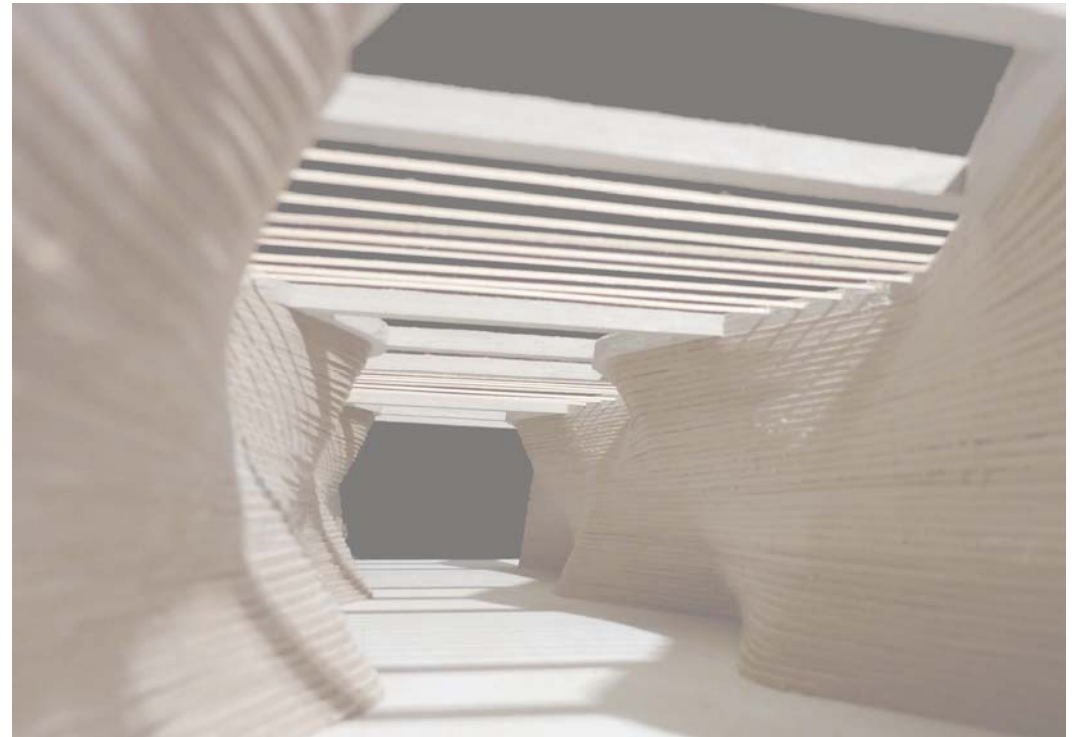


# AN EXPLORATION OF THE MASONRY WALL

A Masonry Institute and Training Facility in Alexandria, Va





AN EXPLORATION OF THE MASONRY WALL

John Michael Wirth

Thesis submitted to the faculty of the Virginia Polytechnic  
Institute and State University in partial fulfillment of the  
requirements for the degree of

Master in Architecture  
in  
Architecture

Susan C. Piedmont-Palladino, Chair  
Jaan Holt  
Paul F. Emmons

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Alexandria, Virginia

Keywords: Masonry Institute,  
Walls, Masonry, Bricks

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I dedicate this thesis to all my family, who proudly supported me and provided encouragement throughout my education and pursuit of a Master of Architecture degree.



# AN EXPLORATION OF THE MASONRY WALL

John Michael Wirth

## ABSTRACT

The teaching of the user through the clear understanding of the building they encounter on a daily basis is the intent of this thesis. Can a user learn how a brick wall is constructed, by looking and interacting with the brick wall they sleep within at night? Is it easier for one to understand his/her built environment if the construction is done in a manner that makes the means transparent, versus hidden tricks within the materials. Through the study of honest and truthful use of materials and construction methods, this project explores if a building can teach.





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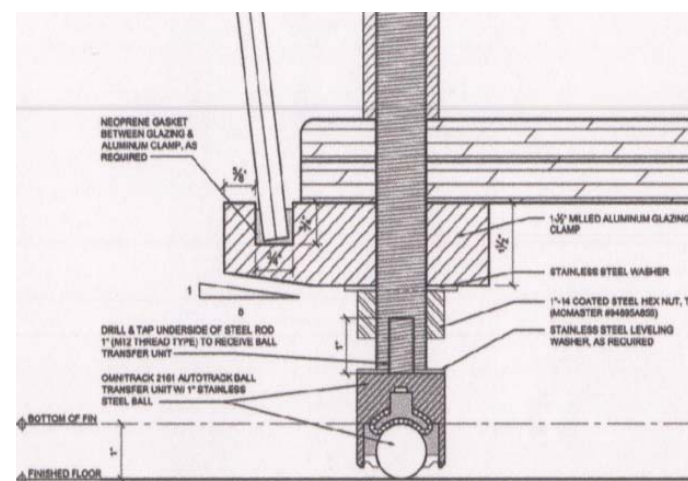
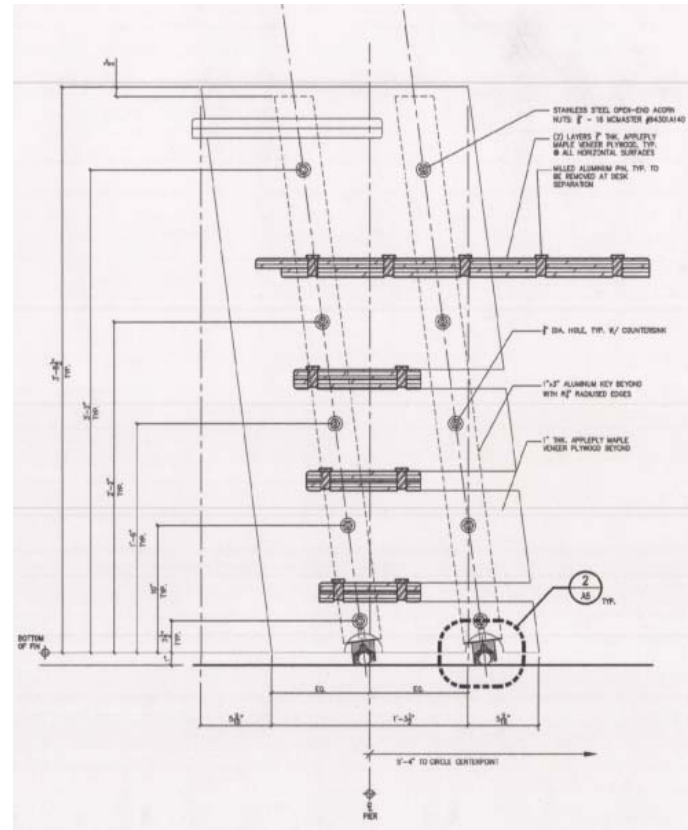
## Presidential Helicopter Facility's Reception Desk: An Introduction to Material Thinking

One of the main focuses during my thesis was the design development, construction, and installation of a commissioned reception desk for the new Presidential Helicopter facility on the Patuxant Naval Base. A team consisting of several students worked for 6 months bringing a competition decided design to a physical element. During the course of construction, many long hours were spent in the wood shop with the team bringing the desk to the physical world from the virtual world, with the understanding that this desk would have to endure the daily use at the new facility.

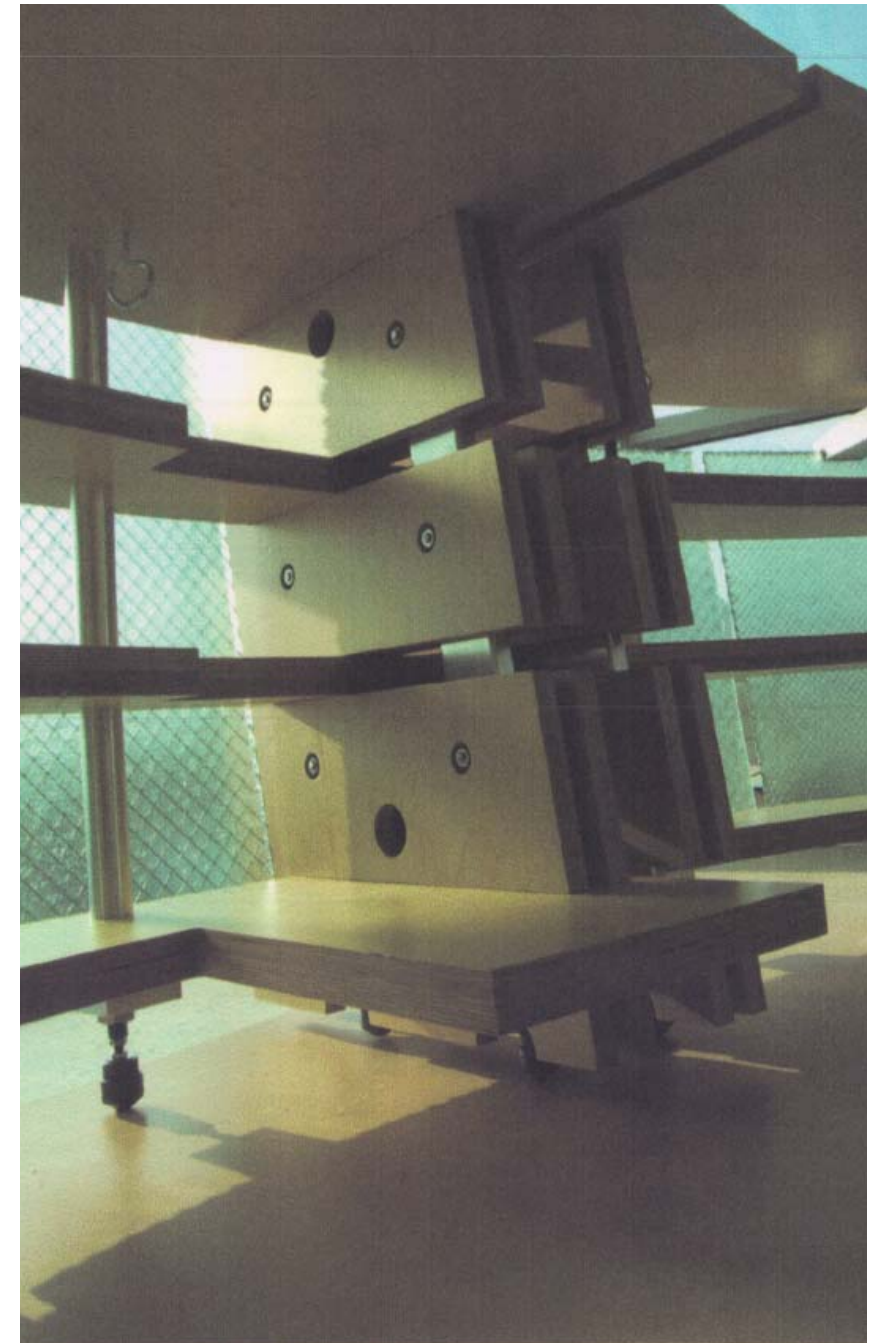
During the process of realizing the final desk, I learned through both design and construction a wealth of information about tolerances and material usage. As fabrications began, it was quickly understood that the wood work and metal work were not the same. The wood and glass construction allowed for much greater tolerance than the metal work. Figuring out how to deal with these different acceptable tolerances was a challenge, but made for great satisfaction when pieces did come together.

I have always been a believer in that people learn the most from their mistakes, and a lot was learned during the construction of this desk. Many mistakes and assumptions were made making us gather our thoughts and come to new solutions.

This desk is one of the projects I will always look back on as being a pivotal moment in my architectural career. It changed the way I think about the zoomed-in design challenges that I face continually in the professional environment.

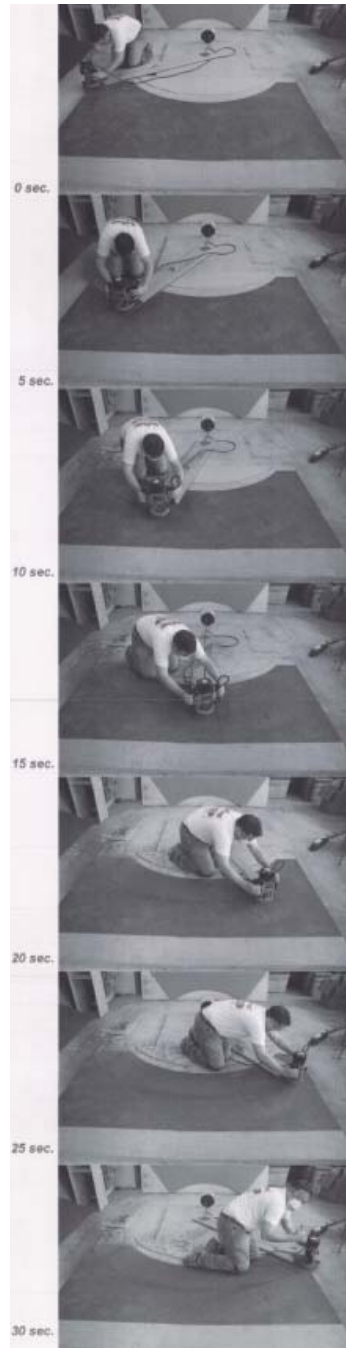


section details



main support fins and shelving





fabrication of arc templates



assembled desk

## PROCESS

During the course of my thesis I explored the process of constructing and the expression of this constructing through architecture. Can a building's user learn or easily read the way a building was constructed? You can look at reading a building as breaking it down to simple items as structure, building skins, division of spaces, and how all these go together.

I studied work by Louis I. Kahn, Eladio Dieste, and Roto Architects. By looking at these architects, I was able to get a good of idea of the history and future of masonry construction. Louis I. Kahn is well known for his expression of the brick. Eladio Dieste was a pioneer in using bricks in a way not seen before. Roto Architects are pushing the advancement of a historically known material into the architecture of tomorrow. Each one of these architects has something to learn from and take away about the use of the brick in architecture.

Much of my inspiration for this project came from Eladio Dieste's Church of Christ the Worker. This church was designed and constructed with two parallel load bearing serpentine walls. These walls allow for the brick to take on a feminine quality that is not usually understood for the brick. We are accustomed to see the brick as a rigid material. Eladio was able to take this rigid hard lined unit and by constructing them with slight adjustments, is able to get beautiful curves that dance around the users. The brick becomes a material that one must touch.

Roto Architects takes over where Dieste left off with the advancement of masonry construction. One of Roto's recent projects was the architecture building at Prairie View A&M University. This project is a great example of an innovative use of the brick. Roto designed a masonry wall that corbels out in a gravity-defying gesture. The one problem with the wall is that it is constructed in a manner that is misleading and hides secrets within, unlike some of Kahn's or Dieste's work.

After studying the different uses of masonry by the above architects, I began to put together my own understanding and desire. I looked at how I can design a facility for students that would allow the building to provide the required program and offer itself as a learning tool. I wanted to the students to eat, sleep, and work with bricks amongst them. This was only fitting, since it is a masonry institute. The students would sleep in the wall, clean themselves in the wall, and exhibit their works amongst the walls.

During the making of my study models and drawings, I tried to do things in a matter of construction. One of my study models was actually built one brick at a time. I also did several drawings by using construction paper and building the drawing.

After many tries of designing a building that tells the user about itself, I kept coming back to the imagery of some of Dieste's work. I began to explore ways that a masonry wall could open up by manipulating bricks and how they corbel out. You can see some of the drawings and models of these studies of a window seat built within the wall. These ideas ended up further developing into a much larger architectural gesture.

I did many studies on how I could use two serpentine masonry-bearing walls to create a great outdoor hall. This hall would be used for exhibiting, teaching, and entertaining. The walls were designed to act as one once finished. They would be built to the top course and then capped with precast concrete coping, which would allow for compression beams and tension wiring to be incorporated. There would also be two ramps that would follow the curving walls down, allowing the user to engage with the wall.

