

turning_space

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for the degree of Master of Architecture In Architecture

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ABSTRACT

This thesis is an eutopian project: it examines what is with a sense of what should be to see what must be done. The project is a rerouting of Interstate 581 in Roanoke, Virginia through a reinforced concrete tunnel from the Orange Avenue exit to the Elm Avenue exit with towers placed at intervals along the tunnel to provide light. A reinforced concrete pedestrian bridge links the towers and provides a path from downtown Roanoke to the Civic Center.

I seldom get the opportunity to express my sincere gratitude to those who have helped me in so many ways in my life. I dedicate this thesis to each of you with my heartfelt thanks for your support these many years.

To my soul mate Sarah, for sending me to Architecture School.

To my parents John, Jeanne, Ernie, Tom and Karen thank you for your unconditional love and support.

To Nancy, for always finding the good in things and to Jerry for teaching me the value of elbows and assholes.

To Billy, Meno, Campbell, Doris, Dave, Ginny, Wayne, Jeanette, Wilkinson, Sue, Tim, Nancy O', Garrett, Margaret, Jeff and Josie for raising us with hammers in our hands.

I extend a special thanks to the faculty who helped me along this incredible journey of the last three years.

To my Committee, thank you for your patient observation as I floundered from diagram to abstraction and finally to architecture.

Steve, for setting up the dialectic.

Scott, for understanding Usonia.

Kay, for introducing me to the Great Conversation.

and

Hans, for bringing it all together at the end.

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Horizon

When people discover that I was an Air Force pilot, the question they invariably ask is "What was that like?" I immediately think of endless hours in briefings and debriefings, paperwork, hot asphalt and inhumanely early flights, but then I realize that is not what they are really asking. What they want to know is what it is like to leave the earth, to travel upon wings into the sky. I have found no better way to describe the experience of flight than John Gillespie Magee, Jr.'s "High Flight."

*Oh! I have slipped the surly bonds of earth
And danced the skies on laughter-silvered wings;
Sunward I've climbed, and joined the tumbling mirth
Of sun-split clouds - and done a hundred things
You have not dreamed of - wheeled and soared and swung
High in the sunlit silence. Hov'ring there
I've chased the shouting wind along, and flung
My eager craft through footless halls of air.
Up, up the long delirious, burning blue,
I've topped the windswept heights with easy grace
Where never lark, or even eagle flew -
And, while with silent lifting mind I've trod
The high untresspassed sanctity of space,
Put out my hand and touched the face of God.*

In the years since I first committed these words to memory as a Basic Cadet at the United States Air Force Academy, High Flight never fails to instill me with a sense of excitement. Recently I began to understand Magee's words are not just about flight, but are an exuberant expression of the experience of pure space. Beautiful flying machines allow me the privilege of disregarding my grounded nature and to inhabit pure space, if only temporarily. When practical limitations demand I return to my nature, I reorient myself with my constant and unfailing relationship with the ground - the horizon. As I leave pure space and reach out to kiss terra firma the horizon gently envelops me, welcoming me back home.

As a pilot, I was constantly aware of my relationship to the horizon. To lose this awareness meant disorientation in the least case and death in the worst case. The horizon is an ideal, something just beyond reach, strived for but never attained. The horizon and utopia are related in the sense that they are both ideals. Utopia is an ideal place or state of being, but as an ideal can not be attained. But, just as the middle ground between a current situation and the horizon can be reached, so can a state of being between our current situation and utopia. This middle ground is eutopia, a good place.

In The Living City Wright states "...natural horizontality - true line of human freedom on earth - is going, or gone." As I reflect on my thesis exploration, I am confronted with a constant theme in the work - the horizon. The presence of the highway as the horizon led me to the concrete portion of the project - the tunnel. The highway obscures the horizon, creating a mental and physical barrier slicing the heart of the city. Placing the highway below ground removes the barrier and allows the city to heal. The restoration of the ideal horizon allows us to advance confidently from our current situation towards the ideals horizon and utopia and, while we may never reach either, we find ourselves in a better place: the eutopian middle ground.

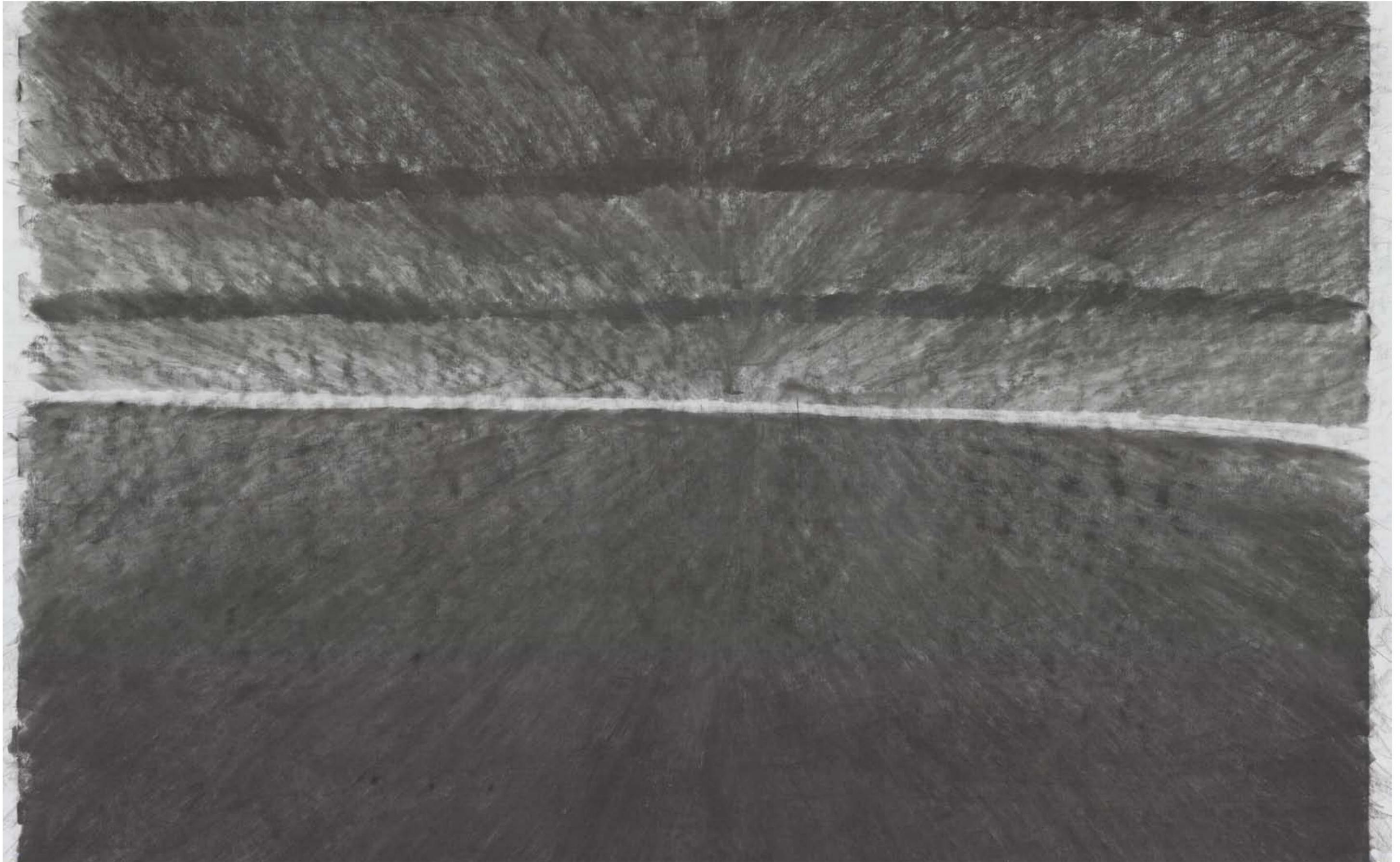
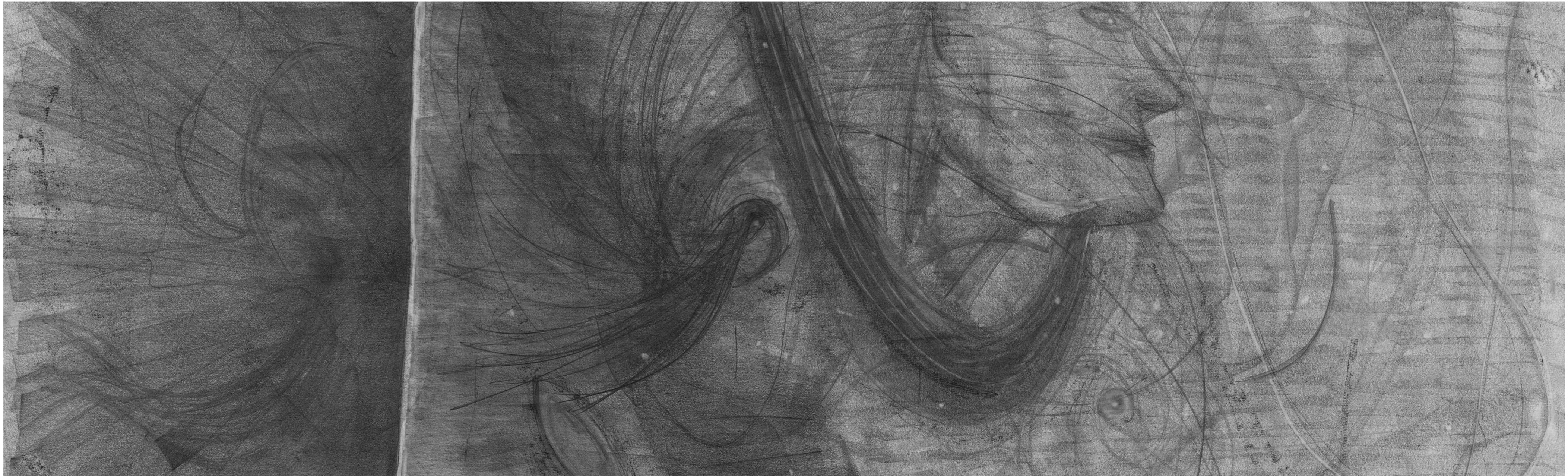


Plate 1 -Dawn Horizon Above Iraq

Expressed Impressions

The architect has the responsibility to offer design that transcends the simple stated purpose, or function, of the program. The training of the architect should uncover a means of drawing upon the experience and humanity of the designer, to reach beyond practical and pragmatic requirements. Everything that we encounter in life creates an impression and the totality of these impressions amount to our experience and influence. Architects must find a way of working that allows them tap into their experience and express their impressions. I discovered an emotional connection to my work through graphite, a nearly pure medium that can be added and subtracted almost endlessly to capture my impressions. My work in graphite not only helped me create an emotional bond and expression in my work but also revealed my latent affinity for horizon.



