

THE STONE AND THE CHILDREN'S HOUSE

MICHAEL ROLLINS

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

Master of Architecture in Architecture

Scott Gartner_Committee Chair
William Galloway
Patrick Doan

May 2nd, 2014
Blacksburg, Virginia

The Stone and the Children's House
Michael Rollins

Abstract

The architect operates in both physical and spatial media. When in the presence of architectural form, an observer exists within the volume defined by surface and within the context of constructive material. At once the presence of architecture is imbued through spatial awareness, texture, sound, weight, light, shadow; material and volume modulate the senses to create the architectural experience.

Montessori education is a pedagogy based on the development of a child's natural curiosity and intuition. The Guides lead rather than teach, encouraging the student to explore through activity. The student's intuitive exploration cannot be dictated or controlled by environment; the architect's role in education, therefore, is to work within his or her craft to create an "experiential architecture", one that utilizes the context of pedagogy, site, and material to develop a series of spaces to inspire within the individual a feeling unique to each. The architect must understand the nature of material, the way in which it wants to be used, to create an experience in which the architecture speaks of its making. The craft of building, then, becomes an architectural experience operating alongside the art of spatial composition. This school is the vehicle for exploring the dialogue between the spatiality and materiality of architecture.

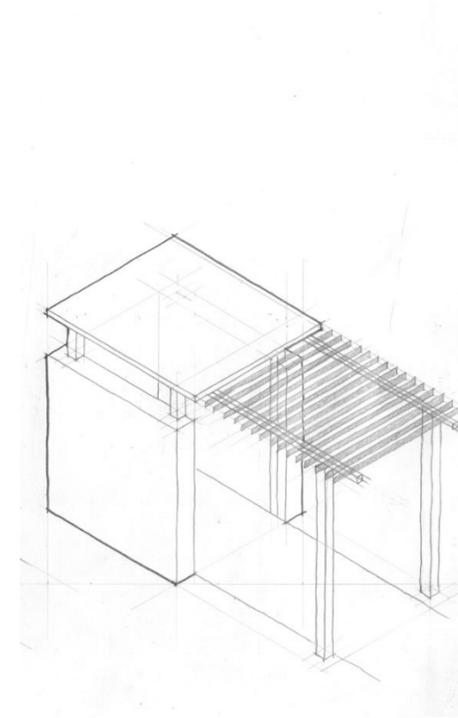
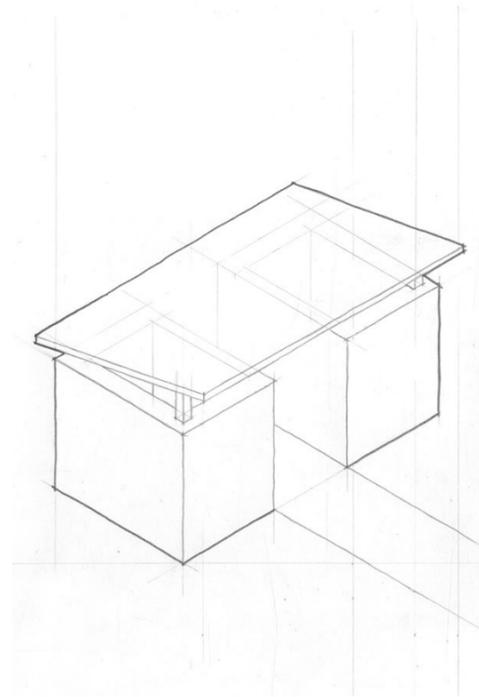
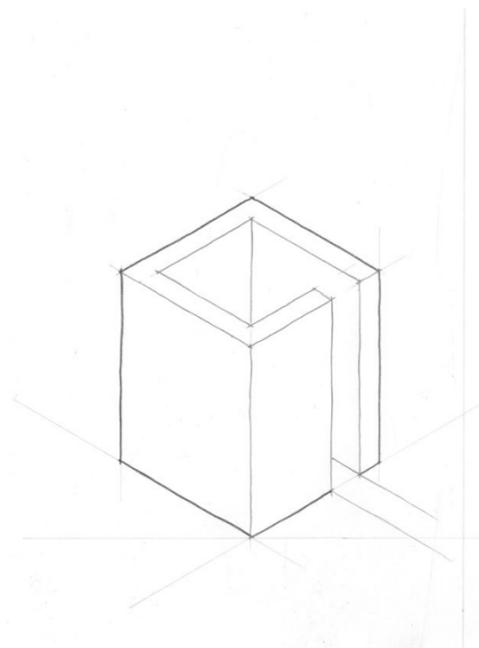
“We must await this spontaneous investigation of the surroundings, or, as I like to call it, this *voluntary explosion* of the exploring spirit. In such cases, the children experience a joy at each *fresh discovery*. They are conscious of a sense of dignity and satisfaction which encourages them to seek for new sensations from their environment and to make themselves spontaneous *observers*... One of our little four-year-olds while running about in the court one day suddenly stood still and cried out, “Oh! The sky is blue!” and stood for some time looking up into the blue expanse of the sky.

The greatest triumph of our educational method should always be this: *to bring about the spontaneous progress of the child.*”

Maria Montessori, *The Montessori Method*

TABLE OF CONTENTS

an abstract	
a pedagogy	02
a context	06
a school	10
a classroom	20
a stone and a wall	24
an experience	32
acknowledgments	36
references	38
appendix a	40



(an expanded abstract)

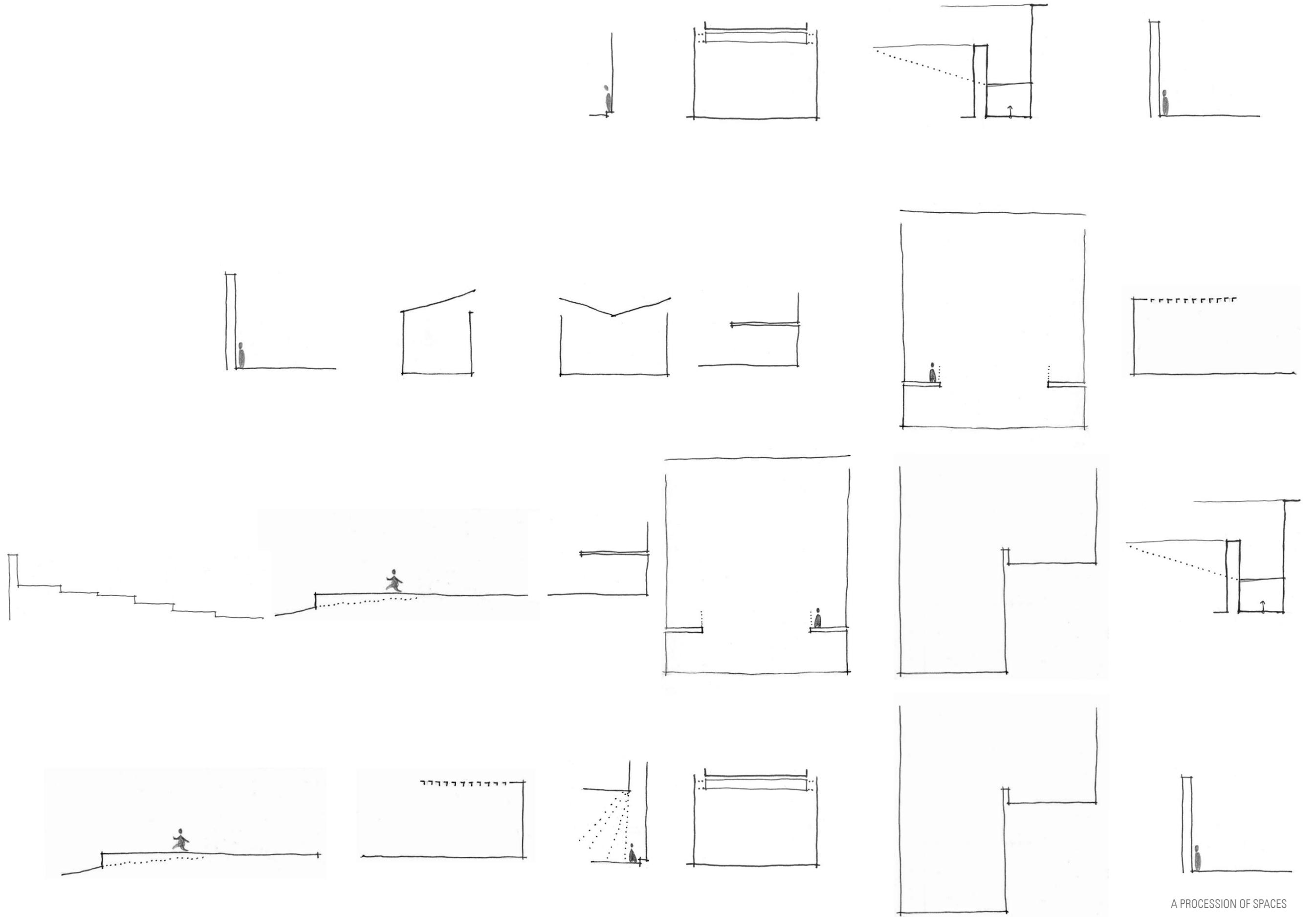
An architect operates in both physical and spatial media. When in the presence of architectural form, an observer exists within the volume defined by surface and within the context of constructive material. At once the presence of architecture is imbued through spatial awareness, texture, sound, weight, light, shadow; material and volume modulate the senses to create the architectural experience.

Montessori education is a pedagogy based on the development of a child's natural curiosity and intuition. The Guides lead rather than teach, encouraging the student to explore through activity.

What is the architect's role in creating a space for learning? It is not the role of the designer to create pedagogy nor dictate a course of human action, one expected to be ignored by students playing out intuitive discovery. The architect, therefore, must work within his or her craft to create an "experiential architecture", one that utilizes the context of pedagogy, site, and material to develop a series of spaces to inspire within the individual a feeling unique to each.

The presence of architecture, defined by the way a person touches it, hears its echoes, moves through it, is created within a constructive medium. It is what imbues architecture with sensual qualities, with a coarseness or warmth or translucence. The architect must understand the nature of material, the way in which it wants to be used, to create an experience in which the architecture speaks of its making. The craft of building, then, becomes an architectural experience operating alongside the art of spatial composition.

The school becomes the vehicle for exploring this dialogue between the spatiality and materiality of architecture.



An important aspect of Montessori's original approach to pedagogy as it related to the students' learning environment revolved around the adaptation of spaces that were already grounded in the lives of students. During early experiments involving impoverished children she established Children's Houses in the lower levels of tenement buildings, allowing the children to learn in familiar environments while easing anxieties of working parents who might otherwise have had to leave their children unattended. Montessori Directresses guided students in activities related to their daily practices that would carry from the classroom to the home including housework, etiquette, and speech. Work completed by the students effectively rehabilitated, both aesthetically and culturally, otherwise substandard dwellings. The students exhibited pride when cleaning public spaces and tending to garden plots; others living in the complex soon began similar routines.

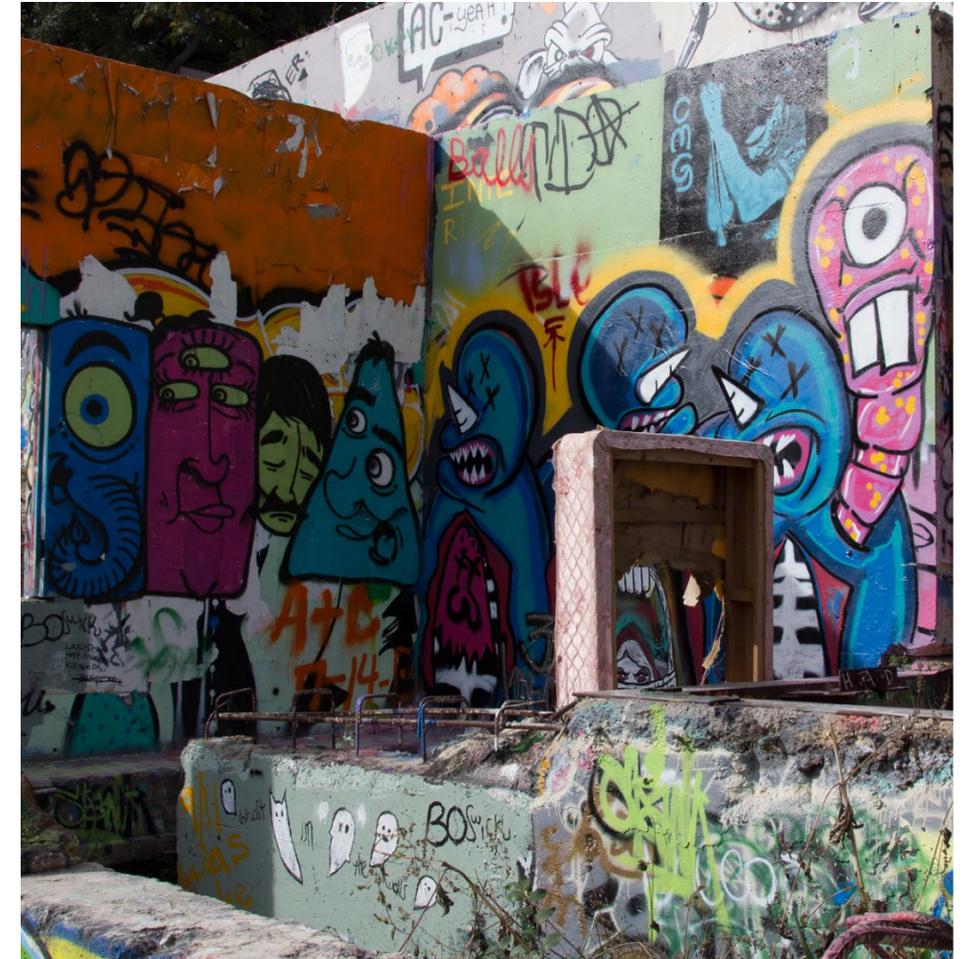
In contemporary practice, the school is detached from the house; the classroom is considered the "second home" of the child, viewed as an entity separate from the child's familial home. Yet it may carry the same meaning: it is a space to be safe, to be fed and be clean, to learn and to rest. It is a microcosm of living.