Once I had developed the design for the great learning hall, I began working on both the dormitories and classrooms. These spaces would be created through the use of a series of masonry fin walls. These walls are very rigid and hard lines, which plays with the geometry and soft lines of the adjacent great learning hall walls. The fin walls would also be a place for things to occur. I wanted the student to live within the walls. For this reason all the masonry walls are more than two feet wide and have programmatic requirements built within. The beds fold down from the wall. The shower is within the wall.

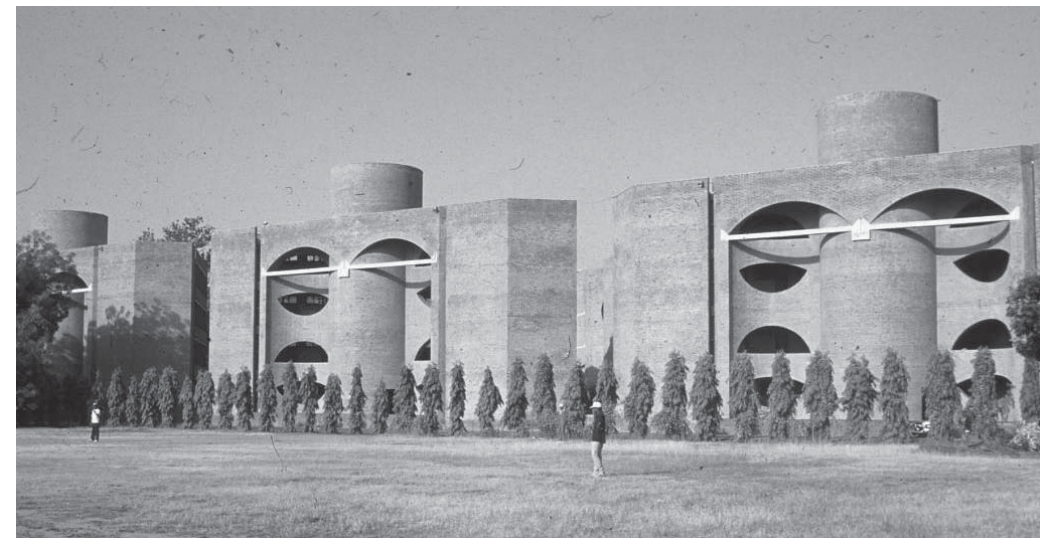


image a: The Indian Institute of Management Ahmedabad - Louis I. Kahn





image b: Church of Christ - Eladio Dieste



image c: Church of Christ - Eladio Dieste

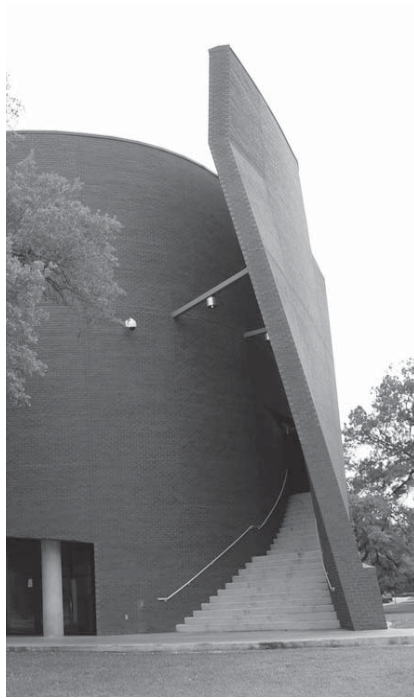
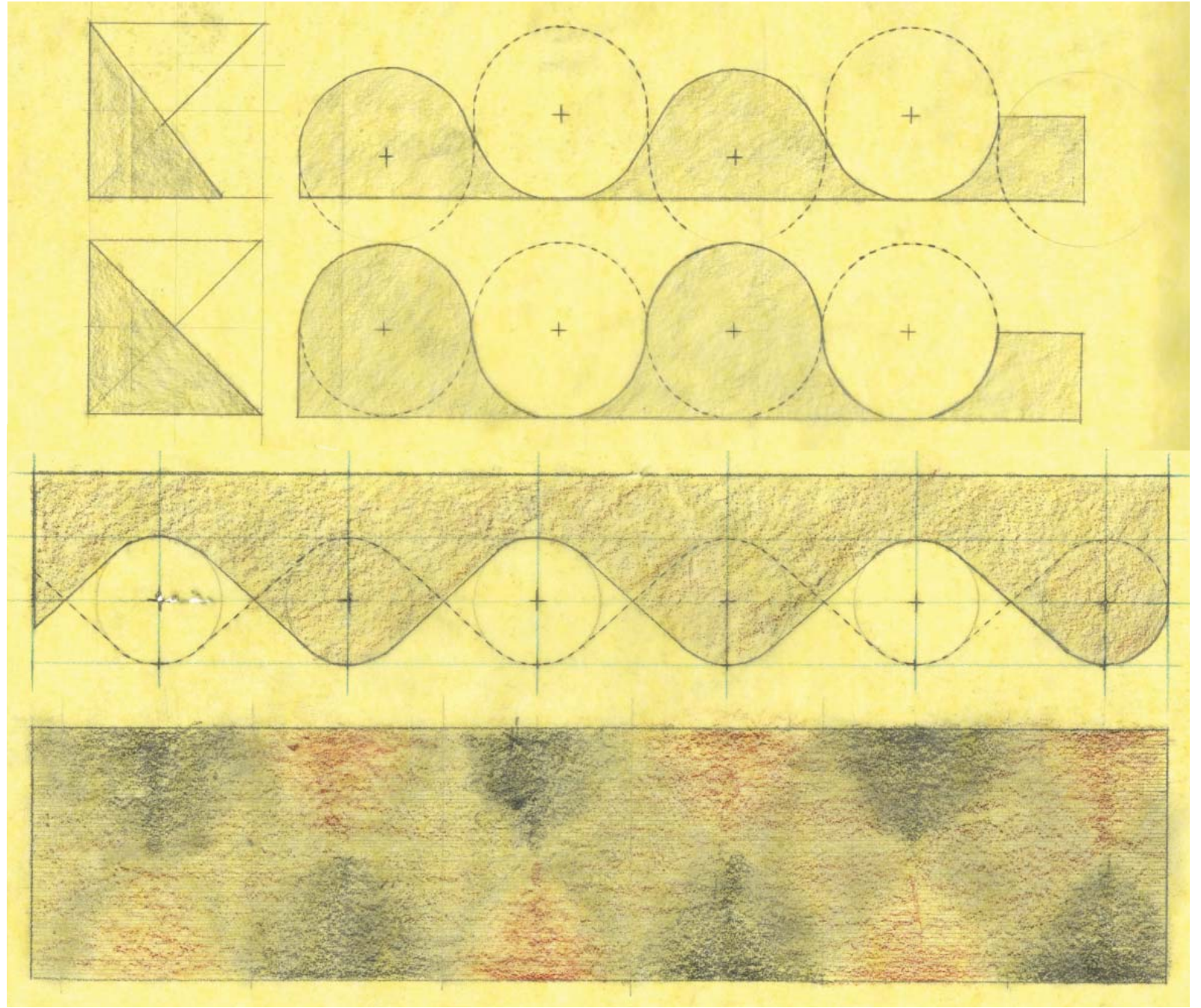
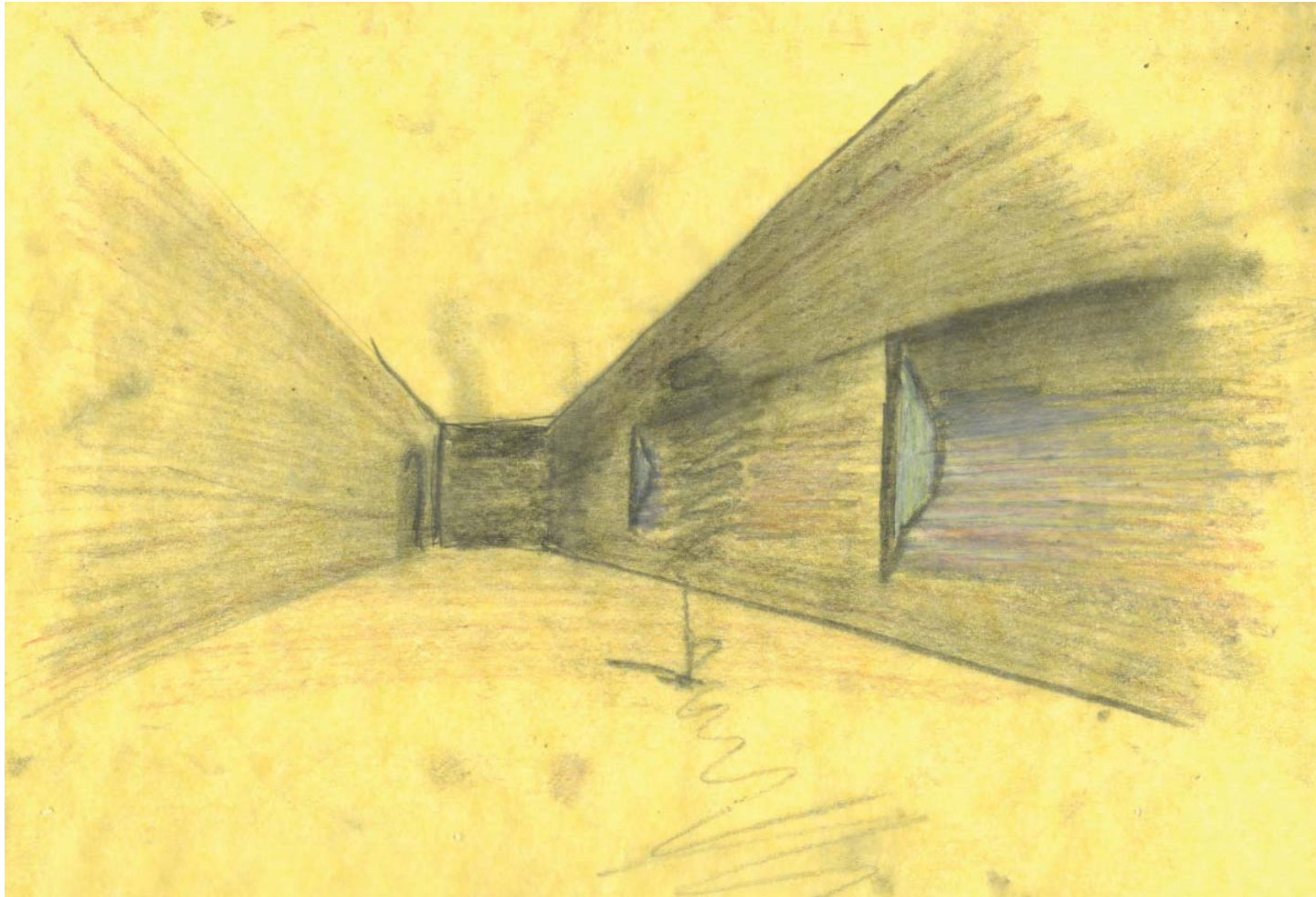


