

# Edifying Design-Build

Towards a practice and place based architectural education

**J. Dennis Daniels II**

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

Masters of Architecture

in

Architecture

**Paul Emmons, Chair**

**Susan Piedmont-Palladino**

**Ryan Pieper**

**12 December 2017**

Alexandria, Virginia

**Keywords:**

Architecture, Design-Build, Site, Place-making, Historic Preservation, Context, Cuba, Attic, Basement, Wall, Ceiling, Floor, Dream, Inversion of Up and Down, Reflection, Education, Community, Construction, Deconstruction, Ad Hoc

# Edifying Design-Build

Towards a practice and place based architectural education

J. Dennis Daniels II

---

## ***ABSTRACT***

Architecture in its primitive form enacted a relationship of making between intentions and outcome. Post-industrialized modernization has created a multiplication of complexities, resulting in a profession that has disengaged theory and practice through the specialization of the architect and the craftsman. Design-build has the ability to be an educational process that re-engages a direct dialog and collaboration of the roles of designer and maker, reinforcing the resilience of culture and place through joining intentions and built reality. Design-build projects have the ability to be an integral part of design education because of their ability to engage in physical manifestation that is fundamentally different than formal education of designing through drawing or design at a distance. Exploring the Washington Alexandria Architecture Center's Design-Build ethos as a primary case study, I intend to support this claim by providing evidence of how a Design-Build process can engage the designer, tools, methods, and materials, with the cultural, social, and environmental context that is sensible to place. By utilizing creativity and ingenuity of available resources as an opportunity for adaptation, an organic sense of place is perceptible, the place is created. Representation beyond drawing encourages one to be proactive in connecting the qualities and characteristics of existing space; this leads to a sustainable practice of continued investment in object, materiality, time, and place. Hybrid approaches to design, or the assembly of both design and building as an academic practice, are no longer insular, but are encouraged as a way to interrelate and connect the built environment with its unbuilt opportunities and impressions.

---

# Edifying Design-Build

Towards a practice and place based architectural education

J. Dennis Daniels II

---

## **GENERAL AUDIENCE ABSTRACT**

Architecture in its primitive form enacted a relationship of making between intentions and outcome. Post-industrialized modernization has created a multiplication of complexities, resulting in a profession that has disengaged theory and practice through the specialization of the architect and the craftsman. Design-build has the ability to be an educational process that re-engages a direct dialog and collaboration of the roles of designer and maker, reinforcing the resilience of culture and place through joining intentions and built reality. Design-build projects have the ability to be an integral part of design education because of their ability to engage in physical manifestation that is fundamentally different than formal education of designing through drawing or design at a distance. Exploring the Washington Alexandria Architecture Center's Design-Build ethos as a primary case study, I intend to support this claim by providing evidence of how a Design-Build process can engage the designer, tools, methods, and materials, with the cultural, social, and environmental context that is sensible to place. By utilizing creativity and ingenuity of available resources as an opportunity for adaptation, an organic sense of place is perceptible, the place is created. Representation beyond drawing encourages one to be proactive in connecting the qualities and characteristics of existing space; this leads to a sustainable practice of continued investment in object, materiality, time, and place. Hybrid approaches to design, or the assembly of both design and building as an academic practice, are no longer insular, but are encouraged as a way to interrelate and connect the built environment with its unbuilt opportunities and impressions.

---







---

## ACKNOWLEDGMENTS

This work would not have been made possible without the financial and material support of many generous donors including Virginia Tech Washington Alexandria Architecture Center, BMC Smoot Lumber, TW Perry, AK Metals, the City of Alexandria, VA through material donations, financial, time and effort.

I am grateful to all those with whom I had the pleasure to work, learn, and collaborate with while studying at the Washington Alexandria Architecture Center. To past current and future students, without your passion for architecture , community and creating place, this unique institution of learning would not be same without the legacy each student leaves behind. I would like to especially thank the many students who helped me carry out the physical labor required for deconstruction and construction of the work.

I would especially like to thank Dr. Paul Emmons, Coordinator for the Ph. D Program, and chair of my thesis committee, Susan Piedmont-Palladino, Director of the WAAC and Ryan Piper, Visiting Assistant Professor of Practice. Through discussions and questioning their mentorship has enabled me to ask tough questions and to continue design explorations professional and academically. Their expertise has taught me more than I could give them credit for.

Nobody has been more important to me in the pursuit of this projects and my dreams than the members of my family, who's love and guidance are with me in whatever I pursue. Most importantly, I wish to thank my wife , Amy Daniels, who provide me unending inspiration, love and support. Thank you for pushing me when I needed it and wrangling me in when I loose track of the important things.

*I can do all things through Christ who strengthen me.*

Philippians 4:13

---

---

# Edifying Design-Build

Towards a practice and place based architectural education

---

## | IV Dedication

## | VI Acknowledgments

## |01 Constructing Place: Design-Build and Education

### |10 Test Place: Habana, Cuba

### |19 Site Place: 1001 Prince Street Alexandria Virginia

## |21 WAAC Design-Build

### |22 Design-Build Practice and Theory @ WAAC

### |48 Attic: Test Installation

### |73 Basement: Crawl Place Design-Build

## Appendix A

### |136 Thesis Defense: Images and Words

## Appendix B

### |148 Bibliography

### |149 Image Credits



## ***Constructing Place: Design-Build and Education as Place***

The Washington-Alexandria Architecture Center of Virginia Tech is a design incubator. It is an international consortium for designers in undergraduate, graduate, and PhD programs. Exchange and hybridization of cultures creates a distinct place for engagement that alters traditional design education. Through its functions as a place, the spaces that make up the WAAC are active participants in the process of place-making through physical making with a focus on design-build adaptations. Leon Bastista Alberti Renaissance Architect, wrote that "Beauty is a from of sympathy and consonances of the parts with a body."<sup>1</sup>

Design-build as a mode of student learning and exploration, models full-scale possibilities for change and adaptability. By studying existing conditions as a foundation to spring from, adaptation within an existing structure can reinforce the spirit of place. The Washington-Alexandria Architecture Center (WAAC) is saturated with ingenious adaptations that are central to the education it delivers. As a building to learn in, and as a building to learn from, the WAAC is also a community, and through its design-build artifacts it creates a sense of place. These artifacts become both figures and landmarks in the school's historic urban landscape. The projects are manifested in the ideas, concepts, prototypes, and explorations that are mortared into the fabric of the building. Looking at these circumstances gives valuable insight into the role of design-build in creating place. Through examining the past and current projects, and the potential for future projects, design-build can be understood as a seed and as a tree, a regenerative process providing ideas and shelter for others, and culminating in a process that proactively responds to the evolving values of place.

The WAAC, as a collection of design-build artifacts, manifests the evolution of multi-generational culture engulfed in the academic setting. Many specific projects address the interrelation of material's durability and the place it sustains. First, 1001 Prince Street provides resilience through its ability to adapt. Built in 1910, brick by brick it illustrates the core values of the robust second industrial revolution. The building's structure is a hybrid combination of masonry bearing walls, timber framed floors, and timber roof structure. The double wythe brick walls are protected by brick veneer, pre-cast concrete panels, and terra-cotta roofing tile. The units of construction are durable and inherently reaffirm the system as a whole. The use of these seemingly mundane materials adds to the complexities of spatial characteristics over time. Structures that were built with similar systems have proven to not only justify the structure's ability to withstand rapid decay but also through the iterative process of maintaining and utilizing the building, they have provided resiliency through historical significance.

In the instance of the 1001 Building, its uses have changed over time. Paralleling the evolution of cultural, social, and economic necessities, the utility of change promotes a process that has the ability to be resilient as well as the ability to adapt. 1001 Prince Street has changed from a place for fundamental education as a primary school to a place for investigation of the creative limits of architectural design education. Developments of knowledge distribution and gathering is inherent on this site through the generations of multiple uses. This building portrays the developing goals of education as a system, thus creating a dialogue between the past and the present. The shell has remained intact while the interior has been heavily adapted over time. The use of the interior forms has collectively created a system of interrelating spaces; making and adapting has shaped the physical place and so also the spirit of the place known as "ten-o-one."

### ***The WAAC is greater than the sum of its parts***

The steps leading up from Prince Street, under the trees and beyond the two brick planters, act as a gate to the school grounds. Concrete cast in the shape of the letters "W A A C" sits at the threshold of the planters. Concrete benches, forms, rubble and inquisitive objects sit at the stoop of the 1001 building. Their form indicates uses that are no longer indicative to the positioning of the landscape. Their surfaces vary from the formwork used in making, from smooth to rough. Formwork that include metal, acrylic, plywood and board form casting illustrates a diversity of ideas and values given to one single material. These elements mark the threshold from the city to the consortium. Cloistered together, they act with the inward facing benches to create a place for conversation. Without formalized order, people's interactions in this place become intimate and tranquil. Dark shadows from the trees cover the benches furthering the enclosure of the exterior space. There is a warmth to the space that contrasts the coolness of the concrete with the interaction of the stoop with the street front. Connected, yet discrete from the views at the street, the concrete artifacts are placed within the landscape that lead up to the entrance and around each side of the building.

---

1      Alberti,

A brick arch creates the opening in the south-facing façade, aligning the entrance symmetrically in the built context. The arch reveals and exposes a large glass covered opening. An inscription in the glass above the doors reads "1001" in bold metallic silver lettering and includes both the address and the name by which every user knows the building. A silver lined diamond decal spans the distance of the double door glass enclosure and represents the physical boundary of the nation's capital. Inscribed on the door in silver text reads, "Washington Alexandria Architecture Center - School of Architecture Landscape Architecture and Urban Studies". The door handles are bronze, worn by weather and use. Above, a red disk three inches in diameter denotes the location of WAAC and its campus within the diamond of the Washington D.C. region and acts as a notion of celebration, welcome, and entrance. The glass door as a place creates the threshold into the exploration of architecture through the lens of a consortium.

Four wooden columns stand just inside the south entrance; three of them are green. As you enter the building, the second column on the right is not painted except for a gold band. It might not seem obvious to some observers; the natural wood blends in to the surroundings. The plywood window box, the maple hand rail of the stair, and the unpainted column do not appear out of place. One student in years past wondered what the interior of the column was made from. After drilling a small hole, she discovered that there was a steel column incased inside of the wooden column. Her willingness to question reality turned into an exploratory process of discovery. She enabled the process of making through removing and by creating a hole she was able to learn much more about the place she inhabited.

The landing of the first floor connects the stairs that lead upwards from the marble floor entrance of four columns and continues to the second floor. The simple arrangement of temporary wooden dowels and printed paper slid into an aluminum tube and suspended by cables elevates the words written on each banner. Here, the semester studio project banners have provided over 35 years' worth of issues that the faculty encourage students to tackle in their own projects. At the end of each semester, the banners are taken down, rolled up, and archived with the previous years. The repetition of the structure of the university has enabled a system of interchangeable artifacts, each spark memory of the evolving thoughts and ideas with each change of semester and year.

Flanking the banners are the east and west hallways of the first floor. Green mullions encase the doorway and are shaped the same as the front doors encased in the brick arch. The walls of the hallways are lined with metal stud and gypsum, and are tilted slightly toward the center of the hall; the ceilings are tall and the slant in the wall accentuates the verticality of the space. Dimensioned 9'-6" x 15'-6" x 20'-0", the corridors act as a long progression and are often used as a gallery of student projects. Each semester and every year, student research and projects are pinned up and displayed ceremoniously at each major junction of a project's life. The works participate in holding up the wall, reaffirming design in the structure of the school. The walls of the corridors are fortified. They are four wyth of brick wide, and thickened by gypsum construction to more than two feet in all.

On the south side of the east corridor the largest space in the school is found, the WAAC Library. Filled with a wide selection of books, the library at the WAAC is one of the most interactively adapted spaces in the building. Traditionally the library has been viewed as a place to preserve history and expand the mindset of students. Through iterative and evolutionary design-build projects, the space has been made into a place of its own. The library bookshelves are one of the first and most reproduced student built elements in the school. Utilizing ¾" maple plywood, the systematic design minimizes waste by only losing the thickness of each cut as the system is made. The system creates a grid of 18"x18" maple cubbies that are used as bookshelves. Modularity of the system allows variability within the design of the layout and maximizes the potential to minimize material and spatial waste. Maple cubbies fill the walls on the periphery of the library and extend from floor to ceiling, filling the space with a grid of knowledge, books, references, and explorations for students to pull from.

The library continuously expanded and eventually it could not be contained in a single room. The room above the first floor space became an addition to the library. Modifications to the existing structure of the second floor were necessary to connect the spaces. Physically connected through a 15'-0" x 15'-0" opening in the floor of the second floor, the space was expanded vertically two-fold. The process involved opening the ceiling, repositioning electrical and other utilities, as well as removing fifteen floor joist each weighing nearly one hundred and thirty pounds. These radical changes are now inscribed in the place as if it were originally intended to be this way. The plywood bookcases are replicated on the second level of the library as well, harmoniously integrating the

two levels as one space. Expanding the library vertically created new opportunities for furthering design-build as a practice in three ways: in function and necessity of access, as an evolutionary process of “placemaking”, and as an educational process. Its modification created physical material for future projects including the secret room table and allowed access to the reconfigured space.

Due to the opening in the floor, there became a need for easy access to the second level of the library. This is what began the spiral staircase project. Adjacent to the office, the staircase begins in the library and incorporates the tools and techniques of the WAAC into the current longest running project at 1001. The project, which started with a directive to utilize a confined space, combined with the want to access the second level of the library, evolved into an iterative process of testing and building. Each step of the stair is a modular system of stacked plywood that engages structure, aesthetics, and function. Tapering the underside of each step from a monolithic mass to a sculpted tread, the taper invokes the movement of the spiral. Machined aluminum joints are bolted together at each tread, grasping curved safety glass pannels and the flat stock aluminum handrail. Each joint is milled on the lathe in the shop; each piece of glass is slumped in the glass kiln. As a whole, their appearance is light. Blonde maple plywood, reflective wire reinforced glass, and silver metallic aluminum are choreographed, utilizing their physical properties of material, innovating their use. The twisting and shimmering reflections of the glass panels in light as it spirals up to the next floor give levity to the object as a whole.

Nearly from floor to ceiling the library is littered with design adaptations. Starting at the floor of the library, two-inch strip maple flooring creaks intermittently at each step. The surface of the maple is polished but shows signs of age, abuse, and neglect. Nevertheless, its continues to express a warm temperament in its golden color. Nail heads are visible where planks have been dialed down. Staggering across the floor with no apparent pattern the nails illustrate the necessary work done to maintain a level floor. Each nail reties the flooring down to the remaining joist. Sliding past each other, the grain of the maple shifts hews of gold and yellow. Splotches of vibrant color fill the corners of the library and the technicolor palette of the books enliven the space as a place. Details here conspire and are left as artifacts; some are known, others unknown, and some are left to be discovered. Hidden under the central table sits a five-foot glass disk mysteriously patterned by the objects that were used to cast it. Two-inch glass tea candles were melted together to make the cloudy and milky appearance. Its translucency doesn't allow a clear view down but suggests the object and spaces below.

Analysis of each square inch that has been manipulated begins to not only create a history of the space but also adds to the collective sense of the place. Names rather than numbers to identify for specific rooms illustrates the connection between design-build adaptations and the memory of place. The “grid world”, “cloud room”, “red room”, “secret room”, and “stair theater” evoke the physical place by virtue of multiplicity of elements, installations, color, and function within each space. The naming denotes a specialization and familiarization of place that is separate from other rooms and functions within the building. Of these spaces the stair theater is another example of multiple adaptations which have changed the nature of the space.

According to Jaan Holt, Professor Emeritus and former director of the WAAC, the volume of the space is perhaps the most influential characteristic architecture can alter. Volume of space also contributes to the sense of place. The stairs that lead from the first floor to the second floor of the WAAC offer two ways up. Directly adjacent to the first floor east and west wings two sets of stair treads rise up to a narrow landing mid height between the first and second floor. Cast Iron banisters create a series of narrow pickets that allow views under and above the stair tread, to the lower stair leading from the main entrance. Reflective light bounces up the through the space and creates a glow that is connected to above. The landing is inhabited by three large vertical windows extending nearly to the ceiling of the second floor, a concrete and steel supported maple plywood bench, and a track system of gypsum dividers slide in, blocking out southern light into the space. The landing connects the base of the stairs, leading up from the first floor. Combining the width of the two stairs below and joining in the middle, this set of stairs continues to the second level. The volume of the space is a hybrid of the necessities for second floor height merging with the layering and opening of the stair.

Left of the stairs on the second floor the piano balcony cantilevers past the edge of the floor. Its circular shape and the materials used to construct it are reminiscent of those used in the spiral staircase in the library. The similar quality of the materials is apparent when compared side by side. However, the glass around the stair

theater has more texture and the curve of the glass fins is rectangular in shape; those used in the spiral stair are triangular. A modified baby grand piano sits snug in the approximal four-foot space.

Right of the stairs on the second levels sits a plywood box. Within the rectangular box a series of seemingly strange bent pieces of plywood. Students, faculty, and alumni illustrate the mystery of their use frequently. Each piece of plywood is sculpted to mesh to the form of the stair treads and risers and also with the curvature of the human back. Acting as seats integrally crafted for the stair theater, they allow one to sit more comfortably on the stairs.

The formation of all of these parts including the stair, the projector, the piano, the blackout screens and projection surfaces illustrates the necessity for care and consideration of details. Care given to each individual project and each individual condition has capitalized on projects that came before it. In this way, a sense of place is created from the double volume space within the stair. The stair theater contributes to the overall spirit of the place, known as ten-o-one.

### ***Change as Opportunity for Added Value***

Methods of making over the lifespan of a place inherently change. Shifts from the initially designed space to the adaptations that happen after are ad hoc and are characterized by initial intentions. Ad hoc design is a solution of design for a specific problem, it is not generalized or intended to be used for other purposes. It is a reactionary adaptation, which is examined within the context of an existing situation, holistically approaching a shift in value. The capability for adaptation of initial intentions is typically created circumstantially, however, it can also be allowed for in the initial design of the space or object. These attributes are both ordered and contextualized as characteristics of place. The distinction between planned design and ad hoc design lies in their relativity to the design process as a whole. While ad hoc design can be planned, it is not typically structured and planned before the initial design. Ad hoc design has the opportunity to take advantage of evolution over time in order to formulate an assembly of space and place.

Ad hoc design must be pro-active in more than just use or function. Planned design aims to fully understand the requirements as a well-defined issue or problem while ad hoc design has the unique ability to confront the non-defined as an opportunity to understand the whole, through smaller and more predictably scaled issues, knowing that the design of making will inevitably need to be filled in as the process emerges.

This is not an opportunity for neglect but an ability to focus on the values that are important in creating quality of built space. The idea of a loose fit ties into this concept. A loose fit building contains ordered components with an inherent sense of flexibility in the design that allows for change and infill.

The ability to create and modify in the future is essential in reassuring added value and the ability to create and manipulate space that is sustainable and resilient. This evolutionary process utilizes "making" as a way to test the success and failures of each step and in order to inform the next. Making in a place over time has the capability to inform the future of making in that same place. Through successes and failures of adaptation, the next generation of making can be informed and defined. As an example, the staircase within the Library at the WAAC was built with a specific technique, procedure, and set of tools. The same techniques, procedures, and tools were expanded upon in other projects such as the Piano Balcony. While both projects are made of similar materials and created from similar processes, the history and memory of the stair lends evolutionary advancement to the Piano Balcony. In this way, making of the past has become a learning tool. The building acts as a living tool, enabling a positive evolution of making.

The notion of the ad hoc implies an evolution of change that questions permanence and temporarily. Design-build has the ability to imply understanding of the current situation as a transition between intentions and goals. The state of being in process is indicative of change, parallel to the mindset and stewardship found in Landscape Architecture studies. As Landscape Architecture focuses on long slow growth, so can a building's adaptations be thought about in the same way. Place matures over time, similar to the landscape. In studying the adaptability of an existing space, emphasis is placed on maintaining the integrity of the past and consciously deciding the current best environment for a holistic conscious future. While in the past the idea of ad hoc, or adaptive change has been contributed to makeshift solutions, designing with sensibility enables cultural and social implication to be read and displaced through the process and ultimately in the artifact left behind. To expand



beyond the ad hoc one must not look at only the current situation but the implication of the situation at hand and also hypothesize the inevitable changes over time. This is not to say that one must be able to see into the future, but one should be aware of the implication and the connectivity the adaptation has on place making.

The WAAC inhabits a building, which it was given. The school did not start from nothing; instead, it began with ownership of an existing venue, which has become its home. Through creative thinking and exploration, the students at the WAAC created ownership out of necessity as well as expression. The necessity is not tied only to function, but also to a creative need to define place. The pedagogical identity of the school as a consortium is embedded in layering, montage, collective senses, ancient texts, and contextualized contemporary design. This is evident in the design build adaptations and change that has occurred throughout the building during its life as a school.

A place is defined over time through the ability to combine planned and adaptive reasoning by consideration of initial needs, added use, refinement of details, and specific opportunities for change. For example, within the WAAC the staircase theater was planned to create circulation throughout the building. Through the established circulation, interactions of people occur and previously unplanned programming happens. A sense of ownership and memory is created in the space, and it eventually is established as a place on its own. The adaptation of the stair begins by questioning; a community of users develop new needs based on desires for a space to gather. This has led to the projector wall and utilization of the staircase as a place to sit, a place to come together. Through the questioning of how to make seating more comfortable in this place, balancing the need for comfort and temporarily, the bent plywood chairs of the stair theater were created. The temporal nature of the chairs and the sliding screens allows the stair to be modified according to its required use. As the screens slide together, the stair is enclosed as a theater. It is not defined as a new realm, but instead an orchestration of elements that are rearranged in order to utilize the space in a different manner. These elements do not detract from the initial function of the stair as circulation; they only add value to the initial design intentions. Through memory and adaptation, these components, along with others in the space, define the stair theater as a place within the school.

The spiral staircase that connects the two levels of the library exemplifies evolution through the design build process. The project has been ongoing for over two decades and has encouraged prudence into the minds of designers. The project has seen changes in earlier iterations of the design build and implementation of new iterations as opportunity for further growth and analysis. The concept of allowing communication between two levels became a process that not only completes the functional goals of connectivity but also acts as an artifact of methods, testing, and iterations of making. Over fifty students have engaged in this project, leading to its overall success of creating and manipulating the built form. As a system of parts, over time the staircase has been iteratively analyzed and constructed through both theory and practice. The overall design is an amalgamation of parts and has produced an organically processed object. This was achieved through the use of repetitive systems including stacking of similar pieces of the same materials, through manipulation of components, by use of materials that are malleable and durable, and through continuous trial and error. Multiple hands are present through the varied uses of materials and tools. The materials include wood, glass, and metal and are utilized in the processes of production as individual objects that are manipulated based on material characteristics and ability to be transformed. These fundamental properties of materials must be understood to produce not only reactionary development but also proactive creativity.

Ad-hoc approaches to the theory of making can challenge the ability of materials to perform in non typical circumstances. Because of the fundamental need for place, the understanding of existing conditions is critically challenged in order to create new with what already exists. Ingenuity such as the adaptations of materials to curve is not only seen as an aesthetic decision but is compensatory to the overall form of the artifact. Change if perceived as opportunity has the ability to create added value in a place. Often change leads to the deterioration of value, however, if the mindset of the community is optimistic and critically engaged, ingenuity and innovation is capable of being created through ad-hoc hybridizations. The consortium community of the WAAC has created its self a place infilling and infiltrating into the urban fabric, a sense and spirit of place.

### ***The Hand and the Tool***

Drawing is inherently limited as the pure means of representation in design. "Not all things architectural can be arrived at through drawing."<sup>2</sup> As artists, designers and engineers, we first see. We must first look in order to transform reality into a exercise of questions and possibilities for adaptations. By looking and examining with one's hands, one can create a glimpse into the intentions and uses of the subject at hand. Tools are no different than the hands that we work with. However, changes in tools and technology has had an effect on the process of making. Hand tools, power tools, and digital fabrication are each different in the methods of how they are leveraged. Moreover, they are each fundamentally different in the philosophy behind how each tool affects the process of making. Commonly it is suggested that hand-eye coordination changes one's ability to fully understand a material and how it can be adapted or manipulated differently with each tool set or device used. This is true even when the same outcome is produced. A design-build process utilizes any and all means possible to create a built form. We must be aware of changes in values when changes in tools take place. Different skill sets are necessary for each type of labor process. Even each distinctive tooling process can both actively engage the designer or, at the same time, it can disengage the maker. When unfamiliar tools are used, digital fabrication, for example, one must be cautious of the potential disconnect between the operation and the operator.

Attained knowledge and tacit knowledge<sup>3</sup> becomes vulnerable as new methods replace old methods in order to achieve a higher efficiency. Tacit knowledge is passed on through the shared repetition of bodily acts. Laying brick or mixing concrete, for example, is learned through iteration and by feeling; one goes over the action until it is understood by the body as well as by the mind. Excellence is achieved through repetition and so craft is created. Craft, not only as a trade but also as a value, develops through the complex interaction of the tacit knowledge and contextual modification. Iterative process can be found in use of "devices" however they have the potential to negate the individual who is operating the device. One must be careful of automation that has the potential to lead to the devaluing of the craftsman. By fully engaging in the process one's investment is realized through a sense of ownership and contribution to the creation of place making. Once understanding of the tools is developed, the tools become more powerful. New uses for the tool are also explored through working with the object. The tools can not only be leveraged to command the task as hand, but also can be useful in connecting the ethos of making and its reliance of understanding the process as part of design.

As designers, we must be critical about the tools we use. Just like our hands have the ability to draw, tools as an extension of the hand take part in the iterative process of making. The pen knows no light mark; it suggests a certain method and flow of working. Pencils, on the other hand, have the qualities necessary to vary line weight not only by pressure but also by weights of lead. Their function is defined by tradition. Assuming a hammer has only so many ways it can be used, it does not seek to be anything other than a hammer. Its role is to drive nails, to hammer pegs in place, and to pull out nails. It does not seek to be another tool such as a saw. Both the carpenter's saw and hammer are purposefully made and through repeated processes; the use of the tools become tacit knowledge. Knowledge that is known by the body and difficult to explain; "poster is gradually corrected; a calculated constraint runs slowly through each part of the body, mastering it, making it pliable, ready at all times, turning silently."<sup>4</sup> The hammer and saw might seek to extend each individual use, but cannot replace each other. The relationship of tools to design is in knowing how something will be made. In order to convey the reality of an object in drawing, the representation of a line must be understood by the drawer in detail. If intentional, the process of making can be applied to help shape the physical place.

A difference in tooling can determine not only the craft of an object, but also the character of an object. One must know the tool, the method, and the material in order to craft the sense of place one desires. Timber, for instance, could be cut and sanded in order to be a smooth surface, or the same piece of timber could be rough saw and would be perceived as a more rugged material. While the material is the same, the work done on the material can drastically vary. Wood used in the design-build projects of the WAAC is in most cases plywood. Overall, plywood is used most often. Its characteristics of a refined veneer on a seemingly raw material and its ability to withstand deformation are why it has become one of the principle materials used. Considering a per-square foot cost, plywood is the most versatile material used in design-build projects. With a cost of fifty dollars per four-foot by eight-foot sheet, it is economical. That equates to \$1.60 per square foot. Plywood is easily cut on

2 Evans, Robin (1986) , *Translations from Drawing to Building*

3 Polanyi, Michael (1966), *The Tacit Dimension*, University of Chicago Press: Chicago, 4.

4 Michel Foucault, *Docile Bodies in Discipline and Punishment*

the table saw and with the CNC router, two of the most precise cutting instruments. Due to its multi-ply assembly, it is strong in multiple directions. It can be cut into many shapes including strips, boards, sheets, and other more complex or organic two-dimensional shapes. It can also be steamed and bent. The manipulations are determined by the materials, the tool and technology used through the method of construction. Plywood specifically has effected the sense of place arguably more than any other materials used in the design-build projects at the WAAC. Known for uniformity and stable characteristics, maple plywood's warmth in color surpasses its relatively economical cost. The plywood acts as a memory inceptor which links moments together creating a spatial map culminating in a feel or a sense of place. Mackey Brow writer of *Orkney Tapestry* is quoted to have believed that "meaning emerges only through continuity"<sup>5</sup>; his focus suggested a "continuity of time" rooted in the world as human made and it is the task of architecture to represent this experience.<sup>6</sup>

Variability in tools is also explored through design-build projects. Design must be inherently aware of play and adjustability within the tools and materials in which help create. A wall as an artifact of construction is rarely as perfect as the line that it is represented with. It moreover will illustrate the irregularities of the materials and craft. If these irregularities are understood, through attained knowledge either through testing or through making, one has the ability to leverage the variability within a prescribed play. This is crucial in design education and in the leveraging of materials to work with you and for you. A building or object with no joints (as if the building was a seamless as the line of the drawing) either negates the fact that joints are essential or it undermines the importance in combining different materials and scales. It takes practice to understand how the relations of material joints, their variability in relation to internal and external tolerance, and the impact on other design decisions will have on the values and quality of space. Robin Evans writes, "Happy results do not of course occur under guarantee of the drawing technique, also requiring, as they do an inquisitive mind, a very strong presentiment of the sense within forms, together with a penetrating ability to visualize spatial relations."<sup>7</sup> Variability is in this way equally important in the mind and hands as it is in the tools. Tolerance within tools and technology must be understood both physically and metaphorically as materials help shape the sense of resilient place.

### *Intimacy of Scale*

The ideas of intimacy and of scale have been ever present in architecture as a theory. Intimacy is approached through the use of the envelope as a shelter and through the progression of public to private space. Intimacy is created between two or more objects in close relationship. It is a sense of atmosphere that Peter Zumthor wrote about when describing the kitchen of his childhood home. Intimacy has also been described as the poetic nature in relationship between the building and phenomenology, a connection of a space and human or through the effects of light on an opening. The work made at the WAAC not only treats design as an opportunity to engage the detail, but also through making space that is both insular and fully connected.

On the second level of the library, there in a nook, a space for a person to sit and reflect. The niche is made by the removing of a large section of the mass of the brick wall that divides the library and the stair case. Because of its location near the corner, the four-foot circular opening seems to float in space. The space was made by physical force, demolishing an opening, laying brick to patch the hole and to creating a ribbon of rowlock bricks that wrap the opening. 1/2-inch glass is floated within the opening, anchored to the masonry structure by machined aluminum standoffs. The space created allows the maker of the space to inhabit the wall cavity. The niche acts contrary to the initial intentions of the design; it takes on the challenges of connecting two large public spaces with an intimate space for reading and retrospection.

The relationship between creator and object in an educational environment as examined in the design build projects at the WAAC illustrates the complexity of interrelated parts that are not typically examined in other practices of architecture. There are many examples of small projects at 1001 that are similar to projects typically taken on by product and industrial designers. Reasons for this include resources of time, material, and cost. It can be stated that working on such scales enables a more conscious relationship between human and object. The scale varies from one design project to the next. Often one will find that design build education does not seek to create cities, or even large buildings. While most of the current architectural design work in the world is built at a much larger scale, it seems to work against the intimacy of the pedagogy of design-build. Large scales are

5 George Mackay Brown, *A Orkney Tapestry*

6 Mhairi McVicar, *Memory and Progress: Confessions in a flagstone wall*

7 Evans, Robin *Translation from Drawing to Building*

difficult to edit down and focus on in a short amount of time. It is not the intent of this paper to disqualify or argue against design programs or methods but rather illustrate how the WAAC's situation creates a unique opportunity. The imagination of working 1:1 is not a limiting factor in educational situations. It enables the designer to examine the smallest details, which have consequences and affect the quality of the object and of the place in which it adapts and creates. Working at scales that are proportioned to the body enables a dialog that promotes craft and forethought. The spiral stair case is an good example of how small parts of a whole are necessary to be able to be moved and placed without the use of extreme measures or total reliance on one decision. Instead, elements are able to be moved by team members and are assembled onsite. This scale also allows the project to carry on from generation to generation of students. With few exceptions, the components can be broken down and replaced over time if necessary. The intimacy of scale enables a focusing on the details that relate to the fundamental nature of the use and of the inhabitant.

Intimacy and scale as described by Mina Najafi as place being layered into different scales. She utilizes Hummon's differentiation between a number of different types of senses of place in a study on community sentiment. "Knowledge, the sense of belonging, attachment, identification, involvement, and sacrifice" are critical in understanding human's connection to space. Human relationships to objects are often investigated in design settings through the exploration of materials and objects and our perceptions of their properties. Beginning with investigating and studying material, whether it is wood, concrete, metals, glass, or plastic, one can begin to understand the properties of material and its value in creating space and its impact on place. Exploration of material's properties through and bodily testing of weight, texture, color, form, pattern, and joinery enables greater understanding of materials, which can be incorporated in full-scale construction. The malleability of a singular product is expanded when it is located in a space, and therefore enhances the space to becoming a place. The place is impacted with the tactile nature of material, quality, craftsmanship, and memory and symbolism. Design-build research integrates the idea of what the materials are, how they are perceived, and at the same time reiterates the necessity to become built or realized.

### ***The Collective Process***

Place-making is an inherently collective process. It is not typical to have a space first be established, and then have the users brought in. While experiments in the real world create circumstances like these they do not describe a space as a sense of place. Inclusivity within design-build projects is fundamentally enacted through collaboration. In both design-build in education and in professional practice the relationship between the designer, builder, and other stakeholders are teamed together in order to create projects that work as a collective, working towards a common goal. Collaboration of this type is key to a project's success. Collaborative making in education promotes communicative learning and softs skills required in practice. The collection of social skills and technical skills will better prepare students for the professional practice that is increasingly interdisciplinary and collaborative. Social learning experiences are crucial to engagement of communities and are even shown to have a positive effect on the design process. Working on a team encourages iterative design methodologies that deal with the design's social, economic, and environmental effects. Design-build represents the foundation of design education and thinking. Design-build places participants outside the vacuum of design, challenges the preconceived notions of the individual, and assures a holistic dialog. This exposure generates an awareness and sensitivity that encourages flexibility and openness. Comprehensively the theory of why we practice and for whom we design is developed and strengthened through design-build practice. Design-build acts as a bridge between academics and professional and between conception and reality. The process strengthens embodied knowledge and memory of place. Design-build as demonstrated at the WAAC also spans the connection of the past and future.

Working within existing conditions, whether with communities or existing buildings, is an opportunity for design-build to expand on the diversity of a singular education. Design-build projects that pro-actively engage with the existing throughout the process of making allows for cross disciplinary learning. Inhabitants of projects are put face to face with design challenges resulting in investment. We are able to learn from the buildings, culture, technology and people. The physical connections can harvest sustainable and productive relationships between the past, current, and future generations that are beneficial to long-term resilience. Connecting to history adds

value to the objects and reaffirms the current and earlier projects. It encourages additional projects that will add to the sum of the place. Many design-build projects are small in scale but none the less are in full scale. The ability to build with construction materials enables a dialog that responds to the needs of the people one is building for.

Over time, the space and place become enriched with adaptations. If they are successful, they will be able to build on the previous adaptation. Learning from the failures as well, the body of the community and of the space are able to better themselves. This testing must be explored. It must be visible in the artifact but also be an inherent core value. Those who are affected by adaptation have a right to be involved in the decision-making process, connecting Architect - Builder - Occupant - Community - Ecology. Enacting design-build into education will become invaluable in the participatory of designing. Not only adding value to the space and the sense of place but in doing so empowers the value of design.

Built form, by virtue of making, examines the sociality of the space as well as the manipulation of materials. Standard construction methods are first learned utilized and are challenged as a means to advance architecture but also reassure the methods history presents. We must remember the previous methods of making. The connection between drawing and making have been separated and reattached. In making we must utilize drawing as a tool to engage in formulating an idea and through drawing details of construction, allowing the drawing to be informative, as well as, allowing the process of making to take responsibility of the means and methods. Robin Evans writes,

*"The sketch and maquette are much closer to painting and sculpture than the drawing is to a building, and the process of development- the formulation - is rarely brought to a conclusion within the preliminary studies. Nearly always the most intense activity is the construction and manipulation of the final artifact, the purpose of preliminary studies begins to give sufficient definition for final work to begin, not to provide a complete determination in advance, as in architectural drawing."*

In his essay from drawing to building, he questions the relationship of drawing as a means of representation. He proposes "drawings have intrinsic limitations of reference. Not all things in architecture can be arrived through drawing." There is a large potential for drawing to expand on its relationship to building. Both before construction and after construction design-build has the ability to investigate the built reality as a study of why and how something was made in order to better understand the trajectory from idea to conception. Working backwards to forwards, enhancing possibilities from building to drawing, we can reexamine the intentions, methods, and actions that predicated the current situation.

### **Conclusion**

The values which have emerged over time to be the most productive and resilient are those which can adapt with both constant and evolving goals. While our goals have been consistent, the built form has decayed leaving the values vulnerable due to unawareness and reluctance to become malleable. When practitioners and researchers emerge themselves in the interrelation of different methods and discourse, new way of understanding are indicative of change. Positive change is possible but not guaranteed. It is not achieved through the understanding but new perspective has the ability to change the responses of the individual to the values set forth by the subconscious and conscious. We must guard the values we have and at the same time be inquisitive to the current values and possibilities of the future.

Design-build as practiced at the WAAC and similar places of community and educations, illustrates a collection of parts that make up the whole. The ability to continuously engage with these elements and respond to them in future design-build projects become the impetus for the next generation of design-build. The concept of making as applied to the WAAC helps shape the spirit of the WAAC and the spirit of the individuals who work within it. The work must be done fast and slow, idealized and built, constructed and deconstructed, and questioned and refined in order to advance the spirit of the place.





---

design **BUILD** Cuba  
towards an architectural education

Habana, Cuba has a shortage of housing and thus residents are constantly innovating to create new space in which to dwell. Cubans created an innovative house type with an ad-hoc design approach that expands habitable space inside and on top of existing housing from 1900-1960. Economics are not in their favor but they still grow culture.

---

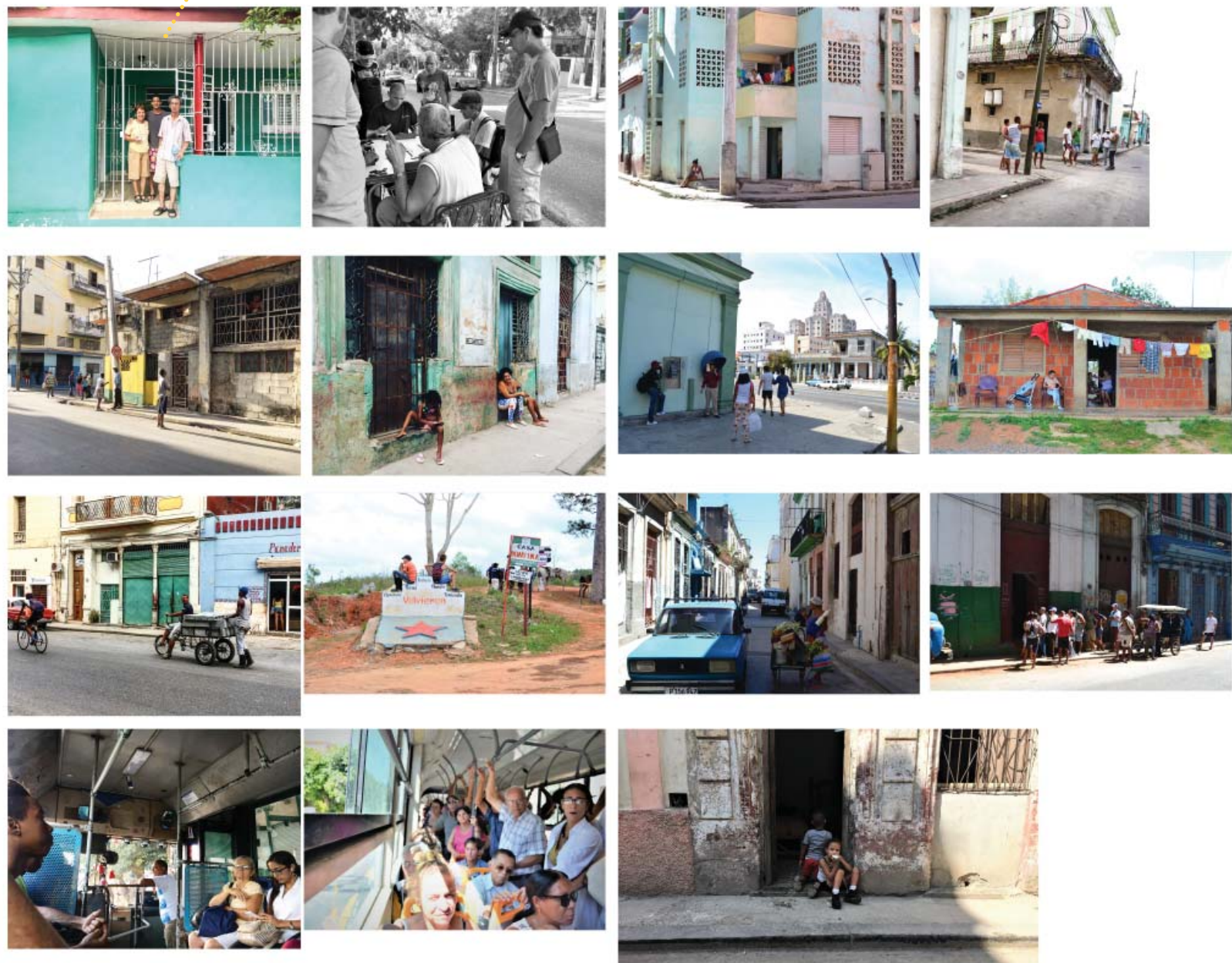
**Ad-Hoc** Cuban's have an approach to working that is contrary to their neighboring culture 90 miles to the northwest. Innovation comes in the form of everyday living for some, buying and making local is the only way one can live in Cuba. From restoring old cars for the tourism industry to making their own tools, they make do with what they have and create value out of spare parts and inventive modifications. The drive is not necessarily to be artistic but from this culture is enlivened and community is made. They work with what they have.

**Economics** Cuba has two economies local and tourist. The Currency ratings between a peso and Cuban dollar are nearly 1 to 25. The CUP or Peso Cubano used mostly by locals is traded between locals. The CUC or the peso convertible is mainly used by tourists. In addition to 10% + paid for exchanging foreign currency. While the exchange rate is 1 to 25 the CUC is exchanged 1 to 1. An ice cream stand might say "Ice Cream \$3". To Cubans it means .12 cents USD, Tourist however are pay 3 USD and end up paying twenty-five times more than Cubans.