In the Montessori school the action of the child and the reflection on that action becomes the vehicle for education. Importance is placed on the experience of objects, on their material and tactile qualities. The student approaches his or her world with an investigative spirit; an inherent desire for exploration, not societal obligation, becomes the basis for a child's educational journey. A Montessori architecture, therefore, should exist as a complement to the child's world. The school environment should offer opportunities for a student to discover the tactile, visceral nature of his or her world. Rough, smooth, loud, quiet, soft, hard, large, small, heavy, light, together, separate, above, below, bright, dark, vast, enclosed; if the pedagogy of a Montessori school revolves around how the child discovers and relates to his or her world the architecture should be an environment of experience.

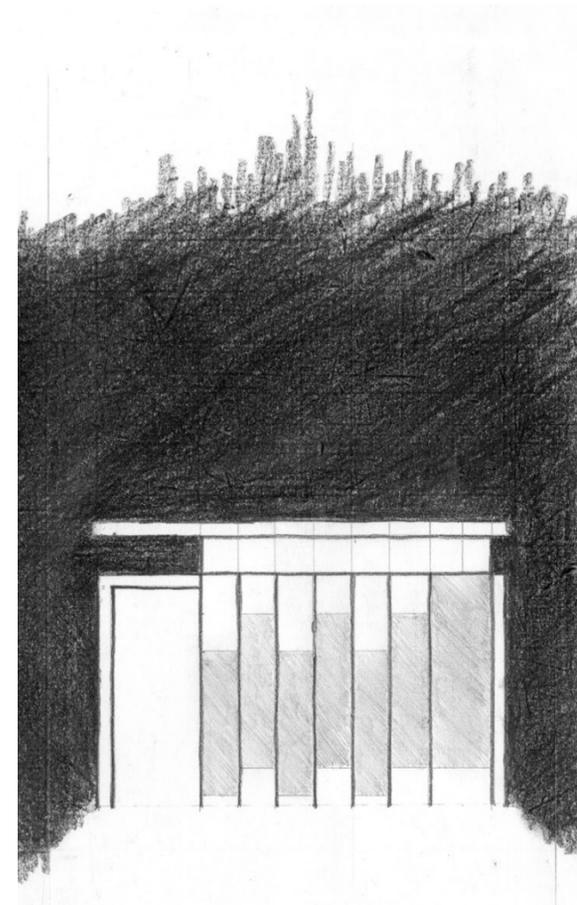
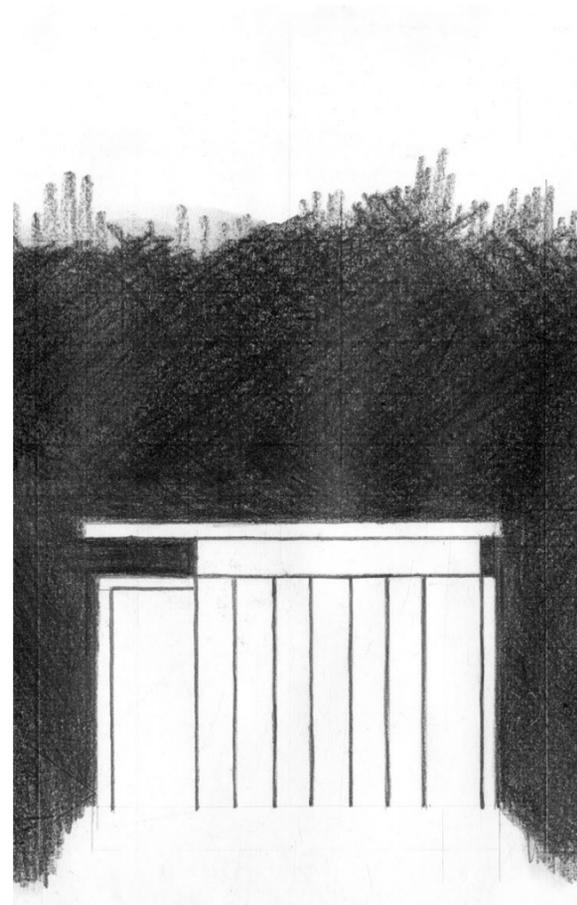
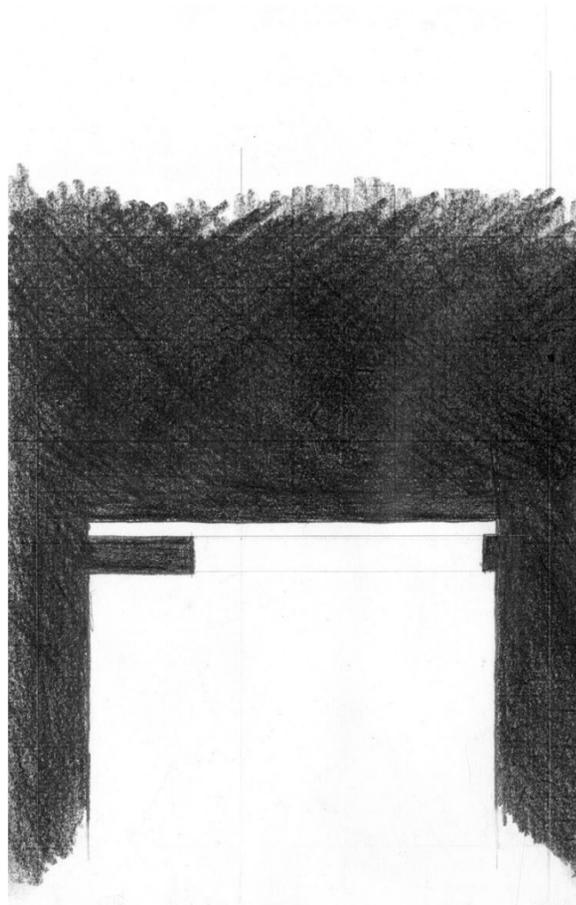
The "second home" and "experiential education" philosophies became driving factors in the initial organization of the school. The sequence of spaces a student would experience should be varied and dynamic, while the organization reflects the archetypal home-community system established in Montessori's writings. There should be a space for the exchange from parent to guide, a space to be both inside and outside simultaneously, a space for working, a space for cultivation, a space for coming and going, a space only for the child, a space to create; while operating in the context of pedagogy, the architecture must be something beyond education, must give something to the child.



The site is the Hope Gallery, a public mural garden overlooking the University of Texas campus and downtown Austin, Texas. The site's present state began in the 1980's as a proposed condominium project resting on the eastern slope of Castle Hill. After construction began, however, an earlier soil test proved to be incorrect and the foundations were unable to both retain the force of Castle Hill and support the new structures. As a result the developer abandoned the project, its skeleton a scar in the hillside. The space's condition slowly degraded, becoming a dumping ground in the 1990's. In 2011 the HOPE Campaign purchased the site and converted the foundation walls into large-scale art installations by Shepard Fairey and local Austin graffiti artists. Contrary to the intention of the project, the murals became the siren call for other artists and vandals not committed to the organization's vision of educational art with a positive message. Soon, the site reverted to a dumping ground for the area with garbage, mattresses, rusting appliances, and other material strewn across the hillside.



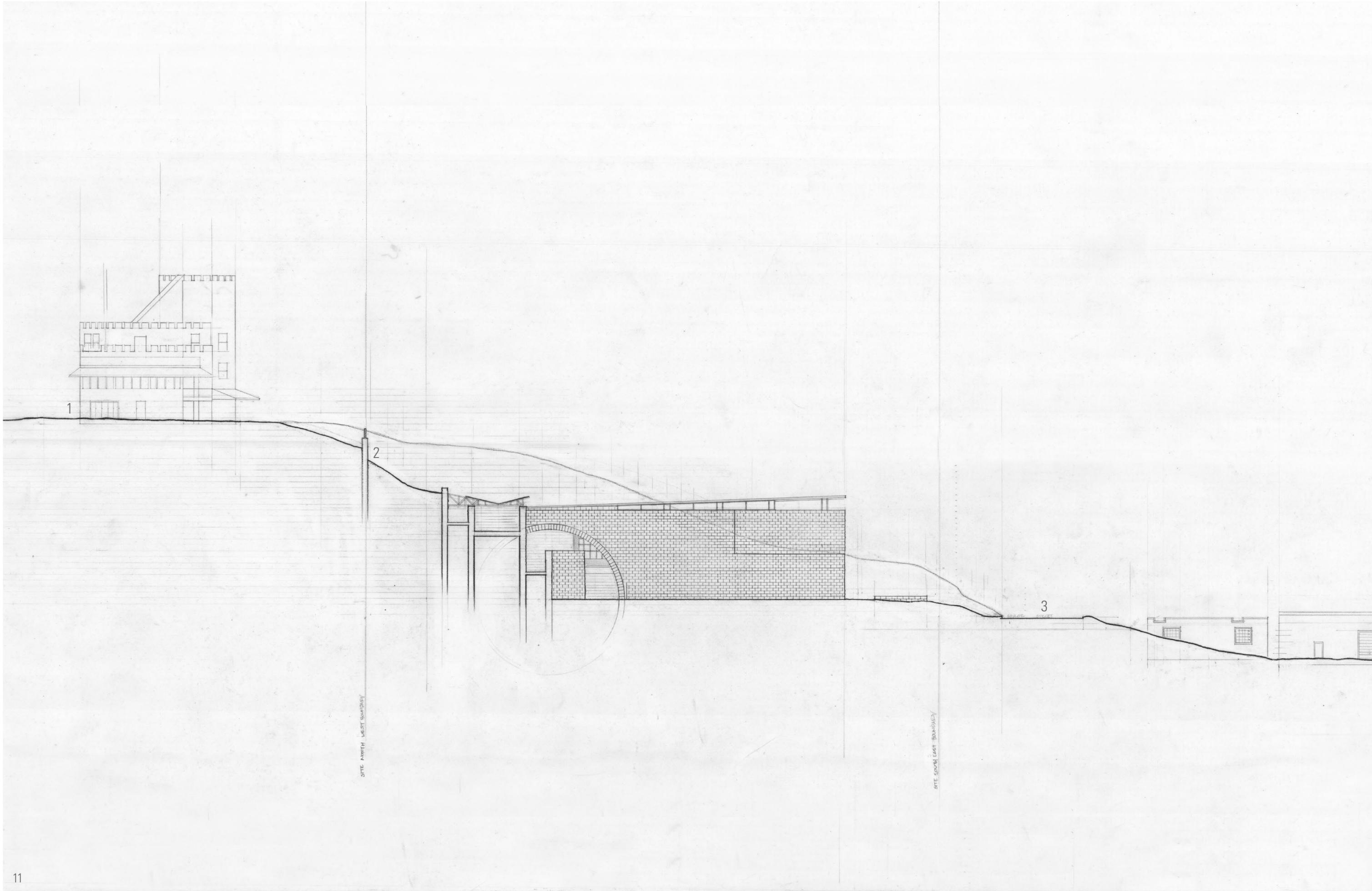




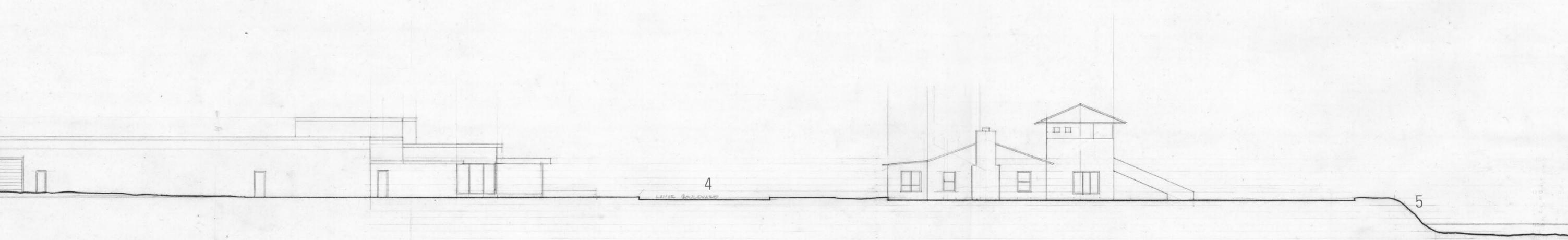
The first move is to carve a void into the hillside, removing the dumping ground that is the site's current state. This is the refuge, the space within the hill where the school is to be built. Structuring this space is a series of buttresses constructed of the white limestone removed from the site itself. A corridor is created around the perimeter of the building to pull the school away from the retaining structure. Finally, the spaces between the buttresses are filled with the classrooms themselves.

The school is organized around the idea that the classroom is the second home of the student. Heavy limestone walls define the child's world for a few hours each day; the student eats, rests, cleans, builds, disassembles, observes, converses, interacts, cultivates, and lives within this particular environment apart from his or her home. And while this refuge exists the student is aware of an outside, of adjacent classrooms filled with other families of students. Linked by outdoor corridors and gardens the spaces defined by porches, light wells, and planters are communal and serve to join student families in experience.

There is no interior circulation; instead the architecture encourages interaction with both natural and built environments when moving from space to space outside the classroom. Children aging from six to nine inhabit the first floor spaces while traditional Children's Houses operate on the second level, serving children from three to six years of age. The hall engages the student at a grander scale and serves as the gathering point for all students at the school. Administrative functions are moved further up the hill, separating the educational spaces of classrooms and gardens from the bureaucratic spaces necessary for maintaining the school.



