

# Terra Firma: Post Superficies

Alteration of the Surface



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## Terra Firma: Post Superficies

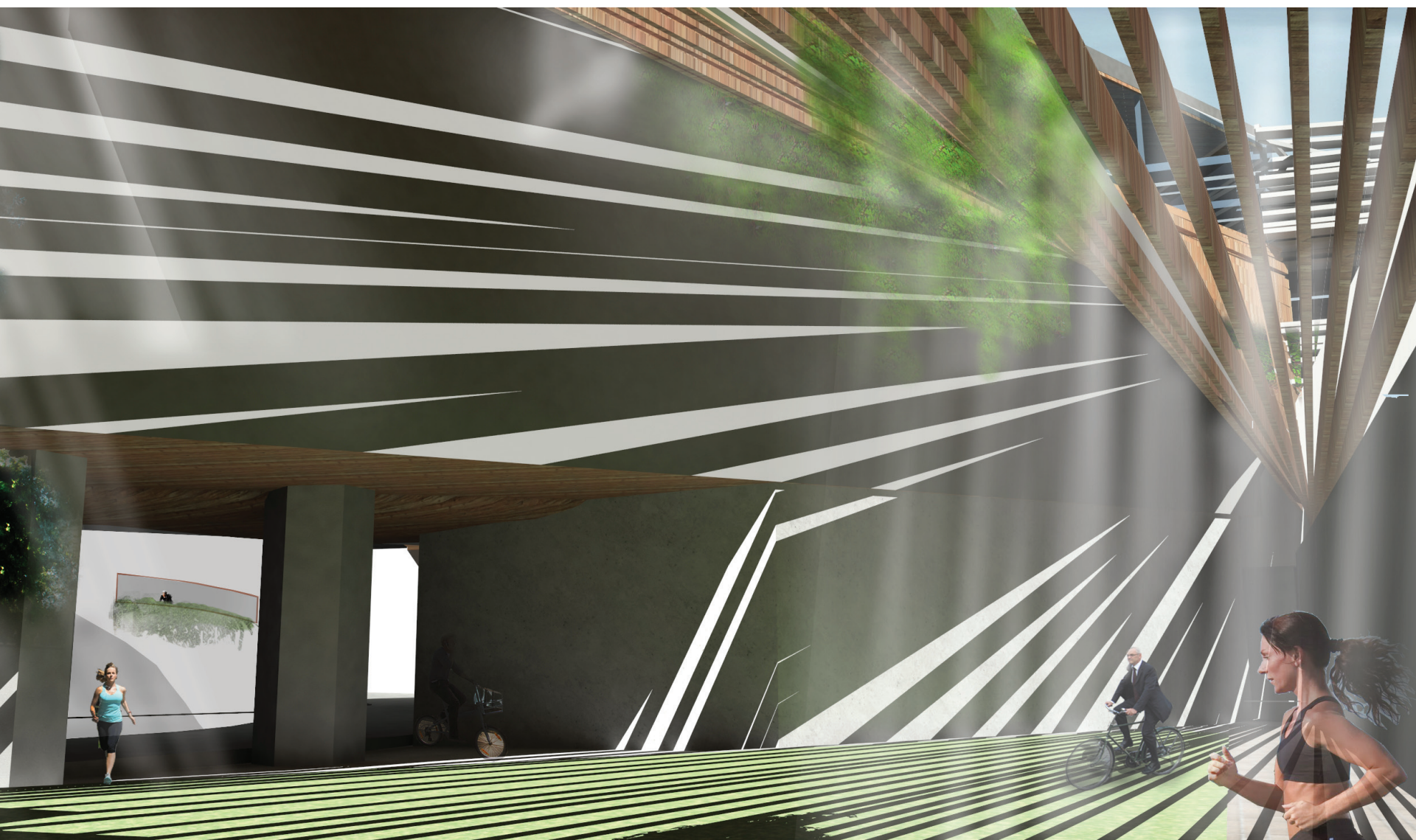
The title is a Latin translation of Solid Ground: Behind the Surface. The title was derived through the questioning of the unknown of what is below us. The interpretation of the underground chapter “THE BLDG BLOG” and the idea of the earth below a city is comparable to a block of swiss cheese.

Dedicated to John Mueller

The Professor who never teaches but motivates his student's to strive for their self interest. To the class of 2012 .

# Make it your own.

-John Mueller



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# Abstract

This thesis is an exploration of how to alter the human perception of the underground, while blurring our orientation to the “Surface”. The general lack of sensitivity exercised for designing spaces below the surface has helped factor into a skewed interpretation of what subterranean architecture could be. By looking at the existing condition of a site, a sensitive design will start to form based on the layers of information extracted to the specific location. The basis of design should infuse a direct connection to the surrounding context while looking at the appropriate connection to the future. The approach of design regarding the surface begins to create an experiential phenomenon which blurs the perception of being underground, in the ground, and above ground. Through the manipulation of the surface by variations in penetrations, materiality, and organization of space, a harmonizing dichotomy is developed between above and below.

The under utilization of the subterranean has resulted in a desensitization of experience below the surface. Over time the underground has become re-purposed as a means of last resort. The neglect of design has altered the perception one inhibits when underground because of the lack in care provided by the design. People inherently associate the underground as the dark, damp, and dangerous. This perception has the ability to implement new design solutions to enhance the experiences below the surface.





# Thesis Paper





Although subterranean architecture is one of the oldest forms of architecture, its potential and utilization as a design tool has gone unused. The unconditional living conditions of the sub-surface world has deterred a progression and advancement of the below surface. Why is it that humans are fascinated with the formations of caves and are willing to pay large sums of money to have a tour of underground chambers but are afraid of the man made formation below the city? Whether man-made or made by mother nature, the spaces hold parallel characteristics which are what create fascination in one and fear in the other. Within society today, the subterranean is used only when necessary. This often results in a place for hiding unwanted infrastructure. However, when spaces are designed for the interaction of the public the spaces designed below try to ignore the natural characteristics of the underground. This is accomplished by suppressing the subterranean world behind thick concrete walls which are covered up with impressive lighting displays and captivating graphics. The spaces below are only an attempt to replicate a mirror image of the world above. The design of these underground spaces attempts to make a user unconscious of the surroundings, distracting them as they descend below the surface. Modern technology has allowed humans to change the underground into an artificial world with no contact with nature, as an evolutionary process to suppress the unconscious. Few buildings or spaces below attempt to capture the essence of the underground to display the potential which lies beneath, rather society moves further away. Why would anyone want to go into the darkness of the underground and who would want to? Within the world today masses of people slip into the spaces of the below world for various reasons other but rarely because they want to go underground. Urban explorers wander through chambers and labyrinths below urban environments hoping to find answers about a lost world, others go underground to escape from the restrictions and order of the surface above. Below is a world of irrationality, where people can truly express their inner emotions without being judged or punished for what they do. It is a free and liberating world not hiding the nature of the spaces but grasping the unique characteristics.

As an attempt to understand the essence of the underground, a further investigation into the worlds below the surface will be examined. The purpose is to find a solution to reunite with the natural world which surrounds us and the natural character of the human. By investigating the established urban setting with the characteristics below, the dis-attachment from the world will be conducted through careful analysis of the world above and the conditions below. The investigation will attempt to find a solution using design to try and retract from the artificial world and lifestyle society has generated.

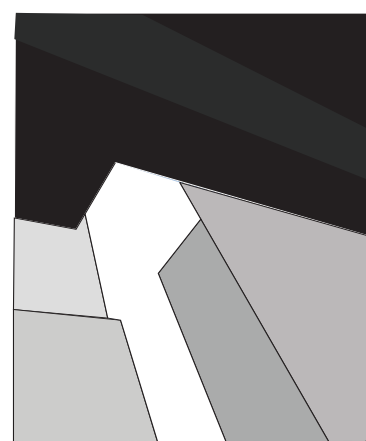
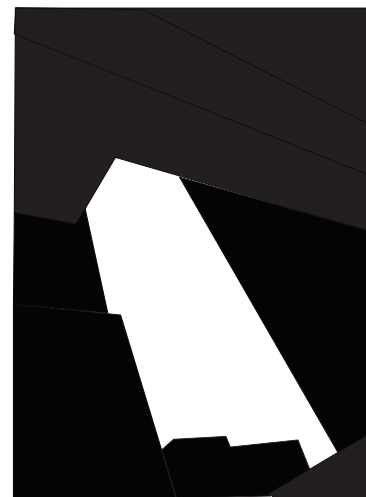


Subterranean architecture has evolved into a universal system of design lacking a general sensitivity to the surrounding context. Reasons for why people use the subterranean can be broken into seven categories which address the conditions of the underground at a variety of levels. The first and most primitive use of the underground is to seek shelter or protection from danger. The subterranean provides a stable surrounding and isolates the occupants. By submerging below the surface one is able to hide from enemies which may be the source of harm but can also hide secret operations and movement. By concealing one self under the surface the ability to know what is below is reduced and can only be understood by entering the voids.

The subterranean has recently been utilized for eco-friendly design by utilizing the consistent conditions in order to reduce energy consumption. However, this knowledge has been used for thousands of years as a source to escape extreme temperature peaks. The consistent conditions are utilized for storing delicate material to reduce the possibility of decay or damage. Scientists use subterranean facilities around the world as a way to conduct sensitive experiments that cannot have fluctuation in temperature or vibrations. In Japan, the Fujima Facility relies on the stability of the earth in order to conduct experiments on particle acceleration. The chamber is also under the ground as insulation in the event that a disaster would occur. By being encapsulated, the devastation resulting from an explosion would be minimal if noticeable around the world.

People have resorted to the underground as a way to find a connection spiritually. The use of below surface chambers have a variety of symbolic reasoning, often relying on natural lighting to evoke these feelings. The confinement to darkness creates the isolation from the rest of the world creating a peaceful surrounding. The light piercing through an opening becomes a powerful symbolic representation of an intervention with the spirits. Thousands of subterranean voids have been found throughout the world including Maes Howe and Skara Brae in the UK. Although Maes Howe was created by earth-berming, it still created the feeling of being under ground.

Today the subterranean is used as a result of a restriction of limitation. This is purely using the underground as a way to extend the surface. As cities grow and the density within the city exhaust all space on the surface, subterranean infrastructure is turned to as a way to overcome the shortage of space. The metro or subway is one example of this system. The design and construction of the underground is purely on a basis of being as efficient as possible. The cheapest and most durable materials are used with little to no excess in design. The metro systems throughout the world are used as a way to connect nodes within the city in an efficient manner because the congestion on the surface has escalated to a level that is not efficient. The lack of parking spaces within dense urban spaces also has also resorted to the underground as a means to extend parking below buildings and in some cases parks. These spaces show no characteristic of unique design and are treated as a universal space below the surface. This idea and utilization of the subterranean has been implemented all over the world and is now being practiced at a more common level. This lack of sensitivity has transformed the underground and has altered the way people view the underground.



The underground is what lies below the surface, the depth needed to reach the subterranean is based on the thickness of the surface. In order to access the subterranean a penetration in the surface must exist, exposing the content within. The underground could in a way be the interior of a surface, it is what we cannot see unless in a void, for in order to truly be below the surface it can not be exposed. This becomes a subjective interpretation for when something is considered in-the-ground and under-the-ground. A substantial difference exists between the two conditions resulting in the amount of enclosure. A void In-the-Ground has an opening to the exterior of the surface in an extent where a new condition or world does not exist. Fluidity between the exterior and interior exists without a suggestion of a barrier or resistance where a break creates a threshold. A suggestion of enclosure would create a restriction of access into the space. The size and position of the opening to the underground chamber is where a subjective interpretation comes into play. A space dug into the ground or gouged out of the earth would be seen as In-the-Ground because of the unrestricted control of movement. In order to create an entrance into the ground and create a condition definable as underground, a small incision must be made exposing the underground in a controlled manner. A hole is the most common association for a penetration into the surface. It is a simple iteration of how this penetration could occur but is not limited to a hole. A slit or incision into the surface suggests an abrasion with dimensions longer than wide. This small opening restricts the amount of movement between the interior and exterior allowing the condition of the surface to maintain its character. On the surface this abrasion is viewed as almost nonexistent, merely a scar.

When underground it is the void that captivates our attention. When first trying to understand the essence of being below the surface the first impressions of prior experiences. This can range in great contrast depending on where one is raised or has lived. In many metropolises around the world, the underground becomes the vein of the city and is a necessity for the growth of the city. Others who do not live in a city with a metro system does not interact

with the below surface. For someone without the everyday experience of the subterranean may have memories of a basement from a childhood house or an experience visiting a cave. Whatever it may be all of the memories are captured by this space. The essence or purity of the underground does not alter as a result of the interior of the space.

The perception of the subterranean have been altered through the interaction of the underground on a daily basis. By passing through the fake spaces below the surface, society has assumed that subterranean architecture is limited. The simplification of form and function and created a perception that subterranean interventions must be in a linear, rigid manner. The spaces lack a sense of character or care and does not evoke interaction with the space or users. The subterranean spaces act as arteries would within the body. However why must this be the case? Before machinery in the past, people were forced to carve the voids out below the earth allowing for the possibility of organic formations. The earth below the surface takes on the idea of permanence but what if the spaces below were flexible and able to be manipulated by users. The subterranean voids vary in the physical conditions yet the same style of design is implemented. Areas where dirt and loose materials exist would allow for more flexible spaces below, where the earth could be viewed as a block that is able to be carved and transformed into a variety of spaces. This could create a new way of design that makes spaces more fluid or smooth. Areas where the conditions are dense such as rock ignore the structural qualities and cover over the existing condition with concrete.

The earth is separate from the surface therefore it is imperative to look at nature and architecture of the past which is sensitive to its location. As cities advance, the use of the subterranean increases. More and more people in the world today are using the underground in some manner, whether it is for a place to live, work, or travel the interaction is apparent. People spend great quantities of money in spaces which people interact with on a rare occasion, why do spaces which are interacted with by millions of people a day receive the same concern and sensitivity.



The general lack of consideration of design within subterranean voids has been widely accepted and rarely questioned. The dingy, cold feeling of spaces within the earth has been addressed by implementing an abundance of light and climate controlling mechanisms such as dehumidifiers and heaters to create a more enjoyable experience. The technological devices act as a way to mask the conditions of the underground. The spaces below the surface are often created with concrete floors, walls, and ceilings. The concrete creates a barrier between the earth and the user.

Natural caverns below the earth have created organic and beautiful spaces which become places of desire. People seek to experience these spaces below the earth because of the interesting formations which are created. The creation of the caverns are fascinating because of the size and unique formations that occur.

When light penetrates into the chambers, it begins to evoke feelings and connection to the earth. The feeling of being underground is lifted and the distraction of being underground is the result of the actual conditions below the surface. The movement of water through the earth is often the reason for the caverns to form and adds to the interest of the voids below. Underground lakes and rivers are rarely experienced by humans and as a result becomes an interest or attraction. Some man-made spaces have been able to create underground lakes which become central figures within the network. One place which was able to create this is the wieliczka salt mines near Krakow, Poland. The original formation of the network was by following the salt deposits within the earth. The areas where large deposits existed created massive voids within the earth. Over time the voids began to fill with water and was a reservoir for the miners.





The city of Cincinnati is rich with history and is one of the oldest cities in the Midwest. The unique past as well as geological conditions of the city has made it unique from many other Midwest cities. The close proximity to the river as well as being nestled in the basin of hills that surround the city gives the city many advantages most cities do not have. However, these unique conditions have also resulted in many burdens to overcome in order to function. The natural barriers of the city have resulted in the formation of isolated pockets within the city and the three hundred plus foot variation in elevation deters many people to travel by foot or bike. This topographic condition has strengthened the dependency of the automobile as a mode of transportation throughout the city. Today the city lacks a mechanism of public transportation which is reliable that connects the city and addresses the topography.

In the early 1900's, the city of Cincinnati had a sophisticated network of streetcars which were able to climb the hills through inclines. At the peak, the network had five inclines which connected the downtown basin to the tops of Mount Adams and Mount Auburn. However, by the 1930s the streetcars began to disappear and the function of the inclines decreased until all were completely stopped in the 1950s. Since this point, the only public transportation

(<http://www.flickr.com/photos/michaelgsmith/4316590873/>)





mechanism are buses. The flexibility of buses are capable of overcoming the terrain but continues to show the over-dependancy of the automobile.

The late 1800s a rapid transit system was proposed as a reliable and sustainable way of moving people in the city. The transit would allow people to move from multiple points within the city with ease. The proposal of the project was to transform the Ohio-Erie Canal into a tunnel which would house the transit line. In 1919 the project began and the under used canal was transformed into an underground tunnel. The network consisted of a 2.5 miles of underground tunnel which would surface along Mill Creek to the West of Mt. Auburn. However, due to budget cuts and a lack of funding, the project was stopped. The infrastructure was completed with two separate platforms completed. The first was at the intersection of Race Street and the second was near Walnut Street where the tunnel stops. The subway never housed a single car and did not ever had tracks laid. Today the tunnel exists in the same condition it did when the project stopped in 1929. For over eighty years the tunnel has been dormant as a scar on the city. The tunnel is located under Central Parkway today and because of the traffic which occurs above the infrastructure must be maintained to avoid collapsing.











(<http://www.flickr.com/photos/michaelgsmith/4316590873/>)

The early 1950s added a new layer on the city which started a complete fragmentation of the city. The introduction of the interstates to the city of Cincinnati, isolated the downtown from many neighborhoods within the city. Interstate-71 and I-75 both run through the city cutting off the downtown from the Riverfront and from Mount Adams. The interstates have created a barren barrier of over 200 feet of asphalt from the downtown to the rest of the city. In addition to the the interstates, the topography has completely isolated the downtown from the rest of the city. With interstate I-71 to the south and the east, I-75 along the west side, and Mt. Auburn on the north the ability to move from the downtown would require overcoming one of the barriers. To most people within the city, this would suggest the dependency of a car because of the absence of a transit system and the overwhelming physical exertion caused by the terrain. The existing conditions of Cincinnati give the city



a multitude of feature which suggest an intervention through the subterranean. Before the city can start to grow and develop it must address major problems that exist within the city. The biggest concern is the lack of people who live within the city's core. The district of OTR which was once the home of over 40,000 now has only 4,000. People do not live in the city because of the problems that exist. Imagine if 35,000 lived within walking distance of the downtown. This move alone would reduce the amount of traffic within the city and on the surrounding interstates. Before people start to move back into the city, a connection to the rest of the city must be implemented so the people do not feel so barricaded by the existing conditions. People need a mechanism to fluidly move through the city. The infusion of a subterranean network that provides areas of retreat within the city could be a potential way to reconnect the fragments, while giving a new perspective to the surface.

The investigation of Cincinnati allowed for a never ending laboratory to investigate the theoretical ideas of subterranean voids and the manipulation of the ground plane. By looking at the site's historical context in addition to the current demands the design begins to be created as a result the analysis. The architecture is questioning the way to intervene sites. The design is more concerned with the manipulation and transition of the surface and not as concerned with the aesthetics of the exterior. The architecture tries to be a part of the urban context, while creating a radical interpretation of design. The overlapping of the two studies creates an endless possibility of design with never creating an identical piece.

The re-establishment of the surface allows people within Cincinnati to be exposed to what was hidden beneath their feet while giving them the opportunity to see the city in a new perspective. The attempt of designing in this manner will attempt to re-establish how we perceive the underground while trying to preserve the existing moments to capture the ruins left in the city of Cincinnati.

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# Collage Studies

Altering our perception of the Underground

## Ascension into the Underground



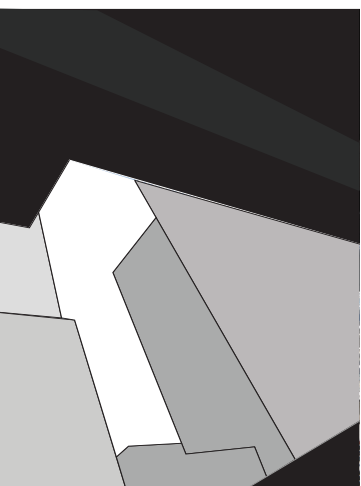
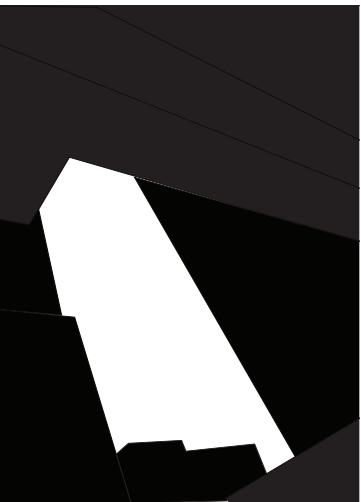
The collage studies question the ideas of what the underground is perceived as and what it could be. The theoretical suggestions question the idea of how one can enter the underground. The collage to the left ponders the idea of entering the underground by going up or into a vertical facade. Entrance to the underground is often associated with descent, but I am questioning ascending into the underground.

The collage to the right is a critique of the existing experience underground. Often subterranean tunnels are lifeless and rigid, so the collage is a study of what an organic green subterranean space could feel like. The abstracted tunnel could create a new experience below the surface.









Within a dense city, the layering of structures starts framing moments of the sky. This idea provoked the idea of how a layering of structures and planes can start to frame views. The extraction of layers started to display how the design of a site can frame moments or views within a city. The position of an individual can create a never ending lense for seeing the city. The evolution of the study probed the idea of how the egress from the earth can capture moments often not noticed in the city or under appreciated because of the surrounding context. By isolating certain moments, the power of the view can be accetuated.

The image to the right is a collage study of how the two ideas can refine the view of a city and can create a more interesting experience. The abstraction of the tunnel is created through a series of planes which are derived from editing out the unaesthetic moments of a city which detract from the beauty of the landscape.





# Precedent Studies

The investigation of existing subterranean voids helped evaluate how to design richer spaces. The vast array of characteristics helped develop a sense of what the underground means. The Four different conditions were analyzed throughly to figure out the expansive ability of the underground. Each of the Precedence were choosen based on the sensitivity to the site, method of creation, and aura of the space.



Roden Crater

James Turrell Landscape Transformation

Paris Catacombs

Abandoned Limestone Quarries

Hang Son Doong Cave

Vietnam Cave System

Works of Paolo Soleri

Infusion of Architecture and Landscape

# Hang Son Doong Cave

Vietnamese Cave System

The investigation of naturally created voids within the earth became an inspiration as to how one can create a new perception of the underground. Hang Son Doong Cavern system was one of many voids investigated. The expansive size in addition to the large openings exposing the surface showed an interesting dynamic between what we normally think as subterranean and what is possible.

The oculus opening within the cave helped develop and inspire the idea of what is really underground or below the surface. The image to the left displays the question of what really is the surface. One would question if the subterranean surface is the real surface or is the elevated level really the surface. The abundance of light also allows for vegetation to grow over 300 feet into the earth. This is a phenomenon that was further investigated into with physical models and the use of multiple layers.

The cavern also displayed the beauty of water within the underground and how we can transform a lifeless void through the filtration of water in a space. This also could create an investigation of the psychological issues resulting from water pouring into a confined space. The idea of subterranean waterfalls helped develop the idea of using stormwater collection within an urban context as a way of recreating this idea.





