



Transparency and Movement in Architecture

Verónica Estremadoyro

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in partial fulfillment of the requirements for the degree of

Master of Architecture

Heinrich Schnoedt, Chairman

William Galloway, Committee Member

Mario Cortes, Committee Member

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ABSTRACT

This project investigates transparency and movement as the main measured elements that define space. These elements seek to articulate distinct and memorable places throughout the building, acknowledging its unique setting along the Potomac River in Old Town Alexandria, Virginia.

Architecture and nature as opposite elements combine here to define a building in which water, light and views become the main architectural agents set in dialog with the natural surroundings. An existing boardwalk along the levee transforms into a transparent enclosed space that connects both city and water on opposite sides.

Programmatically a series platforms, walls and volumes are inhabited by a cultural center. The cultural center contributes to the artistic spirit and identity of the city by concentrating various artistic representations.

ACKNOWLEDGEMENTS

I want to dedicate this book to my parents who always supported me in my way of life.

I would like to thank Virginia Tech, the College of Architecture and Urban Studies and especially my committee members: Heinrich Schnoedt, William Galloway and Mario Cortes. I really appreciate their support and belief in me, giving me the opportunity to study in their Master of Architecture Program.

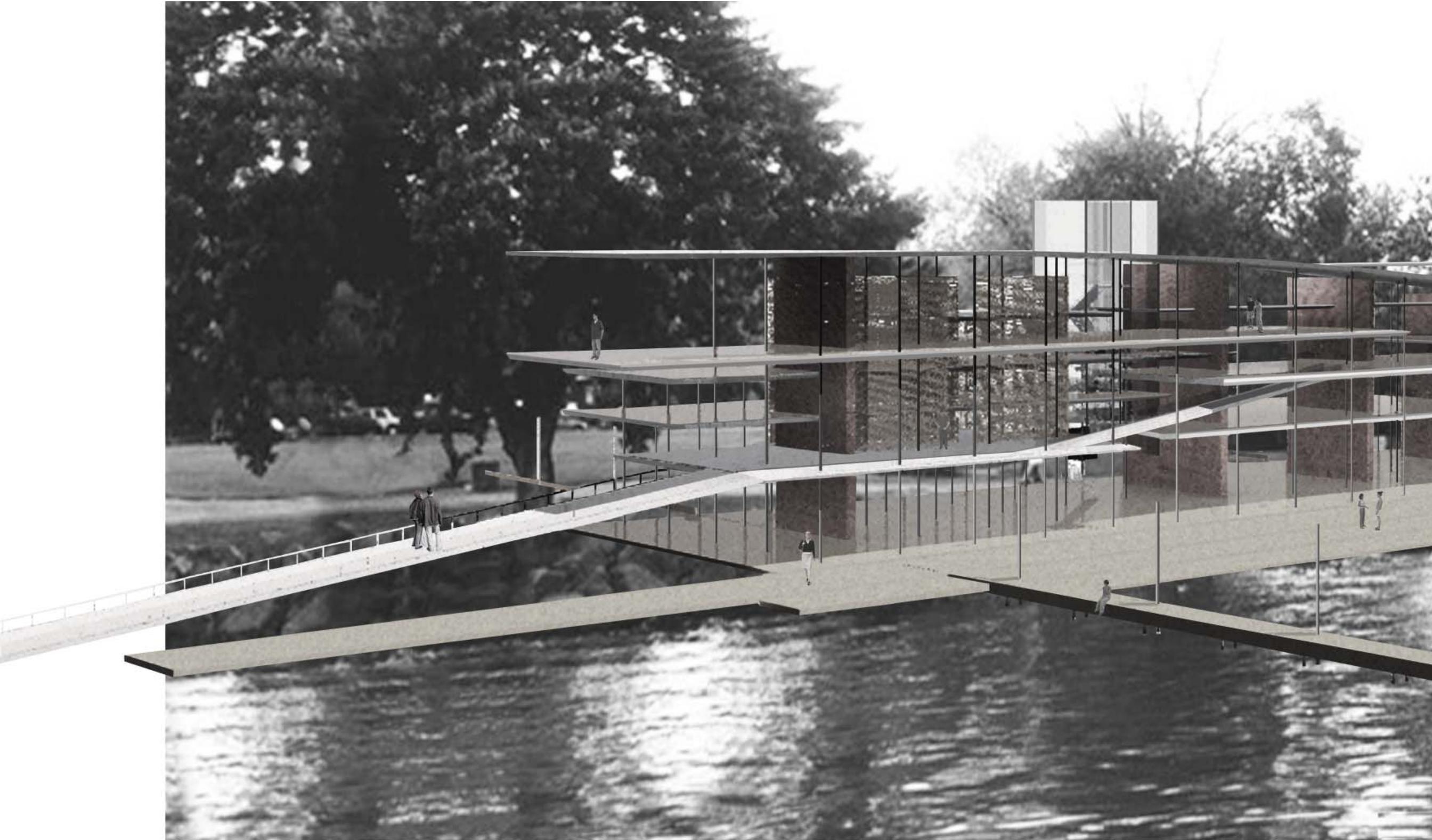
My special thanks to my family and friends I met in Blacksburg, for their encouragement and loyalty.

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*"I would like man and nature to confront each other, and to have a tension maintained with regard to each other.
I want to create a place where that will occur."*

Tadao Ando







Transparency - Capability of seeing through some solid object

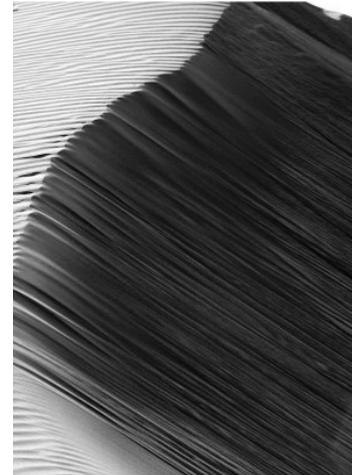


TRANSPARENCY

In general physical terms, transparency is considered as a property defined by the amount of light passing through a material. It is also, the capability of seeing through an otherwise solid object. In architecture, we sometimes assume that transparency makes us perceive different spaces simultaneously, creating different perceptions and sensations inside or outside the space. To achieve transparency through a building which is made out of solid elements, it is important to consider two aspects: permeability and reflection

Permeability - A material property of allowing a fluid to pass through a porous space. In architecture, it can mean having boundaries that function as filters rather than solid confines; or openings that permit things to pass through or to be seen through. This concept permits persons within and outside a space to perceive the immediate physical world around themselves.

Reflection - Defined as to cast back light or to show an image of an object or surface (mirror effect). Reflection helps to give a sense of transparency in solid objects, making them disappear or merge with the surrounding space. As a result, the building appears to have a sense of lightness.



Donna Corless. *Sand Dune Cliff*. 2003



Nicholas Pavloff. *White Dune*. 2003

Natural forms vary with time as a result of their environmental influences.



Carlos Zeballos. *Arquitectura como Topografía*. 2007

The use of the same elements or materials in a consecutive way suggests a smooth flow.



Static elements in architecture can suggest motion

MOVEMENT

Movement is found in nature in every living organism. Even static elements change with time and offer a sense of movement when exposed to elements such as wind, rain, or temperature.

In this project, movement is sought with the construction of perspectival space. A combination of differentiated elements along with a sequence of different spaces suggests a kind of architectural motion.

Movement is promoted with continuity, sequence and flow.

Continuity – Elements reappear in a consecutive manner.

Sequence – A following of an event after another in a logical order and at a different time.

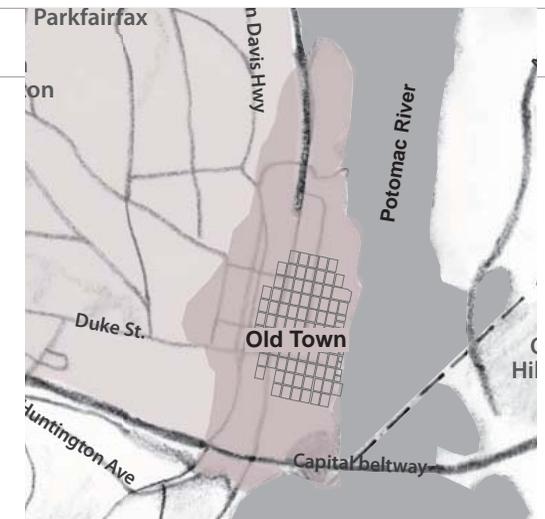
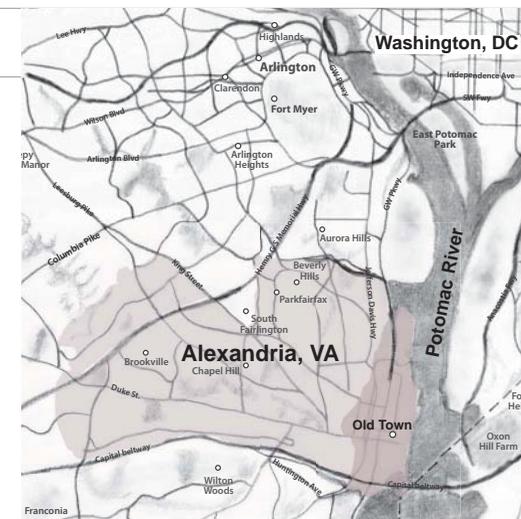
Flow – A continuous and smooth movement that may carry a directional change caused by external forces.

PLACE

Old Town Alexandria

The city is a historical place, where art is present in different ways. Some of Old Town's important roots in the eighteenth century point to the development of a river port for commercial and transportation reasons. Alexandria's role was to be a market town. The city presents a variety of building styles and uses, maintaining the mix of residential and commercial life that has always characterized it. Old Town was laid out in a strict grid of streets and alleys; and houses were built close together to have short distances between the city's activities.

The Potomac River was Alexandria's main reason of existence, and now, is still one of the main attractions. It gives the city a special character and strong quality. The waterfront once used by merchants and riverboats; now serves to sailors, artists and visitors. Along the waterfront we can find wooden docks which serve as paths for riverside walks, as well as parks, with places to sit and enjoy the view across the Potomac river toward Washington D.C.





Old Town street views



1 GW National Masonic Memorial



Waterfront views

George Washington
National Masonic Memorial

Old Town Alexandria

SITE

Duke Street

Prince Street

King Street

Cameron Street

Queen Street

Princess Street

S Union Street

Lee Street

Waterfront
Park

Torpedo Factory

Quay Street

N Union Street

Marina

Founders Park

Robinson
Terminal

Potomac River

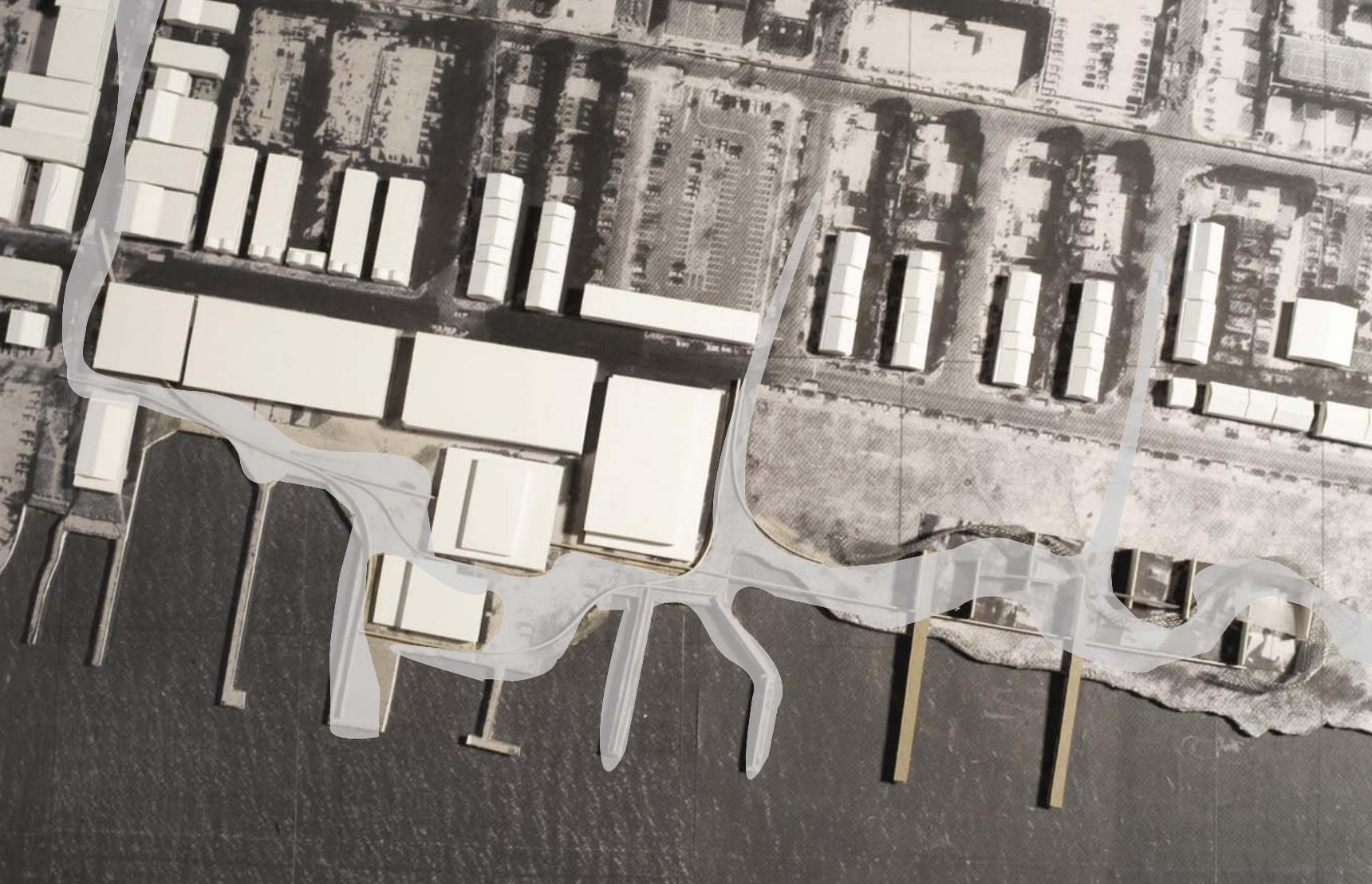
Washington DC





Founders Park, located at the waterfront in front of the Potomac River. This site did not exist in the eighteenth century, as the bay below Lee Street was filled in, and Union Street was later added to provide access to this area.





People

Pedestrians, bikers, street artists and fishermen all create a particular sense of place, which becomes very dynamic and variable. People generate a diverse frequency of movement. This movement by itself generates an attractive flow along the waterfront.

The Founders Park is part of the movement along the waterfront and congregates people of different ages and types. Here, the relationship with the water is different since the park is defined by a natural boundary of stones and trees.





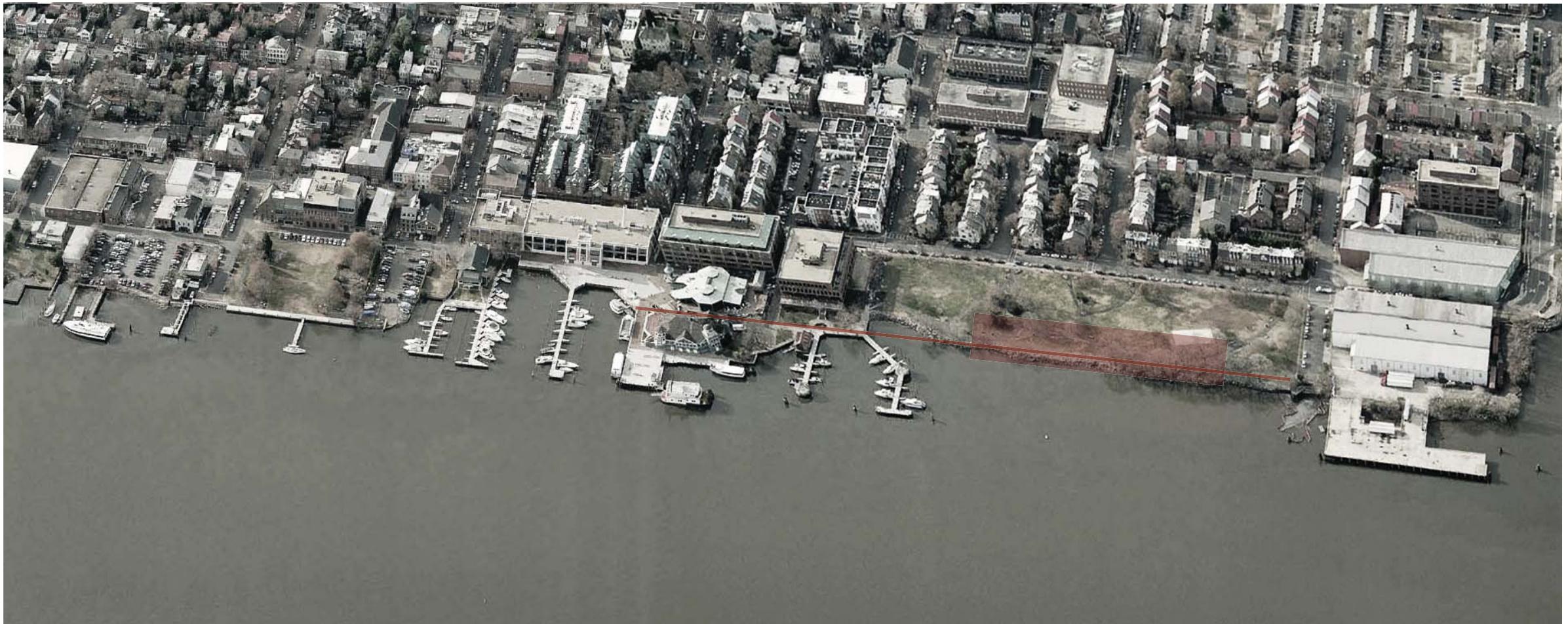
Werner J. Bertsch. 1995. Old Town Alexandria, VA, USA / All Rights Reserved

City and Waterfront

Water provides the most obvious example of immediacy, because the transition between water and dry land offers the biggest of all psychological contrast
- Gordon Cullen -

The waterfront is one of the most visited places in the city, not only because of the different activities occurring every day and especially during the weekend, but also, due to the presence of water.