image d: Prairie View A&M - ROTO

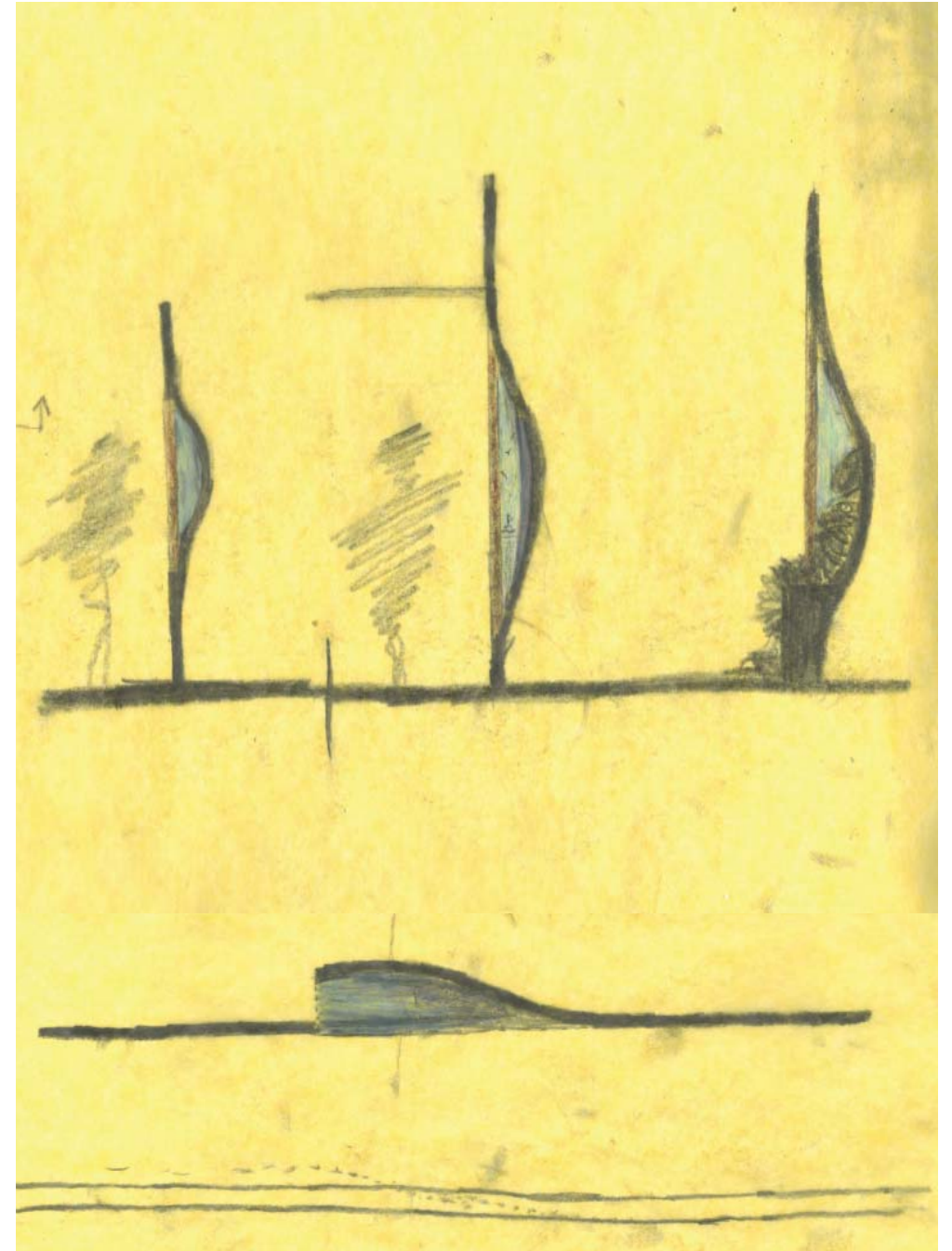


plan and elevation study



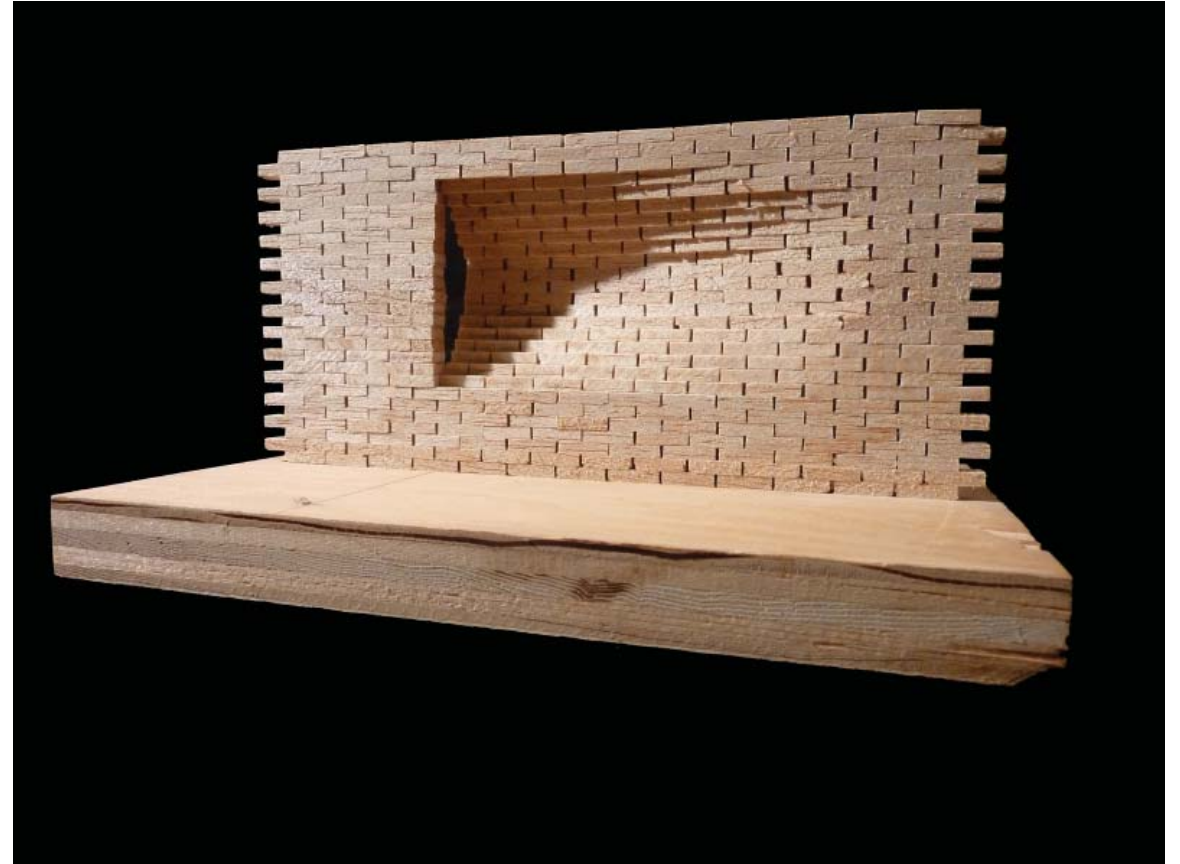
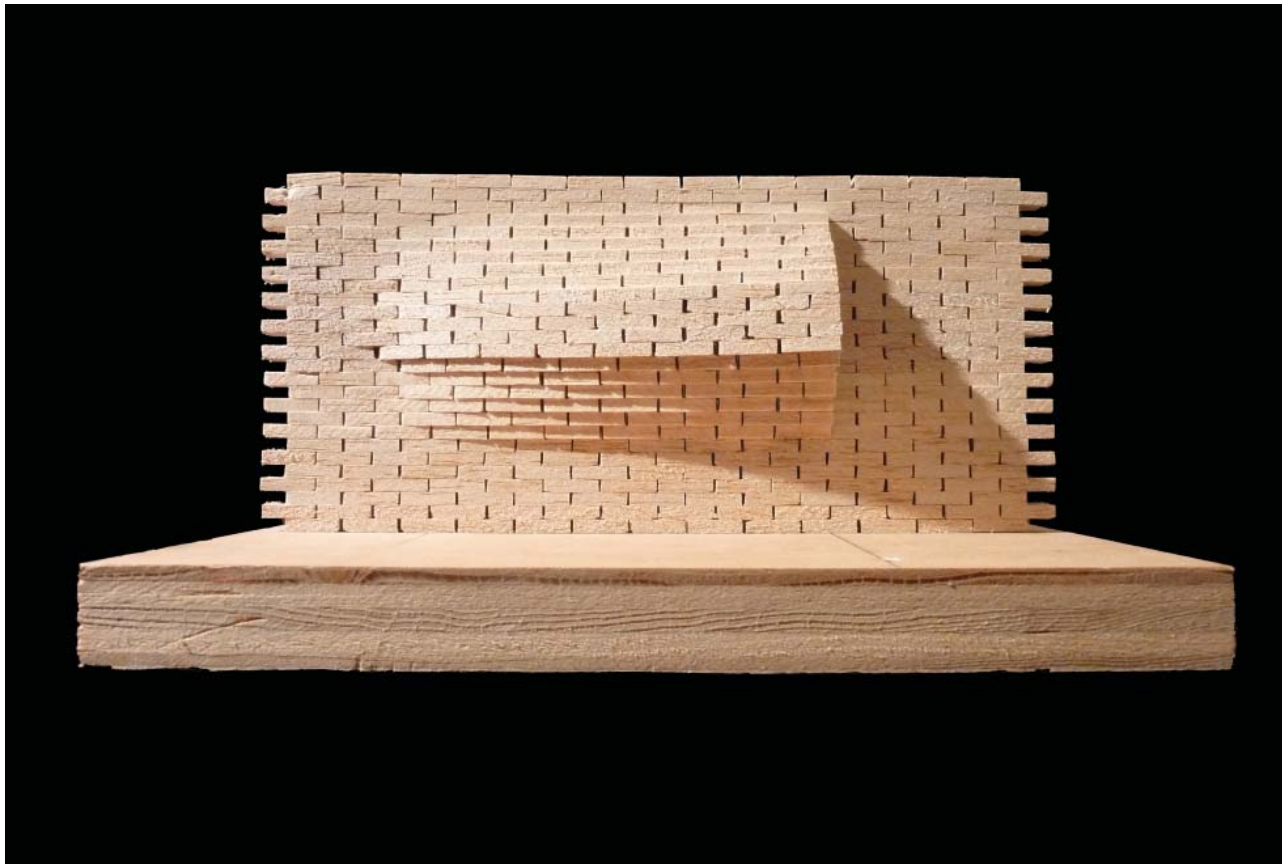


Study drawings and models of a seat wall within the masonry wall. The opening of the masonry wall is created by corbeling the bricks out and then back to meet the wall again. The model on the right was built with model bricks and was laid as the mason would do in the field.



masonry wall study drawings

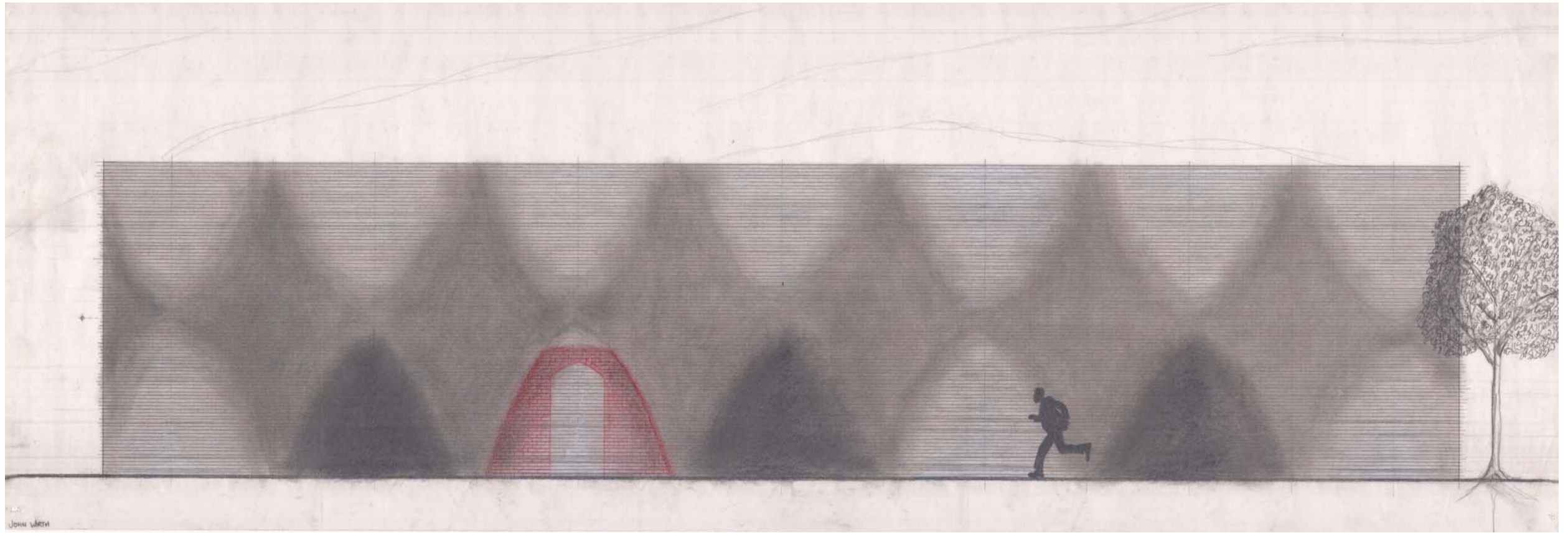




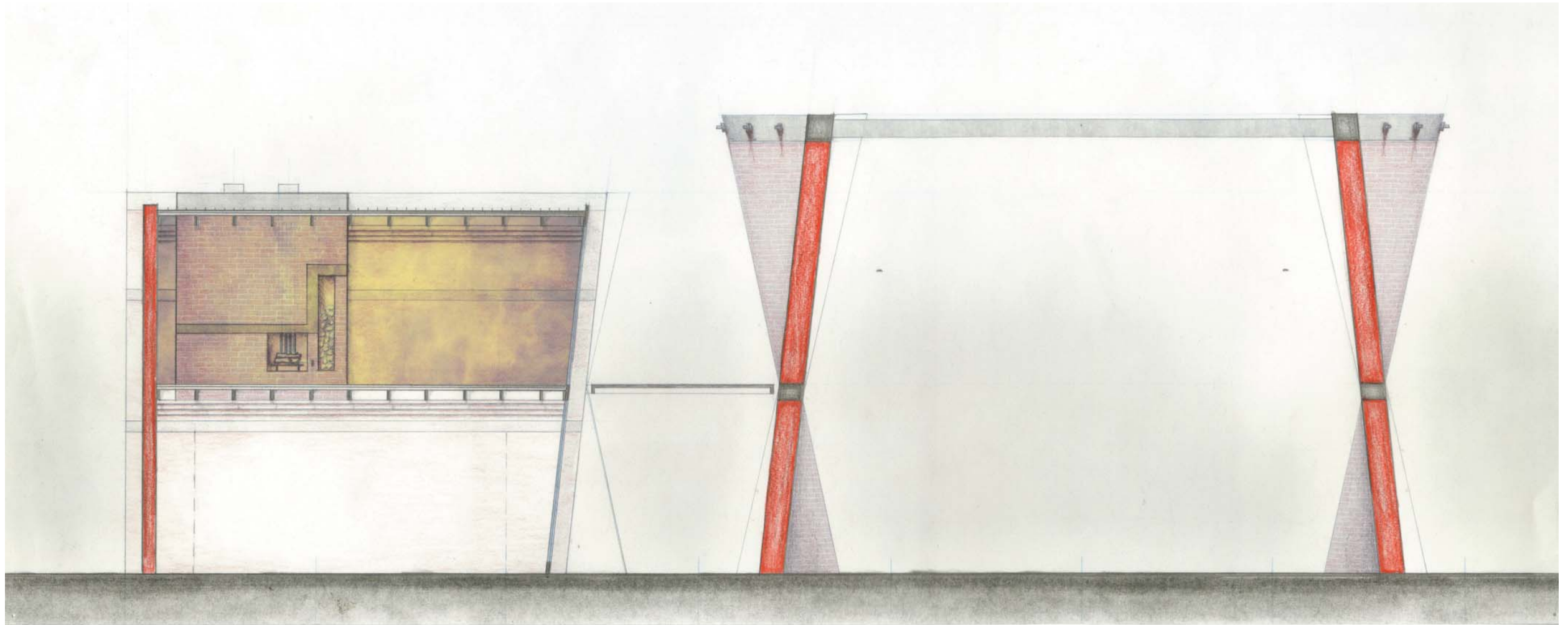
masonry wall study model





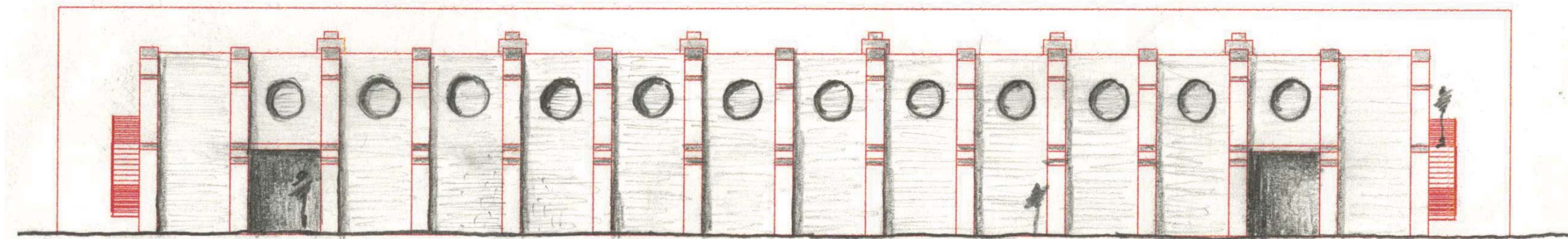
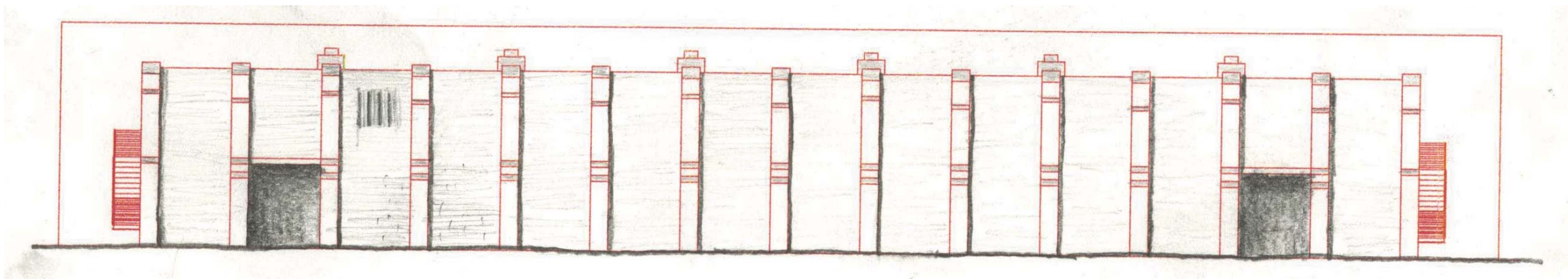
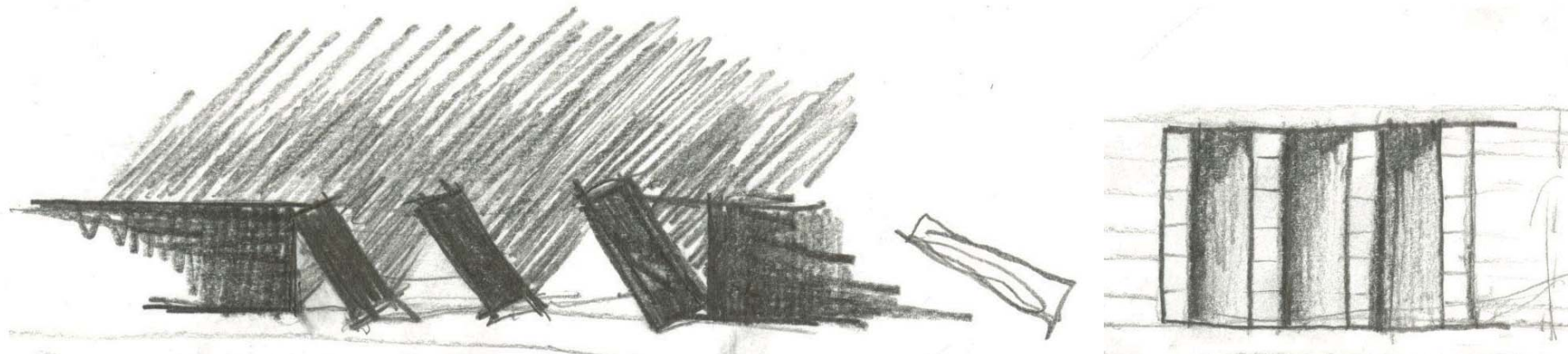