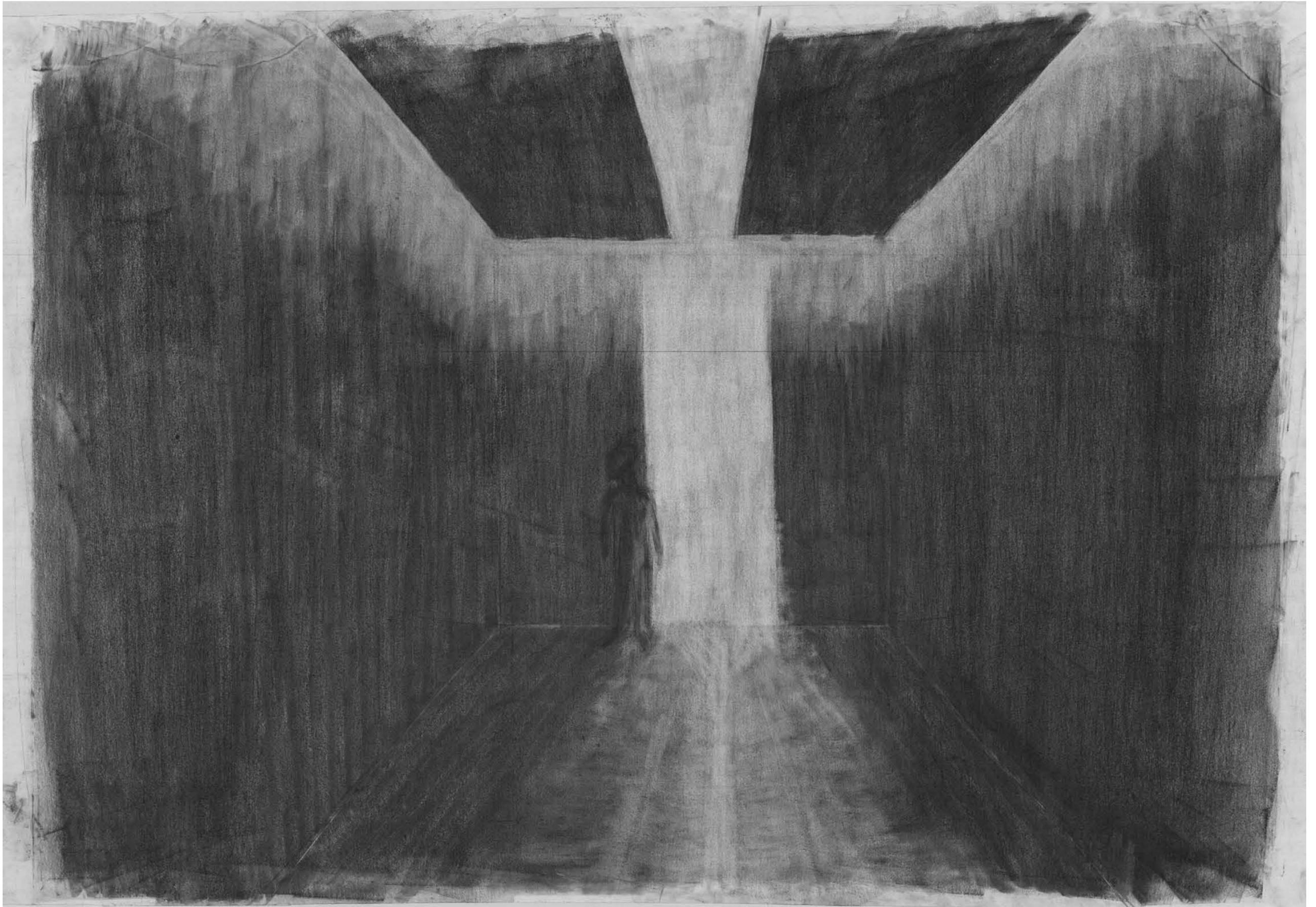


Plate 3 - Letting Light into the Room 1 of 3

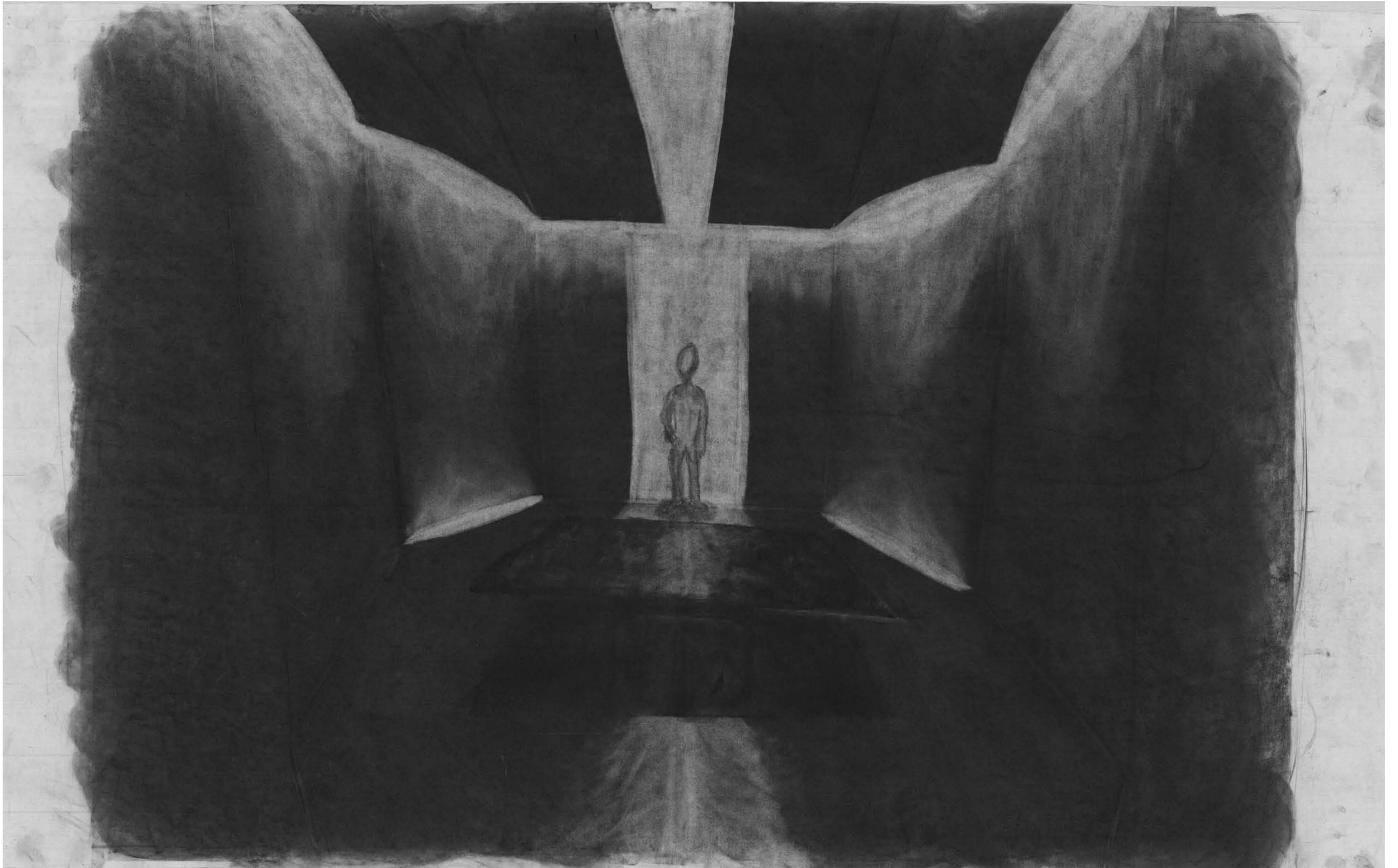


Plate 4 - Letting Light into the Room 2 of 3

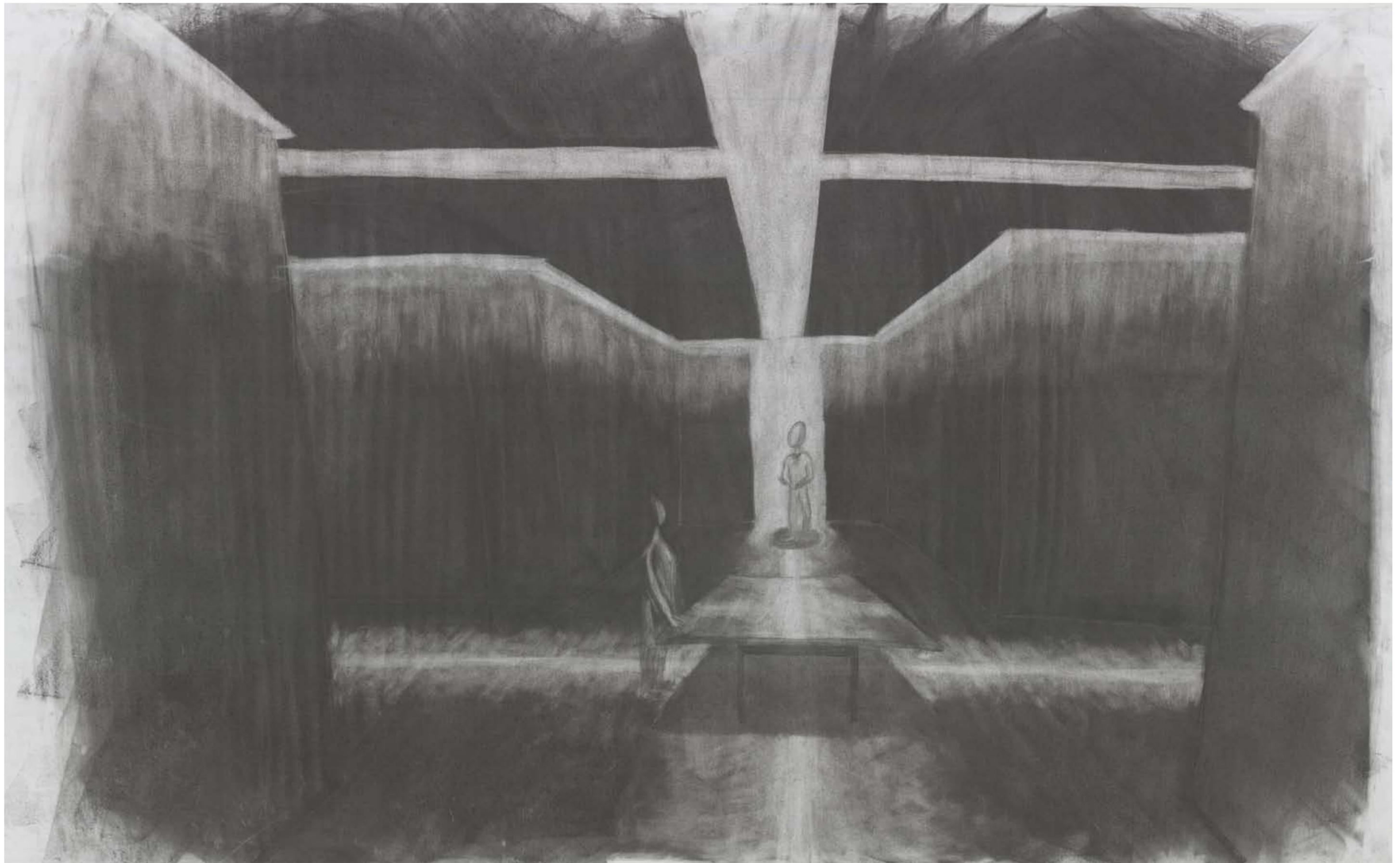


Plate 5 - Letting Light into the Room 3 of 3

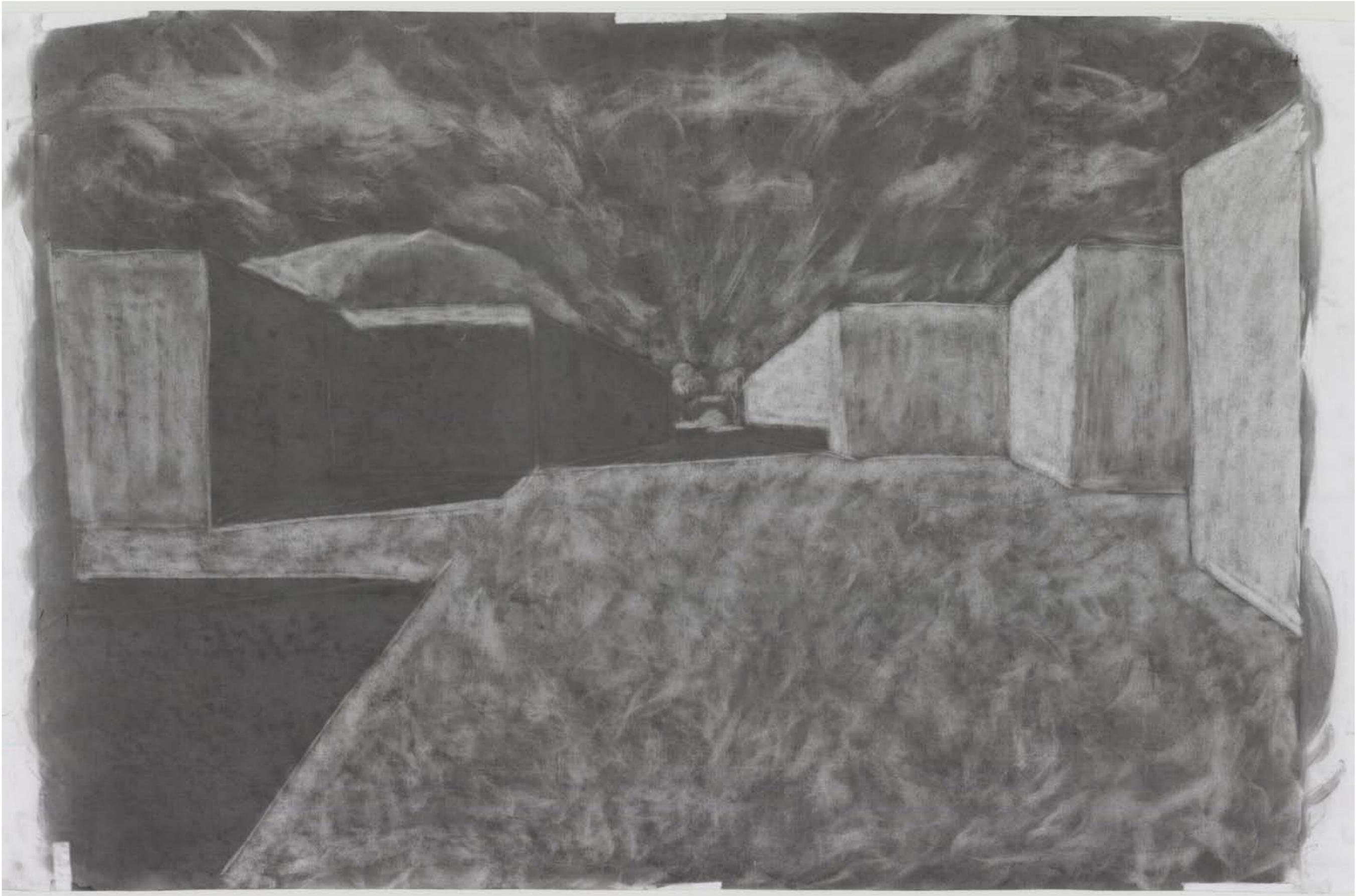


Plate 6 - Seeing the Situation

Situation

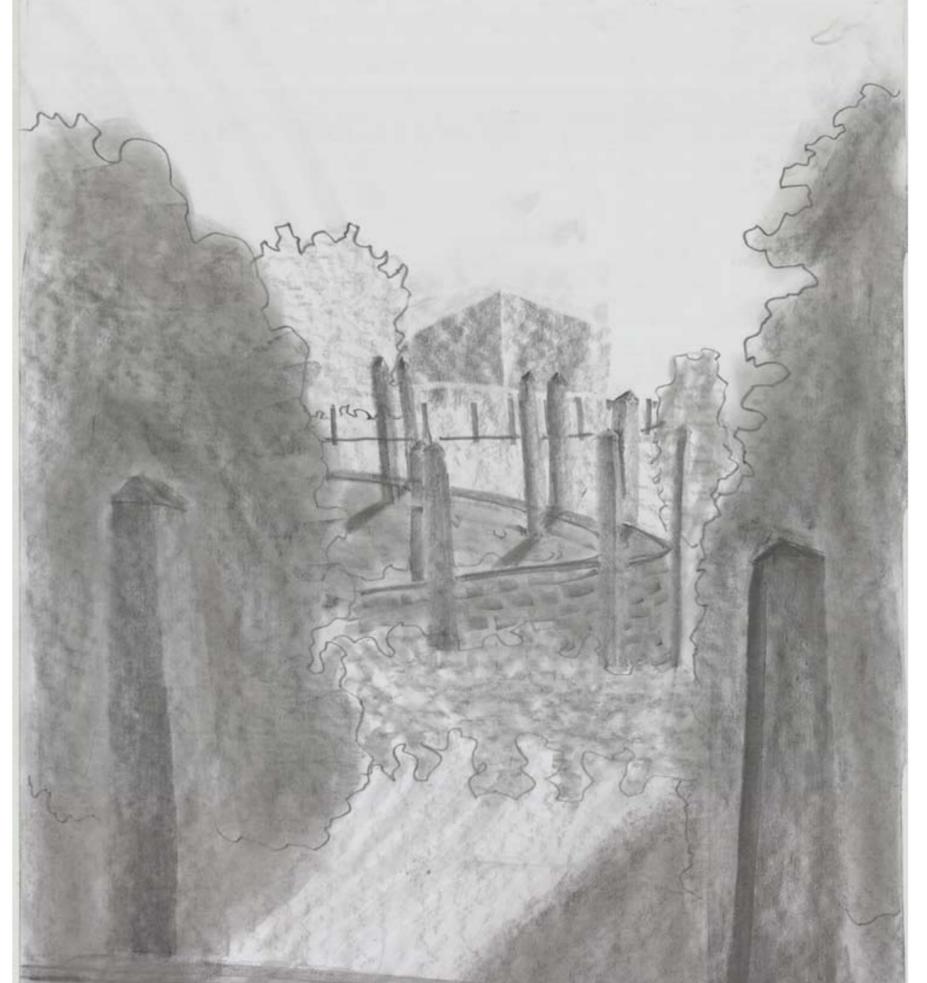
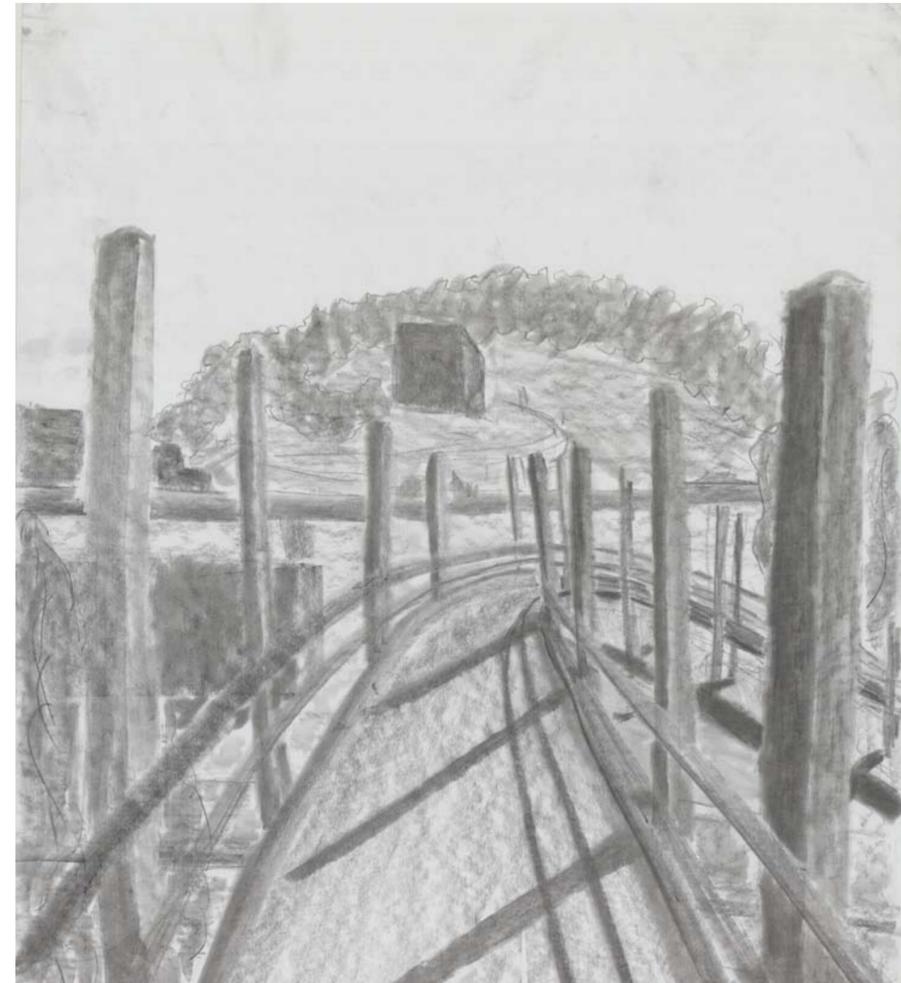
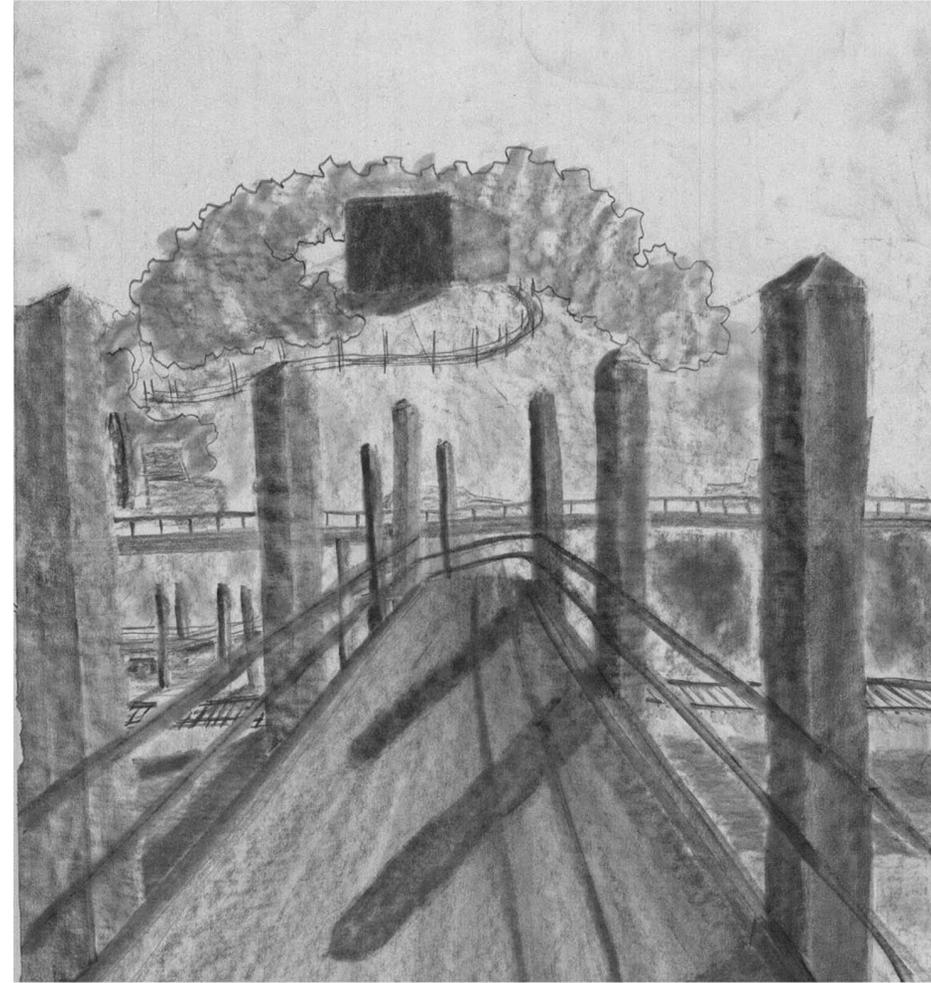
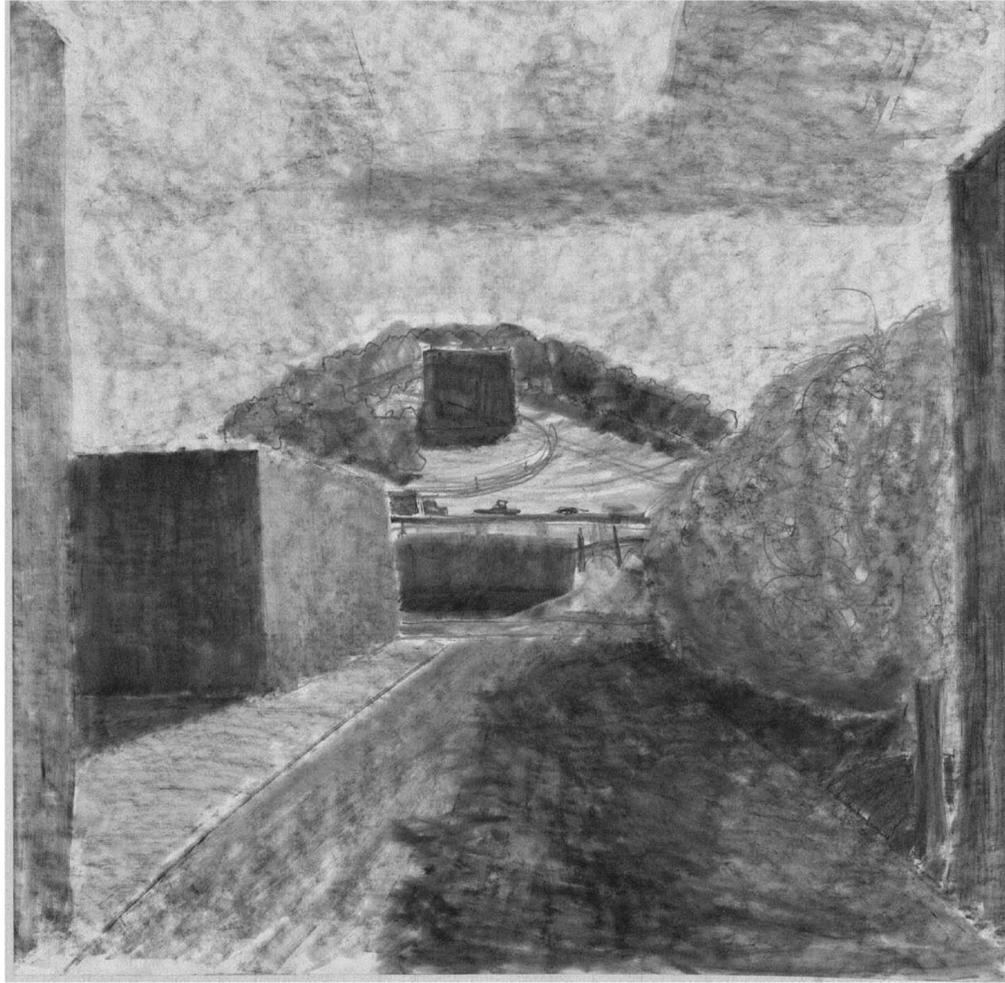
The architect's trained sense of the harmonious "altogether" in the several matters of road construction, planting, and bridge building would, from beginning to end, be indispensable to the integrity of the whole conception, and would therefore be used.

There is no more important function looking toward the city of the future than to get the best architects of the world interested in road building. They should see road building as great architecture.

Frank Lloyd Wright

The Industrial Revolution Runs Away

The following plates describe the scope of the project. The first series of drawings are an early concept study of a meander to a hilltop site from downtown Roanoke. The drawings revealed the disruption of horizon created by the presence of Interstate 581 through the heart of the city and inspired the project which follows. The primary intervention is a tunnel that takes Interstate 581 underground from the existing Orange