The waterfront offers the possibility of physically presenting the grand body of water that characterizes Old Town Alexandria. The piers for small boats along the waterfront make the relation between water and urban ground even stronger. Through the riverfront the city has a dual orientation, one from the river toward the city, and the other from the city toward the river.



Imagery provided courtesy of SkylineGlobe.com and I-cubed

APPROACH AND IDEA

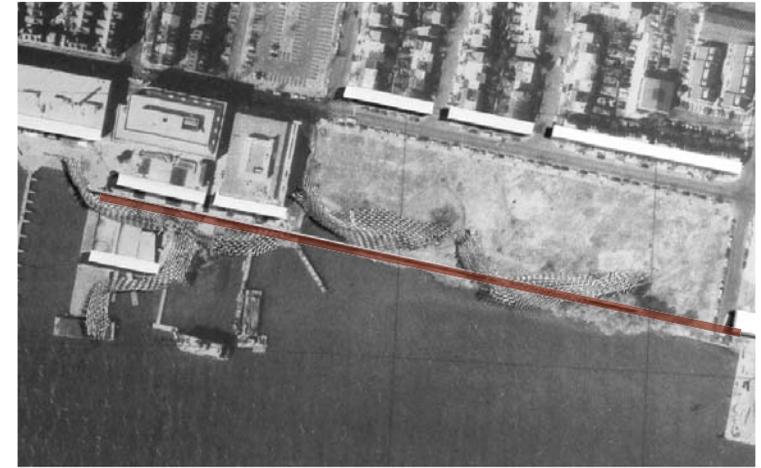
A new urban architectural path connects a sequence of several spaces along the waterfront. This sequence defines a transition from an open to an enclosed space. The idea is to bring movement found at the site into an enclosed space and to maintain the motion within it. This enclosed space is dynamic, interacts with people, and offers a variety of places.

Consequently, the proposed building becomes a part of a pedestrian walkway sequence. This proposal encourages a concentration of activities related to culture and contemporary art and science which will contribute further to the life and identity of Old Town Alexandria.

1. Overall Observations

The current boardwalk stops suddenly, confuses people and makes them change direction toward the city.

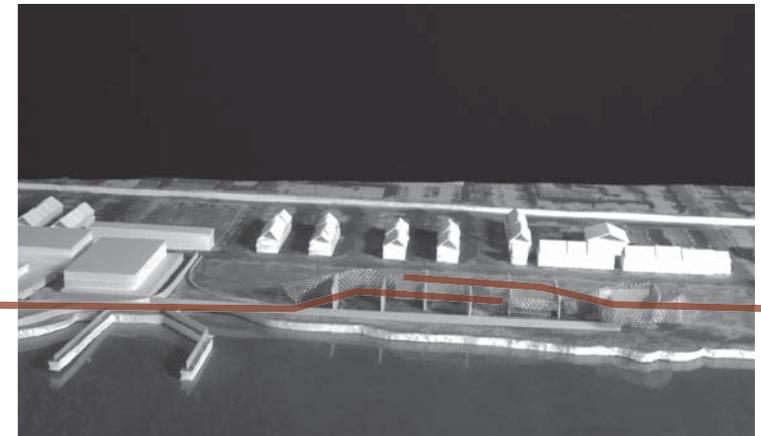
The clear articulation of the waterfront with a continuous path will help to define the border of the city, and will enforce the connection of people with water.



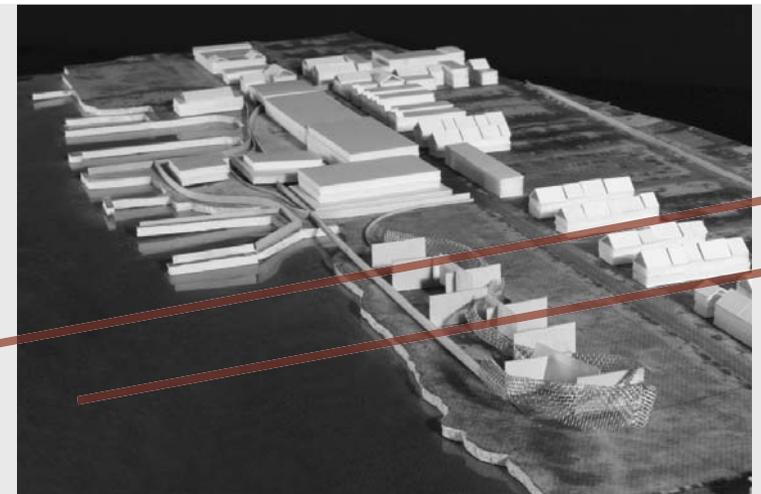
2. Site Specific Assumptions

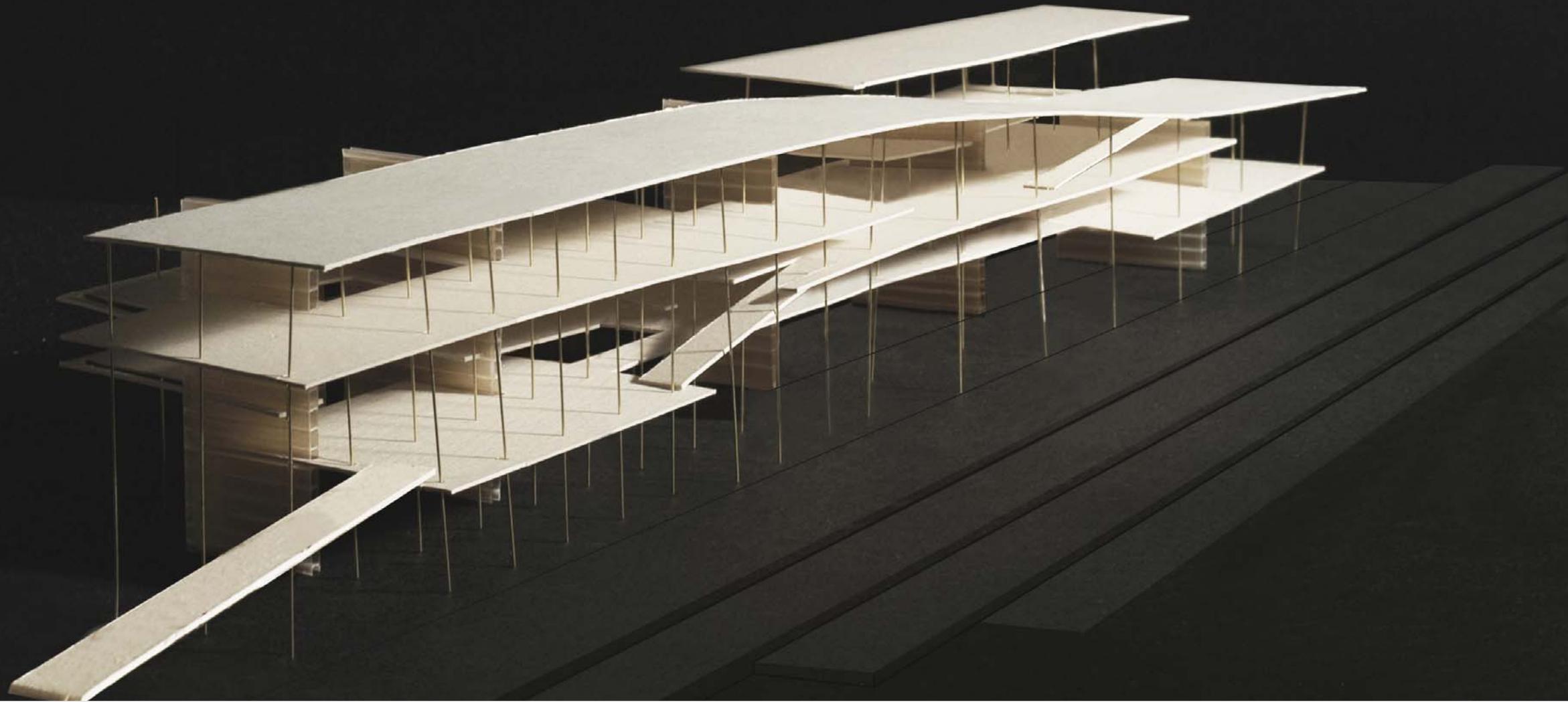
Two opposite conditions are present at this site: longitudinal and transverse.

Along the waterfront sloped planes and ramps allow fluidity through and into the building.



Perpendicular to the waterfront, opportunities exist to make stronger connections between the existing urban fabric of Old Town and the actual water surface of the Potomac, connecting the city with the water physically and visually.





Model showing the irregular overlapped platforms and steps as the border between land and water

3. Building Specific Assumptions

Transparency and movement are primary concerns regarding the building itself.

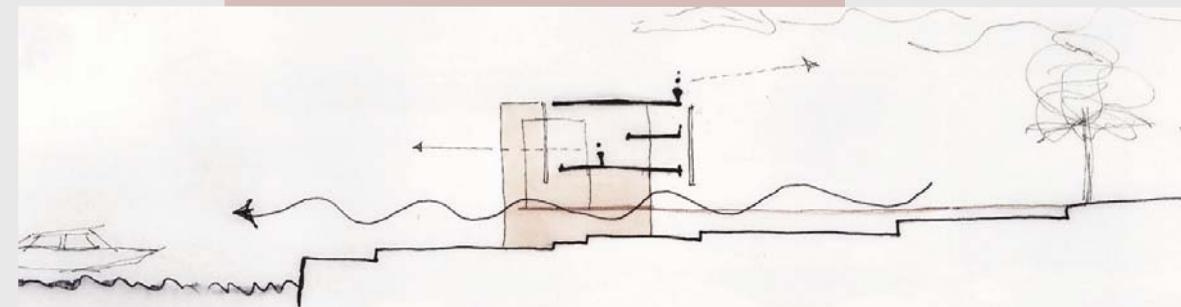
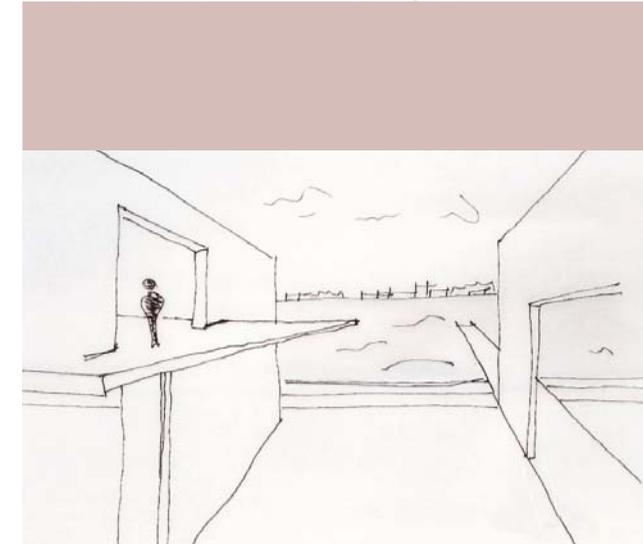
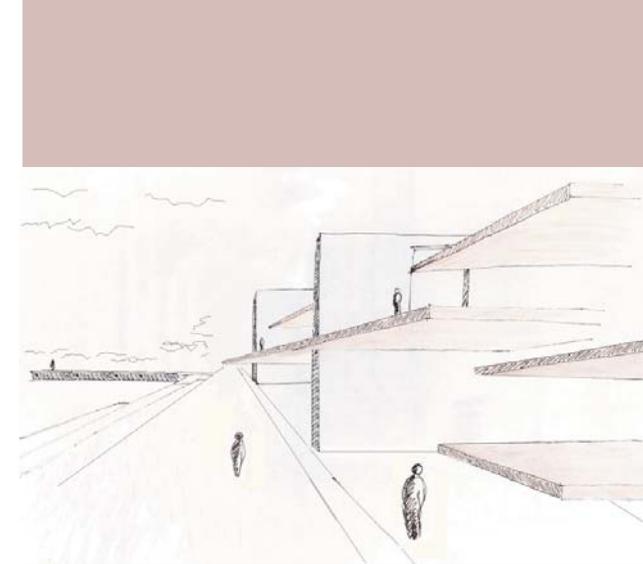
With overlapping platforms a smooth movement within the building and throughout the whole park is possible.

The platforms on the ground level enforce the relationship between water and city, where people coming from the city can walk freely until reaching the water. The platforms end next to the waterfront with long steps as the border between water and land.

The building itself with its high degree of transparency offers direct visibility of the water and extends the public space across the physical building boundary.

The Building

The current waterfront lies in a flood zone. Elevating the building allows water to pass and at the same time, strengthens the visual and physical relationships between water and city.





West View



East View



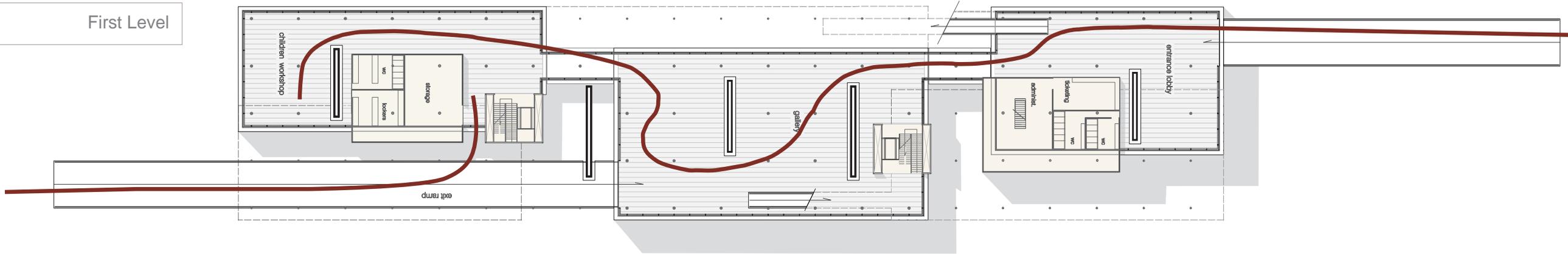
PROGRAM

A cultural center that offers the possibility to assemble different art forms under one roof, presently dispersed along the Potomac River.

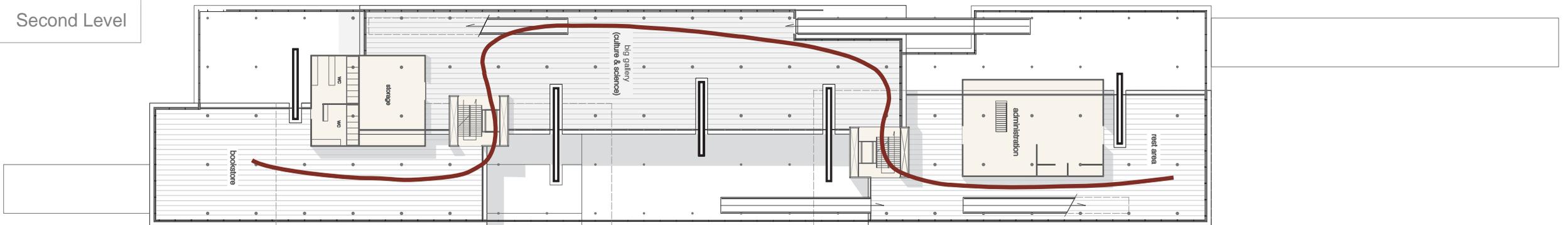
The building programmatically offers rooms for performing arts namely, theater and music. It also provides halls for exhibitions of art, culture and science. A workshop for children and a bookstore offer diverse services for all visitors. All of these activities areas are complimented with a bar, a coffee-shop and terraces.

The ground level stays open and offers shelter and shaded places for outside exhibitions next to the river.

First Level



Second Level



The plan advocates a linear movement on both floors.

— path of a person throughout the building



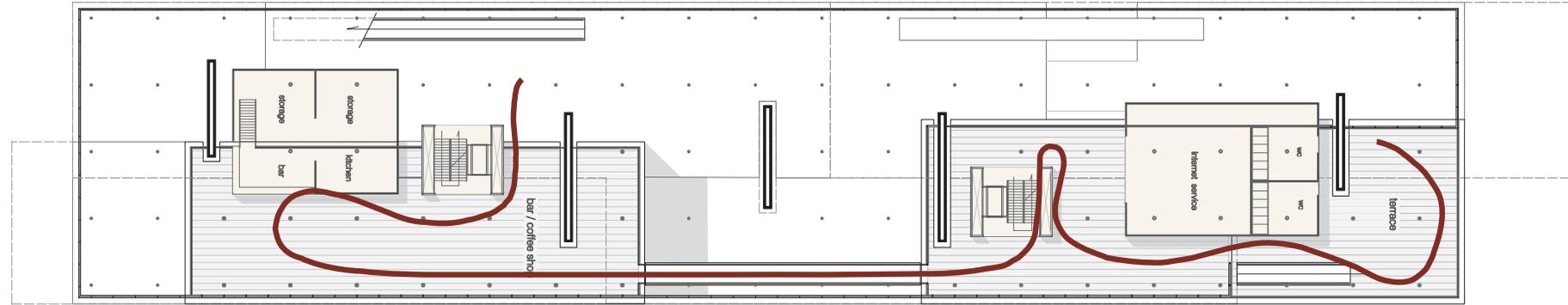
SPACE AND CIRCULATION

Although space is usually defined by solid and static boundaries, the space here makes an attempt to embody with its architecture some of the surrounding conditions.

