

SENSING THE THRESHOLD

# SENSING THE THRESHOLD

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# SENSING THE THRESHOLD

Hillary Roth

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## ABSTRACT

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The sacred and the profane: a dichotomy that can only exist through the thresholds within.

In a world that's drowning in the profane, we yearn for the ephemeral, in which our mind, body, and soul emerge out of the mundanity of day-to-day life, and into something beyond. We search for the art, seek pilgrimage, and long for the symbols. The physical, emotional, and sensational thresholds we pass between the two states are what resonate in our bodies. Those experiences are the stories we pass on. Yet, some of the most sacred spaces in the world have become mere subjects behind the lens of a camera. Technology has empowered our ability to reach marvels, yet it has provided layers now inherently filtered onto our experiences. How real are these thresholds we long to pass if they are experienced only through electronic devices? The sacred experiences I treasure the most were given life through movement: movement of time, light, and the elements, none of which I would trade for a photograph. The following pages trace my imagination of a place where we take a step back through the door we barely noticed. Instead of looking for the sacred, we journey through the profane. *We celebrate the threshold.*

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# THE PROBLEM

Technology has altered our relationship with architecture drastically. We have become so enamored with its power and ability that we've lost some of the purity in how we experience space. We've become completely reliant on modern technology that we have given inanimate objects the rights that should belong to humans. Devices like cameras and GPS systems have removed us from directly experiencing our surroundings. What used to be a conscious journey between entities is now a complaisant one; one that eliminates moments of beauty and wonder. The threshold has lost its significance.



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“The automatic door-closer makes the act of hesitating behind the threshold and attentiveness for the door superfluous and thereby undermines symbolic gestures of respect for the host on whose domain one has set foot.”

-Bernhard Siegert

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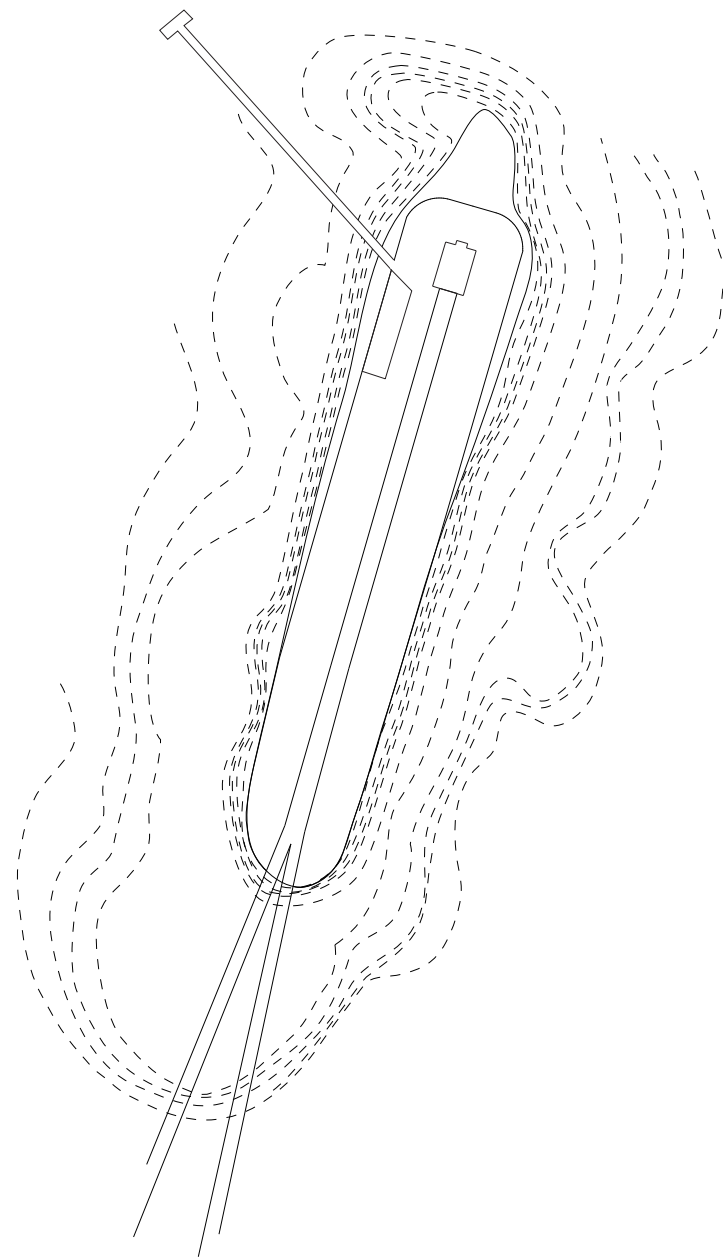
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## THE SITE

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Considered to be one of the largest bridge-tunnel complexes, the **Chesapeake Bay Bridge-Tunnel** weaves through the threshold of the Chesapeake Bay and the Atlantic Ocean. The four-lane, twenty mile crossing facilitates a direct link between Virginia's Hampton Roads area with its Eastern Shore. The first multi-structural span of its time, the design took great innovation and courage, marking the complex as "One of the Seven Engineering Wonders of the Modern World." (An Engineering Marvel in the Making)

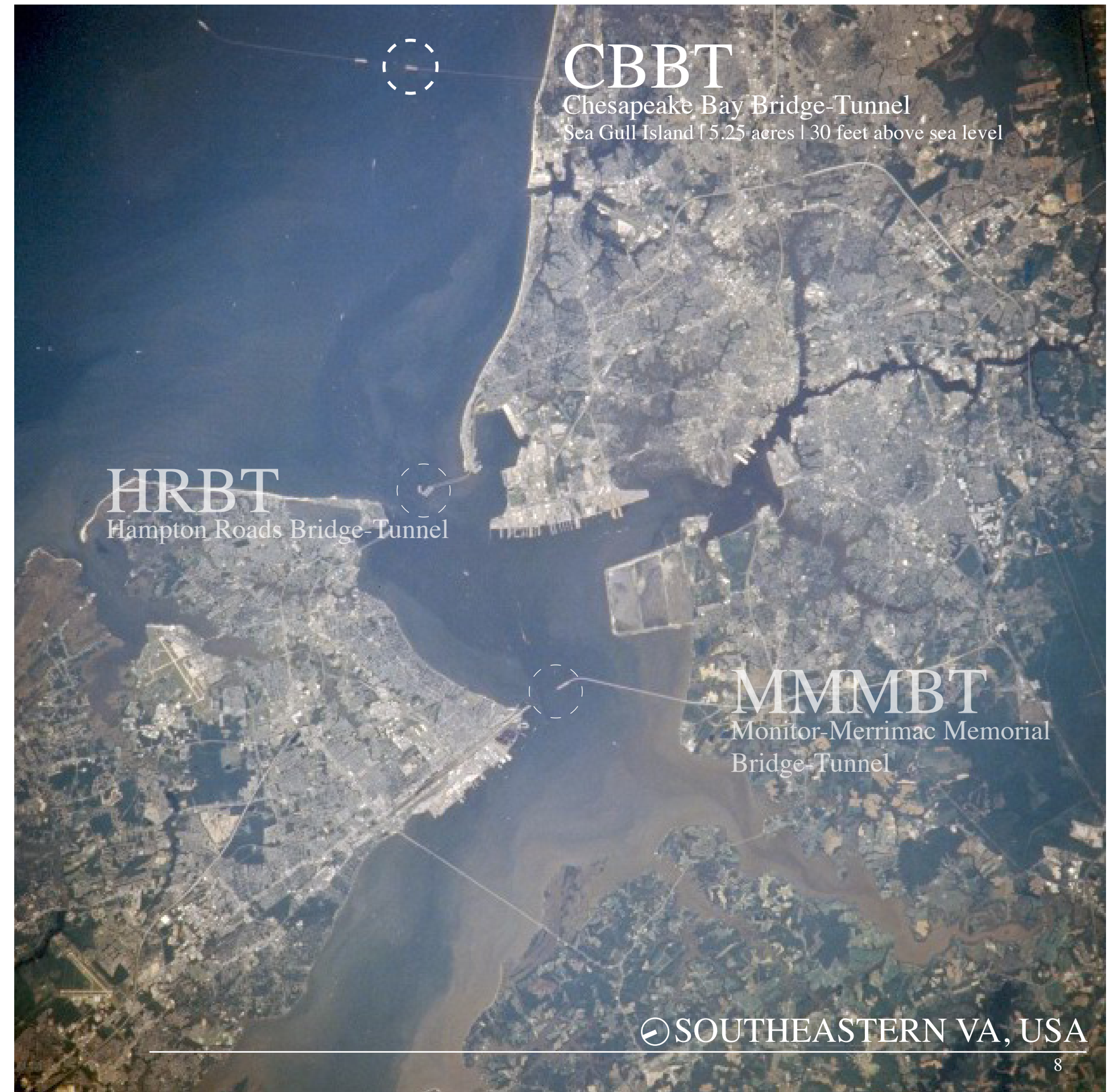





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**LAND | SEA** Driving straight across the entire bridge-tunnel takes around twenty minutes. At only 30 ft. above sea level, along narrow lanes and low guard-rails, the passerby is made fully aware of the body of water being crossed during the entire 20 minute journey. Four manmade islands connect the 80,000 feet of bridge that spans the mouth of the Chesapeake Bay (Roads to the Future). These four islands serve as the threshold between land and sea for travellers en route, merging various sections of the pre-cast concrete spans with two miles of tunnel. Two tunnels, one mile each, were placed under the two main shipping channels, the Thimble Shoals Channel and the Chesapeake Channel (Roads to the Future). The bridge-tunnel structure allows constant access between the ships based at the Norfolk Naval Base and the Atlantic Ocean. If constructed as a completely fixed crossing, any destruction of the bridge would have potentially barricaded in the Naval base, deeming the bridge-tunnel design necessary. The four islands are the only points along the entire complex when the two parallel crossings (built twenty years apart) come together to pass through the tunnels. Ⓜ

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**SEA GULL** The southernmost island is known as Sea Gull Island, and is the only island that is accessible to the public. A prime spot to watch ships navigating the channels, people come to sightsee and enjoy the 360° views of the horizon meeting the sky. Two buildings currently reside on the island: a restaurant and a ventilation building that is closed off to the public. Another characteristic point on the site is the fishing pier, which extends off the north-west edge of the island. The beauty of the composition of the bridge, and the spectacular views it lends to visitors are contrasted with a built environment that is commonly found around similar tourist attractions; ones that encourage wallets, not experiences. The alert nature of the journey across does not translate to the architecture on site.

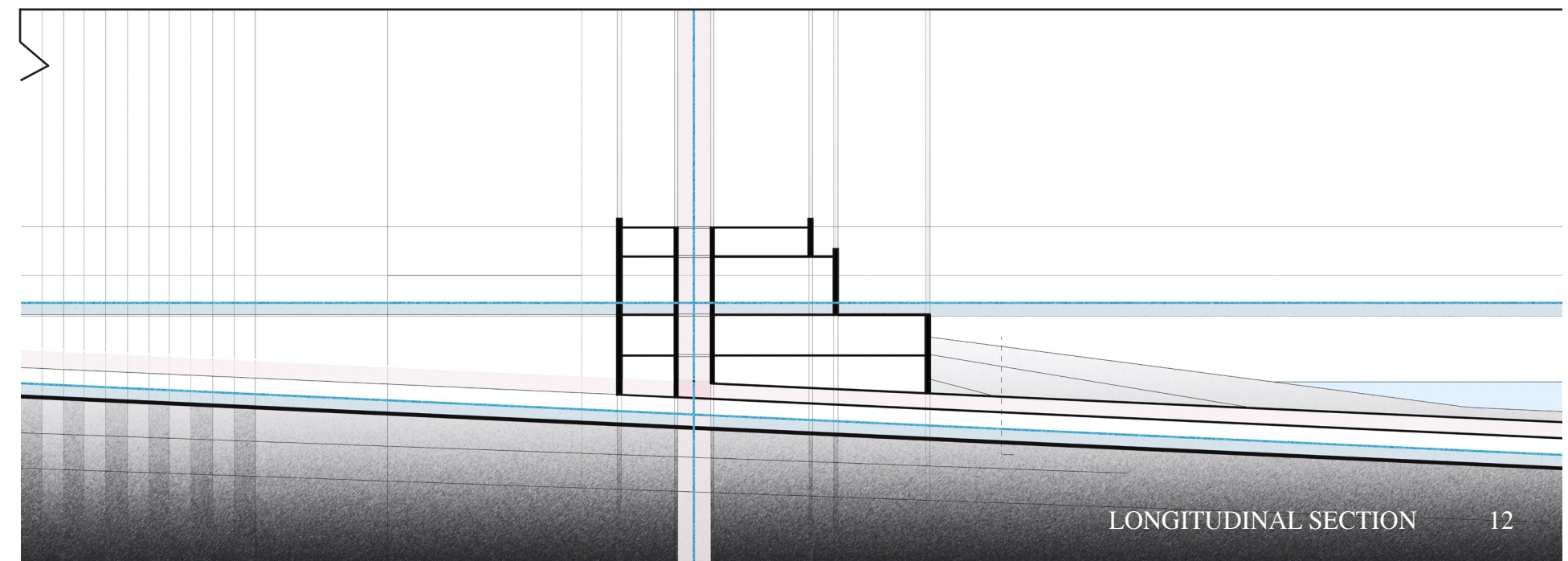
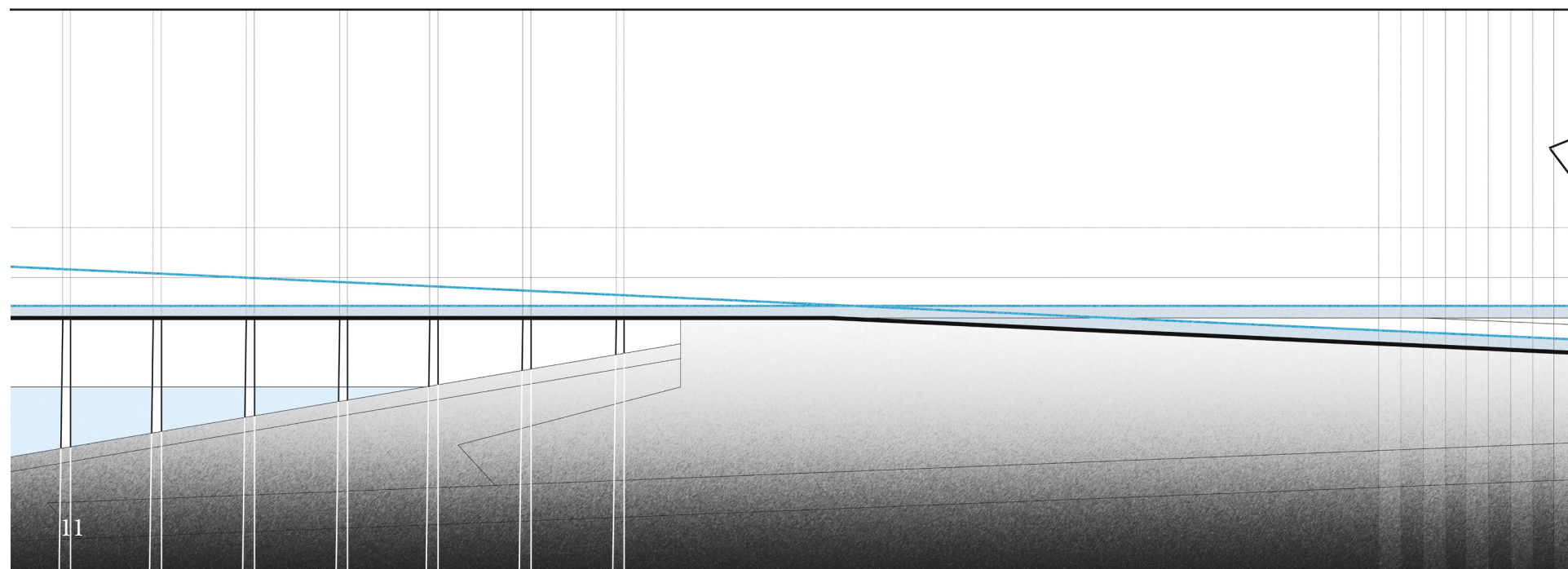
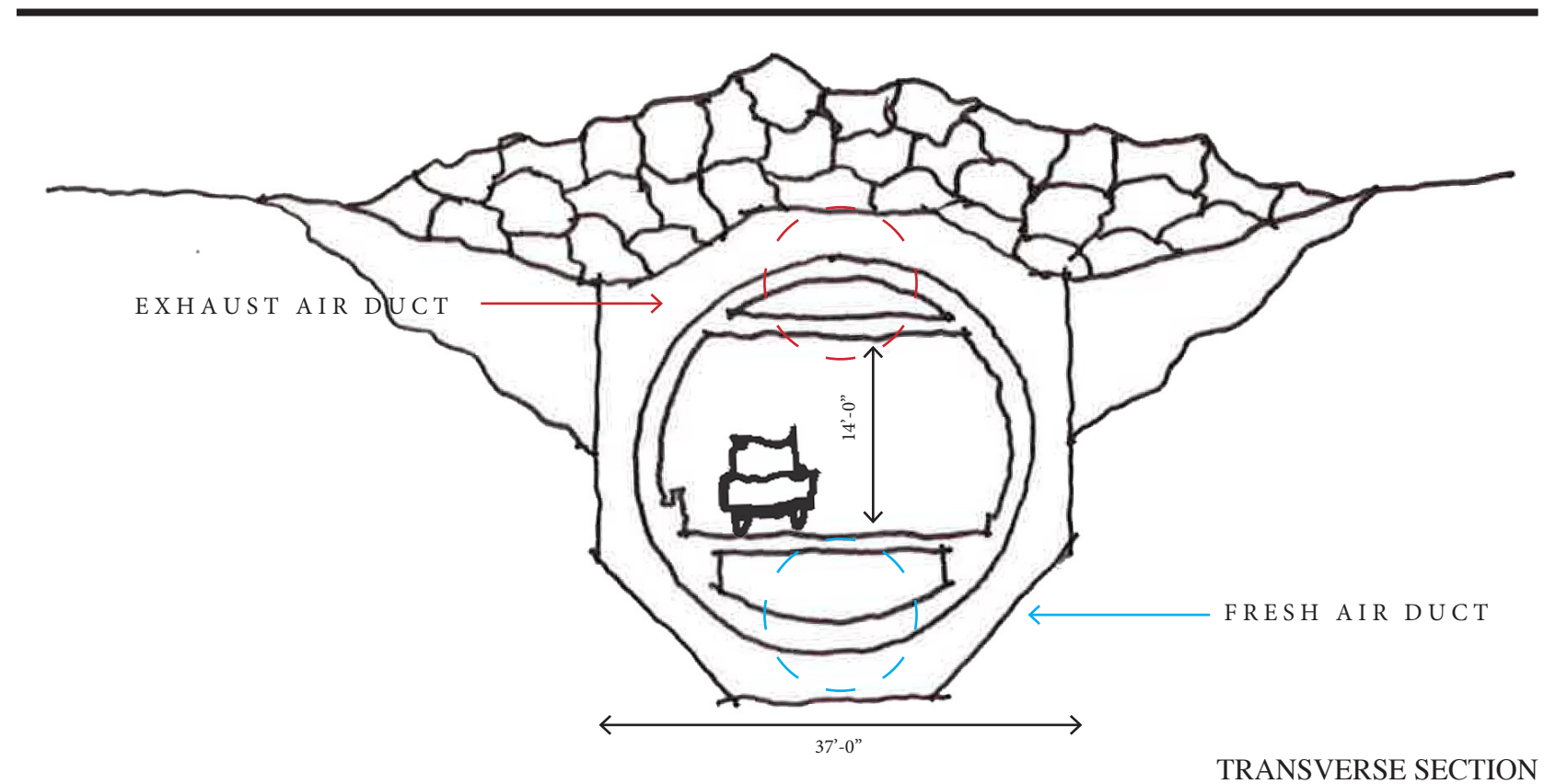
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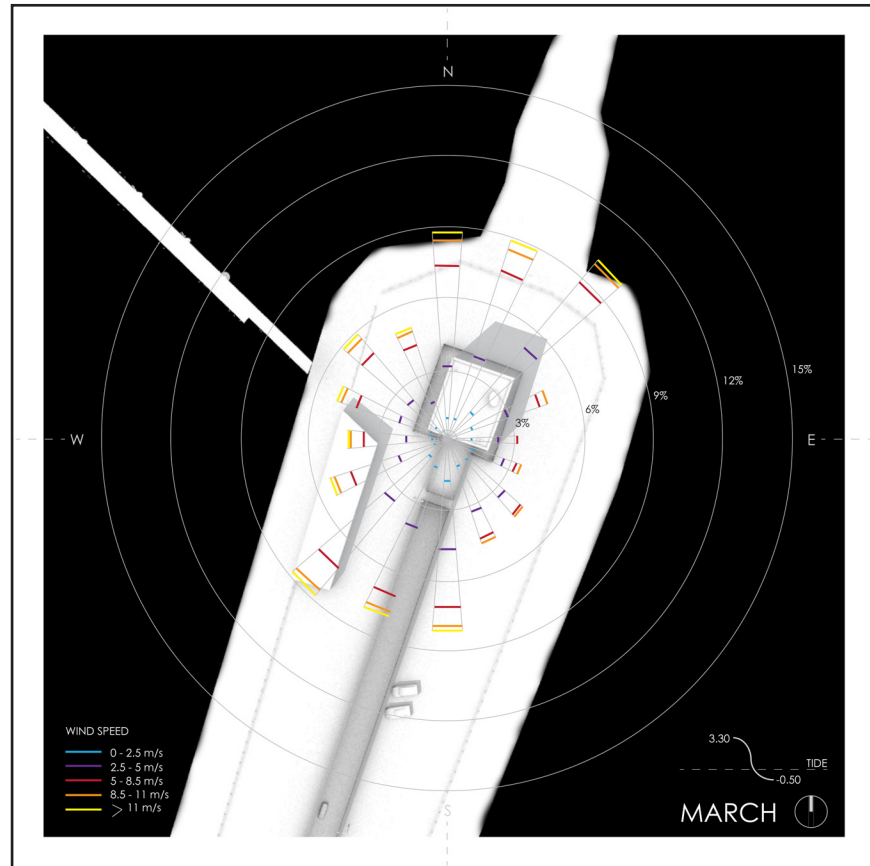
# CONSTRUCTION