Avenue interchange south to the Elm Avenue interchange. The Orange Avenue interchange is replaced with a large scale traffic circle with parking structures beneath. The existing Civic Center complex is reimagined as an amphitheater with a domed coliseum and urban infill on the remainder of the site. The situation plans depict the major interventions of the project: reworked topography, rerouted roadways, civic spaces and a pedestrian bridge.



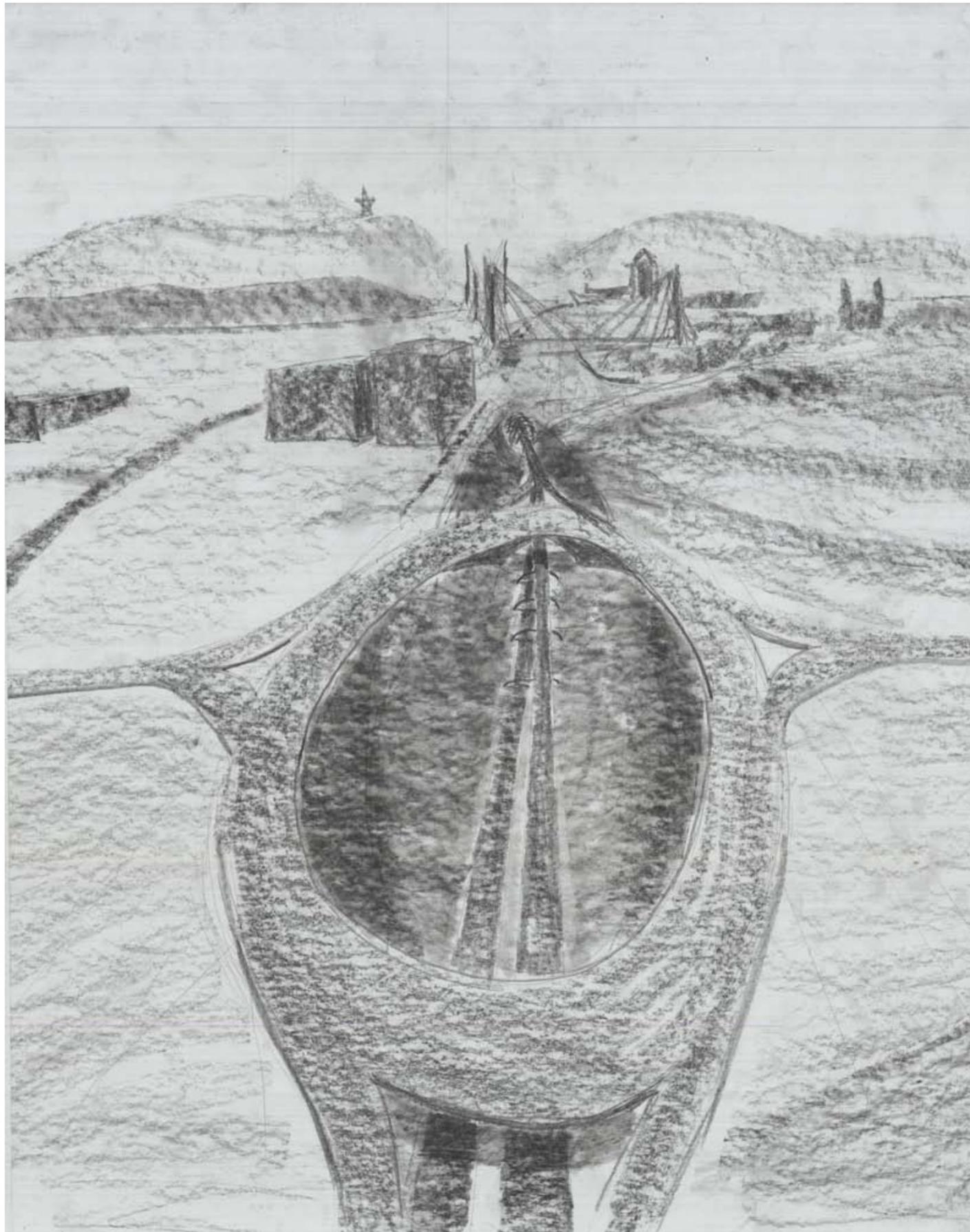


Plate 8 - View from North



Plate 9 - Return of Horizon



Plate 10 - Situation Plan 1 of 4



Plate 11 - Situation Plan 2 of 4



Plate 12 - Situation Plan 3 of 4



Image © 2010 Commonwealth of Virginia © 2009 LCA/SLC

Plate 13 - Situation Plan 4 of 4

The above-ground highway is problematic, but the function of the traffic artery is necessary. Rather than simply hiding away a disruptive object in the landscape, the experience of the motorist is carefully considered. The tunnel's form and structure transcends the functional requirement of simply providing passage through the ground. The structure of the tunnel takes advantage of the strength of the arch to elegantly transfer the earth loads around the interior traffic lanes. The reinforced concrete ribs are sheathed in a luminescent shell pierced by at intervals by diamonds. The diamonds carry light from the surface which the shell captures and distributes bathing the tunnel in a soft glow.