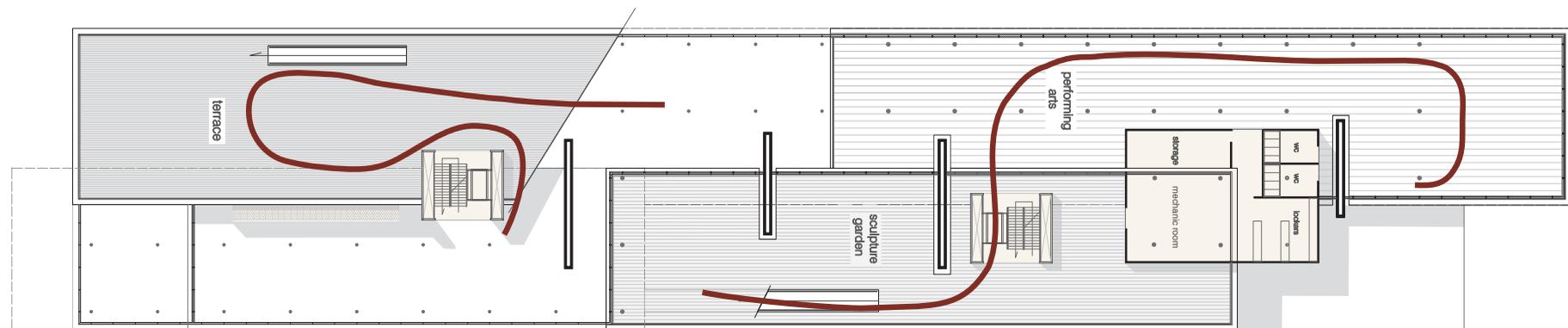
The public space of the streets extends into the interior of the building with a sequence of spaces, rendering a gradual transition from public to private. The path for public access extends parallel to the river, from the existing boardwalk to the second level. The path continues through the entire building; taking a person to the top level and from there to the exit ramp, which is located on the opposite side of the building. The project contains two enclosed staircases that allow for vertical circulation at all levels.

The enclosed spaces are defined by independent architectural elements, and offer different conditions of scale, height, light and openness.

Third Level



Fourth Level



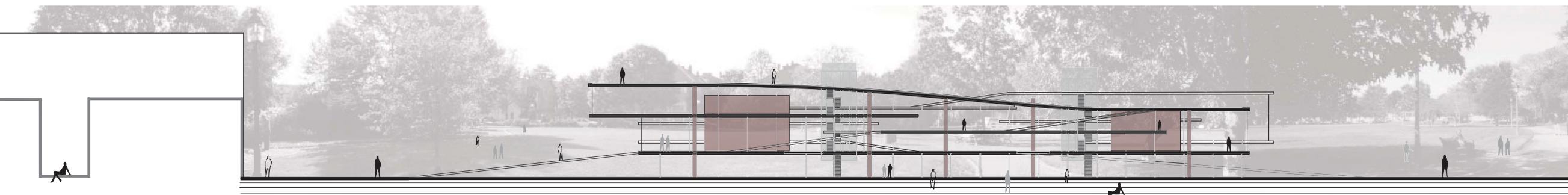
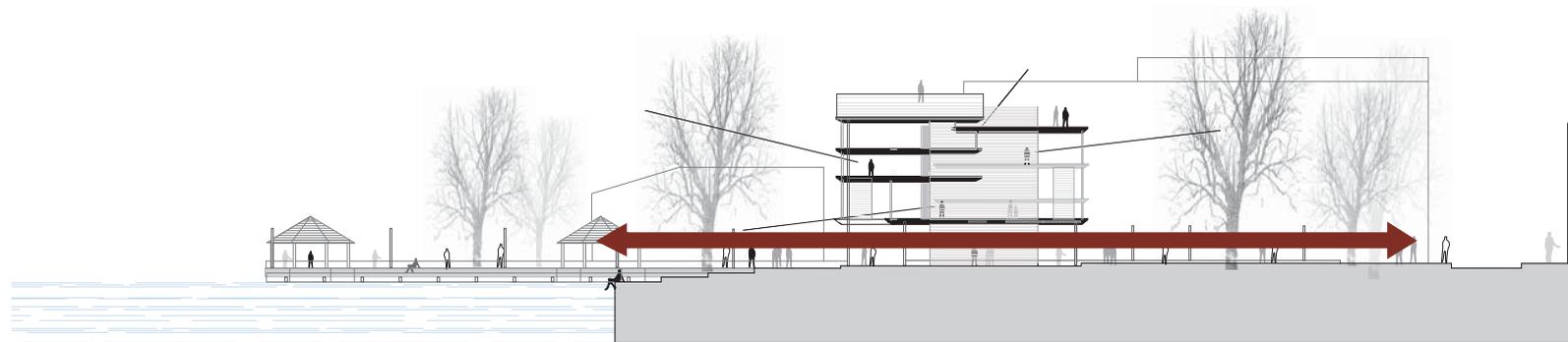
— path of a person throughout the building

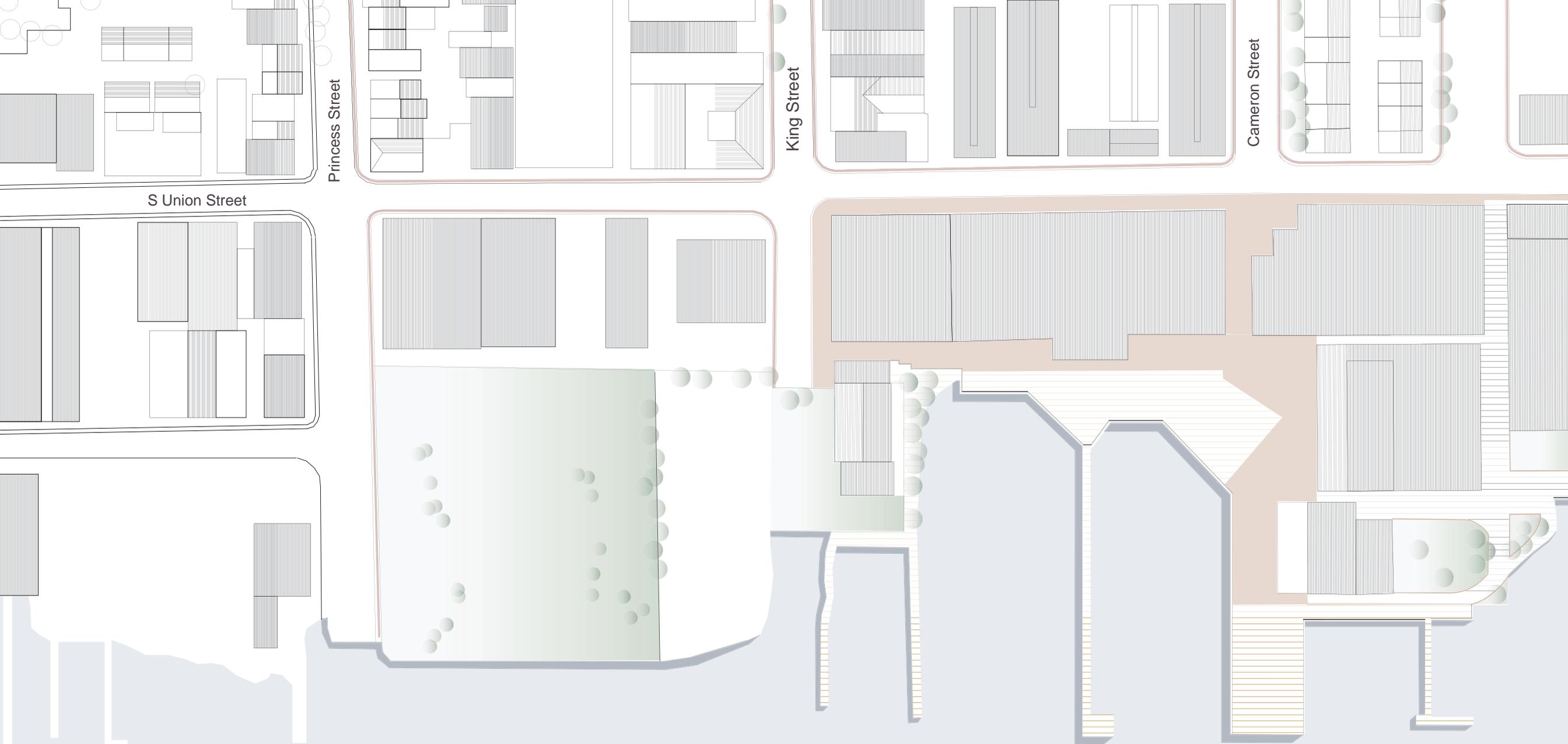
ARCHITECTURAL MEASURES AND ELEMENTS

In this project, architectural measures and elements are chosen to ensure transparency and movement in the building.

Transparency is important in order to achieve the relationship between river and city. A glass facade permits a visual relationship with the exterior. Every architectural element is structured to allow lightness, permeability and reflection. The building is elevated to define a public open ground floor, where people can walk through or stop for some shade. The possibility of walking under the building from the city to the river allows a physical connection that reinforces the relationship between water and city.

The architectural elements for the project: platforms, ramps, columns, service boxes and brick walls are used to define the interior spaces. Along with these elements, there are two different types of urban components considered to consolidate the waterfront. The components are two piers and a 'plaza', both of which are in direct contact with the river.





Princess Street

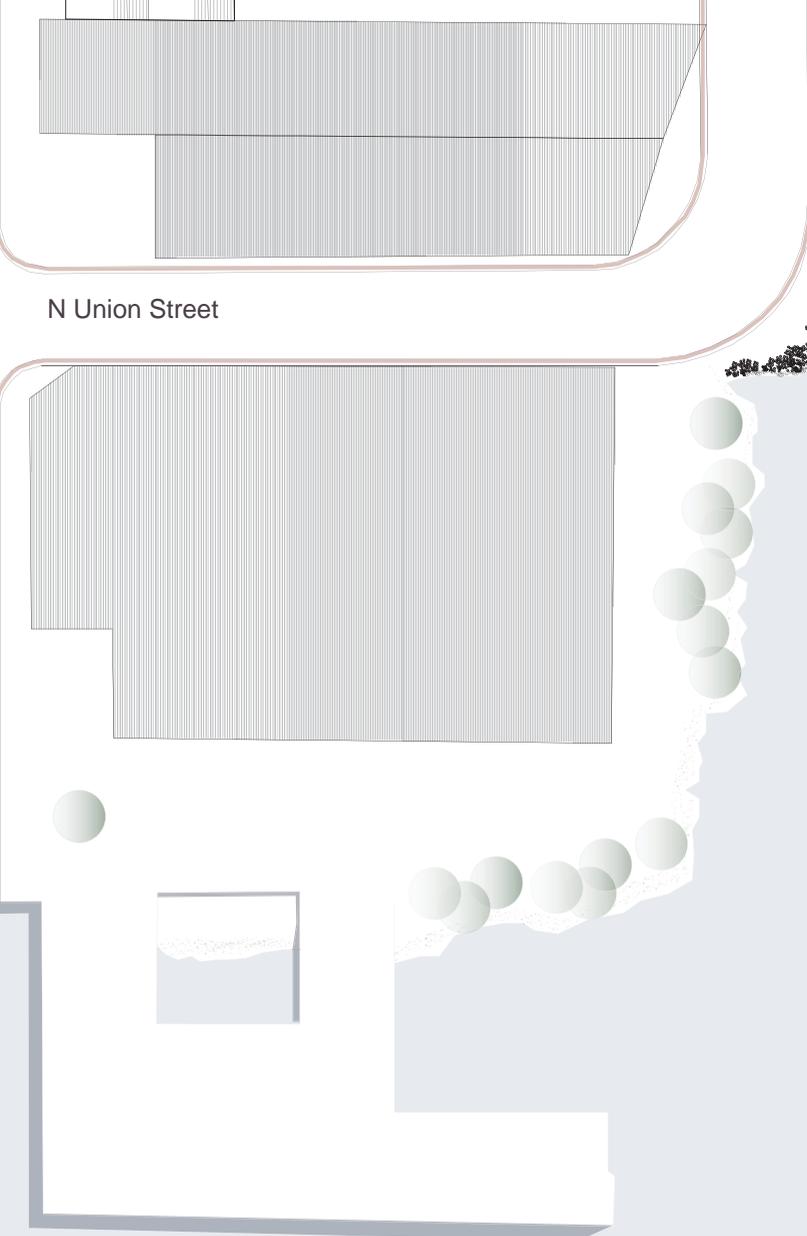
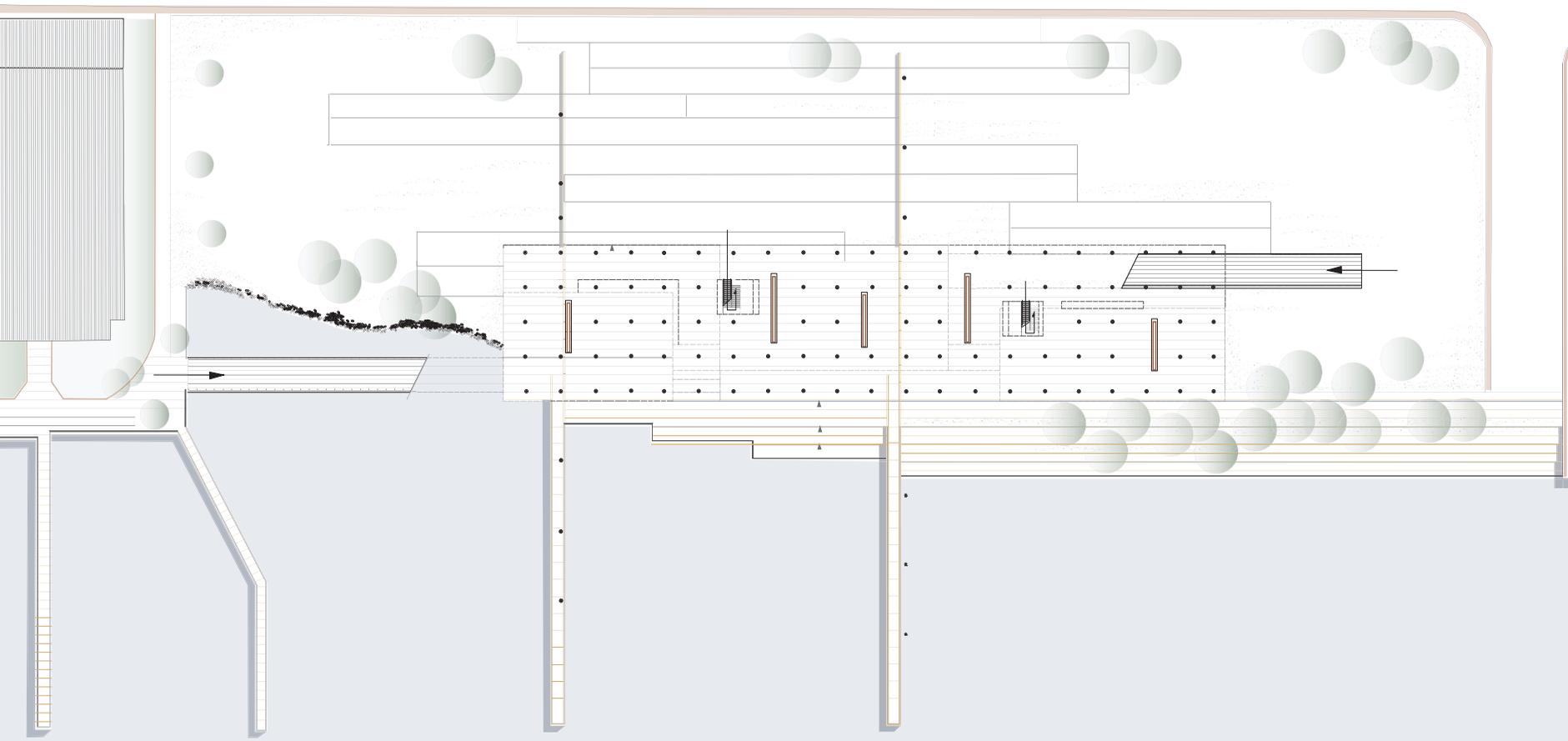
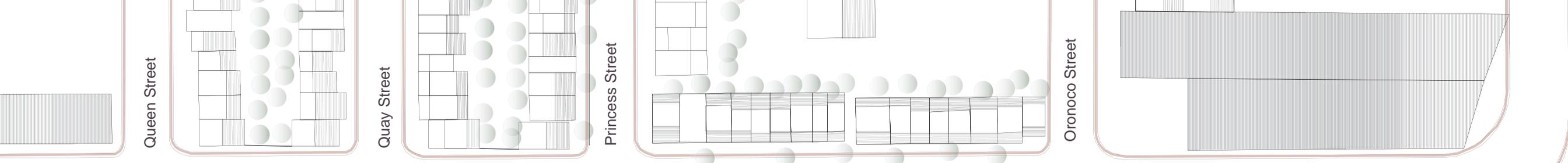
King Street

