MASTER

The riverfront of Rome

the dramatic emptiness of the Tiber and low level quays as better integrated part in the urban tissue

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THE RIVERFRONT OF ROME

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THE RIVERFRONT OF ROME

THE DRAMATIC EMPTINESS OF THE TIBER AND LOW LEVEL QUAYS AS BETTER INTEGRATED PART IN THE URBAN TISSUE

Fig.1 - The Tiber river before the embankment

"For a dense metropolis, today as much as centuries ago, the waterfront is where a city opens up beyond the topography of daily life."

Gastil, R.W. (2002). *Beyond the edge: New York's Waterfront*, p19

ABSTRACT

In history, the Tiber has had many functions in the city of Rome, for example it was used for transport of people and goods. Since the seventeenth century it became more difficult to facilitate transport over water because the water flow was discontinuous and sedimentation resulted in shallow depths. Eventually transport over water stopped in the nineteenth century. Since then, the Tiber does not have a visible function anymore. It became only a source for destruction due to its floods. In 1926 the construction of the embankment was the solution to this problem.

In the city centre, the construction of the embankment went together with the construction of the boulevards on both sides of the river. During this intervention, the context was not taken into account. Since then, there is no relation between the river and its surroundings anymore. The study, based on the ideas of Kevin Lynch, shows that a barrier between the river and its surroundings has been created. It cut off the river from city life.

The intervention has put the Tiber in isolation in the city centre. The Tiber has become a separate space with its own smell, light and sounds. The intervention has created a unique space; a dramatic emptiness. A special aura can be perceived on the low level quays, which is in contrast with the busy and lively city.

Since it is difficult and unattractive to descend to the low level quays, this unique space is not easily noticed. A masterplan, that is part of this thesis, has been designed for the riverfront between Castel Sant' Angelo in the north and Tiber Island in the south. It provides a riverfront that is better connected with its surroundings. Accessibility to the riverfront will improve. People will feel invited to descend to the low level quays. The masterplan creates spatial continuity in order to preserve the identity of the city. It also enables people to experience the area of the water by providing facilities.

The masterplan expresses the specific conditions of the location. It includes history of the location by transforming historical references into a new structure. The masterplan tells something about the relation between the place, the river and its transformation over time. It strengthens the relation between historical layers while keeping the situation readable. With this it strengthens the identity of the city.

Two interventions of the masterplan are designed in detail. The first detailed intervention is next to Castel Sant' Angelo. Here, the history of the location becomes part of the future again because the new design follows the from of Castel Sant' Angelo from before the embankment.

The second detailed intervention is there where harbour Navalia was situated in Ancient Rome. On this location, a new harbour will refer to the old harbour Navalia. The city and the water will be reconnected like it was in Ancient Rome.

Both detailed interventions form an example for the other interventions that are part of the masterplan.

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INTRODUCTION

ATELIER "THE CITIES OF ROME"

CONTENT AND INTENTIONS

Graduation atelier "The cities of Rome" consisted of two parts. The first part has been a collective research and the second part has been an individual research and design.

Rome is a city with many historical layers. In order to get more grip on these layers and its development over time, the city has been studied on the basis of eight important roads. The collective research was in collaboration with eight architecture students from the university Politecnico di Torino and eight architecture students from the Sapienza University in Rome. Each student of Eindhoven was grouped with a student of Turin and a student of Rome to study a certain road. The eight streets that have been studied are: Via del Corso, Via del Lungara, Via dello Scalo di San Lorenzo, Via Flaminia, Via Giulia, Via Leone IV/Via della Giuliana, Via Marconi, Via Ostiense and Via San Giovanni di Laterano.

Series of maps present the morphological transformation of the streets and their surroundings from its first buildings till the current situation. Typologies that are important for each street or area have been subject of a more in-depth research.
Era essays have been part of the collective research, for a better understanding of the ideas behind the urban developments of each historical period. The era essays were provided of maps that showed the urban tissue of every period.

The final result of the collective research has been combined in The Atlas, The cities of Rome. The collective research reveals the logic behind the structure of the city. It reveals the construction and relation between new and old. It shows that the strong identity of the city is based on its many layers and on the continuity of the history. The information that has been combined in The Atlas gave inspiration for further individual in-depth research; the second part of the graduation project.

All the knowledge obtained, resulted in a design which is a rational apply to contribute to the city and to contribute to the identity of the city.

INDIVIDUAL RESEARCH

EXPLANATION RESEARCH AND REPORT STRUCTURE

During the study to the surroundings of street Via Giulia, the change of the Tiber from a functional road towards a silent river without real use, became noticeable.

In history the Tiber always had a function in the city. It was the main 'road' for transport of goods and people from the beginning of the first settlement of Rome. It also played an important role in military defence. In Medieval Age the Tiber became city's lifeblood used for cleaning, its generating power and fish.

Today, the Tiber does not have a direct visible function anymore. Transport over water stopped. There are only several tourist boats that organise a tour over the Tiber. The Tiber seems to flow silently through the city as a dramatic emptiness in the busy and lively metropolis.

In the city centre, the construction of the embankment together with the planting of the trees created a tall wall, effectively separating the city from the water. Due to the embankment, the Tiber seperates the urban tissue on the left side from the right side, functioning as a border in horizontal direction (Fig.2). Besides that, the river is also isolated from its context in vertical direction.

The traffic along the boulevard is another barrier. There are some stairs that descend towards the lower quays, but they are very slippery because they do not drain well.

The aim of this study is to understand the role of the Tiber in the city of Rome in history and today. The study has to reveal the transformation of the Tiber over time. Kevin Lynch writes the following about transformations in the city: *"... it acquires a consciousness and memory. In the course of its construction, its original themes persist, but at the same time, it modifies and renders these themes of its own development more specific."*[1]

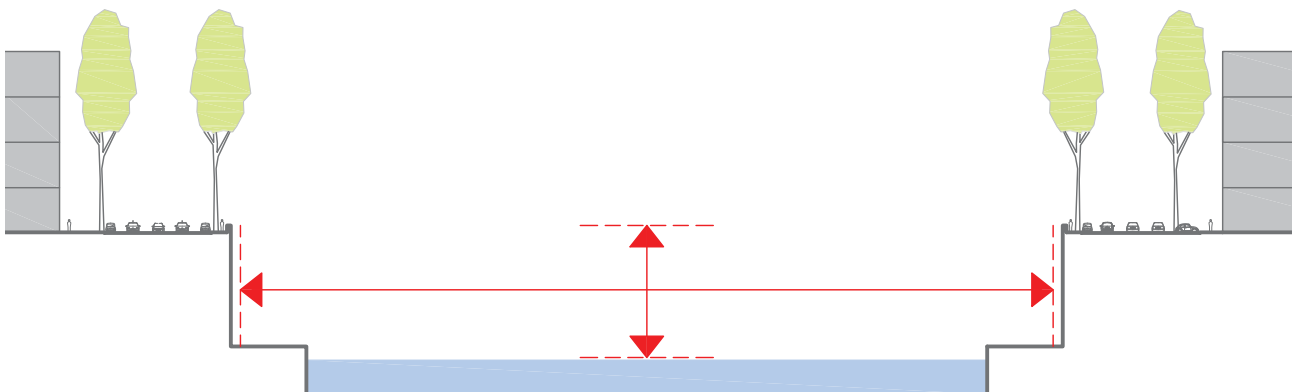1 Rossi, A. (1991). *The Architecture of the City,* p21

Fig.2 - The Tiber is isolated from the context.

An historical analysis will explain the situation in history.

To understand the current situation, the ideas of Kevin Lynch will be reflected on the Tiber and its direct surroundings among other subjects. Facilitating identification and also structuring plays a key role in the imageability of the city according to Kevin Lynch. The Tiber and its direct surroundings play an important role in facilitating identification and structurig. This means that the Tiber and its direct surroundings contribute to the imageability of the city of Rome in the current situation.

Prior to this, some case-studies will be studied. The first case-studies reveal possible relations between rivers and cities. Many cities have a river that flows through the centre. The way these cities cope with their river will be analysed.
The second part of the case-studies reveal possible relations between rivers and buildings. It gives information of the relation between the river, the people and the city.
The third part reveals relations between rivers and art projects.

Using the obtained knowledge, it is possible to make a rational design in which the potential of the riverfront will be underlined and in which the river will become better connected with its surroundings.

The river which is now a border in the urban tissue should eventually become part of spatial continuity. In that way it will help in the preservation of the identity of the city.

PROJECT LOCATION

The Tiber flows from north to south through Rome. The relation between the river and the urban context changes over length.

In the northern and southern part of Rome, the river is not bordered by embankments (Fig.3 and Fig.4). Here the river is embedded in the context. Sport fields, outdoor swimming baths, footpaths and other facilities are located directly next to the water. They use the advantages of the river like the nice views and the peace and tranquillity that the water provides. The water brings nature in the high density of the city.

In contradiction to the northern and southern part, the Tiber is embanked in the centre of Rome (Fig.5 and Fig.6). Any connection with the context has disappeared since the construction of the embankments. The silent passage of the river has become a sharp contrast to its urban context.

The contrast perceived in the centre of the city is the location for further studies. To narrow the size of the research area, the river between Tiber Island in the south and Ponte Sant' Angelo in the north is chosen (Fig.7).
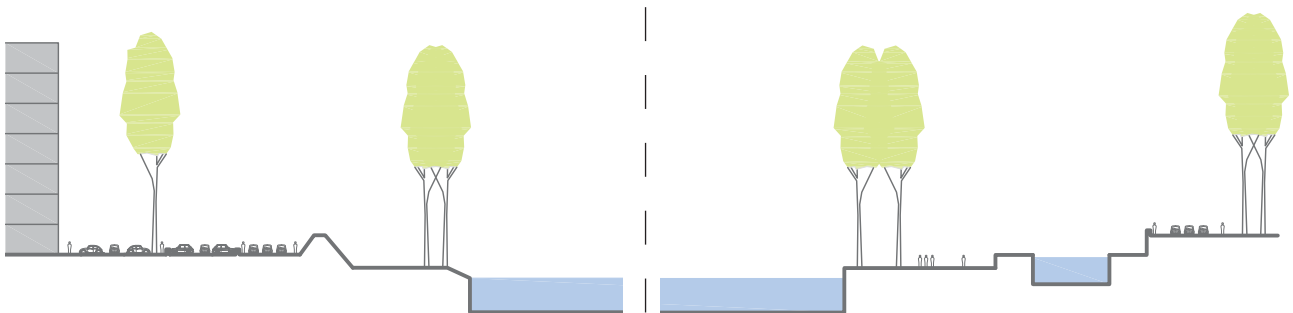

Fig.3 - Section in the north of Rome. Scale 1:1000
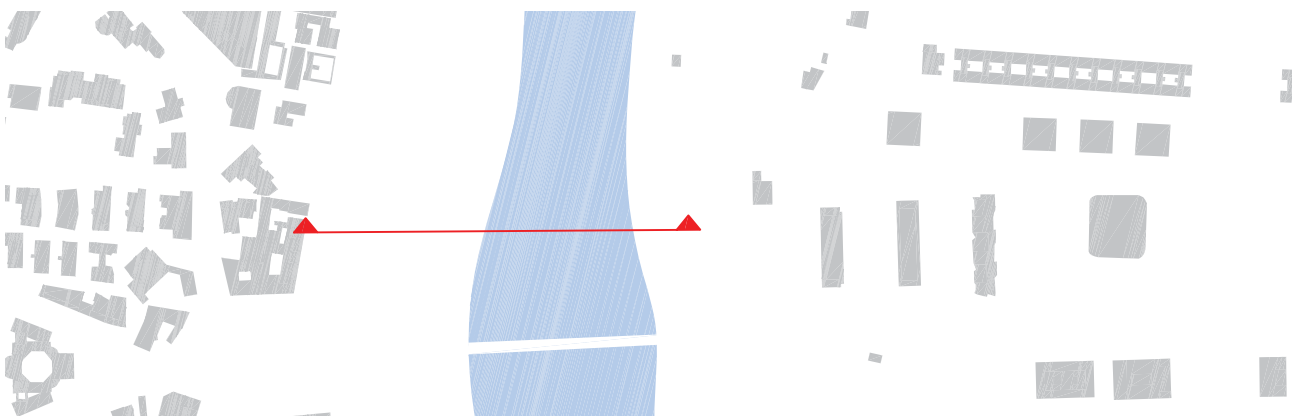
Fig.4 - Location of the section in the north. Scale 1:5000
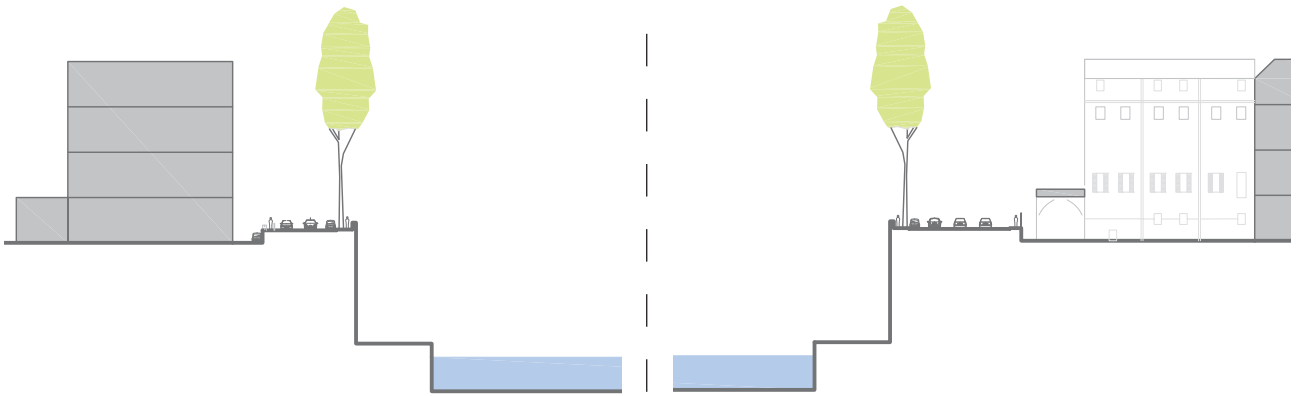
Fig.5 - Section in the centre of Rome. Scale 1:1000
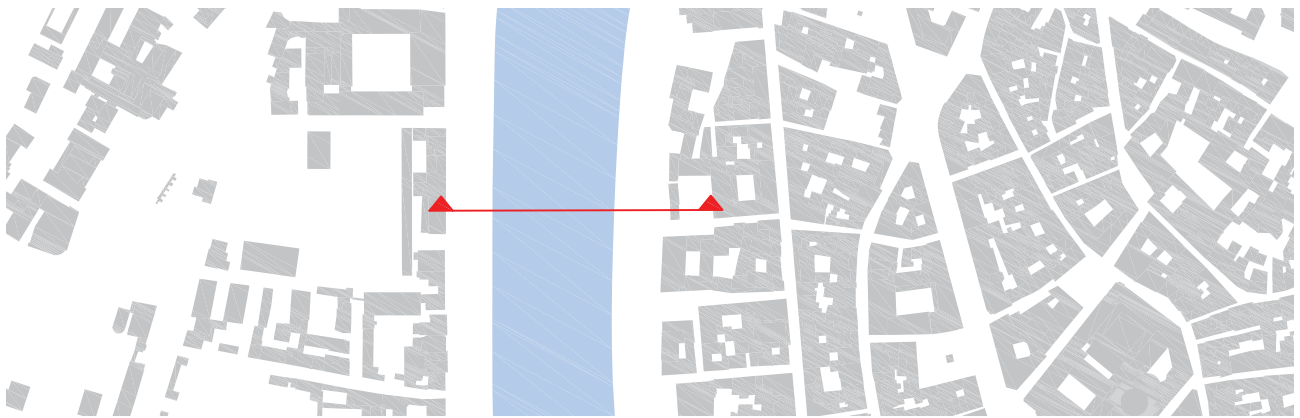
Fig.6 - Location of the section in the centre. Scale 1:5000

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Fig.7 - In red: part of the Tiber that will be the location for the masterplan

CASE-STUDIES

CASE-STUDY
RIVERS AND CITIES

Many cities have a river that flows through the centre. In each of these cities the river has been given another function. Sometimes it is just silently flowing through the city without notice. In other cases the river is fully used and a bustling place.

In order to understand different kind of possibilities, three cities are chosen as case-studies. Each of these three cites copes with its river in another way. Therefore Paris, San Antonio, and Ljubljanica are chosen as case-studies. Paris and Ljubljanica have a similar problem as Rome, because those cities have a river with changing water level.

The intention of this chapter is to understand possible relations between a riverfront and city.

PARIS

WATER-RESISTANT AND EASY MOVABLE DESIGNS
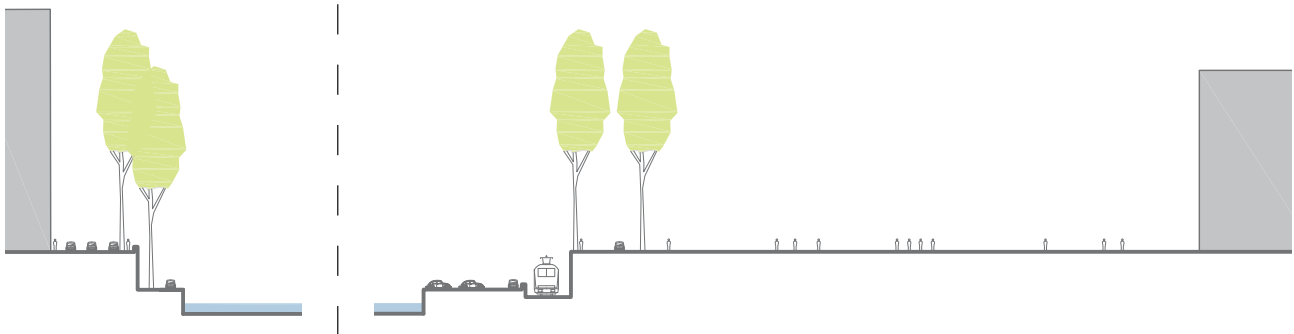
Fig.8 - Section of the Seine in Paris. Scale 1:1000
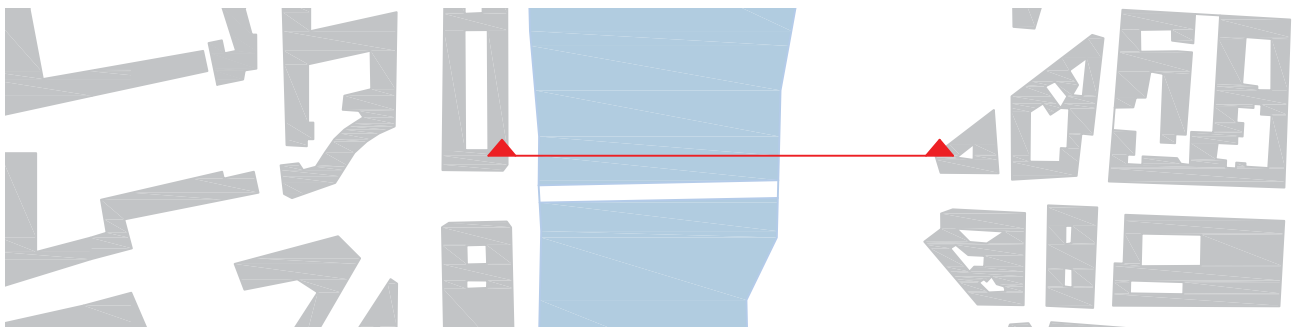
Fig.9 - Location of the section, near Pont Mirabeau. Scale 1:5000

History of the Seine

The Seine (Fig.8 and Fig.9) has always been the heart of Paris. It was used for transport and resulted in a lot of trade along the river.[1] Via the Seine, Paris was linked with the open sea.

Construction of the quays began in 1312 when King Philip IV started the development of today's left bank in order to extra stimulate the river trade.[2] The right bank followed soon after that. Although the banks narrowed the river, they kept their significant role as a centre of urban activity. Water-related activites and houses were concentrated along the banks.

In the nineteenth century, the quays were redeveloped from one quay to two levels of quays.[3] Besides this, navigation of the river had to be improved. Therefore water level was raised by means of dams and by storage reservoirs in bassins.

In the 1960s, both banks of the Seine were paved in order to become roads for cars.[4] The roads largely cut off the river from the citizens of Paris, many of whom have no cars at all.

The Seine is still used for transportation of goods.

River edges

The Seine has mainroads for traffic on the higher quays. There are also roads with parking space

1,2,3,4 www.frenchmoments.eu

on the lower quays. The riverfront is an area for cars instead of pedestrians although it is currently undergoing somes changes. that will be mentioned in the next paragraph.

Strategy

A few years ago Mr. Delanoë started a new project named Paris Rive Gauche in order to reduce car traffic along the banks. He wanted to give the bank back to pedestrian and bicycle traffic. *"We are committed to transform the road along the riverbank into a place of life, beauty and culture"* Mr. Delanoë said[1], noting that Unesco, the United Nations Educational, Scientific and Cultural Organization, placed the banks of the Seine on the World Heritage List. The road for cars on the right bank was narrowed in order to create space for walkways along the river.
The project of Delanoë complements another project of him in which he transforms the Seine into Paris Plages during summertime (Fig.11).[2] In this period, the roads along the river are transformed in sandy beaches with deck chairs, food vendors and concerts.

Like the Tiber in Rome, the Seine in Paris also has a changing water level. This resulted in designs that are water-resistant or easy movable.[3] Seven of these designs are discussed.

The Steps is installed in front of Musée d'Orsay (Fig.10 and Fig.12). The gigantic staircase is a work of art and a way of descending to the the quay. In case of a sudden rise in water level, the Steps can be dismantled in less than 24 hours.

The Faust is a café with terrace that is easy movable because it has one small cubic bar and simple sunshades. Rosa Bonheur sur Seine is a restaurant. It floats on the river in order to cope with changing water levels.

The Floating Gardens is a green space that consists of five islands whom are interconnected by walkways (Fig.13). Each island is planted and equipped with furniture to relax. As the name already indicates, the gardens are floating in order to cope with changing water levels.

"Zen" or "ZZZ" consist of old sea containers that are reused (Fig.14). These containers make it possible to rent your own private garden and terrace right in the heart of Paris along the river. The containers can be moved to a higher place in case of high water.

Among the banks, there is also a place for infants that consists of different elements like a blackboard (Fig.15) and climbing wall (Fig.16).

1 Delanoë. (2012). *With Block Lifted, Paris to Cut Vehicle Traffic Along the Seine*
2 Kroneberger, M. (2012. August 15). *On the Waterfront: Paris, Madrid, San Francisco, Portland*
3 (2013. June 28). *Welcome to the new Seine quaysides*

Fig.10 - Section of The Steps, scale 1:300

Fig.11 - Paris Plages during summertime

Fig.12 - The Steps

Fig.13 - Floating gardens

Fig.14 - Zen, ZZZ

Fig.15 - Blackboard for infants

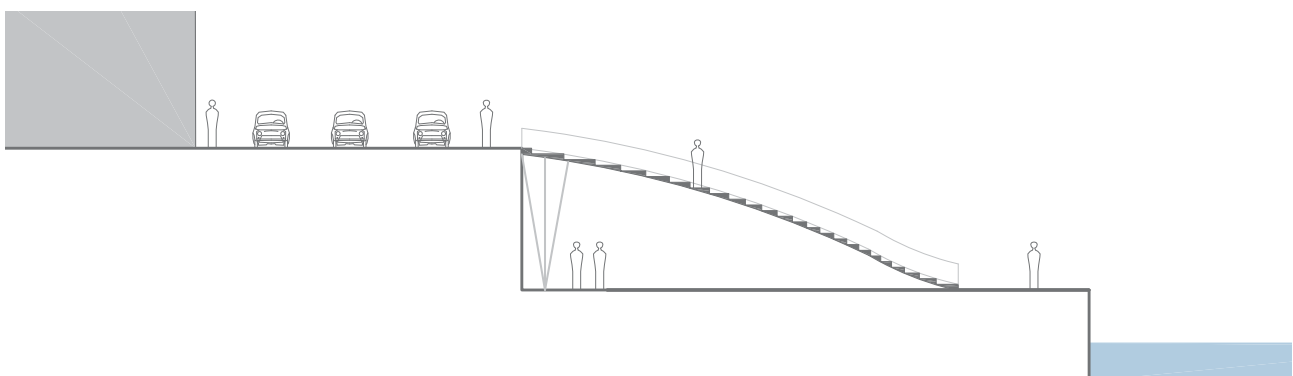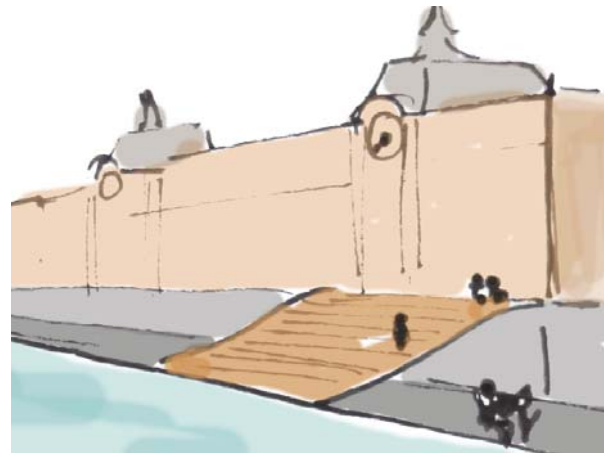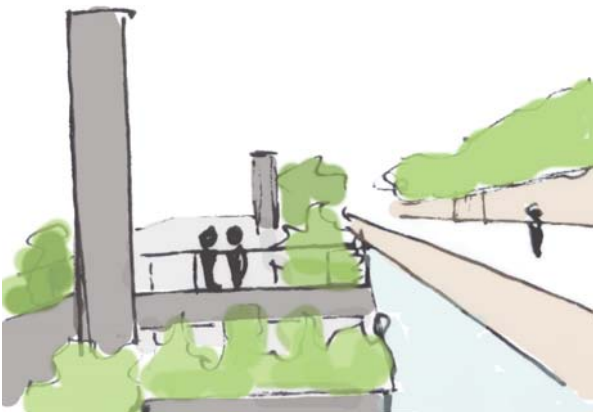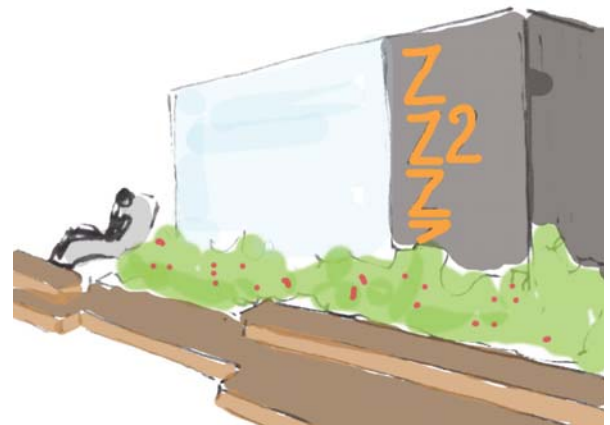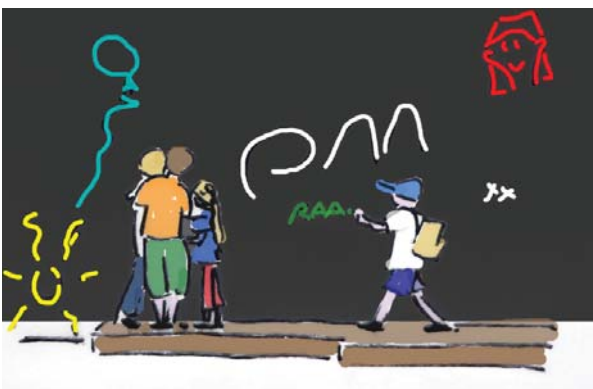Fig.16 - Climbing wall

SAN ANTONIO

A RIVER WALK FOR TOURISTS
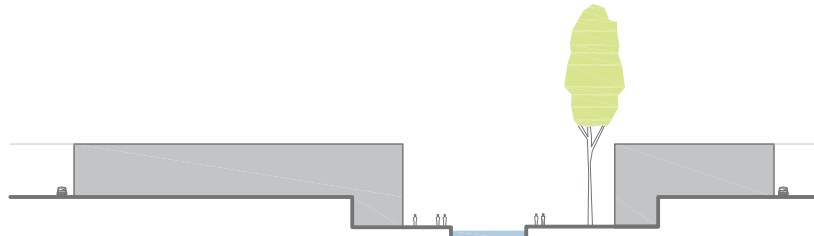
Fig.17 - Section of the river in San Antonio city centre. Scale 1:1000
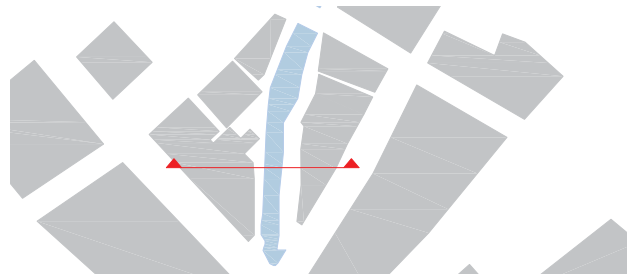
Fig.18 - Location of the section. Scale 1:2000

History of the San Antonio River

San Antonio has its sources three miles north of the city. Due to frequent floods, the government decided to stabilize the river in 1929.[1] Architect Hugman decided that this was an opportunity to do something with the river in the centre of the city (Fig.17 and Fig.18) and designed a riverwalk directly next to the river (Fig.19).

In the city centre, the river runs below street level. In 1938, the development ultimately comprised bridges and stairways that led to lower walkways (Fig.20).[2]

Hugman's redesign for the river was all the more attractive to the city because, in addition to his romantic vision, he announced a plan to close the axe-shaped bend of the river to ensure safety from future floods.

Known as the River Beautification Project, the Riverwalk was completed in March 1941[3], but during World War II and a lack of maintenance the area deteriorated and got a bad reputation.

In 1962 the San Antonio Riverwalk Commission, led by Cyrus Wagner, was established and charged with developing a new master plan.[4] The improvements and redesign of the walkway acted as a catalyst for the buiding of hotels, local shops and restaurants along the river. It revitalized the community.

Reclaiming the river, revived San Antonio's central area. Some of the buildings that were located with their back to the river in history

1,2,3 Arreola, D.D. (1995). *Urban Ethnic Landscape Identity*, p525
4 Lang, J. (2005). *Urban Design, a typology procedures and products,* p350-353
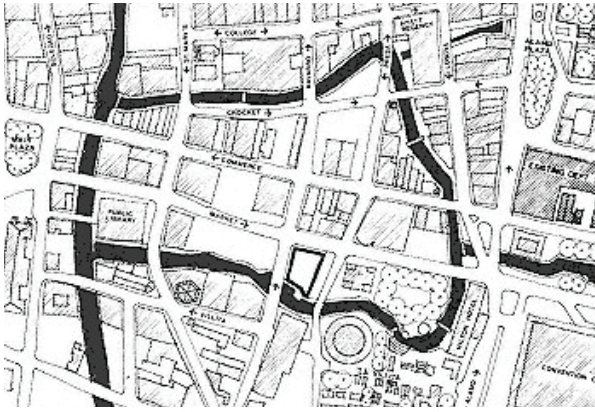
Fig.19 - The river in the centre of the city

Fig.20 - Bridges and stairways lead to the lower walkways

have now been turned around. The back of others have been tidied up. It reminds of the former status of the river. Many buildings even changed their function.

River edges

In the downtown area Hugman designed paved walks directly along the banks. The design and implementation of these walkways is an example of a consciously designed riverfront park integrated with the buildings around it.[1] It winds and loops connecting major tourist attractions.

Strategy

The varied landscape of the Riverwalk provides opportunities for people to sport, eat, shop, sightsee and celebrate, attend entertainment events, or just sit in tranquility.[2] It brings life to the city.

There is also an outdoor theatre for cultural- and small scale community events (Fig.21). It has a tribune on one side of the river and a podium on the other side of the river. The total theatre is made of stone which makes it weatherproof.

The mix of business, leisure and cultural use attract people to to the riverfront at all times of the day and week.[3] The riverwalk has proven to be a major asset to the city.[4]

1,2,3 Lang, J. (2005)., *OpCit.,* p350-353
4 (2014). *Downtown Design Guide,* p54

Tribune/ stairs

Podium
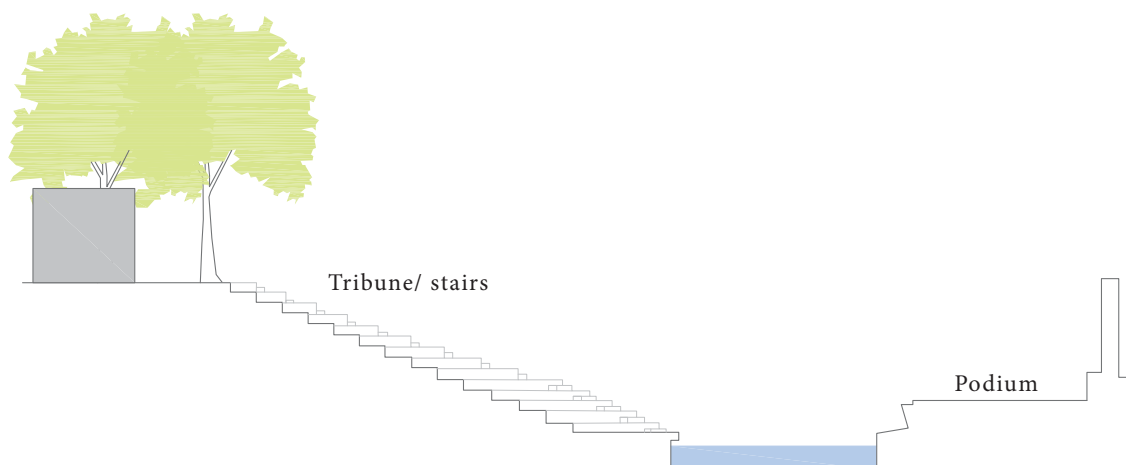
Fig.21 - Section of the Arneson River Theatre, scale 1:300

LJUBLJANICA

A STRAND OF PEARLS
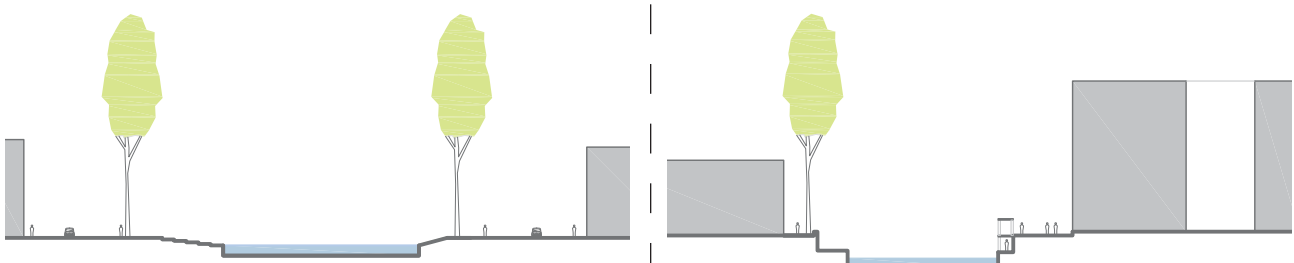
Fig.22 - Left: section outside the centre. Right: section in the centre. Scale 1:1000
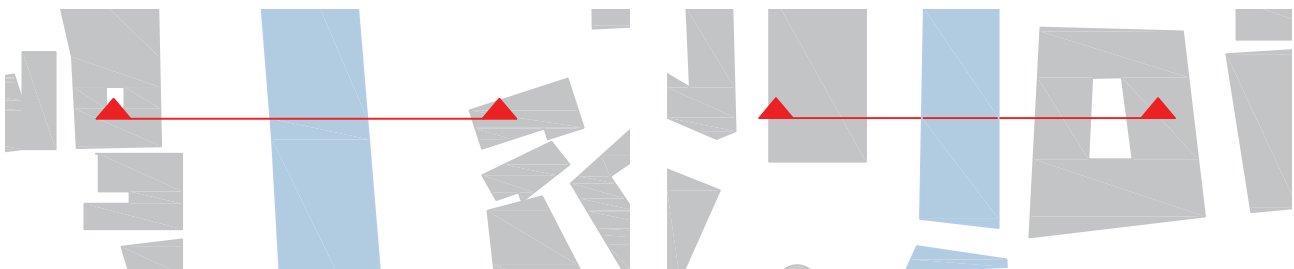
Fig.23 - Location of the sections. Scale 1:2000

History of Ljubljanica

Like in many other cities the relation between the city Ljubljanica and its river (Fig.22 and Fig.23) is complicated, as it is necessary to provide access to the water but on the other hand to prevent the city for its disastrous flooding. During the first half of the twentieth century, Jože Plečnik was unique in his approach of designing the borders of the river Ljubljanica.[1] He was identifying design strategies, like thresholds, engineered walls and soft edges, that could accommodate the inevitable cycles of flooding while redefining space around the waters' edge to provide open access for the citizens of Ljubljana.

