



RED WALL

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Master of Architecture

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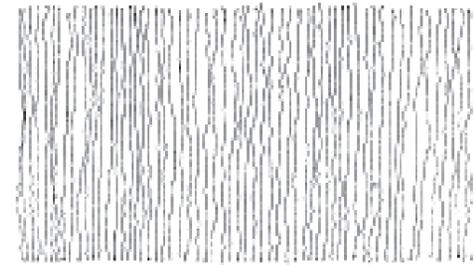




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dedication

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for phil
 an amazing friend and architect, who
 never knew how great he was.

this is for you.

mac





acknowledgments

i would like to thank everyone who has put up with me and this thesis.

my committee for being ever so patient and understanding.

my family; **mom, dad, jo.** thank you for all of your support, love, and mostly patience.

my friends; **bjd, pac, bach, yofis.** this experience has been an incredible life lesson. i miss you all.

most important, my daughter, **ryan.** i couldn't have done it better (or quicker) without you.





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abstract

a small house... in which the details can be explored thoroughly with an understanding of construction through EXPERIENCE, detail, and context.

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the elements

- the site | 11
- the red wall | 17
- the sun wall | 35
- the wind wall | 45
- three volumes |

the house

- an entrance |
- a place to eat |
- a porch |
- a place to live |
- a place to rest |
- the bridge |
- a private place |
- the yard |



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the elements





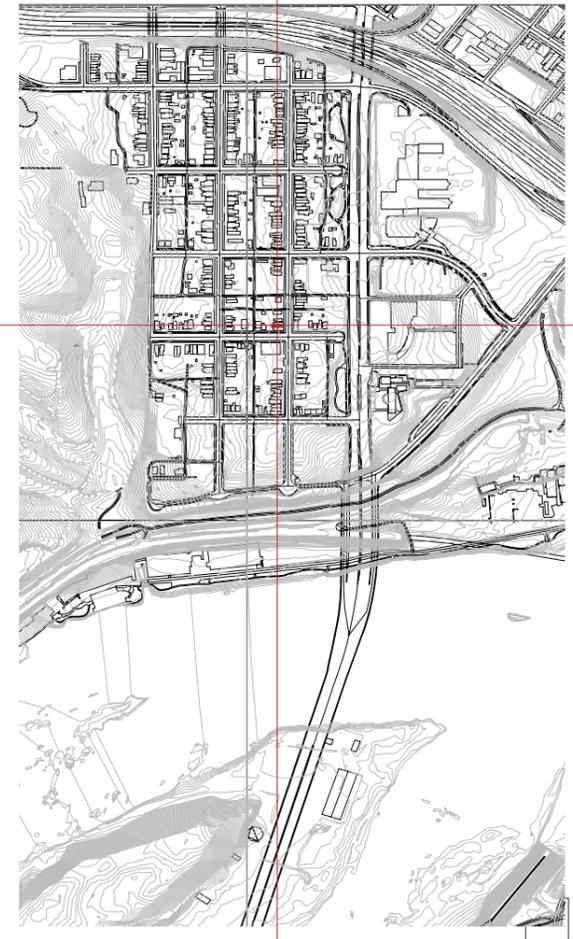
the site



What once seemed like the suburbs of the City of Richmond is now considered downtown. As the state of Oregon was to Virginia, **Oregon Hill** received its name because it was perceived as being far from city center. This *tight knit community* lies just south of Virginia Commonwealth University with the Robert E. Lee Bridge and Hollywood Cemetery bordering on East and West, respectively, and it runs southward into the James River.

Oregon Hill is a historical neighborhood that many nonprofit organizations protect. Save Oregon Hill Organization (SOHO), has protected Oregon Hill from large corporate companies that have attempted to destroy the integrity of the community. In addition, Oregon Hill Housing Improvement Commission (OHHIC) has been restoring it to the way it once was, building new homes that look like the original buildings. Of the **1000 original houses**, 478 remain intact.

“Oregon Hill is one of the best examples of an intact working-class Victorian (1837-1901) neighborhood in the United States.... The majority worked at the Tredegar Iron Works, or as carpenters, masons and other tradesmen or laborers. Most houses were built between 1860 and 1900”

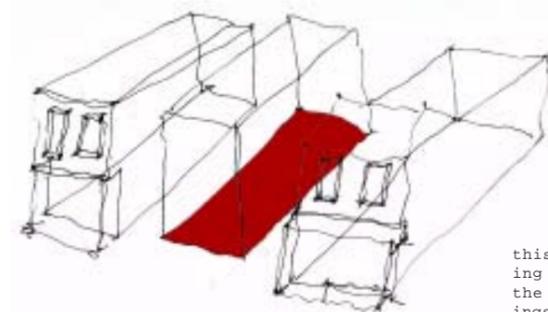




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Oregon Hill is a labyrinth of one-way streets. Pine Street runs north. The **522 Pine Street** site faces east stretching 21'-0" wide and extending 90'-0' back sloping away from the house 4'-0". There is no alley; the site backs onto another property. Two original single-family houses flank the site; these houses have few windows facing into the site.



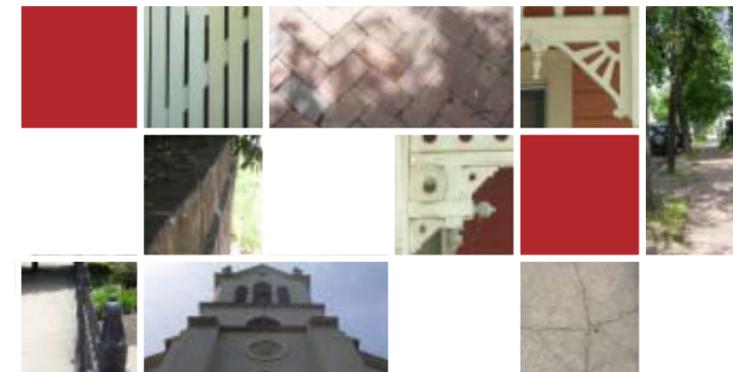
this sketch allowed an understanding of the spatial relationships of the site and the adjacent buildings.

in



The sidewalks in **Oregon Hill** are red brick in herringbone pattern, uneven due to natural interruption of tree roots that make an impact on walking.

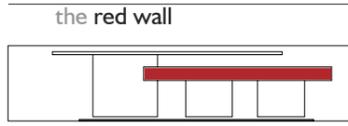
Most of the original houses in Oregon Hill are constructed of wood with brick foundations and clad wood siding on very narrow sites, (creating long rectangular boxes). The sense of ownership is evident: yards are defined by a gate or wall and are kept. Defined entry paths lead to the porch and the front door. These observations of common elements informed the decisions made in this thesis.



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The color red (tuscan red) differentiates significant elements in my projects. I came to realize that there was a red wall to be found in the projects. Beyond the literal, these walls became symbolic of an event unique to the project. The walls led to discovery. What did it mean to be a red wall? What is the event of a small house?

The red wall is to have a presence in the house, inside and out: allowing the wall to make an impact on the house, from the interior and exterior, simultaneously.

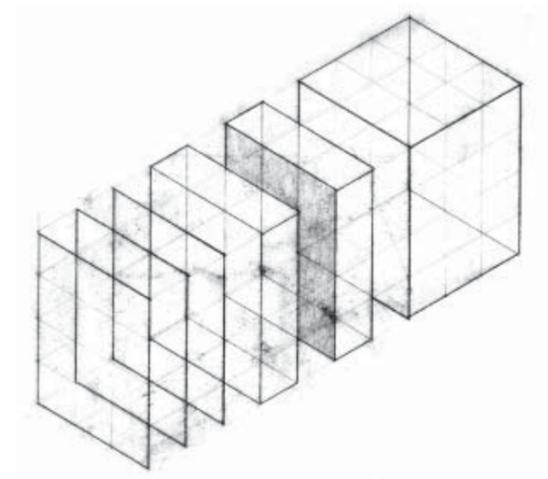
It is to be a directional element – whether by north, south, east, west, or by being able to know your location within the building.

Touch it, walk through it. Experience the wall on many levels.

Depend on it structurally, mechanically – taking advantage of the interiors of a hollow wall.

Take from the wall, and give it back – additions, or subtractions physically to the wall.

RED WALL



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Volume sketches allow the ability to view spatial relationships. An early sketch, geometrically differentiating the site, turned into a typical volume sketch. This sketch was questioned early in the project as to what it was. These sketches are *beginings*.

Thoughts.

Ink on a blank page.

red wall and a volume sketch of the site lead to the ideal.

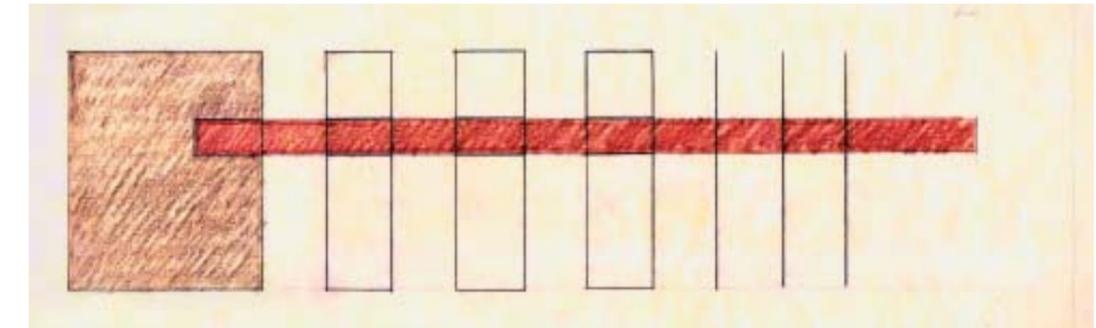
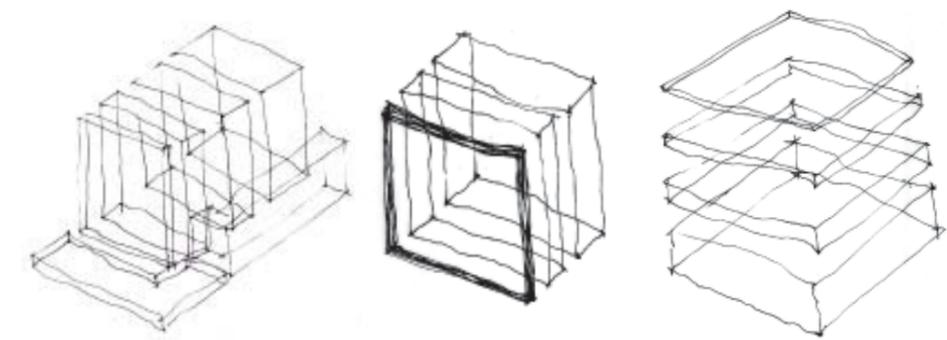




I realized late into this project that these sketches appeared throughout my sketchbook. These sketches served as studies in three-dimensional proportion.

Combining the volume sketch and an additional volume, that becomes the red wall. This shows the intended relationship between the volumes and red wall.