Building the four islands was one of the most difficult portions of the four year construction process. The DVD documentary, *An Engineering Marvel in the Making*, gives insight on how the process was carried out:

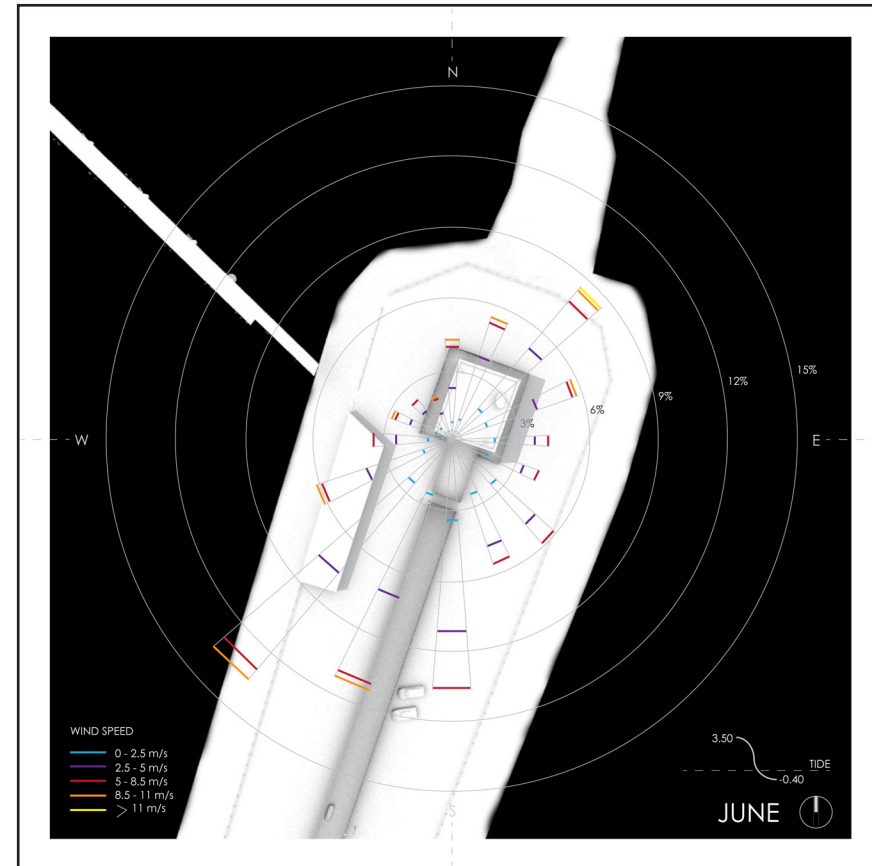
First, hydraulic fill was dumped on site until the area reached a negative 17 ft. elevation. Quarry Run stone retaining walls were then placed around the perimeter, measuring 230 ft. wide, and 1500 ft. long. Against the perimeter, heavy rip-rap stone was carefully placed. Finally, 20 ton granite boulders were anchored around the perimeter. Sand fill for the site was taken from the burrow areas of the Chesapeake and Thimble Shoals channels. Splash walls, 30 ft. tall, were then built around the perimeter. Once this was complete, the placement of the tunnel sections could begin. Each steel tubed section was about 300 ft. long, 37 ft. wide. Almost all of the ballast concrete for the tunnel sections was poured off-site. The final pour was done in the bay, tipping the buoyancy of the sections from positive to negative, until a neutral buoyancy was reached. The walls for the ventilation building are 4 ft. thick at the base, and 1 ft. thick at roof level because of the strong lateral loads (*An Engineering Marvel in the Making*).



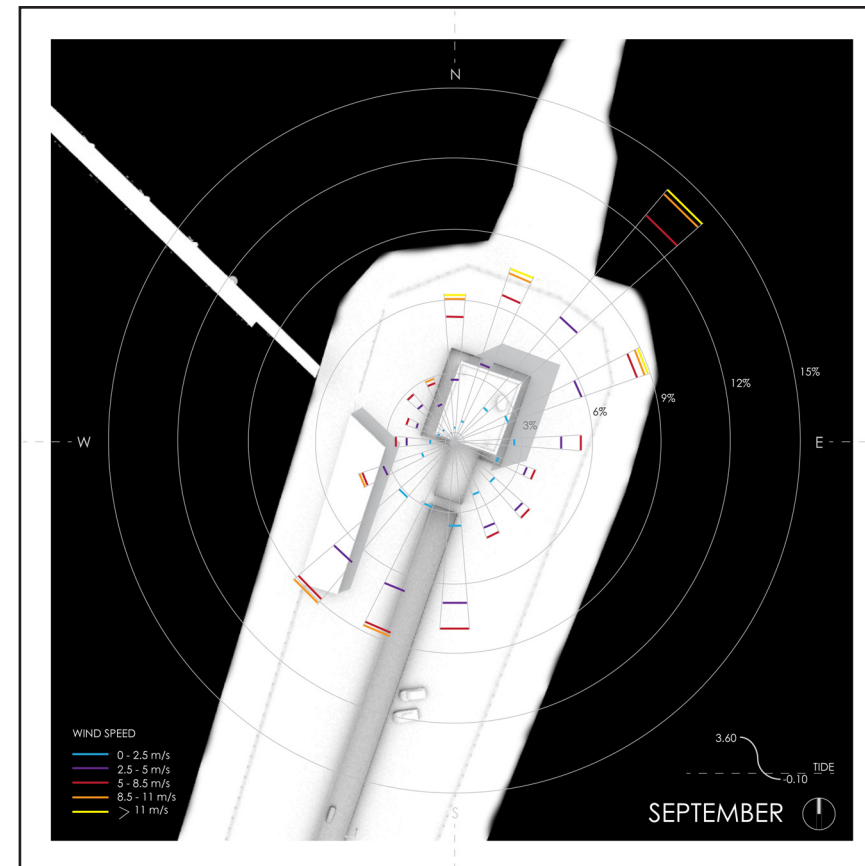
WIND ROSE SOLAR STUDY TIDAL RANGE



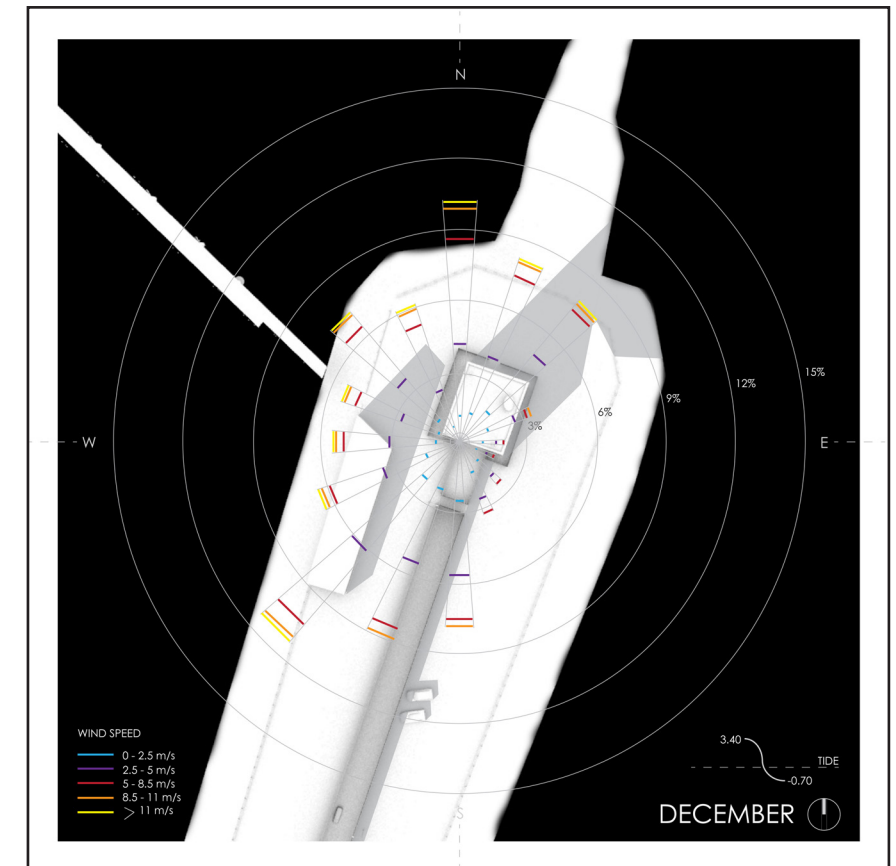
SITE STUDY: MARCH



SITE STUDY: JUNE



SITE STUDY: SEPTEMBER



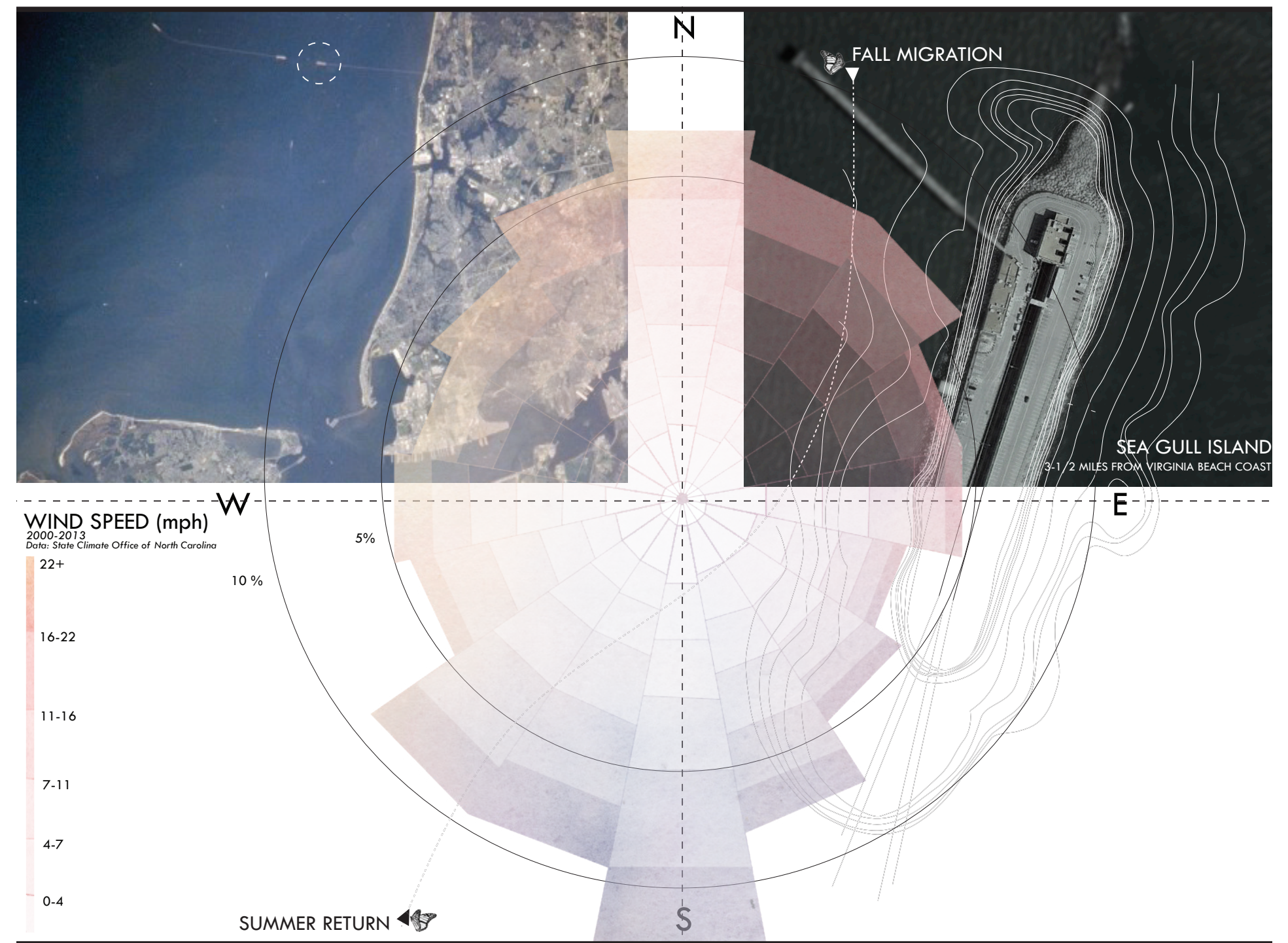
SITE STUDY: DECEMBER



Data from a Wind Rose prepared by the State Office Climate of North Carolina helped identify the presence of strong North and South winds throughout every season. Located in the middle of the Atlantic Ocean and Chesapeake Bay waters, the site is especially vulnerable to hurricanes and northeasters.



**THE MONARCH JOURNEY** The monarch butterfly embodies the art of wayfinding. In the fall of every year, many monarchs migrate south to the warm weather of Southern California and Mexico. In the spring, they migrate back north, which takes four generations of butterflies to complete. The original butterfly breeds, and its successor takes on the next leg of the journey ahead. This is all possible through their ability to sense and rely on the environment to position themselves in the world. Moving with prevailing winds allows them to conserve energy, giving them the ability to travel longer distances each day (Nature Works). They rely on tall landmarks along the journey to rest while crossing large bodies of water. They react to the environment, migrating as a response to decreased daylight and the cool temperatures of the fall. Although the exact methods for this extensive migration are still quite a mystery, it is believed that with the coordination of their inner circadian clock, and their perception of the changing sun angle, the monarch butterfly can arrive at its exact destination point, even if it's over 2,500 miles away (Nature Works). The east coast monarch butterflies make their migration across the proposed site twice a year. We will use their sensational navigation methods as inspiration for human wayfinding on the site, and in turn, provide them with a waypoint along their journey. The design will promote the sensation of thresholds that often go unnoticed. We seek to re-learn how to navigate, without the reliance on technology.