SITE SECTION_3/4" = 20'
CASTLE HILL_1
SCHOOL_2
BAYLOR STREET_3
LAMAR BOULEVARD_4
SHOAL CREEK_5



FIRST FLOOR PLAN_1/16" = 1'

HALL_1

CLASSROOM_2

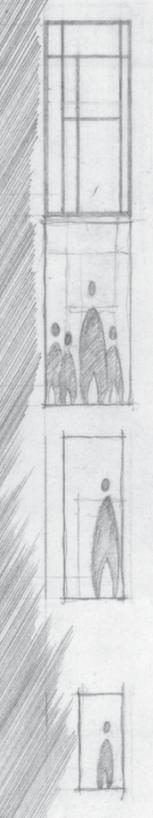
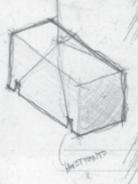
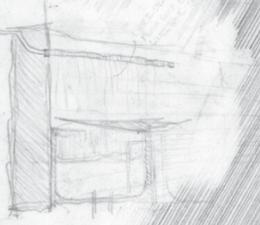
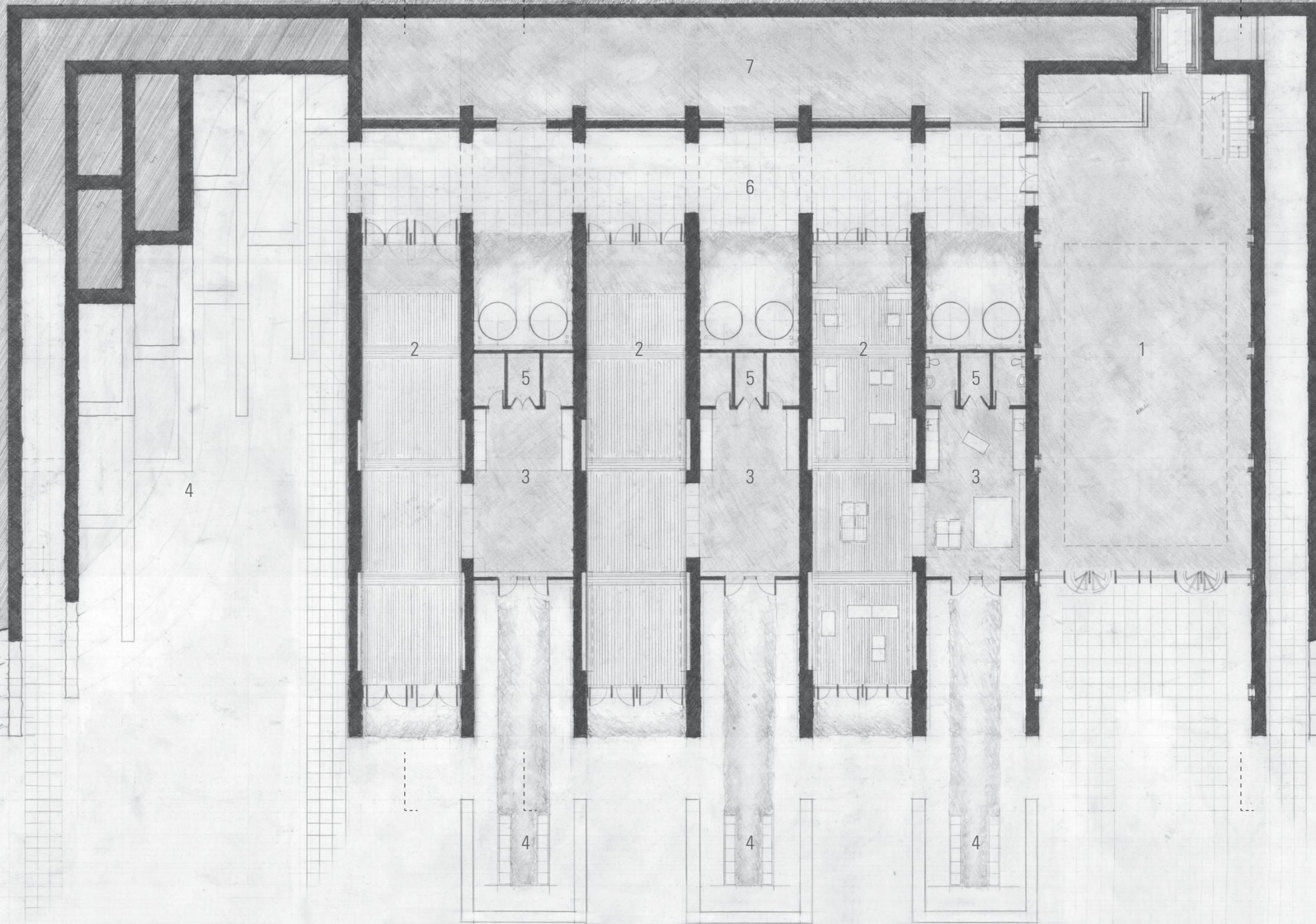
LAB_3