(Jenkins. Nat. Geographics)

# Paris Catacombs

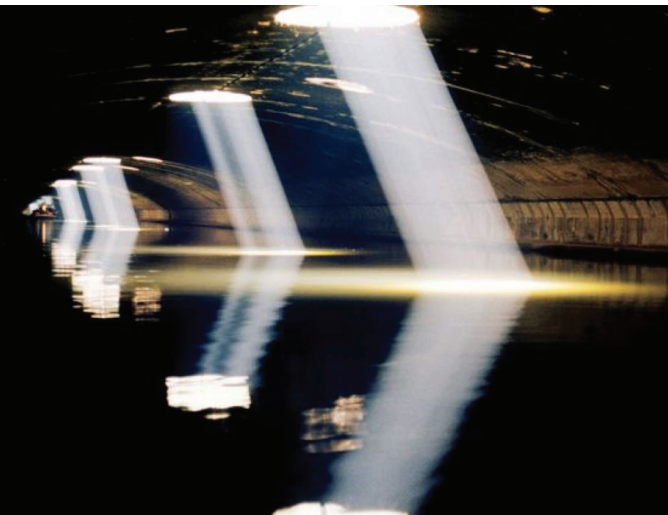
Abandoned Limestone Quarries

The Paris Catacombs has over 500 miles of tunnels beneath the city. The abandoned infrastructure creates a quality of space not capable of being replicated without layers of history. The expansive network creates a maze below the city with a complete loss of orientation.

This study allows an insight of how a subterranean network can be programmed and how the ruins under Cincinnati could capture a similar aura while at the same time function to the cities needs. The graffiti and murals painted in the Catacombs are similar to the images within the subway and instead of covering this, it can be exposed as a beautiful quality of space. The lack of scheduled program allows subterranean explorers to do as they please. Cataphiles use the voids as a place to work, play, study, or just explore. People go below the surface as a retreat from the surface world.

The serenity of the underground allows people to have peace and quiet to do as they please and with no law enforcement it allows people to do as they want. The range of people who go underground include the homeless to business men looking for adventure and a new challenge.

**Cataphiles-** people who love the Paris underground as a retreat from the surface world.





(Shea. Nat. Geo.)

# Roden Crater

James Turrell

Roden Crater is the transformation of an extinct volcano into the largest landscape installation in modern history. James Turrell explores how we perceive the sky and manipulates the way one interprets our surrounding by using the earth to create our lense. The celestial activities of the site influence the formation of voids within the earth. The alpha axis is an 800 foot tunnel, framing the moon on the equinox.

The installation of James Turrell is an example of how the specific location of the site influences the design. The effects of the site would not be as powerful if the user was not underground. The utilization of the ground as a way to evoke strong emotion makes the experience more powerful. The distortion of our relation to the earth along with the abstraction of a tunnel gave inspiration on what we see can be manipulated through the layering of structure.

This precedent is relavant to the city of Cincinnati because of the drastic variation in topography along with the openings of the hillsides. The sites allow for an opportunity to frame the sky and create interesting moments along the passageway of the subterranean network. The alignment with celestial activities could alos influence how light penetrates the voids below.





(Finkel, New York Times)

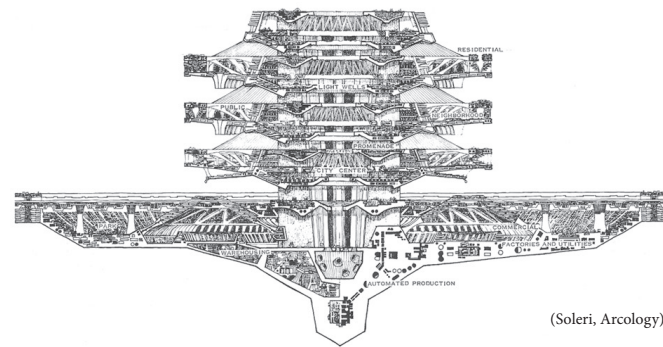


# Arcosanti

Paolo Soleri

"The problem I am confronting is the present design of cities only a few stories high, stretching outward in unwieldy sprawl for miles. As a result of their sprawl, they literally transform the earth, turn farms into parking lots and waste enormous amounts of time and energy transporting people, goods and services over their expanses. My solution is urban implosion rather than explosion."

- Paolo Soleri



(Soleri, Arcology)

Paolo Soleri's exploration of new urban design was an inspirational approach to design. Arcosanti in addition to many of Soleri's work is directly influenced by the site and location. The utilization of the existing conditions creates a more sensitive design and approach to architecture. His vision of creating sustainable cities creates an unusual aesthetic architecture however is more concerned with the efficiency and not the looks.

The use of the surface became an inspiration for designing. The ability to build above and below the horizon while infusing inhabited spaces became an interesting study for investigation. His investigation into earth casting as the main form of architecture is an innovative solution to make a more sensitive design. His urban planning and architecture is a radical attempt to design, however the underlying ideas are practical and something which must be investigated into.

The inspiration of his design was used as inspiration of how a current metropolis could be transformed into an arcology.

**Arcology-** a concept in which the ideal city is a massive vertical structure, which preserves more of the natural environment, a concept combining architecture and ecology as envisioned.





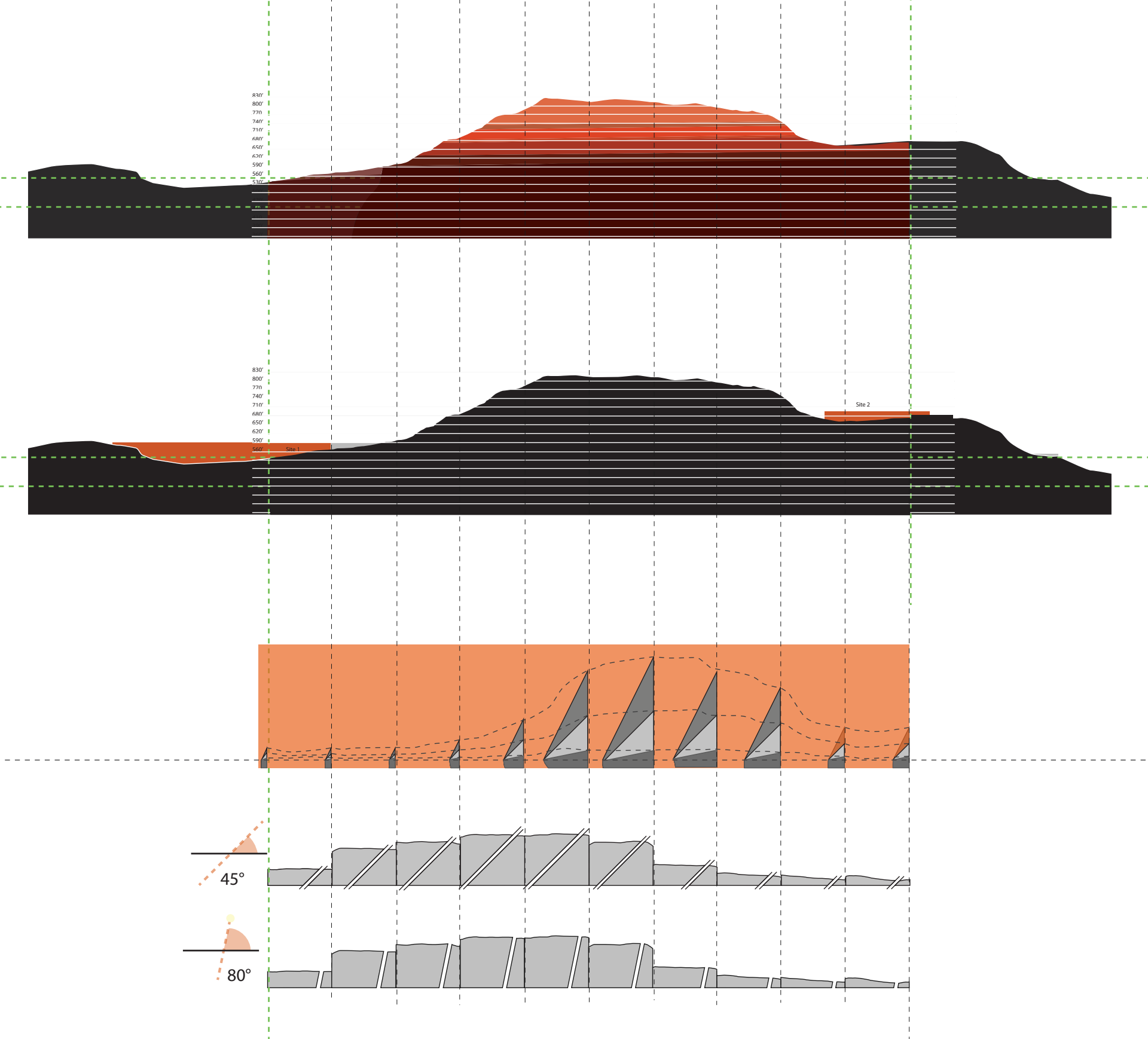
# The “Slit”

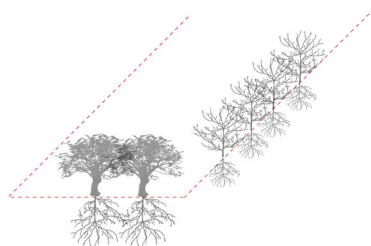
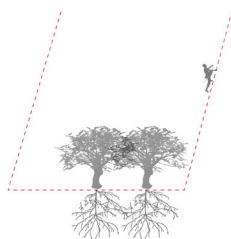
Case Study

The basic condition of the subterranean is absent of light creating complete darkness. The darkness would restrict and inhibit human interaction within the spaces. In order to start designing the subterranean, basic analysis of how the surface could be interacted with and what conditions the light creates within the void. A plethora of light studies revealed a variety of altering conditions which could start to be assigned to different surface contexts. The studies started at the most primitive level by understanding a puncture into the earth. The studies performed started to add new layers, looking into variations of angles, number of slits, and topography. Multiple combinations of the various studies started to reveal interesting characteristics. The layering of topography in correlation to a specific angle began to reveal an interesting dialect which is created through both.

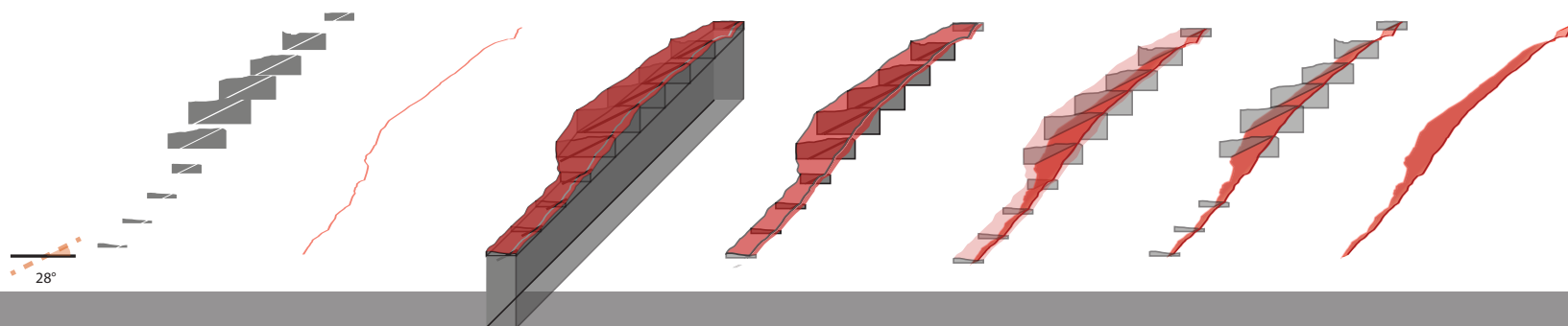
The abstraction of a straight line on the surface created a unique shape due to the topography. This phenomena began to suggest a new way of designing how light enters the voids below. However, this study created an interesting shape on the surface and a mundane, linear space below. By reversing the study, a new form was created which addressed the subterranean in a more sensitive manner. By projecting a straight line onto the surface from an aerial perspective and then implementing an angle from this line, revealed a slit which took on a characteristic specific to the site. This study is examined in a more thorough manner within the first case study.







The collage to the right explores what a space created by the solar activity could feel like. Looking at the solar activity in correlation to the topography, the image suggests how the sun could divide a mountain.









# Buried Ruins



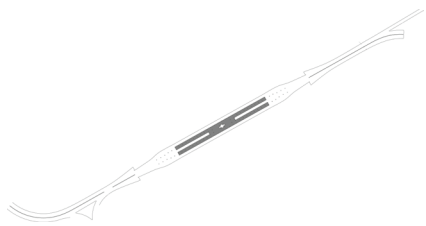
The city Cincinnati has a rich history buried below the surface. The forgotten ruins in the heart of the city have been sheltered from human activity for decades. The abandoned voids have a built in mystery to the spaces due to the historical context. Although the infrastructure is younger than the catacombs of Paris, a similar aura is created to the layers of history within the site.

By exposing the voids below to the world above and having the ability of walking under the streets, it creates a new experience. The subterranean void frames the world above, isolating us from the surface world while allowing users notice moments often gone unnoticed while on the surface.



Above is a collage displaying how the users can start to get glimpses of the world above creating a new experience to occur while passing through the subway.





The collage displays the possibility of what lies beneath the city . Simple interventions and lighting can create a suggestion of the possibility for traveling below the surface. The site looks at how water could be brought in from above as a design element while passing through. The idea is to expose the forgotten layer of history to the public. The built nodes add to the aura of moving through the city.









# Buried Ruins

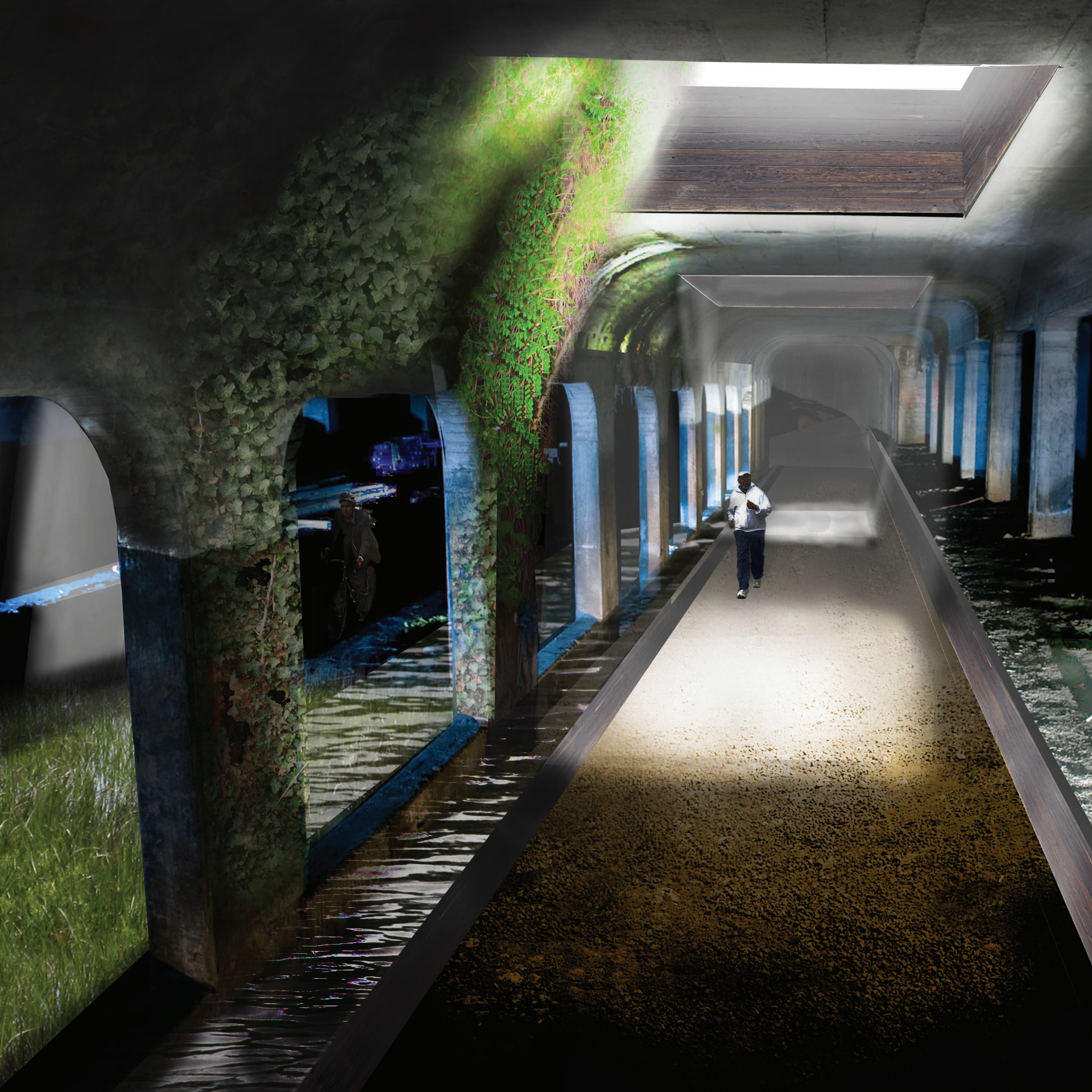


The abandoned subway in Cincinnati was never used as a method of transportation. The project was discontinued due to a lack of funding in the 1920's. The location of the subway was originally a part of the Eerie-Miami Canal, connecting Lake Eerie to the Ohio River. The canal allowed for a cut and fill location for the subway. Since construction stopped, the tunnel has laid dormant other than a water main which runs through the space. Many proposals have been suggested to try and implement a metro system tying into the existing structure but none have been passed. The structure is still maintained, however its potential of being a viable element of infrastructure is an unfortunate failure of the city.. A simple intervention to the space could help be a major element of a renaissance of the city.

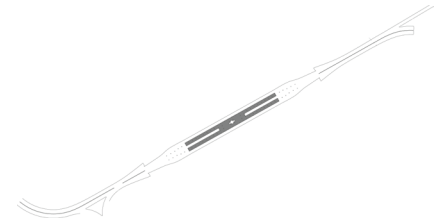






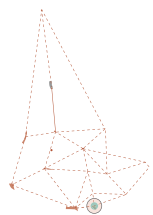






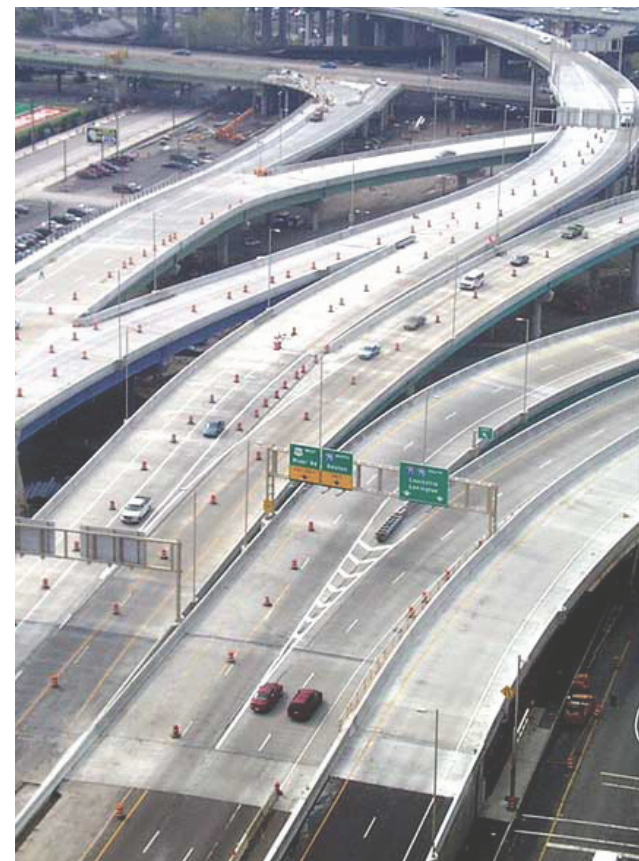
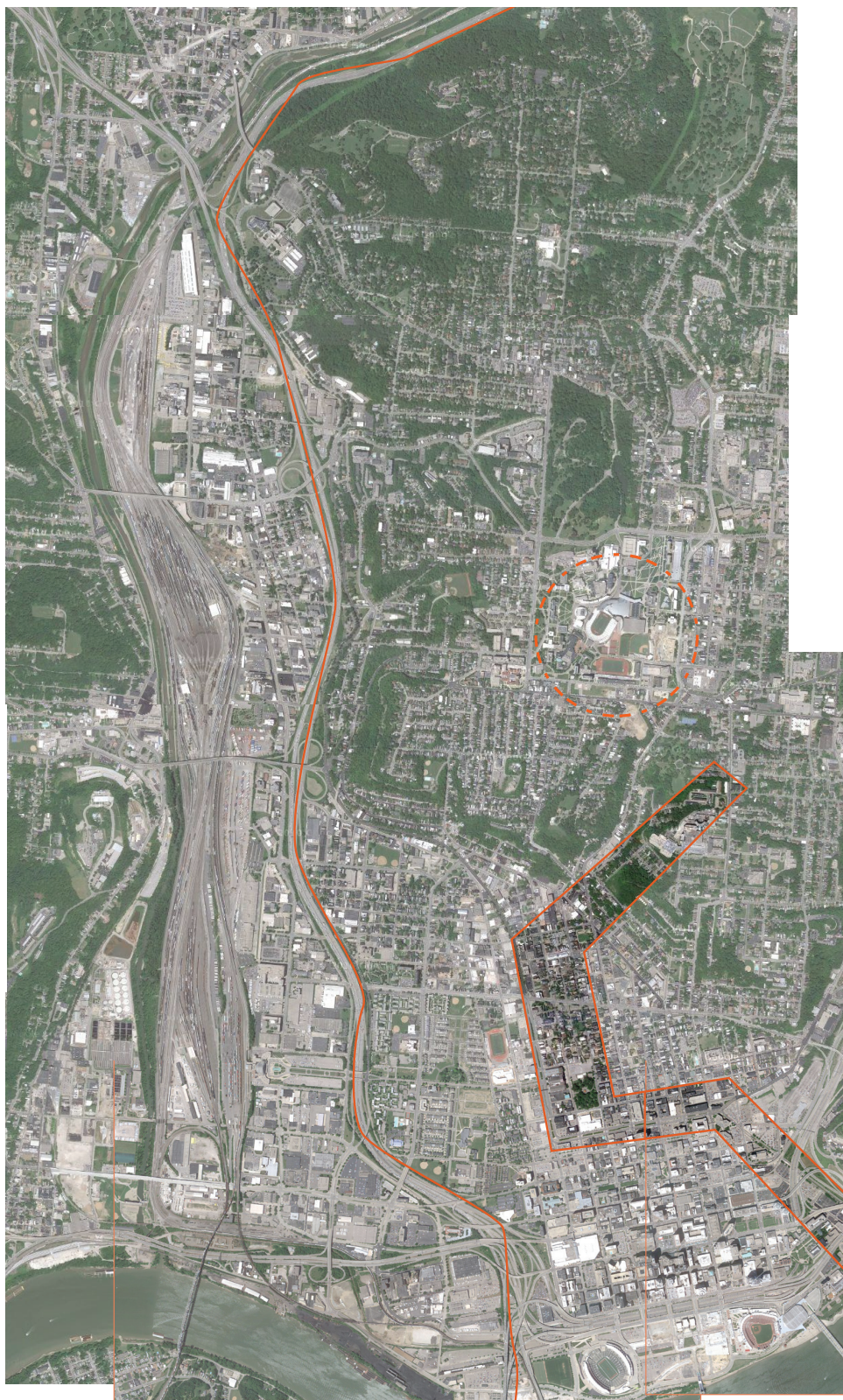
The collage investigated the possibility of how simple penetrations along the boulevard of Central Parkway can create a new experience. The penetrations create an opening to the surface allowing vegetation to grow from above into the subterranean. The lighting will illuminate the beauty created after 90 years of abandonment and destruction.