Cameron Street

S Union Street

Site Plan





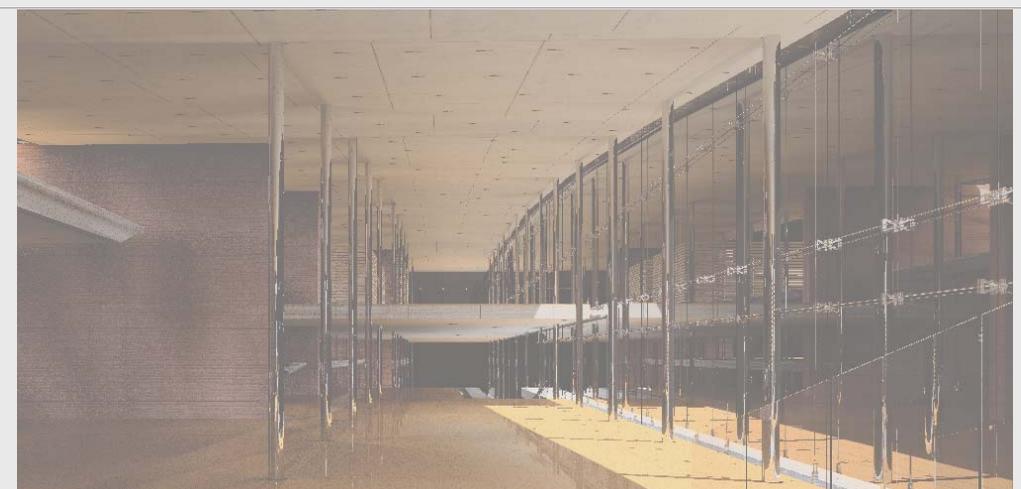


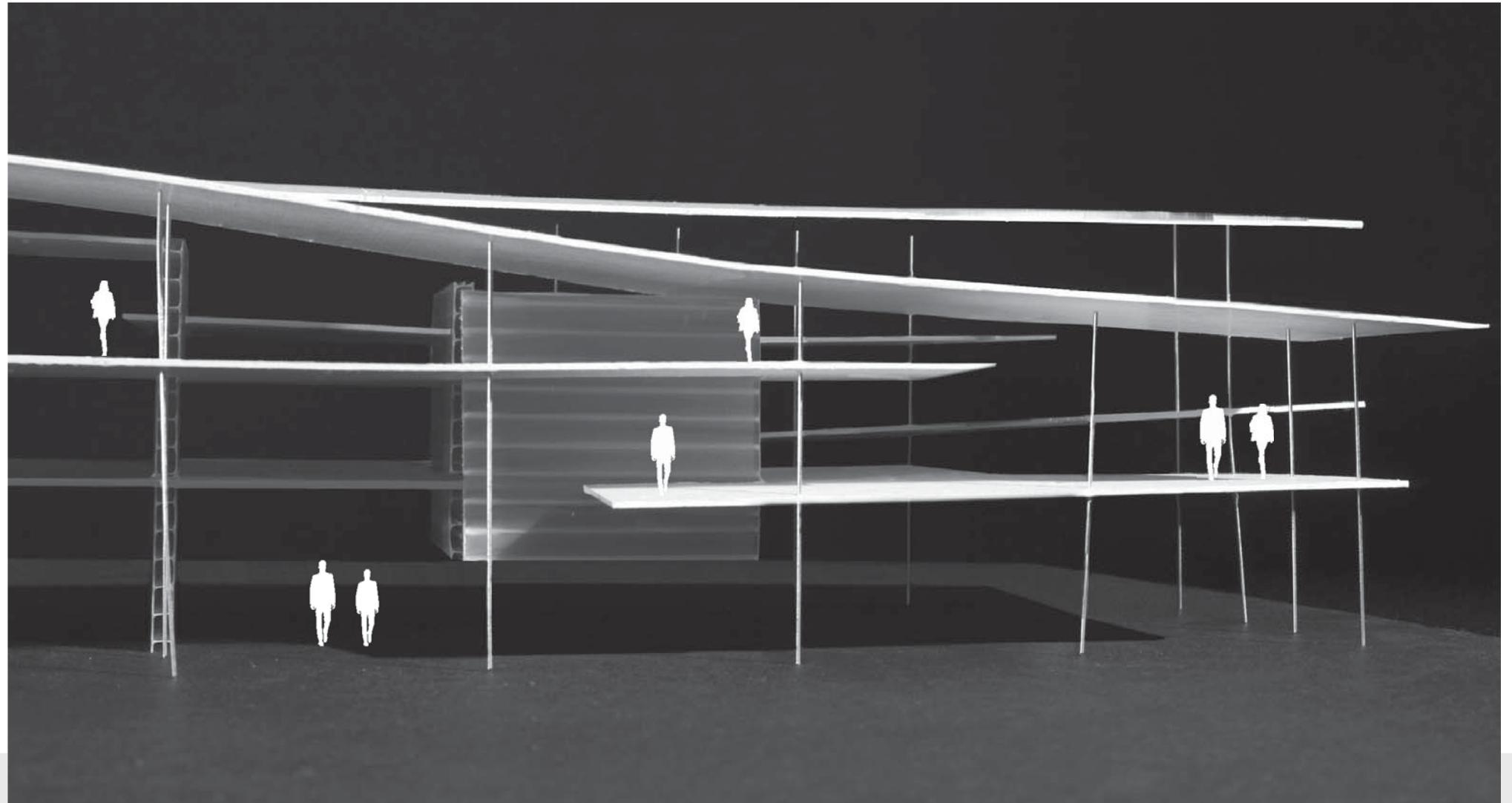
*“A window, an opening which makes us experience the inside as a complement to the outside”
Christian Norberg-Schulz*

GLASS FACADE

A building facade made of glass is a contrast to the brick facades that dominate Old Town Alexandria. This allows the interior activity of the building to become part of the public space and proposes a stronger visual relationship between inside and outside. From many positions, a person is always able to see through the building toward the city.

To support the concept of transparency and lightness the glass skin is used on every exterior enclosing surface.

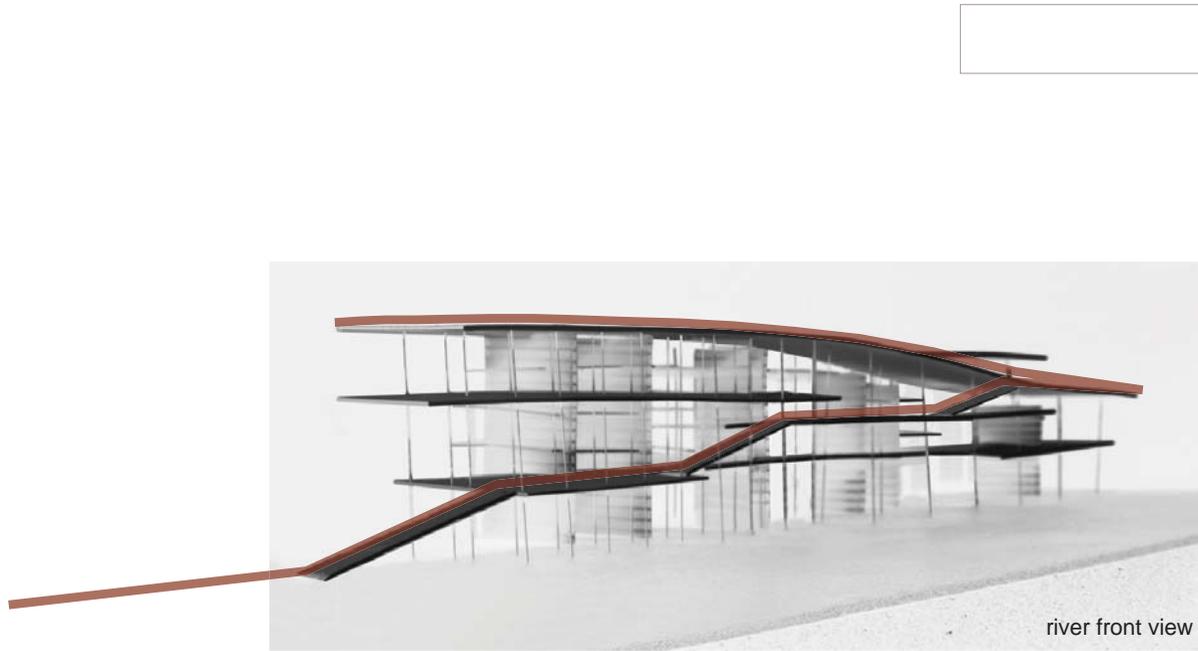




PLATFORMS

Platforms are the main elements for the generation of movement in the building. The platforms are concrete slabs and they differ from each other in size, where the longest sides of the slabs are always kept parallel to the waterfront. In plan, the slabs overlap to define inner spaces, and seem to slide in both directions of the building to create a sensation of movement. This slight displacement between overlapping slabs generates a variety of spaces inside the building that differ in scale, height and proportion.

Each space considers its neighboring space as an extension. Thus, it is possible for these spaces to flow onto each other continuously. Each platform also offers a panoramic view of the river and the city.

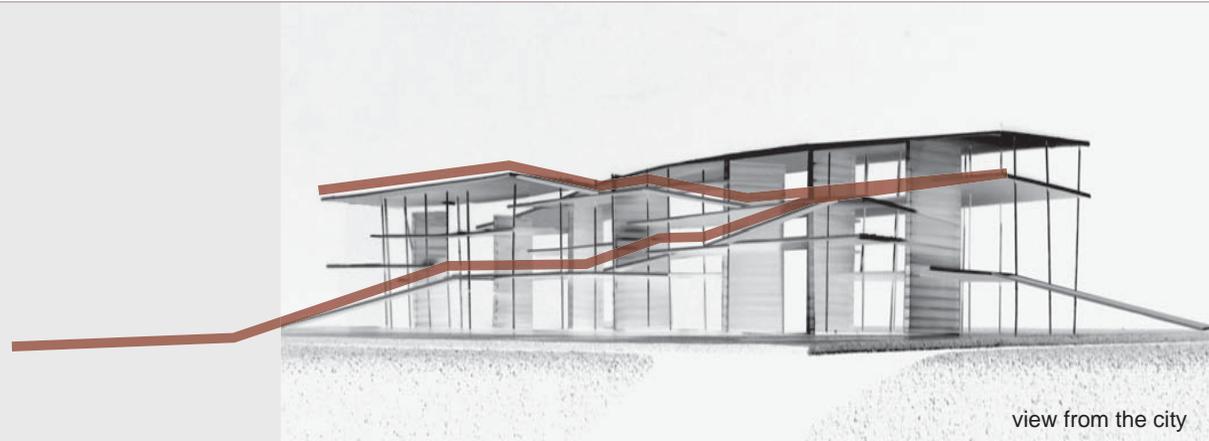


river front view

RAMPS

The ramps are sloped planes that connect platforms, which allow people to move throughout the building and enter from outside. Ramps are the main structural longitudinal elements that allow for circulation of the project. They are located on both sides of the building, parallel to the river, and always offer a view of both: the river and the city.

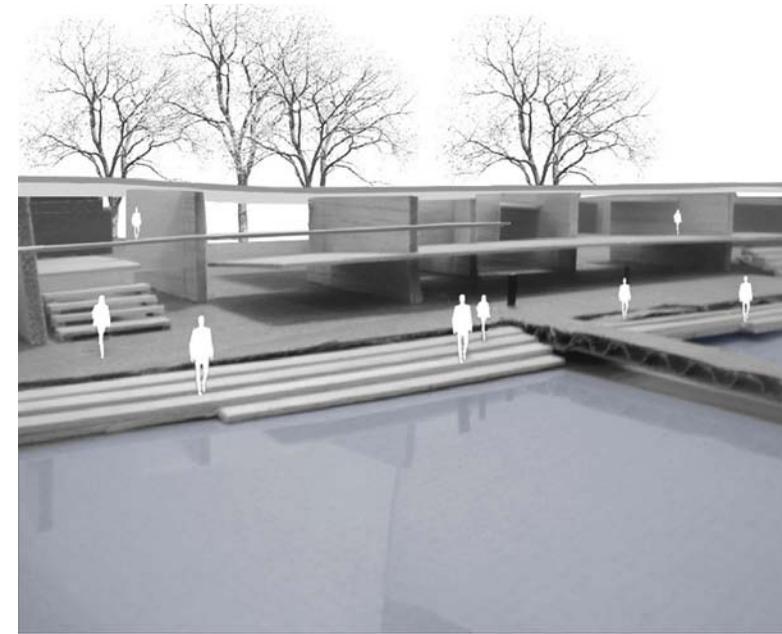
The ramps are also designed to link the urban path on both sides of the project with the interior. The urban path that is defined along the site, slowly converts itself into a building. The movement found along the waterfront is translated into the form of platforms and ramps. They are connected one after the other, generating a flow from one space to the next. This flow goes from the waterfront path, through the building and up to the roof; offering open and closed spaces along its trajectory.



view from the city

PLAZA

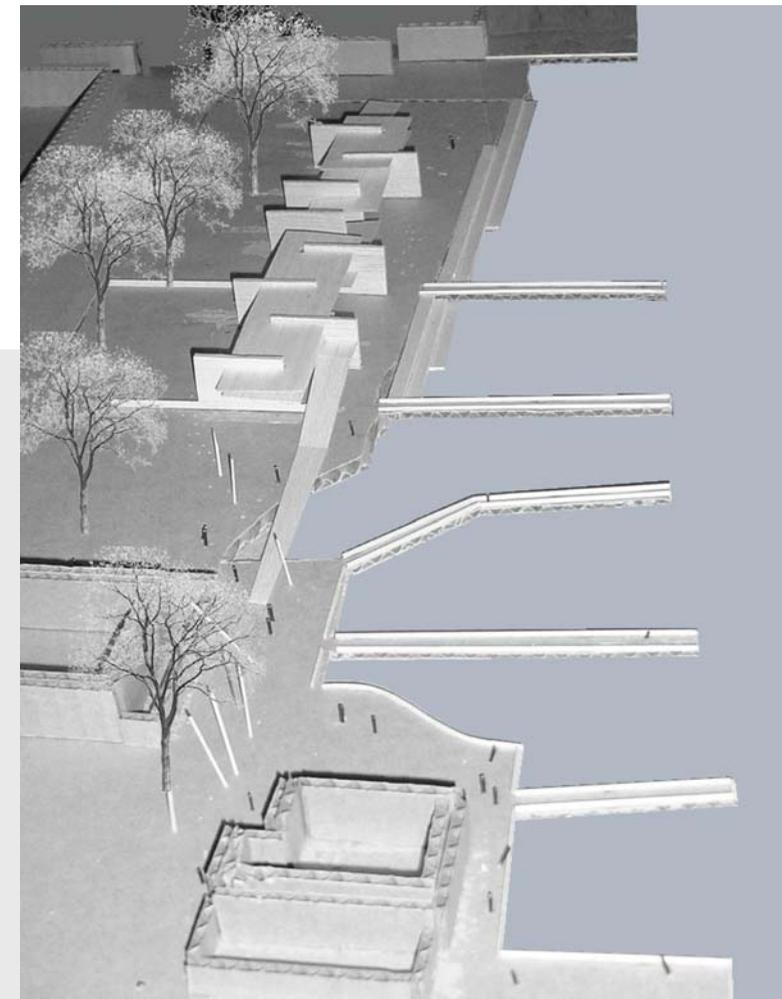
The existing boardwalk does not terminate well next to Founders Park. The approach is to consolidate the waterfront and to present the river to the city. Platforms used along the site change into long urban steps as an elongated plaza along the water. To reach the river, a person is able to step down each level toward the water. The plaza is a place to sit, read, lie down, rest, or just appreciate the view.



PIERS

Two new piers continue the waterfront profile. They are designed to strengthen the transverse circulation at the site, taking people closer to the water. The piers go across the building, from the city streets to the river. They are the continuation of Queen Street and Quay Street.

Two very low walls between the building and the streets create a direction toward the piers. The walls are not continuous and are bounded with light posts on both the city side and along the piers



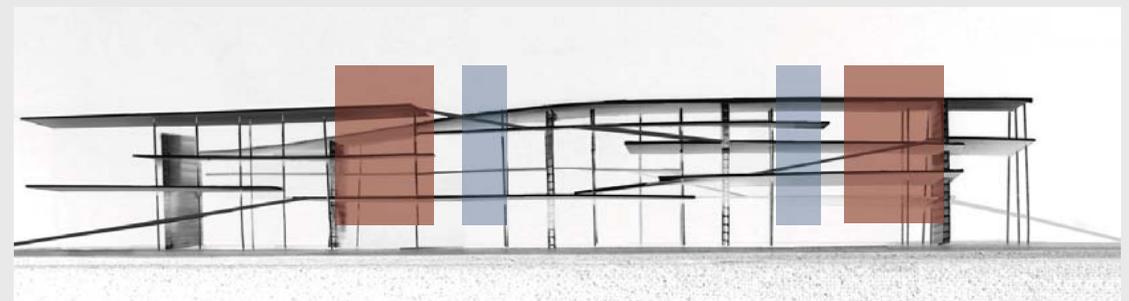


BOXES

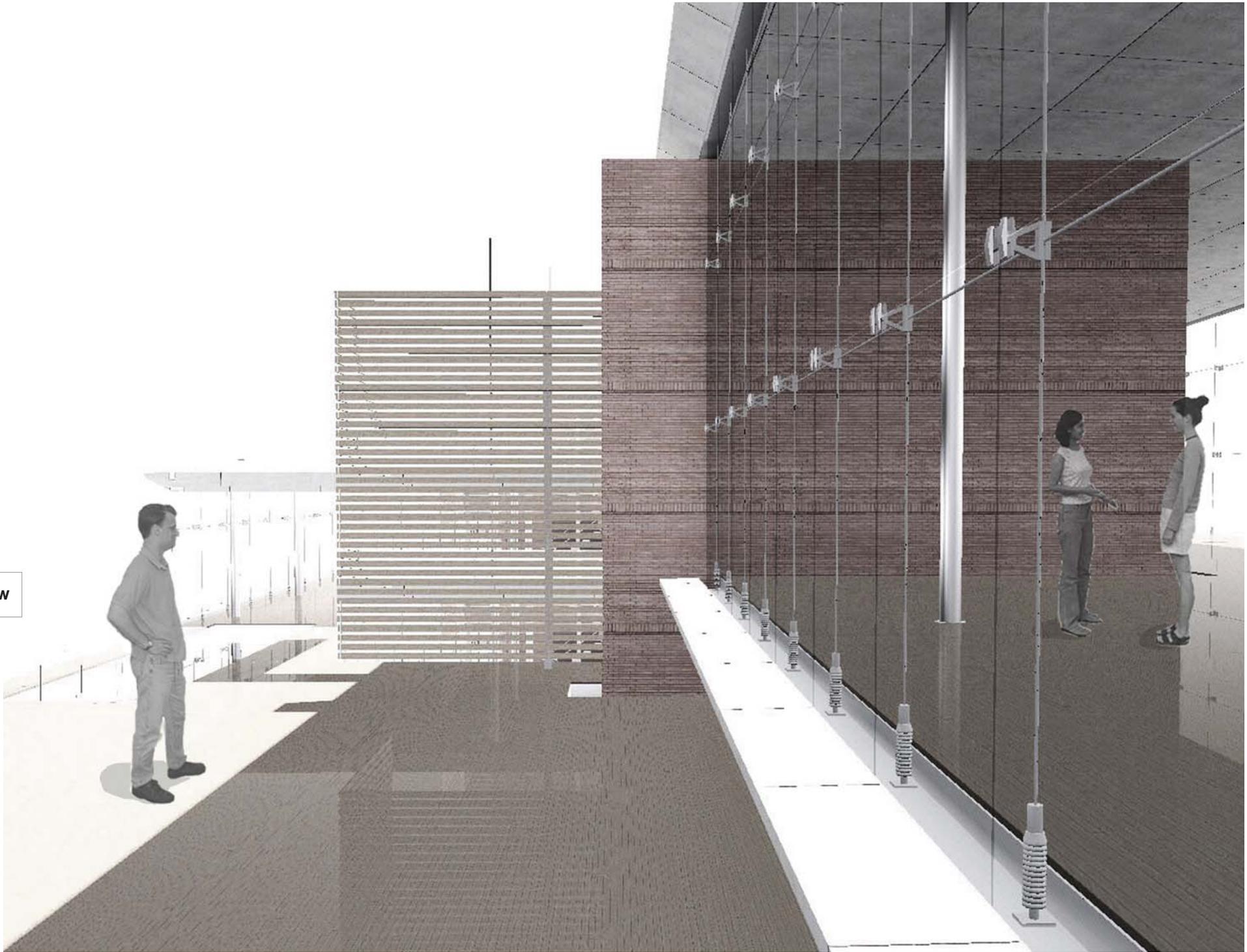
Service boxes are volumes introduced along the building, stretching from the first to the top level. Two types of boxes were considered and incorporated for this design: one closed (opaque) and other open (transparent).

