

SEVEN LOCI
The Completion of Villa Maderni

*A design for the expansion of the Center for
European Studies and Architecture in Riva
San Vitale, Switzerland, a campus of Virginia
Polytechnic Institute and State University*

Thesis submitted to the faculty of Virginia
Polytechnic Institute and State University
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ABSTRACT

Every architect must develop for him or herself a framework, or principles through which to ponder and make architecture. From structural systems to materials and evolving technologies, construction and criticism in the development of a work may result in an intelligent form if the architect works from those principles consistently but is flexible in the approach to a changing number of issues arising and affecting that work. Thinking of architecture in metaphor, or through symbols and those physical things existing outside the art entirely, can provide a rich and objective source of parallel models guiding vital choices in the design process.

Through observation and critical response, *Seven Loci: The Completion of Villa Maderni* is for the author not only a work reflective of his still emergent design judgments, but also one birthed as he lived and worked in the physical fabric of the place. The primary goal of this work is to propose an inhabitable enclosure for the perimeter of an already sacred villa and garden in the Ticino region of Switzerland. The secondary goal of the thesis is to explore and propose an architecture which does not make a forgery of the villa, but one whose language is of its own time and materials, all the while responding to the architectural conditions and more invisible traditions of the town, street and site. Finally, the tertiary and most vital goal of the work is to continuously reflect upon the design's evolution, and in so doing acquire an understanding of architecture whose reach extends indefinitely beyond the project itself.



footpaths of Monte San Giorgio

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Completed in 1965 by Aurelio Galfetti, the school of Riva San Vitale is associated with the nodal point of the town. (Fig. 1)



Introduction

In April 2001, the noted architectural theorist Jacques Gubler stood beside a cold, square column of a Ticino middle school and proclaimed that the bare, sitecast skeleton frame, like the one in front of him, was the beginning and end of architectural integrity. To Gubler, the plasticity of the material and the visible record of its crafting could not be equaled in its beauty by any other archetype. From behind his thick eyeglasses and trench coat, his slow and raspy voice convinced us of one of the true secrets in modern architecture: *the skeleton and its infill*.

Following our afternoon of discovery in the valley of Mendrisotto, we rejoined the distinguished Frenchman for a discussion of all we observed. Through the metaphor of the human body, I challenged his notions that architecture could be realized only through the articulation of a skeleton alone. Could a construction not also acquire muscles, joints, a shell or a skin? If the creation of our own anatomy is unparalleled in complexity and function, how is it that a modern building loses its “integrity” in a physical commitment to these layers? Mr. Gubler stared up at the sixteen foot ceiling and soon responded that he supposed architecture could be achieved through this anthropomorphic understanding; not through its systems or layers, however, but in the spaces differentiating them.

While a continuum of architectural questions and responses constructed the design of the expansion of Villa Maderni, its relevance to those outside the academic realm of inquiry can be made clearer through a more concise collection of drawings and written observations. This particular record, however, exhibits a range of inquiry greater than the project itself; that is, the acts and consequences of those acts involved in arriving at discoveries and conclusions in architecture, in written text and physical forms.

The birth and sustained growth of a good cause must first be believed excellent by those witnessing and taking ownership of the work. Although the limitations of policy and local building codes may thwart or even dissolve the potential of much of this design, it is my hope that this compilation of drawings will define, or at least help us reexamine, the possibilities for the needed physical expansion of our terrific center of learning in the Ticino Valley.