# Subterranean Stitch

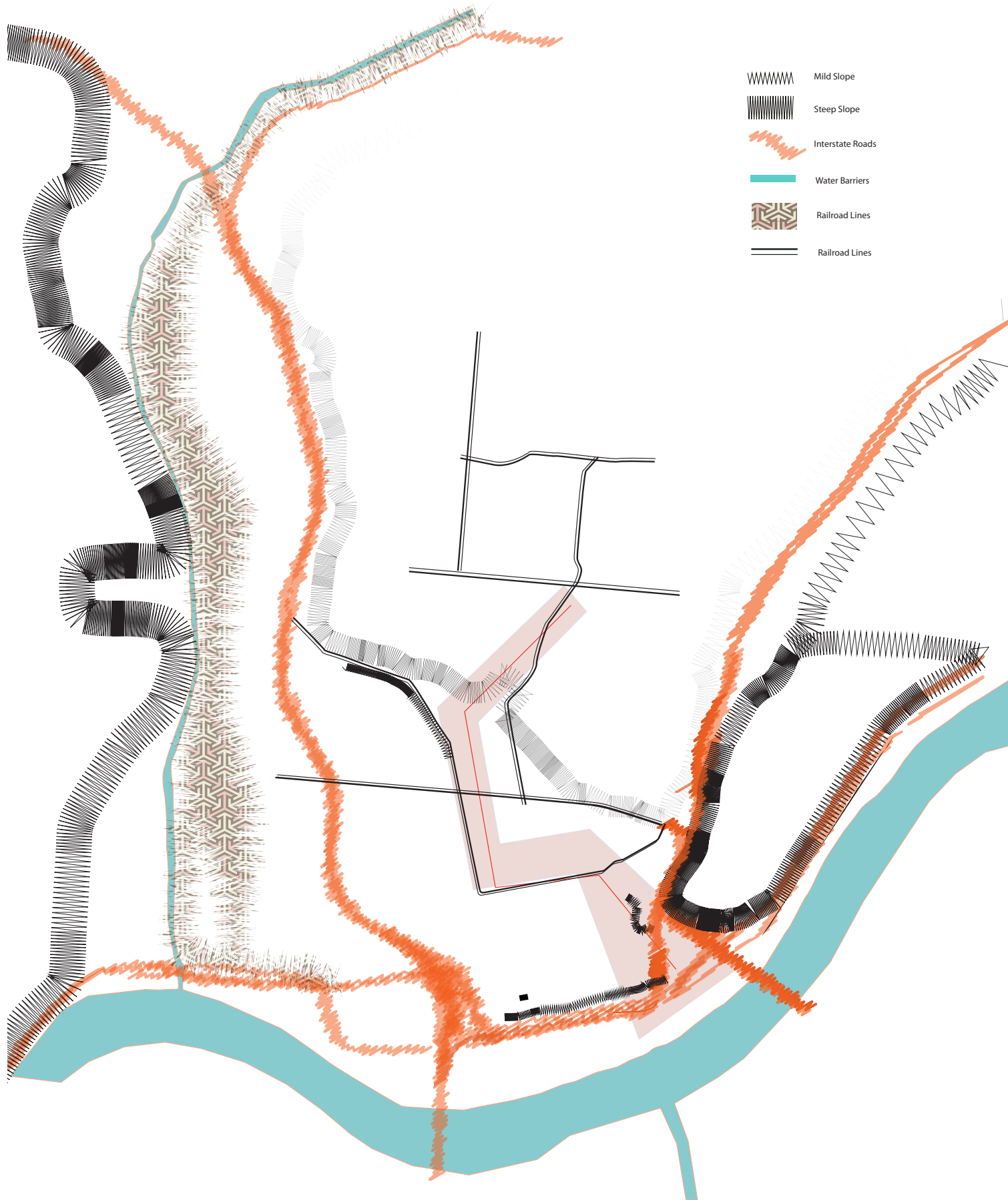
Reconnecting the Urban Fabric



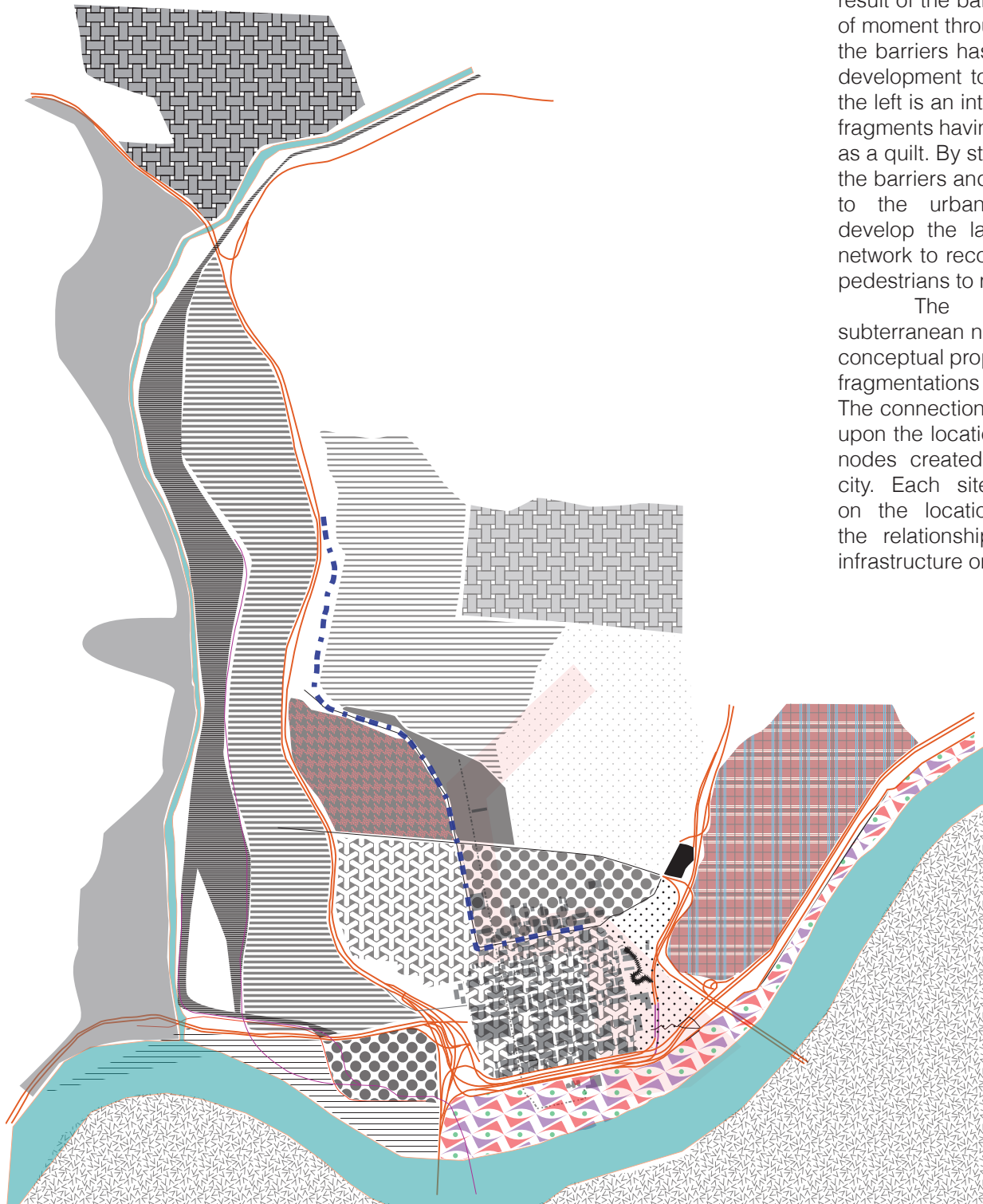
By biking and walking through the city a substantial amount of barriers became prevalent within the basin of Cincinnati. The natural barriers resulting from the topography and waterways display both physical and psychological barriers to pedestrians. Man-made barriers, interstates, rail lines, and major vehicular roadways create additional layers of impediment to the urban fabric. The barriers create an interesting challenge of how to create a more fluid movement through the city.



# Urban Barriers



# Fragmented Landscape

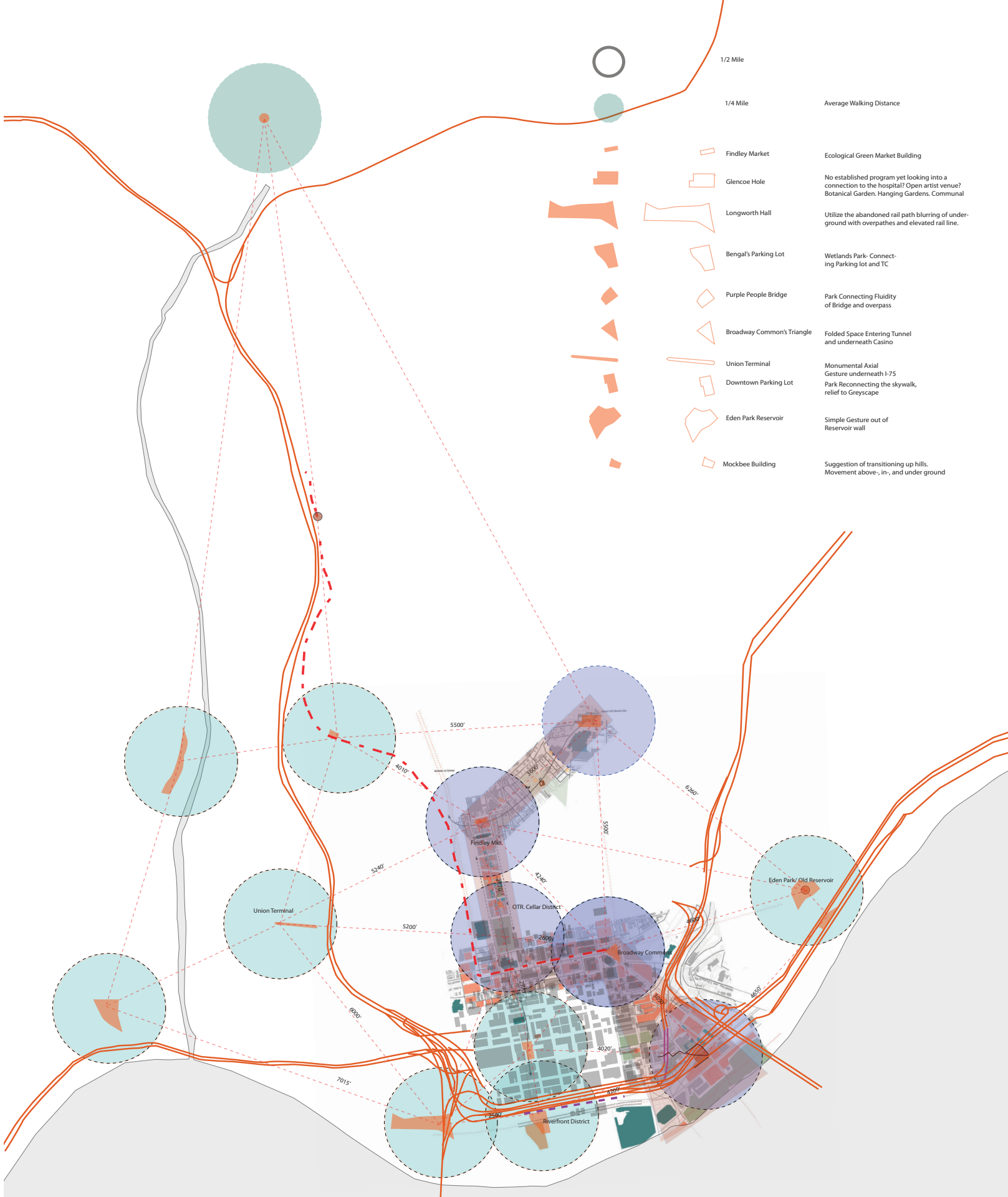


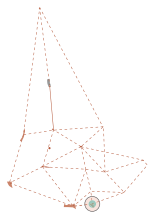
The fragmentation of the city were the result of the barriers separating an ease of moment through the city. The result of the barriers has allowed a vast array of development to occur. The mapping to the left is an interpretation of the various fragments having a similar characteristic as a quilt. By studying an overlapping of the barriers and fragments in correlation to the urban infrastructure helped develop the layout of a subterranean network to reconnect the city and allow pedestrians to move fluidly.

The application of a subterranean non-vehicular network is a conceptual proposal to reconnecting the fragmentations with the city's urban core. The connection of sites were concluded upon the location within the fragmented nodes created by the barriers in the city. Each site was selected based on the location within the city and the relationship to either abandoned infrastructure or underutilized land.



# NonVehicular Subterranean Network





# The Smooth and the Striated

Analysis of the Urban Condition

The analysis of the solid and void within the urban fabric was used to influence the design of the pathway. The pathways are directed by the existing subterranean infrastructure as well as the voided spaces within the city. By directing the pathway in correlation to the voided spaces within the city the ability to manipulate the surface allows the path to weave above and below the surface.

The idea of Deluze's Smooth space and striated space was the start of this exploration. The idea was to look at the lost order within the city as a way to create a more fluid movement of space within the network. The nodes selected were underutilized areas within the city and are in adjacency to major attractions within the city.





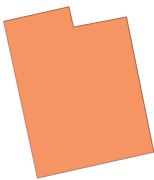
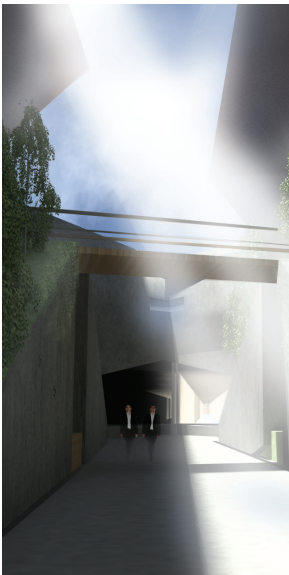


# Site Selection

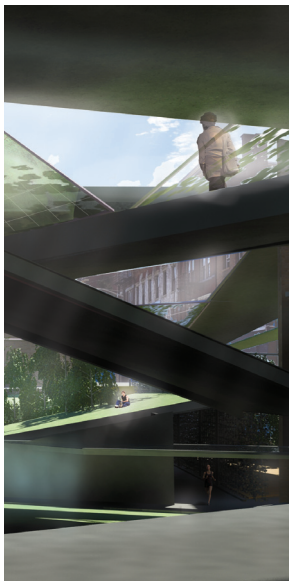
Subterranean Interventions



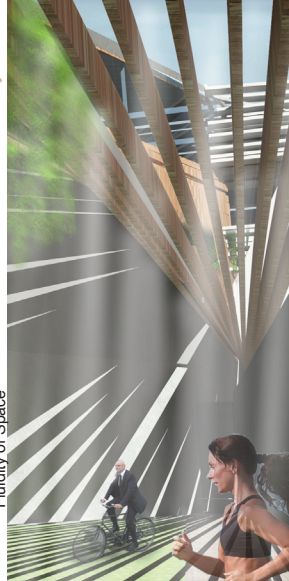
**Divided Axis**  
PuncturingEarth



**UNFolded Illumination**  
Folding the Surface



**Circulated Carving**  
Fluidity of Space



An indepth analysis of three sites within the city helped further the investigation of how to blur the perception of the underground and the surface. Each of the nodes within the basin of the city were an analysis of various conditions for design. The site context, program, and method of addressing the surface allowed for a greater understanding of how to manipulate the ground surface. Each site did follow a similar approach by looking at the urban fabric for inspiration of design.