In 1920, Plečnik began working on the riverfront with a series of bridges. The Three Bridges is the most famous.[2]

While working on these projects, the region in rural Pograd and in central Ljubljana had to deal with disastrous floods. Plečnik was asked to design the riverfront in order to prevent floods.

River edges

Plečnik's solutions for the riverfront were based on site specific edge conditions, which means that a sequence of site-appropriate vertical sections delivers the water from rural Trnovo to the centre of the city and back to the Slovenian countryside. There is a variety in these sections because every part of the river asks for other requirements (Fig.24, Fig.25 and Fig.26). Therefore he designed soft and hard edges; hard edges for locations where the river is rough, soft

1,2 O'Connor, K. (2014) www.plecnikprojects.com

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Fig.24 - Site specific edge condidtions resulted in many sections

Fig.25 - Section in rural area, scale 1:300

Fig.26 - Section in the city centre, scale 1:300

edges for locations where natural absorption is possible. While designing these edges, he took in mind that public access to the water had to be possible.

Strategy

To understand the dynamic of Plečnik's architecture, one has to follow the promenade that he created (Fig.27). Following the waterway, the pedestrian will no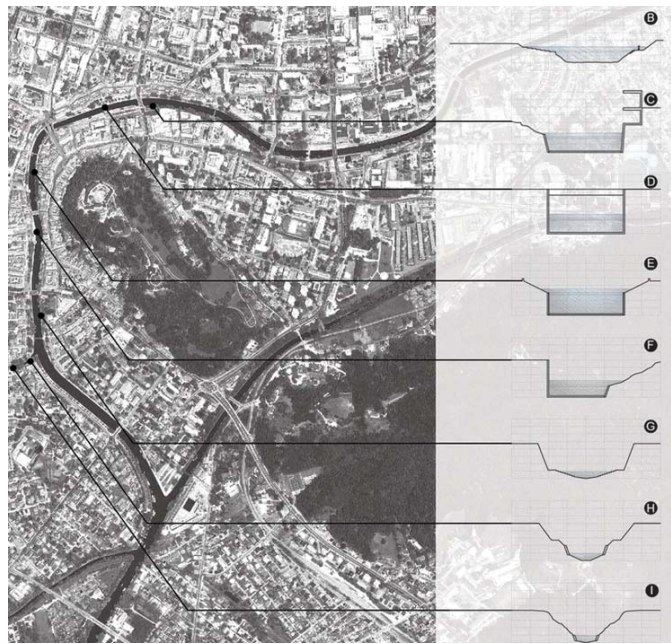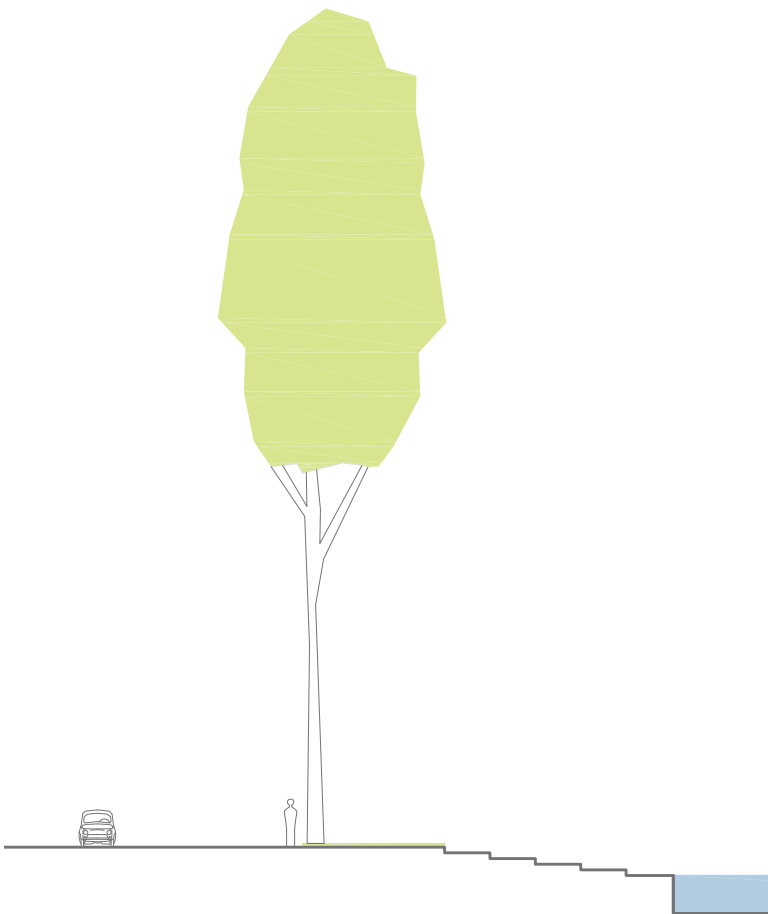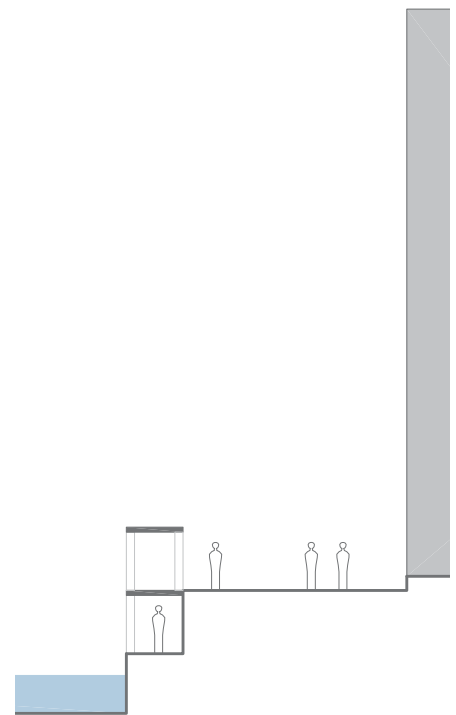tice how the river changes from a tranquil mountain between soft edges to a rough urban stream. The promenade begins at the lock. Further on the river is channelled and flows through the centre underneath the bridges where the embankments are steeper and higher. Here the pedestrian has the possibility to walk along the river on different levels.

The bridges, benches, buildings and streets around it form a total. The Three Bridges does not only span the river but also provides the possibility to descend to a lower level.

Quays provide access from the city to the countryside where the river offers a different promenade. Here the pedestrian can approach the water and sit on a bench while admiring the view and calmness.

In the centre the promenade leads to a castle where interior and exterior flow in one and another. It encourages the visitor to walk further: to experience the building, to discover openings and to admire panoramic views. The castle is part of the promenade in which also a sequence can be found.

The promenade is not a dull path that one follows forth and back in one direction to simply reach the place of interest. The promenade is based on the principle called a Strand of Pearls: points of great interest alternate with less interesting ones. The intermediate points need to be designed in such a way that one wants to continue. All these points together make the route an interesting experience.

Although the images present themselves fragmented, in the end the pedestrian has a total image of the area.

".....his objective was to allow the faculties of perception and the visual memory of the city dweller or the stroller to progressively and constantly forge their own urban vision of Ljubljana."[1]

Kerry O'Connor explains in his study Plečnik Projects: Public Experience and the Section of Water[2] that the physical character of the river embankments is adapted to the relative level of urbanity and density of adjacent neighbourhoods. He writes that in the suburban areas of Ljubljanica the river promenade takes the character of a neighbourhood park, with ease of access and a wealth of open area for leisure, exercise, and conversation, while in the city centre the embankments swell into a framework for urban life, supporting outdoor cafés and pedestrian connections.

The project follows the stream of the river which suggest that it is a linear park although it functions transversely by connecting adjacent neighbourhoods. Plečnik's sequence is an organizing element that connects neighbourhoods and functions in the cohesive urban plan of Ljubljanica.

"...Like his treatment of the water's edge, Plečnik's interventions in the city are experienced as a narrative sequence, where distances are linked by visual markers, large-scale monuments give meter to the walkable city, and widened or distinguished ground planes enrich primary corridors."[3]

1 Burkhardt F., Eveno C., Podrecca B. (1986). *Joze Plecnik Architect:1872-1957,* p186
2,3 O'Connor, K., *OpCit.*
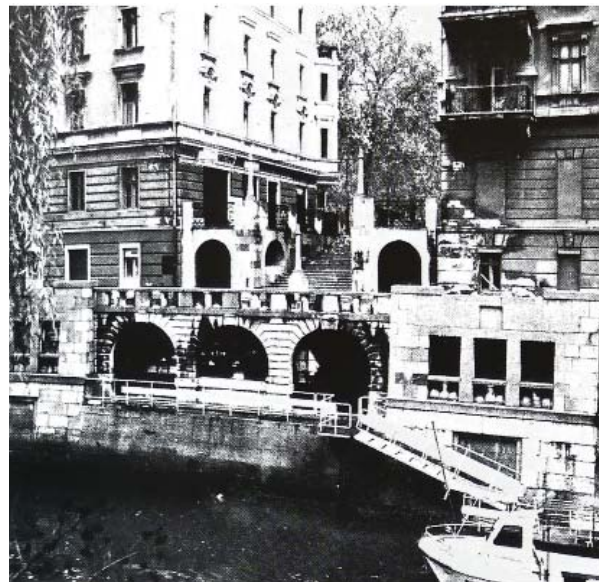
Fig.27 - A walk along the promenade

CASE-STUDY
RIVERS AND BUILDINGS

A relation between a building and a river can be realised in different ways. In history, buildings made use of their location near the water to ease transport from land to water and visa versa. An example is the Adelphi Terrace in London. Here the warehouses inside the building were connected with the quays outside. Boulevard de la République is another example with which they tried to optimise the infrastructure from land to water.

The market in Ljubljanica is also a case-study in this chapter. Here the market expresses the flow of the river and its relation to the city as a transitional city.

The intention of this chapter is to understand possible relations between buildings, infrastructure and water.

THE ADELPHI TERRACE

LONDON

Fig.28 - View on the Adelphi terrace from the water

Adelphi, a district named after the Adelphi buildings, is located between the Strand and the river Thames. The district as it can be seen today, is mostly defined by the Adam brothers: Robert, William and James, who are famous for their elegant, classically inspired constructions. They designed 24 terraced houses in this district. Its centrepiece was the Royal Terrace, later known as the Adelphi Terrace that consisted of 11 houses which were presented as a unit with central pilasters (Fig.28).

The Adam brothers saw an opportunity in the district with bad reputation and decided to make a design. In 1768 the construction of the Adelphi Terrace started.[1]

The river had to be embanked by a network of linked cave-like warehouses to keep tidal muds at bay. These warehouses were partly used as wine cellars and coal wharfs but were also used for storage. The warehouses with internal roads had to support the palatial, neoclassical residences that were situated on top of it. The plans show the network of roads that lay underneath the Adelphi Terrace (Fig.29 and Fig.30). The roads provided acces from the wharf to the warehouses in the vaults to the houses.

During the construction of the Adelphi buildings, the term "terrace" was used for the first time. It described the division of a palatial block into separate houses and refers to a terrace high above the water.

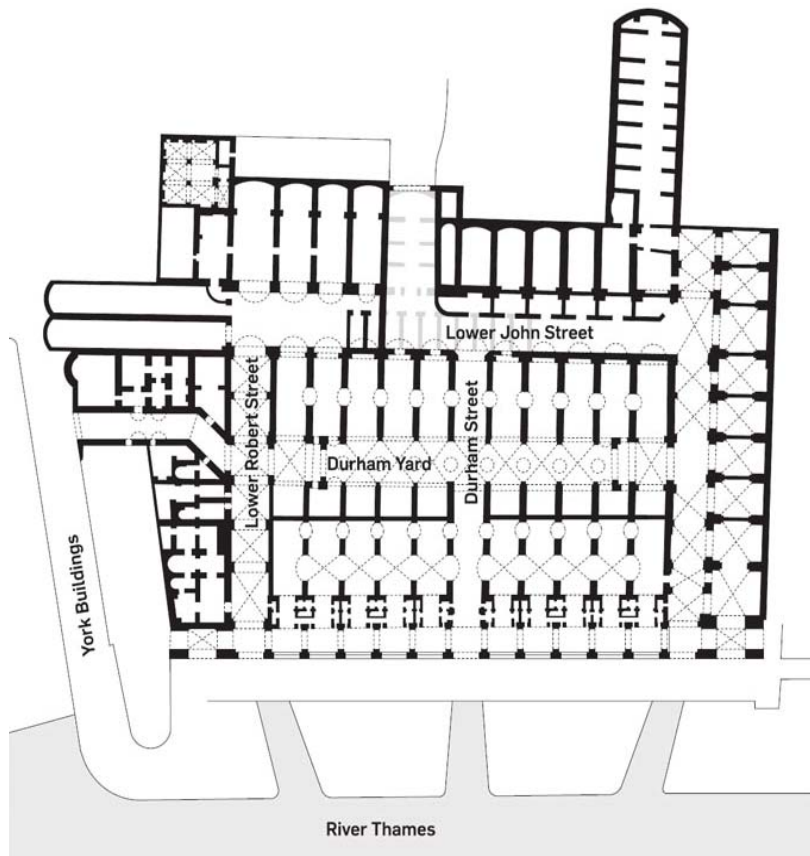1 Hibbert, C., Weinreb, B., Keay, J., Keay, J. (2010). *The London Encyclopedia,* p6-8
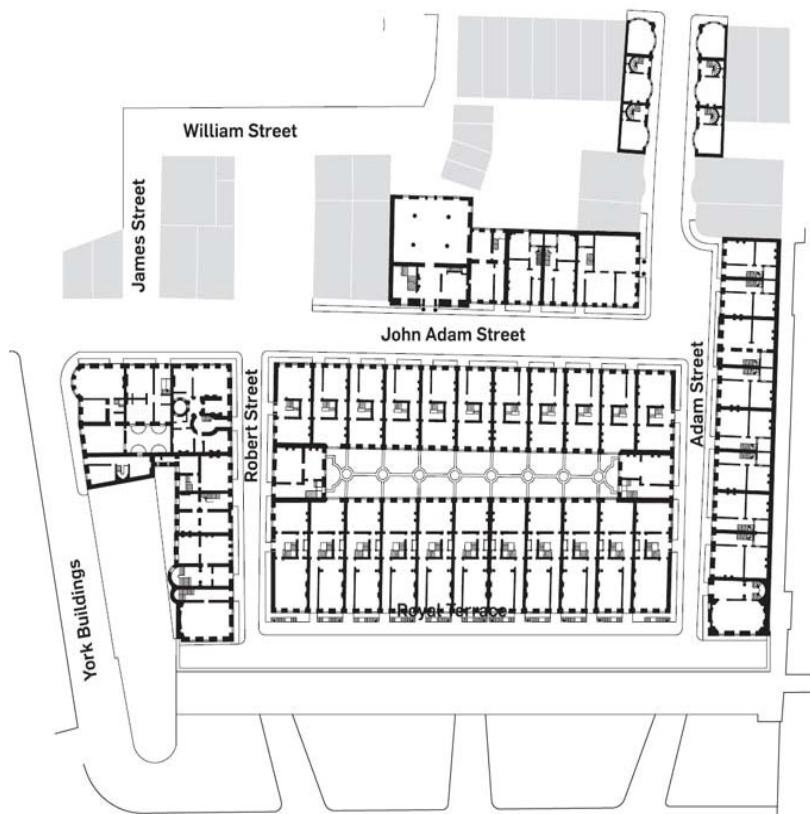
Fig.29 - Basement level

Fig.30 - Ground floor

The Adam brothers also designed a series of streets with four storey houses. Two of these storeys were cellars to house service accommodation. The houses were joined with coffee houses, a tavern and hotel.

The Adam brothers created a social structure with the Thames (in that time the power behind the economy) below and the upper class in the houses above. Fig.31 shows that the houses (black layer) were located above the wharf and warehouses (white layer). Small 'cottages' (grey layer) were built in the spaces between the houses and warehouses and were lit by the arched 'Diocletian' windows.

According to architect Tom Holbrook the brothers saw it as their role as architect to *"reclaiming land from the river and making spaces for labour and commerce right up to rooms of refinements."*[1]

Holbrook describes the building like an occupied hillside, using the slope to form this incredible section:*"It faces the busy Thames and then creates a street world that engages with the political and artistic milieu and houses that attracted a rich mix of people in society."* [2]

Until the nineteenth century many prestigious residents lived in this area, but the Victorians changed the situation.[3] Between 1864 and 1870 the Victoria embankment gardens were created in front of Adelphi Terrace, removing it of its position on the river.[4] Besides this, the Victorians changed the facades of the town houses so the

schematic unity that was designed by the Adam brothers eventually disappeared.

In 1872, The Royal terrace lost its charm when the facade was cemented and its wrought-iron balconies were removed.[5]

In the twentieth century nothing was left of the Adelphi Terrace.[6] A new plan of the government had to increase building heights in the district and had to construct two new roads but eventually the Adelphi Terrace was completely pulled down and replaced by a new Adelphi building between 1936 and 1938.[7] The new building is an Art Deco building, flanked by figural sculptures. There are still some tunnels beneath the building that are from the design of the Adam brothers.

1,2 Holbrook, T. (2010. October 29). *No title.*
3,4,5,6,7 Londonist. (2014. May 14). *The Adelphi Story*
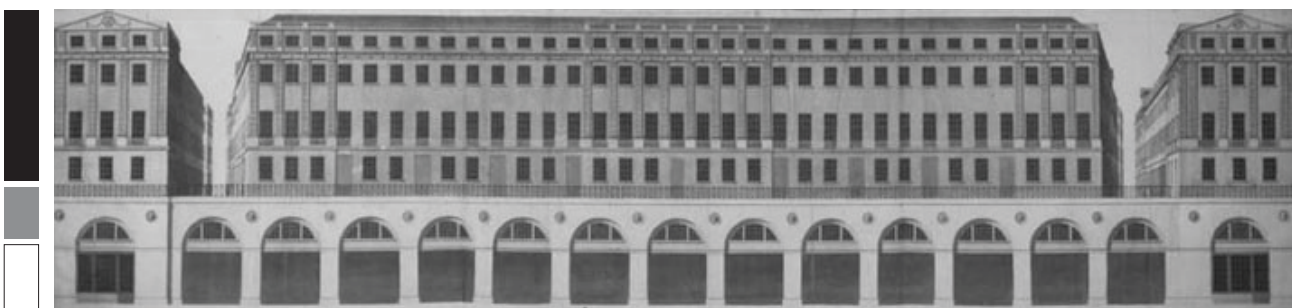
Fig.31 - Facade Adelphi Terrace

BOULEVARD DE LA RÉPUBLIQUE

ALGIERS
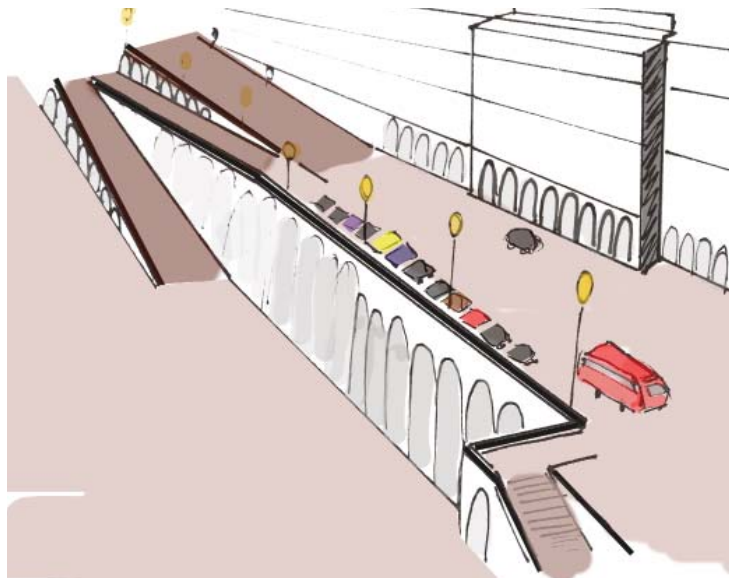
Fig.32 - Boulevard de la République

After the French invasion in Algiers, the French planners wanted to change its urban tissue and infrastructure to provide new quarters to lodge Europeans and to improve sufficient transportation.

The ancient core was left untouched due to resistance of the indigenous politicians but the lower part, called the Marine Quarter, underwent certain transformations.

The French wanted to improve infrastructure in the city because most of the streets were very narrow and there was no structure to be found. Boulevard de la République, was a significant achievement of the Napoleonic regime in Algiers (Fig.32). The first sketch for a main road on the waterfront, called Rue Militaire, was presented by

Poirel in 1837.[1] The road had to serve the harbour and had to act as a promenade as well.

In 1860 the construction began and in 1866 it was completed.[2] The road was named Boulevard de l'Impératrice.[3] It represented a high quality of engineering because it was very difficult to bridge the difference in height between the boulevard and the embankment. A series of arches, that referred to bridges and aqueducts, support the structure.

1,2 Celik, Z. (1997). *Urban forms and Colonial Confrontations: Algiers Under French Rule*, p12-57
3 Petrucciolo, A. (1985). *Environmental Design: Maghreb, from Colonialism to a New Identity. The Boulevard de l' Impératrice in Colonial Algiers (1880-1866)*

The ramp that connected the boulevard level with harbour level was another project that took eight more years to finalize (Fig.33). After this intervention, the waterfront became a symbol for the city.

The arches in the design of the boulevard and ramp were repeated on the lower level of the houses situated along the boulevard, though slightly different: white continuous high arcades of the lower level of the houses, a changing scale of the white arches supporting the ramps and more sophisticated white arcades of the boulevard.

The space behind the arches of the ramp were used for storage of goods and for selling products. The arches of the boulevard were part of arcades that protected pedestrians against the sun.

The four and five storey lined buildings that were situated along this boulevard had regular facades and were decorated with French windows and balconies. The regular facades with horizontal lines accentuated the monumentality of the composition.

After World War II a new design for the Marine Quarter was made, but the project was never fully applied.[1] The area was largely demolished but never rebuilt again.

1 Celik, Z., *OpCit.*, p12-57

Fig.33 - Boulevard de la République II

PLEČNIK'S MARKET

LJUBLJANICA

Fig.34 - Plečnik's market

Plečnik's architecture expresses the specific conditions of the location and context.[1] The design of the food market expresses the flow of the river and its relation to the city as a transitional city. The market is a large complex occupying the entire length of the bank between the Three Bridges and the Dragon Bridge (Fig.34).

In the design of the food market, Plečnik wanted to give a monumental appearance to the river, therefore he designed a straight monumental line.[2] Apart from this, Plečnik also wanted to include history of the location in the design since he had an overall discipline by transforming historical references into a new structure. His work was full of historical elements.

In the design of the market, Plečnik wanted to refer to the former Medieval city walls which ran close to the water.[3]

On one of the first images of the city centre of Ljubljanica, one can see that city walls enclosed the old town (Fig.35). In the longitudinal volume of Plečnik's market and in the round volume of the circular staircase the Medieval walls and tower are noticeable.

Another aim of Plečnick was to show the importance of Ljubljanica as a centre for political,

1 Lampugnani, V.M. (2007). *Betweeen spaial concept and architectural expression of Plecnik's market in Ljubljana,* p13
2 *Ibid.,* p20
3 *Ibid.,* p22

religious, intellectual and artistic culture in his design.[1] The monumentality in the design is implemented in the role of the market as a manner of structuring the city which will be explained in the paragraph "The market hall and the Three Bridges".

The design

The market consists of a variety of shapes. It is not a single volume but a conglomeration of volumes (Fig.37). It suggests the complexity and richness of a small village.

The beginning of the market near the Three Bridges is marked by the independent volume of a flower shop with a classical open porch (Fig.36). On the other side of the river, there is a similar tobacco shop. The flower shop refers to Laugier's prototype of the first cottage. It is an abstraction of functional and rational architectural principles. An abstraction of principles could be noticed in more designs of Plečnik.

The market itself consists of two stories, a rusticated basement below and a smooth stucco

1 Lampugnani, V.M., *OpCit.,* p27

Fig.35 - City walls enclose the old town of Ljubljanica
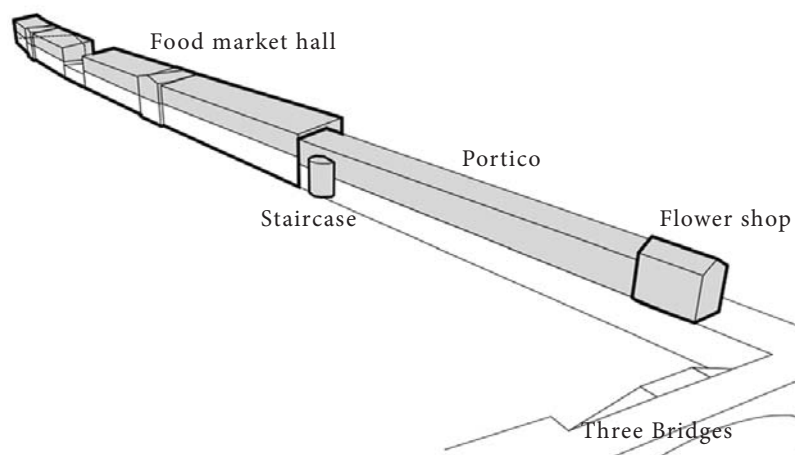

Fig.36 - Flower shop

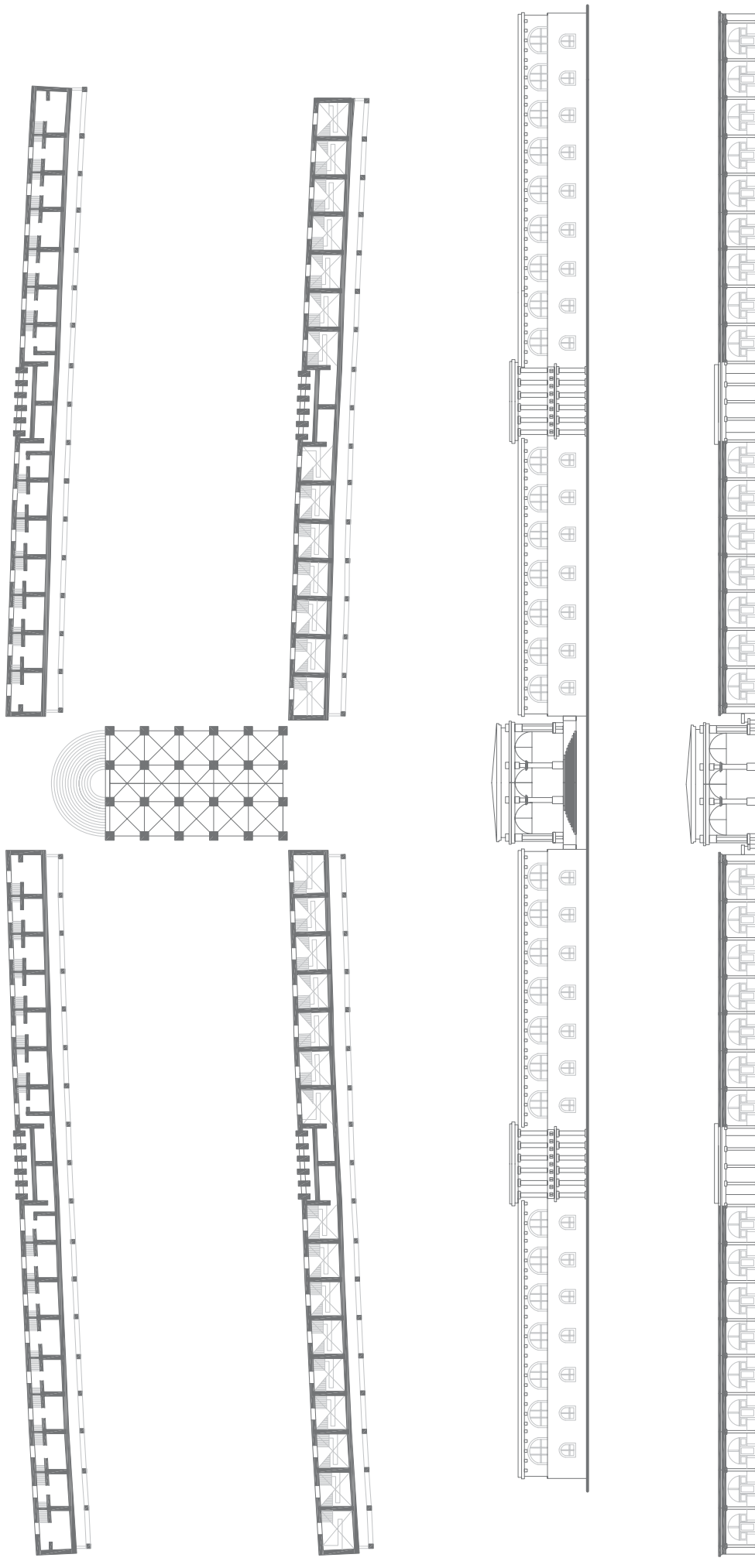Fig.37 - Conglomeration of volumes

Fig.38 - Food market hall, scale 1:300

story with arched windows on top (Fig.38 and Fig.39). The upper story is interrupted by two loggias. The connection of the two different levels is provided by a circular staircase in the round volume on the juncture of the portico and market hall.

Moving along the market Plečnik wanted to provide the passant a sequence of experiences by overlapping perspectives, changing light, sound and smell.[1] The play between open and closed areas, created by the arches, is a game between the passant and the world.

The slightly curved, massive block is interrupted by a two-storey temple facade providing a view from the river to the market and vise versa. The motif of the long composition of the butchers' market with its open loggia in the middle is repeated once more and is connected with the Dragon Bridge via a small building. The mass of the food market with open gallery and the flower shop has a clear monumental line.

The rooms in the food market consist of identical spatial units. Each chamber could be an independent shop, because it has its own entrance. In a straight line leading from the door, a window offers a view to the river. The facade

located to the water reveals the inner structure of the building, which is emphasized by a colonnade on the side that faces the market.

The market hall and the Three Bridges

The design of the market combined with the Three Bridges links the market, the city hall and the old Medieval city with Preseren Square and the nineteenth century commercial sector of the city. This manner of structuring the city brings monumentality in the design.

Plečnik connected the original Three Bridges with the food market via the large, open portico that ends in the flower shop just before the bridge starts.
The connection of the lower and upper level of the market is provided by an acces from the Three Bridges (Fig.40).

Plečnik's bridges are relative wide according to their length, because he wanted to let them function as an urban plaza.[2] The bridges were there to claim some area in the density of the city, to provide space for commerce, promenade and performance.

1 Lampugnani, V.M., *OpCit.,* p29
2 O'Connor, K., *OpCit.*

Fig.39 - Section of the food market hall, scale 1:300

Fig.40 - Three Bridges

CASE-STUDY
RIVERS AND ART

Art could play a role in experiencing the riverfront. Sometimes it can even create transformations in the urban tissue. Besides its role in experiencing the water, the examples draws attention to the water.

In this chapter, examples will be mentioned in which art plays a role in the experience of the river.

The intention of this chapter is to understand different possible relations between art and water.
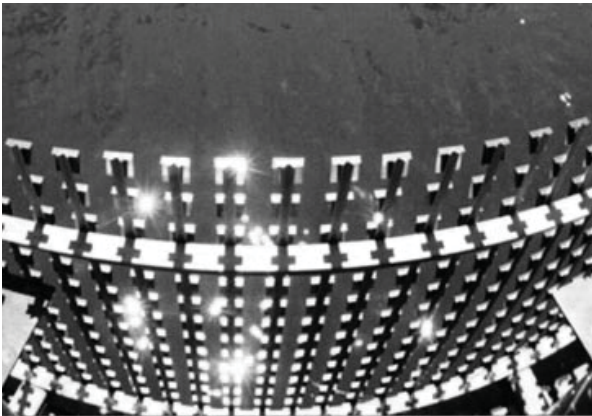
Fig.41 - Encircled stream

Fig.42 - Wave Oculus

Fig.43 - Danube Bycicle

Encircled stream (1995)[1]
Ned Kahn, Washington

The fountain, the Encircled Stream (Fig.41), refers to the massive floods with which eastern Washington had to deal in history. A large whirlpool rhythmically fills and drains every few minutes. It suggests the countless cycles of floods. The water streams in the basin, creating a vortex. After a few minutes, the water shuts off and the vortex becomes calmer and as smooth as glass.
The fountain is encircled by a series of spiral-shaped granite benches that invite people to sit and observe while getting to know something about the history of the place.

Wave Oculus (2006)[2]
Ned Kahn, Union Point Pier, Oakland

Ned Kahn designed a circular pier that is covered with thousands of small stainless steel mirrors (Fig.42). These mirrors are angled down in order to reflect snapshots of the surface of the river.