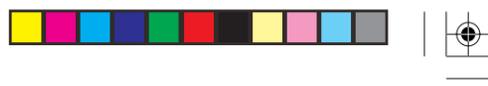
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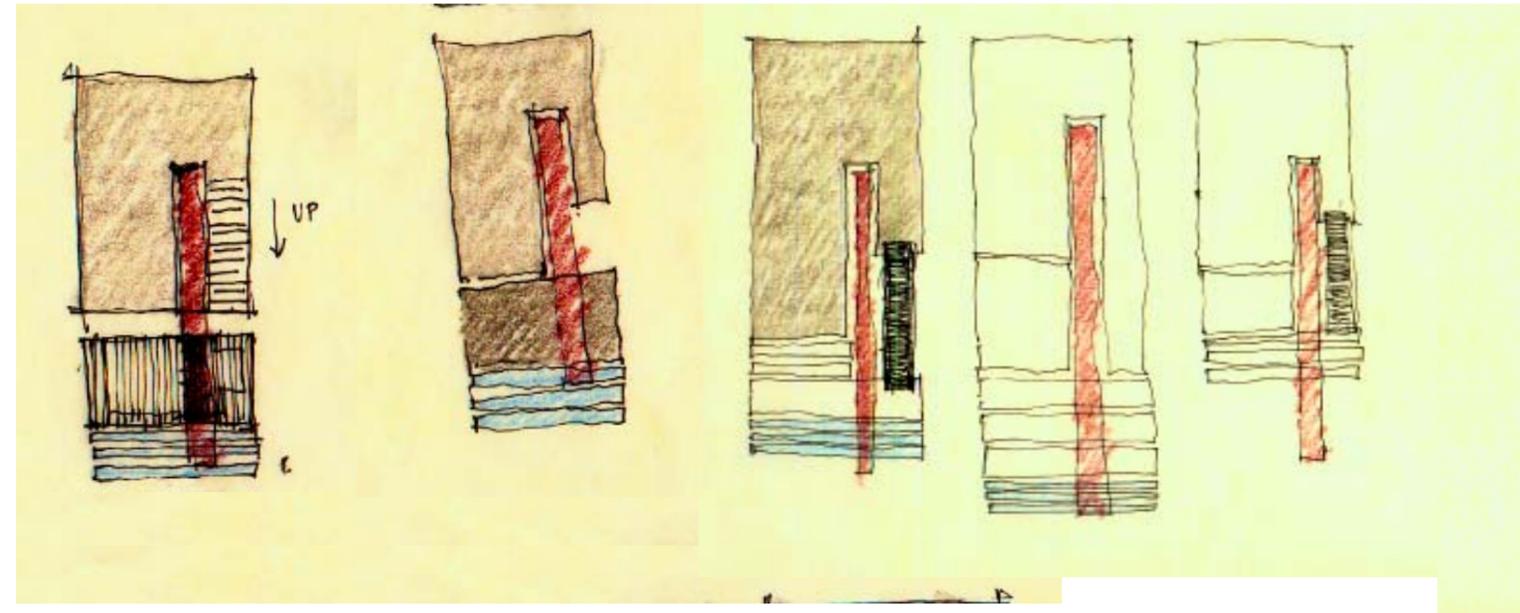
simple combination of red wall and volume sketches, *flattened*.

ideal.

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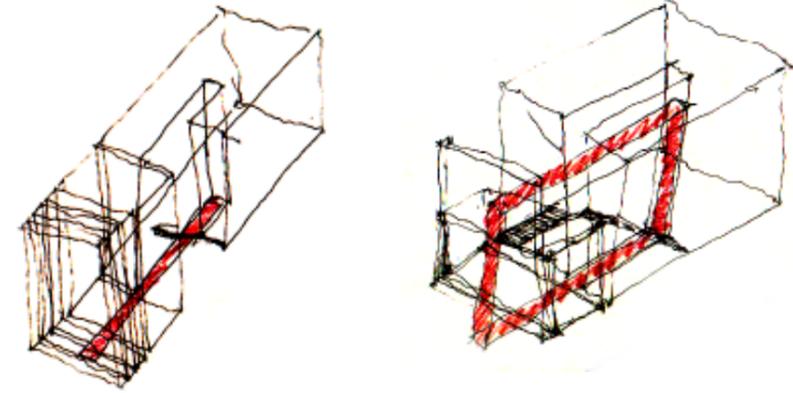


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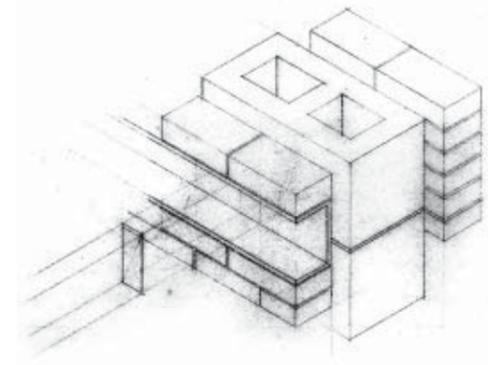
volume studies of the ideal.

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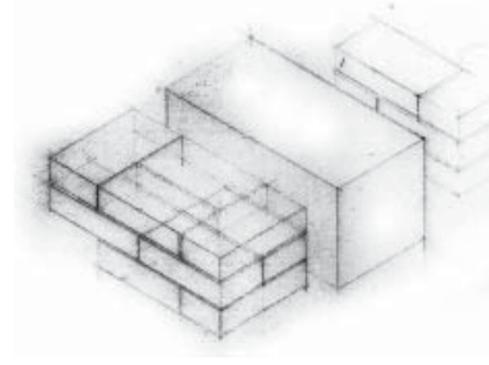




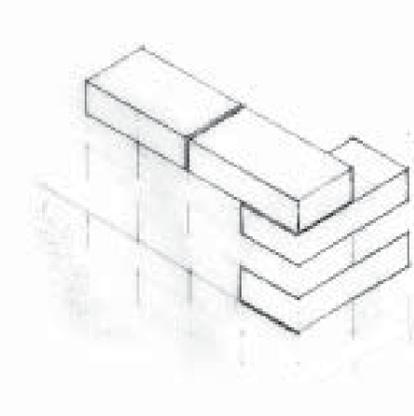
exploration of a joist connection at the second floor.



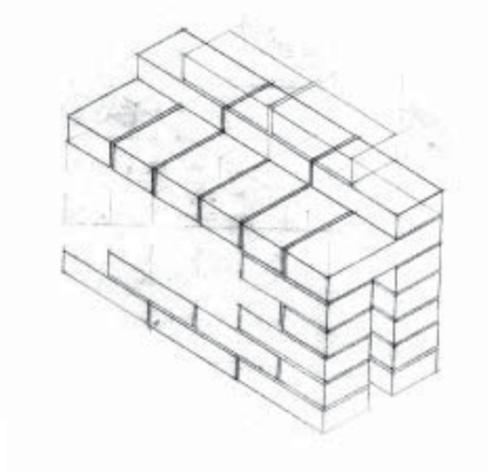
exploration of brick construction through drawings illustrates the required thickness of the wall when using concrete masonry units.



study of a brick corner condition at the cut-out.



experimenting with brick through drawings.



The **red wall** is brick. Brick, not because it is or can be red.

The red wall extends beyond the house; therefore, it is inside, outside, above and below and requires a material that could do all these things.

Exploration of alternative construction for the red wall included studs with brick veneer, CMU with brick veneer, and solid brick wall. This led to the decision to use **reinforced concrete masonry construction**. Since a reinforced concrete masonry wall is poured four courses at a time, it offers the flexibility of openings, rotations, and corbelling.

The wall can also accommodate wiring, plumbing, and mechanical chases.

The red wall is the core of the house.

Since a reinforced concrete masonry wall is poured four courses at a time, it offers the flexibility of openings, rotations, and corbelling.

The bricks play an important role in the wall. There is a great flexibility in how the bricks are laid as formwork, compared to a traditional solid brick wall. The bricks rely on the concrete and the concrete relies on the bricks; the bricks do not rely on each other since the concrete bonds them together.



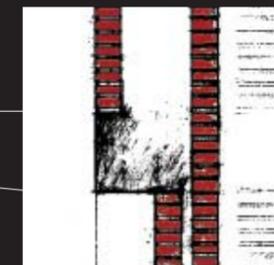


Each opening on the wall posed the question: What are the **lintels**? It was important to be true to material and construction in all cases in the house. Therefore, a steel plate that allowed the bricks to rest on, was not what was desired. Nor was a precast concrete lintel. Considering the trades that are on the site constructing the house thus far, it seemed that allowing the site concrete core to become the lintels was the most rational.

For **six courses**, directly above the opening, the bricks are removed from the reinforced concrete masonry wall process and replaced with plywood formwork; allowing the concrete to come to the face of the red wall. This would provide a ledge for the bricks above the lintel to rest on.



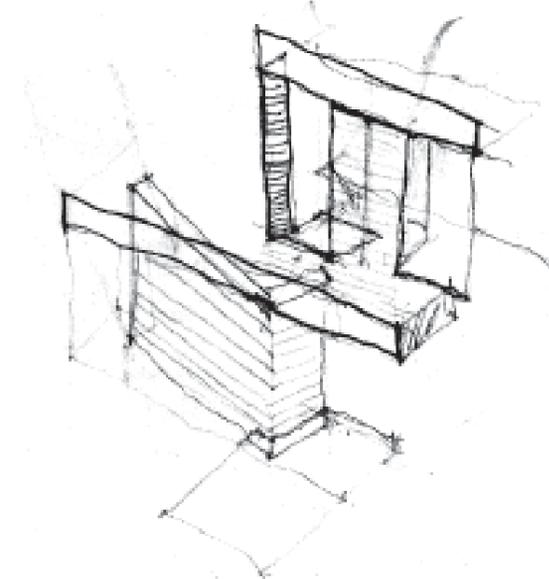
section through red wall: exploring the relationship between the concrete and the brick.



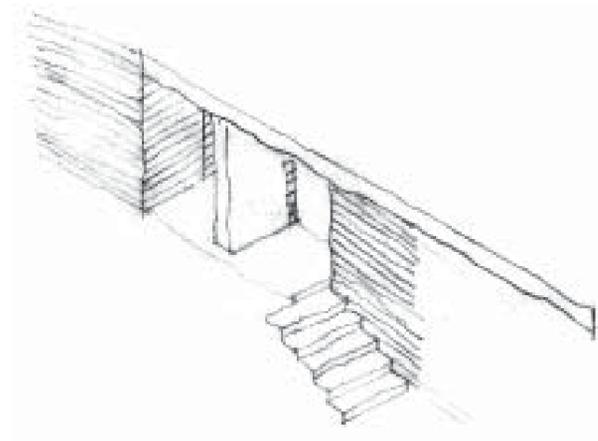
detail: concrete emerges from the wall to create a ledge for the bricks above.

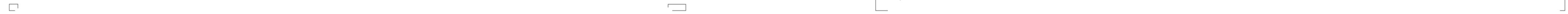
lintel studies in relation to the rotation of the red wall show how the concrete will carry the bricks above.

the relationship between the lintel and rotated wall in the living area.



detail of how the bricks above are held by the concrete lintel at the rotation on the north side of the red wall at the top of the stairs.

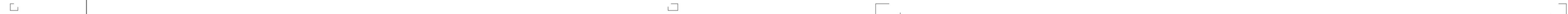
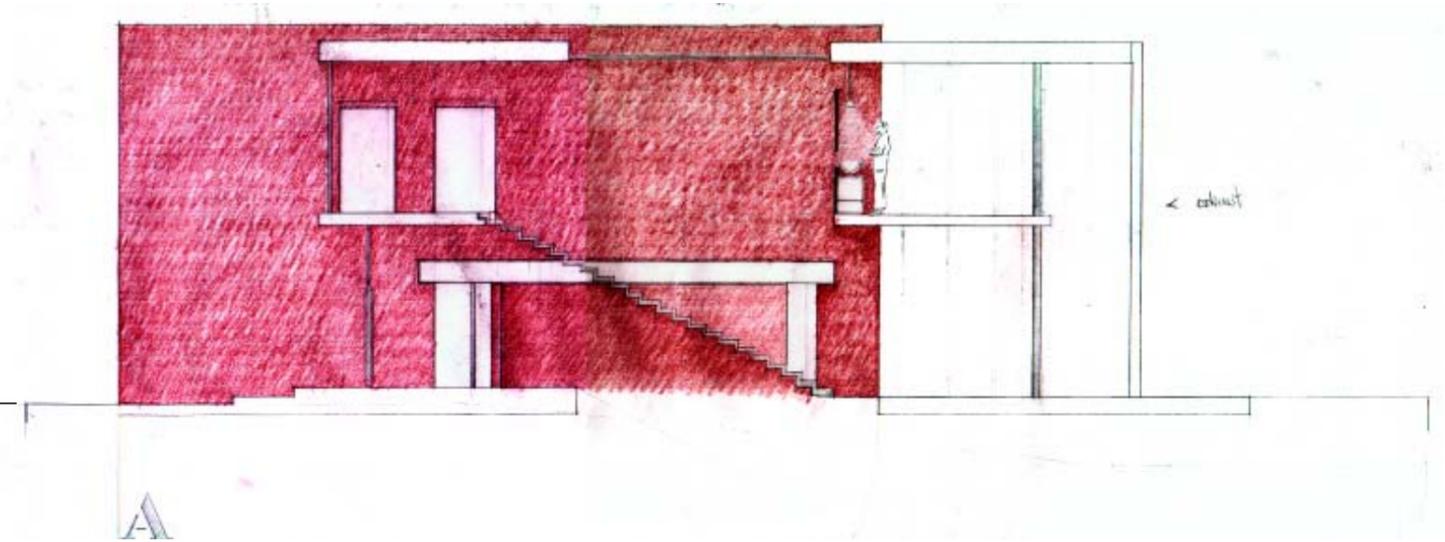