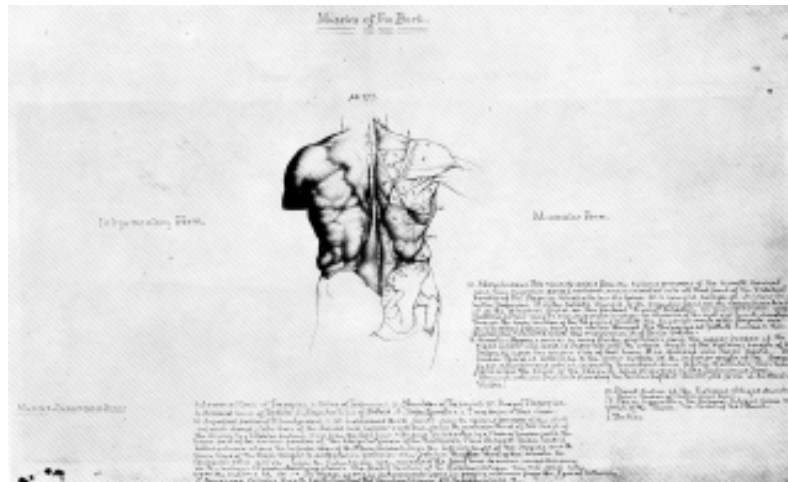


Figure 2

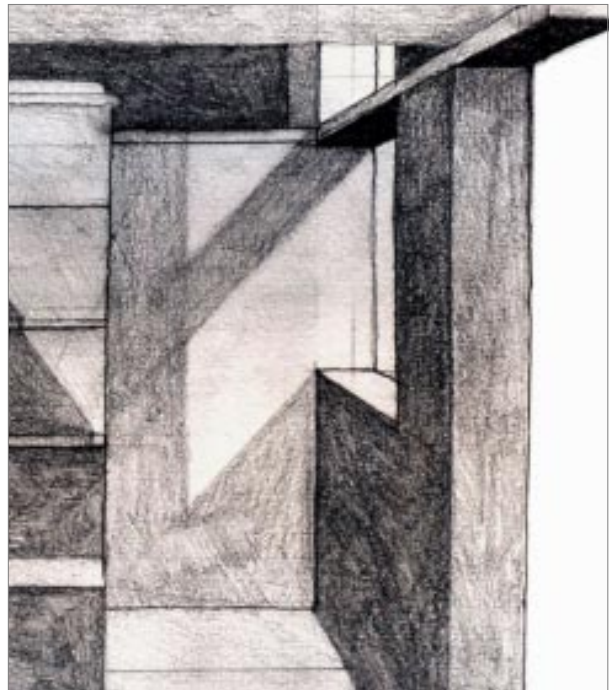
observing

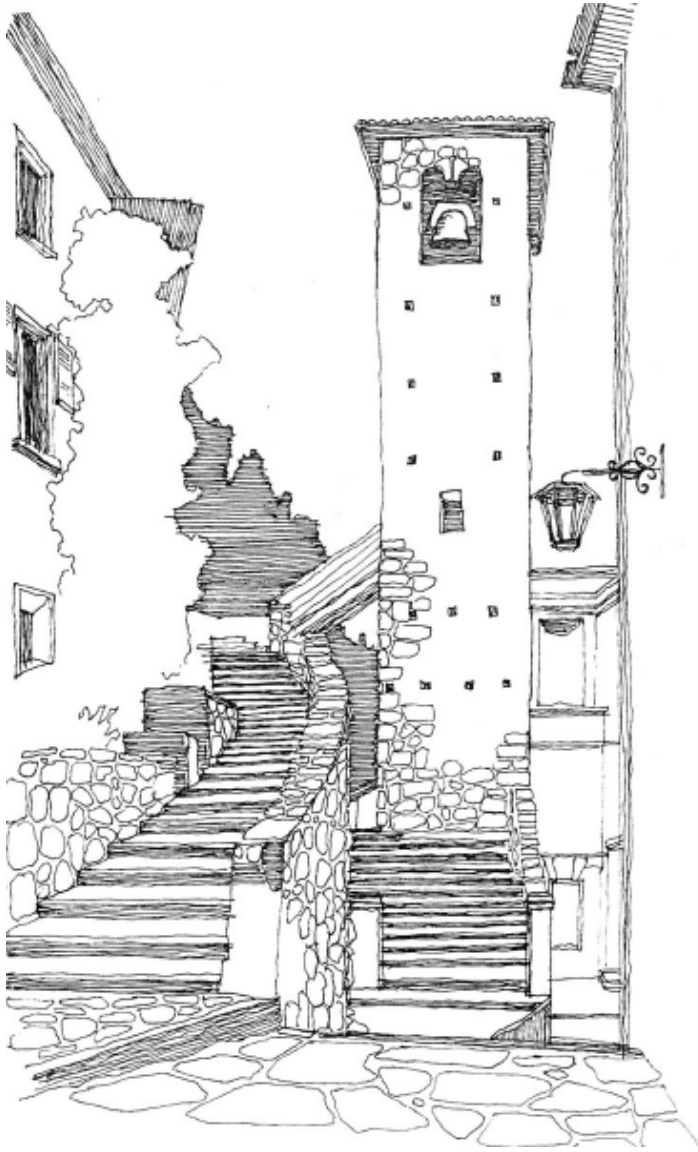
Observing a Villa

Entering the fabric of the Ticino River basin

What Makes a Cell?

Communal living made rich in places of solitude





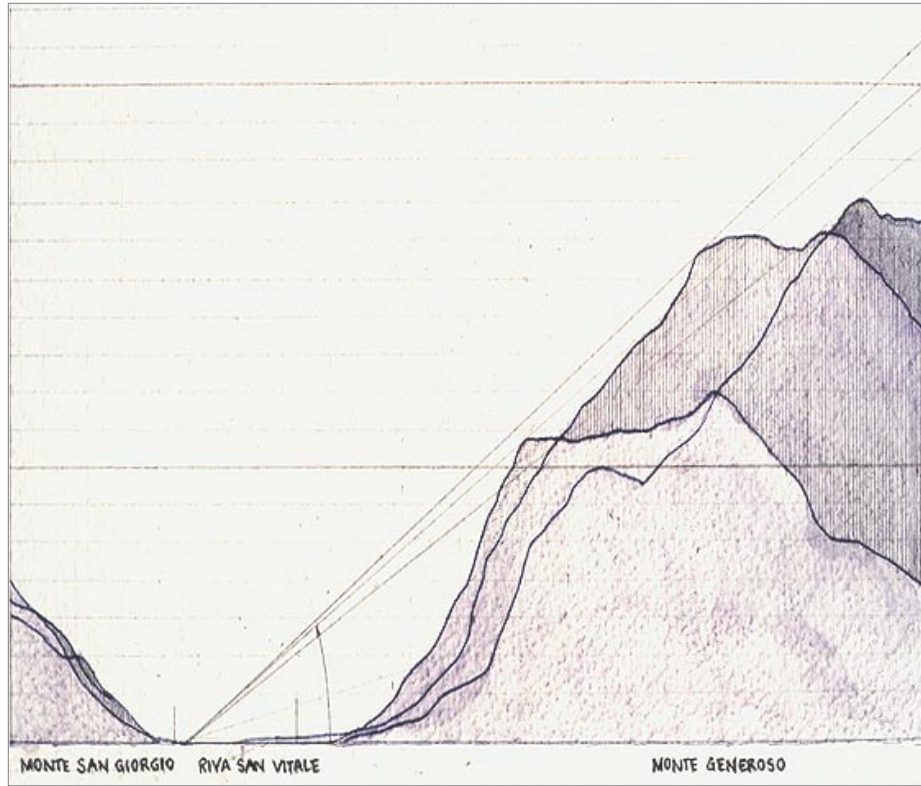
A church tower in Gandria, east of Lugano, hugs the streets on the severe slope for which the town is so often recognized. For most, the simplest means of access to the town is by water. opposite: a section through the towns of Riva San Vitale and Capolago reveals the dynamic topographical changes of the region and aids in design studies of views and direct sunlight.