Danube Bicycle[3]
Zoltan Kecskemeti, Budapest

The Danube Bycilce is a kinetic sculpture (Fig.43). The flow of the water moves the wheels of the bicycle, which moves the legs of the rider, getting the sculpture into motion.

Project Tevereterno (2005-now)[4]
Low level quay in Rome city centre

Project Tevereterno was founded with the belief that art can be a powerful element for urban transformation. The founders of the project have the vision of creating a vital place from the Tiber and its low level quays in the heart of the city. Piazza Tevere is the liveliest public space in the project and a large public space for contemporary art on Rome's urban riverfront in order to revive the river area. The piazza is an

1,2 www.nedkahn.com
3 www.designboom.com
4 www.tevereterno.it

imageable piazza; it is the unused space on the low level quays between Ponte Sisto and Ponte Mazzini (Fig.44). With the piazza the founders tried to refer to history, because the piazza is in size and proportion equal to the ancient Circus Maximus. Witht Project Tevereterno the founders try to celebrate the site.

Project Tevereterno works in collaboration with local institutions and governmental agencies, in order to create a public gathering space. The founders want to create a podium for art, beyond the traditional museum, galleries and concert halls; they want to create a piazza for the Tiber. Tevereterno is recognized by UNESCO's Managament Plan for the City of Rome as an exemplary project and acknowledged as critical to the dynamic renewal of Rome's river.

Since 2005, Tevereterno produced several events, drawing thousands of people to the river. An example is the project of artist and narrator, William Kentridge. He started project Triumph and Laments, a project for Rome in collaboration with Tevereterno. Triumph and Laments is a piece of art, with a length of 500 meter, obtained by the biological patina on the embankment. The artwork shows a sort of silhouetted procession of Rome's greatest victories and defeats from history till present (Fig.45 and Fig.46).
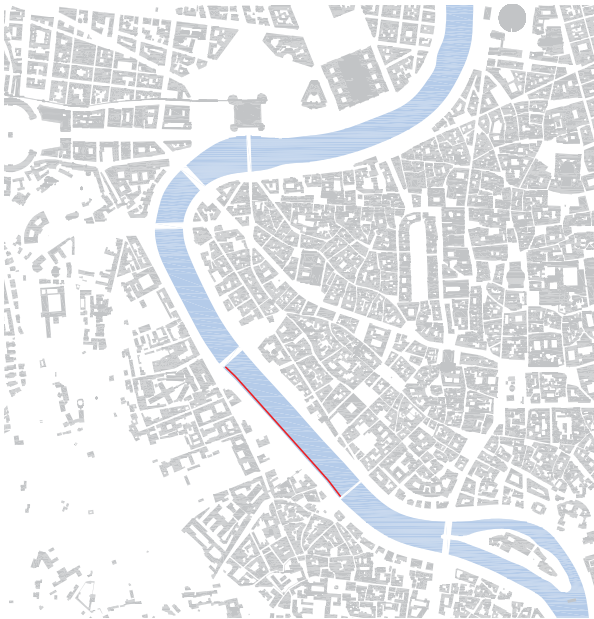

Fig.44 - Location of Tevereterno

Fig.45 - Triumph and Laments

Fig.46 - Triumph and Laments II

CONCLUSION

Rivers and cities

The cities that are used as case-studies provide in spaces that enable people to experience the river area. Accessibility to the river is a recurrent focus point in all four case-studies.

A few years ago in Paris, a new project started that has the aim to give the quays along the Seine back to pedestrians. Like the Tiber in Rome, the Seine also has a changing water level which has to be dealt with. Water-resistant designs like terraces in old sea containers, a waterproof climbing wall and blackboards for infants were solutions to this problem.
Another manner of coping with the changing water level is to create easy movable designs or designs that could adapt to the water level. Examples like floating elements, removable stairs and cafés can be found along the Seine.

San Antonio enables people to experience the river area by its Riverwalk. Bridges and stairways invite people to enter the lower walkways in the centre. A program that focuses on business, leisure and culture attracts people to the place at all times. The activities along the river revived the river area and improved quality of the urban space.

In Ljubljanica, Plečnik designed a Strand of Pearls. It resulted in a promenade along the river that is not a dull path but a chain consisting of points of great interest that alternate with less interested points in such a way that one wants to continue. All the points together make the route an interesting experience. The designs were based on site specific edge conditions, resulting in a variety of sections.

Rivers and buildings

The example of the Adelphi Terrace shows how a building on boulevard level can connect with the low level quays. The Adman brothers created a structure that connected the Thames and its cave-like warehouses below, to the levels above by a network of internal roads that went underneath the boulevard.

Boulevard de la République is another example that used the space underneath the boulevard. Here it was used for storage and selling of goods. The boulevard itself was an impressive piece of infrastructure that connected the upper quays with the low level quays via ramps in order to transport goods from boats to the low level quays and upper level.

Plečnik's market is an example that creates a connection between the river and boulevard level by designing a building that has its lower story on the height of the water and its upper story on the height of the boulevard. The stories are connected by internal stairs.

Rivers and art

Art plays a role in experiencing the waterfront. It can draw attention to the river or it could help in the experience of the water.

Accessibilty to the river

The Steps, mentioned in the case-study of Paris, but also the stairs of Plečnik in Ljubljanica and the stairs in San Antonio, are examples of stairs that invite people to descend (Fig.47). The width of the stairs plays an important role. The small stairs in Rome do not invite people to descend while the wide stairs in the case-studies do invite.

Also the direction of the stairs plays a role. The stairs in the case-studies are orientated perpendicular to the river, so the focus is on the river. This is not the same as in Rome, where the stairs are parallel to the river and quays (Fig.48).

The height and the depth of the treads have their impact on the role of the stairs. Creating a steep

tread indicates that the stairs is meant as path while a gentle slope and deep treads indicate that the stairs is meant to experience. In the last case the stairs is not only a path but also a place to stay, sit and enjoy. The Three Bridges of Plečnik shows the same result although this is not a stairs but a bridge. Due to the width of the bridge, it is not only a space to pass but also a space to use for commerce and performance.

Stairs with platforms also emphasize this idea (Fig.49).

Responding to the river

The concept drawings on the next pages (Fig.50 and Fig.51) are examples of possibilites to better connect the river with the surroundings. They are extracted out of the case-studies. The solutions are adapted to the scale and situation of the Tiber and its embankment.
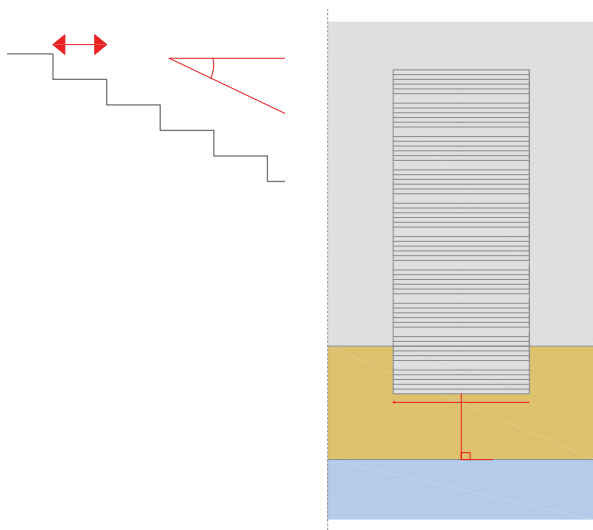
Fig.47 - A plan and section show a stairs that invites to descend

Fig.48 - A plan and section show the stairs in the current situation in Rome
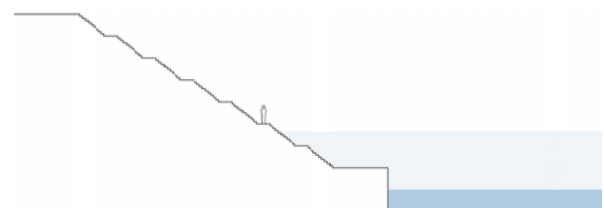
Fig.49 - Stairs with platforms
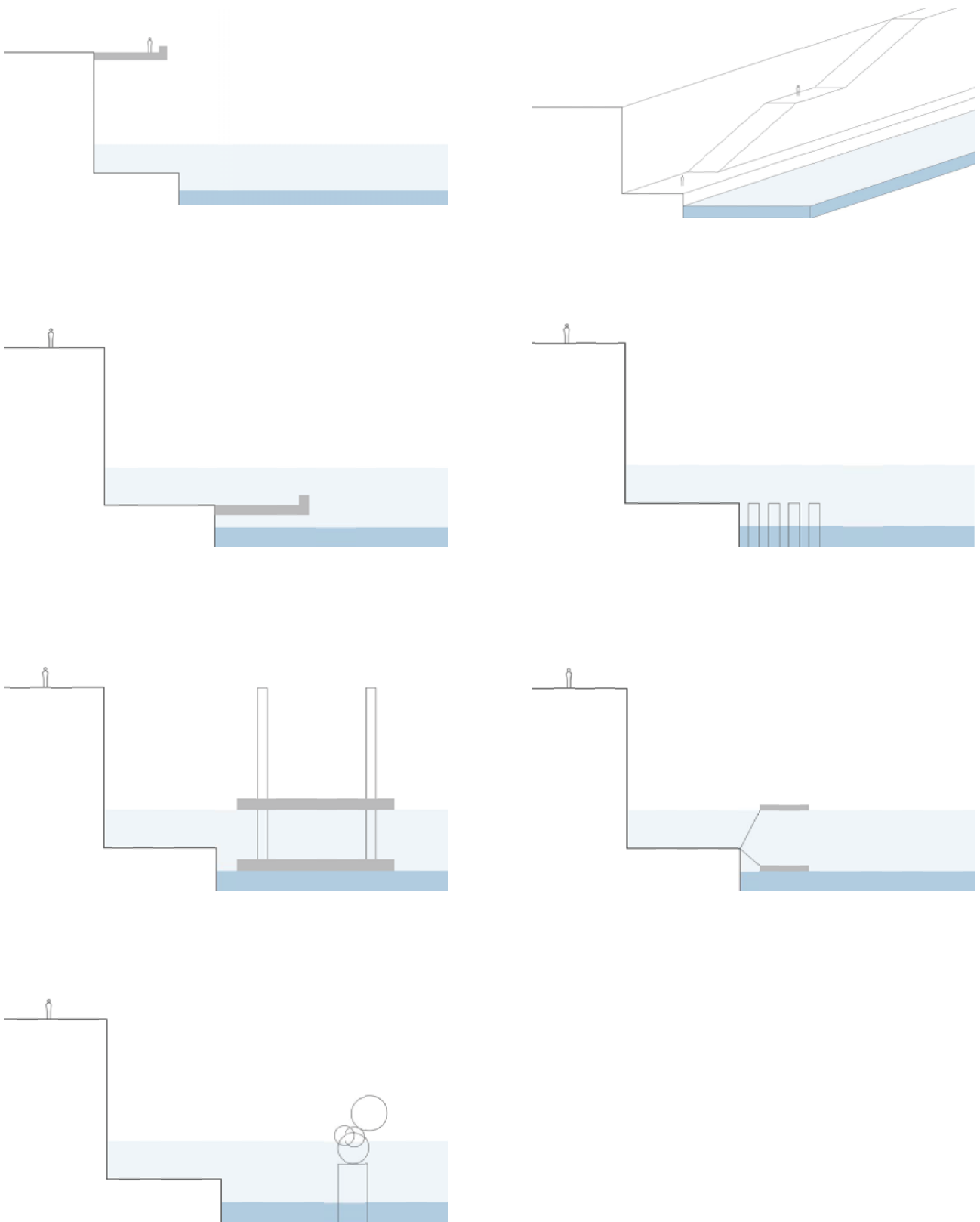
Fig.50 - Responding to the river
From the top down, from left to right:
1. Hanging element on boulevard level; 2. Ramp to descend to the low level quay; 3. Hanging element on the low level quay; 4. Stepping stones; 5. Floating element anchored in the river; 6. Floating element attached to the quay; 7. Water and art.
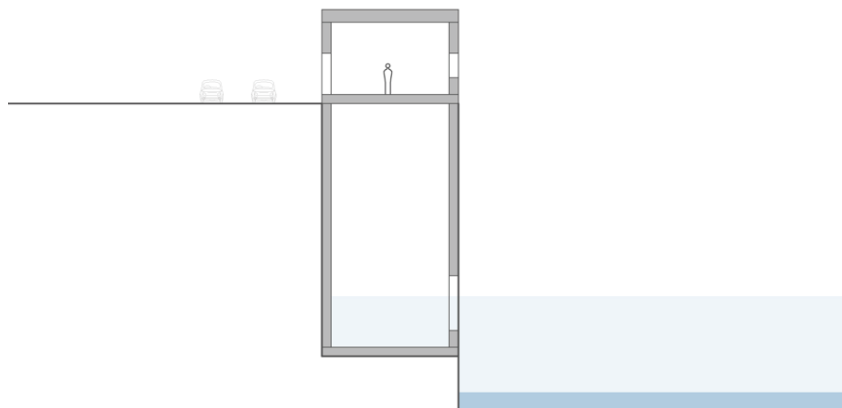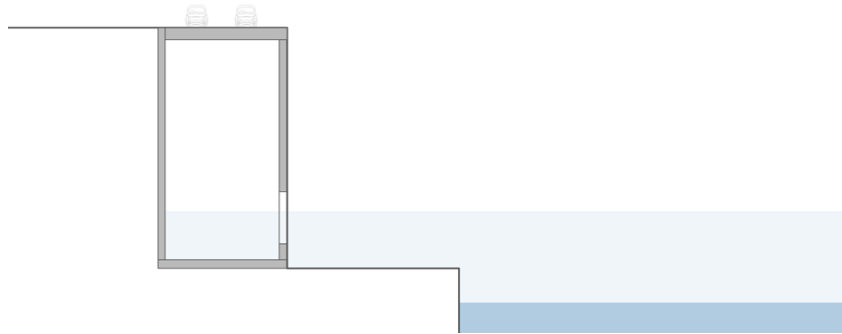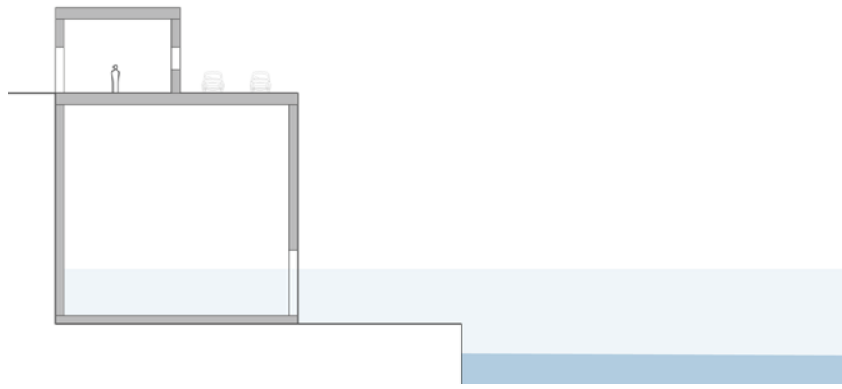
Fig.51 - Responding to the river II
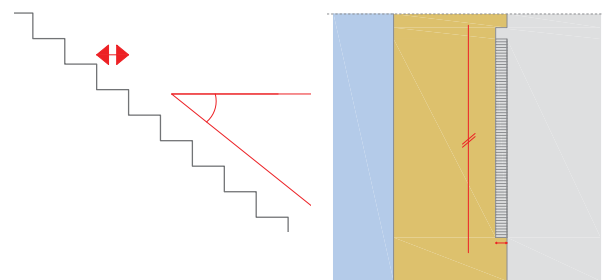From the top down:
1. A connection between the building and low level quay under the boulevard (principle of Adelphi Terrace);
2. Area for storage under the boulevard (principle of Boulevard de la République);
3. A building connects with street level and water level (principle of Plečnik's market).

THE TIBER IN ITS CONTEXT

THE TIBER IN HISTORICAL CONTEXT

What were the functions of the Tiber in history? And what did the Tiber mean for the city? These questions will be answered in the chapter "The Tiber in historical context".

Besides a study to the functional use of the Tiber, the influence of the Tiber to its direct urban context will also be studied. How did the urban tissue respond to the river? And how did this change over time? How were the buildings along the Tiber orientated?

The intention is to better understand the different roles of the Tiber in history.

THE HISTORY OF THE TIBER

FUNCTIONAL USE OF THE RIVER IN HISTORY

Fig.52 - The She-Wolf with Romulus and Remus

Rome's true mother

The history of Rome, situated at the Tiber, started with the myth of the She-Wolf who rescued the twin brothers Romulus and Remus from drowning after they were thrown in the Tiber (Fig.52).[1] The She-Wolf took them under her wing and suckled them. When the brothers were in good shape again, Romulus killed Remus and became the founding father of the Republic Rome. The She-Wolf is still seen as Rome's true mother; feminine yet virile.

The Tiber is a 400 kilometer long river from the Apenine Mountains to the Tyrrhenian Sea. Some ancient writers write that the original name of the

river was Albula and eventually became Tiberis after Tiberinus. The name refers to the king of Alba Longa who drowned in the river. Alba refers to the white colour of the river, caused by sediment that is the source of its creamy appearance.

The Tiber as the main road of Rome

The Tiber provided industry and livelihood throughout centuries. Tiber historian Maria Margarita Segarra Lagunes argues that the river was Rome's most important economic, environmental, ecological and recreational

1 Jones, K. B. (2009. February). *Rome's uncertain Tiberscape: Tevereterno and the urban commons,* p3

resource.[1] Construction materials, wheat, olive oil, Egyptian spoils of conquest and other products were transported downstream to Rome from Tuscany and Umbria or upstream from the sea. Shipping ports lined Rome's riverside quay. Boats coming from the sea arrived in ancient warehouses in the south of the city while boats coming from the north arrived at the important river quay of Porta di Ripetta (Fig.53). There was a clear distinction between northern and southern transport over the river because boats that came from sea were unable to navigate beyond Tiber Island.

In Ancient Rome, the river facilitated military defence besides commercial traffic. Navalia was a military harbour that contained large arsenals for ships.[2] The harbour was a place to repair ships. It was located directly along the bank of the Tiber. Navalia is only visible on maps of Ancient Rome. After this period the harbour dissapeared.

Sewer of the city

The river functioned also as part of Rome's sewer. Ancient Roman's developed a sewer system that ended into the river at the south of Tiber Island. A gaping mouth is still visible, although it has no function anymore. The river was also connected with an underground network of tunnels and other channels, to bring its water into the middle of the city.

The river as city's lifeblood

During Medieval age the city shrank. In 476, the aqueducts had been destroyed which meant that the hill sites were without water.[3] They became deserted and ultimately were avoided. The settled area was now on lower land, the Tiber became even more city's lifeblood than it was before.[4] People settled in a cramped area along the river. The Tiber was a source for bathing, water and fish, although it was still subject to floods. Fishing was even so good that popes charged fishermen

for their hauls. The river was also a source for generating power. Floating mills were located on places where the river was smaller and the water flow stronger. It provided power for industry.

Toll boats were crossing the river for transport because the amount of bridges was not capable to process all traffic. Over time it became more difficult to facilitate transport over water. The water flow was discontinuous and sedimentation resulted in shallow depths. Between the 17th and 19th century, popes tried to improve navigability of the river but none of the interventions improved the situation. Eventually transport over the river stopped.

The downside of the river

Although the river was useful, it was also a source of destruction. Throughout the whole city numerous buildings still have flood markers on their facade that point the height of the water during historical and more recent floods.[5]Despite its floods people did not leave the area. Like in Medieval Age the contrary was happening. The positive aspects won from the negative aspects although building near the river was a challenge. The ground was soft and many times the foundations had to be made in the bed of the Tiber.

After Italy was unified in 1870, the Christmas flood ravaged the entire city.[6] This time the king of Italy went into action, and the construction of a fourteen meter high wall started, aligned with a tree-lined avenue on both sides of the embankment. The construction was finished in 1926.[7] Since then, the river was detached from the city and its relation had been changed forever.

1 Jones, K. B., *OpCit.*, p5
2 Heinzelmann, M., Martin, A. (2002). *River port, navalia and harbour temple at Ostia, new results of a DAI-AAR Project.*
3,4 Grundmann, S. (1998). *The architecture of Rome: an architectural history*
5 (2010. November 17). *Rome Under Water*
6,7 Bencivenga, M. (Date unknown). *Alluvioni in Italia: Eventi storici e gestione del territorio*

Fig.53 - Il porto di Ripetta by GasparVan Wittel (1653-1736)

THE TIBER IN THE URBAN TISSUE

Ancient Rome

Information about the urban fabric in Ancient Rome is difficult to find. Maps from that period only show the most important buildings and Aurelian Walls but residential buildings are not visible on these maps (Fig.54).

Written sources explain that the western side of the Tiber was not inhabited.[1] The eastern side of the Tiber, that is part of the studied area, was called Campus Martius in Ancient Rome. It was a large, flat and vast area with almost no buildings because it was part of a floodplain and subject to frequent inundations.

The Aurelian Walls (Fig.54: the grey line that follows the Tiber) formed a clear border between the Tiber and the city starting from harbour Navalia up to the north side of the city. There where Navalia was situated, the walls did a step back in order to create space for the facilities of the harbour.[2] On the south side of Navalia, the walls crossed the Tiber to the west.

Besides Navalia also Castel Sant' Angelo and the Tarentum were situated along the Tiber. The Tarentum was a religious precinct and field for equestrian exercise. The origin of the Tarentum starts with the story around Valerius Maximus.[3] One of his children who had been attacked by a plaque raging at that time in Rome, became healthy again by drinking water gained from a source on Campus Martius, called Tarentum. Afterwards, Valerius, offered sacrifices to Dis and Proserpina to whom the recovery of his child was supposed to be owing.

The archaeological survey of the area shows that the Tarentum had no buildings. Religious feasts were celebrated on this location. The Secular Game was such a roman religious feast. It involved sacrifices to the gods of the underworld and theatrical performances. Dis Pater was one of the Roman gods of the underworld. On the Tarentum there was a shrine to honour this God.

Medieval Age

There are no maps from Medieval Rome that clearly show the structure of the urban tissue. Mapmakers from this period only made maps with bird views. With these maps they did not try to present the reality but they tried to give an impression of how the city looked like. Therefore this period will not be analysed.

Sixteenth untill the eighteenth century

The first remarkable change is the disappearance of the Aurelian Wall (Fig.55).

Buildings were located slightly landwards instead of directly next to the river because the riverbed was difficult for construction (Fig.56). Besides this, inhabitants of the city could deal with small changes in water level. However the small line of empty land was not enough to prevent the people from the many floods which ravaged the city.

The empty land formed a rough edge where boats were able to get closer to land.

1 Grundmann, S., *OpCit.*
2 (Map) Tav. 117, Pianta LVII, G. Lugli (1939). *Roma antica*
3 Anthon, C. (1846). *A dictionary of Greek and Roman antiquities,* p180

Castel Sant' Angelo

Tarentum

Harbour Navalia

N

Fig.54 - Situation in Ancient Rome (275 AD). Scale 1:10 000

Fig.55 - Situation in the eighteenth century. Scale 1:10 000

Fig.56 - A strip of empty land between the buildings and the river

Fig.57 - Buildings that are founded on the river bed

There were also places where the buildings were constructed in the river (Fig.57). These buildings seem to have located their back towards the Tiber. There was no relation between the Tiber and the buildings. The river was only seen as useful element for transportation.

The map of the eigtheenth century shows that the western side of the river is not as fully built as the eastern side already is in that period. The western side was characterized as a suburban area, dedicated to relaxation, to 'otia'. The eastern side was part of the urban area; it was part of the economical and commercial heart of Rome. Therefore, it was dedicated to 'negotia'. The Tiber formed the border between both areas.[1]

After the embankment

After the construction of the embankment, the river was even more detached from the city as ever before. Since the functional element of the river was gone already, the river was only seen as point of disaster because of its many floods. Due to the construction of the embankment it became a harmless, peaceful water. The threat of the water was gone.

In the next chapters, the effect of the embankment to the context will be mentioned in more detail. It shows that the embankment and trees on both side of the river form a tall wall, effectively separating the water from the city. The one-way traffic along the boulevard is another barrier.

The situation before (Fig.55) and after (Fig.58) the embankment shows that some buildings had to be demolished in order to accomplish the intervention. Comparing a map of the current situation of Rome with the map of Ancient Rome, one can see that Castel Sant' Angelo is the only important building of its time that is still present in the current situation.

Like other buildings, Castel Sant' Angelo

underwent transformations in order to deal with the intervention of the embankment and boulevards.

1 Pratesi, L. (1989). *Via Giulia*

Fig.58 - Situation after the embankment till 2015. Scale 1:10 000

THE TIBER IN THE IMAGE OF THE CURRENT CITY

What does the Tiber mean for the city? And what does the Tiber mean for its direct urban context? Although the Tiber does not have a direct visible function in the current situation, it plays an essential role in the image of the city.

According to Kevin Lynch, the Tiber could be seen as a landmark on the scale of the city.[1] On a smaller scale it could be interpreted as an edge that borders areas and districts.

Both questions, mentioned above, are on different scale level but equally important. The imageable city plays a role in the answer to both questions. Landmarks, paths, edges, nodes and districts are elements that help to define the image of the city.

1 Lynch, K.(1960). *The image of the city*

IMAGEABILITY

THE NEED TO RECOGNIZE SURROUNDINGS AND TO FIND PATTERNS

People and their activities are an important element in the city. They are not only observers of the city but they are living the city; they are part of the city. Their characteristics should be taken into account when designing or changing parts of the environment.

The necessity of a recognizable environment

The need to recognize our surroundings and the ability to find patterns has been a crucial element since the existence of the first human being. Structuring and identifying the environment is not only important for human beings but it is also an important ability among all animals.

It is of both practical and emotional importance. It is practical in a way that a human always need to find escape routes in cases of jeopardy. Besides this it is important to find the way back, for example to your own house.

When one has the feeling of recognizing the environment, it gives a sense of control and with that a sense of rest. This is of emotional importance in order to create a more relaxed and stress-free atmosphere.

"*Although clarity or legibility is by no means the only important property of a beautiful city, it is of special importance when considering environments at the urban scale of size, time, and complexity. To understand this, we must consider not just the city as a thing in itself, but the city being perceived by its inhabitants*".[1]

A distinctive and legible environment offers more than only security.[2] It heightens potential

depth, improves emotional satisfaction and provides a better framework for communication and organization. It also intensifies human experience. A certain regular action could get a different meaning if it is carried out in a recognizable situation instead of a disordered situation. The human experience will be more intense in the first scenario.

Analysing and designing a highly imageable city

When changing an environment, imageablity should be taken into account. This imageablity should be extended and strengthened. In this way, a city could be readable over time. Continuity will be preserved while parts of the city get better interconnected.

"*The perceptive and familiar observer could absorb new sensuous impacts without disruption of his basic image, and each new impact would touch upon many previous elements*".[3]

Facilitating identification and also structuring plays a key role in imageablity. Creating clear structures are important on every scale. Lynch makes use of elements in the process of making those firm and clear structures.[4] The elements are: paths, edges, districts, landmarks and nodes.

"*A frequent problem is the sensitive reshaping of an already existing environment: discovering and preserving its strong images, solving its perceptual*

1 Lynch, K., *OpCit.*, p3
2 *Ibid.*
3 *Ibid.*, p10
4 *Ibid.*

difficulties, and, above all, drawing out the structure and identity latent in the confusion".[1]

Memory also plays a role in the common image. The collective memory has to be found. The current situation is a place where people still could feel history. These historical memories are associated with places and contribute to the cities identity and image.

Before being able to implement or strengthen structures, the current situation should be analysed. A public image should be formed. The difficulty in here is that people who live in a city have all different backgrounds. Each observer of the city makes his own image of the city. In order to take all these images into account, a public image should be created. This is an image which combines the common elements of every individual image.

This chapter, "The Tiber in the image of the current city", shows a common image of the city in the current situation. This common image is not the result of a collection of personal images from different people. In order to obtain a sort of common image, the role of different people is assumed in order to presume their perception.

1 Lynch, K., *OpCit.,* p115

LANDMARKS

Fig.59 - Landmark Castel Sant' Angelo

The studied area contains, like Rome in general, many landmarks (Fig.60). A landmark is an element that stands out in relation to the rest of the environment due to variable possibilities. For example its form, its spatial prominence or its relation with history and certain events. The contrast of the element with the background seems to be the principle factor.[1]

Landmarks are related to a certain scale level. One should notice that landmarks for a city could be landmarks for a district but not the other way around.

Landmarks on city level

In the area that has been studied, five landmarks could be seen as landmarks for the city.

The Tiber is an important landmark for the city. Spatial prominence is established by making the element visible from many locations and by its contrast with nearby elements. Besides that, the Tiber is in the memories of many people since it brought many floods in history. The generation of today was not involved but even they will know of its disasters by stories.
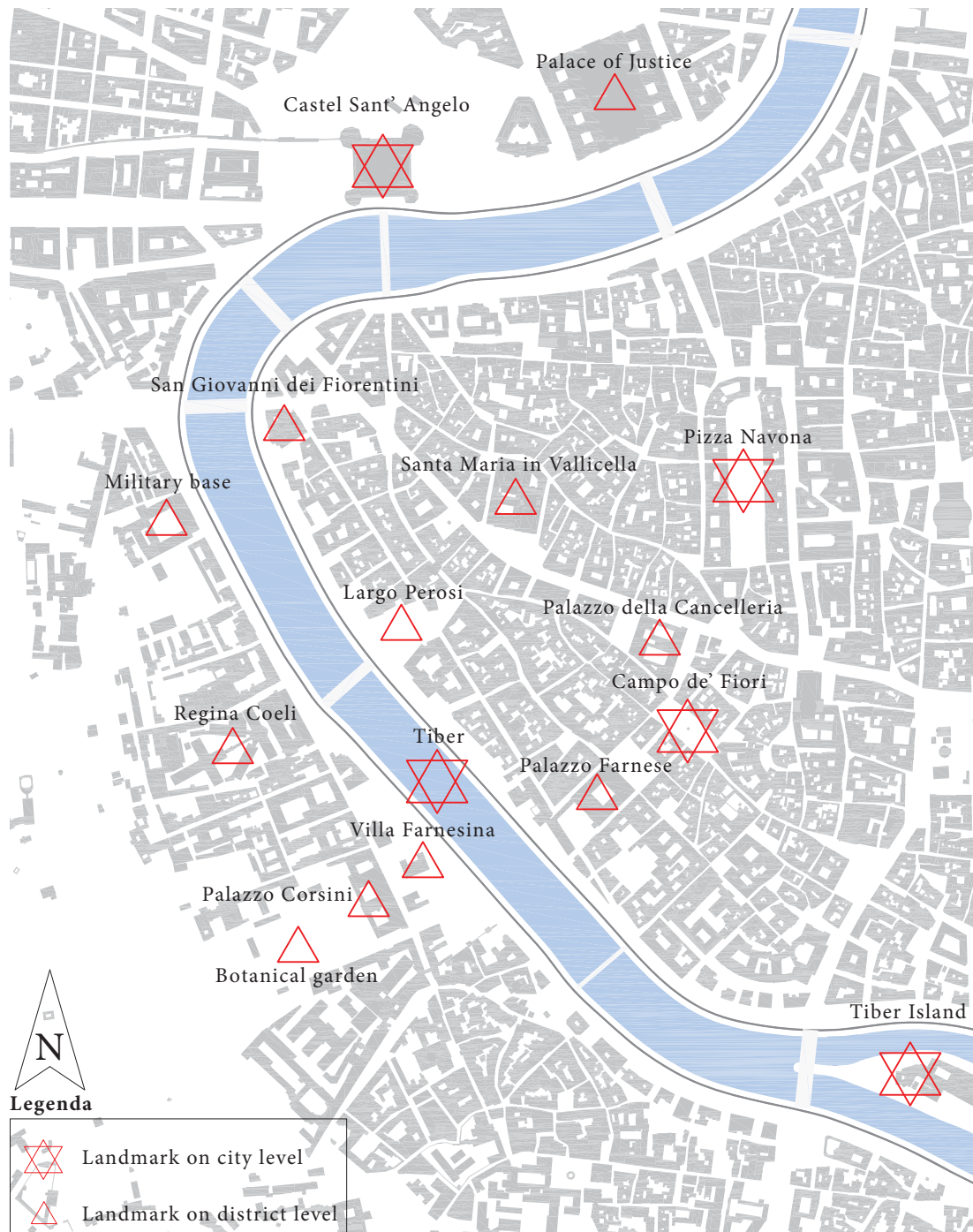
1 Lynch, K., *OpCit.,* p79-79

Palace of Justice

Castel Sant' Angelo

San Giovanni dei Fiorentini

Pizza Navona

Santa Maria in Vallicella

Military base

Largo Perosi

Palazzo della Cancelleria

Campo de' Fiori

Regina Coeli

Tiber

Palazzo Farnese

Villa Farnesina

Palazzo Corsini

Botanical garden

Tiber Island

N

Legenda

Landmark on city level

Landmark on district level

Fig.60 - Landmarks. Scale 1:10 000

Thinking of Rome, Castel Sant' Angelo will pop up as an important element in the city. It is a building that brings part of history to the current time. It is an identifiable landmark as the building has a clear, outstanding form which contrasts with the background. Spatial prominence is also established by making the location visible from many other locations. The Tiber in front of the building, provides sightlines from other locations to the building. One should notice that sightlines differ during the year, since the trees next to the boulevard impede sight.

Piazza Navona and Campo dei' Fiori are other landmarks that are located in the area that has been studied. These landmarks are not visible from the Tiber. Piazza Navona is a square with a dominant form that is different from the rest of the urban tissue. Due to its distinctive width and length, it contrasts with the other squares in the city. Campo de' Fiori is another square. Its use as a busy market since history till now, plays a role in its function as a landmark.

Tiber Island is a landmark because it has a rich history. Besides that, its form and spatial prominence make it an identifiable and significant element in the city.

Landmarks on district level

Most landmarks on district level are churches and palazzo's whom are important for the district but not for the city. Palace of Justice, church San Giovanni dei Fiorentini, church Santa Maria in Vallicella, palazzo della Cancelleria, palazzo Farnese, villa Farnesina and palazzo Corsini have all a rich, memorable history and a recognizable appearance which makes them a significant element in the environment.

The military base and prison Regina Coeli are noticeable due to their specific function. Regina Coeli is also identifiable by its form but this is not the case for the military base.

The botanical garden is a large green area that stands out from its background.

Largo Perosi is an open area in the high density of the city centre. Roman ruins have been found on this place so the construction of a new building on that location stopped.

PATHS AND EDGES

Fig.61 - Paths and edges

When presenting the studied area it is not realistic to make only one figure that shows the public image because the image of a given physical reality may occasionally shift its type with different circumstances of viewing.[1]
Fig.62 and Fig.63 represent both a public image of paths and edges. Fig.62 is an image where one is looking through the eyes of a driver. Fig.63 is an image where one is looking through the eyes of a pedestrian.