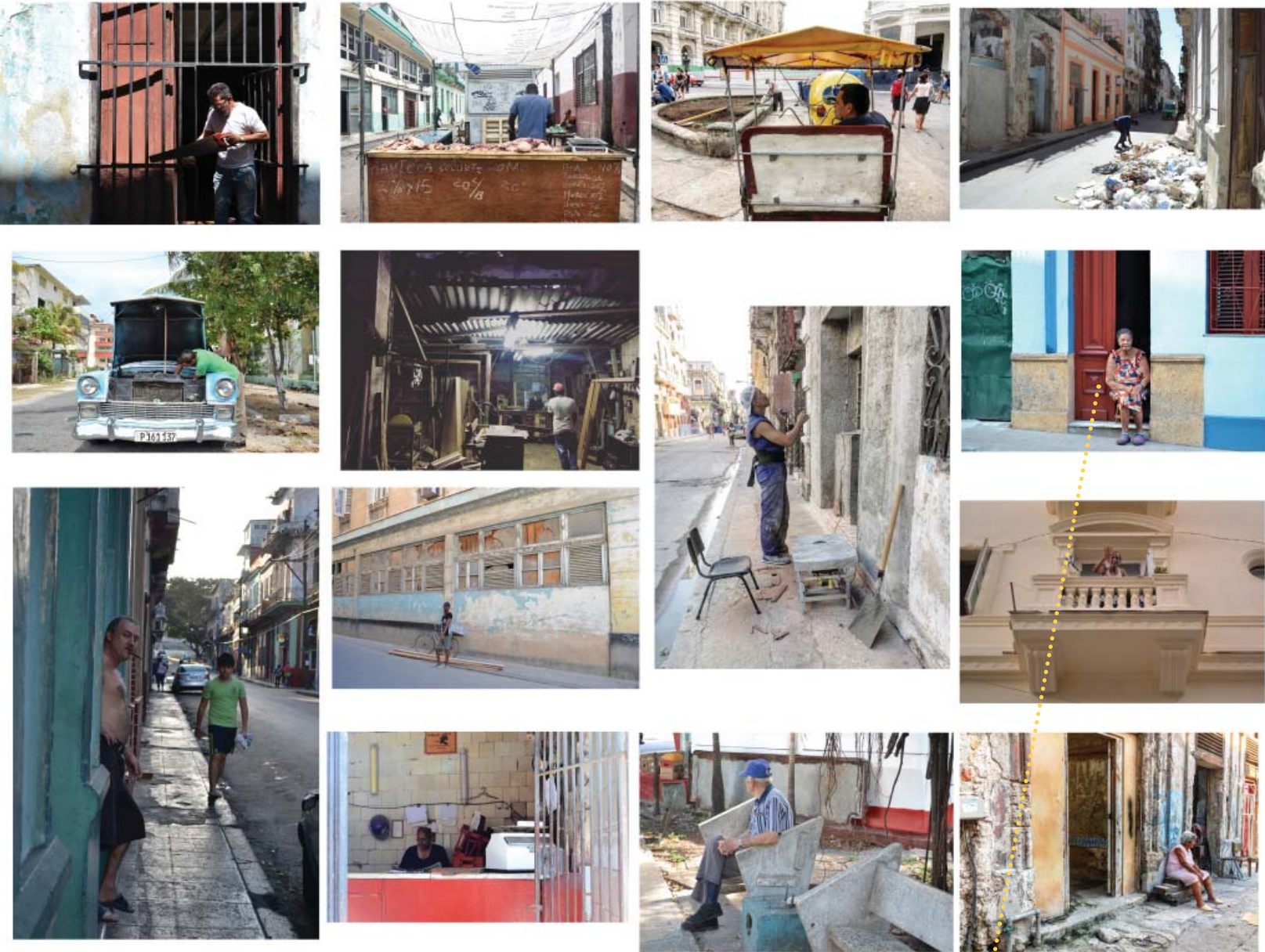


Host Daniel Pedro and his mother, on the front porch of their house Casa de Lemon. The house is named for the lemon tree in the front of their house. Pedros works in IT at the Hospital and Daniel was a civil engineer for the government for 40 years. Pedro's mother, Mirana, takes care of his brother who has disabilities. She is the motivator of the family and the kindest heart. Pedro started their casa paticular two years ago and hopes to expand their number of beds.

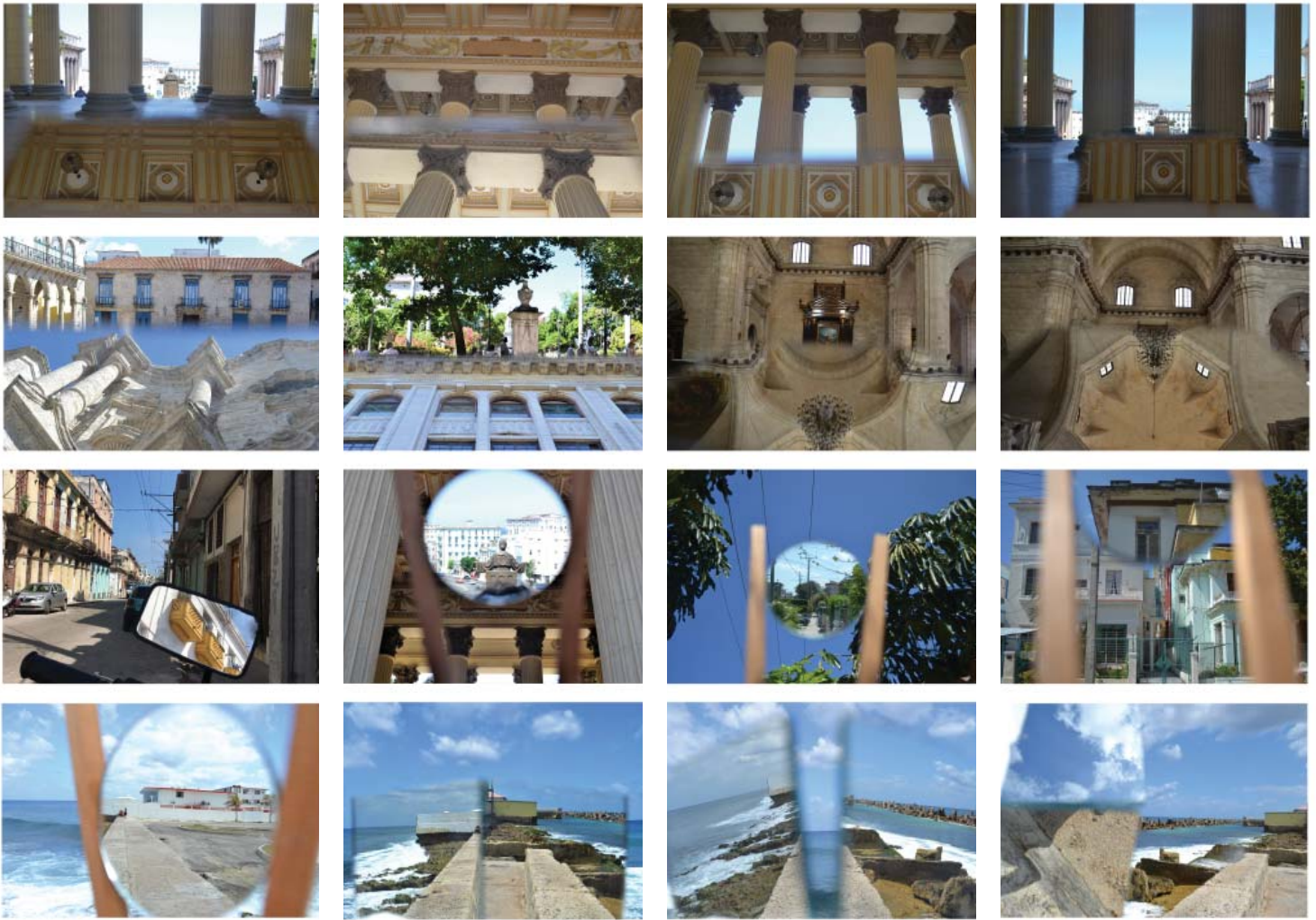




**42.1** Photographs of people and their places in Cuba. From the Family i stayed with to the people i waved to up above in their balcony to people I sit next to on the bus. People in Havana utilize their space. Tight urban conditions have maintained culture and community: pride of country, pride of job, pride of leisure, pride of home. Ownership is mutually shared and individually explored. Deterioration is not a constant but only a transition. Cubans live both inside and outside. Often you will find people in the threshold of interior and exterior, often working and mostly observing, being participants of the community and the place.



Luisa has lived at this address since 1968. She has raised two boys and is a proud grandmother. Her sons painted the house for her 82nd birthday her favorite blue, like the sky



40.1 Photos of the Mirrors in the Landscape, ideas of memory and reflection, Cuban Case Studies of Mirrors in the Site, Field Work, "Investigating the connections" Habana, Cuba



**41.1** Carpenters and plaster workings restoring the inside of the 4th president of Cuba's mortuary Habana, Cuba



**41.2** The effects of time and plant material growing on buildings. Irony between time and recycling.



**41.3** Urban edge across the street from the Malecón . Revitalizations of Historic edge with adaptation and vivid color. Along the Malecon tourist take sunset drives in automobiles from the late 50s and 60s





52.3 Adaptation Out and UP, Habana, Cuba



52.2 Adaptations Local Expansion Cause and Effect. Havana, Cuba

### Expansion through decay

Panoramic view of workshop of Cuban carpenters, Jose Alverze (74 y.o.) and Denis Alverze (17 y.o.).

Their workshop is on the ground floor inside the shell of a decomposing concrete four story apartment building. The day I visited they were making doors and transoms from reclaimed wood using an ad hoc table saw made out of refurbished parts.

Due to the climate, salt water and heavy rains, the concrete roof and floor build in the 1930s have faced extreme weathering, corroding the rebar. The floors became unstable. Some have been selectively demolished and others fall down on the own, causing significant risk to those who work and live below.

These conditions have made it difficult for the carpenters to keep their lumber dry and the electricity working. All other tenants have vacated the building. However, Jose and Denis hope to expand a small roof, level with the second floor similar to the one seen in the photo of the shop. Place is made through necessity and innovation.

52.1 Carpenter's Workshop Expansion Through Decay. Habana, Cuba

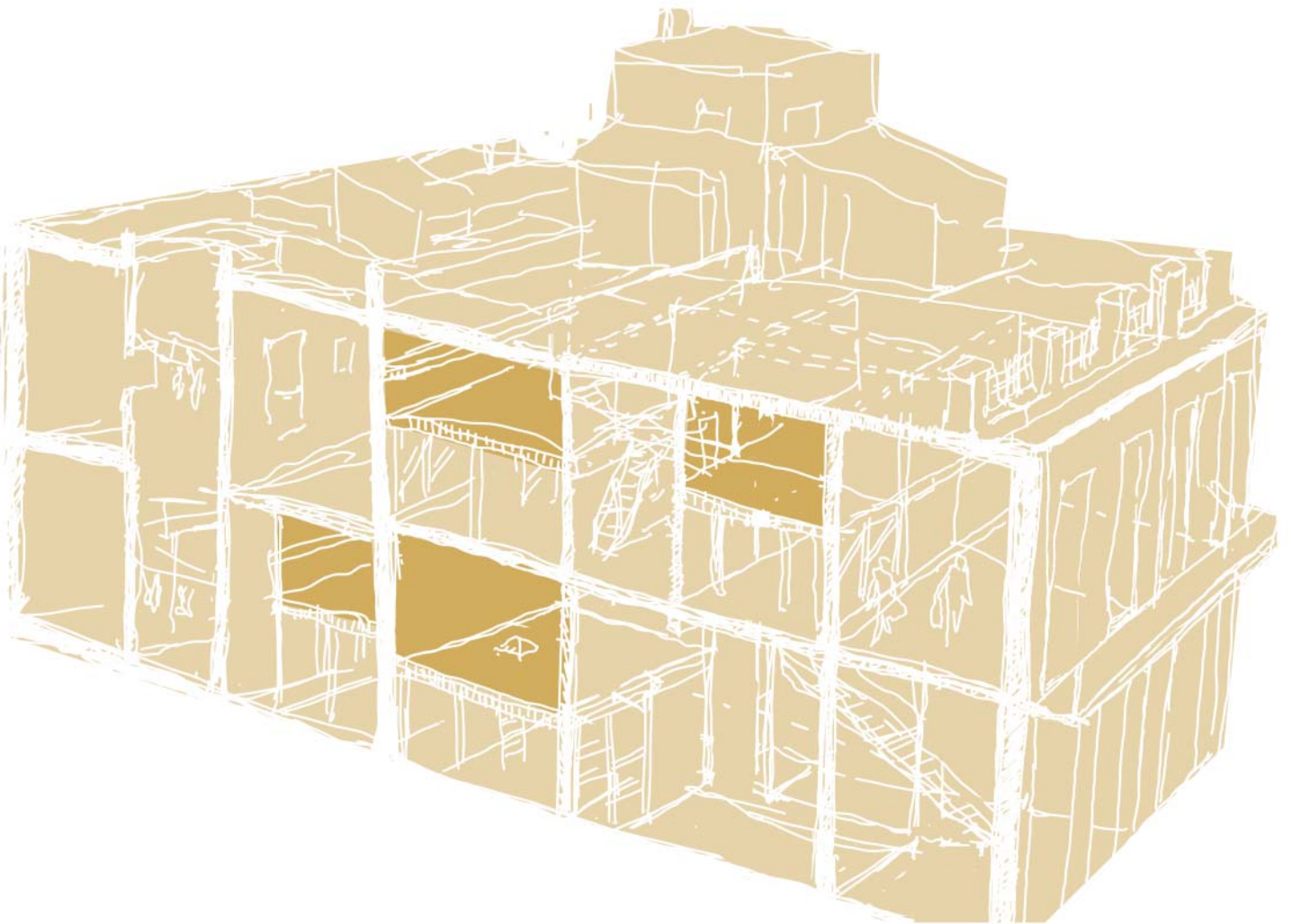




53.1 Concept of Expansion In and Out. Habana, Cuba



53.2 Multifamily Unit. Adapting in Real Time. Habana, Cuba



Investigating the WAAC as a space for innovations and adaptations could not be possible without first understanding the existing conditions and uses of the buildings prior to Virginia Tech acquiring the building in 1981. Photographs taken by alumni show that even though paint might peel and the building at times might look like they are in disrepair the buildings' robustness and character are indeed intact.

Existing condition drawings were created to document the building as well as create a tool for students to engage with the building. Three-dimensional computer modeling enables the connection between part and whole to be closely examined with hopes that new connections will be brought into light.

Adaptations over time can be understood as additive or subtractive in order to create space that is both useful and contribute to the overall spirit of the WAAC. Evidence of change brings answers to the history place and its ability to change over time while enabling further questioning of architecture's role in creating positive change.



---

## Design **BUILD** W.A.A.C

towards an architectural education

Washington Alexandria Architecture Center  
**Design Build**

(<http://www.waac.vt.edu/design-build>)

---

“Ever since the Renaissance, when L.B. Alberti famously declared “the carpenter is but an instrument in the hands of the architect,” the field of architecture has become increasingly divorced from the act of construction. While many throughout history have tried to reunite the architect and the builder, the schism between the people who conceive of buildings and the people who carry out that conception has never been greater. With new software technologies (BIM) promising a reunification of hand and mind, the desire to resurrect the pre-Renaissance notion of the architect as master builder is as powerful as ever.”

„The directness of touch is largely absent from the daily work of a modern architect. Working on cellphones or behind the screens of computers, architects nowadays have lost many of the basic sensibilities one can only learn through the sense of touch, via direct confrontation with materials. In WAAC Design Build, the hand becomes the singular and proper instrument with which to explore the realm of matter, allowing one to not only physically, but mentally, grasp architectural concepts. The hand thus becomes a direct extension of the architect’s imagination.”

„Design-build students undertake projects that involve the skilled application of both hand and mind, engaging in the full spectrum of constructive thinking, from conception to drawing and modeling, all the way through to execution and reflection. Many design-build projects have involved renovation of the 1001 Prince Street building itself, allowing students to leave behind a small part of their work here to act as future inspiration for others. Some notable design-build projects include the coffee bar, the courtyard, the library stairs, and the basement cylinder.”



## Photographs of Existing Conditions when 10001 Prince Street was acquired for WAAC c. 1981

---

**23.1** Second Floor Looking West towards Henry St. Secondary mean of egress. Since then door and exterior staircase was removed c 1981

**23.2.** Second Floor Looking south east towards main. A palimpsest of chalkboards, wall covers create a horizontal strip along each classroom.

**23.3** Second Floor Looking East towards Patrick St. towards two exit doors ,removed c 1981. Brick interior jambs exposed at doorways into room on the north wall.

**23.4** Looking north west south side of the center demising wall with an egress door and chalkboard from the era when the building was a elementary school.

**23.5** Second Floor Staircase looking east. Afternoon sun coming through the window. Potential site for the circular window now futher the library and the staircase.

**23.6** Second Floor Window Looking North into the Alley between King and Prince.

**23.7** Main office looking at the Spiral Stair design-build Project Completion. Connects the first and second floor library (2017). The Staircase straddles a short distance between the chimney flue and the interior masonry bearing wall.

**23.8** Second Floor Window looking south towards Prince St. Wood frame double hung windows with nine over nine window pains. Removed and stored in the crawl space during the 1980s renovation.

**23.9** Second Floor View of Interior corner possible location north recess.

**20.1** Second Floor Looking West towards Henry St. Secondary mean of egress removed c 1981 Patches of color, rejuvenate the abandoned hallways.

**20.2** 1021 Prince St. looking East. Image shows doors on second level and remains of wooden exit stairs. Original wooden double hinge windows are in poor condition.

**22.3** Second Floor south west corner looking East Plaster lath walls and chalkboard are left.

**22.4** First Floor looking south towards Prince St. Open ceilings reveal the steel beam holding the stairs. The spirit of the place remains.



22.1



22.3



22.2

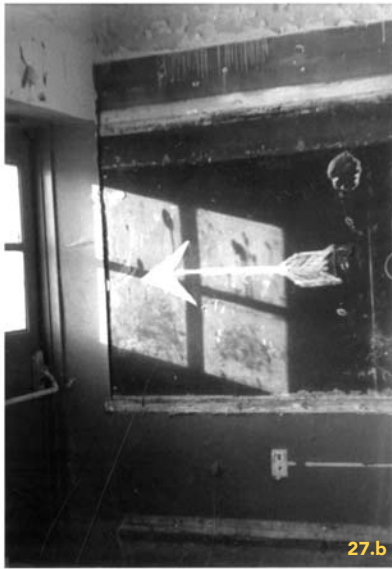


22.4





27.a



27.b



c.27



A-27



A-27



A-27



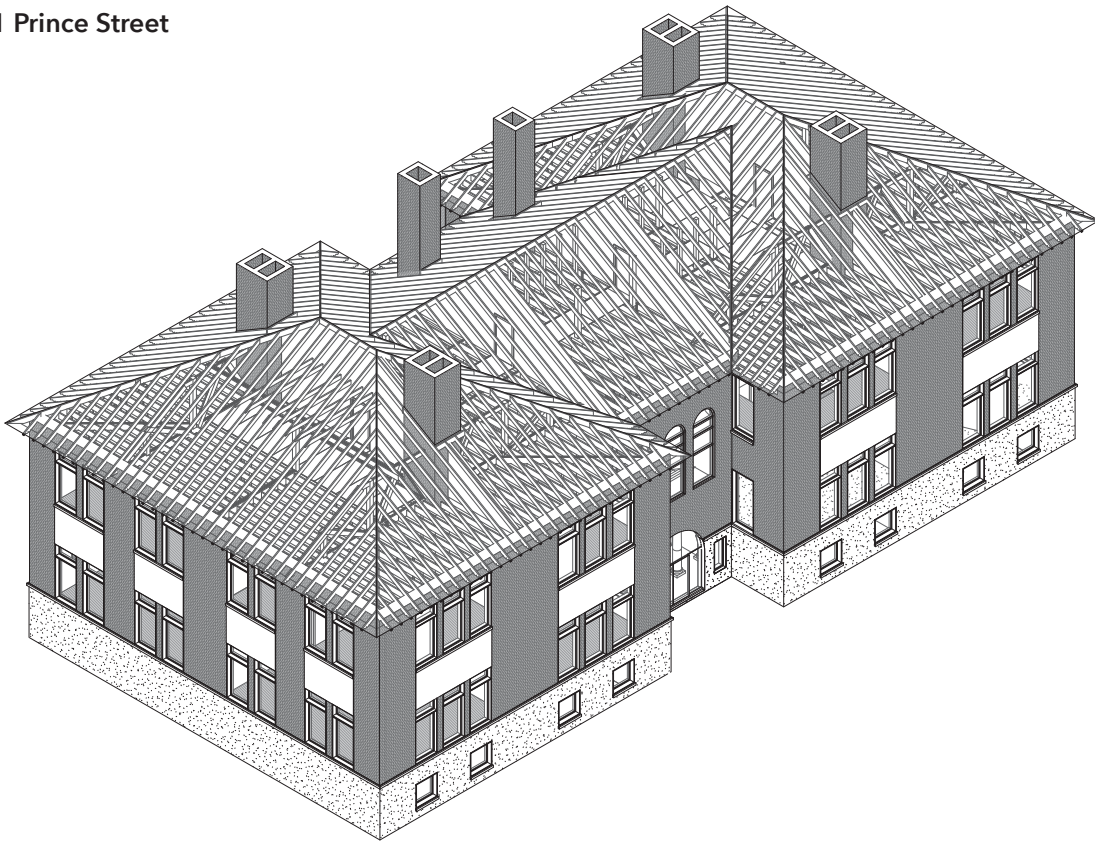
A-27



A-27



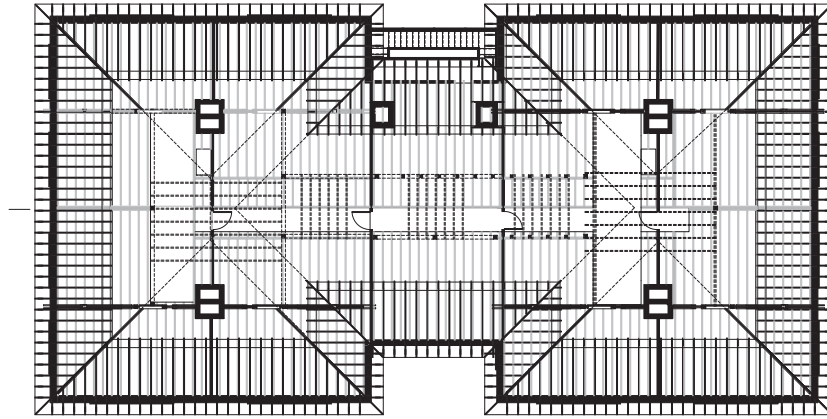
A-27



22.1 Birds eye axon from south west

22.2 Worms eye axon from south west





22.1 Attic / Roof Plan



22.1 Second Floor Plan



22.1 First Floor Plan



22.1 Crawl Space / Basement Plan



22.1 South Elevation - 1001 Prince St





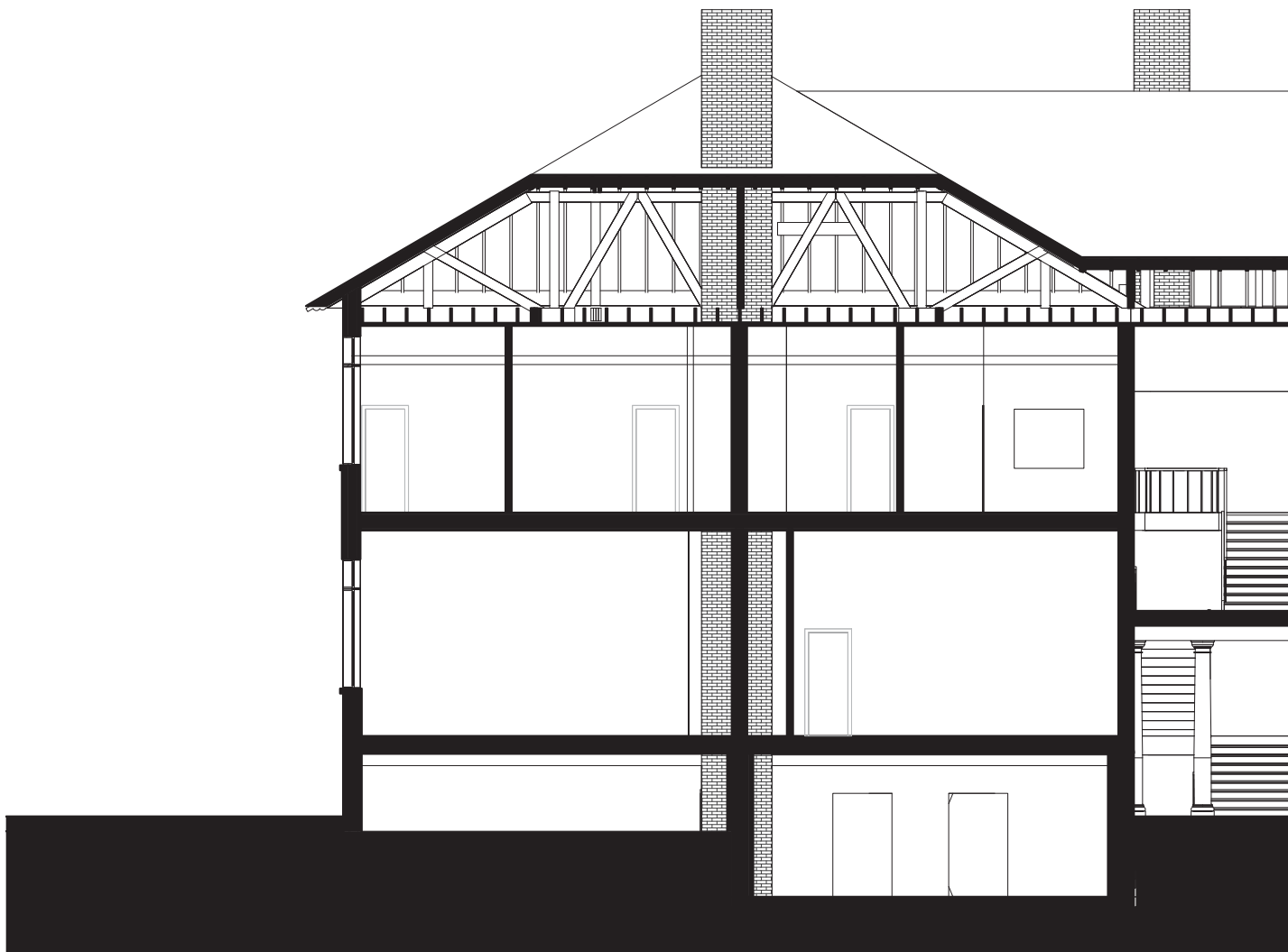


22.1 North Elevation - 1001 Prince St.



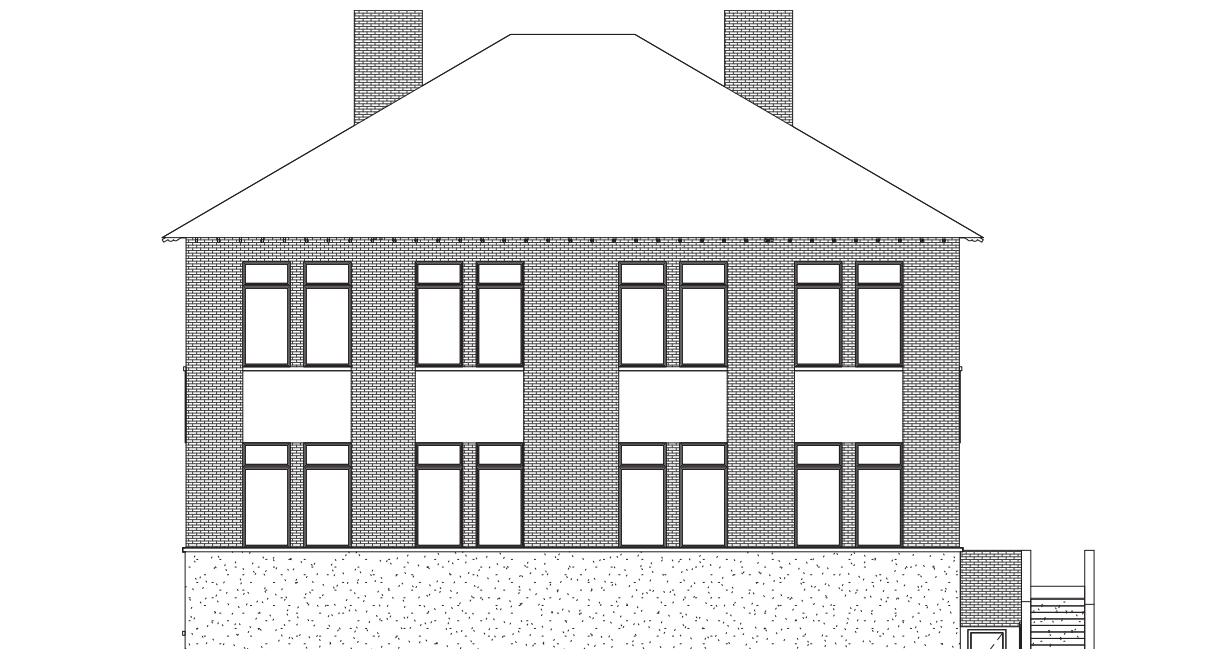


22.1 West Elevation

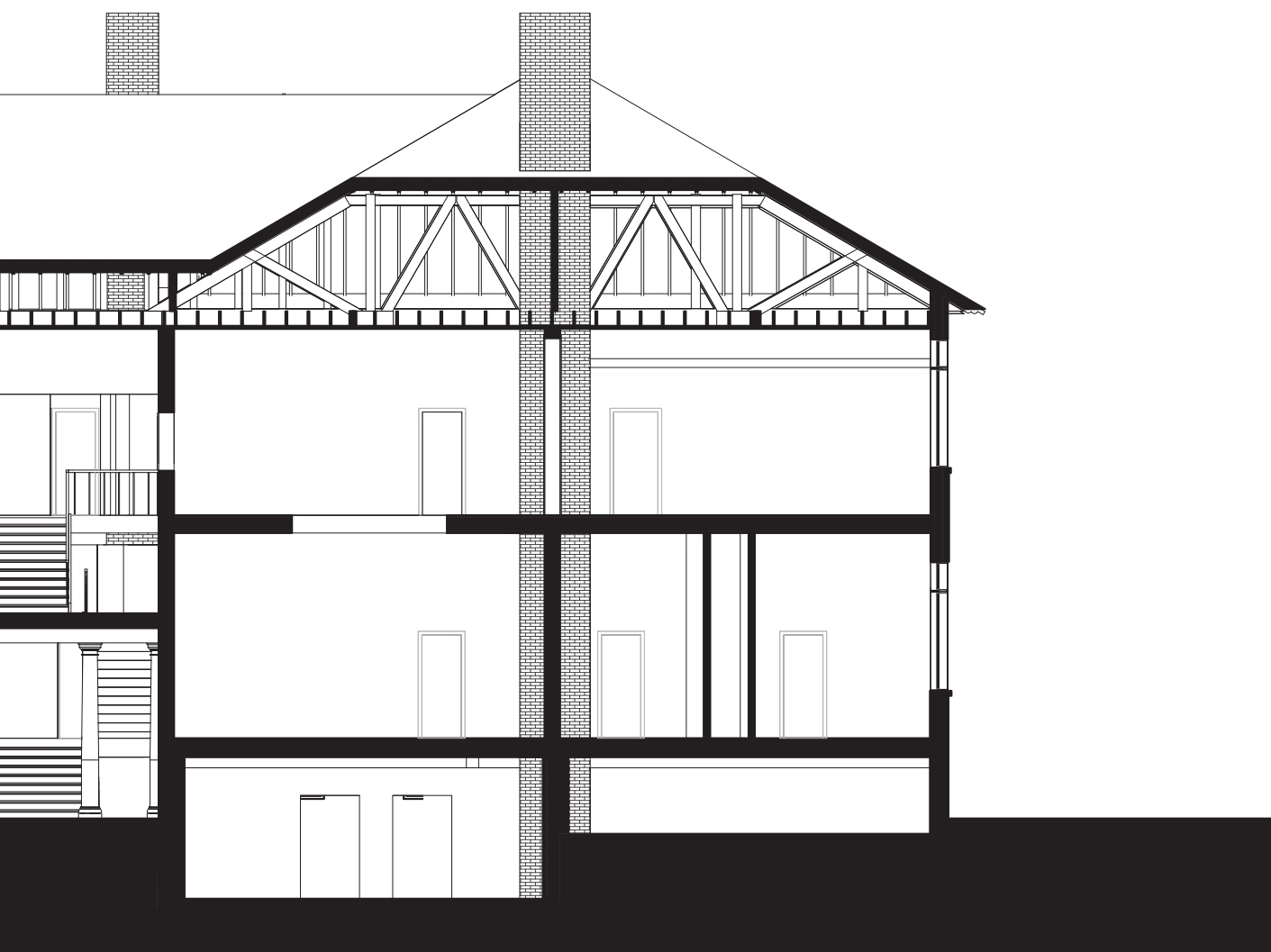


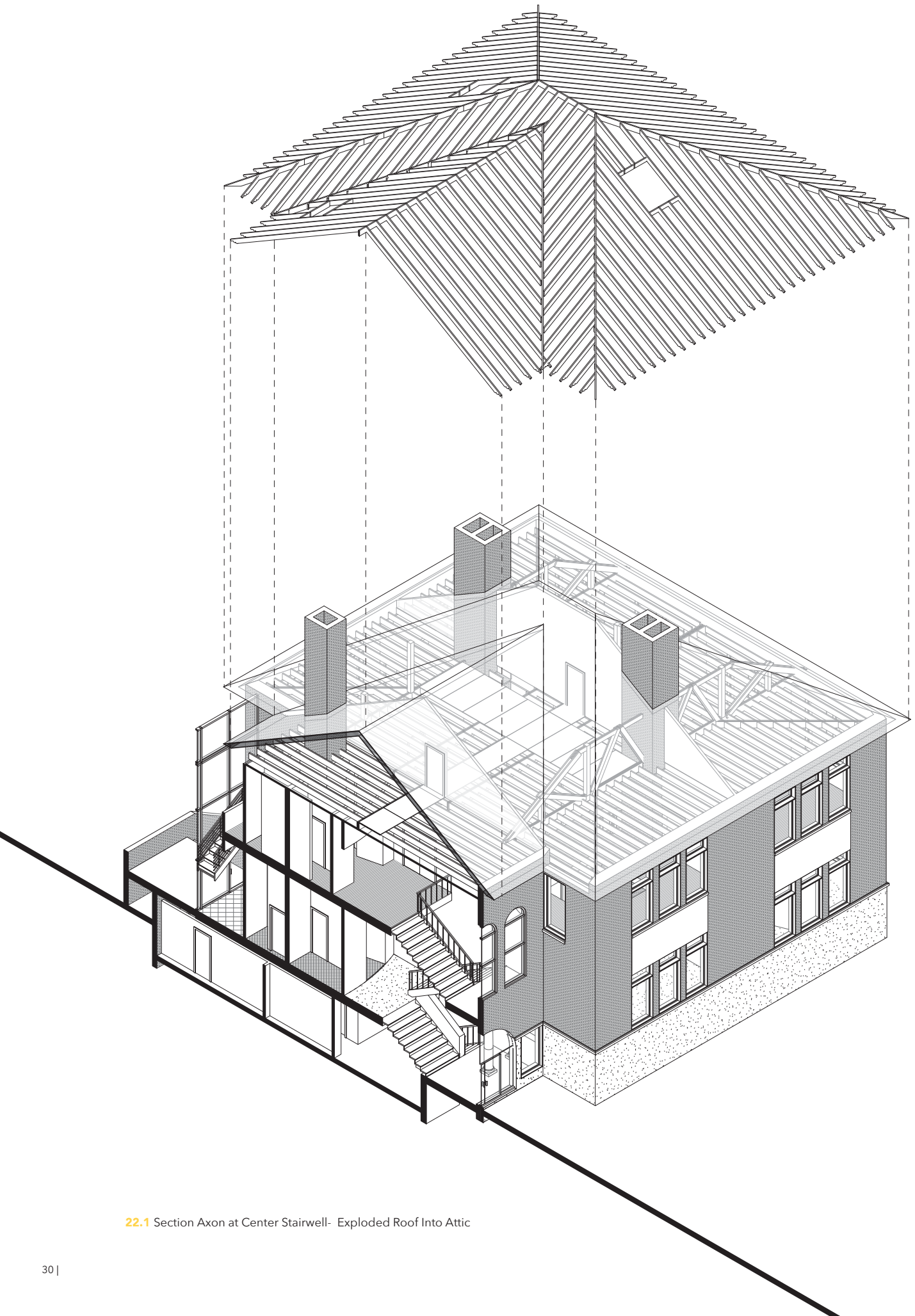
22.1 West section looking north



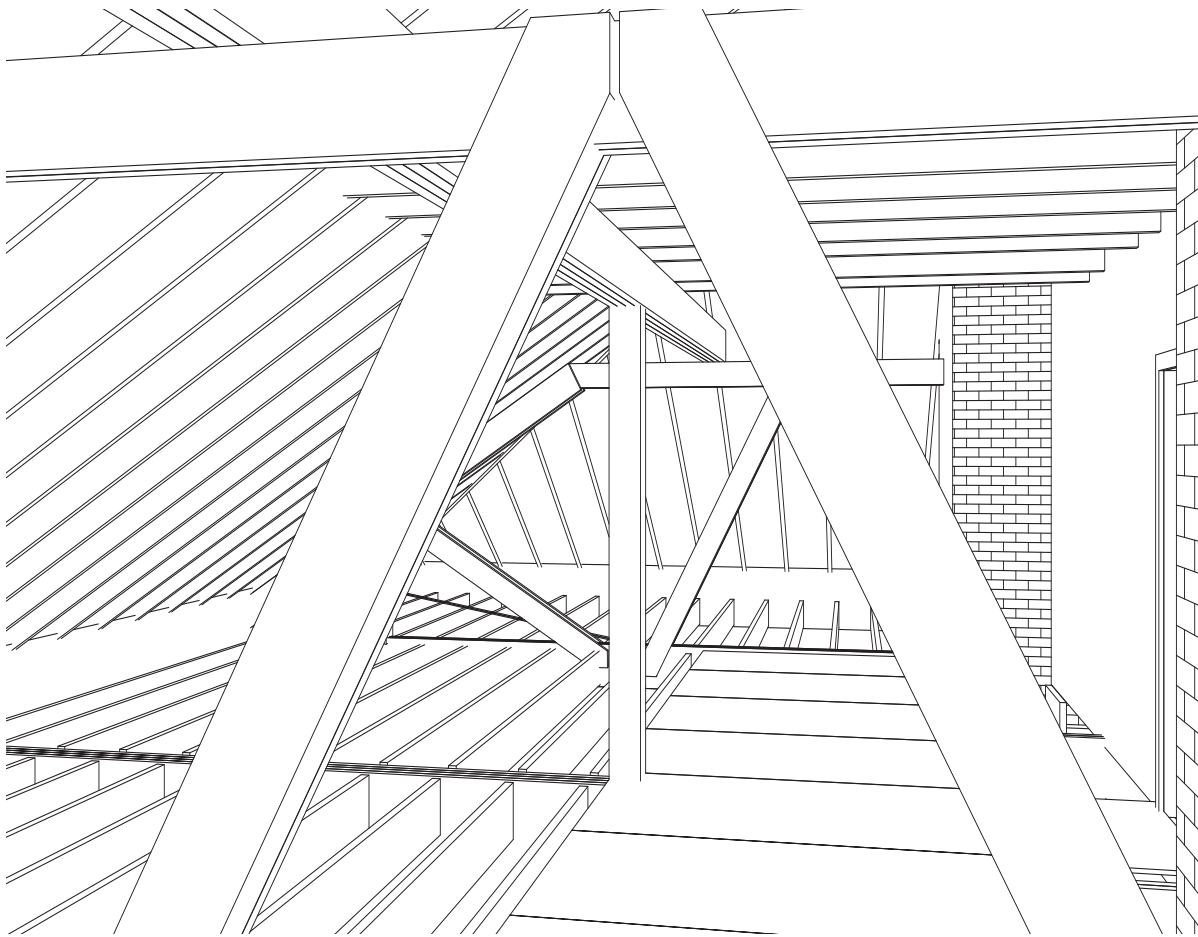


22.1 East elevation



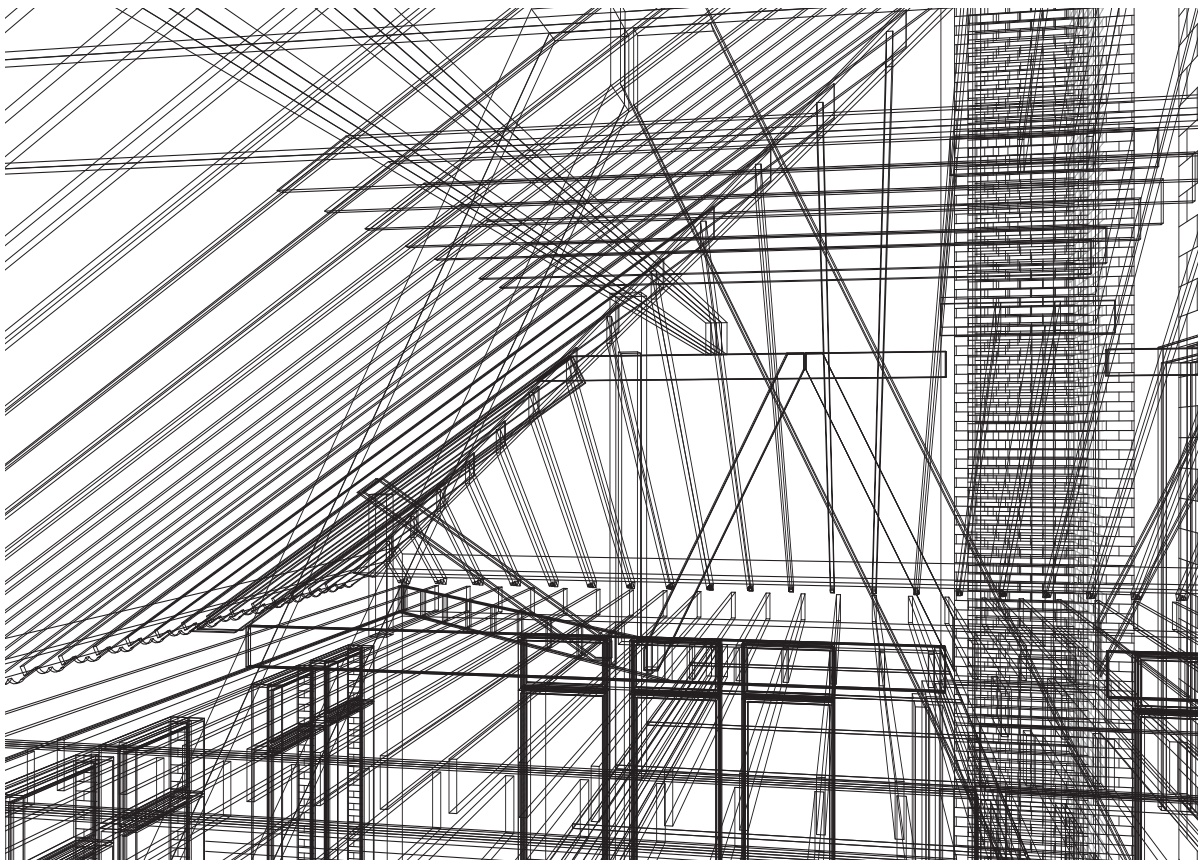


22.1 Section Axon at Center Stairwell- Exploded Roof Into Attic



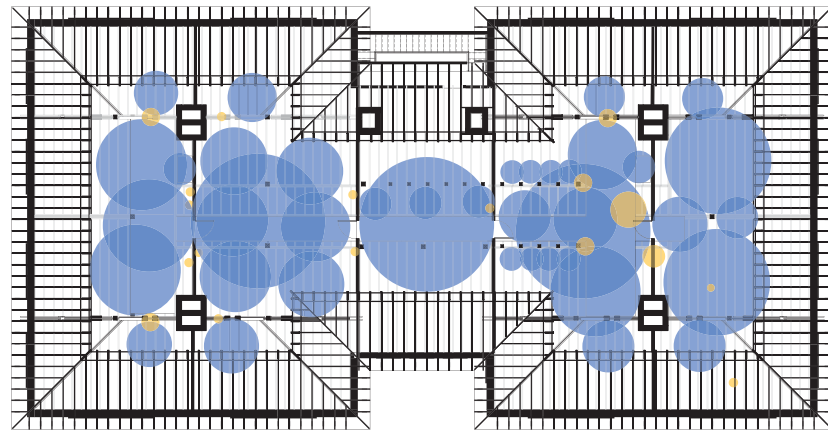
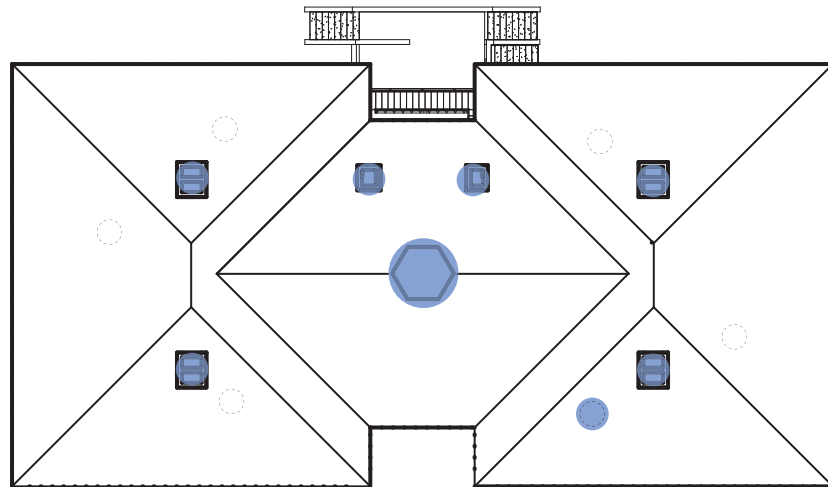
Attic Views ooking North West

Two perspective line drawings of the Attic Space juxtaposing the perceived enclosed attic with a wire frame view showing the connectivity to spaces just beyond the membrane of the space.