GARDEN_4

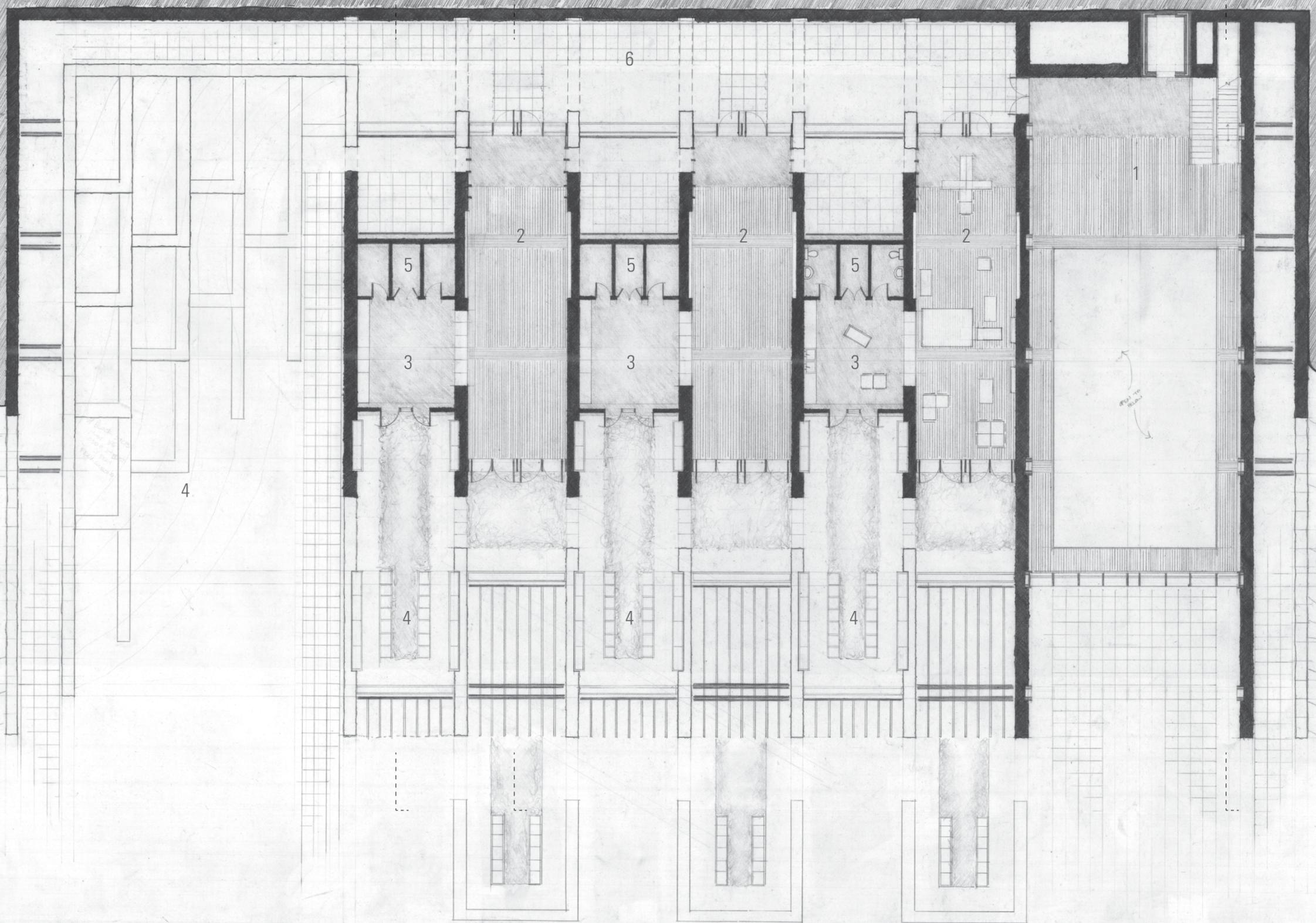
RESTROOM/STORAGE_5

CORRIDOR_6

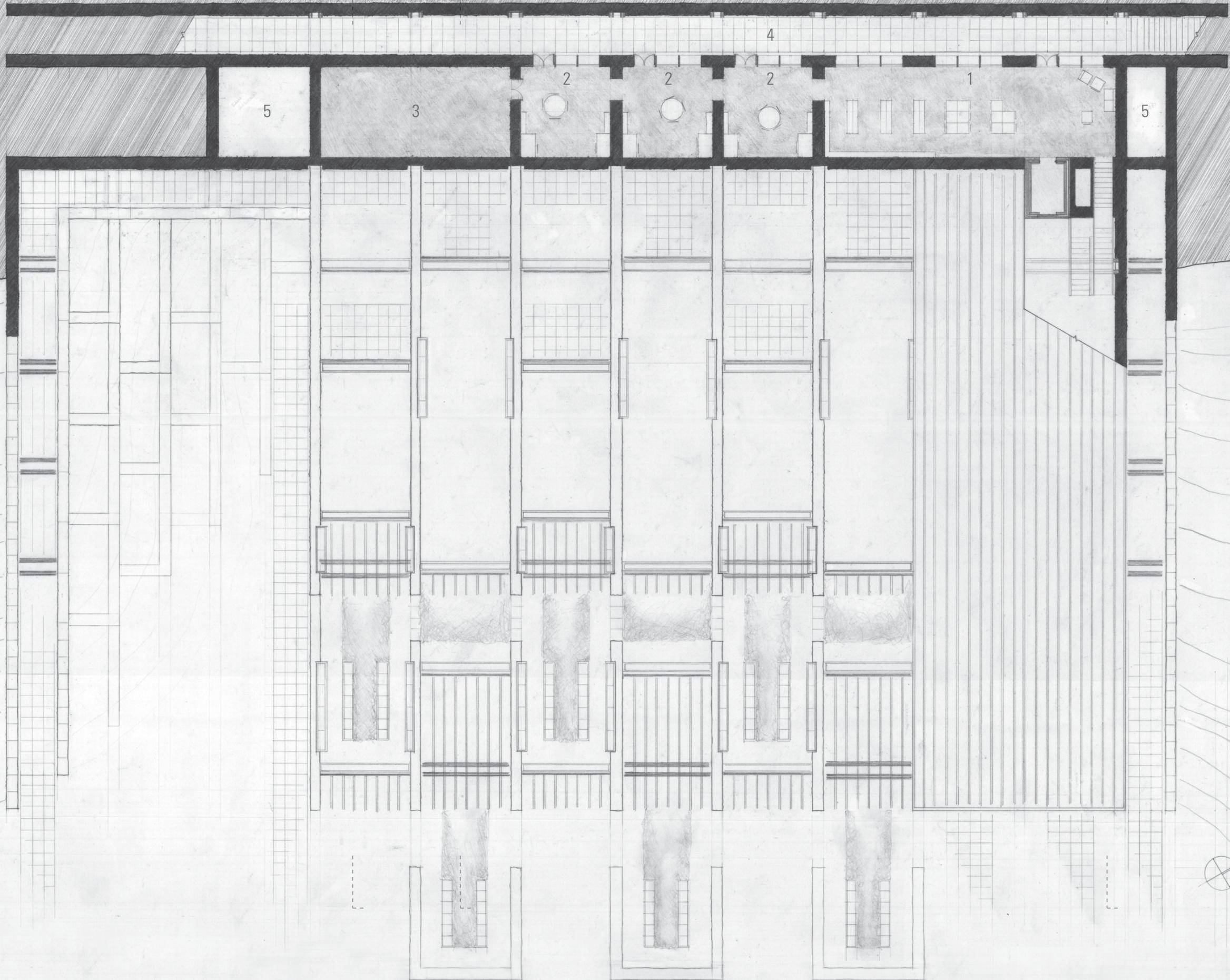
MECHANICAL_7

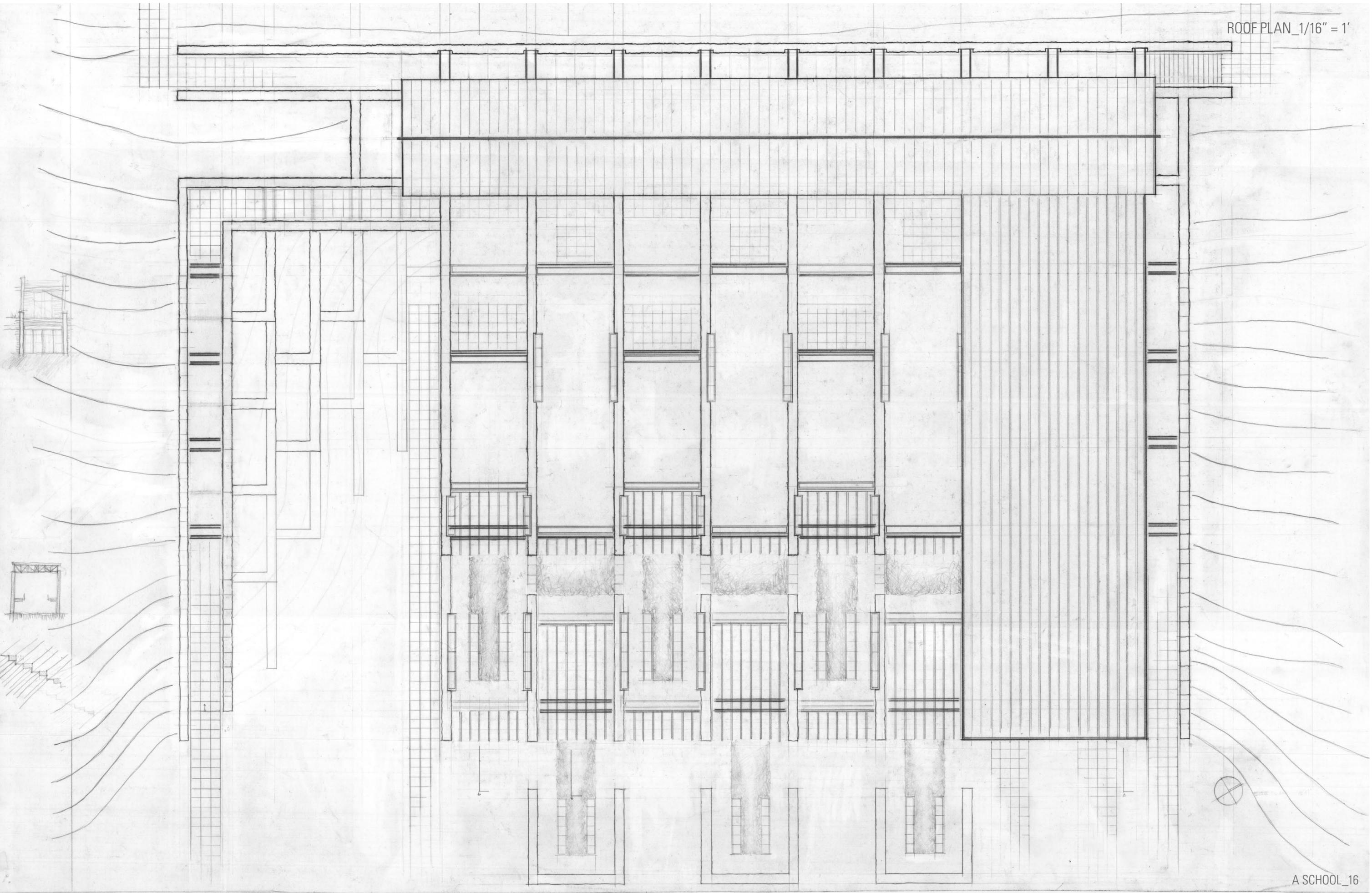


SECOND FLOOR PLAN_1/16" = 1'
HALL_1
CLASSROOM_2
LAB_3
GARDEN_4
RESTROOM/STORAGE_5
CORRIDOR_6

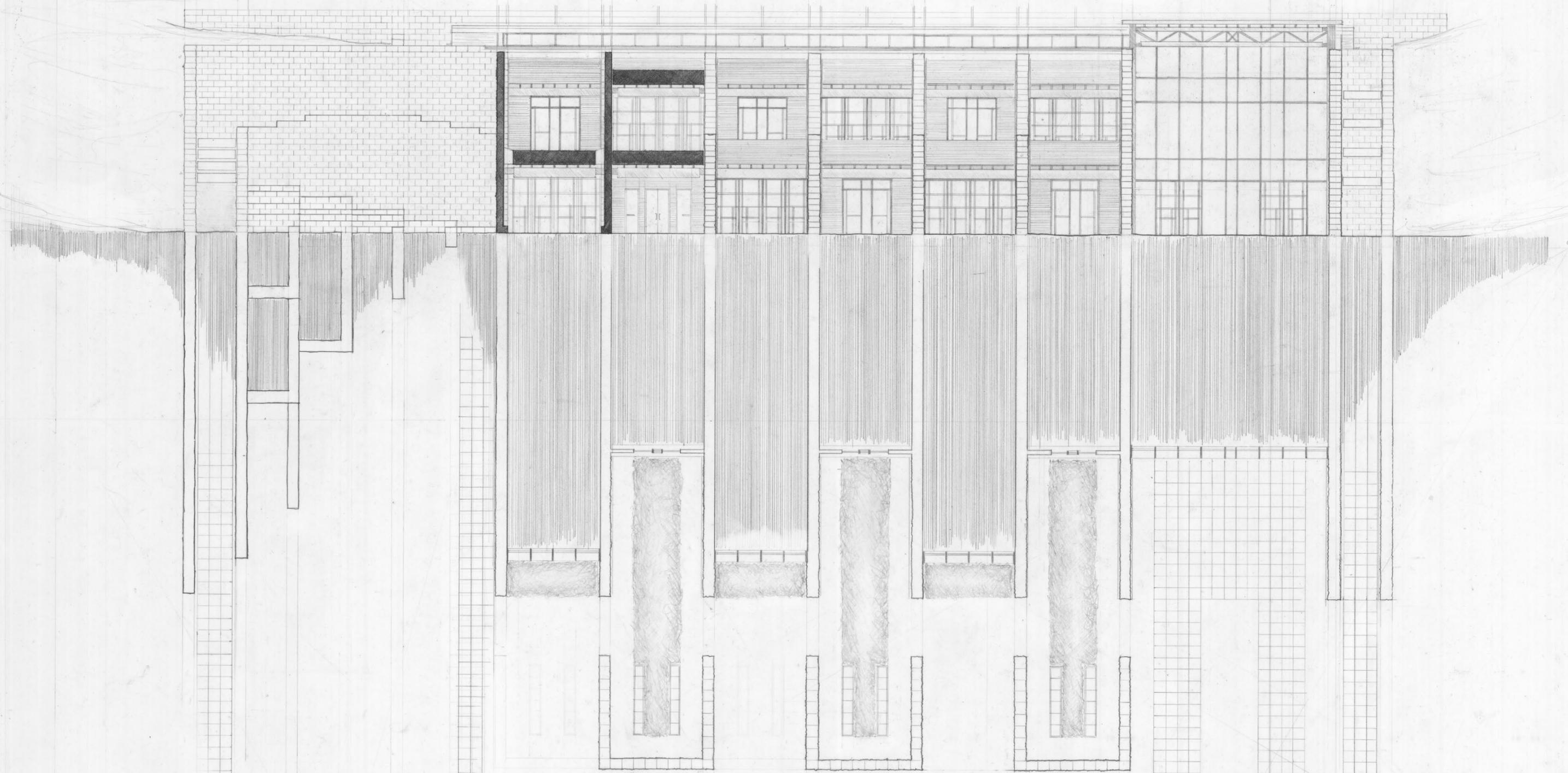


THIRD FLOOR PLAN_1/16 = 1'
LIBRARY_1
OFFICE_2
STORAGE_3
CORRIDOR_4
CISTERN_5

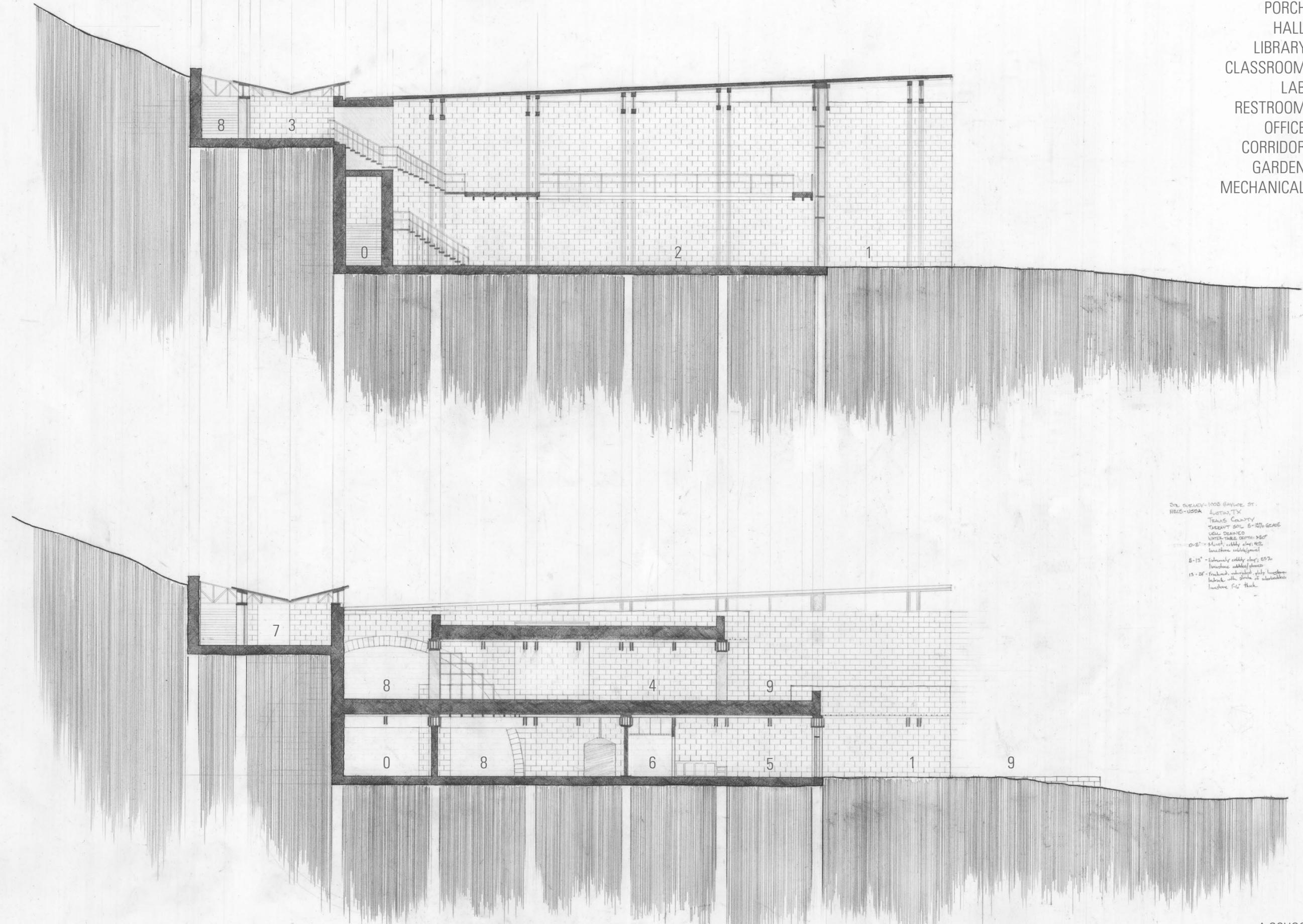




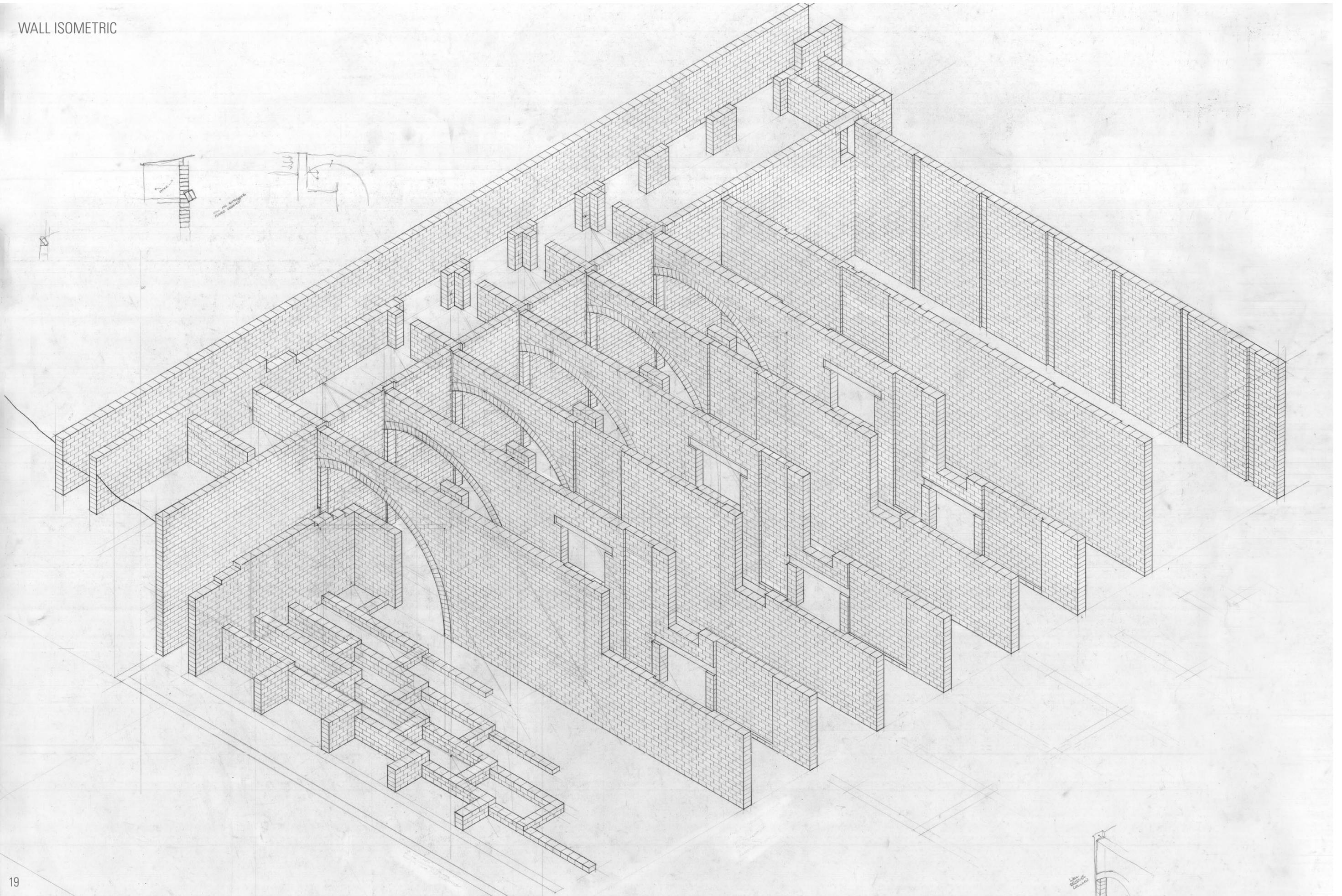
SOUTHEAST ELEVATION_1/16" = 1'
TRANSVERSE SECTION
FIRST FLOOR GARDEN PLAN



- HALL/CLASSROOM SECTIONS $1/16" = 1'$
- PORCH_1
 - HALL_2
 - LIBRARY_3
 - CLASSROOM_4
 - LAB_5
 - RESTROOM_6
 - OFFICE_7
 - CORRIDOR_8
 - GARDEN_9
 - MECHANICAL_0