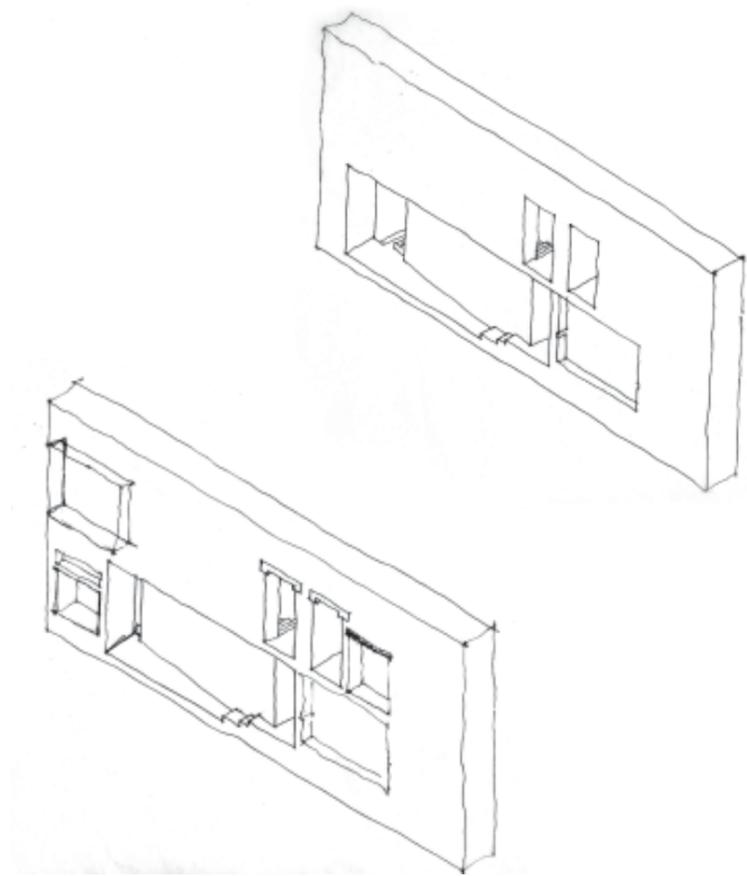


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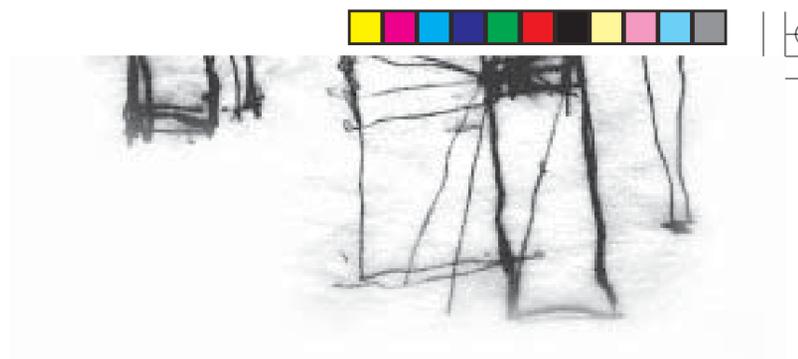
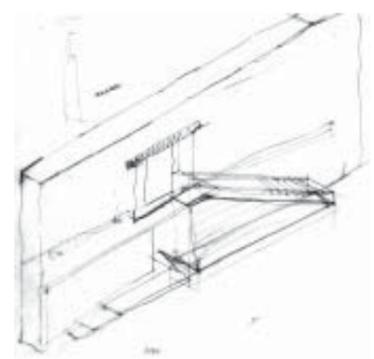
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red wall, north side section:
illustrates needed locations of lintels,
openings, floors, and stairs on the red
wall.



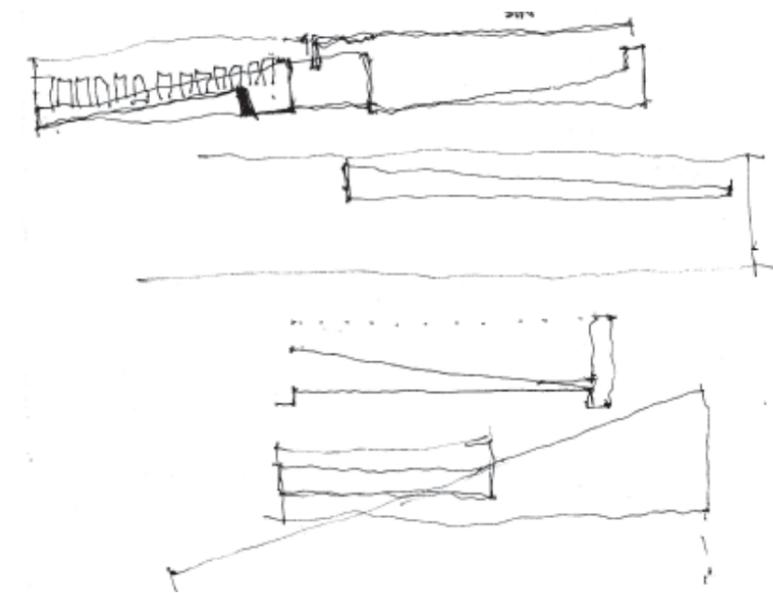


several locations on the north side of the red wall, decisions were made to cut or push back the red wall; creating places that allow the red wall to be **interactive and experienced**, while responding to the needs of the house. At these conditions, there are two choices: to fill with brick or expose the concrete. At times, the wall is an extension of the furniture and filled with brick. However, at others, experienced and understood by exposing the concrete and brick sections.



The **stair** location was a decision made early in the project. Directly adjacent the red wall seemed a reasonable location; taking up the least amount of space on the site. Early sketches rotating a portion of the red wall a few degrees showed possibilities for the stair to connect to the red wall. This opened many opportunities for the red wall.

sketch study:
relationship of the stair to the red wall.

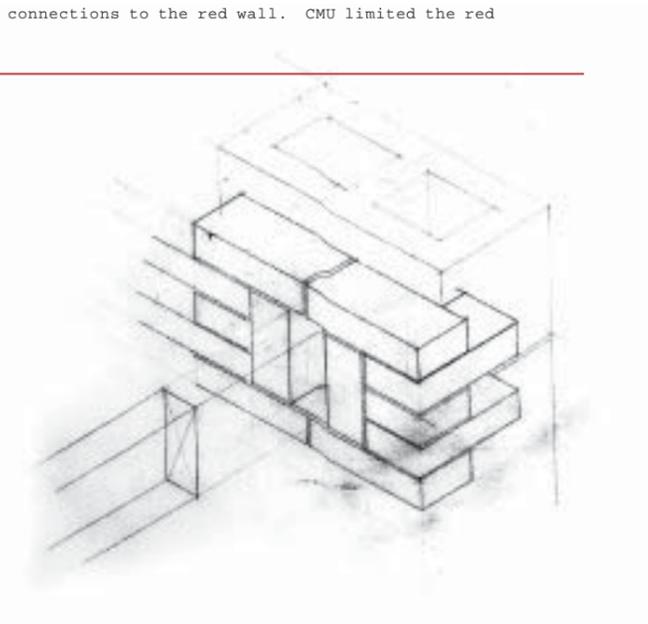
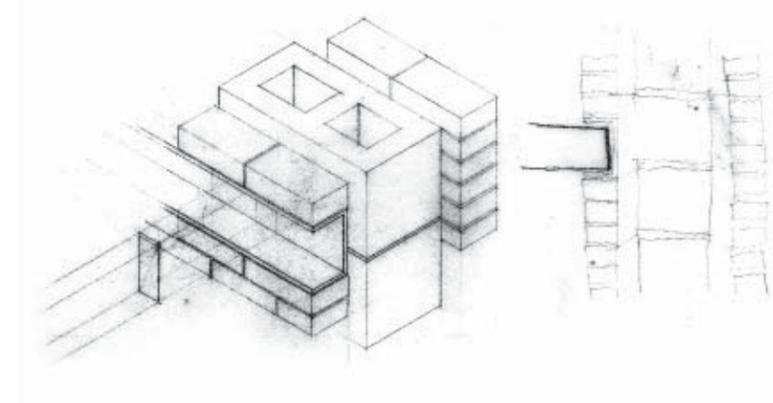
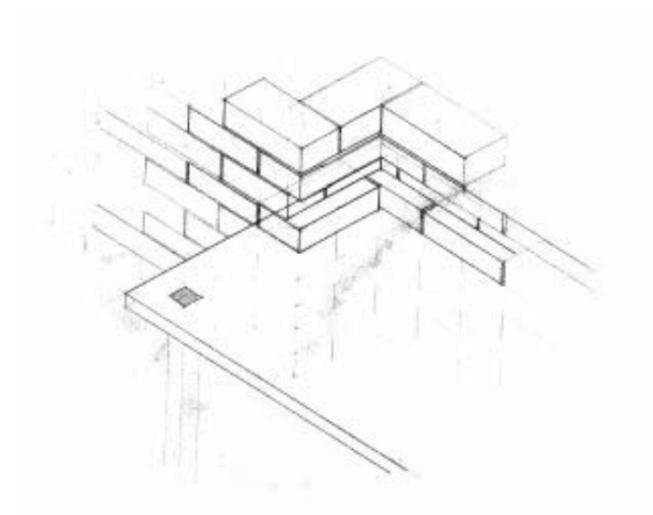
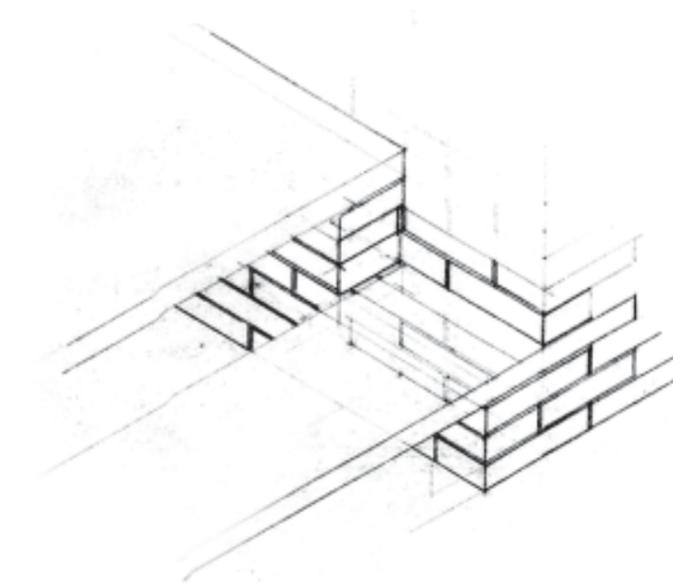




stair detail: introducing a second material, wood or steel, to the brick wall stair allowed for the stair to rotate slightly from the red wall. Once rotated, the stairs become wood or steel.

the brick steps back and makes a place for the countertop.

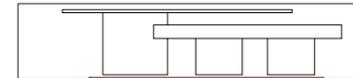
Alternative joist connections to the red wall. CMU limited the red wall's thickness.





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the sun wall

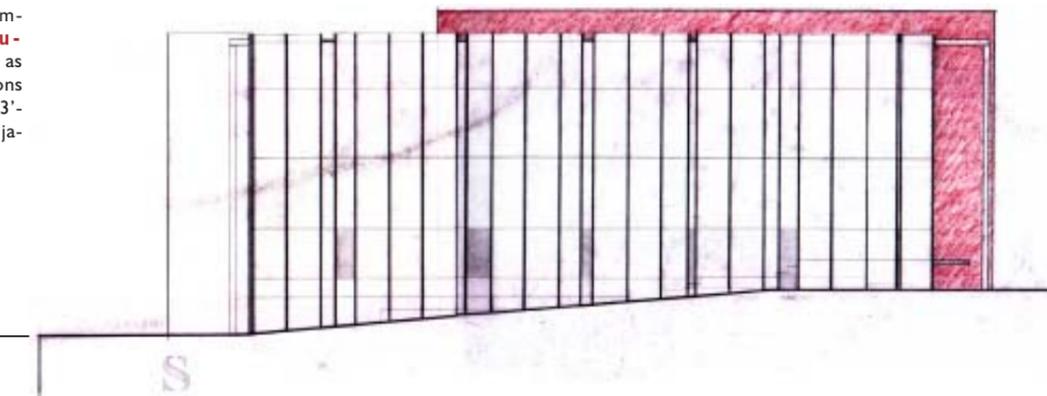


The house faces due east. The long sides of the house face north and south which brings a concern for **ventilation, privacy and lighting** to the qualities of the space. Studying the site and its climate conditions through programs such as, *Climate Consultant* was crucial to respond to the natural elements of the site.