The wooden box or opaque box is permeable. There are two boxes located opposite each other, at each end of the project. They contain the administrative services, along with storage and restrooms. Their opacity or permeability varies depending on their specific use.

There are also two long glass or transparent boxes which can be found throughout the building. These glass boxes hold the elevators and the emergency stair cases which connect all the floor levels to the ground.



Terrace View





BRICK WALLS

The walls in this project are the most massive vertical elements. They are placed standing perpendicularly to the river, keeping the visual connection between the river and city. Their layout corresponds to structural and spatial demands. These walls add a sequence of vertically arranged spaces. They define an enclosure for one direction of the building, providing some more quieter interior spaces.

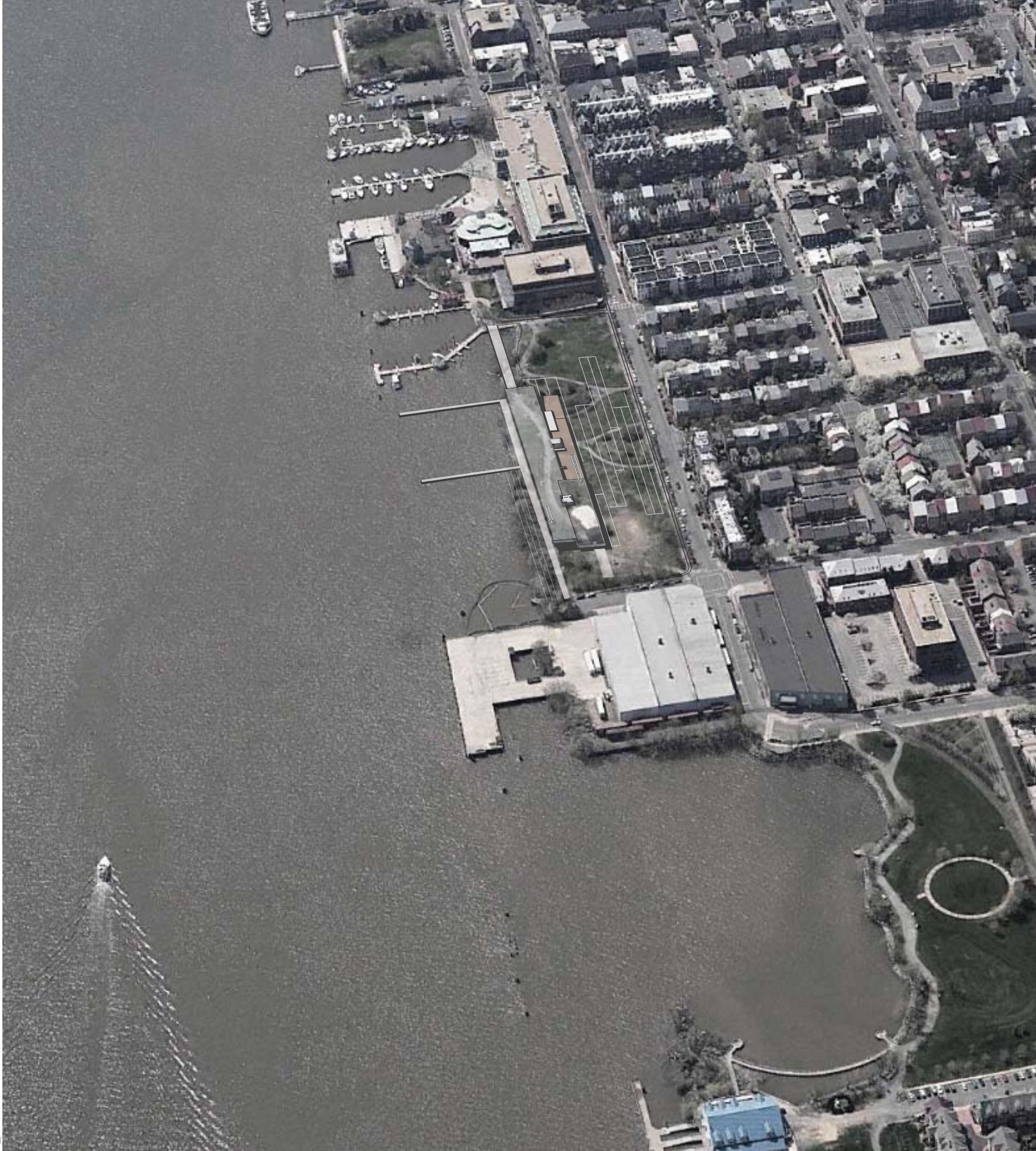
The space between the double-layered wall is used for the vertical distribution of services and utilities. Although the structural use is to hold the concrete slabs, they are seen as one solid piece. There is a gap between the platforms and the walls, allowing natural and artificial light to pass along them.

Pedestrian View



Aerial View

View of Old Town Alexandria with the cultural center as part of the city.



Assembly and Addition to the **TEXTURE OF THE CITY**

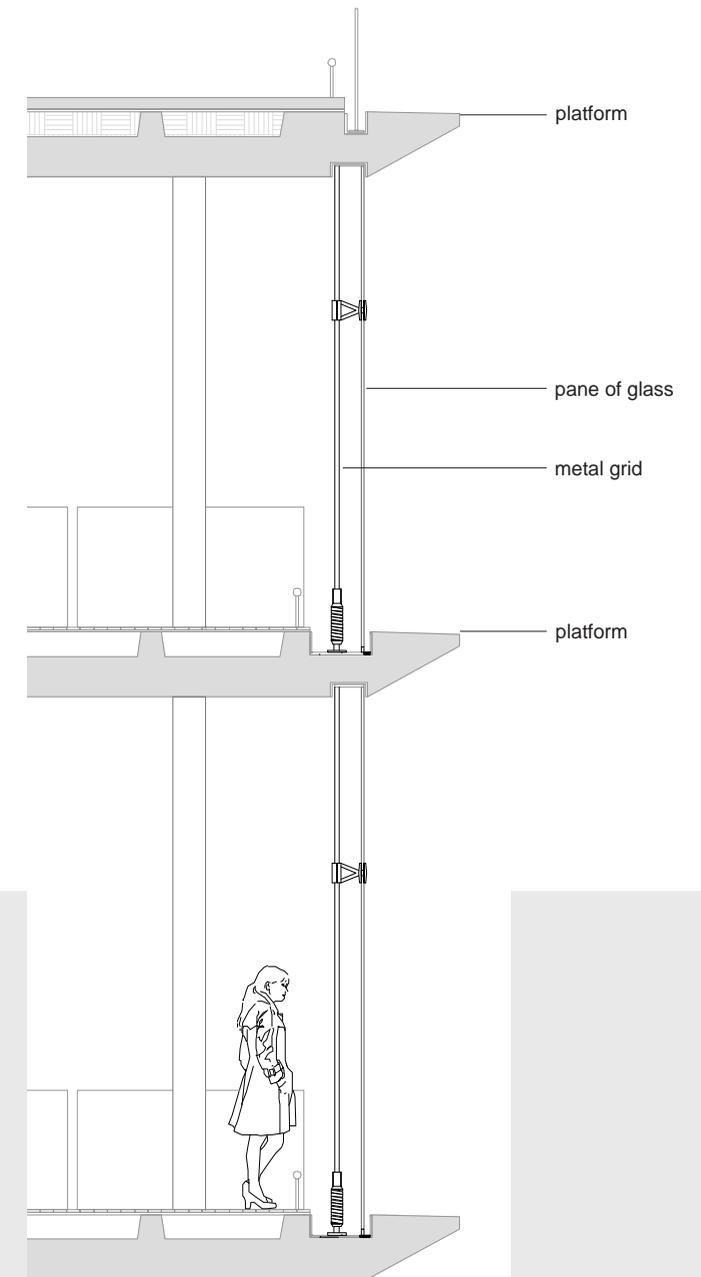




Platforms

Two way concrete slabs or waffle slabs are the primary horizontal structural system in the building. Traditionally, the waffle shape is shown in the ceiling. Here, in order to generate a smoother ceiling, the slab system is inverted. This leaves the waffle shape hidden in the floor. The result is a continuous smoothness inside the space encouraging a more directed movement.

From the outside view, the slabs project over the glass facade. This creates shade on the facade and allows one to perceive the overlapping platforms more clearly. The end section of the slab is tapered to diminish its presence toward a light horizontal line. From the outside, the slab appears to be lightweight, or to create an effect of lightness in opposition to the massive structure that it is.



concrete floor

wood floor

oriented longitudinally to emphasize the flow and continuity

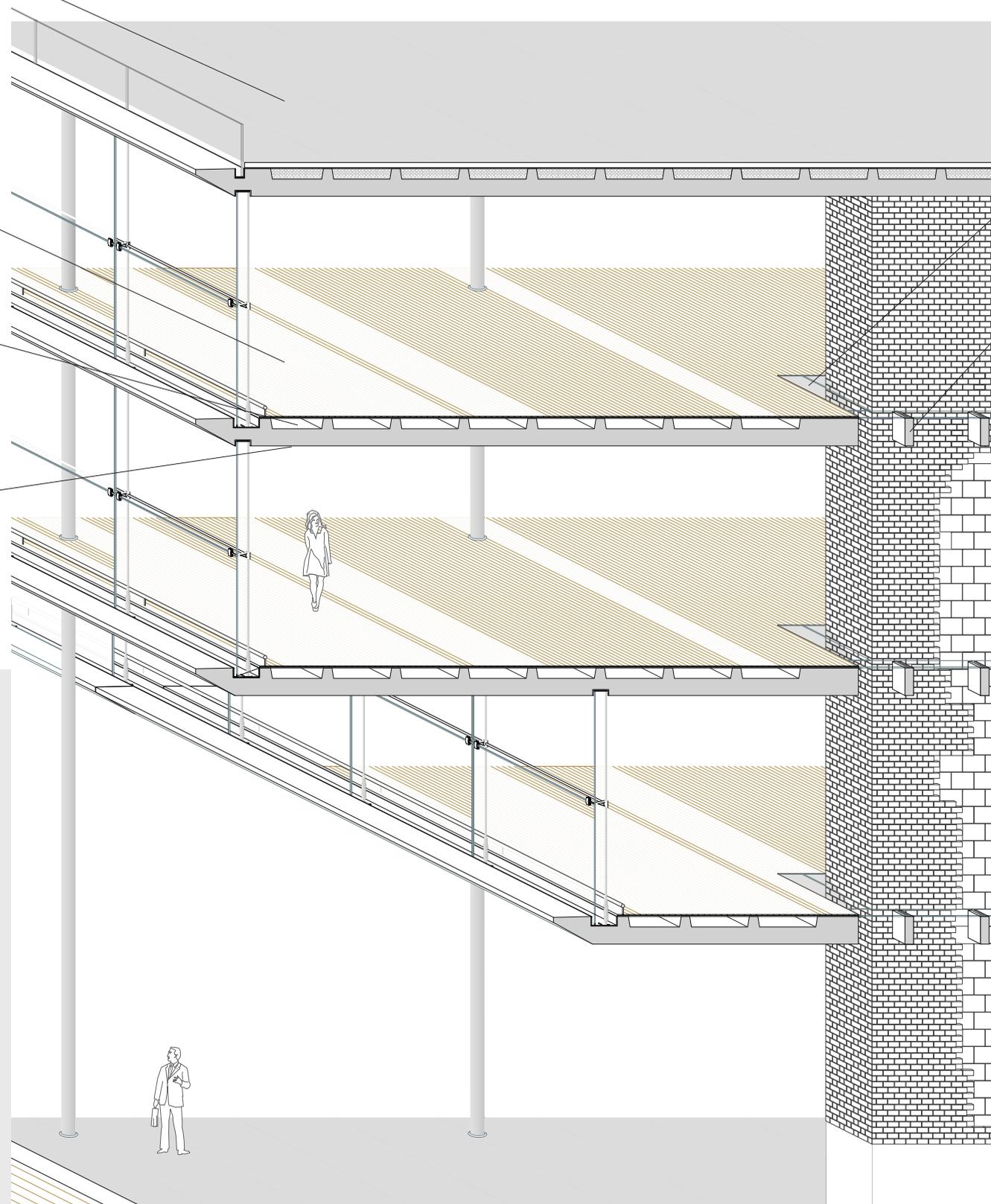
acoustic spaces

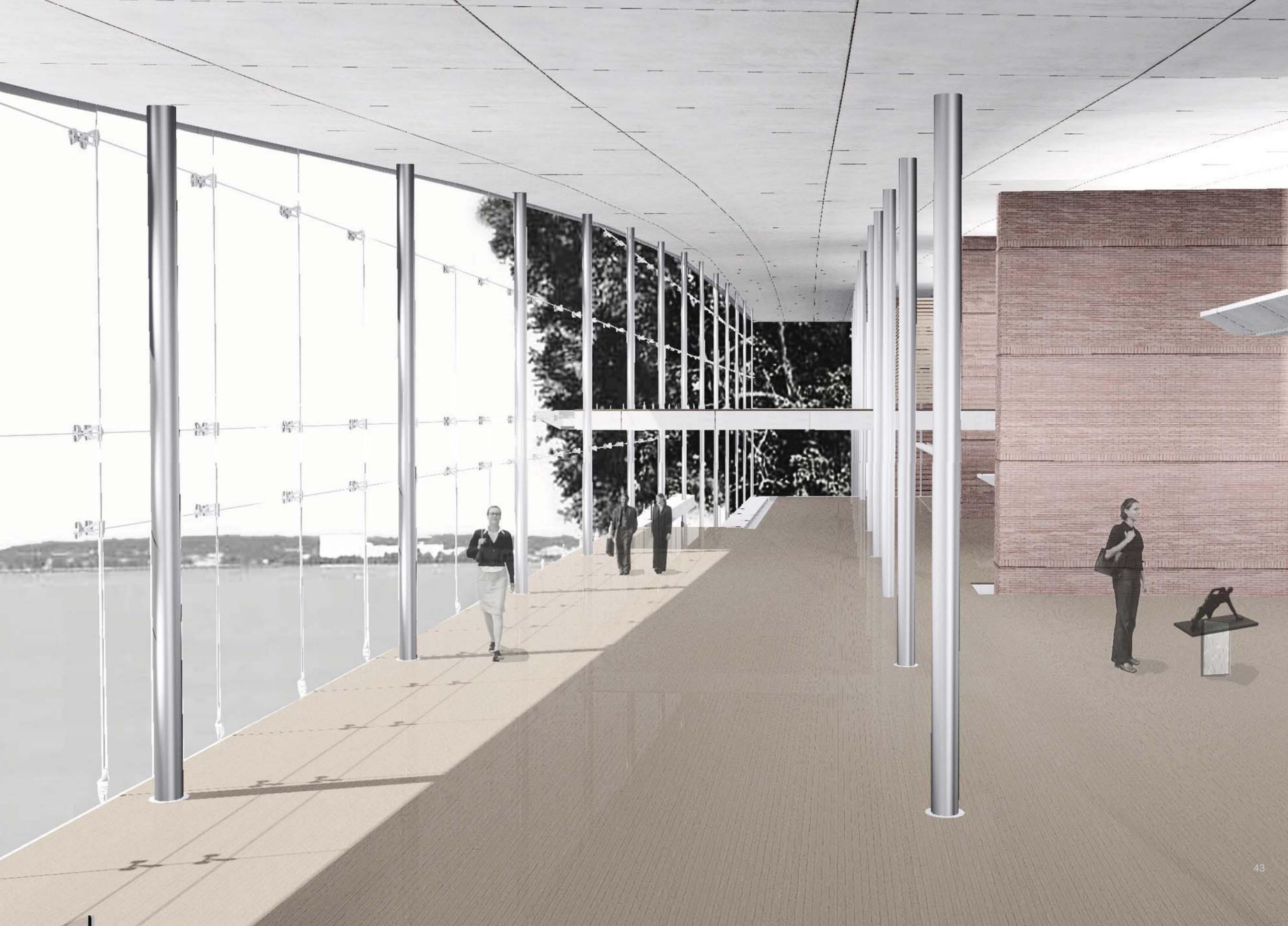
concrete slab

waffle slab built upside down to create a smooth surface

space around brick walls allow light through the building and helps the sense of lightness