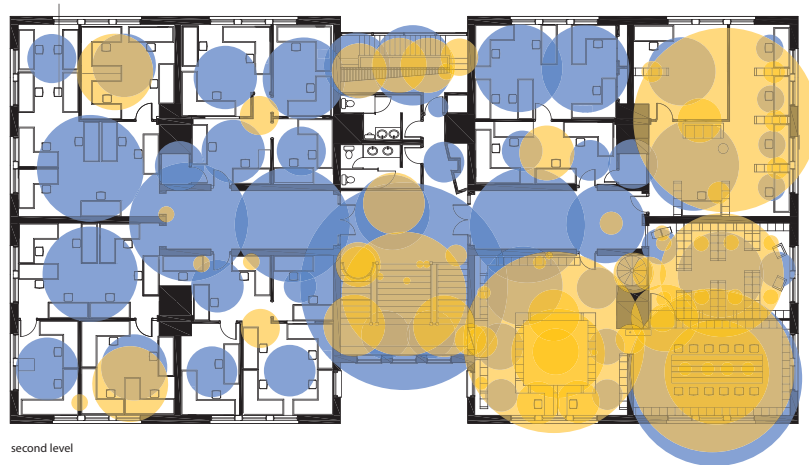
22.1 Attic view looking north west -transparency

## Design-Build Interventions c. 1980-2017

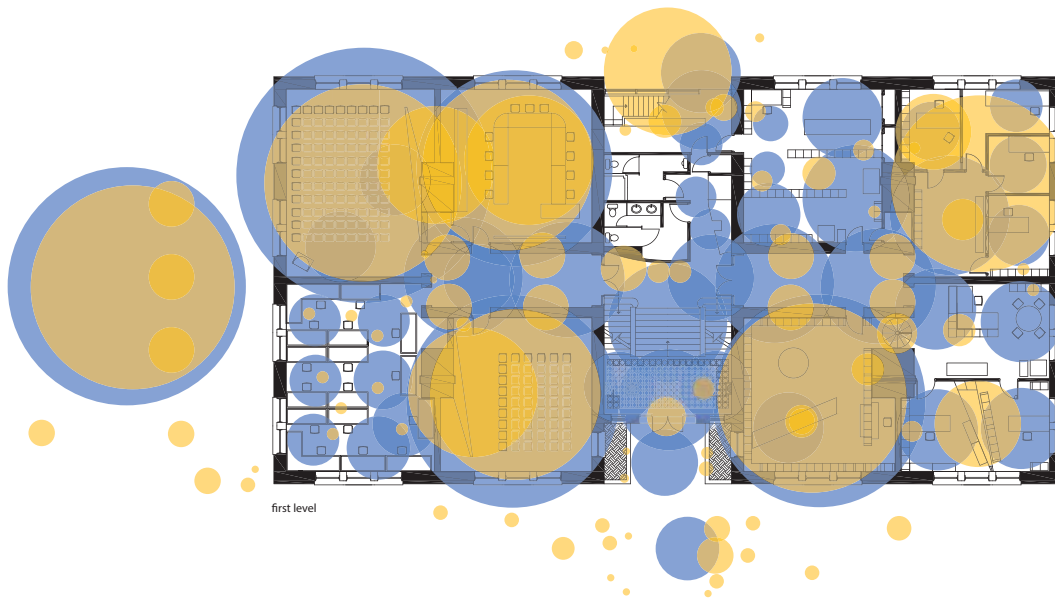


**32.1** Plan Diagrams of 1001 Prince St. illustrating zones of possible iterations in blue and areas of design-build interventions shown in yellow.

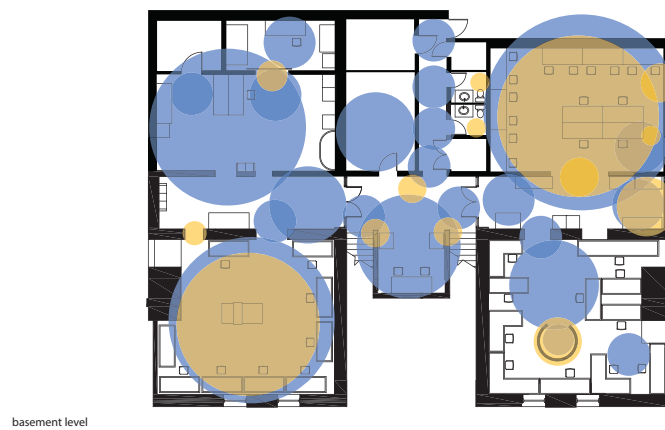




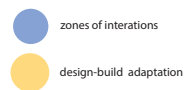
second level



first level



basement level



2nd Floor.....  
North East Studio



Grid World/  
Conference Rom



Computer / Printing Lab





Attic

Second Floor  
WAAC Library

First Floor  
WAAC Library


Basement Studios



Food is important in collaboration; Beginning a tradition of the WAAC Potluck Architects, Landscape Architects  
Urban Designers from across the world gather to eat and share their experiences with one another

# **potluck.**

**October 9th 5:30 pm @ 1001 Prince**

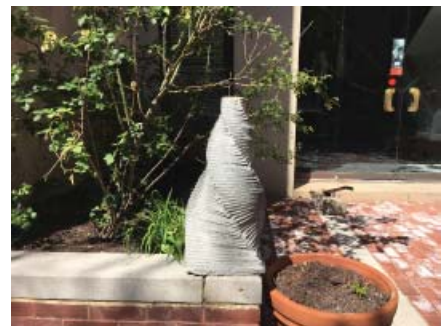


**SHARE: an evening of storytelling,  
food and ideas**

**dinner and diversity  
a smorgasbord of culture**







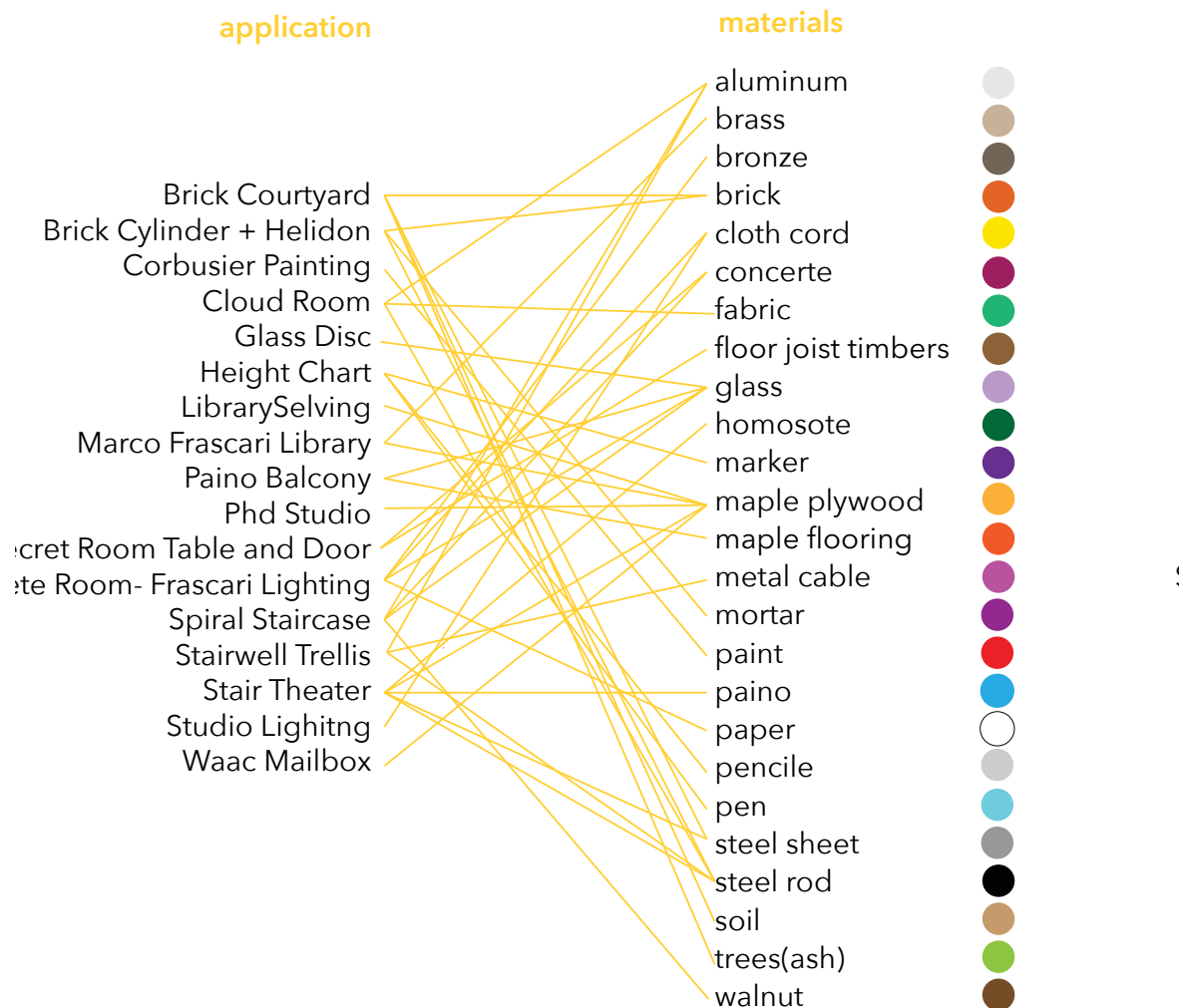
# Analysis of Design-Build Projects c. 1980-2017

## application

Studio Lighting  
Marco Frascari Library  
Stair Theater  
Cloud Room  
Stairwell Trellis  
Library Shelving  
Spiral Staircase  
Glass Disc  
Brick Courtyard  
WAAC Mailbox  
Brick Cylinder + Helidon  
Height Chart  
Corbusier Painting  
Piano Balcony  
Phd Studio  
Secret Room Table and Door  
Secret Room Frascari Lighting

## materials

aluminum, cloth cord  
maple plywood, aluminum  
birch plywood, homosote, steel, concrete,  
steel, fabric  
brass, braided metal cable  
maple plywood,  
maple plywood, glass, aluminum, maple, steel, wallut  
glass candle stick holders  
brick, steel, concrete, soil, trees  
maple plywood  
brick, mortar, steel rod  
penile, pen, marker  
paint  
piano, maple flooring, walnut, glass, aluminum, plywood  
maple plywood, glass, aluminum  
floor joist/ timbers, concrete, steel, plywood aluminum  
glass, fabric cord, aluminum

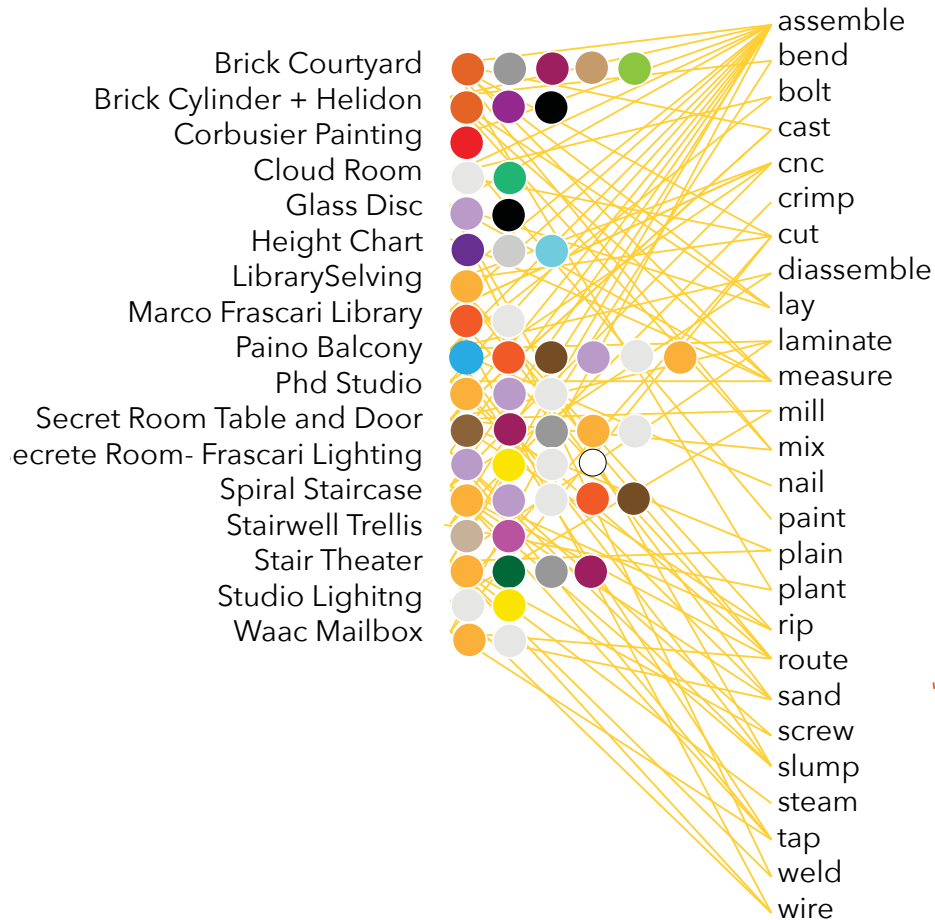


## processes

milled aluminum, wired cords and lights  
 cnc milled plywood  
 bent plywood, laminated homosote plywood and steel, bent steel channel  
 cut and tapped steel,  
 milled brass, cut and crimped metal cable  
 table saw cut, cnc, gigsaw cut, milled alumimum,  
 cnc walnut giwsaw cut sanded plywood, plained mapel, milled and tapped aluminum, slumped glass bolt steel  
 slumped glass  
 layed brick, cut metal channel, planted trees  
 milled aluminum, cnc plywood  
 layed brick welded steel  
 draw and measured people  
 painted  
 disassembled cut reassembled piano, cut maple flooring, slumped glass, milled and tapped aluminum, welded steel  
 jigsaw cnc plywood  
 plained timber, cast concrete, weld steel  
 slumped glass, milled aluminum, wired cable

## application

## processes



---

design **WALLS** site  
Values and Constructibility of Walls

The construction of building walls illuminates their society. Are the original intentions and values of society present in walls and their construction? Constructibility of walls is predominantly determined by the materials of the wall. For the sake of continuity this paper will focus on the properties and qualities of stone and masonry walls. The origin of the wall has been debated between Vitruvius and his followers Alberti and Semper. Their origins of building and their origin of walls are related. Whereas, Vitruvius believed columns were primary and that a wall resulted when infilled. Alberti believed walls were first created and openings were cut into them for windows and doors; thus columns became a well-proportioned wall with maximum openings. The purposes for walls over time have stayed consistent. This including protection from nature and from enemies, as well as the division of space, and to embellish wall surfaces. Through the research of the original reconstruction of walls and historic writings social intentions become clearer.

---

Vitruvius writes in 20 BCE as a decorated architect and defense engineer. Vitruvius begins with defining city walls as necessary for defense. During Roman rule, defensive cities had to have large walls able to deflect the brute forces of their enemy. According to Vitruvius, city walls should have a definite minimum width, which should relate to the width of two armed men and their ability to pass as they walked on the wall. In this instance, Vitruvius illustrates that there has been evolutionary change in the use and development of the wall. Walls that began with twigs and mud made to create areas of refuge from wind and sun is now being used to create a sense of containment and safety. (Vitruvius, 37)

As men came together to deliberately assemble and to socialize, walls were used to create protection from supernatural resources; now the wall is for the protection from other humans. At first barriers and walls were made from laying down trees and filling their interstices which were left on account of the thickness of building materials [were] stopped up with wood chips and mud. (39) At this point the materials acted in the same way they acted and reacted in nature. The thickness of materials were not standardized and usually not carried far from the original source. The value of protection and ease had been established. As culture was formed, and civilization soon came to reserve materials for specialization based on their qualities.







In Alberti's writings the intent and purpose for the way that buildings should be composed included fitting the lineaments and angles of the lineaments to define outline of the surface of thing being built. These lineaments have nothing to do with materials but are rooted in the mind. (7) The origin of the wall begins when men began to settle in one place. Alberti's ideas included construction in the origin of the building and wall. According to Alberti, walls were developed by primitive man to set aside one space for sleeping, another from the hearth and allocated spaces for different uses. (8) The use of walls became placeholders for the separation of social task or program.

Walls were built so that a roof could be supported to shelter from the rain, wind and sun. Through the walls primitive man cut openings for doors and windows to let in sunlight and breeze at appropriate times. (8) Gottfried Semper in the 19th century was of the mindset that the wall originated from weaving and that the wall was primarily a divider of space. His theory was informed through anthropological study and was heavily influenced by his parents trade. The origin of the weaving wall sought not to be the structure but as a spatial divider. First with sticks innerwoven like a fence but then later like clothing walls were woven like carpets and carried symbolism. "Weaving" became only a space definer rather than as previous theory suggested that walls began to take structural loads, the materials change; the language remained intact.

While the accuracy of these origins are not definitive, traces of where these concepts might have historically come from as remnants of these origins are still at the forefront of this discussion. From the origin stories from Vitruvius, Alberti and Semper the primitive hut can find their common approach that sets up their own values and construction techniques. Each of them might agree that there should be "individual parts should be well suited from the task for which they were designed and above all should be very commodious and regards strength and endurance and the material should be sound, firm and quite permanent; yet in terms of grace and elegance they should be groomed, ordered and garlanded as it were in every part" (Alberti, 9) Either in brick or woven materials these qualities stand firm. Not all materials were equal according these writers. Vitruvius believed that materials such as "wattle and daub" should have never been

invented. While wattle and daub can save time and gain space, it can cause disaster with fire and is disorderly. The materials can hold great amounts of moisture, which leads to excessive cracking. Vitruvius heavily condemns the use of this material and makes intercessions that if it must be used in order to save time or money, the construction should be located off of the ground because of decay over time. As an architect Vitruvius has a duty to work diligently with the material at hand.

Semper's theory of the woven wall created texture and pattern that represented the values of the originating cultures. Each "tribe in an early stage of development applied their budding artistic instincts to the braiding and weaving of mats and covers" (Semper, 103). Craft becomes an underlining feature of buildings. Understanding the limitations of materials were critical for building a robust building but Vitruvius understands that sometimes the goal or the necessary actions to create a place is not dependant only on the material choice. While wattle and daub were sufficient for primitive man it does not meet the requirements for Vitruvius's work. He acknowledges that in treating of the origin of buildings and how it was fostered and how it made progress step by step until it reaches its "present perfection". And while Semper employed weaving to create visual separation, the structure of the roof was necessarily separate and not dependant on the screen. Once the load of the roof was to be carried down to the wall, the material of the woven textile changed to brick or stone, But continued to be influenced by weaving.

Through the use of material research and human development, building materials should meet the intentions of the use and should be well suited for the designed task. Some information has been passed down from earlier than the 1st century that can help keep the original values of society present. There seems to be a sense of robustness and an intentionality behind every move. The intentions might come from the exuberant amount of energy it took to produce a single brick. The amount of care that was given to the thought and use of the materials rival today's standards.

Brick has been a material choice throughout all ages. Each civilization had different methods for the construction of walls. Differences arose from the challenges of the source of materials, providing many different

shapes and standards for bricks. During the 1st century Vitruvius wrote extensively about brick. The knowledge of these building materials were fostered and had made progress within his time-frame. Bricks were to be made of white chalk, red clay, or coarse-grained gravelly clay. The consistency of the aggregate determined the durability. Clay that was rocky wasn't consistent enough and therefore wasn't durable. Sourcing such materials became important as the placement of the building relative from the production became further. Location of brick sourcing became regional. Each region that created their own brick had specific properties that reacted to the regions climate and the needs and craft of the people. Each mix of chalk or clay became a social trait of the area and thus created a sense of place. The clay or stone of a particular place would have a specific color and method of construction which lead to the immense diversity of types. Sourcing local material today is apparently so difficult, that extra rewards and awards are given to projects now that source materials for projects that are closer than 500 miles away according to the Leadership in Energy and Environmental Design (LEED) standard.

The constructibility of masonry units is also deeply related to timing. During the first century, bricks were to be made in the spring or autumn so that they would dry uniformly. During this time kilns were not used to harden the brick, instead brick makers would dry the bricks in the sun. This process took nearly an entire season and adds significant time to the process. Bricks were to be made two years before using. This would allow the brick to have time to dry but more importantly this time allowed the bricks to acclimate to the seasonal changes in its location. By extending the time from creation to implication bricks could be observed and tested for proper strengths and cohesiveness.

Raybun Taylor in *Roman Building* he writes about how the old roof tiles would become the new walls. For if they could stand the harsh weather of the roof they might be sturdy enough for the wall. The notion of time is contrary to the values of current society. Bricks are currently manufactured and are made in a controlled environment. Kilns are used and excess energy is drawn from the environment. Current techniques use the drying conditions as precautions to prevent improper settling and shrinkage. Already we can observe a

slight disconnect between the constructibility of historic walls and current construction techniques and values. Time, "allows the proposal to settle a while, and wait until initial enthusiasm for the idea has mellowed and you have a clear impression of everything." (Alberti, 35) The speed at which current brick are manufactured detract from the slow and methodical process of making. Masonry is now not only reserved for the specialization of its qualities but also is prostituted for the aesthetics and idea of what bricks symbolizes. Clay, ash and chalk are shipped in from different locations to a single factory to create a brick for a building across the region or even the world.

While development of methods and materials has increased, there has been a decrease of respect for the pureness of natural material. Techniques and technology should heighten the awareness and properties of such materials. Vitruvius writes about three different types of bricks; the Greek Lydian, a foot and a half long and one foot wide and the Palm, which is approximately four or five palms square. The dimensions of the masonry unit are determined by its ability to be easily laid. Today bricks come in a wide range of color textures and sizes, however bricks still are standardized to mechanization of the hand which places it. As modern time has progressed the size of the brick itself has become endangered. Making brick thin to then appear deeper is a lie of the materials. The scale of the brick, according to Alberti, should be scaled to the building. The building "part ought to relate to the part," "the scale should be no larger than utility requires, no smaller than dignity demands, nor should it be strange and unsuitable, be right and proper so that none could be better." The need for coursing is mitigated with the use of half bricks and even custom shapes to account for differentiated surfaces. Not all bricks, even when systematically formed, perform the same way. Some bricks get fired at a different temperature. Some even burnt are seen as wasted brick. Romans however used these bricks to tie the brick to the other courses of the wall. There was little waste. If the brick was broken a wall would be made out of the rubble. Vitruvius writes about a brick that when finished and dried, it can float due to its location of origin in the state of Maxilua Callet and further parts of Spain as Pitane in Asia Minor. The material this brick is made of is similar to pumice stone. It is light and does not absorb liquids. Advantages of this brick include light weight materials that cannot be spoiled by bad weather (Vitruvius,

44). While this type of brick could be used in other applications its sourcing of materials have lent it self to only be used in its local setting. Product performance should be able to adjust to the needs of people and place. Technologies like this should strive to produce inventions that rival, or if possible, surpass the glory of previous technologies and methods. The planning and constructibility of brick would begin at the concept design, if that were true. While primitive man took what was available and applied it to the situation, it seems that much of what is built today follows the primitive man's approach. However, the practical planning stops sourcing masonry manufacture that is available in modern times. The procuring components of planning, sourcing and creating are no longer elements of design. While this allows the process to be expedited it does not create a more holistic approach to construction. The process of locating and placing materials which do coincided in the beginning lead to unnecessary amounts of failure. Today, architecture passes off the responsibility of materials in order to focus on space making. If time for material specifications is not allocated, architects begin to neglect the values of materials and their implication of place and space making. Semper's mindset was that woven walls were still the "true wall, the visible boundaries of space." Woven walls were necessary for the creation of space and creating visible boundaries and that other walls if created behind them were needed for "security, for supporting load and for their permanence and so on." (Semper, 104). This mode of thinking can be implemented into the concept and construction of cavity walls. The woven fabric creates the aesthetics and the wall behind is used for structure. This embellishment of space shows a shift in values and intentions from the previous primitive hut. Walls that included embellishments might say something about the value structure of civilization or how ornament quickly becomes important in creating architecture and defining space.

The appearance of walls was not only seen as aesthetics but evidence of organization and structure. Two methods of buildings Romans walls were the *Opus Reticulatum* and the *Opus Incertum*. Where the *Reticulatum* was regular sized masonry turned on edge and packed with mortar, the *Incertum* used irregular stacked stones cut and fitted together. While the *Reticulatum* looked more refined, it was likely to crack. The *Incertum* was strong but lacked the aesthetics that the *reticulatum*.

In both regards, the masonry draws moisture in the water condemning it to ruin. (Taylor 104) The double wall that was described by Semper, became known as the cavity wall. This cavity wall has followed us from generation to generation. In the image attached, Serlio illustrates a wall of stone fixed into brick. The deviations of styles of buildings show the difference between faced and tied stone of the smallest quality to incorporate economy. Face stone to imitate cut stone is keyed into brick and a detail of a balcony set into the thickness of the wall below.

Value has now shifted once again to favor economics and style. It seems however, that there is integrity of masonry under structure. There is a value of masonry, socially, politically, and monetarily. "So they value them at not what the cost to build but deduct the cost from 1/80 for each year the wall has been standing." (SOURCE!!) In brick walls no deductible is made provided that the wall is still plumb. They are always valued as the cost to build. In order to account for the robustness of the walls arbitrators have set a "valuation of the party wall". This method of value is efficient in creating a hierarchy to intentions of the party wall and not on the material value. Because brick is more stable than a beautiful veneer over rubble, the beauty of the veneer will not add to the value of the wall and should not be accounted for in the arbitration of selling property the same way that a stable wall is inferred (Vitruvius 53). Yet we should be cautioned by Alberti as he speaks of labor and expense of buildings. It "should not be undertaken lightly: apart from everything else that may be at stake." A well-constructed building will enhance the renown of anyone who has invested understanding, attention and enthusiasm in the matter. Accepting the changed value as development these criteria for valuing becomes easy to use today. The contemporary cavity walls ought stand up to the test of values and to articulate this development. The process should respect the demands of use and convenience and follow the methods sanctioned by those who are experienced. (Alberti, 24)





### ***Explication of the Frontispiece***

The frontispiece shows a stratification of elements. From the bottom there is a bar of "waddle and dob"; Above it is the Roman Opus Reticulatum of Roman Brick, above that common bond brick. On the top half of the page is a capriccio of a ruined brick factory building, Only the smoke stack is fully attached with the name of the file company painted on or built with a different color brick. In the foreground there are holograms of several primitive huts illustrated in white. Also in the images are five astronauts searching for value among the rubble. In the distance there is a hologram drawing of LeCorbusier's utopian housing. Along the left side of the capriccio there is a faint image of a crane holding up only the glass of a skyscraper. Along the top are a set of concrete masonry units, symbolic of the masonry units that are able to float. The image is meant to provoke the sense of time and burial. It should gesture to a warm new beginning or a revisiting of the past. The warm hue is meant to warm the past. The image shows material amidst construction, deconstruction and allusions.

### **Statement of Intent**

Design-Build in architecture unites what is otherwise usually separated: the ideas of theory and the actions of practice. This research will test its value in two-ways: as a pedagogical framework for holistic, integrative learning, and as a demonstration of resiliency in the built environment. The generative process of Design-Build promotes hands-on, full-scale thinking and doing, informing participants about the values, qualities, and capabilities of the built environment. The use of actual building materials requires one to adjust preconceptions of the force and flows of material properties.

The dominant "Aristotelian hylomorphic model of creation " [1] – the imposition of preformed ideas on passive matter – is replaced by a dynamic understanding of the processes of formation with materials that results in an evolving goal. The specific Design-Build project will experiment with durable, resilient building materials that are capable of being assembled, disassembled, and reassembled as a system that can respond to changing needs of inhabitation. Design-Build as an educational core can further students' knowledge and becomes part of a larger evolutionary process of a whole

## **Motivation**

Architectural practice has limited its ability for architects to be fully engaged in both the construing of theory and simultaneously in the construction of practice through physical construction. By maximizing design potential, practice has rationalized theory in a way that allows it to be built. The built reality therefore enables an evolutionary process of practice and theory. While it has integrated the two, hyper rationalization has also de-valued both theory and practice because of their non-consistent evolution; the amalgamation of the two does not result in an iterative process.

Currently, sustainability focuses primarily on the implications of technologies to existing infrastructure in order to create a more resilient future. The modern Architectural Profession shows signs of replacing architecture with devices that the installer has no control over and does not know how it works. Because of this disconnect these value systems create a combative relationship. It becomes necessary to look at the individual not as a system to conform but an opportunity for indexing to elaborate the diversity and variance.

Research and evolution of modernity [3] have debated the necessity for quick solutions and have somewhat neglected longer term, more resilient practice. Exposure to architectural Design-Build process can contribute to better understanding of the systems that influence place making. Design-Build has the ability to contribute and influence the future trends within education both in theory and practice. The ability for architecture to be a catalyst in recreating cooperative resources for constructed installations and adaptations can be better understood through the interactions of making and preserving [3] utilizing "tacit knowledge" [4]

Design-build processes are able to engage in real time interaction of fabrication and concept that can inform the process through collaborative educational studies of drawing, making, modeling, diagramming and analyzing the situation at hand. Collaboration with other disciplines and situation become necessary in understanding the current situation. Iterative processes are repeated as necessary in order to compel a more organic environment that promotes equality and a diverse sense of place through the use of raw materials. Challenges that will be investigated include budget, values, and diversity within the projects' environment.

## **Method**

I intend to build a structure that will fit within a 10-foot cubic space. The built form will examine the sociability of the space, privacy of interiority, and the manipulation of material. The construction will also be a catalyst for considering educational reform. The process will include researching materials that are both fixed and temporary, while also being resilient and long lasting, resolving processes that are typically categorized as fundamental opposites. The work intends to be adaptable in function and has the ability to be changed over time. Multiple iterations of on-site interventions indexing the specific site's attributes will be included. Standard construction methods will be utilized and challenged as a means to advance architecture but also to reassure the methods that history offers.

## **Justification/ Broader Impact**

The typical understanding of site analysis is not inclusive in understanding place and space. It must be looked at through an interdisciplinary lens including social and anthropological understanding of space. This makes it a study not only about form and function but also on its greater impact of social space. Anthropological surveys of the characteristics of the space including: aesthetics, function, and approach of systems will be conducted to achieve this understanding. Each participant's own speculation will help inform the space to become a place [source]. Through the iterative process, prudence is introduced into practice and will inherently influence productivity and creativity. Hopeful results in a more equitably oriented culture of the site.



design **BUILD** ATTIC  
towards an architectural education

### **The Inversion of Up and Down: the Interrelation of Floor and Ceiling**

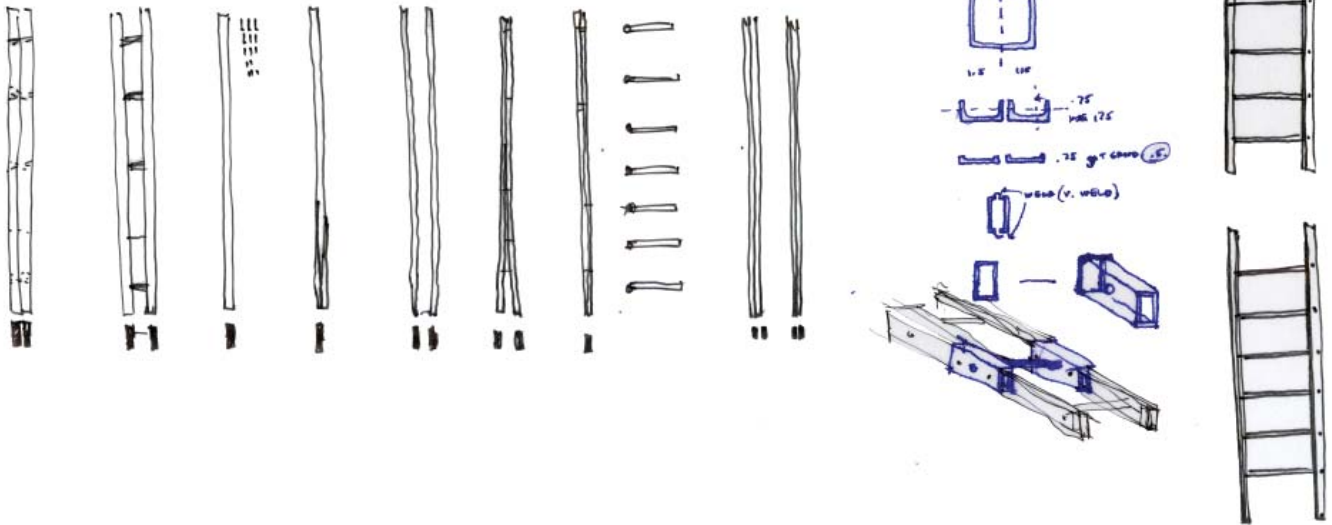
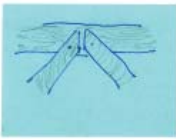
Through the documentation and analysis of the existing 1001 Prince St. building, I intend to physically manifest a series of experience “dreams” located above the horizon. The series of adaptations for which drawings of my own spatial reality are recorded are created to engage interchange between real and unreal, up and down, creating a sensory interchange that will intrinsically challenge our preconceived network of senses that collectively create place.

Gaston Bachelard’s *Poetics of Space* illustrates vivid experiences humans have with interior spaces composed of many elements that create a sense of visceral subjective consciousness. Bachelard argues that we must not get rid of spaces like the garret, or the attic. Perhaps we are instinctively in need of solitude and shut-in space, nevertheless our persistent daydream leaves the ceiling blank for our imagination to wonder what could be above or below the levels we inhabit. Using the WAAC Studio, 1001 Prince St, I intend to collage a series of inverted spatial interventions that place geometrical relationships of floor and ceiling into question. Through the iterative process of drawing, photographing, and projecting, these alterations will be temporarily fixed through the lens of projected technology. While the ceiling will continue to be a place on which we impose and hide mundane technology above, projection allows us to flatten the spatial depth of what is above onto the 2D surface of the ceiling itself. The projection will trace the existence of the past (background), present (mid-ground), and future (foreground), simultaneously in order to invert not only space but also time. In the company of dreams reality is skewed and at the same time relatively implausible. These installations will attempt to do the same creating a synesthesia between perceived touch, sound, and sight. Un-grounding the observer’s equilibrium, the contact with the floor will feel lighter, the body undulating in and out of stasis, and the ceiling heavier.



"In day dreaming itself, the recollections of moments of confined, simple, shut-in spaces are experiences of heartwarming space, of space that does not seek to be extended, but like above all still to be possessed."

(Gaston Bachelard, Poetics of Space p. 10)



### 69.1 Looking Devices

The device allows you to look down but see up. inverstly looking up  
arears downwards..

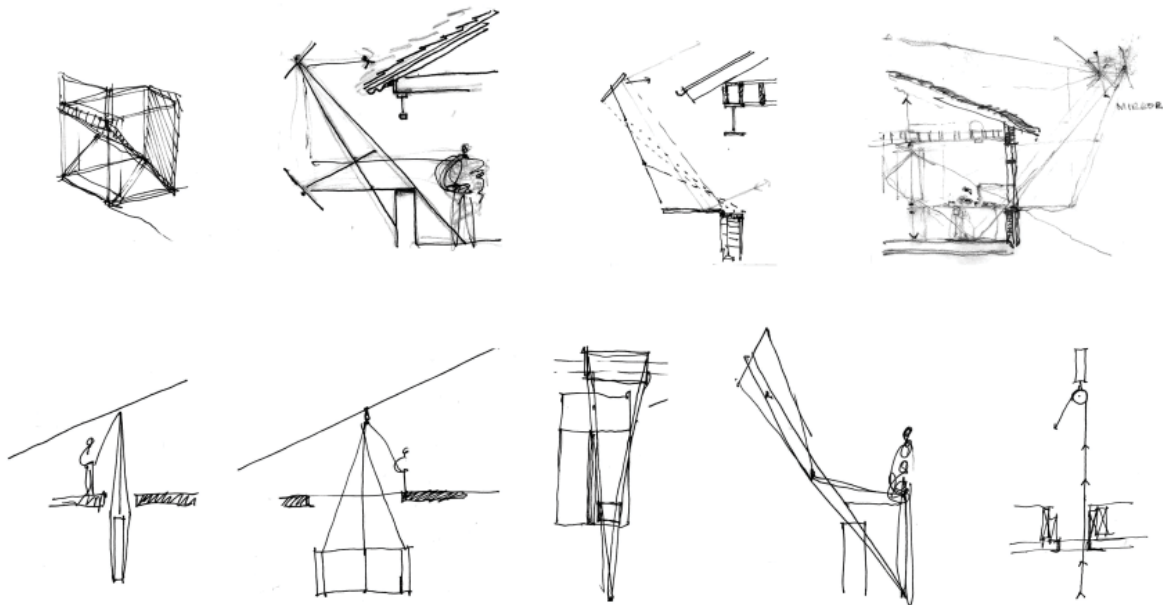


" Umbrella, Kite, drawbridge, mirror, dream, cloud ,interior , exterior, scaffolding  
device to earth and sky." (D.D.)



### 69.1 Looking Down but Seeing Up - Looking Out but Seeing In

Sketches and preliminary concept model for looking out a window and seeing the roof above you as if it's in front of you. By using mirrors, reflection and secondary and tertiary spaces to reflect from, one might be able to dream or image possibilities.









**42.1** Photographs of identical images, inverted, re-orienting the perceptions of a place, Inversions of Up and down. The roof can be a hat for the building or it can be tied down by the chimneys, acting as a funnel into the sky.