Tunnel

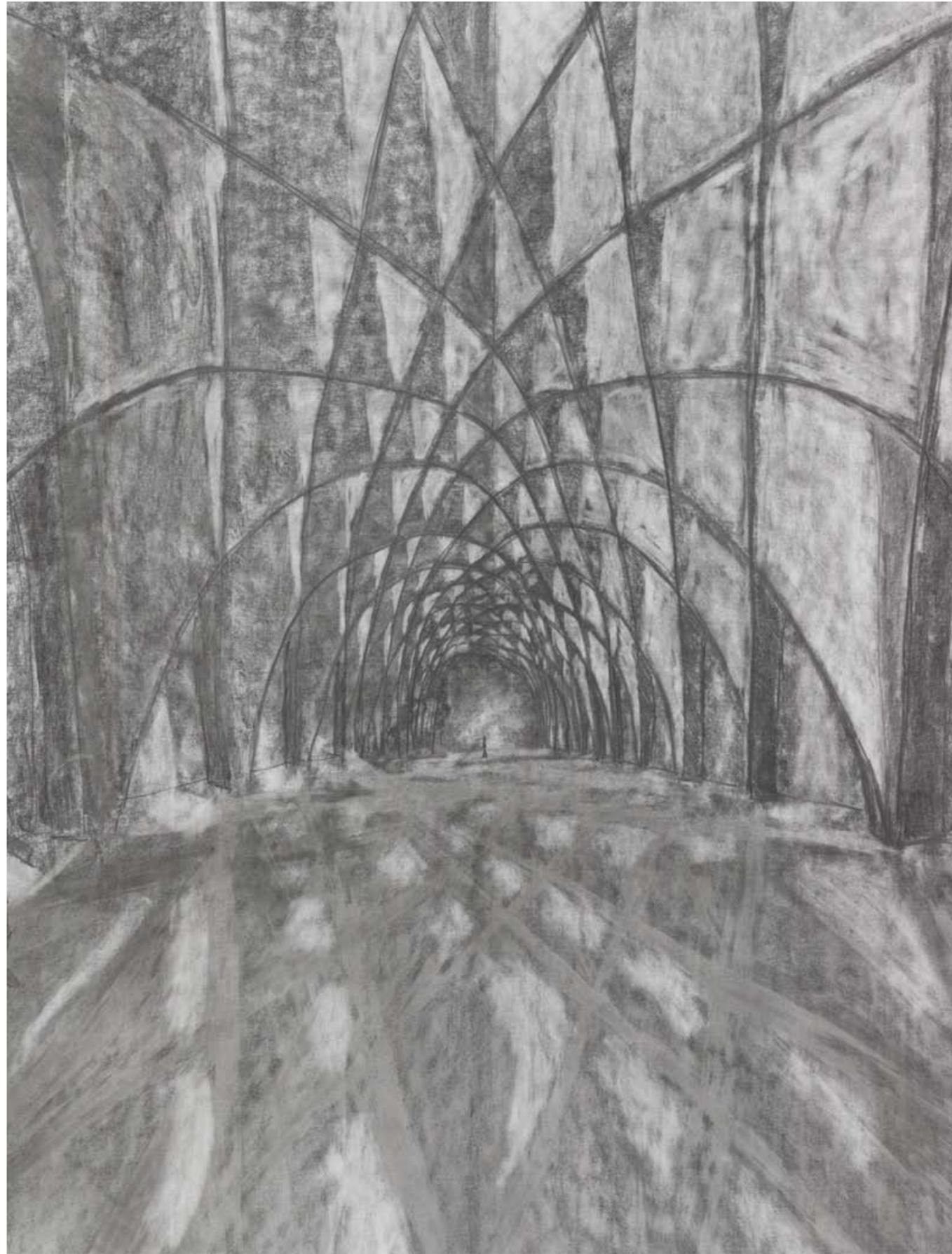


Plate 14 - View from Floor

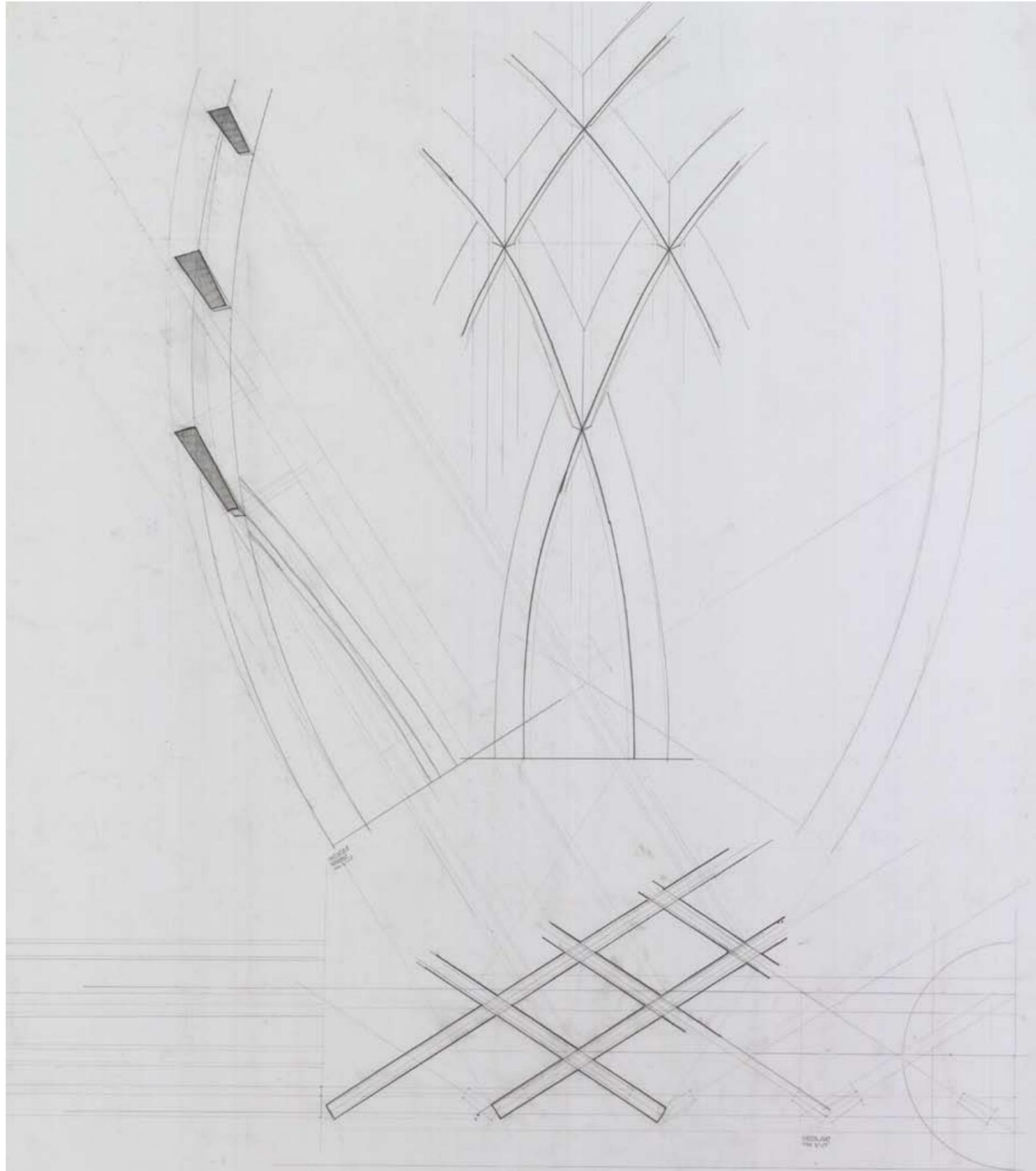


Plate 15 - Rib Construction Partial Plan, Section and Elevation

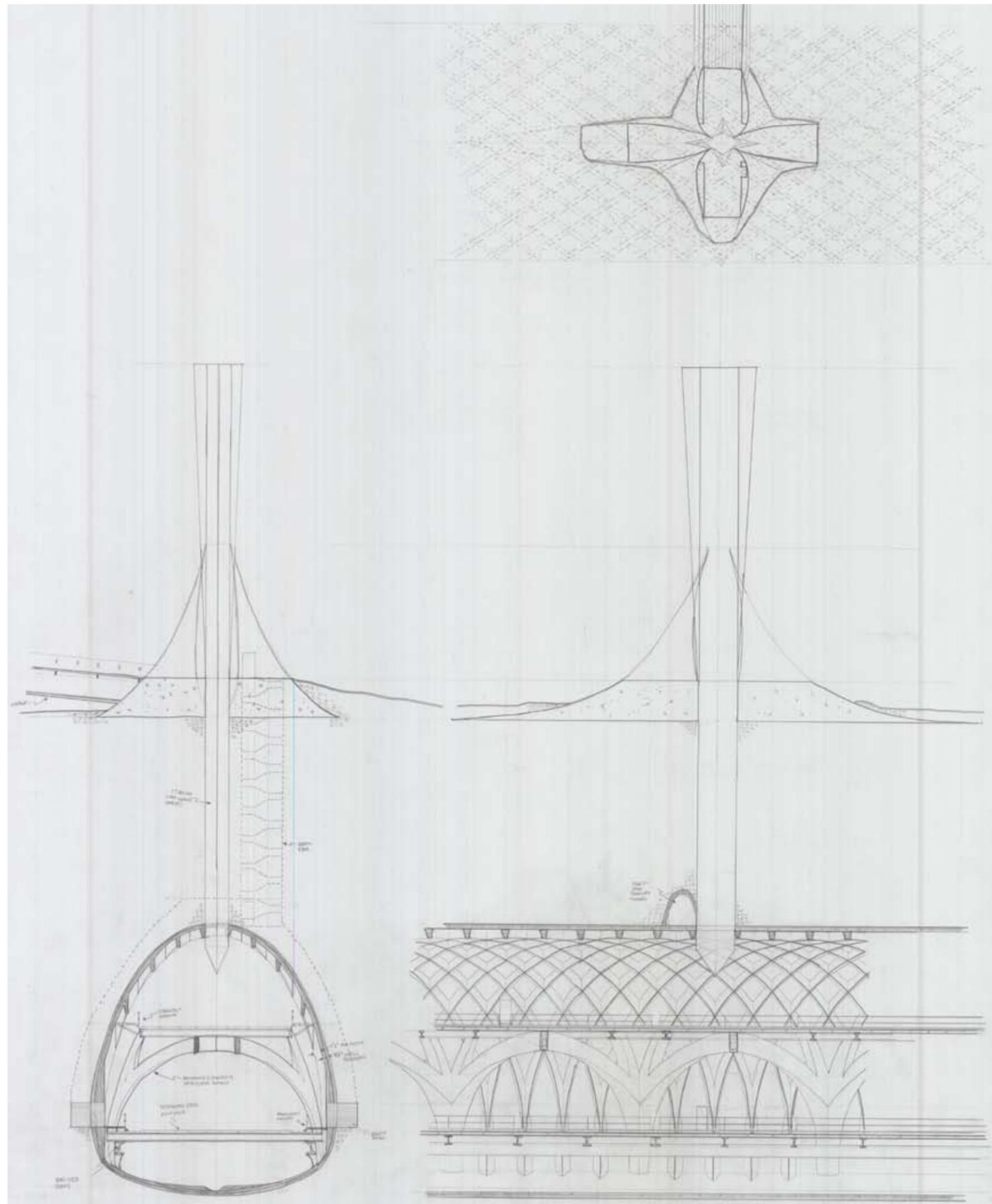
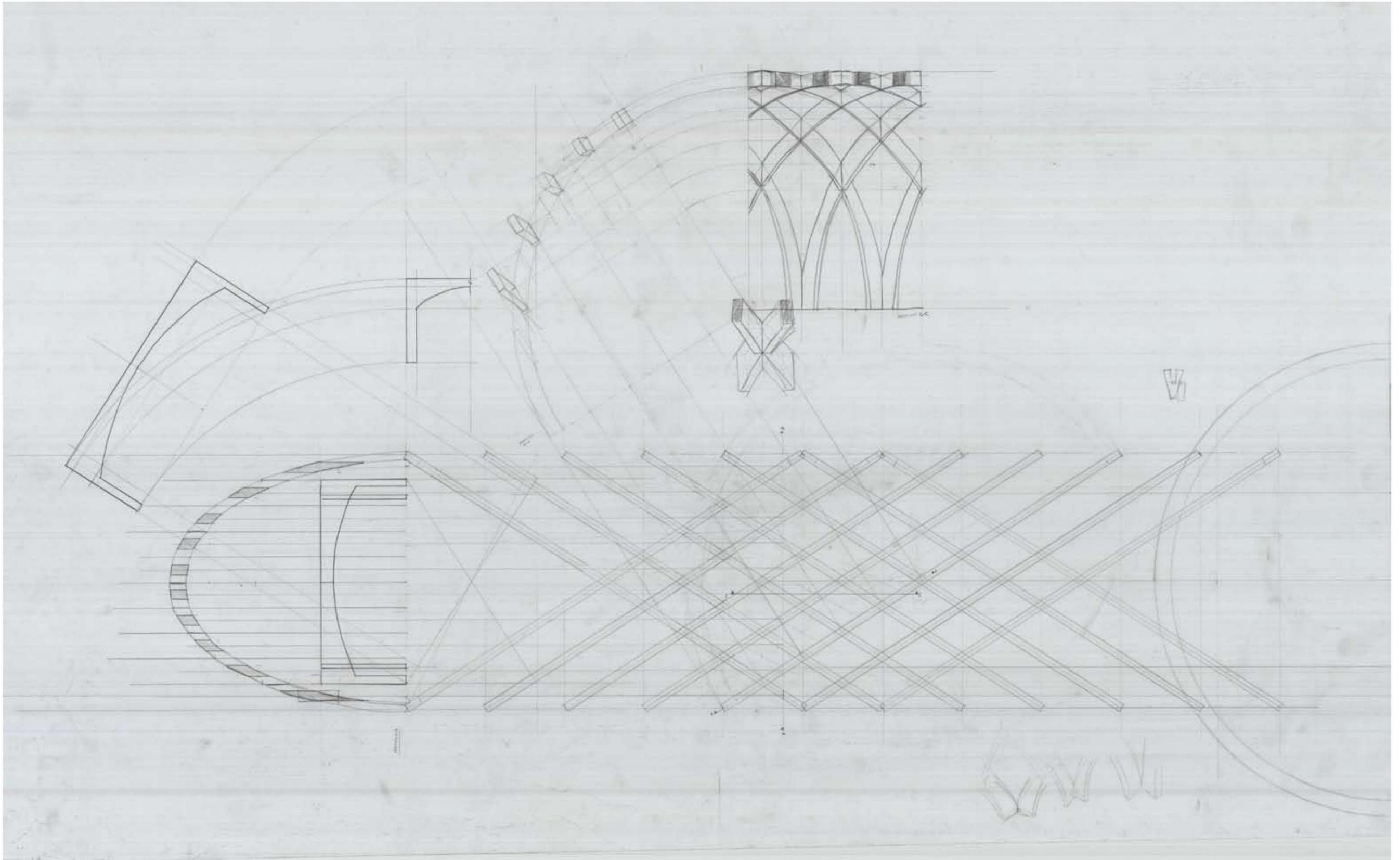