## Divided Axis

Broadway Commons

## Unfolded Illumination

Pleasant Road

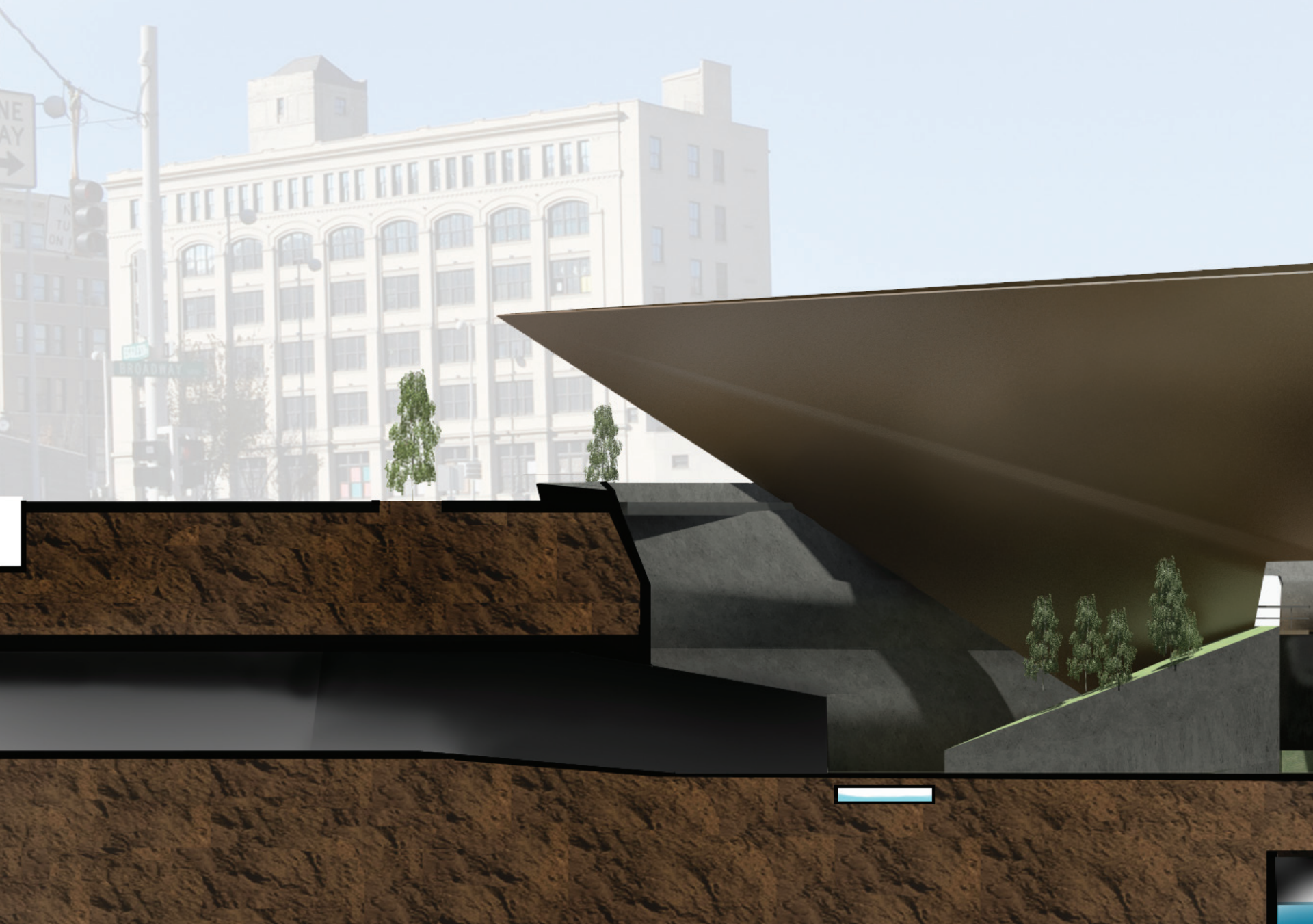
## Carved Circulation

Purple People Bridge

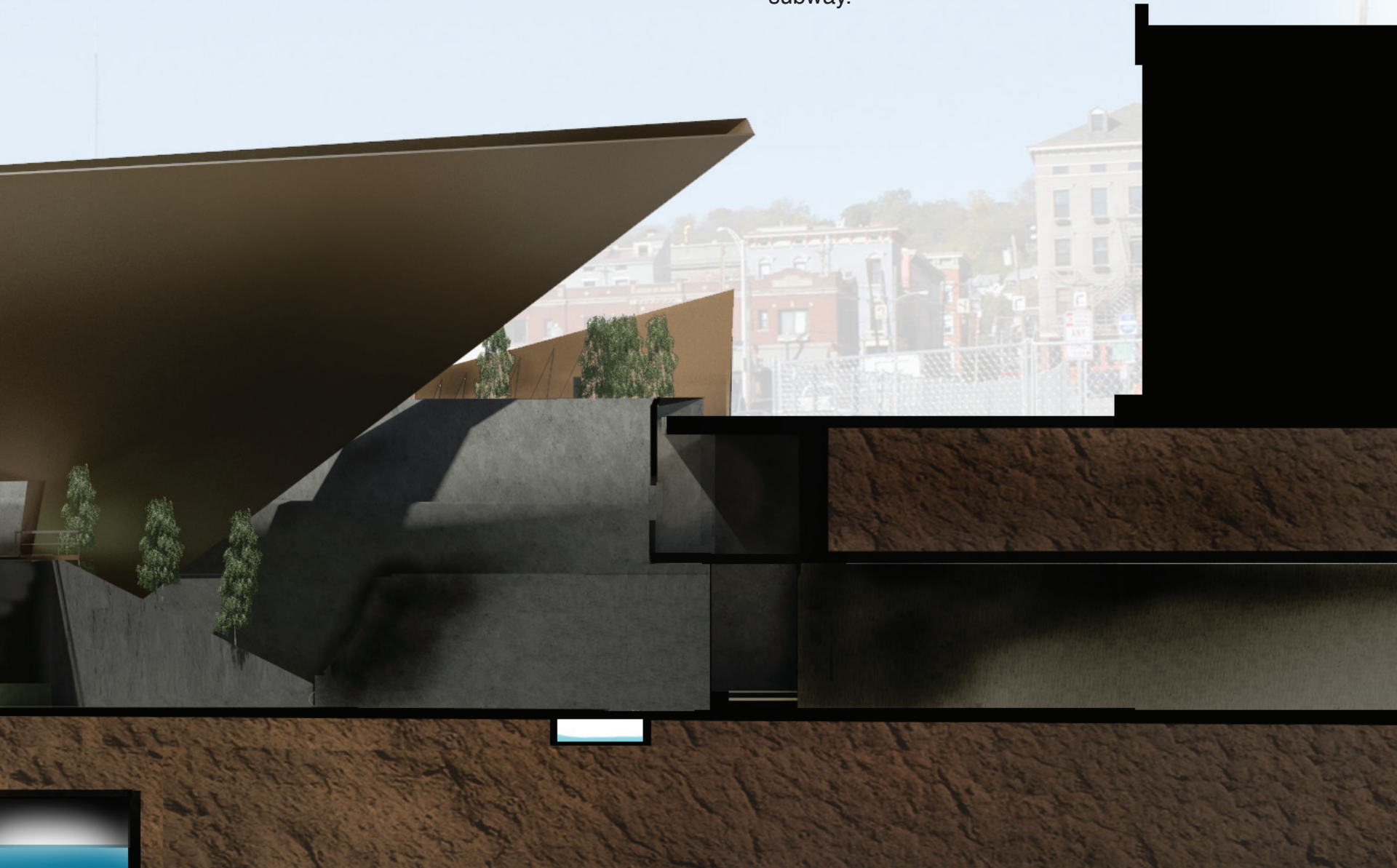


# Divided Axis

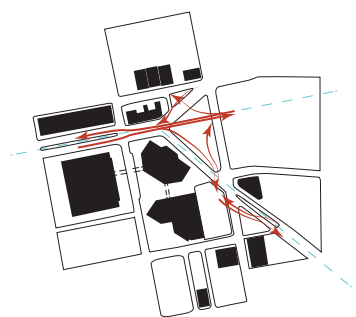
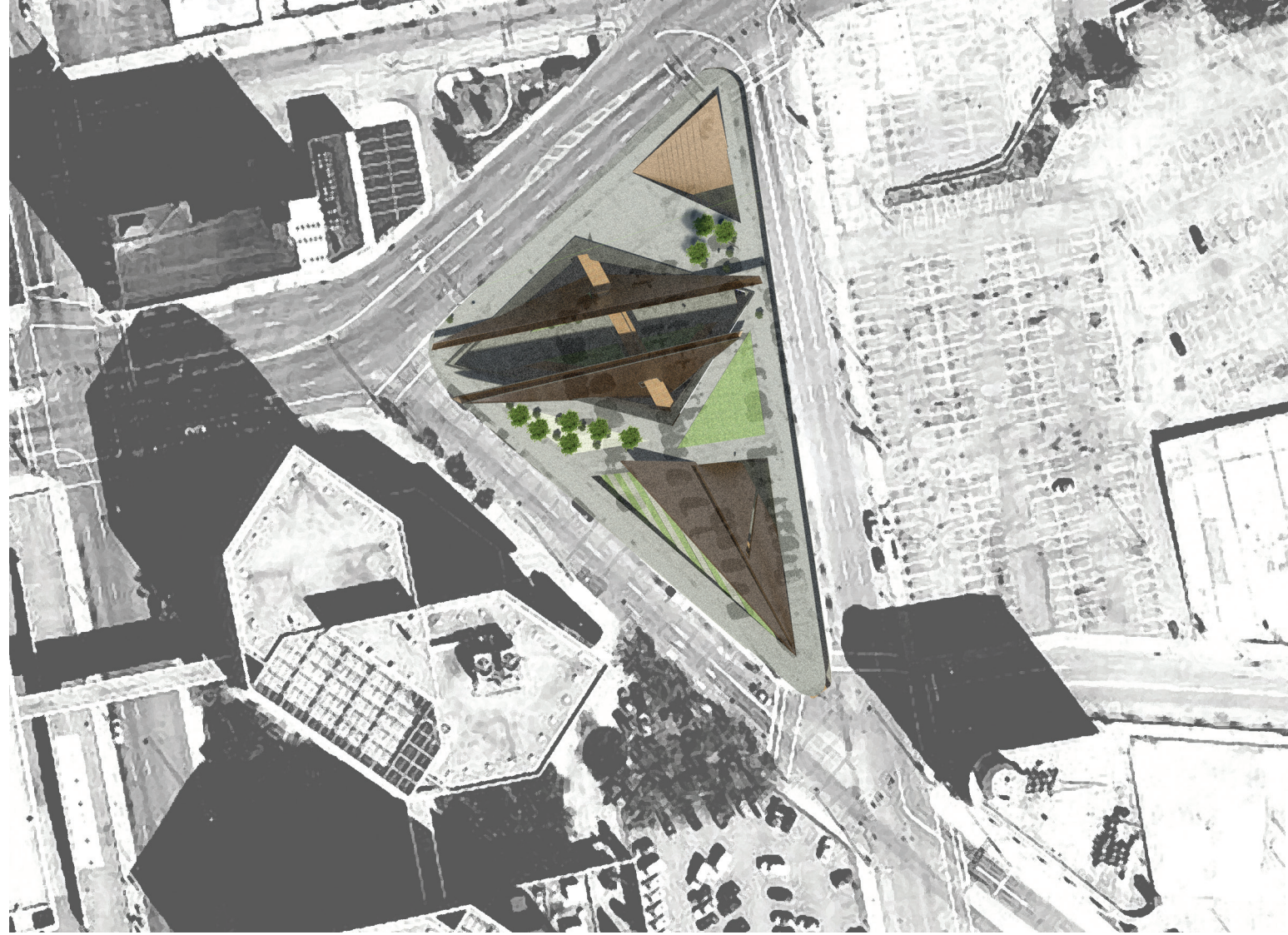
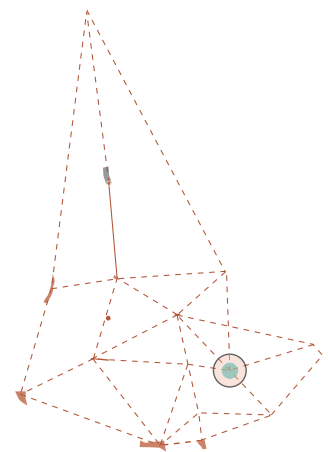
Non-vehicular Interstate



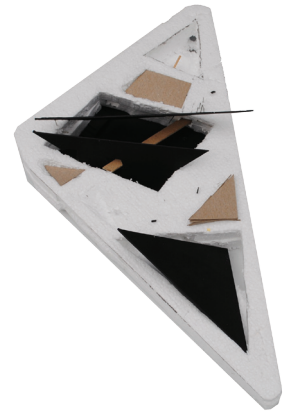
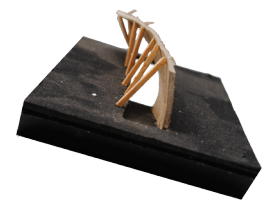
The Broadway Commons is a triangular site framed by Eggleston and Reading Road. The site is at the termination of Central Parkway, the dividing line between downtown and Over-the-Rhine. Two blocks from the site is where the abandoned railroad is terminated. The site is an opportunity to connect with the underground subway.



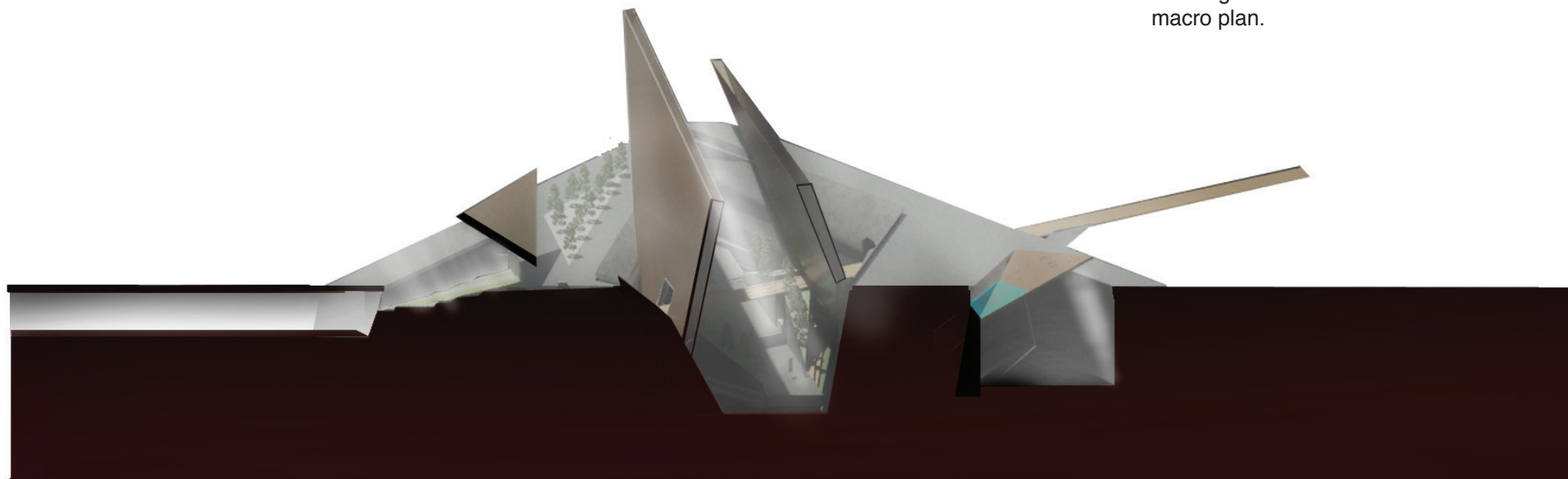




Initial Ideas of Design  
Penetration of the Surface



The unique site shape and condition was the source of inspiration to the design of the site. The triangular form organized the circulation of the subterranean network. By looking at exterior site conditions, the punctures in the ground were the result of the macro plan.





# What you see...



New Casino  
Reconne



Big Building  
Eye-Soar to the City



Parking Lot  
Multi-Level Urban Park



Reading Road  
Barrier For Bikers



Plaza Space  
Opening to



# What I See....



Subterranean Pathway



Green Space  
Pathway Connection

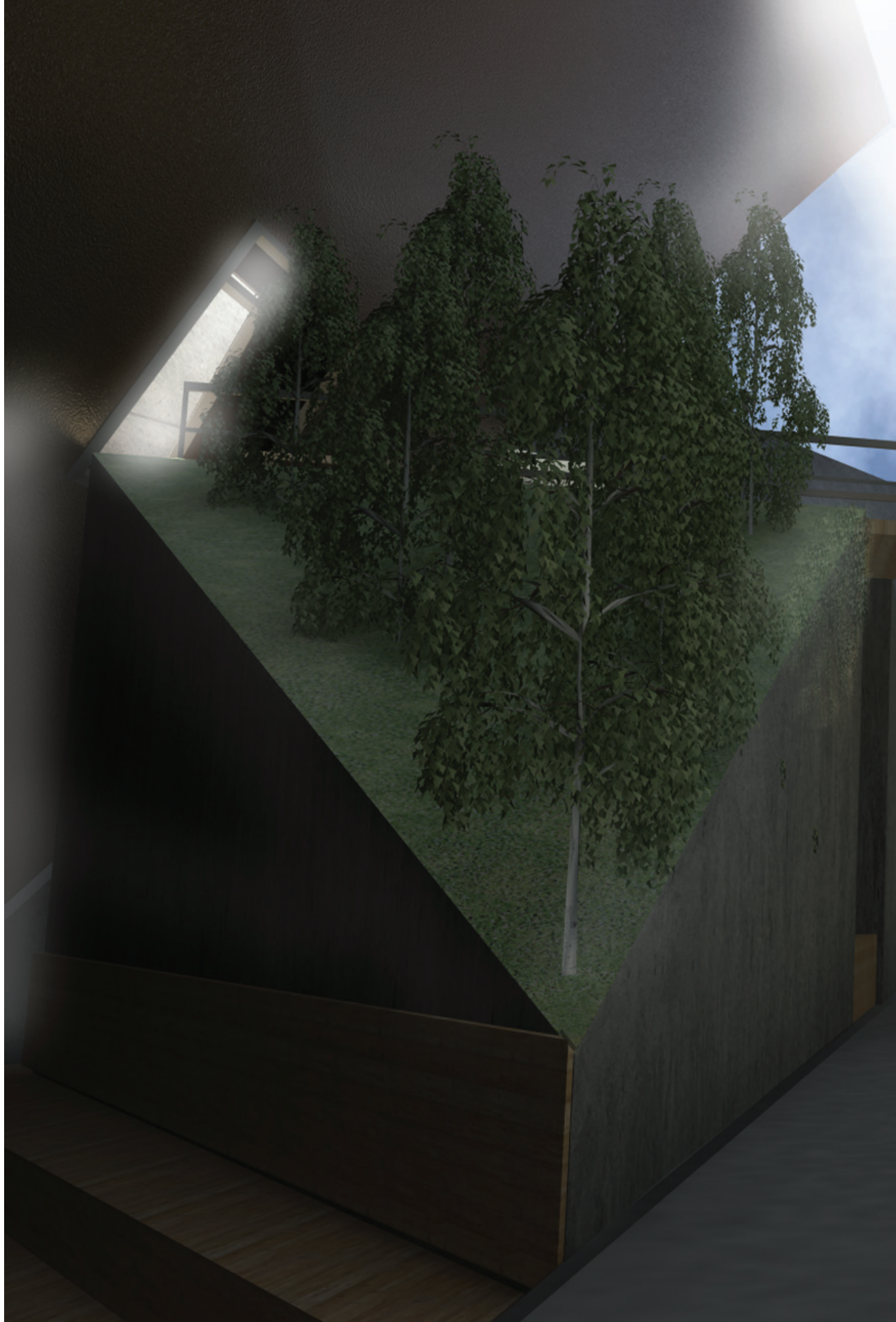


Alley Way  
Pedestrian Connection to City

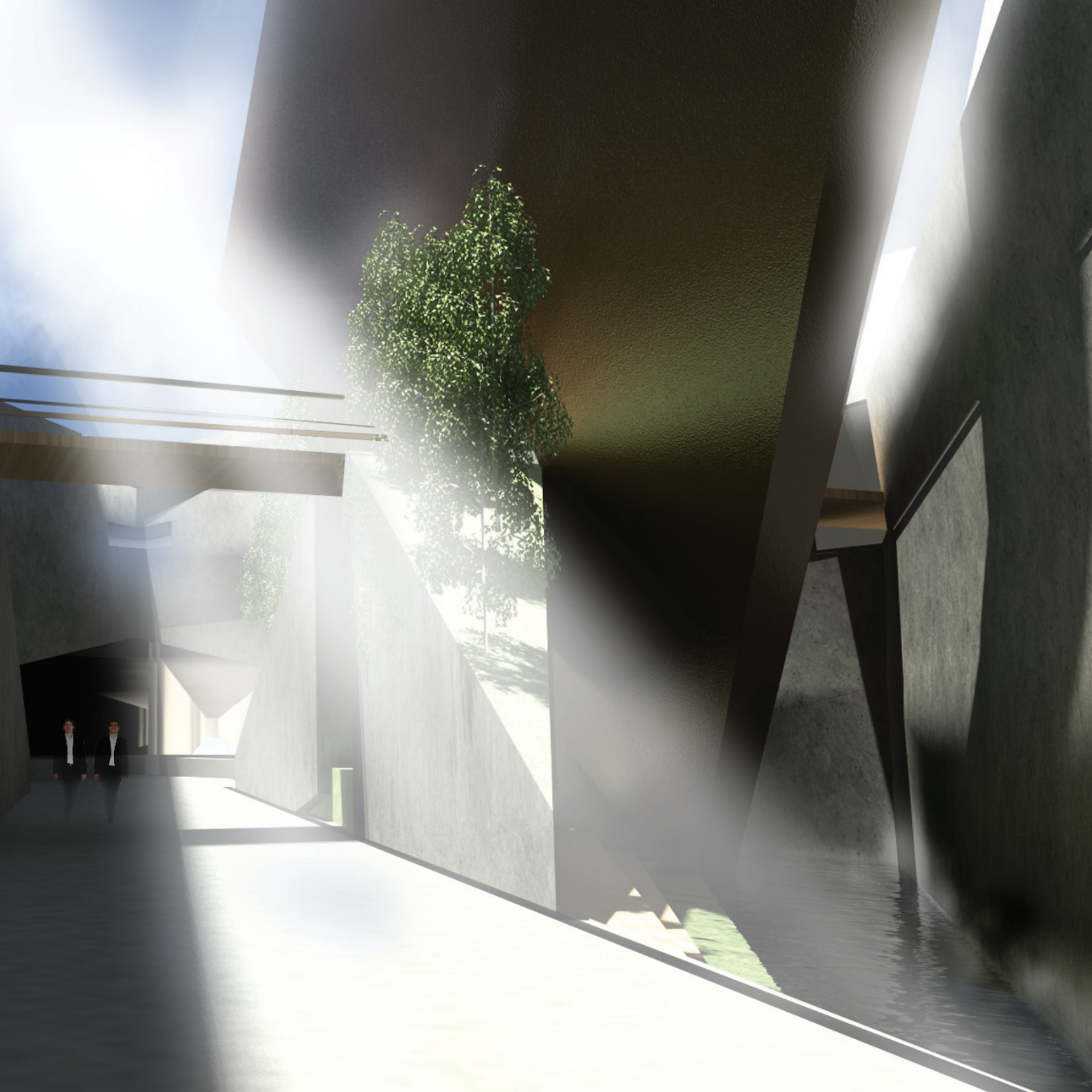
PARKING  
LAW OFFICES  
ARNOLD S. LEVINE  
324 READ



The site is an interstate of circulation with two distinct levels. The lower level is established by the depth of the subway with the elevated level being the north-south axis. The main opening is created by the monolithic elements puncturing and exposing the subterranean voids. The large opening distorts the actual depth into the earth.



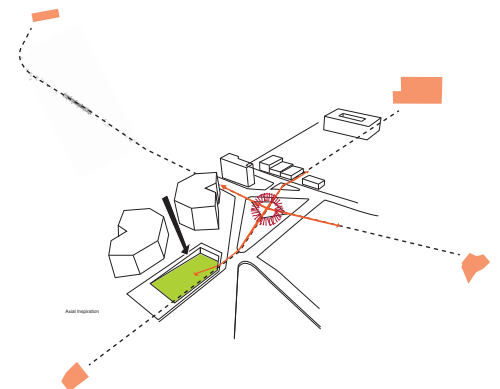
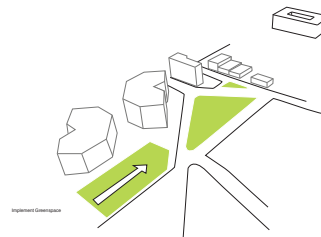
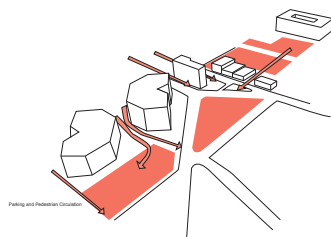
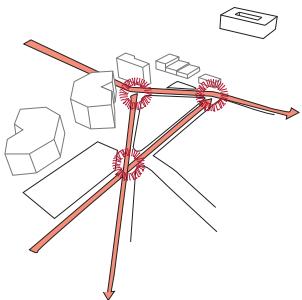


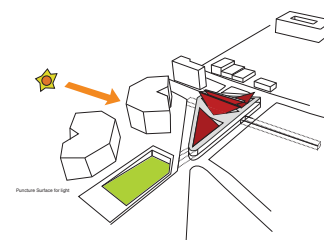
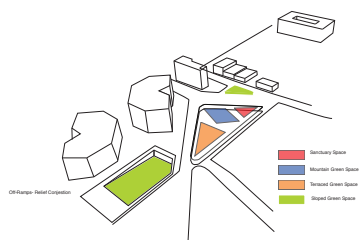
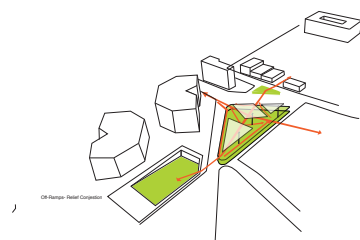
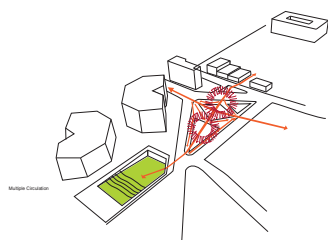
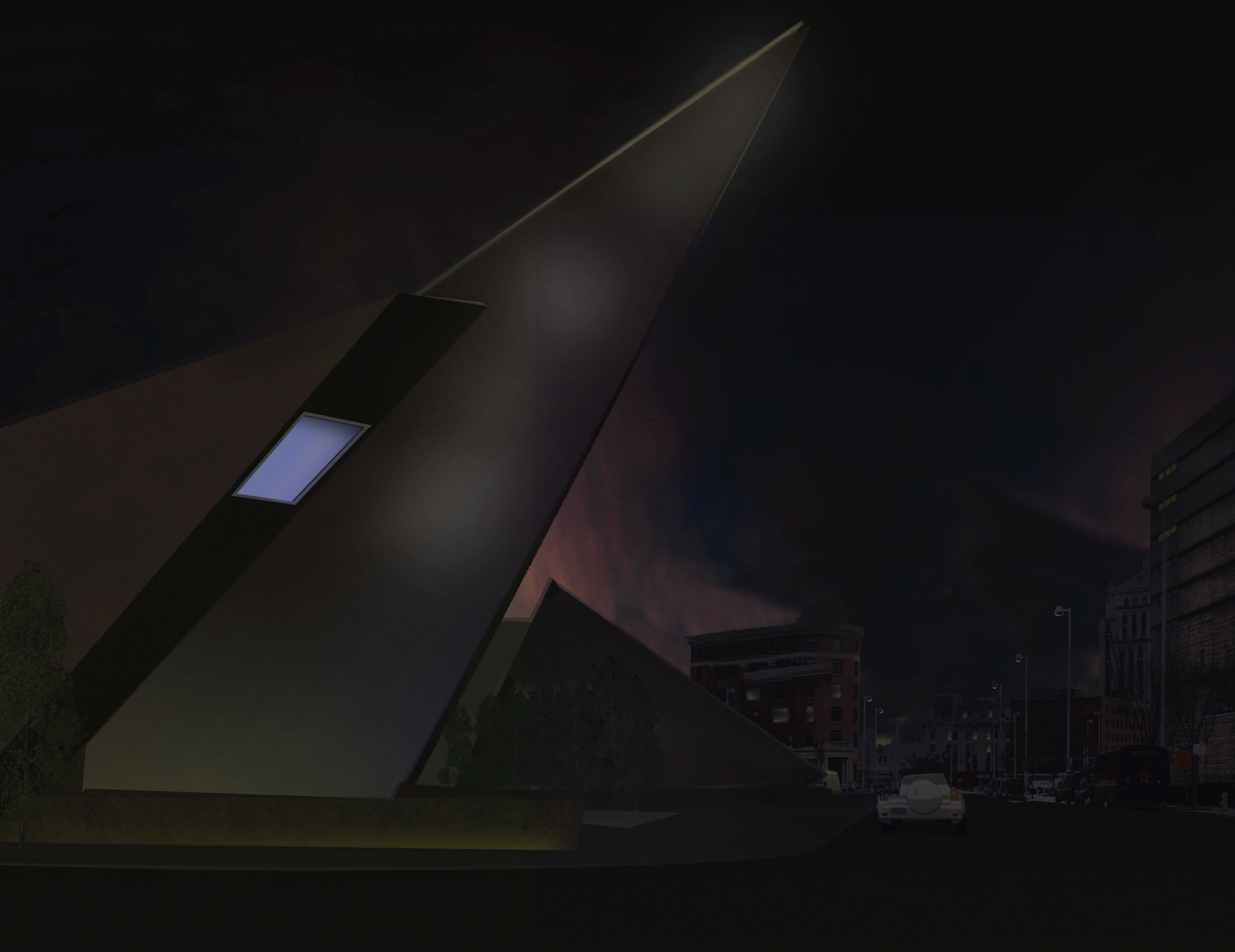






The unique shape of the site and condition was the source of inspiration to the design of the site. The triangular form organized the circulation of the subterranean network. By looking at exterior site conditions, the punctures in the ground were the result of the macro plan.