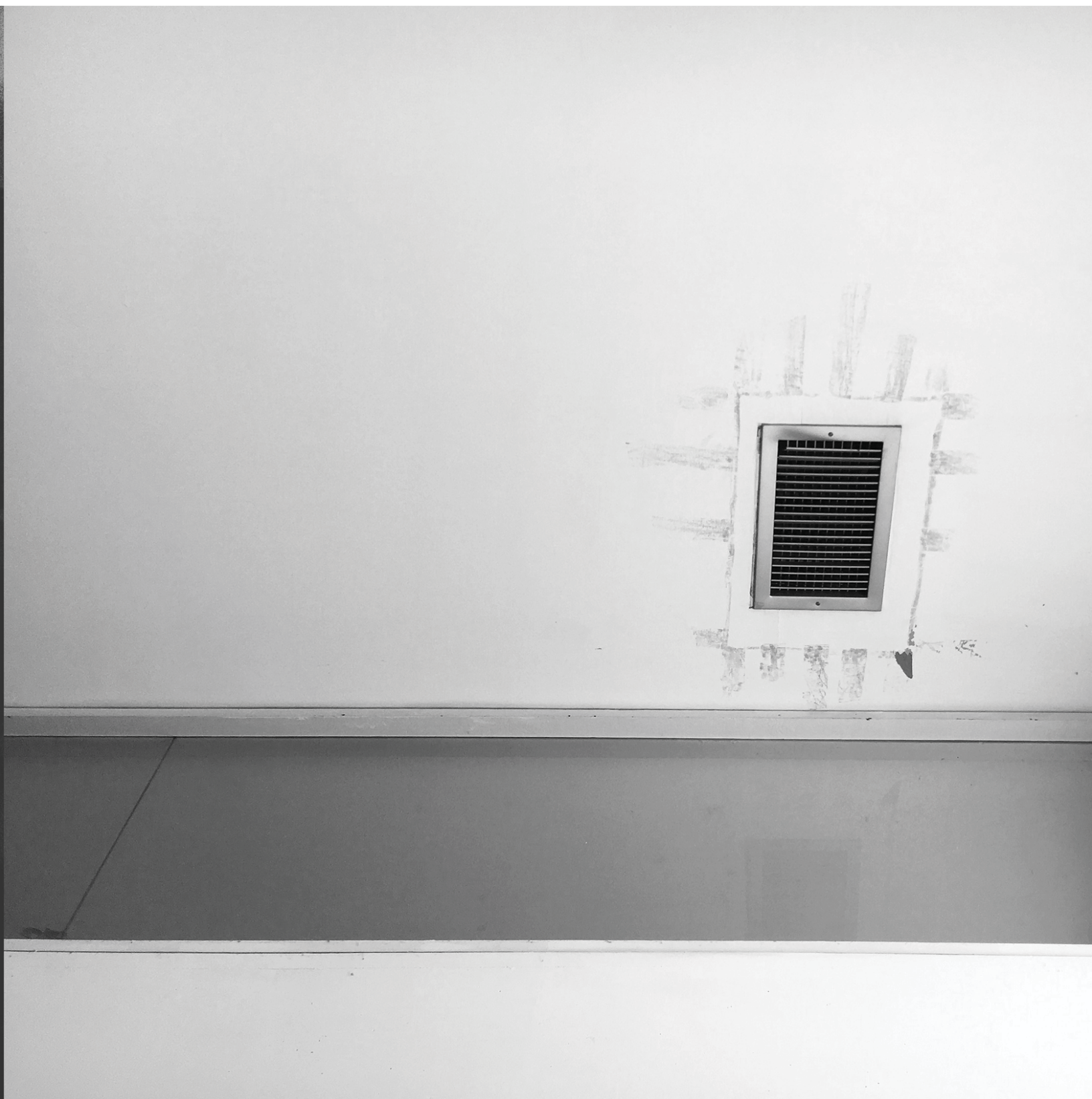


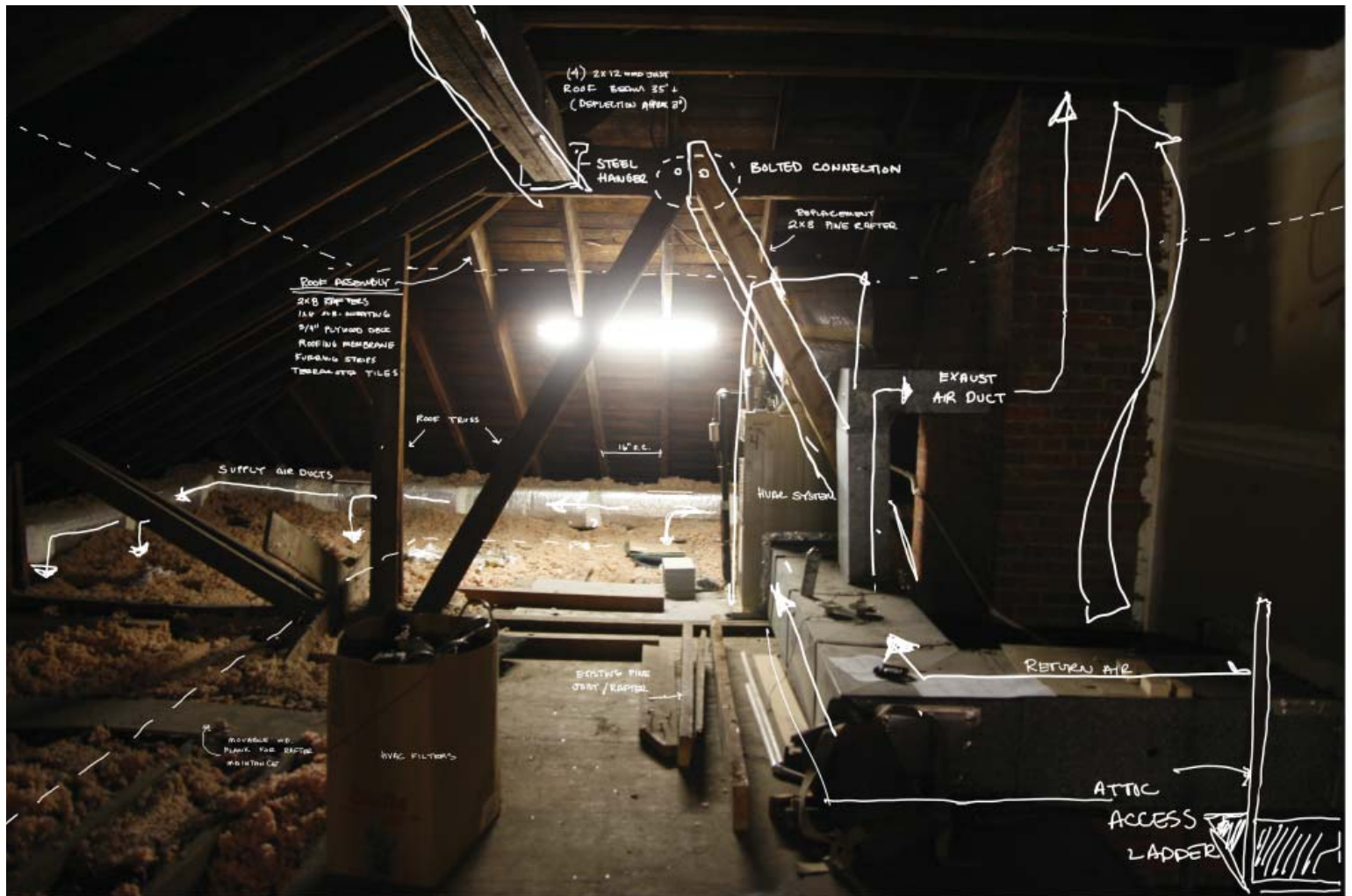


**62.1** View from the attic looking down the attic hatch. The interior of the space is dark and in shadow, the space beyond and the ladder extend up into the space.



63.1 View from the second floor looking up at the ceiling activated by the air defuser. a pallemest from an ad hoc deflector remains visble by the residue of duct tape. The space beyond the white surface has spatial potential, however its use it not made visbile.

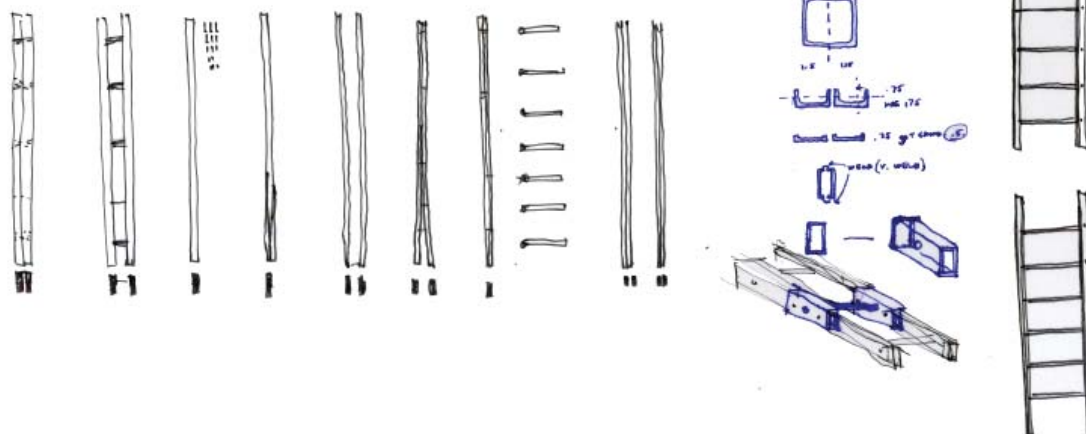


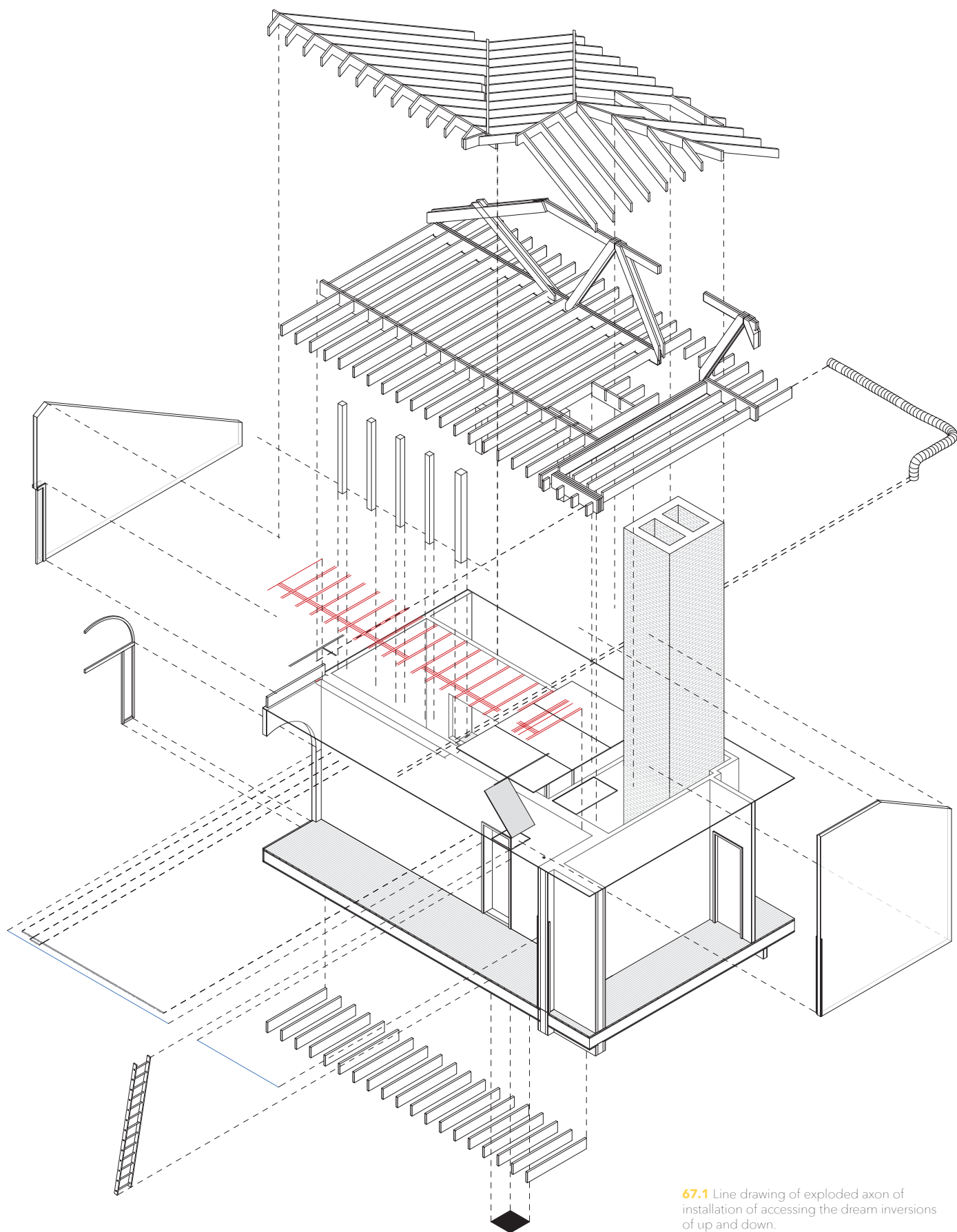


**52.1 / 53.1** Annotated photograph of west and east end of the attic. Annotations show mechanical systems flow, renovations of replaced boards and left over lumber. Tucked away student architectural models litter the attic. Documentation of space allows for visual diagrammatic clues and allow the context to be broken down into its elements qualities.





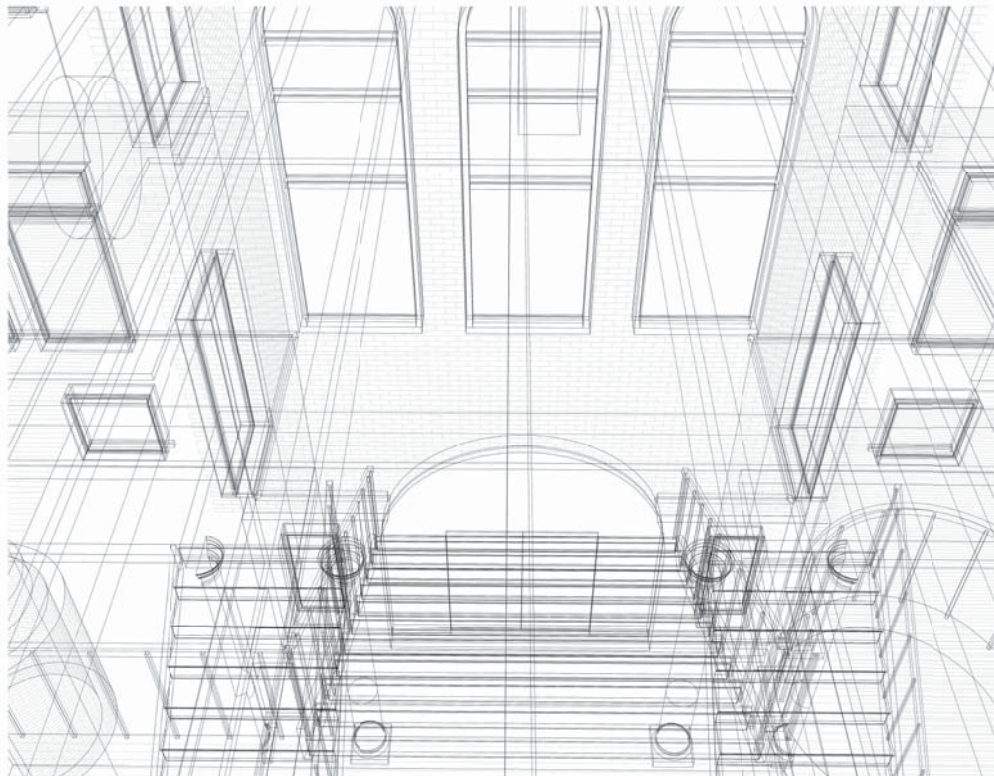
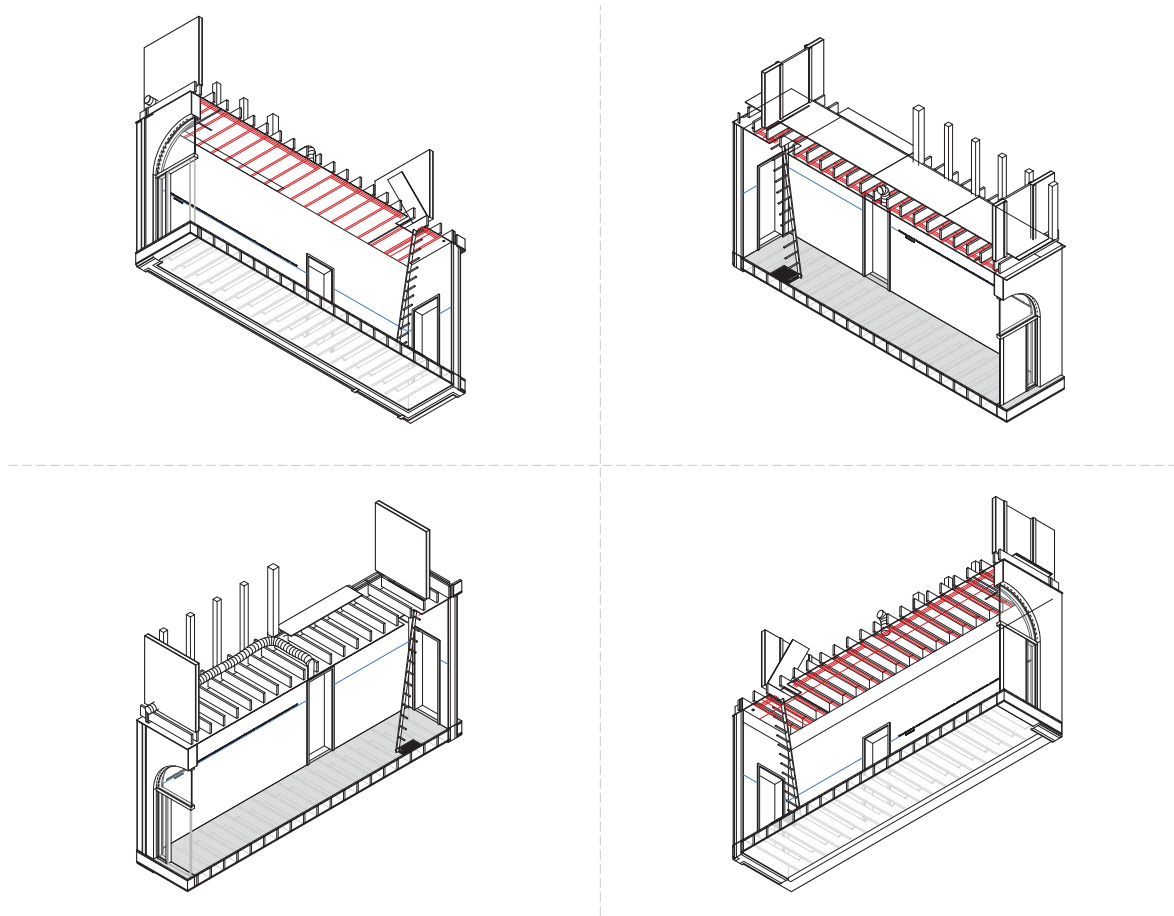




67.1 Line drawing of exploded axon of installation of accessing the dream inversions of up and down.

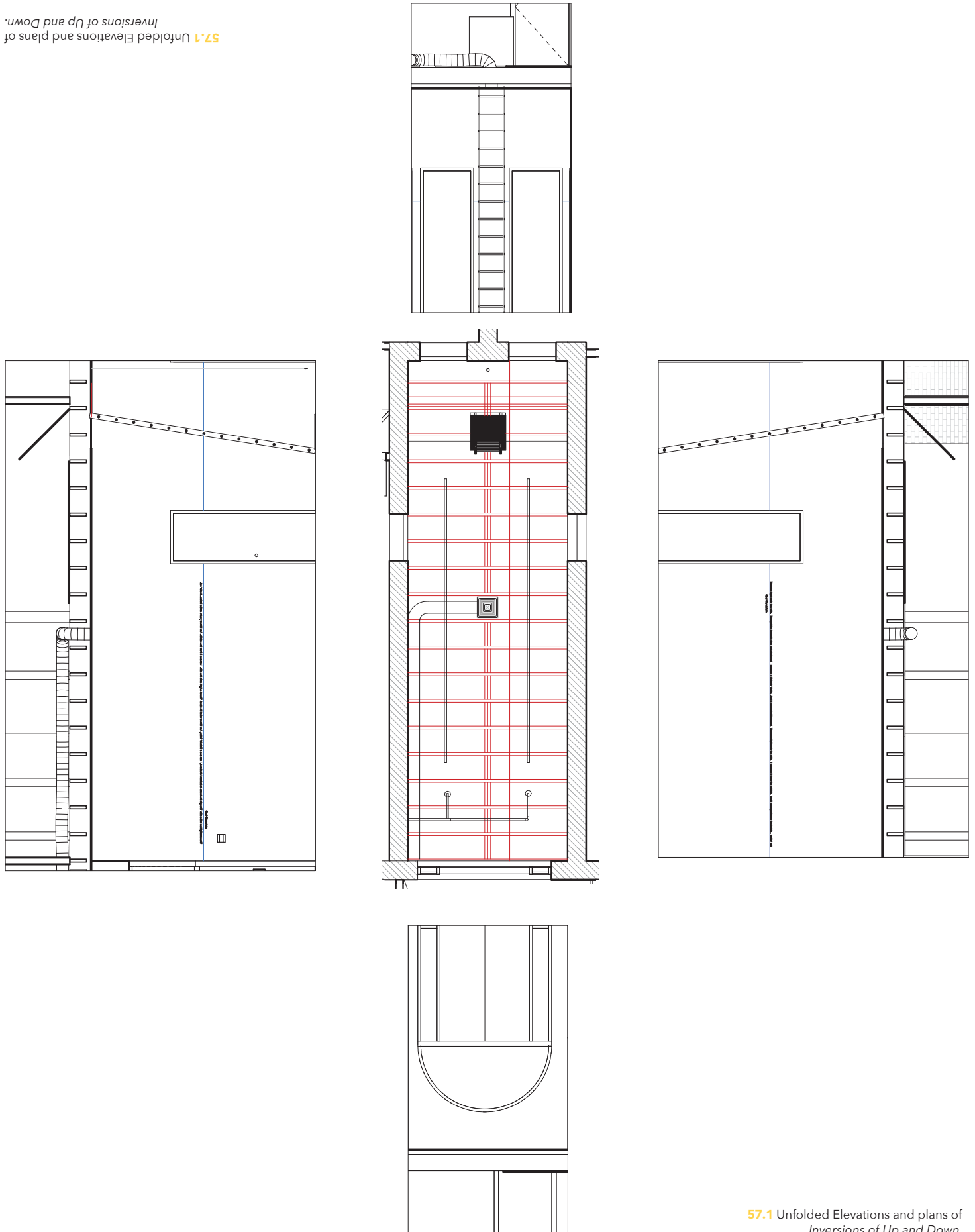


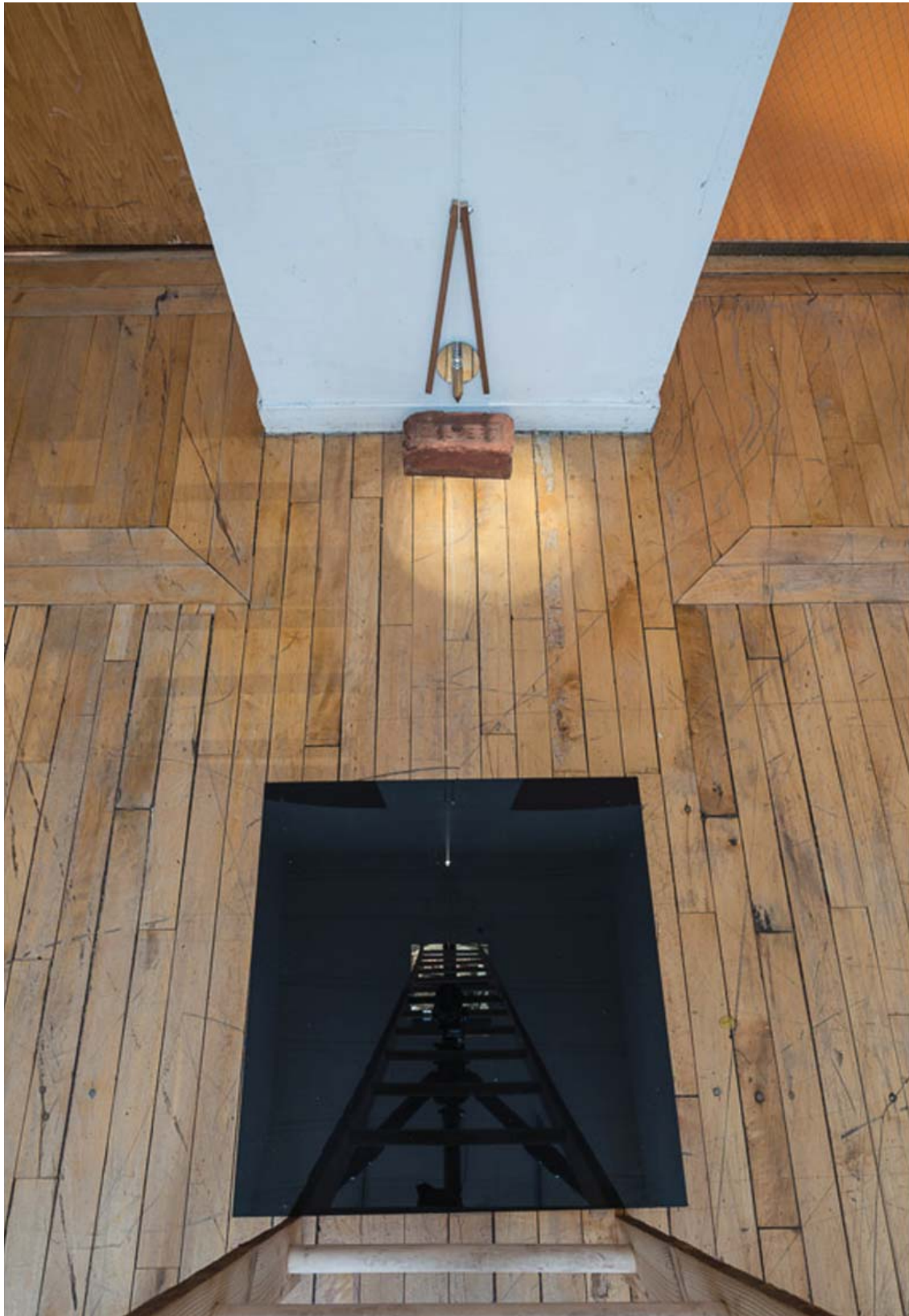
56.1 Section Axons of Installation Inversions of Up and Down.



56.2 Wire frame transparency view from the attic looking down to the front door



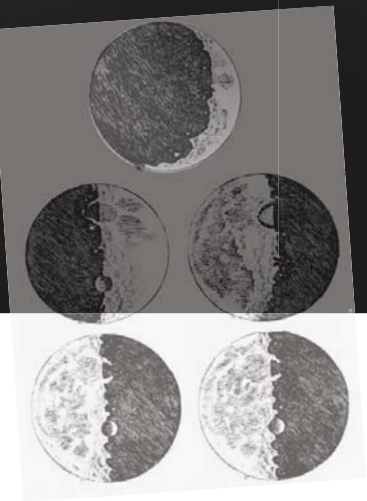




**70.1** Photograph looking down on to black reflective acrylic seeing the source of light that highlights the brick and the plumb bob hanging down, a one and a half inch hole in the ceiling and a light source coming extramural.

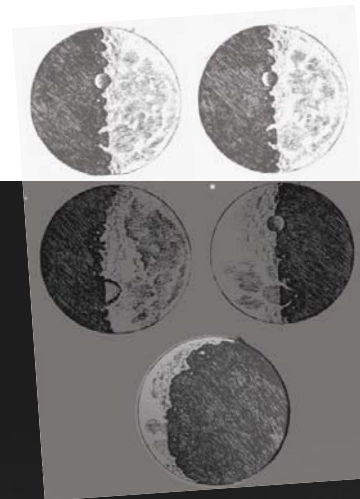


71.1 Photograph looking down the hallway of the second floor  
A ladder, a mirror, a hole (whole)



**72.1** Connecting the attic to the moon. Investigating how light could enter the attic.





72.1 Connecting the attic to the moon. Investigating how light could enter the attic.

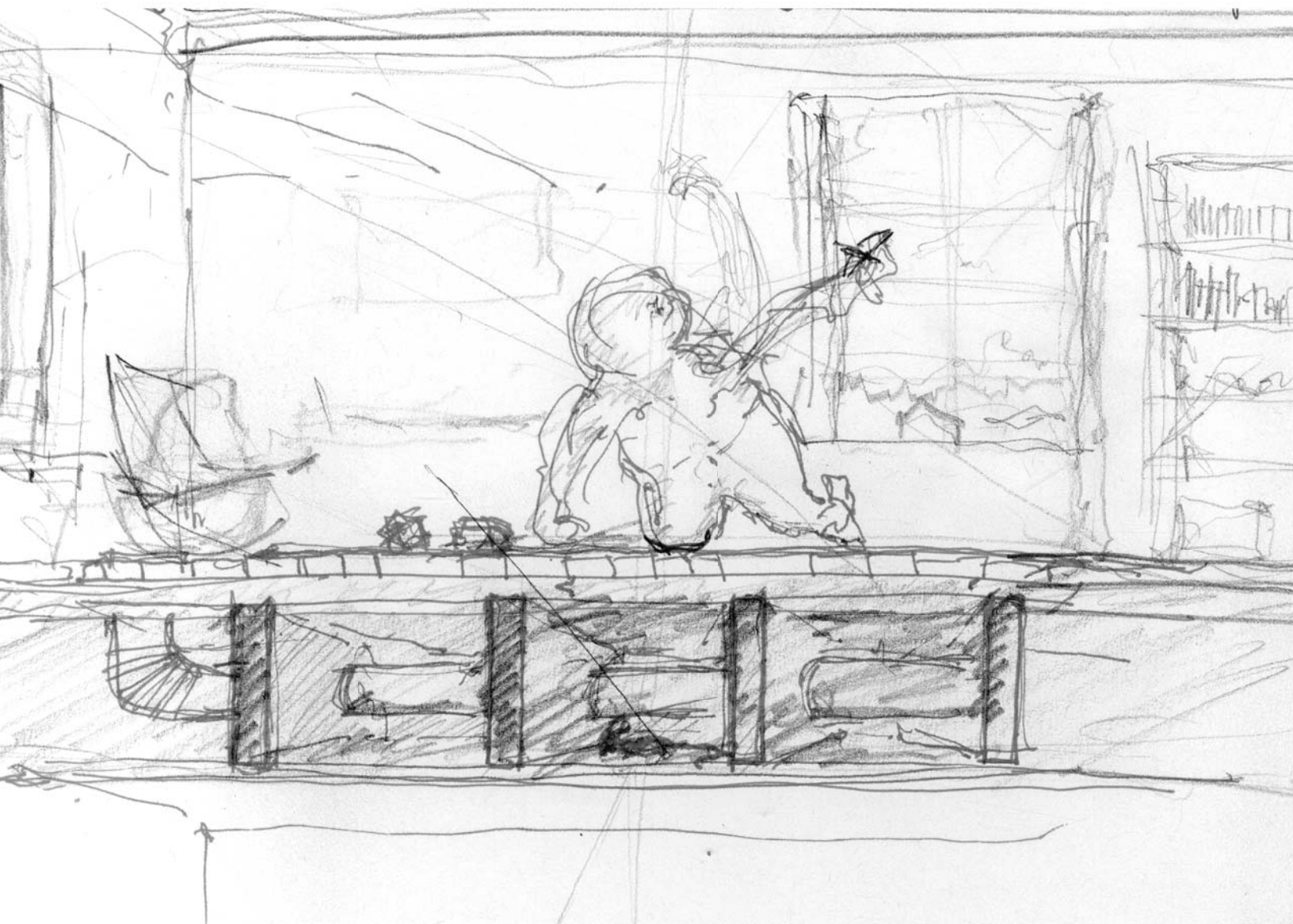




**74.1** Construction refilling the whole cut in the gypsum in the ceiling that once exposed the attic space refilling the hole (whole)



74.1 Current view up the ladder at the whole which once was hole.



d43 Section perspective of a mouse, a boy, and an airplane.



## The Mouse, the Boy, and the Airplane

"The house is a matrix of discrete but thoroughly interconnected chambers."<sup>1</sup> We enter into the drawing through the mechanical duct, between the ceiling below and floor above. We are the mouse; we hear the movement of the human above. The mouse becomes still. It is tripped up in the moment speculating danger from the noise above. The mouse does not see the human but through the cracks in the wood floor it senses the closeness of the seemingly large creature. The mouse waits. Simultaneously, the child is nearly on all fours, crawling on the floor above the mouse. Staggering closer to the crack in the floor in which the mouse is looking up. The child is unaware of the space below; he is fixed on an imagination above. The movement of the arm of the child remains fluid as he moves the airplane across the air. The toy is a statue, made of metal and painted yellow. Plane noises are made as the boy whirls his arm about. Windows in the room are open. The space is filled with sunlight and gust of fresh air. The propellers of the plane move in the wind and it is lifted into the sky framed by the window beyond. The image becomes fixed in the moment; moments become ghost trails. Motion shudders to a stop. Fixated in the moment of the image, time collapses. We ourselves as observers and participants are tripped up for a moment, stopping.

Stasis and tripping up in regard to architecture is enabled in the moments the occupants create for themselves as well as in moments of architecture that cause one to stop and pause getting caught on the unexpected. Tripping up allows one to conceive beyond the initial glimpse or the contiguous interaction of constant movement. Robin Evans writes in *Figurers Door and Passages*, that barriers, "are employed to first divide and then selectively reunite inhabited space."<sup>2</sup> In the scene, the child and the mouse are separated by the substructure and finish material of the floor. The wooden flooring springs up under the pressure of the boy's knee. As it is peeled back, an opening to below is revealed but the mouse stands as a statue at the edge of the shadow. The boy, startled by the springing of the wood plank, recoils back on his feet. At that moment, the wood plank falls and is jammed back into place. Both the mouse and boy are tripped up by the unexpected movement of what is perceived as solid and impenetrable. When the wood plank moved, the space below and above became united for a moment. The underside of the floor is momentarily inhabitable with the space above.

For the mouse, the dream became true. The mouse's fear of being discovered, which is previously merely a fictitious exaggeration of the situation, became an unexpected reality by all participants. The mouse's fear is still somewhat fictitious. While his position behind the boundary is exposed, the human is not looking for the mouse. Instead, the child is tripped up from the unexpected hinging of the wood flooring as well. The child is brought back from his dream flight. Startled by the moment, the boy drops the plane. As it falls to the floor the wind dies down. The boy, leaning back, sits up and pauses, wondering how it all happened. The mouse is still frozen in motion. After a few moments the boy returns to flying his plane. The fantasies of the boy continue and the mouse is left to fantasize about how lucky he is to have not been seen. The mouse became a statue, escaping death through the wish of becoming a statue, "feeding on the idea of threshold states between life and death."<sup>3</sup> Resolved, the chambers of the house<sup>4</sup> become equalized and the occupants enter back into their own worlds

---

1 Robin Evans, *Figures, Doors and Passages* p. 64

2 Robin Evans, *Figures, Door and Passages* p.64

3 Kenneth Gross, *The Dream of the Moving Statue*, p. 20

4 Robin Evans, *Figures, Door and Passages* p. 64



---

## collateral **BEAUTY**

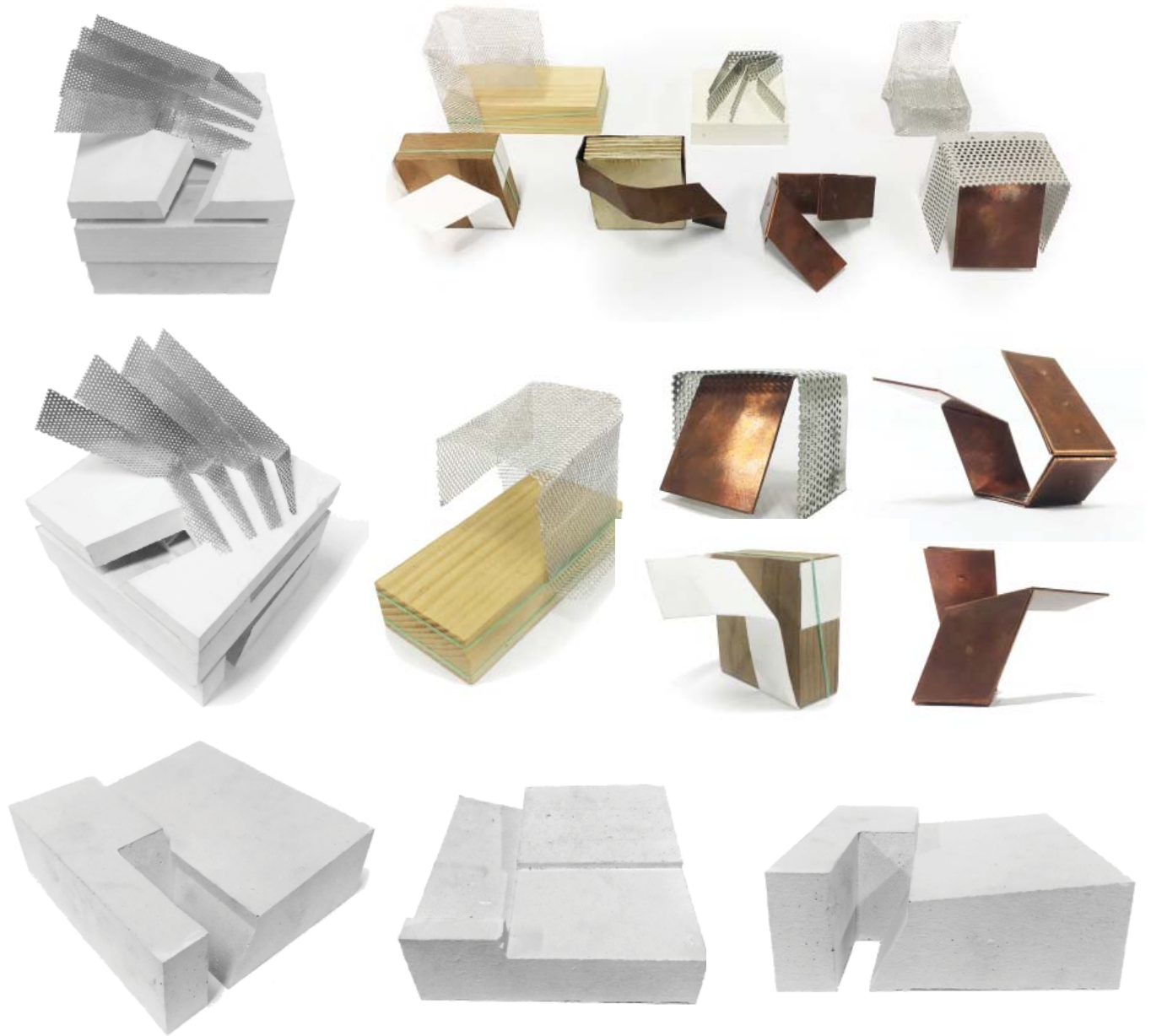
towards an architecture

Rough Sea at Etretat embodies the emotion of Claude Monet's timeless brush strokes as well as the scene it illustrates. The various scales composed by the foaming sea, the midnight sky, the rugged but complacent rocks, and the huddled onlookers at the foot of the sea bring awareness to the wonder founded in the moment. The image depicts a struggle of time between real time and imagined time. Duality between the rocks and the sea is constantly reacting though the slow but hard erosion. The mood is mellowed by the cool crisp atmosphere as the dark sky meets the white foaming sea, constantly creating a soft loundless.

---

***Hard Erosion*** is the effect of the waves crashing on the rock faced with the dramatic shift from rocks above to the low aggressive sea. Jagged rocks break from the cliff crashing down into the sea. It is the abrupt distortion and shearing of the seemingly robust solid. Sharp angles and abrupt shifts begin to create the relationship between the object and the action. As an element erodes, the fragments become smaller and less dense, leaving a void in its place.

***Soft loundness*** is the overwhelming noise from the continuous waves of the sea. Each wave is distinctly present but the roaring never ceases. The white noise is like a cloud hovering, distorting with subtle differences. Like the sound of static it folds and oscillates driving deeper and deeper into the presence of the observer until they are engulfed into a fog which seems to create its own baseline of nothingness. Its noise is gentle and calming but nevertheless destructive. It drones out the distance, obliterating the interferences.



**81.1** Models expressing the emotion of the collateral beauty of Claude Monet "Rough Sea at Etretat."

85.1 Photo of crawl space as storage space








---

## design **BUILD** CRAWLSPACE

towards an architectural education

The basement level accounts for the crawl space and all spaces below the horizon. The crawl space is filled with dirt to half height of space from excavated soil from the original constructed. The crawlspace is a uninhabited space is invisible to the occupant. It is like the attic. Rather Meeting the sky it meets the ground. The foundation embeds the building into the site.

---

*Hard Erosion* is the effect from the deconstruction. The dramatic shift from top of the seemingly finished spaces to spaces deconstructed with out floors or gypsum walls.. Carving harp angles and abrupt shifts begin the create the relationship between the object and the action the angle of repose of the dirty and of the body. . As element erodes the fragments become smaller and less dense, leaving a void in its place. The particles are distributed and are put into use arose the site.

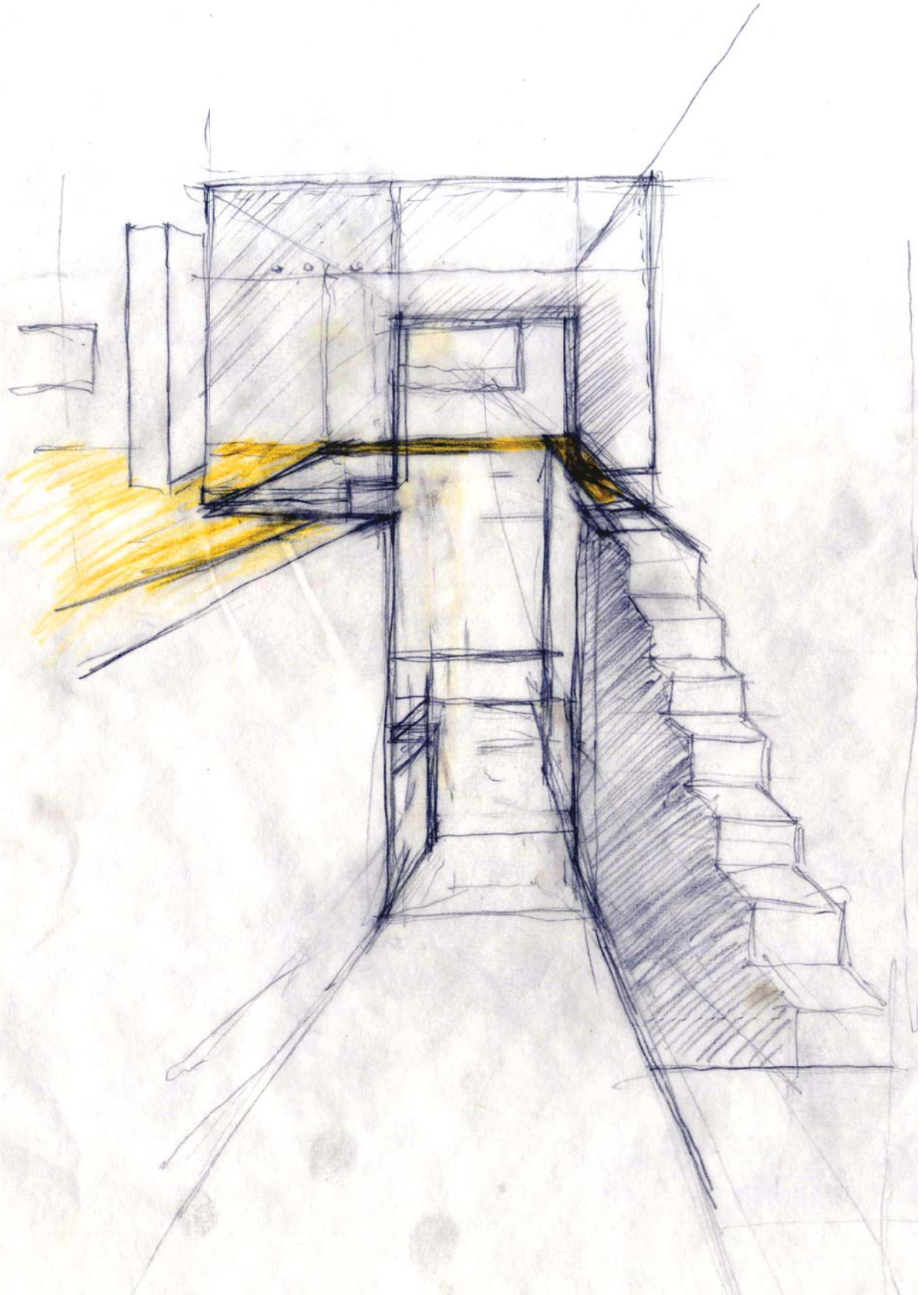
*Soft loudness* is the overwhelming noise from the HVAC and the equipment resuscitating the building . The white noise is like a cloud hovering, distorting with subtle differences. Like the sound of static it folds and osculates driving deeper and deeper into the presence of the observer until they are engulfed into a fog which seems to create its own baseline of nothingness. Its noise is gentle and calming but nevertheless destructive. It drones out the distance obliterating the unwanted interferences. .