Car drivers

Since the embankment of the river the wide boulevards on each side of the Tiber, are important paths for drivers to connect the north with the south of the city. The river is in this case a characteristic spatial quality that strengthens the image of the paths next to it. If this was not the case, the path would have lacked identity, which would have resulted in an image that was more difficult to identify.

The river also plays a role in the directional quality of both paths. Lynch explains that people tend to think of path destinations and origin points, as they like to know where paths come from and where they go to. The river provides a good view

1 Lynch, K., *OpCit.,* p48

N

Legenda
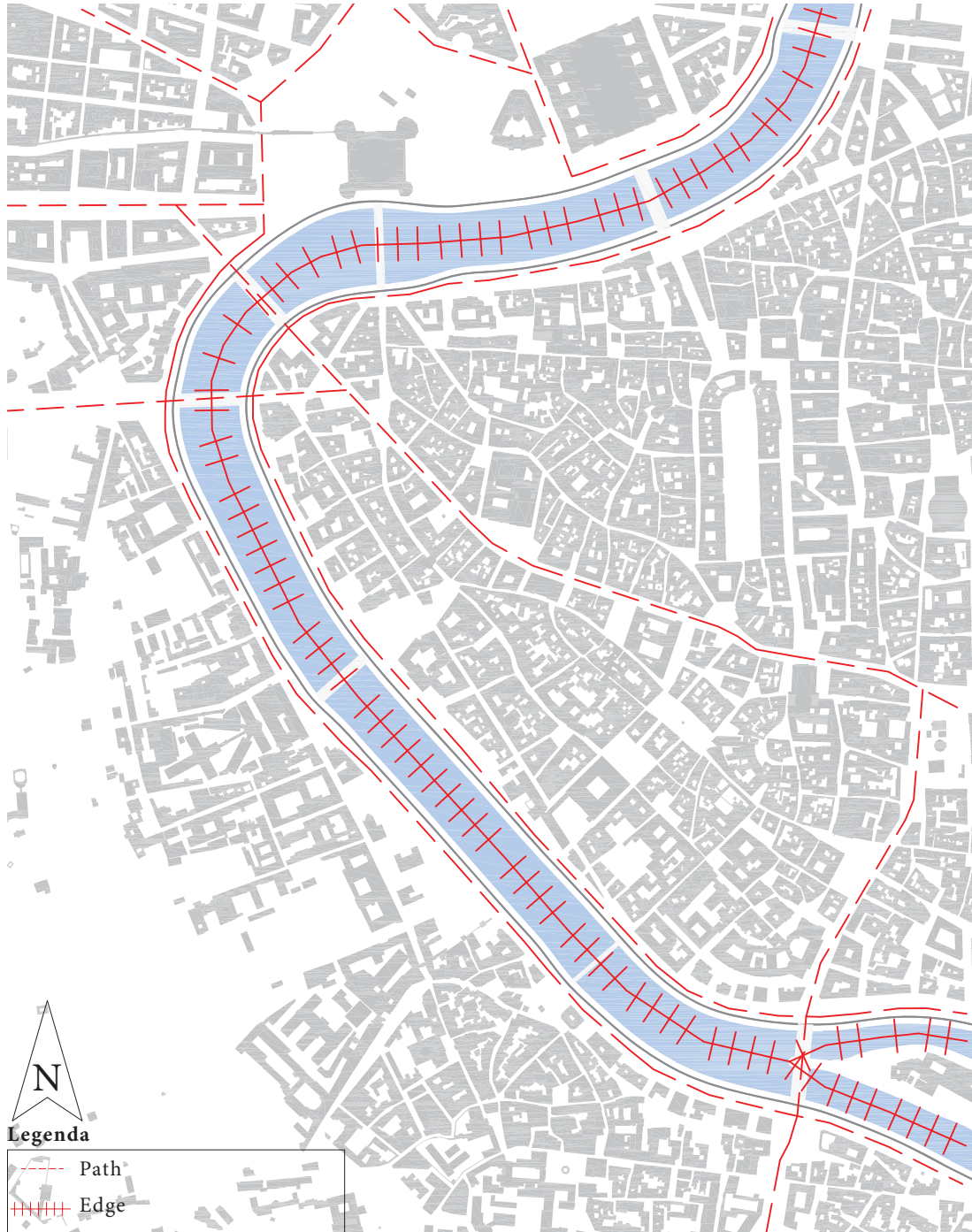
Path

Edge

Fig.62 - Paths and edges through the eyes of a car driver. Scale 1:10 000

N

Legenda
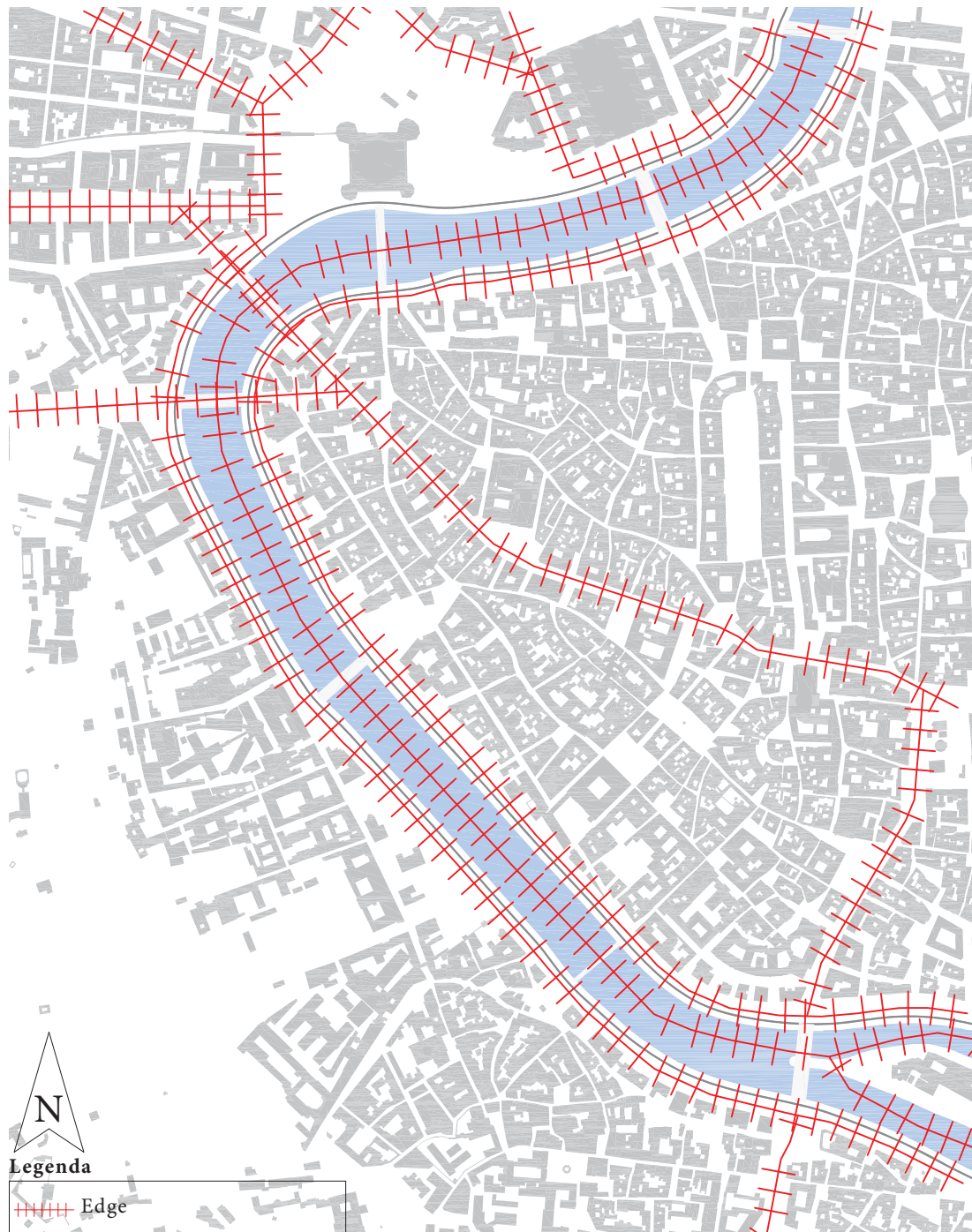
+++++++ Edge

Fig.63 - Edges through the eyes of a pedestrian. Scale 1:10 000

of the surroundings and their landmarks which makes destinations easy recognizable.

The Tiber is an edge through the eyes of drivers. Although continuity and visibility are crucial for edges in general, it does not mean that edges are impervious as the bridges show.

Pedestrians

The image through the eyes of a pedestrian shows that there are no real main paths for pedestrians, only the edges are shown in the figure.
The edges for pedestrians are paths for drivers. These paths are main roads in the area and only easy to cross at certain crossings, nodes.
The boulevards along the Tiber are an edge for pedestrians which makes it less attractive to pass the boulevard in order to walk to the low level quays next to the Tiber.

Near most of the bridges along the river, stairs are situated that descend to these low level quays (Fig.64). Due to the poor quality people do not feel invited to enter the low level quays (Fig.65 till Fig.67). An iron rail for bikes is constructed on the stairs, but they are broken on most locations. Sometimes they are completely missing, which makes it difficult for cyclers to descend to the quays.

Fig.64 - Location of stairs. Scale 1: 20 000

Fig.65 - Status of the stairs I
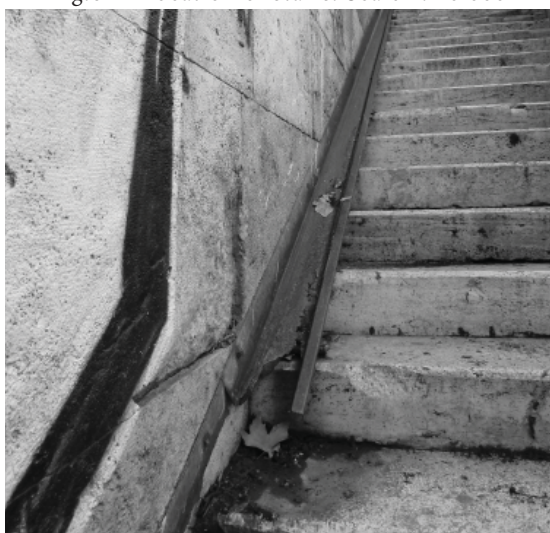
Fig.66 - Status of the stairs II
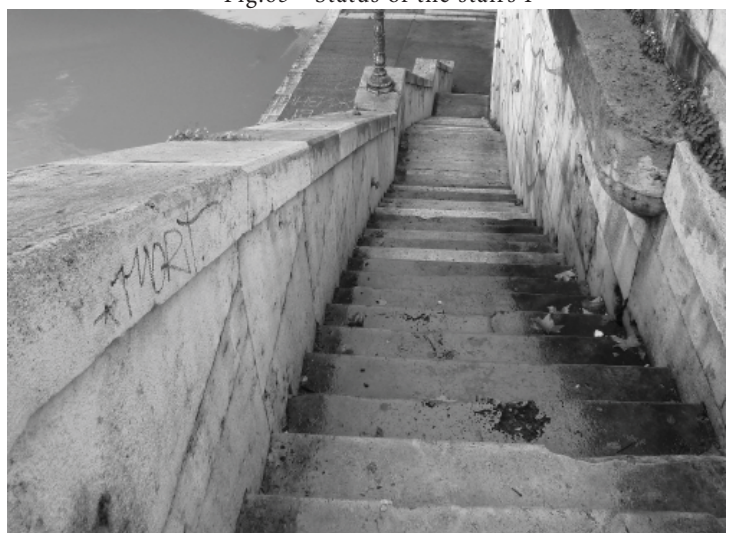
Fig.67 - Status of the stairs III

DISTRICTS

Fig.68 - The Tiber as an edge between districts

An observer mentally feels inside or outside a certain area because of the common characters within an area. This identifying character makes an area a district. According to Lynch, some people structure their city in this manner.[1]

The area that has been studied contains of four districts: the Northern Centre, Vatican district, Old Rome and Trastevere (Fig.69). Since the Northern Centre is such a small part of the area, it will not be mentioned anymore.

The identifying character of Vatican district is the Roman Catholic faith. Many functions in this area are related to this character. Old Rome is identifiable by its most old buildings. Trastevere is a place to go to for dinner and for a pleasant evening and night. It is full of restaurants and cafes.

The Tiber forms the border between Trastevere and Old Rome.

1 Lynch, K., *OpCit.a*

Northern Centre

Vatican district

Old Rome

Trastevere

Legenda

--- Borders of a district

Fig.69 - Districts. Scale 1:10 000

NODES

Fig.70 - Nodes in the form of bridges

In case of the studied area, the nodes are spots where infrastructure is concentrated (Fig.71). They are the intensive foci for pedestrians and/or cars. Most of the nodes are bridges that link the east with the west side of the Tiber. People come from all directions to a bridge to cross the river. From there people spread again in different directions.

Already in Ancient Rome the river could be crossed on more bridges than existed in any other city in the world.[1] The bridges made the development of region Trastevere possible and became gateways to new prospects.[2] They also served as landmarks by which sailors could read their progress.

The bridges still are an important part of the urban tissue and infrastructure. They play a role in the development of the city. The bridges that are located in the area of the location for the masterplan will be explained further and are numbered in the map of Fig.71.

1,2 Taylor, R. (2002. June). *Tiber river bridges and the development of the Ancient city of Rome,* p18

N

Legenda
● Node
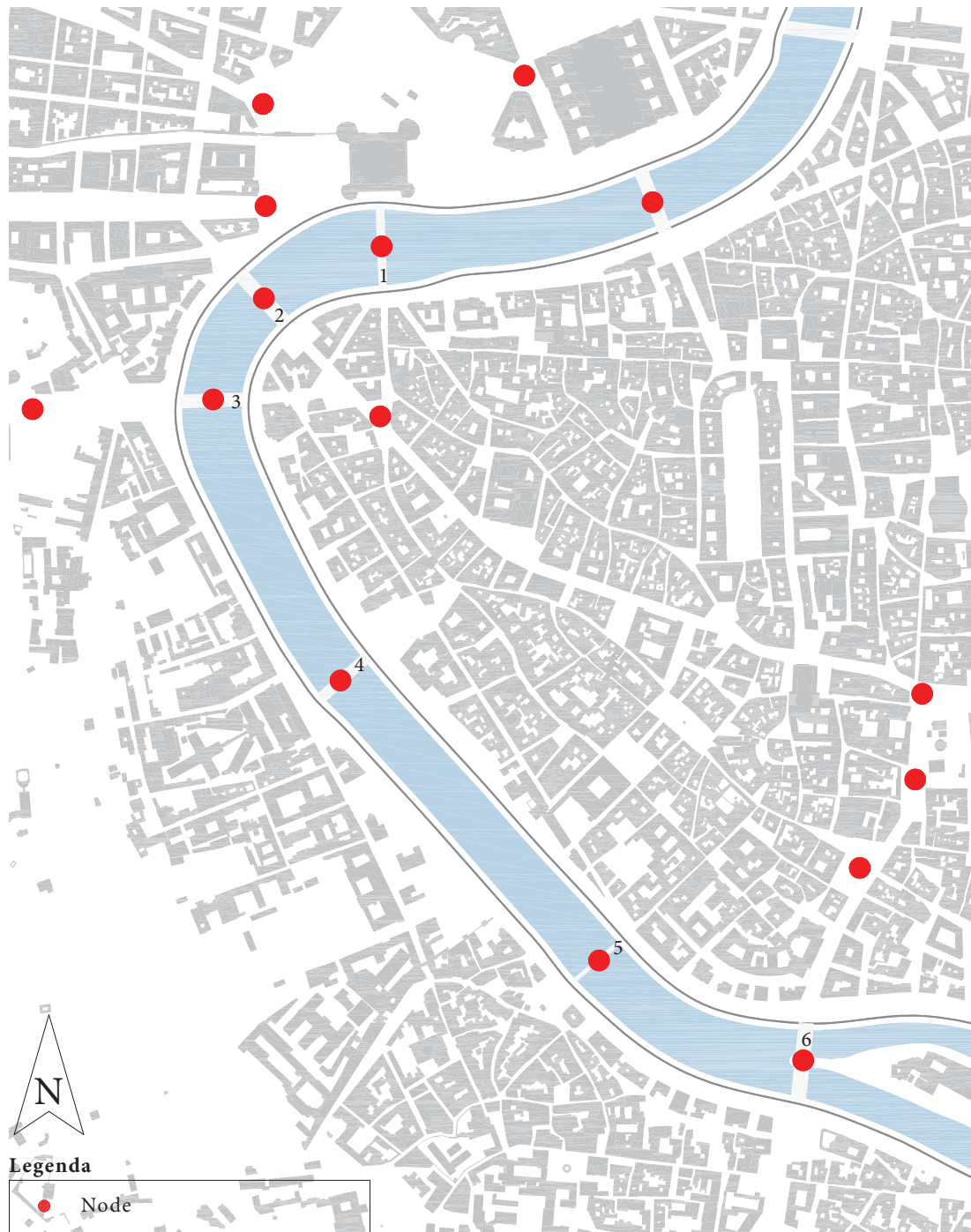
Fig.71 - Nodes. Scale 1:10 000

Ponte Sant' Angelo (1)[1]

Ponte Sant' Angelo (Fig.72 and Fig.74) functioned as a ceremonial aisle to the monument behind it; Hadrian's mausoleum (now Castel Sant' Angelo). It was a promenade, inviting people to come to the mausoleum. The bridge was not an answer to civic needs, because it eventually knocked out the function of the old Pons Neronianus that was located to the south of Ponte Sant Angelo.
The bridge is the only ancient bridge that survived although it changed during the construction of the embankment and boulevards.

Ponte Vittorio Emanuele II (2)[2]

Ponte Vittorio Emanuele II (Fig.73 and Fig.75) was constructed in 1911 after the construction of the embankment of this part of the river. It is an extension of Corso Vittorio Emanuele that connects the historic centre with the region Borgo and Vatican City. On both sides of the river are pedestals that show bronze statues of goddess Victoria. The bridge is almost situated at the location of the old Pons Neronianus.

Ponte Principe Amedeo (3)[3]

Due to the expansion of Rome behind the Vatican, a new bridge had to link the area to the centre (Fig.76). Ponte Principe Amedeo was constructed in 1942. The bridge links Lungotevere dei Sangallo with Piazza Della Rovere on the western side.
It has three brick arcades covered with marble. Between the arcades are openings with rounded arches like in many other bridges. In case of

1 Taylor, R., *Ibid.,* p13
2,3 www.romeartlover.it

Fig.72 - Statues on Ponte Sant' Angelo

Fig.73 - Statue on Vittorio Emanuele II
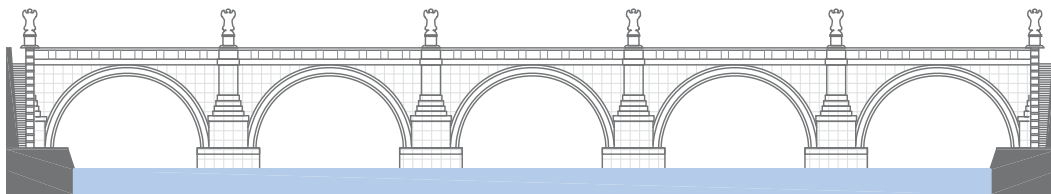
Fig.74 - Ponte Sant' Angelo. Scale 1:1000
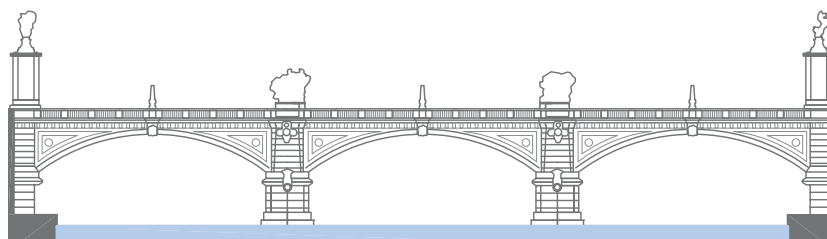
Fig.75 - Ponte Vittorio Emanuele II. Scale 1:1000

floods the water can go through the openings which stabilizes the bridge.

Ponte Mazzini (4)[1]

Ponte Mazzini, connects Via Giulia with Via della Lungara (Fig.77). The bridge was built by Viani and Moretti and was finished in 1908. It was part of a larger plan to design a grand access to Janiculum Hill for the fifteenth anniversary of the Italian Unity but the project was never carried out.

Ponte Sisto (5)[2]

In 1450 a mule went mad on Ponte Sant' Angelo during a crowded Jubilee procession. Many people fell into the river and 170 people died. In 1475 there was another Jubilee so Pope Sixtus

IV built before that time an extra bridge to facilitate another access to the Vatican. The new bridge, named Ponte Sisto (Fig.78), had to avoid a repetition of the tragedy.

Ponte Garibaldi (6)[3]

The traditional accesses to Trastevere via the bridges of Tiber Island and Ponte Sisto had not enough capacity to answer the needs of modern life. As a result Ponte Garibaldi was built in 1888 (Fig.79). It had an iron structure but in the 1950s the structure was replaced by reinforced concrete and the bridge was enlarged.

1,2,3 www.romeartlover.it
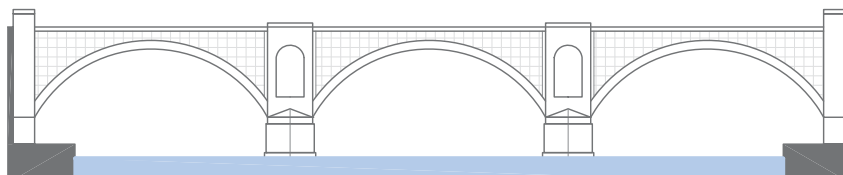
Fig.76 - Ponte Principe Amadeo. Scale 1:1000
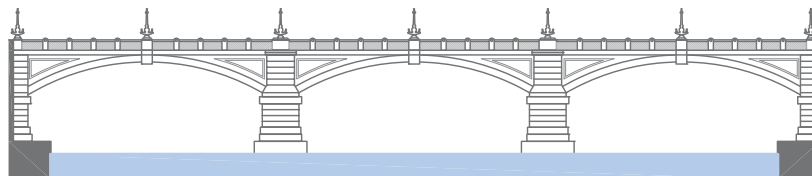
Fig.77 - Ponte Mazzini. Scale 1:1000
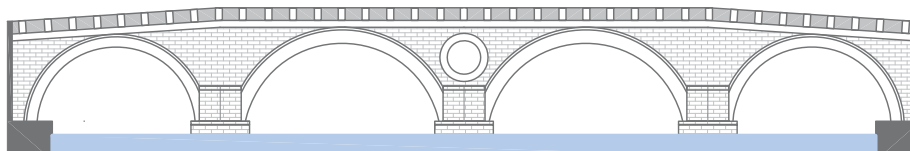
Fig.78 - Ponte Sisto. Scale 1:1000
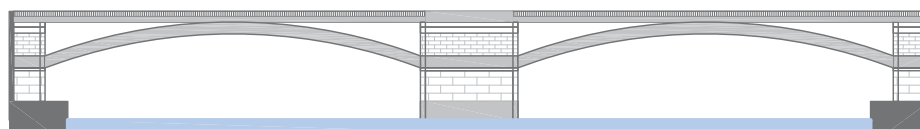
Fig.79 - Ponte Garibaldi. Scale 1:1000

THE TIBER IN THE CURRENT CONTEXT

A UNIQUE SPACE

Fig.80 - The Tiber and its low level quays

The construction of the embankment has put the Tiber in isolation, which since then has become a abandoned, particular space. There is a special aura that can be perceived on the low level quays, which is in contrast with the busy and lively city. It has become a space that has its own smell, light and sounds. It has created a unique space, a dramatic emptiness, which was not even the direct intention of the intervention.

"Empty, abandoned space in which a series of occurrences have taken place seems to subjugate the eye of the urban photographer. Such urban space, which I will denote by the French expression terrain vague, assumes the status of fascination, the most *solvent sign with which to indicate what cities are and what our experience of them is."[1] (Fig.80)*

The special aura can only be observed while being on the quays but the study in this thesis supports this observation.

Vertical sections over the length of the studied area are provided (Fig.81 till Fig.88). The sections reveal the isolation of the river.

Studying the sections, one can conclude that no connection is designed between the boulevards and its adjacent tissue.

1 De Sola-Morales, I. (2008). *A matter of things.*
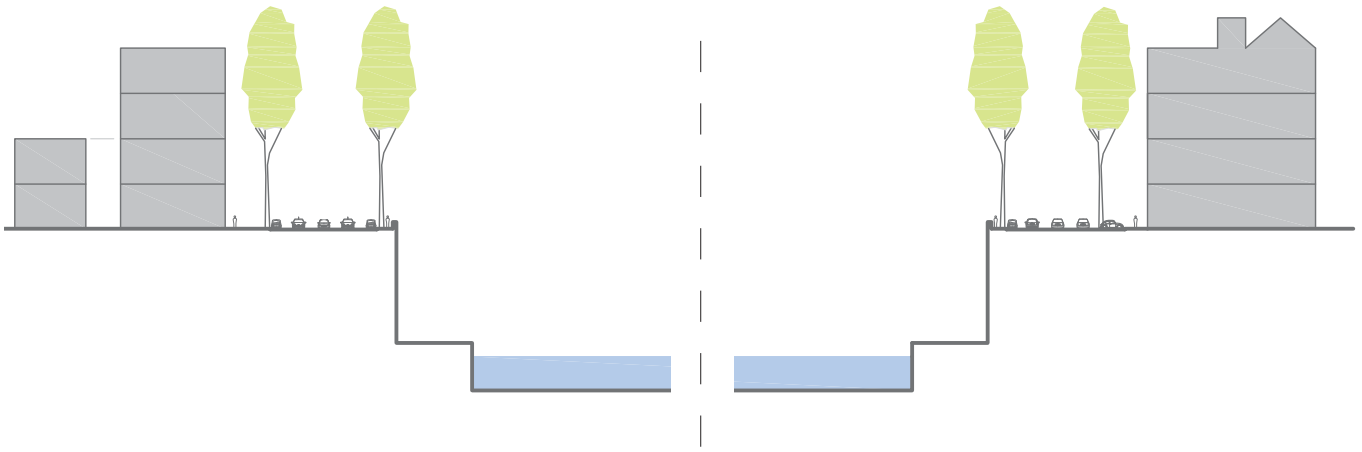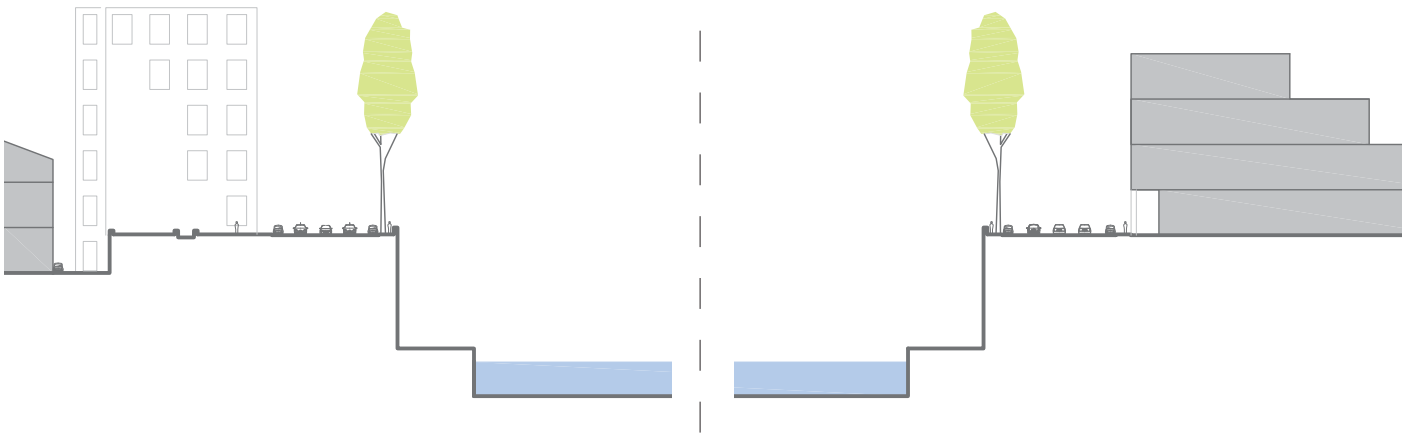
Fig.81 - Section 1. Scale 1:1000
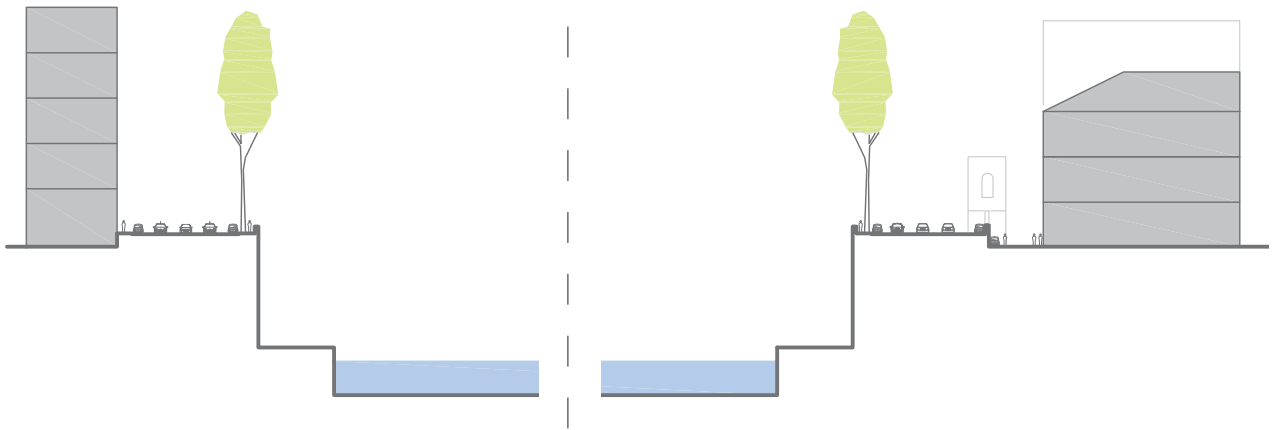

Fig.83 - Section 2. Scale 1:1000
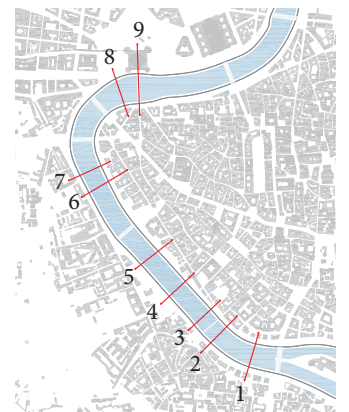

0   10m   40m
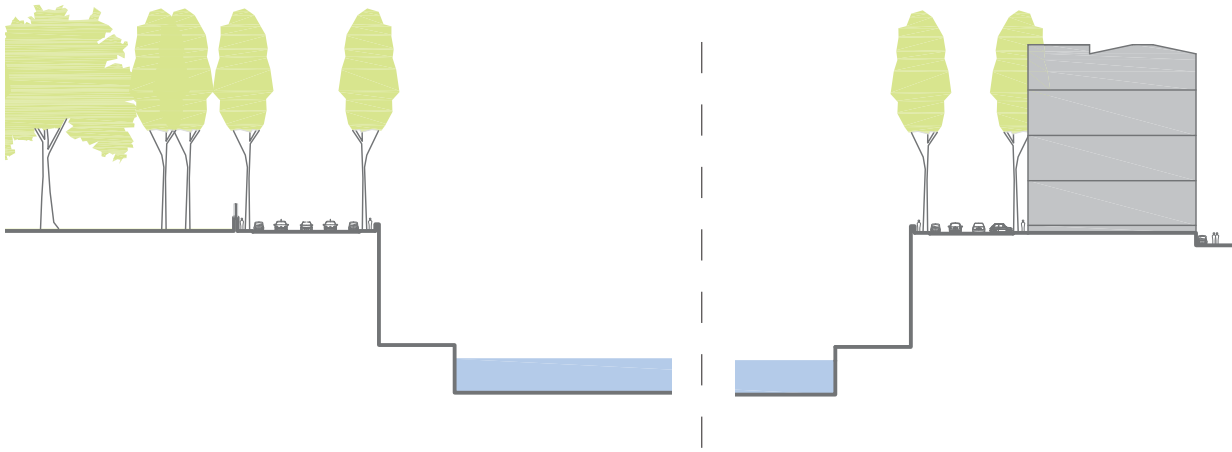
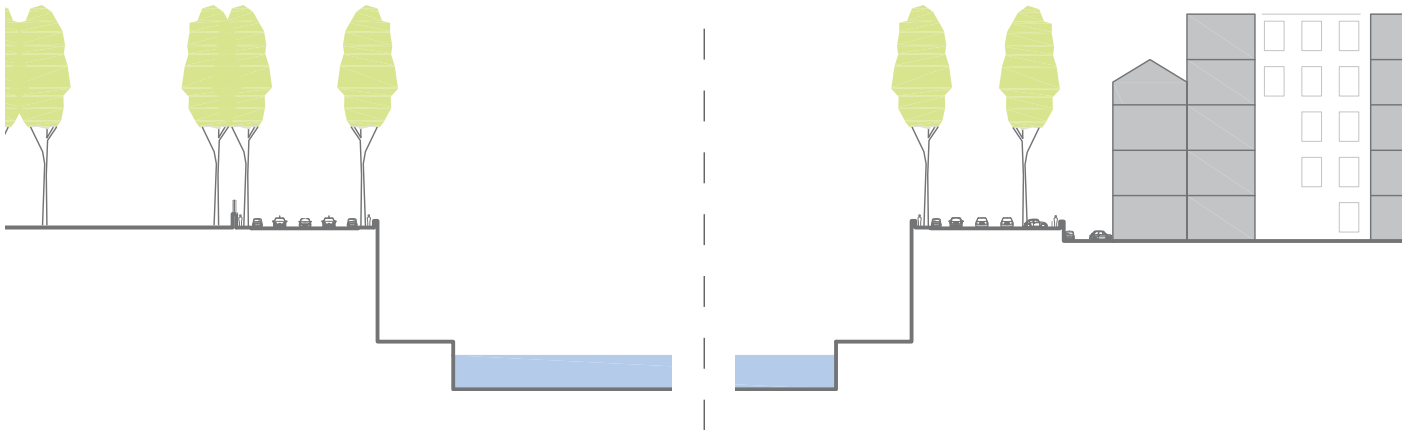Fig.82 - Section 3. Scale 1:1000