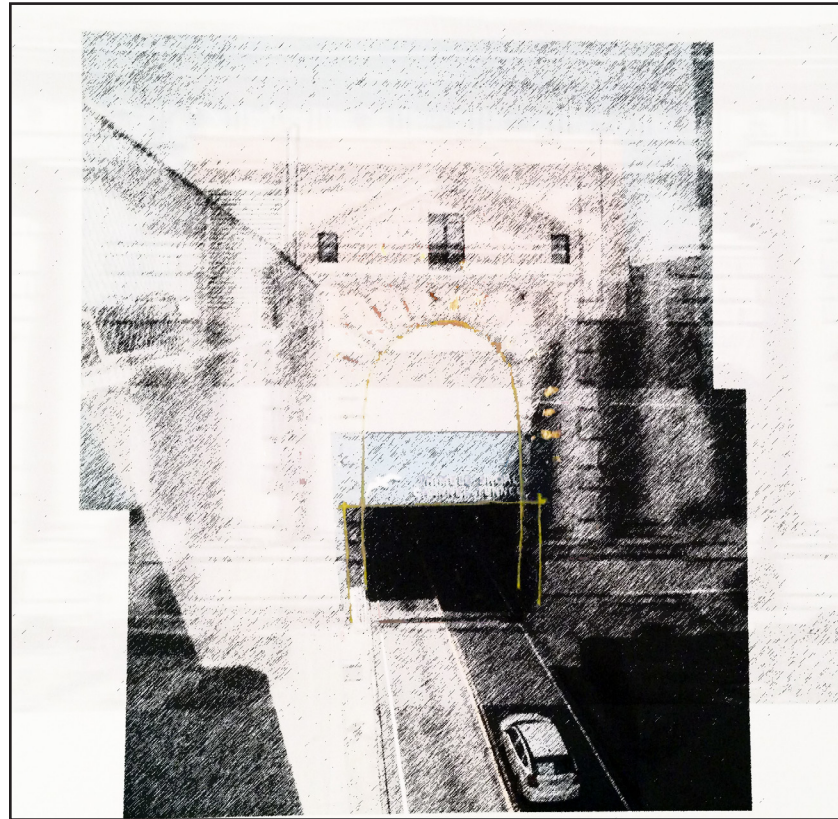


## THE THRESHOLDS

To understand the site beyond its physical boundaries, I studied the various thresholds that are either currently present, have the potential to occur, or are unfulfilled. I narrowed my studies to the physical, emotional, and sensational thresholds of the site. The process allowed me to develop an appropriate mixture of potential building programs. I came to recognize many missed opportunities along the journey. With the introduction of recognizable thresholds between a composition of sacred and profane moments, the experience could be greatly enhanced.

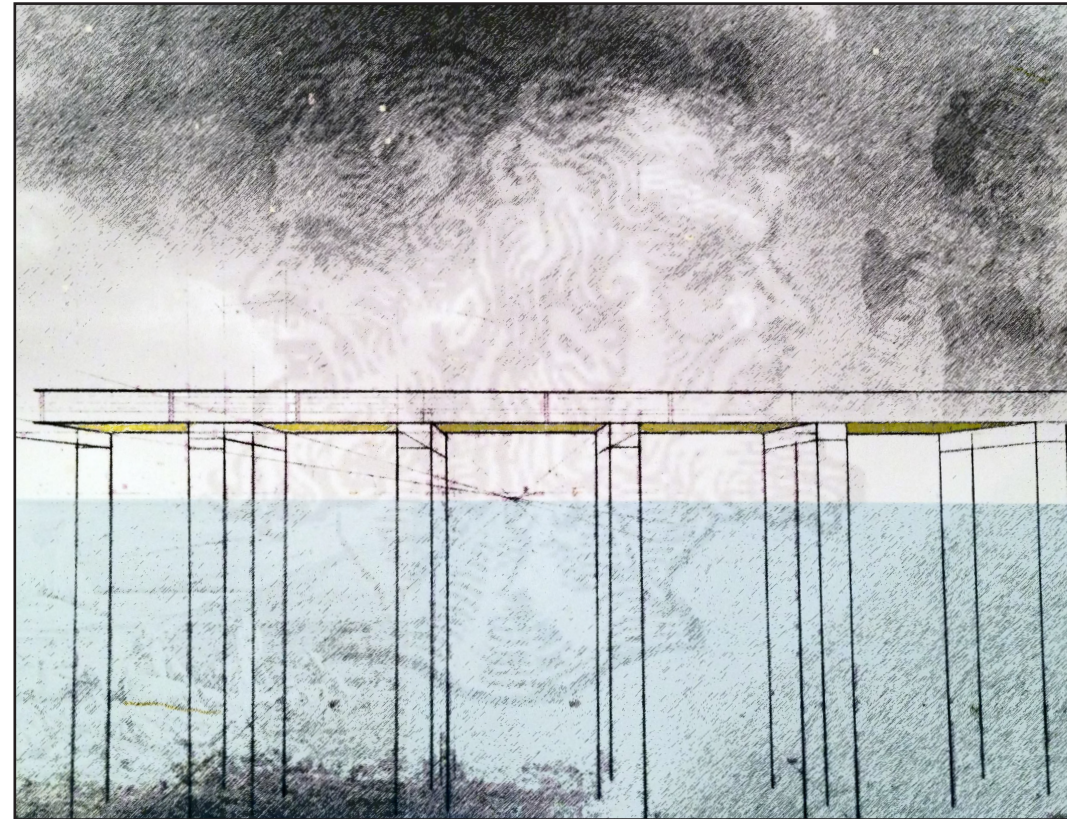
P H Y S I C A L   T H R E S H O L D S

— gateway, bridge, opening, doorway —



GATEWAY

The threshold between one territory and the next used to be celebrated with a large landmark. Inscribed on these landmarks were often images of victory and other tales of the jurisdiction, offering the passerby a chance to understand the place he is entering or exiting. We do not experience the celebrated gateway on our site; the comprehension of the threshold is ignored.



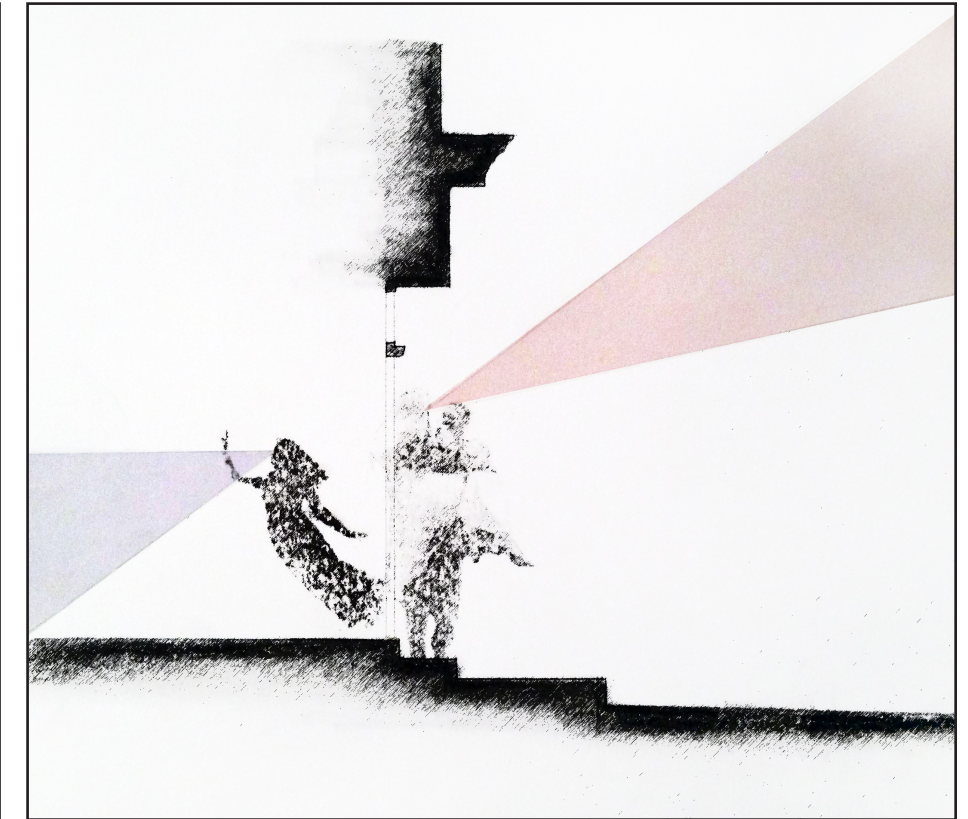
BRIDGE

Janus is the Roman god of thresholds. In *The Idea of a Town*, Rykwert, Joseph states “As openings in boundaries and walls join two spaces inside and outside, so Janus had two faces”(The Idea of a Town, 139).The bridge acts as a transition from the fairly dense city of Virginia Beach to the rural lands along the Eastern Shore. The bridge itself passes over a significant threshold in ancient mythology; water. The threshold between Heaven and Hell was thought to be the line between the sea and its horizon.



OPENING

In *The Sacred and the Profane*, Mircea Eliade says “The threshold, the door shows the solution of continuity in space immediately and concretely; hence their great religious importance, for they are symbols and at the same time vehicles of passage from one space to the other” (The Sacred and the Profane, 25). Sacred spaces of reflection often have either a door, or some type of visual or physical connection to the infinite sky above.



SILL

The threshold, or sill, of a doorway gives the door and the ground plane a place to meet. It prevents disturbance to the floor, while keeping the environmental and interior atmospheres from interchanging. Tripping over the threshold is thought to give bad luck. This sparked the tradition of carrying a newly-wed bride over the threshold to prevent years of bad luck.

# E M O T I O N A L   T H R E S H O L D S

*the starting point of an experience, event, or venture*



## GOODBYE

### Program | Viewing Shelter

The site is a well known spot for those saying goodbye to ships going off to the open waters of the Atlantic Ocean and beyond.



## MARRIAGE

### Program | Chapel

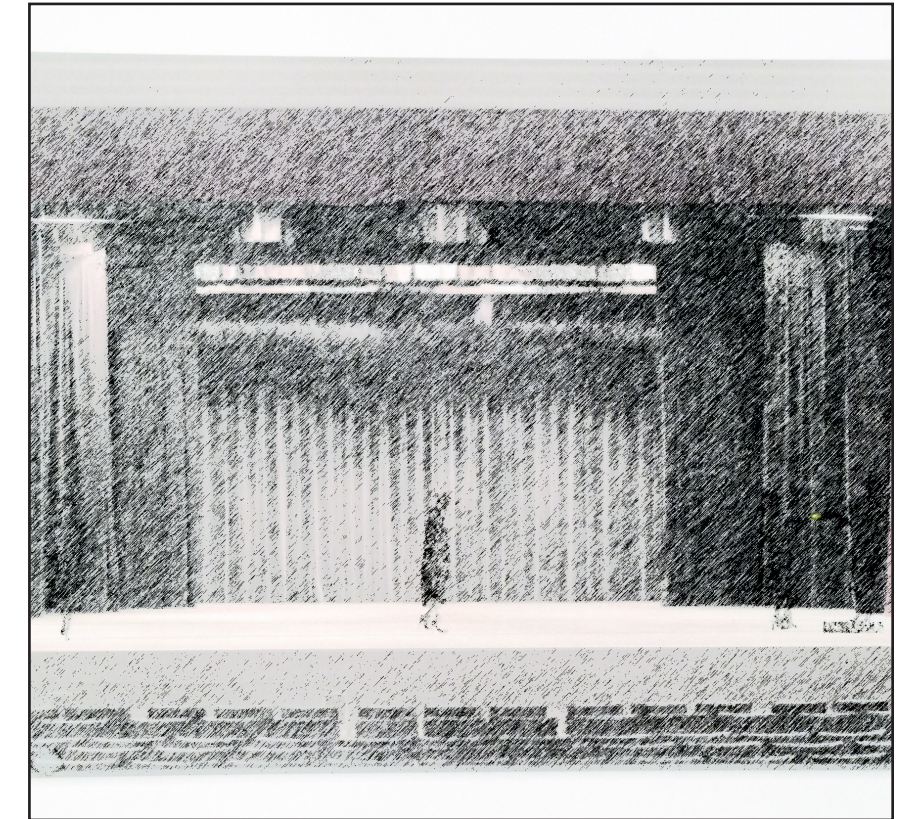
Witnesses celebrate the union of two single people into one married couple. Many marriage traditions celebrate this threshold, whether it's by pouring sand into one jar, merging two flames into one, or jumping over a broomstick.



## NEW HOME

### Program | Apartments or Hotel Rooms

Whether buying or renting a place to reside, making the space your home is either a shared, or individual threshold we pass several moments in our lives.



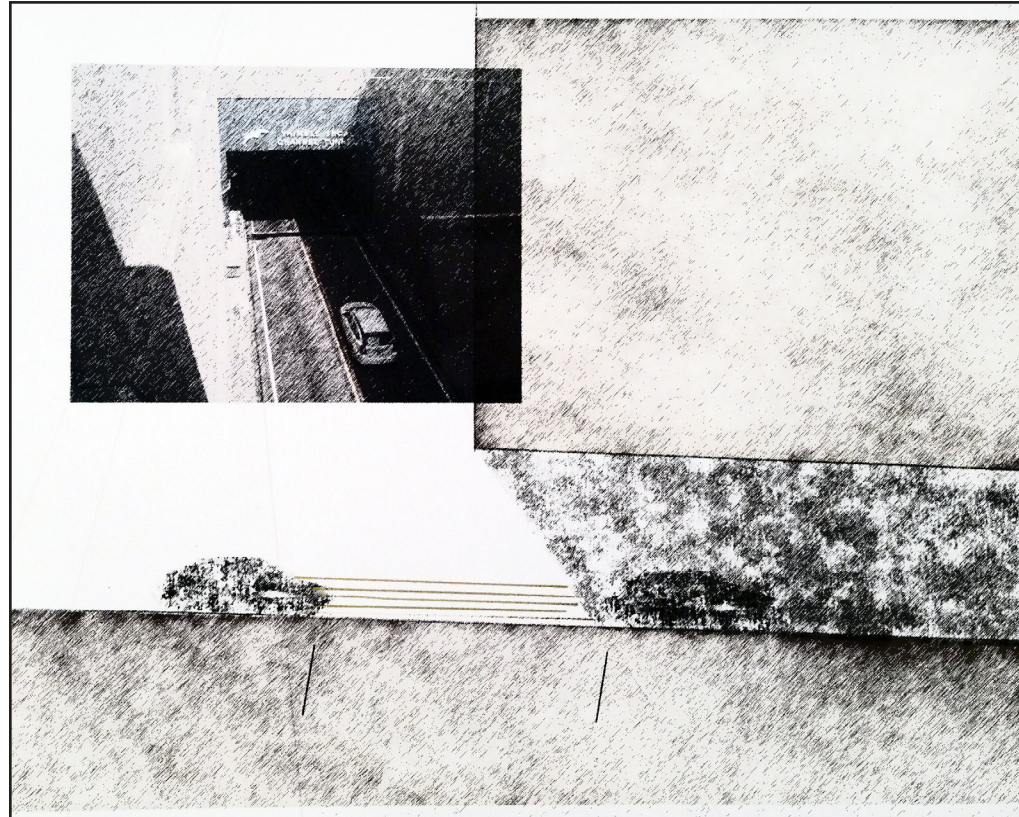
## GRADUATION

### Program | Auditorium

Graduation from school, training courses, etc., are not only experienced by the graduate, but also by those close to them. It is usually held in an auditorium or grand open space.

S E N S A T I O N A L   T H R E S H O L D S

*the magnitude or intensity that must be exceeded for a certain phenomenon to occur*



SIGHT

Movement from the bright outdoors into a dimly lit space is always a strain on our eyes to adjust. This period of transition happens the first few seconds of driving under the gateways into and out of the tunnel. This change is a transition the driver should sense, and associate with the passage from above land to below sea level.



TOUCH

The fishing pier, although highly populated, is a very still environment. Many locals come and sit for hours, waiting for the slightest tug on their fishing poles. This activity is of great contrast to the fast paced transit of cars speeding into the depths of the tunnel.



HEAR

The site is full of a constant mixture of sounds: sea gulls overhead, cars passing by, and wind blowing across the waves as they crash against the boulders. Not one sound is perceived over another; they blend together to create a pleasant composition.



SMELL

The Virginia Originals is the restaurant on site, and the only public building to visit. All the restaurant seating is located in the slender interior, which is often over crowded and cramped.