**104.1** Preliminary sketch of proposed demolition of a large portion of the stairs. Reflection of this condition revealed the excessive work to undo something that was once set, and the possibility to see the stairs as an opportunity.

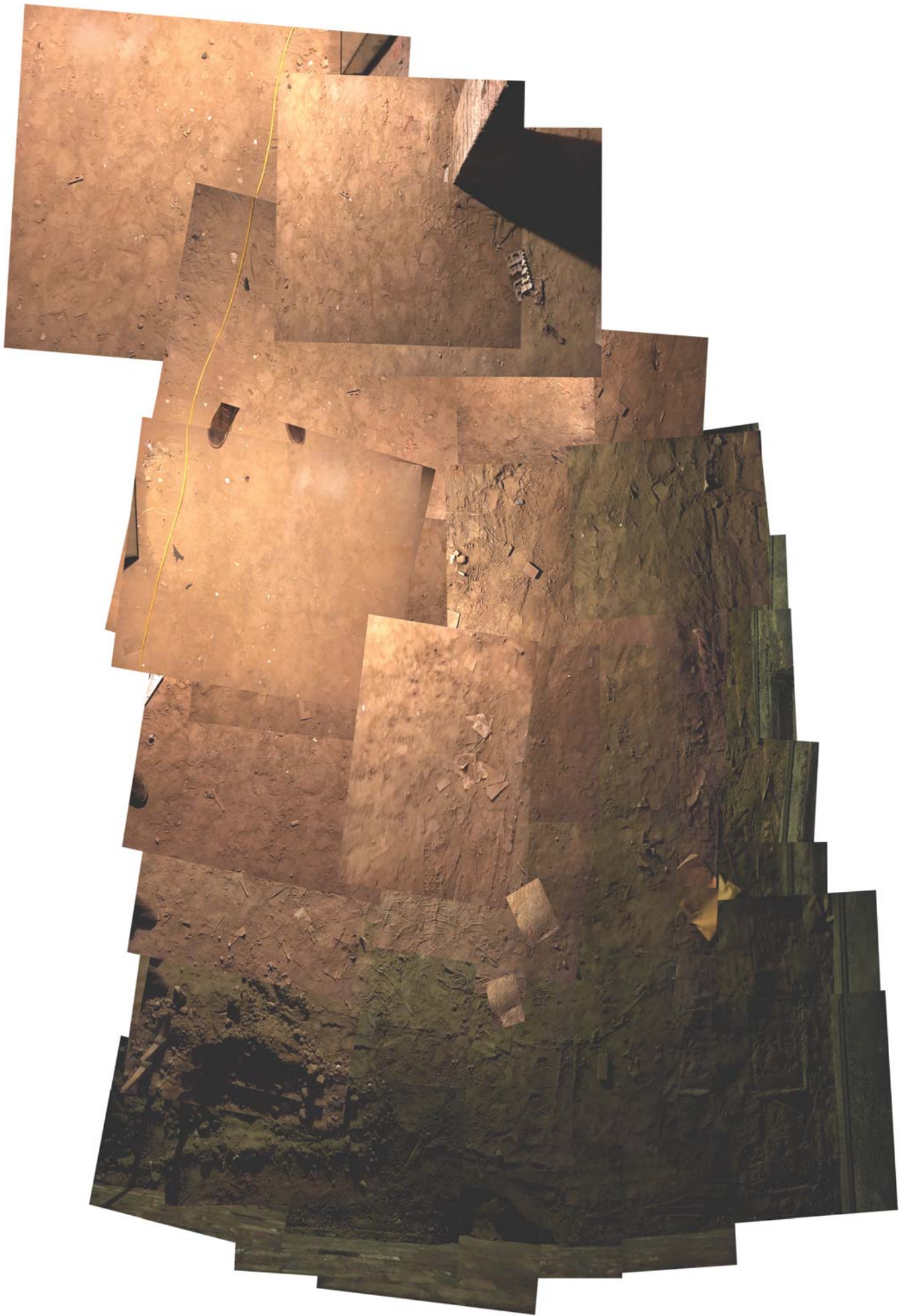




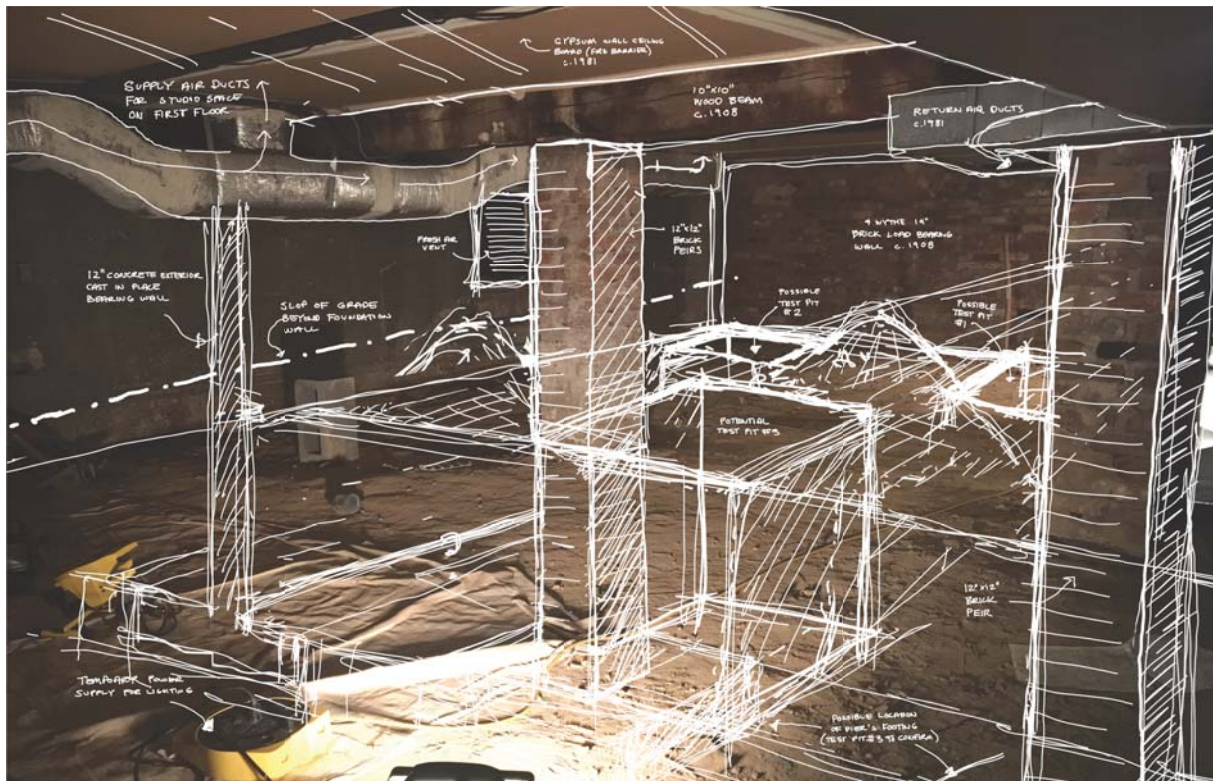
**105.1** Preliminary sketch of proposed carved-out space in the existing crawl space. The space is to be split at the horizon of eye level. Cradled in the ground and hung from above, it makes room inside of a room.



**112..1** Plan view photograph montage of ground surface in-crawl space







113.2 Overexposed overlay of designing, digging, and bagging





86.2 Sandbags fill the crawl space before moving them out into the courtyard.



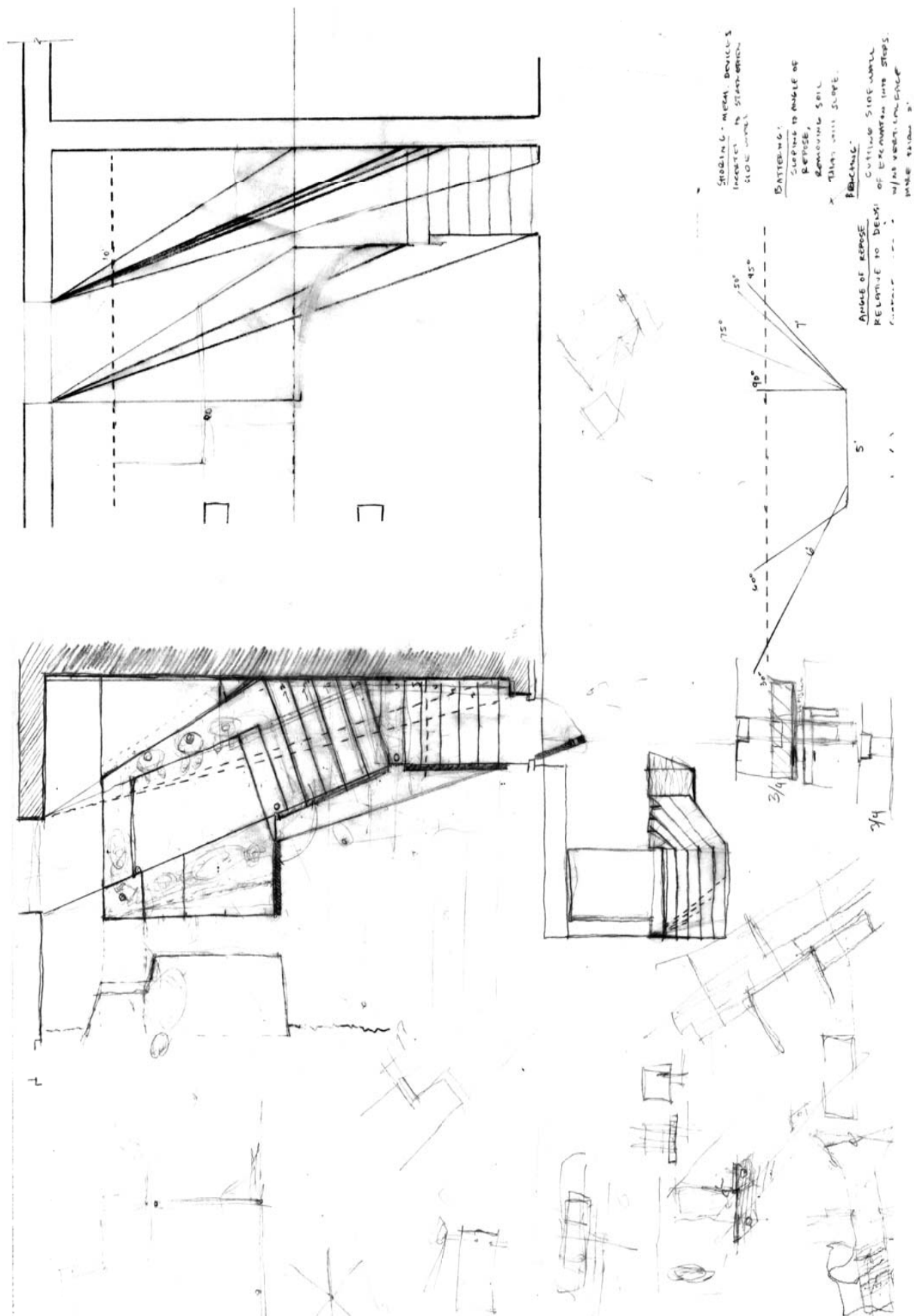
86.2 Footprints of students entering the crawl space observing excavation.



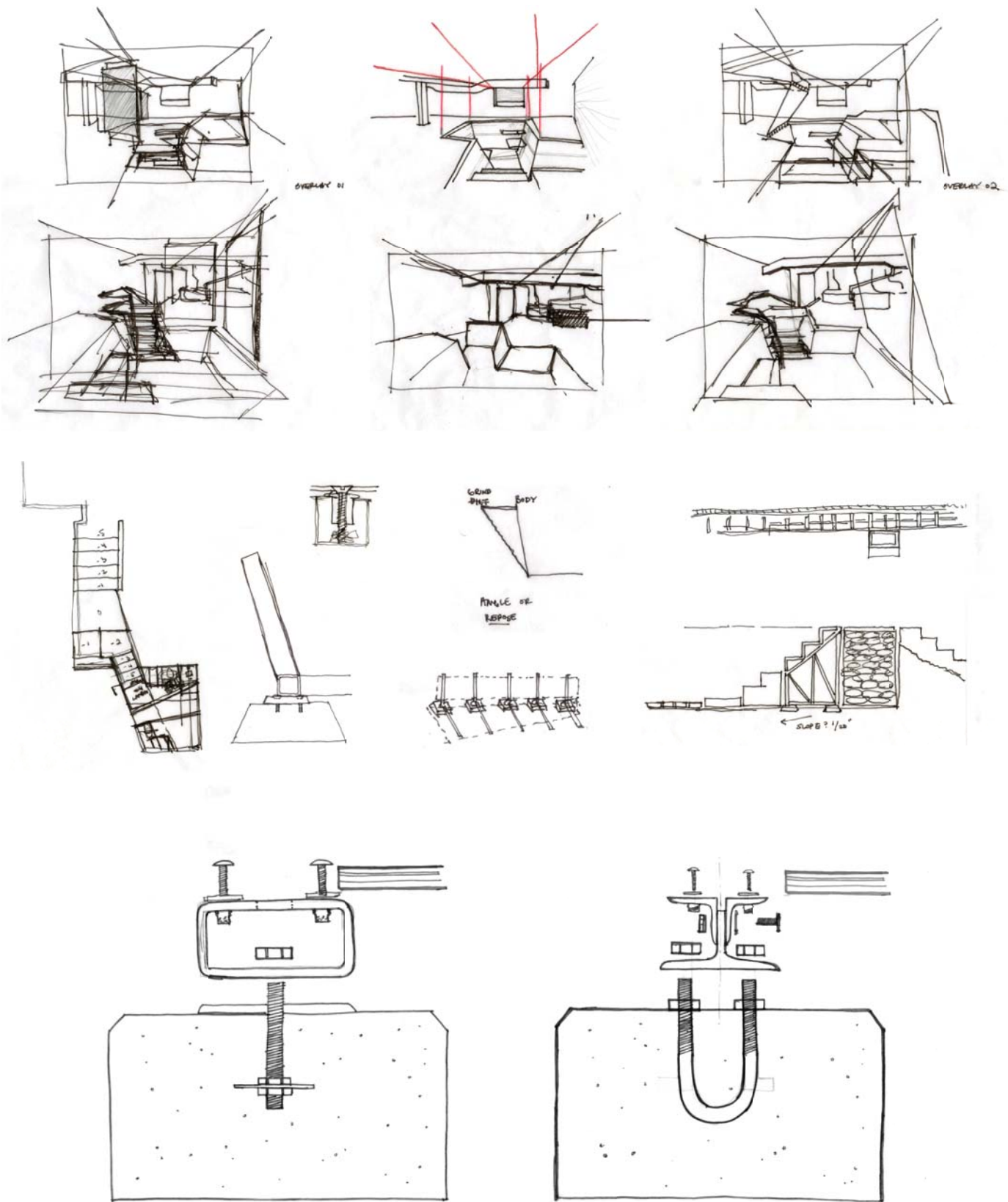


107.1 Excavating dirt, shovel sitting on foundation of interior bearing wall.





**107.1** Sketches of possible schemes of approach and entry into the space. Sections show possible angle of repose sitting, laying positions and future growth of a room



107.1 Sketches of possible adaptations above the horizon of the dirt with connections to the frame below.





91.1-4 Threshold between basement and crawl space.



90.2 Plum-line, sandbag, and the edge of the excavated site



91.1-4 Excavation of dirt from the crawl space, 400 hrs of labor using shovels pick-axe and spades.



91.5 Stratifications of dirt : golden yellow sand from 1900s renovation. Layer of coal and gravel deposits shown in gray and red strata and possible dirt deposits from before I from c.1845









Process of drawing, digging, and discovering in the crawl place stratigraphical in 8' lifts.







101.1 Artifacts unearthed during excavation including pottery shards, iron, coal, glass, shells, etc.







94.1 Photo of interior light and exterior light creating shadows in the excavated area.



95.1 Photo of ambient morning light coming into the crawl space





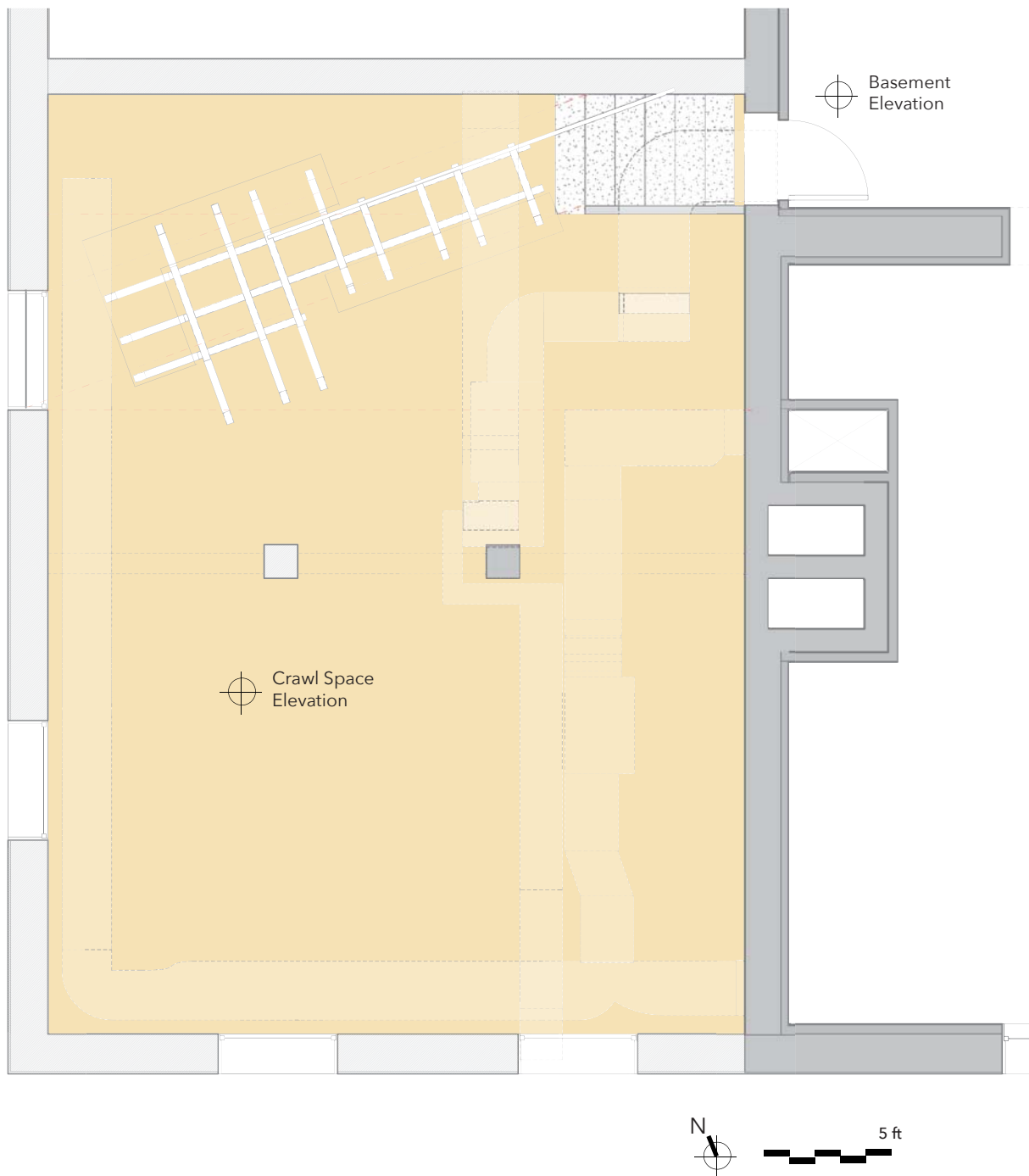
**97.1** White chalk lines on dirt fades with the transition of afternoon light coming in the exterior wall window. The lines mark the progress of time in 15 minute intervals starting right and moving left, as the sun tracks the western sky shows light dancing along the horizon.







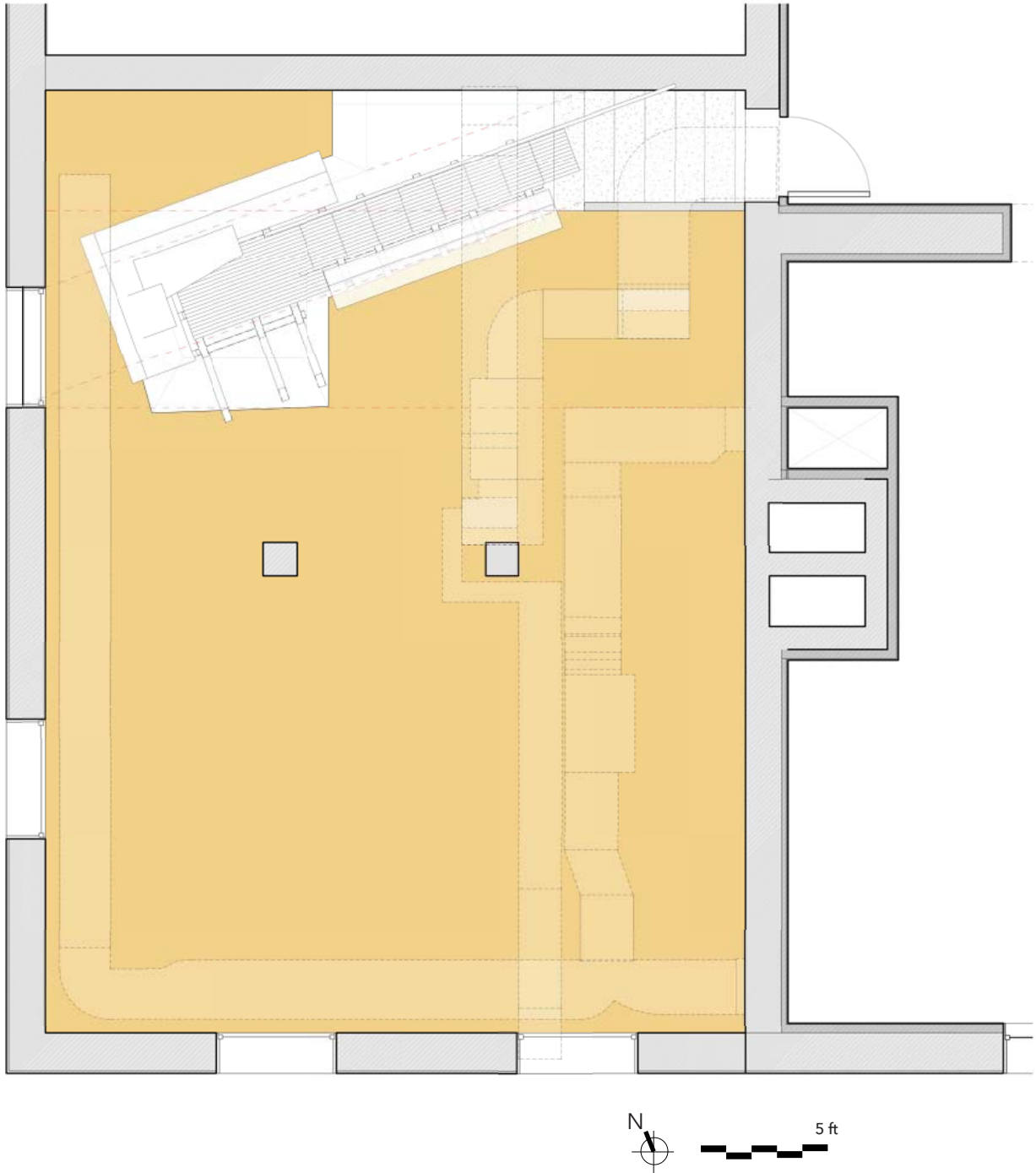


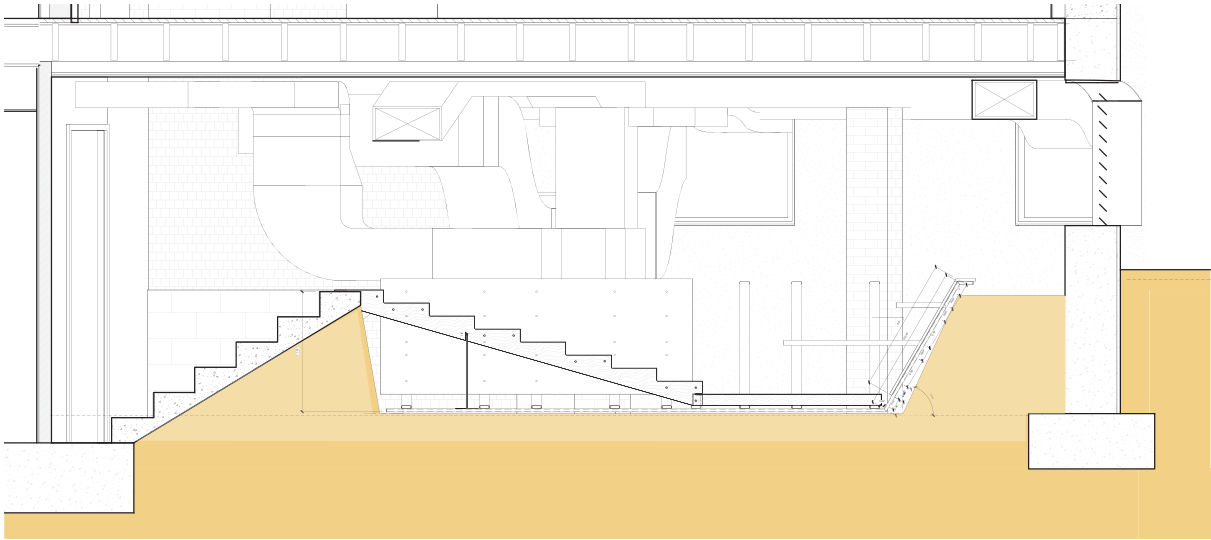


**118.1** Structural plan of 1x3" tube steel frame in the Crawl Space red dashed line indicates location of red nylon cord strung across the ceiling.

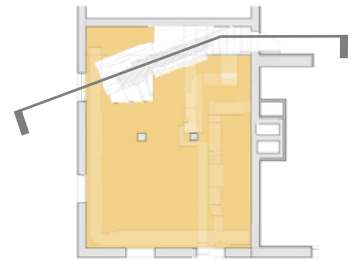


**119.1** Floor plan of the crawl place in the crawl space. 12 -2x10s bolted together make of the stairs and the floor. Tube steel cradles the wood stair and floor. plywood sheets attached to the steel frame creating a rigid structure. A long bench and a table that slides terminates the end of the constructed space. Beyond a louver that has been opened allows reflective light into the space creating a glow at the end of the path.

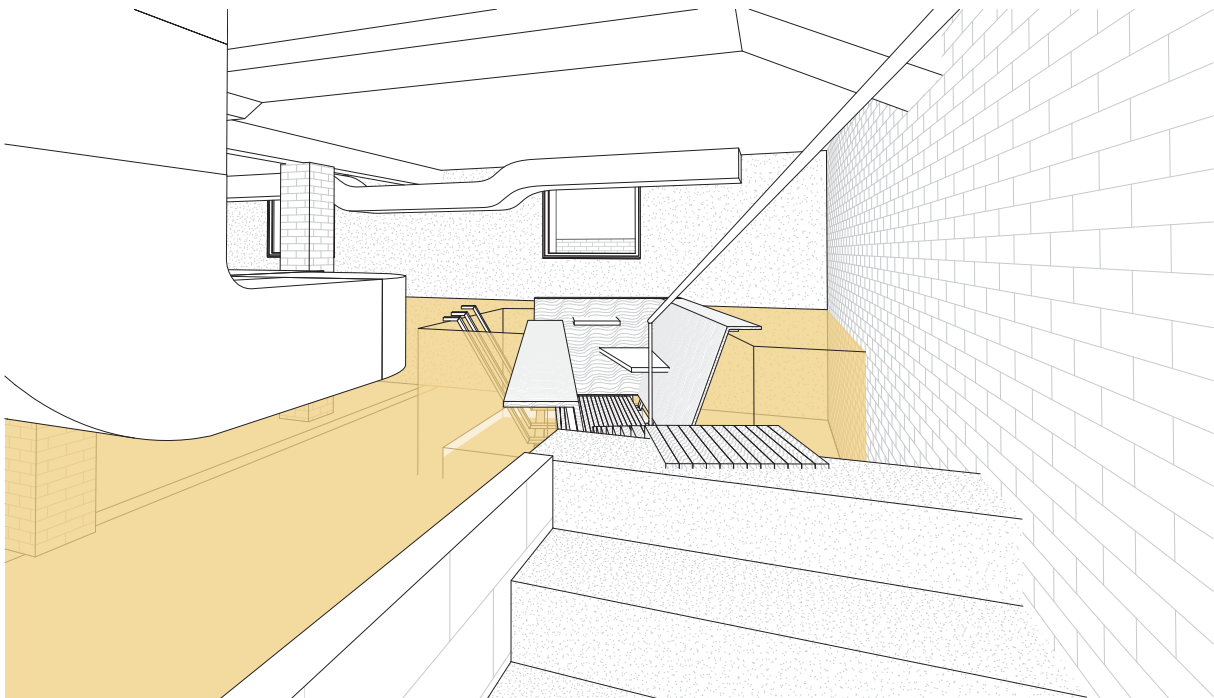


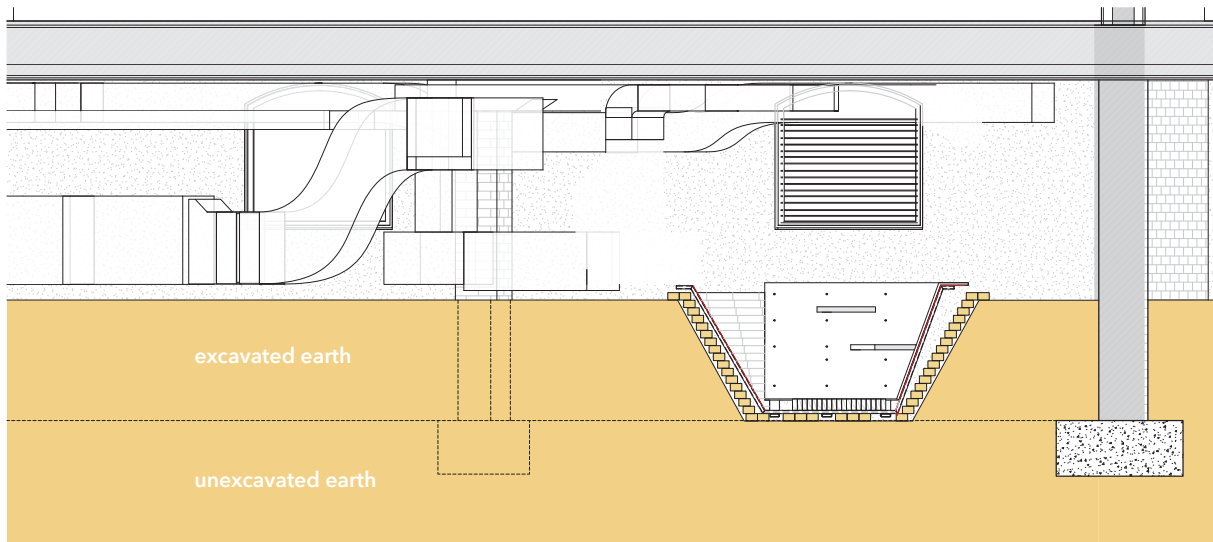


**104.2** Section looking south at two angles and joined at the juncture between the existing concrete stairs and the wood stairs. Section shows the quick rise and the slow descent into the crawl place.

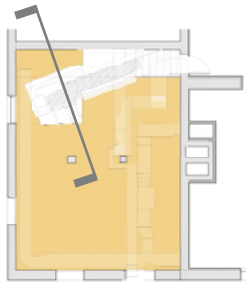


**104.2** View looking north west back from towards window louvers.

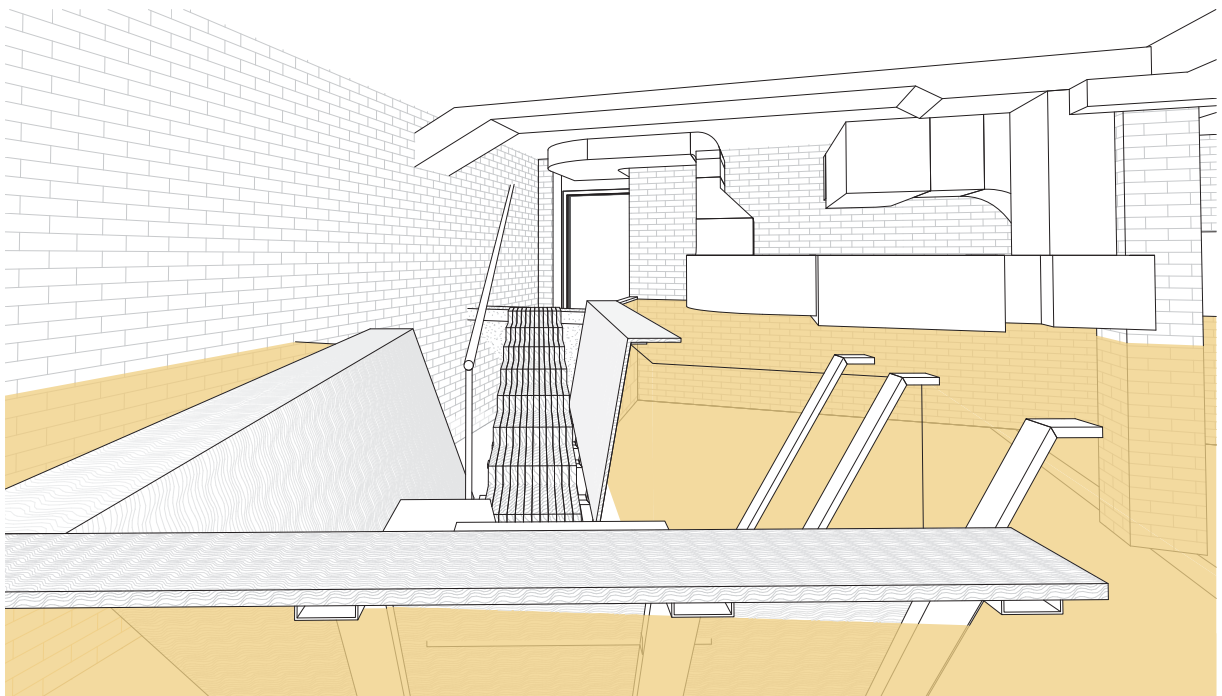




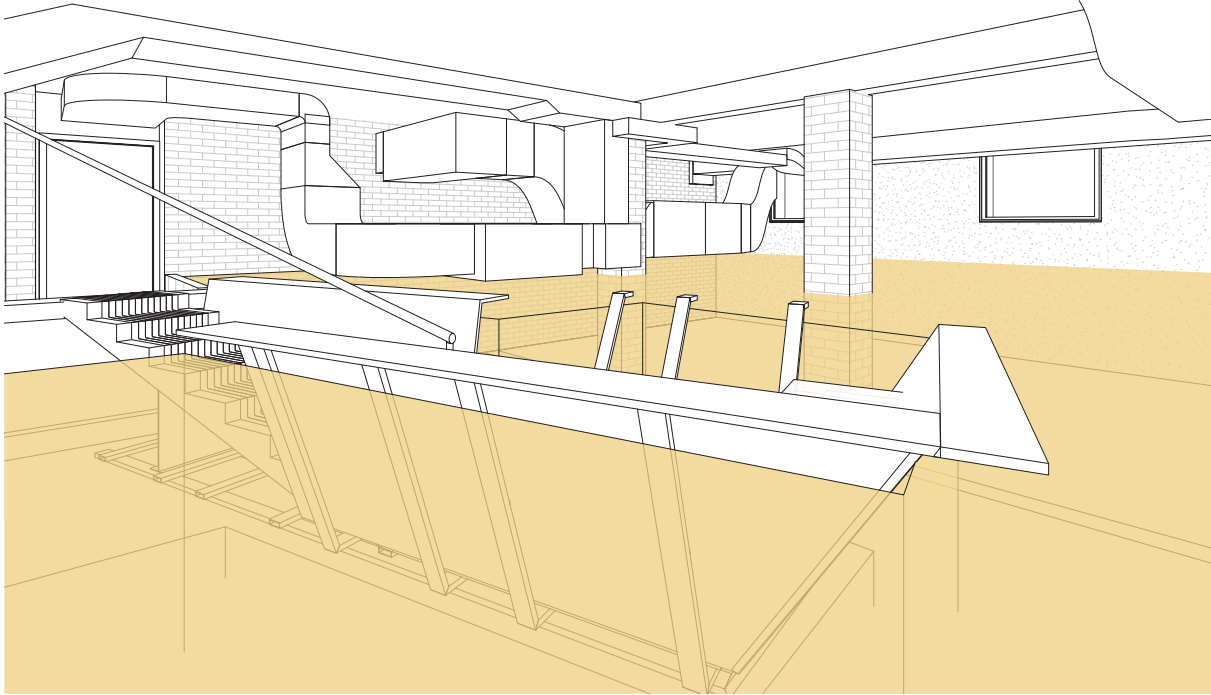
**121.2** Section looking west cut through the foundation level . The bench and table are in elevation. Bricks line the walls of repose of dirt. The steel frames rotate to account for the angle of repose to the body and to the dirt.



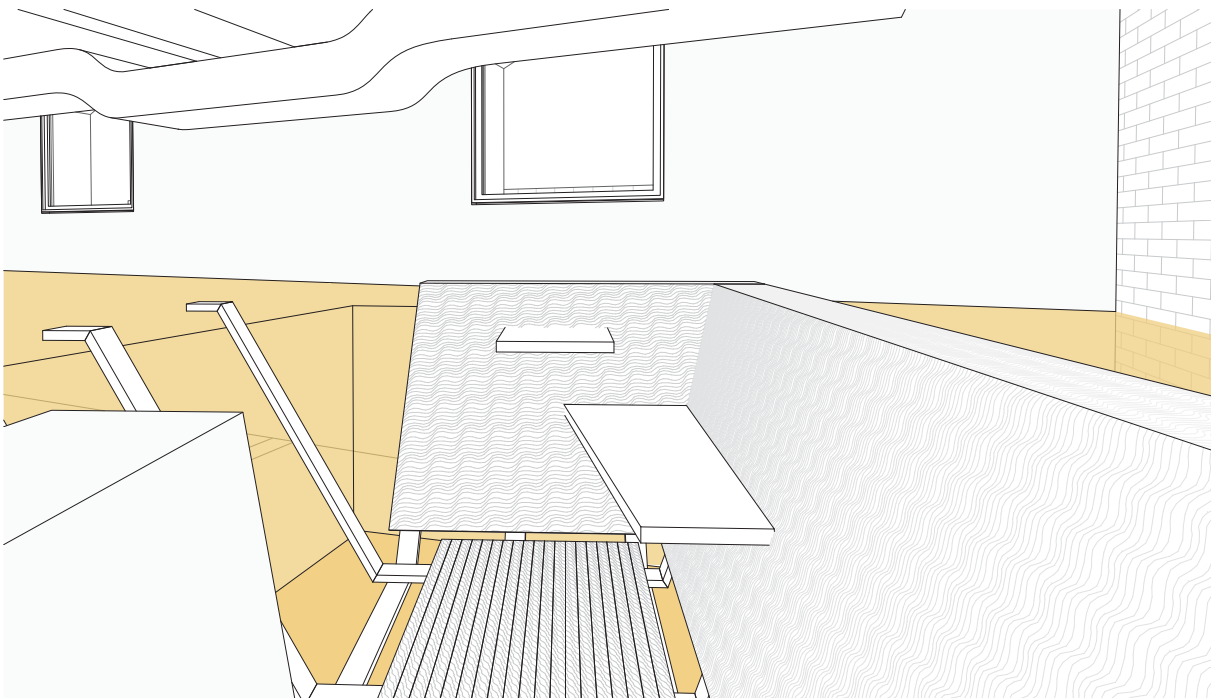
**121.2** View looking north east back to stairs and door leading back to the basement.