Fig.85 - Section 4. Scale 1:1000

Fig.84 - Section 5. Scale 1:1000
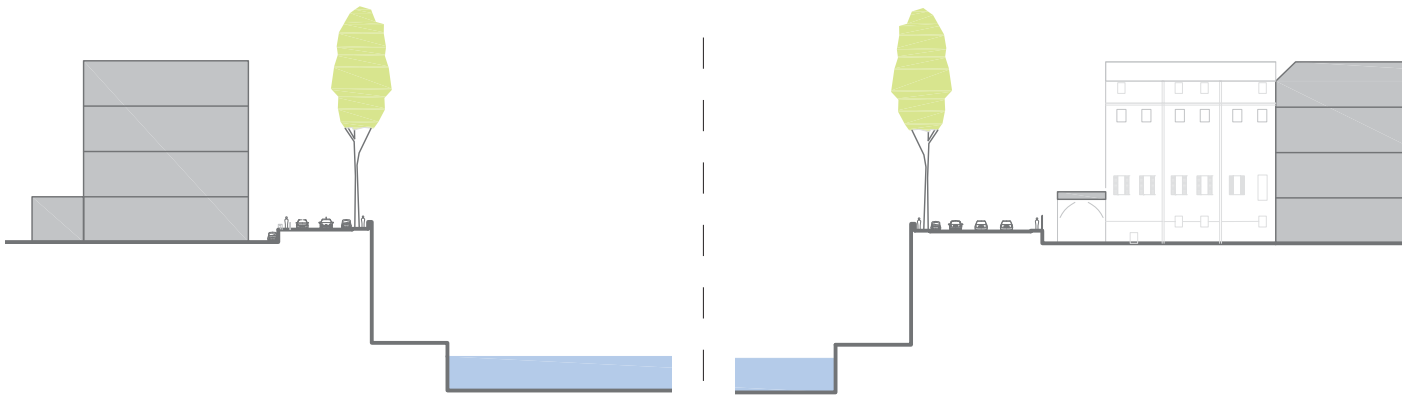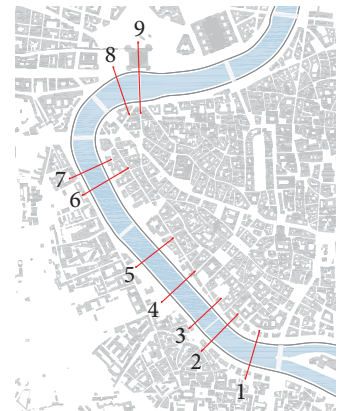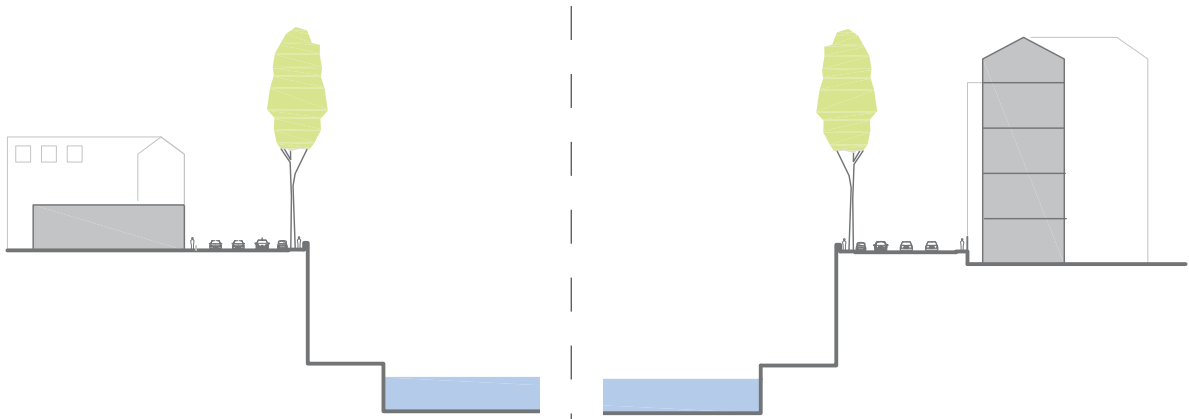

Fig.86 - Section 6. Scale 1:1000

0   10m   40m

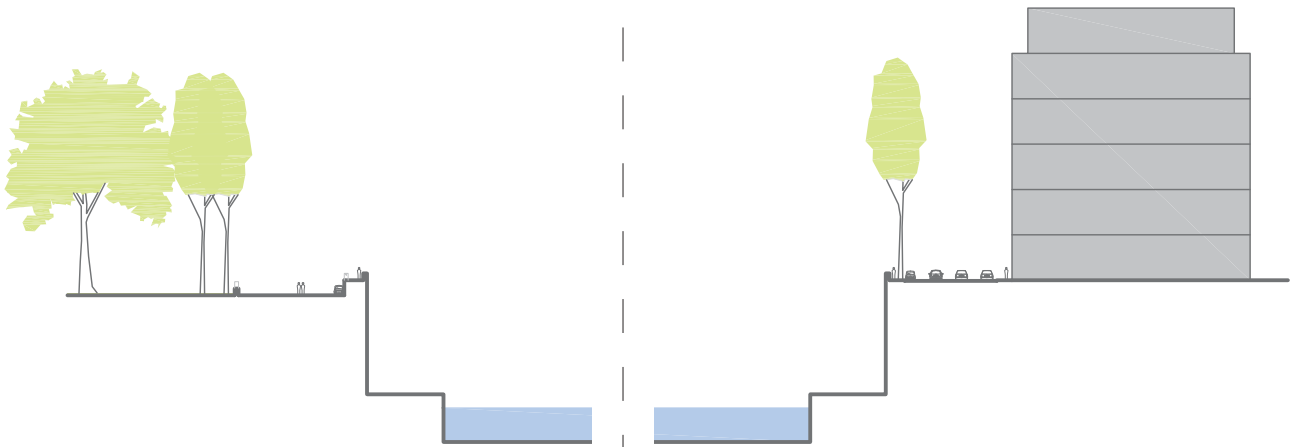Fig.87 - Section 7. Scale 1:1000
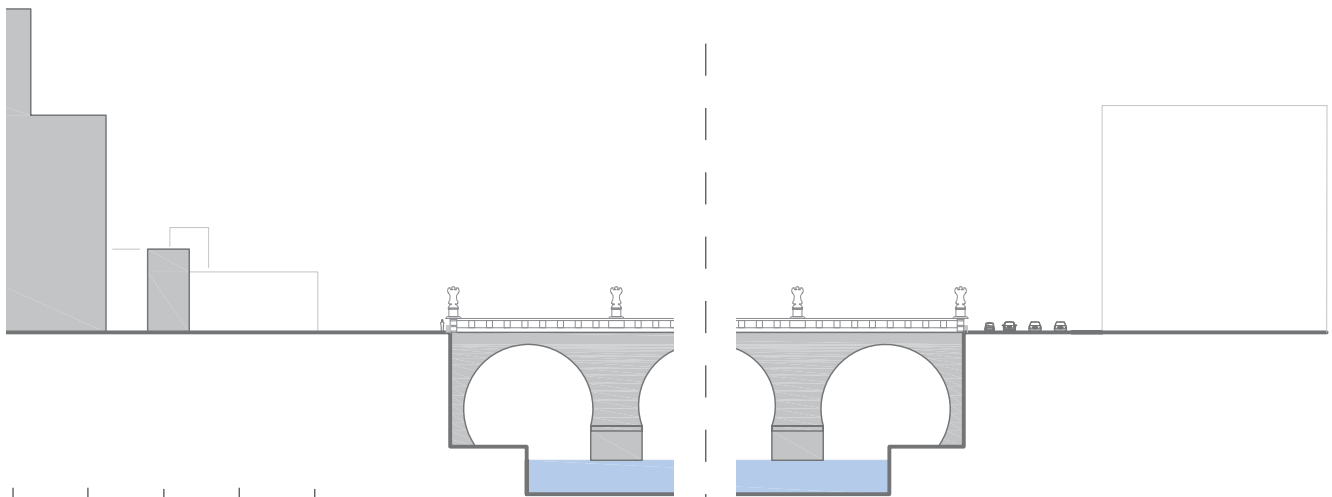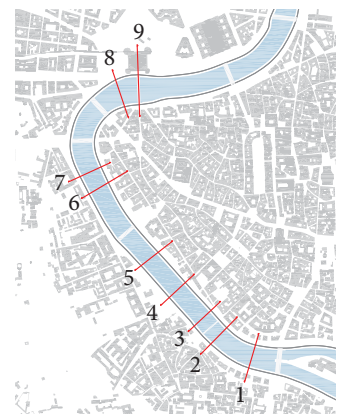

Fig.89 - Section 8. Scale 1:1000

Fig.88 - Section 9. Scale 1:1000

0   10m   40m

MORPHOLOGY

Morphology is the study of the form of human settlements and the process of their formation and transformation. It reveals the spatial structure and character of settlements. Morphology can be studied on different scales. This study will focus on building level.

Building block

The studied area consists mostly of building blocks. The borders of these blocks have been formed by the borders of the streets. Since the streets are not straight but bended, each block has another footprint.

The blocks are divided into smaller spaces. Normally a block houses more than one family. Fig.90 shows a building block, located in Via Giulia, that is not designed as a total but as a block that consists of different buildings forming a block together. It is an example of the common situation. All these buildings have their own entrances and sometimes even more than one, because shops in buildings usually have another entrance. Since different buildings form a block together, the facade of the block is not a whole but consists of different facades. This means that the block does not have a striking front facade since some sides of a block are of equal importance.

Fig.91 shows a block that is the contrary of Fig.90 because it shows a block, which is designed as one building. The building has a striking front facade. Besides that, it has only two entrances.

Usually a building block has one or more open internal spaces which are usually used as a place for car parking and for storing waste containers, since the courtyard is accessible for all residents of the building.

Fig.90 - Different buildings together form one block. Entrances are marked in red
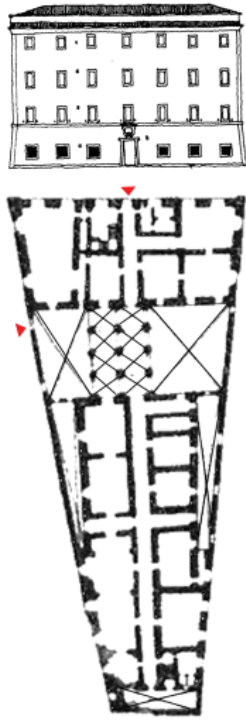
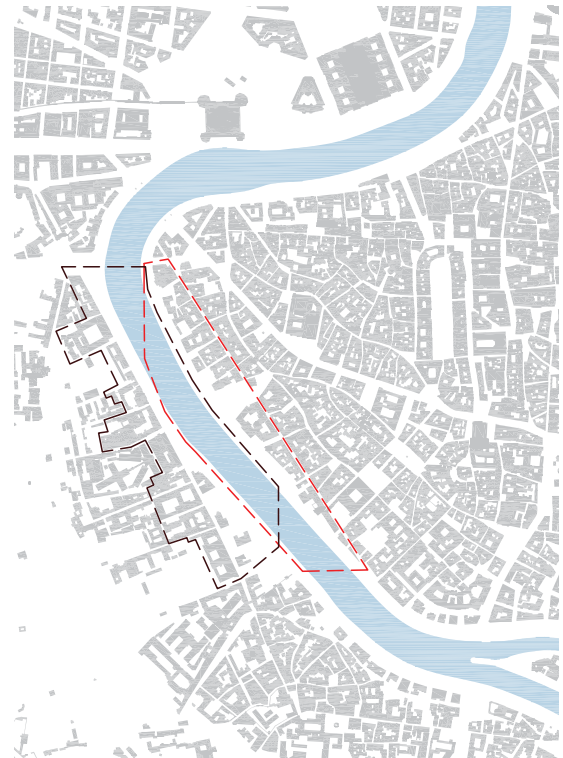Fig.91 - A block designed as one building. Entrances are marked in red

Fig.92 - Via Giulia (red) and Via delle Lungara (brown)

Orientation

Buildings located on Via Giulia (Fig.92, in red) and Via della Lungara (Fig.92, in brown) have a form and orientation that was designed for a context before the embankment. The orientation of these buildings did not change after the construction of the embankment and boulevards. The situation before and after the embankment is drawn in maps on the next page.

Buildings located on the west side of Via Giulia had a clear orientation with their back towards the Tiber and with their front to Via Giulia (Fig.93). In the current situation, it is still visible in the form of the blocks since the facades on the back side are not aligned (Fig.94). It forms a rough line while the facades located on Via Giulia, follow the building line that is provided by the street (Fig.95).

Before the construction of the embankment and boulevards, buildings were situated between the buildings along Via Giulia and the Tiber (Fig.93). These buildings also had their back located to the river but were demolished during the construction of the embankment.

The situation on the west side of the Tiber is different. Like in Via Giulia, the buildings located on Via della Lungara were located with their front to the street. Buildings on the east side of the street were located with their back towards the Tiber (Fig.96). These buildings were demolished during the construction of the embankment (Fig.97). Since then, the buildings on the west side of Via della Lungara are orientated with their front to the boulevard and river (Fig.98).
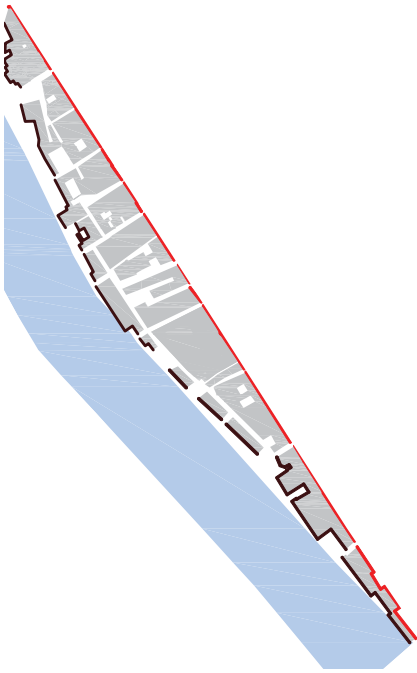
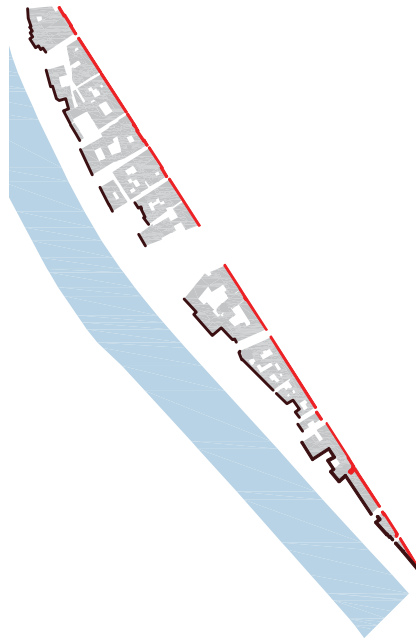Fig.93 - Via Giulia in 1800. Scale 1: 10 000

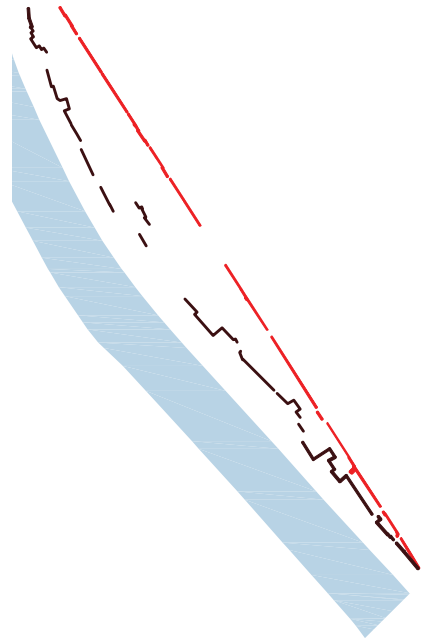Fig.94 - Via Giulia in 2015. Scale 1: 10 000

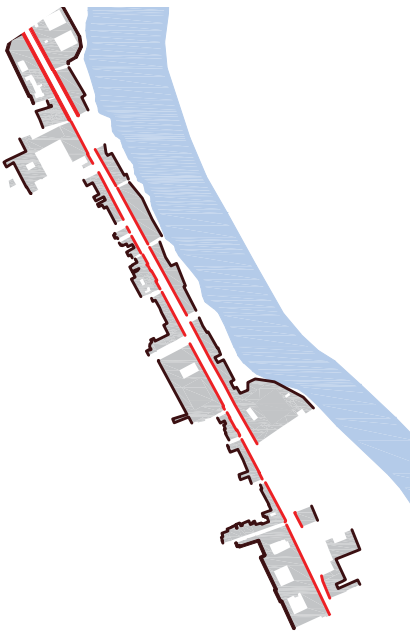Fig.95 - Front and back line in 2015. Scale 1: 10 000
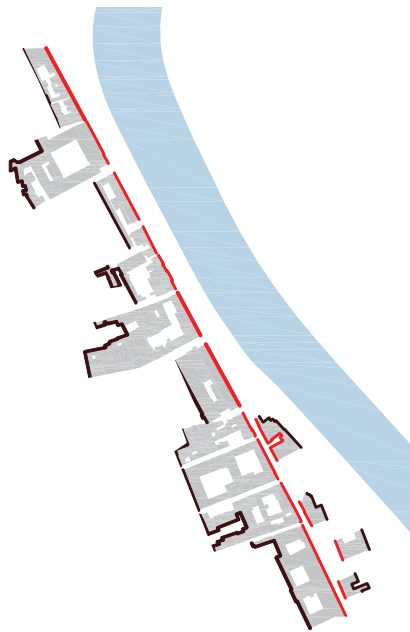

Fig.96 - Via della Lungara in 1800. Scale 1:10 000
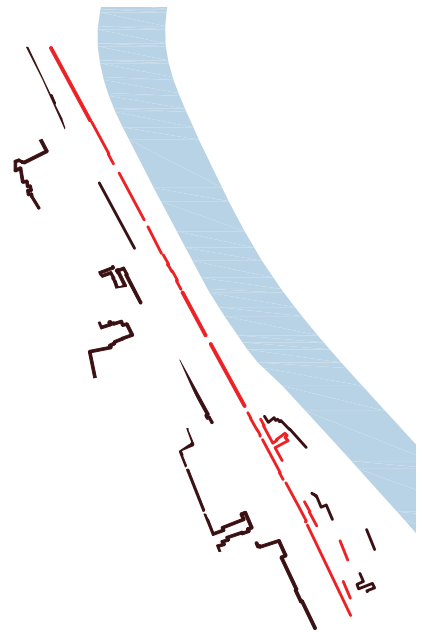

Fig.97 - Via della Lungara in 2015. Scale 1:10 000

Fig.98 - Front and back line in 2015. Scale 1:10 000

Legenda
— Front facade
— Rear facade

FLOODS

The water of the Tiber has always been an uncontrollable power. Even nowadays there are moments that the floods of the river destroy parts of the city. The recurrent floods that afflict Rome are caused by heavy rainfall that swells the river far beyond its normal level.

From Ancient Rome till the construction of the embankment, floods were part of daily life.[1] One can wonder why men always started to live along a river, when it makes a city so vulnerable. The reason for that is that the river did not only offer possibilities for transport, but its floods were good for renewing the soil.In this way, agricultural fields kept fruitful.

Nowadays water level rises and falls with little effect because of the embankment (Fig.99). The embankment has an average height of 14,0 meters. The average water level is 8,1 meters below the top of the embankment.[2] The risk of a flood reaching street level is unlikely, although, since the embankments have been built, three floods inundated Rome. Since the construction of the embankment there were 57 cases in which the water level rose till 13 meters above its normal level.[3]

1 Aldrete G.S. (2007). *Floods of the Tiber in Ancient Rome*
2 www.roma.andreapollett.com
3 Aldrete G.S., *Ibid.,* p80

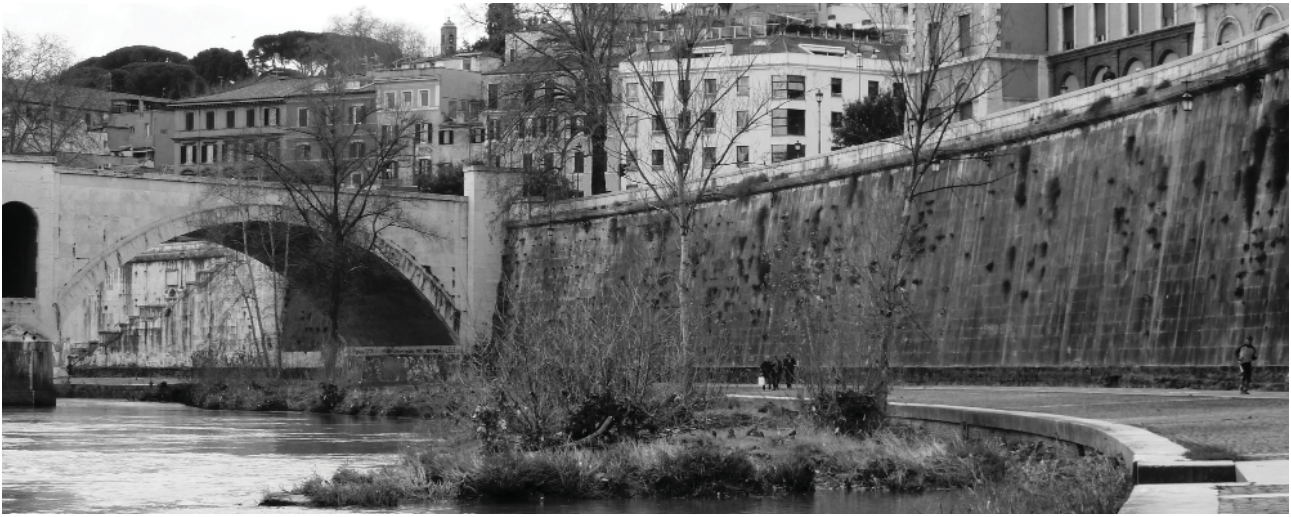Fig.99 - High water level on february, 27th 2016

CONCLUSION

Fig.100 - Tiber river

The historical study in this thesis revealed the transformation of the Tiber over time. Already in Ancient Rome, the river was used for transport. In the seventeenth century it became more difficult to facilitate transport over water due to difficulties with navigation Eventually it stopped in the nineteenth century. Since then, the Tiber has not been of use any more. It was only a source for destruction due to its floods. In 1926, the intervention of the embankment was the solution to this problem. The embankment prevents the city against floods.

The intervention of the embankment went together with the construction of the boulevards on both sides of the river. The direct context was not taken into account during this intervention and it has never been changed afterwards. There still is no relation between the direct urban context and the location of intervention, which could been seen in the sections of the current situation (Fig.81 till Fig.88). Some buildings even had to be demolished in order to make place for the embankment. Also the front of landmark Castel Sant' Angelo is partly demolished.

As the study based on the ideas of Kevin Lynch shows, a barrier between the direct context of the river and the river itself has been created. The boulevards and embankment cut off the river from city life. The boulevards became an edge for pedestrians making it unattractive to to pass them in order to enter the low level quays.

Due to construction of the embankment and boulevards, there is a special aura that can be perceived on the low level quays, which is in contrast with the busy and lively city. The construction of the embankment has put the Tiber in isolation, which since then has become a unique space with its own smell, light and sounds.

"If there is too much to see, that is, if an image is too full, or there are too many images, the effect is you do not see anything anymore. Too much too quickly turns into 'nothing'. If an image is empty, or almost empty and sparse, it can reveal so much that it completely fills you, and the emptiness becomes 'everything'."[1] (Fig.100)

The enclosure of the Tiber creates a space which is readable and which has his own special identity. However one should keep in mind that a space is never completely enclosed but always connected with other spaces. In the case of the Tiber, the connection is hard to find aside from the few small stairs that descend to the water. The intervention created a scar in the urban fabric that disconnected spaces.

1 Jones, K.B. (2009). *Romes uncertain Tiberscape: Tevereterno and the urban commons,* p1

MASTERPLAN

As the study revealed, the Tiber has become a space with its own identity and special aura after the construction of the embankment. It is a space that is not connected with its surroundings anymore. Since it is difficult and unattractive to descend to the lower quays, the space of the Tiber is not easily noticed by habitants and tourists. There are neither possibilities to experience the water on the higher level of the boulevards. Pedestrians are only able to walk over the small footpath next to the large boulevards for cars.

The main aim of the masterplan is to better integrate the area of the Tiber in its direct urban tissue. The interventions that are part of the masterplan enable people to experience the area of the river.

Accessibility and experience

In order to enjoy this special place, accessibility to the river will be improved. People need to get the feeling that they are invited to enter and experience the low level quays and riverfront. By improving accessibility to the low level quays, the relation between the quays, river and context will be restored.

Redesigning the borders of the boulevard on the higher level will enable people to experience the area of the water from that level.
While changing the environment in the masterplan, imageablity has been taken into account. Improving accessibility to the low level quays and providing spaces that enable people to exprience the water area strengthens the current image of the city because continuity will be preserved while spaces get better interconnected. The masterplan contributes to a more distinctive and legible environment, which heightens potential depth and intensifies human experience.

Quality of the area

In order to better enjoy the special aura on the low level quays, and to improve the experience, quality will be improved. Due to isolation and enclosure of the low level quays in the current situation, the area of the low level quays is in a poor condition. The quays have holes on many places, graffiti can be found everywhere and it has become a place for homeless people. Providing a (recreational) program along the riverfront improves quality of the area.

With a program, the area becomes a place to stay instead of a place to pass. Besides that, the program creates social control.

The program that will be part of the masterplan consists of:

- café and terrace;
- viewing platforms;
- a restaurant with terrace;
- a study room for students;
- a hotel with conference rooms;
- a boathouse with pavillion.

These functions support the experience of the river area.

In the current situation, the low level quays do not have a permanent program. Only some days in summer, the quays are used for markets. These markets could still take place after the implementation of the masterplan. The masterplan even supports the temporary markets since accessibility and quality improves.

Historical layers

The title of the atelier, "The cities of Rome", already refers to the fact that Rome is a city with many historical layers. The Atlas and study that is part of this report both reveal the construction and relation between new and old. It shows that the strong identity of the city is based on its many layers and above all on the readability of them. While intersecting these layers, continuity is

preserved and the image of the city is maintained and even strengthened over time.

The interventions in the masterplan expresses the specific conditions of the location and context, based on the idea of Plecnik's architecture in Ljubljanica. The interventions of the masterplan include history of the location by transforming historical references into a new structure. Therefore the places of interventions are chosen strategically.

Kevin Lynch already emphasizes in his theories that memories are associated with places and contribute to the identity and image of the city. The interventions of the masterplan emphasize a certain aspect in history that tells something about the relation between the place, the river and its transformation over time. The interventions strengthen the relation between historical layers of the city while keeping the situation readable. With this, it strengthens the identity of the city. On the locations of the interventions, history will become part of the future again.

Masterplan

The masterplan (Fig.101) consist of different locations where interventions take place in order to integrate the Tiber and low level quays in its surroundings. Here a program communicates with the low level quays.

The locations of the different interventions follow the stream of the river, suggesting that it is a linear masterplan. However the masterplan functions in the opposite direction by improving connection between the adjacent urban tissue and the riverfront.
The new connections create a new and more active relationship between the city and river side. The spaces along the river become recreational. They become a better designed space for the community.

Two of the interventions are designed in detail (intervention one and five) and will be mentioned in the next chapter. Intervention one is next to Castel Sant' Angelo and intervention five is there where harbour Navalia was situated in Ancient Rome. Both detailed interventions improve the connection between the Tiber and it surroundings. They form an example for the other interventions.

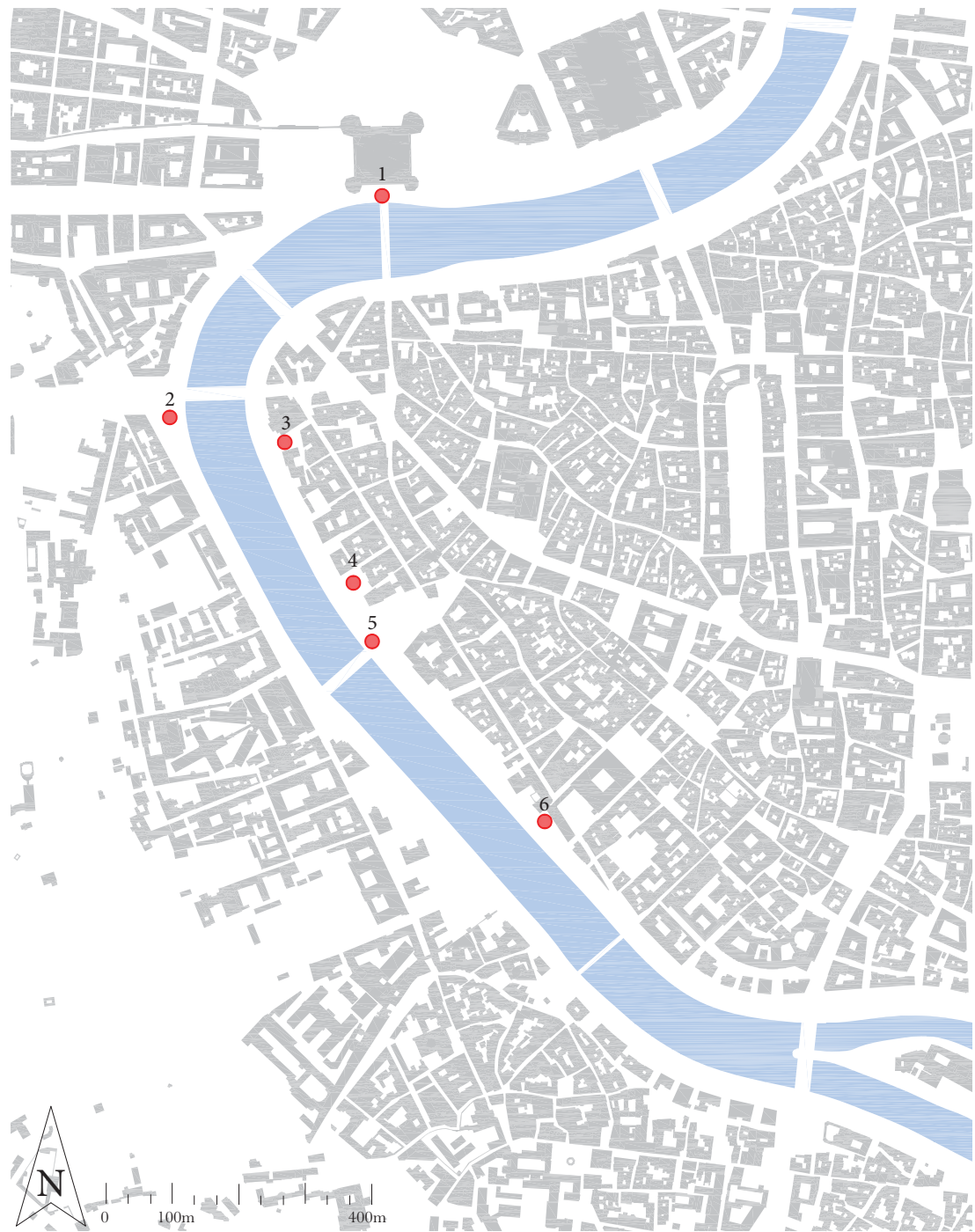The other interventions are not designed in detail, but their partition in the masterplan will be explained here.

Fig.101 - Masterplan, scale 1:10 000

Intervention two

The location of intervention two changed due to the construction of the embankment. Before the embankment, the buildings located on Via della Lungara were orientated with their front to the street. The buildings on the east side of the street were located with their back towards the Tiber. Together with the embankment, these buildings were removed (Fig.96 and Fig.97). Since then, the buildings on the west side of Via della Lungara are orientated with their front to the boulevard and river.

On the location, a new design will improve acces to the low level quays, while referring to the situation before the embankment.

Intervention three

Intervention three is there where the Tarentum was situated in Ancient Rome (Fig.54). Tarentum was a location near the river where one of the children of Valerius Maximus became healthy again by drinking water gained from this location (see chapter "The Tiber in historical context").

Currently this location is a parking space. In the new design its function will be maintained while combined with a program in order to improve quality along the quays.

The design will refer to the historical layer of its location, while creating a new inviting accessibility to the water.

Intervention four

As mentioned before, in the eigtheenth century the western side of the river was characterized as a suburban area, dedicated to relaxation; to 'otia, while the eastern side was part of the urban area. It was part of the economical and commercial heart of Rome; dedicated to 'negotia'. The river functioned as border between otia and negotia.

Location four is part of this border. The location is an open space next to the river that has no function. The new design will improve the connection with the river but also fills a gap in the continuity of the urban tissue.

Intervention six

Intervention six is near the location of villa Farnese. In the sixteenth century, Farnese connected its palazzo with the heart of the city via an axis perpendicular to the palazzo.
He also wanted to link the palazzo with the other side of the Tiber where villa Farnesina was situated. It was an attempt to show the power of the familiy.

The connection over the water was never carried out. The design will refer to this historical event, while creating a new access to the water.

DESIGN IN DETAIL

INTERVENTION ONE

HISTORICAL BACKGROUND

Like all interventions of the masterplan, intervention one emphasizes a certain aspect in history that tells something about the relation between the place, the river and its transformation over time. As already mentioned in the chapter, "The Tiber in the urban tissue", Castle Sant' Angelo is a building that underwent a transformation due to the embankment. Looking at the map of the current situation, one can immediately notice that the star-shape form of the fort is not complete anymore. In order to better understand this transformation, one has to understand the history of the location. The history of Castel Sant' Angelo already started in 123AD.[1] The building has been transformed over centuries which is still visible in the different layers of structure.

In the beginning the building was built to create a monumental tomb for the emperor's ashes. The location was chosen based on the previous function of the location. It was built in an area which was previously used as cemetery. Although it was built near the Tiber, the ground was very solid. The monument was linked with the rest of the city by the bridge in front of it.

Till 217 AD the building kept its function as tomb.[2] The exact original layout of the tomb is still uncertain. The building consisted probably of three volumes: a square base, a cylindrical volume on top of it and another cylindrical volume, but smaller in diameter, on the top of the other. Some parts of the volumes are still visible. They formed the core around which the new constructions were built over the next years.

In Medieval Age, the building was transformed from a tomb into a fortress, which resulted in a modified layout. The location of the building was perfect for a fortress because of its location on the northern access to the city. It became an even more important place when the construction of the Sint Peters Basilica started. The changes took place over more than ten centuries. The first change took place in 271 AD, when the building became connected to the Aurelian Walls.[3] The last modification took place under military architect Lamberti in 1404.[4]

The Papal Court took possession of the building when they came back to Rome after its period in Avignon. Over the next centuries, many interventions were carried out to make the building a safe residential place for the Pope. Also the fortification was modified due to the use of new weapons. The bastions at the corners of the square walls were strengthened and around the walls, a moat was created. Water from the river was streaming through this moat.