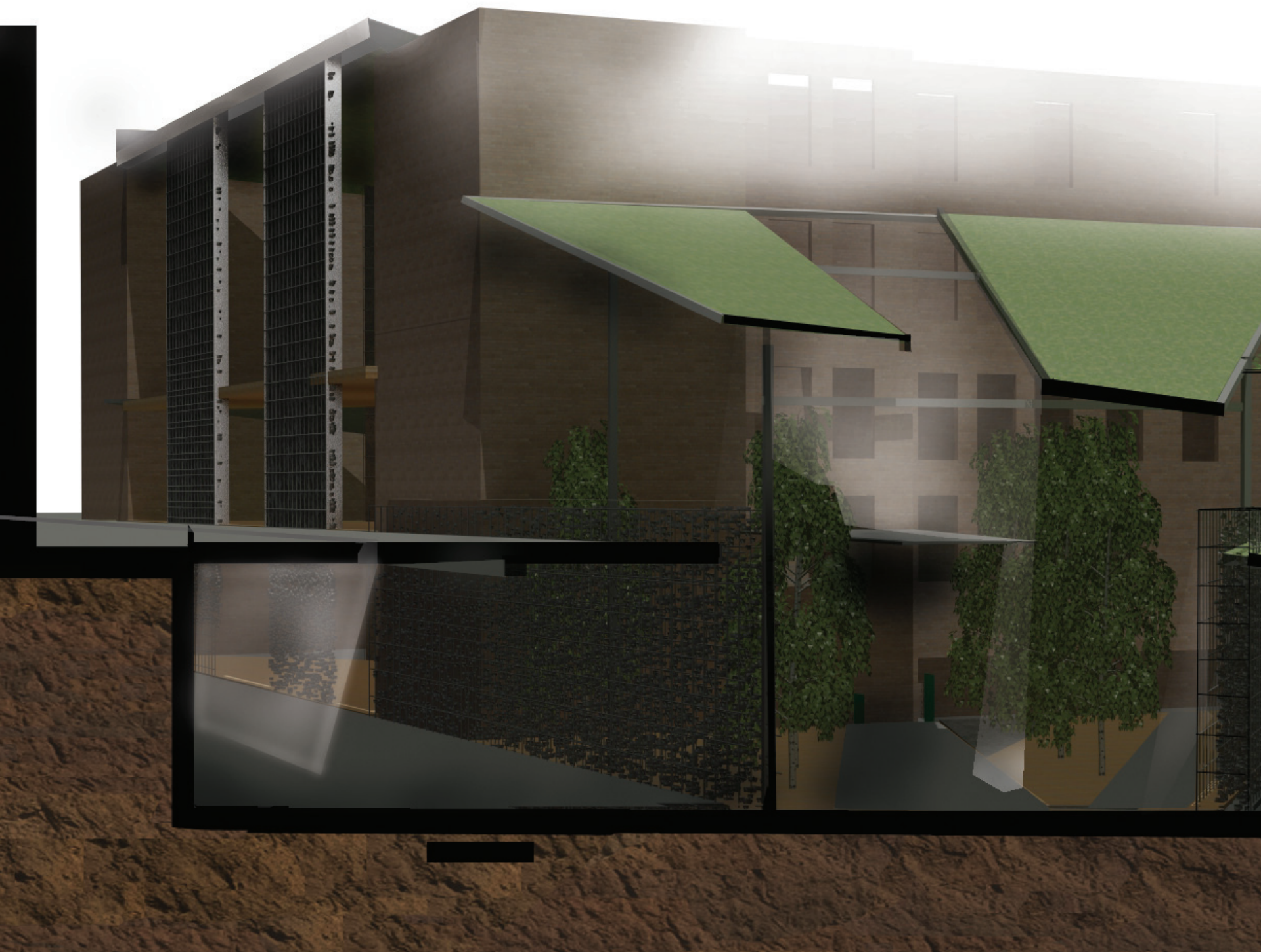




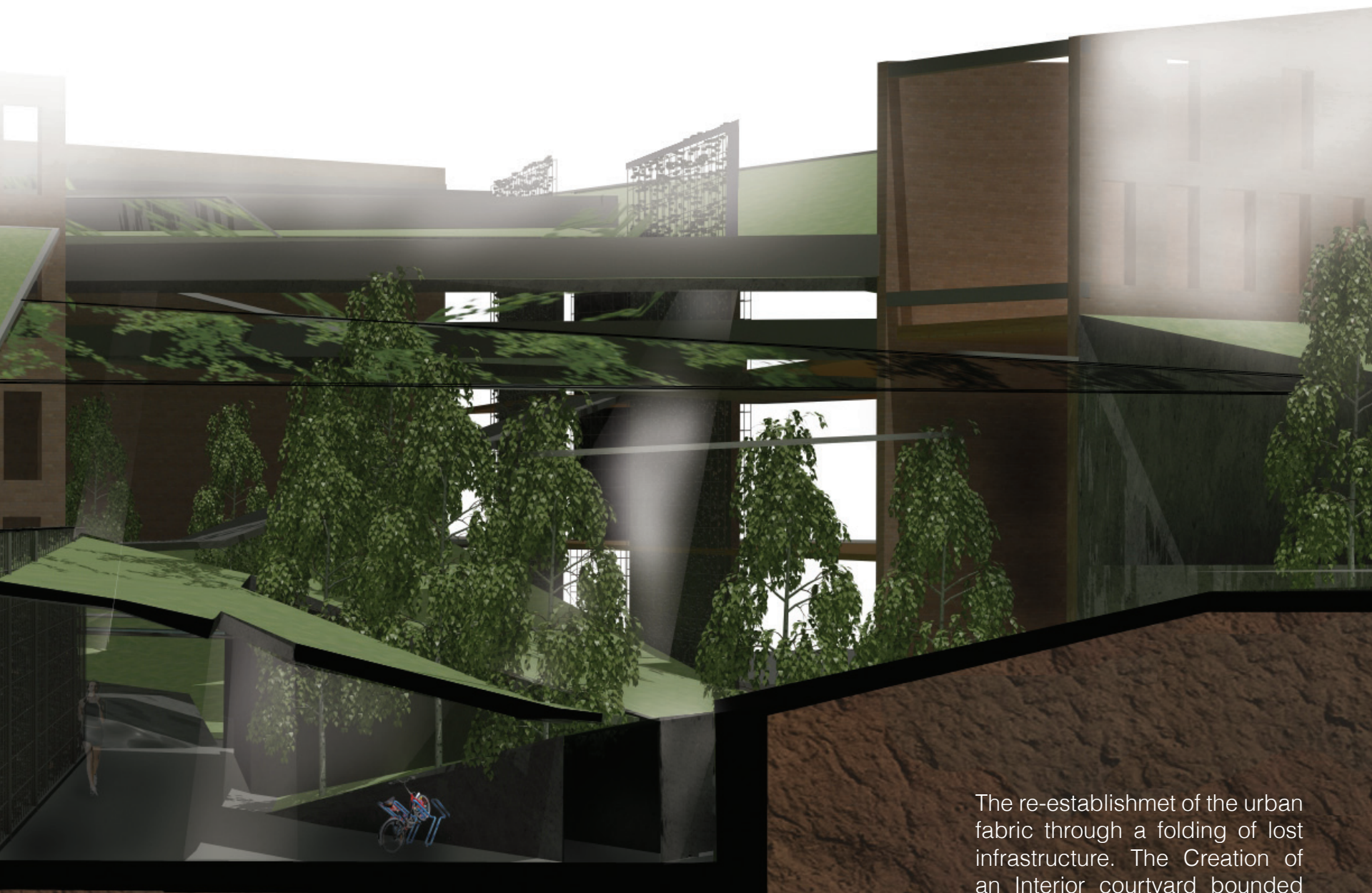


# UN I Folded Illumination

Folding the Surface



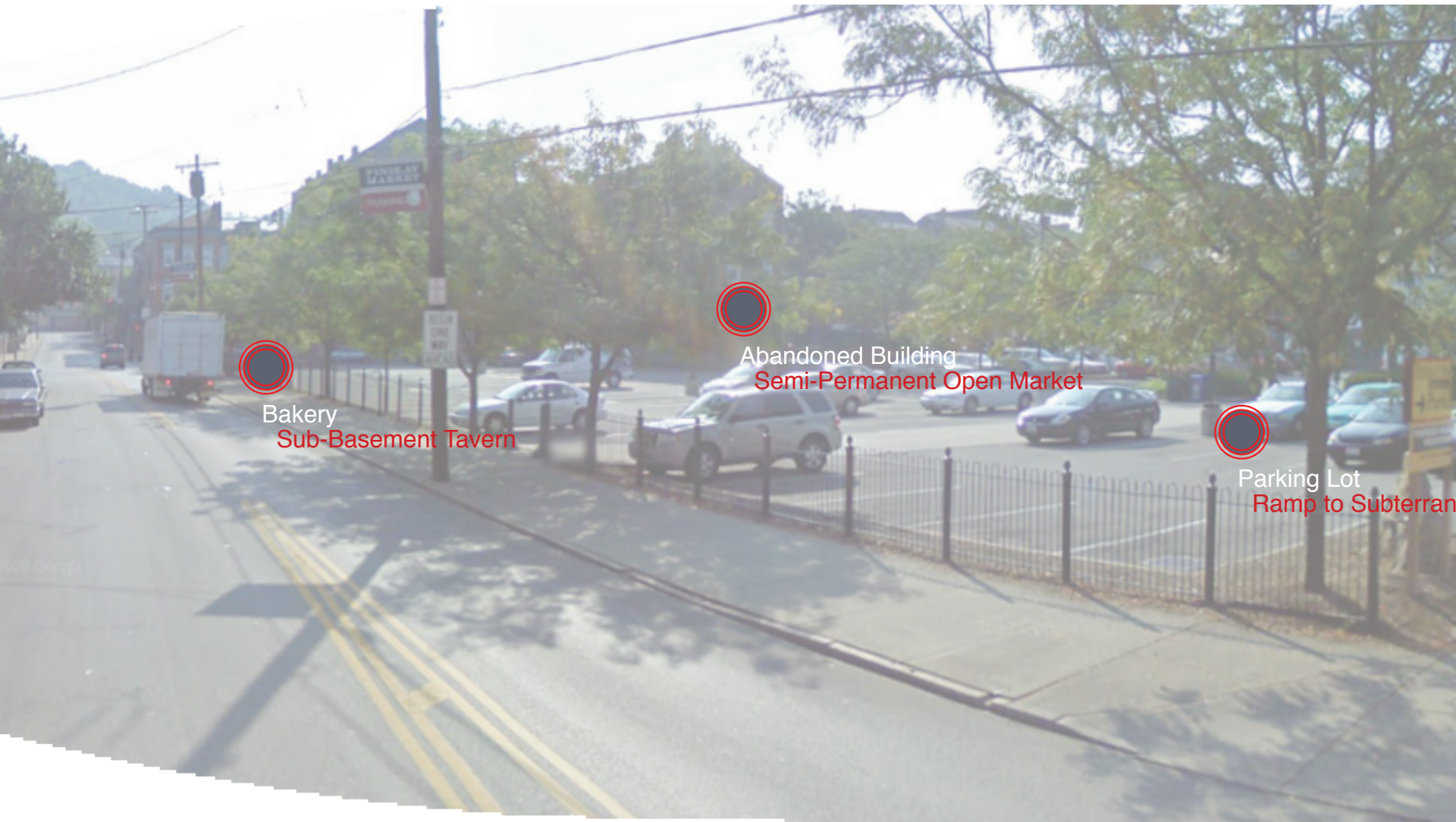




The re-establishment of the urban fabric through a folding of lost infrastructure. The Creation of an Interior courtyard bounded by open air market space.



# What you see...



# What I See....



Pedestrian Boulevard  
Two-Story Pedestrian Boulevard

ean Network

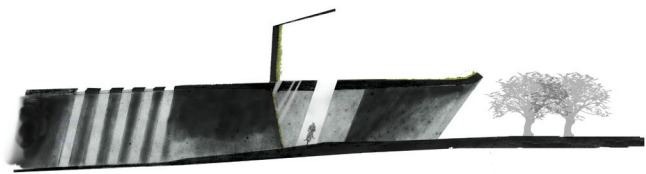
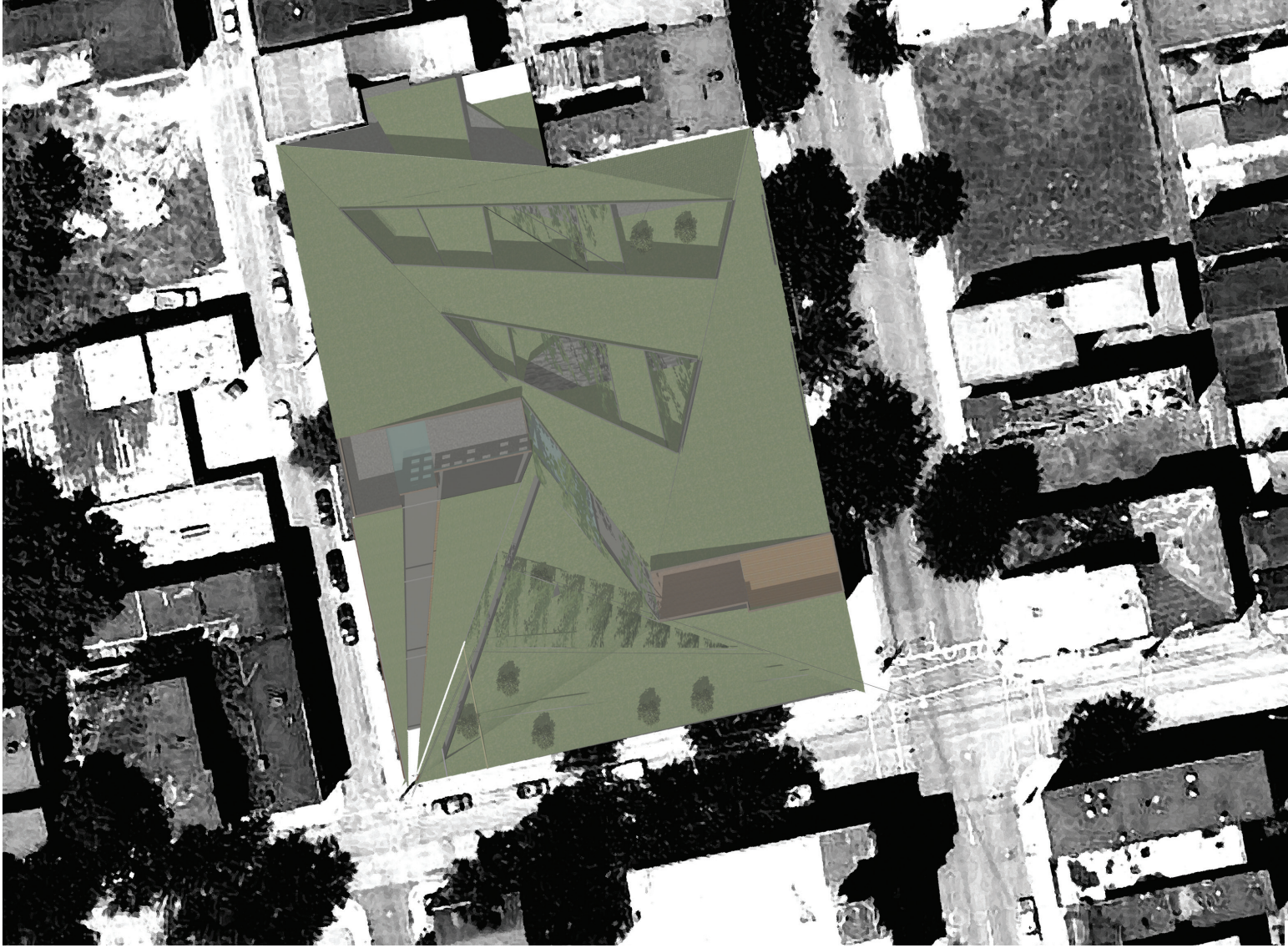


DriveWay  
Expansion of Findley Market

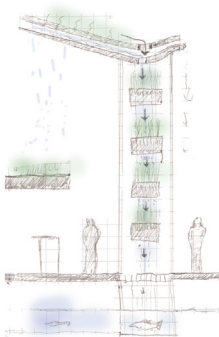


Abandoned Buildings  
Vertical Green House



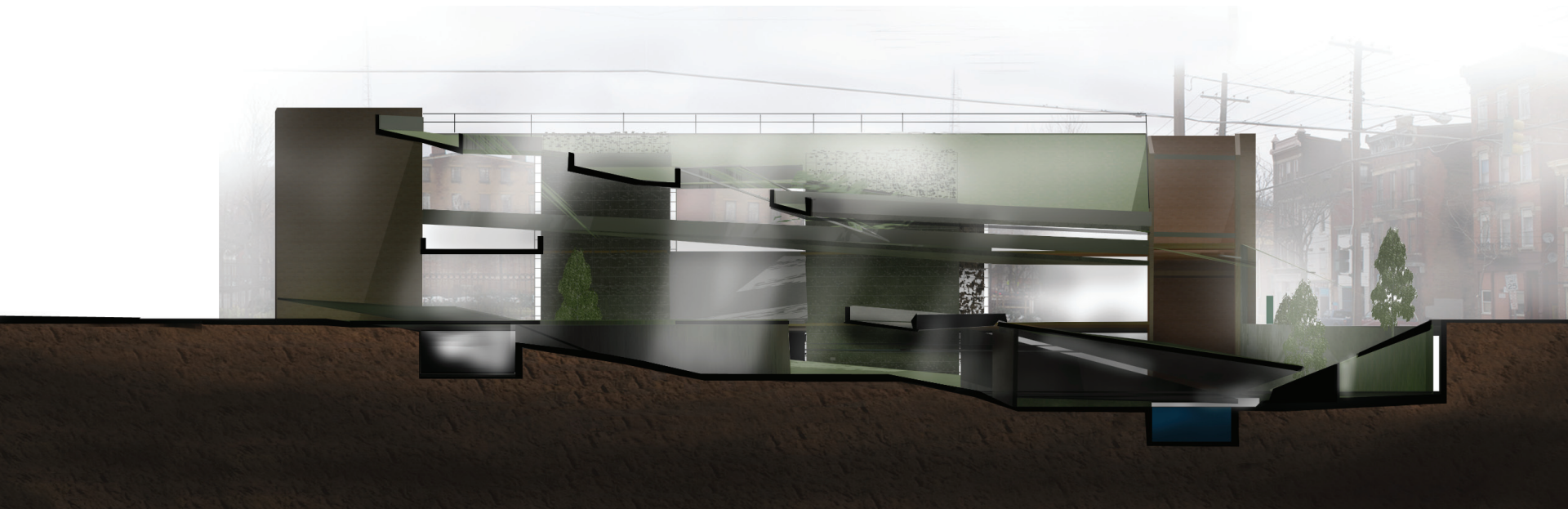


Initial Ideas of Design  
-Unfolding the Surface to  
allow lighting into the Voids





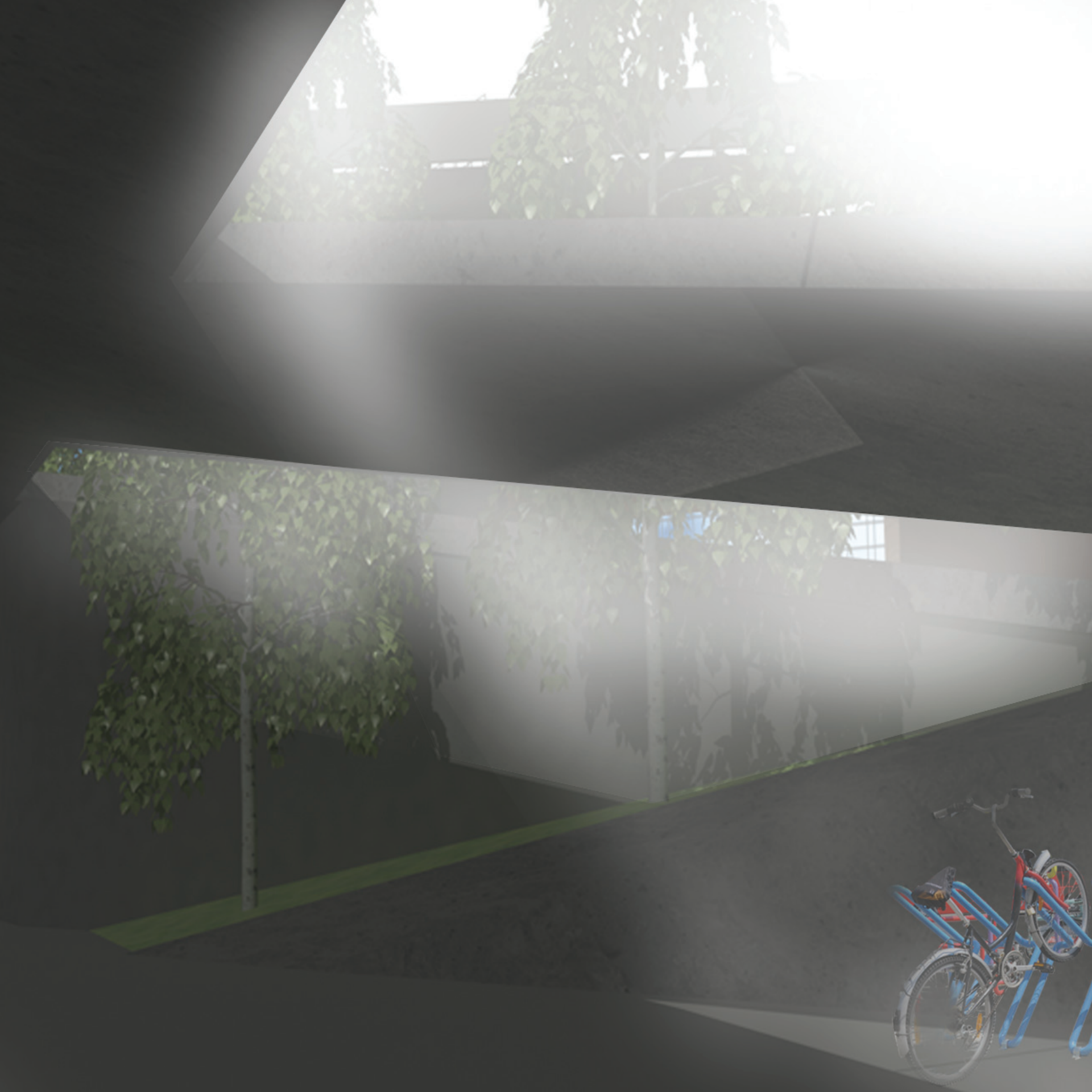
The program of the site is a conceptual proposal for an open market in addition to an abstraction of a vertical garden of the interior. The site investigates the idea of folding the landscape to blend into the architecture while penetrating the surface to illuminate the passageways below. The manipulation of the ground plane blurs the occupants perception of the original surface. The ribbons of vegetation above start to filter out direct sunlight capturing a Piranesian feeling except with the application of greenery.