elevation study drawing



dormitory and great hall section drawing





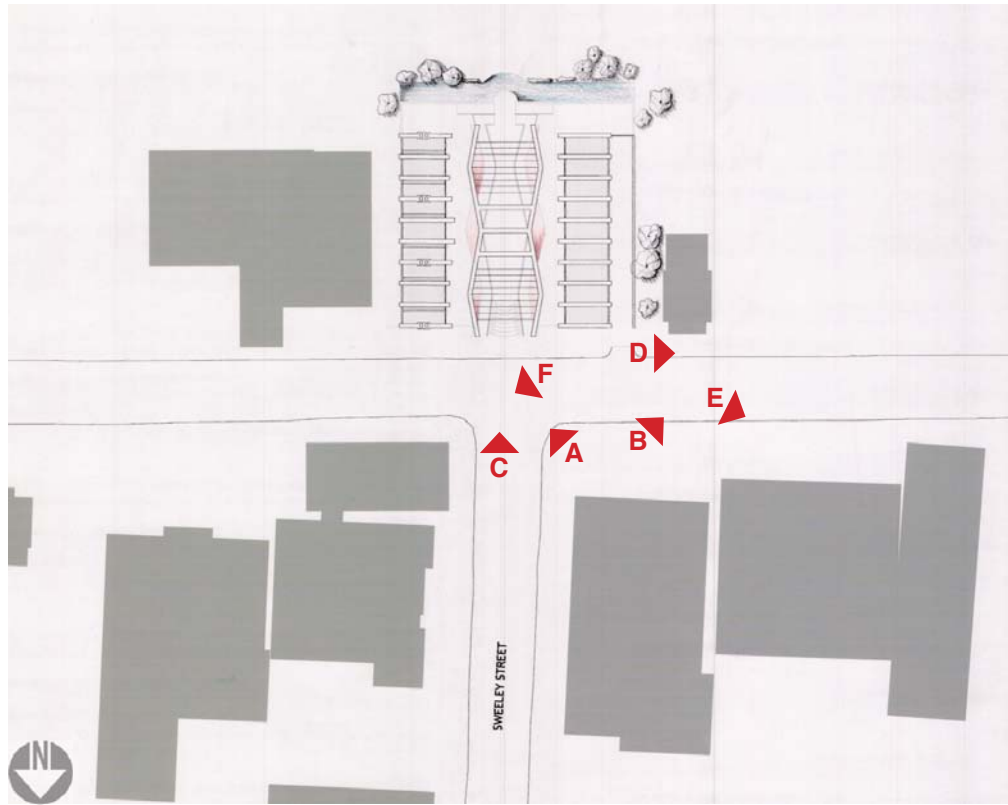
## PROJECT SITE

The site for the Masonry Institute is located in an industrial area of Alexandria Va, which is at the intersection of Colvin Street and Sweeley Street. The surrounding properties consist of uses such as car repair shops, metal fabrication shop, Alexandria transportation division parking lots, and animal boarding. The site lends itself to industrial uses.

The site for the masonry institute is on axis with the main street access to Colvin Street. The project is set up to be a landmark for this industrial area. Those arriving to this area will see this prominent building as they turn and drive up Sweeley Street. This also allows for a place for the students to showcase their work to the public.

The site also provides the necessary infrastructure to support an educational facility with students be housed on site. There are grocery stores, restaurants, pharmacies, and other needed facilities within short walking distance.





A



B



C



D



E



F

SITE PHOTOGRAPHS









SITE PLAN

# BUILDING PROGRAM

## Masonry Institute

The intent of the masonry institute is to provide a facility for teaching the trade of masonry to enrolled students. The campus will consist of the great hall, the learning center, and dormitories. It is here will the students will live and learn the craft of masonry work through hands on teaching.

When a wall falls during building, you must clean it up and build again. By following this mentality, the student will learn why the wall fell and how not to repeat the same result. Through this hands on teaching, lessons are etched in your mind forever.

## Great Hall

The great hall is a space for the institute to showcase the work of the school. It is also the outdoor amphitheater where lectures or larger presentations could take place. The space is defined by two masonry curving walls that are structural tied together by precast compression and tension systems as the uppermost level of the wall. Ramps lead the user down along the curving wall

## Learning Center

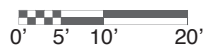
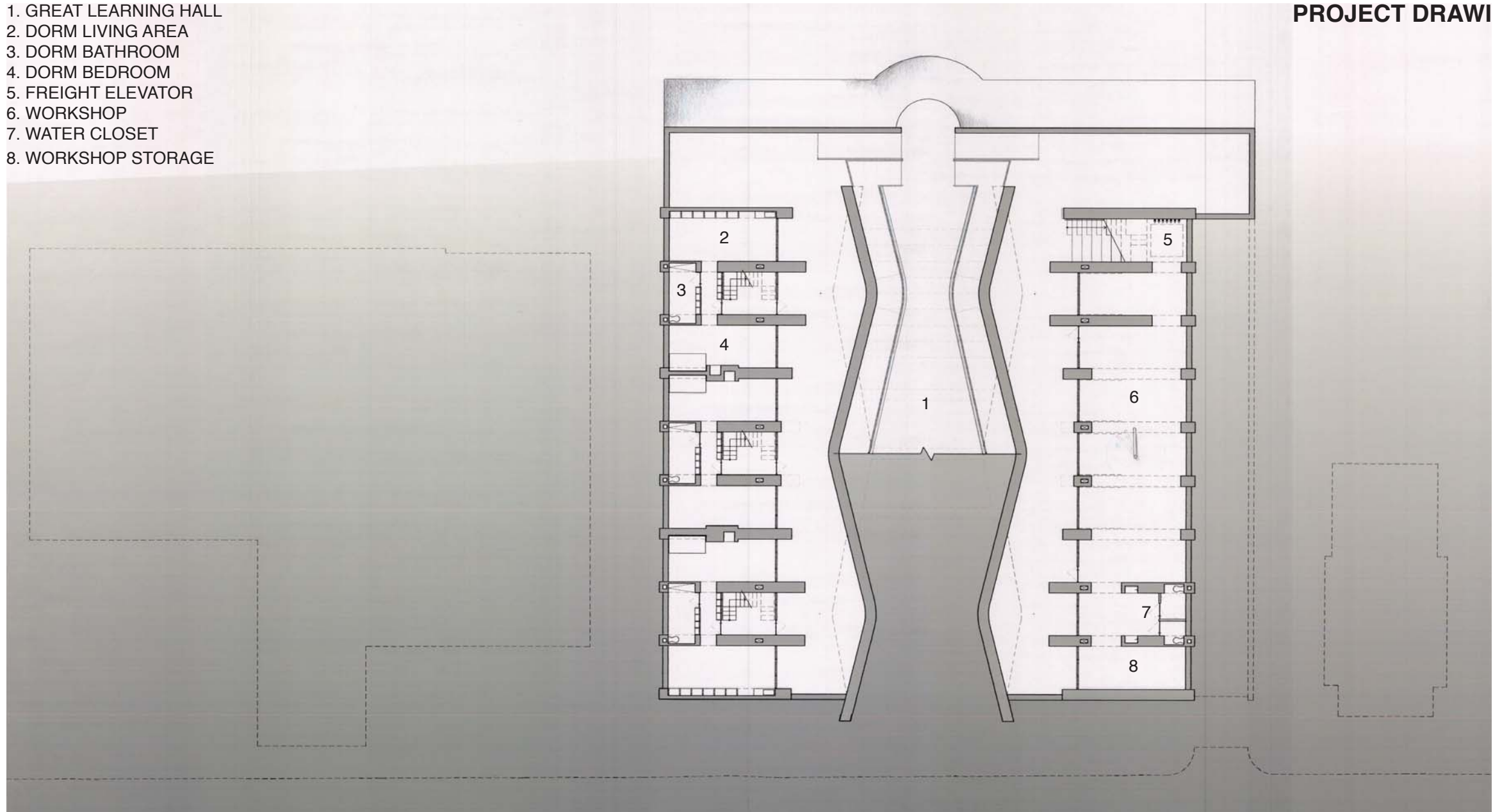
The Learning Center consists of classrooms, offices, and a workshop. This is where the students will learn about the history and future of masonry. They will also be able to get there hands dirty and build mock-ups and explore their own potential, pushing the limits of their own work.

## Dormitories

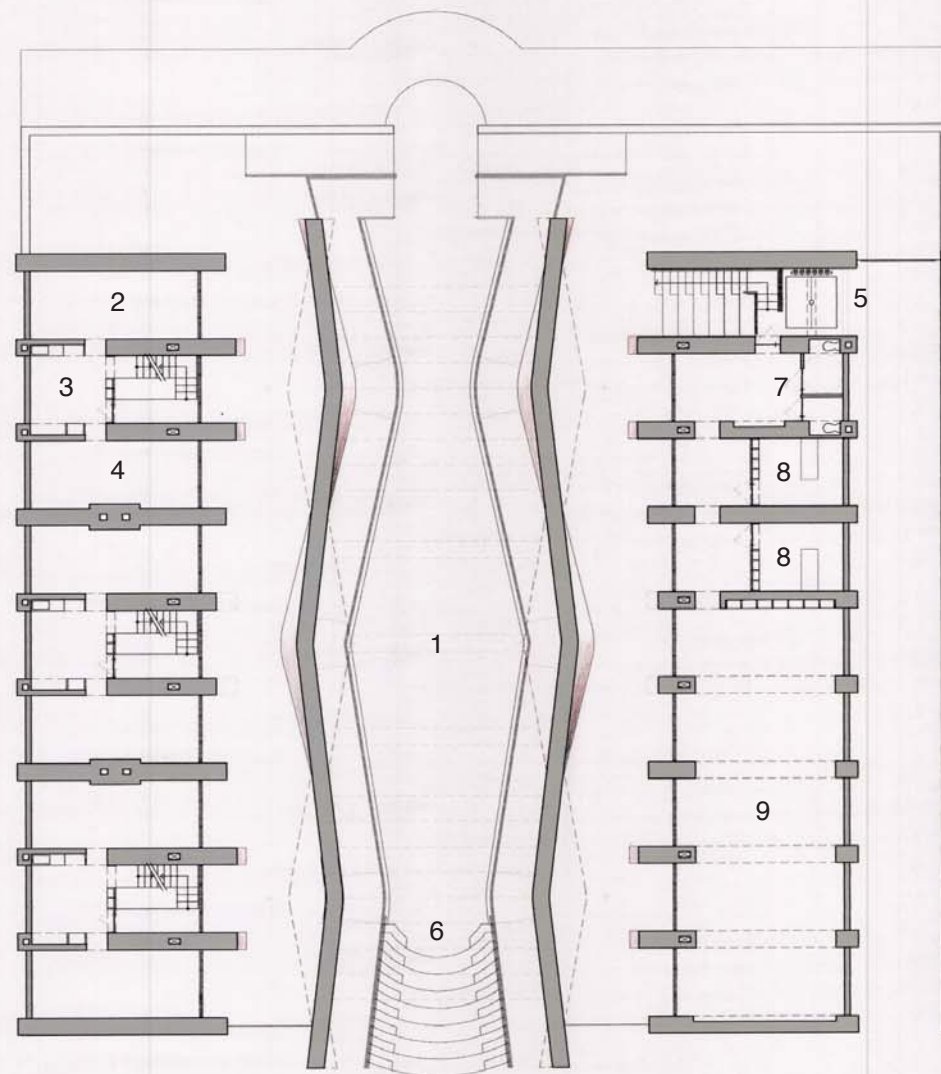
The dormitories allow for the students to live on the institute's site. The dorms are setup as a series of thick masonry walls that have many of the programmatic requirements within the walls. The beds, toilets, showers, and storage spaces are integrated with the wall. The user is intimately involved with the masonry wall in there living quarters.