concrete beams connect the platforms with the brick walls



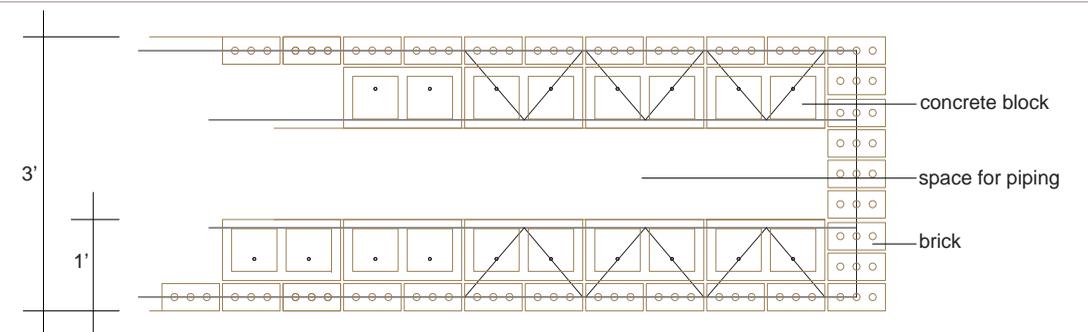


Brick Walls

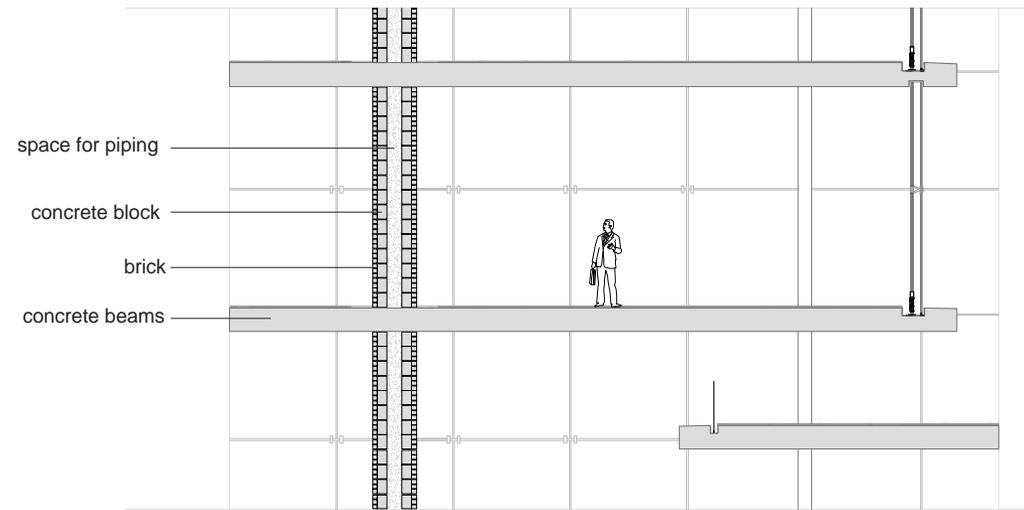
Architecturally, they support part of the load of the building load, and they also give structure to the interior spaces. The walls are made of a layer of brick and concrete, relating to the city landscape. These thick masonry walls are conceptually three feet wide with a core for piping building infrastructure.

Three concrete and steel columns hold each massive wall to create stability and stiffness. The walls are built as a solid piece from the ground floor to the roof, and their height varies depending on the location.

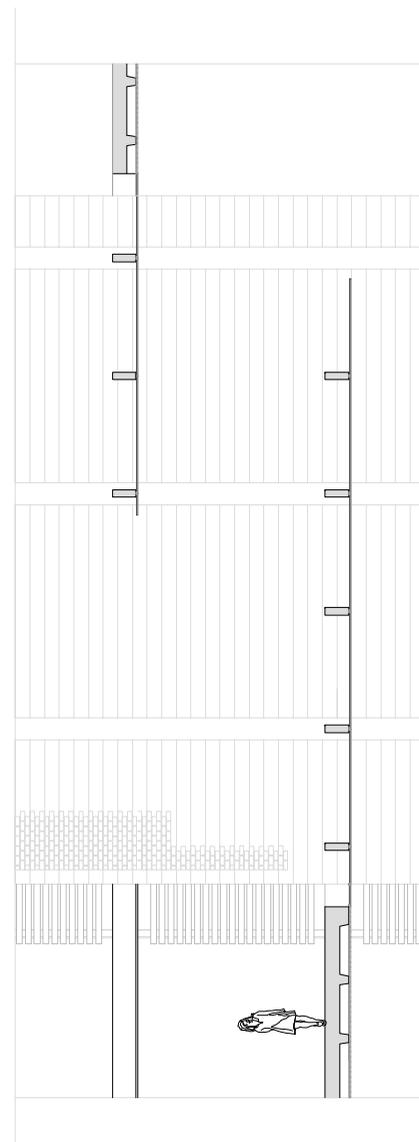
The walls hold the platforms through the use of concrete beams. The two massive structures are not attached to each other, except at the locations of these beams. There is also a big gap between the structures; creating an effect of lightness as well as allowing light to pass through the platforms from top to bottom.