The density of material in correlation to lighting, creates a distortion of what lies on the otherside of the wall. A proposal of creating a rubble wall from broken concrete and metal mesh creates an interesting play of shadow while screening the vision of what lies beyond the wall. This is a play on Bachalrd's interpretation of the basement in Poetic of Space.

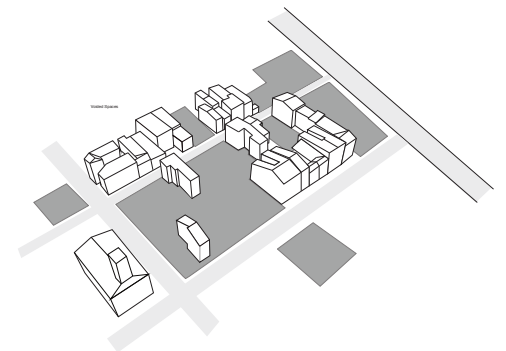
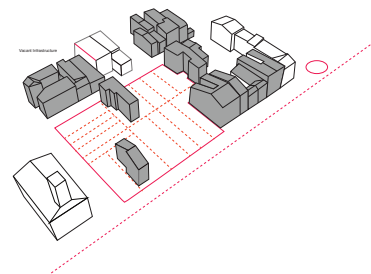
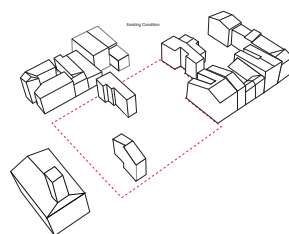
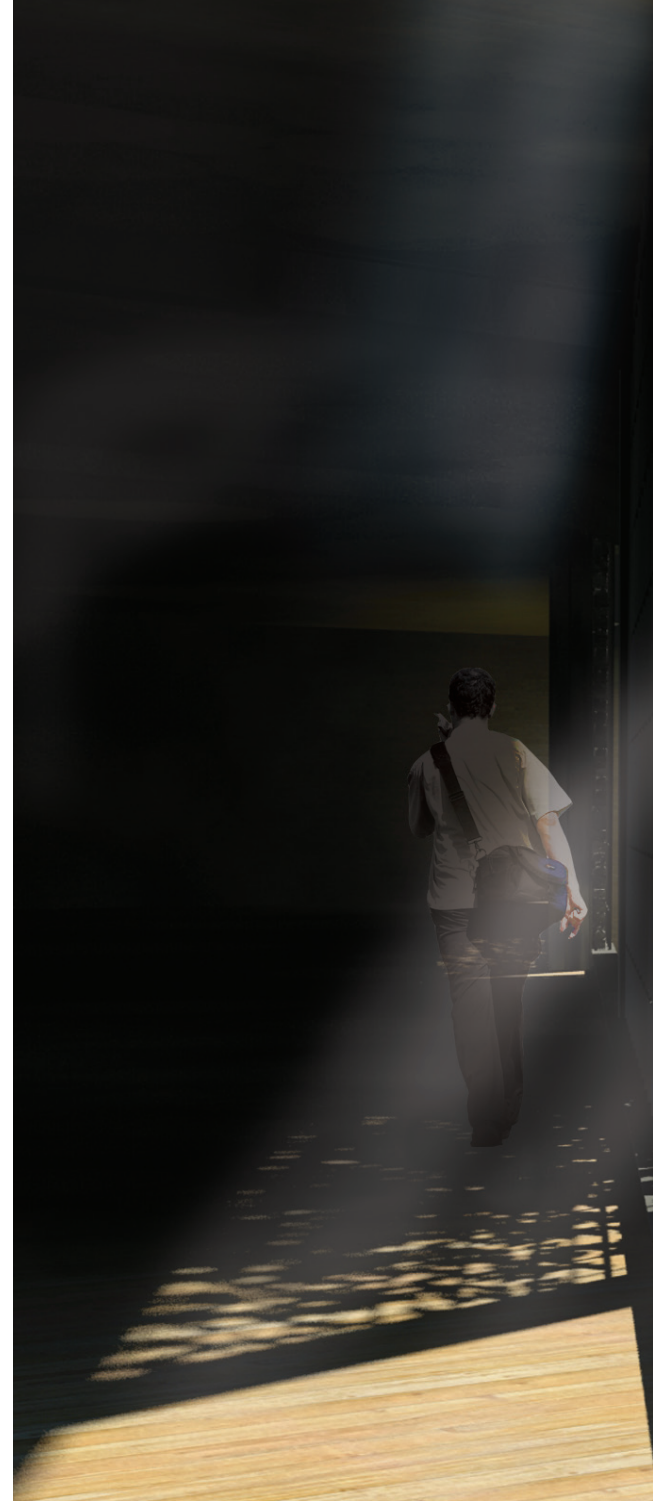




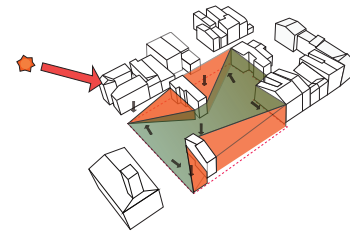
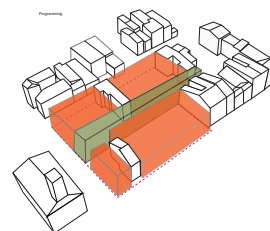
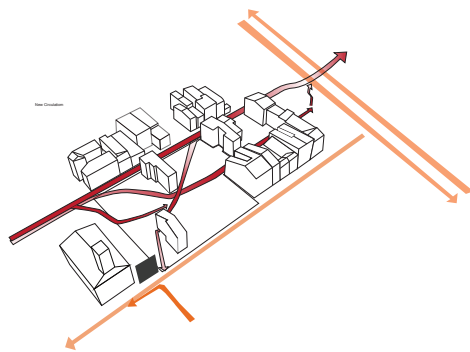
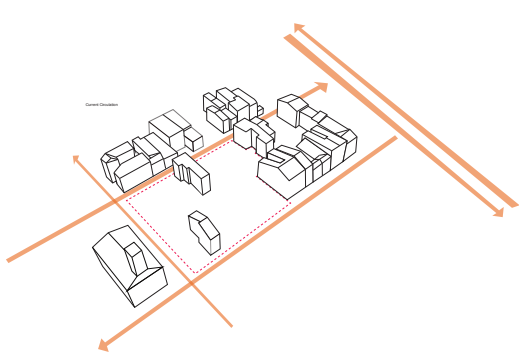
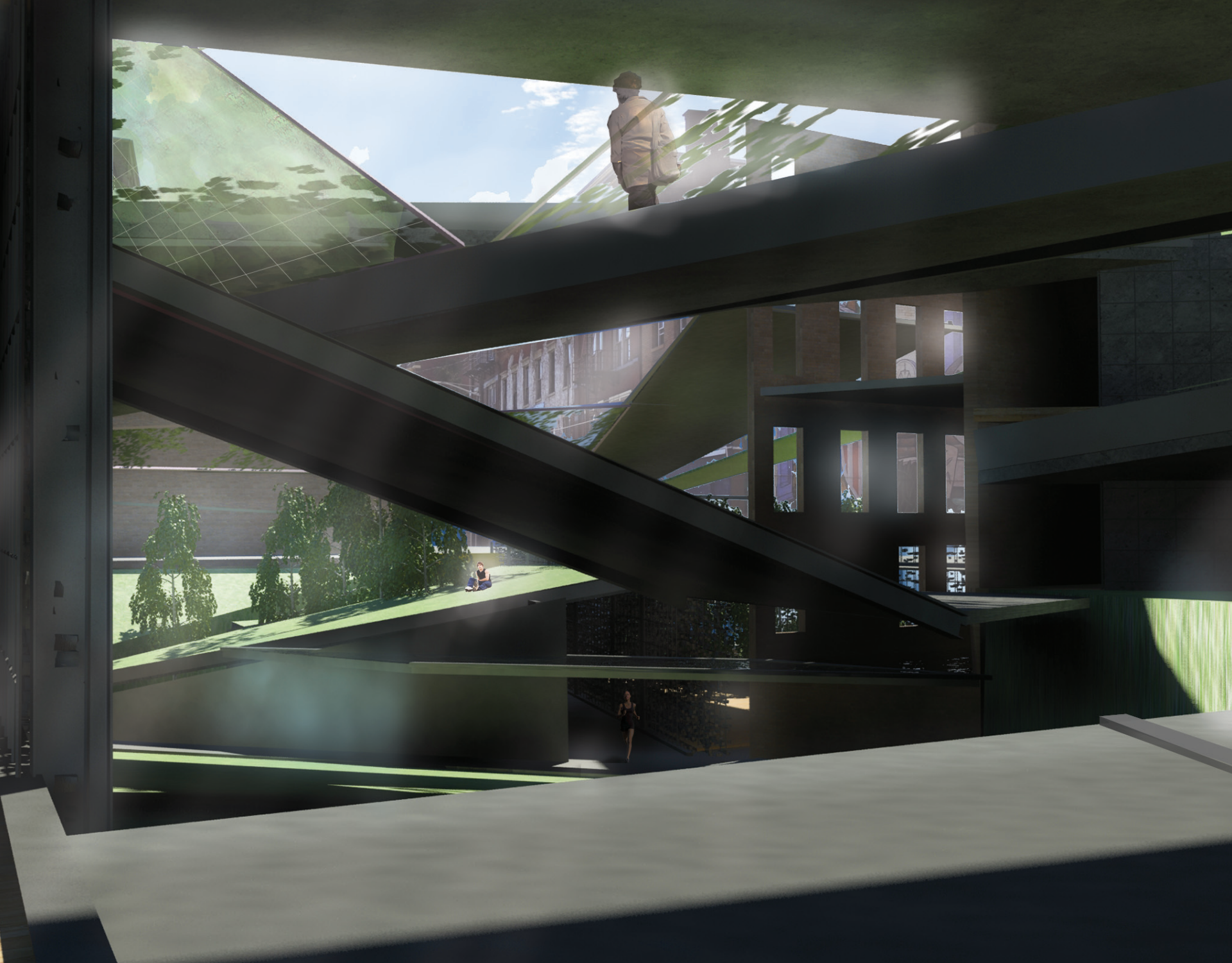




The implementation of a semi-permanent structure allows the public to wander through the site. The inspiration of design was derived through looking at the existing ruins within the site in correlation to the invisible property lines. The structure is a suggestion to where the lost infrastructure once stood. The use of broken bricks as a materiality is a suggestion of the structure once used for the buildings. The interior space is an off-ramp for the subterranean network allowing a connection point to the pedestrian boulevard and the light rail.

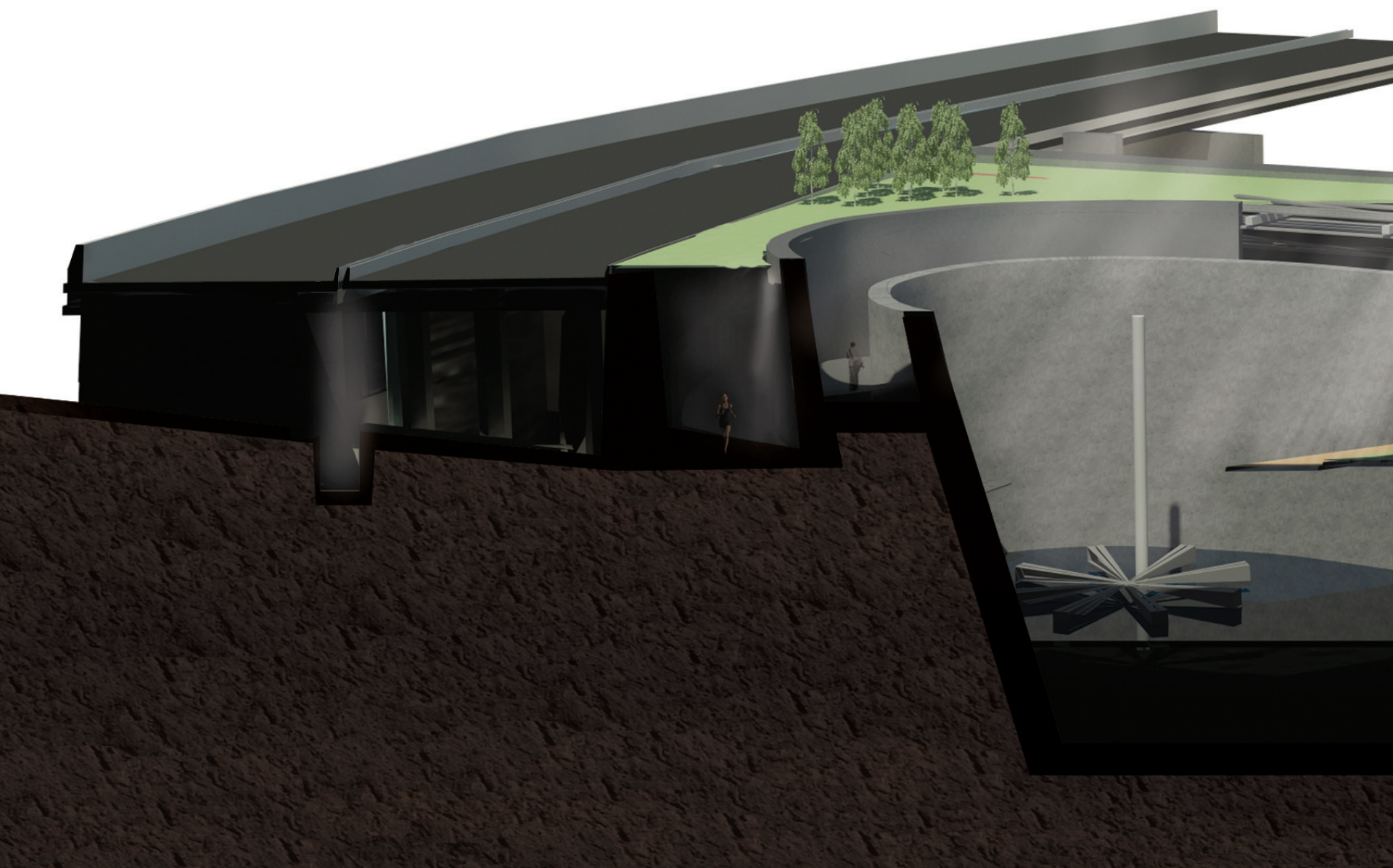




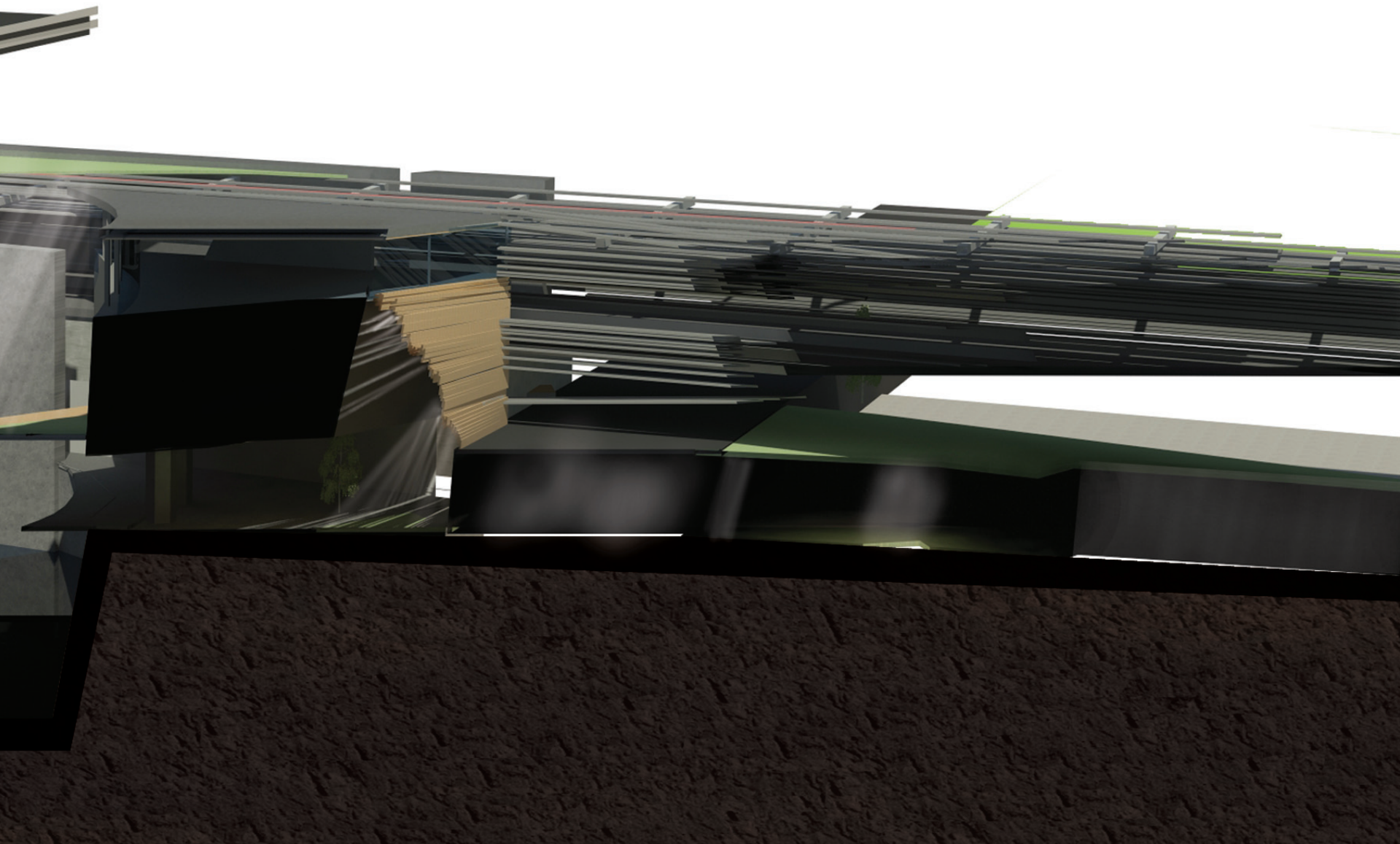




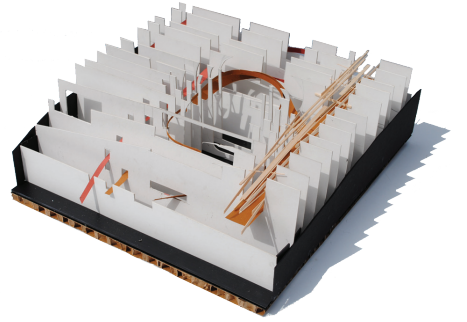
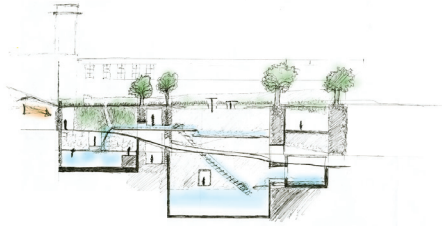
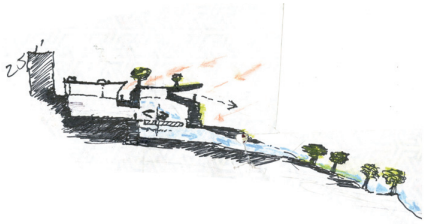
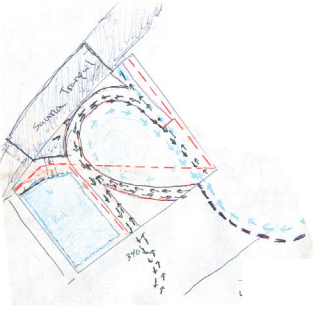
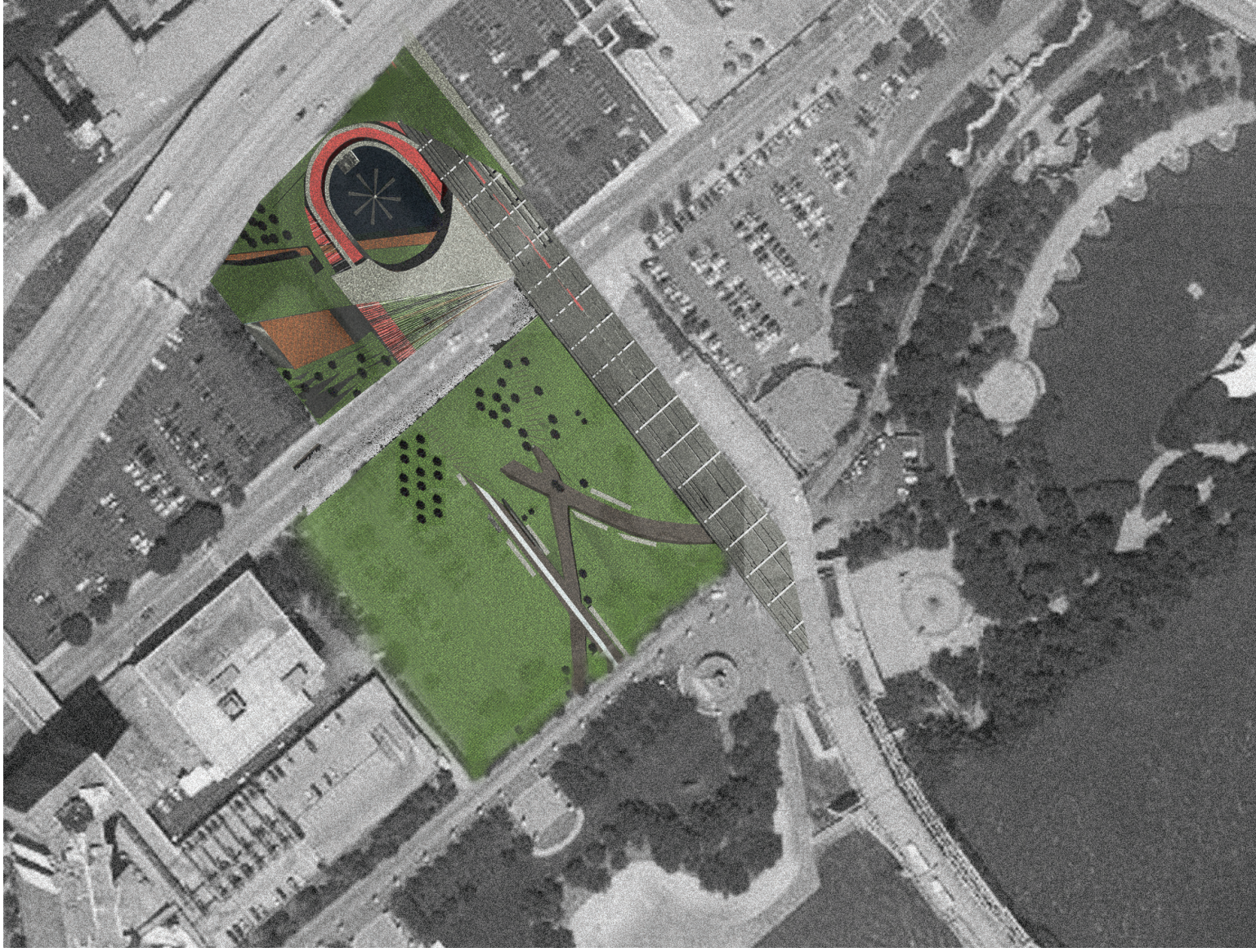
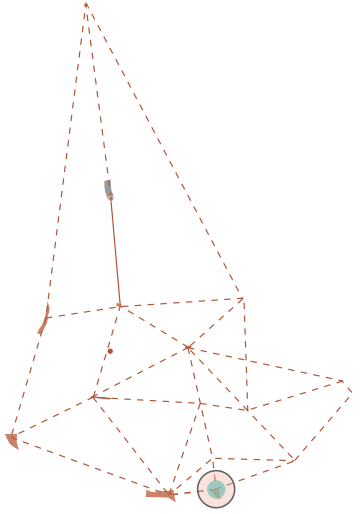
# Circulated Carving



The investigation of the site looked into the historical context as well as the current demands for development. The site proposed an opportunity of addressing solutions to multiple barriers. The intervention established a connection between Kentucky and Cincinnati. The site was an exploration in fluidity of movement and water. The circulation of water and people carved the voids out of the earth creating an interesting investigation of solid and void.