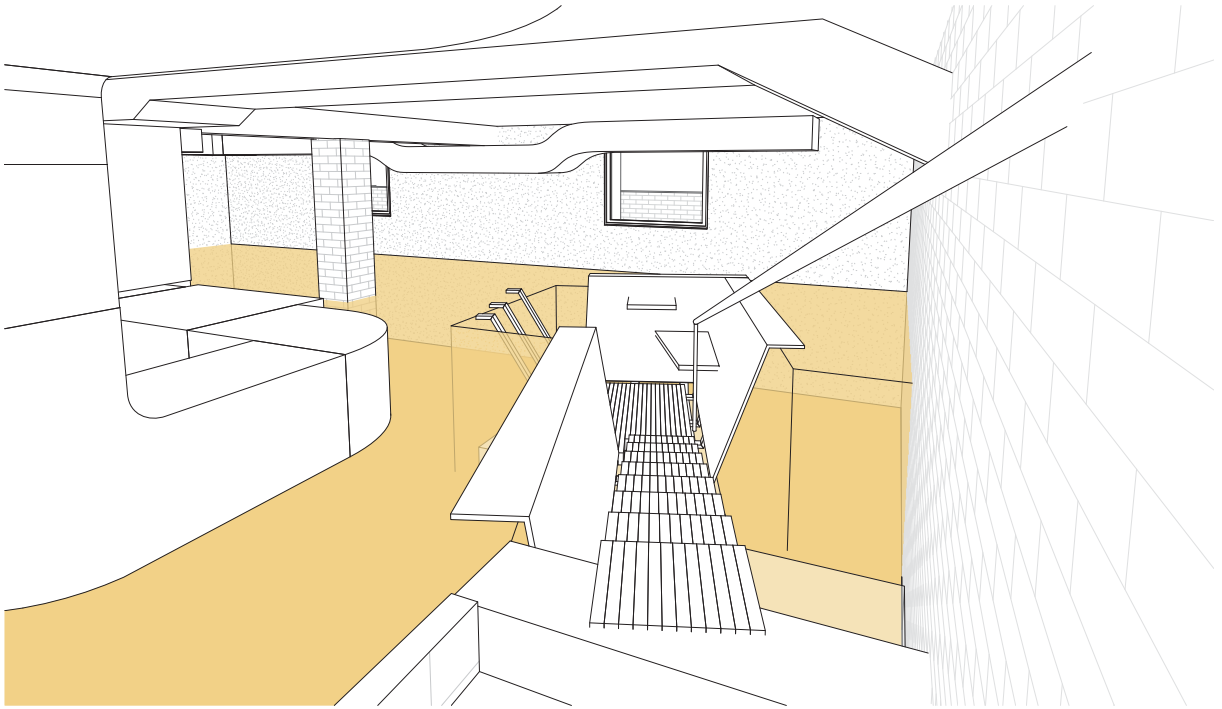




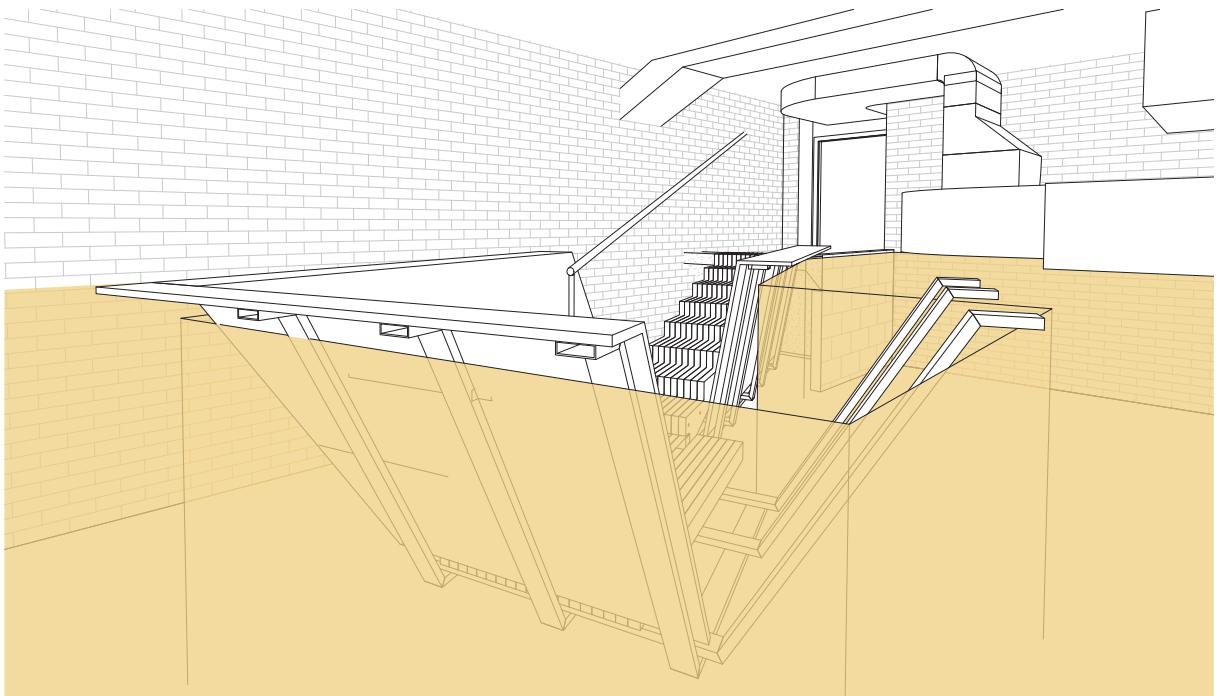
**122.1** View looking south from the far northwest corner of the crawl space. Dirt shown as transparent to show the depth of excavation.



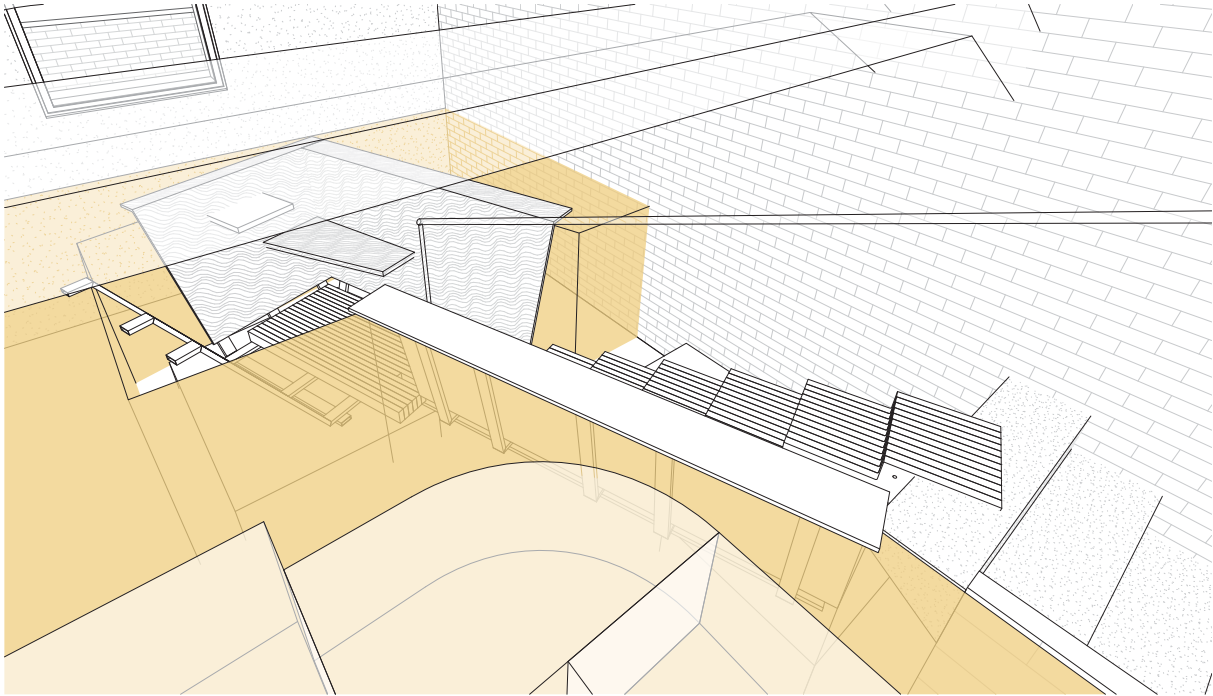
**122.2** View looking west towards the bench table, and louvers as one approaches the last step before meeting the foundation level.



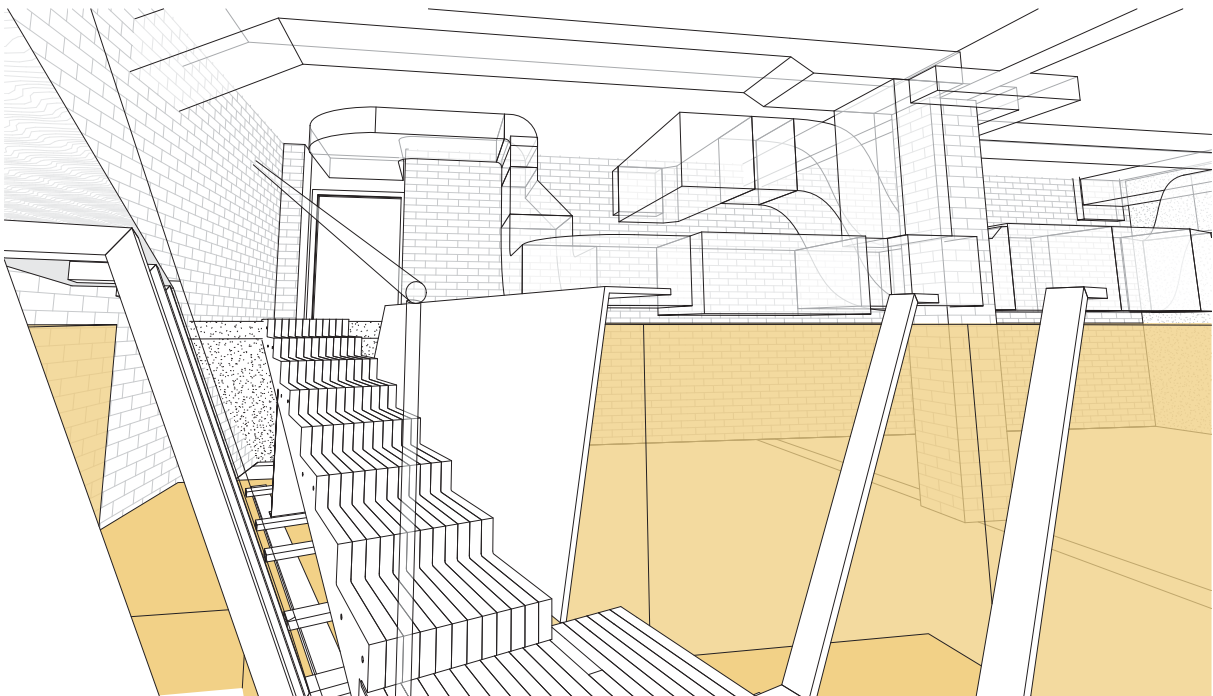
**123.1** View looking west into the crawl place from the third step up. Situated in the middle height between the basement and the crawl space.



**123.1** View looking northeast back from the window louvers to stairs and door to the basement.

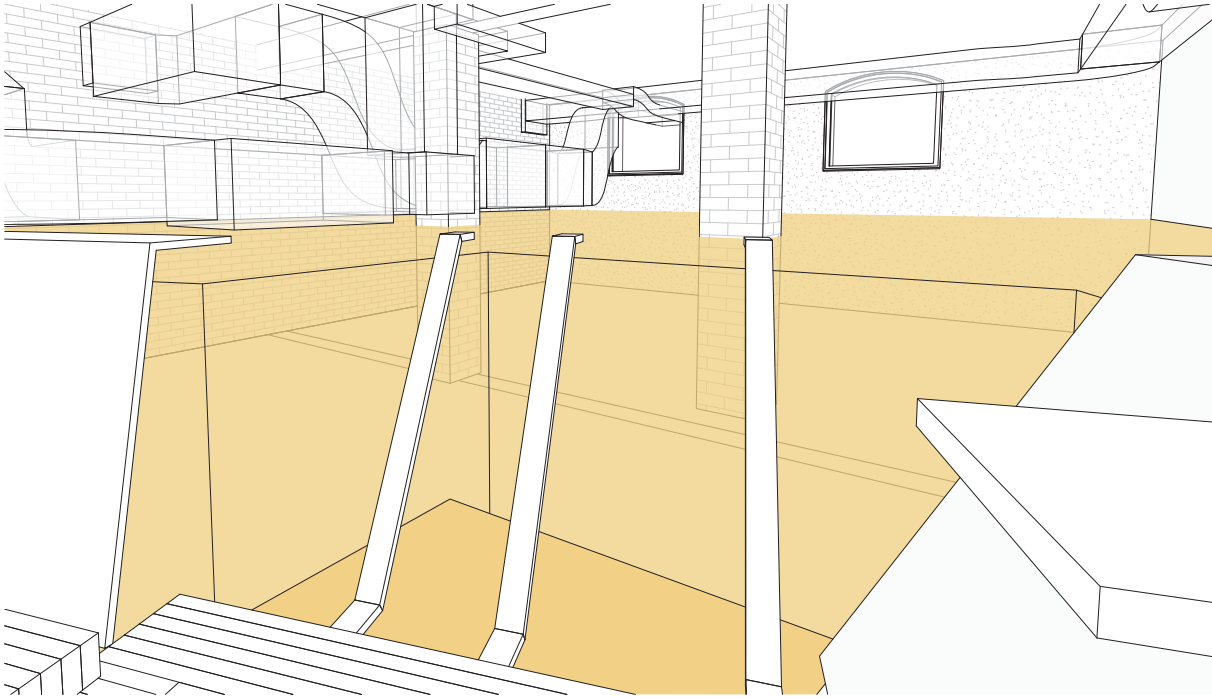


**124.2** Top view of the crawl place looking north west. The table, bench railing and foundation run along the same axis to continue the language of support.

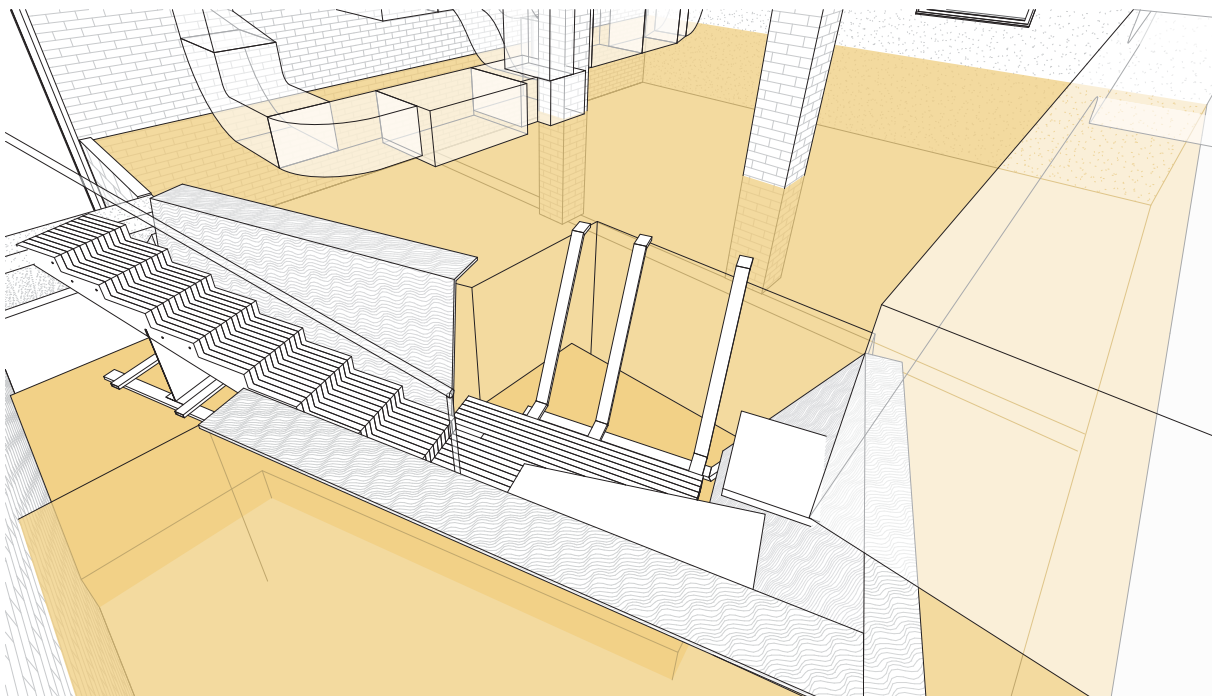


**d43** View from the crawl space bench looking back towards the door to the basement. The eye is submerged into the site with the top of the dirt as its horizon



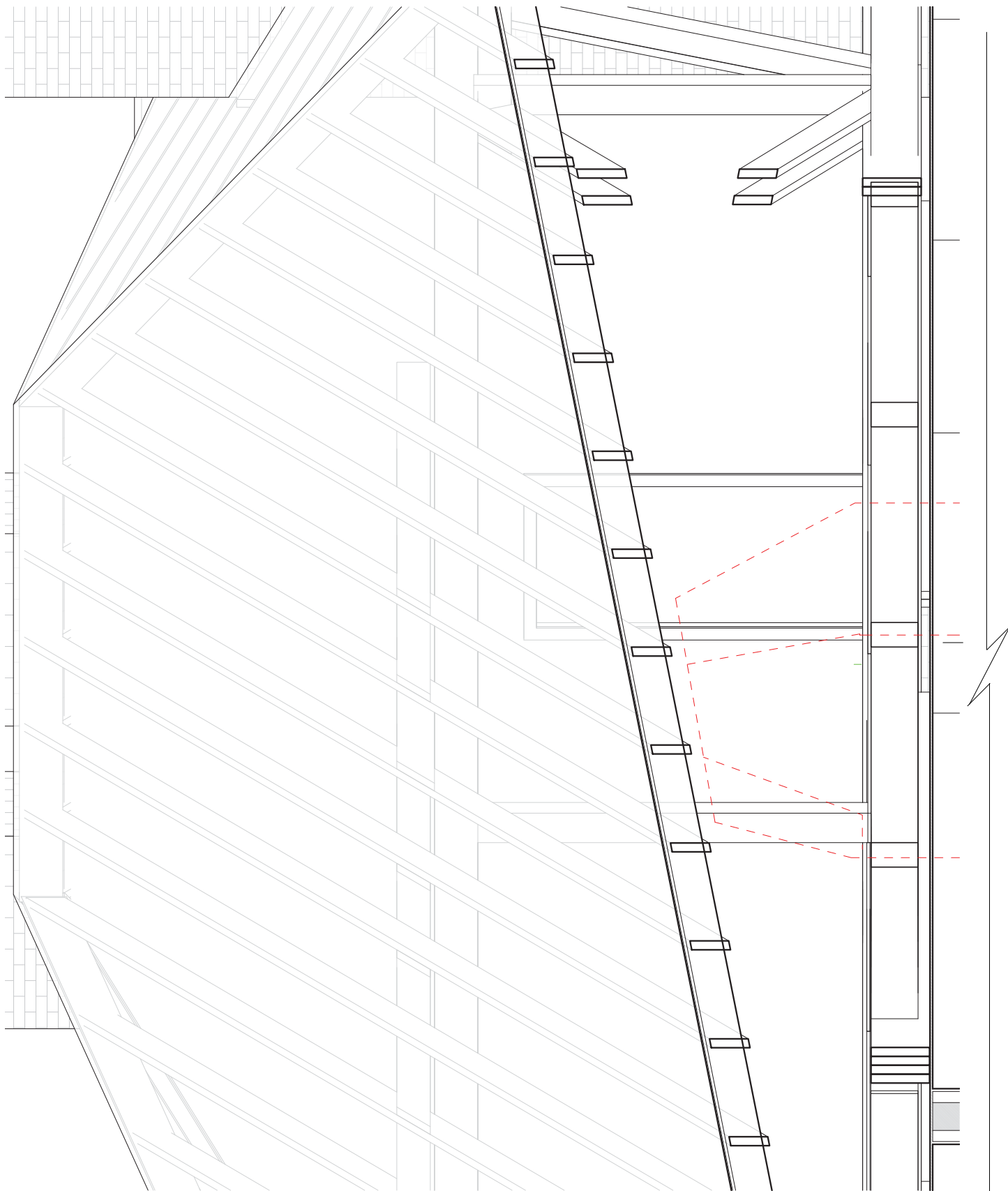


125.2 View from the crawl space bench looking south .

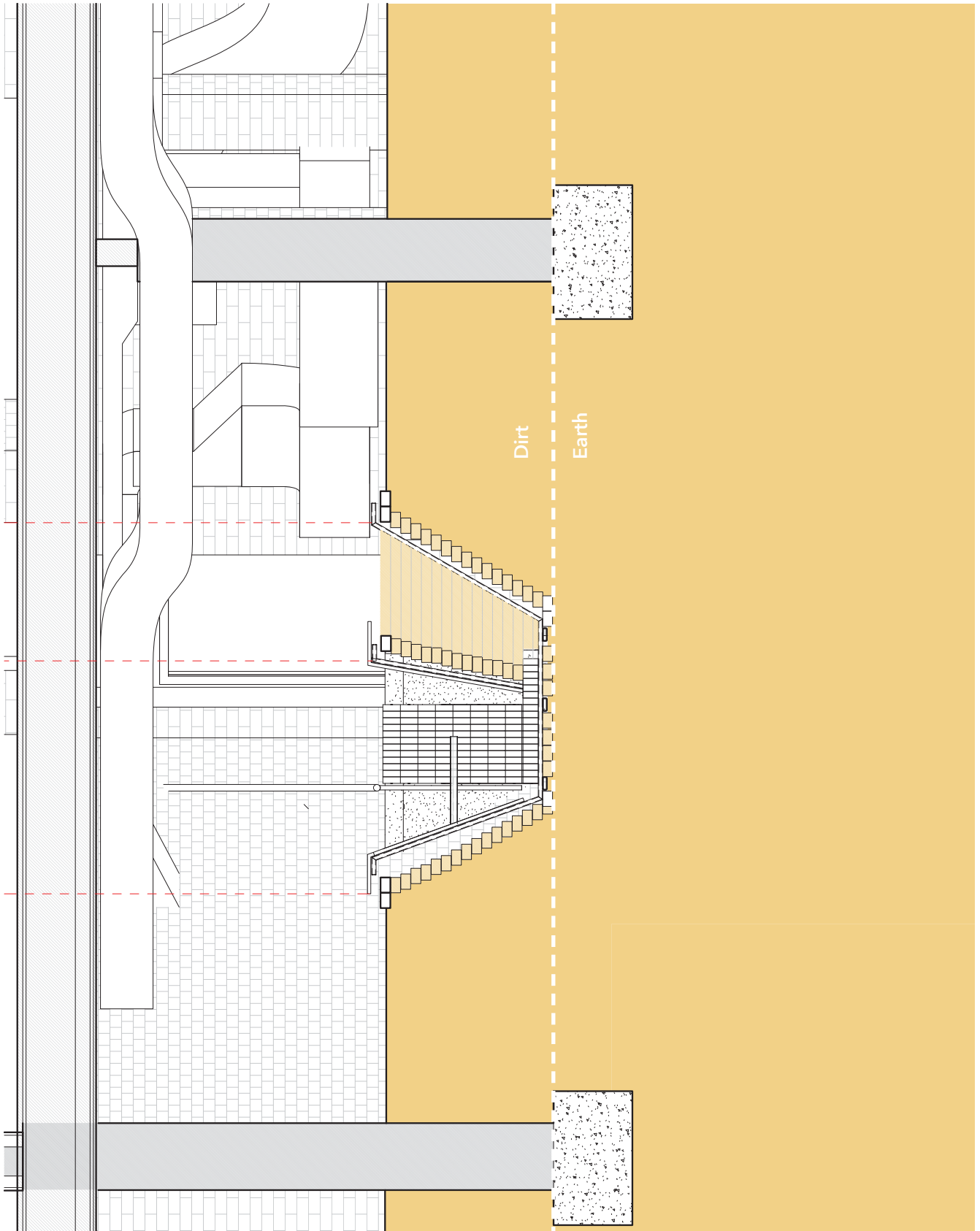


125.2 View from the north west corner of the crawl place looking south

SKY

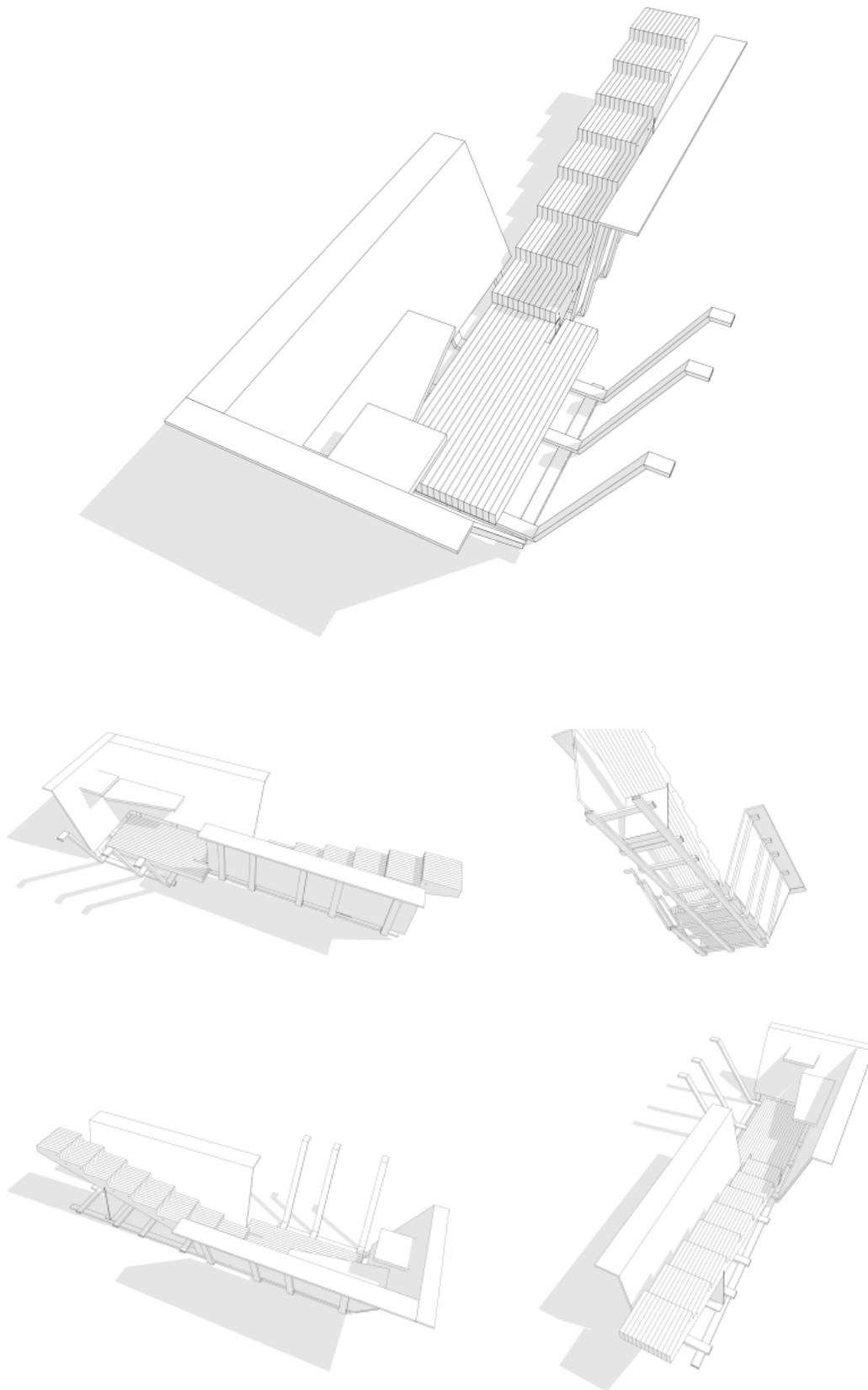


126.1 Section at attic with form of possible adaptation based on previous structure.

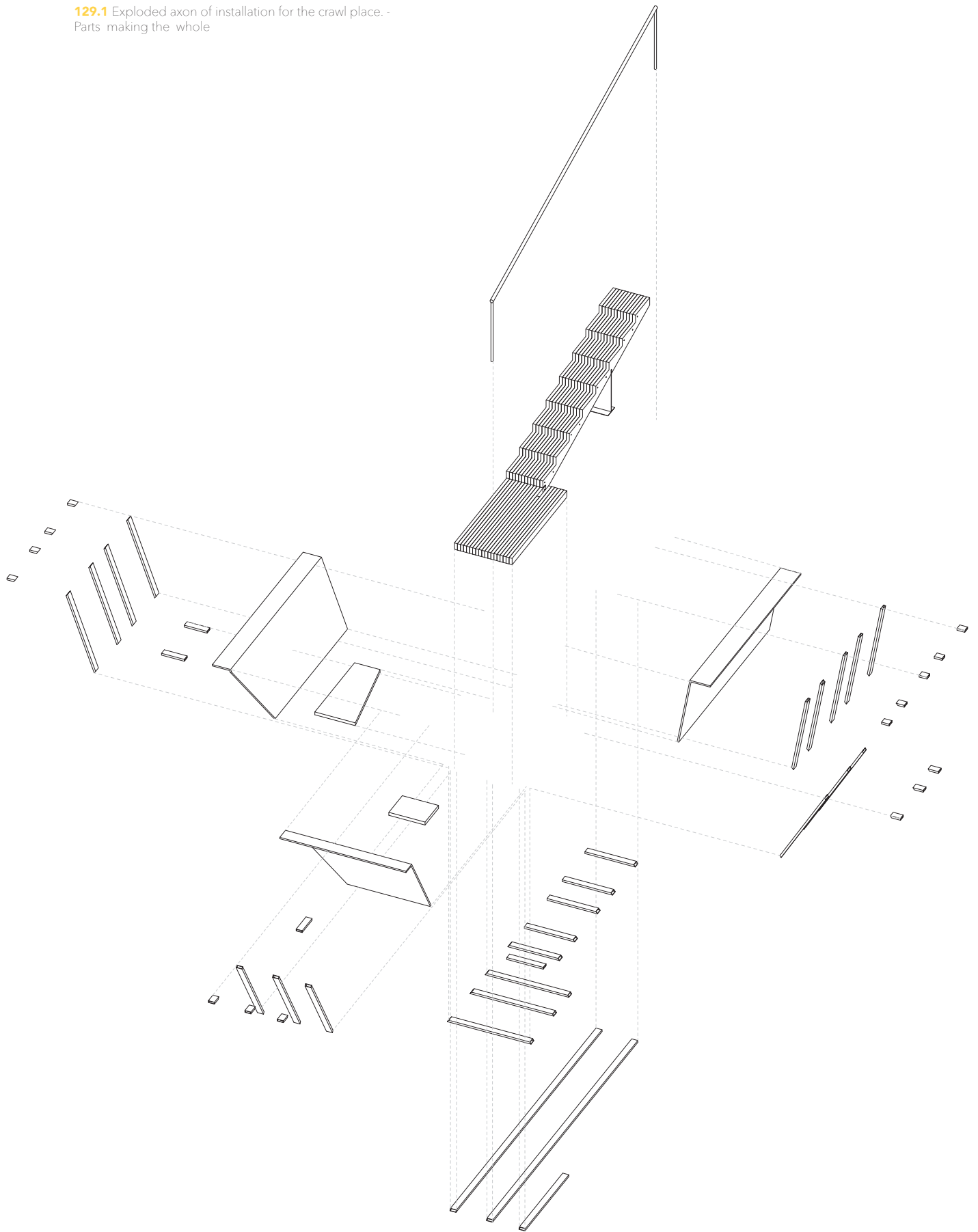


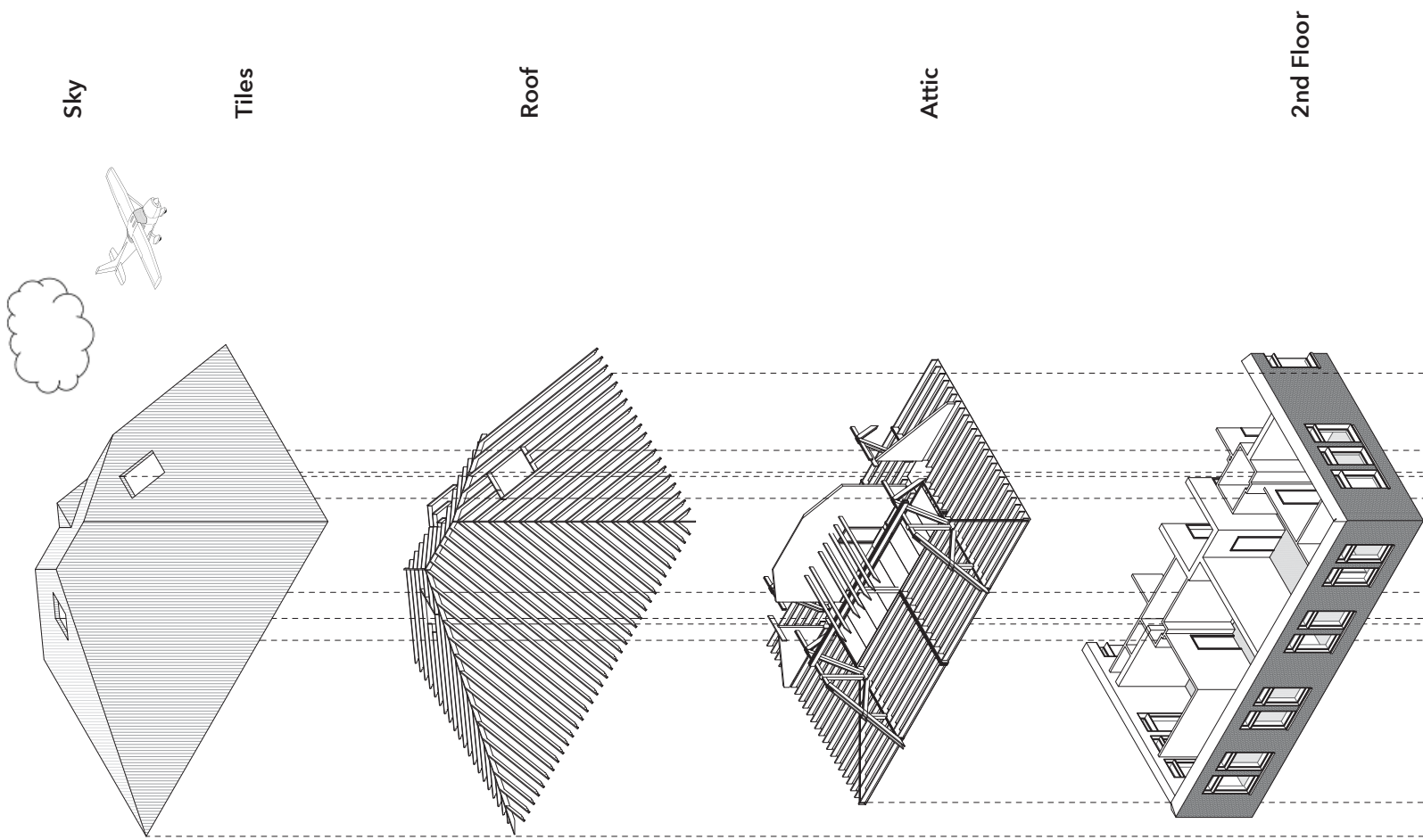


128.1 Axons of build structure without site

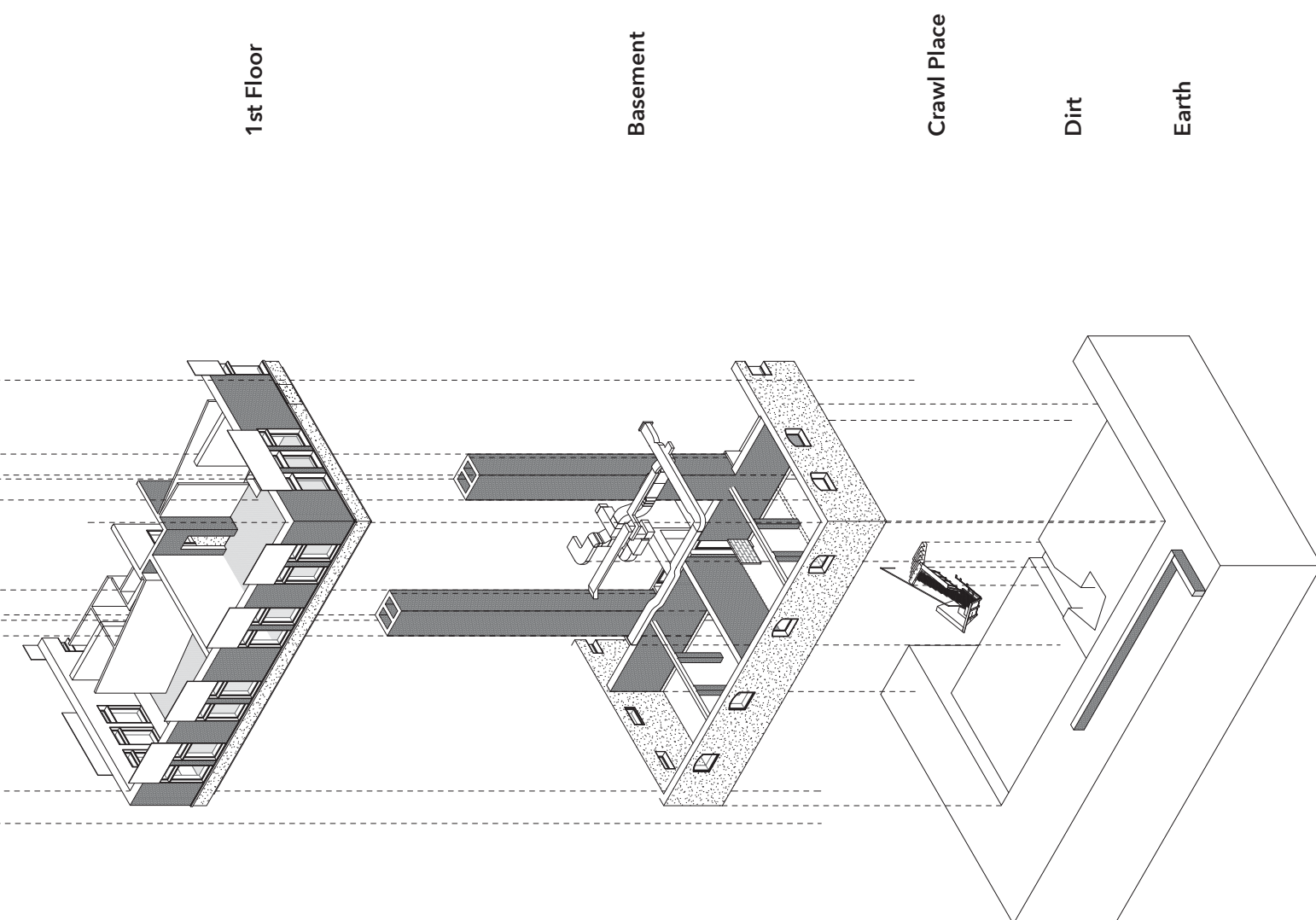


**129.1** Exploded axon of installation for the crawl place. -  
Parts making the whole



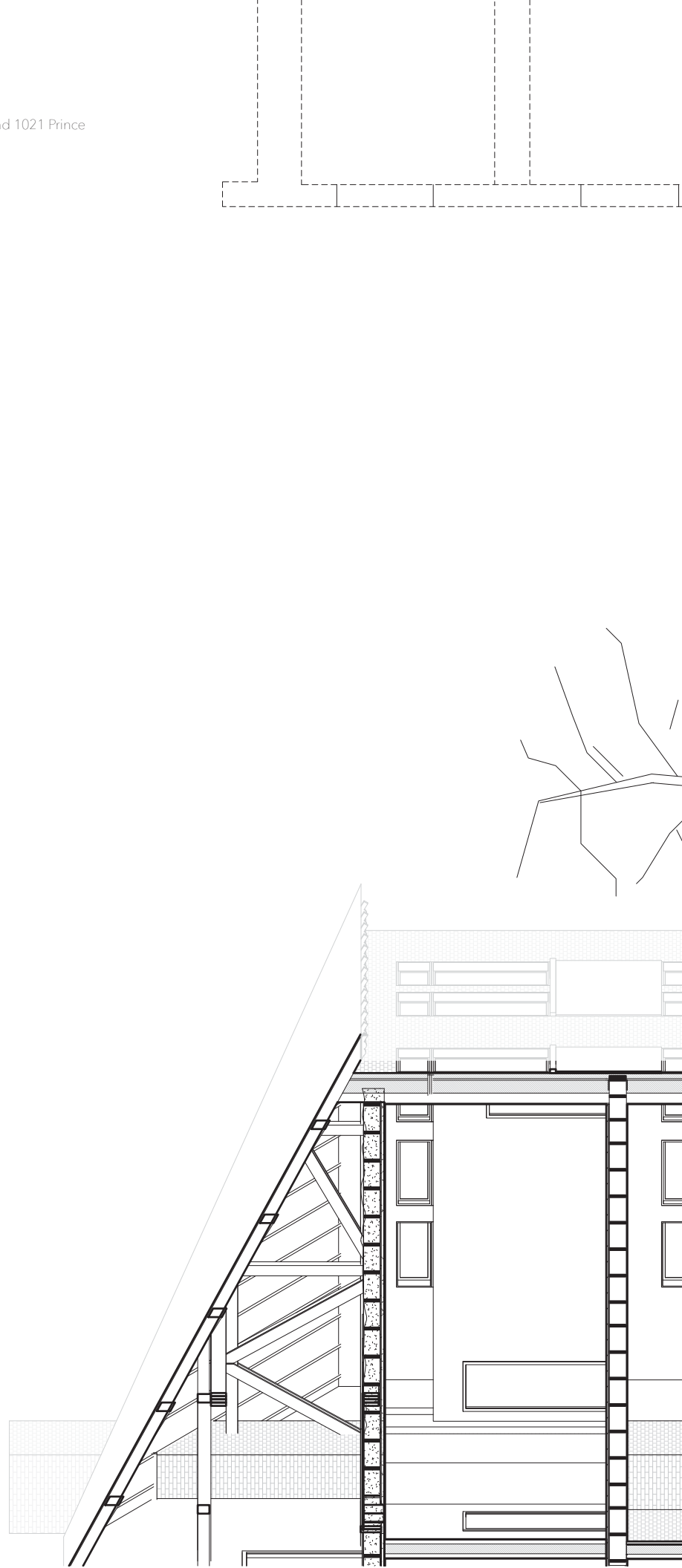


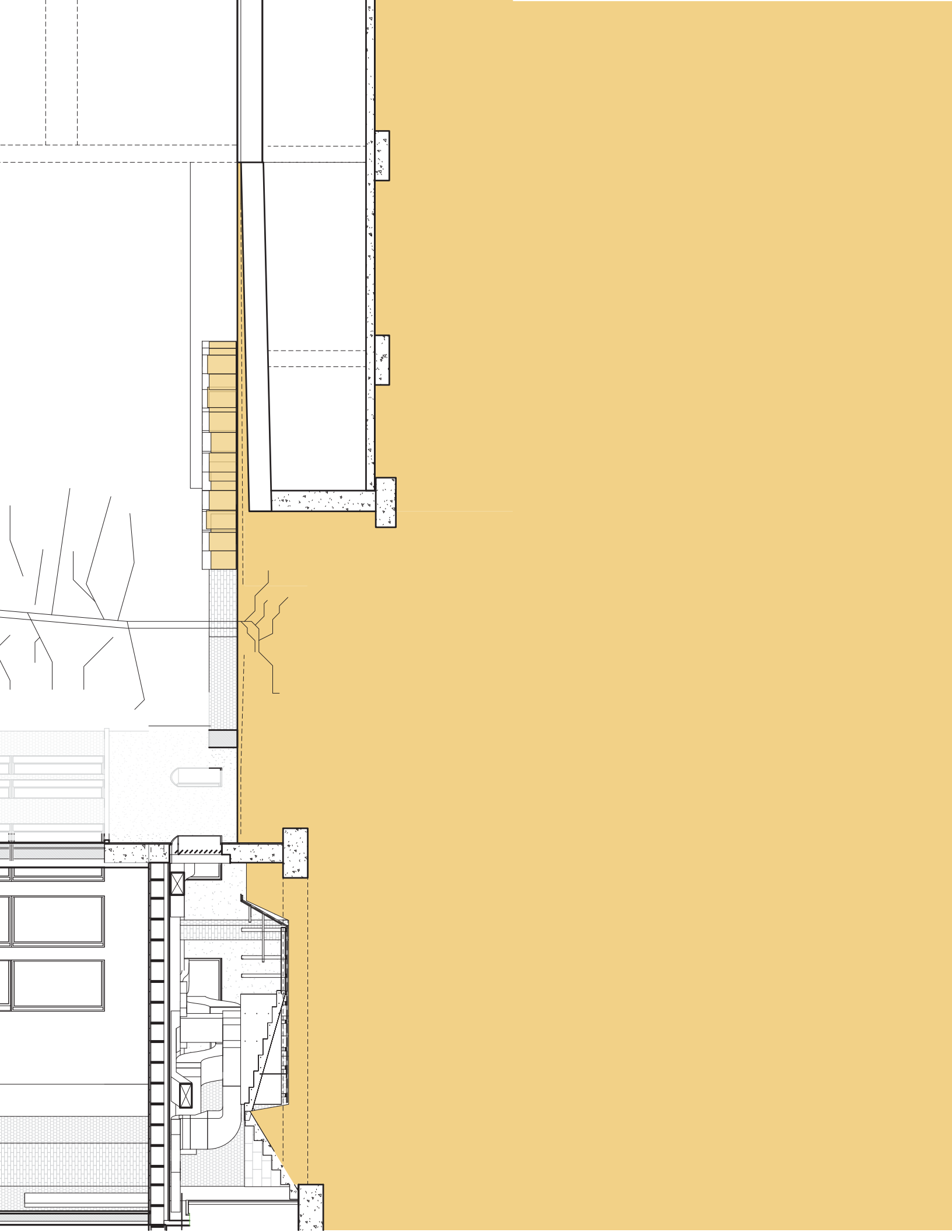




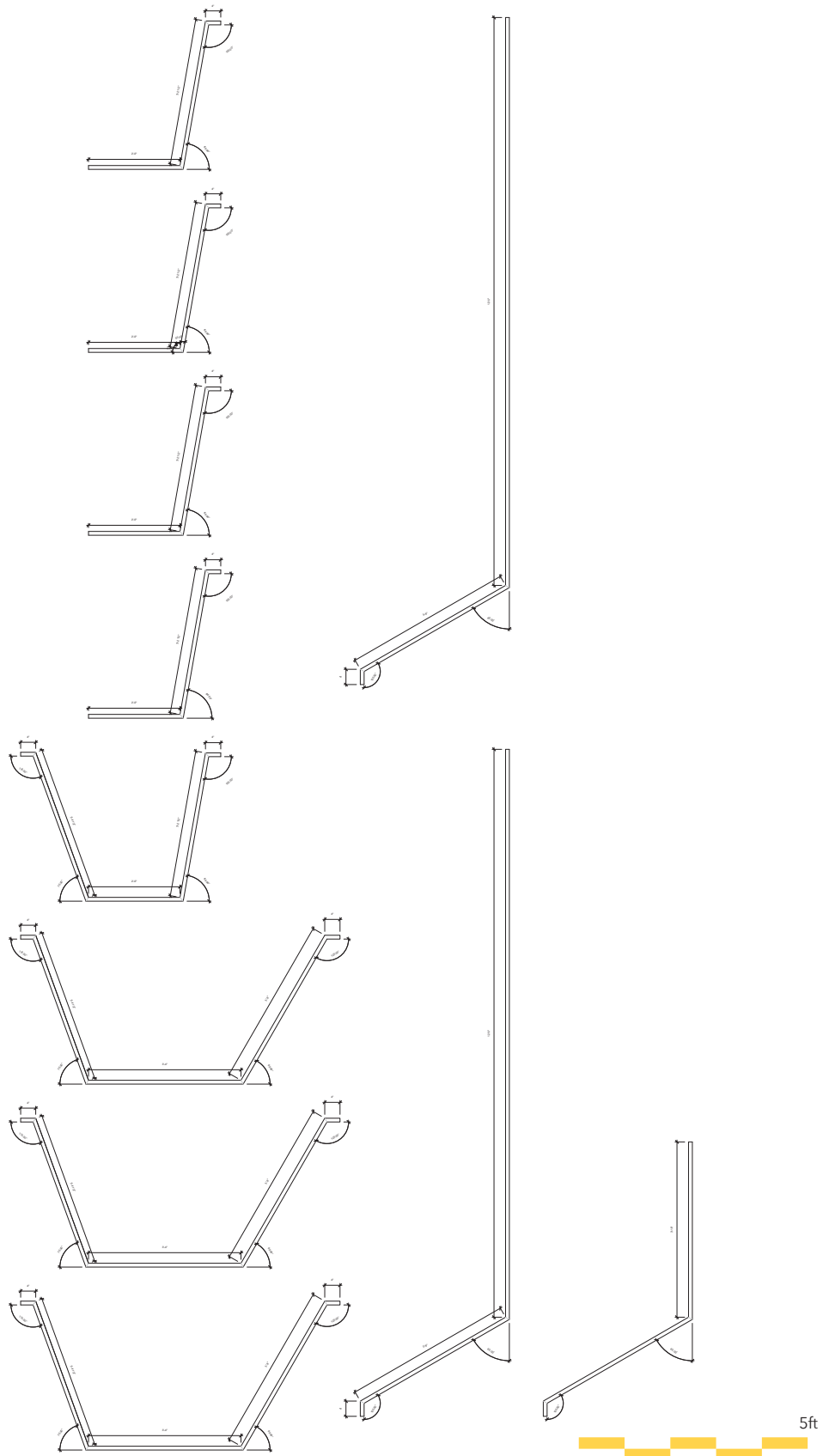
**131.1** Concept of vertical expansion. Exploded axon, How the interventions attic and crawl place fits into the whole.