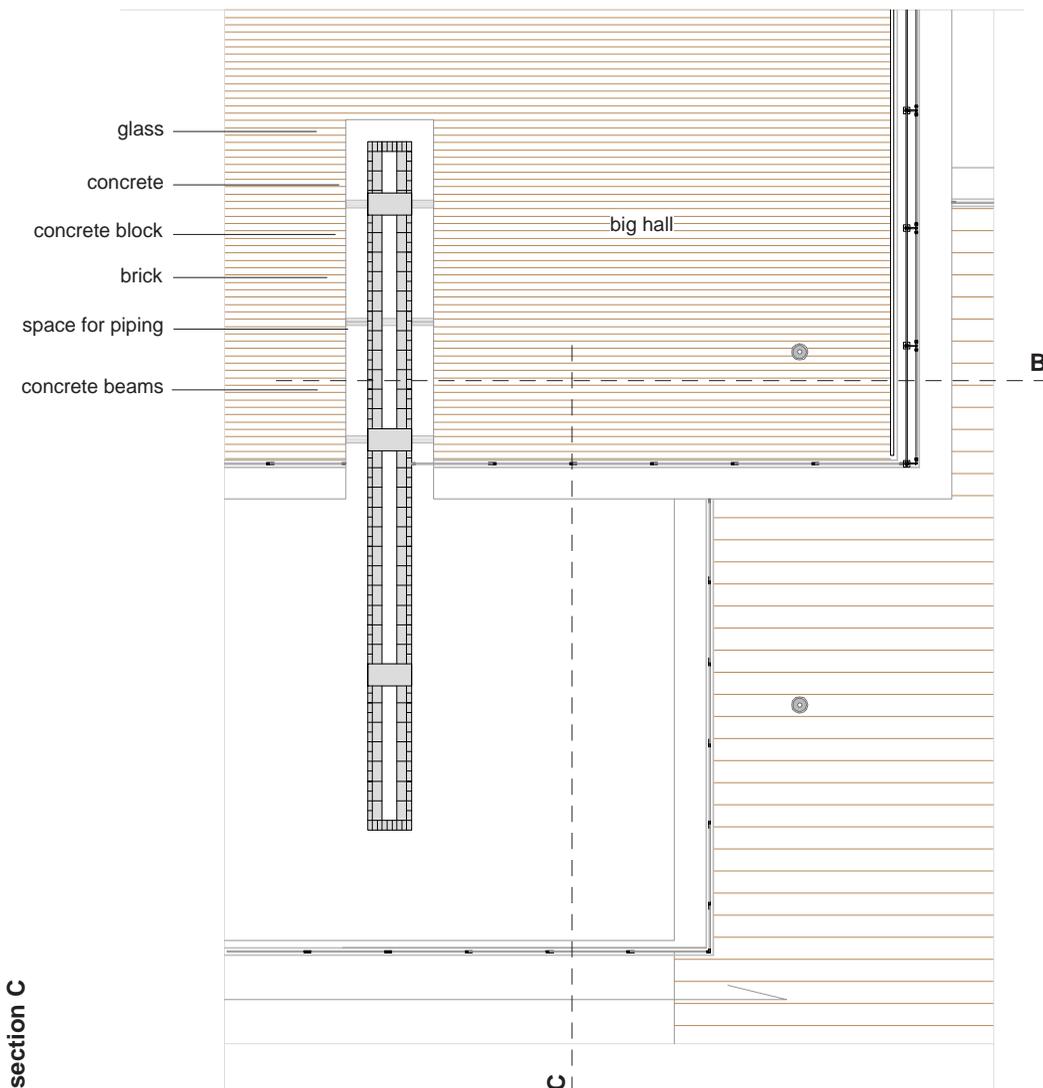
Plan and Sections

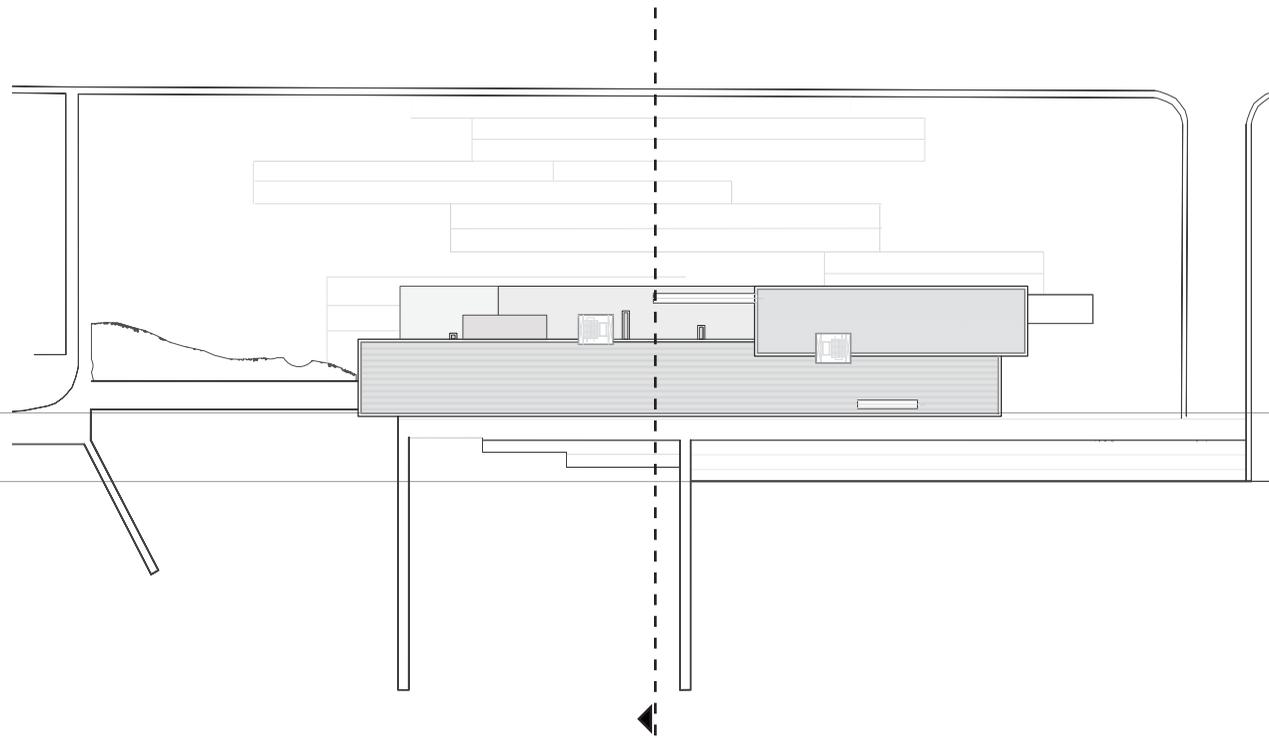


section B

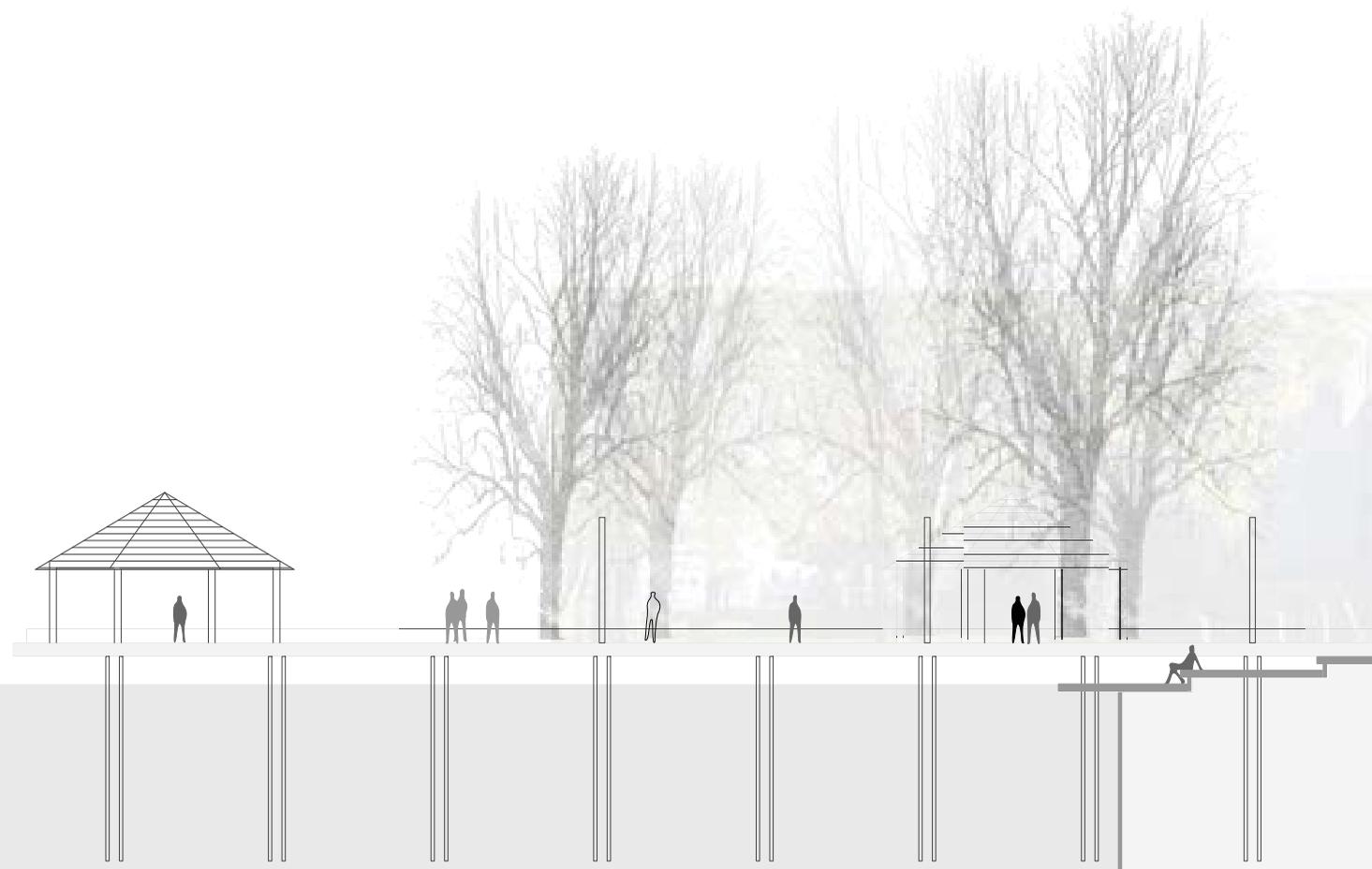


section C

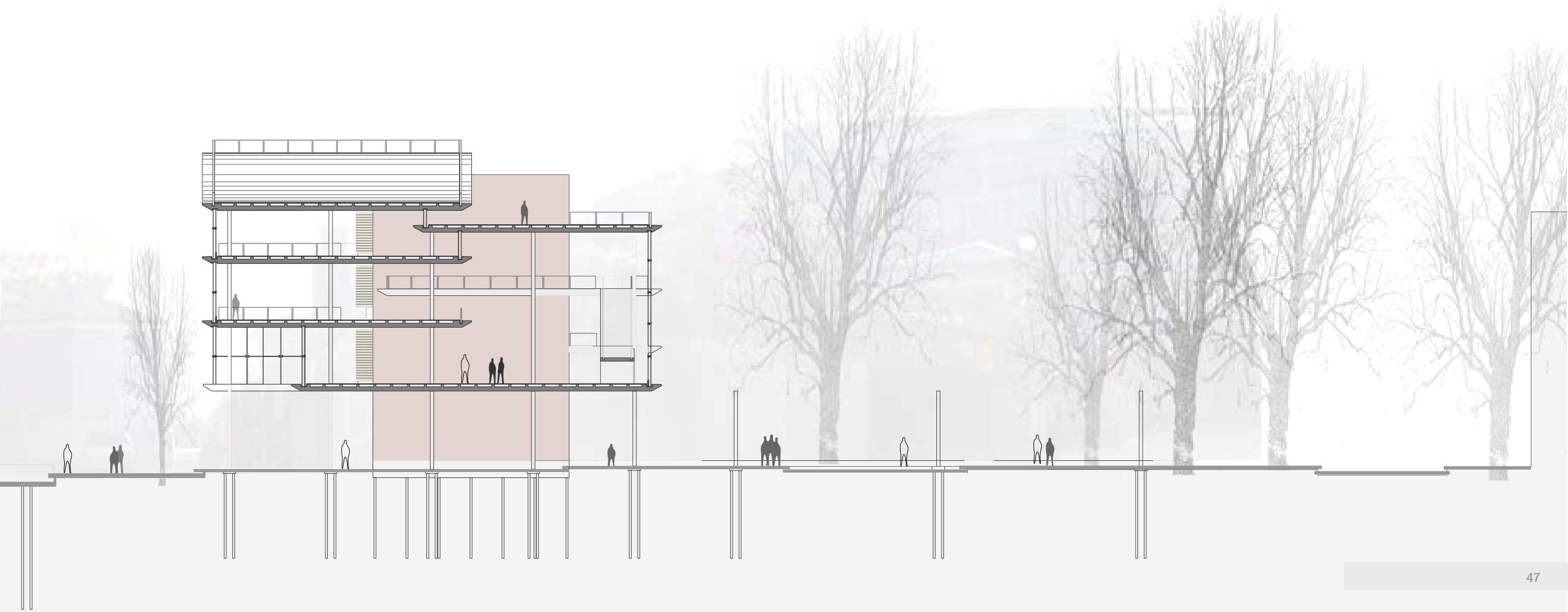




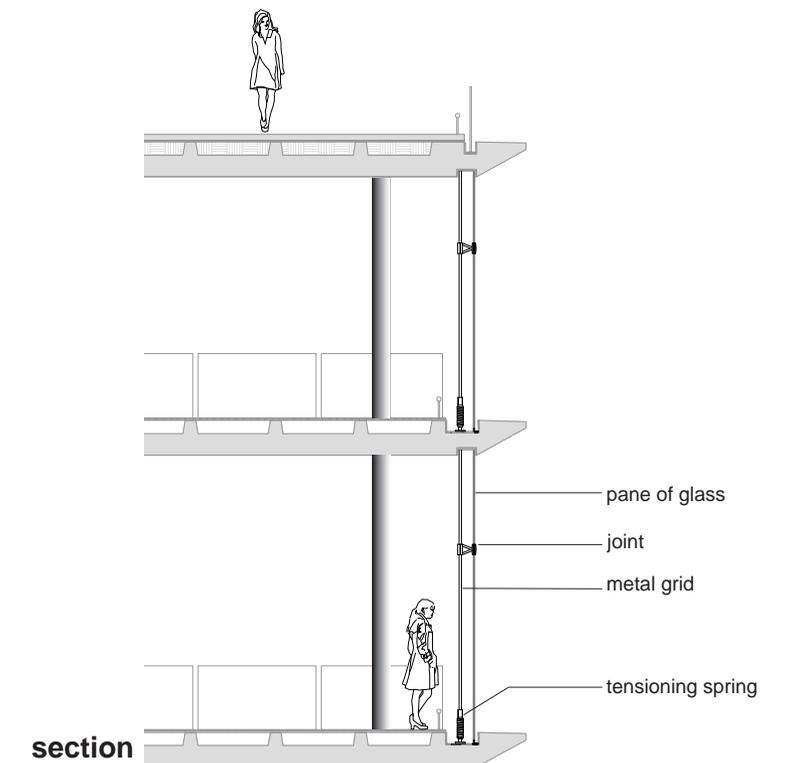
Transverse Section



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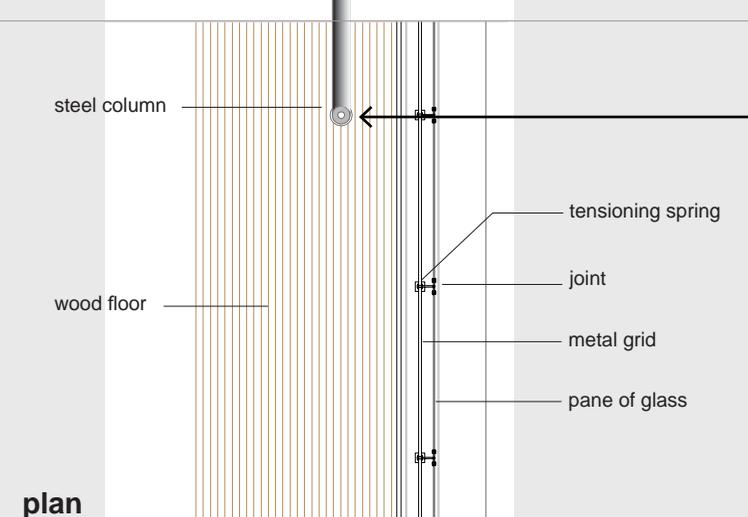
Glass Facade

The glass facade is made with big panes of glass, which are connected to a steel grid. The grid has horizontal and vertical rods attached to the roof and the floor through several tensioning springs. A metal joint is located at every intersection point of the metal grid. The grid is designed to connect the different panes of glass, where each joint holds the corners of four panes. The glass skin envelops the building, from the second level to the roof. It offers both an open view to the river and to the city

Columns

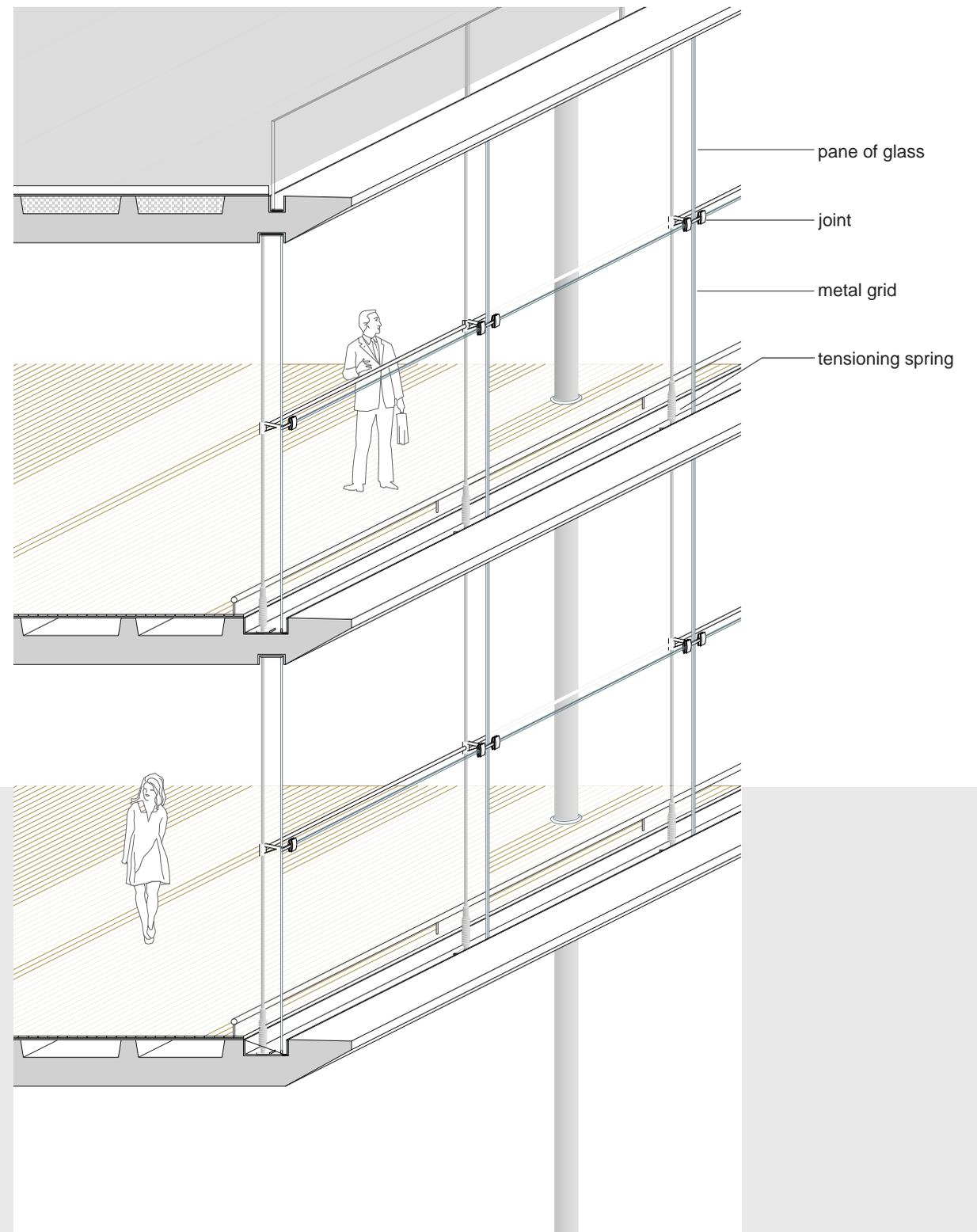
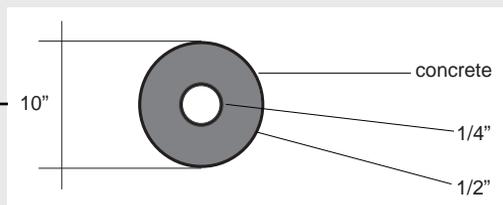
Along with the walls, columns help bear the total weight of the building. This structural element is laid out in an octagonal grid. It has a circular shape made of steel and filled with concrete. The columns have to appear as thin as possible; therefore the steel is assumed to be highly reflective to reduce their presence in the space.

section



plan

Steel Column

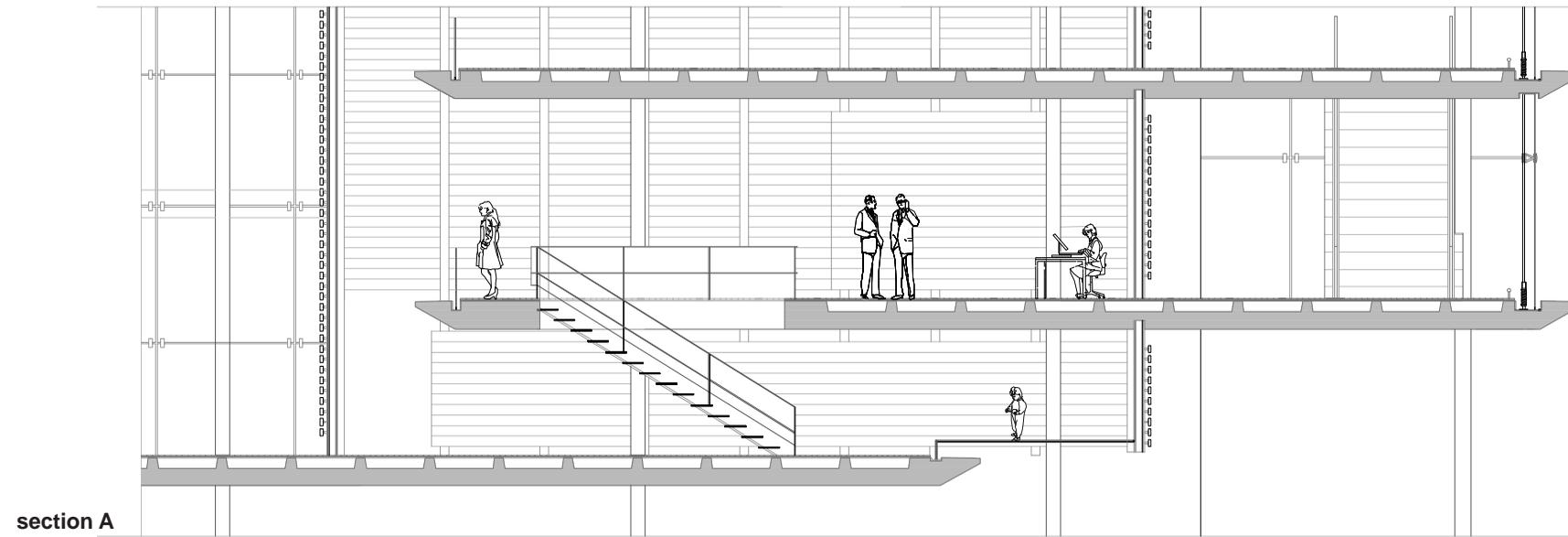




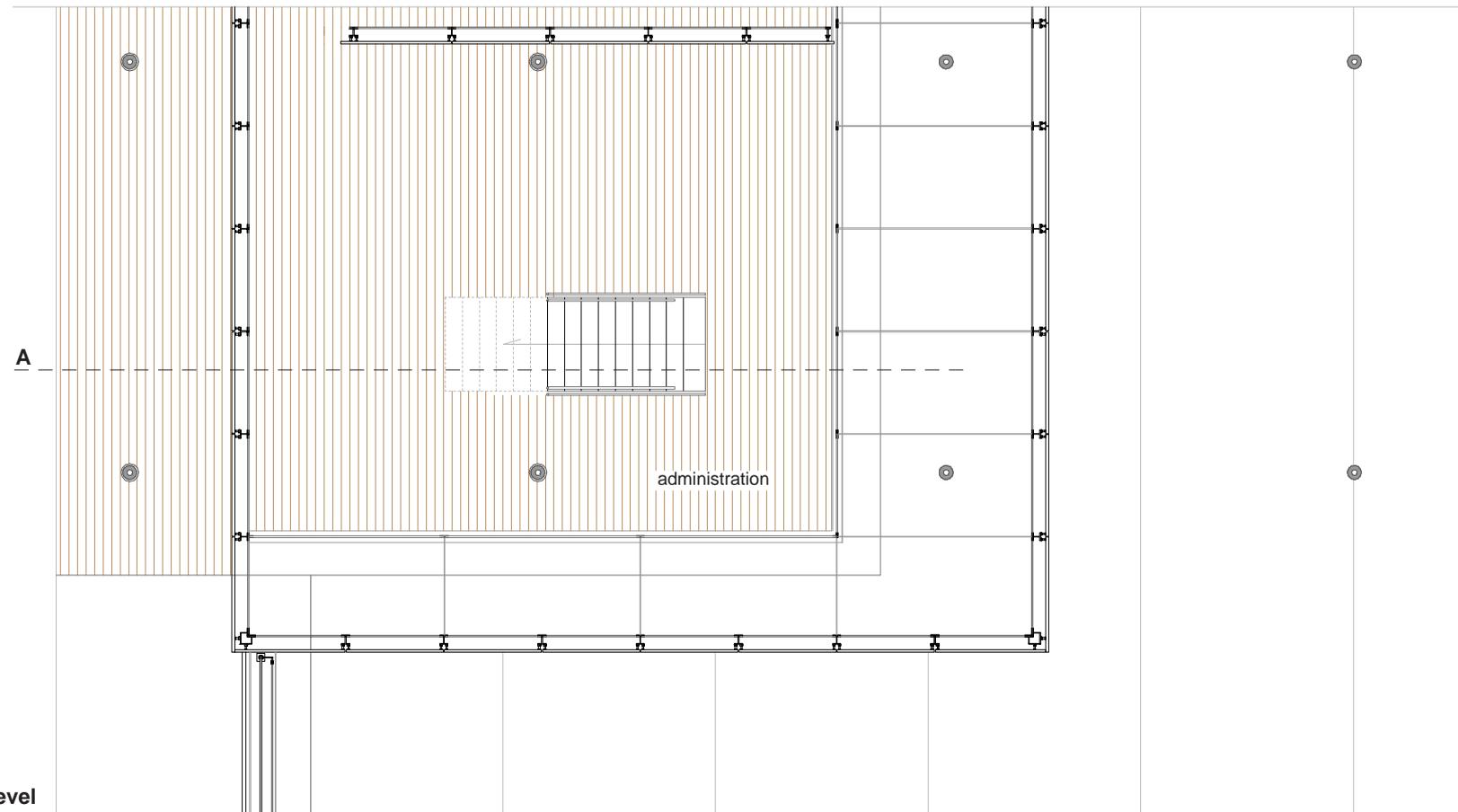
Wood Boxes

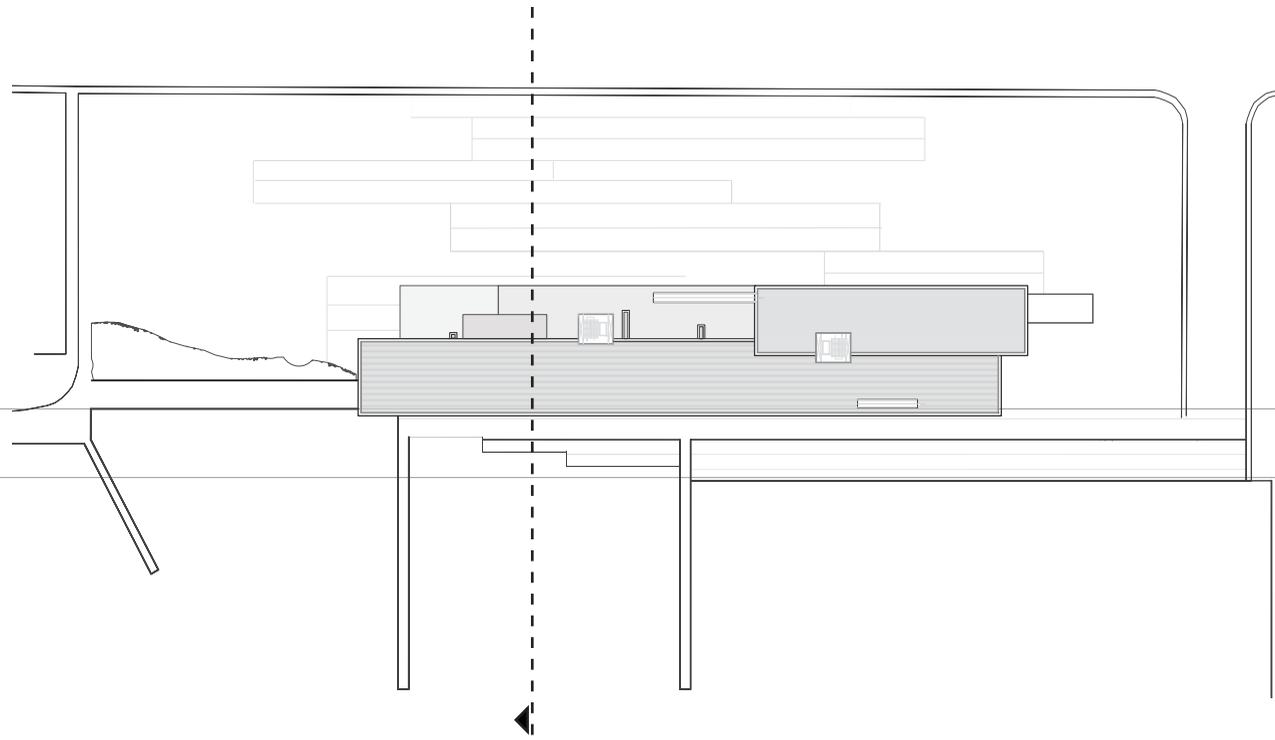
These boxes due to their service nature have to be opaque. Horizontal wood slats define the boxes and retain the major horizontal lines throughout the project. These slats are held with vertical steel I beams connected to the roof and floor. These beams also support the thermal and acoustic glass enclosure on the inside of the wood. The gap between the wood slats varies depending on the activity within the interior space. These gaps allow light to pass through and moderate visibility.