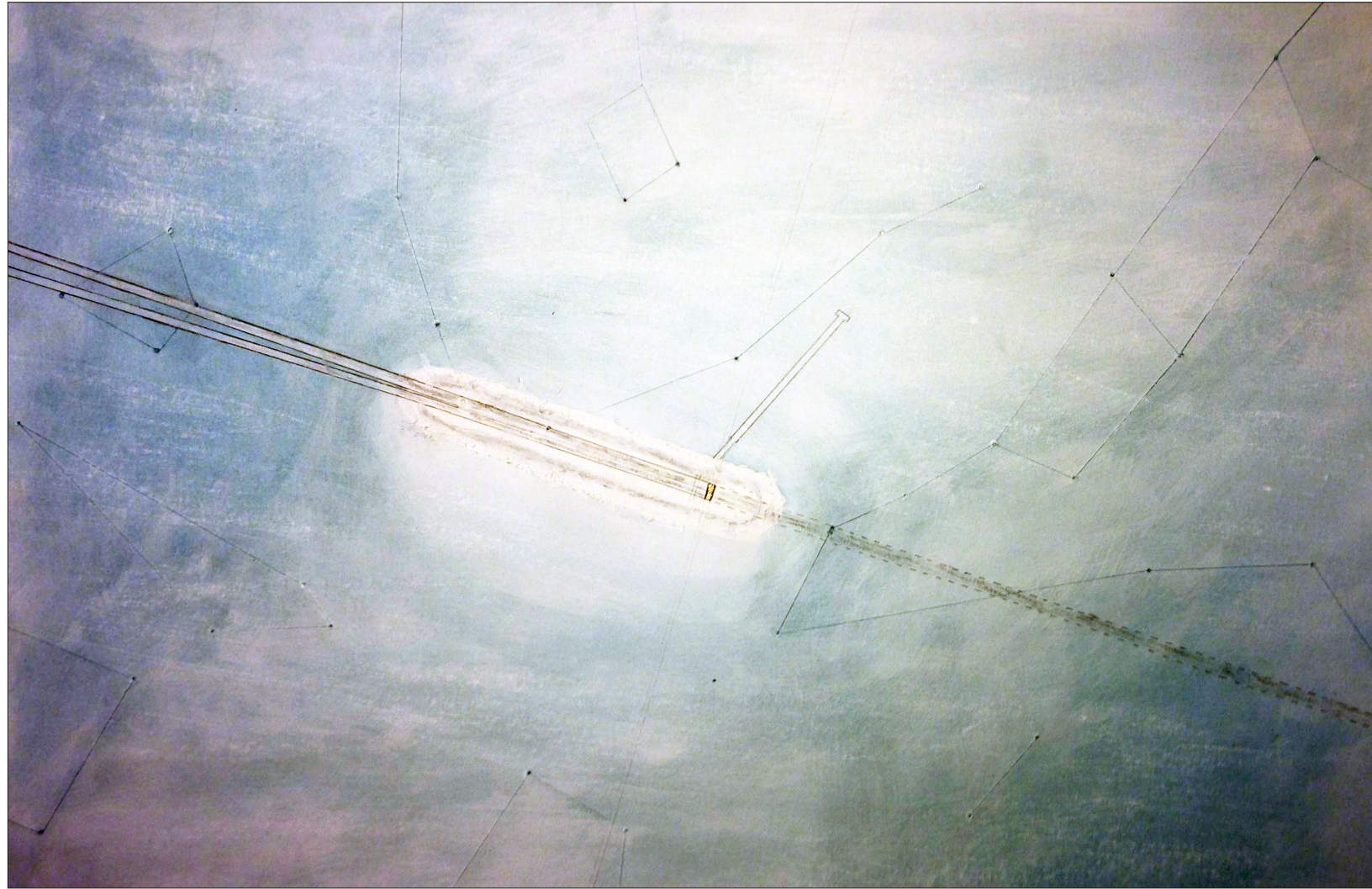
# THE JOURNEY

The site was calling for a composition of these physical, emotional, and sensational thresholds to bring the journey across the complex to the forefront, avoiding the typical tunnel vision to the destination. The site craved an enhancement of the mundane characteristics to give way to more elevated spiritual experiences. It wanted a landmark to celebrate the great achievement of the bridge-tunnel complex, that not only took years of heavy industrial operations, but continues to require an immense technical effort to maintain.



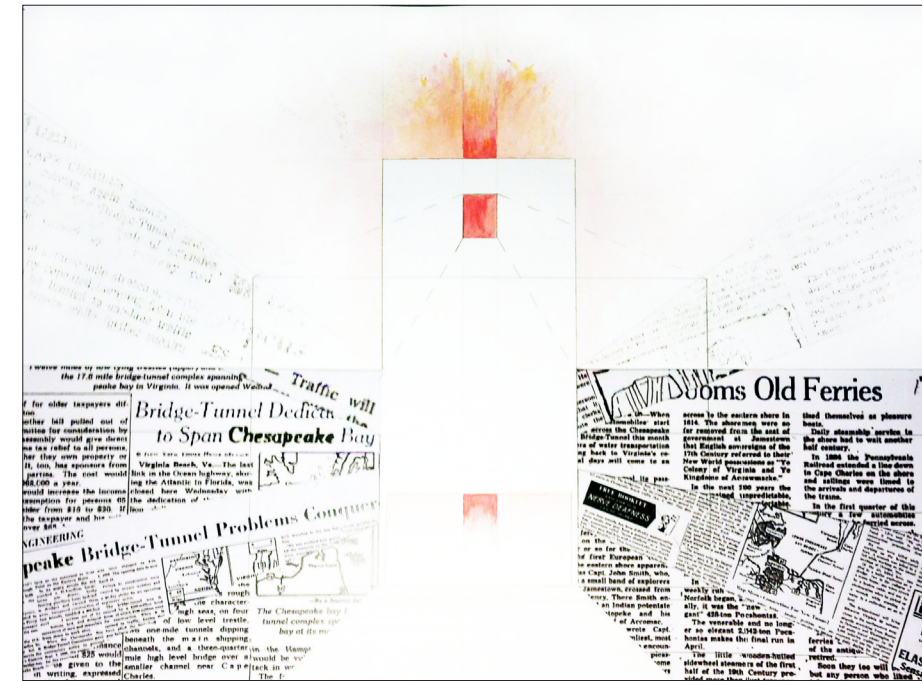
# MIRROR OF DESIGN

The process of designing started on my drafting table. The process of creating drawings proved to be as important as the finished product. To truly uncover the design, I had to immerse my senses, and allow my reactions to dictate the progression.



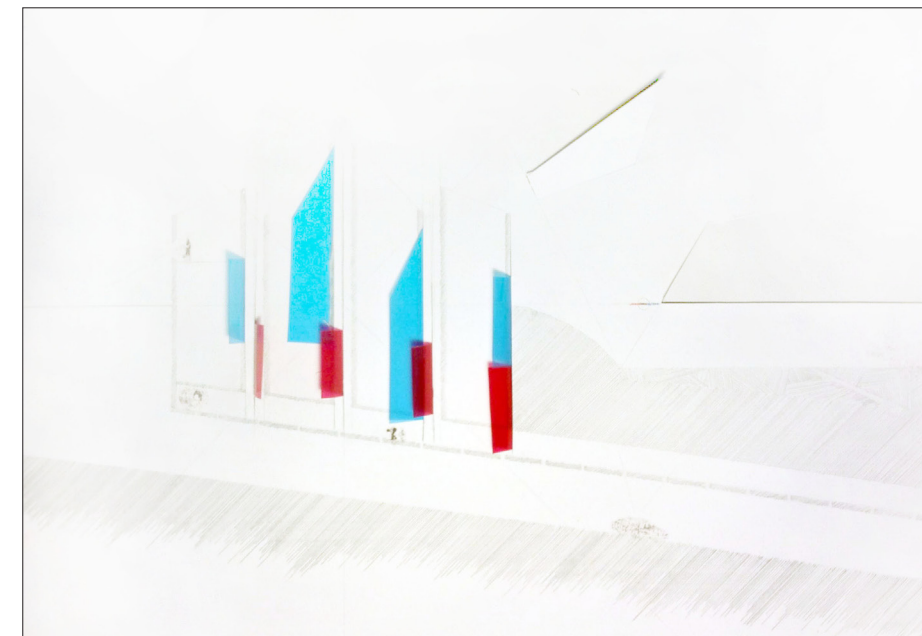
## ICHTNOGRAPHIA | THE FOOTPRINT

The orientation of the drawing of the site, with the north facing to the right, reflects how ship captains used to view the site: a port to be entered from the ocean. Being that the site is so far removed from any obtrusive light, the ability to see the night sky is optimal. Therefore, the position of the night sky was overlaid on top of the paper, as I poked holes through the paper to represent the asterisms and stars within them. Watercolors were used to represent the constant motion of water, layering in the areas of great depth along the major sea channels. To represent the making of the man made island, I placed glue dots, representing boulders, to hold back the watercolor from entering the area where the island would eventually be placed. White pastels were used to cover over the portion of the water where the bridge was constructed. An imperative part of the site's footprint is the constant live load of cars going in and out of the tunnel. Using pastels, I created the vehicular transit with a very fast stroke and light press. The strong presence of wind was represented by rubbing sand paper across the paper. The sand paper etching can be seen in strokes on the watercolor, like the wind can be seen blowing across the bay water. Gold leaf was placed at the location of the gateway of the tunnel, which will be the focus of the design.



## ORTHOGRAPHIA | THE UPRIGHT

The upright examines the various vertical and horizontal layers apparent, and maybe not so apparent, on the site. Newspaper clippings written about the early life of the Chesapeake Bay Bridge Tunnel are used as a poche for a section through the site, representing it's foundations. The clippings also lightly show the outline of the retaining walls that lead into the tunnel. As the driver moves closer to the tunnel, they are reminded of the process it took to construct the entire complex. The newspaper clippings show that the building grows from the support of the history of it's construction, and how the people reacted, and continue to react, to it. The ventilation building comes off as a large blockade, a distinct boundary between the bridge and the tunnel. Breaking the consistency of the white, there is one window that is colored in. This window looks out onto the cars for surveillance purposes, and is the only main break in the facade. This window acts as a mysterious window, the eye of the building, watching over those passing by, as if the building were a guard. The layer behind the blank canvas of the facade is the mysterious movement of carbon dioxide from inside the tunnel to the exterior. The hazardous gases that would otherwise be trapped inside of the tunnel are pulled up through the ventilation building and dispersed into the air above.

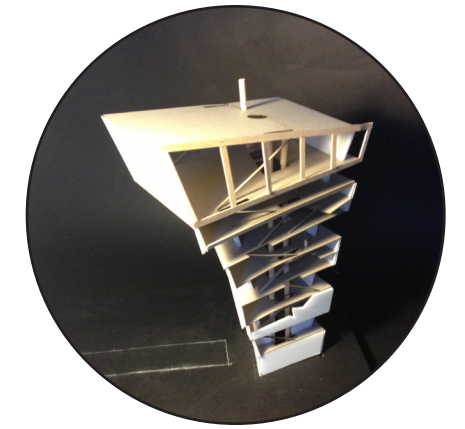


## SKENOGRAPHIA | SECTION+PERSPECTIVE

The section starts to unveil the mystery of the elevation. We now see that there is a watchful eye behind the window. We start to play with the profane process of moving the toxic gases out of the tunnel and into the air above. The section is cut west to east, through the middle of the tunnel. In the ceiling of the tunnel, there are vents that the rising gases pass through, which are then pulled toward the island by large ventilation fans. There are also fans with their own ventilation building on the opposite side of the tunnel, that push fresh air into the tunnel in vents underneath the travel lanes. Once the gases are pulled in by the fans, they continue to move upwards through the building until they are released into the atmosphere. To explore this occurrence, I've attached transparent, moveable, blue and red plastic strips: blue representing potential sacred spaces (chapel, prayer room, etc), red representing profane spaces (control rooms, ventilation rooms, etc). As air is being pushed up, and out through the building, there is a chance for the two needs, sacred and profane, to meet. This is represented by the red vertical strip in between the vertical shafts. Moving the strip upwards, shadows that were once blue to represent sacred spaces are now purple, representing a coexistent, new space.

# PROGRAM

A site with a complex configuration of roadways, islands, tunnels, low rise, and high rise bridges, calls for an equally diverse collection of building programs. I started with a list of required spaces: two control rooms, a garage for an emergency crash truck, a pump and fan room, and a tall ventilation shaft. The ventilation shaft became the main core I based my various design schemes around. It was important for me to keep the ventilation shaft as a dominant presence, for it was the original purpose of the building. Celebrating the importance of the ventilation shaft, I elongated it about 100 ft. above sea level, to create a balance with the depth of the tunnel at its lowest point along the Chesapeake Bay. I began space planning further with a list of desired spaces: replacing the removed gift shop and restaurant, as well as an exhibition space, several floors of guest rooms, with a chapel and honeymoon suite at the very top.



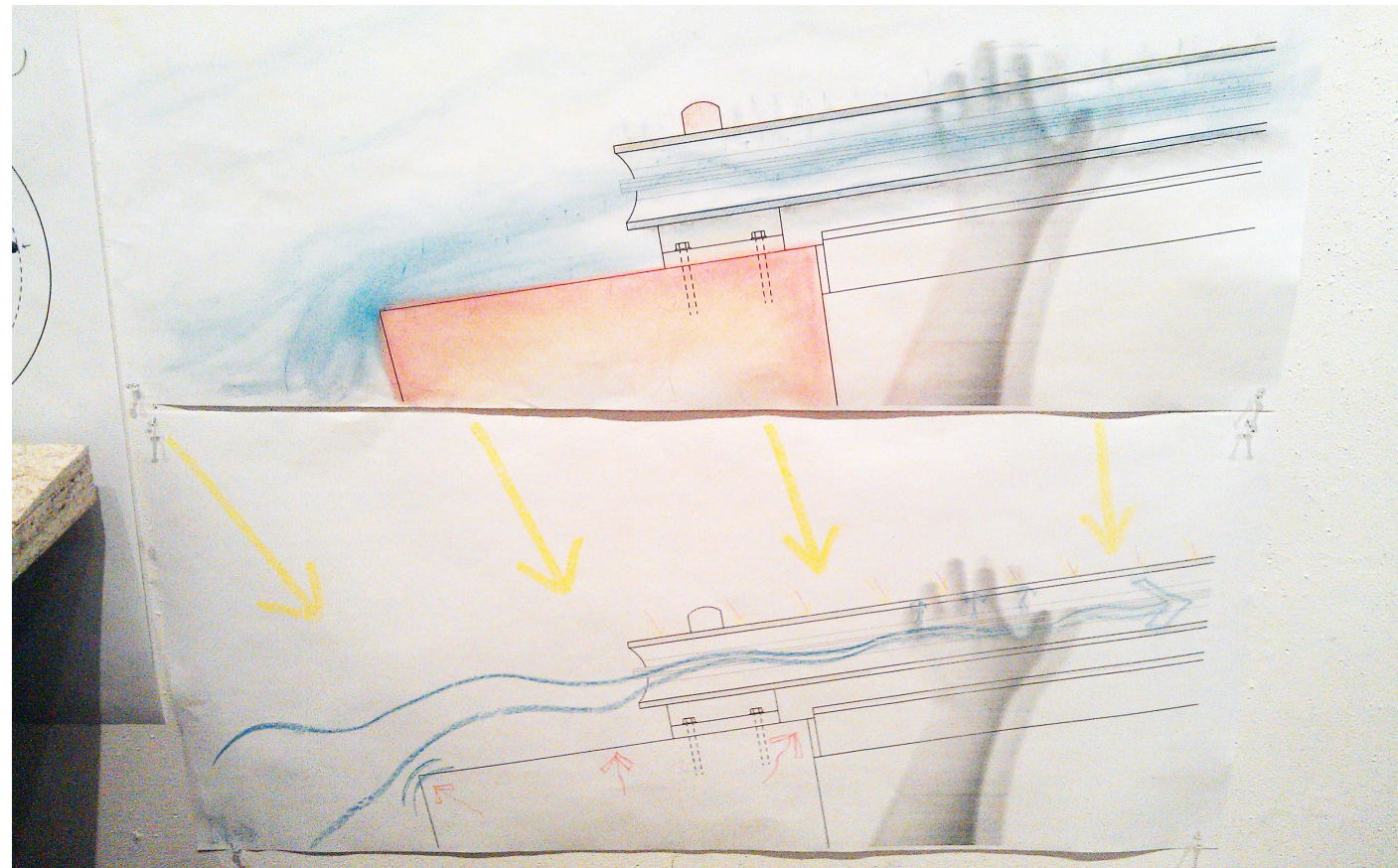
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# EMPATHETIC DETAILING

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Keeping in mind the importance of the human sense to the journey, I explored the design through details. "HAND RAIL DETAIL" is a section cut through a hand rail along an exterior walkway on the North-South axis of the site. The detail explores the southern winds in the summer running through the hollow railing, provoking a cool sensation once grasped. With perforations along the railing material, there would be faint composition of noise as the wind swept through. The more hands touching the railing, the different the sound. "FULL SCALE WALL SECTION" illustrates the concept for the honeymoon suite. With a tall curtain wall system overlooking the ocean, the couple can enjoy their elevated view outwards, as well as the reflection of the stars projected onto their ceiling. The roof of the honeymoon suite became one of the most distinguished thresholds as the design progressed.

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HAND RAIL DETAIL



FULL SCALE WALL SECTION

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## THE ARCHITECTURE

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The final design of the building enhances the sensations of visiting Sea Gull Island, emulating the drive along the Chesapeake Bay Bridge Tunnel. By activating our senses, we are prompted to make conscious thoughts and decisions, as we used to before the reliance on modern technology. We adapt the element-based navigation techniques that are signature to the migrating monarch butterfly. We experience the thresholds that allow us to resonate the sacred and profane dichotomy.