Plate 16 - Tunnel-Tower Connection Plan and Sections



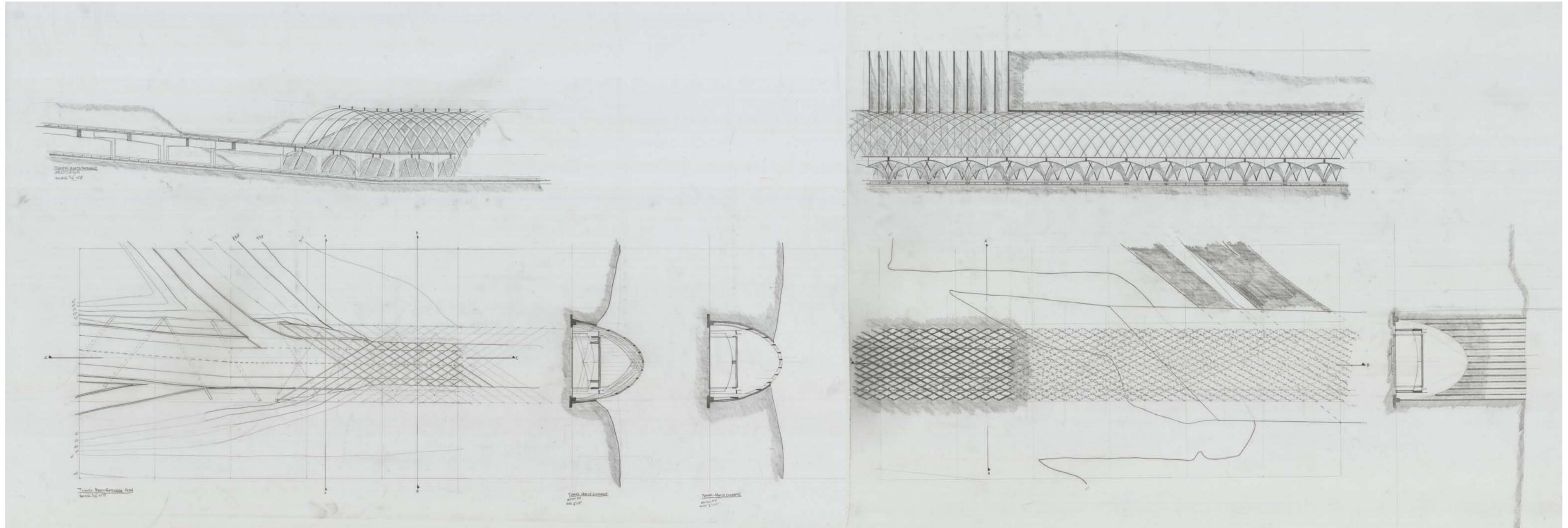
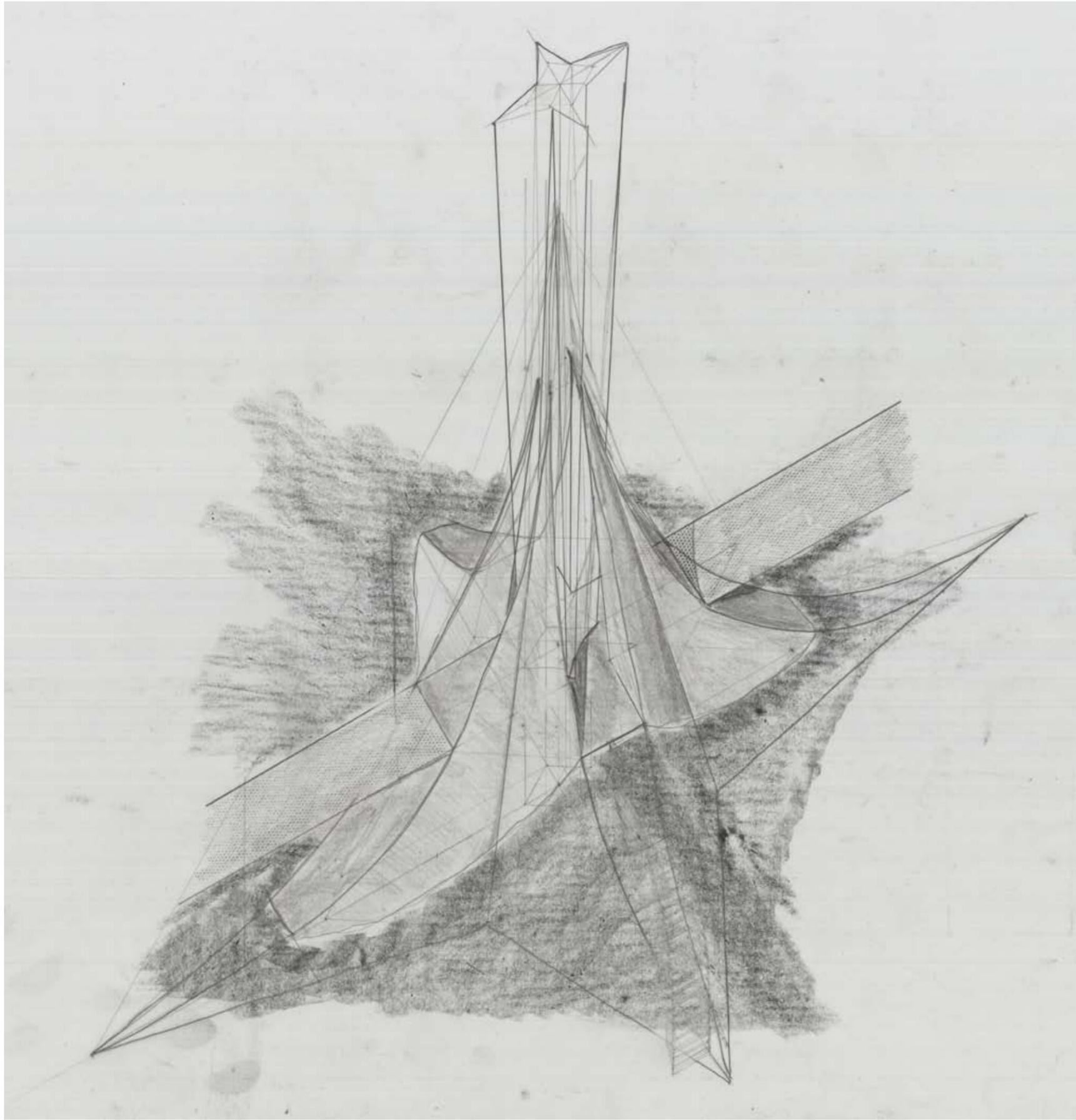
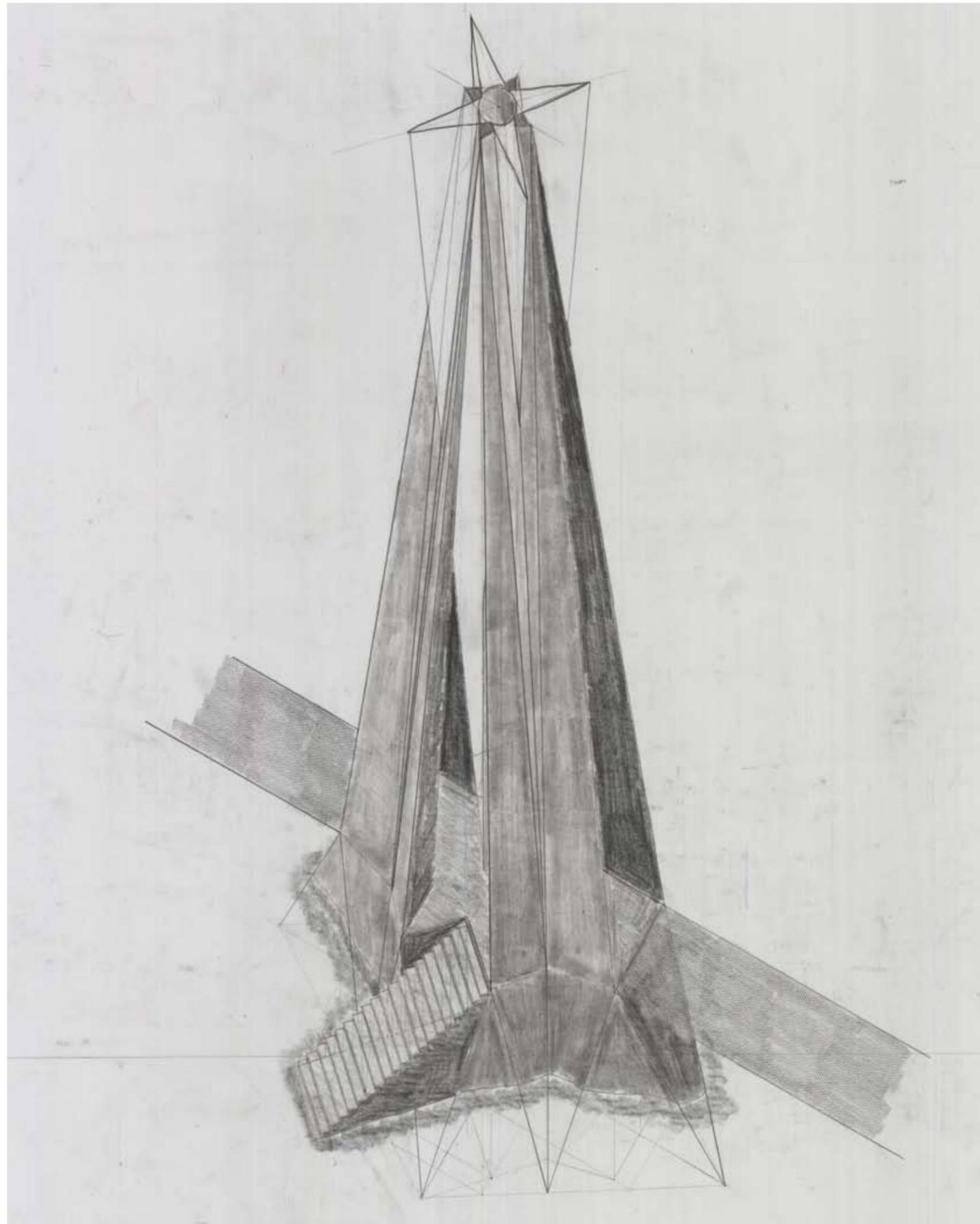


Plate 18 - Tunnel Entry and Lighting Development Drawings

Tower

The towers support the diamonds that bring light to the tunnel and also act as markers in the landscape. The towers provide a visual link to the tunnel above ground and provide embarkation and debarkation points for the pedestrian bridge. While they are positioned along the former Interstate 581 corridor, their verticality emphasizes rather than obscures the horizon. At night, the diamonds are lit from below allowing the towers to serve as beacons in the landscape that can be seen throughout the city.