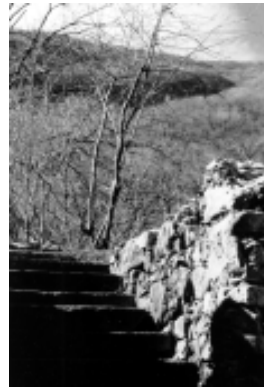
Observing a villa

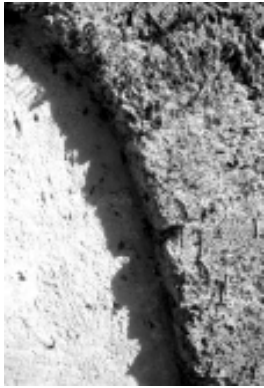
entering the fabric of the Ticino River Basin

To the architect of the Ticino River basin, the notion of building in direct relationship to the history of a region is not only characteristic of his work, but also inescapable. The 1,086 square mile region occupied by this canton of southern Switzerland has remained a coveted passage since the height of the Roman Empire. The dynamic land changes in altitude from over 2,300 meters near the summit of the Grieshorn to under 200 meters by the Lakes Maggiore and Lugano. True to its form, centuries of changing the natural conditions of the land into rational places for dwelling are compounded by layers of craftsmanship in the region. Axially rigid Roman roads intersect Renaissance and Baroque forms, which act in visible tension with the strict Neorationalist work of several twentieth century architects.

The construction of complex towns in the crevasses of the Ticino valley has been forever ruled by the limitations of space and available materials. Yet, those factors present, the scarcity of resources understood as fundamental to proper planning and building actually contributes much richness to the living traditions of the region. The organization of towns around the Ticinese lakes uses as its premise that space is limited, and therefore sacred. To exist, each new building or planning project must recognize its place in the region and respond to both its physical and more esoteric contexts.