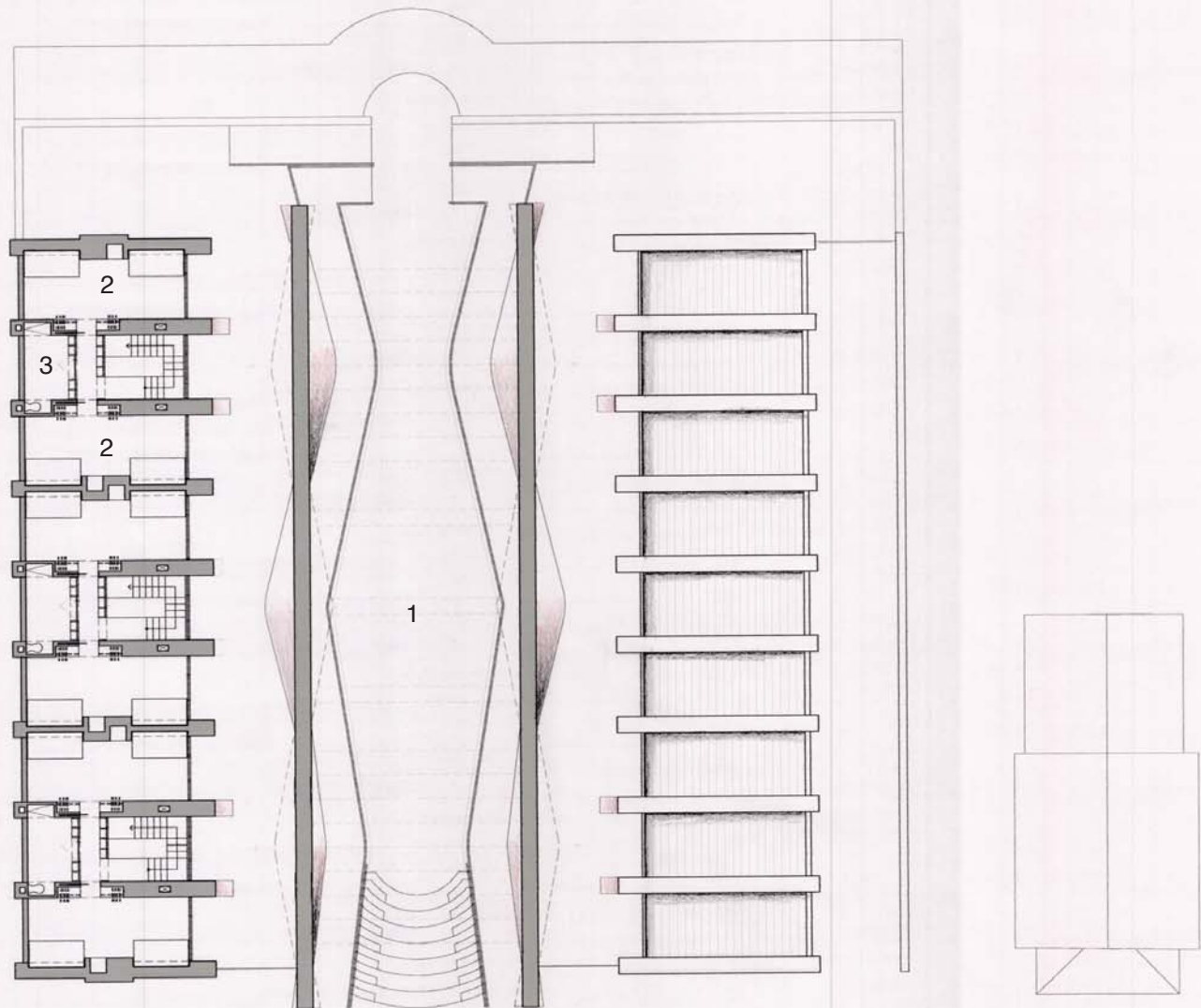
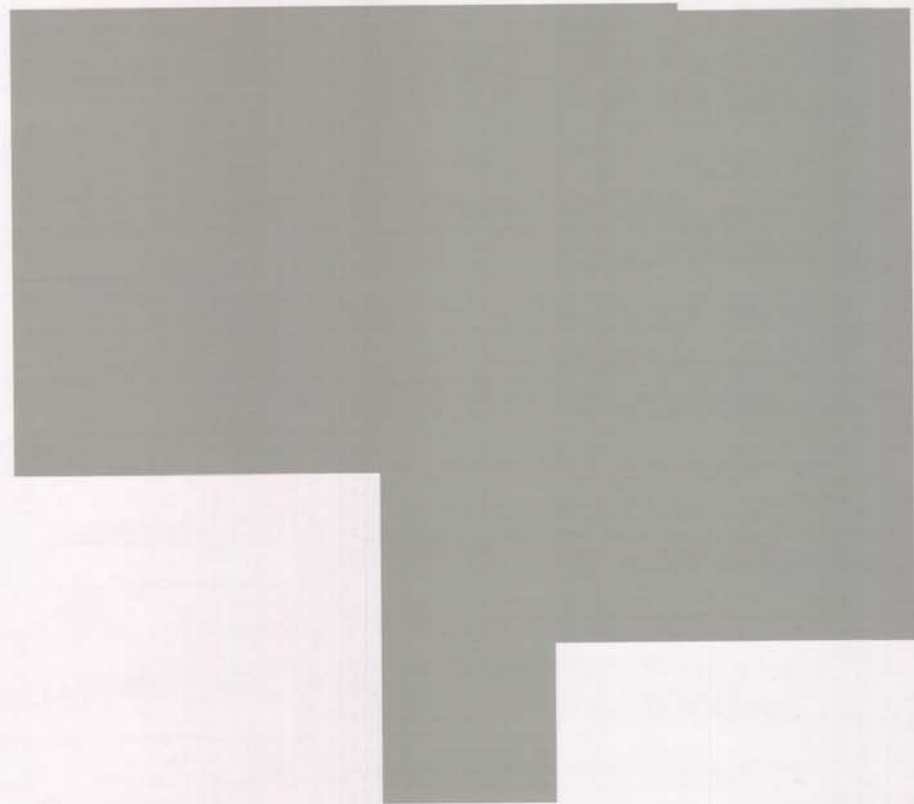
- 1. GREAT LEARNING HALL
- 2. DORM LIVING AREA
- 3. DORM BATHROOM
- 4. DORM BEDROOM
- 5. FREIGHT ELEVATOR
- 6. WORKSHOP
- 7. WATER CLOSET
- 8. WORKSHOP STORAGE

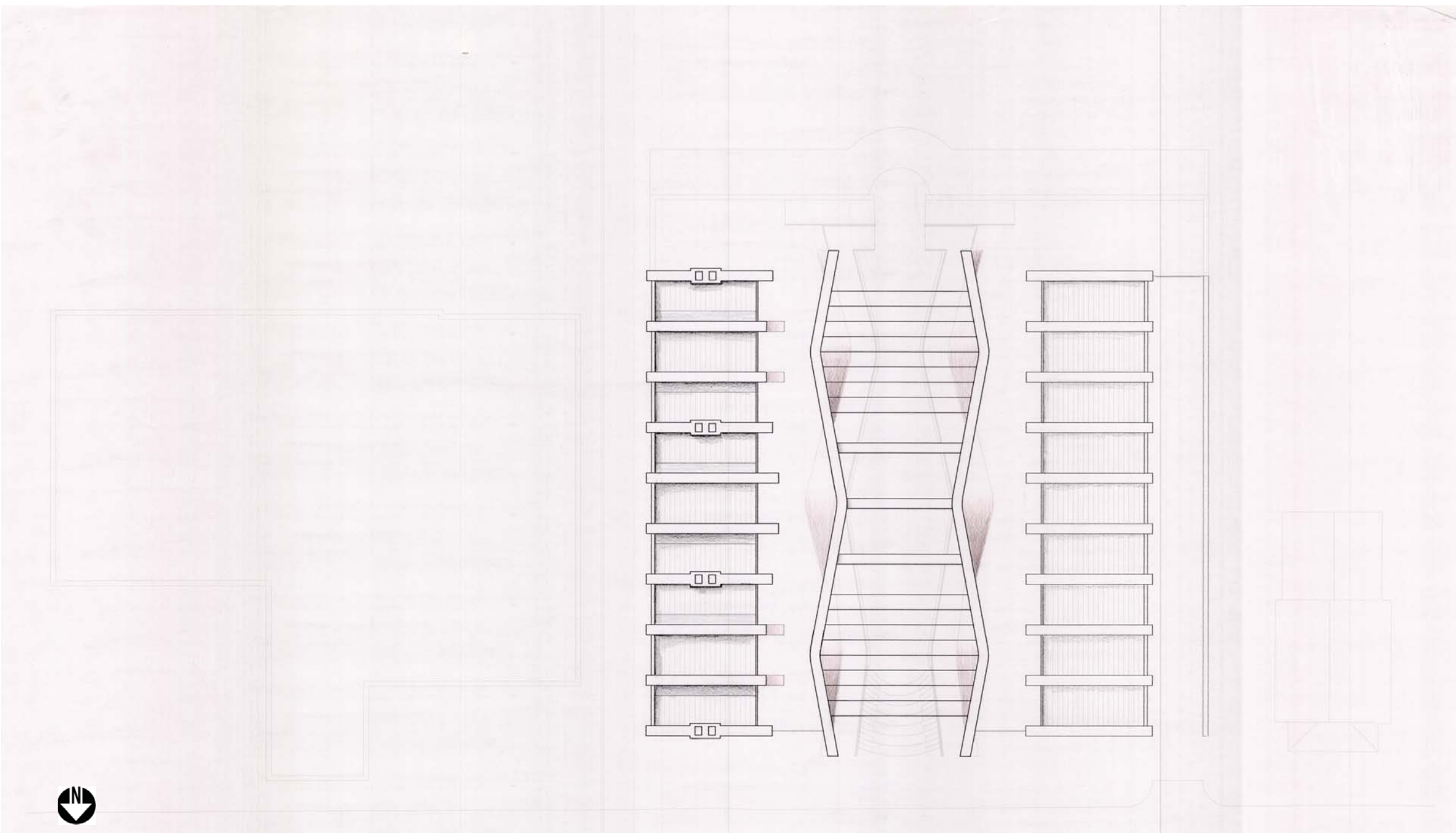


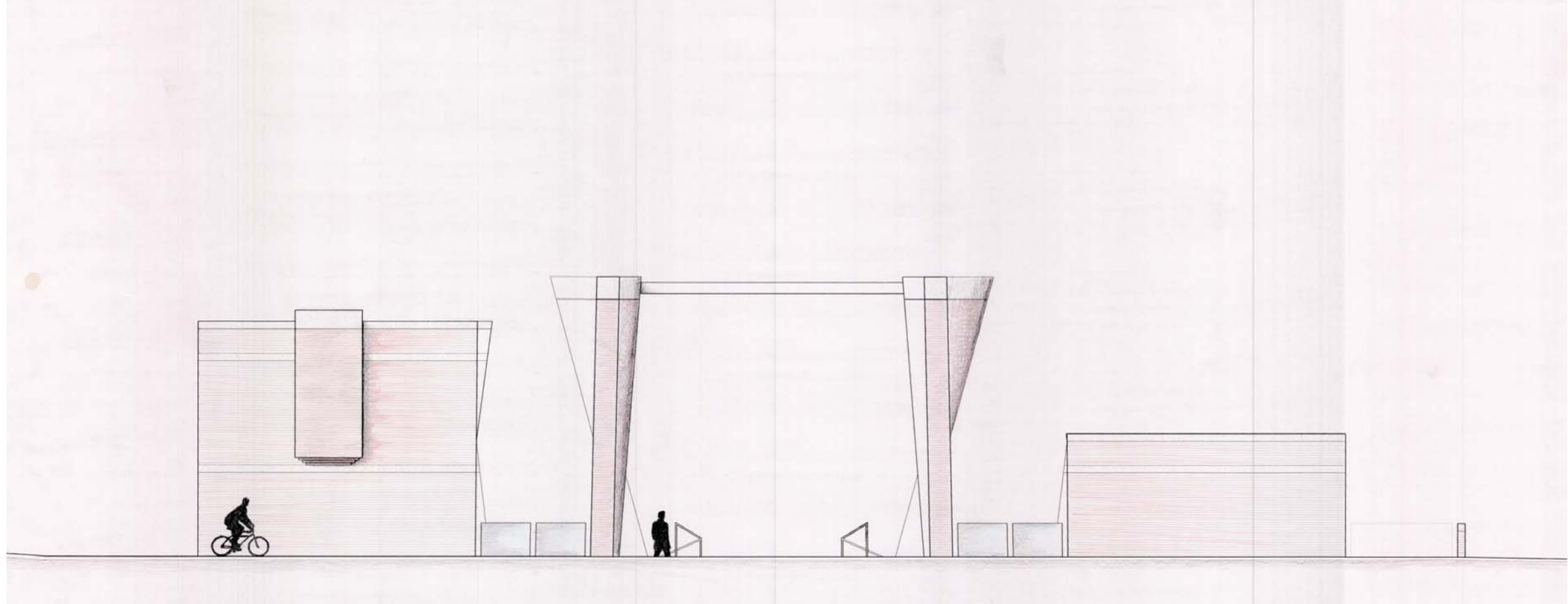
- 1. GREAT LEARNING HALL
- 2. DORM LIVING AREA
- 3. DORM KITCHEN
- 4. DORM DINING
- 5. FREIGHT ELEVATOR
- 6. GREAT LEARNING HALL AMPHITHEATER
- 7. WATER CLOSET
- 8. FACULTY OFFICE
- 9. CLASSROOM



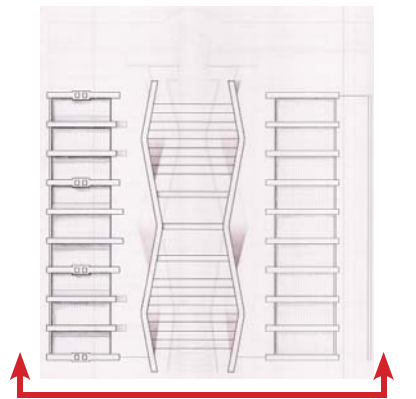
- 1. GREAT LEARNING HALL
- 2. DORM BEDROOM / STUDY
- 3. DORM BATHROOM
- 4. DORM BEDROOM / STUDY



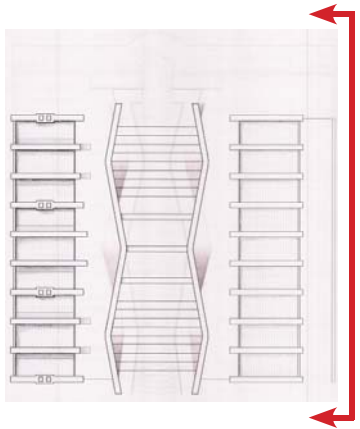
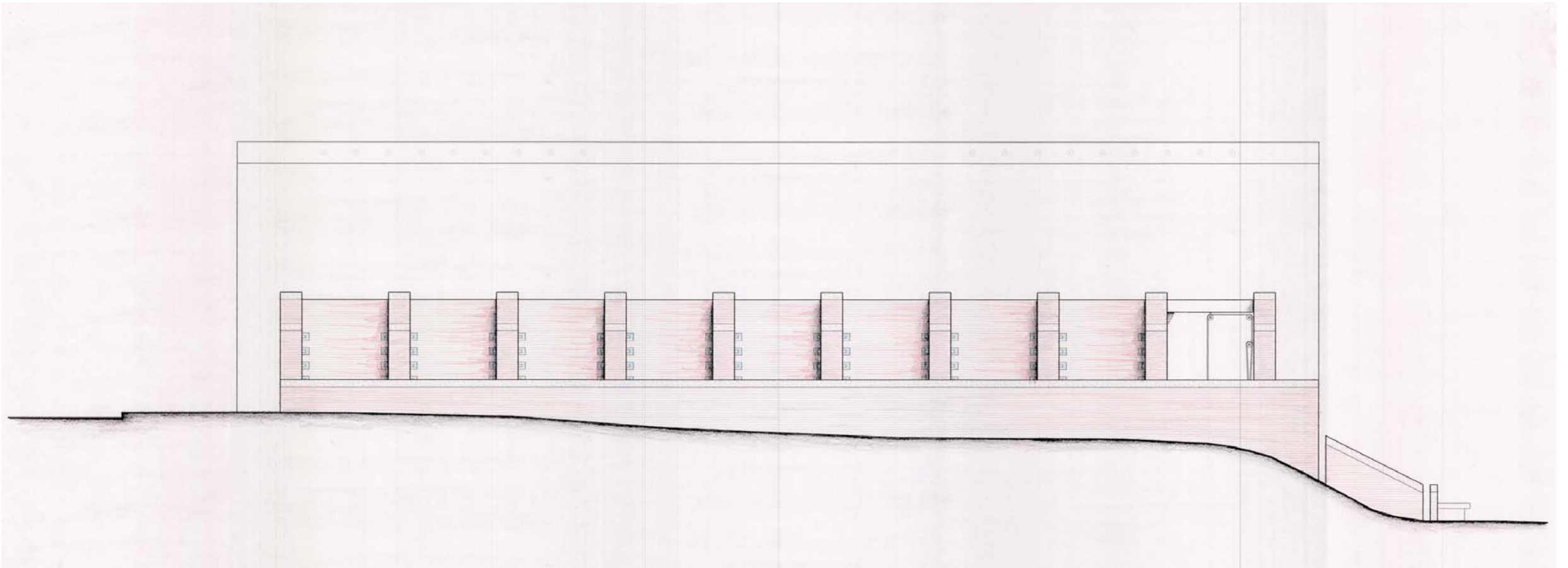