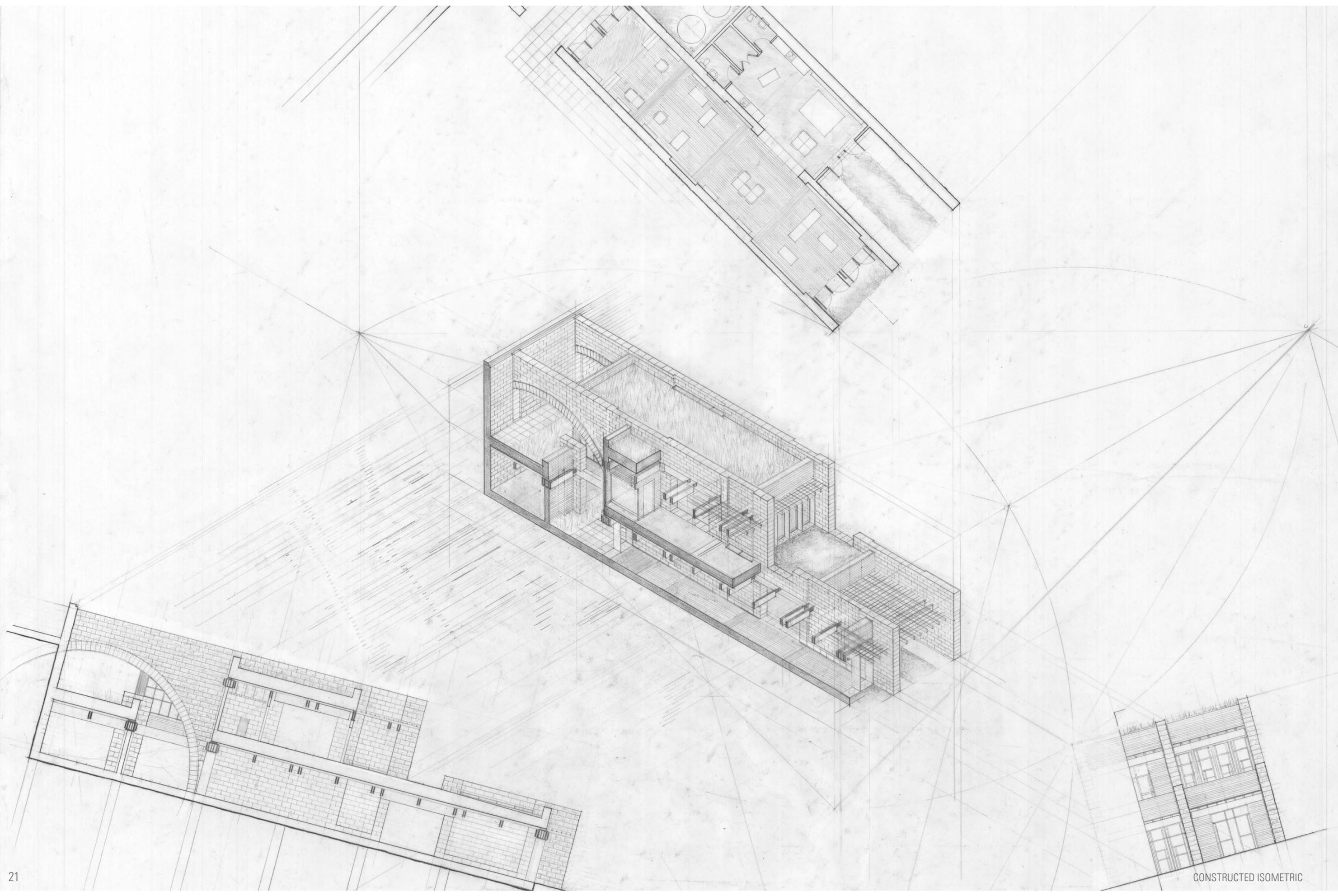


DR. SWEENEY - 1000 BAYLOR ST.
 NEOS-USA
 AUSTIN, TX
 TRAVIS COUNTY
 TARRANT SOIL 5-10% GRADE
 WELL DRAINAGE
 WATER TABLE DEPTH 280"
 0-2' - Moist, cobbly clay, 45%
 limestone subsoil
 5-15' - Extremely cobbly clay, 65%
 limestone cobbles, 15%
 15-20' - Fractured, silty limestone
 below all soils of limestone
 limestone 1/2" thick

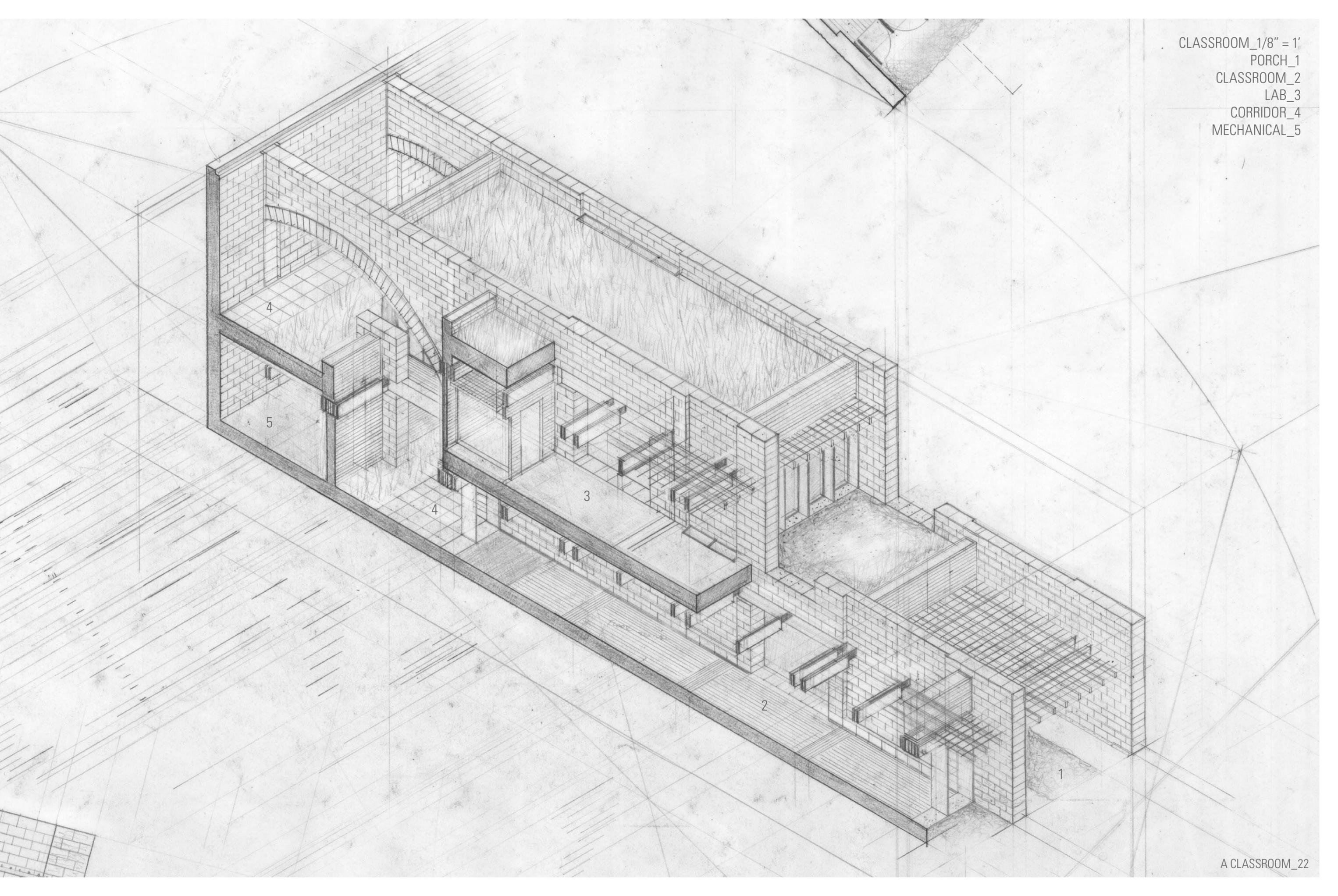


The classroom began with the development of a grid. The smallest unit of the child's world is the work mat. During exercises this 24"x48" surface defines the area of the student's activity, existing as the "room" in which the child is working. This unit became the smallest module of the classroom grid, a tartan organization with 16' bays and 2' structural widths allowing for the limestone walls to pass between the classrooms and define the space. The grid is reinforced aesthetically through flooring orientation along grid lines and the rhythm of fitch beams supporting the garden roofs.

The combination of classrooms becomes the community, embracing the tartan grid as a means of organizing space at various levels and at various scales as the series of enclosed and open spaces unfold in the project.



CLASSROOM_1/8" = 1'
PORCH_1
CLASSROOM_2
LAB_3
CORRIDOR_4
MECHANICAL_5

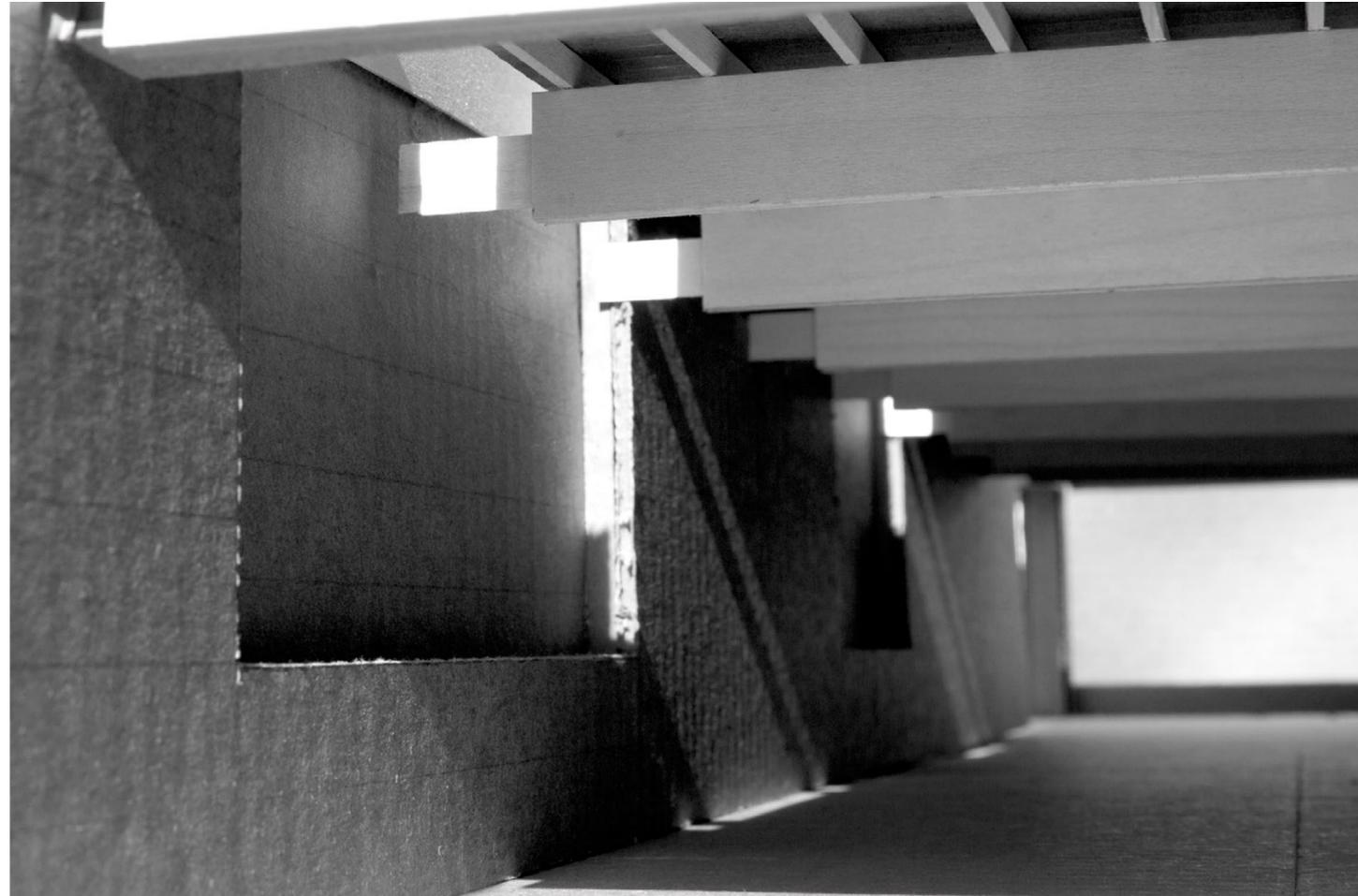
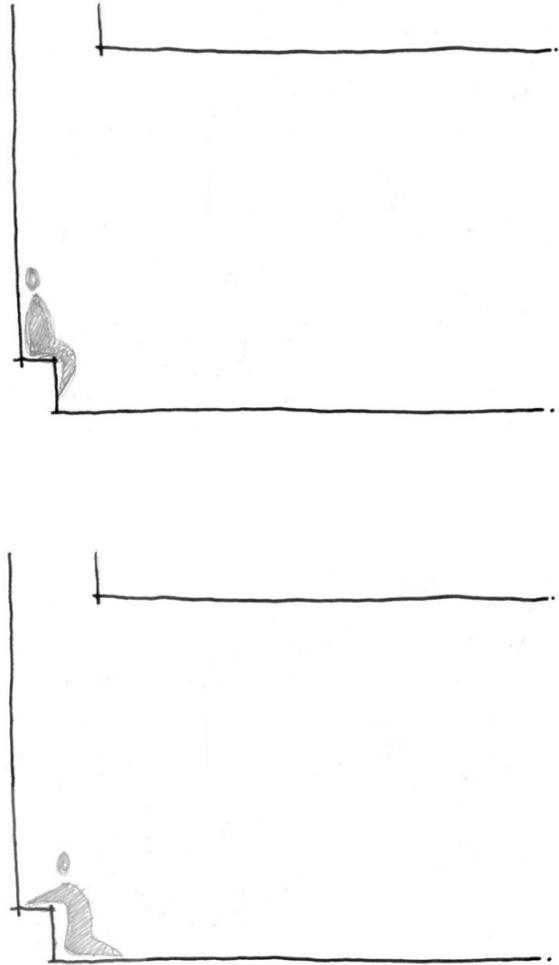


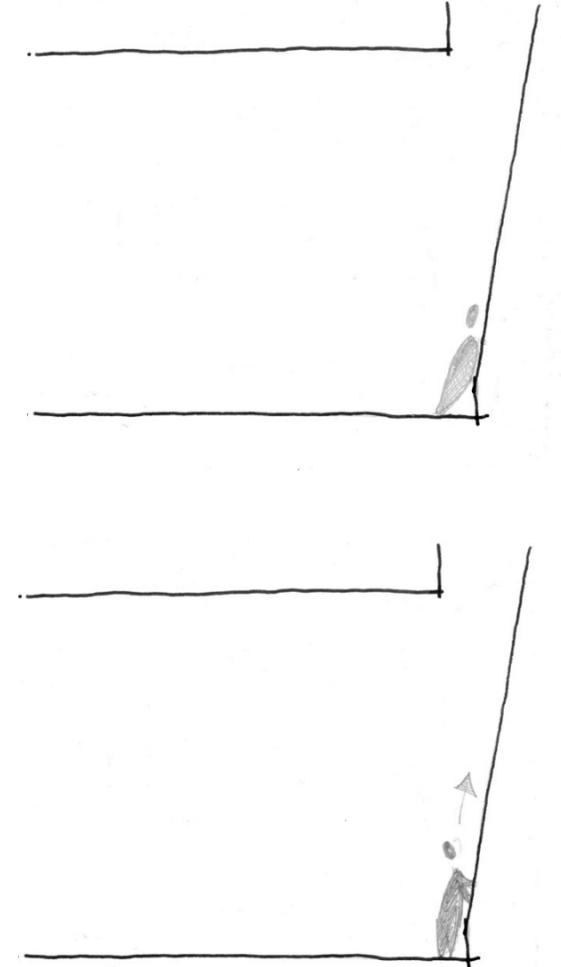


Light manifests texture, pattern, and form to the eye before the student may feel the physical presence of material. A ceiling aperture rakes light across the surface of the wall, celebrating the way in which the stone was cut through shadow and light. The student's experience of this phenomena, how he or she might interact with the surface and the light cast upon it, becomes imperative in discovering the nature of the wall in each classroom. At the scale of a child a space is created within the wall itself, giving a sense of the presence of the wall by carving from it a small room, a ledge, a seat, a desk.