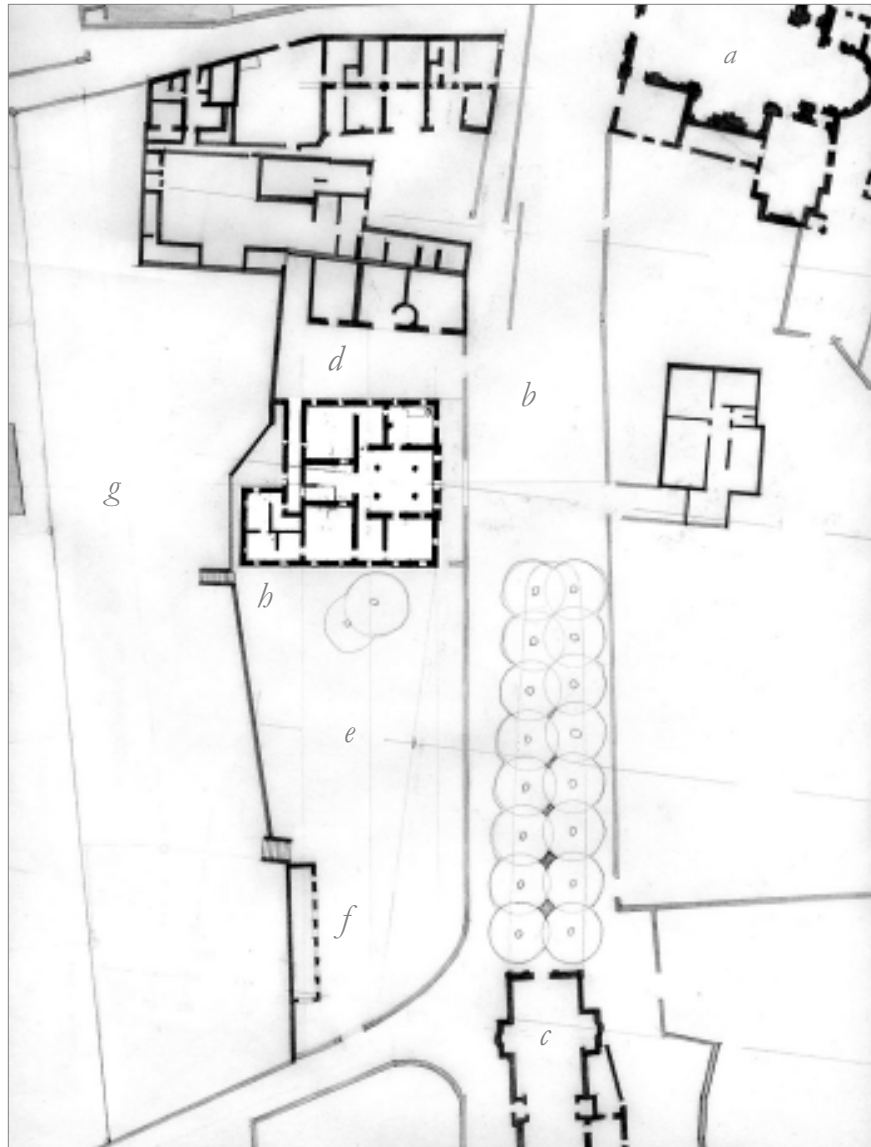


That architecture is a physical response to forces acting upon a place, both visibly and invisibly, cannot be overstated. For the town of Riva San Vitale, the regeneration of the two hundred year old Villa Maderni as the Center for European Studies and Architecture has placed this sensitive context into the forefront of the student experience.

As greater numbers of students continue to arrive at and live in the villa, the physical response of its architecture must carefully follow and adapt to its success. Yet, the architecture of Villa Maderni must first recognize its place in the fabric of the town and its unique relationship to the land, sitting deep in a valley. It must respond to the structure of the late Renaissance house and its sprawling Baroque garden. And finally, any new construction should be a delight to inhabit - for students, professors, groundskeepers, cooks, administrators and guests of the town. Only after these issues have been contemplated can an architect propose a new structure, space and material.