**116.1** Site Section showing the basement spaces of 1001 and 1021 Prince Street.



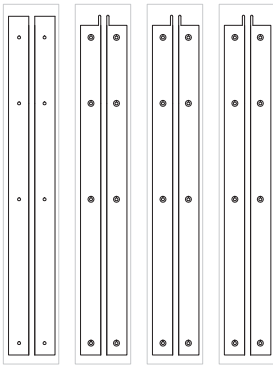
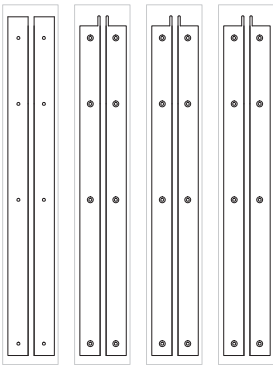
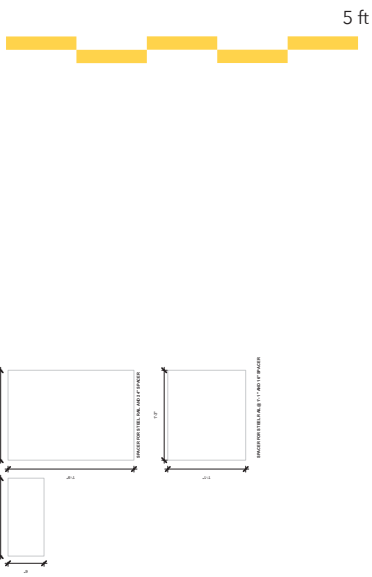
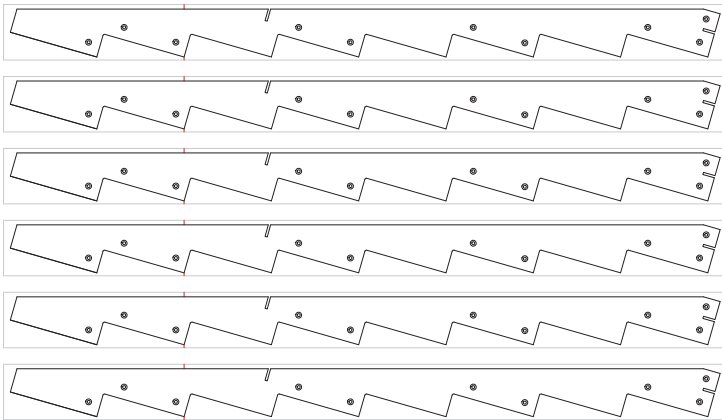
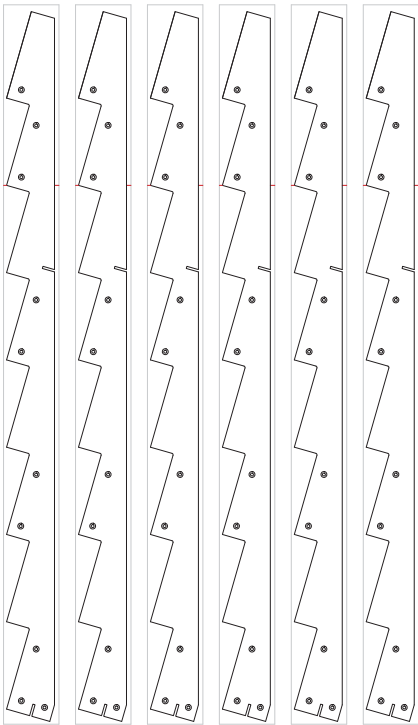
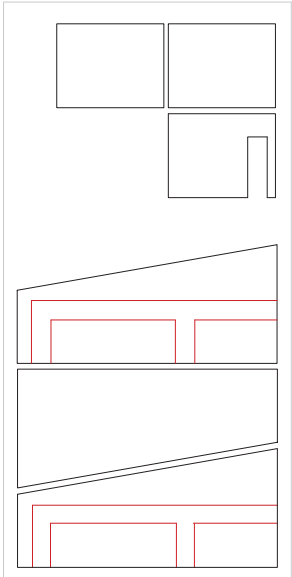
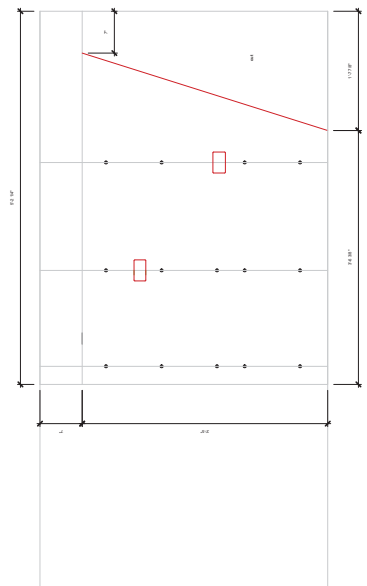
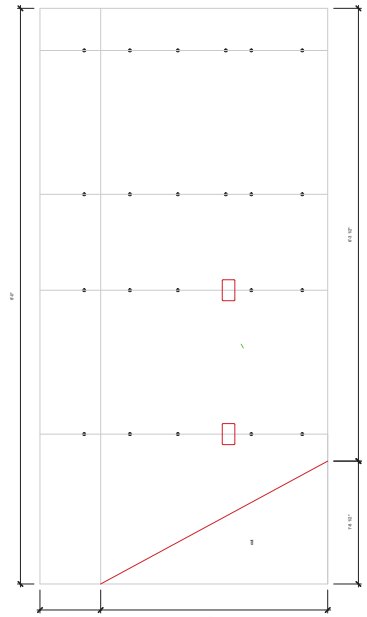
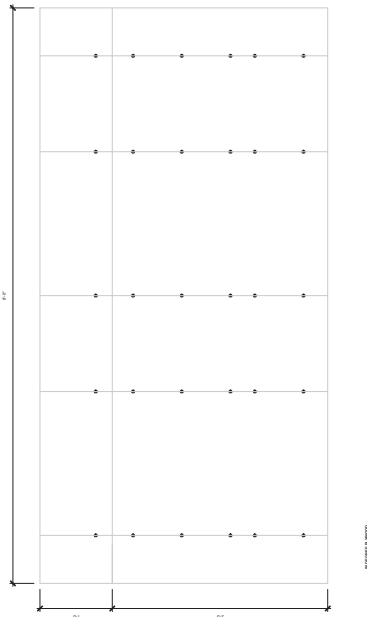






118.1 Construction drawing used for cutting and welding tube steel ribs

119.1 Computer numerical control files for plywood cuts for wall panels, table, bench, and jigs for construction





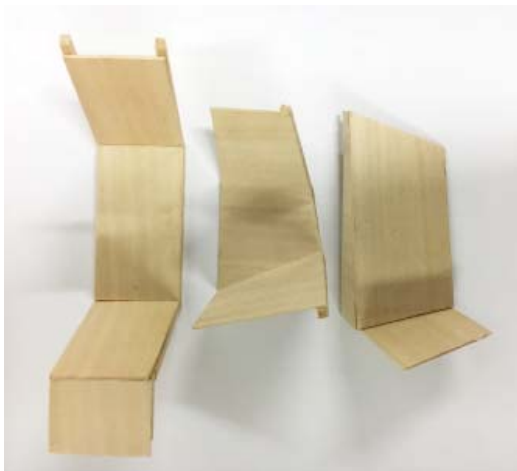


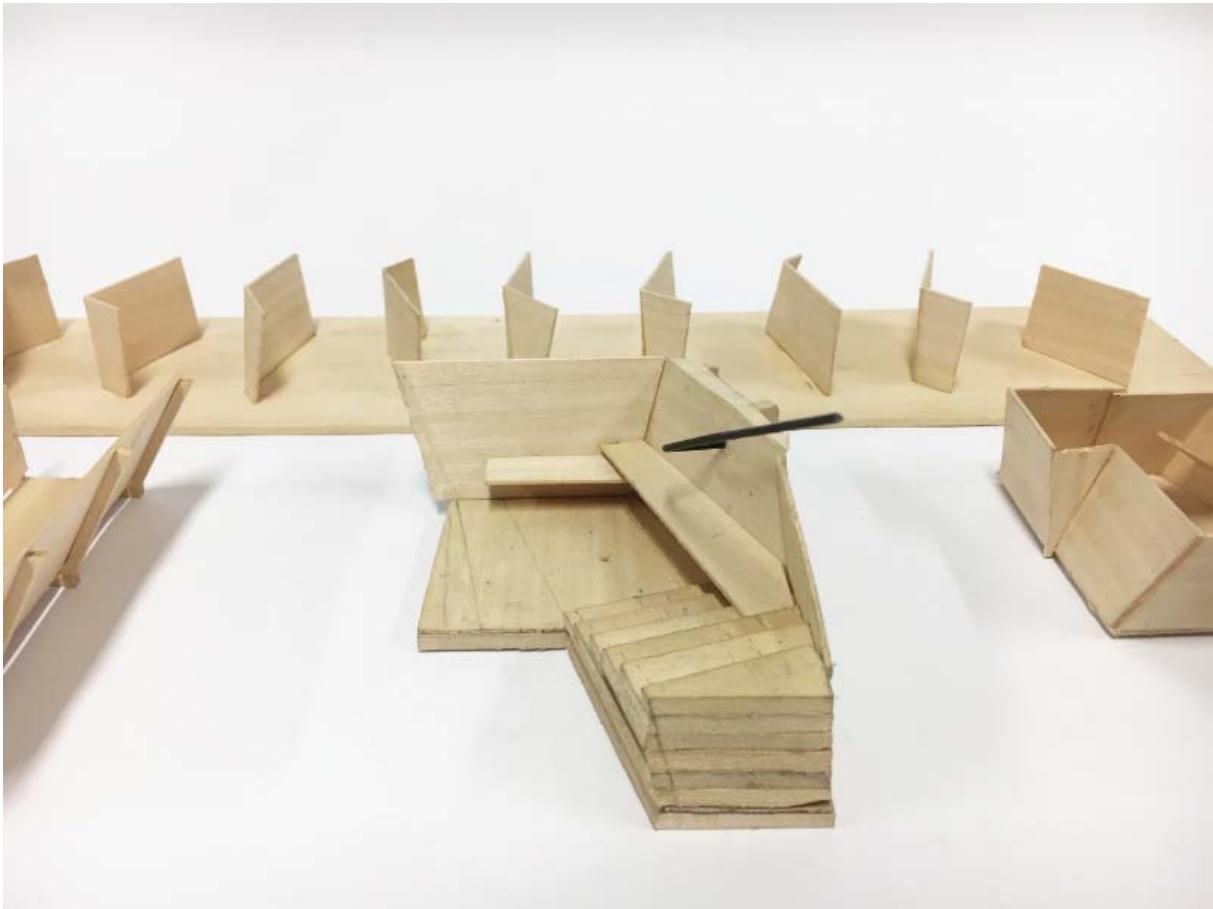


121.1 Hand tools utilized in constructing the crawl place



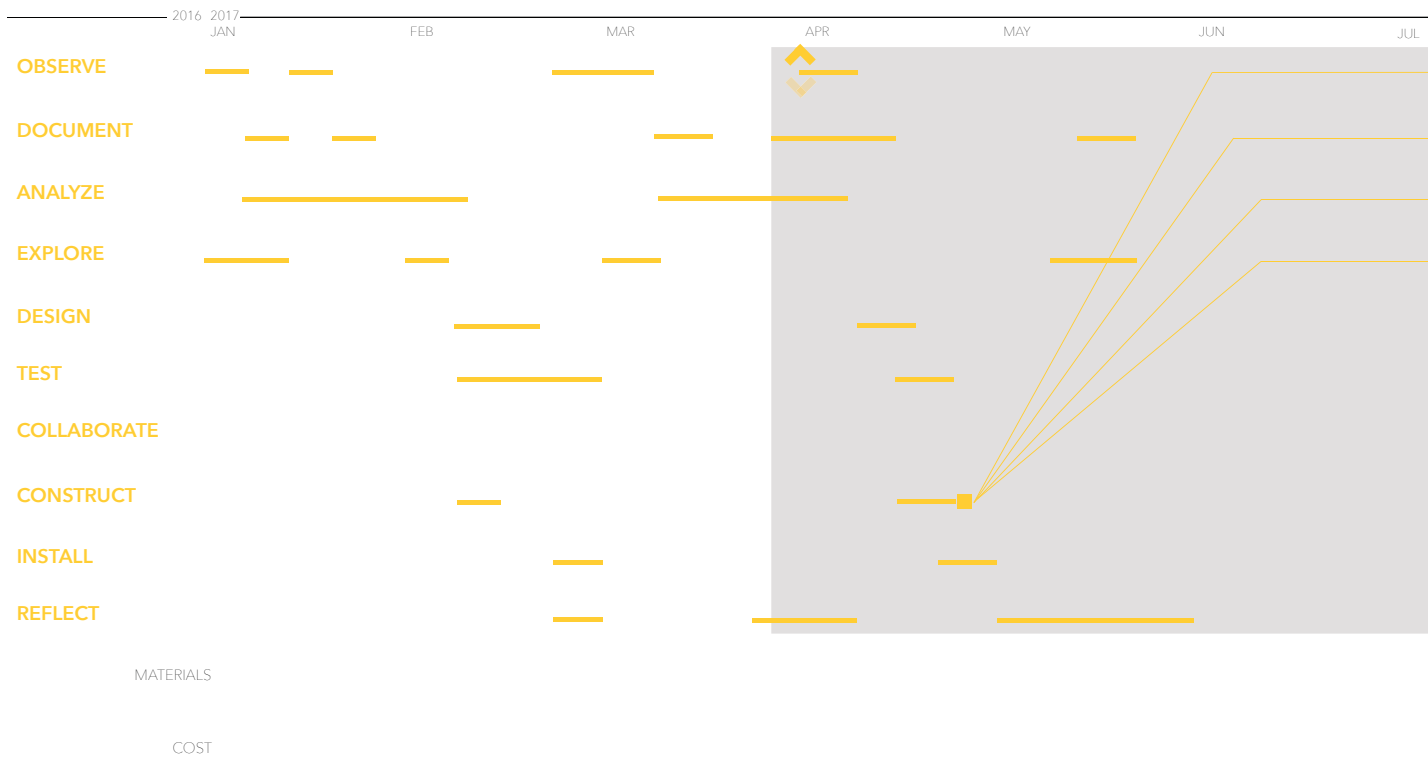
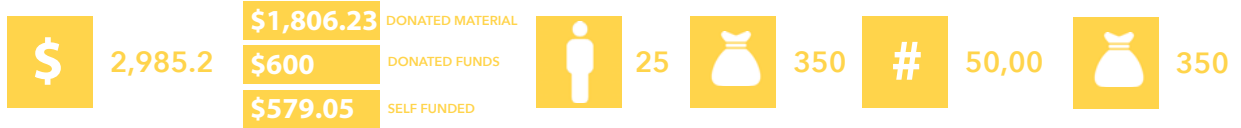
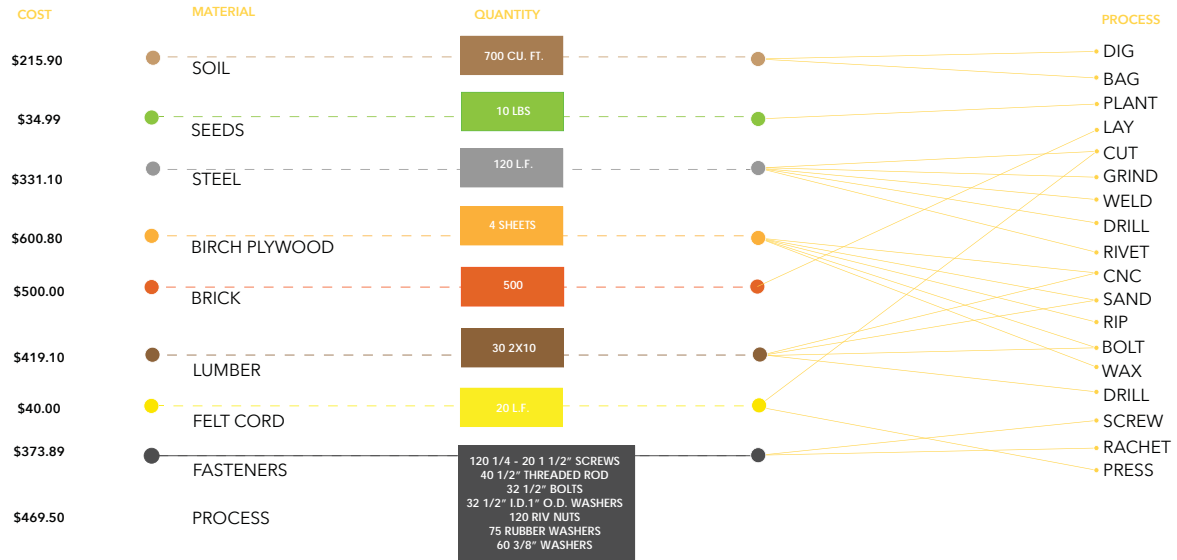
**121.2** Concept models of crawl place made of bass wood steel , lead and copper. Studies of folding a single sheet of wood to create unique interactions within the space created.







## 127.2 Material labor cost and processes diagrams

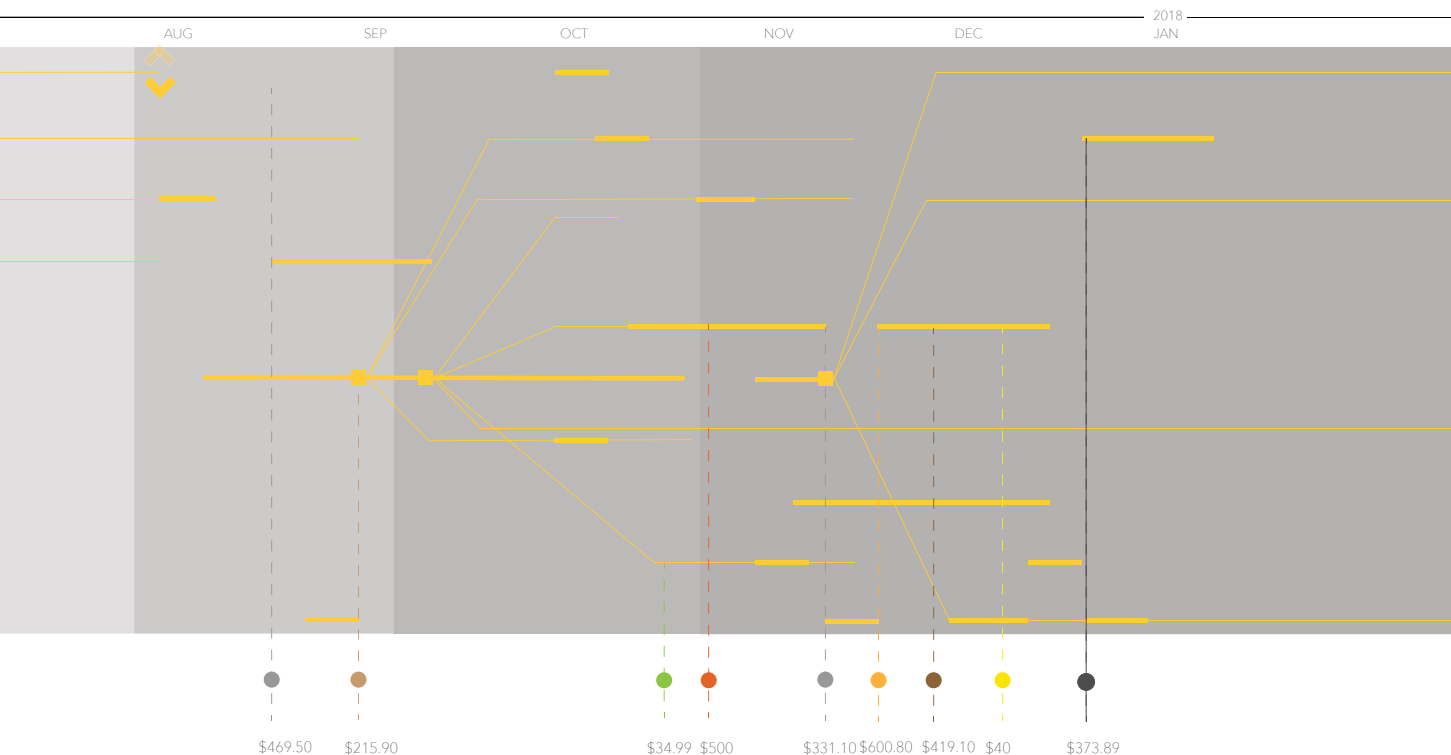


124-125.1 Gantt Chart - Conceptual time-line of process moments reflections and iterations in the process broken into categories found in educational design build.

## Materials, Specifications, Cost and Procurement

Tæc^läæ	Üä:'	Ü'æjæc'	Ö(•c)^Wäc	Ö•cä(æc^äÖ(•c	Ö(•c	Ü'f&^	Tæc^läæ+Væll'K æ&c'æiÖ(•c	Tæc^läæ
<b>FRAME</b>								
Tube Steel	1"x 3" 14 GA x 24	1	\$42.30	\$42.30	ÄIGÉHt	DD-paid-cc	Missco, INC	\$42.30 STEEL
Tube Steel	1"x 3" 14 GA x 24	6	\$42.30	\$253.80	ÄGHEIE	DD-paid-cc 11-18	Missco, INC	\$253.80 STEEL
1"Dia. Sch 40 approx .133	1" Dia x 0.133 x 21'-0"	1	\$35.00	\$35.00	ÄHIEDE	DD CC paid		\$35.00 STEEL
<b>Öæ•c)^N</b>								
FEĞÄVBI^äâ^äÜ(äâ	FEĞÄcFFcHÄ	FF		ÄFFIEHt	ÄFFIEHt	Öj(æc^ä	Üj(cStä^N	\$116.33 HARDWARE
FEĞÄYæ•Ö(•N	FEĞÄäæ•Ö(•N	ID	BÉFI	ÄIEID	ÄIEID	Öj(æc^ä	Üj(cStä^N	\$6.50 HARDWARE
FEĞÄD'c	FEÇ	ID	BÉFI	ÄIEID	ÄIEID	Öj(æc^ä	Üj(cStä^N	\$6.60 HARDWARE
Aluminum Rivit Nut 1/4-20	Alum 1/4-20	4	\$12.80	\$51.20	ÄIFÉGE	WAAC ORDERED	Mc Master Carr	\$51.20 HARDWARE
Machine Screw 1/4-20 x 1 3/4"	1/4-20 x 1 3/4"	4	\$6.56	\$26.24	ÄGIEGI	WAAC ORDERED	Mc Master Carr	\$26.24 HARDWARE
Silicone Rubber Washers	1/4"	3	\$14.70	\$44.10	ÄIIEFD	WAAC ORDERED	Mc Master Carr	\$44.10 HARDWARE
Misc. Hardware 12/12/17					ÄFIEGI	DD Paid CC	Ace	\$15.96 HARDWARE
Misc. hardware 12/11/17					ÄJIEII	DD Paid CC	Ace	\$98.55 HARDWARE
Misc Hardware 12/11/17					ÄIEII	DD Paid CC	Ace	\$8.47 HARDWARE
<b>UOVOTEVOUQ</b>								
Uæjääæ•	FGÄcFIæcGGÄ	HID	ÄBÉII	ÄFIEID	ÄFIEID	Öj(æcä)jEQÜOÖ	Öäc[-CE^cæjääæ	\$157.50 SANDBAGS
<b>ÜPOÖI</b>								
Ü'j(äÉÖä&@Ü@jÖ(äâ^	ilcJÄ	FD		ÄIBDEIB	ÄIBDEIE	Öj(æc^ä	Üj(cStä^N	\$600.80 PLYWOOD
<b>Brick</b>								
2 Pallets Delivered; estiated cost	2 pallets, 1000 bricks		\$250/ea	\$500.00	ÄIBD	Donated		\$500 BRICK
<b>Lumber</b>								
2"x10"x10'	1.5x 9.25x10'	30	\$13.97	\$419.10	ÄIFJÉFD	Donated	TW Perry - Jose Valencia	\$419.10 LUMBER
<b>INCIDENTALS</b>								
Steel Plumb bobs	8 oz.	6	\$5.98	\$35.88	ÄHIEII	DD-paid-cc	Lowes 09-24-2017	\$35.88 MISC + process
Nylon Paracord	50'-0"	5	\$7.97	\$39.85	ÄHJIEII	DD-paid-cc	Lowes 09-24-2017	\$39.85 MISC + process
Screw Eye Hooks	3/8"- 40	2	\$4.45	\$8.90	ÄIEJD	DD-paid-cc	Lowes 09-24-2017	\$8.90 MISC + process
Structocast Line		1	\$2.98	\$2.98	ÄGÉII	DD-paid-cc	Lowes 09-24-2017	\$2.98 MISC + process
Tax Lowes 9-24-2017					ÄIEGI	DD-paid-cc	Lowes 09-24-2017	\$5.26 MISC + process
Lowes Order					ÄJIEDE	DD-paid-cc	WHO PAID?	\$97.00 MISC + process
Concrete								
Concrete Forms								
McMaster Carr	P3272396	\$107.94			ÄFDIEJI	WAAC		\$107.94 MISC + process
McMaster Carr	P3270414	\$38.93			ÄHIEJH	WAAC		\$38.93 MISC + process
McMaster Felt	P3298506	\$40.00			ÄIDÉDE	WAAC		\$40.00 Felt
Crimson Clover Cover Crop	10 lbs		34.99	\$34.99	ÄHIEJU	DD-paid-cc	Handcock seeds10/23/2017	\$34.99 Seeds
Volenteer Refreshments			95		ÄJIEII	DD-paid-cc	Harris Teetters 10/07/2017	\$97.76 MISC + process
- Routine, Organic Matter, Soluble Salts		2	\$16.00	\$32.00	ÄHGÉE	DD-paid -check	VT Soil Testing Laboratory	\$32.00 Soil + Sandbags
Soil Testing- Particle Size Analysis		2	\$13.20	\$26.40	ÄGIEID	WAAC	VT Soil Testing Laboratory- Julie Burger- PO P3291599	\$26.40 Soil + Sandbags
Fabric Samples					ÄHIEDE	DD-Paid	Basement Fabrics	\$35.00 MISC + process
					ÄGÉIIIEGI			\$2,985.26

127.2 Budget for final craw space construction.






---

citizen **PLANT** site  
towards an architectural education

Collaborating with landscape architecture faculty, Nate Heavers and Paul Kelsch and students, Alex Darr and Alex Schiavoni, we researched possible uses for removed/bagged excavated dirt. The approximately 350 sandbags filled with dirt were transported through the crawl space hatch and aligned across the courtyard to create a place for future growth. More than 800 acorns were planted into the soil after a week of incubation to promote growth. Crimson clover was seeded to act as a cover crop releasing nutrients such as nitrogen and organic matter.

---

### *Excavated Dirt Analysis*

#### *Particle Size*

Lab Depth	TOP01 0'-12"	3FT01 3'-0"
%VCS	1.8	0.1
%CS	3.2	0.3
%MS	6.3	0.8
%FS	6.2	2.2
%VFS	5.8	4.1
%CSI	6.4	8.6
%MSI	31.5	40.7
%FSI	12.4	14.7
<b>Total % Sand</b>	<b>23.2</b>	<b>7.5</b>
<b>Total % Silt</b>	<b>50.3</b>	<b>64.0</b>
<b>Total % Clay</b>	<b>26.5</b>	<b>28.5</b>
<b>Textural Class</b>	<b>SIL</b>	<b>SICL</b>

### *Concept Process*

#### ***Phase I: Fall 2017***

Visualize aerating  
Cultivating  
Temporary

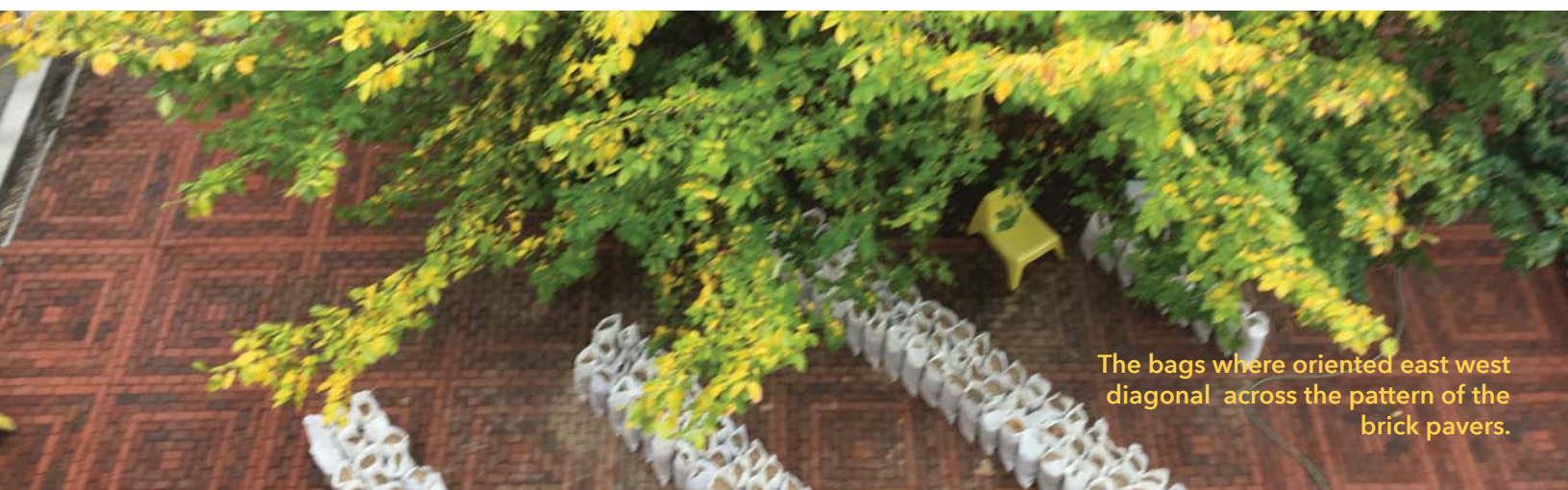
#### ***Phase II : Spring 2018***

Construct  
Infiltrate  
Regenerate





Dirt from the Excavation was watered and seeded.

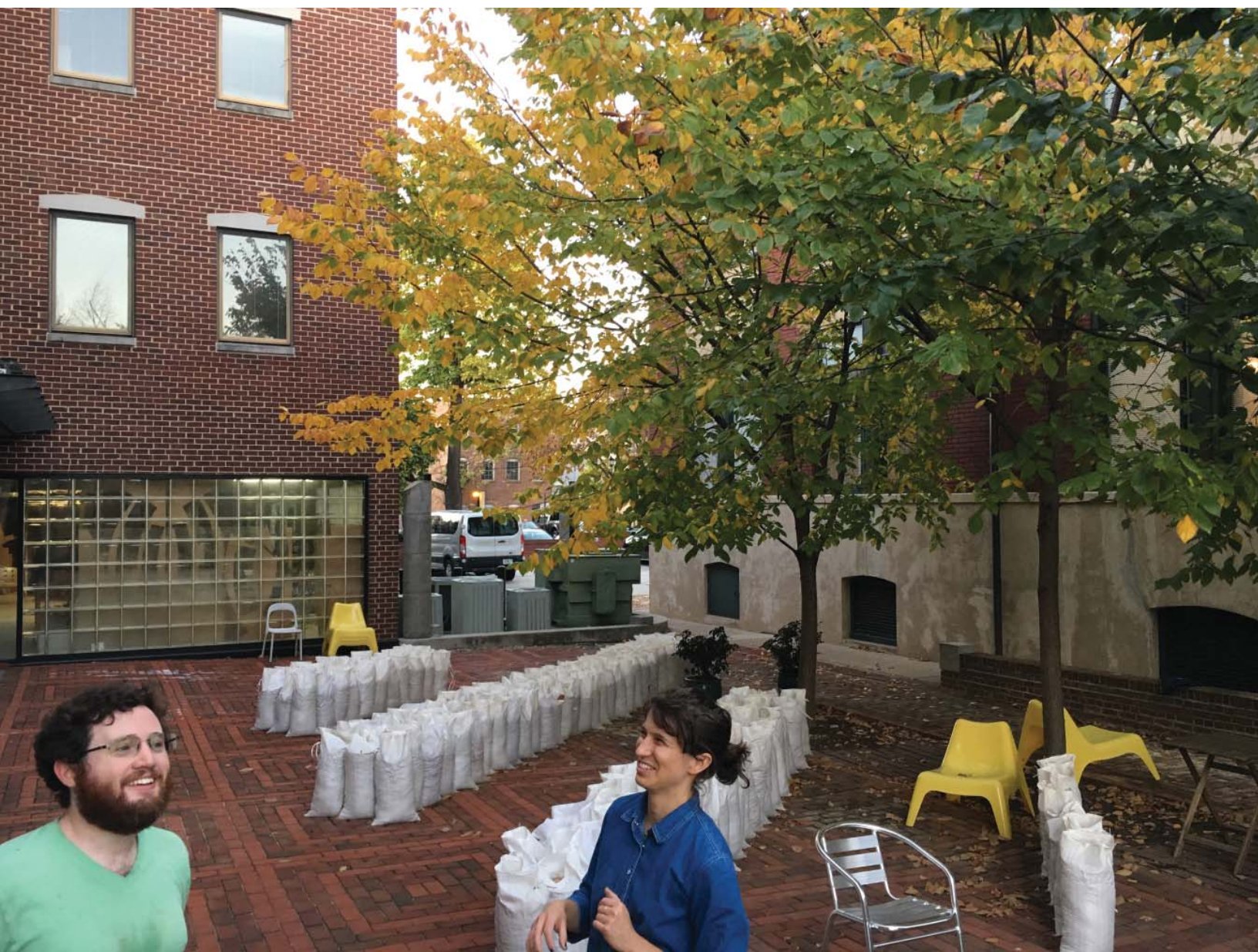


The bags were oriented east west diagonal across the pattern of the brick pavers.









Angles of Bags: line of sun rotating into the crawl space from the louvered window. Creating pockets of intimate space within a larger dooryard.







133.1 Photo colleague of the final excavation of the crawl place



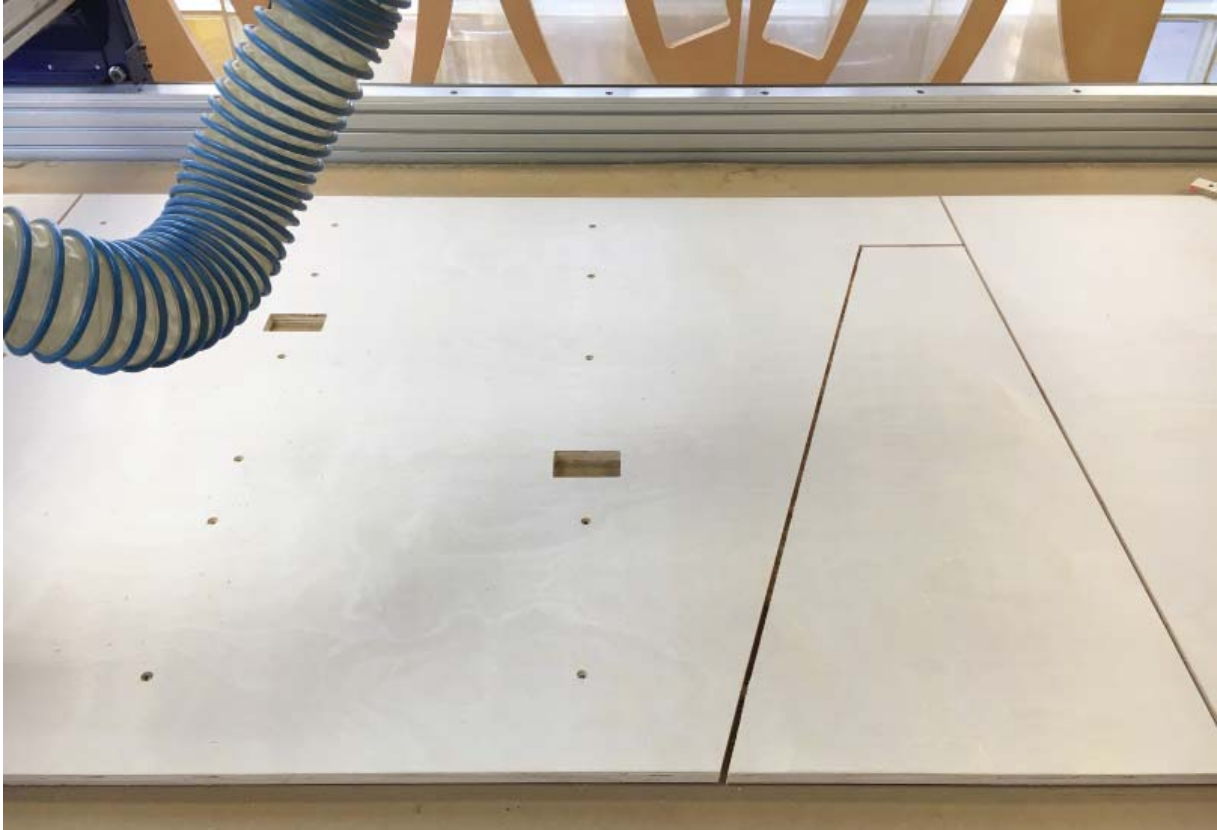
132.1 Welded joints of tube steel for construction



132.1 Fabricating and assembling simultaneously a dry fit of the steel frame and plywood panels using jigs and spacers.



133.1 Plywood profile and hole spacing cut on the cnc machine.



133.2 Testing joint connection between stair and floor.

**144.1** Final defense pinup,- photographs, drawings, ladder and ark. Looking south in the West Room, 1001 Prince St.



**145.2** Final Defense Pinup - Drawings Photographs, the ark, the Sliding table, \ and ladder, Looking South West in the West Room, 1001 Prince St.

**145.1** Final Defense , Photographs, Drawings, The Ark, A Sandbags, Exterior Masonry Wall Constructions, Non load bearing Interior Gypsum and Stud Construction, Table of models and Mock- ups, Dry stacked Masonry Wall Proposed for the Crawl Space , and artifacts found in the crawl space.