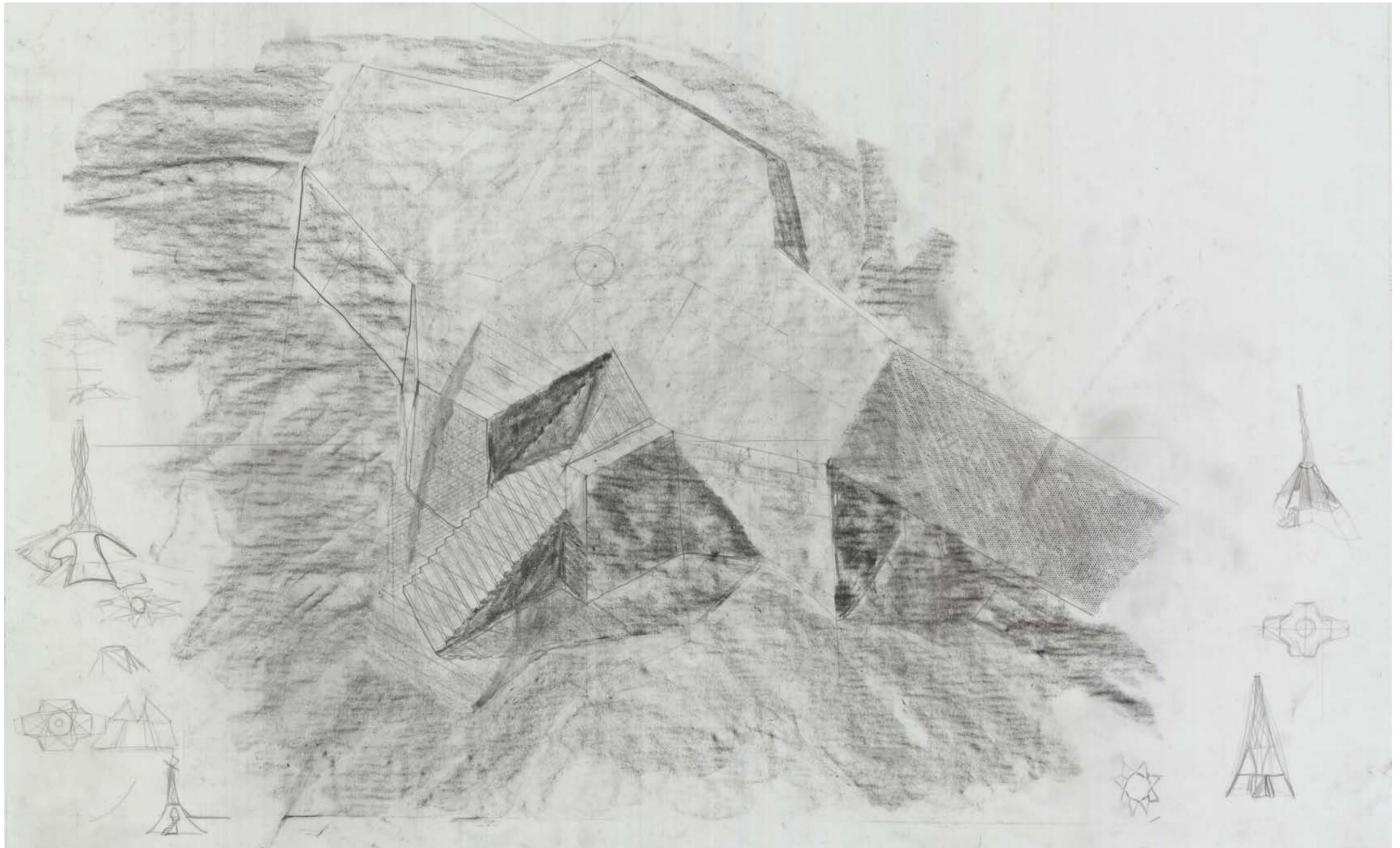
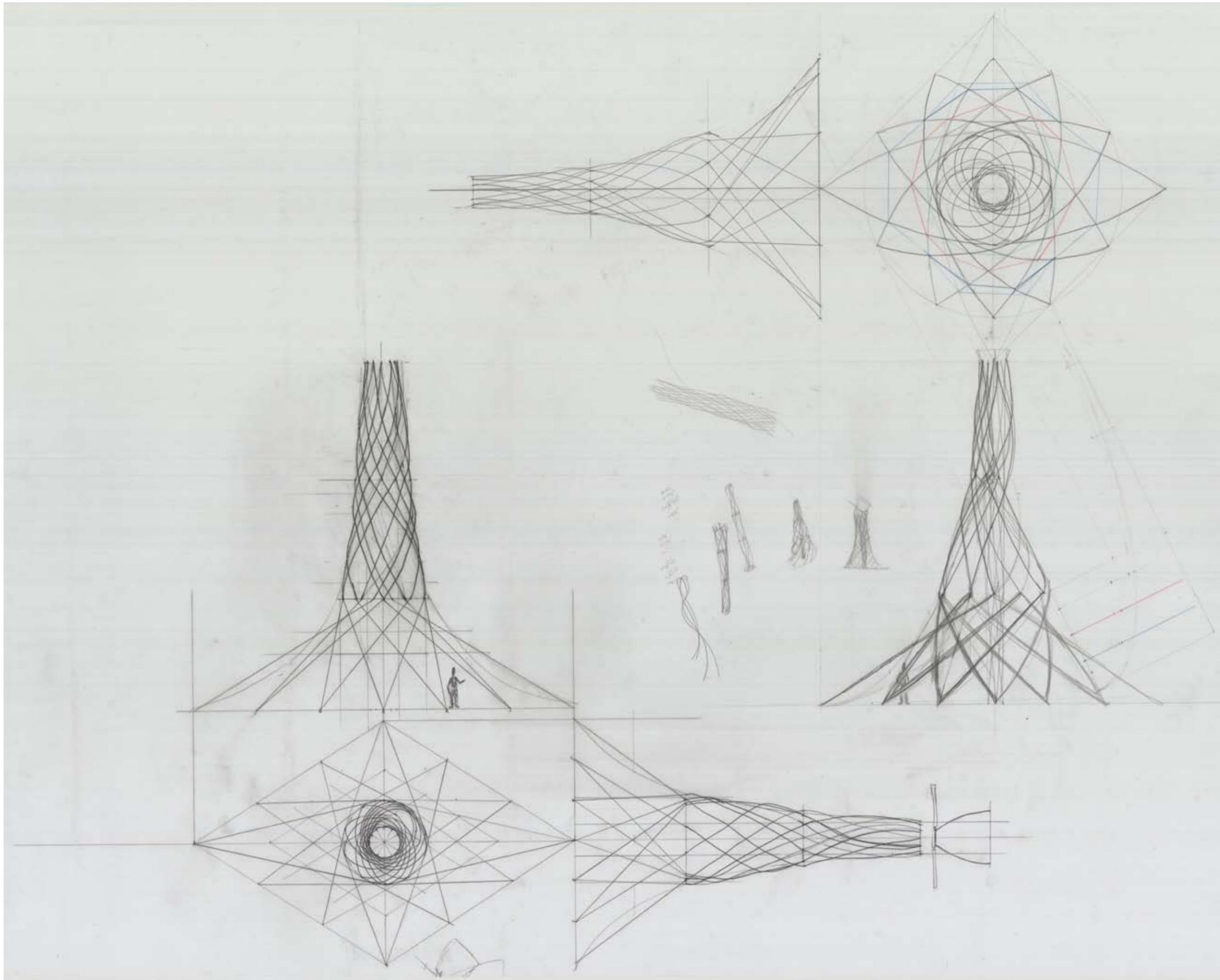
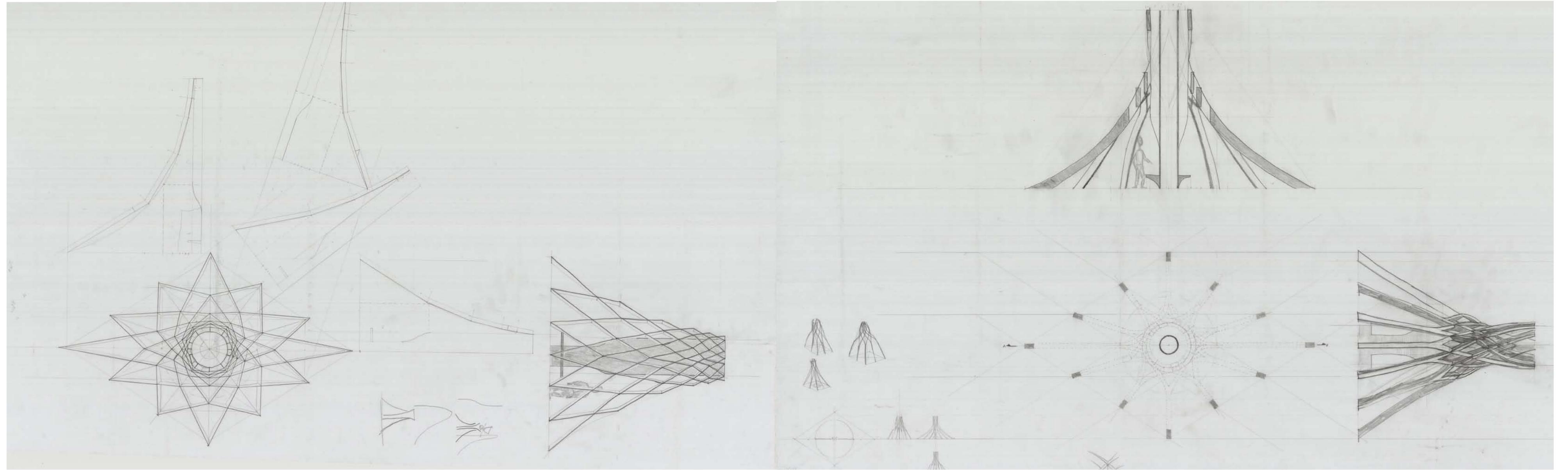


Plate 21 - Tower Base Sketches





Bridge

Suspended as a line above the city, the pedestrian bridge elegantly frames the gently rolling hills on the horizon. The bridge links downtown Roanoke with the Civic Center but is also a destination. With expansive views of the city on both sides the observer is afforded the opportunity to reflect on the situation of the city. The tapered supports form a series of arches that delicately support the walkway and meet the ground in a manner appropriate to the situation. The supports in the railyard are clad in durable granite while those terminating on grassy slopes flare slightly to provide a seating area. The supports at either end of the walk open to allow rainwater to cascade to the surface.