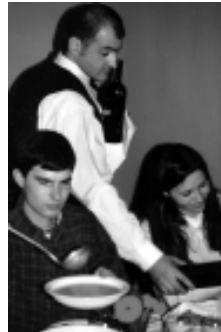


Figure 3



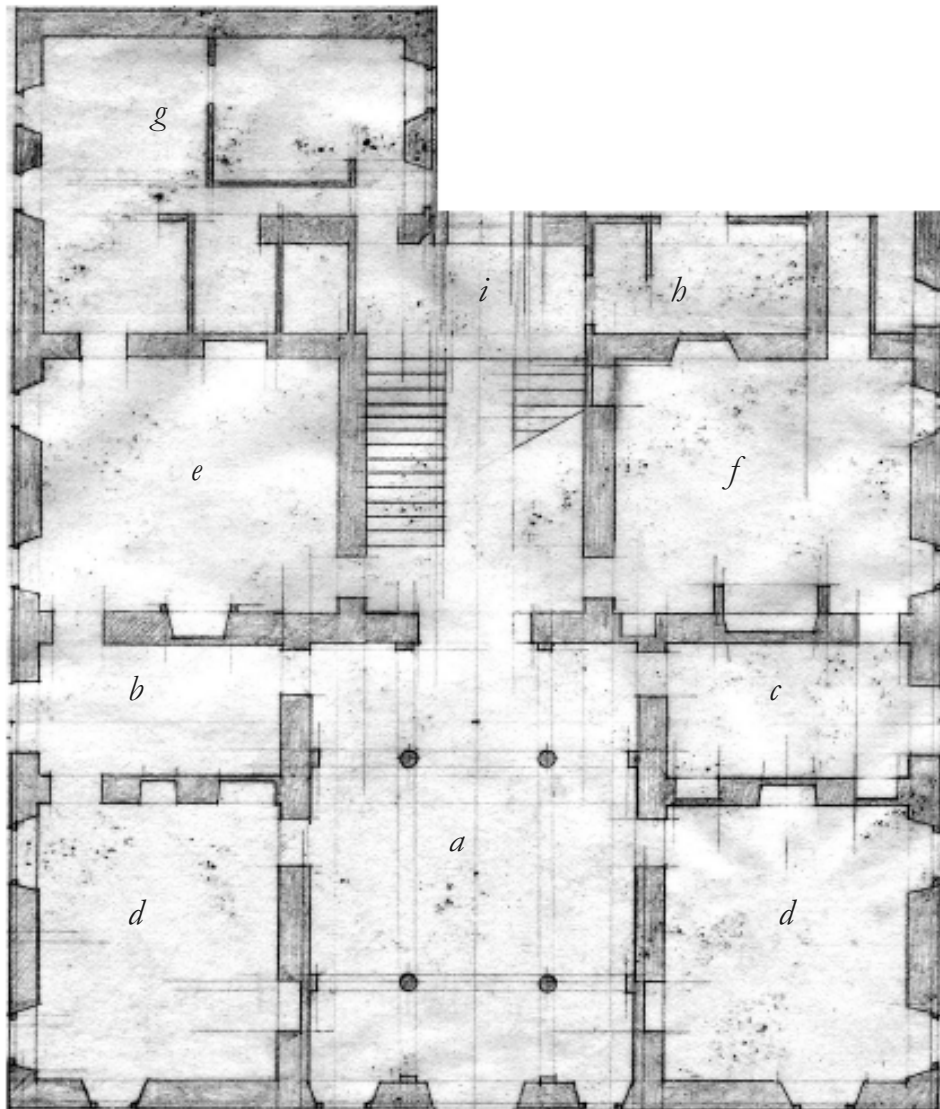
LEGEND

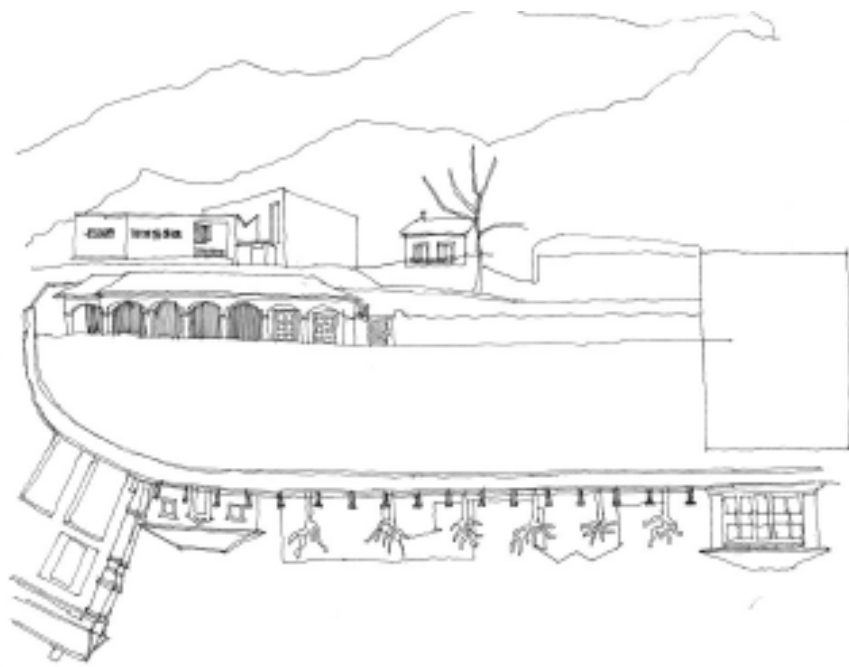
- a* Church of Riva San Vitale
- b* Via Settala
- c* Church of San Rocco
- d* villa stables and court
- e* villa garden
- f* villa washhouse
- g* undeveloped property
- b* Casa Maderni