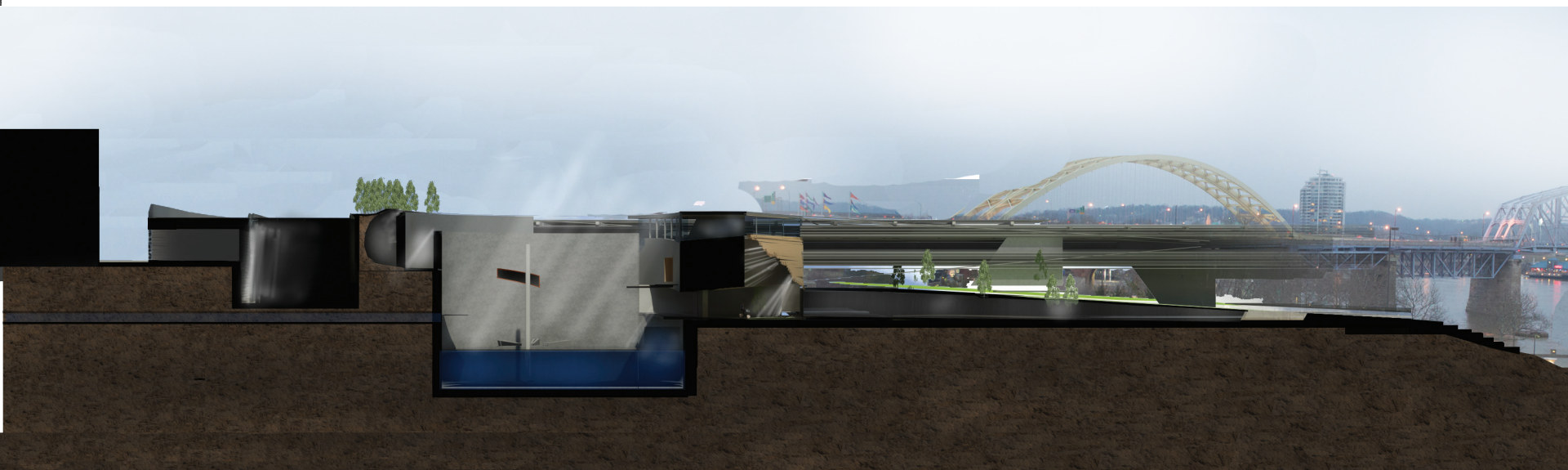








The close proximity to the river made the site a perfect location to study the use of how water from the city flows into the river. The idea of water influencing the design of the site became the center of the intervention. The center became a well which allows an abundance of water to flow from the city and bring the site to life. Theoretical ideas were looked into including the use of an Archimede's screw and waterwheels.





# What you see...



# What I See....



Existing Structural Columns  
Connection from bridge to city

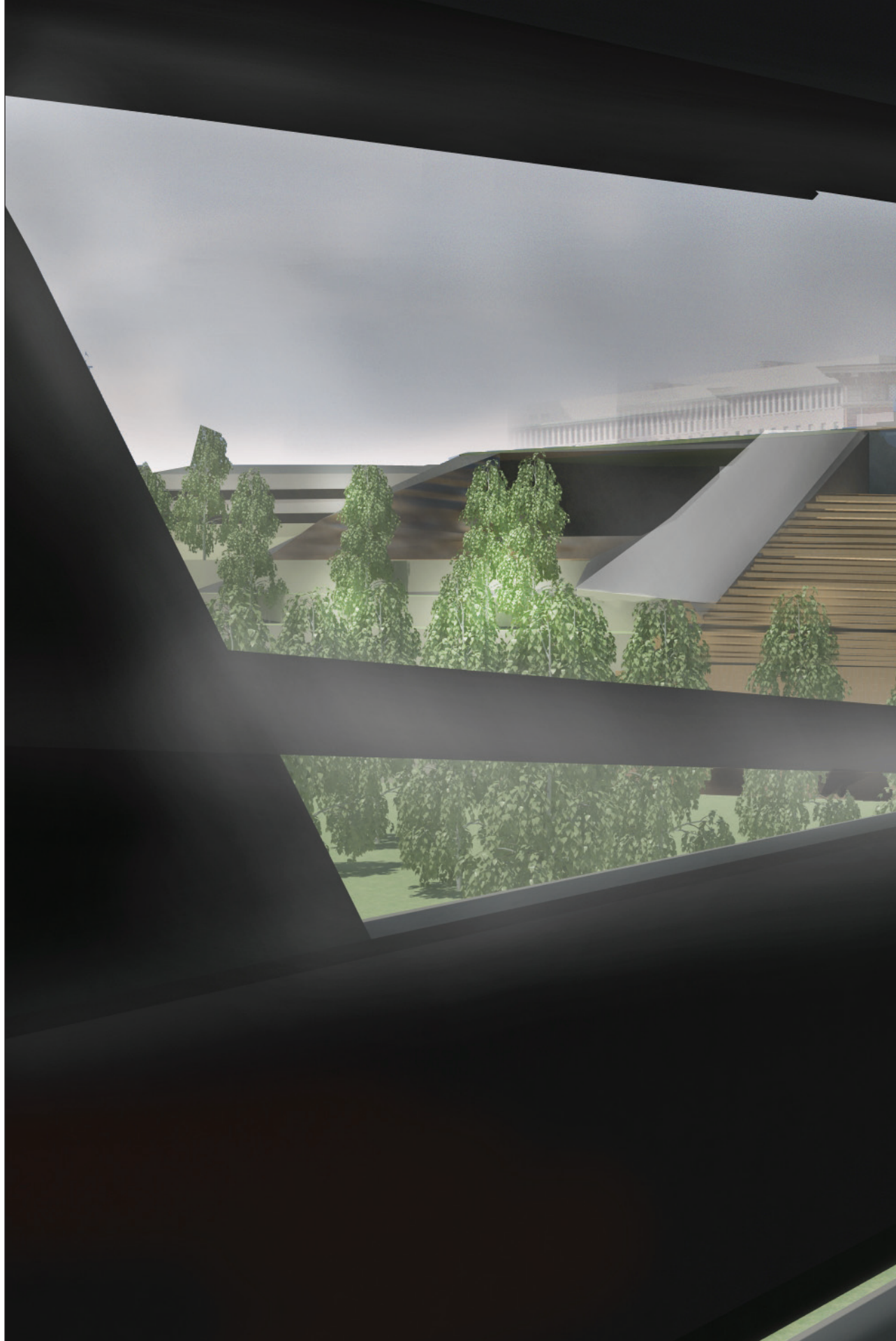
Pedestrian Bridge  
Reconnection of two cities

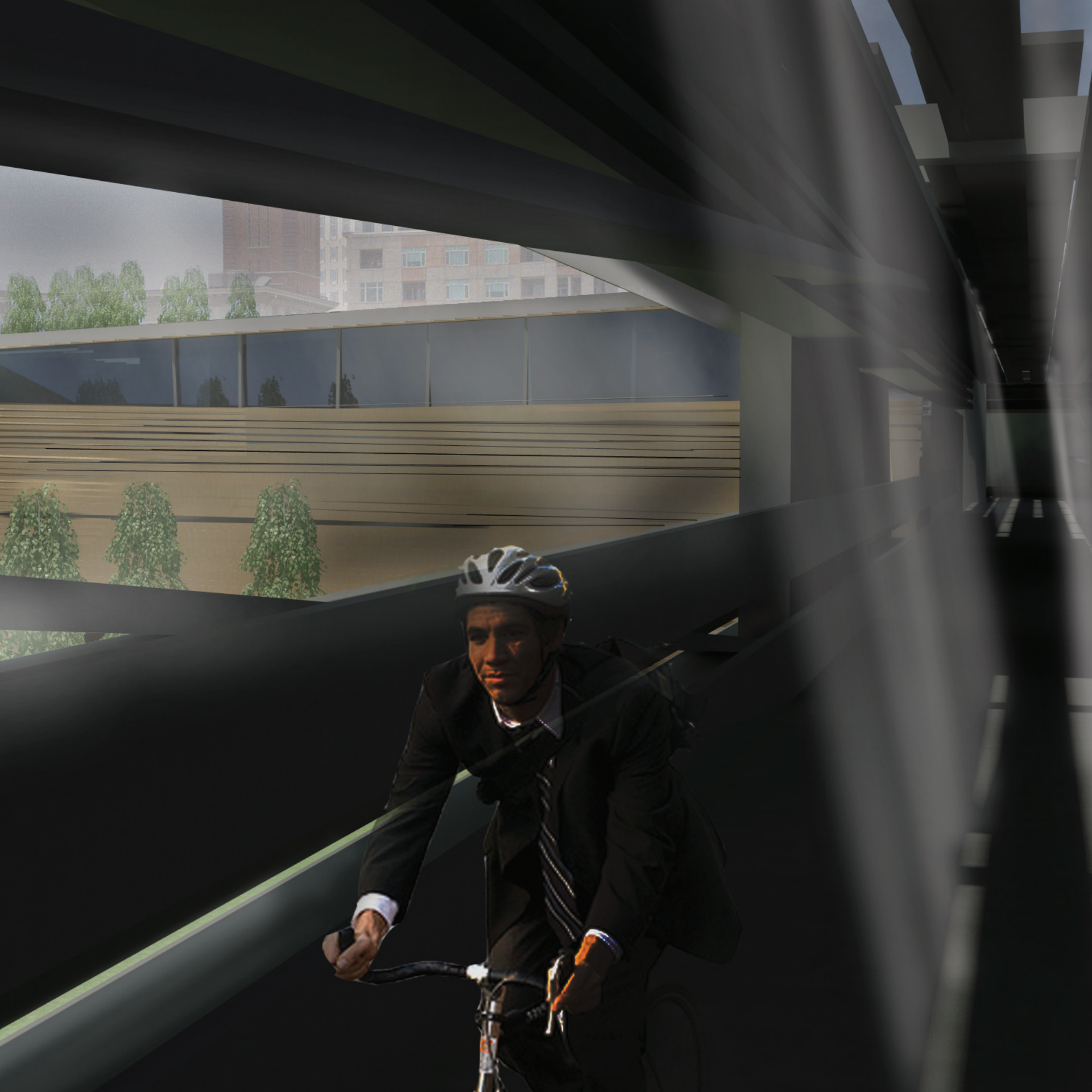
Newport, Kentucky  
Demolished Building  
Pool/Spa Area



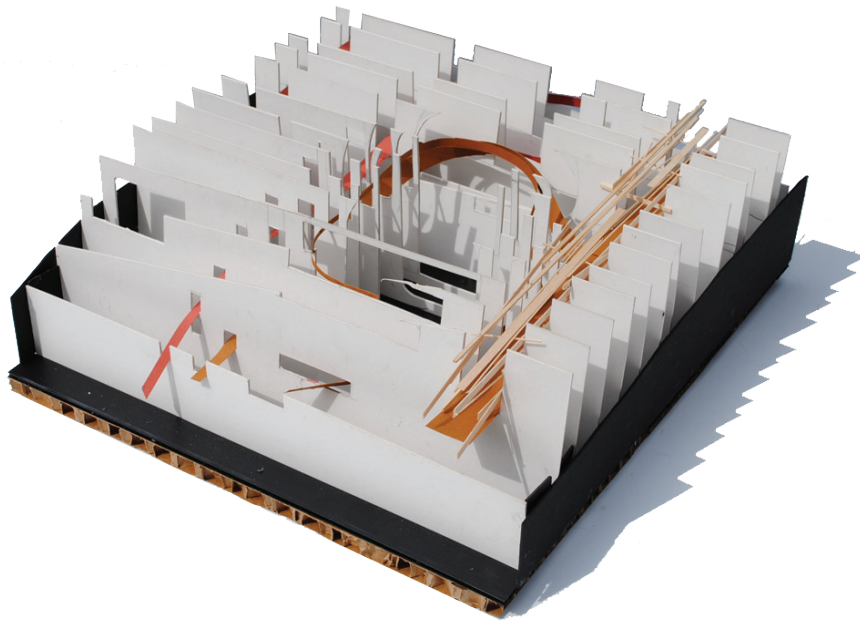


The connection from the bridge to the site intervention allows the user to pass with ease across. Pete Rose Way while simultaneously entering into a perception of underground spaces. The deconstructing tunnel creates a framing of the site



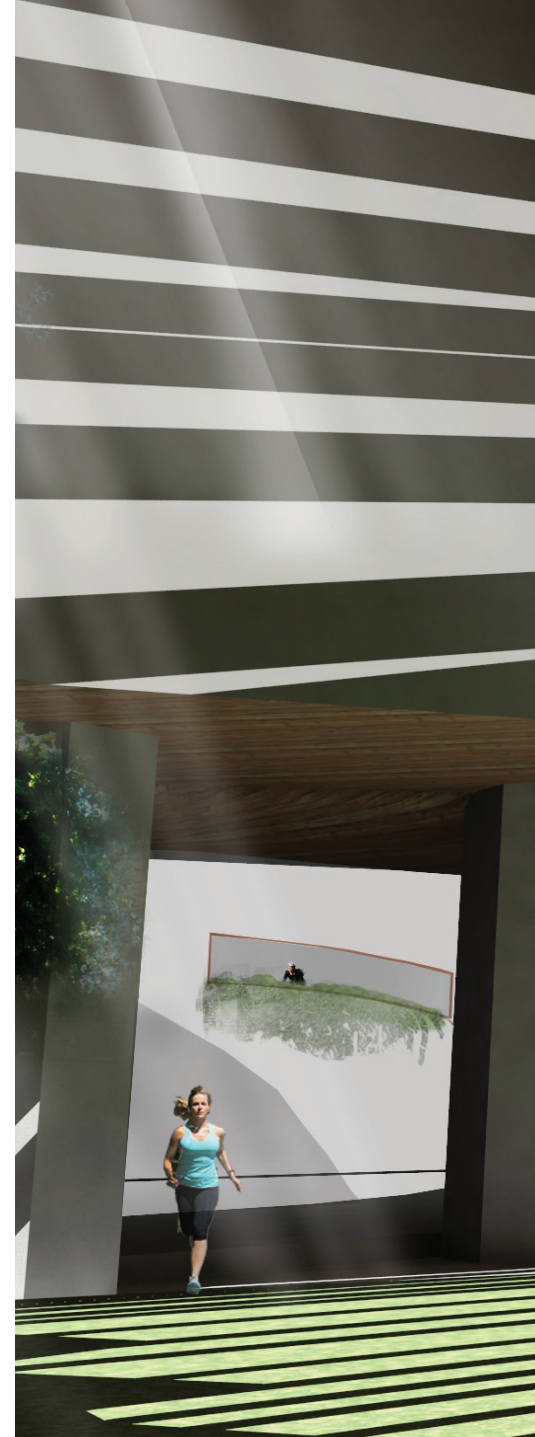




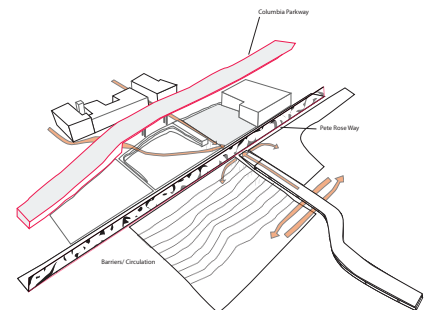
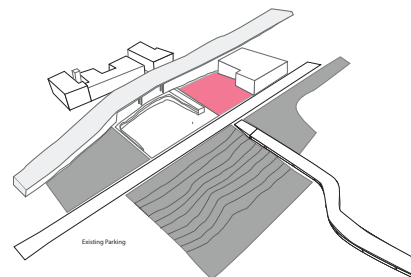
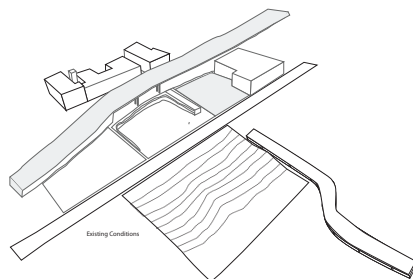


The barrier created by Pete Rose Way was addressed by moving below the road. This void is the only moment which one goes below the surface. The loss of orientation due to the circulation around the well makes the occupant lose contact with the actual surface until this moment. The surface is revealed through peeling back the facade and unveiling the sky. This moment is the threshold between the site and the riverfront.

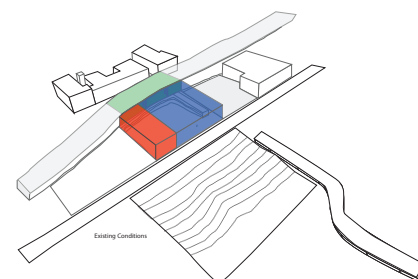
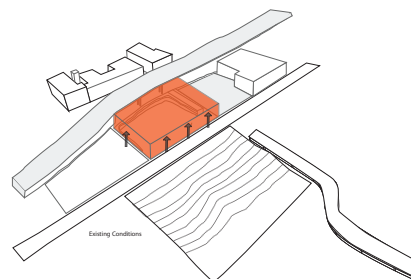
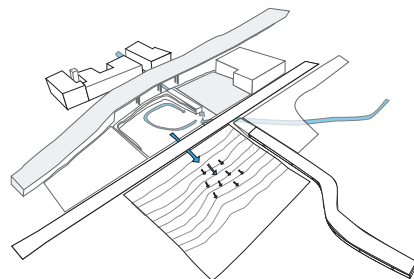
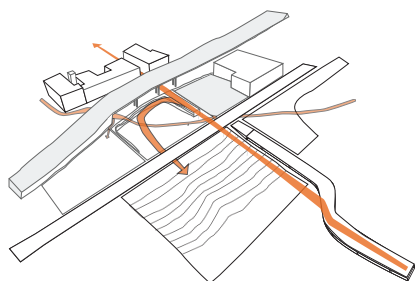
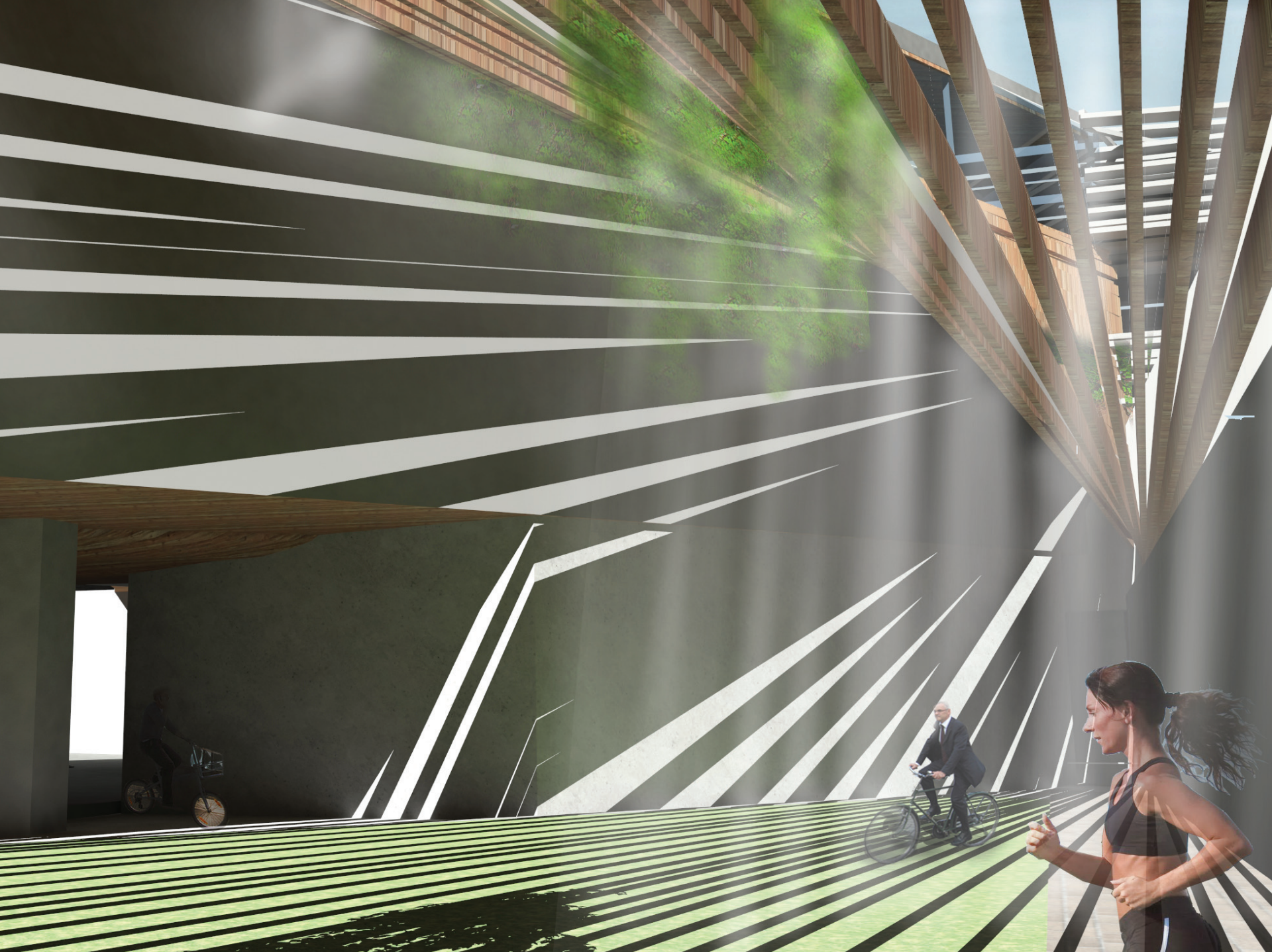
The peeling back of the building's front facade allows an abundance of light to pour into the space. The space allows the surface vegetation to grow into the space while also allowing vegetation to grow within the void. The variation of heights within the network plays with the ideas of compression and release often used by Olmsted. This strategy creates a distorted perception of the spaces created, emphasizing the importance.



