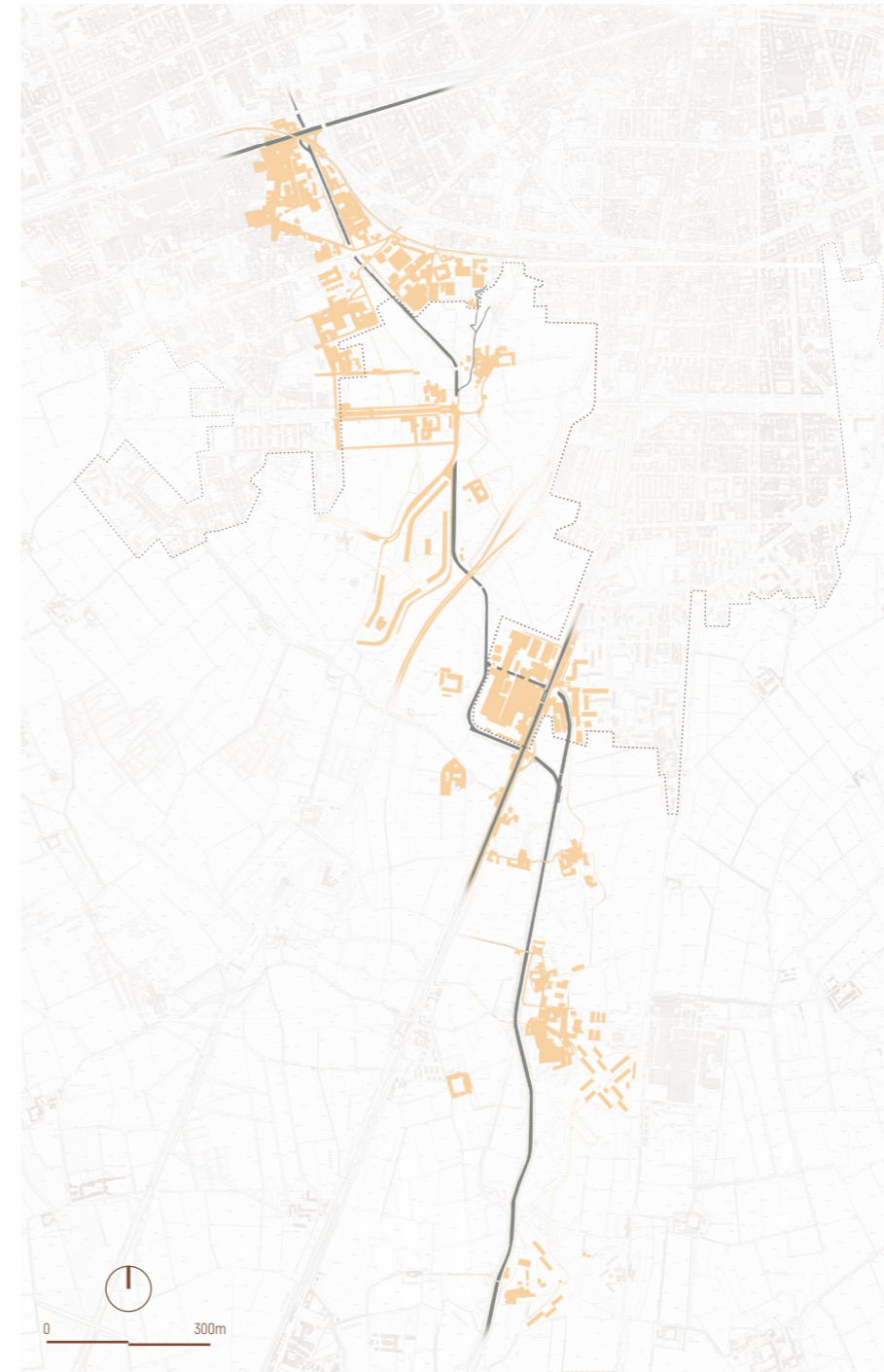
HISTORICAL MAPPINGS.



1930.

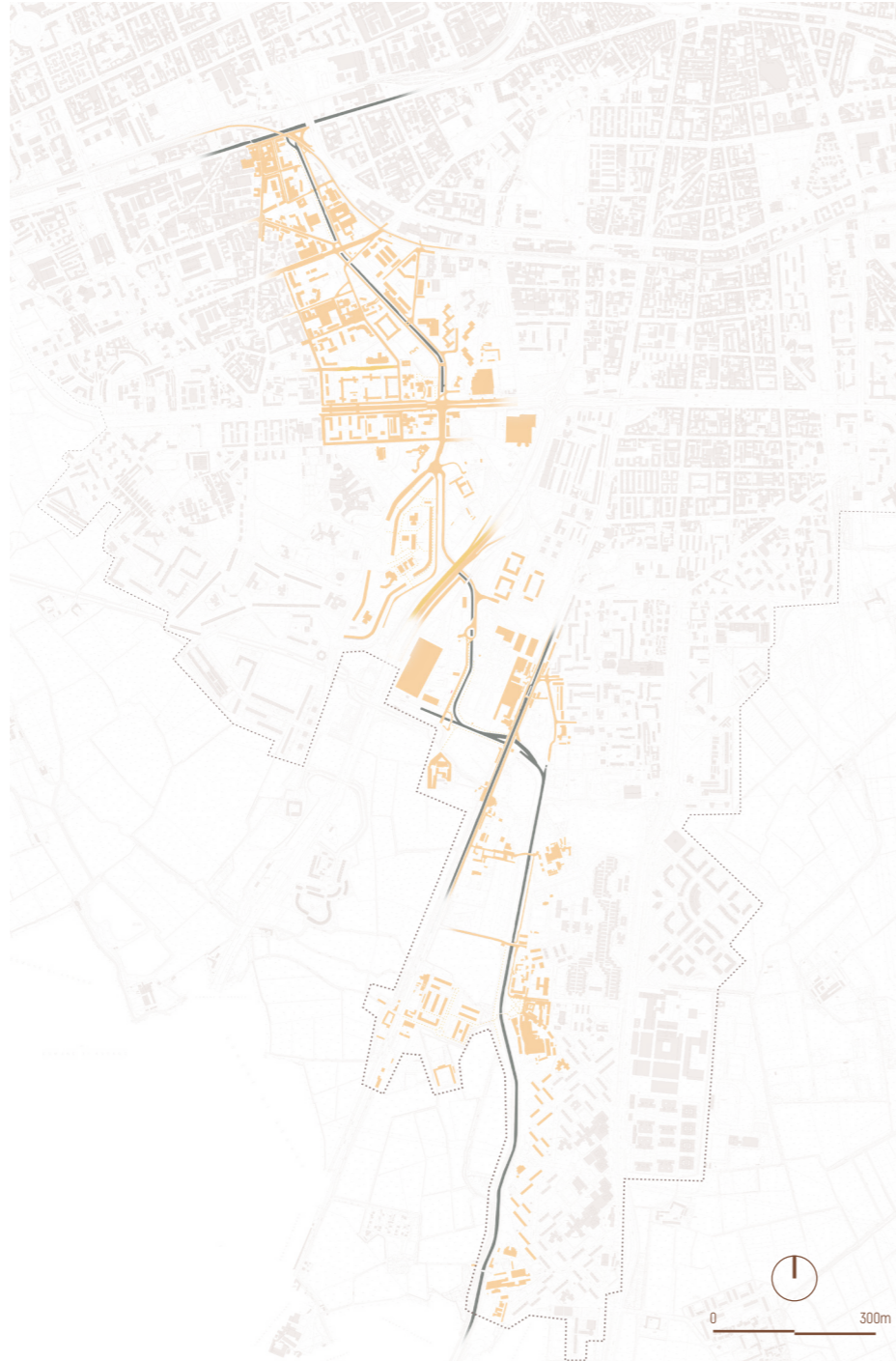
The waterway was in a relatively nature situation, without much urban fabric around it.

There are a number of freestanding buildings along the river, some of which we can still see today.



1965.

Artificial forms replaced the more natural waterway forms, and urban expansion and infrastructure flourished.



2006.

The surrounding urban fabric is further extended, and part of the waterway is covered by infrastructure.

However, in practice, the space of the city is not actively connected to the waterways. The waterway is only surrounded but not organically integrated into the urban fabric.

HISTORICAL PICTURES.



In this photo, we can see that the Lambro Meridionale still takes on a more natural form at that time. Some churches, farmhouses and other buildings are present along the Lambro Meridionale. But they are relatively independent buildings instead of a continuous urban space



The source of Lambro Meridionale in natural condition (1949).

The city has expanded to the edge of Lambro Meridionale, some infrastructure has been built, but there are no already built urban spaces along the coast. It is still more of a natural presence.



The source of Lambro Meridionale in construction condition (1950).

Starting in the middle of the 20th century, the river began to be regularized and hardened. The image of this river began to change from a natural to an artificial state. The structure in the photo is now located at the beginning of Lambro Meridionale.



Piazza Bilbao Scolmatore Olona (1995.)

Lambro Meridionale is fed partly by the Olona river and partly by the Naviglio Grande. In fact, it is structurally similar to the extension of the Olona river which today becomes an underground river after entering the city in the north, and which, after re-emerging from the surface, is linked to, or becomes the Lambro Meridionale.

Through the mapping of the current situation, the fieldtrip in different seasons, and the cross-sectional understanding, we generated a segmentation and summary of the nature of Lambro Meridionale in the urban context of Milan.

The mapping focuses on Lambro Meridionale and its surrounding spaces. Different kinds of infrastructure (pedestrian, vehicular, highway, bridges, tunnels, etc.), different kinds of green space systems (parks, community gardens, green spaces, brownfield, abandonment, etc.) and connections to different urban functions. And cross-section helps to understand in the height space. And the site research in all seasons allows us to recognize the influence of time on landscape vegetation and water level embankment, and to understand the real spatial feeling, materials, colors and other urban conditions. Only by fully depicting all the existing elements can we make our planning and design onsite and specific.

The overall design is divided into six paragraphs: 1. Double source with Naviglio Grande and Olona's outlet, 2. Enclosure in urban environment, 3. Hidden under the city, 4. Re-appearing between the way, 5. Re-appearing between the way, 5. Intersection with pollution issue, 6. Inserting into urban edge.

Each paragraph is clearly distinguished not only in terms of urban geography, but also in terms of waterway characteristics, space along the waterway, and connectivity with the city, and by splitting the paragraphs, it is possible to provide a more effective overview of the various existing conditions.

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EXISTING SITUATION PART01.

Site 01 is the source of the Lambro Meridionale, which, as mentioned above, originates from two waterways: the Naviglio Grande and the Olona river. Site 01 is also one of the sites with the most development potential and value for several reasons.

The first is its connection to the urban complex; the source of Lambro Meridionale is linked to the urban environment through the railway viaduct and, together with the railroad and viaduct, forms a complex infrastructure system. Thus, how to cross these conditions and make the waterway more closely connected to the city of Milan is the key challenge to be considered. The arch space, which will be gradually opened in the future, will also bring opportunities for accessibility and public activities in Lambro Meridionale.

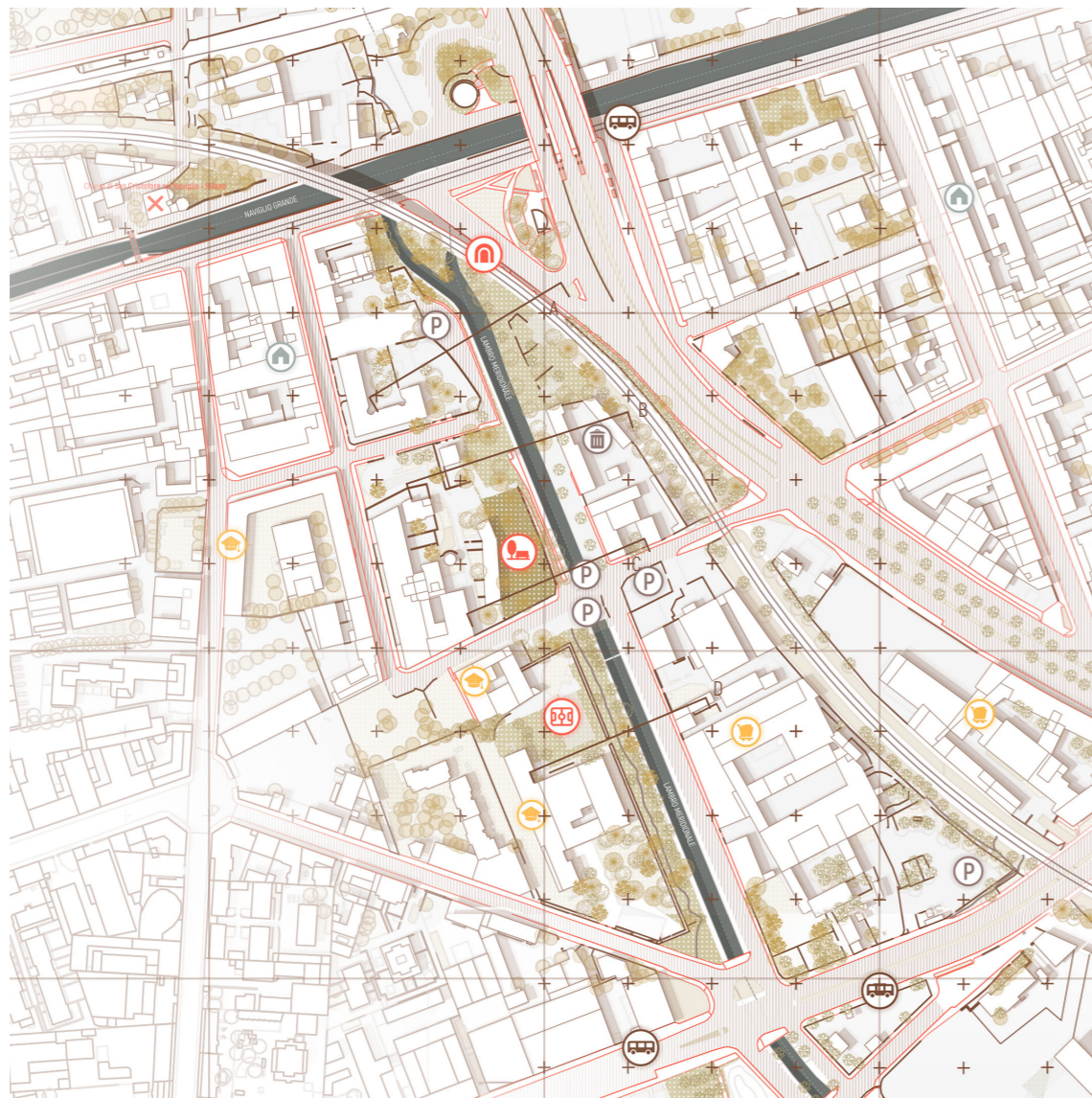
Secondly, the more abundant space along the river will allow people to experience Lambro Meridionale up close. For the source of the waterway, there is not much road system along the river, which brings the possibility for people to approach the waterway and helps to generate water-friendly space.

In addition, the site is filled with abandoned green spaces, community gardens, and sports facilities along the river, and this spatial sufficiency opens up the possibility of creating a continuous green space system.

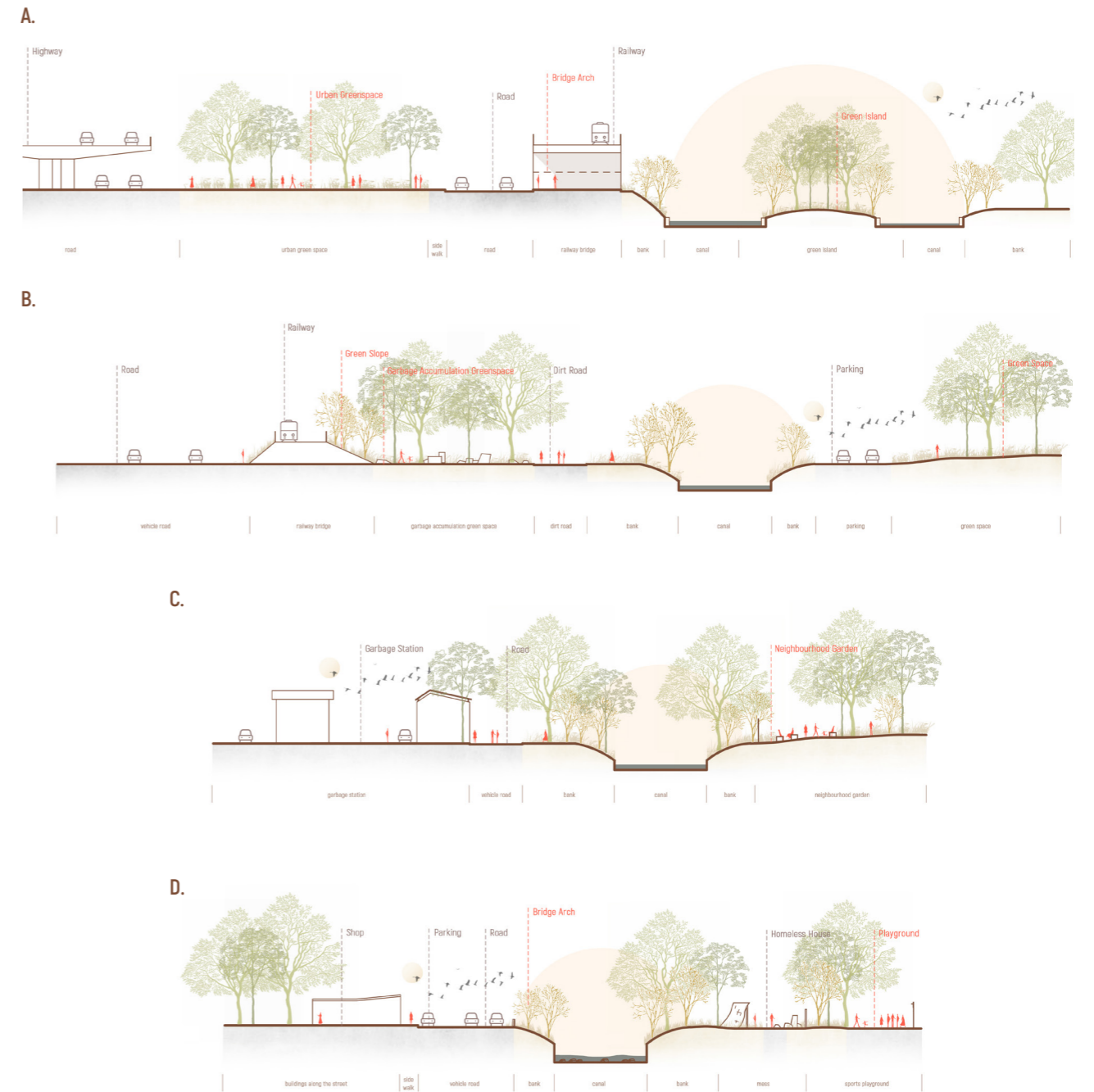
Finally, the environmental quality of Lambro Meridionale, which is close to the railway viaduct, is now overgrown with garbage, which greatly reduces the spatial quality along the waterway; the various green spaces are also separated from Lambro Meridionale by walls, creating a division in the flow. The chaotic parking system and the linear green space where homeless people make their home are factors of urban insecurity and stability.

For Site 01, we will carry out a series of design and planning to make it an attractive source of Lambro Meridionale that hosts public activities.

PLAN AND CROSS-SECTIONS.



In the first section, the waterway is surrounded by some green spaces that are not properly planned and used. People can perceive the presence of the Lambro Meridionale, but it is difficult to make an effective interaction with it.



PHOTOGRAPHY PERCEPTION.



4 5 Waterway bank.



1 The source.
2 3 The opening arch.

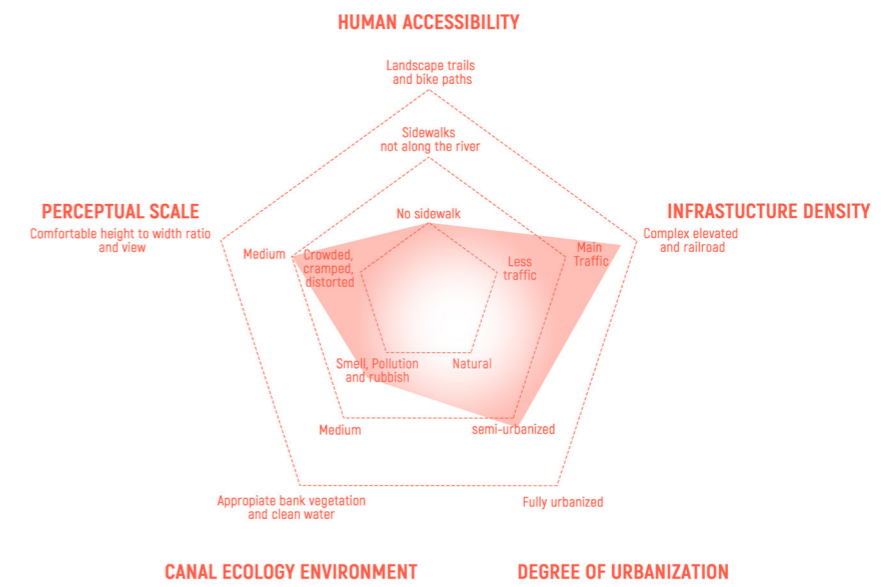


6 Waterwayside space (West).
7 Waterwayside space (East).

CONCLUSION.



Lambro Meridionale Situation.



As the starting part of the waterway, possessing design potential. The arches planned to be opened can become an important connection to connect the city and unite its vitality, while the quality of the water-friendly area along the river is in urgent need of upgrading.

EXISTING SITUATION PART02.

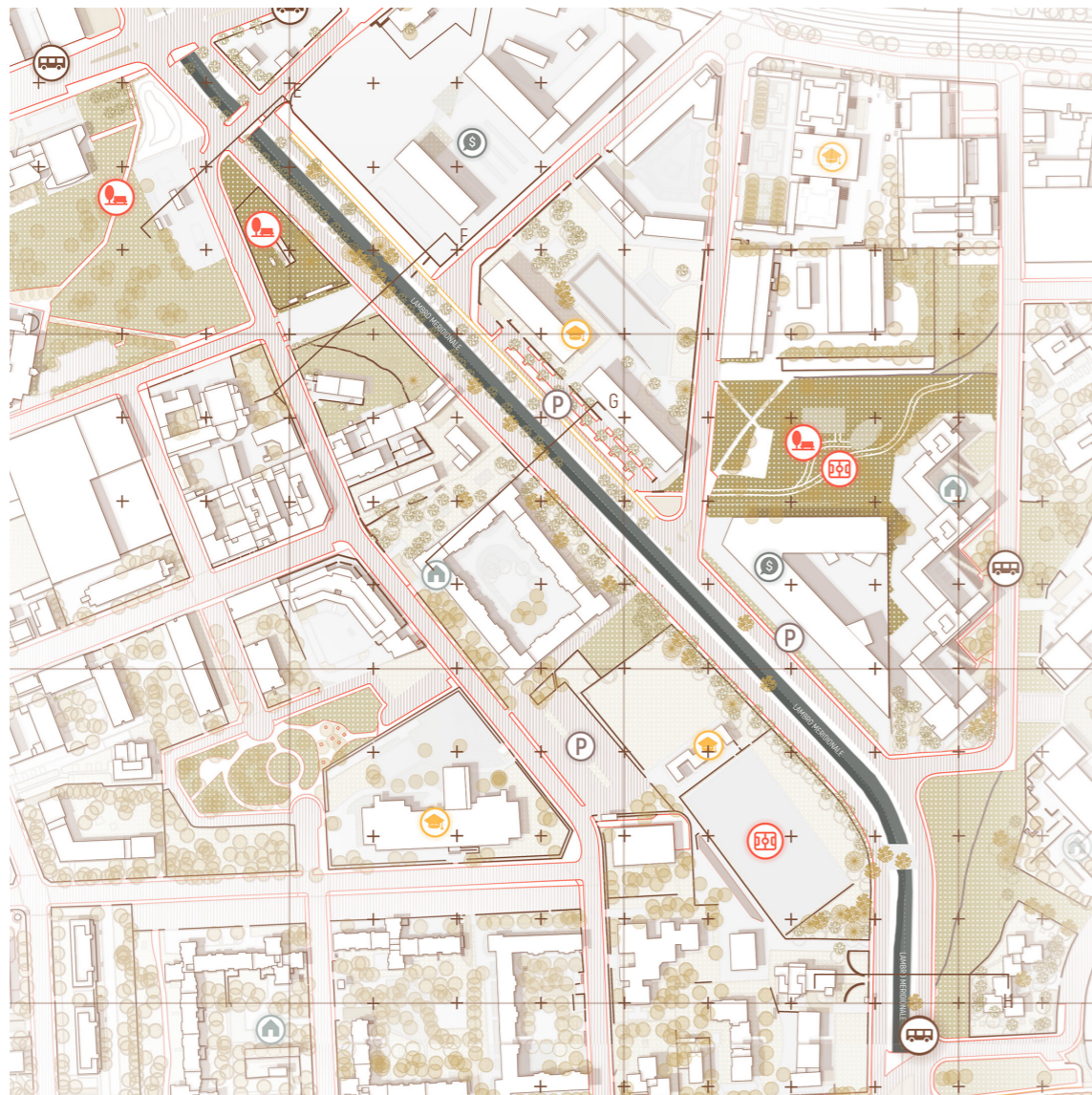
Site 02 is characterized by the relationship between Lambro Meridionale and the surrounding large urban buildings, as well as by the excavation of historical traces. In general, Site 02 is not the perfect location to establish a green space system. However, some development strategies along the site can be effectively implemented with independent green space design.

For the urban complex, Site 02 is composed of vehicular and pedestrian paths along the banks of the site, with trees and shrubs shading the site, making Lambro Meridionale invisible and losing its connection to the surrounding area. The texture of the waterway is dominated by large buildings, with a lack of continuous bicycle paths and landscaped walkways, and each block is inwardly oriented, with its own space and away from Lambro Meridionale. Therefore, on this basis, only the traffic and parking flow along the waterway needs to be sorted out, and no further design adjustments can be made.

The green space along Lambro Meridionale is relatively abundant (dog park, Milanogreenway, community garden, campus green space, etc.) and is generally well designed and maintained. Besides, there are also interesting sites to explore. A small section of historical trace is depressed below the ground level in its current condition, and this palimpsest has historical value and educational significance, and has the potential to become a key design object for Site 02 and form a linkage with the surrounding green space.

For Site 02, due to the existing urban conditions, Lambro Meridionale itself is hardly a subject of activity and vision, and the surrounding space is more mature, requiring less attention to design in general.

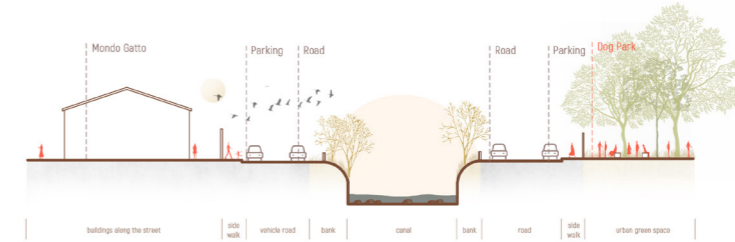
PLAN AND CROSS-SECTIONS.



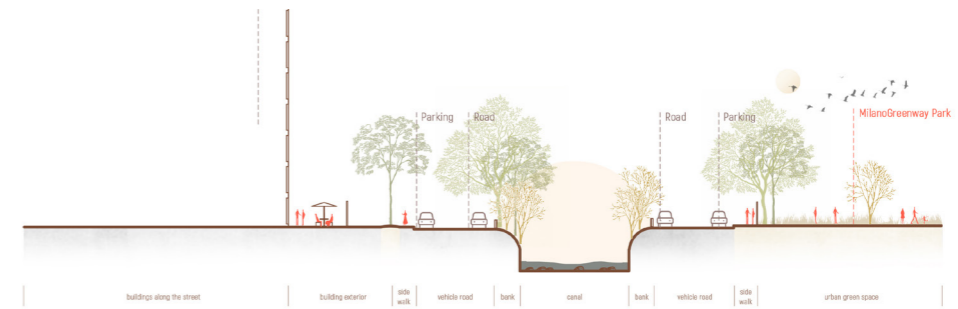
In the second section, both sides of the waterway meet directly with the motorway. People perceive Lambro Meridionale much less. The urban functions on both sides of the waterway are mostly large urban public buildings.