**145.2** Final Defense Pinup - Looking south east in the West Room, 1001 Prince St.



142.1 Call it what you want, The Ark, the Boat, Sled, Shell, the Thing, etc.



142.2 Transition from stair to landing/ Wall to floor: Steel, Birch Plywood, Douglas Fir, Threaded Rods. Machine Screws, Riv-nuts





















148.1 View Looking West though the Open Crawl Space Hatch from inside the Crawl Space

148.1 View Looking West at an open louvered from inside the Crawl Place  
Shadow and light dance on the screen.



## Masters of Architecture - M.Arch.1, Advanced Research and Design

### Thesis Defense

Thursday December 14th 4:30pm

**DD:** After working for several years, I feel that there was a disconnect between architecture and the act of construction. I really didn't know what that was exactly, but I had a few ideas of how I could dive deeper into reflecting on its process. One thing that design build does is enforce the approach of learning by doing. It is a pedagogy that has been contributed from all of the schools that make up the Washington-Alexandria Architecture Consortium (WAAC). It is also heavily attached to the WAAC itself and its founding's. Learning by doing connects people and place. It connects the interactions that we find in everyday situations and adds to what is existing. My process began by documenting what the WAAC is, its place. It is a multiplicity of academics, cultures and time that has been layered, a palimpsest into its history. There are things that have been made apparent visually while others are not. Some things are audible like the creaking of floors, while others are hidden. One thing that these characteristics or qualities serve is the creation of memories of place.

Another place where this notion is in Havana, Cuba. Here, the community engages itself in a very limited scope based on its perimeters of confinement within its social, economic, political and environmental conditions. Physical expansion of space is primarily limited in the vertical dimension; both up and down. Through ad-hoc innovations Cuban practices spring from limited resources, and the grassroots efforts to sustain their culture. Efforts are put into place to waterproof roofs with bright red impermeable paints that try to keep the moisture from seeping through the concrete structures. These practices become visually apparent as one of the leading fixes to water infiltration issues. As the paint fades one can see the layers of where the previous layers of paint worked and where leaks persisted. Other patterns can be observed including exposed rebar on seemingly finished construction, where they are really preparing for the next construction even though there is no finite timeline of when the next construction phase will commence.

These interactions of layering and responses to the conditions over time are like contour drawings that where one line continues to the next and those can only continue by the constant interconnection to the people and the place where they are located. People use spaces that we are not typically associating with places of work and of rest such as: working in a doorway, on a bike, on the street, resting under a car. This is similar at the WAAC. Students work in the shop, in our studio, in the darkroom, and rest wherever they can find a place. The WAAC Design-Build approach is also similar to the contour drawing analogy of connecting from one line to another in that at the WAAC adding onto other people's labor and work produces an organic outcome. The WAAC staircase, for example, took 25 years from inception to completion. Cubans know that while some things are temporary others must be made to withstand the pressures of the next phase's needs or generation. It's not for them, it's for those who come after. Not that it is built for permanency, but buildings take place anticipating that there will be another, future iteration. This mindset is a good way to add value into architecture vs others which are made to be put up and made to appear finished from the start.

Within the process I began to investigate the dreams and intentions of the WAAC and how the process of design build takes an empty space into innovations of the design-build adaptations and their interactions throughout the building creating places for connections.

My intentions were not visible and could not be seen through the preliminary processes of documentations. The places where I ended up working within the existing building of 1001 Prince Street are normally hidden. They are buried behind barriers which students normally don't conceive



as spaces that we can work within.

This was a translation of how design build can function beyond its previous conceptions and expand into the horizon of the process.

Philosopher Gaston Bachelard's *Poetics of Space*, considers preconceived notions and dreams of spaces. His writings feel somewhat of a descriptive narrative of self-examination of the human experience. The attic and the basement illustrates both illusions and memory. Basements and attics are used to store ... they warehouse the memories that are put into them like physical storage, but also these spaces that are away from the main levels. They may be dark, damp, scary, mysterious. and so forth. Are they such? Is there an opportunity for these spaces to be experienced differently and go beyond what they are perceived as original rather than previous?

By working with existing conditions one can take spaces like the attic or the basement and work within them so they do not lose the quality of the place itself, which is very respecting their powerful sensoria. The goal is to make this adaptations that build on the layering process of design as time passes. From the attic down to the basement I wanted to make a visual connection, opening up the invisible to the visible nature of architecture and to the place of WAAC. While the work that could be done in the attic or in the basement cannot be finished by one student in one semester, by starting with an installation that allows views up and light down, perhaps, it will give another student enough light that they might begin to question and say, "Look, what is up there?" They might then question how do we eventually attain or gain access to these spaces? Maybe we don't build objects; instead we build transitions.

Entering the basement crawl space, I saw golden dusty sandy, dirt which seemed oddly out of place three feet above the basement level, making the space was uninhabitable. How can these spaces that are uninhabitable become habitable? Through the process of digging questions arose of "what to do with the dirt?" and "How to I move the dirt?" Does the dirt get removed from the space or does it belong to it? All actions become projects of their own enabling the interiority of the previous questions to become external to themselves. These projects begin to extend the boundaries of the original intention while strengthening the whole.

The question was answered by bagging up the dirt into 350 standard white sandbags, with the help of many students - one students labor became the labor of a community. The bags of dirt outside; making use of it again, beginning a rejuvenating process in which adding cover crop such as crimson clover will over time add nutrients to the soil infusing it with high levels of nitrogen and organic material. Over 1000 acorns were planted and the fall leaves gathered by the breeze in the tops of the bags adding both protection and organic plant matter. By beginning this process the project's intention is to illustrate and to nurture the benefits of allowing time to become a part of a process. The bags of dirt will gain value as time progresses and value is assigned to the future plants.

In doing all this I wanted to work the existing conditions of the basement. My first intention was to assign value to a space which I perceived as a continuation of the basement. One of my first sketches of the crawl space where the drawing shows my thoughts I explored cutting the stairs out and continuing the basement to create another basement room. It was before engaging the site and learning from the existing conditions and parameters to consider in adaptations of reality. After that I had to wrestle with how to get carved out space without demolishing more than necessary. The processes became an iterative internal and external process of reflecting on what one thinks could happen, what one wishes should happen what would happen and what is feasible to happen.

Leaving the concrete stairs in place enabled the transition from one space to another to take place. As you would climb to the top of the existing concrete stairs, you would enter into a place not unlike

other rooms in the upper floors of the building. But unlike others, the head height is decreased to only five-foot, six inches.

The existing steps coming up into the crawl space are typical concrete cast in place stairs that have a rise and run equal to 7:11. The steps I designed and built allow one to descend into the carved-out space are longer and allow the descent to slow as one submerges oneself into the space. The idea here was to make a transition space between what is apparent and the unapparent or unseen. The intention was to slow one's pace down until submerged into the horizon. This idea of combining the horizontal and vertical into an axial relationship that intends extending one's perceptual awareness.

The crawl space is separated from every other space within that building. I explored making it into another studio space or making it into a classroom space. But that did not make sense for it became a place to be alone and get away from work every day, to contemplate what you are working with and to re-center yourself back into the horizon.

After descending the stairs, you can sit down on the bench on the bench you begin to contemplate and notice the things that are around you as well as those things which are no longer in sight. You are in a place that is completely enclosed. You have no visual of what are around you. You hear the sounds of the air handler, the creaking floor above you, and possibly the sound of a car passing by on the street twenty four feet beyond the exterior bearing wall. By receiving these orientation signals one might realize that these elements are more connected to you than they previously were. They might allow you to reexamine your relationships to the things you are working with. Maybe you might sit and write. Maybe you will slide over to get a little closer to the table to draw. You might find that the table slides out so that there is an point of compromise and flexibility found for one's posture so one might reimagine the possibilities rather than instruct the possibilities.

This idea of adjustment and the idea of movement is an idea of reflection. Interpretation and discovery of the places you are within may lead to discovery how the structure was built, what are it's materials and what are the possibilities within the space which it can take on, as a place. One might even explore how the construction would but added on to.

The stairs were fabricated by laminating twelve two-by-twelves of Douglas Fir. Eight ribs were made of fourteen-gauge one-inch by three-inch milled steel tubes welded at each joint. The ribs are laid out in an offset pattern relating to the maximum distance that the three-quarter inch birch plywood can span per the manufacturing specifications of twenty-four inches on center spacing with the offset of sixteen inches on center spacing to relating to the typical spacing for timber frame wall construction. The relationship between the actual and the maximum creates interactions between their perceived robustness and the necessary rigidity of materials and joints.

The language of the joints exposes the connections allowing one to see and examine the details. The welding of the steel frame, the mitering of the wood edge as the plywood folds over the lip of the frame, and the bolt spacing and its possible connections not only relate to the structure itself but also back to the excavation of the layers of dirt and its revealed stratification. Digging down inch by inch the discovery of the diverse layers which filled the space invoked a process of constant reflection as construction and excavation took place.

The top layer of dirt had the consistency of sand and chalk. The next foot was dry, sandy and had little clay. At this point the excavation seemed manageable. The next three inches were significantly harder to excavate with over 90% gravel. As fellow classmates and I were digging our preconceptions of digging were quickly shifted when we hit harder soils as we continued down. Periodically I imagined at any minute we would come across a concrete floor. Nevertheless what we did find was even more fascinating. Located 1'8 down from the current dirt floor was a few inches of coal deposits; Its origin

was unconfirmed nor was the use of the space in previous eras of the site. Questions arose such that lead the project to further investigate the history of the building and its previous uses. Though the assistance given by the staff of the Alexandria Archeology Commission we are closer to uncovering the mystery of how the building was built including all previous phases.

There was a railroad located along Henry Street and adjacent to the block where 1001 Prince Street sits was a coal pit that was used to distribute coal off of the train cars and into the boilers to heat Alexandria's homes. Perhaps coal was stored in the crawl space and was used to feed the boilers that were once located on the north side of the building. Perhaps the layering over the coal suggest that over the 1700 and 1800s coal was stored on the site. Land records show that the previous building on site was owned and operated as the office for the Rail Road company located on the next block. Perhaps the reason there is both a crawl space and basement suggest that the previous building located centrally on the footprint of the current building had a full basement and when the school was built the need for more basement space was not necessary and would be costly. As trenches were dug to build the foundation walls the dirt was excavated and remained on site. Perhaps this is where the one foot and eight inches of fill dirt on top of the coal came from. The explorations of existing conditions continually expand our understanding of the place and its life. While the object constructed for the crawl place in not sited it has a point of reality. It's not where it was intended to be left. While unintended, it exemplifies how each stage of a process is temporary and each structure is also temporary in the context of the larger whole.

Often architects have a complete set of drawings for a construction, and after handing the drawings over to the builder their immediate response is that they are incomplete or that they don't fully transfer the knowledge of the architect to the builder. Ironically but true no drawing is complete. They are only a means of representation by which architects have the ability to communicate. To document every step of a process prior to its completion is not executable due the limitations time, site, material and craft. There are things that can never be expected.

The process of design is never finished and even when finished there can always be more drawings to be done. There can be modifications to the design, and things that would have been built or designed differently if the construction was only a prototype. If we as designers take this mindset by constantly reflecting on the work at hand we can expect some of these changes before the pencils are down. Others have to wait until construction is in progress.

Making drawings is only a part of the design-build process. After making axons, plans and sections, and figuring out the quantity and quality of each of the parts and pieces of the whole and knowing how one would like it to go together still more designing has to take place. When you have a full dimension you think it's real. Even if it's a fraction like three-eighths you often imagine and wish for the cut to be exact. Even when you measure twice and cut once there are still imperfections. A jig helps, better yet another hand or two to assist beyond the limits of the projects of the internal struggle. Everyone needs experts, and volunteers who's effort supports the cause and the burden of ownership and responsibility can be shared. We all need a community.

Community helps and encourages. Working towards a collective goal personal, professional and education goals can be achieved. Nevertheless no achievements can be accomplished without overcoming interruptions and obstacles. If these instances are seen through the lens of a reflective process, one is able to refocus their intentions in order to strengthen the whole. Learning from these situations and using the existing conditions and site context as parameters in which to respond, enriches the process of design and the overall quality of the work.

Some obstacles are harder to overcome in design-build practices. Budget and financing are seemingly one of the most directly related limitations to quality and value. Design-build projects



have a unique opportunity to face design decisions in a way that incorporate the best use of the materials, its qualities and its relationship to other materials. By working parallel with budget, design and construction is able to have a better grasp of how each decision plays out across the process.

Procurement of funding is never easy. The ladder to the attic had a budget of zero. Found materials were used to reduce the cost for design-build effort but also added value to the project. My own finances were used to buy a few items that could not be found. By doing so I had more skin in the game, sweat equity and cash equity became two major factors that kept the scope of the project accountable.

Design-build projects in academics can allow multiple stakeholders to support higher education by engage in financing. Local construction Industries including Smoot Lumber and TW Perry see enough potential in collaborating and the importance in hands on learning that they were willing to donate a large sum of the materials necessary for the crawl space project.

WAAC students mostly took on the larger investment. They took time out of their own studies to help support this work. Students pitched in and helped excavate the dirt, fill sandbags, document found objects, moving sandbags outside, gathering and planting acorns and crimson clover.

The processes of observing, documenting, exploring, analyzing, designing, testing, collaborating, constructing, installing, and reflecting are revolving processes especially when faced with hurdles. The hardest and most surprising factor is neither money, nor time, although time both of which are always issues but having to deal with bureaucracy has been the most challenging. The complicated administrations that seeming to act on behalf of the university has halted the work of academics.

Once again we must pause and reflect.

We must be able to re-frame the argument so that our intentions are clear. Our understanding and knowledge of the body of work and the place in which the work is done must be able to be transcribed and translated into a language so that any and all communications are opened.

Challenging the preconceived notions of what is normal use of space and pushing the boundaries of practice based research seem to be the most difficult to overcome with bureaucrats.

Because a crawl space is a only a crawl space, it should not be entered in. Not because it is dark and damp but because there are risks that are involved.

As a practice-based researcher any risk should be taken seriously. The work should be walked through with code officials, archaeologists, other architects, structural and geotechnical engineers.

The mindset that these spaces should be closed and not entered into should be challenged. A basement/crawlspace should not be left to the mice. An attic shouldn't be left to spiders. There is great value from every part of a building and being able to learn from the existing conditions of a 1900s masonry, steel and wood frame building like 1001 Prince Street has the potential to teach more to students than previously supposed.

These spaces can inherently enrich the university's mission to promote cross disciplinary and trans-disciplinary studies as well as innovations beyond products but innovations on how we think and question all design decisions. By doing so the University can better educate the next generation based on the previous explorations, by other students. Students can build upon other's work and push academics and professionals to work together.

Through design-build and all of its various processes, we as architects, landscape architects, and urban designers can contribute to making spaces into places.

**PE:** *One thing I would like you to talk more about is your installation last semester in the attic and how it became relevant to you once you delved into the basement.*

**DD:** The process of the attic installation includes drawings on the ceiling and the floor just below the attic. A plumb bob, a chalkline, a ladder made of a discarded wood rafter that was previously replaced in the renovations of the building in 1980s. A mirror attached to the underside of the existing subflooring in the attic and a 2x2 hole cut in the gypsum ceiling connected above and below.

The intentions where to engage design build practices in a way to introduce phenomenological theory into an educational toolbox.

The attic became a metaphor for constructing memories. A place above your head hidden in a tertiary space. The ceiling which typically is understood to shelter became a boundary that obstructed the access to the unknown. In order to reexamine existing conditions the idea of reflections physically and psychologically, came to the forefront.

When relying on visual clues one tends to ignore the other senses. In order to instigate the imagination without dreaming one might respond to spatial, auditory, tactile or otherwise felt signals which questions reality for what it really is as well as what it could be.

The lines on the ceiling are reflections of the joists above the ceiling. The drawing illustrates the ductwork and sprinkler line above, connecting to the visual cues of sprinkler heads and air registers on the surface of the ceiling.

The mirror was placed at a forty-five degree angle from the top of the joist, at the opening so that when one stands at the base of the ladder and looks up one would see the space in the attic as if it was directly in front of them when in fact one is looking backwards into the space above where they previously walked.

Moving from the attic to the basement, the attic was a pilot study for the work in the basement. Throughout the process I wanted to incorporate an ad-hoc process of designing from reactions. These shifts in thinking allowed for the transformation from aesthetics and to how these spaces function how they are constructed and how they respond to each other.

In the crawl space the concept became about how the orientation and centering along the horizon can connect to spaces and places beyond the interior of a space. The horizontal axis is located along the top of the dirt in the crawl space, located three feet above the basement and two feet down from the ground level outside of the building. The horizontal axis is situated east-west. In doing so it creates a dynamic relationship to the space carved out and the space that was left unexcavated.

The work done in the attic and the exploration with drawings and making the adaptation was documented with axonometric drawings to illustrate the direct relationships between datum, and axis of the parts that make a whole. The way in which the design showed itself in the space began by stringing red nylon cord across the ceiling, marking important edge conditions and creating a grid of reference planes. Plumb lines were dropped from the ceiling and hovered inches above the dirt. Sketching of course was very instrumental in the beginning but once I was able to draw with these elements in place the relations of the existing conditions could not be ignored. By mocking-up possibilities temporarily within the space I was able to rapidly test out scenarios more effectively in full scale.

Testing took place with digital software drawing but working in the field was far more successful and impactful. Sun angles and natural light was analyzed for the crawlspace in Revit but it wasn't until the only exterior hatch was open that I realized the impact from one opening in the space. First drawing in the dirt and then laying calk along the profile of the direct sun was marked on the dirt. Over the course of a few hours I tracked the sun angle as it became wider and elongated until it began to collapse as the sun went behind a neighboring window.

**PE:** *Another questions is, After you and the other burrowing animals dug the dirt out of the basement you then dealt with how your design touches or doesn't touch the dirt. Can you talk about the role of the brick and its role in construction?*

**DD:** Brick became a key element to meditate between materials and their relationship between body and site. Practically speaking brick was used to retain lose dirt falling in the pit from the angled dirt excavation. Theatrically and conceptually brick was used because of its relationship to the materials it was retaining. The concept of constructing space by deconstruction or by excavation is used to iterate the uncovering of value and making connections. Clay from the ground was excavated. It was mixed, set in a mold and then was fired. Returning the brick back to the ground completed this cycle of taking away to find value and well as putting these two elements side by side could spark the awareness of the process that it took to make the brick. The faces of the excavated ground are to be faced with dried stack brick against the angle of repose of the dirt. By not mortaring the brick in place its creates a robust but semi-temporary surface could be removed easily.

There is a duality between the supporting elements and the object which it holds. Brick holding the dirt and steel supporting the plywood which in turn support the human body that inhabits the space.

There are three steel ribs that are intentionally left exposed. The absence of the plywood allows for the layering of the materials to be exposed. In addition, it suggest that the space is incomplete . It allows for the possibility for the space to expand.

While the design is intended for occupancy of one person, maybe in the future there becomes the need for the space to hold seven people in order to have a good game of poker. Nevertheless, the idea was not to fully enclose these elements so that when you are in the enclosed low lit space the place would give cues that the place is malleable, so that the place doesn't become insular but connected to elements exterior to itself and open to the possibilities of the future growth.

**RP:** *I want to commend you first for achieving so much despite being setback twice by bureaucracy. Not everybody in the room know what Dennis went through and I think he is downplaying it. He basically had to reset after his venture into the attic and start over gain. It was only a month ago when he was shut off from his site. Which is rather unfortunate and is still an ongoing battle but he was still able to finish this. Its quite impressive.*

**PE:** *He finished it with grace.*

**DD:** I couldn't have finished it without all the help and support that I recieved. There were more helping hands than I would have ever thought.

**RP:** *You referred to this as the installation. Have you had any thoughts of what you might call it?*

**DD:** I think one title for this will be "untitled, un-sited, and unfinished". It has also be referred to as a boat,an ark, a turtle without a shell, the voyager of discovery.



**SPP:** *There are so many things we could talk about. It is just a fascinating project. As I am sitting here looking at the drawings, which everyone of them are crafted with the same care of everything, But this constant questioning in a way that the projects exhibits between all of these binary set that we recite when we design. We think of them as a priori pairs . Serving and Served, Inside and Outside, Additive and Subtractive, Solid and Void , Useful and useless, Front of house and Back of House, and Design and Build. We already pair those with a slash and sometimes a hyphen but the slash is the thing is like the word cleave it has two meaning that are opposite to one another. They are contronyms. Cleave means to separate and to join. That's what the slash does. The way the drawings are drawn, the way you talked about them, causes to question the slash between those words. What is outside and inside. It is not entirely clear. Because there are outsides that are in and insides that are out. The fact of what is serving and served , what is inhabitable and what is not . Unmasking like you said the deep seeded feeling that there are places in buildings that shouldn't be entered, which is a really interesting question. Those sort of reactions to the outsiders that its some taboo because that is something that is unexpected because it is always cloaked as risk management, which is the cowards place to go when they do not have a reasonable answer. Well why would ? Of course And I know the journey through this project. Whenever you do something that partakes in the real world, once you open the door a bunch of stuff comes in whether you like it or not . And that's one of the interesting lessons, when you open up the attic, when you open the door to the outside. To the foundation the ironic use of those words. You were exploring the foundation and at the same time you got to know the Virginia Tech foundation in a way that none of us anticipated. I think that I will never think of the basement in the same way again. I have an entirely different conception of what the enclosure of this building is and it is that drawing, the section that includes the parking garage, another forgotten and back of house, sub-habitable space, all of sudden are almost in whispering distance of the underside of this building. It is absolutely fascinating. I just wish I saw the roots of the tree.*

**DD:** The roots are faintly shown as lines. I'm not a landscape architect so I apologize to the landscape student and Faculty if they are not shown correctly. Maybe I can use a little more help figuring it out.

**SPP:** *Ha maybe you need to dig to excavate. We could go on and on about all of this. But I guess I wanted to say a couple of other things. Everything you did for this project was done with the utmost care, which I really appreciate. Which is why we trusted you to do all of this. We got ourselves in a heap of trouble, I have to say. But I don't regret it, at all! I regret that we couldn't steer the ark the direction we wanted. But you can't, as a wise man once said, " you can't always get what you want, but if you try some time you just might find." I also enjoyed the Bachelardian exploration. So on one hand this is very pragmatic, its like how do you miter that joint, how many bits do you need. On the other hand it allows us to talk from the celestial to the chthonic. And it gives me the chance to use that word, which I love. And the impact here is enormous. You wanted to leave something behind. And you did. As the Klingon said, the will sings songs about this project. It is a really fantastic exploration. The conversations we had about it over the last year have been enlightening and revelatory. We could talk about the weird experience as dirt as the horizon line.*

**PE:** *One of the things I like about the dirt being the horizon is that is the architectural view point whenever we draw section or elevation, that is exactly what we see. And you were able to construct that.*

**Dennis:** The horizon is something we always conceive as being far out in the distance . The Horizon is where the earth meets the ground. Our metal capabilities try to extend ourselves out in reality as the horizon is reaching back to us. In the relationship to up and down we mostly stop at the horizon. We don't imagine the limits of the ground in the same magnitude as we conceive the sky. The ideas are limited by our conceptions. We could dig down multiple levels but because of the preconceptions we limit ourselves to stay on the horizon for the most part and only those who dare venture in any direction.

**PE:** Another quotation from the *Poetics of Space* says that "modern humans live in one story where their attic is in the basement". It makes me think about your project in many ways but one way is Freudian. There are now historians that have established that Freud's basic model for the human psyche, the ego, the id and superego, was based upon his Viennese apartment with the basement, the main floor and the attic. The model of human being as we think about our emotional life is really the model that you have explored in this building. When you talk about places you're not allowed to go, that is almost the definition of the id. All those repressed emotions that are buried.

One way you could talk about it is as a personal exploration about yourself. But I wanted to ask you about something a little less personal that in the reading of Maurice Merleau-Ponty you established triads rather than dualities. If you were going to establish a third element to design build do you have an idea of you would identify some intervening or additional elements to the phrase "design-build" that reflects how you discovered as your work?

**DD:** That's a questions I will have to keep thinking about but for the sake of this discussion the additive element would have to be associated with time. So maybe the addition would be "design build-reflect". But that doesn't feel just right. Maybe the word collaborate would also be able to join those two words. It is about the collaboration of the two words beyond the dash, going beyond the limits of your knowledge and to have interdisciplinary collaborations. Not with someone with similar ideas but with someone who looks at the issues at hand from another perspective. To bring up Merleau-Ponty brings up the ideas of extension of the body and the hand to the tool. Often we mistake tools for being only instruments for us to better take on a certain task but in the case of Merleau-Ponty the ideas allow the tool to become a part of the body and once we allow for those connections to be made then the relationship between the task, tool and body becomes innate and more productive.

Another way we can talk about Merleau-Ponty's chapter about temporality in *Perception of Phenomenology* can be about how time is not only linear but is a matrix of events in which they are strung together through memory. The situations and reactions to those situations are complex. Reflections must happen to better understand the whole situation and the personal perception of the events. The day I heard the stop work order for the research in the basement I was pretty upset. I wanted to take the dirt and situate in someone's front yard even though I didn't know who that would be. It was a reaction based on a feeling; a feeling that I wanted the other to understand the magnitude of the effects of stopping the work would be felt by those who impeded the progress. I fought the urge to react negativity. By reflecting I was able to rise above the emotional horizon and to find a way to rethink the conditions based on my previous professional experiences.

Reflection didn't stop at this point and still continues throughout the process. When collecting the work to be pinned up for my final defense I brought down the ladder that was constructed for the exploration in the attic. The question of reflection can bring self doubt but it can also bring ingenuity to the current situation. Looking at the connections of the ladder I realized I could have continued with similar methods of joining the ribs with dowels. In order to create a more stable frame. Nevertheless the plywood created the stability that would have been needed and the outcome of robustness remained. This type of reflection is one that comes after one takes a step back after seeing a phase of completion. It doesn't necessitate that the decisions were wrong in the beginning but validates the fact that there are many options and opportunities to see things differently.

**SPP:** *I wanted to make a comment to the rest of you in the room particularly those who are starting thesis, in the middle of thesis, contemplating thesis, worried about finishing thesis rather its fifth year masters or landscape. This is as good as any that shows the difference between a project and a thesis. The projects, we can stand over there, walk on it touch it. So in a sense the project was to install a thing*

*in the dirt under the building in the basement, actually in a space we didn't have a name for it the crawl space I suppose. The thesis is radically larger than that. A thesis with enough calories which this one has, is a thesis that you will dine on your entire career. A thesis can find its way into everything. The thesis is where you decided where the fasteners should be and the discussions about what kind of screw heads would you have. What are the dimensions and what does that mean. Also that your own commitment to your thesis comes you and you alone. Dennis generated his own questions figured out what he had to do to solve them picked up the phone to ask someone, looked up something found another we never had to say Dennis you really should do some more work. That since of that you own it and it will never let you down even with other do. You don't have to dig a hole to do.*

**DD:** Thank you. It's also about owning the mistakes and owning the design decisions that you have already made when things go differently. Sometimes those are places for future adaptations for re-design. The plate holds up the stairs because the end support was not able to be placed. Also to quote Jaan Holt, who is not here, but has said, "The word is made of shims". So of course there are always shims. Under each of the ribs, leveling the plywood, because when you think you have a clean dimensions and you just weld it. you find out the night before your presentation that welds heat up and contract and bend backwards and so when you level something it won't end up level in the end. So how do you deal with that. It's a reflective, repetitive, reactionary, hair pulling, crying, asking for someone's advice and help and making a decision in the end. It is as important as the first decision.

**PE:** *Are there any questions from the audience? While we are all here?*

**Student:** *Yeah what going to happened to this? Where does it go? Can I have it?*

**RP:** *Take it with you?*

**SPP:** *It's going to enjoy be here for a while.*

**DD:** Well there was an offer to buy it. Maybe it ends up in the basement, or in a field? Or hung upside down somewhere. While it is not situated in the site. It has so many relationships from the way it was dug out the angle of repose and the spacing and the whole is hard to separate from the site. It is odd to me that it is here. Maybe after a day or two it might seem less so. It helps that the horizon line of the pieces, its drawings, and the window sills are all the same and continue this datum even in this room.

**SPP:** *That's kind of amazing...That's kind of serendipitous*

**Student:** I have a questions and a comment, Maybe "design-build-repeat" is a good way to think about it because you repeated the process over and over again. Also can you talk more about what you are going to do with the dirt?

**DD:** Part of the collaboration I did with the landscape students and faculty we planted over 500 acorns, maybe there are only twelve left after the squirrels had their share. That is a process that was not intended to happen. One day I was pretty defeated about collecting and replanting the acorns that I left a bucket outside near the bags and waited. The squirrel came and started eating the nuts out of the bucket. I realized that the number of nuts in the one bucket was enough to entice them. Then all of the sudden the squirrel took them and started burying them in the bags of dirt, and I said, "YES! They are helping me!"

I think there are many options for regenerating the soil and letting the trees flourish. The questions of temporality came up during a discussion with a faculty member of the Planning department next door. As I was placing them outside they stopped and commented on the installation. They asked, So it's a temporary art installation? " We replied yes that correct. Moments went by. We went back



to moving bags and they stopped again and just paused. I stop and asked "How long do you think temporary is?" They chuckled and said "A day or two, well I don't really know."

I would like the bags, dirt and nuts to stay out there until the oaks start to spout saplings or until the bags start decomposing. They have a lifespan of a twelve to eighteen months. The bags are not biodegradable. There are many possibilities for landscape students to utilize the dirt and the new growth. Take the bags to make earth mounds to make spaces for rain gardens or donate them to reforestation efforts. Or to get people to donate money and give them an oak. The can have a WAAC Oak. Take the bag of WAAC oaks back to your property and bury it the bags of terrible soil. That somehow works. It kind of talks about the way we are. We come in as dirt and end up being useful in the end. From WAAC nuts to WAAC oaks.

**JLC:** *When you talked about where this thing might go I didn't hear you didn't mention the basement and I was wondering in the WAAC spirit of instigating change is there any direction that you see all of us can do to help you in order to put it in there.*

**DD:** I was granted access to document, sketch and photograph. They had explicit instructions that there was to be no more work done in the space and that there would be absolutely no more digging. So contrary to those of us who might want to put it in under the veil of darkness it would be disruptive to the current dialog. Where there might be ways to get in, it was always an intention to respect the administration and authority to make sure there is a positive dialog. The intentions are now to present this to the VT Foundation, to show them the value and show them this is not just one student to dig a hole and make the building fall down. There was an additive process by using this subtraction method to install something that could be reflected on and to be used over time - that's the intention. How can you guys help? If you are good at writing and debating, I could always use help figuring out better ways to argue and get at it from another angle. Sometimes I have trouble getting my feelings across and I end up just frustrated. We need to be able to see things from a multi perspective viewpoint that can come at the problem from all angles. Not one intentional angle. So if the foundations idea is to fill the hole with new dirt ironically or fill it with concrete because they are worried about more dirt falling way. I think this is a great way to keep the soil from falling away. There could now be a structure that holds it back. That would be a whole new process of digging and re-digging; designing and redesigning-; Building and re-building. When work was halted, I was just adjusting the dimensions on the drawing to the hole that was dug. All of the measurements were not taken and so adjustments would either have to be made in the design for any discrepancies or the conditions of the frame could cause another reaction to it by carving out pockets of space.

**PE:** *If I may borrow your drawing over here for just a moment. I never thought I would be a Virginian, I'm a Minnesotan and a Wisconsinite and I have been here for some 16- 17 year-stand so many of you here don't have the same memory of the WAAC that I have, although some have a longer memory than mine, but you can see in this section that the underground parking structure has a concrete top and when I came here the concrete top was what you saw when you walked out there. When Virginia Tech purchased this building next door, we would walk between these two buildings, because landscape and architecture were sharing these two buildings so we were constantly walking back and forth. There was never any reference to this space. The concrete had no name. Then a group of students brought a truck load of dirt and poured it on top of the concrete the they got lots of bricks donated and they laid all the bricks in the courtyard the way you see them now after spending months on designing the proper patterns to make with the bricks. And it was incredible, because shortly after the bricks were set down. Everybody starting calling this the Courtyard. No one gave any instructions but it becomes a place of occupation because of the simple change from the concrete to the brick. What I see here with Dennis's work is very much like that where these two lost spaces have been rediscovered and they are going to have names.*

**PK:** *I think it should be called the Crawl Place, because it transfer from a space to a place.*

**PE:** *And for those who don't know the history far back. Isabel's office was once the place where poker was played with a circular table. When I look at this construction. It reminds me of the Russian constructivist who were some of the most amazing architects and they were working in the new Russia right after the revolution. There was no money. There were no buildings being built. They were inspired by the changes around them to make these wonderful little constructions out of scraps of materials that they foundm begged and borrowed. One of which is the speaker's podium. So when I see this here I am convinced that a generation from now when there is a whole new group of students and this is still sitting here, this will be the speaker's podium. We can always re-conceptualize what things are with how we live with them but one thing I hope is that this stays with the WAAC in one way or another. Because I know it will also have a life in the future.*

*Now we have another tradition which is the bestowing of the crystal award for me to congratulate you Dennis on defending you thesis successfully.*

**DD:** Wow. Thank you so much for your comments and commentment to going on this jounry. Thank you all. Well Does anyone want to go have a drink?

**DD:** Dennis Daniels

**SPP:** Susan Piedmont-Palladino

**PE:** Paul Emmons

**RP:** Ryan Pieper

**PK:** Paul Kelsch

**JLC:** Jodi LaCoe

## Bibliography

Alberti, Leon Battista. *On the Art of Building in Ten Books*. Cambridge, MA: MIT, 1988. Print.

Ara, Dilshad Rahat, and Mamun Rashid. "Between the Built and the Unbuilt in Vernacular Studies: the Architecture of the Mru of the Chittagong Hills." *The Journal of Architecture*, vol. 21, no. 1, Feb. 2016, pp. 1-23.,

Bachelard, Gaston. *The Poetics of Space*: Translated by Maria Jolas, Beacon Press, 1996

Bonnemaison, Sarah, and Ronit Eisenbach. *Installations by Architects: Experiments in Building and Design*. Princeton Architectural Press, 2009.

Brand, Stewart. *How Building Learn What Happens after They're Built*. Penguin Books, 1994.

Burns, Carol J., and Andrea Kahn. *Site Matters: Design Concepts, Histories, and Strategies*. Routledge, 2005.

Cavanagh, Ted. "Dream or Dilemma: The Unconscious Construction of the Modern House." *Journal of Architectural Education*, vol. 70, no. 2, Feb. 2016, pp. 300-310.,

Dutoit, Allison, et al. *Quality out of Control: Standards for Measuring Architecture*. Routledge, 2010.

Evans, Robin. *Robin Evans: Translation from Drawing to Building and Other Essays*. London: Architectural Association, 1997. Print.

Ewing, Suzanne, et al. *Architecture and Field/Work*. Routledge, 2011.

Foote, Jonathan. "Design-Build :: Build-Design." *Journal of Architectural Education*, vol. 65, no. 2, 2012, pp. 52-58.,

Foote, Jonathan. "Drawing as Building: Lewerentz and the Drawing for St. Petri." *Lewerentz St Petri 50 År: Kontext, Fragment, Och Influenser = Lewerentz's St Petri at 50: Context, Fragments, and Influence, Klippans Kommun*.

Foucault, Michel. *Discipline and Punish: the Birth of the Prison*. Vintage, 1995.

Stewart Brand. *How Buildings Learn: What Happens After They're Built*. London: Penguin Books. (2012).

Gross, Kenneth. *The Dream of the Moving Statue*. University Park, PA: Pennsylvania State UP, 2006 Print.

Goffi-Hamilton, Federica. *Time Matter(s) Invention and Re-Imagination in Conservation ; the Unfinished Drawing and Building of St. Peters, the Vatican*. Ashgate, 2013.

Heschong, Lisa. *Thermal Delight in Architecture*. Cambridge, MA: M.I.T. Press. 2002.

Andrea Palladio. *The Four Books on Architecture*. New York, NY: Dover Publications, Inc. Translated by Robert Tavernor. 1965.

Hoffman, Dan. *Architecture Studio: Cranbrook Academy of Art, 1896 - 1993*. Rizzoli, 1994.

Hugo, Victor. Translated by Frederic Shoberl "This Will Kill That." *The Hunchback of Notre-Dame*, Buccaneer Books. 1831.

Isozaki, Arata. "Floors and Internal Spaces in Japanese Vernacular Architecture: Phenomenology of Floors." *Res: Anthropology and Aesthetics*, vol. 11, 1986, pp. 54-77.



Juhani, Pallasmaa. *The Eyes of the Skin: Architecture and the Senses*. Wiley, 2014.

Lueder, Christoph. "Upside down or Sideways up: Corporeality, Architecture and Urbanism in Translations between Ground and Image Plane." *The Journal of Architecture*, vol. 19, no. 6, Feb. 2014, pp. 923-948.,

Lynch, James. "Cuban Architecture Since the Revolution." *Art Journal*, vol. 39, no. 2, 1979, p. 100.

Maeda, John. *The Laws of Simplicity Design, Technology, Business, Life*. MIT Press, 2006.

Merleau-Ponty, Maurice. Translated by Donald A. Landes. *Phenomenology of Perception*. Routledge, 2012.

McVicar, Mhairi. 'Memory and Progress: Confessions in a Flagstone Wall' *Architecture Research Quarterly*, Vol. 11, No. 3-4 (2007) 198-208.

Najafi, Mina, and Mustafa Kamal Bin Mohd Shariff. "The Concepts of Place and Sense of Place In Architectural Studies." *World Academy of Science, Engineering and Technology*, vol. 56, no. 2011, p. 1100.

Polanyi, M. "The Tacit Dimension." *Knowledge in Organisations*, 1997, pp. 135-146.

Ray, Mary-Ann. Pamphlet *Architecture 11-20, Seven Partly Underground Rooms and Buildings for Water, Ice, and Midgets*. Princeton Architectural Press, 1997.

Schwartz, Chad, et al. "Building a Social Framework: Utilising Design/Build to Provide Social Learning Experiences for Architecture Students." *Architectural Theory Review*, vol. 19, no. 1, Feb. 2014, pp. 76-91.

Semper, Gottfried. Translated by Harry Francis. Mallgrave. *The Four Elements of Architecture: And Other Writings*. Cambridge: Cambridge U, 1989. Print.

Straus, Erwin W. "The Upright Posture." *Essays in Phenomenology*, 1966, pp. 164-192.,

Swaffield, Simon R., and Edward Relph. "Place Reclamation." *Theory in Landscape Architecture: a Reader*, University of Pennsylvania Press, 2002, pp. 102-104.

Swaffield, Simon R., and Steven Krog. "Creative Risk Taking." *Theory in Landscape Architecture: a Reader*, University of Pennsylvania Press, 2002.

Taylor, Rabun M. *Roman Builders: A Study in Architectural Process*. Cambridge, U.K.: Cambridge UP, 2003. Print.

Woods, Lebbeus. *Radical Reconstruction*. Princeton Architectural Press, 1997.

Vitruvius, Pollio. Translated by Ingrid D. Rowland, Thomas Noble Howe, and Michael Dewar. *Vitruvius: Ten Books on Architecture*. New York: Cambridge UP, 1999. Print.

## Image Credits

With Permission Prakash Patel 47.1 , 46.2  
Susan Peidmont -Palladino, 23.1, 23.3 , 23.4

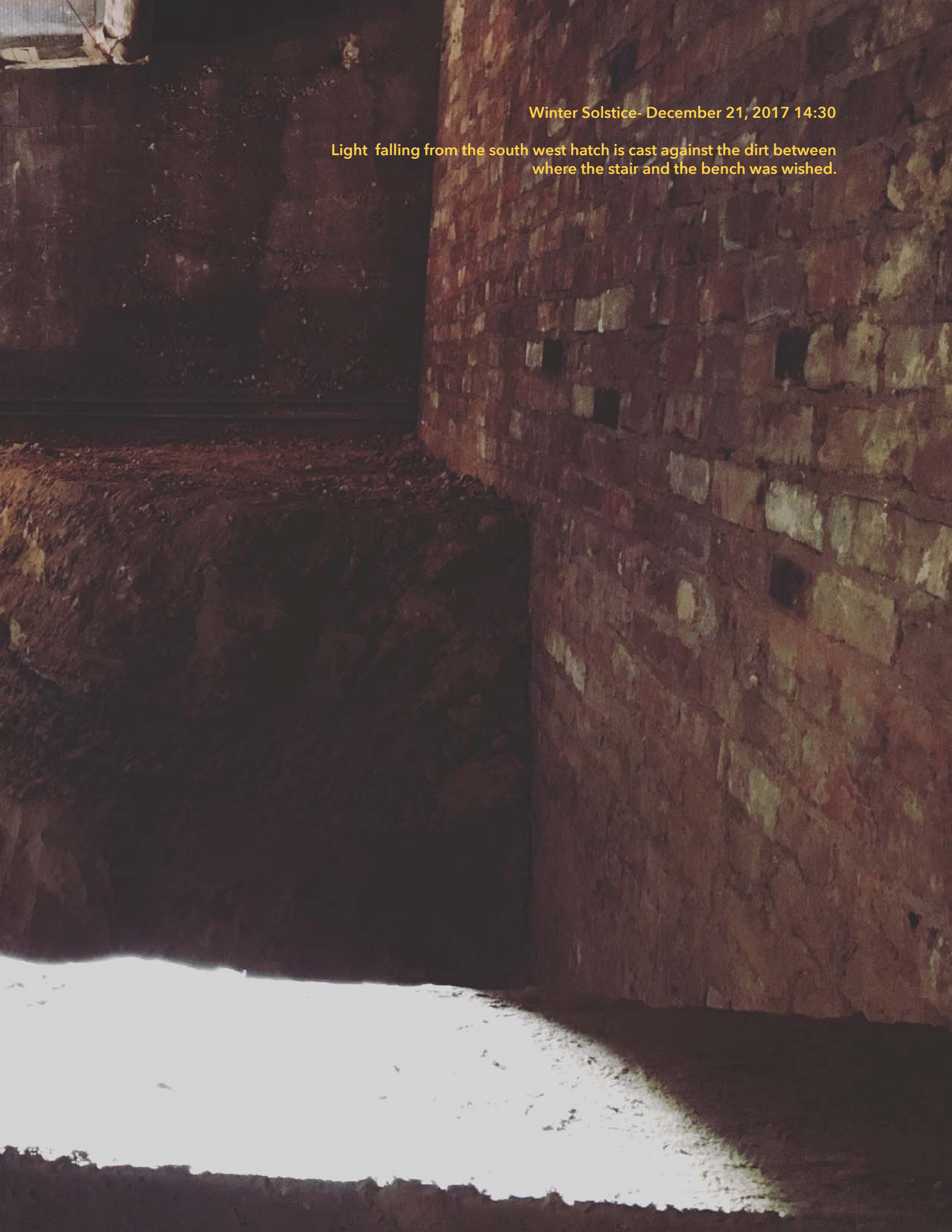
All other photography and drawings are by Dennis Daniels, Copyright 2017





Winter Solstice- December 21, 2017 14:30

Light falling from the south west hatch is cast against the dirt between where the stair and the bench was wished.





There should be a repeat sign between Design and Build. ||: design - build :||