The wooden boxes are neither connected to the roof nor to the floor. On the inside, they appear as floating elements on every floor. From outside, they appear as one continuous vertical element.



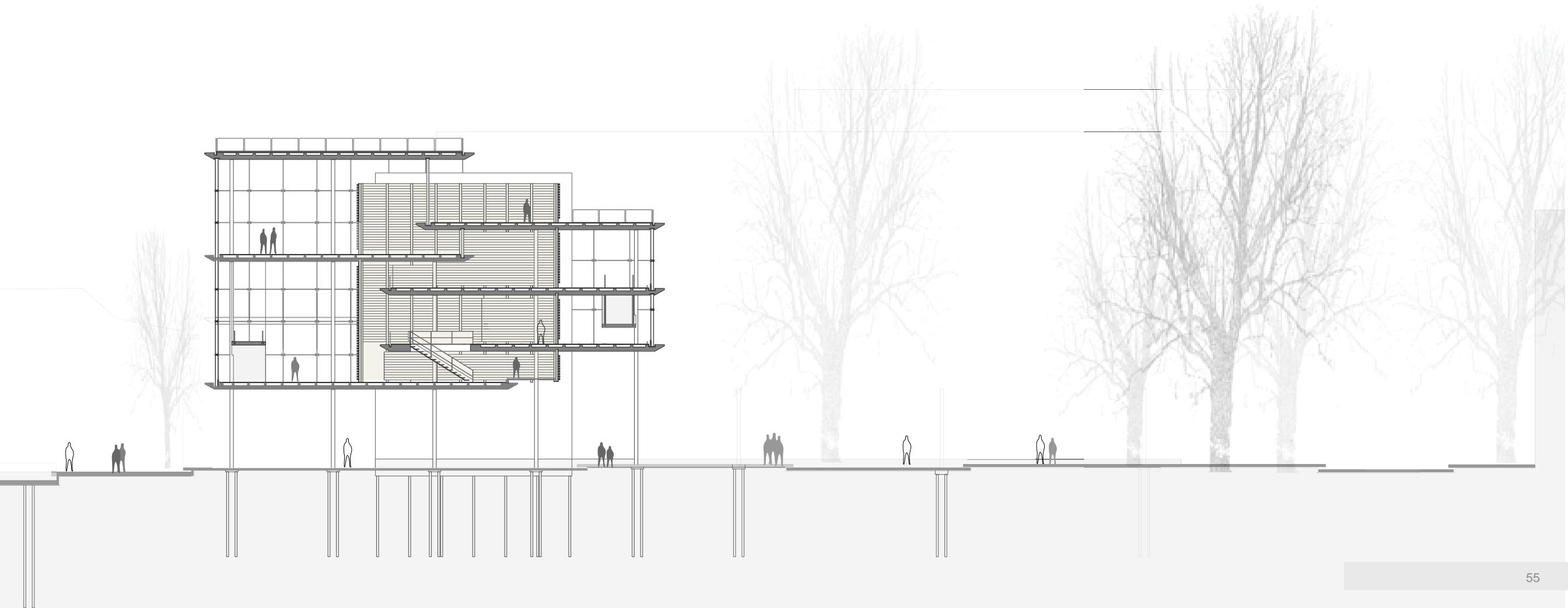
Plan and Section



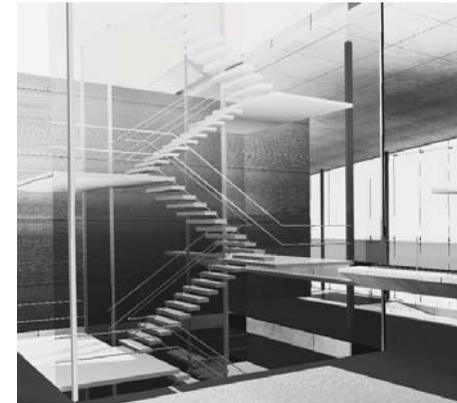


Transverse Section









stairs at terrace level



stairs at third level

Glass Boxes

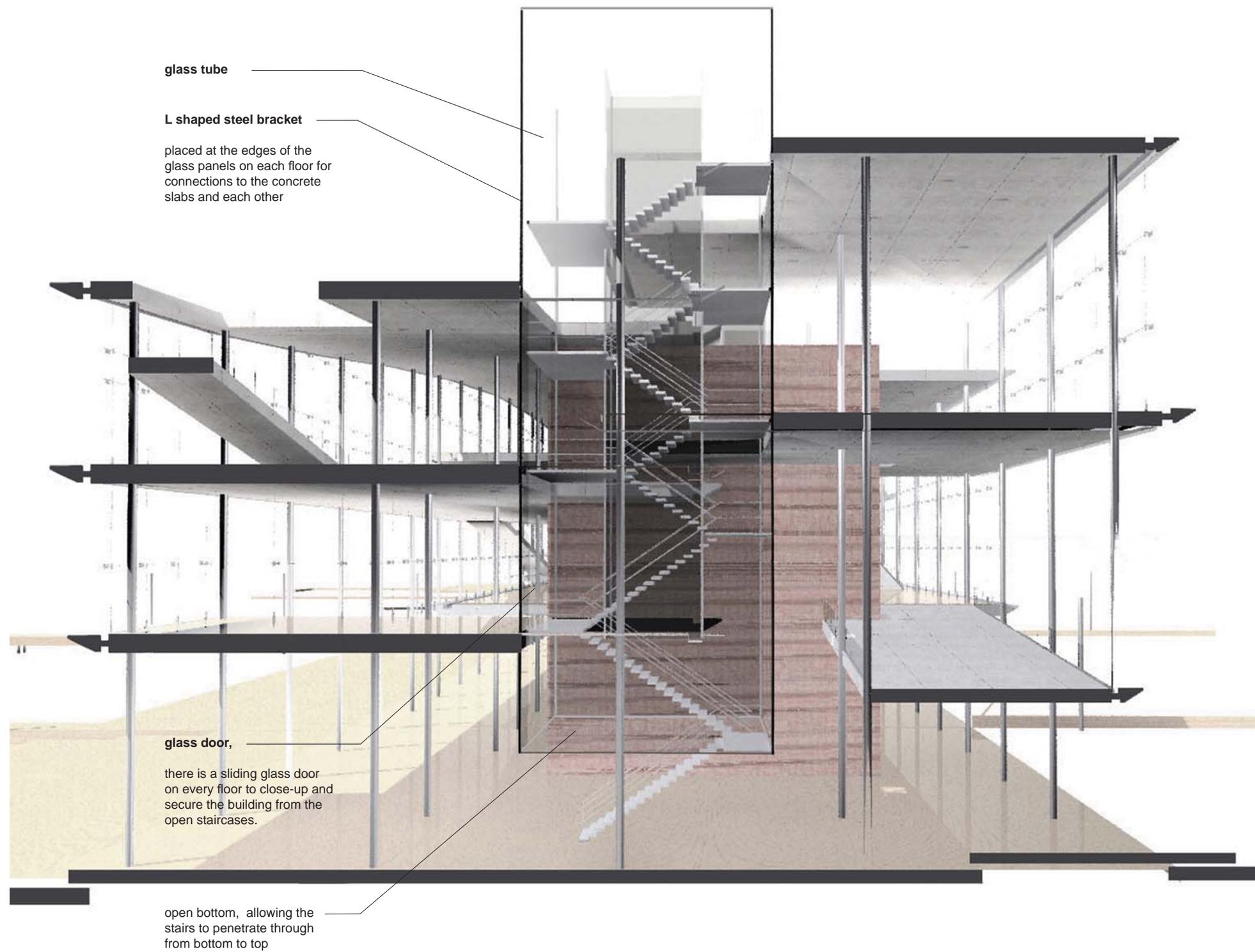
The glass boxes are punched through the building in a vertical direction, opening a hole in every concrete slab. The platforms hold the big structures that contain the stairs cases and the elevators, which are also made of glass.

The stair cases allow for vertical circulation to all levels, from the ground level to the roof. The material used is stainless steel. To promote the horizontality the staircase is made of several treads and a longitudinal circular bar for the hand railing. The steps are held with a center stringer and attached to the slabs at each level.



stairs at first level

Stairs Section



glass tube

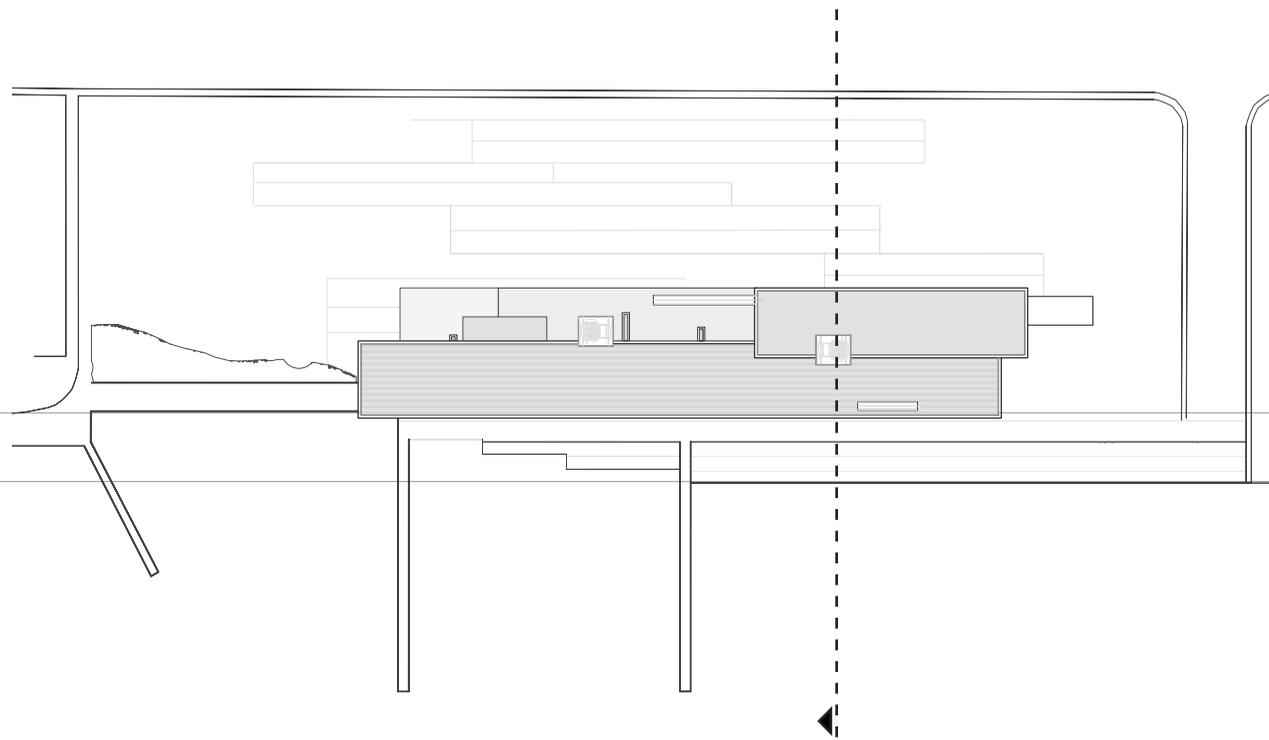
L shaped steel bracket

placed at the edges of the glass panels on each floor for connections to the concrete slabs and each other

glass door,

there is a sliding glass door on every floor to close-up and secure the building from the open staircases.

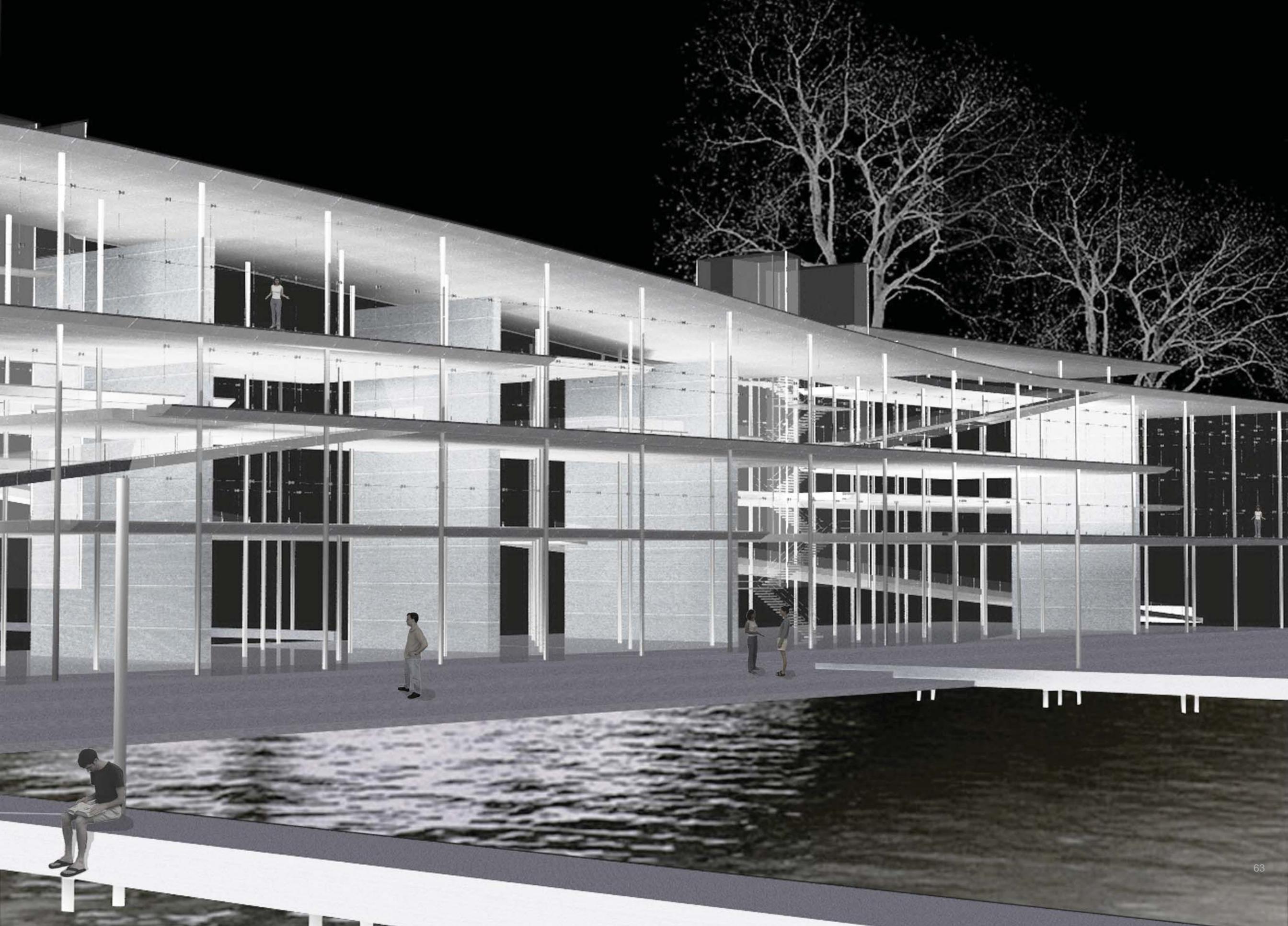
open bottom, allowing the stairs to penetrate through from bottom to top



Transverse Section







EPILOGUE

Architecture constantly oscillates between the extremes of inside and outside, where nature is the most important element outside since it always collides with the man-made. Thus, a building belongs to the people and the place where it is located. It should respond to their different demands and take in the different components of a place.

In this thesis, transparency and movement are the main elements in the definition of a building and they aim to diminish the tension between public and private space. These elements strengthen the relationship between river and city. They also help capture the dynamic in the surrounding and merge them in the transition between opened and closed spaces.

Here, water has a strong presence and gives a special quality to a place. With the architectural elements defined in this project, there is an attempt to address the contrast between land and water. Architecture and nature as opposite elements can in dialog define new spaces toward a contemporary meaningful environment.

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