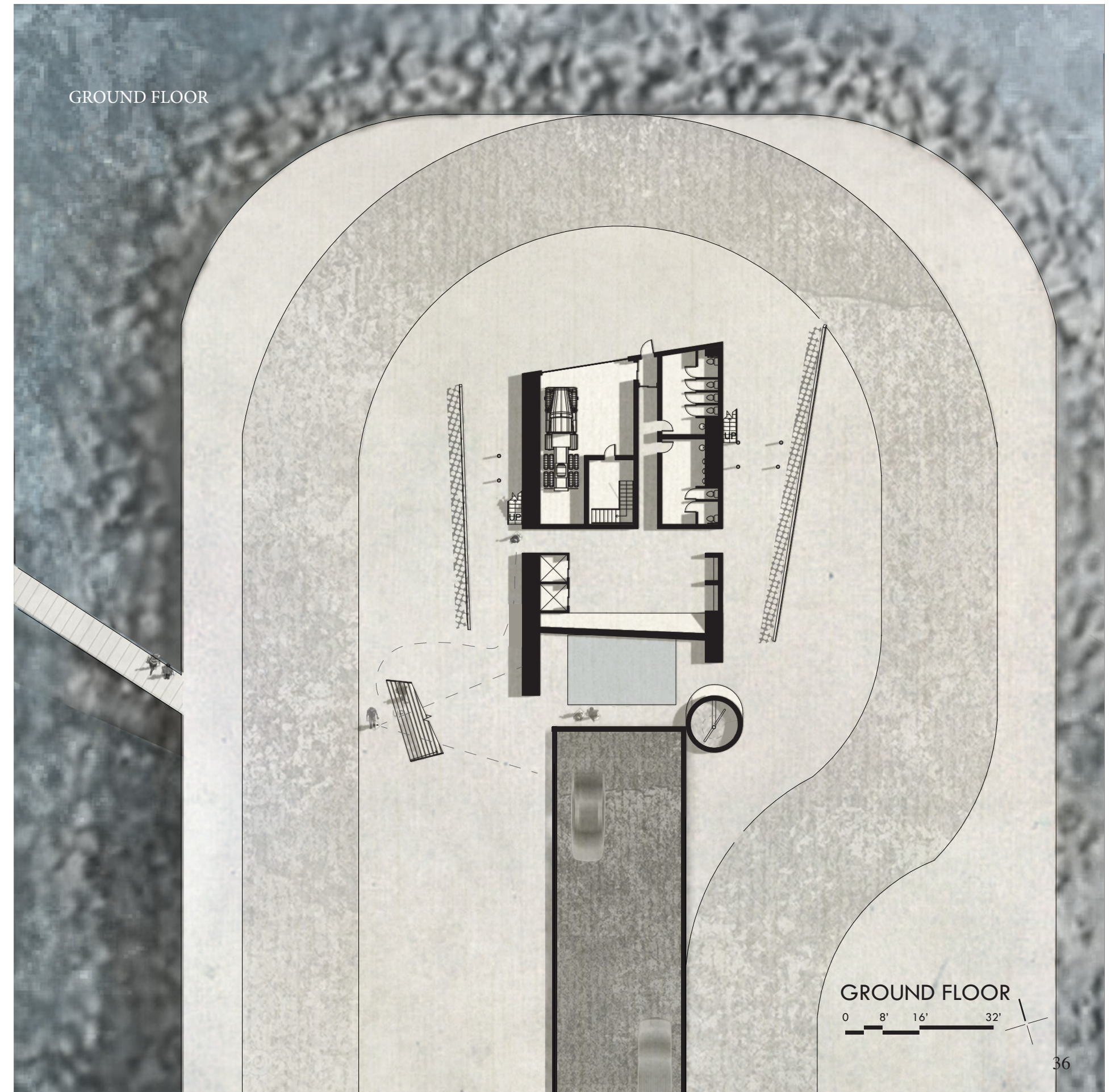
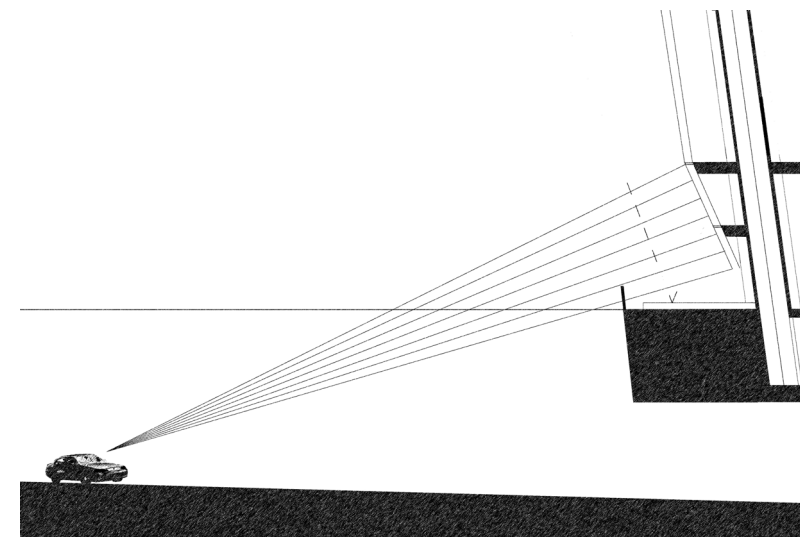


*welcome to*  
VIRGINIA BEACH

## G R O U N D F L O O R

The visitor's main entrance is located on the southwest side of the building. Greeted by a grand stair, the visitor is immediately brought up two flights, leaving the ground level. For the visitor, the main pedestrian level is elevated above the island's ground level, which is mainly dedicated to vehicular transit. The angle of the grand stair mirrors that of the pier. The visitor may see a small opening in the perforated skin of the facade and be enticed to enter the building via this route instead. An employee coming to work in the building would either enter through the small opening the visitor just went through, or enter through the back near the garage.

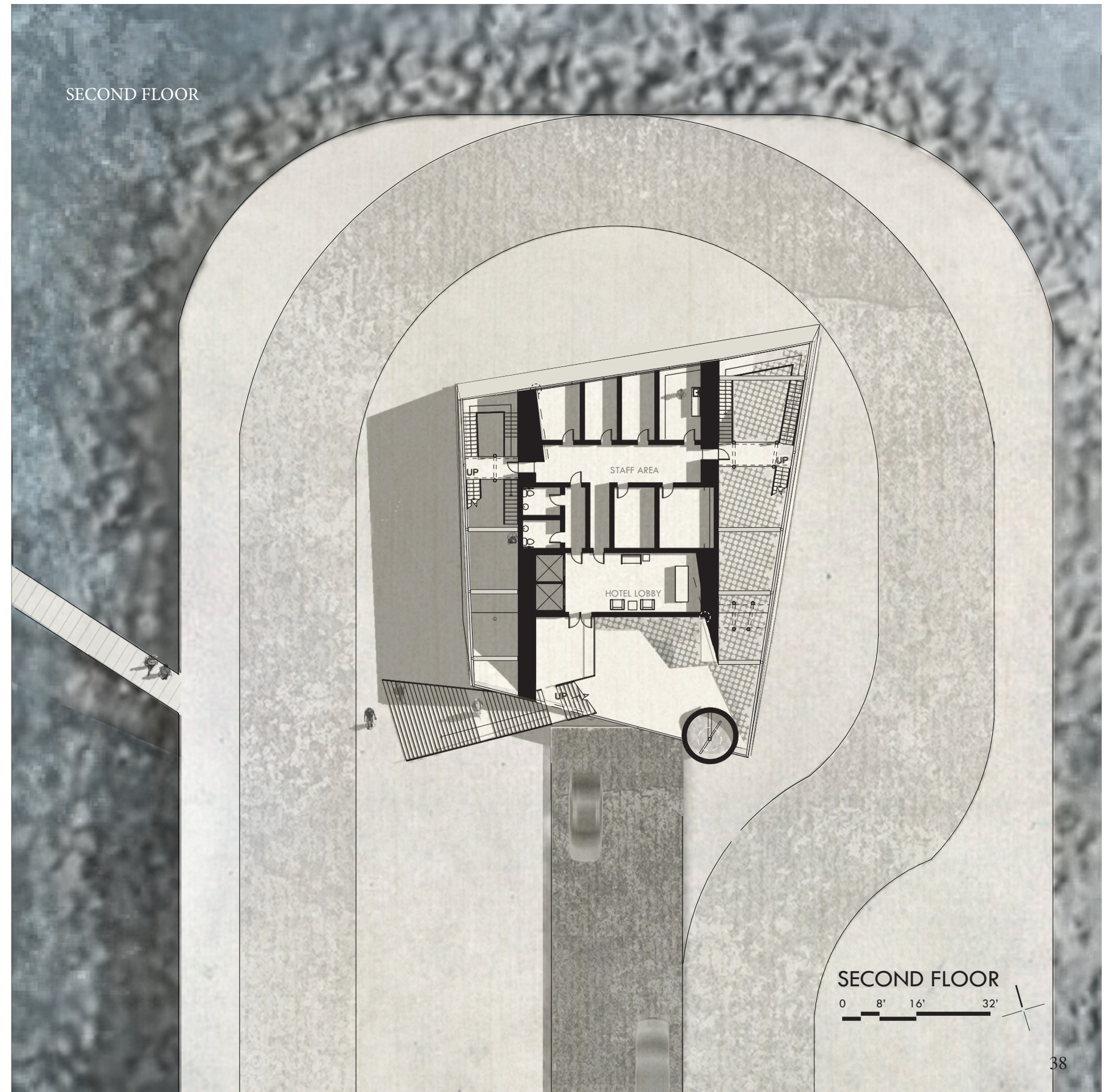
There is a shallow water basin in the front of the building. Directly above the basin is a metal wall panel that angles to meet the second floor above. The wall is angled such that a driver approaching the entrance to the tunnel would notice the reflection of moving light from the water basin below. Along with the change of going from light to dark, and vice versa at night, the driver going into the tunnel has a visual cue of the threshold he is passing. He is leaving land and travelling under water.



## S E C O N D F L O O R

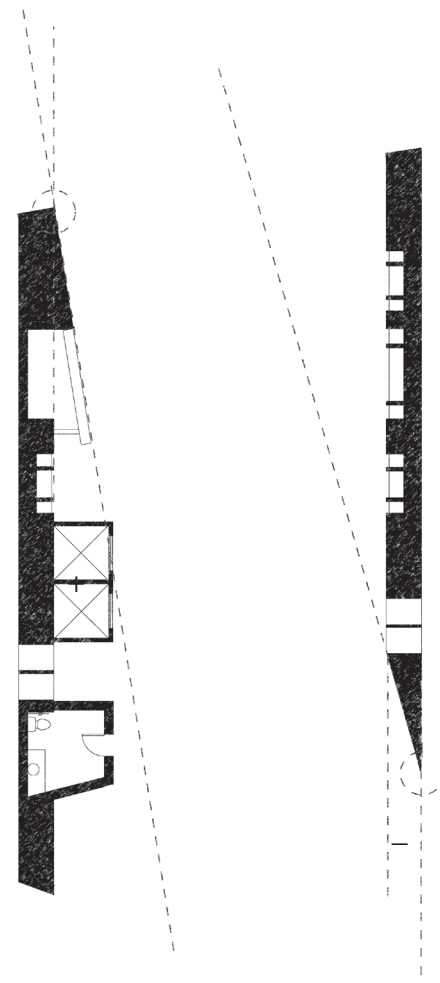
The guest coming to stay at the hotel will notice a sign for the hotel lobby on the second floor, and will stop to check in. There is also space on this floor for administration and housekeeping. Visitors are likely to pass the narrow obscure landing that leads to what is technically the second floor. They would continue up the grand stair.

The visitor who took the smaller entrance into the building is now in a semi-enclosed space that hosts the fire stairs. The atypical fire stairs articulate different types of spaces as one circulates up the building. The diameter of the perforations along the skin vary. The diameter can be as wide as 8 inches and as small as 2 inches. They are the widest in spots along the monarch butterflies migration path, inviting the butterflies in to stop along their tiring journey across the Chesapeake Bay. The steel members that are bracing the skin also serve as support for vertical gardens that host the resting monarchs.

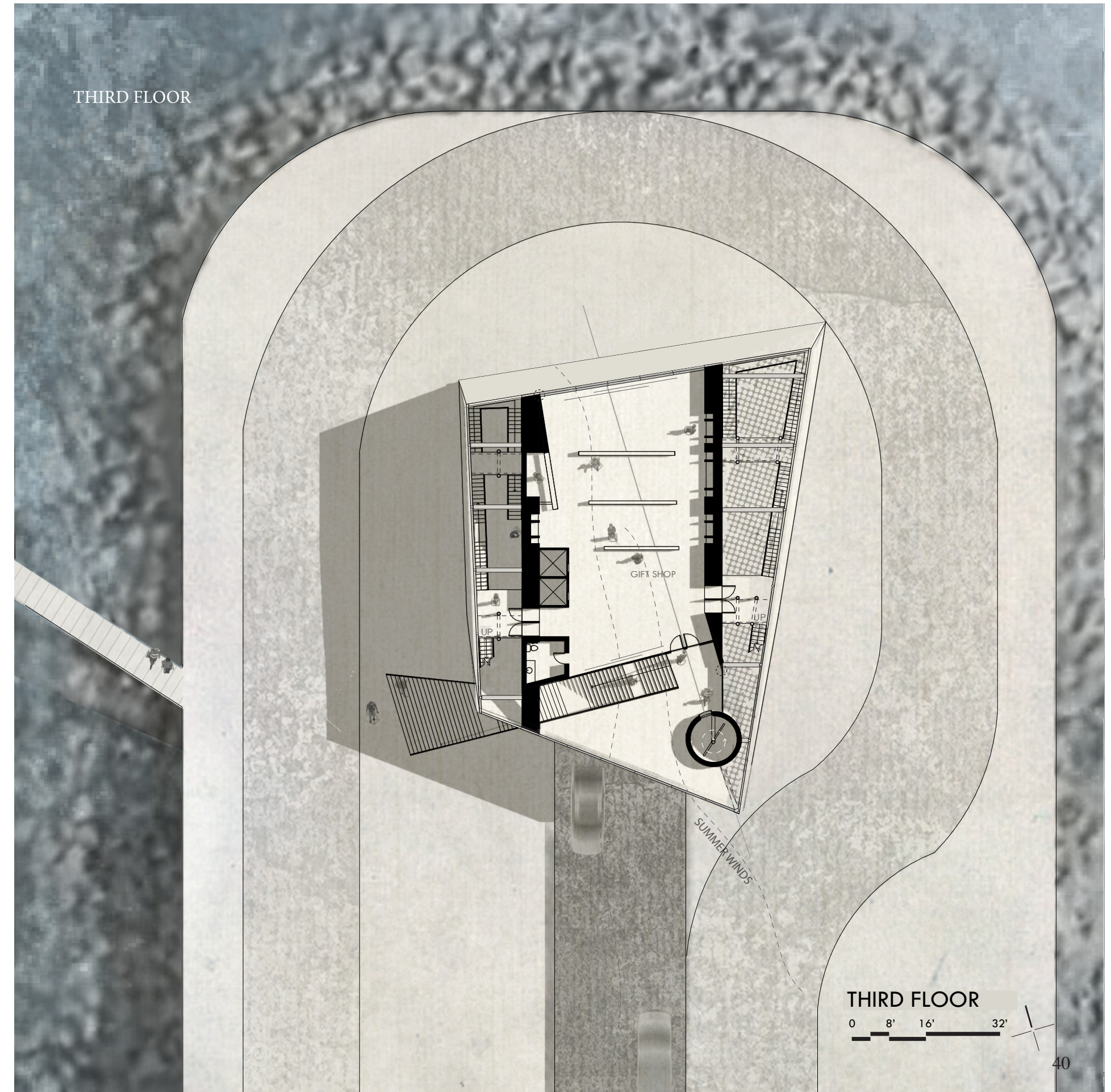


## T H I R D F L O O R

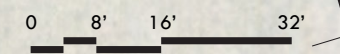
The first main level for the visitor is the gift shop. The open floor plan allows visitors to walk freely between the two concrete, load bearing, walls that are the main structural support for the tower. The 4 ft. walls vary in thickness, hosting various spaces within their mass. The marriage of the two parallel crossings of the bridge-tunnel is manifested in the composition of the walls. As one expands, the other retracts. As if in a dance, both partners compliment one another, choreographing the spaces within to enhance human interaction. These walls frame the north and south views. Operable panels in the curtain wall system along the north and south facade slide and can remain open in the summer. This allows the wind to flow through the building, lightening the lateral loads, while providing passive cooling, as well as wonderful smells of the bordering sea. These visual, auditory, olfactory, and tactile stimuli cue the visitor of the north direction as he journeys through the building. As the monarch butterflies use the angle of the sun to move north, and sea travellers reference the north star for positioning in open waters, the visitors to the building will be conscious of their position in the building, and on the site.