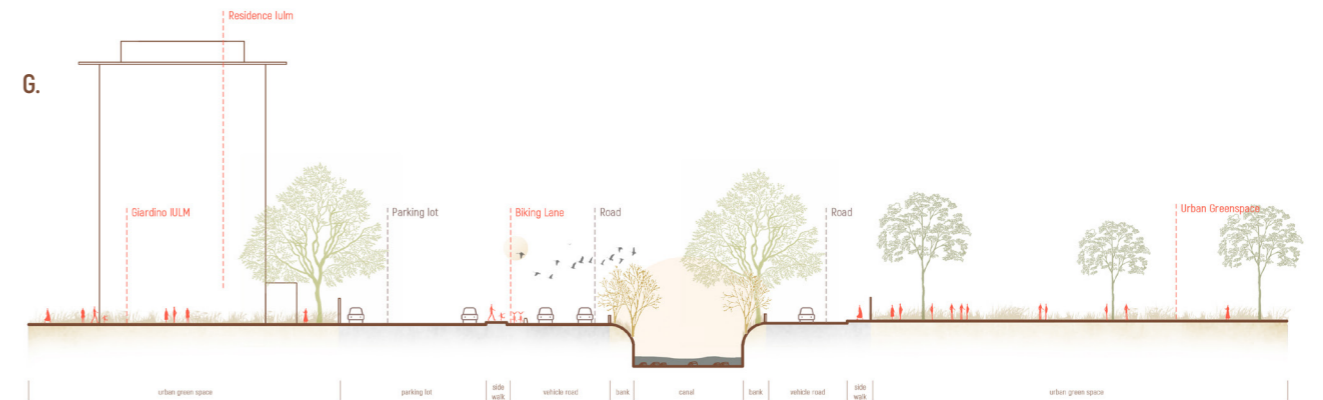
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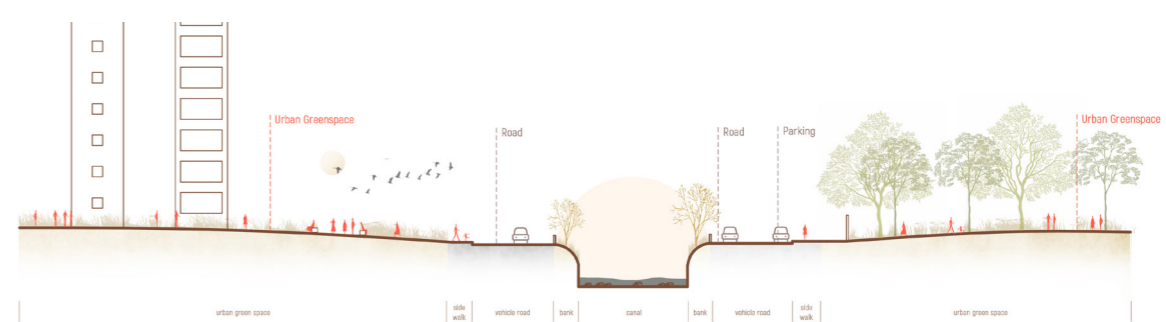
F.



G.



H.



PHOTOGRAPHY PERCEPTION.



12 Pollution situation.



3.



5 Side space (West).
6 Side space (South).



2.



4.

34 Waterway bank.

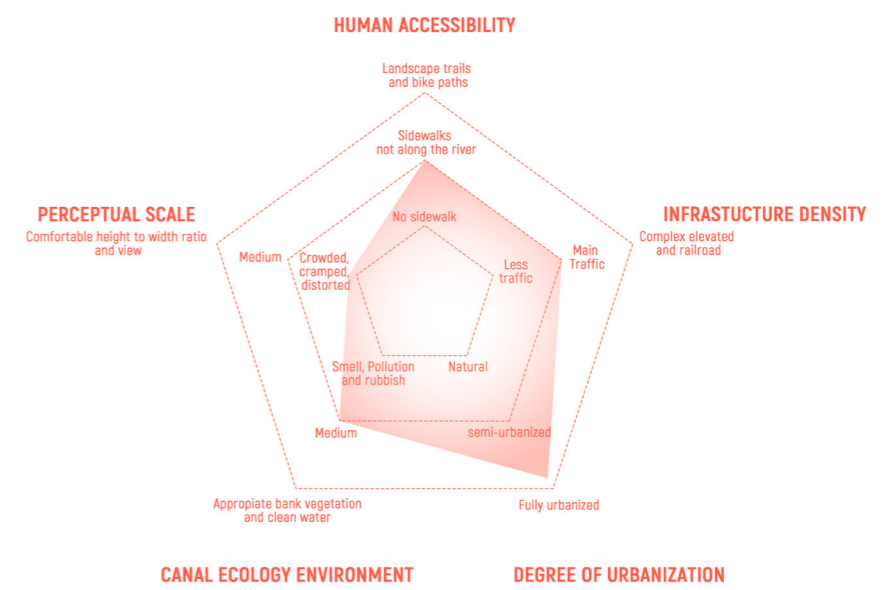


6.



Lambro Meridionale Situation.

CONCLUSION.



This part of the waterway is in the midst of a large volume of buildings and heavy traffic. The waterway as a whole is fragmented from the urban environment, with little interconnection.

EXISTING SITUATION PART03.

Site 03 is one of the more special ones among several parts.

The Lambro Meridionale is covered by infrastructure and has a weak connection with the city.

First of all, for the waterway, we think that a fully closed state is not suitable for its health management, and it can be partially opened to make people aware of the existence of Lambro Meridionale on the one hand, and to facilitate maintenance and cleaning on the other.

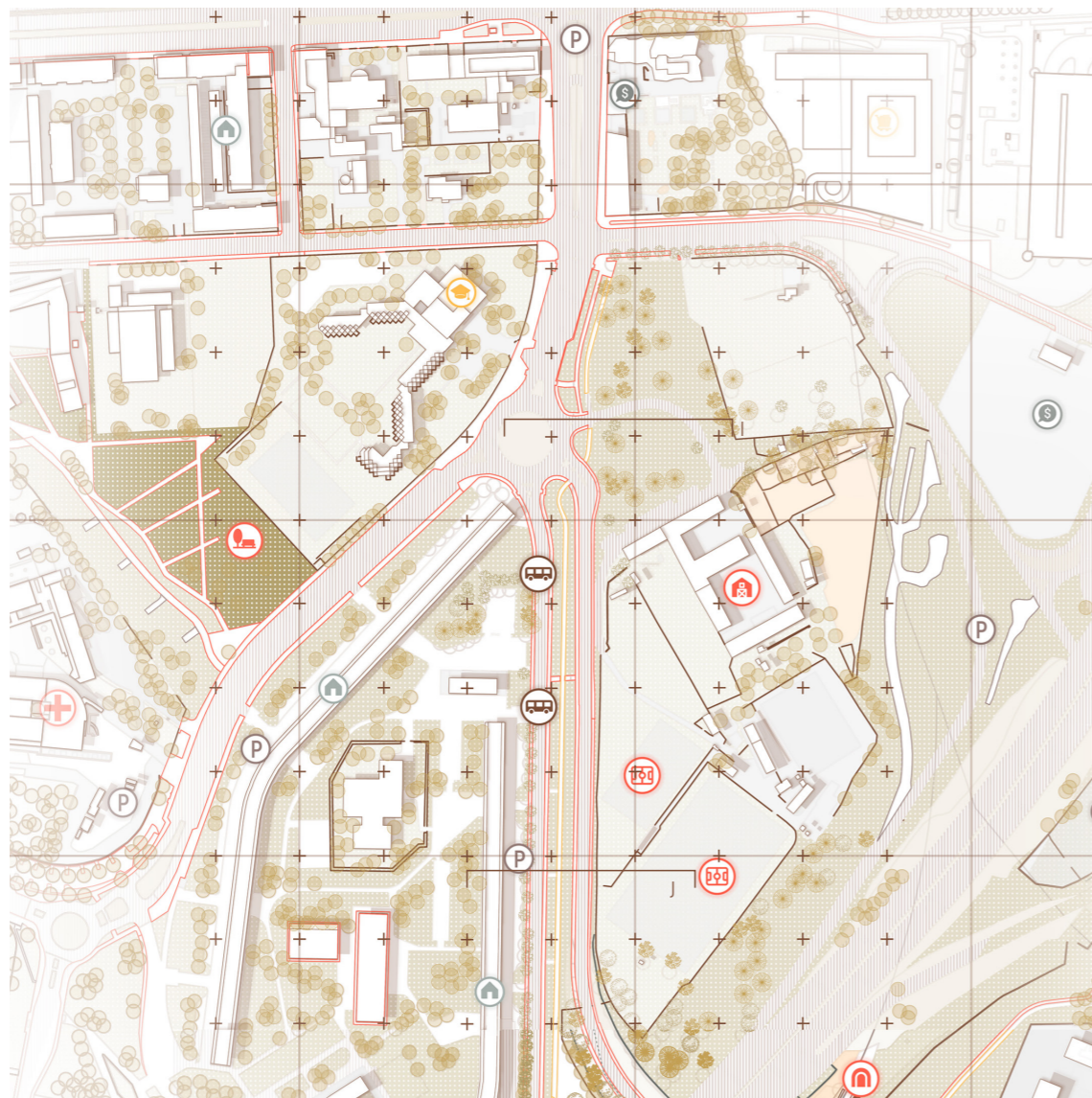
Its covered part is on the central axis of the traffic center island, and the right amount of opening can make a good relationship between cycling, pedestrian, and green space stay with waterway.

For its surrounding urban environment, its variety is more diverse. Self-sufficient large communities Quartiere Sant'Ambrogio, large stadiums as well as schools, parks, brownfields, farms, etc. The blocks can be linked to Lambro Meridionale through a relatively small strategy, thus ending the fragmentation and solving the chaotic traffic flow.

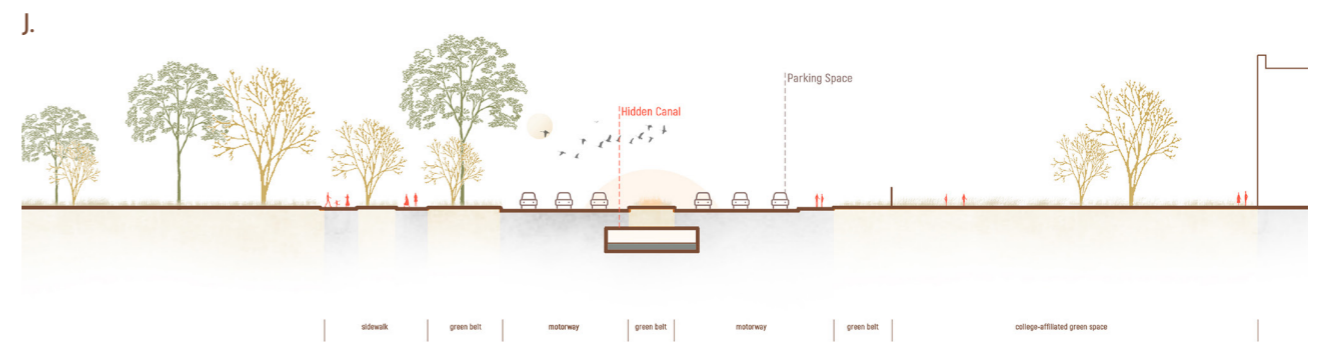
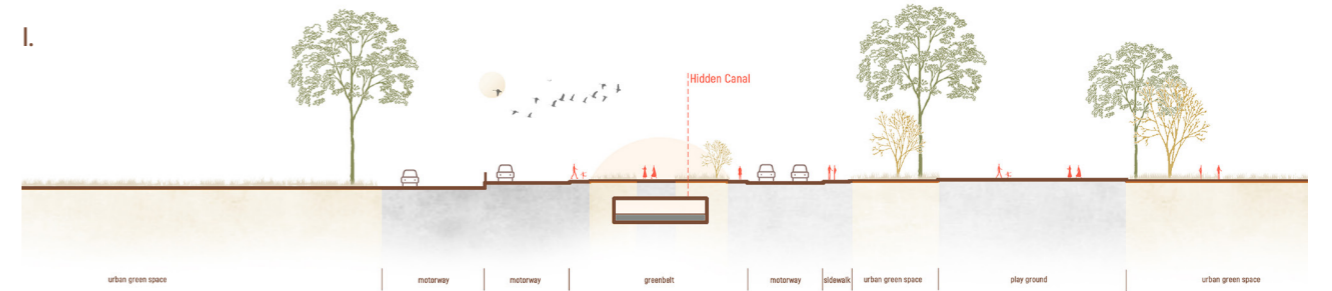
At the same time, the opening of Lambro Meridionale can follow the entrance and the flow of the city buildings, enhancing the physical and visual connections.

Overall, the disappearance of the waterway is not a sustainable development strategy for Site 03, and by gradually opening it up, it can be an important part of the overall Lambro Meridionale development plan.

PLAN AND CROSS-SECTIONS.



In the third section, the river turns into an underground river. But the construction of roads and sidewalks still roughly follow the direction of Lambro Meridionale. The density of urban construction is further reduced in this area.



PHOTOGRAPHY PERCEPTION.



5 6 Tunnelway.



12 Disappear of canal.



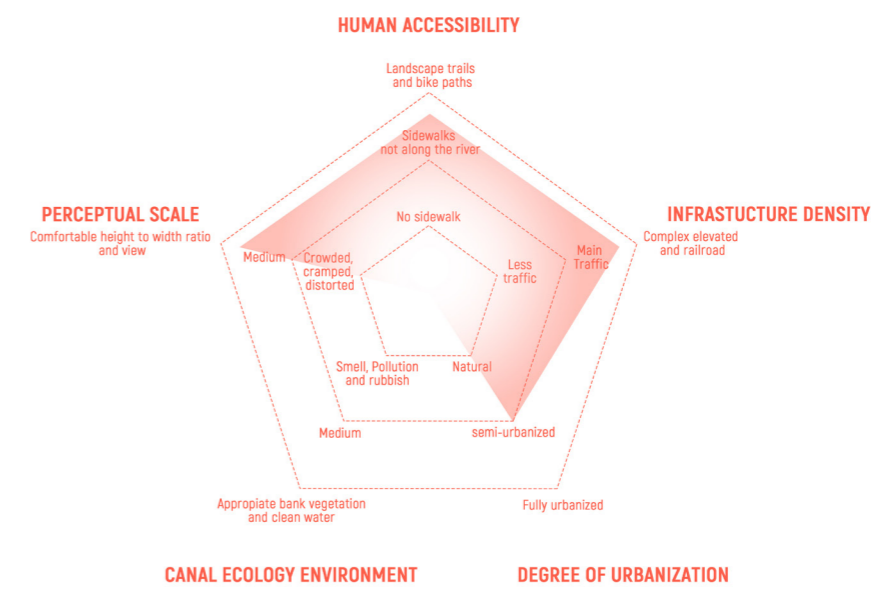
3 4 Linkage with surrounding.





Lambro Meridionale Situation.

CONCLUSION.



This part of the waterway is underground, with infrastructure and pedestrian paths covering the waterway. In addition, the presence of giant communities along the river is an important feature of this area.

EXISTING SITUATION PART04.

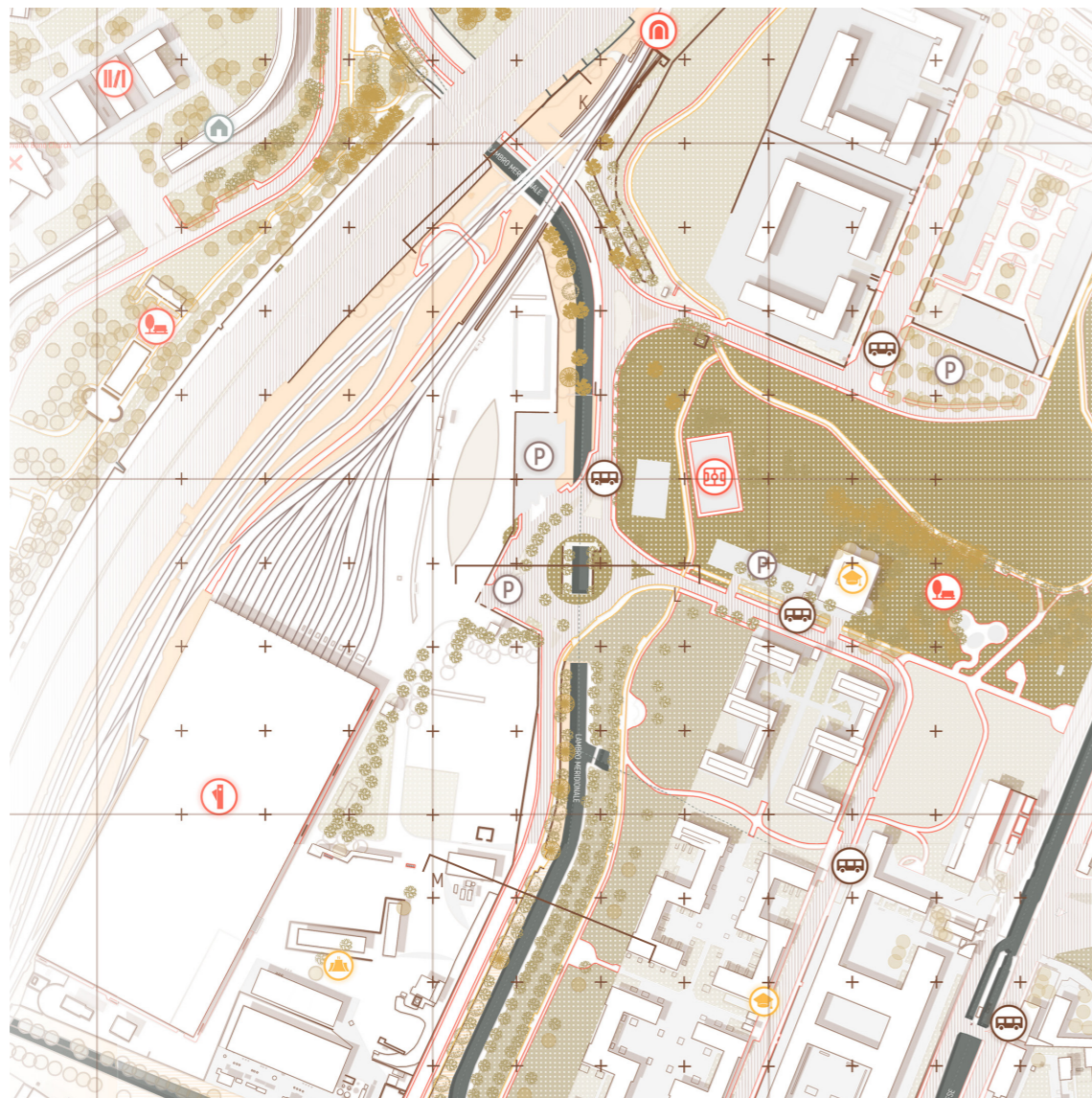
This section of the waterway is, in general, the more desirable state of Lambro Meridionale in the urban area of Milan. Adequate planting, the construction of a trail along the river and the green spaces attached to the community along the river contribute to the overall quality of the environment.

In terms of urban complexity, site 04 is the starting point for the re-emergence of Lambro Meridionale and is closely linked to the infrastructure of railroads and tunnels. For the waterway traffic movement, the confusion of the pedestrian system, crossing the tunnel and the parallelism with the traffic flow are the main problems, which can be enlivened by the smaller signage design and sightline design, while effectively guiding the human movement and giving life to the space under the tunnel. This is also a good design point for people to observe the re-emergence of Lambro Meridionale.

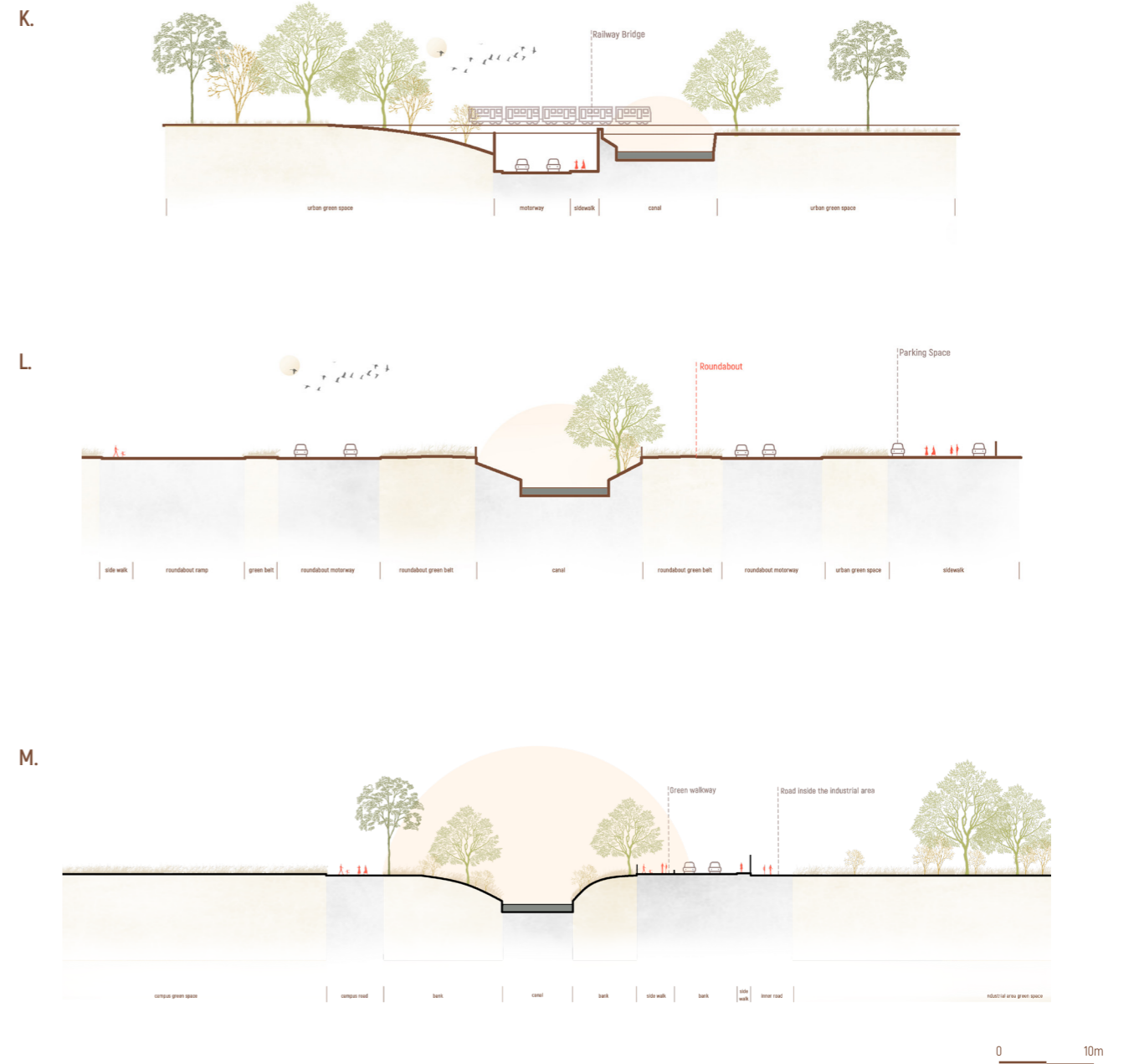
In terms of the surrounding space, this section of Lambro Meridionale has successfully integrated into the urban fabric, transitioning from a dense urban environment to an urban boundary initially through large green spaces and transitioning with the surrounding train station, factories, and large residential areas. The overall green space has become systematic, well maintained and clearly connected, thus requiring a more limited design approach.

For site 04, spatial grooming and design are not required, but rather the main issue is to resolve the relationship between urban flow and infrastructure.

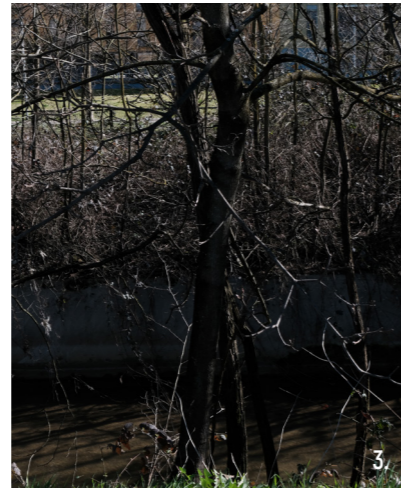
PLAN AND CROSS-SECTIONS.



In the fourth section, Lambro Meridionale reappears on the surface after crossing a viaduct. More public green spaces and greenway systems have emerged around it. But the landscape of this area still lacks connection to the waterway itself.



PHOTOGRAPHY PERCEPTION.



4 5 Waterway bank.



6.



2.

1 2 3 Re-appear of the waterway.



5.



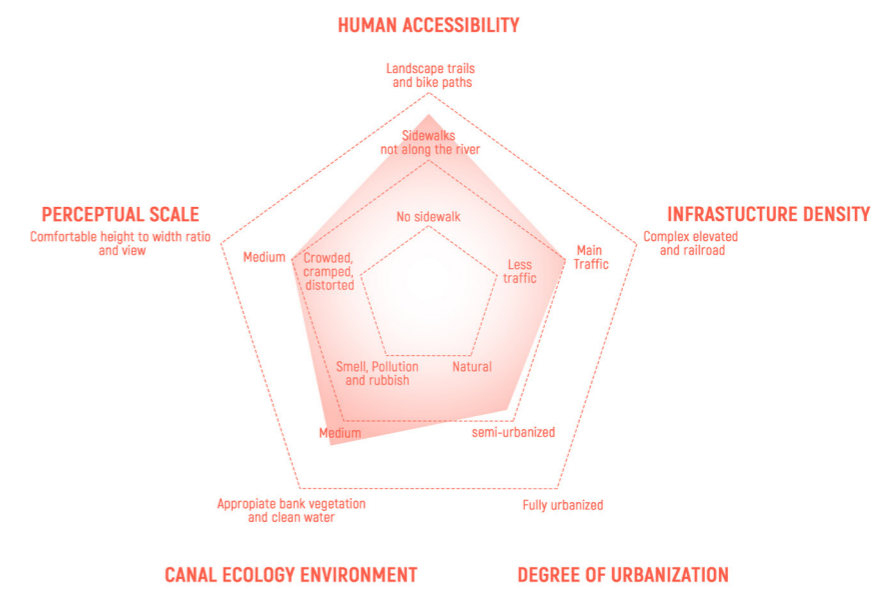
7.

6 Side space (West).
7 Side space (East).

CONCLUSION.



Lambro Meridionale Situation.



This part of the waterway reappears and enters the urban fringe where residential areas and factories are the main presence throughout the area. Landscape walks begin to appear along the river, creating a good interaction.

EXISTING SITUATION PART05.