In addition, the house stands approximately 4'-0" from the neighboring houses, on both sides, providing no decent view in these directions. Essentials for the sun wall are simple. It is important to allow for natural ventilation, requiring operable windows. It is necessary to provide adequate privacy, perhaps with an opaque or translucent wall. In addition, the wall needs to provide appropriate lighting without thermal heat gain.

To contrast to the red wall, the sun wall has intended to be a curtain wall. This allows the columns to be their own element in the hierarchy of the structure in the house, articulating the columns as structure and the curtain wall as enclosure.

Exploration of the sun as an aluminum-framed curtain wall with panels: **translucent, transparent and opaque**, as well as, operable and inoperable. Mullions were repeated at a maximum spacing of 3'-0", in addition, mullions were placed adjacent to each column.



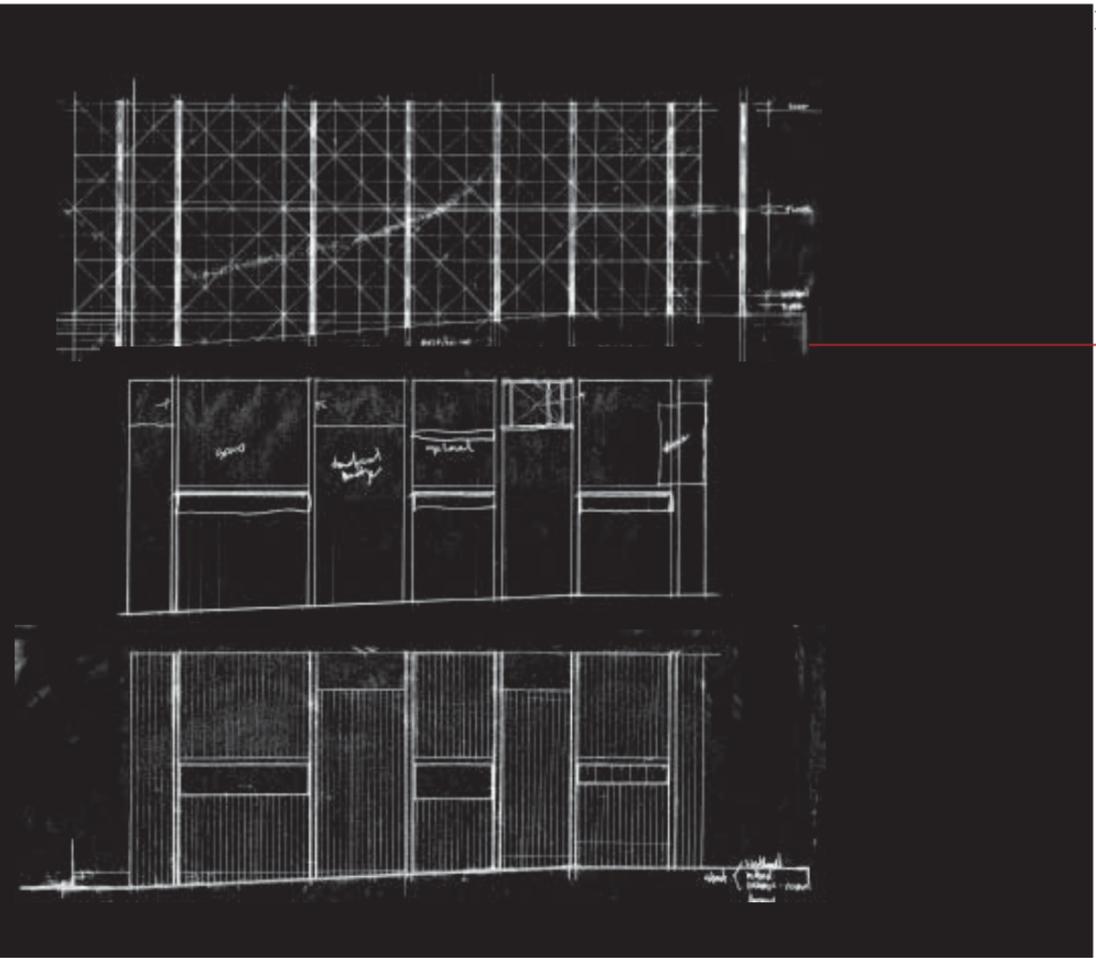
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The mullion spacing on this version seemed too arbitrary, furthermore, the 3'-0" grid did not respond to any of the elements on the interior of the house. The only element that responds to the house is the mullions that are adjacent to the columns. Since the repetition did not flow with the spaces inside, it made the placement of the operable or opaque windows fall in nonsensical positions.

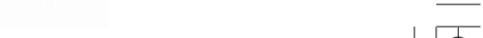
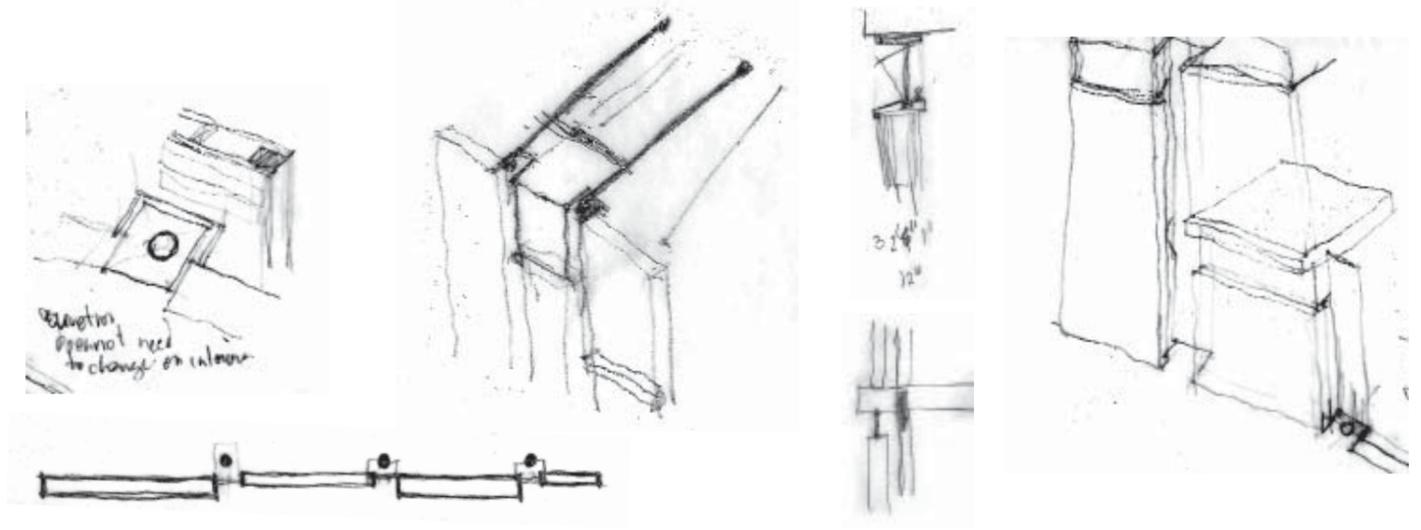




Completely contrasting the transparent wall, exploration of an **opaque wall** developed. Small areas of glass could allow the light in and accentuate the interior spaces. Allowing the red wall to be maintained horizontally, the sun wall desired verticality. Wood siding being hung vertically, posed a problem with water entering the house. Moreover, the span of 22'-0" required the wood to stretch the distance without obvious breaks.



sketch details of proposed south wall.



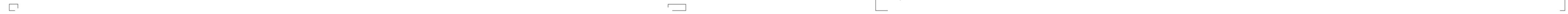


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Going back to the basics, the criteria for the wall: **view, privacy needs, and ventilation**. A Kalwall wall system will be used. Kalwall is a thin (2 3/4 " thick) translucent insulated wall system. This serves well to be a curtain wall not acting as anything but enclosure. It allows the structure to stand at a further distance from the wall because of the wall's thinness.

The curtain wall is able to span the required 22'-0" vertically as well as provide generous amounts of diffused light, while maintaining privacy from neighboring houses. To further accentuate the structure, the Kalwall stops and breaks at the columns allowing for an operable window. These windows are only 8" wide, repeat vertically, spanning the height of the house, stopping 1'-0" short of the top of the kalwall. This breaks the wall vertically and lights the column as well as adds natural ventilation through the house.

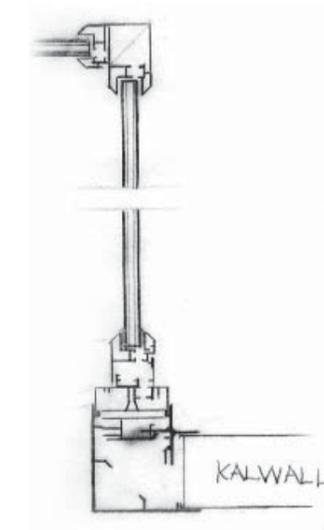
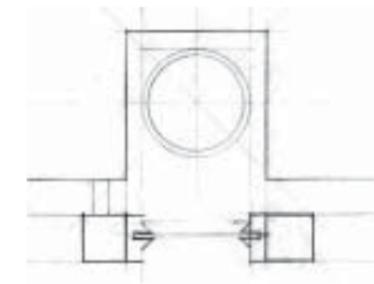
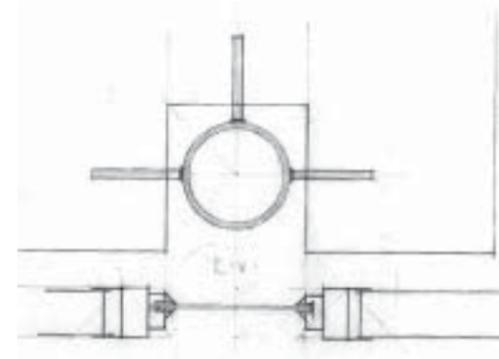




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The **kalwall** connects at three points: the roof, the base and the mid-point at the second floor. The latter connection needed attention, as it adds to the integrity of the space. After much exploration; 8" steel plates, welded vertically on the columns extend out into the concrete. The top of the steel plate is flush with the finished flooring at all connections. The column then accepts the load from the floor. In addition, the kalwall transfers its load at the connection between the wall and floor to the floor, transferring further to the column. An angle bracket mounted at the face of the concrete floor connects to the frame of the kalwall at two points, thus supporting the wall. The 1'-0" by 2'-0" aluminum bracing grid that runs through the Kalwall makes this connection sufficient support against deflection.

detail drawings at column connection:
studying placement of window openings and connections to kalwall



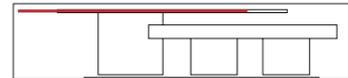
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typical corner connection between
kalwall and a window





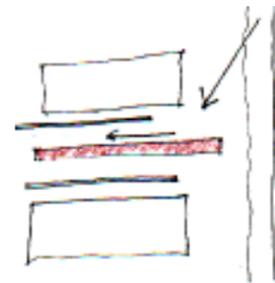
the wind wall



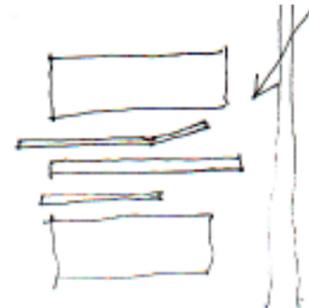
The wind in Richmond, Virginia comes from the northeast in the summer months and north in the winter months. A study model taken to the wind tunnel, helped explore the possibilities of the site in relation to the wind.

Results from the **wind tunnel** found that the wind speed would accelerate between the buildings and bypass the entrance. These discoveries lead to the decision to push the wind wall back from the street allowing the red wall to direct the breeze into the house.