## THIRD FLOOR



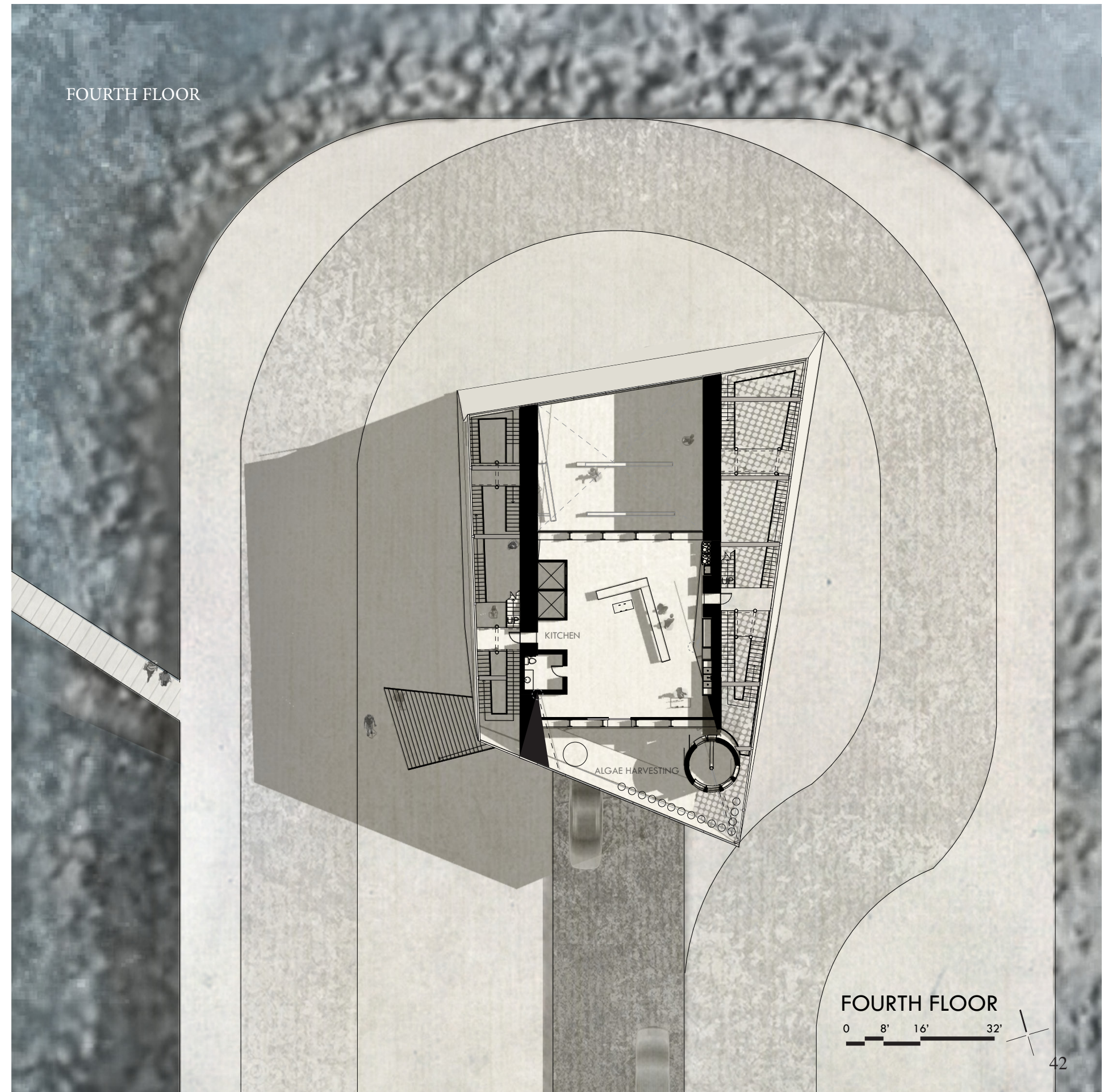
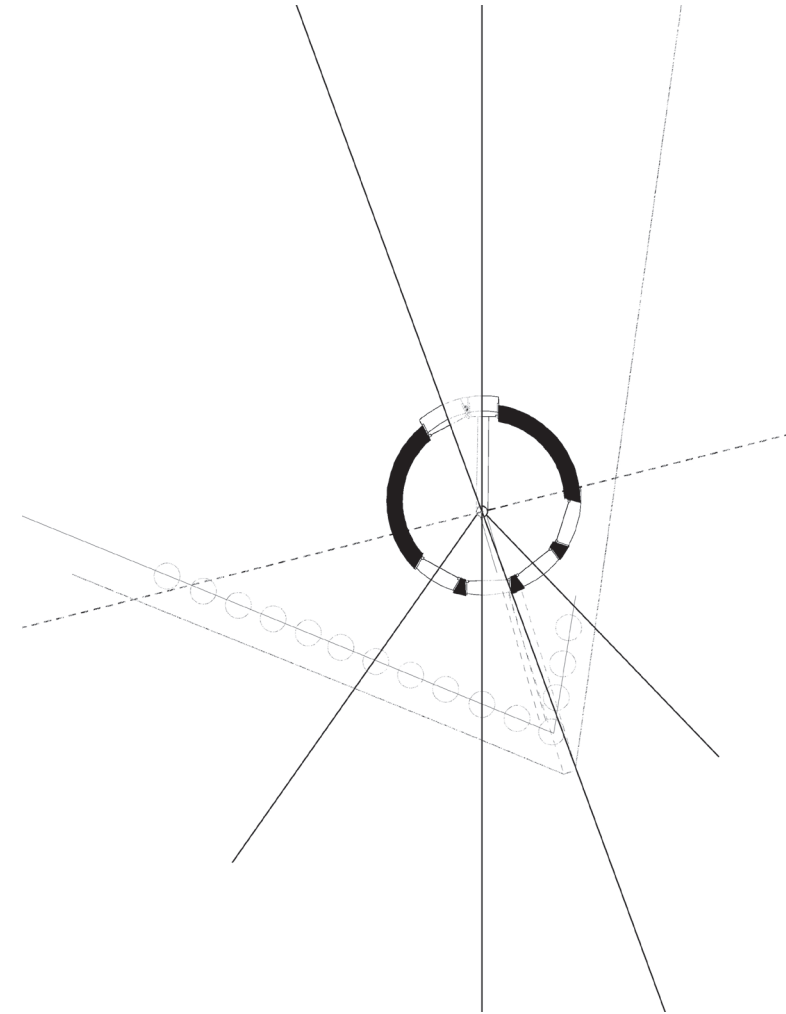
## THIRD FLOOR





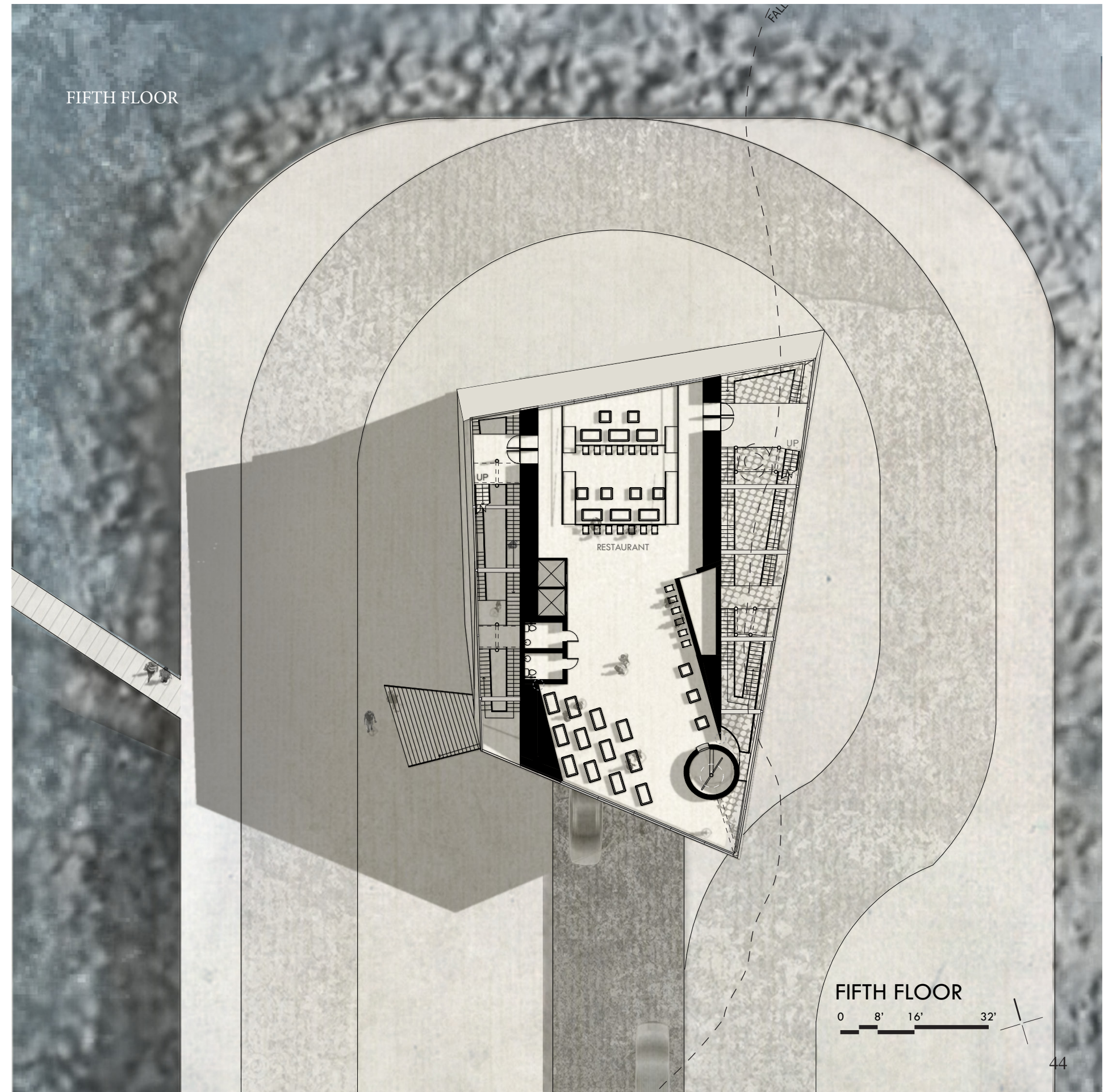
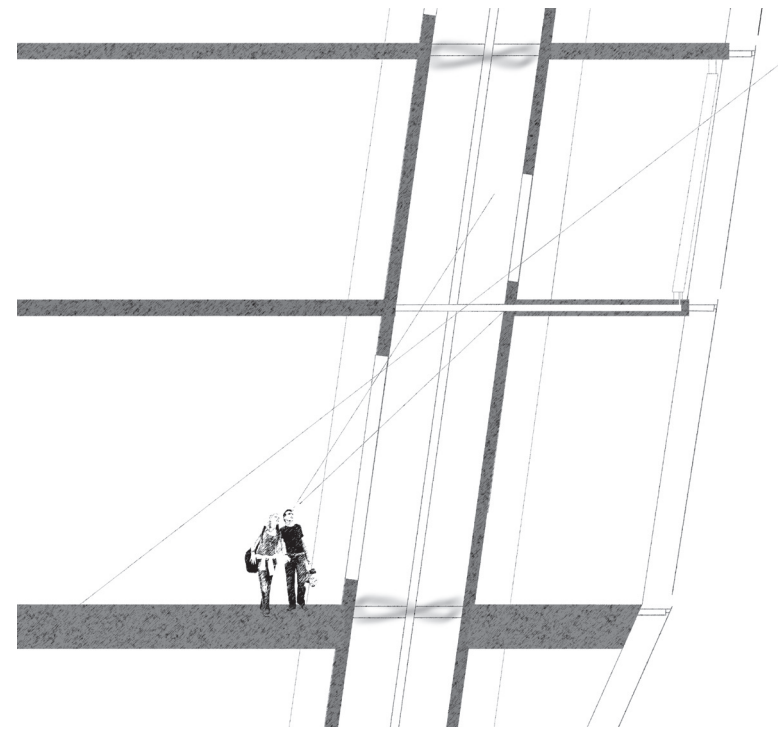
## F O U R T H F L O O R

There is no longer a main stair for visitors to take up through the rest of the building. It is up to the individual to find a side stair if he would like to continue up the building. As the visitor moves through, he notices curved walls that repeat on every floor. This cylinder is this ventilation shaft that removes the carbon dioxide and carbon monoxide from the depths of the tunnel. This shaft acts as a hinge; it connects one entity while disconnecting another. To allow the toxic gases to rise, the space had to be a separate enclosure from the rest of the building. Although physically disconnected, there are moments of revelation through slender windows into the shaft. Those pauses along the journey allow the visitor to comprehend the massive effort taken to ensure that the journey through the tunnel is possible.



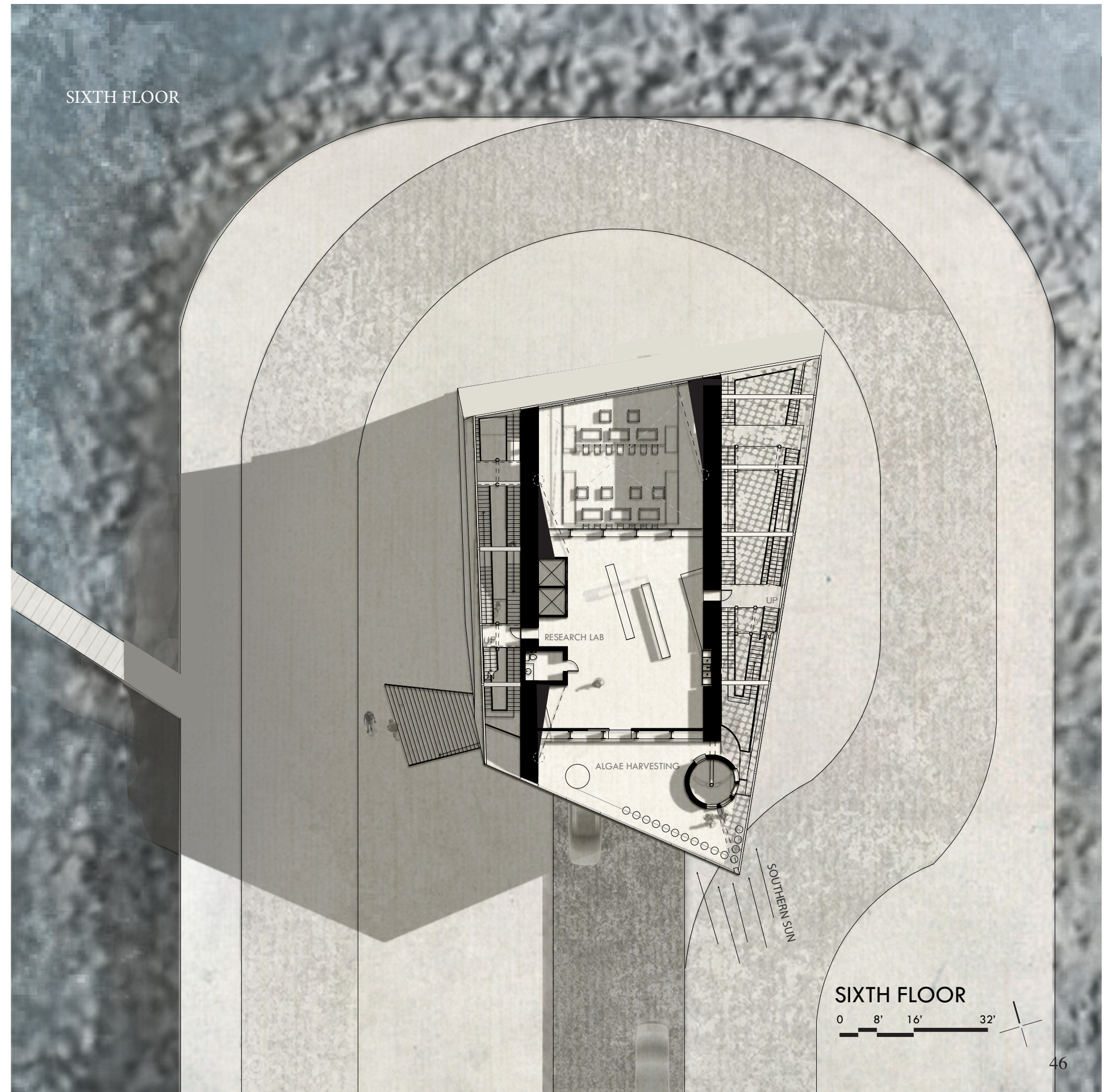
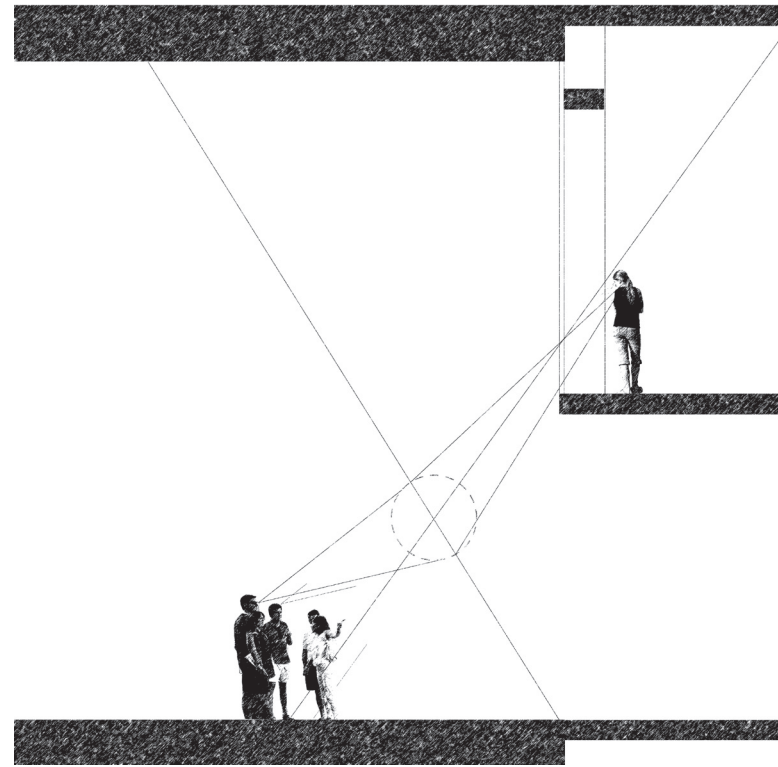
## F I F T H F L O O R

Now traveling up through the side stairs, wide landings with glass double doors tell the visitor that this is the next public level to stop on: the restaurant. They spot the slender window looking into the shaft, where they will see a fan slowly turning. Although the carbon monoxide and carbon dioxide are undetectable to our eye, the fan makes a visual cue to the observer that there is movement within the space. The movement of the fan generates energy that powers water movement through vertical algae screens that are suspended from the ceiling on the level above. The building slowly cleanses itself by filtering out the carbon monoxide and carbon dioxide into the vertical algae beds that are located on every other level. The algae produces clean biofuel that can be reused. The algae screens are located on the southern corner of the building to maximize solar exposure. The window on this floor looks up into a window on the floor above, where the harvesting takes place. These windows allow a hint of green light to enter the public spaces as light hits the algae above. Although the shaft physically disconnects the two spaces, a visual connection is made, and the observer is left to wonder about the space above.