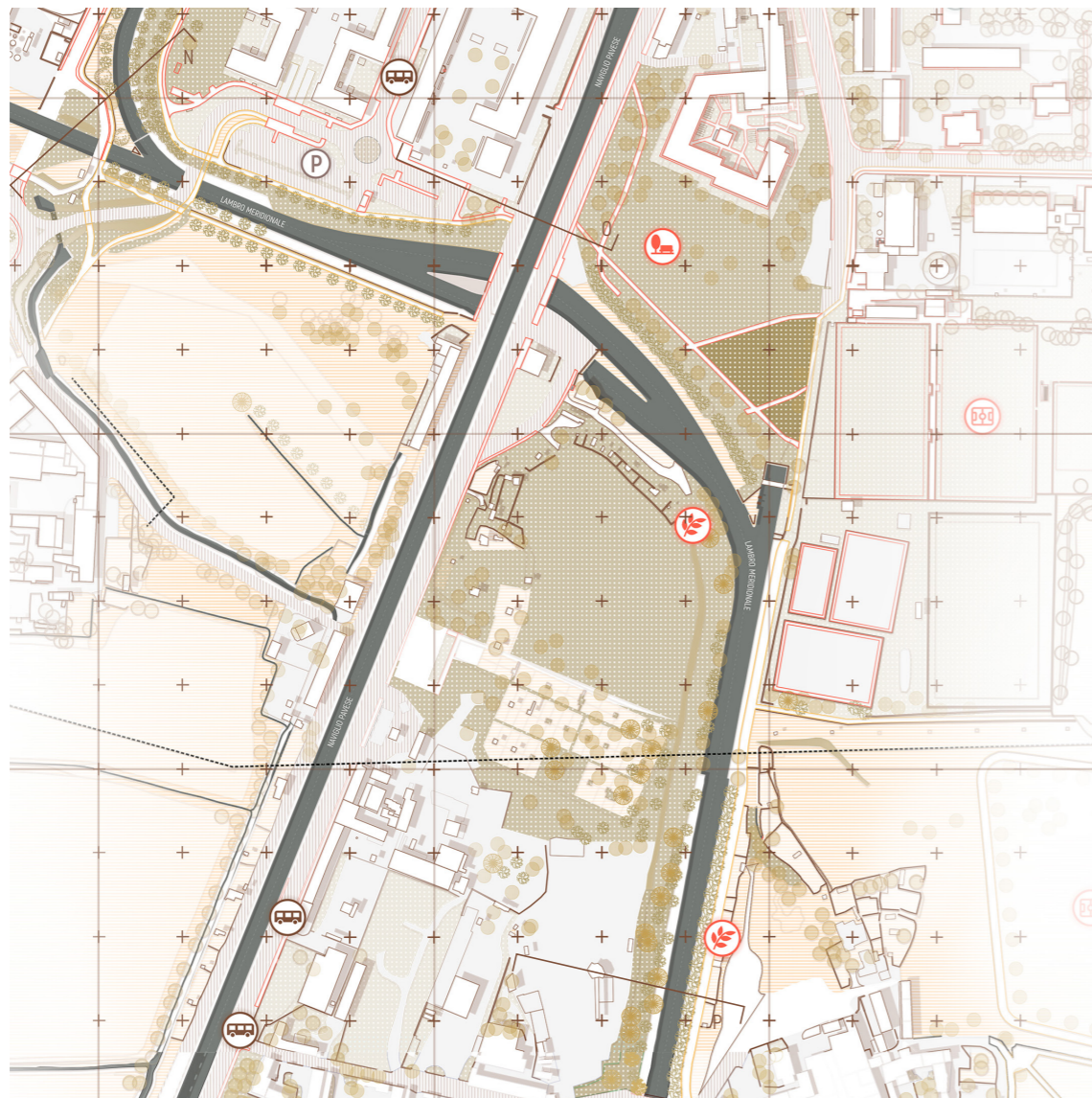
Site 05 is another area of focus, where the intersection and turning of the waterway, the adaptation of urban-agricultural boundaries, pollution and waste accumulation, and illegal farming are concentrated.

In terms of urban complexity, Lambro Meridionale intersects with Naviglio Pavese here, and a diversion of pollutants is provided by the installation of a bifurcation device. However, the resulting negative visual and olfactory impacts are particularly pronounced, causing problems for the surrounding businesses and residences. In addition, the traffic flow is affected by the intersection of the two waterways. For walkers and cyclists, they need to walk several hundred meters more and pass through the busy highway in order to find their way back to Lambro Meridionale, which seriously interrupts the continuity of the space along the waterway. Therefore, how to deal with the relationship between the waterway intersection, infrastructure and pollution issues is an important issue for this site.

In terms of the green space around Lambro Meridionale, site 05 still needs to be improved. Due to its location at the urban boundary of Milan, the community green spaces, farmlands, parks and gardens, and illegal farming intersect with each other to form a green system interface across Lambro Meridionale, but their maintenance quality and flow connections are problematic. For this area, it is particularly important to replace illegal farming with regulated urban agriculture to meet the needs of the stakeholders and to make the interface effective.

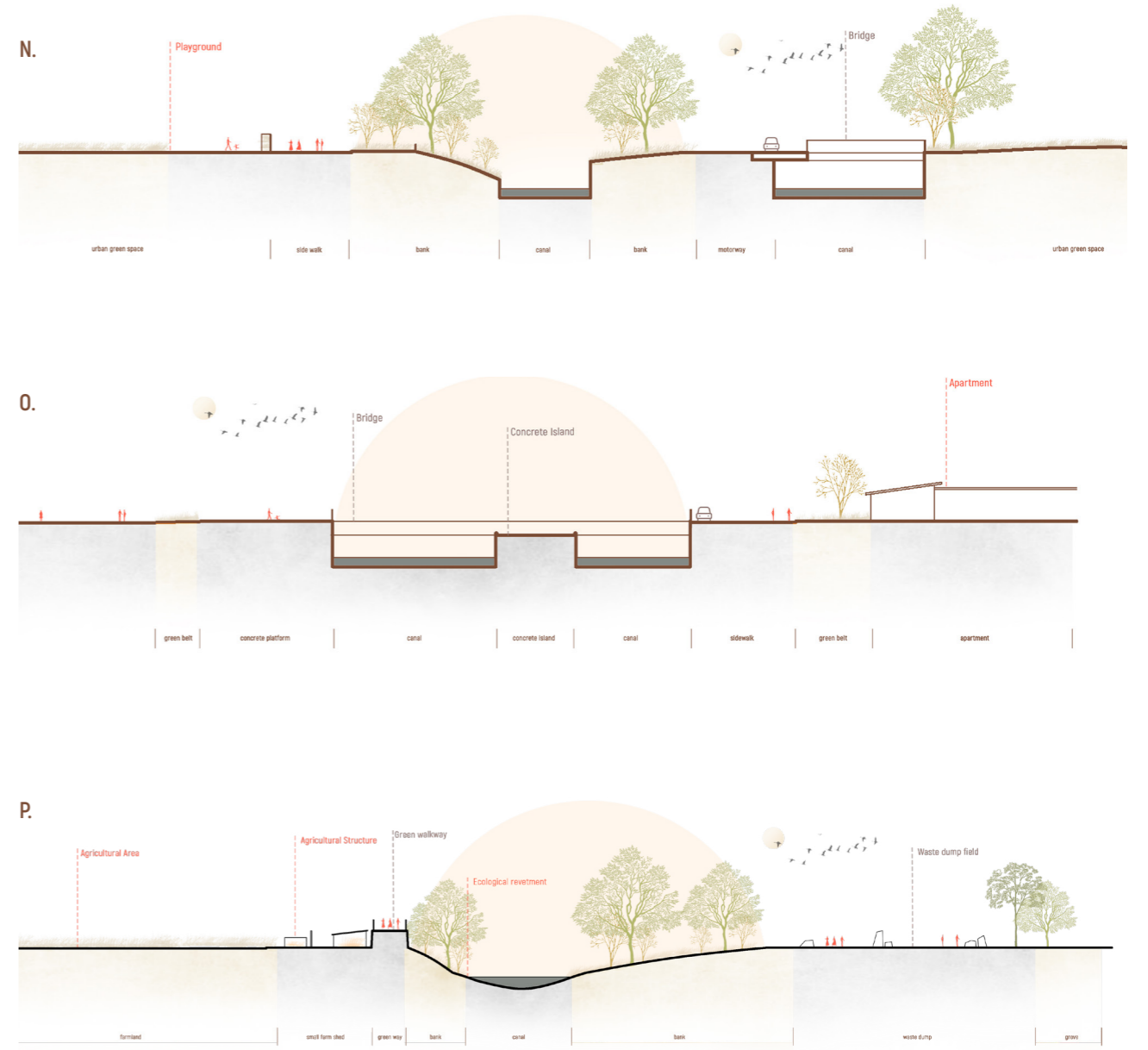
For site 05, the large scale of the individual units and the concentration of problems make it necessary for a holistic solution and further planning and design.

PLAN AND CROSS-SECTIONS.



In the fifth section, Lambro Meridionale gradually leaves the urban environment. The greenways in this area create a more active connection with the waterways. But its intersection with the Naviglio Pavese interrupts the continuity of human activity.

This is also the area where the most pollutants accumulate and a water purification facility is already planned for the future.



PHOTOGRAPHY PERCEPTION.



1.



3.



4.

4 5 Waterway bank.



6.



2.

1 2 Waterway intersection.
3 Naviglio Pavese.



5.



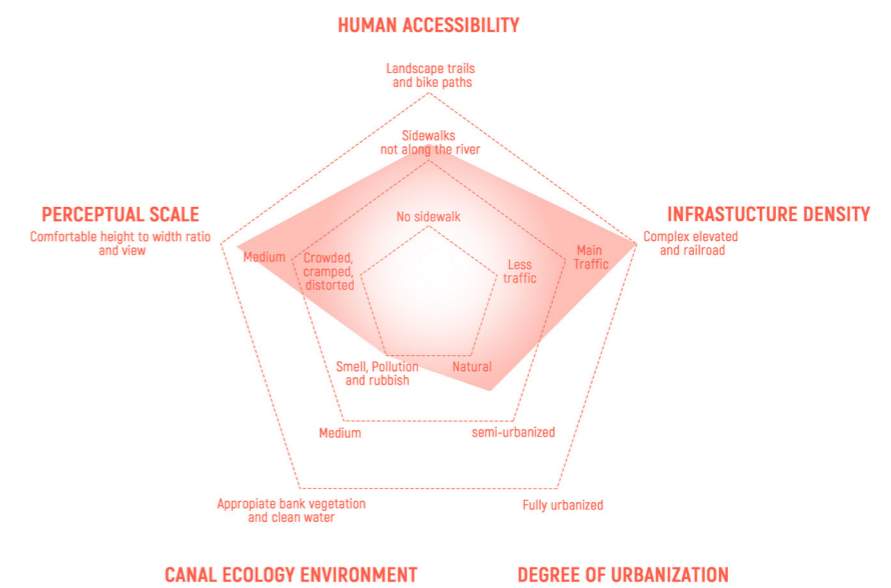
7.

6 Side space (East).
7 Side space (North).

CONCLUSION.



Lambro Meridionale Situation.



This part of the waterway begins to converge and redirect its tributaries and intersects with the Naviglio Pavese. The problems are more concentrated and complex, with a chaotic pedestrian highway system, garbage accumulation at the confluence, and illegal agriculture all needing to be addressed. In addition, seasonal changes in water levels are evident in this area.

EXISTING SITUATION PART06.

From site 06 onwards, Lambro Meridionale gradually flows into the outskirts of Milan, away from the urban fabric. The embankment and the planting of Lambro Meridionale are gradually becoming semi-natural.

For site 06, the situation and the problems are relatively simple: the Waterway, the large farmland, the Cascina, and the few scattered settlements are in a good structure,

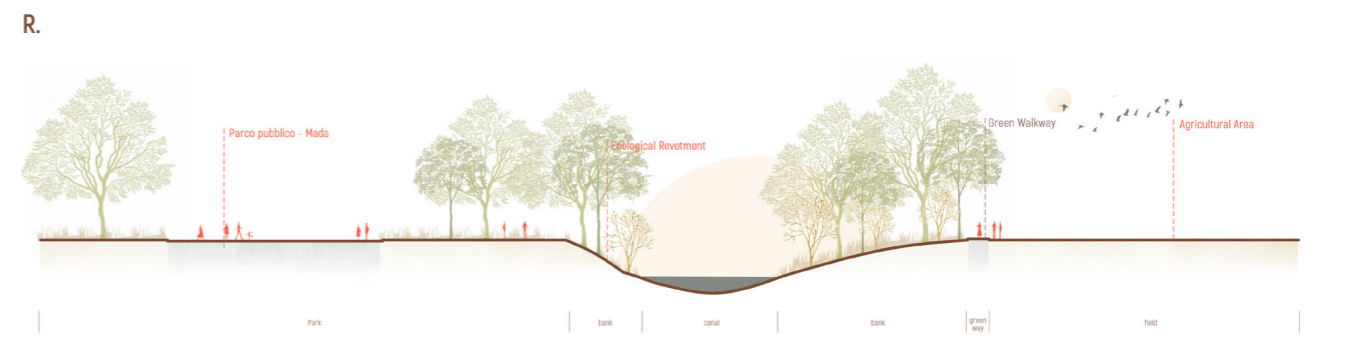
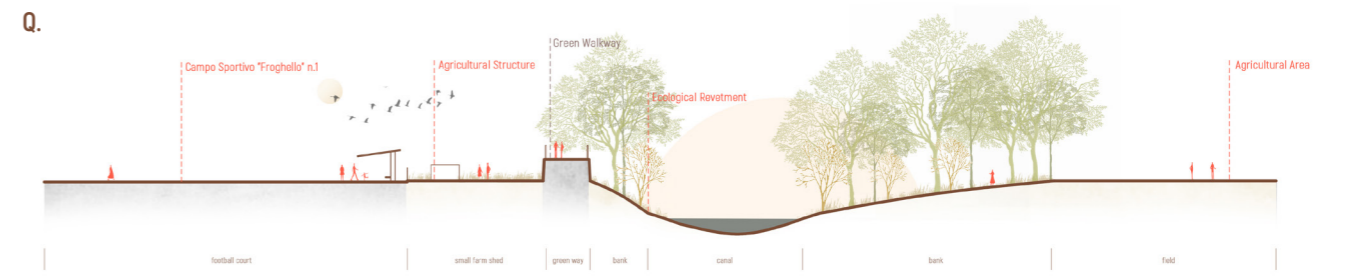
without redefining and modifying the space along the river. It is only necessary to create a natural water space by creating a trail that connects the two sides of the waterway according to the flow direction of the Lambro Meridionale.

Since Site 06 the Lambro Meridionale is no longer part of our study due to its distance from the urban environment of Milan.

PLAN AND CROSS-SECTIONS.



In the last section, the waterway is surrounded by suburban agriculture or small towns. The river has a relatively high quality ecological embankment. The water quality in this section of the river has also improved significantly after the pollutants were trapped in the fifth section.



PHOTOGRAPHY PERCEPTION.



1.



3.



4.

4 5 Waterway bank.
6 Urban edge.



2.

1 2 Illegal farming.



5.



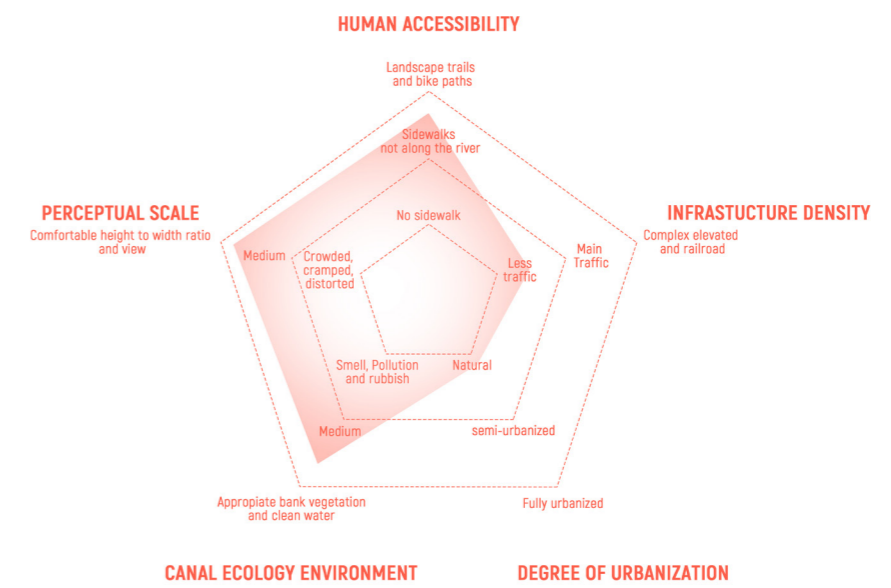
6.

3 Side space.



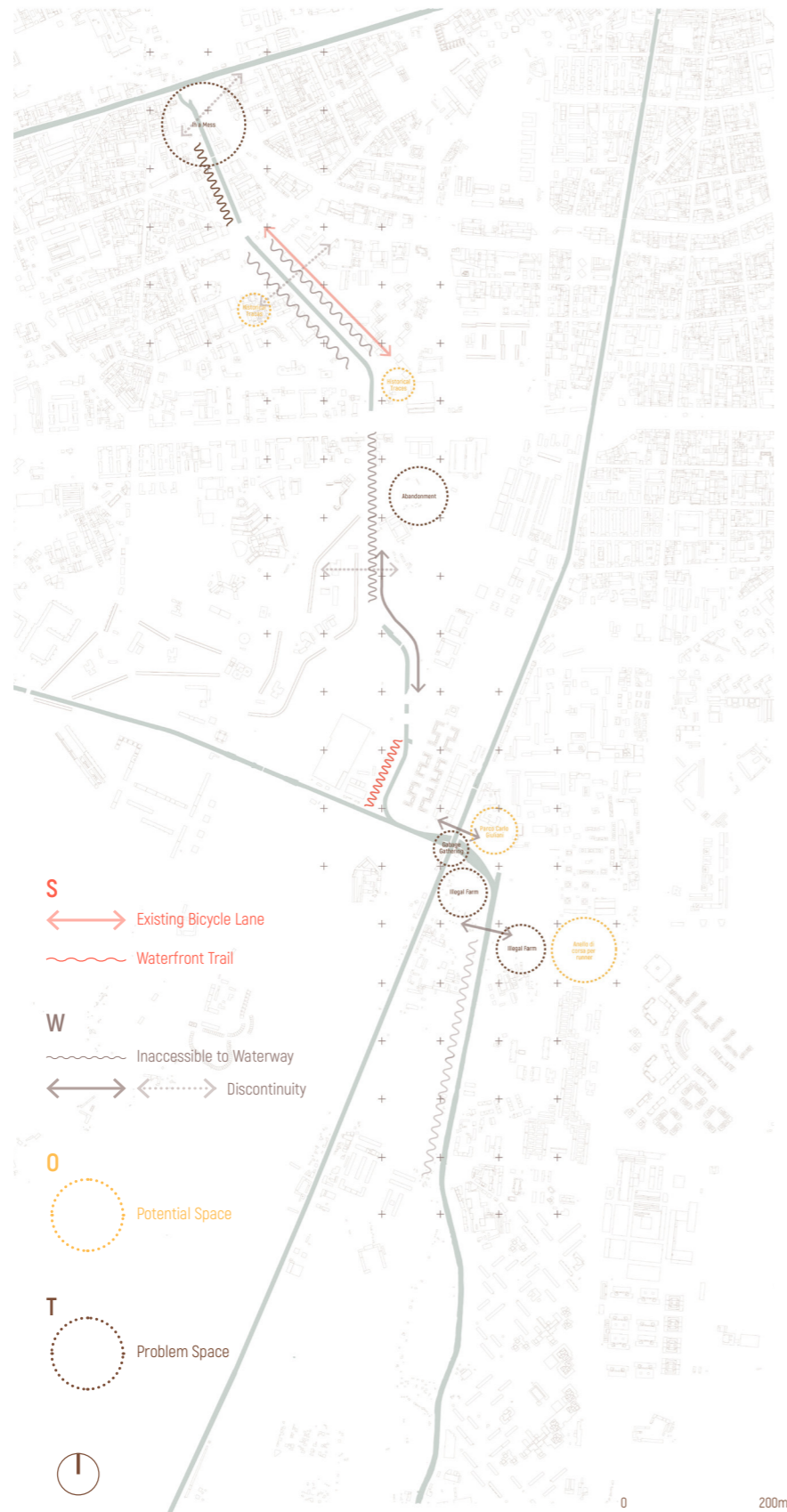
Lambro Meridionale Situation.

CONCLUSION.



This part of the waterway is in a more natural state and is at the urban-agricultural edge, and will then flow out of Milan to reach the vast farmland.

OVERALL MAPPING.



CONCEPT AND STRATEGY.

In this chapter, we describe the process of thinking from vision to concept to strategy to actions, with a conceptual presentation of some common strategies and an adaptive strategic planning for specific spatial aspects.

Based on the history of the current Lambro Meridionale and its position in the city, we propose the vision. By analyzing the value and potential of the subject, we propose three main strategies based on spatial relationships: a linear enhancement along the Lambro Meridionale, a linking of the points along the coast, and a centralization of the city's interfaces across the Lambro Meridionale. These three scenarios are able to cover almost all spatial types and are more in line with our pre-material spatial analysis patterns.

The overall strategic diagram is based on swot analysis, forming one-to-one relationships to solve threats, improve quality, and realize potential. And these actions can also be implemented in space according to the three types of strategies to form a logical self-consistency. For some common or specific strategies, they can further show the spatial patterns through the form of small axonometric diagrams. However, they do not fully and effectively correspond to the real current situation. Thus, detailed strategy planes, as well as cross-sections with modified sections highlighted in red, are essential and pave the way for the next step of design site determination.

VISION.

Our overall goal is to make an attractive landscape space along the Lambro Meridionale, which would otherwise be neglected by urban activities, a vision we call Reclaim the back of the city.

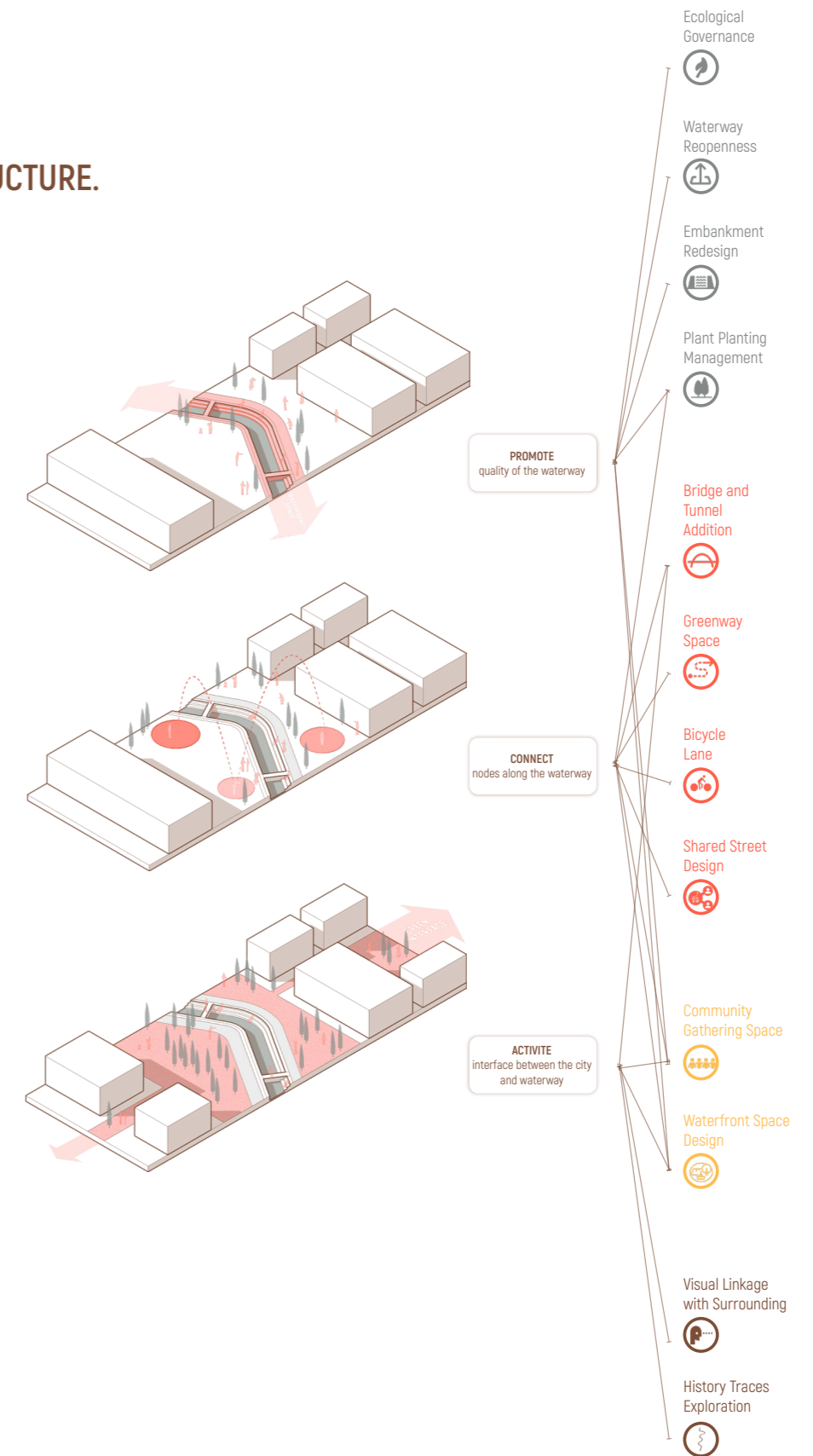
In order to achieve this vision, our strategy is divided into three main categories. The first category is to improve the quality of the waterway itself, such as water purification and barge enhancement, so that the river itself becomes an positive element.

The second category is to build a more pleasant connection system along the river, including bike paths and pedestrian walkways, so that the space along the river can be more accessible to people. Through this kind of enhancements, we hope that the space along the river can truly become a continuous system

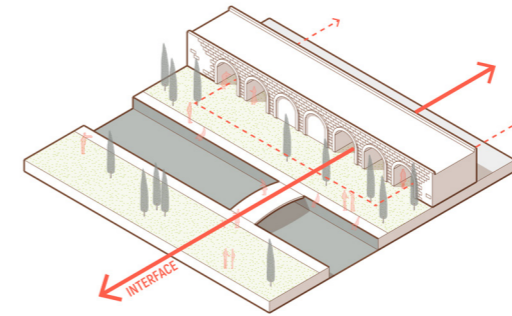
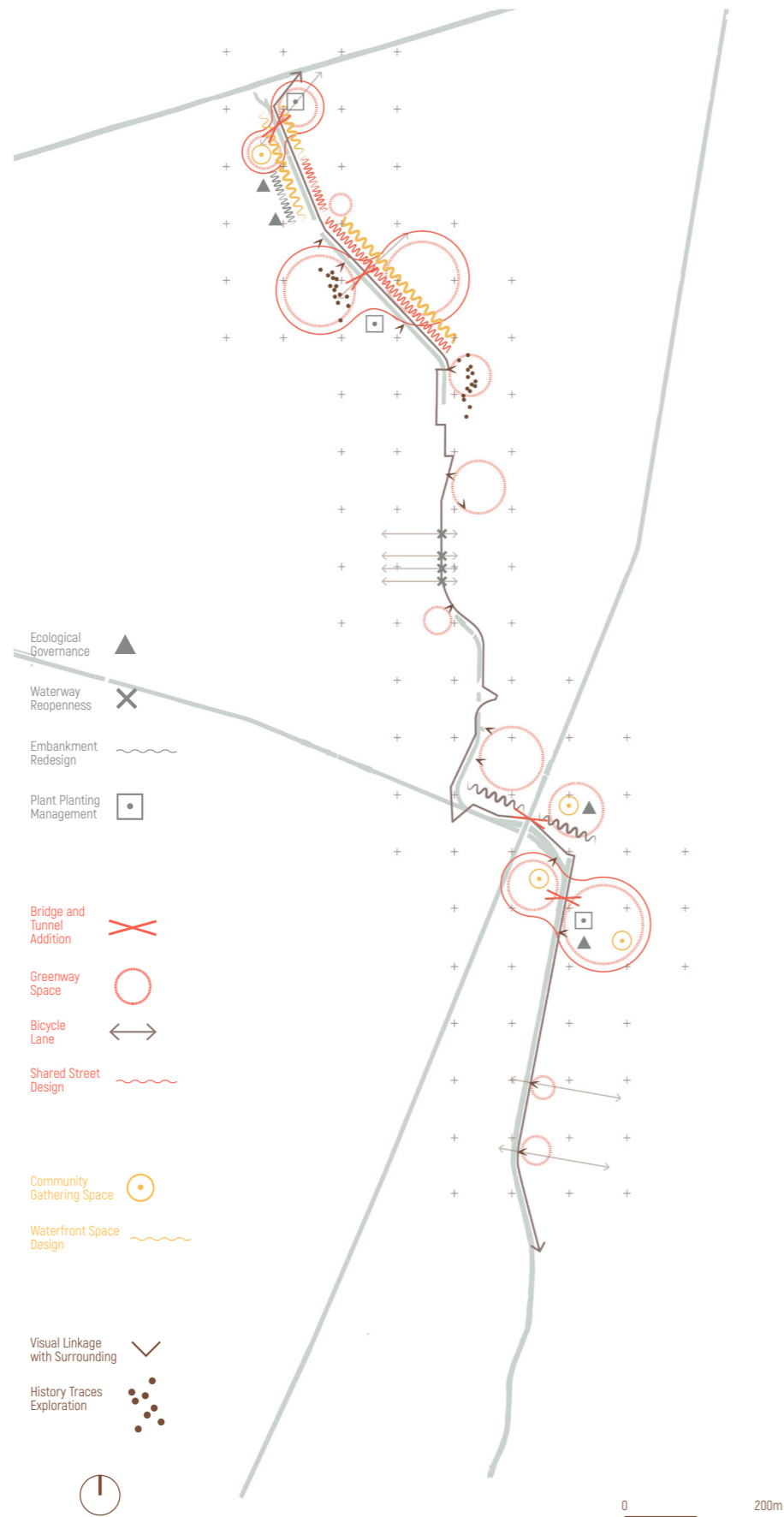
The third category is to connect the space along the river with the urban fabric more organically, for example, more community landscape spaces will be opened towards the river, and the spatial resources such as historical sites and urban green spaces along the river will be integrated by the design along the river. We want the river, a naturally attractive resource, to be used by the surrounding space and to invite people's lives and activities to it

Guided by these three broad strategies, we proposed a series of specific design operations and planned them within our site in conjunction with the results of our research.