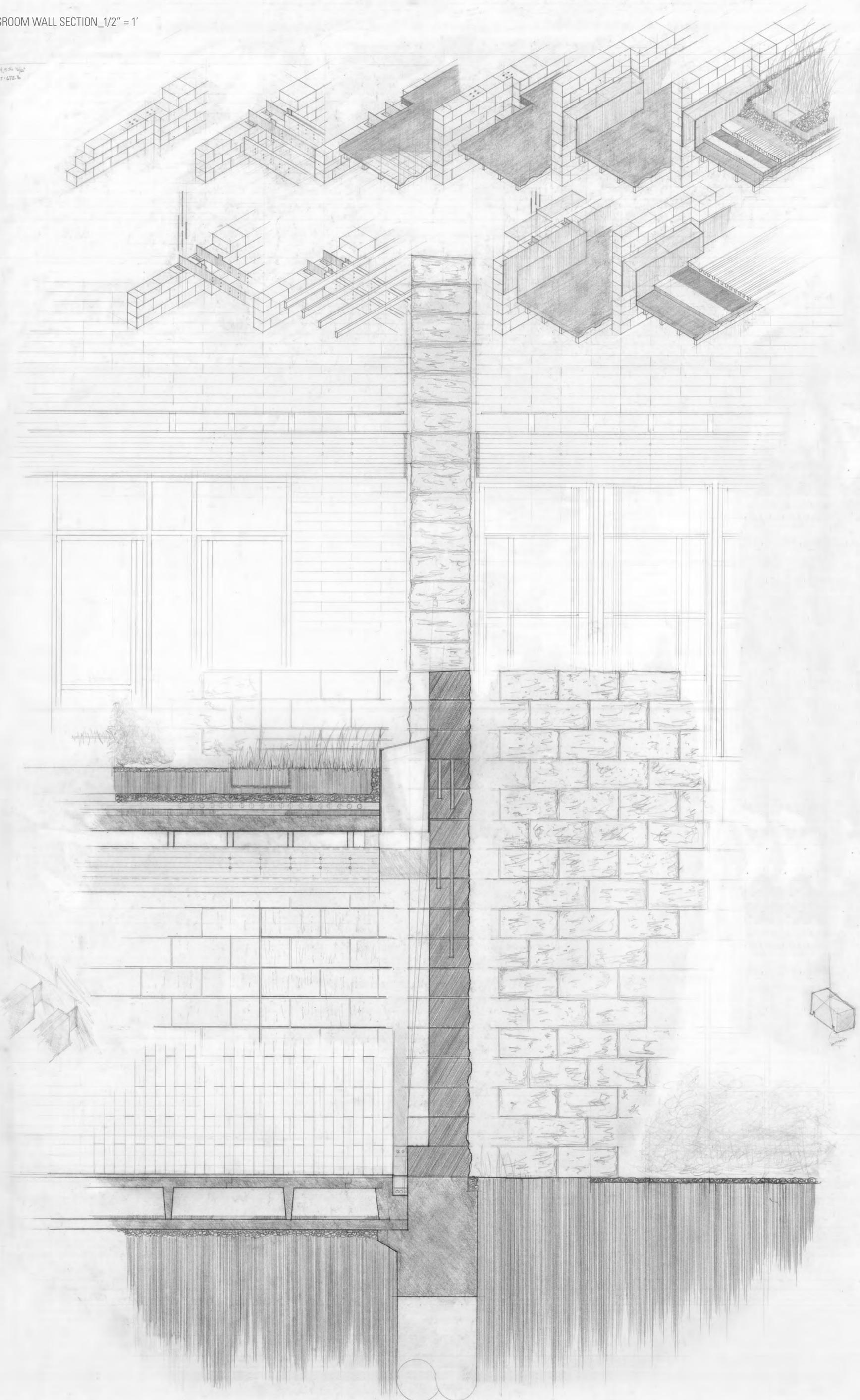
The stone itself speaks of its making, of the moment it was split from bedrock and of its lifting into the wall. A split-face surface denotes exterior spaces while a sawn surface is revealed on the interior. The 12"x24" square blocks are lifted into place, the hoist cuts in the stone left exposed both inside and out.

The change in surface quality creates a dialogue between the limestone walls and the infill condition. In all instances the infill classrooms give way to the buttresses, allowing them to visually slide past the building envelope. Inside the classroom the surface of stone, the material of floors and beams, and the moments that exist within the wall itself, speak to the refinement of interior spaces. Yet despite the change in quality of the limestone surface, structure and envelope give way to the wall, opening skylights and pulling the glulam portion of fitch beams away from the buttresses.





UNIVERSITY OF CALIFORNIA
ARCHITECTURAL CENTER



COOL SOLID SMOOTH WARM ROUGH
HEAVY ORANGE MATTE CREAM BLUE
RUST DRY SPLIT STACKED CUT SAWN
CHIPPED DENSE DELIBERATE 4,536 LB/FT³
LOCAL HONED 672 POUNDS CRAFTED

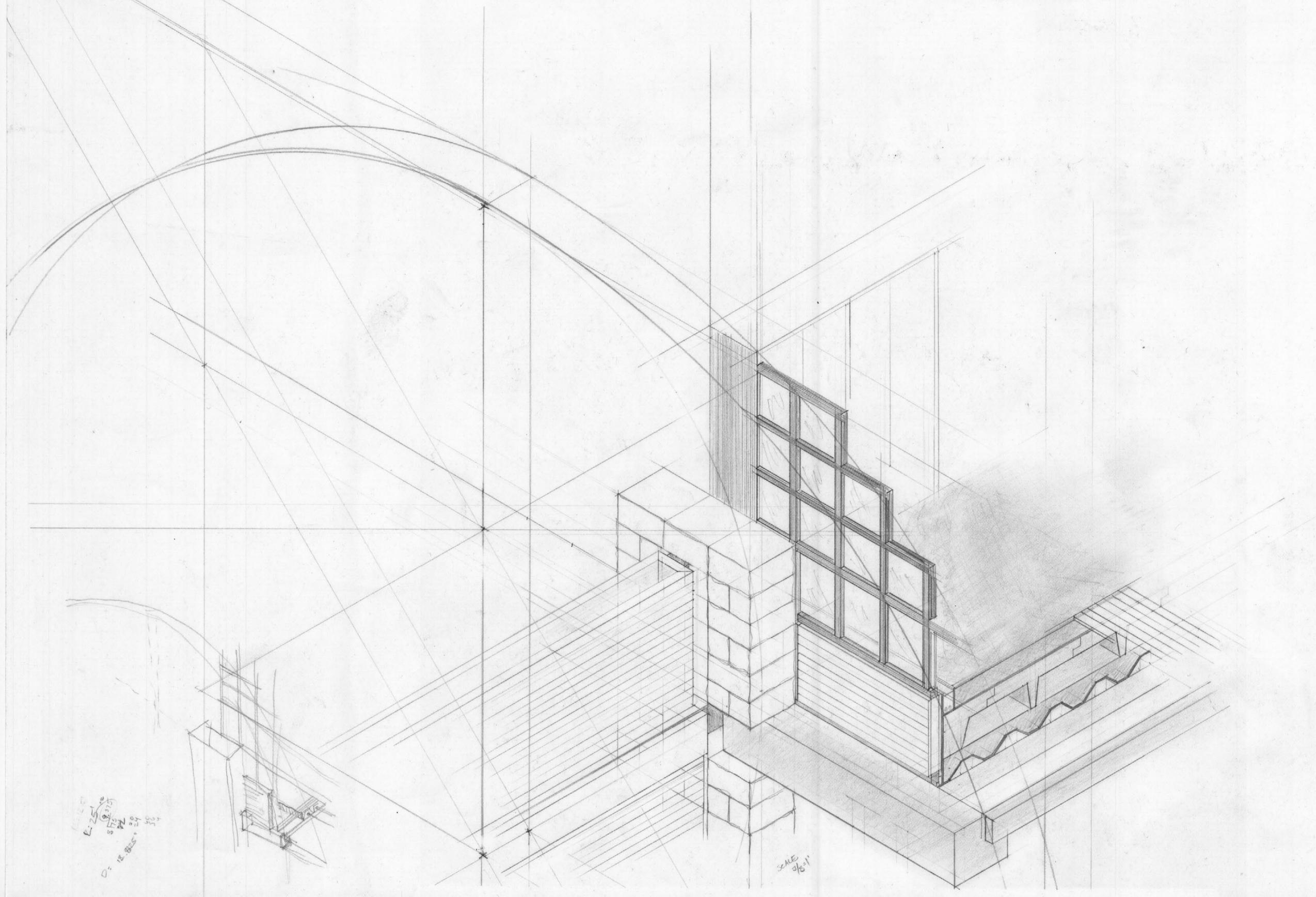
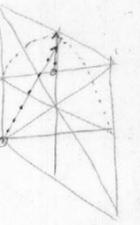
24" x 24" x 12" QUARRIED CENTRAL TEXAS
LIMESTONE WITH 3/4" CONCAVE MORTAR
JOINT SAWN INTERIOR SURFACE
SPLIT-FACE EXTERIOR SURFACE WITH
EXPOSED LIFTING MOUNT CUTS

NATIVE PRAIRIE GRASSES SOIL
CRUSHED LIMESTONE CRUSHED SITE
CONCRETE ROOT BARRIER WATER
DRAINAGE LAYER WATERPROOF
MEMBRANE 4" RIGID BOARD
INSULATION 6" CONCRETE DECK

18" x 48" x 1" GLASS TILE METAL PLATE
FRAMED SKYLIGHT 3/4" Ø 24" AND 16"
STAINLESS STEEL ROD THROUGH
3/4" STEEL PLATE 2" x 8" BUR OAK
BEAM 24" O.C. 4" x 8" BUR OAK
GLU LAM FLITCH BEAM JOINED TO
3/4" x 12" PLATE STEEL BY 1/2" Ø 9"
BOLT FLUSH WITH BEAM FACE

4" x 24" MAPLE FLOORING 15 LB FELT
PLYWOOD SUBFLOOR PRECAST CONCRETE
"T"-4" SLAB DEPTH TO 16" BEAM DEPTH
WITH 48" x 16" MECHANICAL SPACE 3"
RIGID BOARD INSULATION 4" CONCRETE
SLAB VAPOR BARRIER GRAVEL