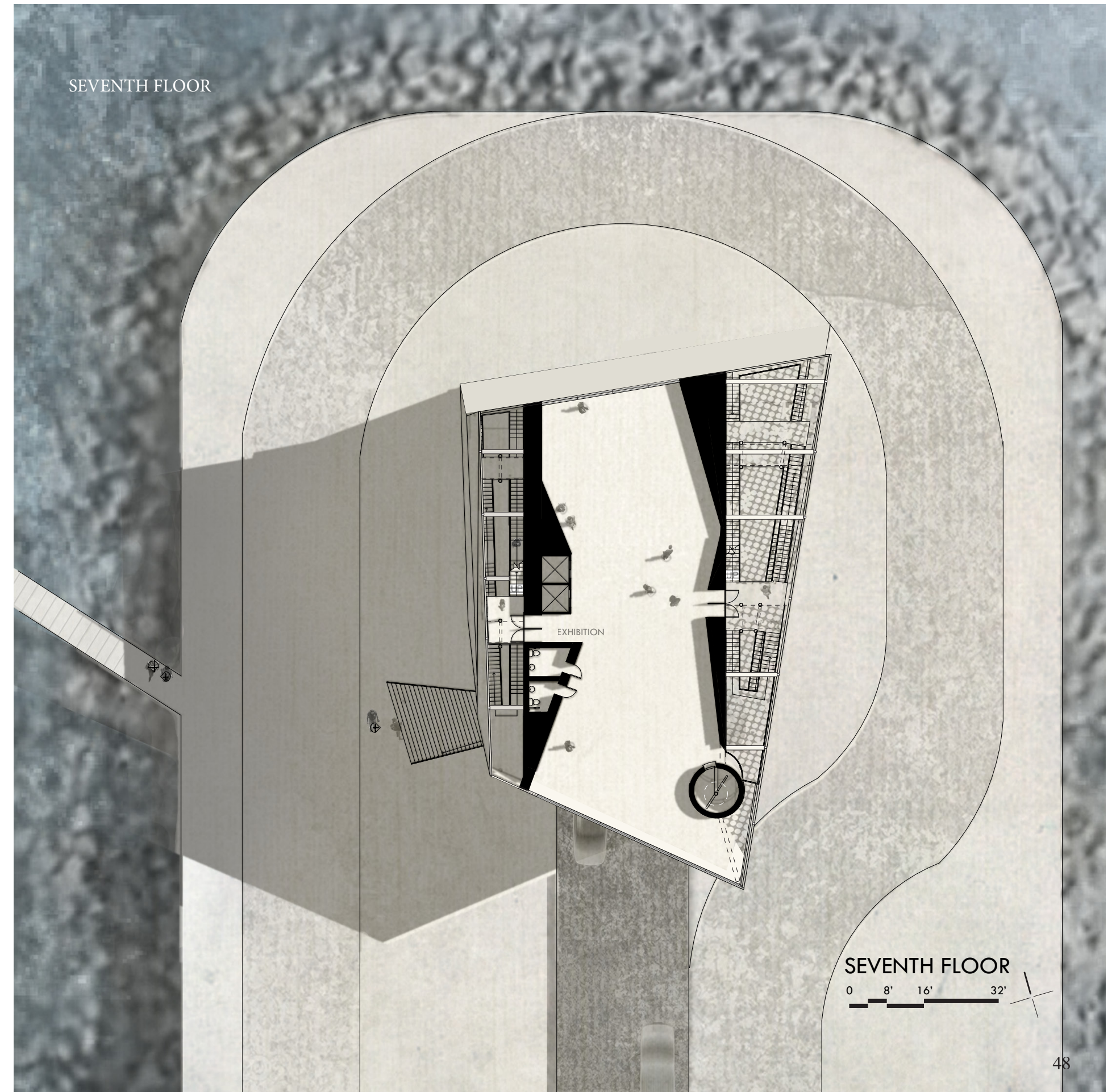
## S I X T H F L O O R

Intermediate private levels are placed above the big public spaces. These private spaces are accessed by the same two side stairs, but the landings to them are narrow and out of the passersby's line of sight. A vierindeel truss system supports the floor slabs, while also providing the tower with additional bracing. The private spaces above, lined with glass supported by the truss, have a view out to the north and south, while not taking away from the grand public space beneath. The public spaces below can only see a shallow depth of the private spaces above. In that regard, the height of those spaces maintains the private nature of the rooms above.



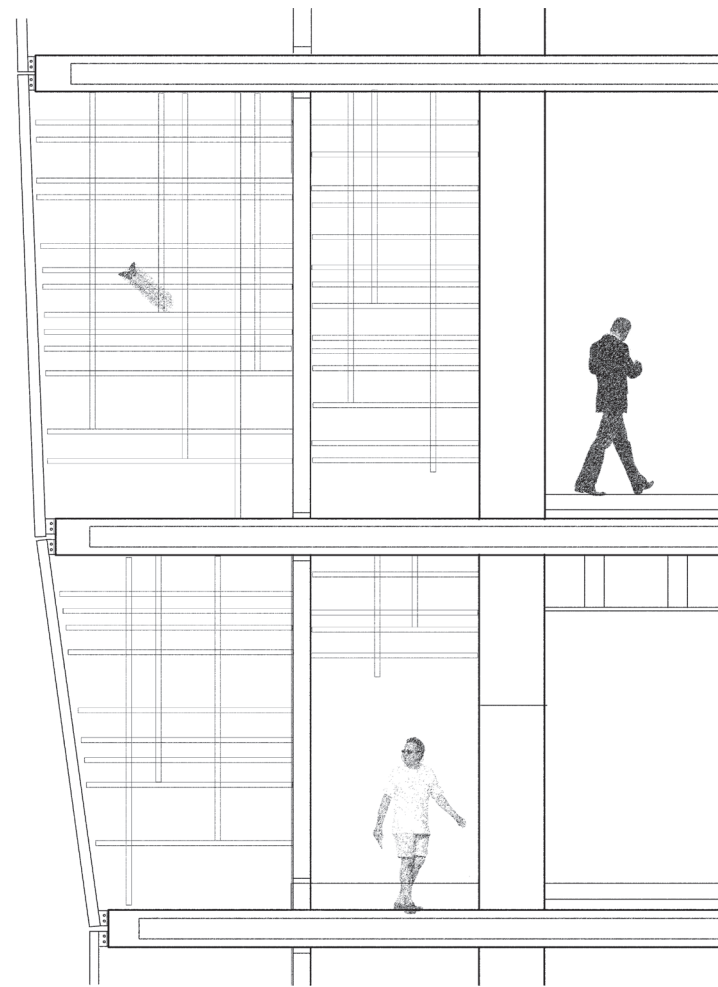
## S E V E N T H F L O O R

The last main public level is an exhibition space. It's at this level that the concrete walls create a unique canvas for displaying artwork of the great history of the Chesapeake Bay. The walls form to the dynamics of the space. In double height spaces such as the exhibition level, shadows and lines are formed as the walls prepare to meet the next level, giving visitors the wonder of what lies beyond their immediate surroundings.

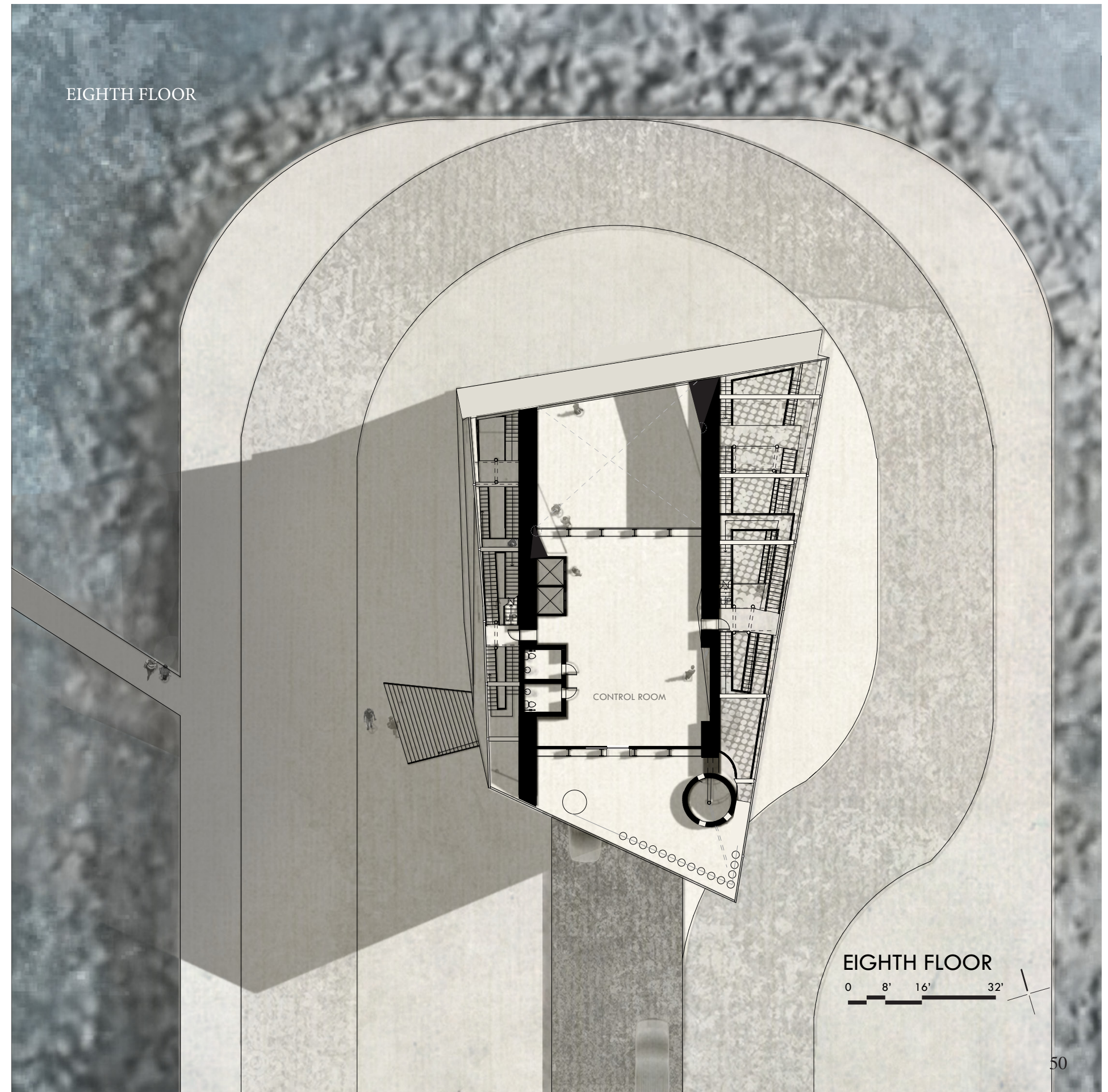


## E I G H T H F L O O R

Once on the level of the control room, we no longer see a lot of movement on the side stairs, as the spaces beyond are all private. This is the last level at which the vertical garden caters to butterflies on their fall migration, searching for a vertical post to rest before continuing the journey. As we continue to move up the building, the vertical garden will transition.

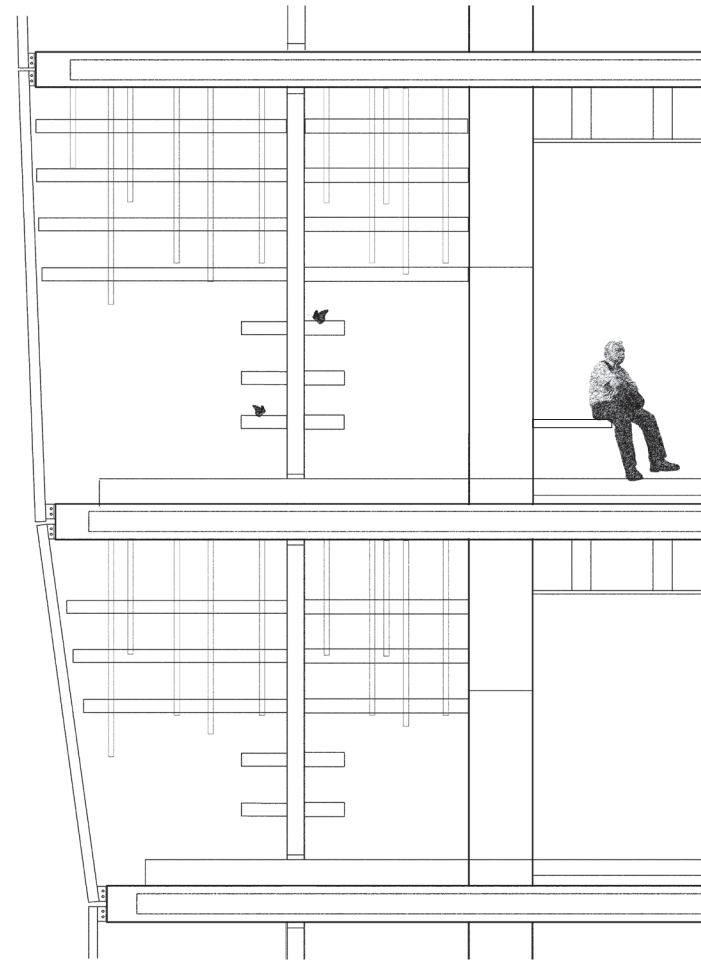


## EIGHTH FLOOR

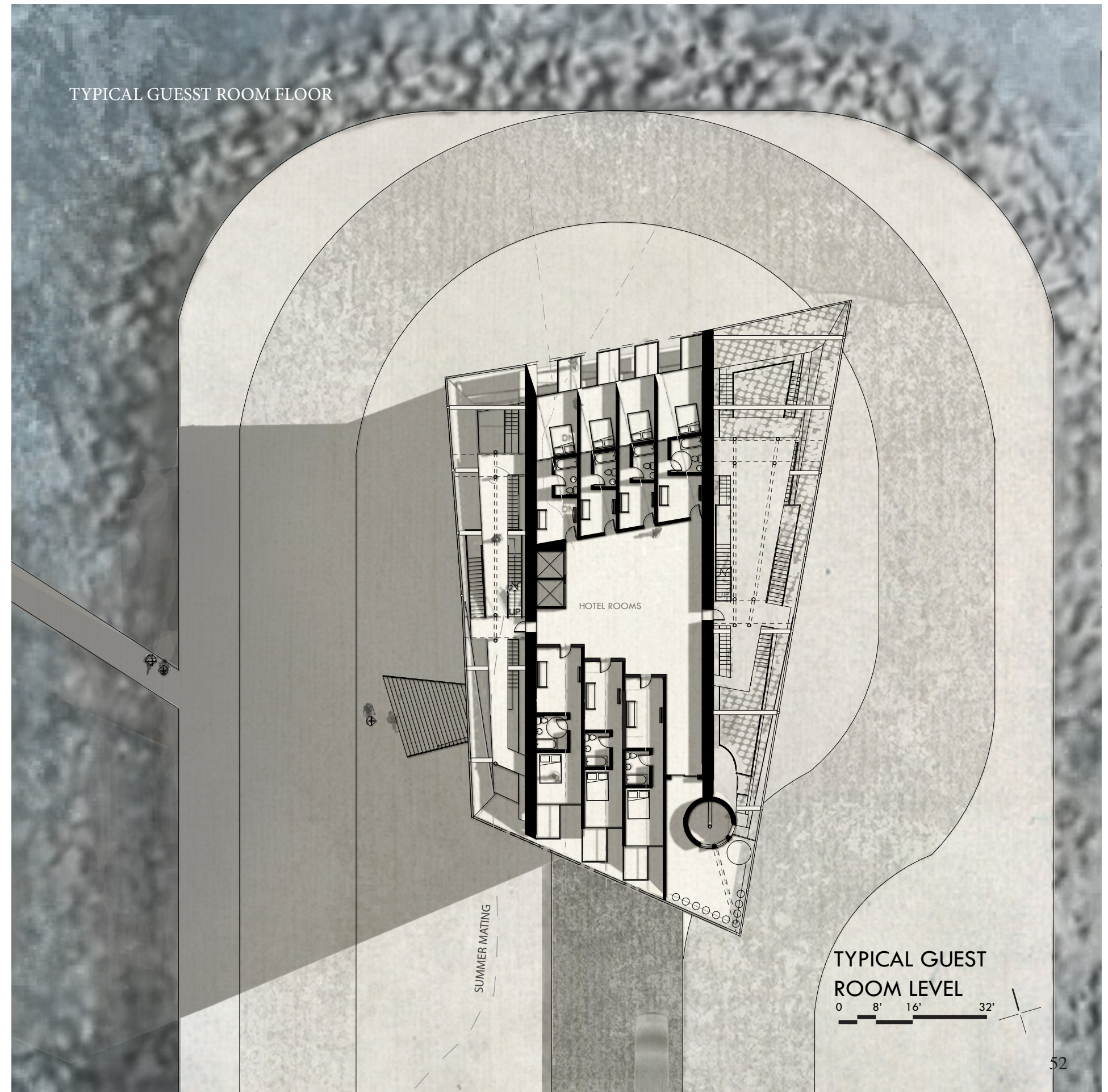


## TYPICAL GUEST ROOM FLOOR

The building has five levels of guest rooms available. The individual rooms are slender in width but tall in height, which creates a statuesque view of the Chesapeake Bay. The view can be seen through a small opening while standing at the front door of the room. It's not until you walk around the space and into the bedroom nook where you get the full view. The guest room level has a catwalk attached to the slabs that allows guest to inhabit the side stairs filled with greenery. We see that the vertical garden has transitioned to include more spaces for planter boxes, filled with flowers and milkweed for the monarch butterflies in spring migration to feed and breed. In that way, the guest room levels are for humans as well as butterflies.