In the sixteenth century, a new project for the fortification of the building was carried out.[5] Pentagonal ramparts and fortified towers were added to the existing square walls meaning that a second defensive wall was constructed (Fig.102 and Fig.103).

The last modification regarding the outside appearance of the castle was between 1889 and 1906 because a part of the fortification had to be demolished in order to create de embankment and boulevard (Fig.104).[6] Since the boulevard was raised, the height of the facade of the castle reduced. Now, the building is a museum.
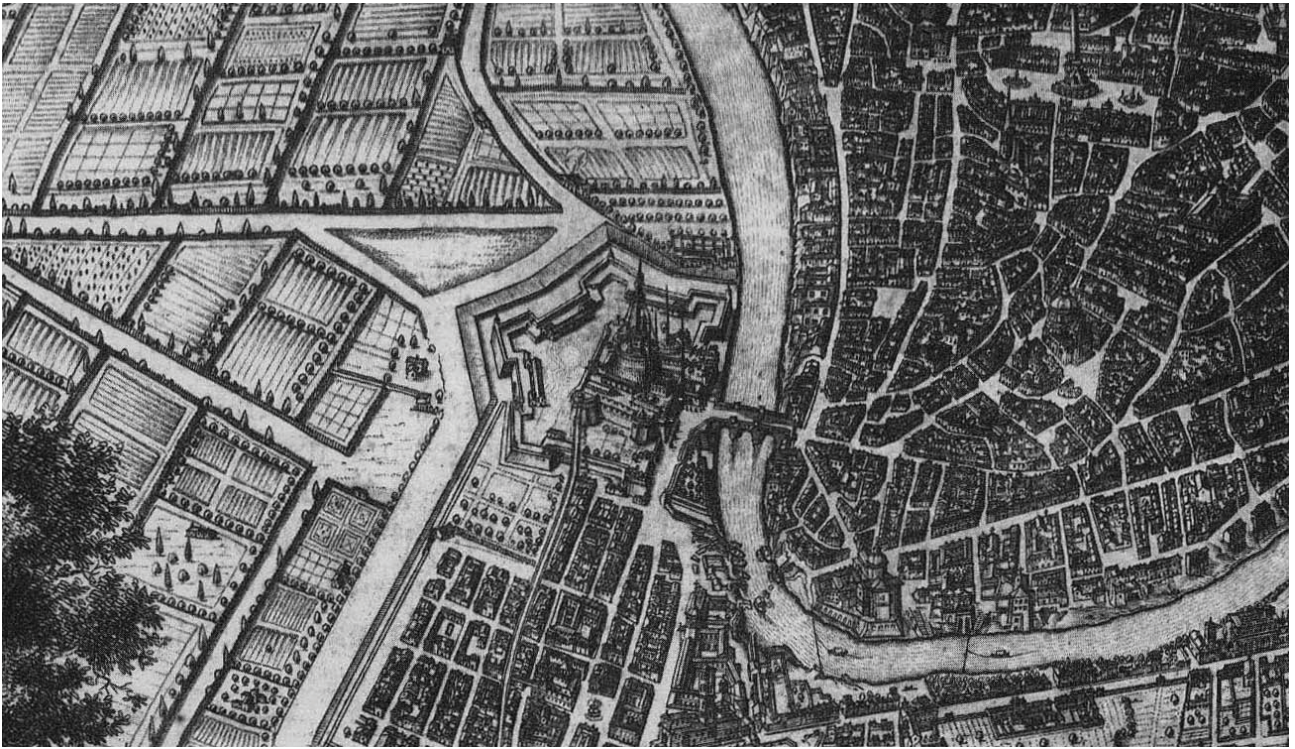
1,2,3,4,5,6 www.castles.org

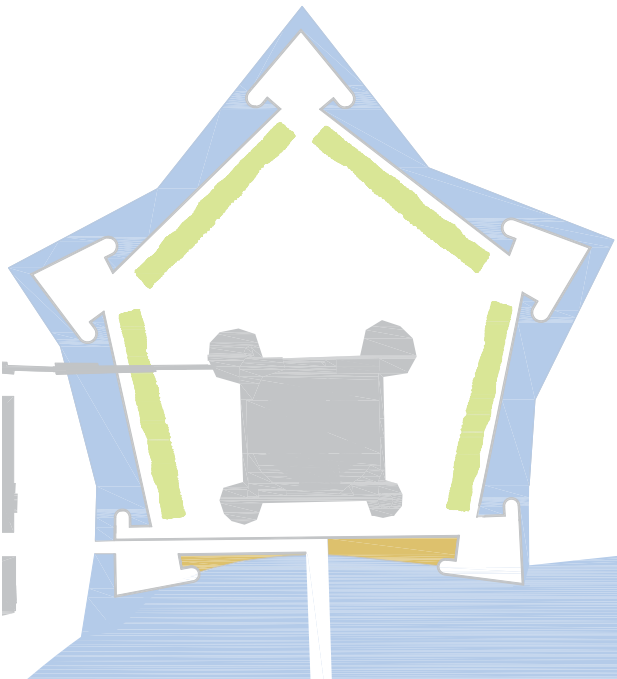Fig.102 - Castel Sant' Angelo after the project of fortification in the 16th century

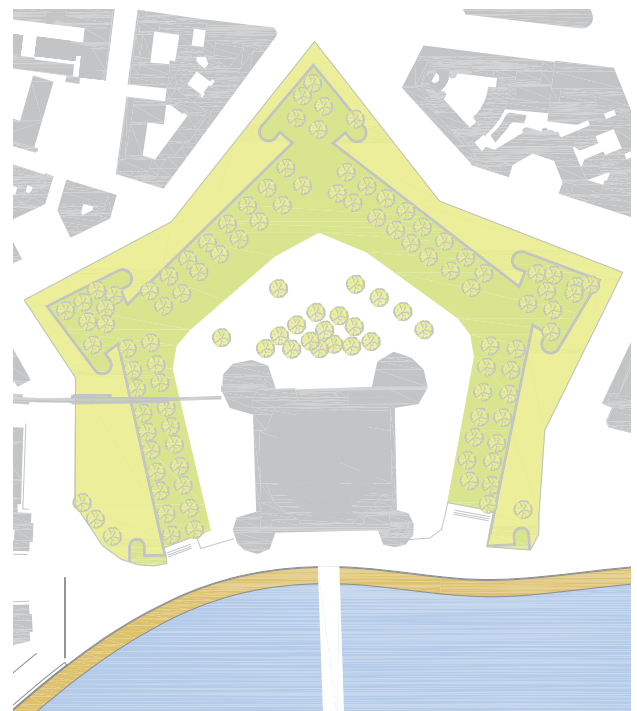Fig.103 - Situation from the 16th century till the embankment.

Fig.104 - Current situation.

DESIGN

In the new design, the history of the location becomes part of the future. The design follows the form of Castel Sant'Angelo from before the construction of the embankment telling something about the relation between the place, the river and its transformation over time. This means that the two arrow-shaped elements of the fortification wall in the direction of the water become visible again (Fig.105).

The design strengthens the relation between the historical layers of the location. It makes the location more understandable and readable, strengthening the identity of the city.

The water of the Tiber that previously flew through the moat is restored in the new design to reveal the form of Castel Sant'Angelo from before the construction of the embankment. By restoring this moat the complete shape of the fortification walls is accentuated.

To let people enjoy the special place of the riverfront, the design improves accessibility to the low level quays by two new designed arrows that are based on the historical arrows of the castle. By improving accessibility, the relation between the quays, river and context will be restored. Due to the design the Tiber is better integrated in its direct urban context.

Along the stairs in the left arrow, a study room and café with terrace are situated on the first basement level. A restaurant with terrace is situated on quay level.

The right arrow contains a hotel with conference rooms. The facilities of the hotel are divided over two stories.

The facilities in the two new designed arrows improve the quality of the area. The facilities that are divided over the height of the embankment create an area that is not a place to pass but a place to stay. It creates an area where one is able to experience the riverfront. Besides that, the program creates social control.
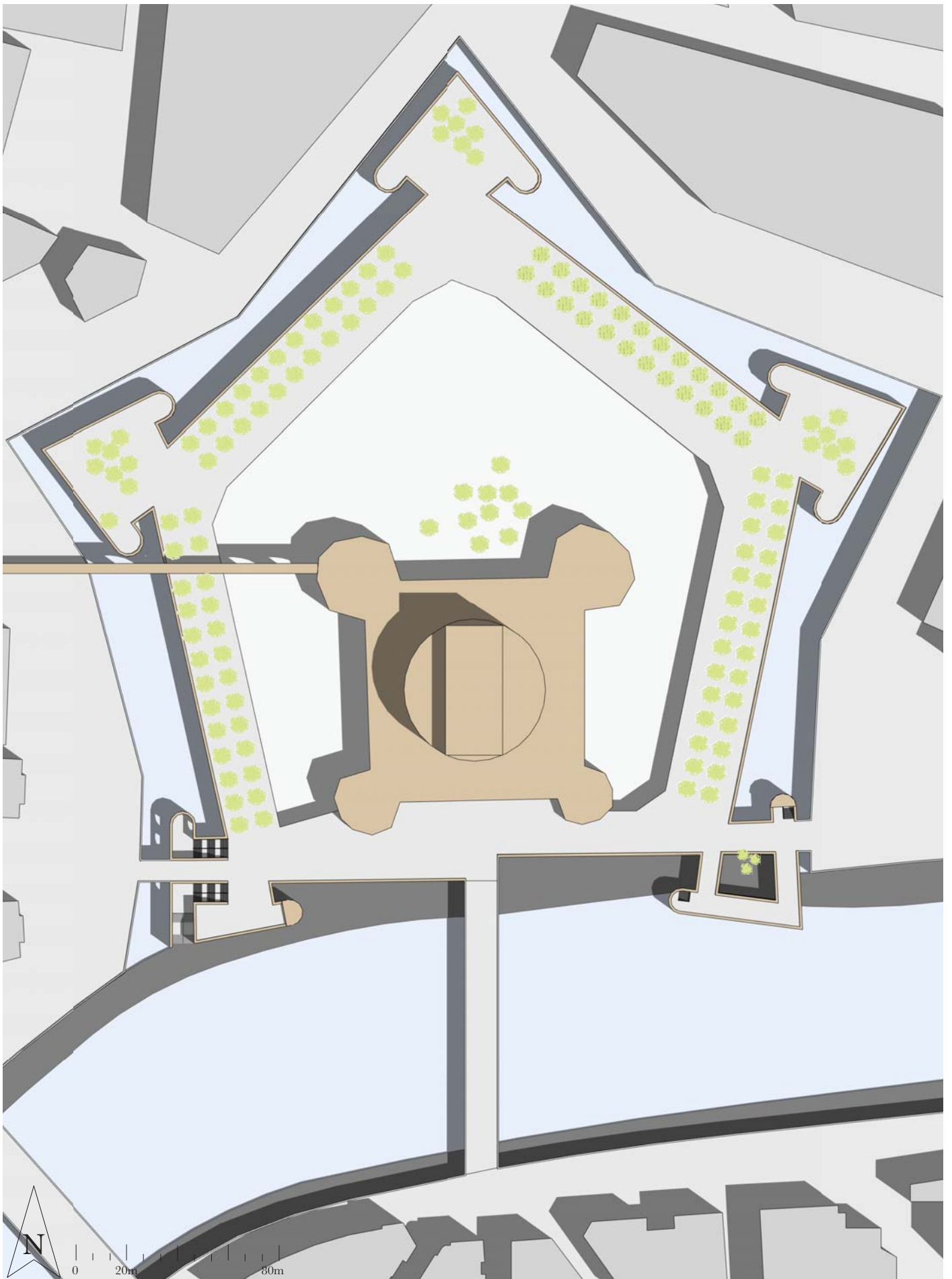
Fig.105 - Top view. Scale 1:2000

N

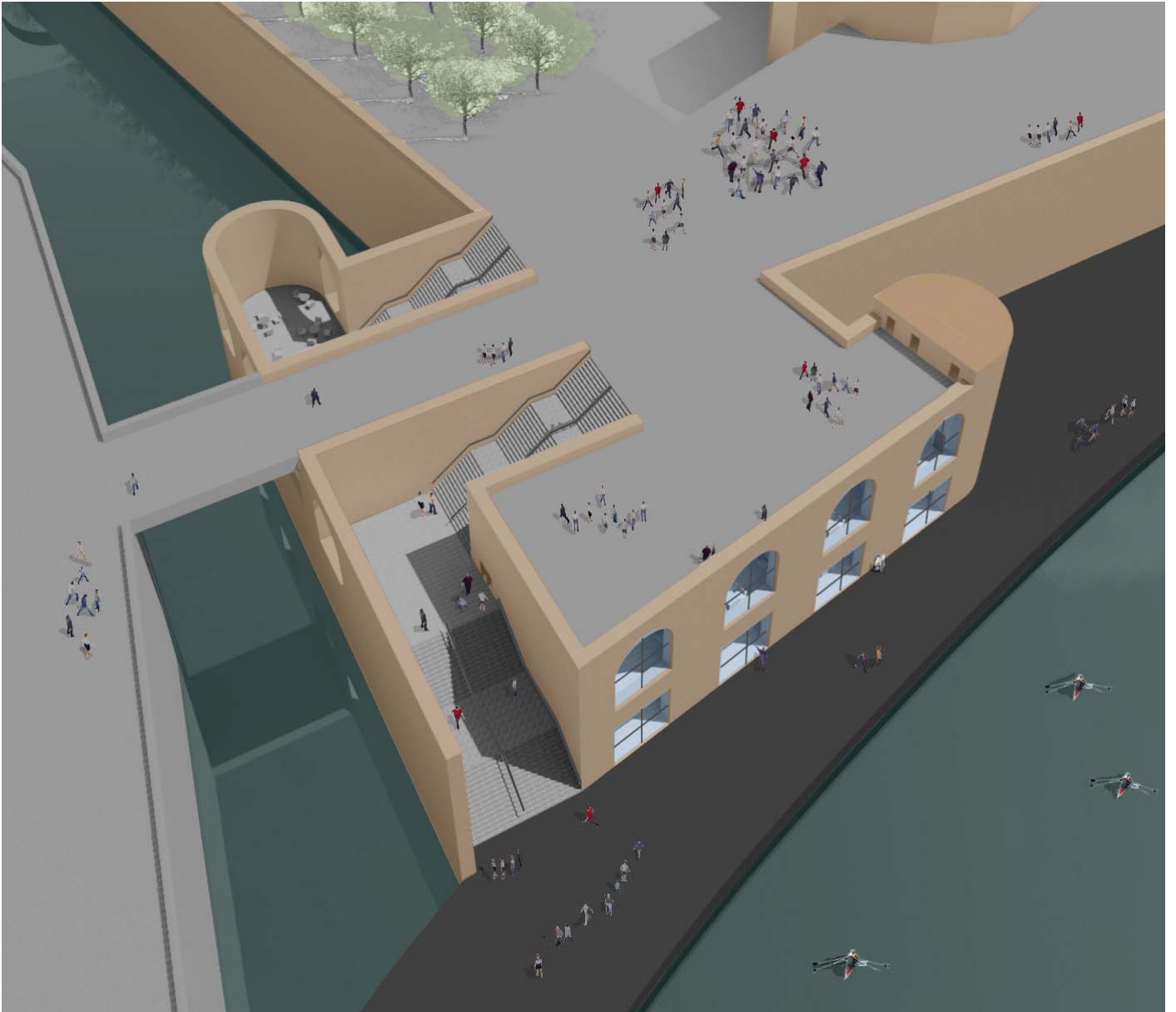0   20m   80m

DESIGN LEFT ARROW

Fig.106 - Design left arrow
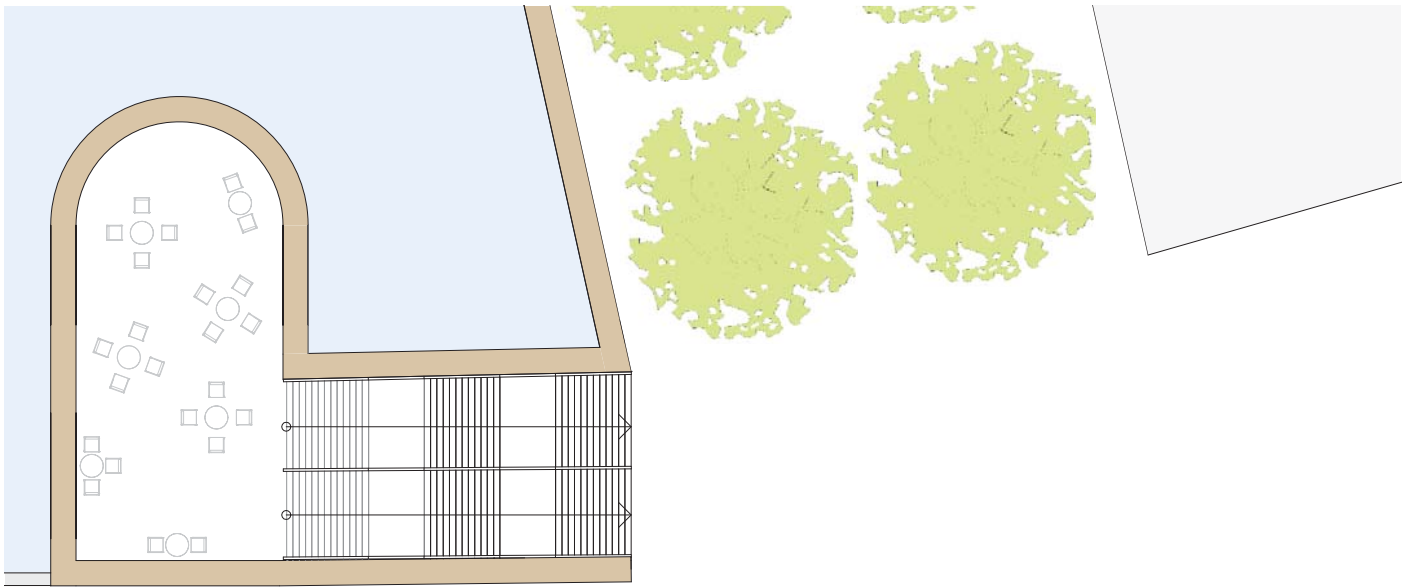
Surface level

(Fig.107)

A new bridge connects the mainland on the left side of the moat with the arrow. This is similair to the situation before the embankment (Fig.103).

The left arrow improves accessibility to the water and invites people to experience the river area. On surface level one has a viewing platform where one can overlook the river and the activities around it.
A wide stairs descends to the low level quays. People get the feeling that they are invited to enter and experience the river area.

Public toilets and an elevator are situated on surface level. The elevator provides access to the study room on the first basement level and to the restaurant on quay level. It improves accessibility to the low level quays for disabled people. In the current situation, disabled people cannot descend to the low level quays.
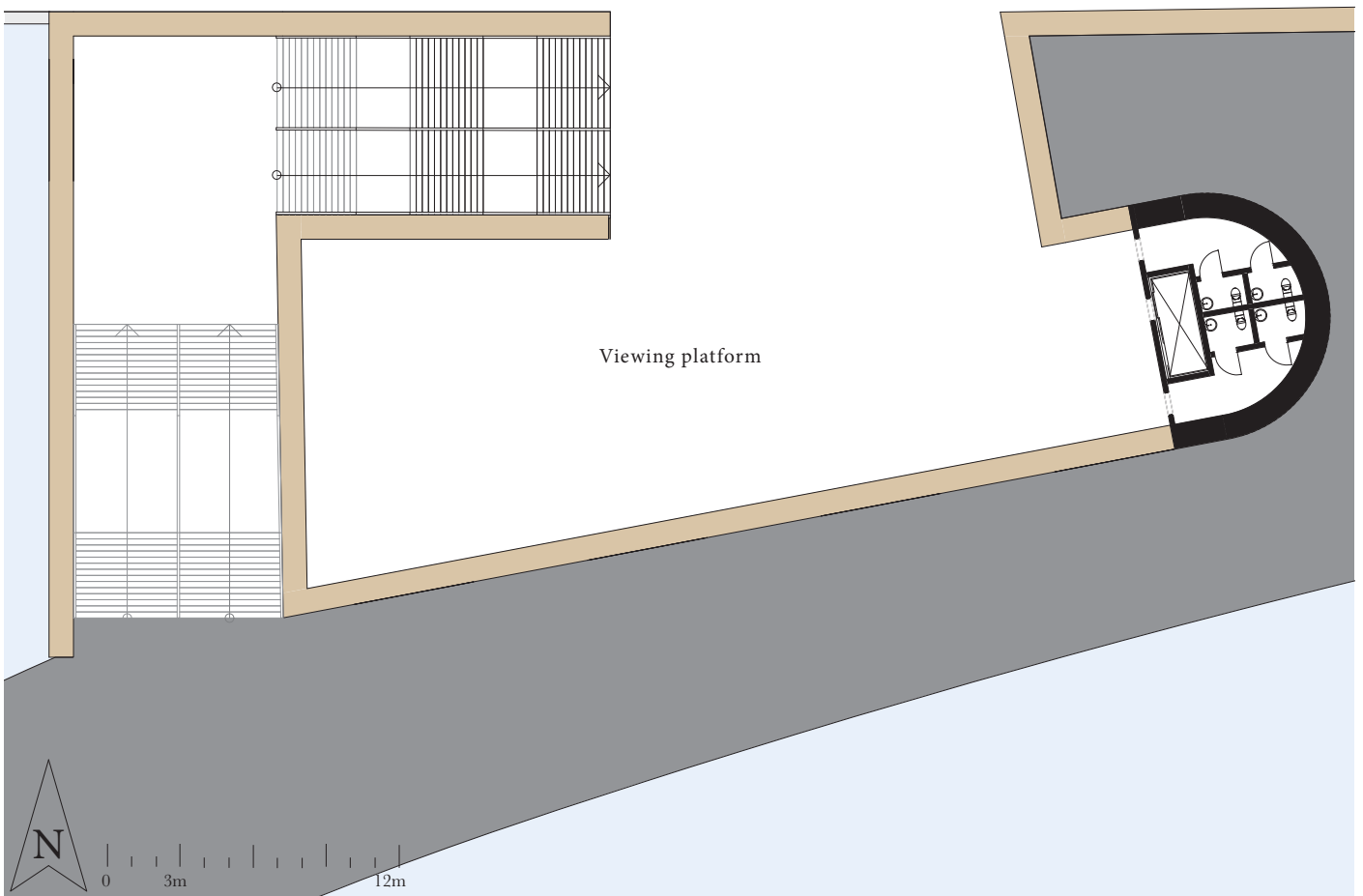
Bridge

Viewing platform

Fig.107 - Left arrow, surface level. Scale 1:300

N

0   3m   12m

First basement level (-8,0 meter)
(Fig.108)

Two stairs descend from surface level to -8,0 meter. The northern stairs leads to a terrace and café. The terrace that belongs to this café is surrounded by the immense fortification walls of 9,0 meters high. It is located in a sort of cocoon where one experiences the impressive mass of the fortification. In this way, the intervention does not only support the experience of the river area but also of the fortress itself. The walls provide a tranquil area which is in contrast with its surroundings. Here one only sees the sky above and the water flowing through the moat.

The southern stairs enters a plateau on which one already has a good view on the river area. Via this plateau one can enter the study room that is meant for students in Rome. It provides a small bar and flexible working spaces with a view over the river.

In case of a flood, the facilities on the first basement level cannot be used. The terrace and stairs will become unusable making the facilites unaccessibile.
Water-resistant sliding doors will be closed in front of the windows and doors of the café and study room. It will protect the inside space against water. These sliding doors will be explained further in the chapter "A watertight design".
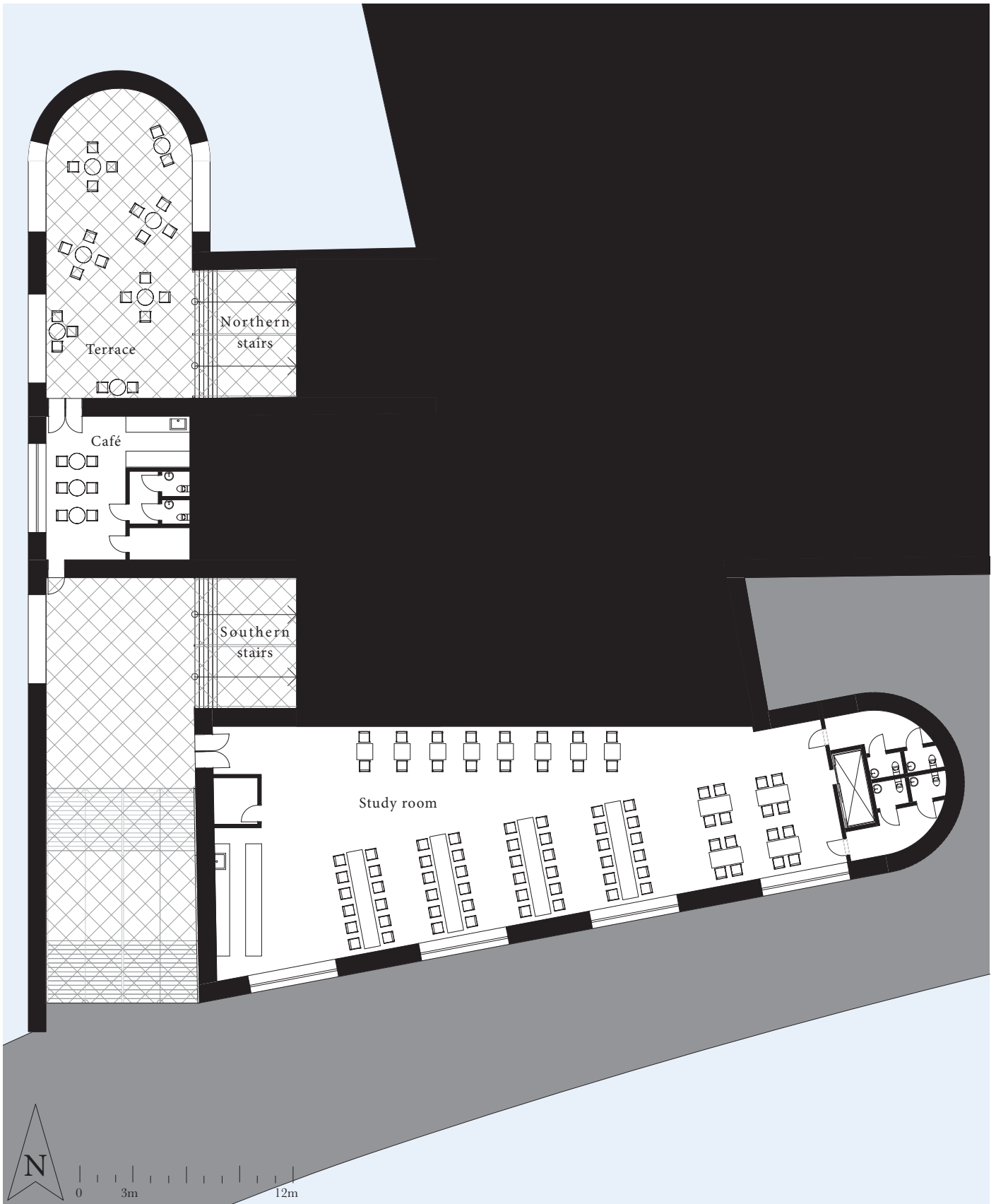
Terrace

Northern
stairs

Café

Southern
stairs

Study room

N

0   3m   12m

Fig.108 - Left arrow, first basement level (-8,0 meter). Scale 1:300

Quay level (-14,0 meter)
(Fig.109)

A restaurant is situated on quay level. Here one can have a good look over the river while having a drink or while meeting people. In case of good weather conditions, a terrace can be provided in front of the restaurant on the quay.

Like the facilities on the first basement level, the restaurant cannot be used in case of a flood but the internal space of the restaurant will remain intact.
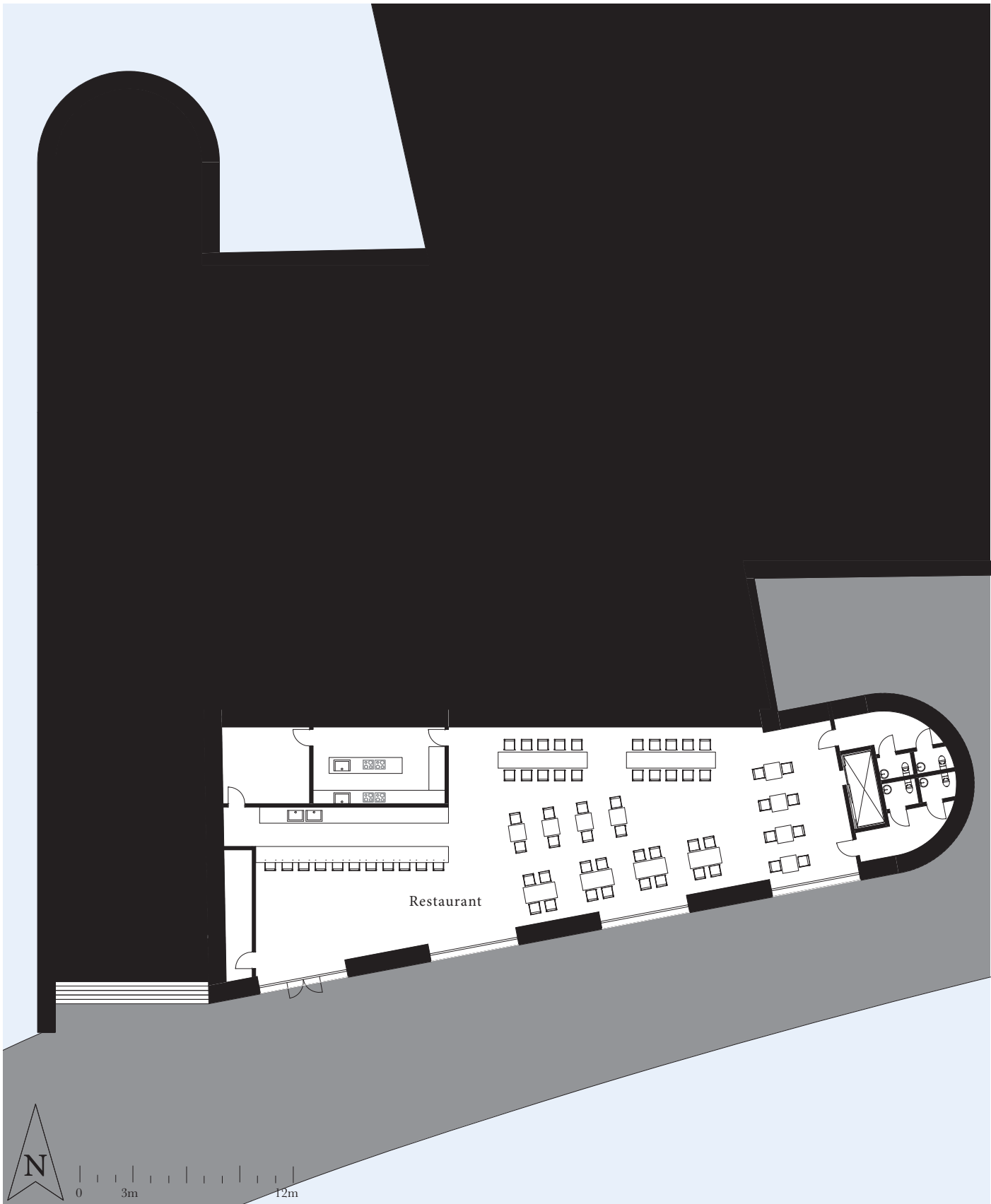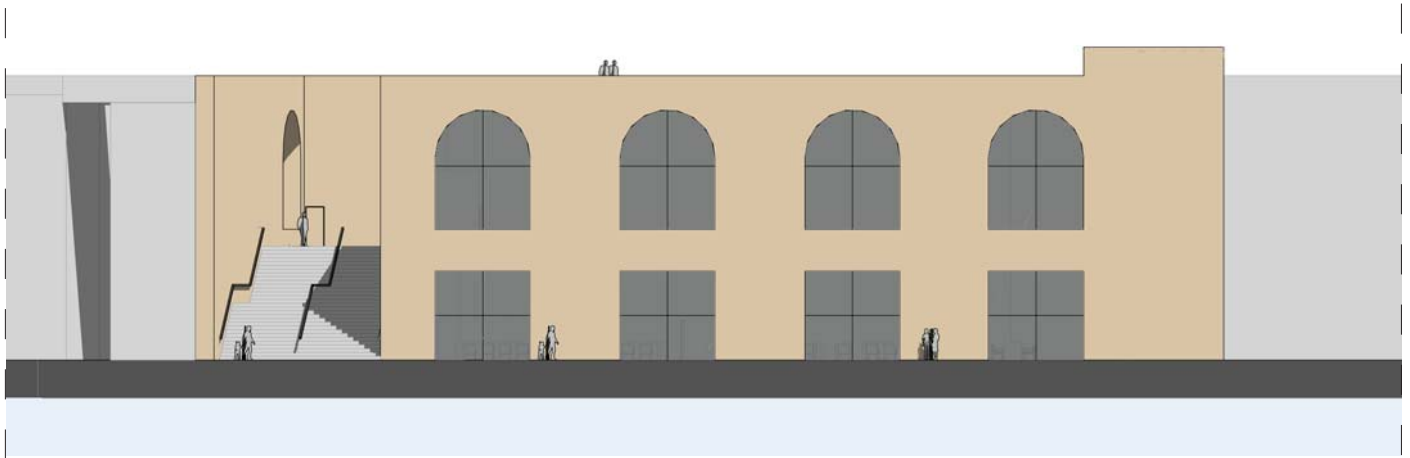
N

0   3m   12m

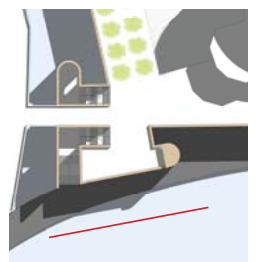Restaurant

Fig.109 - Left arrow, quay level (-14,0 meter). Scale 1:300
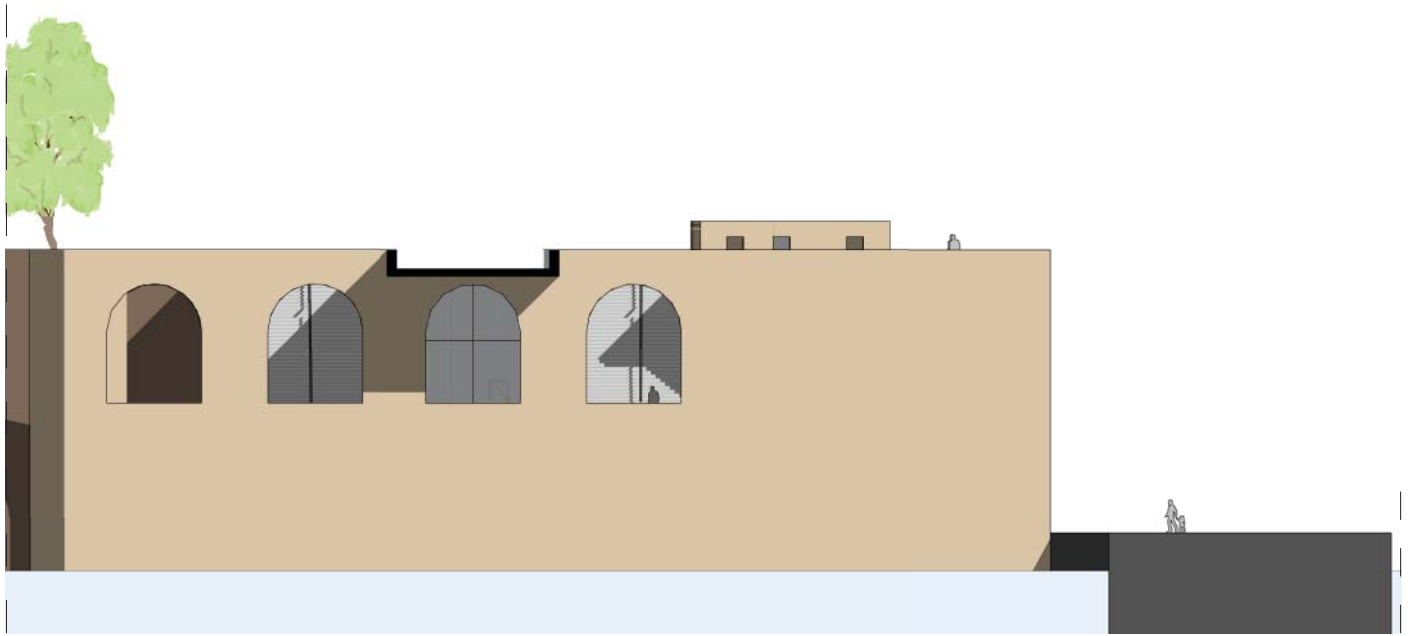
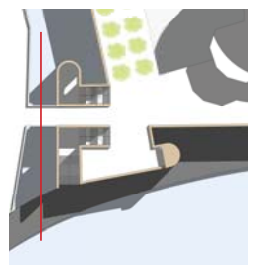Fig.110 - Left arrow, view from water. Scale 1:400

Fig.111 - Left arrow, view from in the moat. Scale 1:400
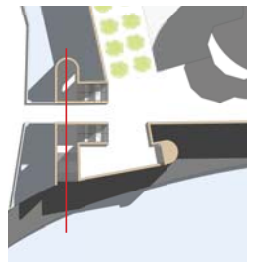
Fig.112 - Left arrow, section. Scale 1:400

0   4m   16m

DESIGN RIGHT ARROW
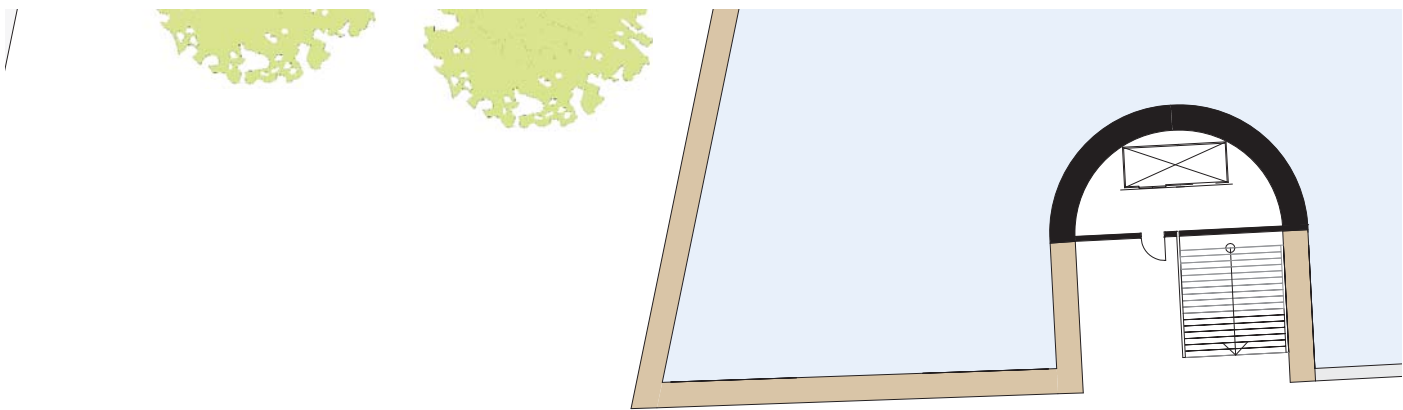

Fig.113 - Design right arrow

Surface level
(Fig.114)

Like the left arrow, the right arrow has a viewing platform where one can overlook the river and the activities around it.
Besides a view on the river, one can also look downstairs in the open patio and see what happens in the hotel that is situated in the arrow itself. Via the patio one can already see the quays, triggering people to descend via the left arrow.