NORTH ELEVATION

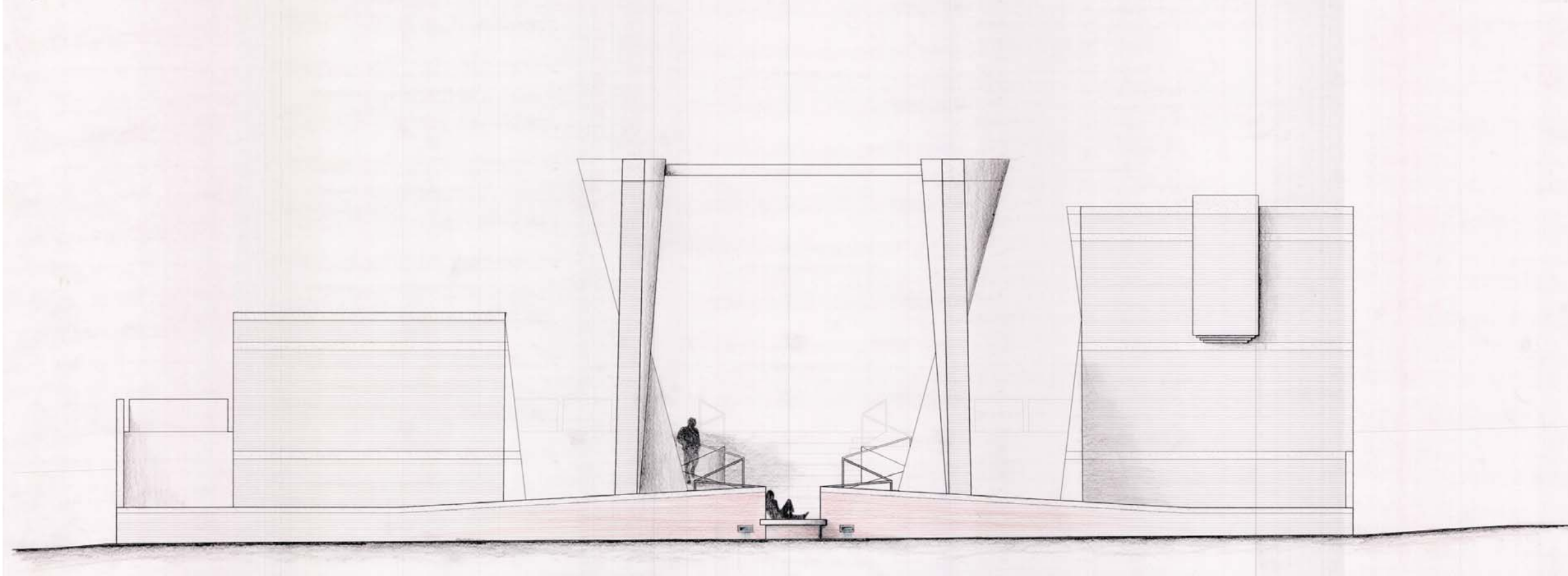




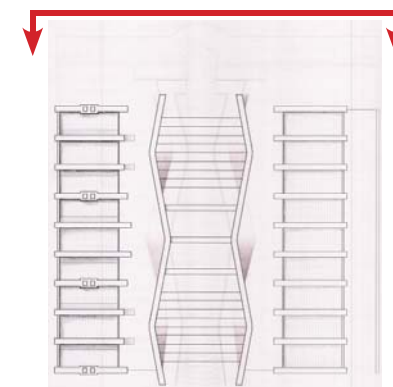


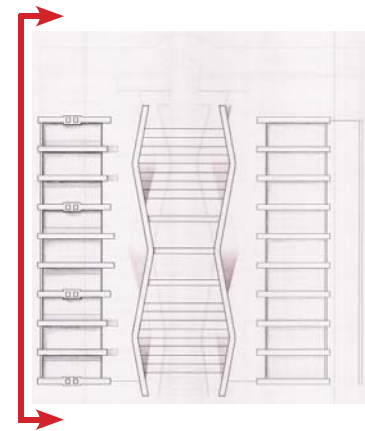
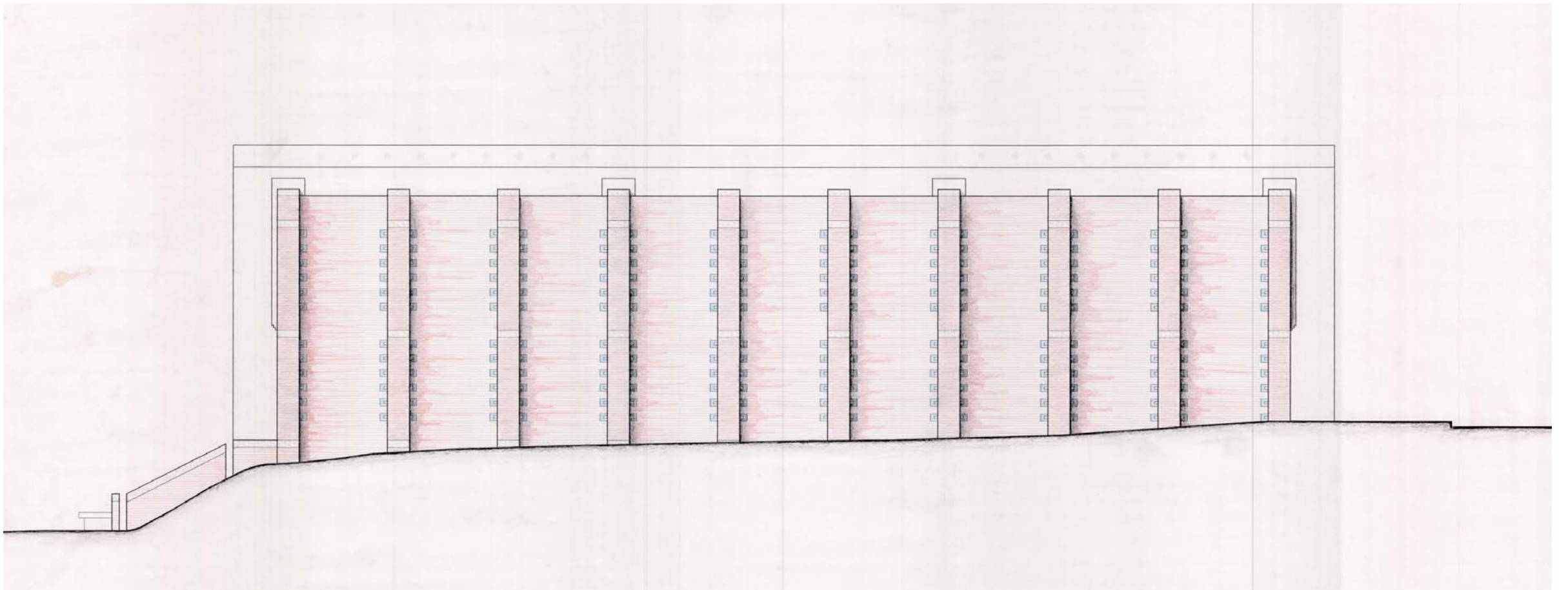
WEST ELEVATION



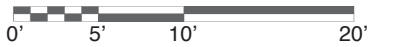


SOUTH ELEVATION

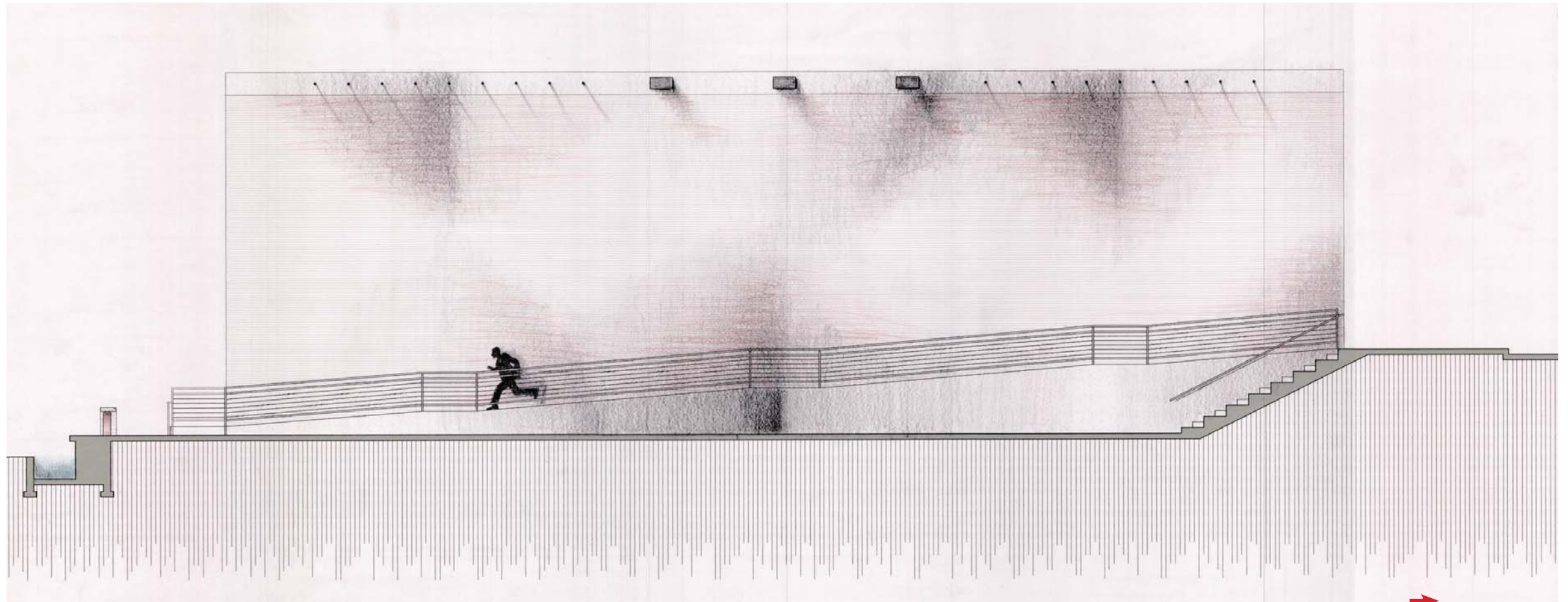




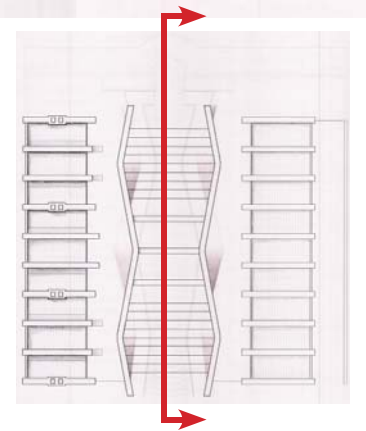
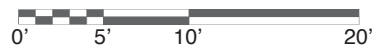
EAST ELEVATION

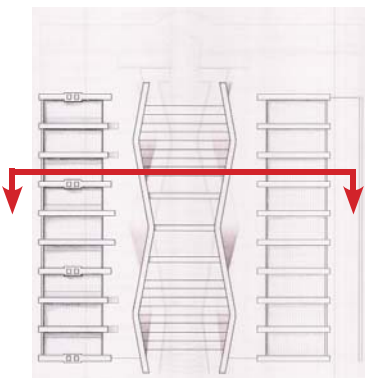
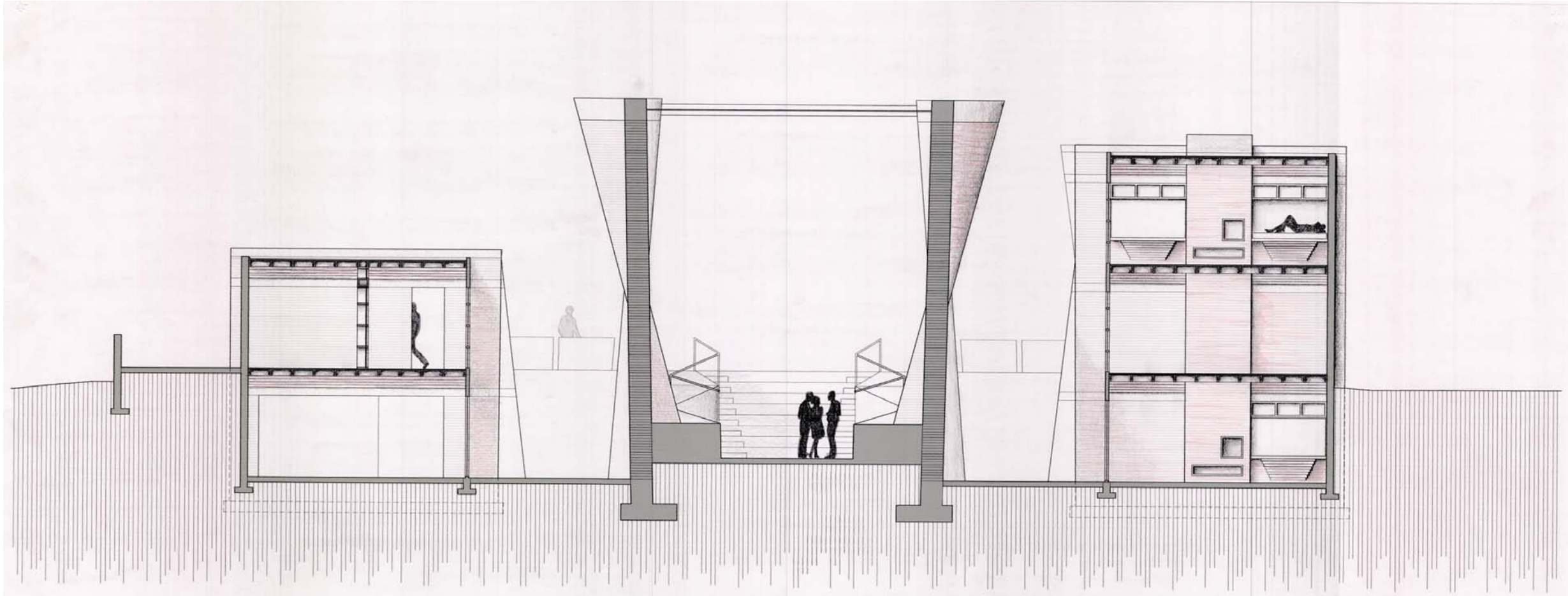