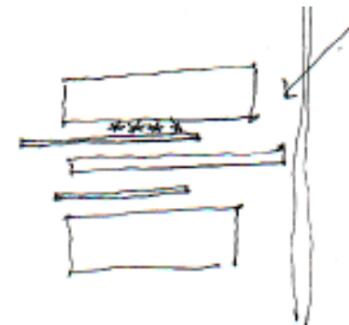
wind tunnel studies.



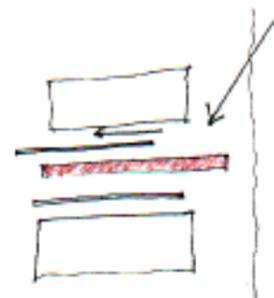
rotated the wind wall to catches the wind.



bushes are added to direct the wind into the house.



sketch showing results from wind tunnel. the wind accelerates past the wind wall.



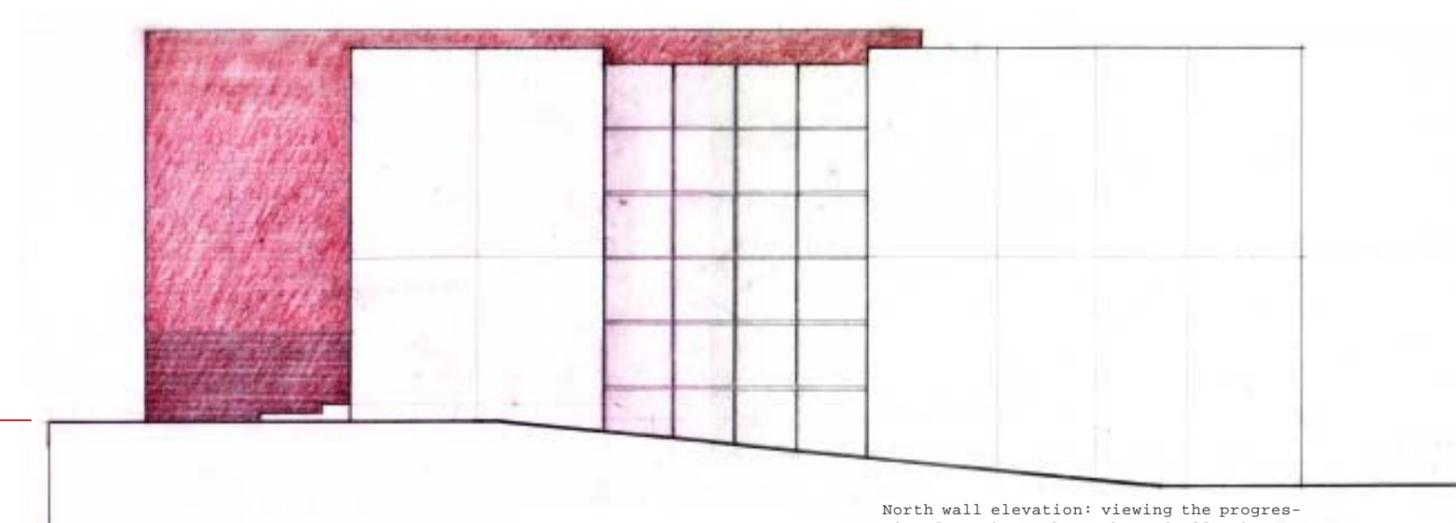


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“ If we were to train ourselves to draw as we build, from the bottom up...stopping our pencil to make a mark at the joints of pouring or erecting, ornament would grow out of our love for the expression of method.”

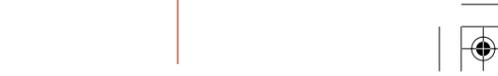
Louis Kahn

The north wall is a simple wall made of poured concrete, using plywood framing. Placement of concrete joints and ties are the only ornamental markings on the wall. However, the rotated stair is echoed on the exterior by allowing the north wall to rotate with it. At this point where the stairs meet, the wall changes to **frosted glass** panels. The change of material differentiates the wall allowing an opportunity to briefly exhibit the life of the house inside without the intrusion of privacy. In addition, this portion of the wall brings light into the stairwell, which otherwise would be darker, dimly lit or purely electrical.



North wall elevation: viewing the progression from the path to the redwall, the north wall, the rotated portion the north wall, as glass panels, back again, finishing at the yard.

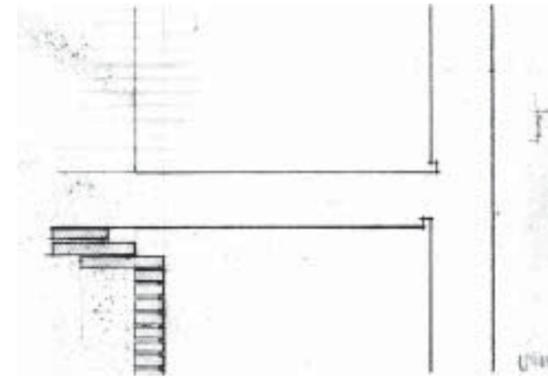
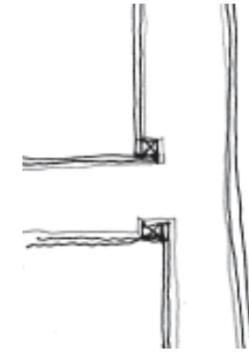
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The north wall acts as a substructure to the red wall at points by making a direct **connection** between both walls. Adding a small piece of blocking to the formwork creates a small reveal detail making a shadow to diminish the natural inconsistencies of the concrete at the sequential pours.

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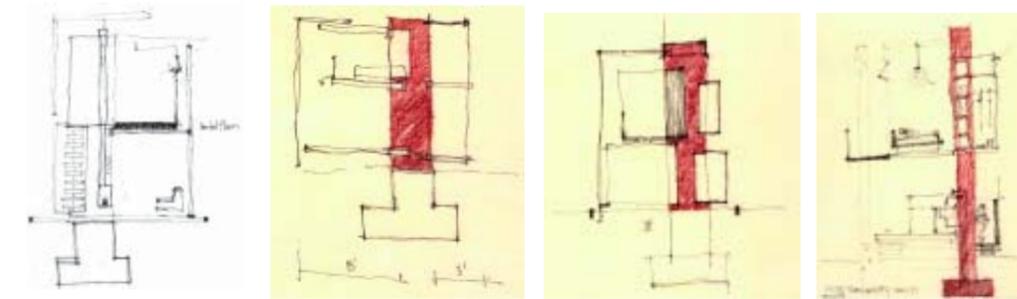
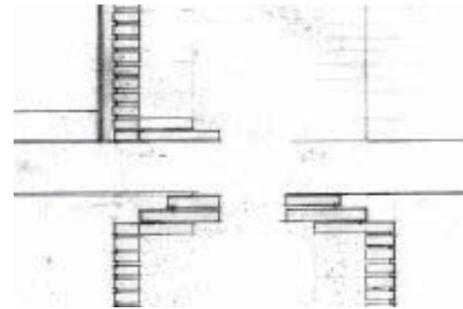
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three volumes



The **volumes** are an alternative to extruding a second floor. The volumes allow the red wall to be viewed and experienced at the full height at different places in the house. Furthermore, these volumes allow cutouts and subtractions from the red wall, extending a greater experience with the red wall.

Formwork allows the concrete from the red wall to make the floors of the volumes. Furthermore, corbelling at the red wall accepts these floors. The bricks steps three bricks into the red wall. This detail shadows the imperfections of the concrete pour, in addition, provides a place for the concrete to crack naturally.

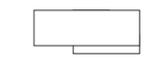
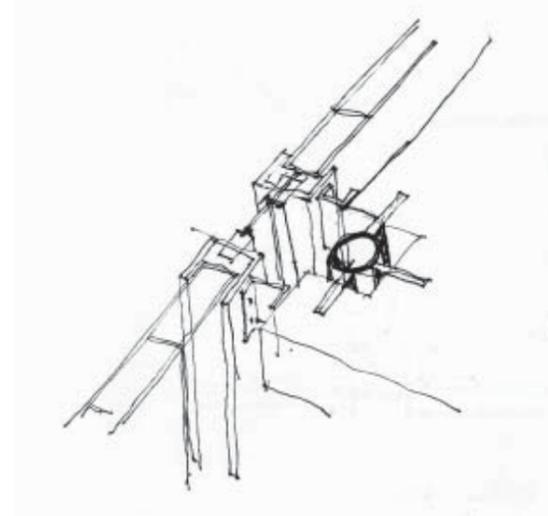


early sketches of the red wall holding the volumes and the enclosure.

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As discussed in the sun wall chapter, the sun wall does not support the floors. They connect to the column. Three steel plates positioned in the concrete are welded to the column supporting the concrete floors. The floors support the sun wall with an angle connection at the floor.





The drywall does not touch the concrete. On the interior of the rooms the drywall is lifted 4" from the finished floor, making a place for electrical outlets.

50|

The partitions that complete the volumes are of standard stud construction with drywall. The partitions are a piece of furniture that bolts to the concrete floors. Initially, I wanted to connect the partitions to the red wall, but found it unnecessary if the partitions are self supported pieces of furniture.



The front bedroom, the bathroom, and the rear bedroom make up the volumes. The front bedroom requires the red wall for support. A connection.....The bathroom is the only volume with a ceiling. Interior dimension is 8'-0", creating an intimate and private space. The rear bedroom partition has a partial ceiling/bulkhead that acts as additional storage.

Further discussion of these details will occur in each chapter.

|51

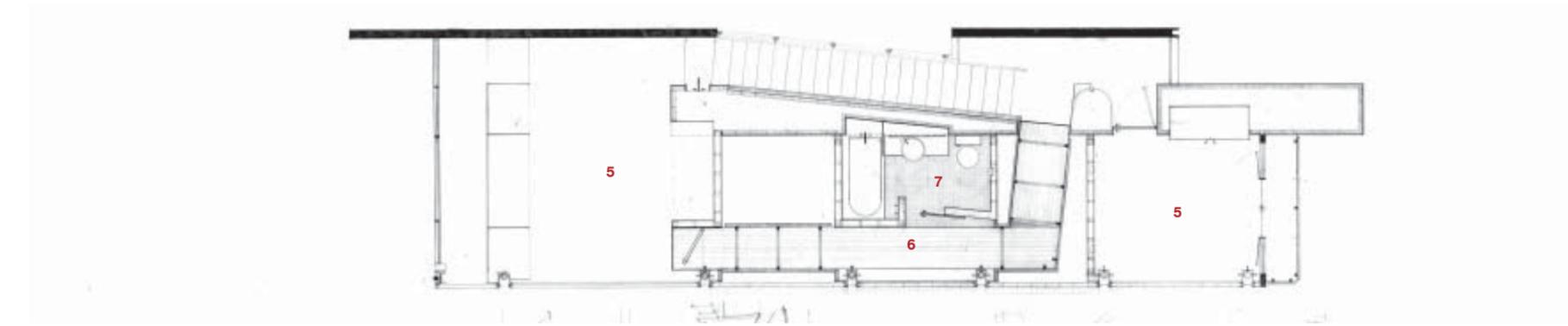
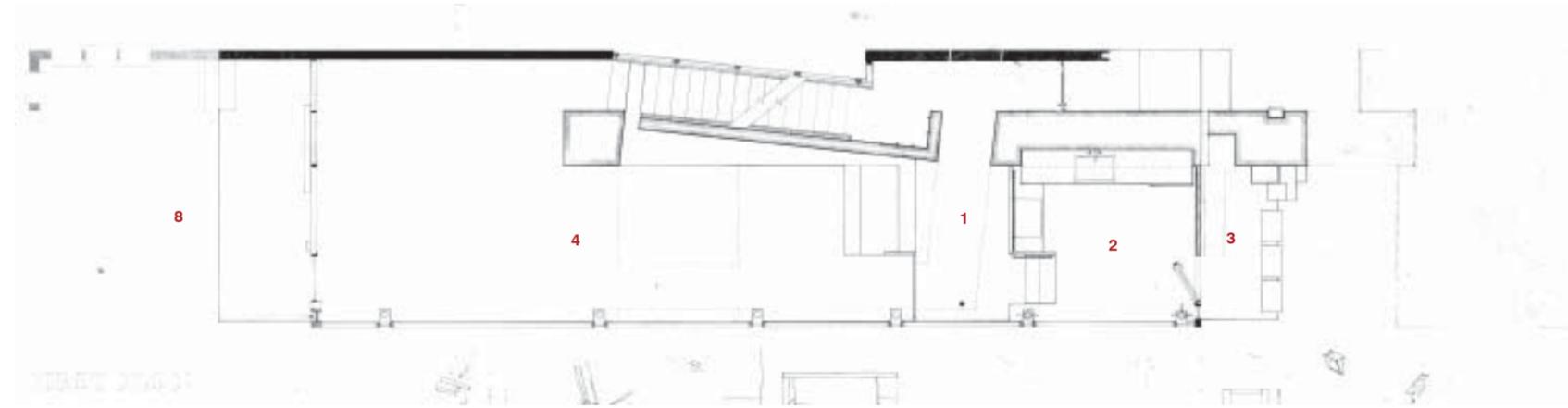