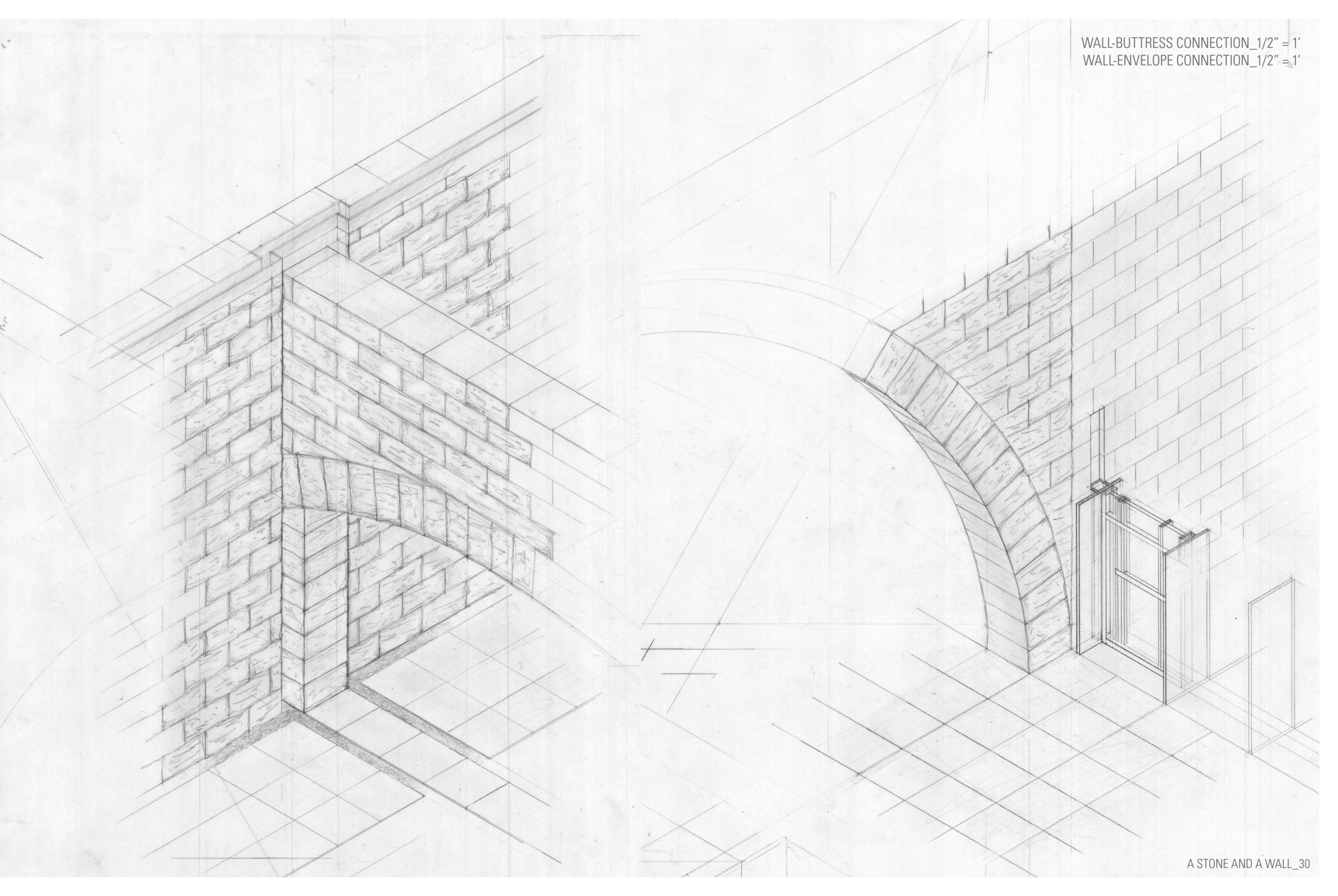
34" GRADE BEAM 6" SERVICE CHANNEL
ALONG WALL EDGE 6" GRAVEL DRAIN
ON WALL EDGE 48" FOUNDATION PIER



Handwritten notes and calculations in the bottom left corner, including:
L: 25'
W: 12'
H: 12'
D: 12'
S: 12'
T: 12'
C: 12'

SCALE 3/8" = 1'

WALL-BUTTRESS CONNECTION $1/2'' = 1'$
WALL-ENVELOPE CONNECTION $1/2'' = 1'$









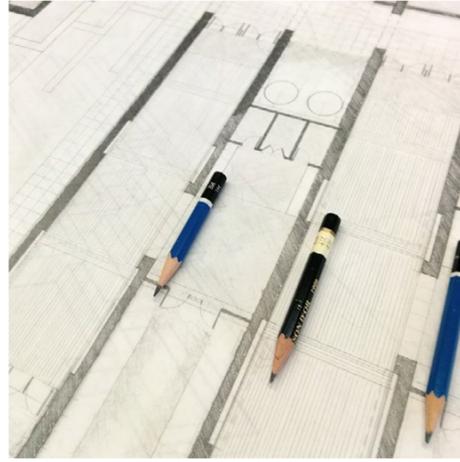
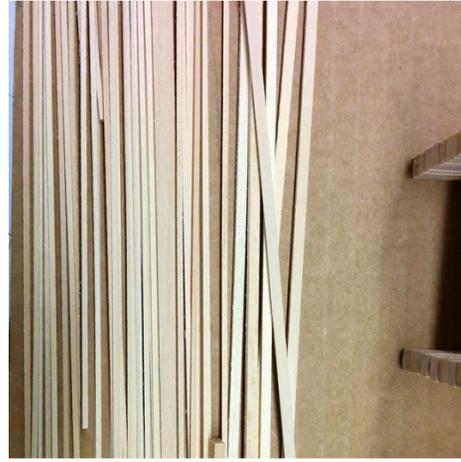
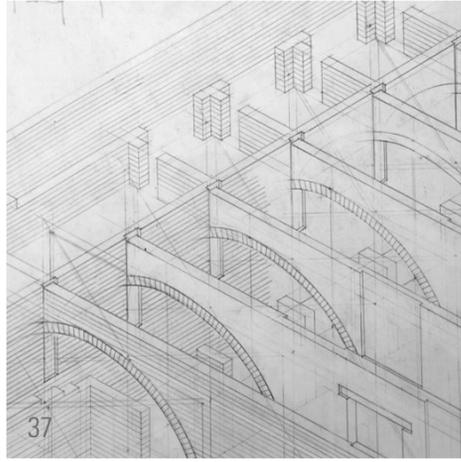
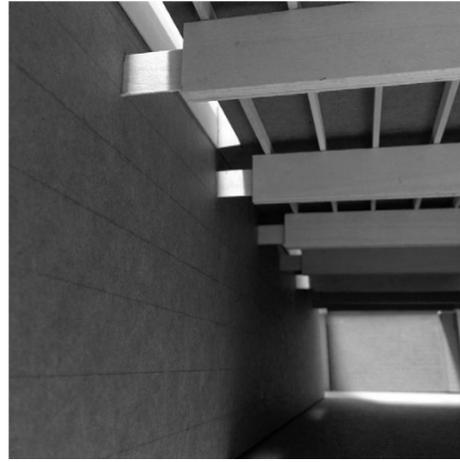
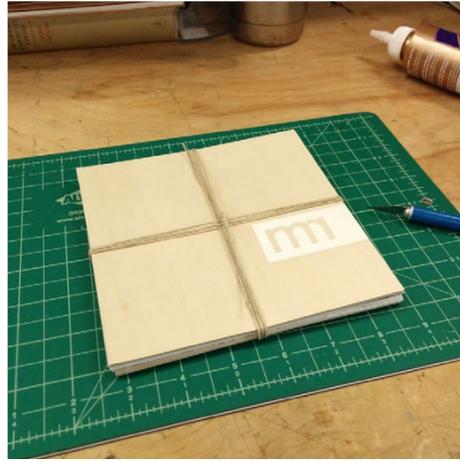
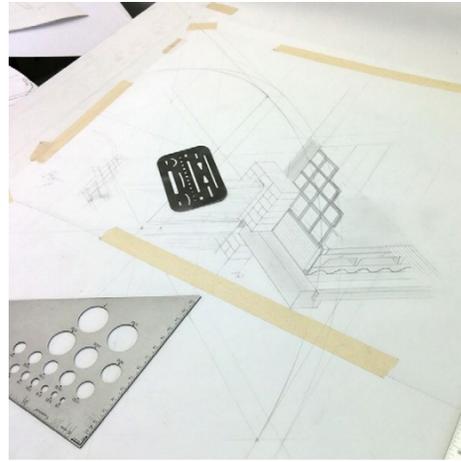
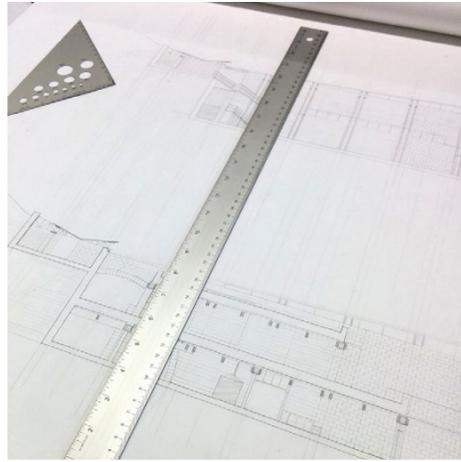
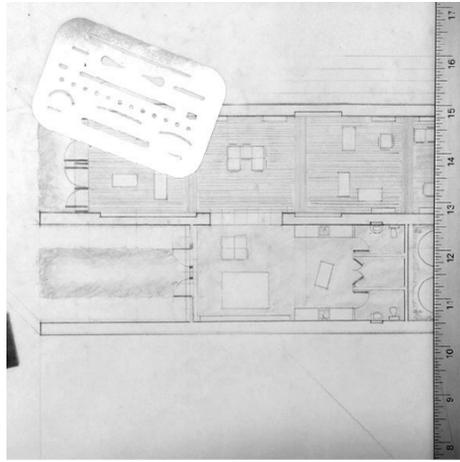
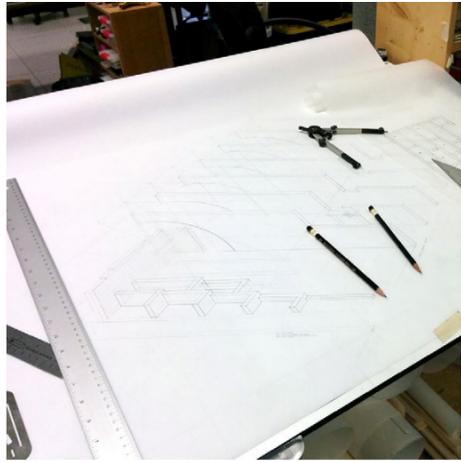
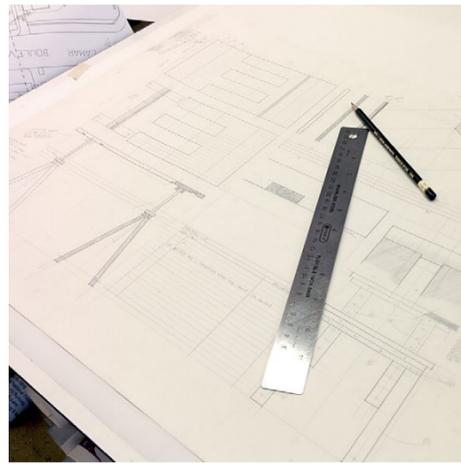
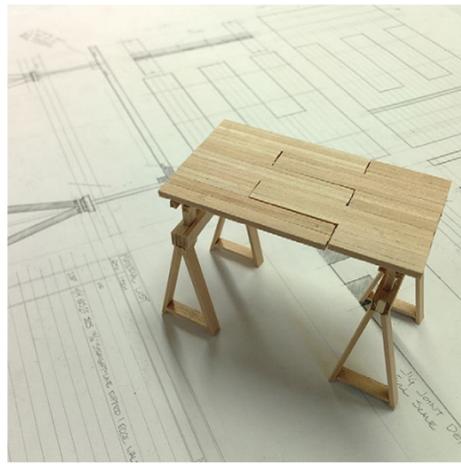




I would like to thank Scott Gartner, Bill Galloway, and Patrick Doan for their guidance, support, and patience in the exploration of this thesis project. Additionally, thanks to Hans and Steve for their time and attention in studio.

Thanks to Rodney Hill, Marcel Erminy, and Gerald Maffei for their encouragement and support during my undergraduate and graduate studies.

I would also like to thank Ms. Lori Friedman and Ms. Amber Miller of Austin Montessori for the opportunity to visit and observe students in a Montessori learning environment.