## Design Strategies

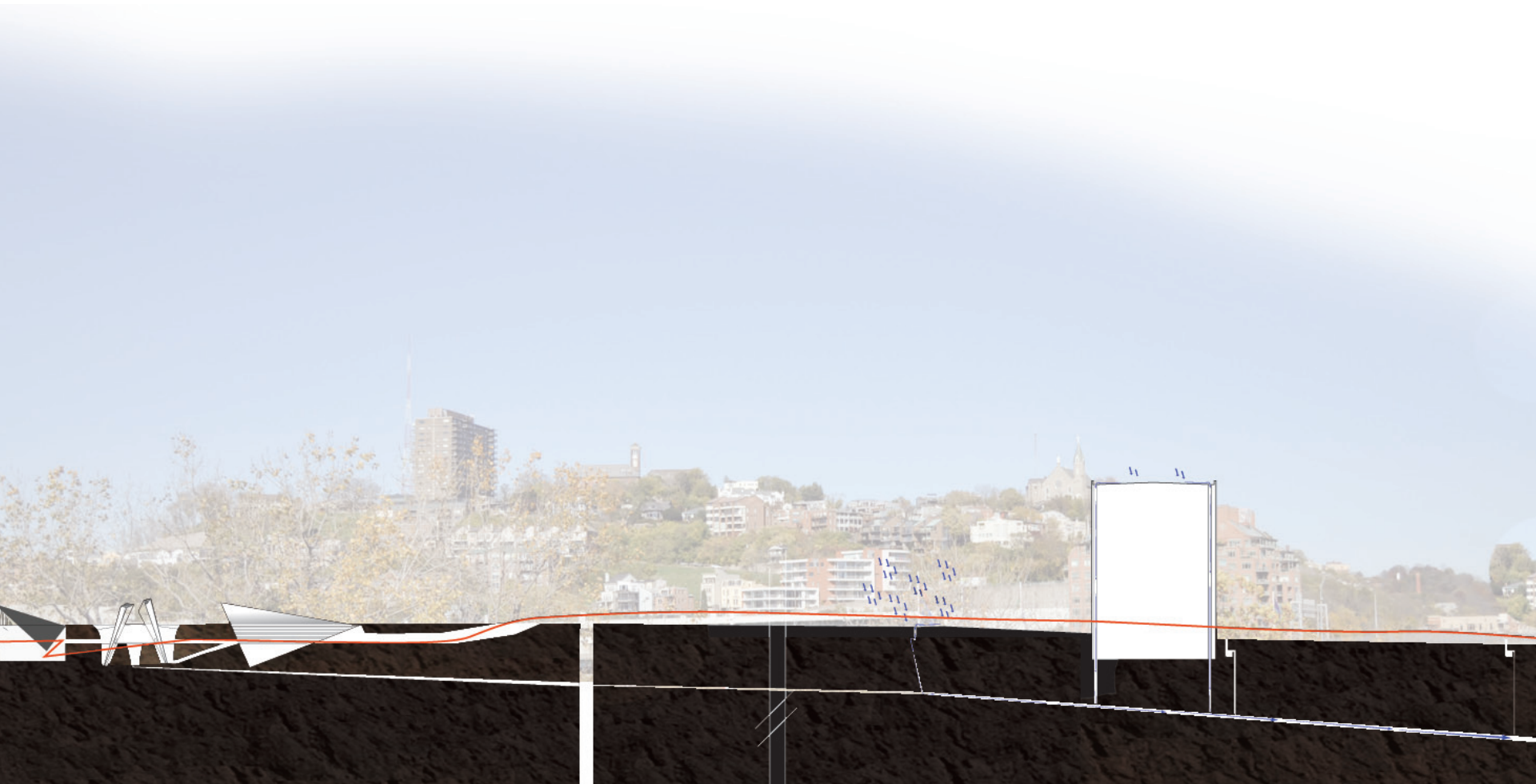






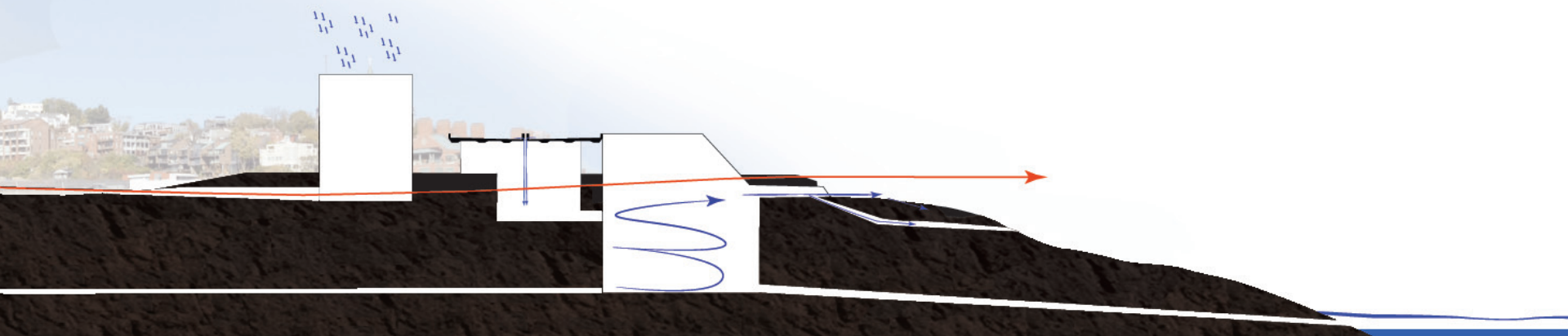


Eggleston Street  
A sea of 3000 Cars





The connection between the Broadway Commons and the Purple People Bridge has a plethora of vacant land. The once dense area is now barren of buildings, replaced by a clusterfuck of interstates crisscrossing. The area is the result of being sandwiched between the downtown district and Mount Adams. The site was demolished in 1950s to make room for I-71 and Columbia Parkway. The layering of interstates creates unwanted space resulting in the surface being a conglomeration of parking lots. The roadways suspended above, deters development in the area. The transition between the two sites allow ample opportunity for the path way to intervene with the surface. The area also provoked the idea of using the surface as a way to harness rain water in a manner which could be used within the network. Ideas of collecting stormwater from the surface could be used as a way of generating energy within the node. The suggestion would capture the rainwater and by using the natural properties of gravity could generate harnessable energy. The suggestion would be nothing more than the powering of waterwheel as sculptural elements. This process would be a theoretical suggestion to bring awareness to the lack of sensitivity for our stormwater runoff. The current water collection in the city collects the water and funnels it into the Ohio River and Mill Creek. This method is not capturing the potential and opens the opportunity to further exploration.





# Essence of the Underground

Throughout the history of man, the stability of the ground has been as a source of refuge. Primitive man transformed subterranean spaces into dwelling because it provided protection from the climate. The consistent conditions under the surface developed a sense of comfort because one knew what to expect. The confined spaces start to suggest the idea of a nest or the womb. The source of protection evolved throughout time and is now where we resort for safety from air raids, nuclear warfare, and drastic climatic conditions. Although we use the subterranean as a refuge, the use of these spaces is reduced to times when harsh conditions exist on the surface. We are forced to descend as a last resort of survival. This evolution has transformed the perception of the subterranean.

Modern technology has allowed humans to transform the perception of the subterranean into an artificial world, isolated from the natural elements. This is an evolutionary process which has changed what we distinguish as subterranean. Our experience of subterranean voids has radically changed as a result of the progression in technology. Our aversion towards the subterranean has inhibited a pure analysis of these phenomena. It can be argued that the subterranean is an uninhabitable space lacking basic necessities for life such as sunlight and circulation of fresh air. One could claim that subterranean malls and subway tunnels have camouflaged the essence of the subterranean. Contemporary underground spaces are not below the surface at all, but rather extensions of the Surface. In order to find the essence of the subterranean, it is imperative that we disregard this attempt to camouflage the subterranean. In my following phenomenology of the subterranean, I will analyze the subterranean through the experience of being under the Surface. It is only through the



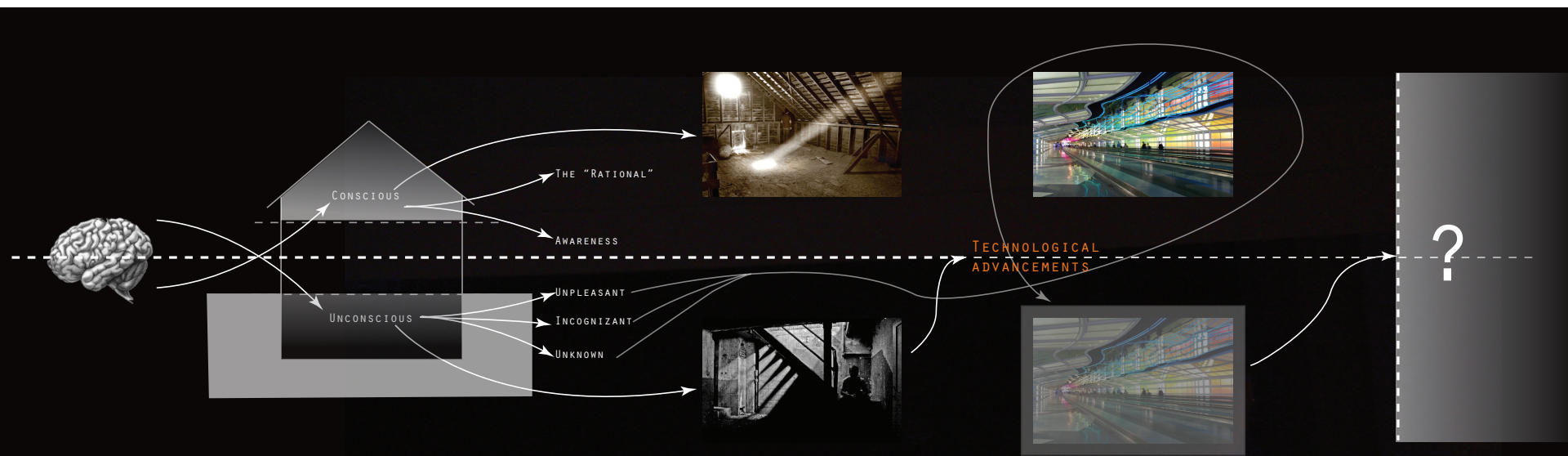
experience of the body that one is able to reach the real essence of being under- the- Surface.

Gaston Bachelard explores the subterranean through a psychological analysis of the cellar in the Poetics of Space, using Sigmund Freud's theory of unconsciousness. His interpretation of the subterranean begins to probe a multitude of characteristics portrayed while being below the Surface. The essay falls short of reaching the essence of the subterranean because it ignores the feelings derived through an experience. By analyzing the act of being on the Surface, penetrating and submerging through the Surface, and being under the Surface will begin to shed light on the failure of Bachelard.

Bachelard's interpretation of the subterranean begins to probe the fundamental feelings of being below the Surface but looks at the experience only through the mind and not the body. The act of being below the Surface evolves anxiety and unease which are caused by the physical conditions. The existing conditions of the subterranean are foreign to the world we experience on a daily basis. While below the Surface we become more attune to our surroundings and question elements that do not normally enter our consciousness. Anxiety emanating from the subterranean can occur while on the Surface. While interacting with the Surface, we do not question the stability of the ground. Previous encounters with the Surface unconsciously make us assume that the ground is terra firma or solid. Our questioning of what is under our feet is limited to what is visible and does not extend any further. It is only when the ground shifts or alters below our feet that the solidity of the ground enters our consciousness. While walking on the Surface, we do not think of what is below us. When one is walking through a city this awareness could be awoken by the passing of a subway car. The

vibrations emanating from below our feet makes one question what actually exists below as well as the stability of the Surface. The thought of something moving below the Surface creates anxiety within us and directs all of our attention to the source of the vibration. This anxiety vanishes once the source has been identified and examined.

The subterranean is what lies below the Surface, however the depth is determined by the thickness of the Surface. In order to access the subterranean a penetration must exist exposing the content within. We cannot experience this phenomenon unless a void exists. When one is actually under the Surface is a subjective interpretation of when one is in-the-ground and under-the-ground. A substantial difference exists between the two conditions resulting in the amount of enclosure. A void In-the-Ground has an opening to the Surface in an extent where a new condition or world is not felt. Fluidity between the exterior and interior exists without a suggestion of a barrier or resistance. One does not perceive a threshold on the Surface but is below the horizon line. A suggestion of enclosure would create a restriction of access into the space. The size and position of the opening to the subterranean chamber is where a subjective interpretation comes into play. A space dug into the ground or gouged out of the earth would be seen as In-the-Ground because of the unrestricted control of movement. In order to create an entrance into the ground and create a condition definable as under the surface, a small incision must be made into the Surface. A hole is the most common association for a penetration into the surface. It is a simple iteration of how this penetration could occur but is not limited to a hole. A slit or incision into the surface suggests an abrasion with dimensions longer than wide. This small opening restricts the amount of movement between the interior and







exterior, allowing the condition of the Surface to maintain its character. On the surface this abrasion is viewed as almost nonexistent, merely a scar.

Descending below the surface creates powerful emotions, beginning the experience of the subterranean. As one begins to penetrate through the Surface, the earth begins to surround us which alters our viewpoint of the world. The first step down is when the body breaks the threshold of the Surface. Moving lower into the earth changes our viewpoint of the world from a three-dimensional view to a flat two-dimensional view. One no longer has a vantage point which allows the ability to perceive depth. Looking straight ahead, the world would look like a layering of planes instead of three-dimensional object. The Surface world starts to elude our consciousness as the earth begins to encase the body. The encasement starts limiting the amount of movement and freedom which is allowed on the Surface. Feelings of unease build with every step down and our attention is drawn to what lies in front. When one enters a subterranean space, light is absent below the Surface and we are restricted visually to what lies in front. Our attention is directed toward the wall of darkness and what could possibly exist beyond this wall. The surroundings of the Surface dissipate from our consciousness completely and are now focused on the dissension. The lack of light creates a feeling of uncertainty. With every step we question the stability of the ground, probing the surface with our foot to ensure its solidity before allocating weight onto the front leg. This unease slows our entrance into the earth and is intensified through the process.

When our body has completely broken the Surface, we shift our attention from the darkness to the light. The light flowing from the Surface appears as its own voluminous figure. The light becomes a reference to our location as the sun acts on the Surface. Every movement made within the subterranean void is in relation to the light form. When one starts to move away from the volume of light, feelings of discomfort overwhelm us. Moving a substantial distance away from the opening, the eyes adjust to the uncomfortable level of illumination. Eventually the source of light diminishes completely ensuring we are encapsulated by the earth. A feeling of restriction overwhelms us because knowledge of our surrounding is limited.

When no source of light is visible the true essence of the subterranean can be reached. A space of complete

darkness means an absence of vision; one is no longer capable of using the sense we depend on most. This feeling is rarely, if ever experienced on the surface. Even on the darkest of nights, light is emanated from the horizon. Our loss of vision heightens the other senses and our sensitivity to the surroundings. The slightest noise or gust of air creates discomfort making one question our surrounding. This discomfort makes us contemplate whether to move toward the source or run back to the entrance. As a result of our uncertainty of what surrounds us, we are paralyzed. Movement is now dependent of our sense of touch. On the Surface we are attune to our surroundings visually, however under the Surface this awareness is limited to the distance of our fingertips. The ground we are standing on becomes an invisible island and everything beyond is unknown territory. If the level of anxiety becomes too strong, we may seek comfort by kneeling or lying on the surface. One might subject to crawling as a way to question the solidity of the ground, using the hands as a way of feeling what lies ahead.

Our sense of touch makes us probe every crack, pebble, and puddle. The boundaries of the space become apparent to us and the understanding of the surface is explored at an intimate level. We understand our surroundings in a new way which makes us question everything because if we do not our next move could be catastrophic. We begin to understand that the subterranean spaces found within nature do not have comfort elements we take for granted on the surface. The surface one walks on in a cave is not a flat, smooth, horizontal plane, ensuring stability with every step. When one is in complete darkness, the body immediately perceives a loss in warmth. We often associate warmth to light but when light is absent we cannot generate this sensation of warmth. When one moves from complete darkness and encounters a light source a sensation of warmth and comfort passes through the body allowing the anxiety to repress. Gradually our eyes adjust to the light and the volume of light becomes our sole focus. Every step closer is more confident than the last until we become immersed in the light.

Below Surface spaces are bounded by the voids carved from the earth suggesting a limitation to where one can go. At the surface, the finite meets the infinite, where void connects with solid. Beyond the surface we perceive that it leads to an infinite amount of earth. We become uneasy because it seems that the earth wants to collapse into the void, but is being held back by an invisible force. The permanence of the earth is the

result of the dense conditions that it carries. The encompassing earth can be shaved to a fraction of an inch and still have the characteristics of a wall that is hundreds of miles thick. The mind can only interpret what is revealed on the surface and nothing more. Below the Surface light the source of comfort to the mind; however it cannot penetrate through the surface even at its thinnest level.

The surface now confines our ability to move. While under the Surface, we experience conditions that are not normal because we cannot gain comfort from the Surface or terra firma. No matter the size of the chamber, it feels too small. The anxiety of being confined makes it unbearable to be relaxed. Knowing that the only way of escape is reduced to only a couple of options elevate our conscious of what surrounds us. Every passage is assessed to ensure no danger is lurking but also to see if it is viable escape route. The feeling of claustrophobia is emphasized when chambers are reduced in size. In the event of an accident, one would not be able to run away from the source with ease. The escape is restricted to the voids and is why we are aware of our surrounding. The derailment of a train on the surface would allow people to escape and run away from the accident in almost any direction. However, while in a tunnel the opportunity to escape is reduced to two directions. This only heightens the anxiety because escaping means passing alongside the wreck before reaching safety.

Our fear of death is unavoidable and being confined by the earth unconsciously thinks of the idea of being suffocated. Being buried alive is a fear that we are not able to overcome. The weight of the ground constricts us and makes us feel uncomfortable. The air within the space becomes heavy and

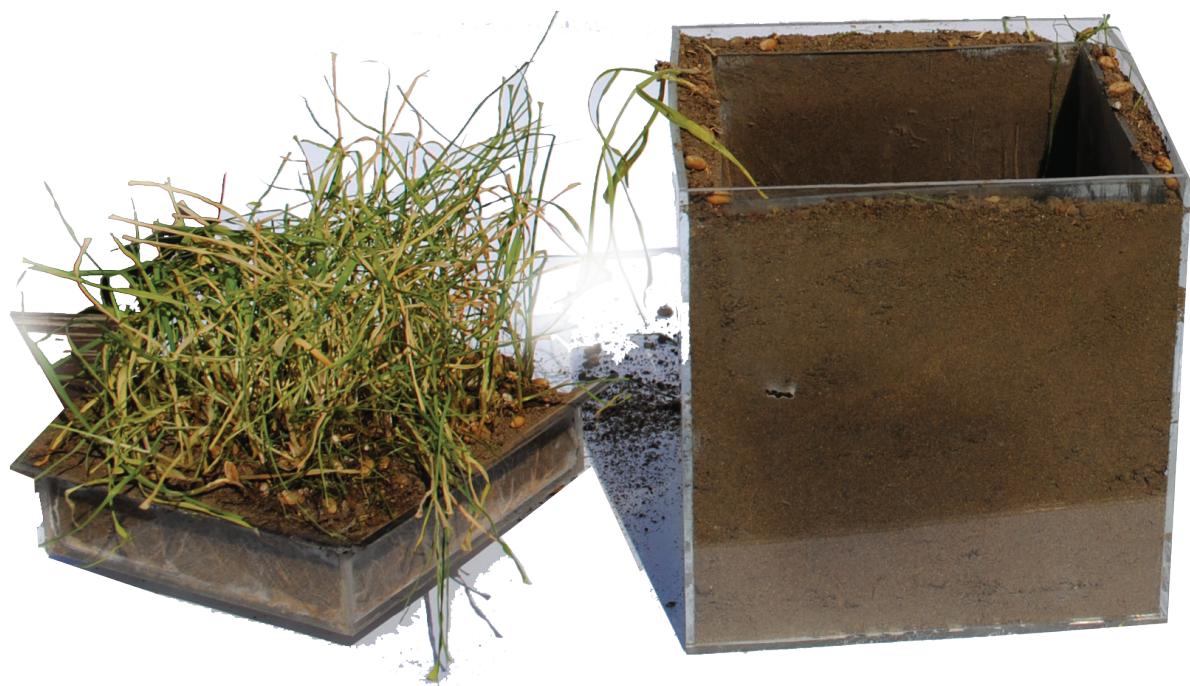




we breathe harder and our heart rates escalate as a result of the anxiety. This feeling of claustrophobia overwhelms us when we lose orientation of the Surface. By losing any perception of our location creates a discomforting feeling. We are no longer able to know which direction safety is. The subterranean lacks a landmark that allows us to know which way to travel. As time passes the anxiety can change to paranoia. We begin to question every movement because it could result in moving further from the Surface. The question of never escaping begins to overwhelm our thoughts. The thoughts of being buried alive turn from a thought to a logical possibility. The conditions of the subterranean isolate us from the necessities to live and life under the surface is limited. Modern subterranean architecture has been able to overcome the uncertainties created by the conditions below the surface. Developed spaces under the surface such as subway stations and shopping malls use a plethora of techniques to distract the user of their position. The use of escalators and elevators allow us to transition fluidly from the Surface. The surfaces of the voids are covered up with materiality that makes us unaware of the earth. The chambers below are illuminated allowing users to see the surface they are walking on and the context of the surrounding. In addition, digital displays avert attention to the flashing lights or bright posters. The pathways are laid out and orientated in a manner that is an established pathway. We do not question where the tunnel ends because it was created for a purpose of movement and will lead to the Surface. The subterranean spaces, experienced by people on a daily basis are not the subterranean nor should be viewed in that manner. These voids are merely an extension of the Surface which is being utilized because of the lack in space above.

The subterranean has unique characteristics that create an array of emotions and feeling. The feeling generated while under the Surface can only be felt through the experience of being. This experience includes the entire process of being on the Surface, in the Surface, and under the Surface. The essence of the subterranean is not felt in modern subterranean spaces giving a false interpretation of what it feels like. We must attempt to enter a space that is truly underground and imagine what it would feel like entering a cave or abyss that has never been entered before. The feeling of anxiety and constriction are the result of uncertainty. By being under the Surface is allowing the possibility of being buried alive. Death is something humans will never be able to overcome









# Final Conclusions

Throughout the investigation of subterranean architecture, the questions answered evolved into a search for how architecture can begin to blur the surface. The investigation delved into the idea of how not only the spaces can create a transition of spaces but also can investigate the possibility of blending the landscape with the architecture and look at the two as one harmonious piece. The investigation has led to a continued exploration of how we as architects can look at the site more sensitively and create a stronger design. Each study created a new investigation to explore and resulted from a simple study before. Subtle alterations within the process proposed the next step to study leading to an investigation of the city.

Throughout my investigation I learned about the rich history and culture of Cincinnati. My investigations gave me new insight of how to explore a city more in depth. The experience of a city via bicycle allowed me to wander spaces in the city I would often not notice. This process of exploration revealed to me a new layer of the city, one that I found more exciting and interesting.











# Terra Firma: Post Superficies

Alteration of the Human Perception