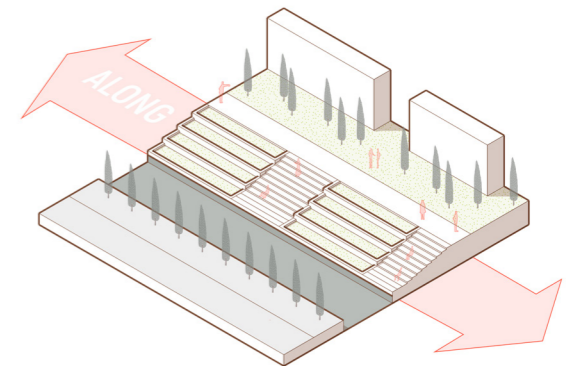
STRATEGY STRUCTURE.



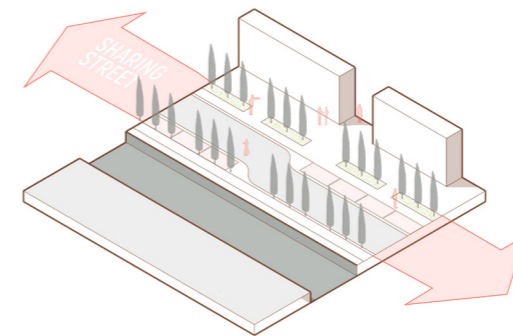
STRATEGY DIAGRAM.



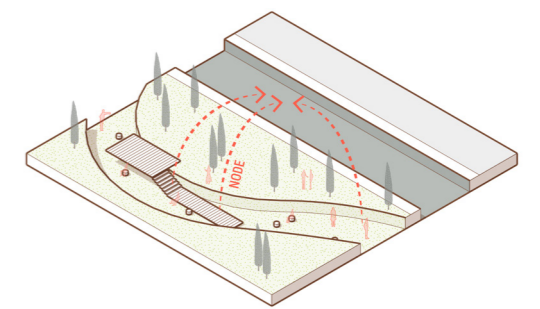
PUBLIC ACCESSIBILITY.



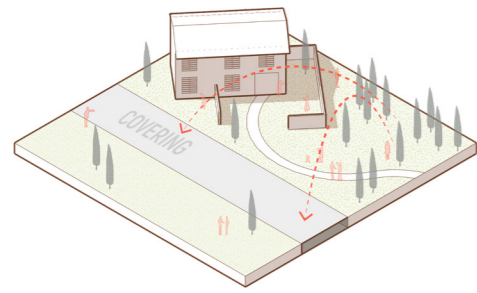
ECOLOGY BANK.



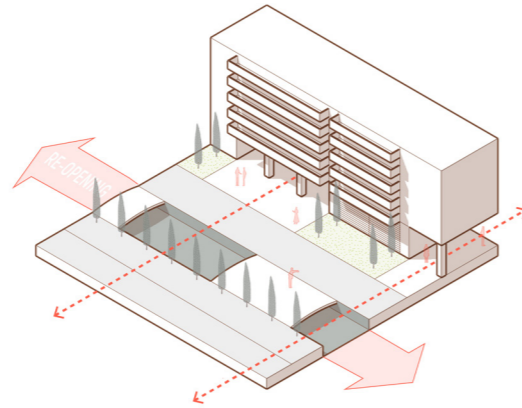
SHARING STREET.



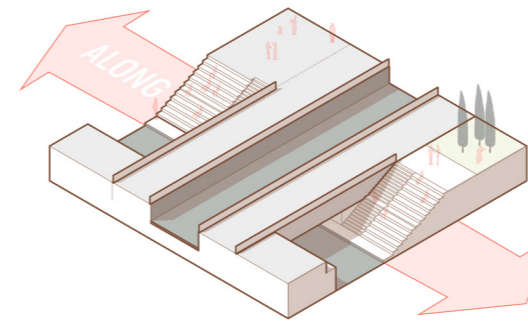
HISTORY TRACE.



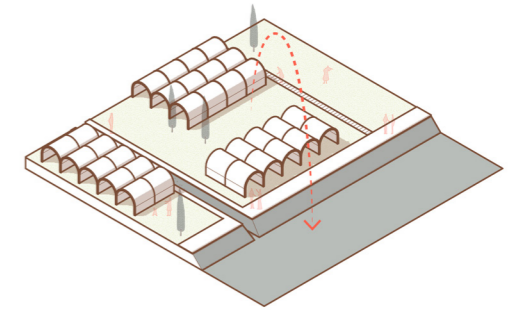
NEW GREEN SPACE.



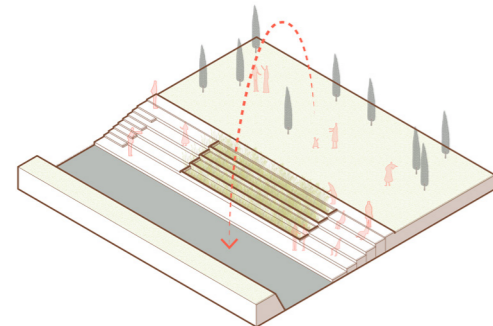
WATERWAY RE-OPENNESS.



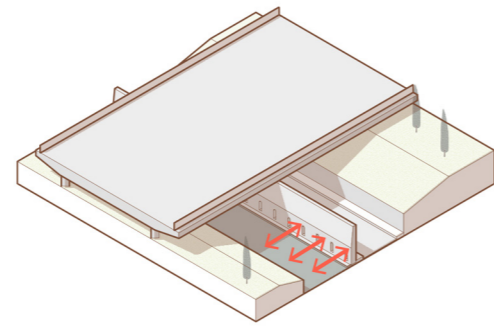
LANDSCAPE TUNNEL.



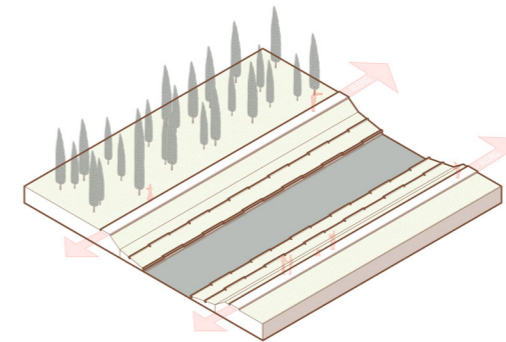
URBAN FARMING.



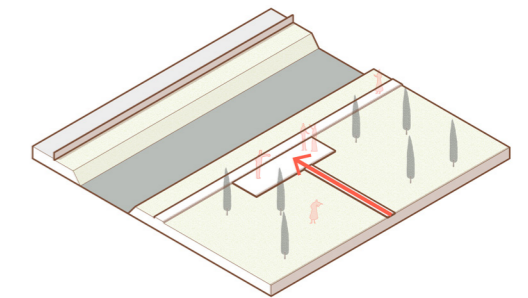
RAIN GARDEN.



TUNNEL WALKWAY.



FIELD WALKWAY.



WATERFRONT WALKWAY.

The strategic plan and cross-sections focus on all the planning and design elements of Lambro Meridionale within the city limits of Milan. The overall form of the project is a strip along the river +interface that extends to the urban fabric. Corresponding to the status quo analysis, it is also divided into 6 parts for disassembly.

For Site 01, the accessibility of Lambro Meridionale, the connectivity with the city and the re-planning of the green space along the river are the main concerns. Through the linking of green spaces, the creation of shared streets, the activation of public spaces, the maintenance of ecological embankments, and the linkage with the flow of Naviglio Grande, it becomes a core design site where people and ecology live in harmony.

For Site 02, the connectivity of Lambro Meridionale with the urban space is the focus of the plan. The strategy focuses on the riverside infrastructure and pedestrian and bicycle circulation, and provides a linkage between the various green spaces. In addition, the historical trace will be designed as part of the green space system.

For site 03, the partial re-openness of the urban traffic flow and the partial opening of the Lambro Meridionale are the main strategies. The re-openness along the building axis is a minor design initiative that can have a direct impact on the Lambro Meridionale.

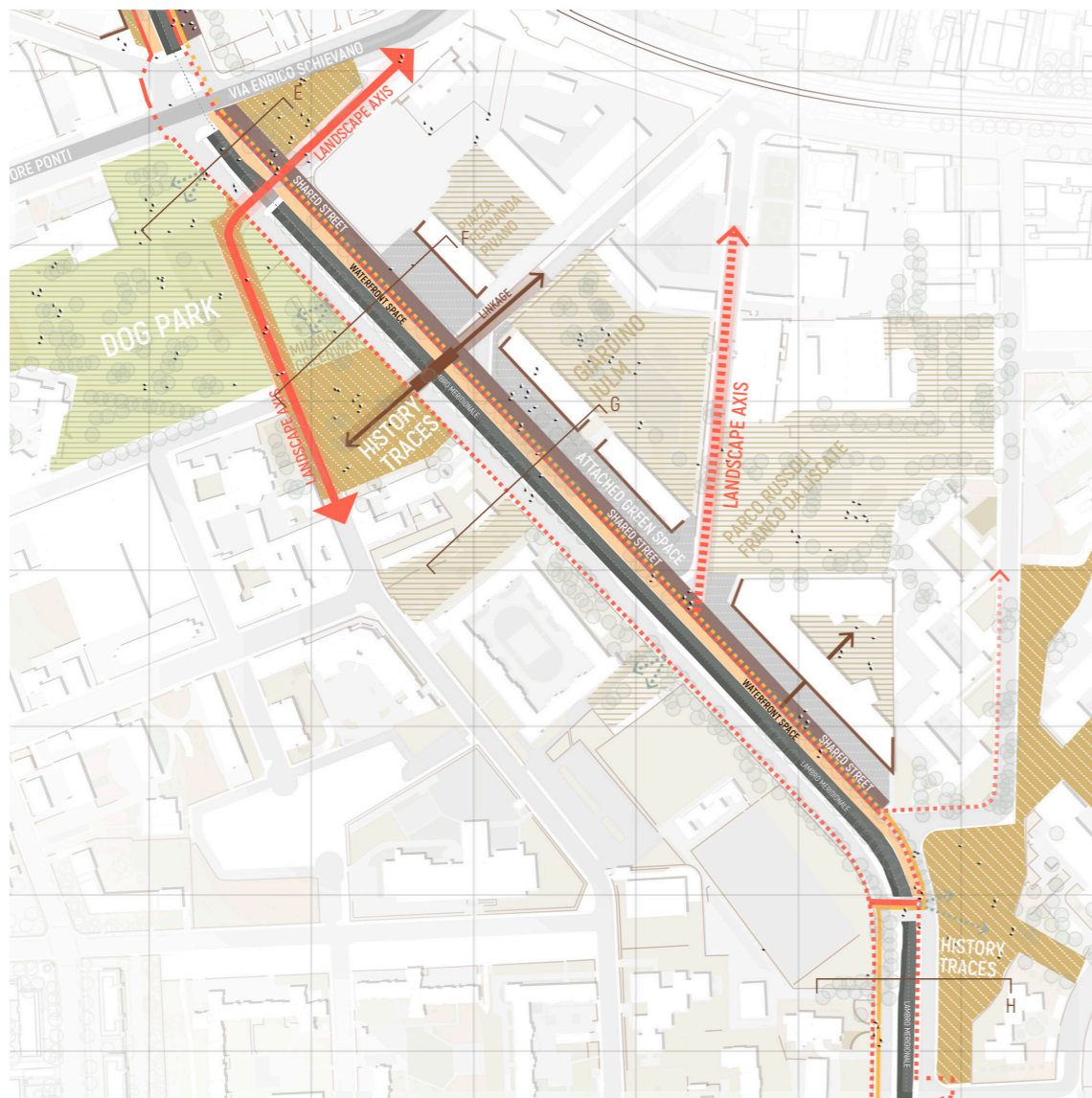
For Site 04, as the overall flow and function are in a more rational state, the strategy only increases the interaction of sight lines and the guidance of signs.

For Site 05, the redesign of the traffic flow and the redefinition of the large green spaces are the main concerns. New bridges and new tunnels together with pedestrian and cycling paths form a new non-motorized movement system. The establishment of community agriculture and ecological forest along the river replaces the original illegal farm and creates a better relationship between green space.

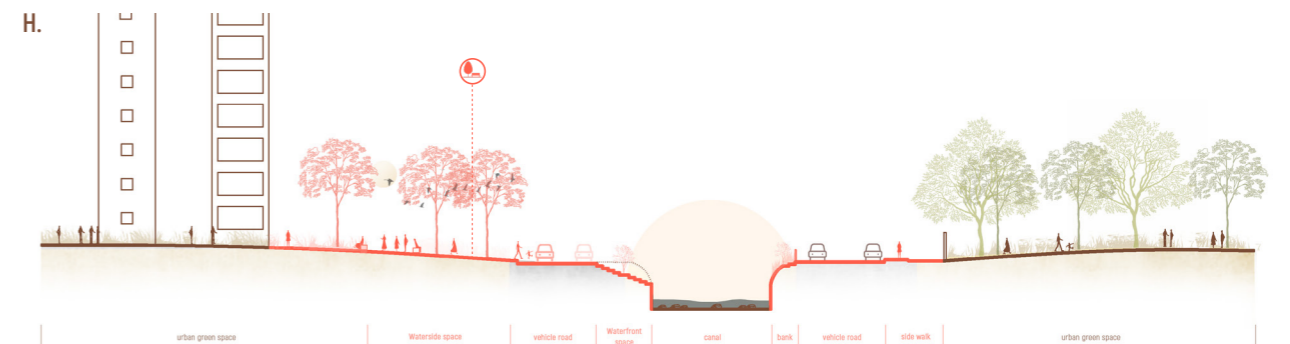
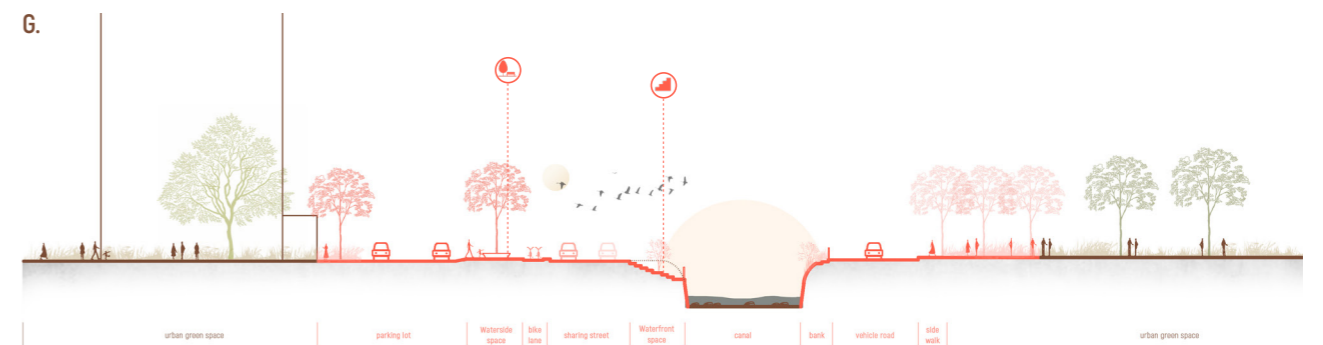
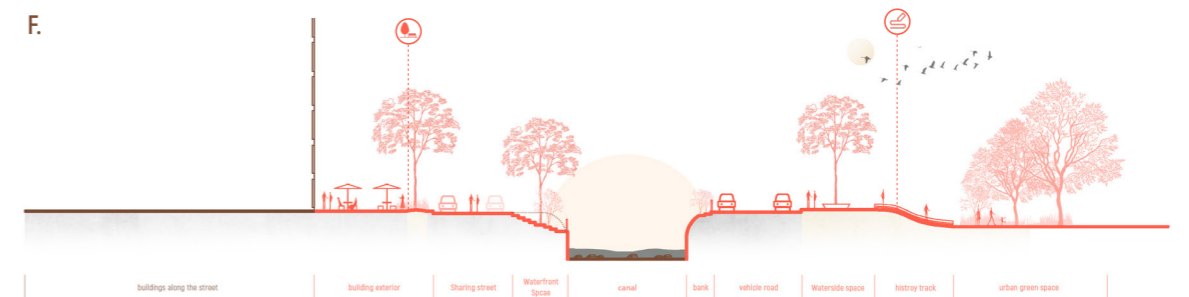
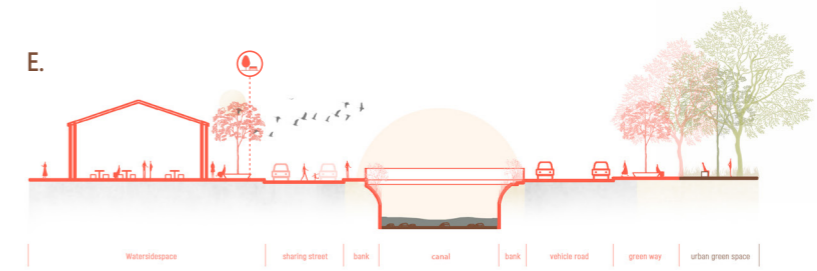
For site 06, the strategy will only sort out the non-motorized traffic system along the river, which is not in the main research scope of this topic.

Through the formation of the overall strategy, we will focus on two design areas, namely the double source area of Lambro Meridionale and the Milan city boundary area overlapping with Naviglio Pavese.

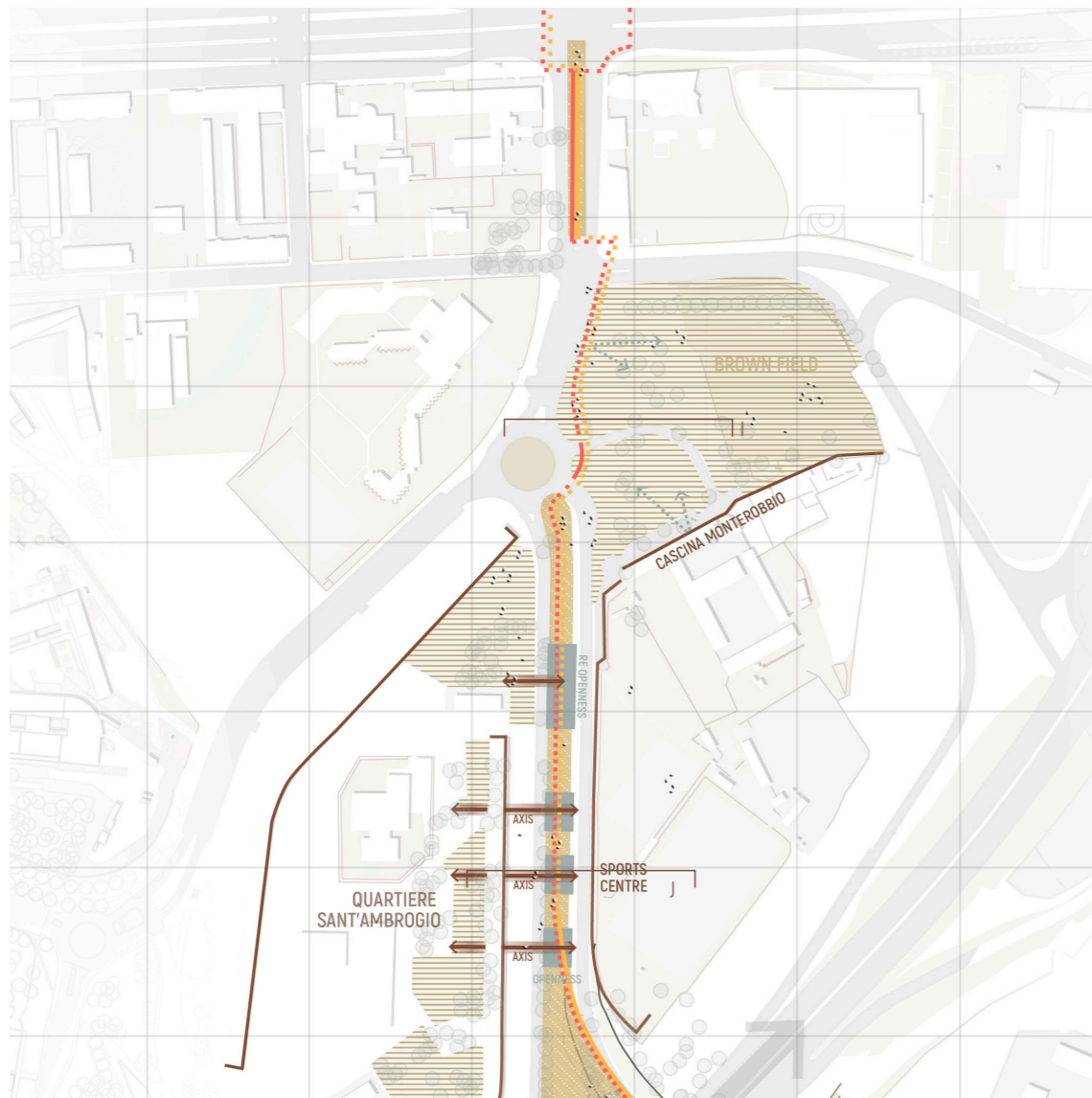
STRATEGY PART02.



For the second part, the original motorway is planned to be renewed as a shared street. The speed of motor vehicles will be limited here to give the surrounding public space more possibilities to connect with the waterway. Also In this area, a historical site of the river will be developed as an archaeological park to show people the history of the river.

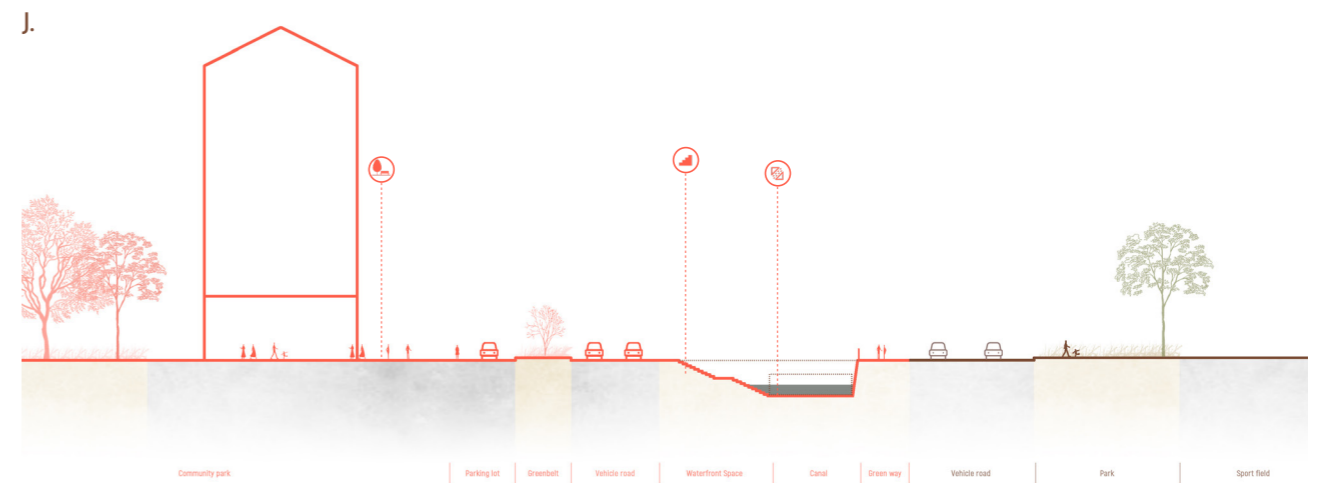
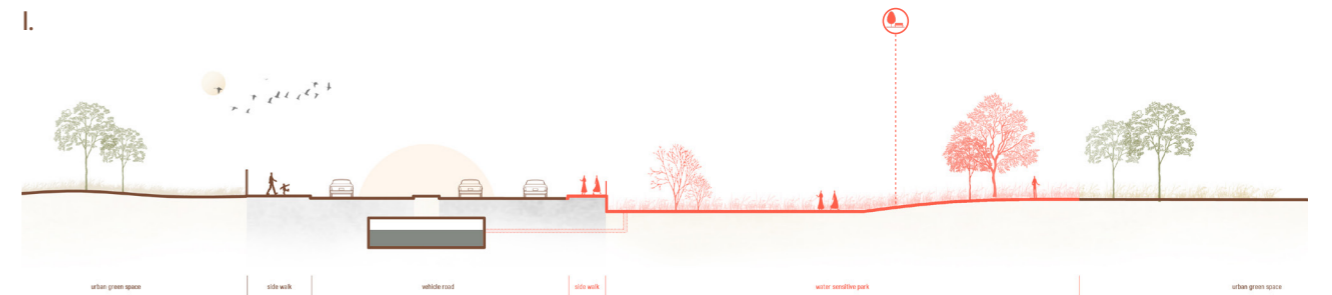


STRATEGY PART03.

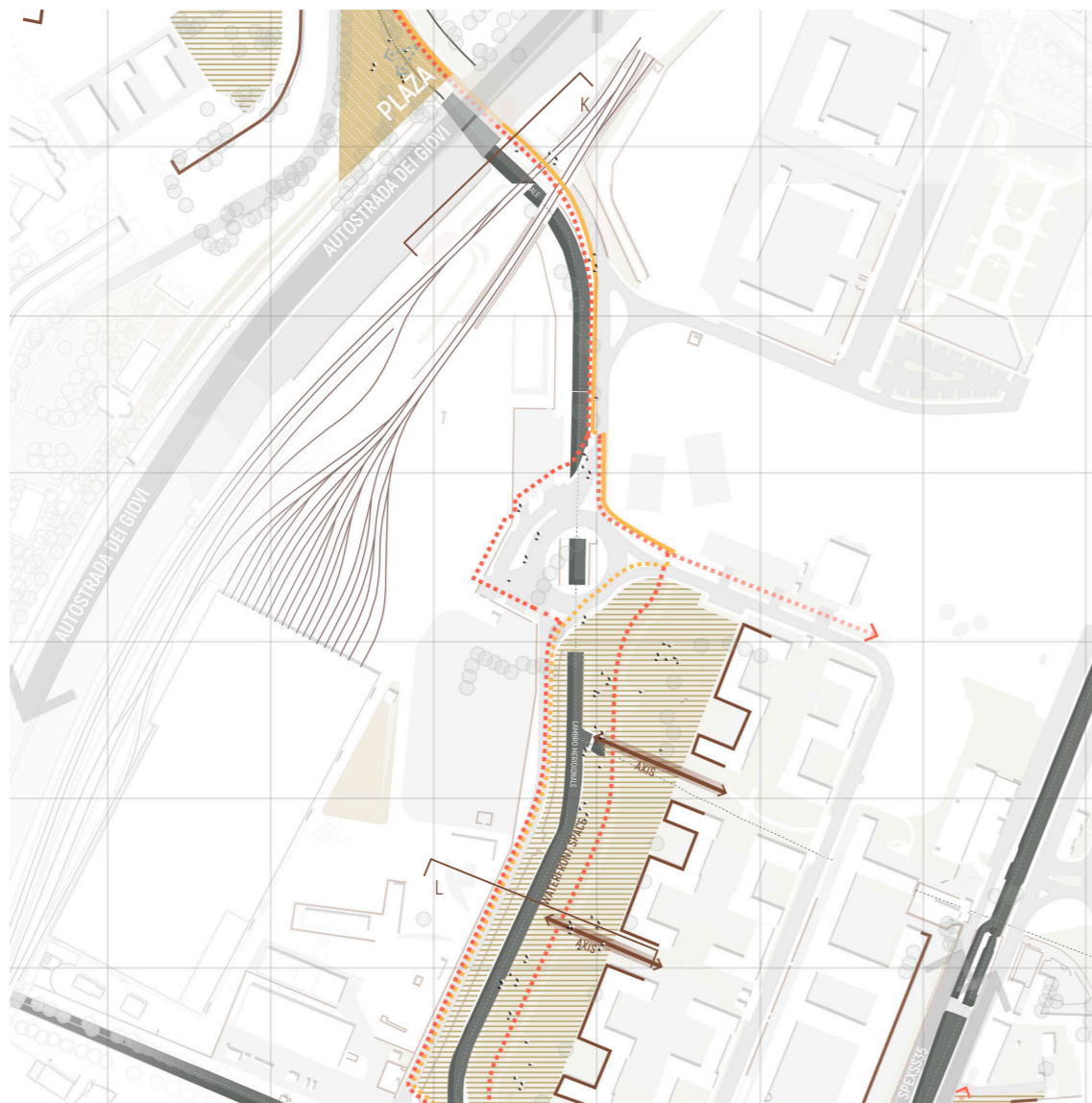


In the third area, the original green space around the area will have a more direct connection to the river. The partially buried waterway will be opened up to create a connection to the public space of the surrounding community.