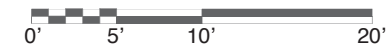


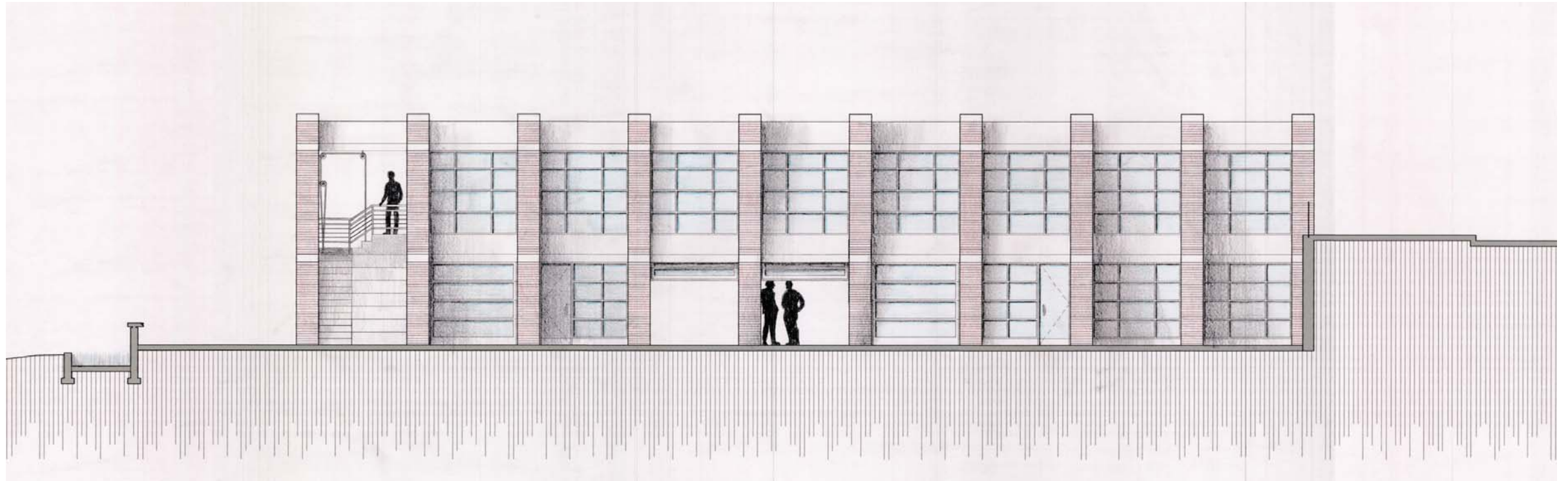
BUILDING SECTION THROUGH THE GREAT LEARNING HALL



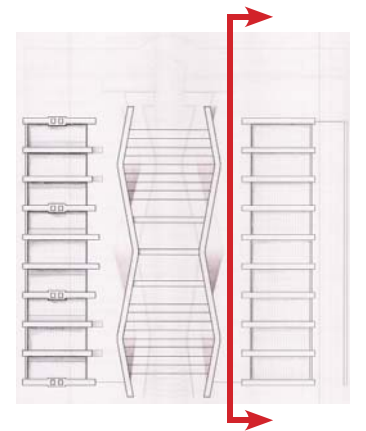


BUILDING SECTION THROUGH THE LEARNING CENTER, GREAT LEARNING HALL, & DORMITORY

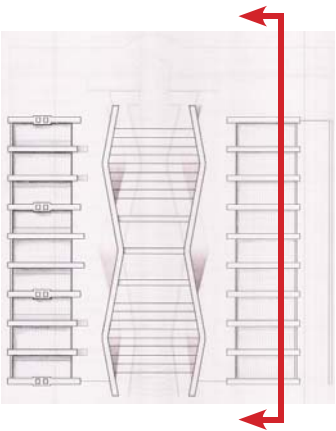
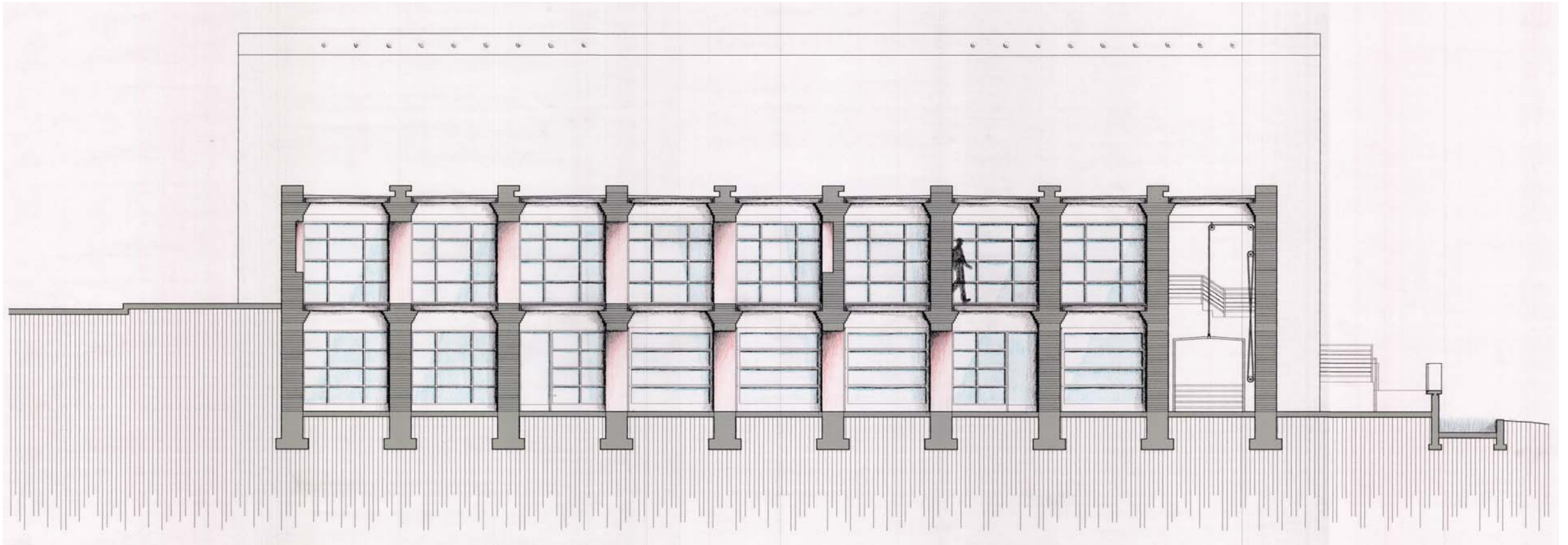




SITE SECTION / ELEVATION OF LEARNING CENTER





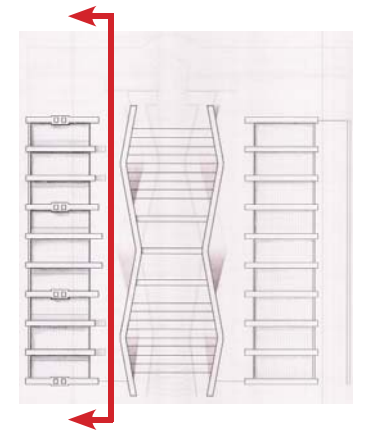


BUILDING SECTION THROUGH LEARNING CENTER

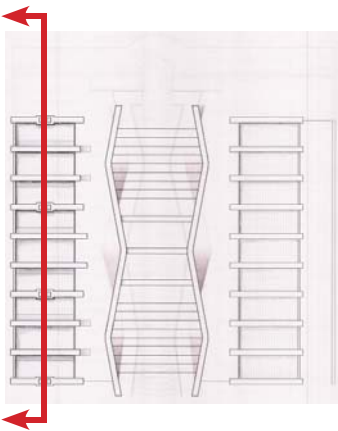
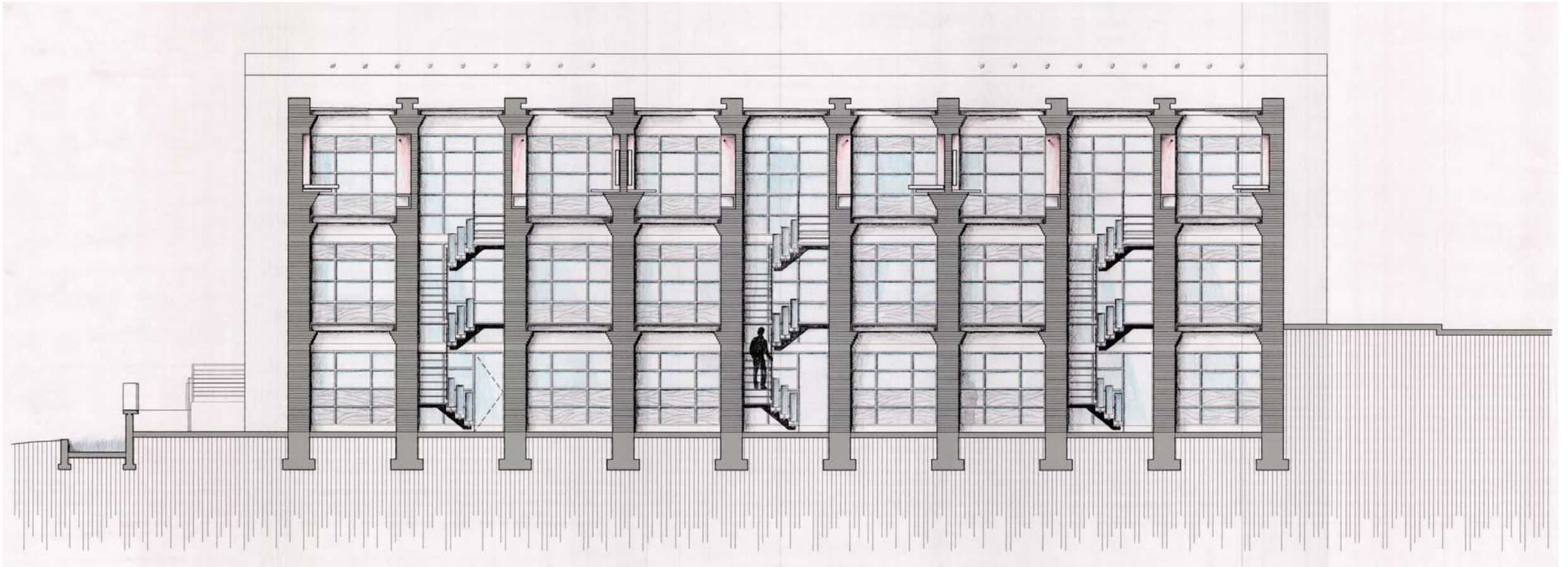




SITE SECTION / ELEVATION OF DORMITORY

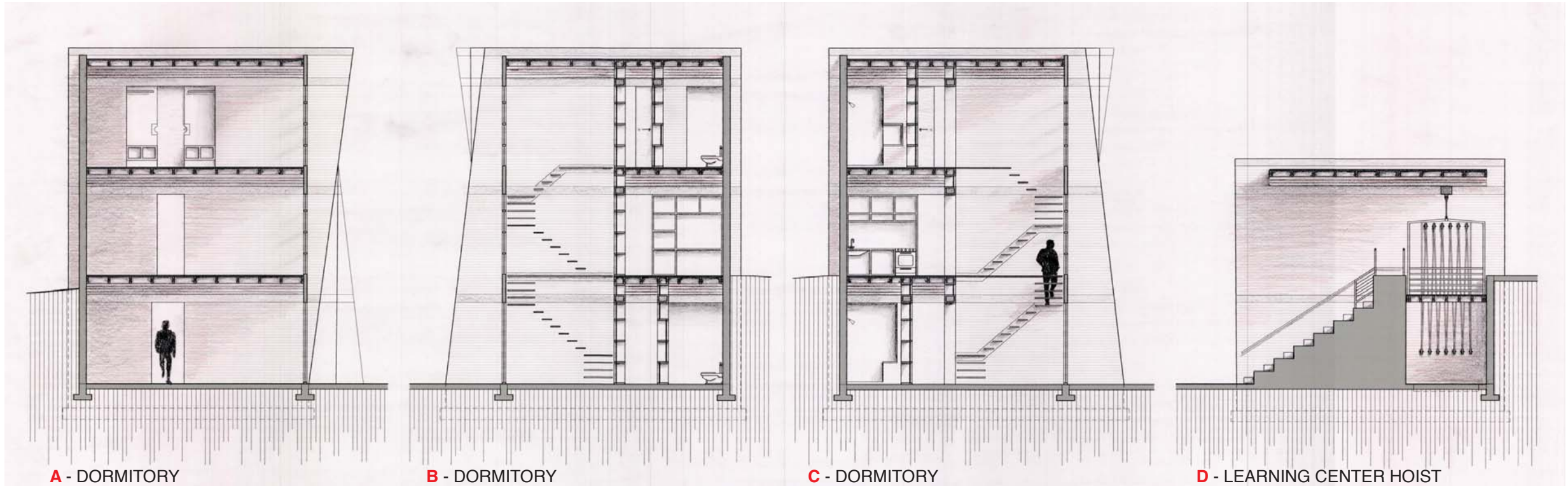




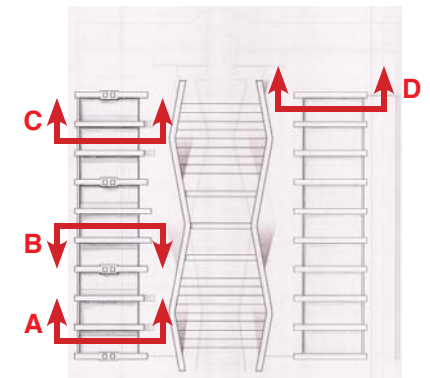
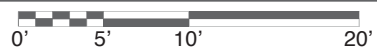