52|



the house

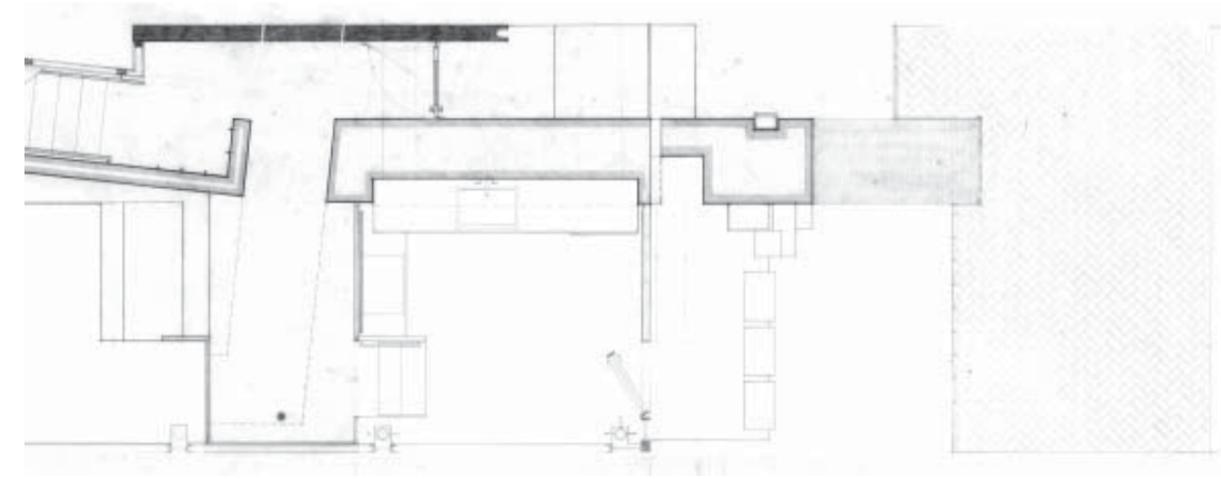
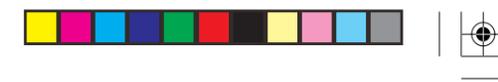


54|

- 1 | an entrance
- 2 | a place to eat
- 3 | a porch
- 4 | a place to live
- 5 | a place to rest
- 6 | the bridge
- 7 | a private place
- 8 | the yard



|55



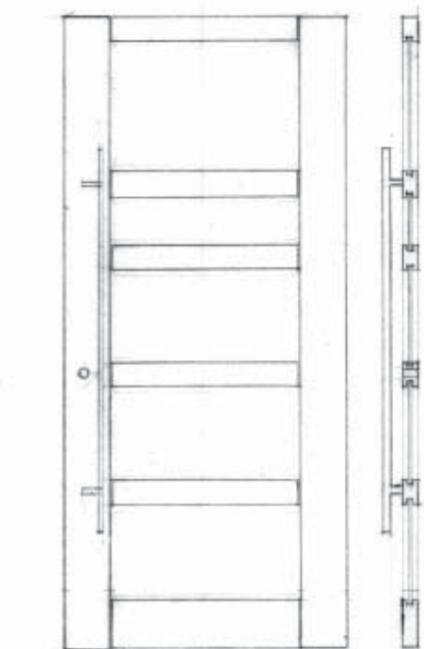


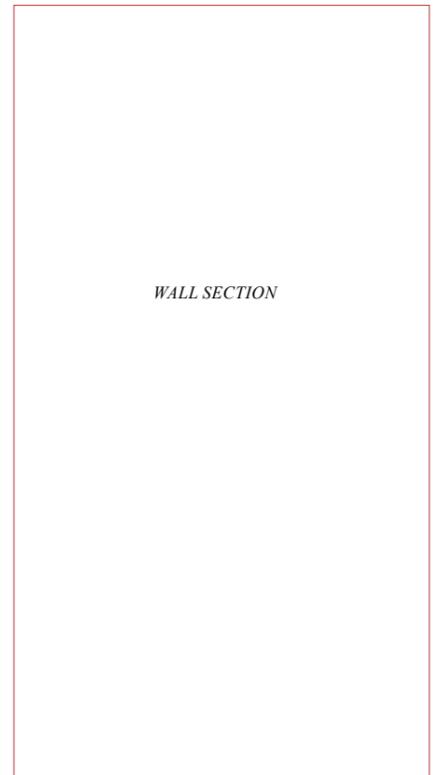
The stone path from the brick sidewalk to the front is 12'-0". Gradually climbing three poured concrete steps, up with varying tread depths and 6" risers. The intention is to slow the energy down from the street.

A maple mailbox inserted in the red wall as a piece of furniture.



The entrance is most important and is the place where one first engages with the building, specifically the door handle. The frosted glass paneled maple door provides privacy at the same time as lighting the entrance corridor. The door handle that spans the height of the door vertically is made of solid aluminum.





WALL SECTION

an image showing light from kalwall at the entry level through the living area

60

The north wall and the red wall continue into the house into a narrow corridor space. The ceiling height is 8'-0". Here another opportunity to gather oneself is provided before passing through the 3'-0" by 6'-8" opening in the red wall to the entry level. Recessed lighting and HVAC systems will occupy the 1' -0" plenum space above the ceiling.

Straight ahead is the entrance to the basement. Although the rotated wall directs the flow into the entry level, behind the wing wall, towards the basement, is a place to hang jackets, bags and place shoes. In addition, it is a place for communication of messages, such as mail or notes.

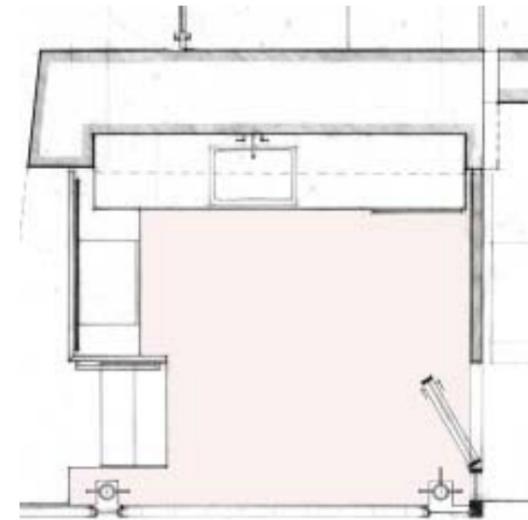


61

The entry level is a mediator between the living area, the kitchen and furthermore the entrance. The entry level opens vertically and horizontally. The ceiling height is 9'-6" to the bridge above and 20'-0" to uppermost ceiling height, elongating the small space vertically. The space also opens horizontally presenting the main living level and all the elements in its entirety.

Light in this space comes mostly from the kalwall system on the south wall. An insulated translucent wall system extends the length of the south wall.

The 6'-0" wide stair that leads to the main living area has varying treads that can be used as seating, to provide for the gradual exiting process that I know my family has.



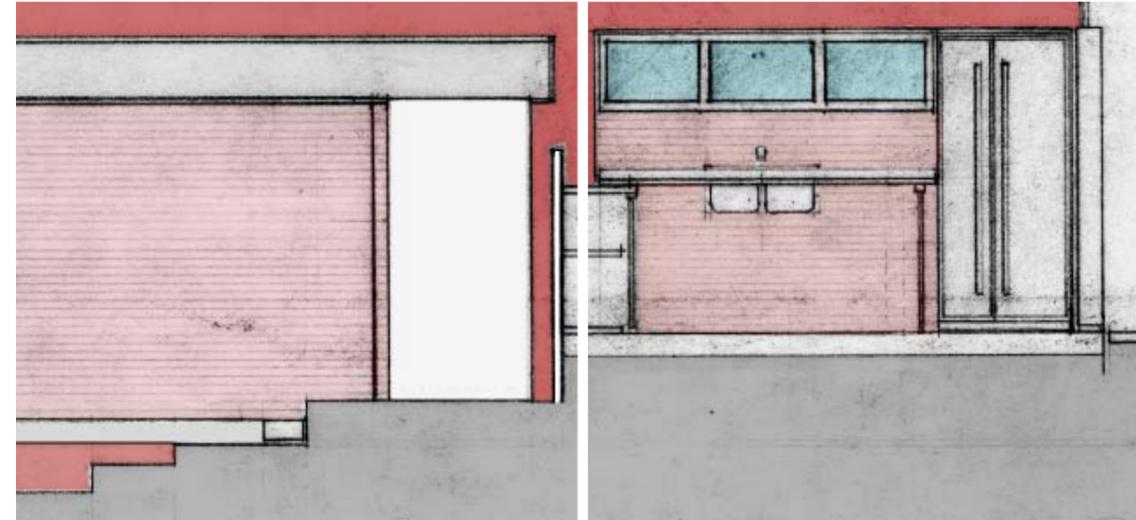
Kitchens are one of the most used spaces in a house and can be the messiest room in the house. Placing the kitchen on the main path of circulation would not allow the kitchen to operate efficiently. It is an important attribute for a kitchen to be open at times and closed at others. These factors contributed to many decisions for this room.

The sun wall has an important role in the kitchen, providing light in the very small space. In addition, the sun wall extends past the kitchen, to the mid point of the porch, extending the kitchen as well. The front wall opens to further extend the kitchen to the porch providing an outdoor dining area.

Three steps lead up to the kitchen level are out of sight from the entry level giving the opportunity to invite or not invite guests to the kitchen.

Materials are an essential quality in the kitchen. The wood floors have been constructed from seven-layer birch plywood that have been cut into 3/4" slices and laminated on its side to create a very thin line stripe pattern for the floor.





64

65

A laminated wood partition wall separates the kitchen level and entry level, it is 4'-0" when on the kitchen level and 5'-6" when on the entry level, allowing for privacy to the kitchen when on the entry-level side. However, conversation and interaction with those in the entry and main living area levels is possible when in the kitchen.

The kitchen is a small intimate space. The ceiling height is 8'-0". A subtraction in the red wall allows for the built-in cabinet and the sink area, and is the source for the plumbing and electric conduits. The appliances line up on the red wall. The down vent stovetop with oven faces the living area but connects to the red wall under the cabinets.





The importance of a porch in Oregon hill is significant. While visiting the site, I observed that every house has a porch. It is important for the kitchen to connect to the porch at the front of the house facing Pine Street. However, it was also important for the **entrance to be separate** from the kitchen.

The intention of the porch is to become an extension of the kitchen. Creating two separate entrances one through the house and one through the kitchen is not an acceptable solution. The porch needs to allow accessibility to passersbys but not used as an entrance. However, it is crucial to have *one* entrance that does not pass through the kitchen.