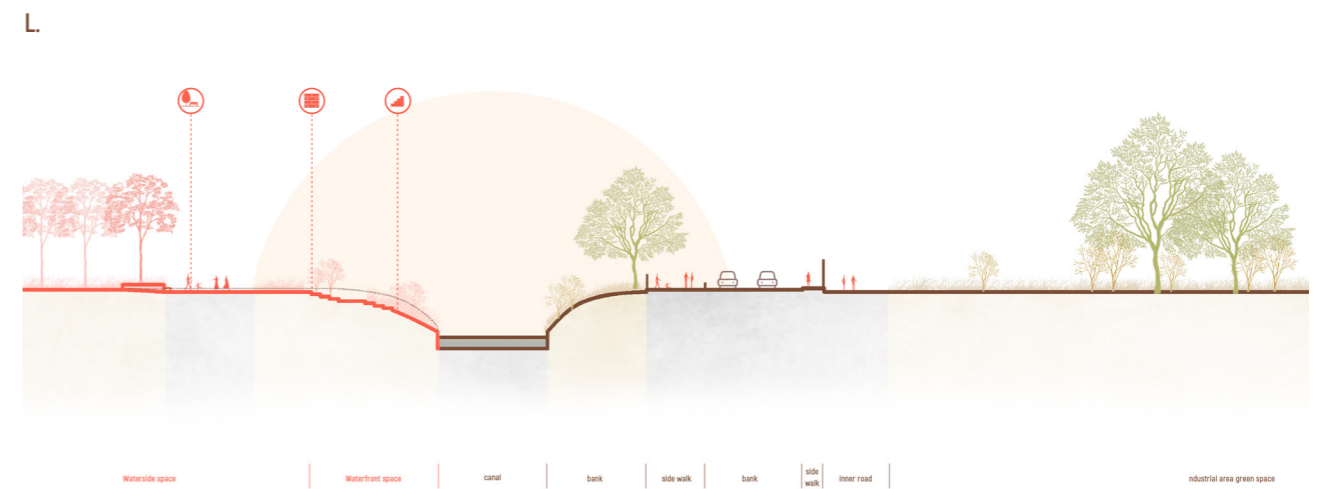
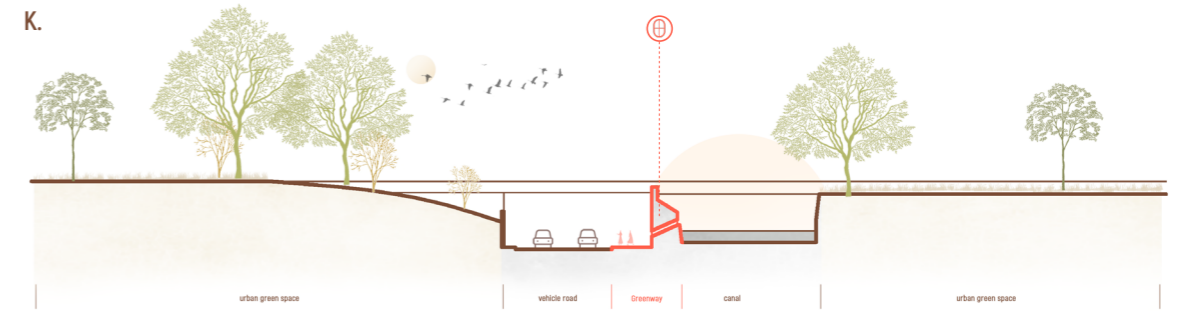
The alignment of the river will be marked by a greenway on the ground to reinforce the systematic nature of the landscape along the river.



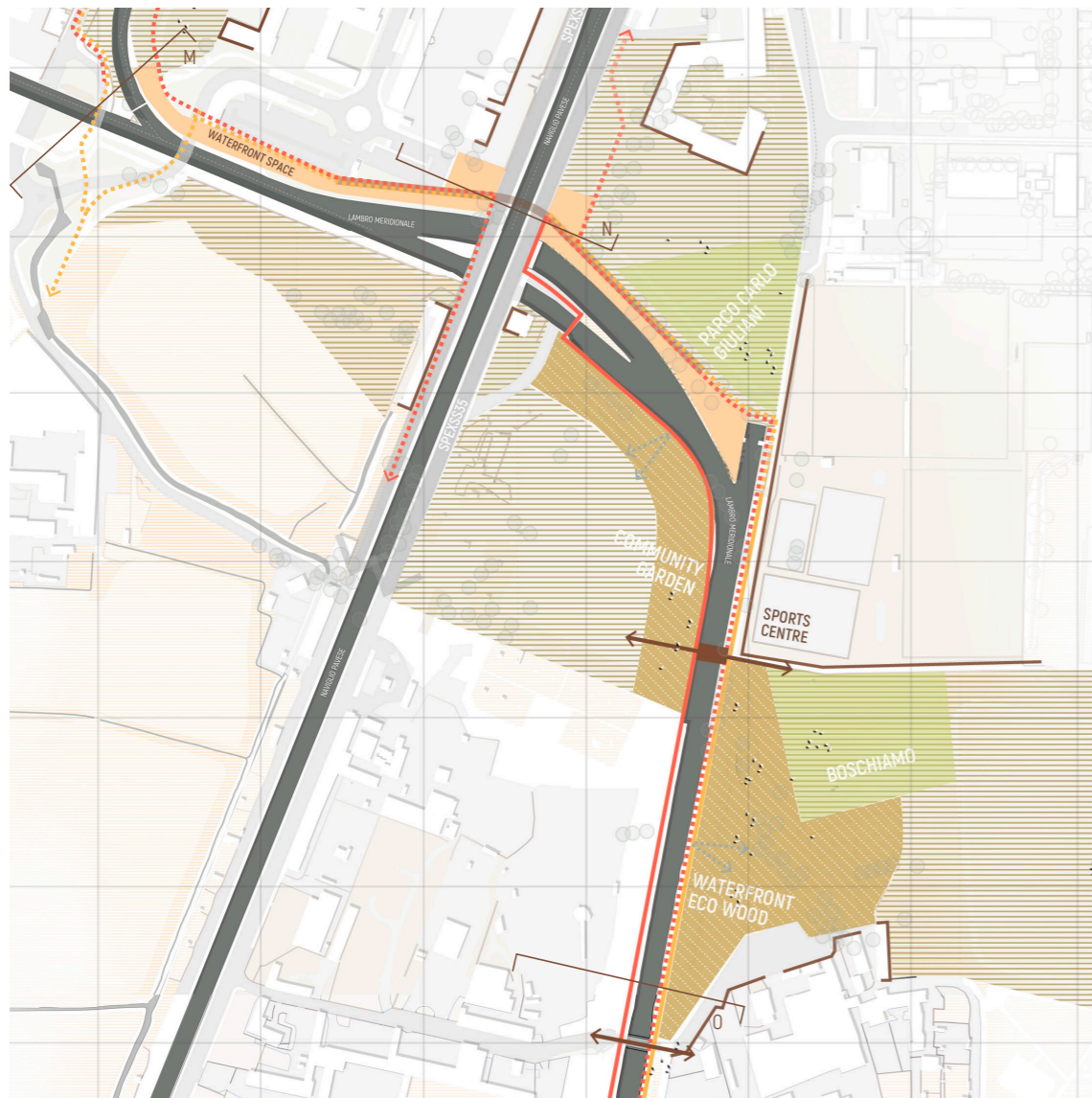
STRATEGY PART04.



The fourth part of the landscape will be upgraded based on the existing greenway system, and more activity nodes will be added to the greenway system. The waterway will have a better line of sight relationship with the space where people move as well as stay.

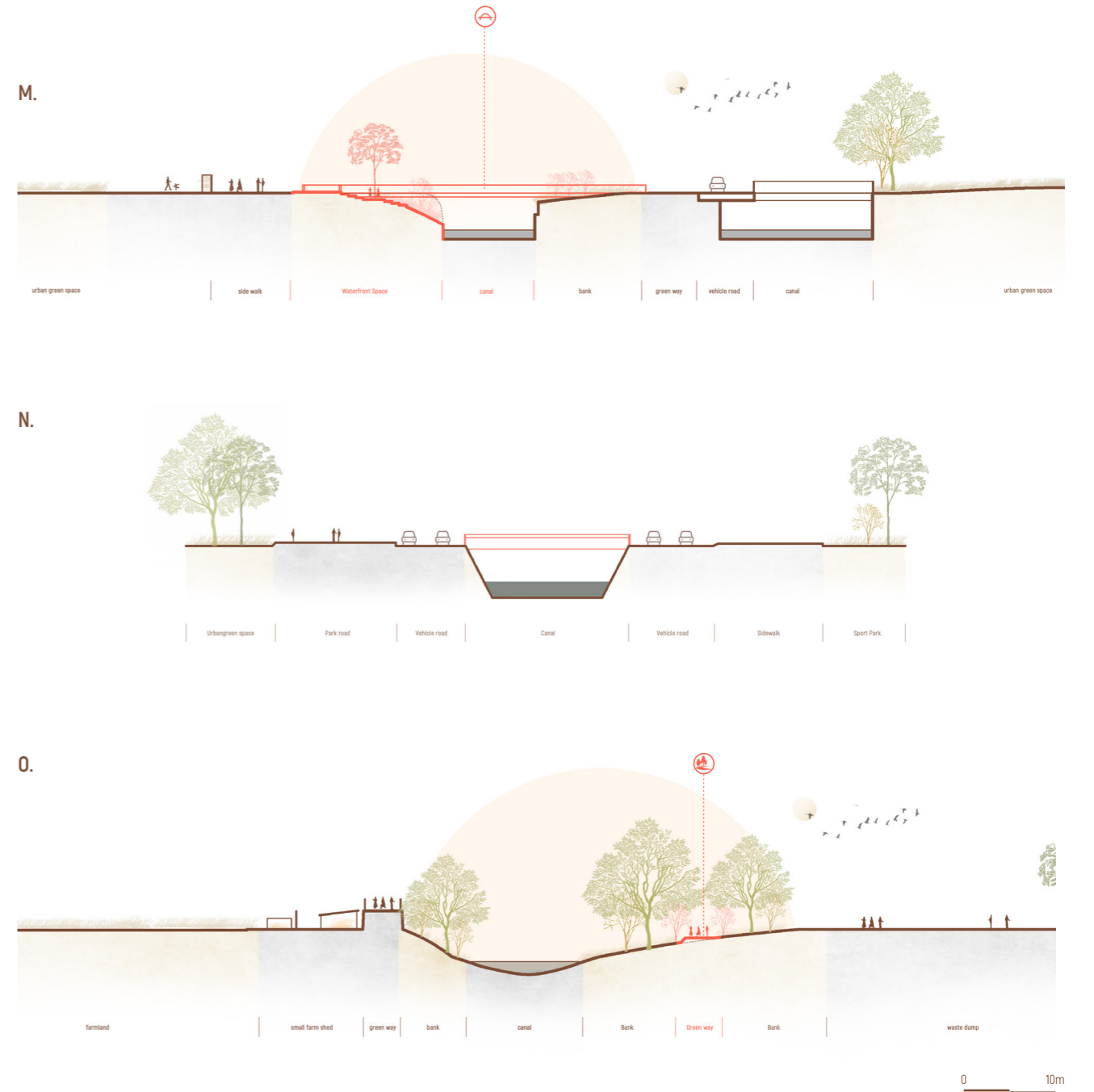


STRATEGY PART05.



In the fifth area, using the Lambro Meridionale water supply, the original illegal agricultural activities of the surrounding site are planned to be regularized. Urban agriculture becomes one of the features that characterize the area. The original fractured greenway system will be reconnected, including an introduction through the Naviglio Pavese tunnel.

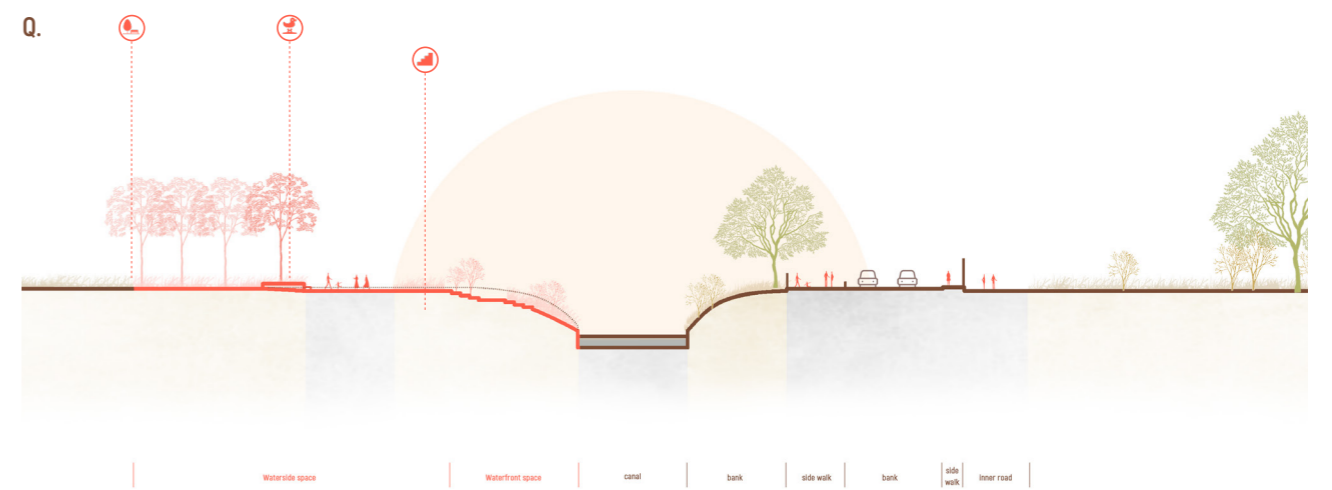
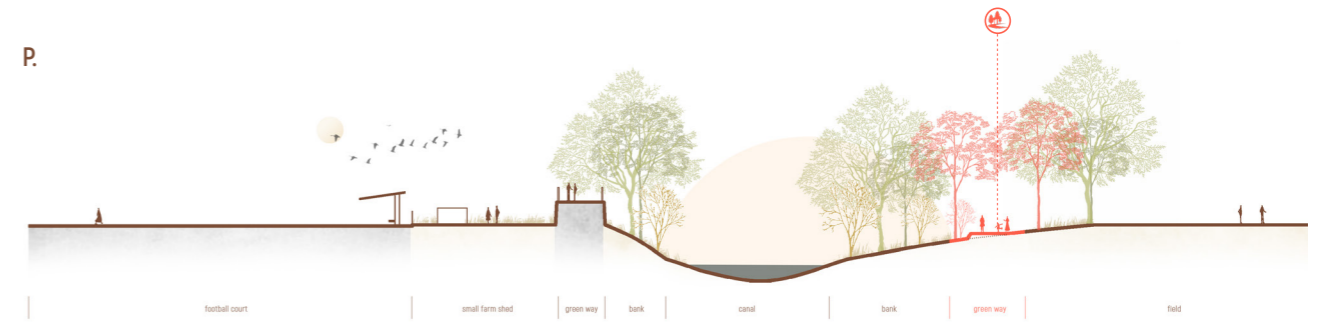
More ecological embankments will be introduced, which in combination with the planned sewage treatment site will form a system that will purify the water.



STRATEGY PART06.



In the sixth area, the greenway system on the west side of the Lambro Meridionale will be added, to complement the greenway system on the east side. More stopping points, bridges will be added to enrich people's experience.



DESIGN FOCUS.



DESIGN SITE 01.

Design Site 1 is closer to the core of the city, which is interconnected with the more mixed-use blocks of the city. The design of this area seeks to be a formal and functional extension of the surrounding urban fabric. The Complete and more pleasant walking and biking paths are integrated into the transportation system along the river. This system will also exist in other areas linking the entire river.

Within this context, two nodes have been focused on. The first is the starting point of Lambro Meridionale, where we want to penetrate the vitality of the Naviglio Grande into the Lambro Meridionale shoreline. With this goal in mind, the originally closed bridge structure is planned to be opened up, allowing the interconnection of the two rivers' coastal landscape spaces. A larger waterfront space is introduced, allowing the river as an element to be more perceived and appreciated.

The second node is a section of the river's historic site. Through planting and paving, we hope to make this historical site known to the users along the river and to make people aware of the deeper connection between Lambro Meridionale and the city of the area.

The design of Site 01, as the source of Lambro Meridionale, is divided into three main parts. They are divided from each other by urban roads.

The first part is the double source, which is the most waterfront part of the whole area. There is no infrastructure obstruction along the river and people are free to cross from the urban fabric, through the railway viaduct, to Lambro Meridionale and connect the two sides by a new bridge. This section also integrates community gardens, waterfront platforms, entrance plazas, and community fairs, and is spatially oriented towards Lambro Meridionale, while reducing the obstruction of the site by adjacent buildings such as the waste treatment plant and parking lot.

The second part is a linear green space with a waterfront on one side and an urban road on the other. For the urban road along Lambro Meridionale, we transformed it into a shared street. On the one hand, we can slow down the speed of motorized traffic without breaking the continuity of the open space along the river, and on the other hand, we can facilitate the excursion of pedestrians and cyclists through the installation of bicycle lanes and the axis of street trees. For the waterfront, the curved paths are connected through the entrance tree square, and the ecological planting of water-friendly plants enriches the layers of the embankment, creating a natural breathing green space environment.

The third part is the historical trace, which we hope to introduce to allow people to overlook and view the remains of Lambro Meridionale, and to rest and feel in it, and the historical trace also forms a linkage with the entrance plaza and Milanogreenway to create a suitable spatial combination.

DESIGN DRAFT.

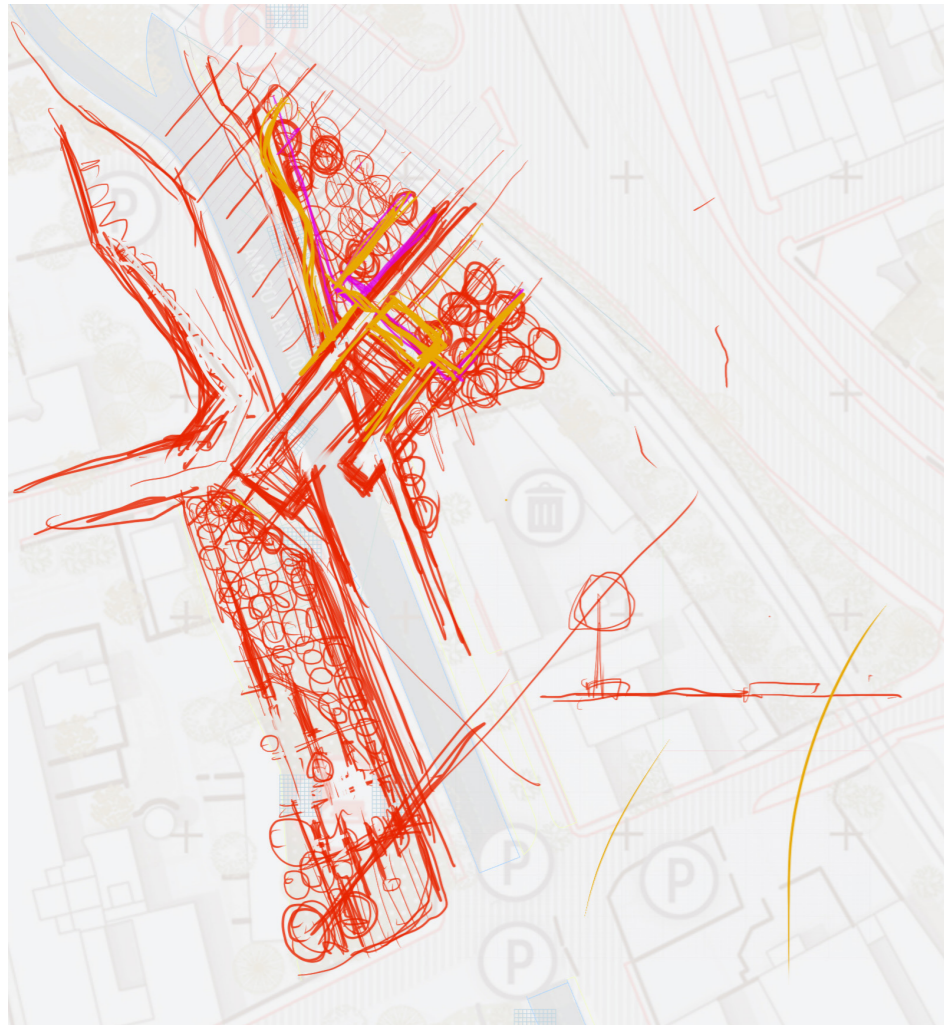


Figure 1. Double source

Figure 2. Waterfront linear space

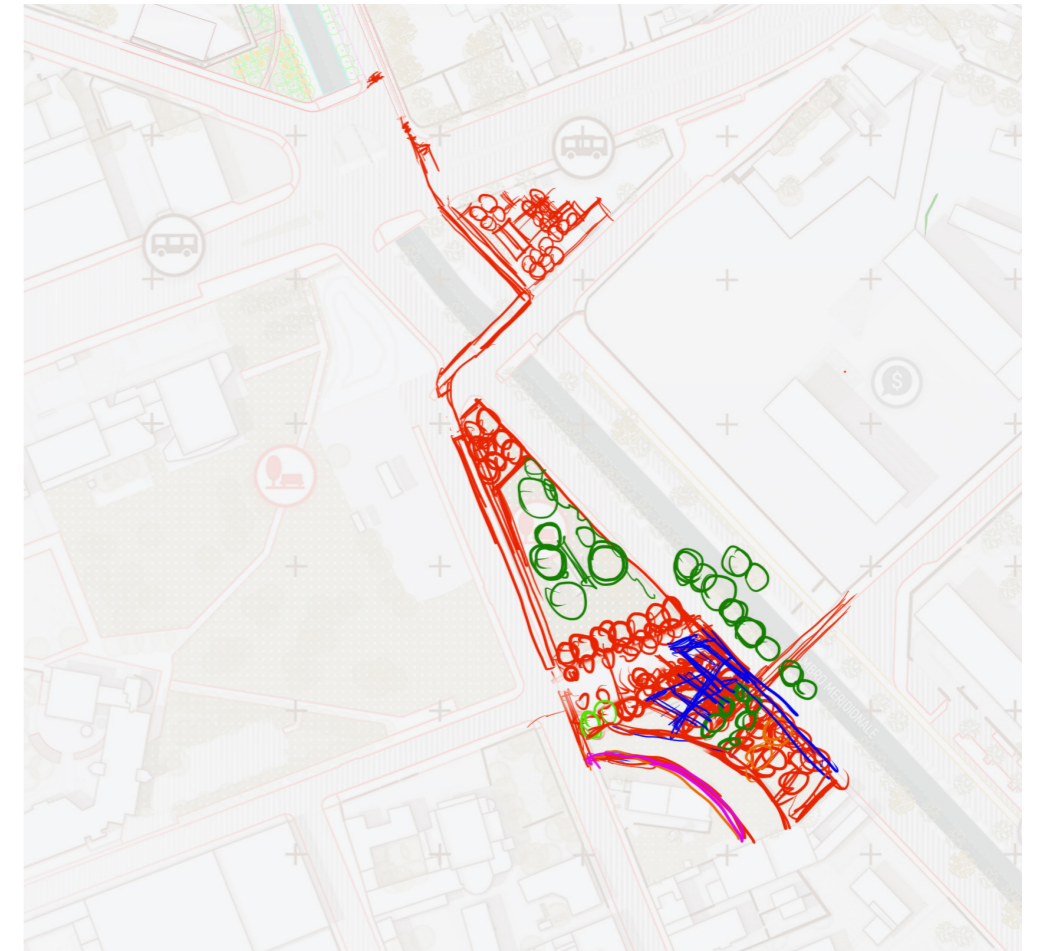
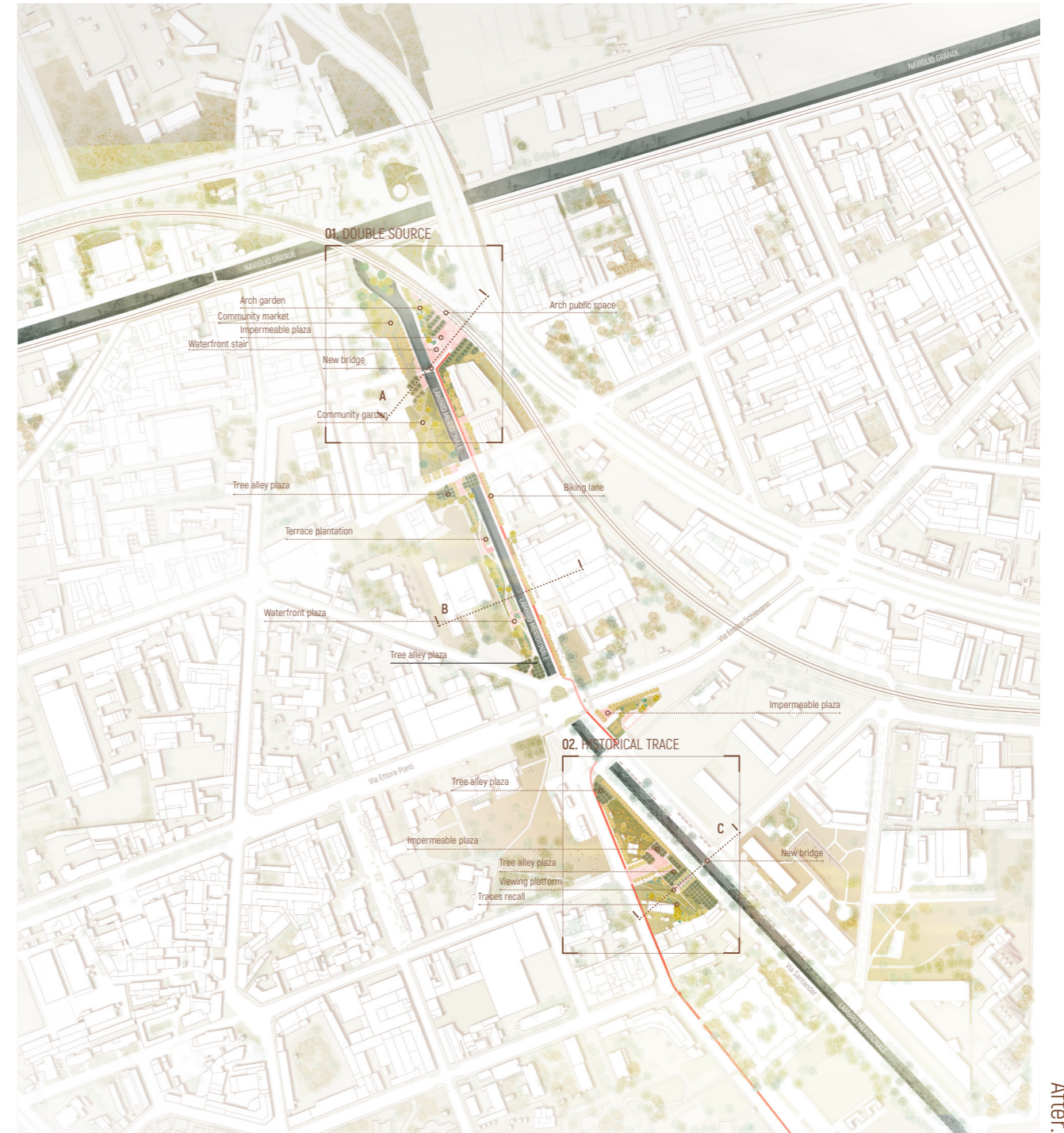


Figure 3. Historical trace

MASTERPLAN.