The entrance of the hotel is situated in the northern part of the arrow. The stairs on the southern part is only part of an escape route for users of the hotel.

Like the left arrow, the right arrow is connected with the mainland via a bridge over the moat.

Bridge

Viewing platform

N
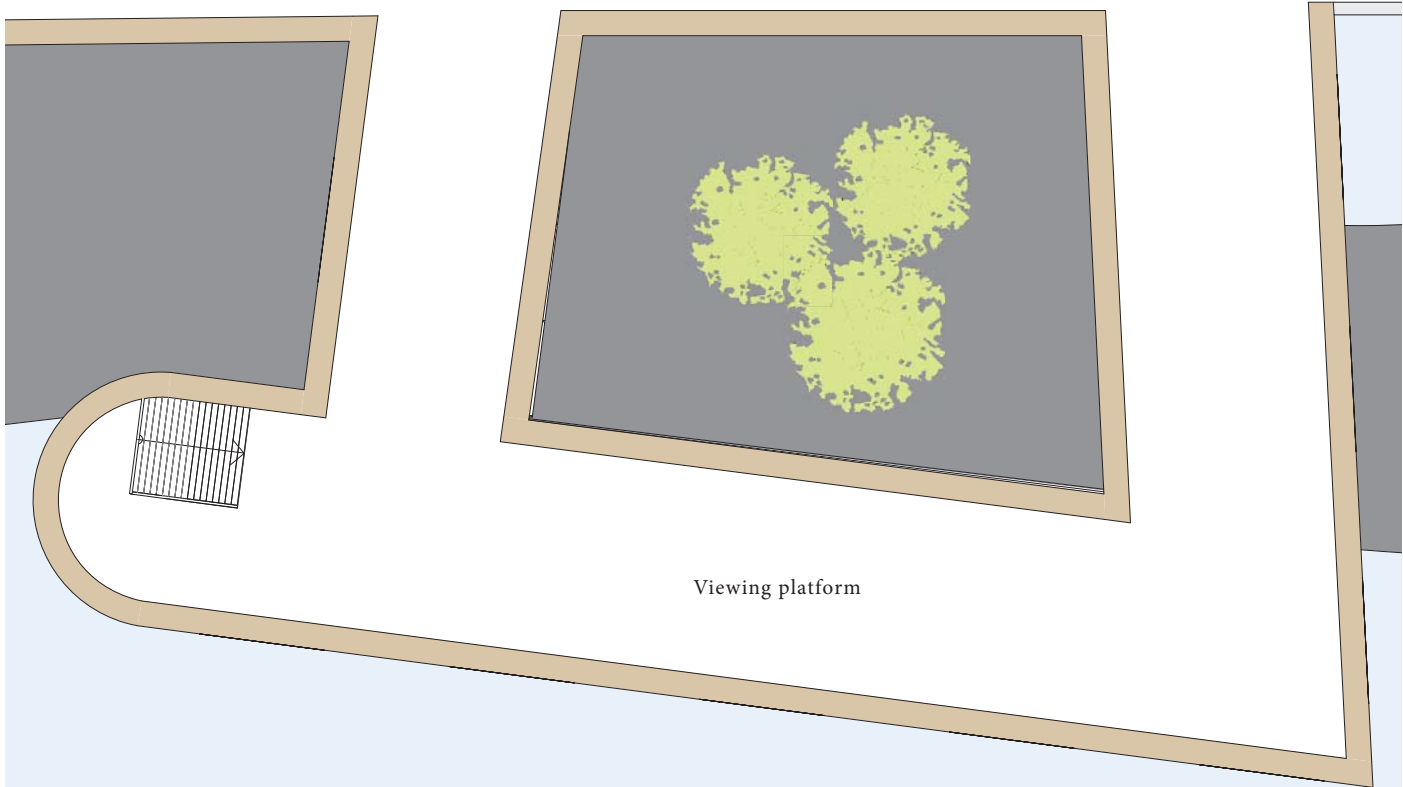
0   3m   12m

Fig.114 - Right arrow, surface level. Scale 1:300

First basement level (-3,55 meter)
(Fig.117)

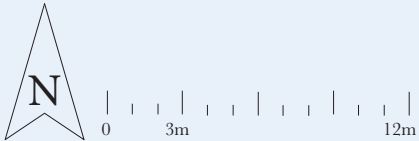The facade of the left arrow (Fig.115) and right arrow (Fig.116) have the same appearance to create continuity in the design. Like the left arrow, the right arrow consists of two stories with internal spaces, but the figures already show that the division of stories over the height is different.

Both two stories of the right arrow are occupied by the hotel. Unlike the restaurant and study room in the left arrow, a hotel has to do with bookings that could be made far in advance. Therefore the hotel should be able to stay open most of the time. When the water reaches the windows of the hotel rooms, the rooms have to be closed. The risk of water reaching the windows, is minimized in the design, because both levels of the hotel are situated as high as possible (Fig.116).
The first basement level in het right arrow starts 3,55 meter below surface level and the second basement level starts at 7,1 meter below surface level. The average water level is -7,1 meter below surface level. Although there are always floods that go higher than the lowest level of the hotel, most floods will be unnoticed.

All hotel rooms have a view on the water, supporting the experience of the water. In case of a flood that reaches the windows on first basement level, water-resistant sliding doors will be closed in front of the windows to protect the internal space.

Besides hotel rooms, the first basement level also consists of a restaurant with kitchen. The restaurant has a view on the open patio. In case of a flood, the patio can be closed on quay level, meaning that the patio will always be free of water. Since the patio is always free of water, the restaurant could be used in any case; also in case of a flood.

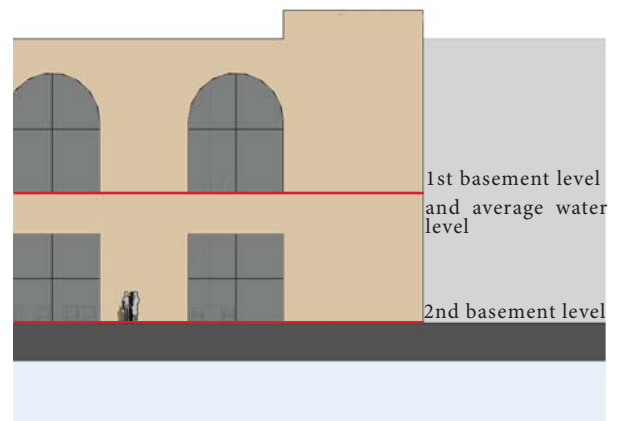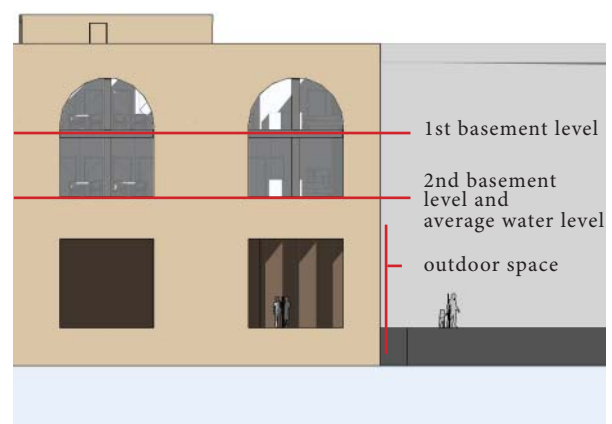Fig.115 - Part of the facade to the water, left arrow

Fig.116 - Part of the facade to the water, right arrow

Restaurant

Kitchen

Storage

Storage

Reception

N

0   3m   12m

Fig.117 - Right arrow, first basement level (-3,55 meter). Scale 1:300

Second basement level (-7,1 meter)
(Fig.118)

The second basement level consists of hotel rooms and conference rooms.

Hotel rooms on the second basement level have a higher risk of water reaching the windows than the hotel rooms on first basement level, however the risk is very small.

In case of a flood, sliding doors will be closed in front of the windows and the rooms cannot be used. The rooms on first basement level could stay open if the water level does not reach that height in order to keep part of the hotel open.

The floods can be predicted two weeks in advance, which gives the hotel time to create alternative arrangements for guests.

Conference rooms are orientated to the patio instead of the river. This means that the conference rooms could be used in any case; also in case of a flood.

Conference rooms

N
0   3m   12m

Fig.118 - Right arrow, second basement level (-7,1 meter). Scale 1:300

Quay level (-14,0 meter)
(Fig.119)

On quay level the arrow is opened in order to create a passage for people that make use of the quays. Via the patio there is a visible connection between quay level and surface level.

In case of a flood, the passage will be closed. Water-resistant sliding doors will close all openings on quay level.
It is possible to make a green space of the patio on quay level because the patio is always free of water.
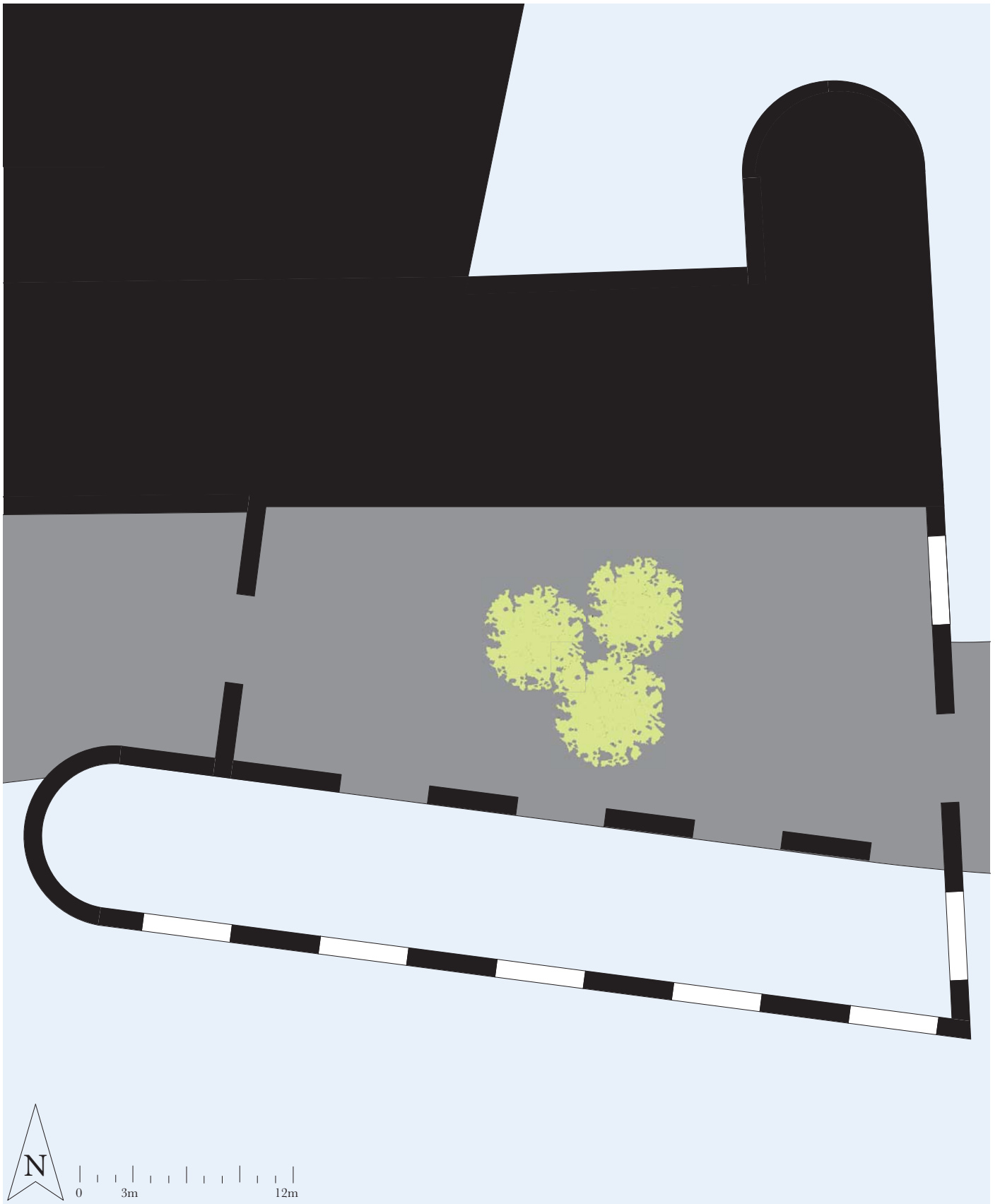
Fig.119 - Right arrow, quay level (-14,0 meter). Scale 1:300

N

0   3m   12m
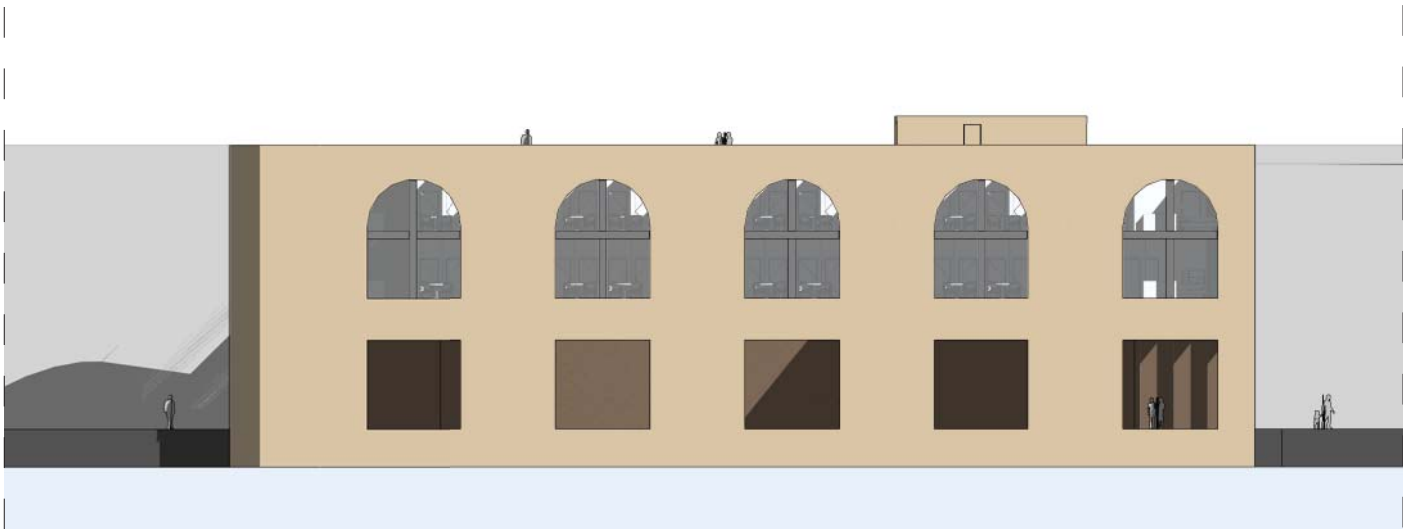
0   4m   16m

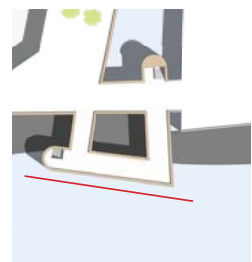Fig.120 - Right arrow, view from water. Scale 1:400

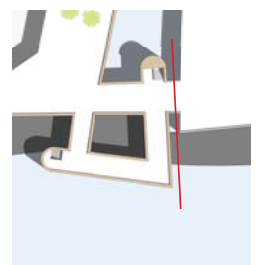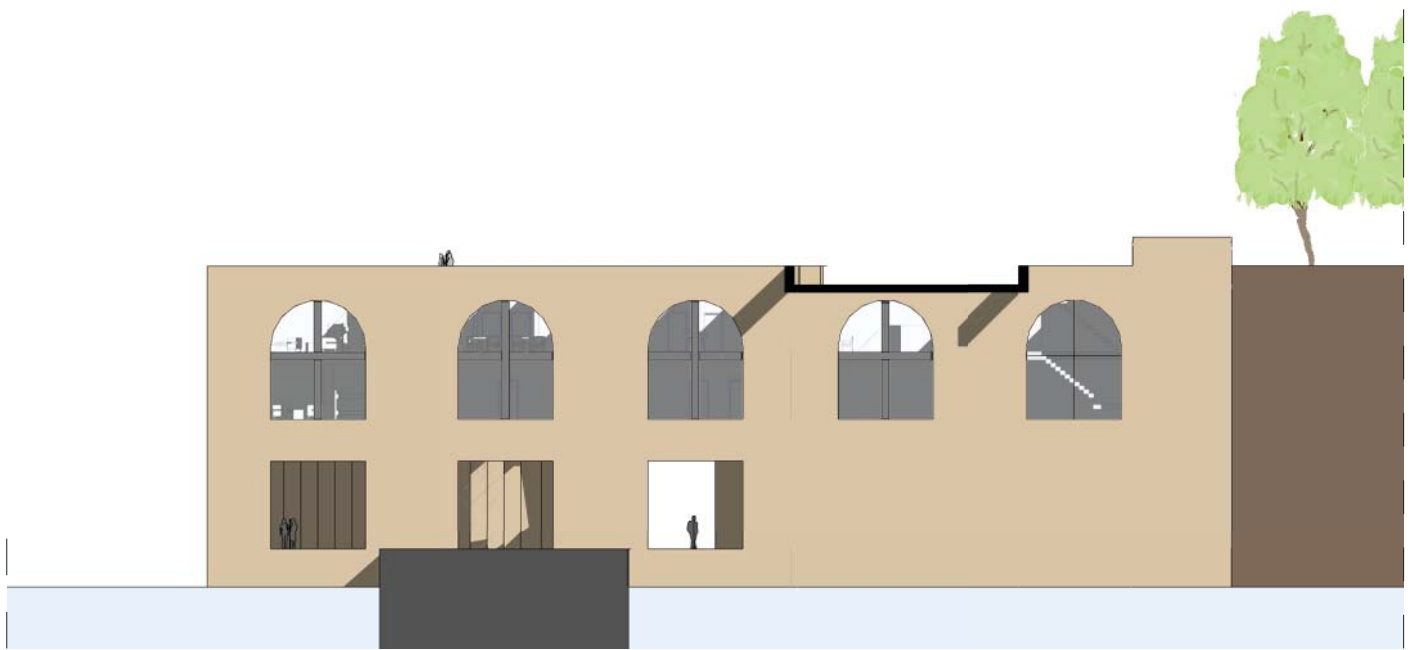Fig.121 - Right arrow, view from in the mout. Scale 1:400

0   4m   16m

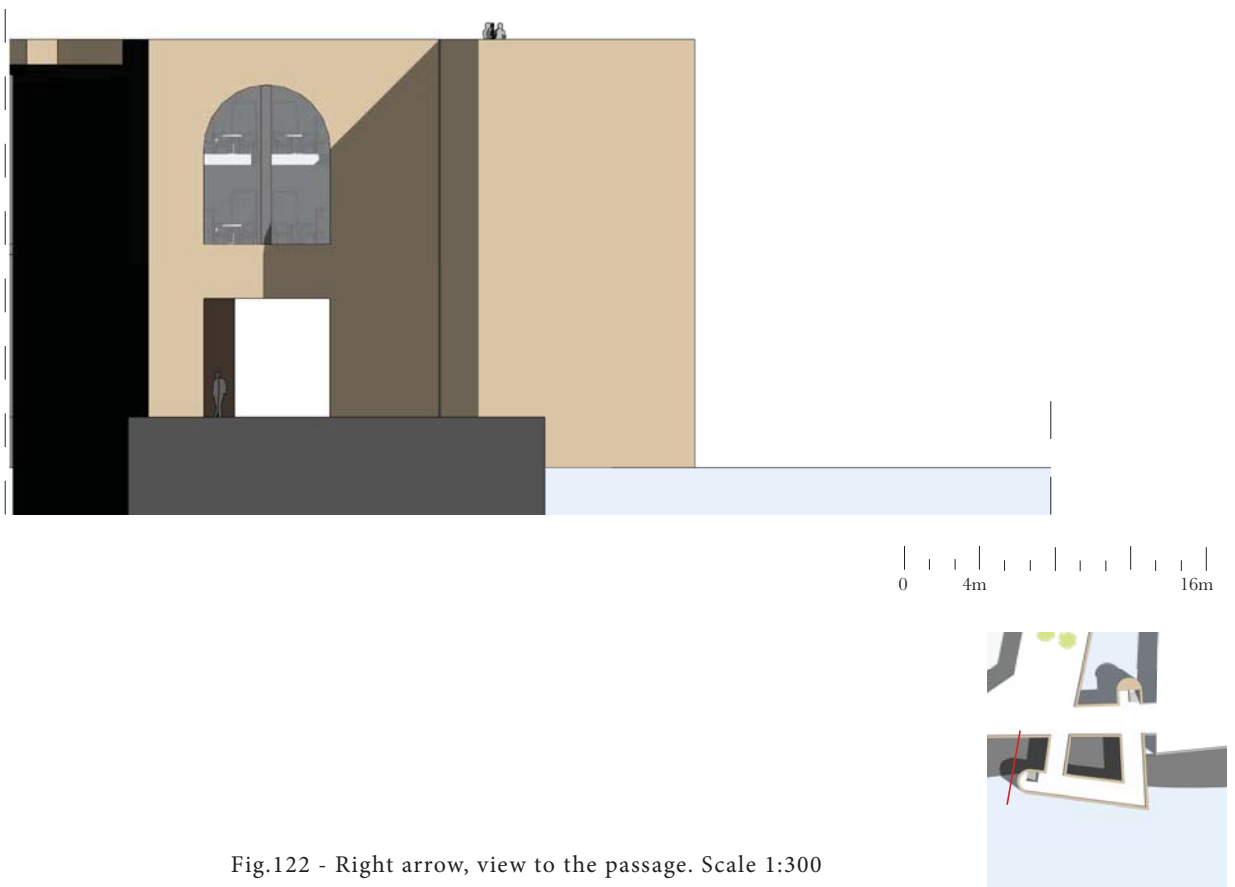0   4m   16m

Fig.122 - Right arrow, view to the passage. Scale 1:300
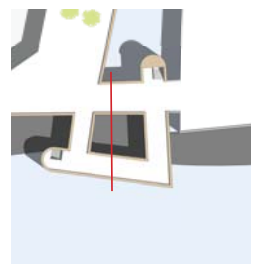
Fig.123 - Right arrow, section. Scale 1:300

0   4m   16m

Fig.124 - View from the water to the new design. Scale 1:800

0   8m   32m

Materials and construction

As the plans of both arrows show, the outer walls of the arrows are very thick. Parts of the fortification walls that are still present in the current sitution, show that the old walls were 1,0 meter thick.

Like the old fortification walls and Castel Sant' Angelo, the walls of both new arrows are made of brickwork. Like in history, the brickwork is only the outer layer of the wall. The inner layer consist of a load bearing structure.

Already in Ancient Rome, round arches of brickwork, Roman arches, were used for many structure like aqueducts and bridges. It was also used to create openings in walls.

The aqueducts that are connected to Castel Sant' Angelo are an example of a sturcture where they made use of Roman arches. The same structure is used for the openings in the new design of intervention one (Fig.125). Above the windows a Roman arch is created. Like the aqueduct, it consist of different layer of vertical brick work that is placed under a certain angel in order to create an arch. In this case, three layer of vertical bricks are used.

The walls of the arrows contrast with the surroundings because the embankment walls are made of travertine. Due to its contrast, the shape of the fortification will be accentuated (Fig.124).

Windows and openings in both arrows consists of normal glass. Special sliding doors can be closed in front of them in order to protect the internal spaces at times of a flood. The sliding doors will be explained in the chapter "A watertight design".
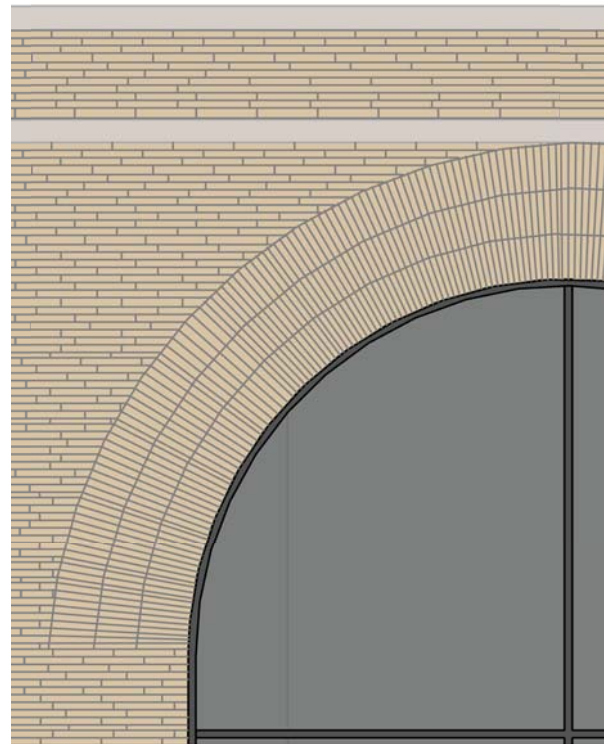

Fig.125 - Detail of Roman arch in the new design. Scale 1:50

INTERVENTION TWO

HISTORICAL BACKGROUND

Like the other interventions, intervention two expresses the specific conditions of the location and context. The new design of intervention two transforms a historical reference into a new structure.

In order to understand the implementation of the historcal layer in the design, the history of the location will be explained.

The location of harbour Navalia is the location of intervention two. Harbour Navalia was a port for military ships in Ancient Rome.[1] Here, ships were repaired and loaded for war. Like the map of Ancient Rome already showed (Fig.54), the Aurelian Wall had to do a step back in order to let the harbour function directly along the Tiber. Navalia is only visible on maps of Ancient Rome. After this period the harbour dissapeared. There is not much information about the harbour. The design is unknown.

The location of intervention two, seems to have had two important functions in history. Ruins of horse stables, a Roman house and spa have been found on the location. In 2009 archeologists started digging close to the location of the harbour, which is known as Largo Perosi. Largo Perosi is situated a bit more land inwards. Archeologists found foundations and basements from buildings from the 1930's (Fig.126).[2] Digging further, people found ruins from buildings between the seventeenth and nineteenth century.

In 2010 archeologists arrived at the layer that showed ruins from Ancient Rome (Fig.127).[3] The northern side revealed stables for horses whom were used during games in Circus Maximus.

According to archeologists, these stable seems to be used until the fourth century.

In the direction of the river, one found a paved street leading to ruins of an old spa. Also a Roman house was found on the location. All these ruins are situated 2 meters under ground level.

There is no information about a possible relation between the harbour and the other functions during its existence in Ancient Rome. There is neither information that proves that the functions were there at the same time during this period.

1 Heinzelmann, M., Martin, A., *OpCit.*
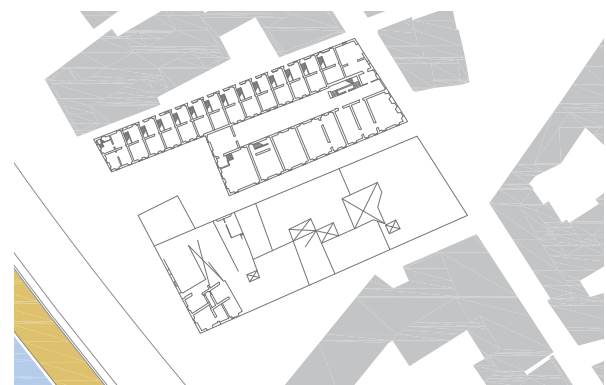*2,3* www.archeoroma.beniculturali.it
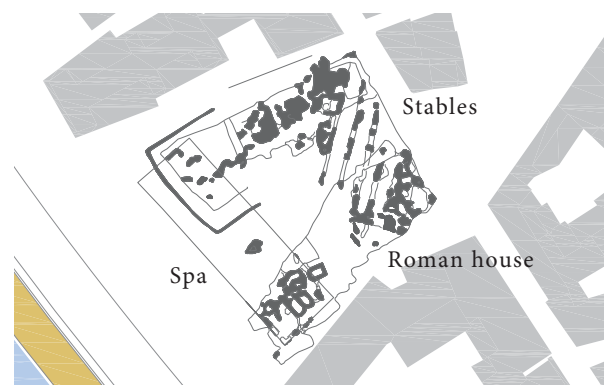

Fig.126 - Finds from 1930's

Fig.127 - Finds from Ancient Rome

DESIGN

The new design (Fig.128) refers to the situation of the locaton in Ancient Rome. A new harbour will refer to the old harbour Navalia, making the history of the location readable in todays situation. It strengthens the relation between historical layers. The city and the water will be reconnected like it was in Ancient Rome.

The new harbour is not meant as place for military ships like it was in history. In the new situation, the harbour will be used for pleasure- and rowing boats. It contributes to the recreational activities along the river.

The harbour is constructed in the embankment wall on quay level (Fig.129). It is connected with an harbour pavillion on top of it, which is also constructed in the embankment wall. Both facilities support the experience of the river and improve the quality of the riverfront.

An entrance on surface level (Fig.130) invites people to descend to the Tiber and harbour facilities. Accessibility to the river will improve.

The entrance on surface level contains a kiosk. The kiosk is orientated to the open archeological area, called Largo Perosi. One can sit on top of the kiosk and have a good view over the ruins of Largo Perosi. Due to the archeological finds on the location, an historical layer has been revealed and has become part of the currrent urban tissue.