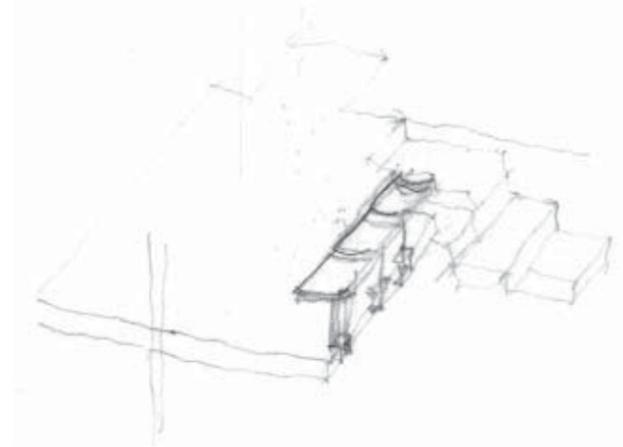
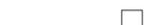
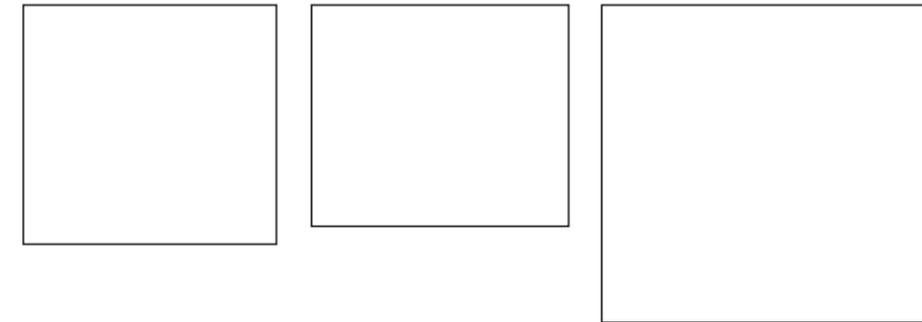


porches in oregon hill, va





I considered many options for the porch. First option, is to add a secondary stair that would essentially become the main entrance simply out of convenience to the kitchen; secondly, no stairs at all, which would cut off access and not allow anyone to access the porch without going through the house. Conclusively, construct three poured concrete blocks that connect with the red wall as steps with 1'-0" risers leading to the porch level. This allows access to the porch but would not be the most comfortable route and discourages the porch as an entrance and makes the steps a special moment.



The red wall has a storage space for outdoor plumbing, electrical outlets and furniture with direct access to the porch.

The porch is 3 feet off the ground. Adding a railing to prevent anyone from falling off became a concern. Alternatively, adding three individual places to sit to protect people from falling and additionally, further encourage use of the porch.

The sun wall continues past the interior of the house, adding privacy from neighboring house and furthermore, extending the kitchen to the exterior.

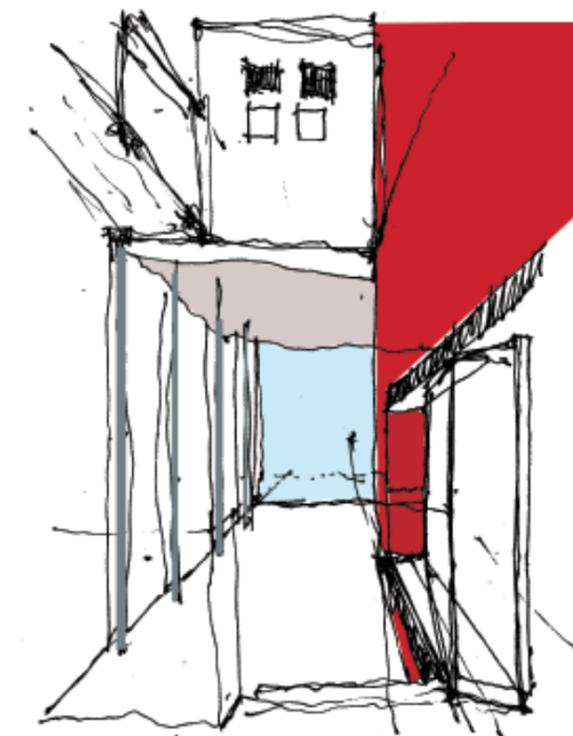




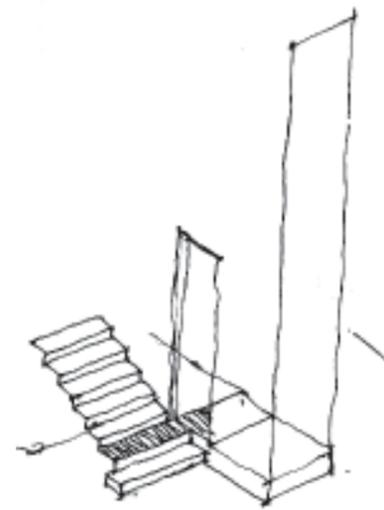
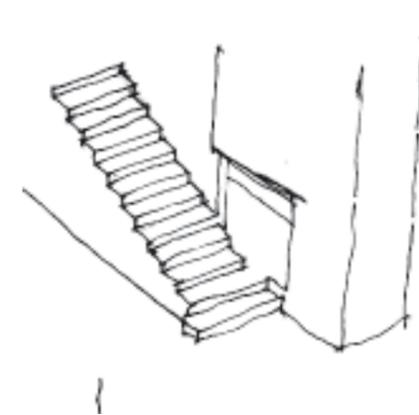
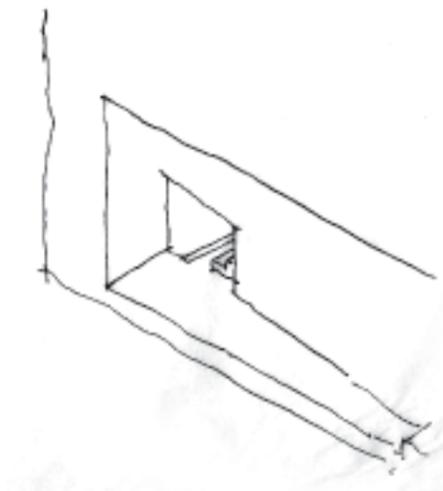
A living room should be just that, a place to live. This space is open. The living area is the full height of the house that encloses three 'floating' volumes, in order to allow for better ventilation throughout the space and to make the very narrow space feel larger by increasing the verticality of the space. To maximize the space, the room changes height as you step down from the entrance level making the ceiling height 11'-0" below the volumes and 20'-0" at the spaces between the volumes.

70 |

a place to live

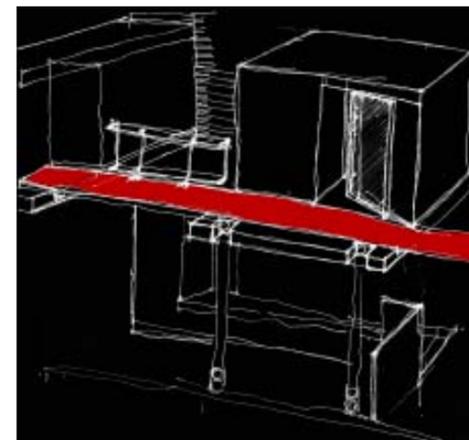
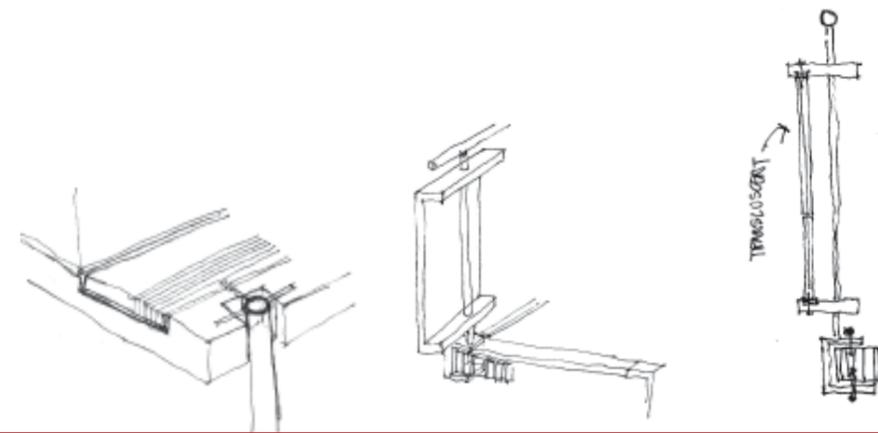
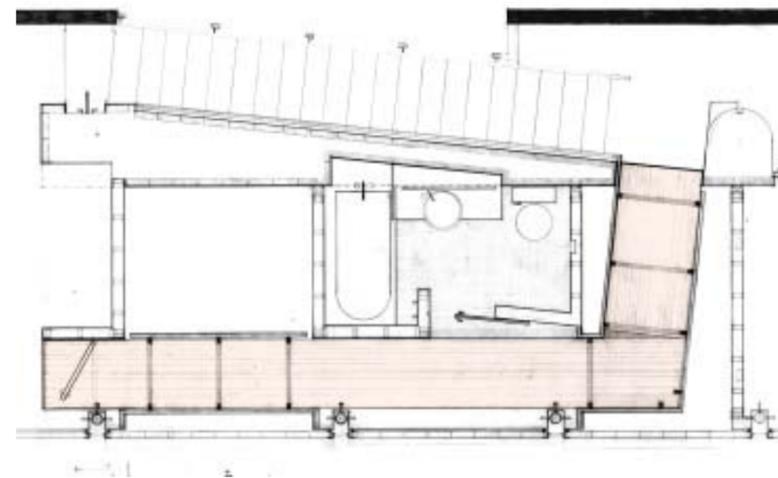


| 71



The rotation in the red wall is directional in two ways; leads to the living area, and is a way in letting one know where they are.





As a result of the three volumes a bridge is created for access to each volume. Thus, creating an open 'corridor' in lieu of a closed corridor. In addition, it allows the light and air to flow to the living area below; and ultimately creating varying ceiling heights.

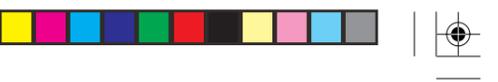
The bridge is made of a series of strips of wood laid vertically for maximum strength. Steel rods are threaded through to add additional support to the wood bridge.

The railing is connected to the bridge with steel. It is attached

The railing is composed of many parts. The compression post holds the 1 x 6 at the top of the bottom, which secures the translucent glass panel in place. The handrail is painted steel pipe.

The bridge provides a visual connection between the living area and second floor.



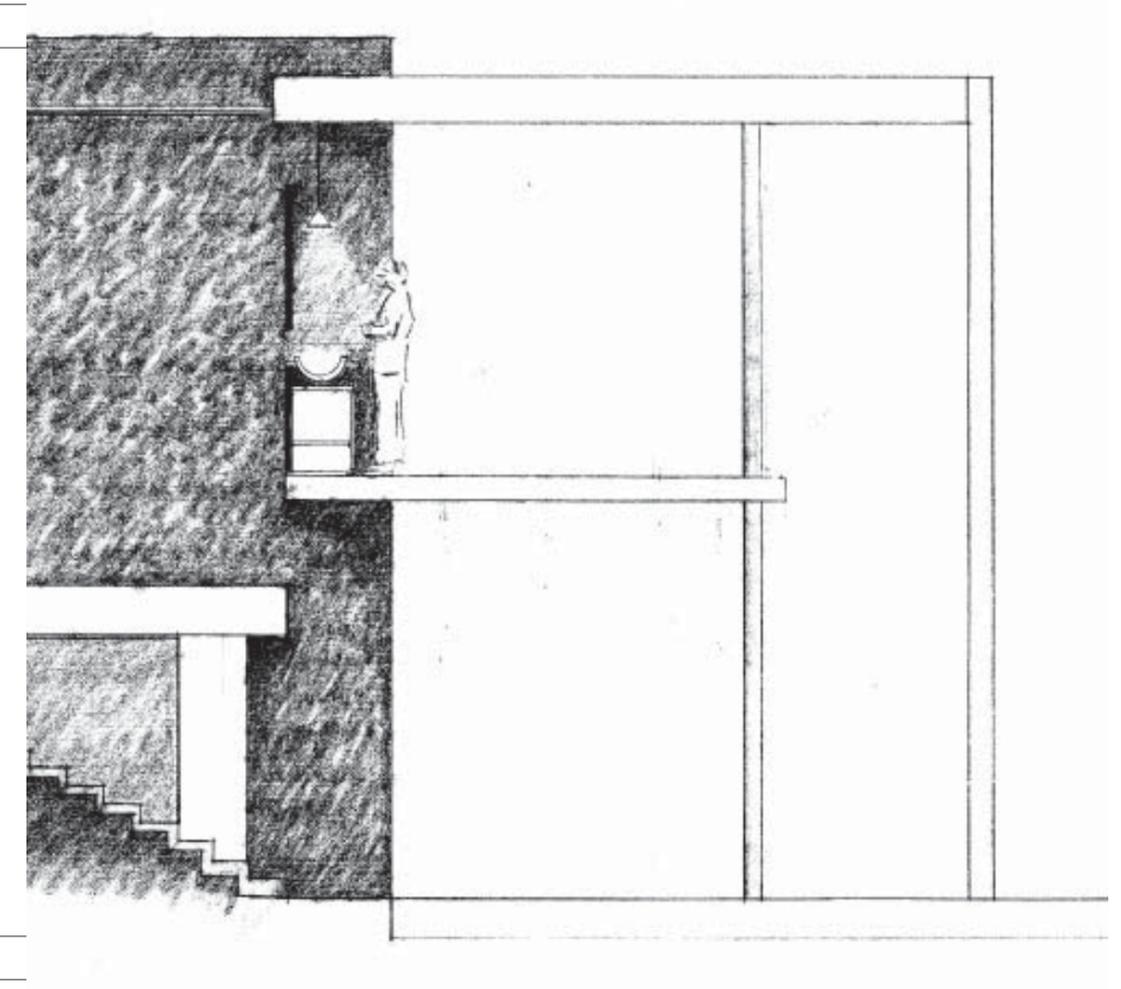
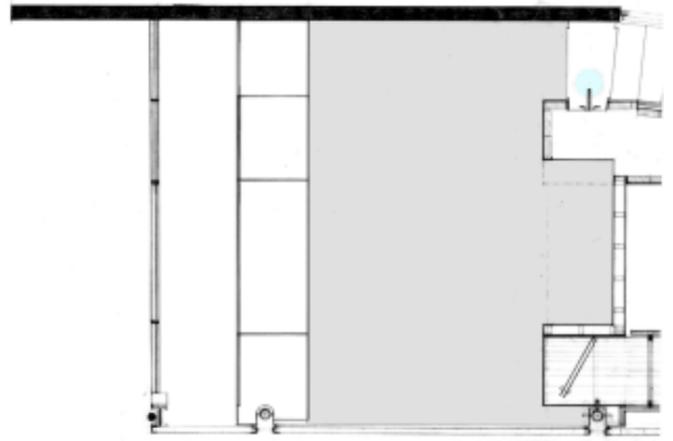