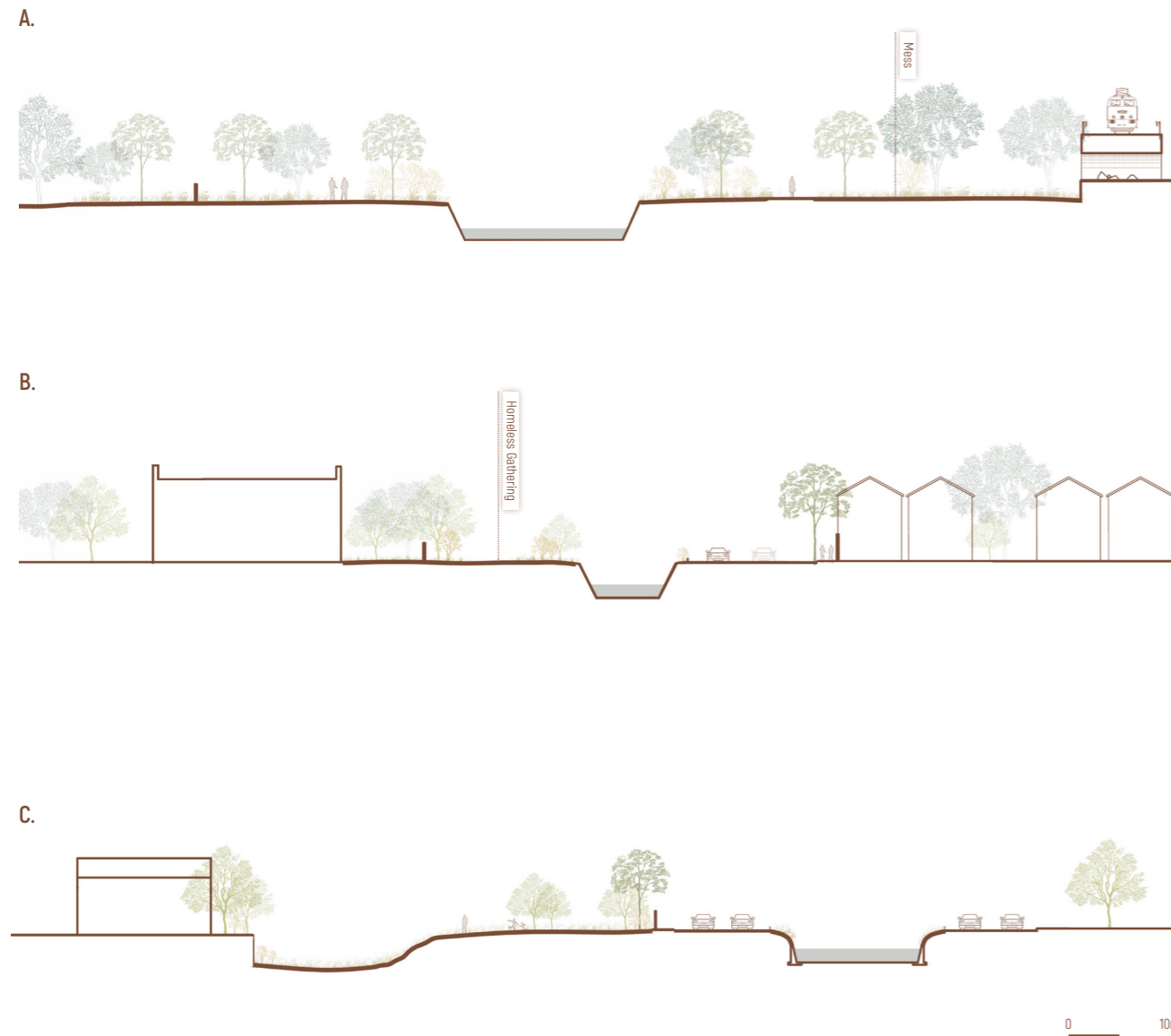


Before.

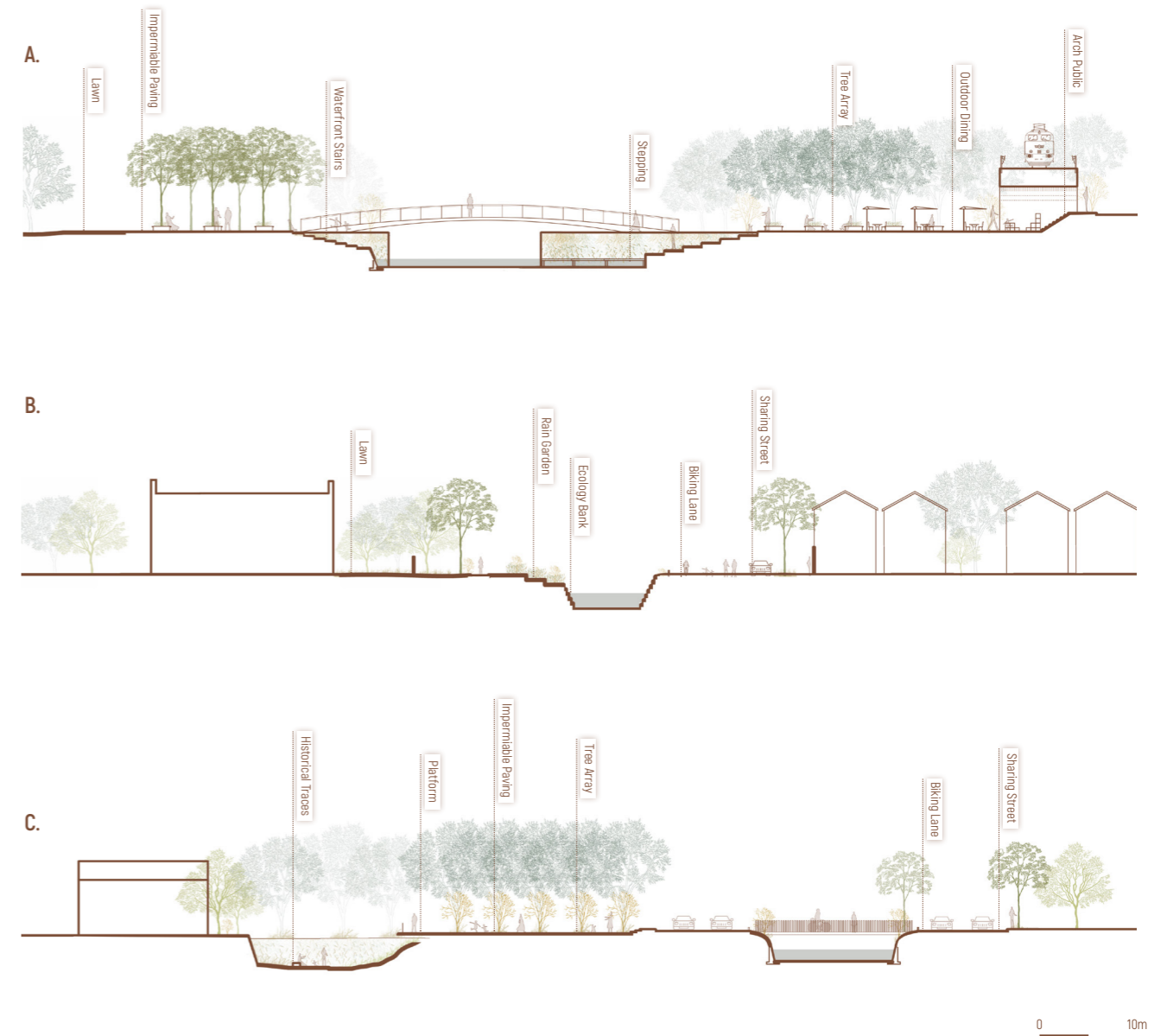


After.

SECTIONS.



Before.



After.

S I T E 1 .

The Double source site consists of several main parts.

The first is the railway viaduct that connects the urban environment with the riverside area, it has a total of 11 arches, the first of which has been opened in its current state. Our design is based on a gradual opening, using the first two arch as the main entrance to the Lambro Meridionale area, the middle part as a small business to stimulate the area. The last part opens up towards Lambro Meridionale, linking the street with waterway plaza, using its grey space to form a café, library, meeting place and other activities, together with the outdoor hard plaza, to form a linked commercial activity place.

The second is the coastal space into Lambro Meridionale, where people enter the waterway through the lush garden or the quick path along the railway line. the tree formation plaza provides silver and seating,

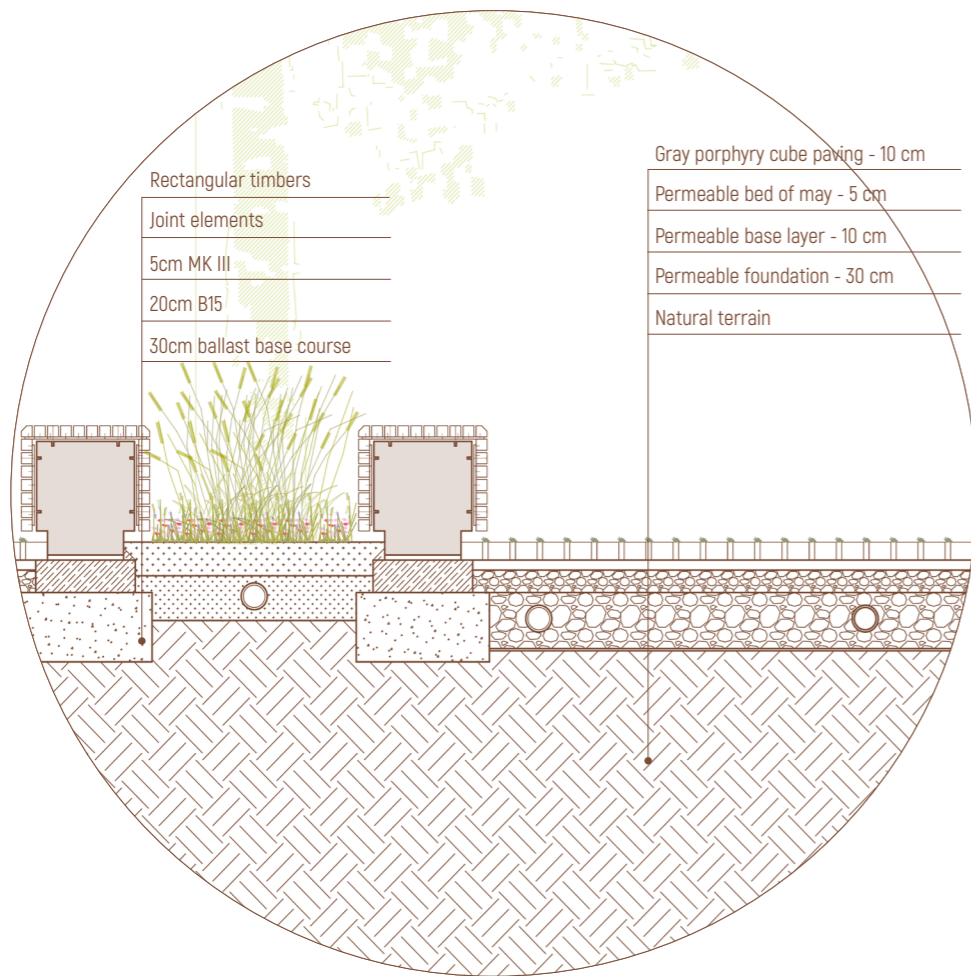
while the waterfront steps provide a place to gather and view Lambro Meridionale. In addition, the exposed riverbed stones that break through the waterfront platform are a witness to the transformation of Lambro Meridionale from a natural to an artificial waterway.

Finally, there is the space on the other side of the river that is accessed through the bridge. The newly designed bridge is presented as a steel arch structure, light and simple. Since the waterway is not wide, the arch structure can be easily weighed without the need for pillars to support it. After the bridge, the waterfront big stairs are designed to echo the opposite side, and the tree array plaza, woods, and temporary community market with permeable pavement can be an extension of Naviglio Grande's activity function.

The overall design uses a lot of planting and permeable materials, and the choice of shape is more rustic, forming a natural, traditional and pure atmosphere.

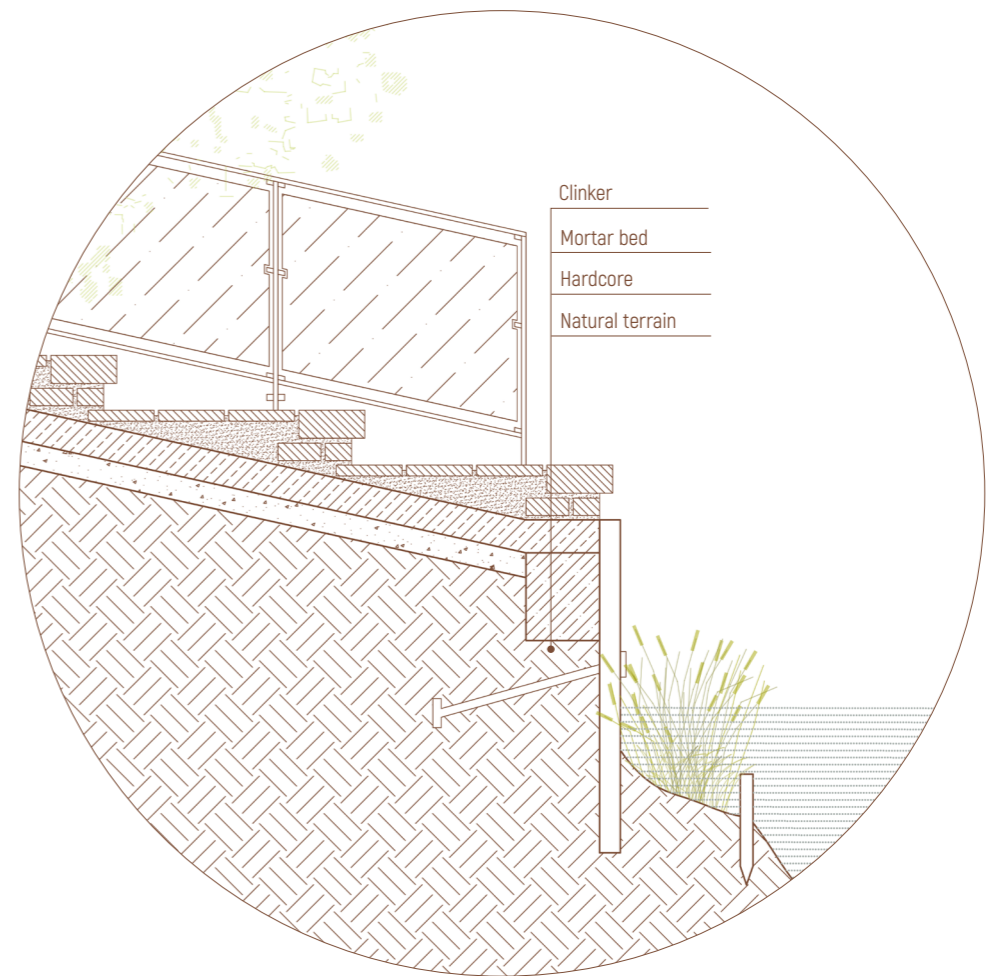
DETAIL STRUCTURE.

TREE SEATING SECTION 1:40



A tree array structure combined with permeable paving.
Provide people with suitable leisure space.

WATERFRONT SECTION 1:40



The waterfront steps make it possible to get closer
to the water body. More ecological measures are
introduced to enhance the landscape benefits of the
embankment.

S
I
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.

For this design site, the most important thing is the exploration and experience of the historical trace.

First of all, for its accessibility, the new bridge and tree plaza form a new central axis that leads directly to the center of the historical trace, achieving direct access to the flow and sight lines.

For its integration with the surrounding spaces, we have effectively connected all green spaces through a series of plaza combinations and landscape axes to form a series of interactions.

For the most important historical trace itself, we have designed a series of processes.

The current situation is the remains of a sunken riverbed with a height difference of about 1.5m, with a vertical wall structure on one side and a grass slope transition on the other.

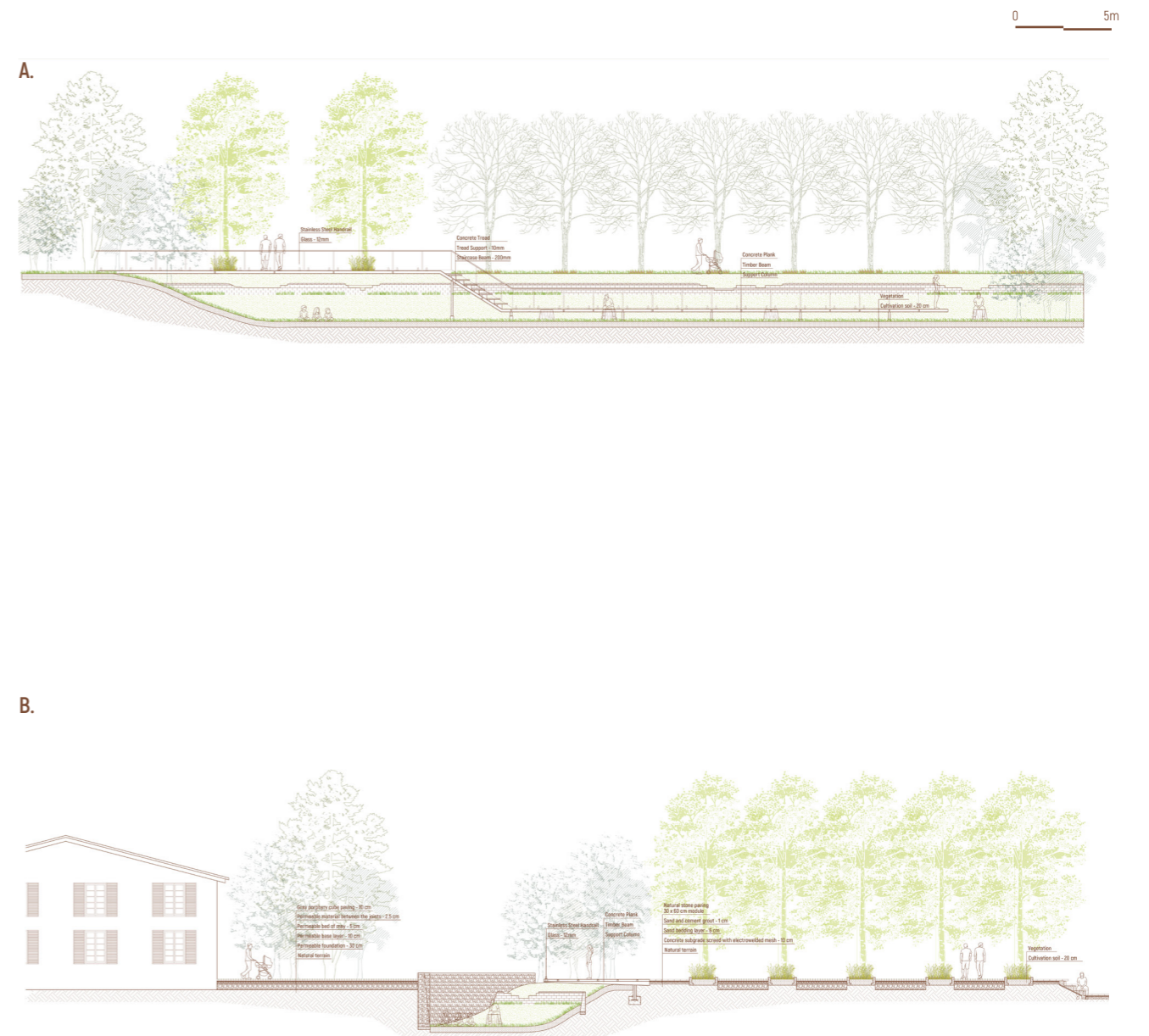
First we will excavate the grass slope to find its original embankment structure and maintain it. Then we repair the gabions on the other side of the vertical structure to maintain its natural state. We then replace the vegetation at the bottom of the trench with long grasses that transition through the existing slope to short grasses in other areas of the site, reinforcing the uniqueness of the historical trace and distinguishing it from the rest of the site.

For the experience of the historical trace, we set up a light suspension structure on it, so that people can look down on it without hurting its internal structure. Secondly, a long staircase was set up to reach the surface of the trail, so that people can feel the traces of the historical trace up close. Finally, the wooden piles set up inside the trace provide seating and rest.

The overall atmosphere of the site is quiet, natural, and traditional, inspiring memories of palimpsest.

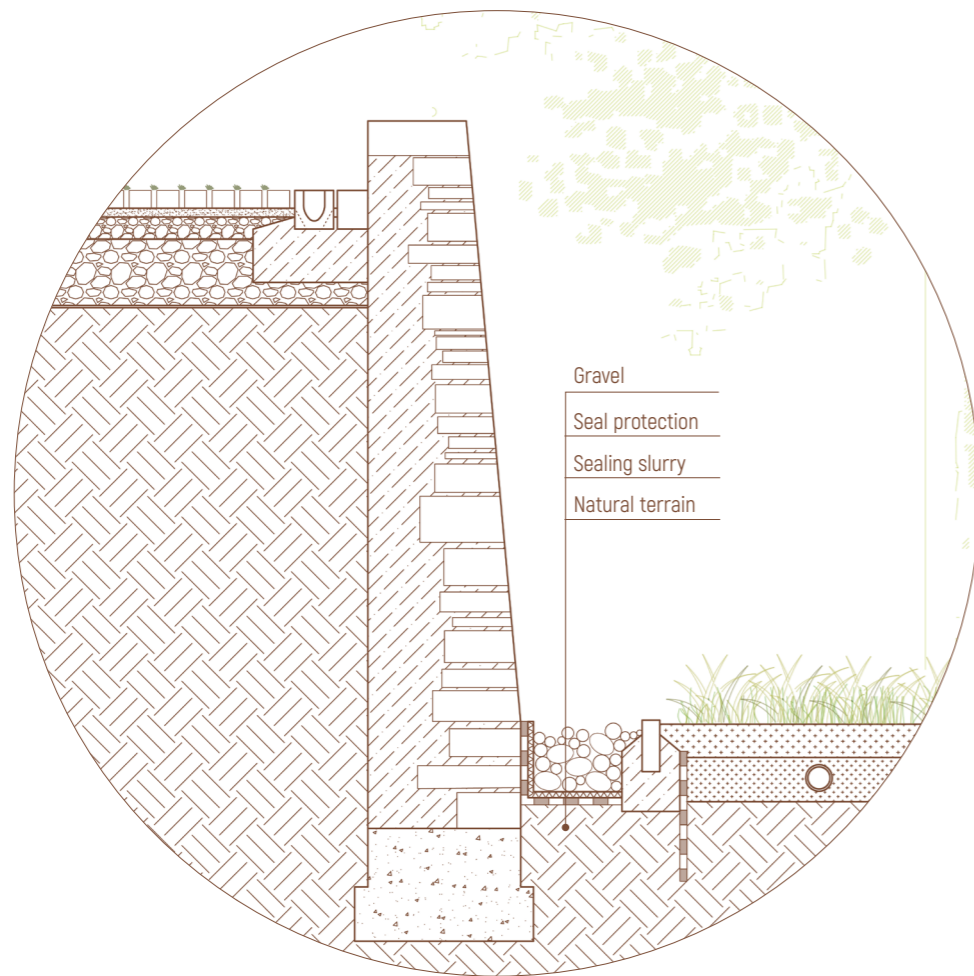
DETAIL.

HISTORICAL TRACE.



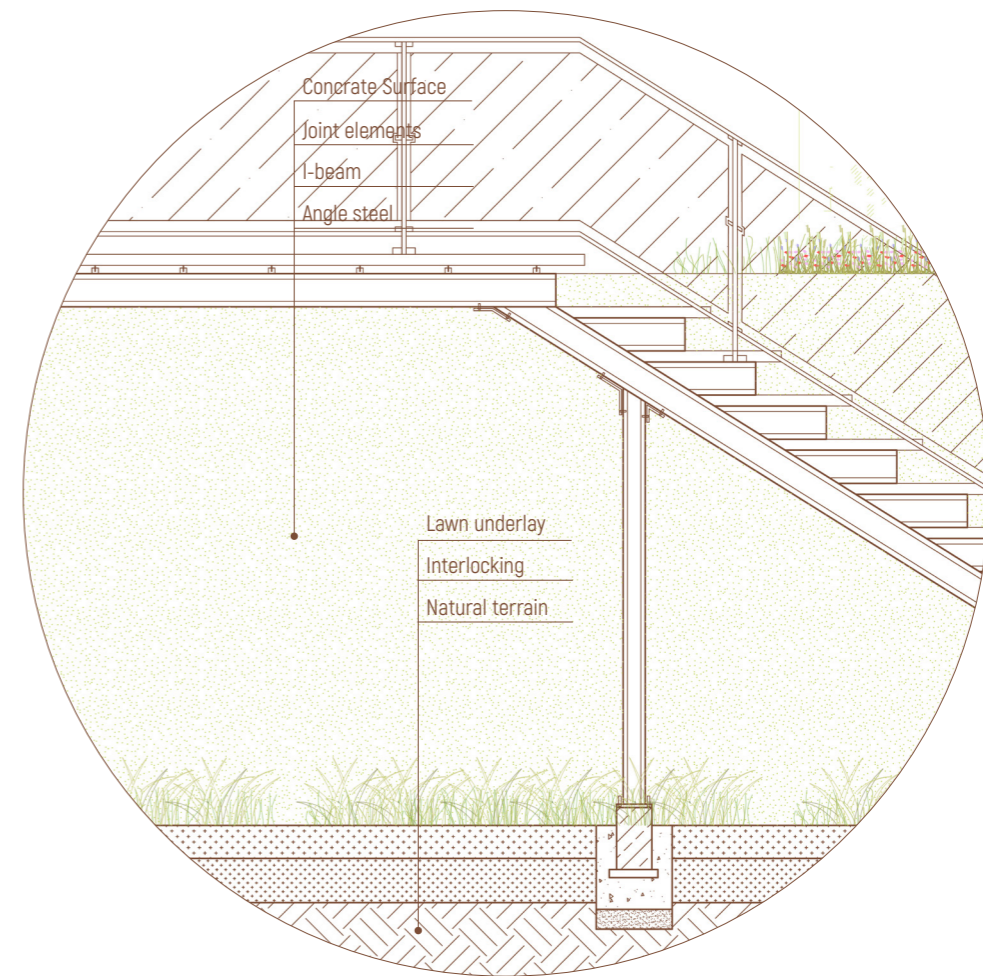
DETAIL STRUCTURE.

RETAINING WALL SECTION 1:40



Different species of grasses were used to mark the extent of the ancient riverbed. An efficient drainage structure will be built into the lawn to prevent water storage problems due to low ground level.