The visual language that is used for intervention one is also used for intervention two, creating a connection over the length of the river on the low level quays.
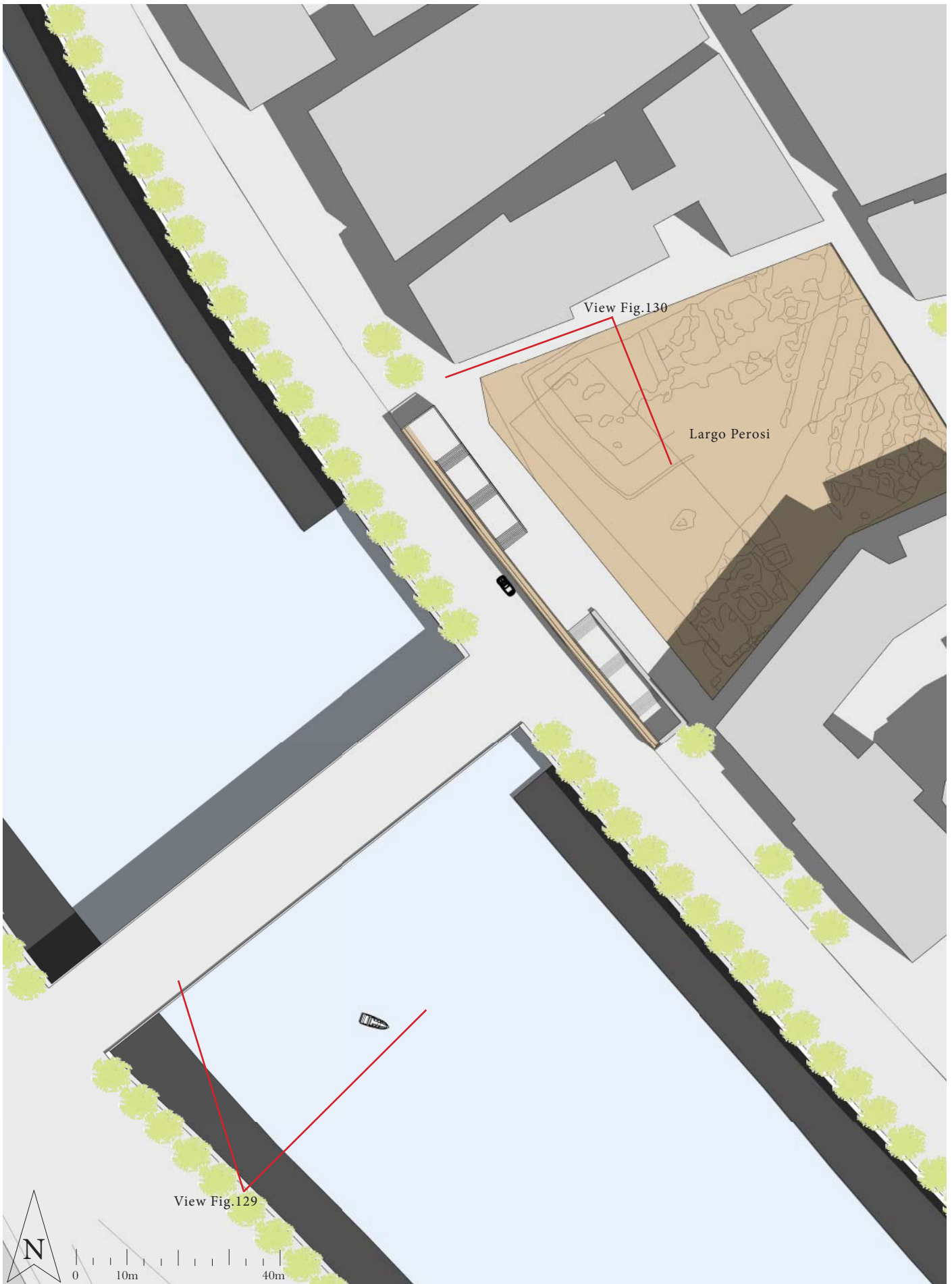
View Fig.130

Largo Perosi

View Fig.129

N

0   10m   40m

Fig.128 - Top view. Scale 1:1000

Fig.129 - View from river side

Fig.130 - View from archeological site

Surface level
(Fig.132)

On surface level, the entrance to the riverfront has a noticeable, thick wall located towards the boulevard. The wall refers to the old Aurelian Wall that had to do a step back for the functions of the harbour. At the same time it secludes the boulevard from the other side of the entrance, providing a peaceful place.

The entrance contains a small kiosk. An elevator in the kiosk provides accessibility to the low level quays for disabled people.

The roof of the kiosk is a stairs. One can buy a drink in the kiosk and then climb the stairs in order to take a seat on top of the 'old Aurelian Wall' (Fig.131). The seats on top of the wall provide a higher point of view, which means that one has a better view over the ruins of Largo Perosi. Here one can experience the ruins and learn about the history of the location.

One can also experience the thickness of the wall itself. Like the Aurelian Wall, the wall is made of brickwork.

Next to the kiosk is a wide stairs. People will feel invited to descend to the lower levels and harbour.

The total design on surface level expresses the flow of the river, which makes it slightly curved.

Fig.131 - Section over the entrance on the boulevard. Scale 1:100

Kiosk

Section Fig.131

N

0   4m   16m
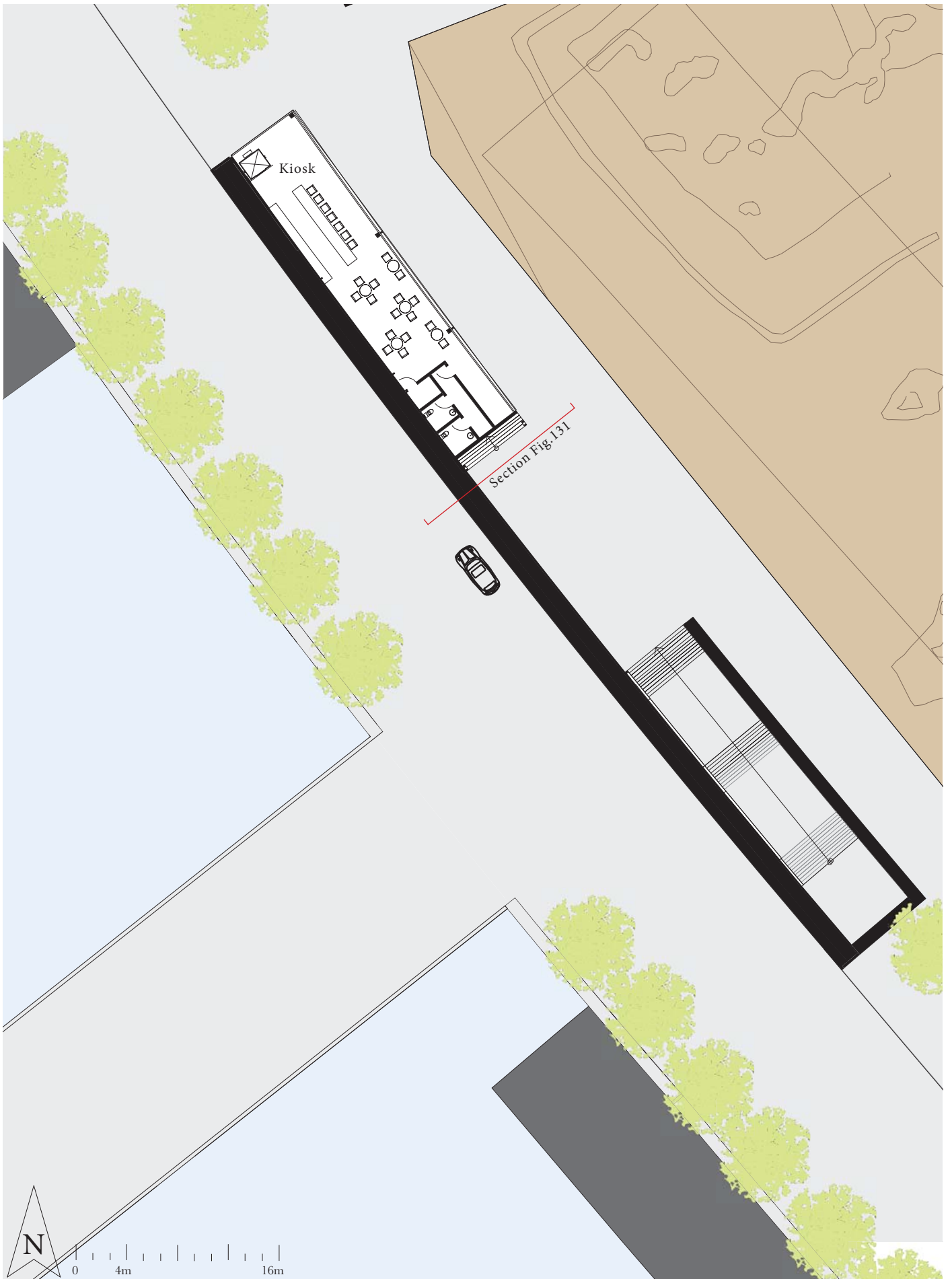
Fig.132 - Surface level. Scale 1:400

First basement level (-7,0 meter)

(Fig.133)

The first basement level houses the harbour pavillion. It contains changing rooms and a restaurant with covered terrace. On the terrace one can experience the riverfront, one can relax and behold the surroundings.

From this location one could easily see the events on the other side of the river that is part of project Tevereterno, mentioned in the chapter "River and art". It supports this project during its events by providing space where people can have a drink.

In case of a flood the harbour on quay level will not be used. This means that the harbour pavillion will not be used either. Like in the case of intervention one, water-resistant sliding doors will protect the inside space of the pavillion against water.

Kitchen

Changing rooms

Changing rooms

Restaurant

Terrace

N

0   4m   16m

Fig.133 - First basement level (-7,0 meter). Scale 1:400

Quay level (-14,0 meter)
(Fig.134)

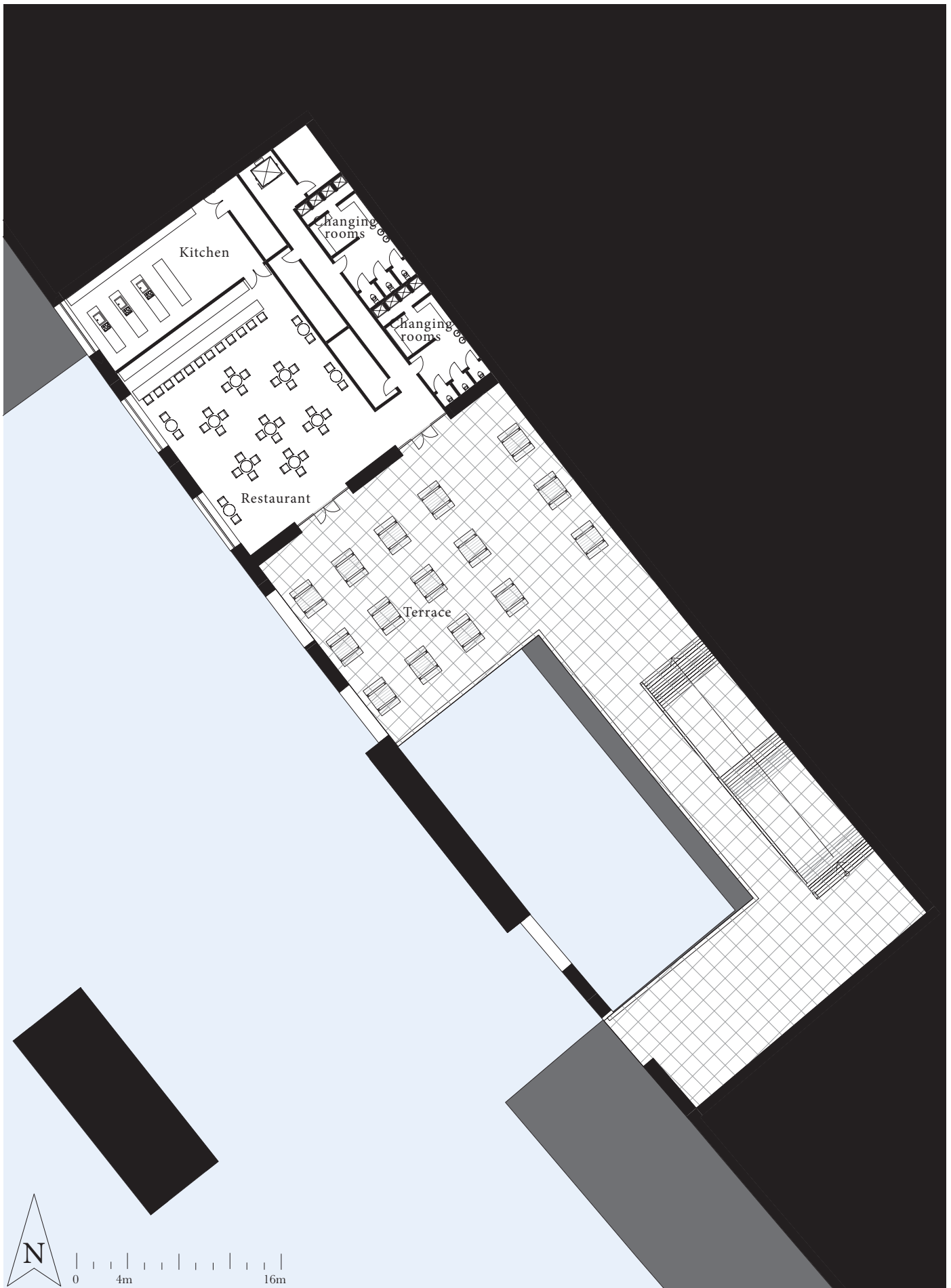While descending further downstairs, the passant is provided by a sequence of experiences by overlapping perspectives, changing light, sound and smell. Via the pavillion on the first basement level, one will enter the harbour on quay level.

The scheme of the design of the harbour is based on the general scheme of other important harbours from Ancient Rome, like Carthage in Tunisia[1] and Navalia in Ostia[2]. Like these examples, the new design shows that a harbour consists of a line of docks covered by barrel vaults in which the ships could park directly on the water. In case of repairs, a dry dock is available. Behind the row of docks, there is a building for storage. In case of the new design, a dry dock is combined with the place for storage.

The function as harbour does not only connects history with the current situation, but the function also strengthens the experience of the water area. Using the boats one can experience the area on the water instead of only next to the water.

Storage and
dry dock

N

0   4m   16m

Fig.134 - Quay level (-14,0 meter). Scale 1:400
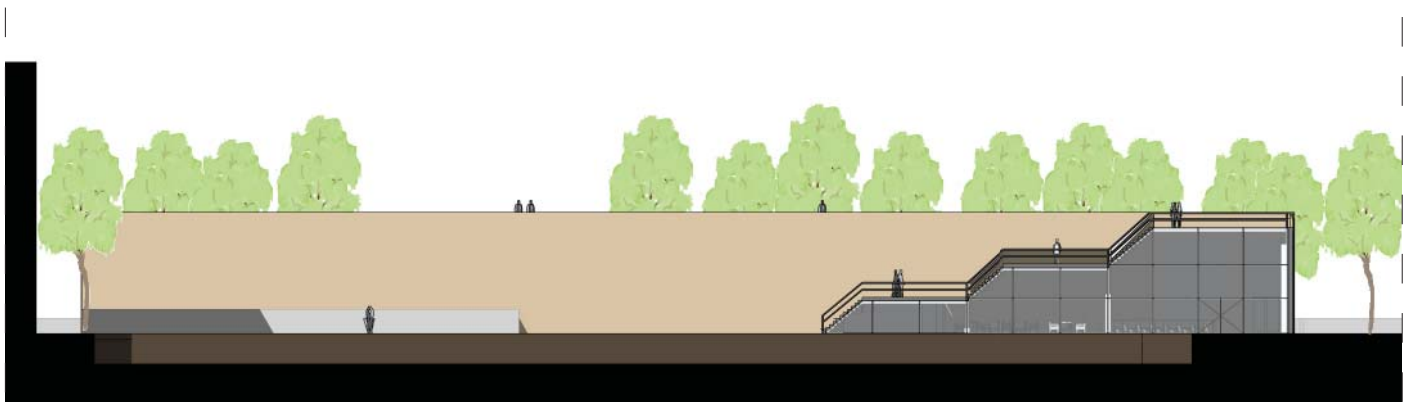
Fig.135 - View from archeaological site. Scale 1:500

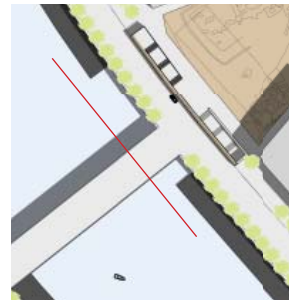Fig.136 - View from water. Scale 1:500
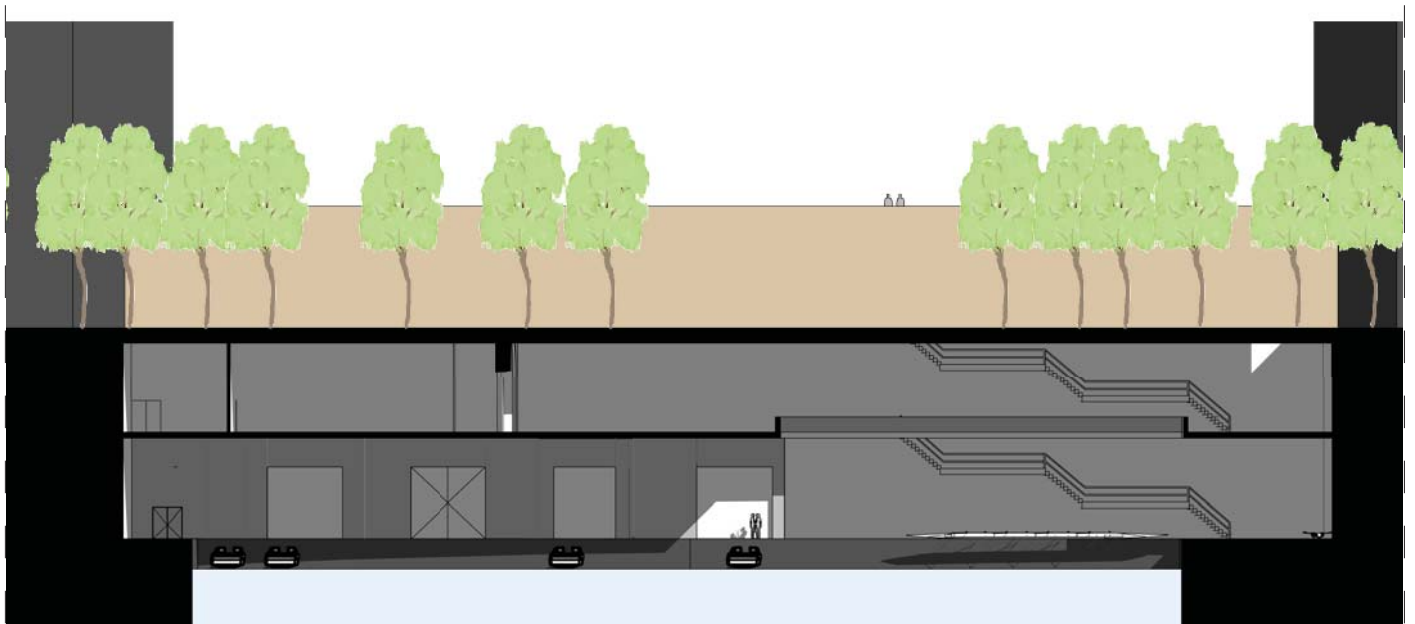
0   5m   20m

Fig.137 - Section over length. Scale 1:500

0   5m   20m

Fig.138 - Section towards the entrance of the pavillion. Scale 1:200

0   2m   8m

Materials and construction

Like in the case of intervention one, all windows consists of normal glass. Under surface level, water-resistant sliding doors can be closed in front of doors and windows in order to protect the internal spaces at times of a flood.

The design under surface level is situated in the embankment wall. The facade is made of grey travertine (Fig.139). This is the same material as the embankment wall. Roman arches in travertine are created above the windows and other openings in the same manner as intervetion one already showed.

Since the design of the harbour and its pavillion is designed in the embankment wall under the boulevard, the boulevard gets a new floor and structure at the location of the design. A reference is the situation along the river Po in Turin.

Fig.139 - Detail facade river side. Scale 1:200

A WATERTIGHT DESIGN

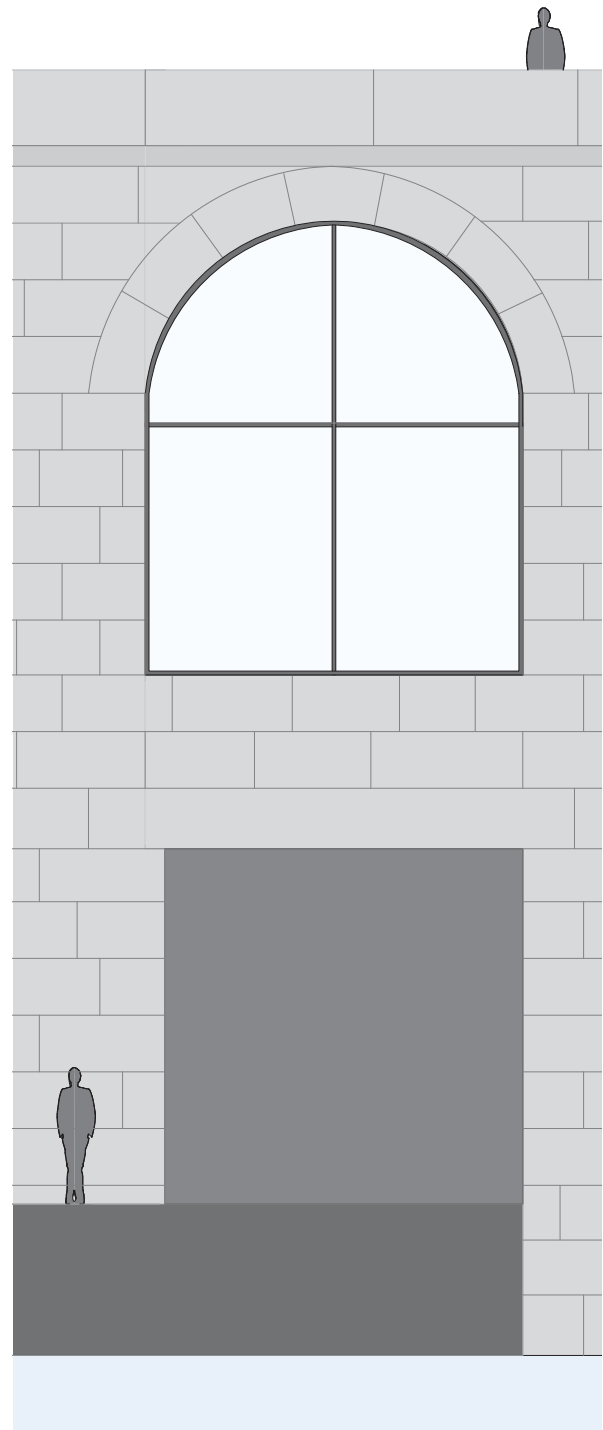The interventions of the masterplan have to deal with floods. In the case of the detailed interventions, parts of the designs cannot be used, in case of a flood. Though the internal spaces remain intact.
In case of a flood, the windows and doors are the most vulnerable parts of the design.

Water-resistant sliding doors, also named sliding flood protection doors, are implemented in both detailed interventions to protect the windows and doors against inundation of water. They are placed on wheels to allow easy sliding.

The doors will automaticly close since they can monitor the level of the water.

The water-resistant sliding doors are available on the market in different sizes up to 7,0 meter in height and 5,0 meter in length.[1] The openings in both interventions are all under these maximum dimensions.

Since the outer walls of both interventions are 1,0 meter thick, the sliding doors can be slided in the walls. When there is no flood, the sliding doors will not be visible.

Given the high prevalence of flooding in countries like Australia, a lot of research has been done to answer the question: how to withstand water inundation and reduce flood damage. The implementation of water-resistant sliding

doorsare already implemented in designs in countries like Australia (Fig.140). These examples proof its positive result.[2]

1 www.floodcontrolinternational.com
2 Zurich Risk Engineering, Australia & New Zealand, *Australian Storms and Flood: White Paper*

Fig.140 - Example of the use of sliding flood protection doors

EPILOGUE

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Kim Vermeulen
Eindhoven, July 2016

BIBILOGRAPHY

Anthon, C. (1846). *A dictionary of Greek and Roman antiquities.* Boston: Little Brown and company.

Aldrete G.S. (2007). *Floods of the Tiber in Ancient Rome.* Baltimore: Johns Hopkins University Press.

Arreola, D.D. (1995). Urban Ethnic Landscape Identity. *Geographical Review*, 85, 518-534. Retrieved November 19, 2015, from http://www.jstor.org/stable/215923

Bencivenga, M. (Date unknown).Alluvioni in Italia: Eventi storici e gestione del territorio. Retrieved November 17, 2015, from http://www.silvae.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/81

Burkhardt F., Eveno C., Podrecca B. (1986). J*oze Plečnik Architect:1872-1957.* Cambridge, Massachutes, and London: MIT Press.

Çelik, Z. (1997). *Urban Forms and Colonial Confrontations: Algiers Under French Rule.* Berkeley: University of California Press.

De Sola - Morales, M. (2008). *A matter of things.* Rotterdam: NAi Publishers.
(2014). *Downtown Deigin Guide.* Retrieved December 26, 2015, from https://www.sanantonio.gov/Portals/0/Files/CityDesignCenter/DowntownDesignGuide.pdf

Elsheshtawy, Y. (2004). *Planning Middle Eastern Cities: An Urban Kaleidoscope.* London: Routlegde.

Gastil, R.W. (2002). *Beyond the edge: New York's*

Waterfront. New York: Princeton Architectural Press.

Grundmann, S. (1998). *The architecture of Rome: an architectural history.* Stuttgart: Axel Menges.

Heinzelmann, M., Martin, A. (2002). *River port, navalia and harbour temple at Ostia, new results of a DAI-AAR Project.* Journal of Roman Archaeology. Retrieved November 12, 2015, from http://archaeologie.uni-koeln.de/files/Heinzelmann_Ostia_Harbour_JRA_2002.pdf

Hibbert, C., Weinreb, B., Keay, J., Keay, J. (2010). *The London Encyclopedia (3rd edition).* London: Macmillan.

Holbrook, T. (2010. October 29). *No title.* Retrieved December 15, 2015, from http://www.5thstudio.co.uk/wp-content/uploads/2012/10/BD-29.10.10.pdf

Hurst, H. (2008). Understanding Carthage as a Roman Port. Bollettino di arheologica on line. Retrieved April 11, 2016, from http://www.bollettinodiarcheologiaonline.beniculturali.it/documenti/generale/6_Hurst_paper.pdf

Jones, K. B. (2009. February). Rome's uncertain Tiberscape: Tevereterno and the urban commons. *The Waters of Rome 6.* Retrieved November 12, 2015, from http://www3.iath.virginia.edu/waters/Journal6Jones.pdf

Kroneberger, M. (2012. August 15). *On the Waterfront: Paris, Madrid, San Francisco, Portland.* Retrieved December 14, 2015, from http://thecityfix.com/blog/on-the-waterfront-

paris-madrid-san-francisco-portland

Lampugnani, V.M. (2007). *Betweeen spatial concept and architectural expression of Plecnik's market in Ljubljana*. Retrieved April 01, 2016, from http://rarchitecture.eu/other/lampugnani/plecniks_market.pdf

Lang, J. (2005). *Urban Design, a typology procedures and products*. Oxford: Architectural Press.

Londonist. (2014. May 14). *The Adelphi Story* Retrieved December 15, 2015, from http://londonist.com/2014/05/the-adelphi-story

Lynch, K. (1960). *The image of the city*. Cambridge, Massachusetts and London: MIT Press.

Petrucciolo, A. (1985). *Environmental Design: Maghreb, from Colonialism to a New Identity. The Boulevard de l' Impératrice in Colonial Algiers (1880-1866).* Rome: Carucci Editions.

Pratesi, L. (1989). *Via Giulia*. Rome: Artigrafiche Fratelli Palombi.

Platner, S.B., Ashby, T. (1929) *A Topographical Dictionary of Ancient Rome.* London: Oxford UP.

Author unknown. (2010. November 17). *Rome Under Water*. Retrieved November 12, 2015, from https://thebournechronicles.wordpress.com/2010/11/17/rome-under-water/

Rossi, A. (1991). *The Architecture of the City*. Cambridge, Massachutes, and London: MIT Press.

Rowe, C., & Koetter, F. (1978). *Collage city*. Cambridge, Mass: MIT Press.

Taylor, R. (2002. June). Tiber river bridges and the development of the Ancient city of Rome. *The Waters of Rome 2*. Retrieved October 28, 2015, from http://www3.iath.virginia.edu/waters/

Journal2TaylorNew.pdf

Author unknown (2013. June 28). *Welcome to the new Seine quaysides*. Retrieved December 14, 2015, from http://next.paris.fr/english/english/welcome-to-the-new-seinequaysides

Author unknown (2012. August 08). *With Block Lifted, Paris to Cut Vehicle Traffic Along the Seine*. Retrieved December 14, 2015, from http://www.nytimes.com/2012/08/08/world/europe/paris-to-cut-car-traffic-along-the-seine.html?_r=1&ref=europe

Zurich Risk Enigneering, Australia & New Zealand. (2013). *Australian Storms and Floods: White paper*. Retrieved April 30, 2016, from https://www.zurich.com.au/content/dam/australia/general_insurance/risk_engineering/australian-storms-and-floods-white%20paper.pdf

www.archeoroma.beniculturali.it/attivita/scavi/scavo-largo-perosi-via-giulia
www.castles.org
www.designboom.com
www.floodcontrolinternational.com
www.frenchmoments.eu
www.nedkahn.com
www.plecnikprojects.com
www.roma.andreapollett.com
www.romeartlover.it
www.tevereterno.it
www.triumphsandlaments.com

The maps of Rome that are shown in this thesis are own work, based on the maps that are available in the cartoteca of the Sapienza University of Rome, faculty of architecture.
The following maps have been used:

Tav. 117, Pianta LVII
Lugli, G. (1939). *Roma antica*

Tav. 189, Pianta CIX
Bufalini, L. (1551). *Roma nel sec. XVI*

Tav. 342, Pianta CLIII
Lbaeu, G. (1663). *Roma nel sec. XVII*

Tav. 396, Pianta CLXIX
Nolli, G.B. (1748). *Roma nel sec. XVIII*

Tav. 433, Pianta CLXX b
Falda, B.F. (1756). *Roma nel sec. XVIII*

Tav. 534, Pianta CCX
Marre (1870). *Roma nel sec. XIX*

IMAGE REFERENCES

All images and photos in this thesis are own work unless mentioned here.

Fig.1- Author unknown. (Date unknown). *Murgaglioni in construzioni.* Retrieved May 01, 2016, from https://nl.pinterest.com/pin/533676624567974067/

Fig.19- Attoe, Wayne, Donn. (1989). *American Urban Architecture Catalysts in the Design of Cities.* Picture 107.

Fig.20- Author unknown. (Date unknown). Retrieved November 18, 2015, from http://www.visittheusa.com/usa/states/texas/cities/san-antonio.aspx

Fig.24- O'Connor, K. (Date unknown). Retrieved November 24, 2015, from http://www.plecnikprojects.com/follow

Fig.27- Burkhardt F., Eveno C., Podrecca B. (1986). J*oze Plečnik Architect:1872-1957.* Page 193-195.

Fig.29 and Fig.30- Woodward, C. (date unknown). *Adelphi plans.* Retrieved December 15, 2015, from http://www.5thstudio.co.uk/wp-content/uploads/2012/10/BD-29.10.10.pdf
Fig.31- Adam's office. (c.1768) *River façade of the Adelphi development.* Retrieved December 15, 2015, from http://www.soanefoundation.com/robertadam.html

Fig.33- Idéale. (1917). *The Ramps Leading to the Port.* Retrieved December 16, 2015, from https://www.flickr.com/photos/gettyresearchinstitute/3362583523/in/

album-72157615408291069/

Fig.34- Author unknown. (Date unknown). Plecnik's market next to the Tromostovje Bridge. Retrieved April 01, 2016, from thumbs.dreamstime.com/x/central-market-ljubljana-overlooking-canal-27573344.jpg

Fig.35- Janez V.Valvasor. (1660). *Mestni špital and Špital bridge.* Retrieved April 01, 2016, from http://rarchitecture.eu/other/lampugnani/plecniks_market.pdf.

Fig.37- Author unknown. (Date unknown). *An aedicule of the flower pavilion as an abstraction of fundamental
architectural principes.* Retrieved April 01, 2016, from http://rarchitecture.eu/other/lampugnani/plecniks_market.pdf.

Fig.36- Author unknown. (Date unknown). *Volumetric scheme of the market's composition.* Retrieved April 01, 2016, from http://rarchitecture.eu/other/lampugnani/plecniks_market.pdf.

Fig.40- Jalovec, Z. (Date unknown). *Ljubljana, Slovenia.* Retrieved April 01, 2016, from https://nl.pinterest.com/pin/133559945173053448/

Fig.41- Kahn, N. (Date unknown). *Encircled stream.* Retrieved April 01, 2016, from http://nedkahn.com/

Fig.42- Kahn. (Date unknown). *Wave Oculus.* Retrieved April 01, 2016, from http://nedkahn.com/

Fig.43- Author unknown. (Date unknown).

Danube Bycicle. Retrieved April 01, 2016, from www.designboomcom

Fig.53- Van Wittel, G. (1653-1736). *Il porto di Ripetta.* Retrieved December 15, 2015, from https://www.pinterest.com/pin/129619295498827767/

Fig.44- Author unknown. (Date unknown). Retrieved April 10, 2016, from www.triumphsandlaments.com

Fig.46- Roehm, D. (2016). Retrieved April 10, 2016, from it/william-kentridges-triumphs-and-laments-opens-april-21-22-2016/

Fig.56- Van Wittel, G. (1653-1736). *Il Tevere a Ponte Sisto.* Retrieved December 6, 2015 from http://www.angeloferretti.com/downloads/zampilli/labrestaurourbano/lezioni/01_esperienze.pdf

Fig.57- Van Lint, H.F. (c.1730). *Ponte Sisto e la Casa dei Centopreti.* Retrieved December 6, 2015 from http://www.angeloferretti.com/downloads/zampilli/labrestaurourbano/lezioni/01_esperienze.pdf

Fig.73- Greco, A. (2015). Retrieved May 12, 2016 from https://ilsassonellostagno.wordpress.com/2015/09/29/gian-lorenzo-bernini-e-gli-angeli-della-passione-sassi-di-arte/

Fig.75- Grandmont, J.P. (2011). *Groupe allégorique du Ponte Vittorio Emanuele II à Rome.* Retrieved May 12, 2016 from https://commons.wikimedia.org/wiki/File:Groupe_all%C3%A9gorique_du_Ponte_Vittorio_Emanuele_II_(5).JPG

Fig.90 and Fig.91- Muratori. (1950). *Map of Rome.* Combined with Tafuri. (date unknown). *Una Utopia urbanistica del '500.* Annex book.

Fig.102- Map cartoteca of the Sapeinza University of Rome. Tav. 342, Pianta CLIII. Lbaeu, G. (1663). *Roma nel sec. XVII*

Fig.140- Author unknown. (Date unknown). Retrieved May 01, 2016, from www.floodcontrolinternational.com

The riverfront of Rome

The dramatic emptiness of the Tiber and low level quays as
better integrated part in the urban tissue

Kim Vermeulen