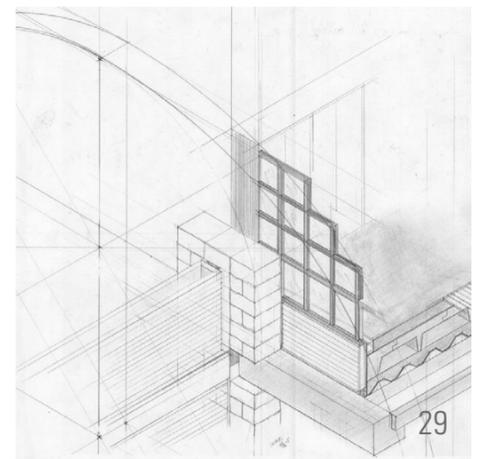
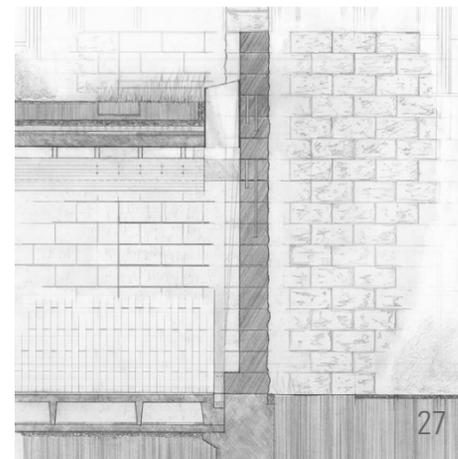
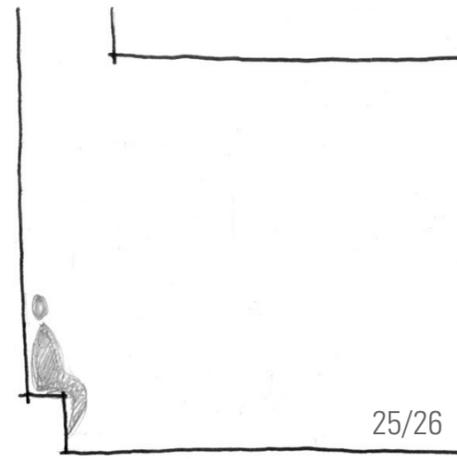
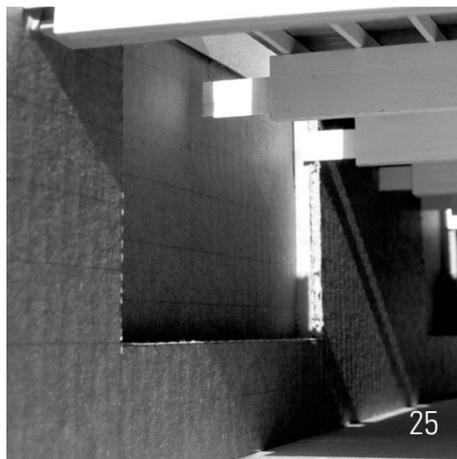
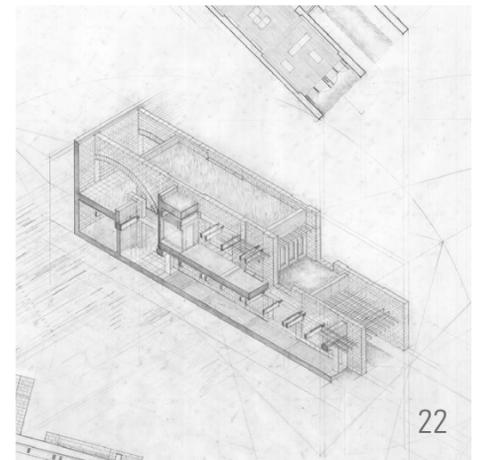
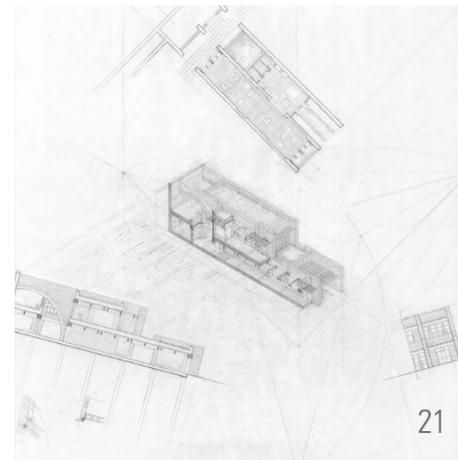
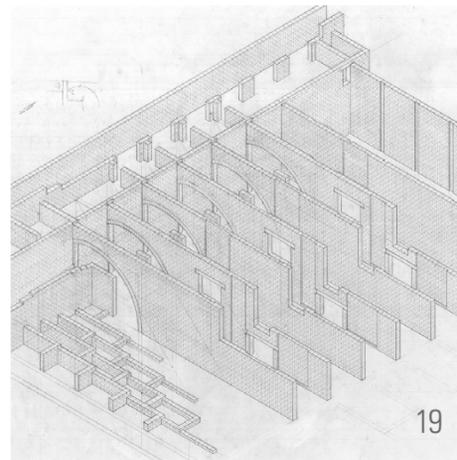
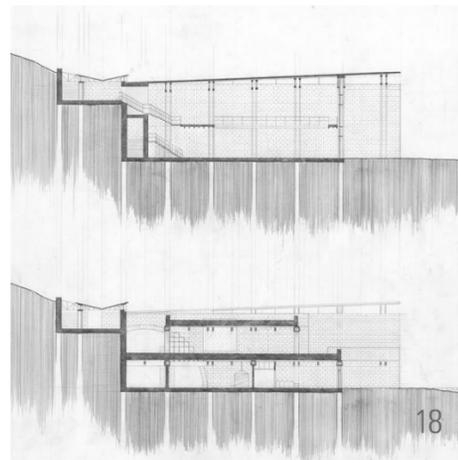
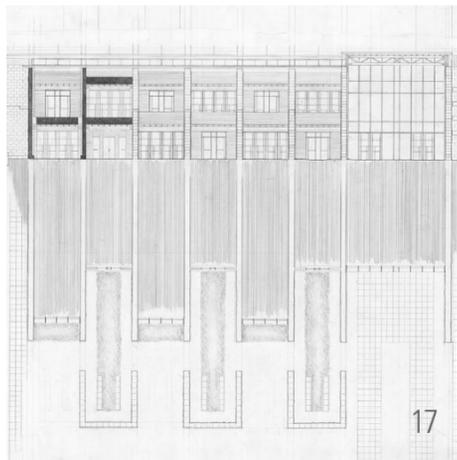
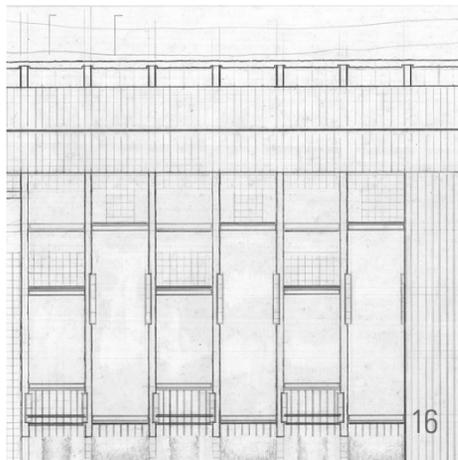
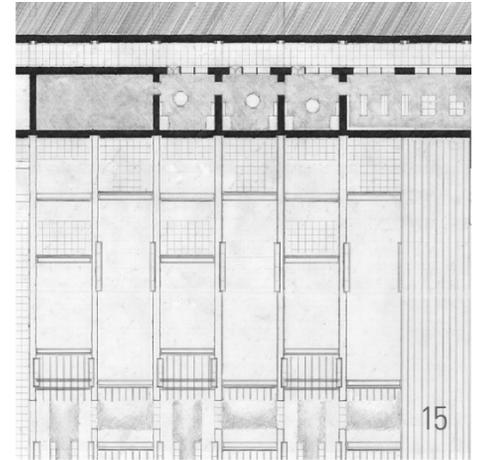
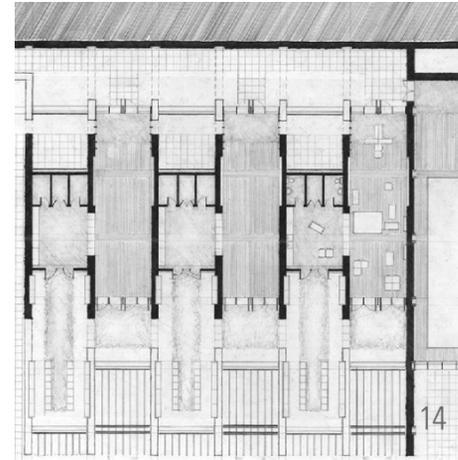
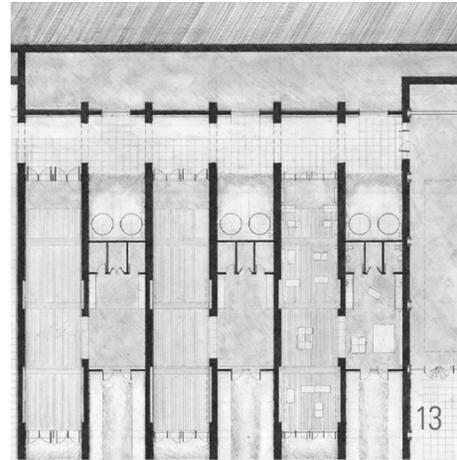
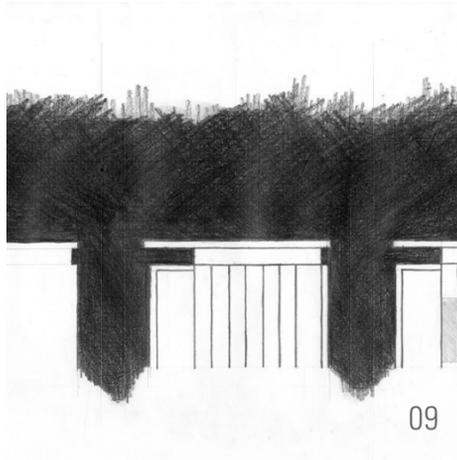
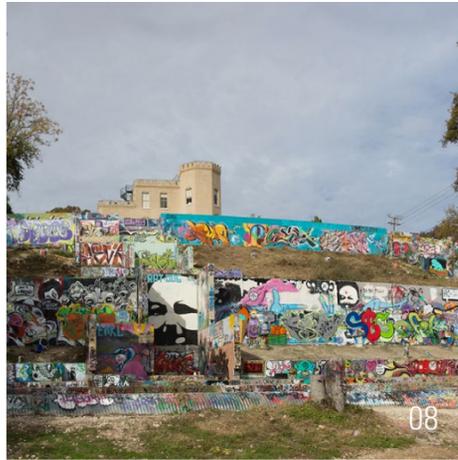
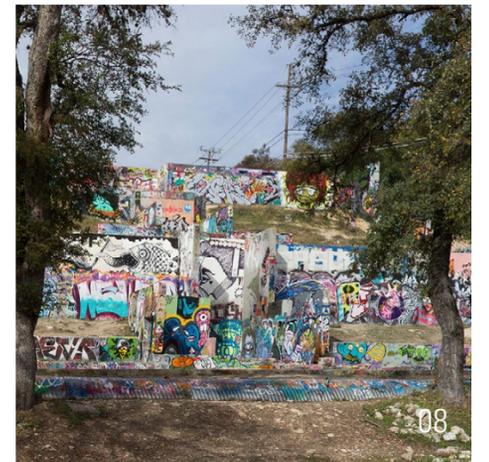
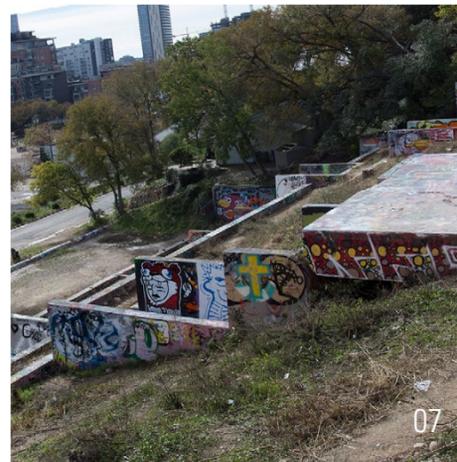
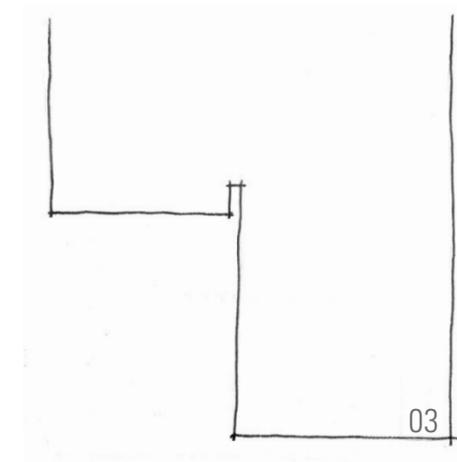
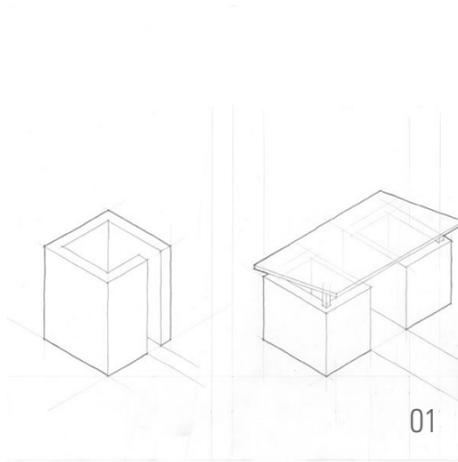
REFERENCES

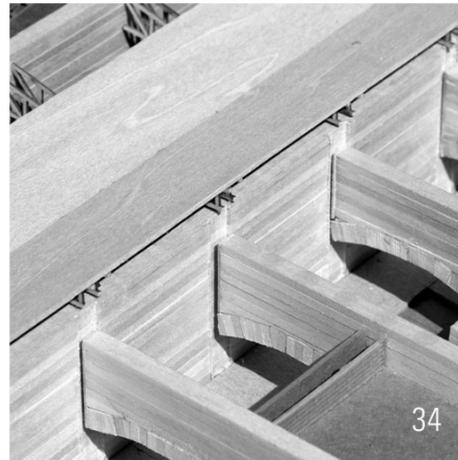
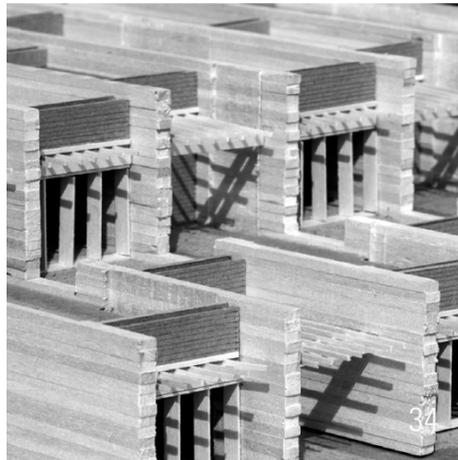
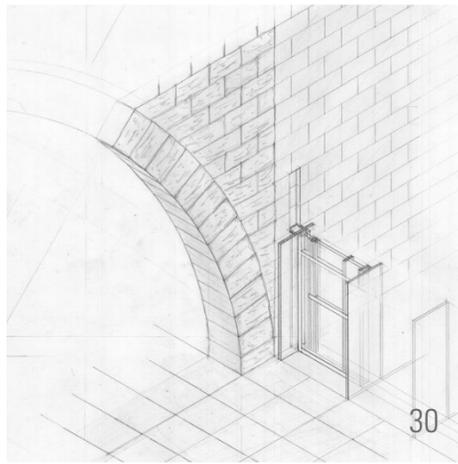
LIST OF THESIS RESEARCH MATERIAL

Heimsath, Clovis, Maryann Heimsath, and Lisa Hardaway. *Geometry in Architecture: Texas Buildings Yesterday and Today*. Austin, TX: University of Texas, 2002. Print.

Montessori, Maria, and Gerald Lee. Gutek. *The Montessori Method: The Origins of an Educational Innovation: Including an Abridged and Annotated Edition of Maria Montessori's The Montessori Method*. Lanham, MD: Rowman & Littlefield, 2004. Print.

Pestalozzi, Johann Heinrich. *How Gertrude Teaches Her Children*. Washington, D.C.: University Publications of America, 1977. Print.





APPENDIX A LIST OF FIGURES AND IMAGES

- 01_the light well, the dogrun, and the porch
- 03_a procession of spaces
- 05_site_1007 Baylor Street, Austin, Texas_Source: "Austin, Texas." Map. Google Maps. Google, 2 May 2014. Web. 2 May 2014.
- 07/08_site photographs
- 09_site development diagram
- 11/12_site section
- 13_first floor plan
- 14_second floor plan
- 15_third floor plan
- 16_roof plan
- 17_southeast elevation/section/garden plan
- 18_hall/classroom sections
- 19_wall isometric
- 21_constructed isometric
- 22_classroom
- 23_skylight study model
- 25_light shelf study
- 26_leaning wall study
- 27_wall section
- 29_arch-envelope connection
- 30_wall-buttress/envelope connection
- 31_model_entry into classroom
- 32_model_classroom and upper garden
- 33_final model
- 34_final model details
- 35_final model