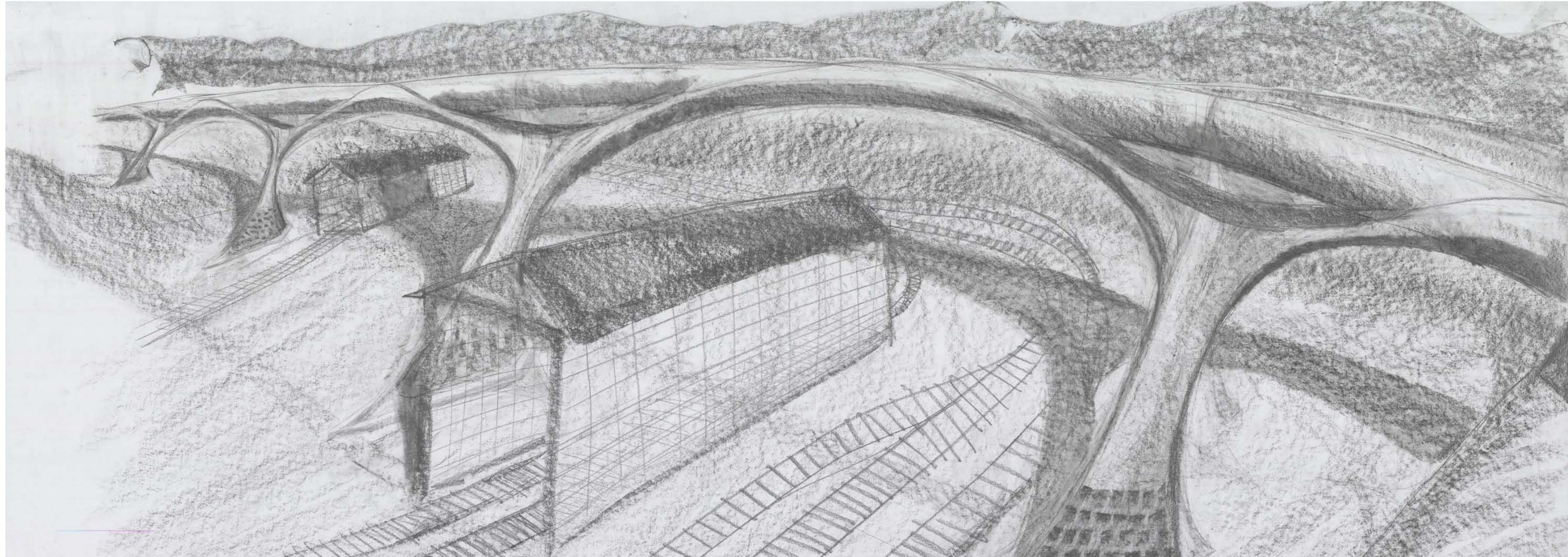


Plate 24 - Railyard Situation

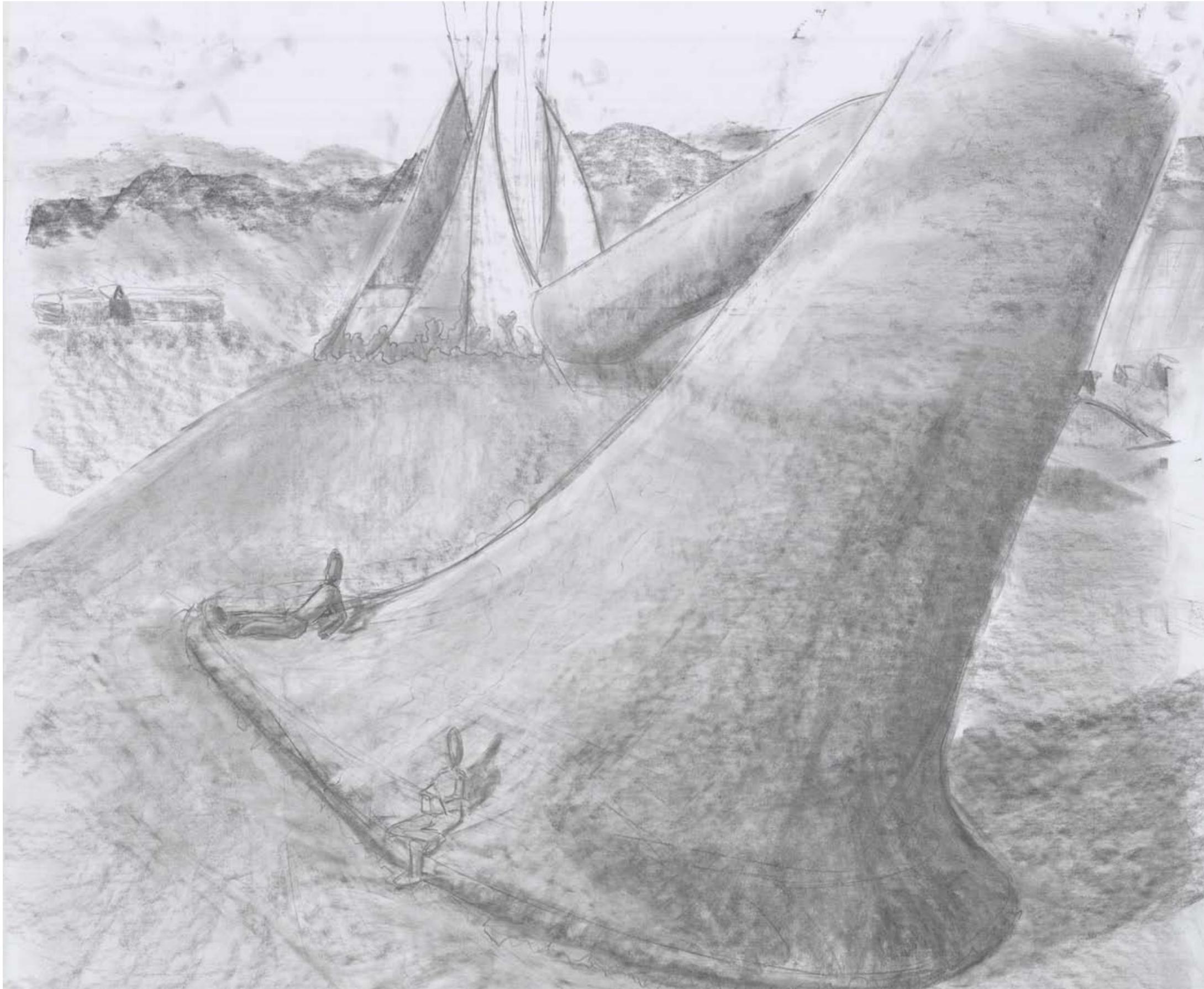
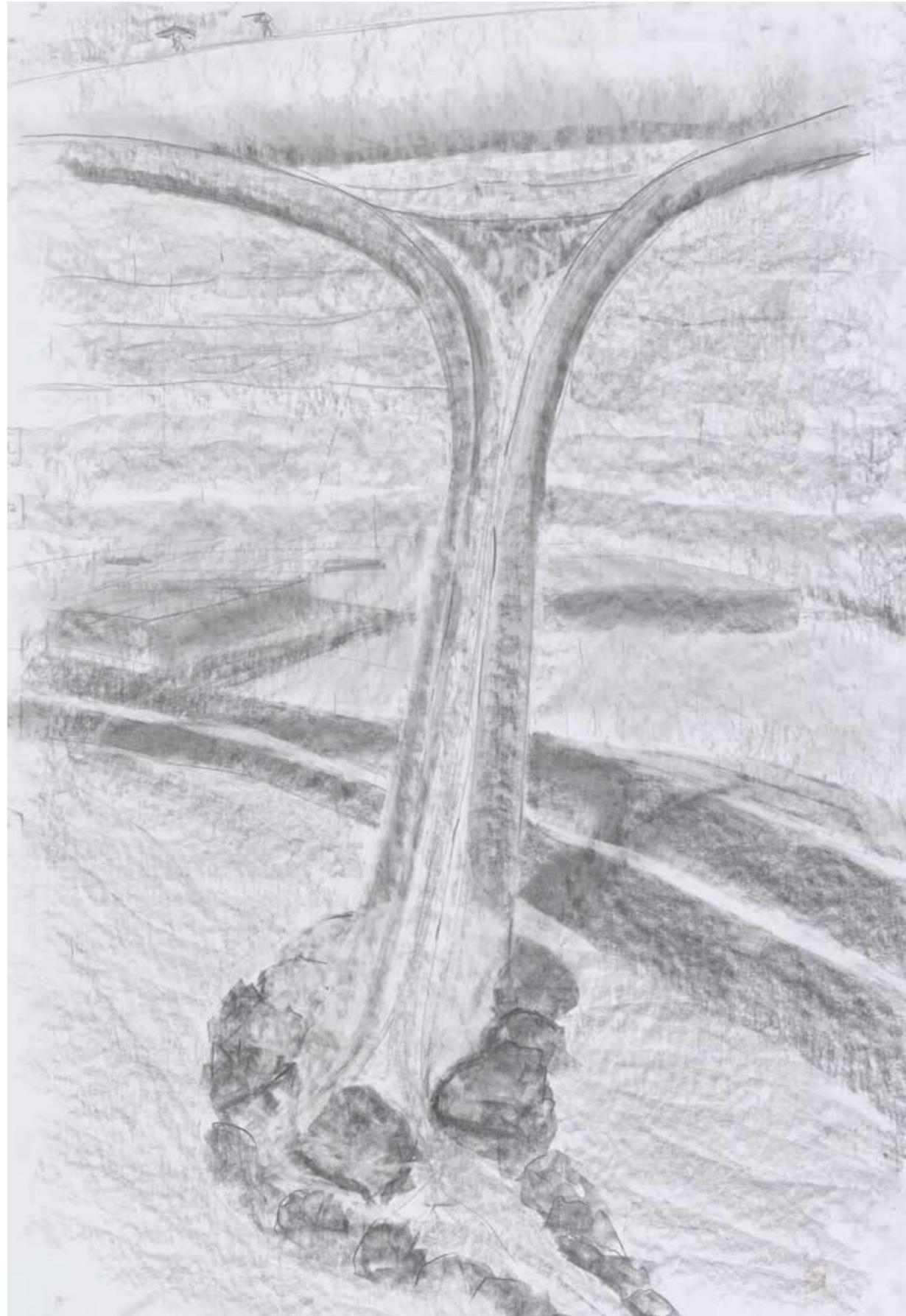


Plate 25 - Hillside Situation



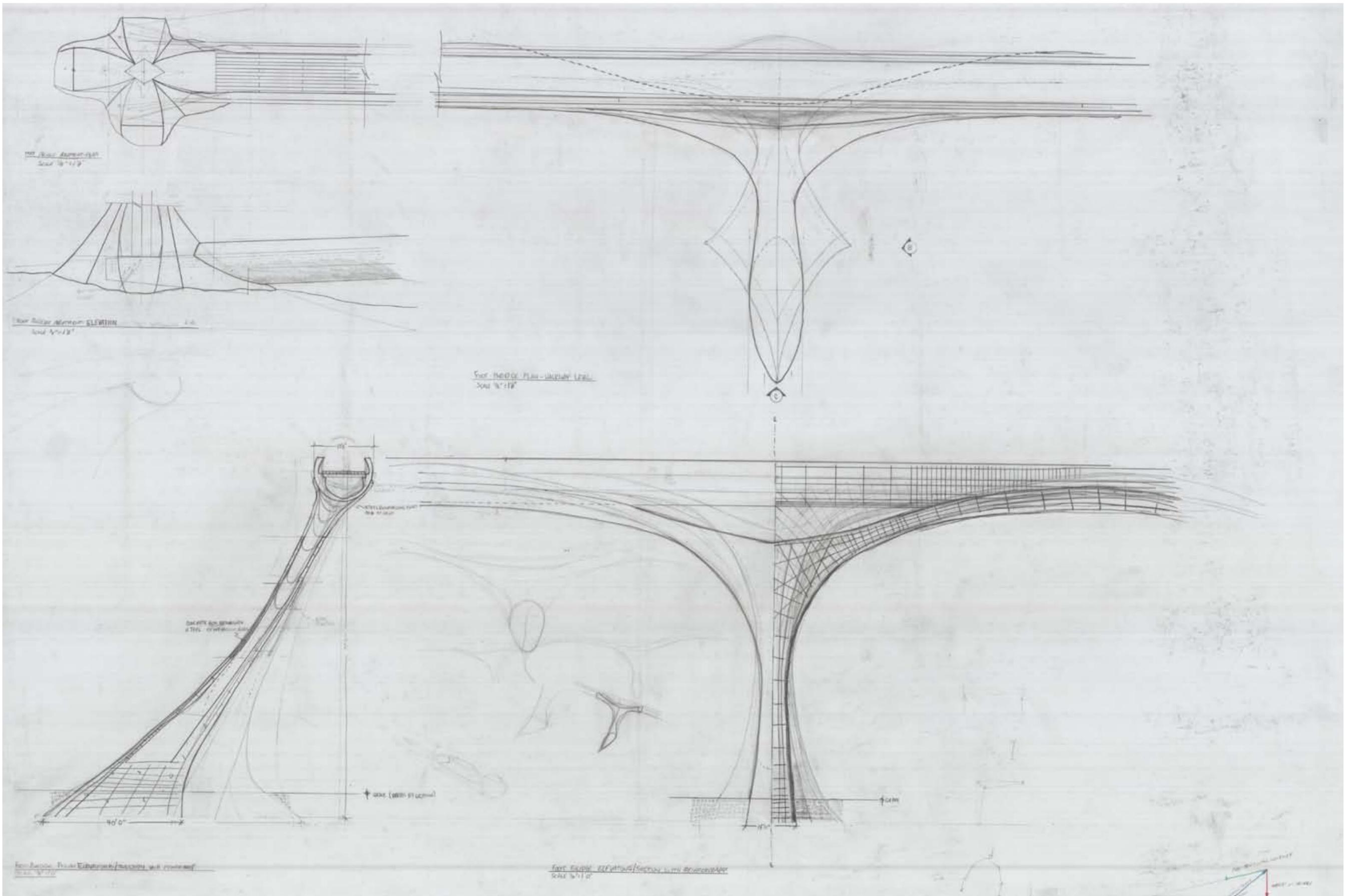


Plate 27 - Bridge Support Plans, Sections and Elevations

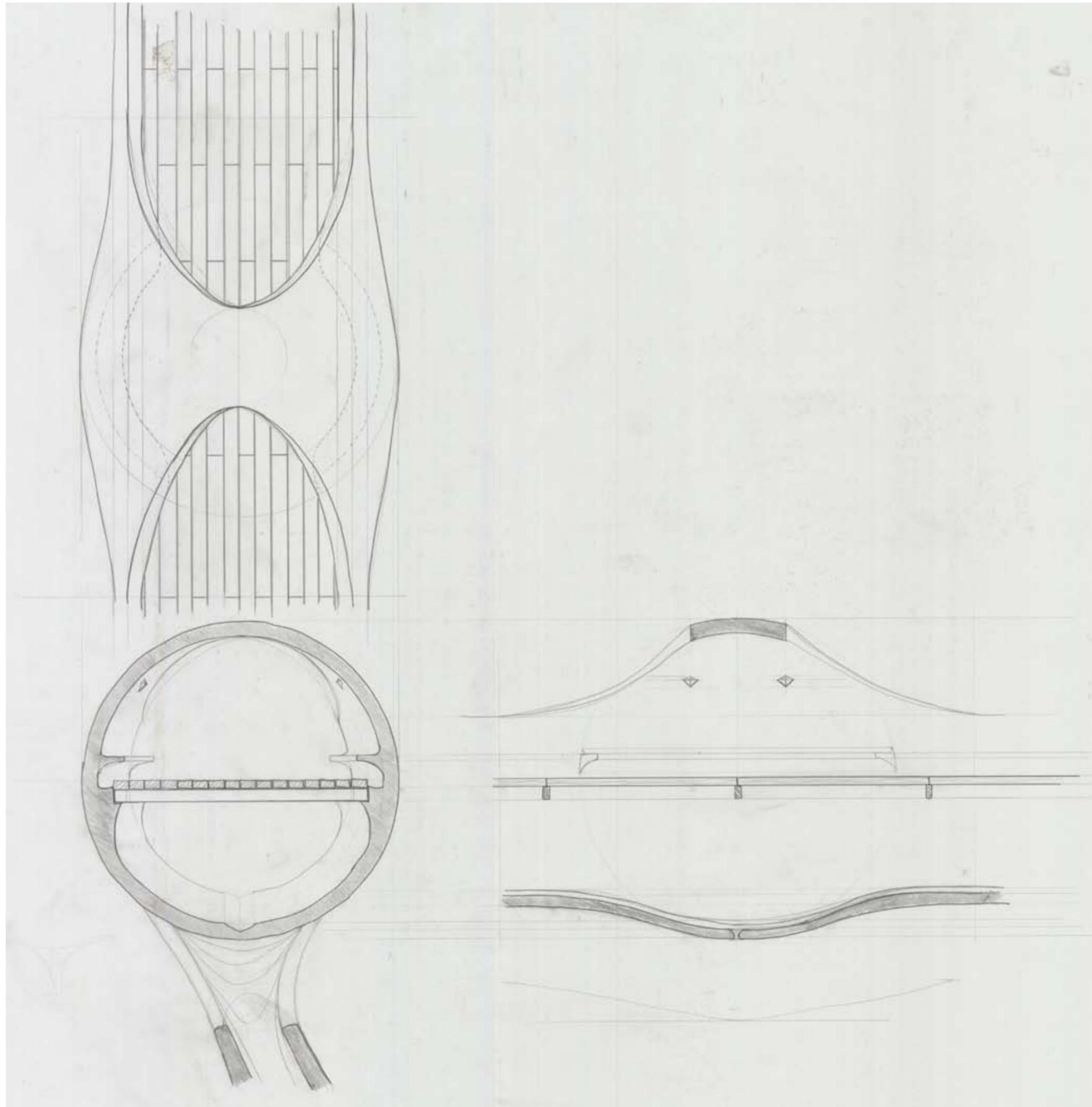
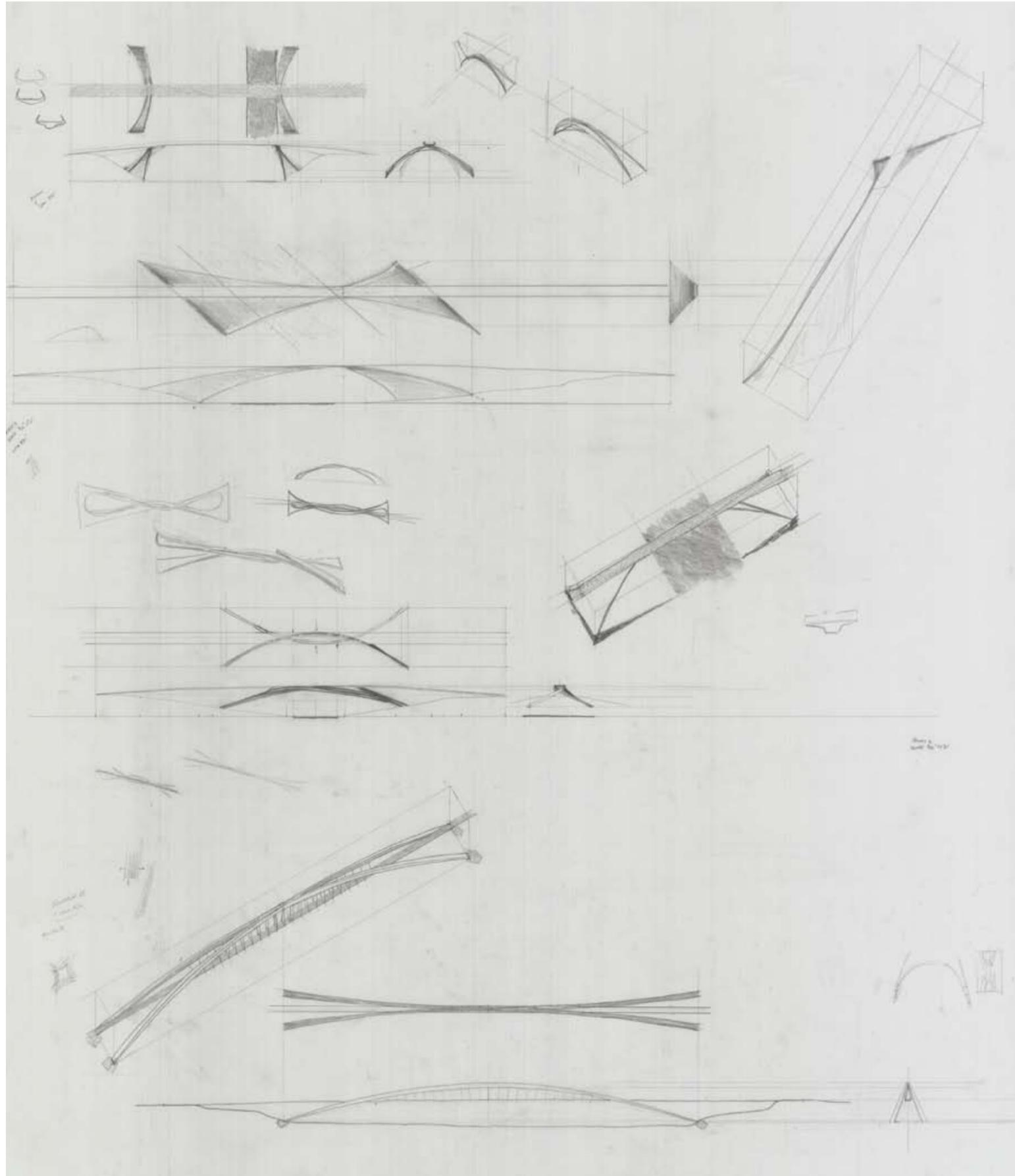