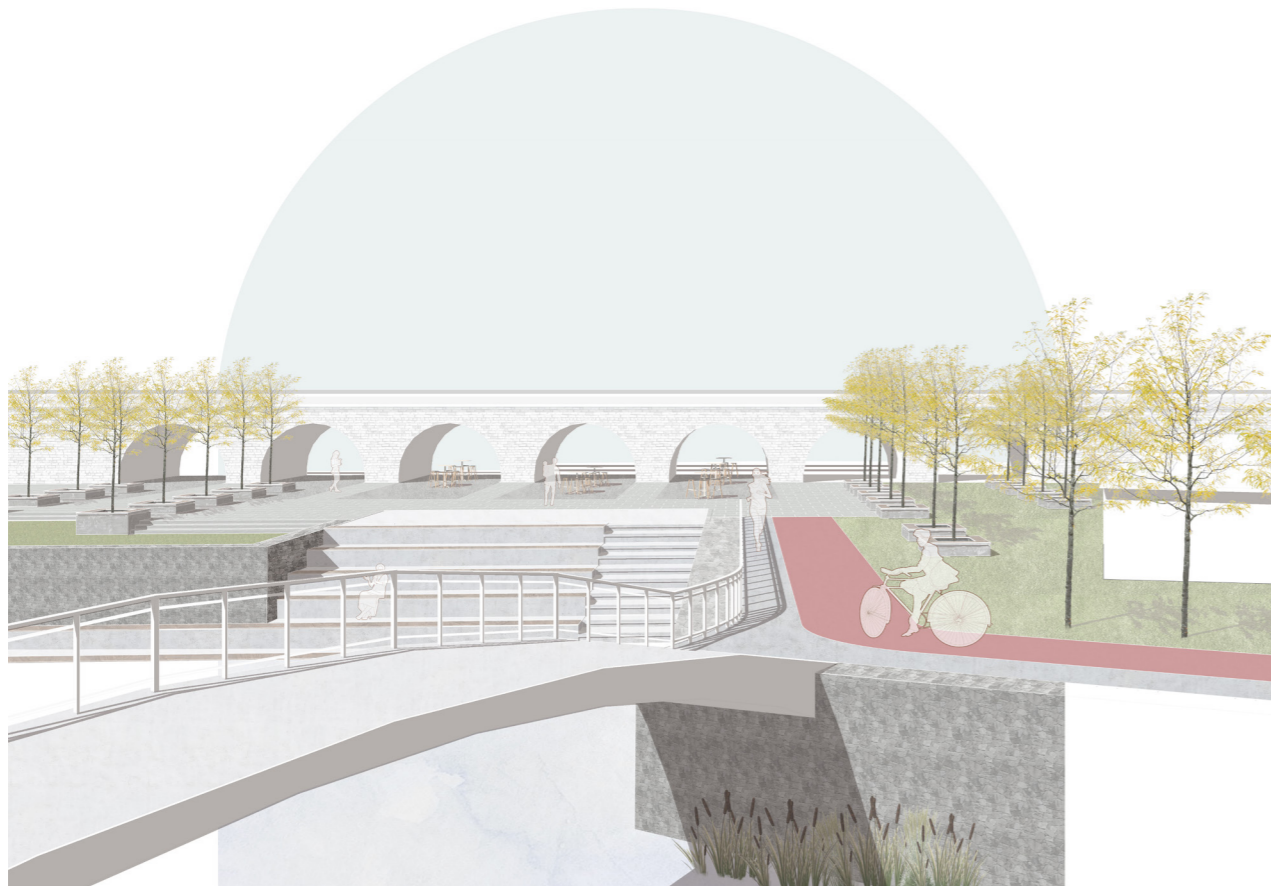
PLATFORM SECTION 1:40



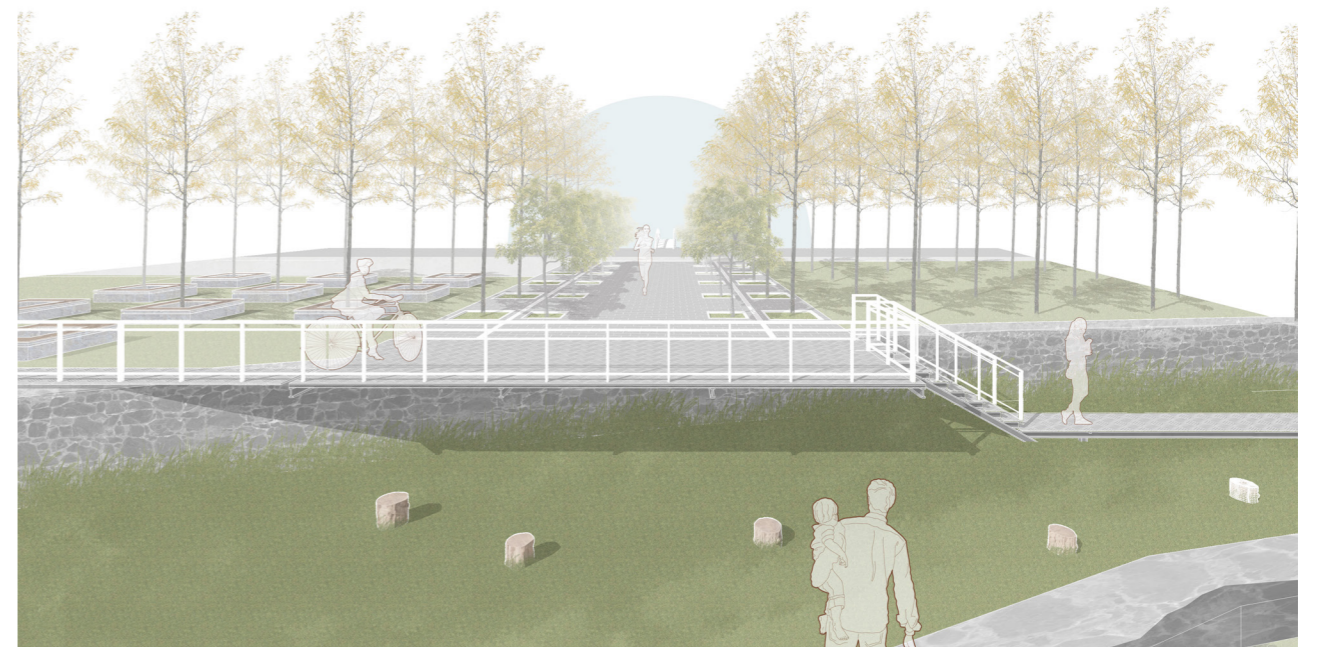
The use of overhanging structures and minimally grounded steel framing allows the viewing facilities to disturb the original riverbed site as little as possible.

RENDERING.

DOUBLE SOURCES.



HISTORICAL TRACE.



DESIGN SITE 02.

The second large area is the transition area between built-up urban areas and peri-urban agriculture. The original pedestrian system in this area is cut off by the infrastructure, and some illegal self-generated agriculture exists in the surrounding green areas. In the face of this chaotic situation, we first tried to establish a comprehensive greenway system. The "embankment space" has been made to have a more active connection with the river.

The presence of illegal agriculture in the site actually reflects the needs of the local population to some extent, and we believe that this activity has the potential to become a sustainable form of spatial use. Therefore, we have planned the area where illegal agriculture was occurring as a formal suburban agricultural area. This area will be divided into regulated agricultural growing units that can be rented by the surrounding residents or visited by tourists to experience agriculture. At the same time, new walkways, viewpoints, and trees will be introduced to create an ornamental and interactive agricultural landscape on the edge of Milan. Some new water channels will be connected to the natural water source of Lambro Meridionale, allowing the area to function in a more cost effective and sustainable way.

The design of Site 2 is focused on the treatment of the urban and agricultural border interface, which can be divided into three parts.

The first is the intersection of Lambro Meridionale and Naviglio Pavese, where we want to make it easier for pedestrian and cycling traffic to cross the whole area. In this complex area, the highway is on both sides of the Naviglio Pavese, while the Lambro Meridionale flows under the Naviglio Pavese, thus, comparing the two options of elevated pedestrian and underground tunnels, we chose the latter, which is a more logical structure on the one hand, and a budget saver on the other. This area also has functions such as space along the river, rain gardens, and children's activities, which are organized around the traffic flow.

Next is the community agriculture part. We planned the original illegal farming as a legal community agriculture site, and made a simple site division. We prefer a kind of spontaneous human activity, rather than a simple limitation. This zoning relationship can stimulate the possibility of more people to grow in it.

Finally, the accessibility of Lambro Meridionale. A new bridge connects the community agriculture to the ecological forest on the other side of the river, the existing orchard to the running path, and creates a landscape axis that enhances connectivity.

The whole site is spatially organized based on the original fabric, and the existing problems of the site are solved with minor changes.

DESIGN DRAFT.

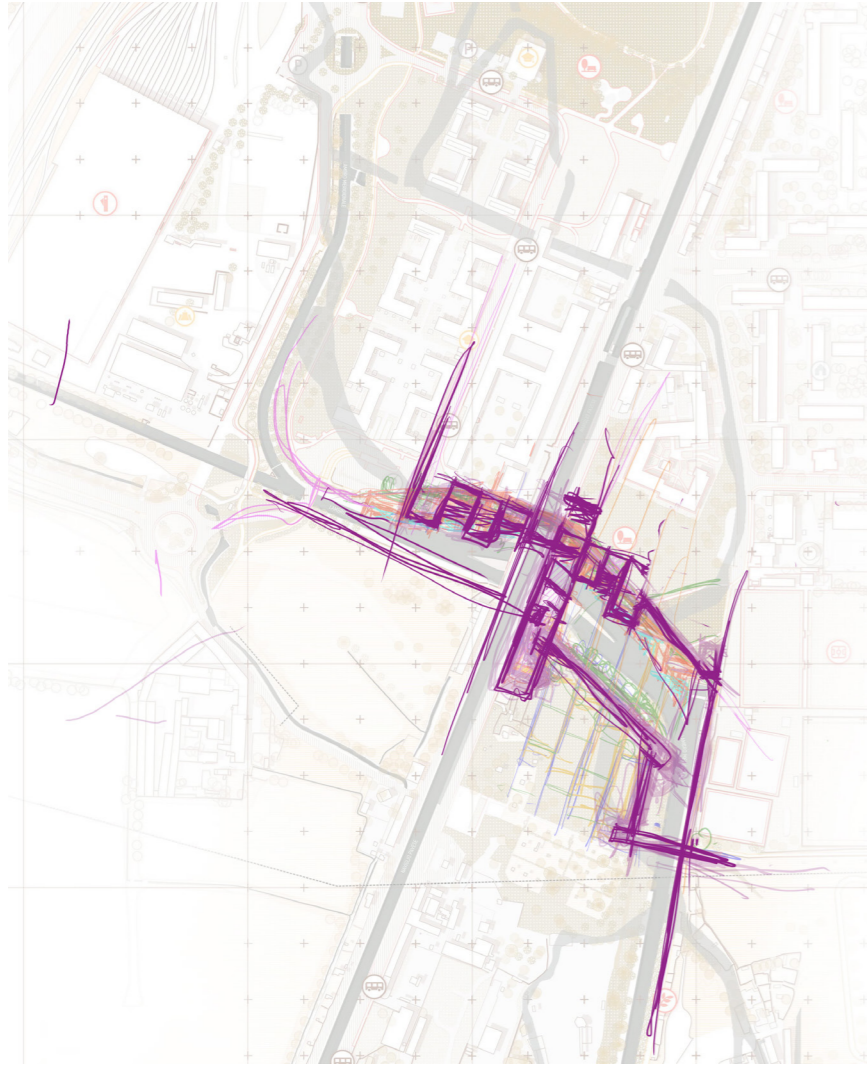


Figure 1. Overall design

Figure 2. Landscape tunnel

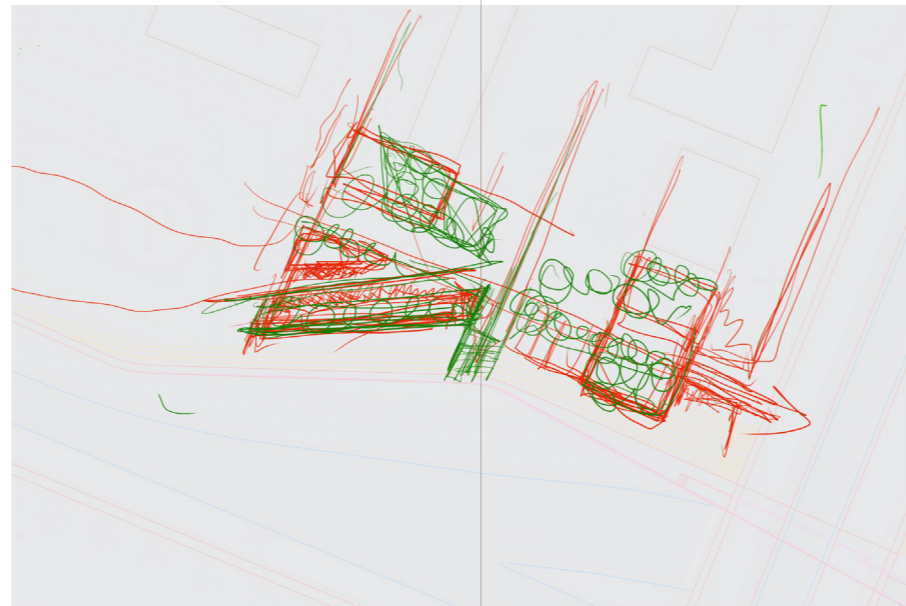


Figure 3. Urban farming

MASTERPLAN.

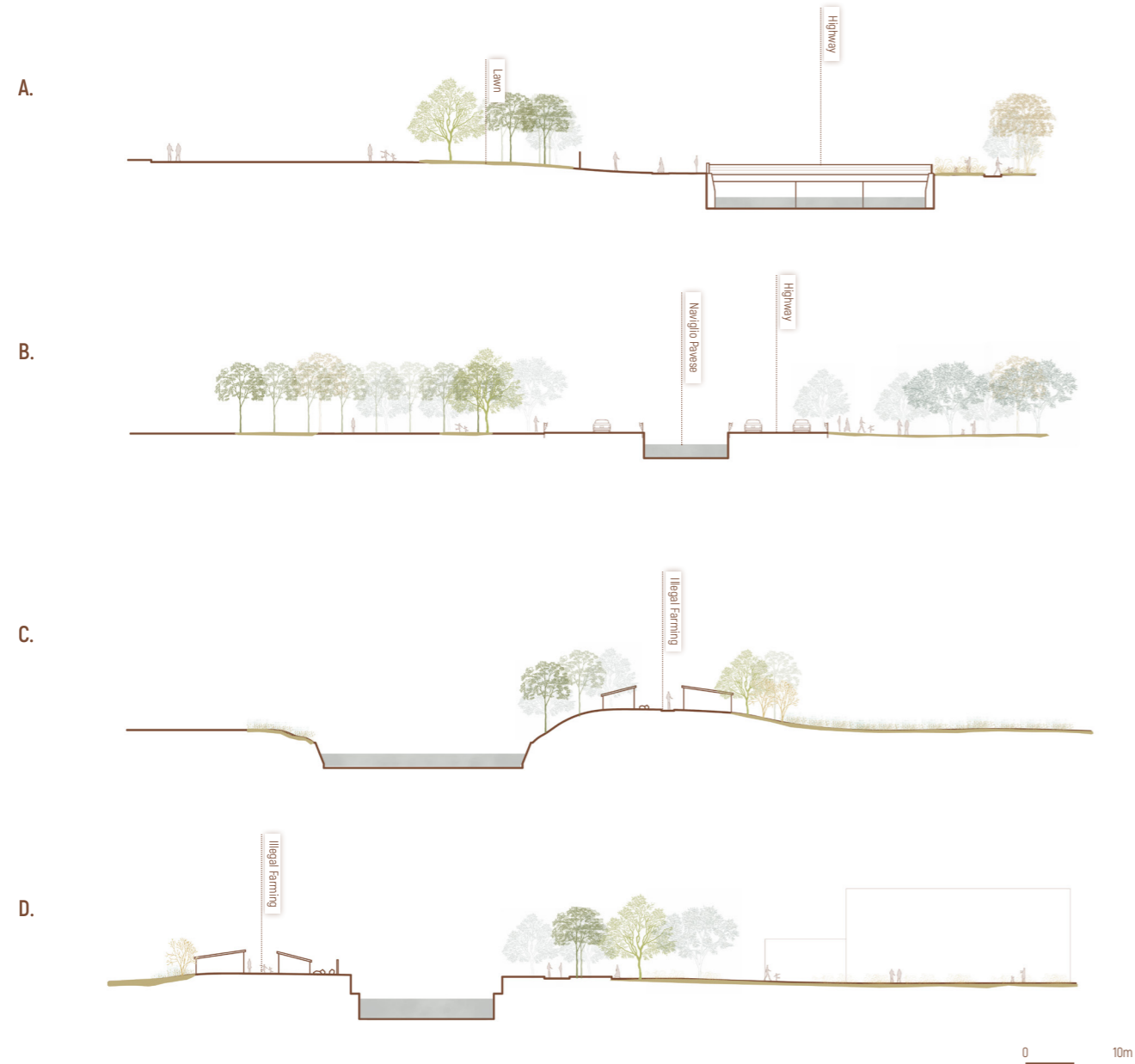


Before.

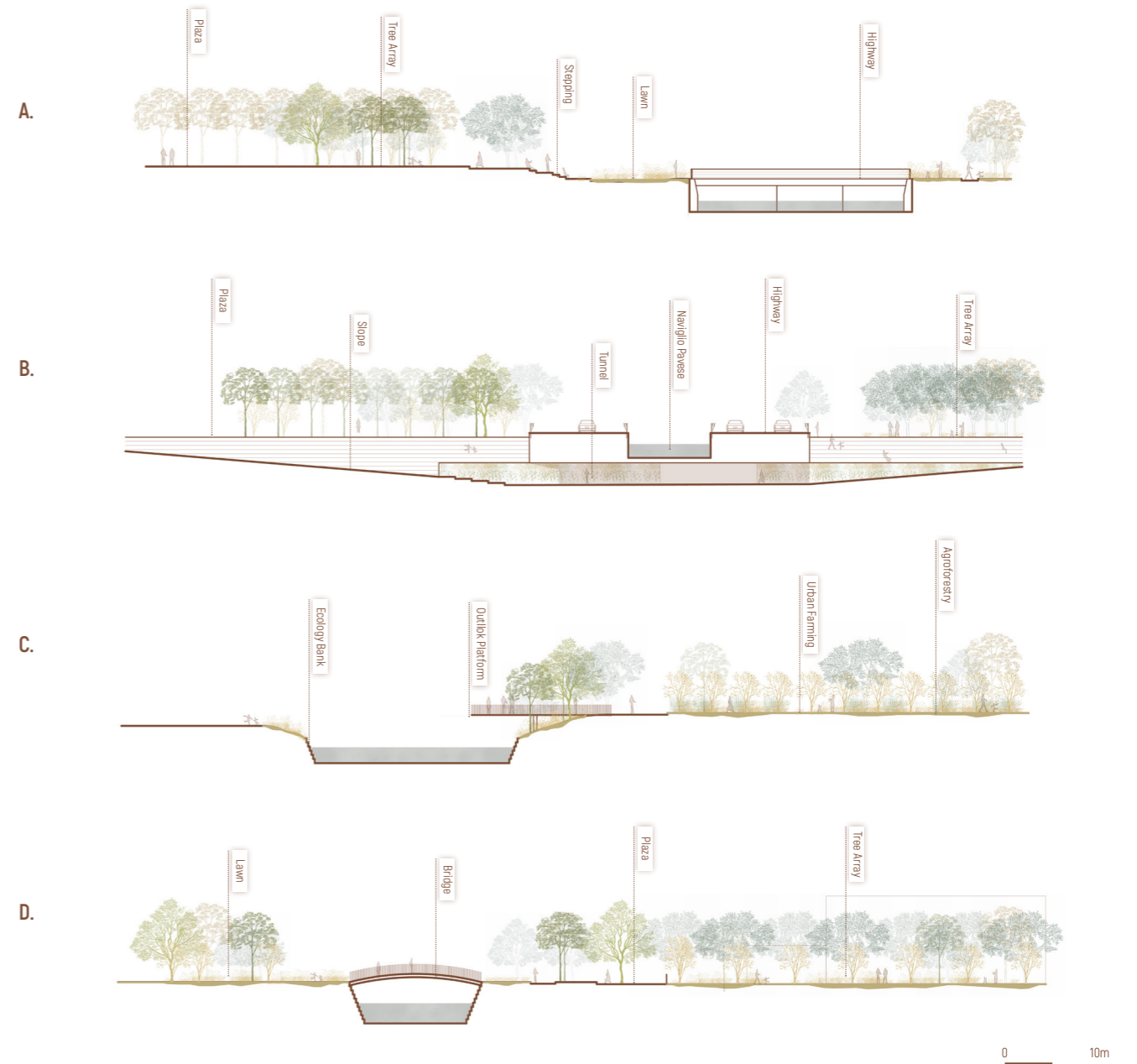


After.

SECTIONS.



Before.



After.

S I T E 1 .

For this design area, we have made the following considerations.

First is the integration with the surrounding urban environment. Our axis mainly continues the entrances and exits of the surrounding community as well as the existing park paths to provide convenience for the surrounding users. For the original collection of parking lots on the site, we removed some of them and re-planned the rest to ensure the parking capacity while making the spatial form more in line with our design.

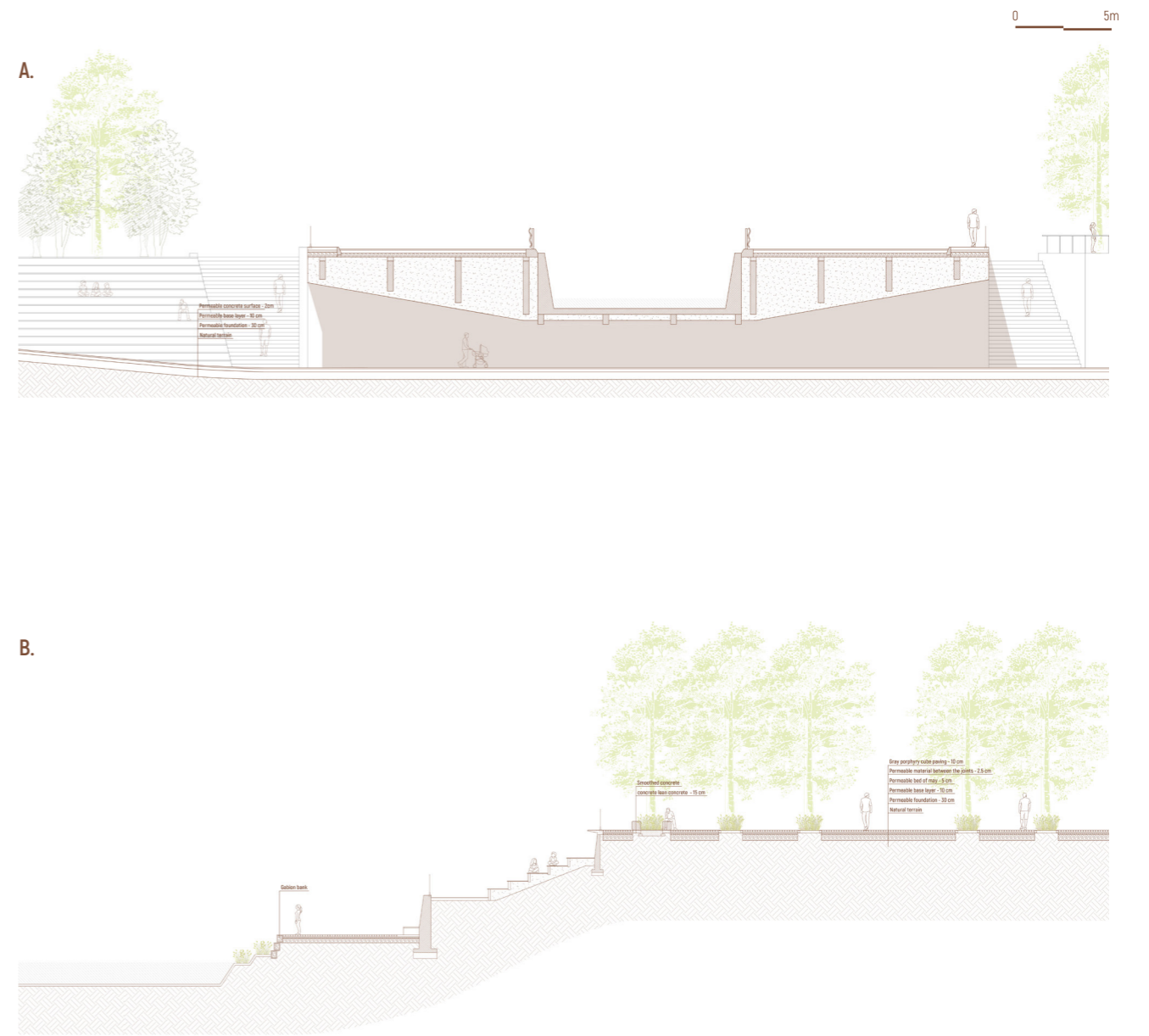
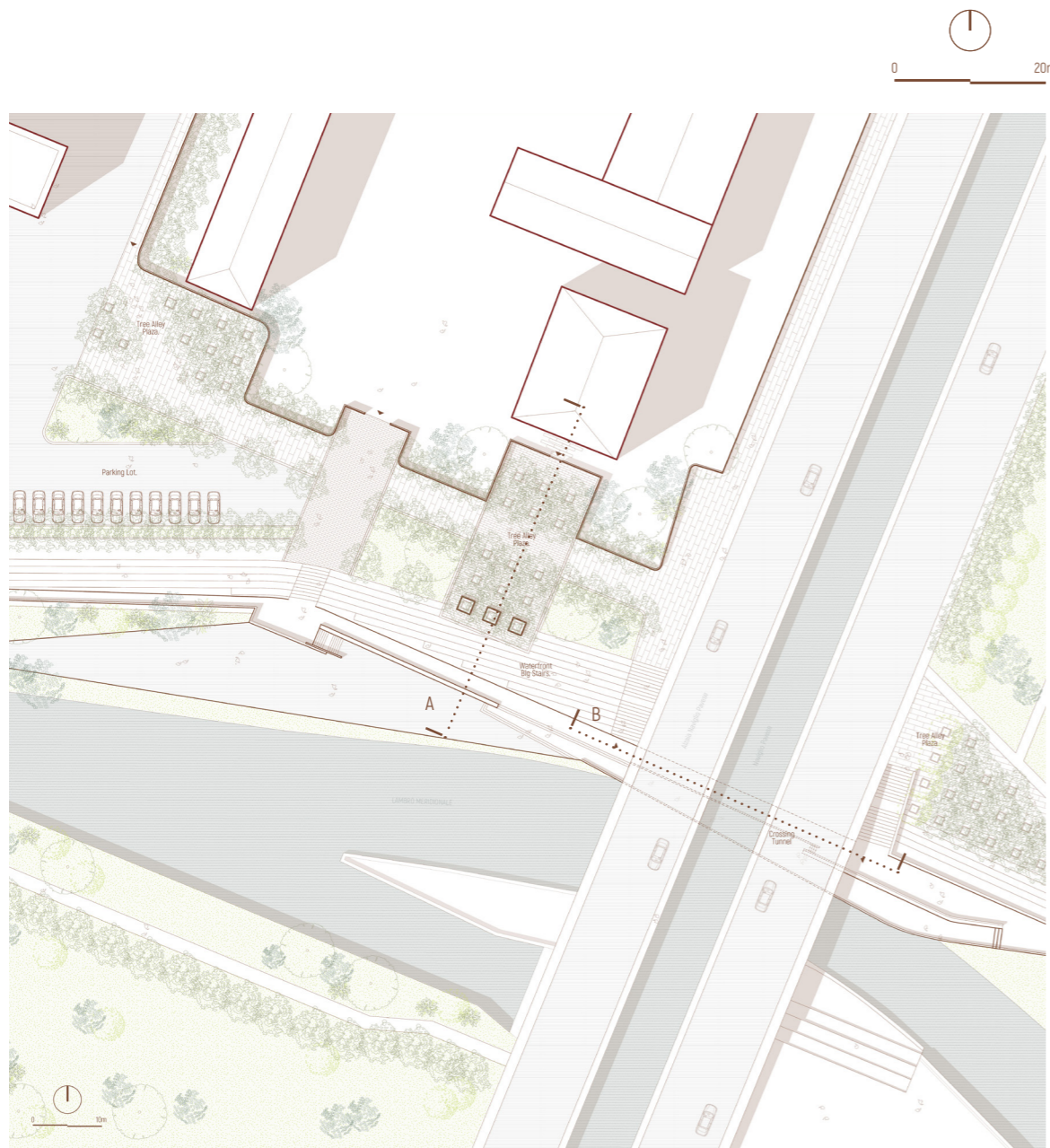
The second is the design of the tunnel. We wanted the tunnels to not only provide a crossing function, but also to be part of the landscape itself. In this regard, we chose to excavate the tunnel in the lower part of Naviglio Pavese so that it is at the same height as Lambro Meridionale, thus opening up to the waterway instead of being a dark and closed state. People can pass through the tunnel and get in close contact with the water at the same time.

The final issue is the connection between the tunnel and the surrounding space. We use an 8% barrier-free ramp combined with a fast path staircase to consider the needs of different people. For the long slope brought by the tunnel, we use z-shaped stairs to connect with the surrounding environment to mitigate the height difference brought by the slope while opening the waterfront big stairs facing Lambro Meridionale to enhance interactivity.

The earthwork of the whole site is large and requires a certain economic budget. The overall atmosphere of the design matches the surrounding area, presenting a more modern, open and bright state.