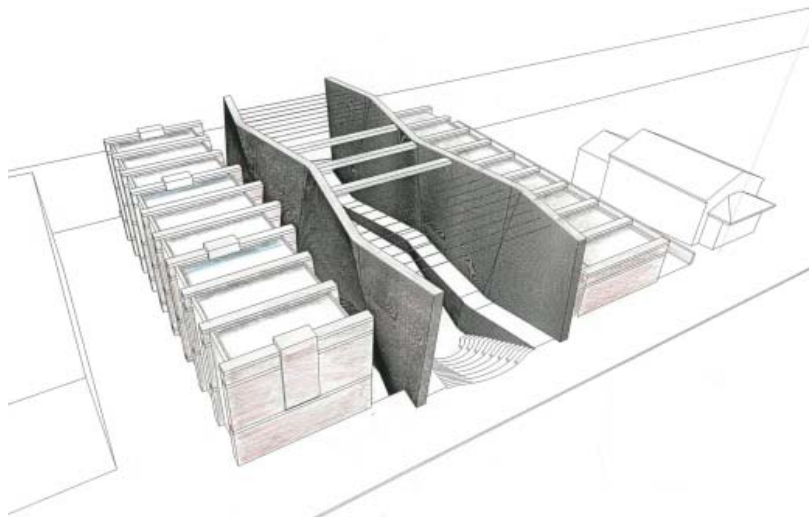
BUILDING SECTION THROUGH DORMITORY



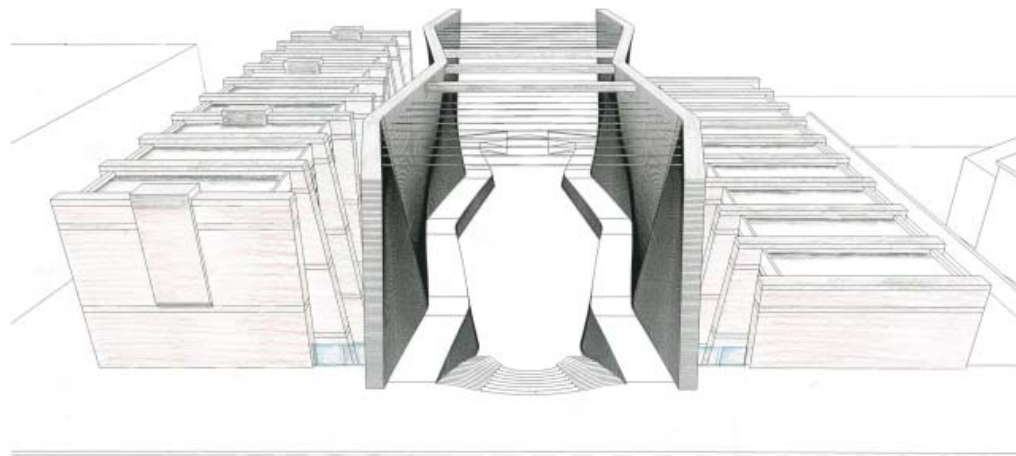


BUILDING SECTIONS / INTERIOR ELEVATIONS

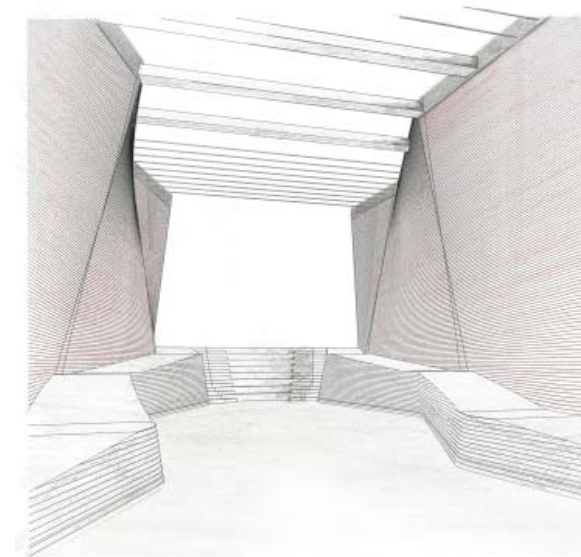




aerial view of project site

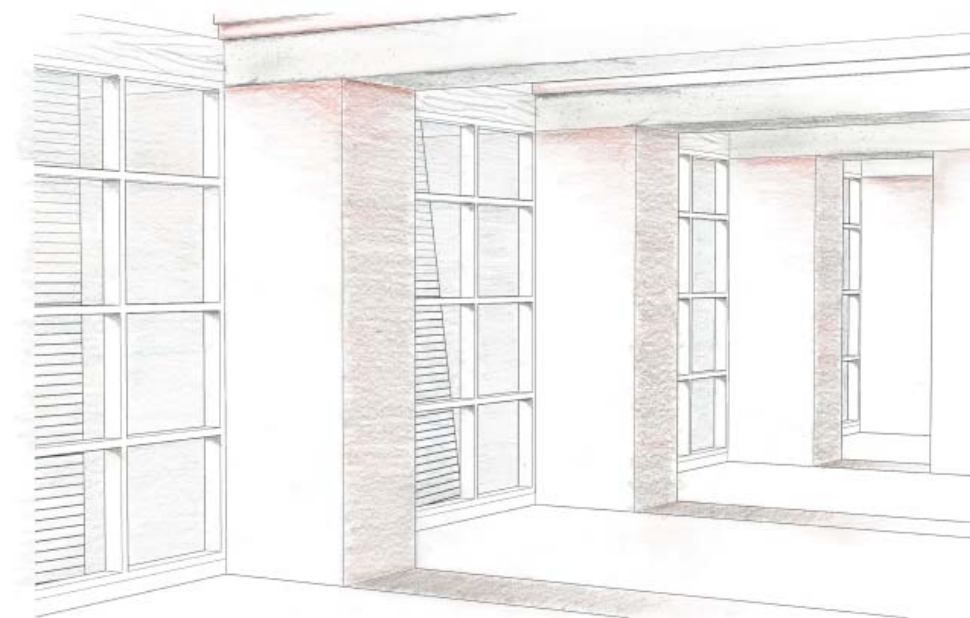


aerial view of great learning hall



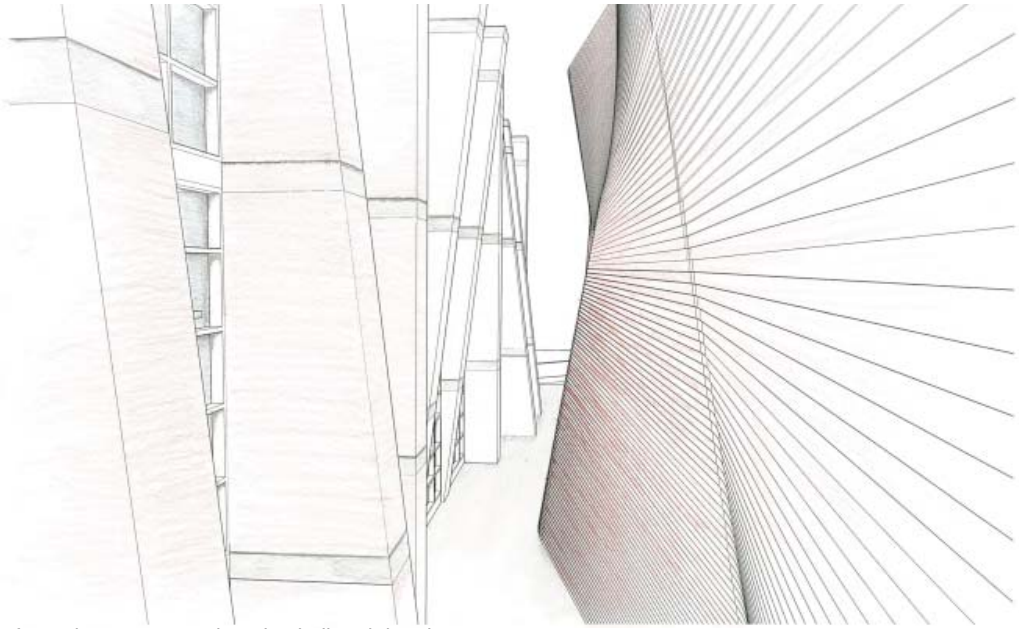
view from great learning hall

## PERSPECTIVE VIEWS

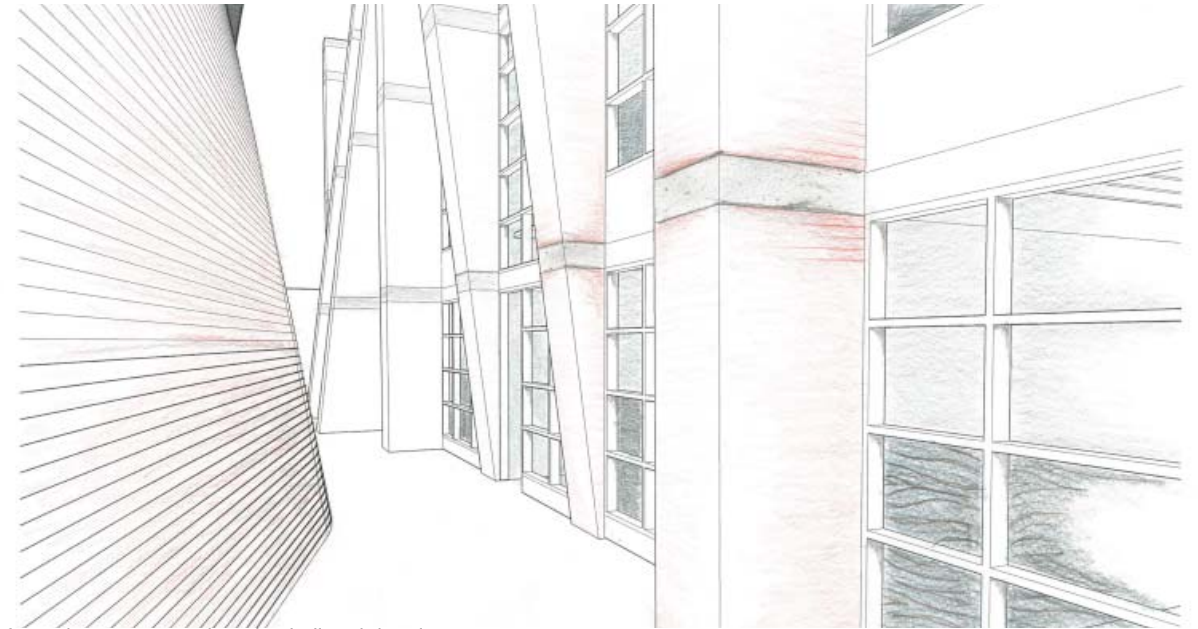


view from learning center classroom





view of area between great learning hall and dormitory



view of area between great learning hall and dormitory



view from dorm kitchen



view from dorm stairs

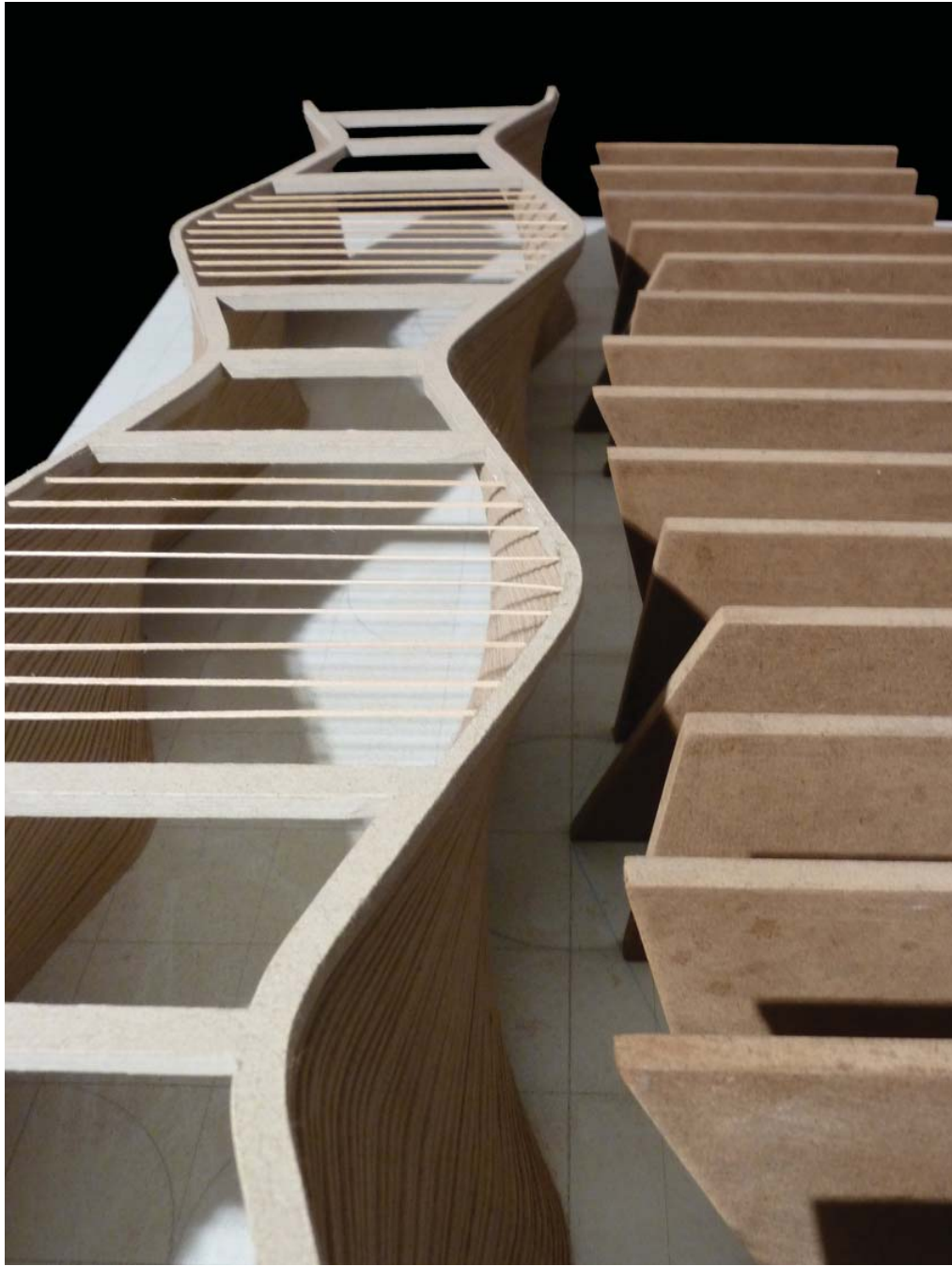
## PROJECT MODEL

When ever building models for this project, I would try to do it in a way that the mason would construct a building. I would lay course after course of chipboard to build the walls. Glue was my mortar and chipboard was by brick.

Throughout the process of building my models course by course, I learned a lot about my choices. If something was missed or off in previous courses, then you had to disassemble back to the point of error and begin again. Care had to be taken to keep the walls plumb and true, so they did not get out of line half way thru construction. There was a sense of better knowledge of my design decision because of the model-making methods used.

Making the model became a way to escape, and get into a world of much smaller scale. There was a rhythm that would be developed, and thus making time escape me as walls were constructed.





Model of the Great Hall of Learning and Dormitory

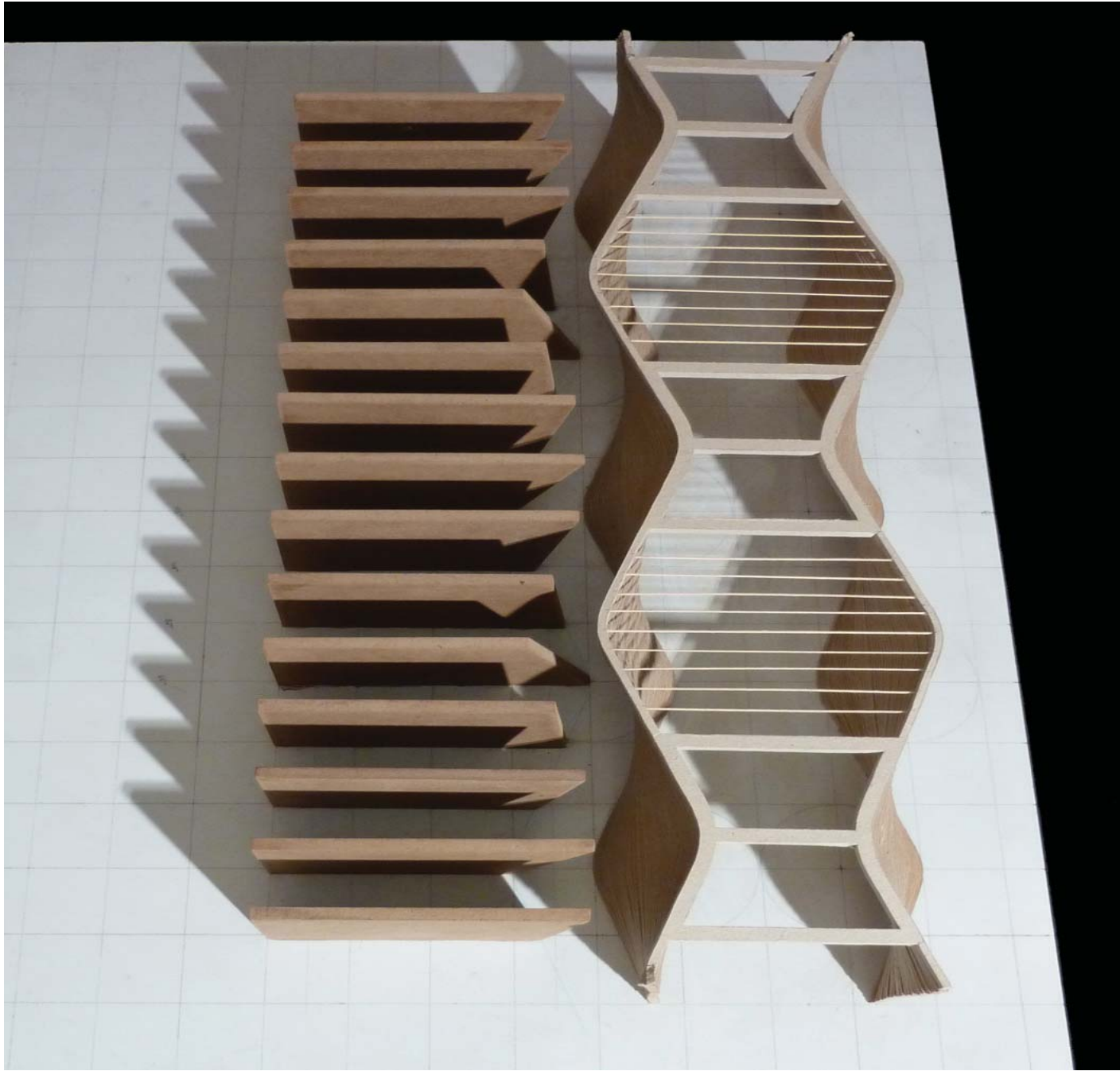


Model of the Great Hall of Learning and Dormitory



View of the Great Hall of Learning





Model of the Great Hall of Leaning and Dormitory



Dormitory section model



Dormitory section model



Dormitory sleeping wall



Dormitory exterior lighting study



Dormitory interior lighting study





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Page 4 image b: Maria, Ana. Fachada. Accessed 6 December 2011.< <http://www.flickr.com/photos/anamarialeon/6090813830/>>

Page 4 image c: Maria, Ana. Frente. Accessed 6 December 2011.< <http://www.flickr.com/photos/anamarialeon/6090384443/>>

Page 4 image d: Chen, Calvin. Design Study: School of Architecture, Prairie View A&M. by Roto Architects. DSC\_0313. Accessed 6 December 2011.< <http://www.flickr.com/photos/bercychenstudio/6163023785/>>

Page 13 - Site Aerial Photographs  
satellite image of Alexandria VA, retrieved on August 14, 2010 from website maps.google.com, digital manipulation by John Wirth

All other photos, drawings, and illustrations were provided in this book were taken or created by John Wirth.



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