Plate 29 - Repose Area Plan and Sections

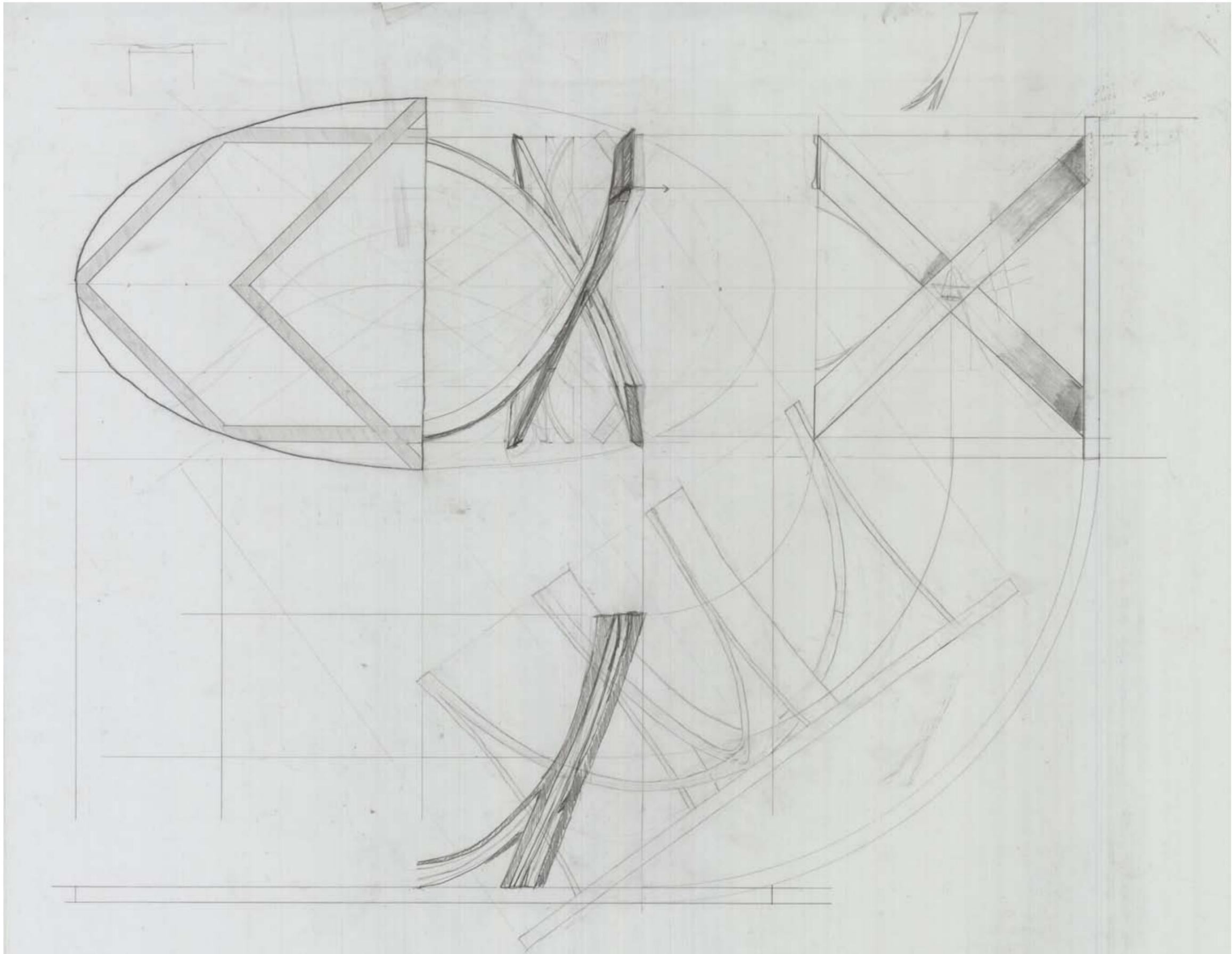


Table

Originating during the Expression of Impression inquiries, the design and fabrication of the table both informed and was informed by other aspects of the project. As an exploration of structure, it maintained a close dialogue with the ribs and upper deck supports of the tunnel. More importantly, working with a material object provided a sometimes necessary diversion to work through design challenges. Simply diverting the conscious mind to another task allows the subconscious to work the problem and inevitably a proper course appears. This table materializes the eutopian basis of the thesis investigation as a place for the gathering of friends for civil discourse.



Plate 31 - Discourse among friends



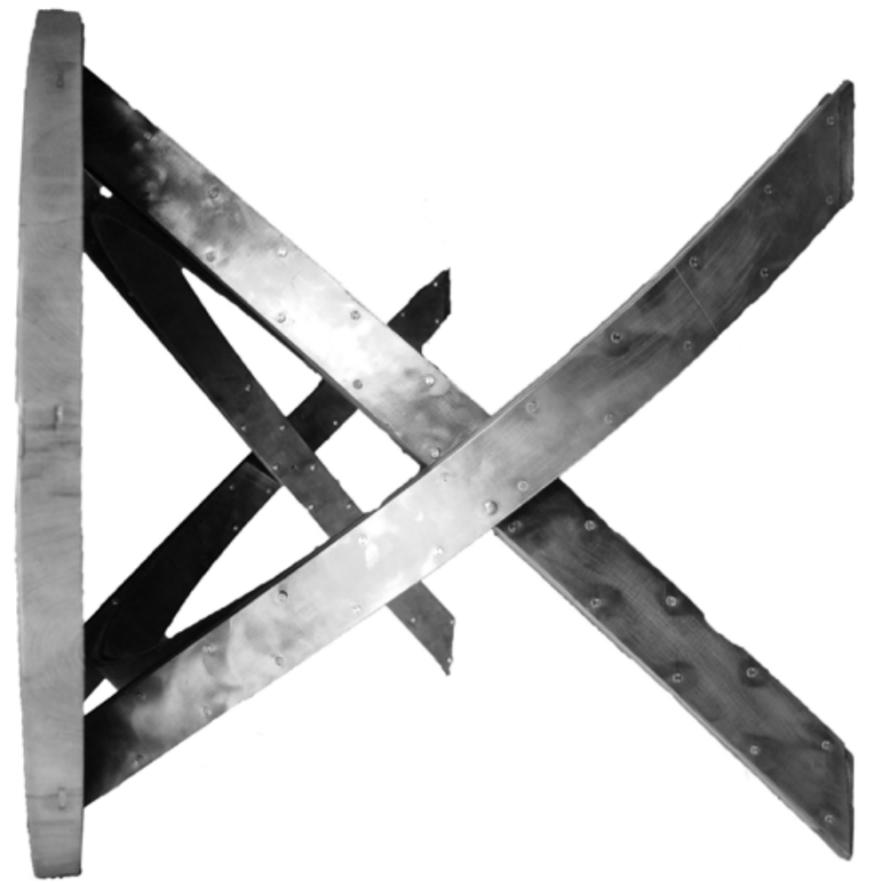
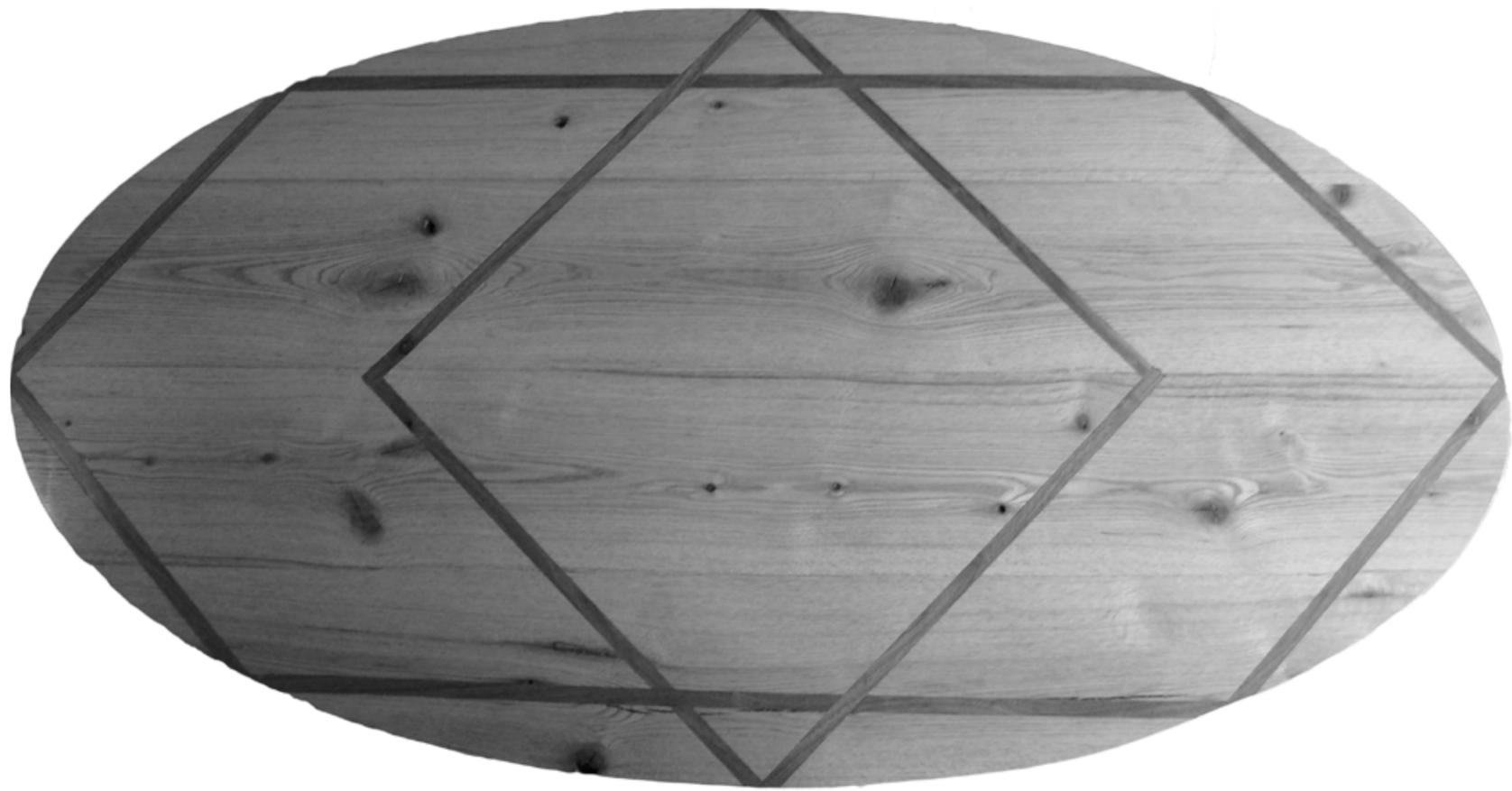


Plate 33 - Table

Bibliography

Bill, Max. Robert Maillart. Girsberger: Zurich, 1955.

Magee, John Gillespie, Jr. "High Flight." Retrieved from <http://www.deltaweb.co.uk/spitfire/hiflight.htm>

Wright, Frank Lloyd. The Industrial Revolution Runs Away. Horizon Press: New York, 1969.

Wright, Frank Lloyd. The Living City. New American Library: New York, 1963.