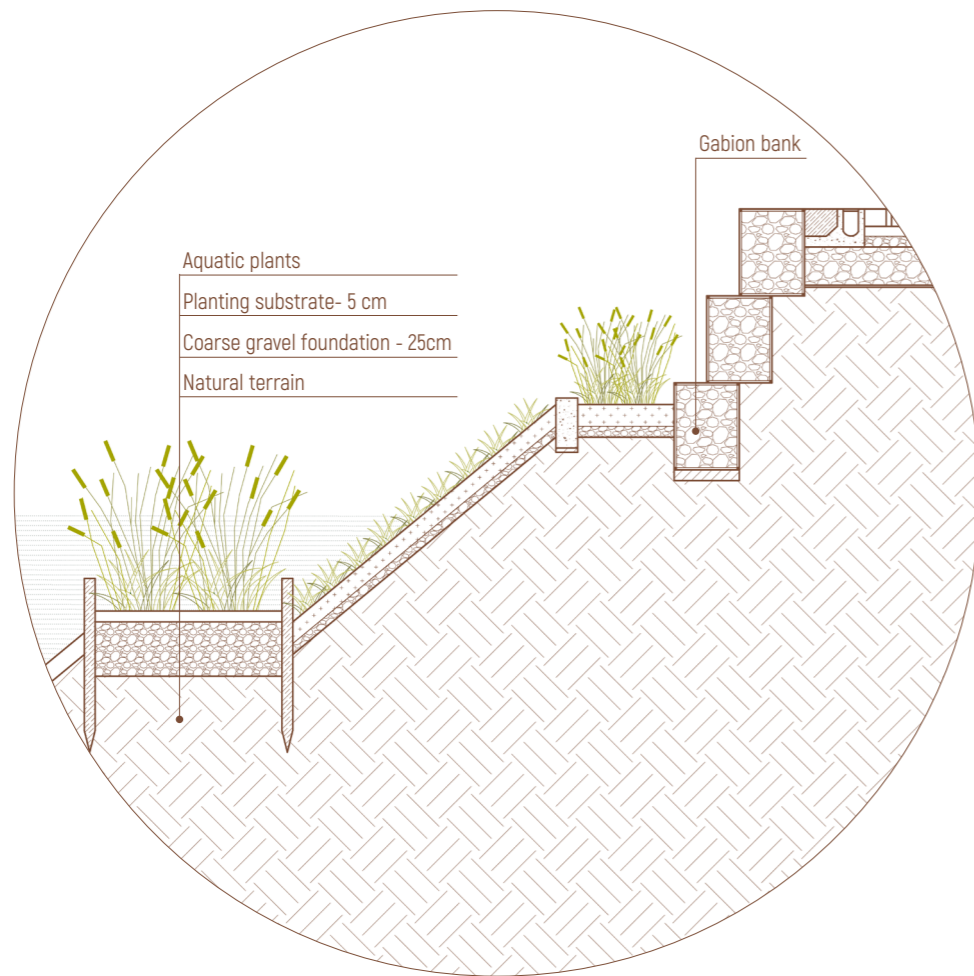
DETAIL.

LANDSCAPE TUNNEL.



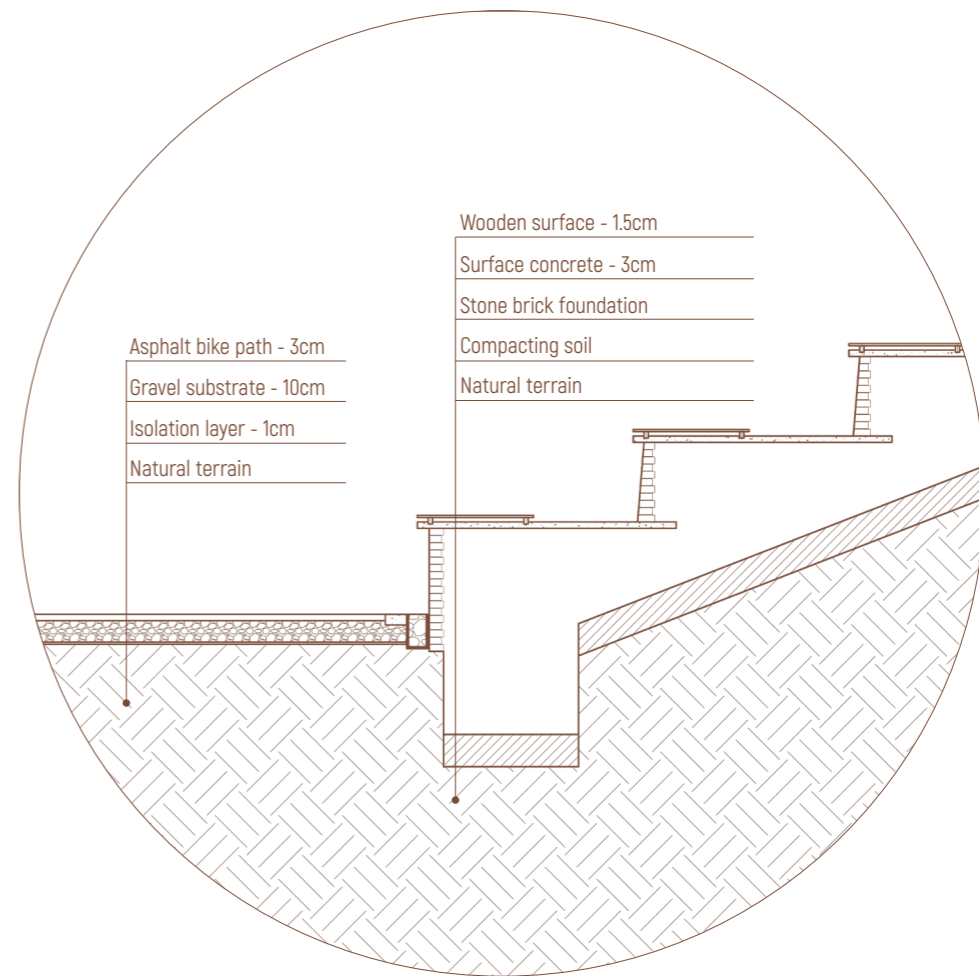
DETAIL STRUCTURE.

WATERWAY BANK SECTION 1:40



The original vertical hard concrete embankment will be transformed into a more ecologically efficient multi-layered embankment.

WATERFRONT STAIR SECTION 1:40



The upper level of the embankment is a river view staircase for people to stay. The ramp leading to the tunnel are combined with it.

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We provide a spatial division for urban agricultural areas, the specific use of which is more flexible.

For the agricultural zoning itself, we have created an orthogonal system of alternating footpaths, ditch and agroforestry row planting for the basic site division. Ditch water diversion from Lambro Meridionale for planting. Juglas Nigra and Populus Nigra Italica, which provide agricultural protection while also yielding some agricultural output.

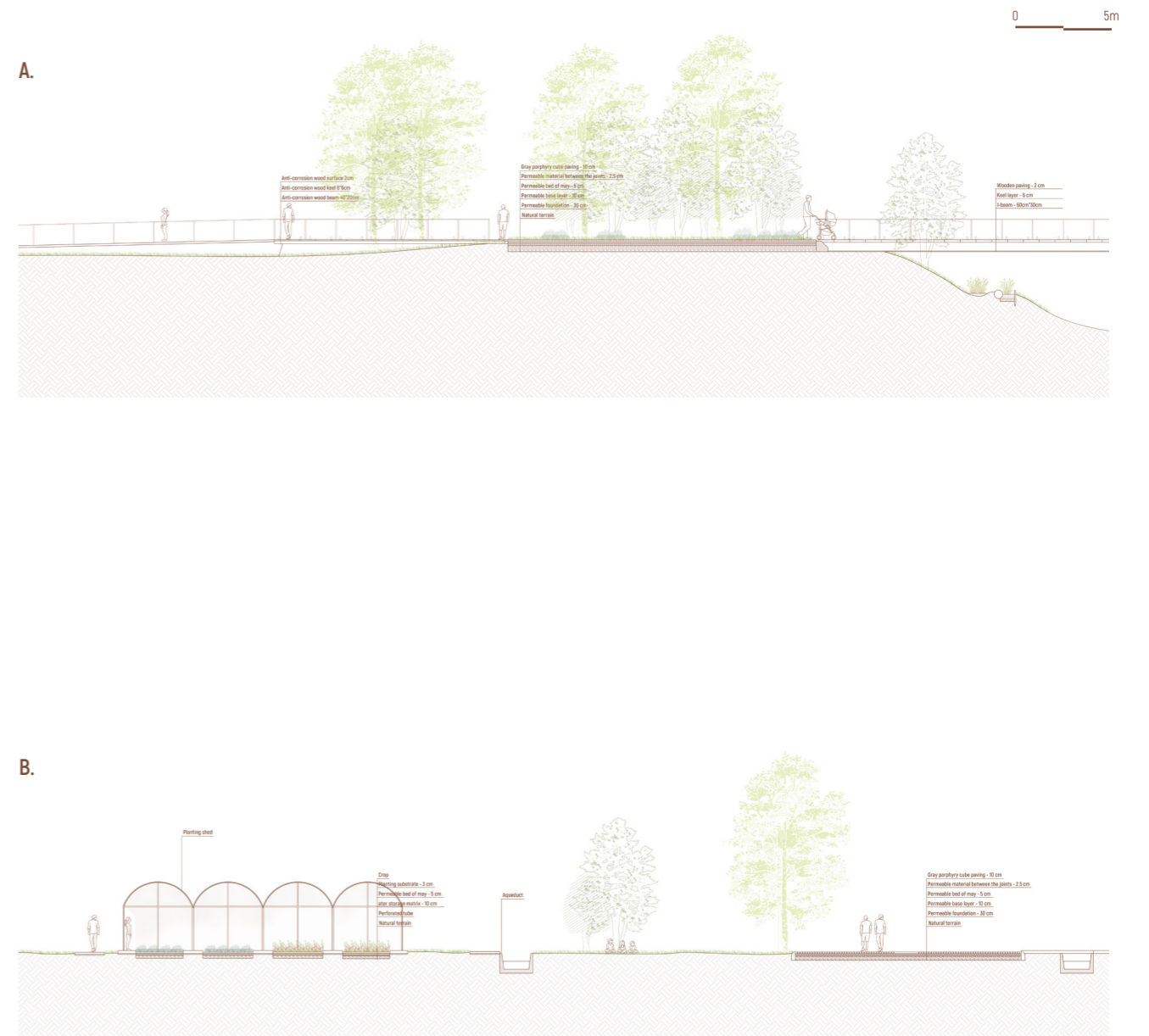
For each agricultural subdivision, we set up a pre-determined texture of the farmland in different sizes, offering the possibility of spontaneous planting activities. In addition, the modular planting units, consisting of metal supports and light-transmitting plastic film, can be freely combined between the modules to meet different planting needs.

For the connection with the surrounding space, we set up a landscape axis to connect the urban agriculture with the urban boundary space, and add a corresponding new bridge. Smaller plaza sequences are linked by trails, which provide rest while being more in line with the overall agricultural site atmosphere.

Flexibility, spontaneity and sustainability are the key words in the design of this site, we only provide a platform and expect the users to transform it.

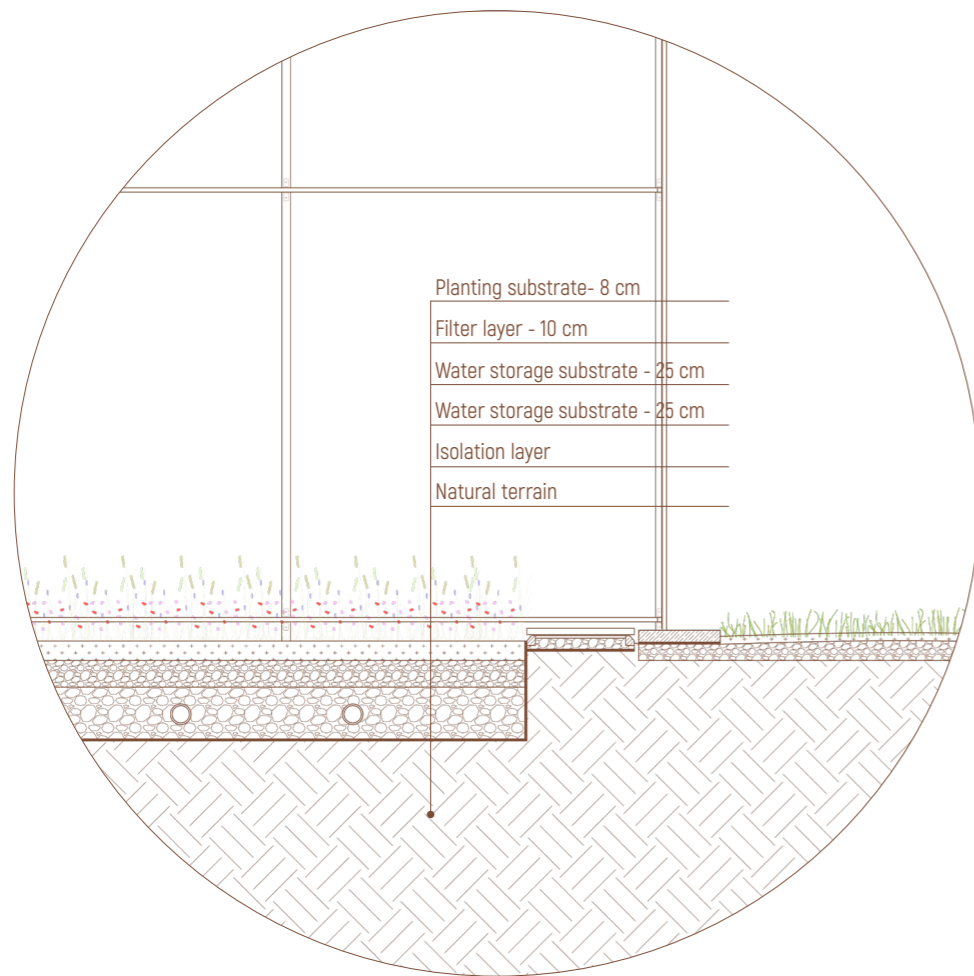
DETAIL.

URBAN FARMING.



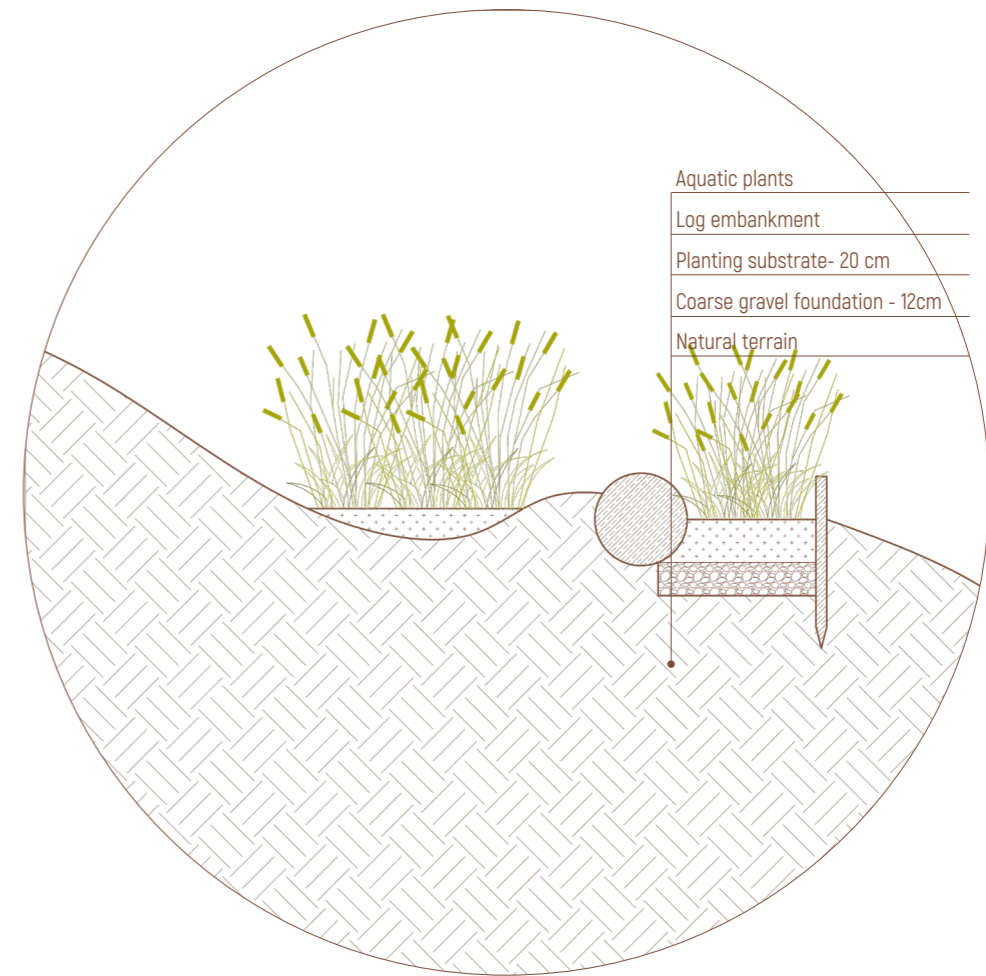
DETAIL STRUCTURE.

URBAN FARMING UNIT SECTION 1:40



The interior of the agricultural unit can be customized by the user. The water supply system connected to the Lambro Meridionale provides a good base for agricultural activities.

ECOLOGY BANK SECTION 1:40



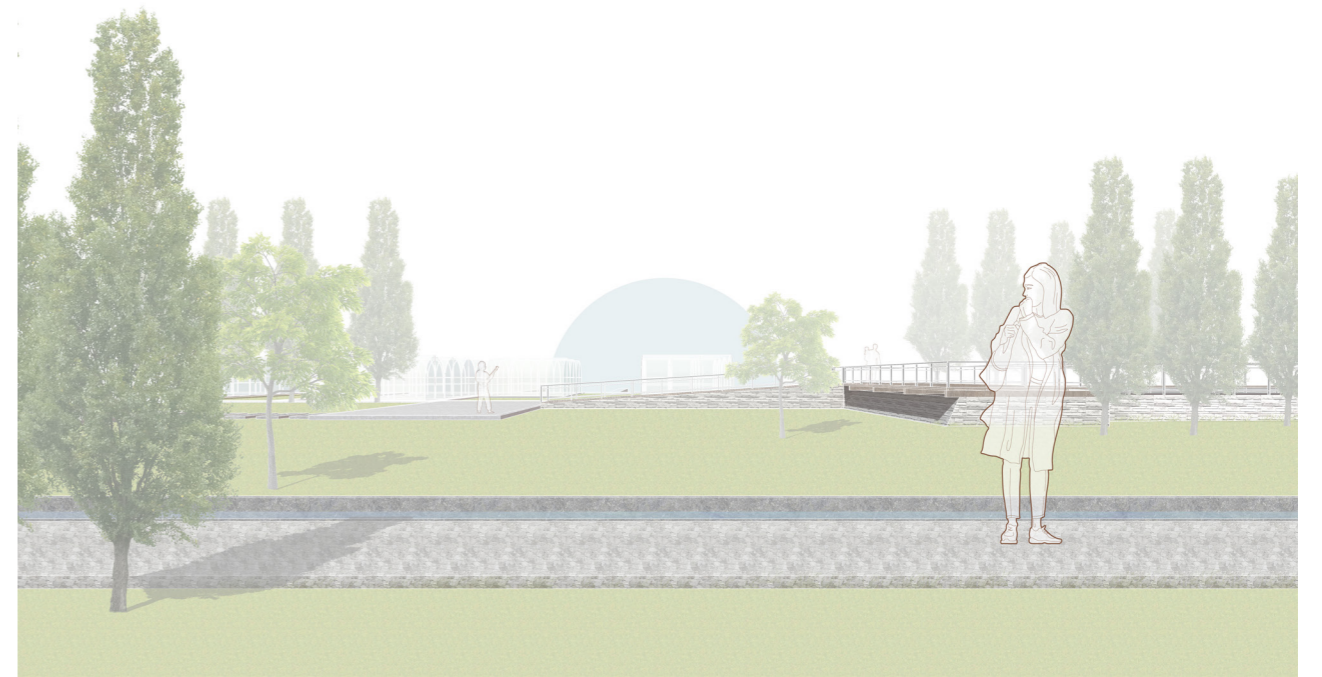
In this area, a more natural way of embankment construction is used.

RENDERING.

LANDSCAPE TUNNEL.



URBAN FARMING.



PLANTATION AND SEASONING.

In the choice of plants, we considered first and foremost their suitability for the local ecology, and we believe that the landscape along the Lambro Meridionale should be a native and sustainable one. It should exist in a harmonious and natural form in the urban life of Milan. Therefore, the main plant species we used are those that have been proven by other practices to be suitable for the Milanese climate.

Secondly, we wanted to create a different landscape character in different seasons, so that the area would have a continuous attraction for the users. Flowering and fruiting plants of different colors in different seasons were included in this consideration.

Similarly, beyond the physical attributes of the plants, the cultural significance of some species was also considered as part of our planned planting. For example, *Populus nigra* 'Italica', a representative tree in the agricultural landscape of the Milan suburbs, was involved in the creation of our agricultural landscape.

SPECIES PERCEPTION.



SITE 01 PLANTATION.



SITE 02 PLANTATION.

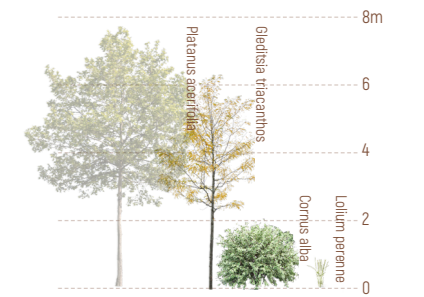
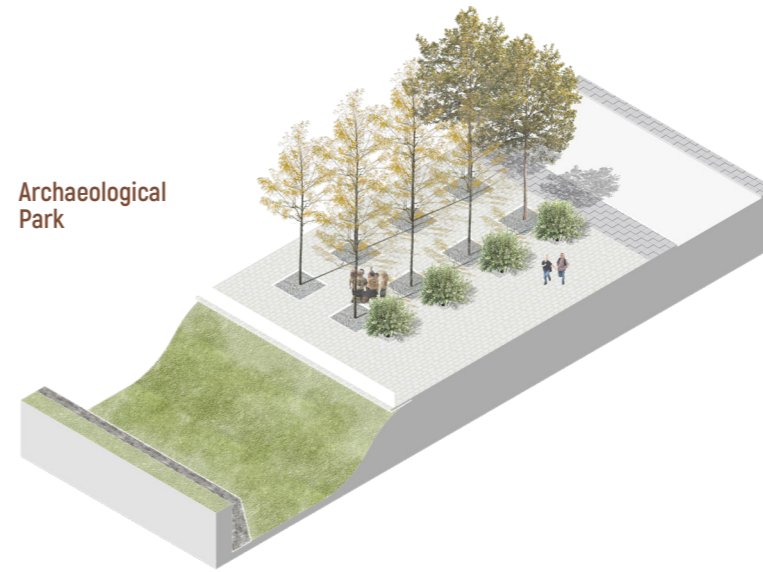


TYPICAL CONFIGURATION.

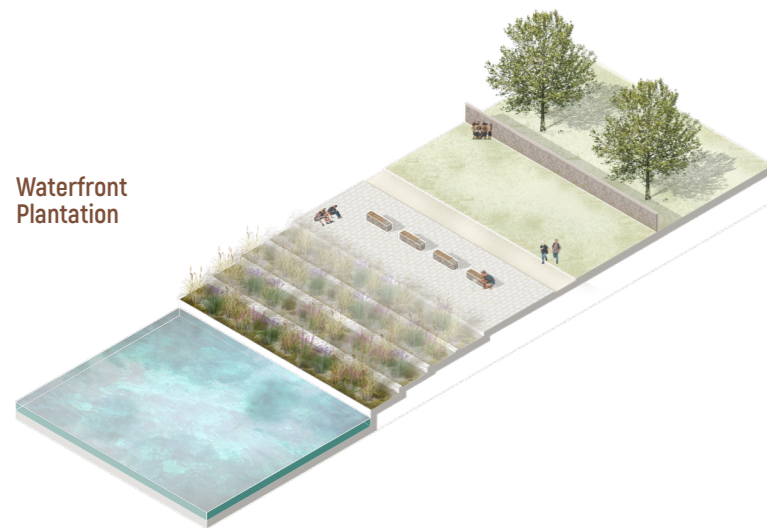
Tree Array



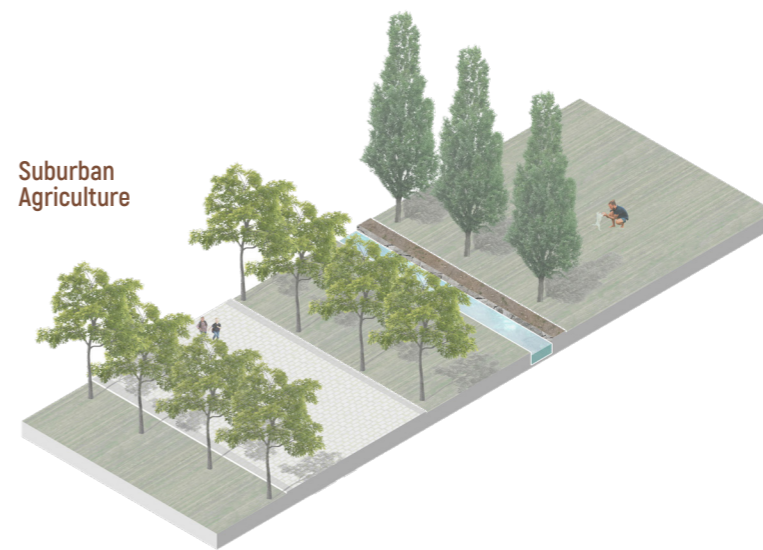
Archaeological Park



Waterfront Plantation



Suburban Agriculture



CONCLUSION AND BIBLIOGRAPHY.

CONCLUSION.

Throughout the process of research on Lambro Meridionale. We feel that sometimes it is not the limits of its physical properties that determine the fate of a space, but the transformation of people's attitudes towards it. When we first arrived along Lambro Meridionale, we had the impression that it was chaotic, complex, and urban problems that needed to be solved. But as our research progressed, and as we gained a more understanding of the river, we discovered that its own points of interest had exceeded our expectations.

Was it the depression of the waterway itself that brought about the neglect of it. Or is it the neglect that has brought about its broken and chaotic state? When we treat Lambro Meridionale as an urban problem, it is indeed tiresome. But when we shift our thinking and put it together with the space around it and rethink a whole new system, I think this waterway has the capacity to bring lasting vitality to this regional city. It makes us regret that people didn't consider this waterway as a positive element in the early stages of urban development in this area.

However, we do not think that the potential of this river has disappeared. As we said at the beginning of this book, the Lambro Meridionale is like a main line that links a series of fragmented clusters. The interesting elements along this waterway have still not disappeared, they just have not been noticed and integrated into a system.

This is where I think one of the core meanings of our research and design comes from, to show a possibility of the future of the spaces along Lambro Meridionale. To call attention to and positive imagine Lambro Meridionale.

Although we have tried to come up with a complete design, but if in the future people do plan to systematically enhance the landscape of Lambro Meridional, The challenge will be more comprehensive. And in the end, what we get will be a result that exceeds all expectations. This does not mean that I am not responsible for our work, but we believe that the real world is richer in detail. We believe that a landscape system is ultimately the result of the interaction and collaboration of all stakeholders. Reality is often a barrier to the realization of the designer's ideas on the drawing board, but in many cases it is a way to inject more sustainable energy into the conceptual design. What we want to do is to inspire more positive attitudes and actions in the people who have a relationship with Lambro Meridional.

For example, in the fourth site we designed, we planned a model of peri-urban agriculture that operates as a unit. But the government, agricultural experts, farmers and other stakeholders will all have their own opinions about this model. Even if they fully endorse our concept, they will have a deeper understanding of the technical details of growing crops, urban management, and other operational aspects than the landscape architects. In that case, the city will be a more organic and sustainable area.

Beyond the technical aspects of the design, economic issues may also become a big problem for the upgrading along the Lambro Meridional. This is because a major renovation of the Lambro Meridional is destined to be a process with a large up-front investment and a long period of time to obtain benefits. During the design study, we have been deeply aware of the complexity of the property rights along the waterway. Buildings and spaces belonging to different organizations such as communities, schools, companies, factories, etc. are deeply intertwined. In other words, the fragmentation of the Lambro Meridional is now not only a fragmentation of space and design, but also a fragmentation of ownership; the Lambro Meridional is not only a linear element, if the future Lambro Meridional is to be a system, the spaces along its are inseparable. We expect that there will be a lot of difficulties to get the support of the stakeholders of these spaces. And this part of the work may not be easier than the redesign and planning of the space.

So, if one does plan to implement the enhancement of Lambro Meridional, people may need a phased planning. Let some stakeholders get their share of the profits in a phased manner, so that there is a positive cycle in the area. And this process will attract funding and builder input to make the enhancement of Lambro Meridional sustainable.

Overall, even though we will not see the complete transformation of Lambro Meridional in the near future, we have a sincere and positive expectation for this area. We believe that in the future, with the joint efforts of landscape workers, government, landscape workers and others who are committed to creating beautiful things, Lambro Meridional will shine brighter than anyone can imagine.

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