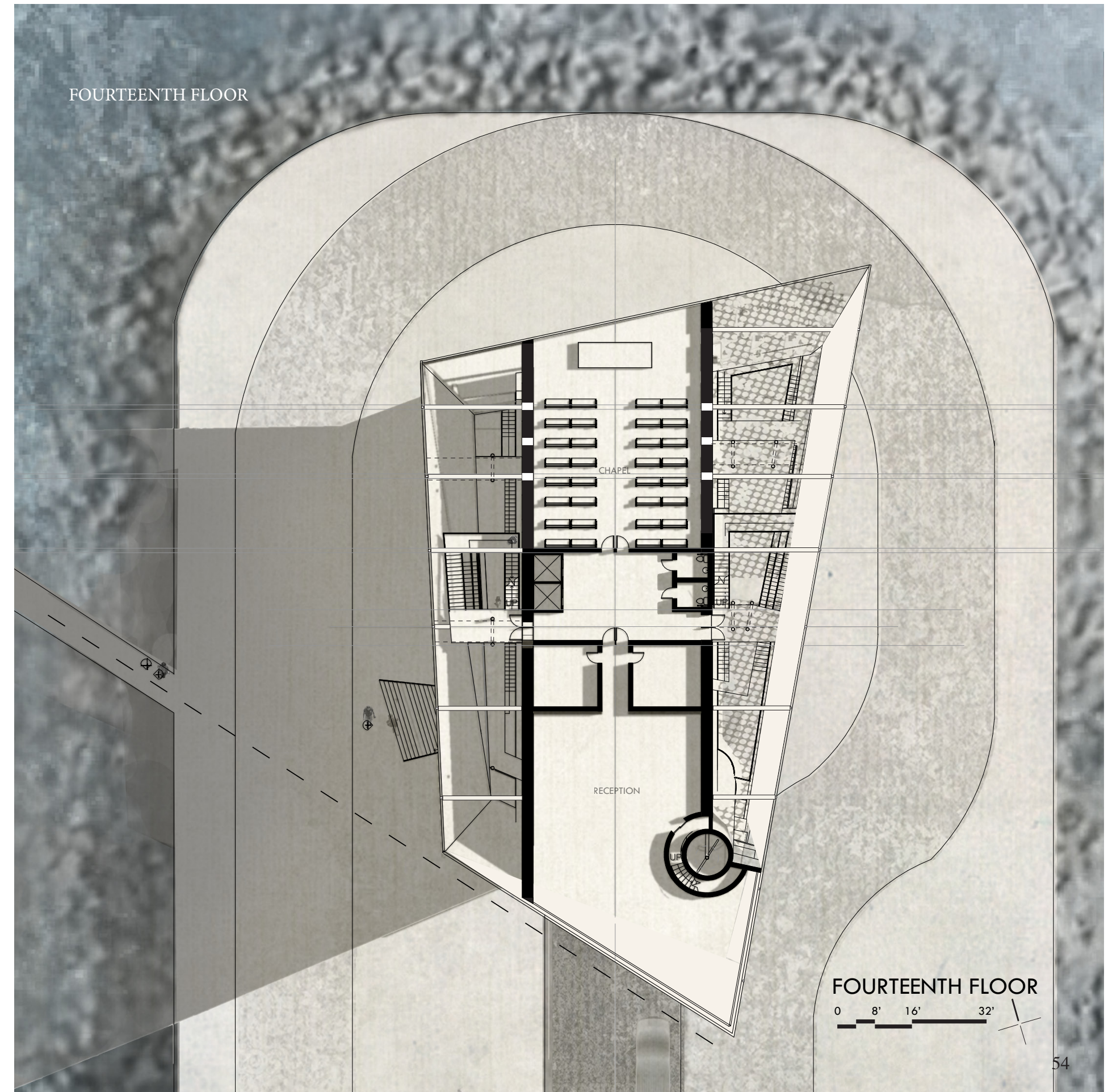


## TYPICAL GUEST ROOM FLOOR



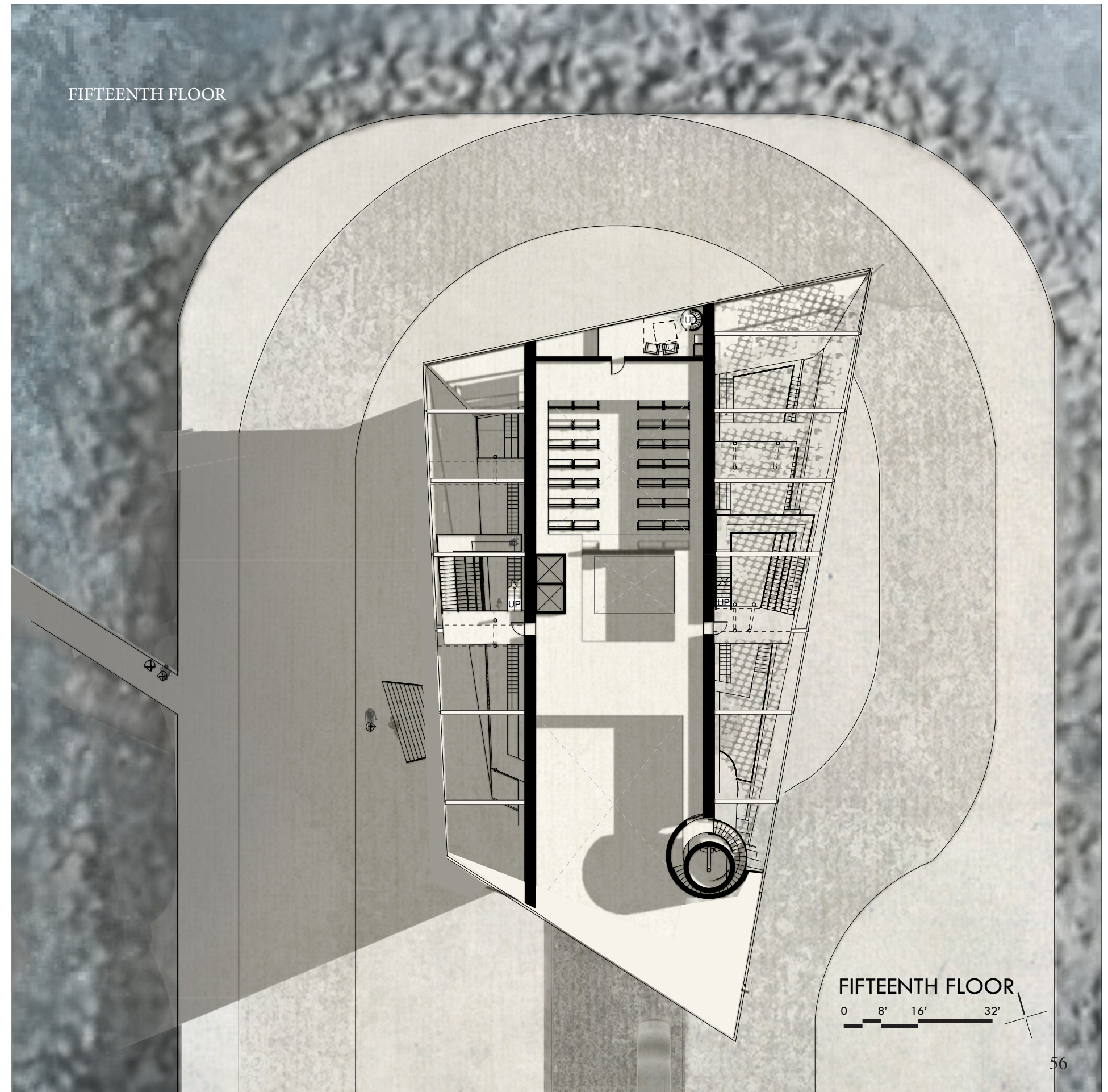
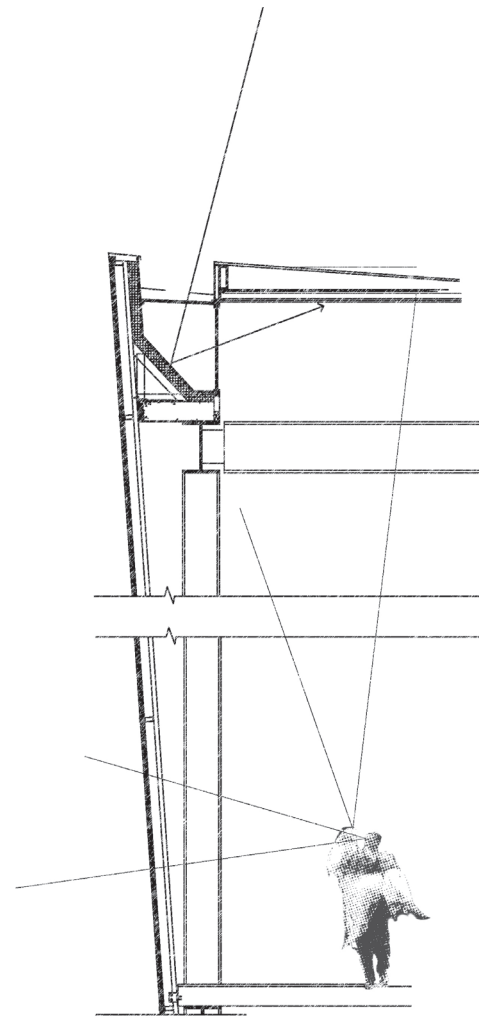
## FOURTEENTH FLOOR

Directly above the guest room levels lies the chapel. A small, yet spiritual space to gather at the top of the tower. It is the first of the elevated levels where the walls remain parallel, giving the chapel a pure rectangular space. It is also the level at which the south wall perfectly aligns with the angle of the fishing pier. There are three stained glass windows on either side of the altar, spanning the entire length of the 25 ft. walls. The stained glass uses hues of red, yellow, and green. It's speculated that these are the only colors that monarch butterflies comprehend that overlap with our visual spectrum. A small door overlooks the congregation, adding a sense of wonder as to what lies beyond the sacred space.



## F I F T E E N T H F L O O R

The small door above the altar in the chapel leads to a honeymoon suite. After the ceremony, the bride and groom walk down the altar towards the south side of the building. Around the ventilation shaft, there is a small spiral staircase that is intended solely for the couple to ascend up to reach the honeymoon suite level above. In the suite, the ceiling is constructed to reflect the sky/stars above, giving the couple the sense of their position in the sky with relation to the ground plane. This genuinely sacred spot in the building hosts an area of algae beds for carbon dioxide extraction. The dichotomy of the sacred and profane is truly realized.



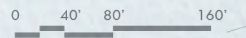


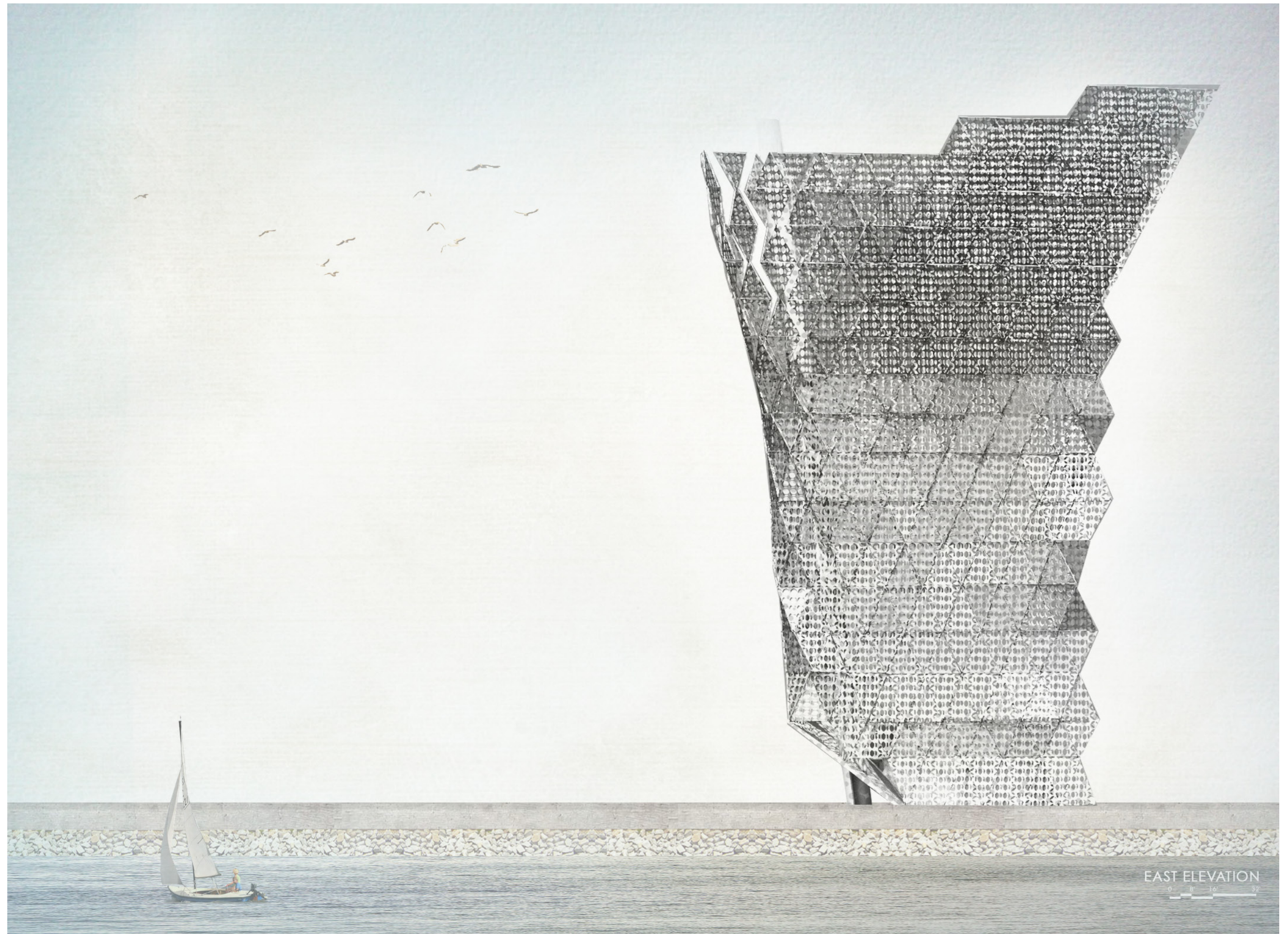


ROOF PLAN



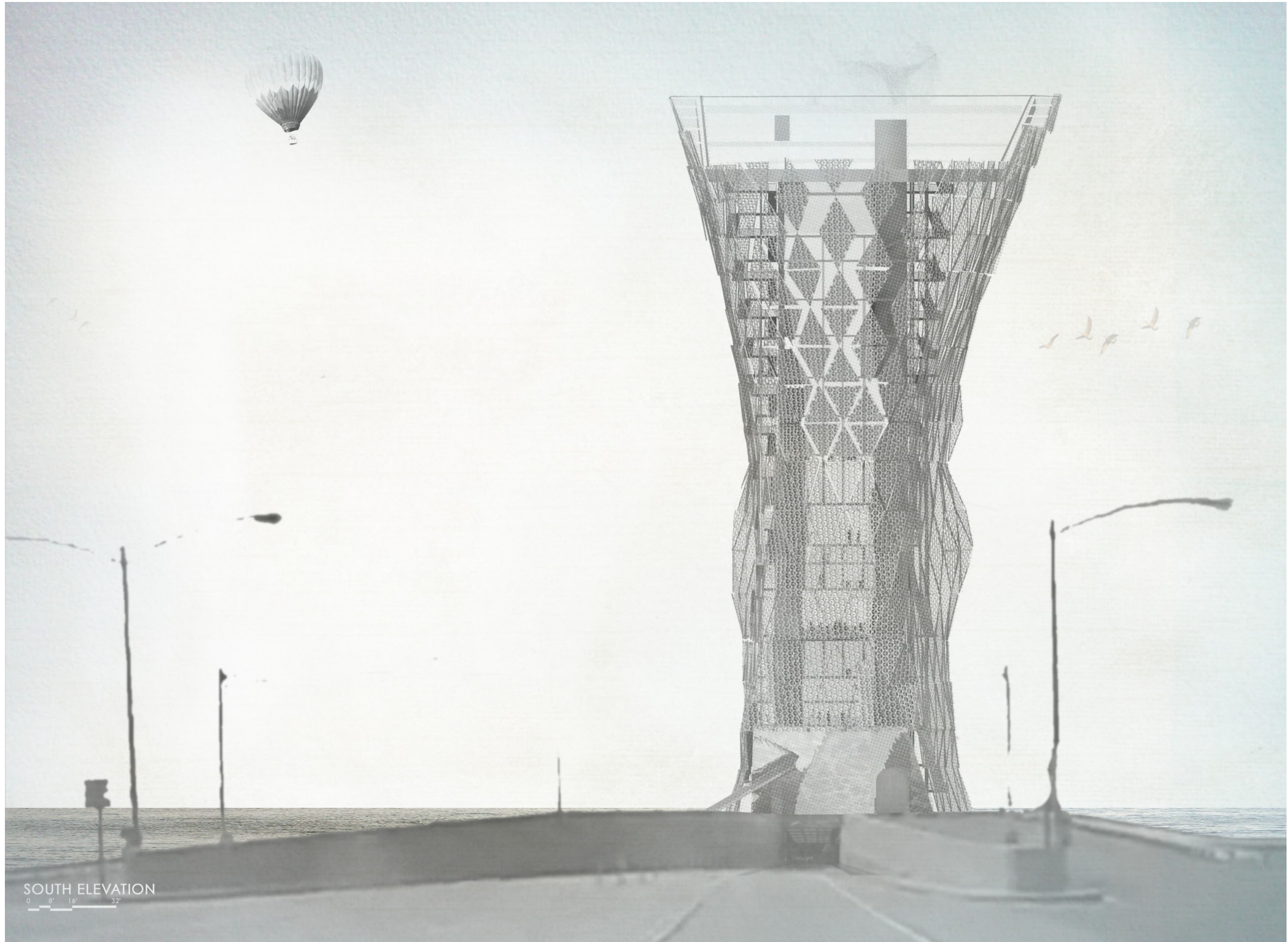
SITE PLAN







WEST ELEVATION



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## IMAGE CREDITS

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To my WAAC friends: You will always have a special place in my heart. The memories of our time spent in a truly enriching environment will not soon fade.

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