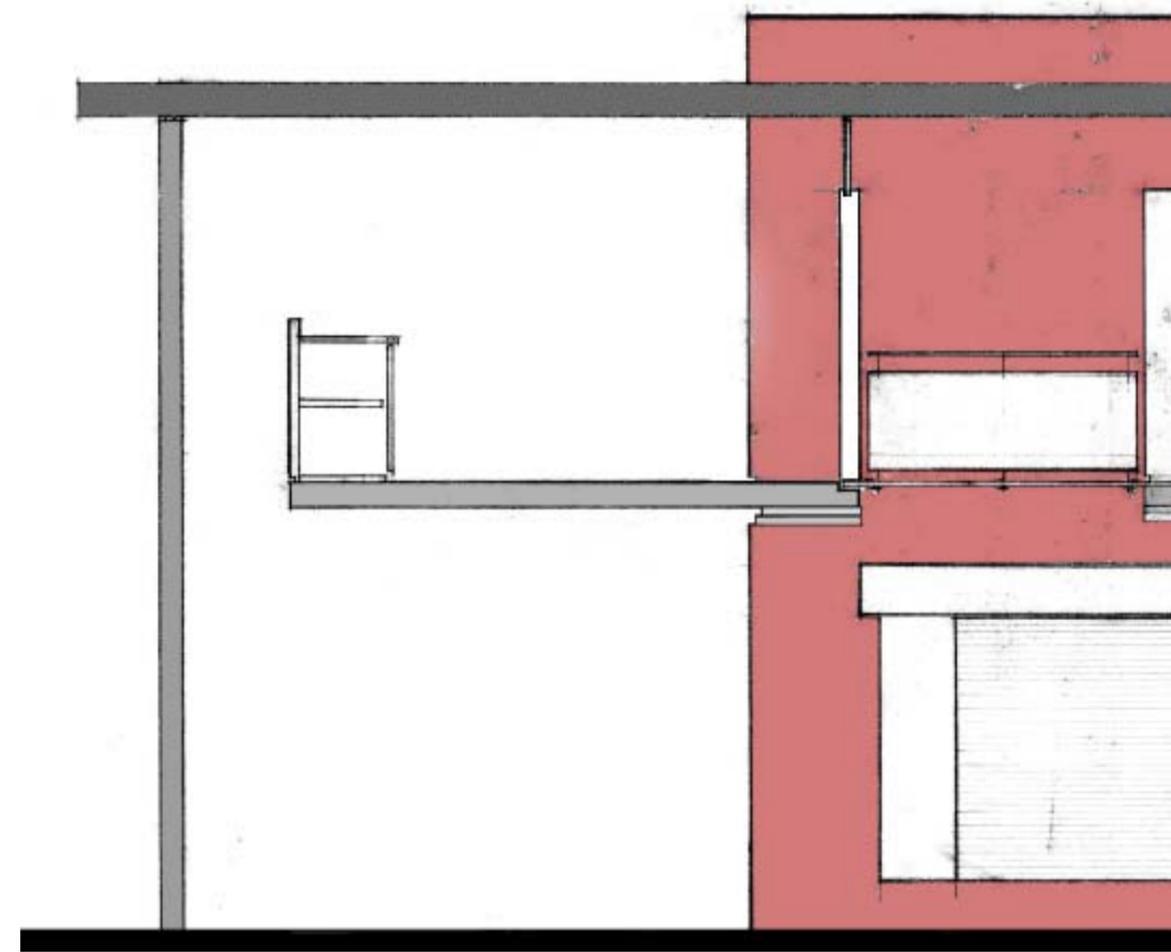
beds, with hanging space, drawers and doors act as the guard.

The windows are operable from this floor, through a pully system next to the north wall.

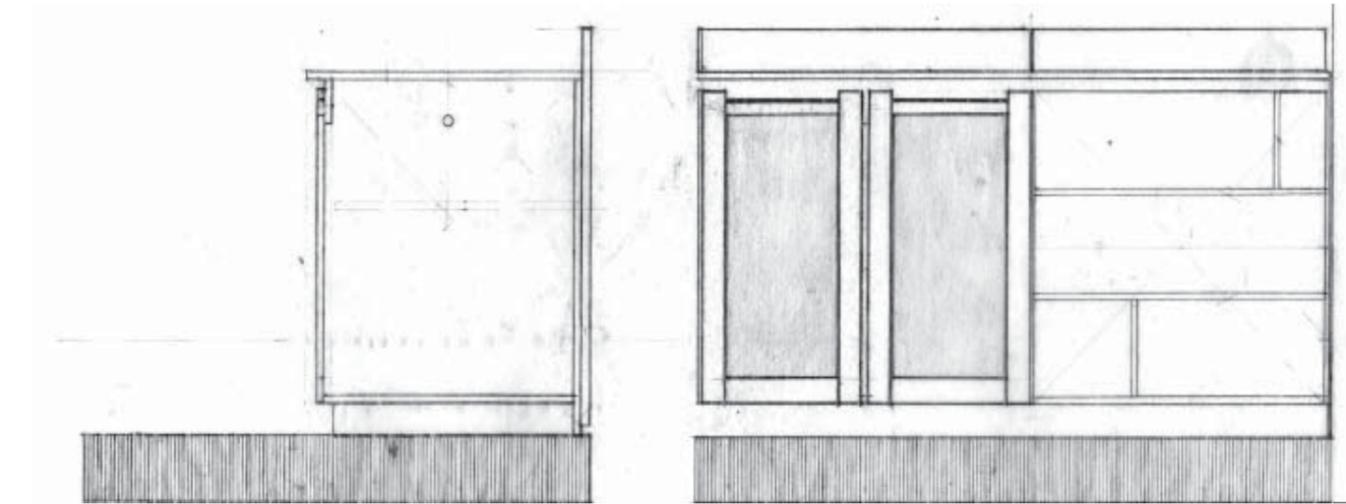
cabinets
south north walls
openness to yar
open to below
ceiling height

This room also has a vanity built in over the sairs. a mirror is suspended open between the red wall and the north wall, which also allows for natural flow of air to pass

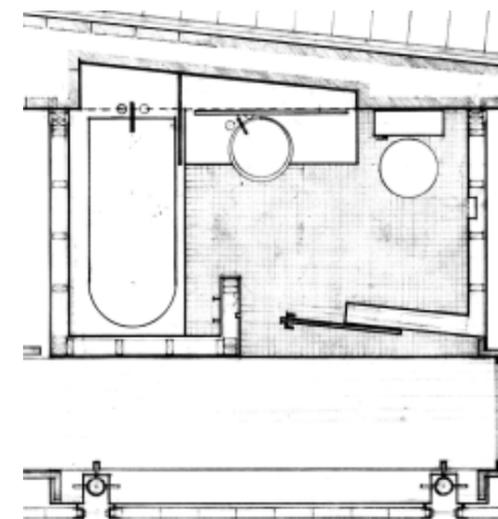




78 | section looking north.
the relationship between the
bedroom and the living room.
the cabinets providing a
guard the ceiling contin-
ues.



79 | storage cabinets provide a barrier to below, allowing
the light to come int. from the yard. a view of the
back yard. the room a feeling that the room is larger
the ceiling continue a consistant ceiling eheights

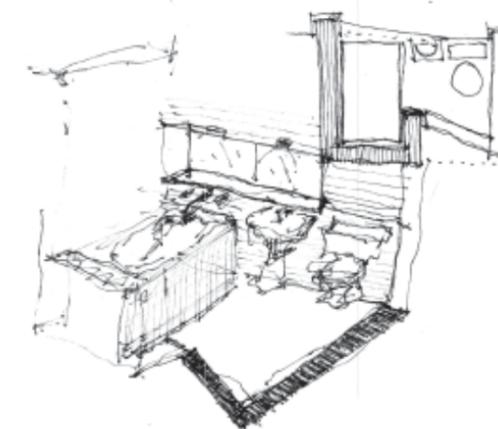


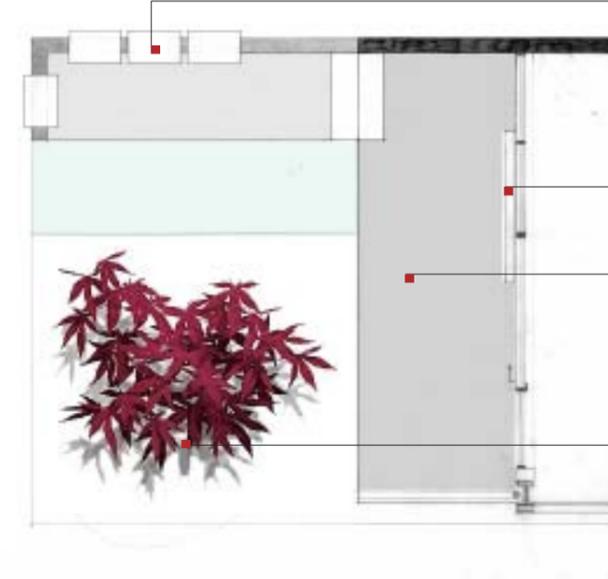
The center volume is the bathroom.

A simple, intimate space. This room has a low ceiling. The red wall is very much part of the space. A subtraction is made to provide space for a pivoting mirror and shelving behind.

A glass partition cuts through the shelving and the shelving becomes part of the shower. The floor, and the tub and shower are 1 x 1 glass tile.

a door on a slider is the bathroom door, to give maximum space to the bridge and bathroom.





the north wall ends and lowers, providing a place for seating

the door slides wide open to extend the living room for many, or swings opens for one.

the living room floor continues beyond the door to the backyard 20" above ground level and becomes a shaded place to sit.

japanese maple sits in the center of the space providing shading and additional privacy



Privacy

Allowing the living room to extend to the yard expands the space. It is very versatile. The sliding door which allows many to come and go or the single swing door that allows one.





i have learned a lot from this project. although from the time that i started and finally finished. i have learned more. understanding this project may take me a lifetime. but for now it must be time to be finished. with all of the time that has past. i still love this project. and still want to contiu learning form it.

spacial relationships. connections. t

life. takes you thourgh series of experiences. this house could keep growing

the effort that has gone itnot understanding detials is endeterminalbe. it is just a begiings

experienceing tthe space. understanding the

although this projet has come to an end. it is truley the very beginning. i continue to collect ideas from my surroundings to create great spaces.





vita



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