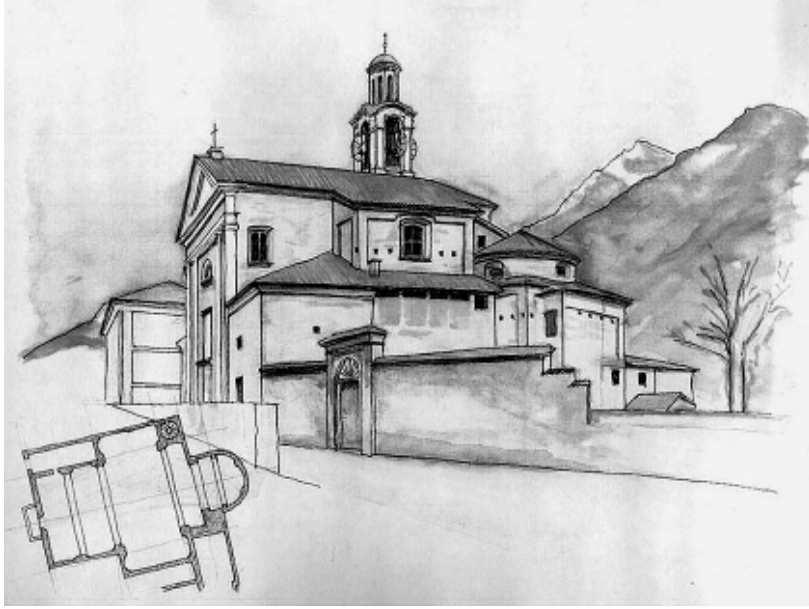


LEGEND

- a* entrance hall
- b* south entrance
- c* north entrance
- d* office
- e* dining room
- f* living room
- g* kitchen







What makes a cell?

Communal living made rich in places of solitude

The vast majority of the vital student experiences at Villa Maderni are communal in nature. Students dine together for three daily meals, attend classes and design studios together, and likewise spend innumerable hours in and around the town in groups. Communal living extends further still, as students share a bedroom with two or three others. Unless he purposely creates the time and physical space for temporary solitude and reflection, a student will more often than not find himself sharing his proximity with another. The boundaries of work, rest and interaction with others are only differentiated by the thick walls of the Casa which divide one room from another. Presently, Casa Maderni accommodates the living arrangements of close to two dozen students, with all other students in subsidiary housing off the site and dispersed throughout the town.

The growing density of the villa faces parallel questions and issues which are encountered in urban contexts of high density. Can dwelling places and the workplace exist in the same structural envelope? Does the spatial overlap of one function with another distort their limits and impose confusion, or does the convenience of their proximity help optimize learning? As city planning evolved and prompted the divisions of urban spaces and zones, the villa faces these issues on a more minute scale. Nevertheless, regardless of those models which one could forever investigate and develop hypotheses, one's questions for the growth of Villa Maderni should center squarely on caring for *the mind of the student*.

Perhaps a better model for the architect's inquiry of community is that of monastic living. Traditionally, the physical structures of the monasteries of western Europe were those which clearly differentiated the life of solitude with that of living in community. In fact, a belief held in common by these religious orders was that the life of community and sharing was only possible after times of retreat and solitude were imposed. While the unity of the brotherhood was experienced during worship in the *church*, the enrichment and reflection necessary for the spiritual maturity of a monk was only possible in his *cell*. It was the task of the architect for a monastic order to recognize this ritual and propose a structure responding to this differentiation.



In the Convent of La Tourette, in Evreux, France, the modest and simple cell of sitecast concrete is a response to the vital rituals of the brother finding solitude: reading, reflection, prayer, washing and sleep. Its simplicity and rather spartan qualities elicit calmness in the individual seeking retreat on this rural hill in southern France.

opposite, top: An irregular site required that Borromini construct a design for cells of a "collegio" which respected its geometry and still complemented the existing structure of the church. opposite, right: Both the convent of La Tourette (c. 1955) and La Certosa di Pavia (sixteenth century) make the articulation of the single housing unit, or cell, the foundation upon which a thriving life in community is first based.

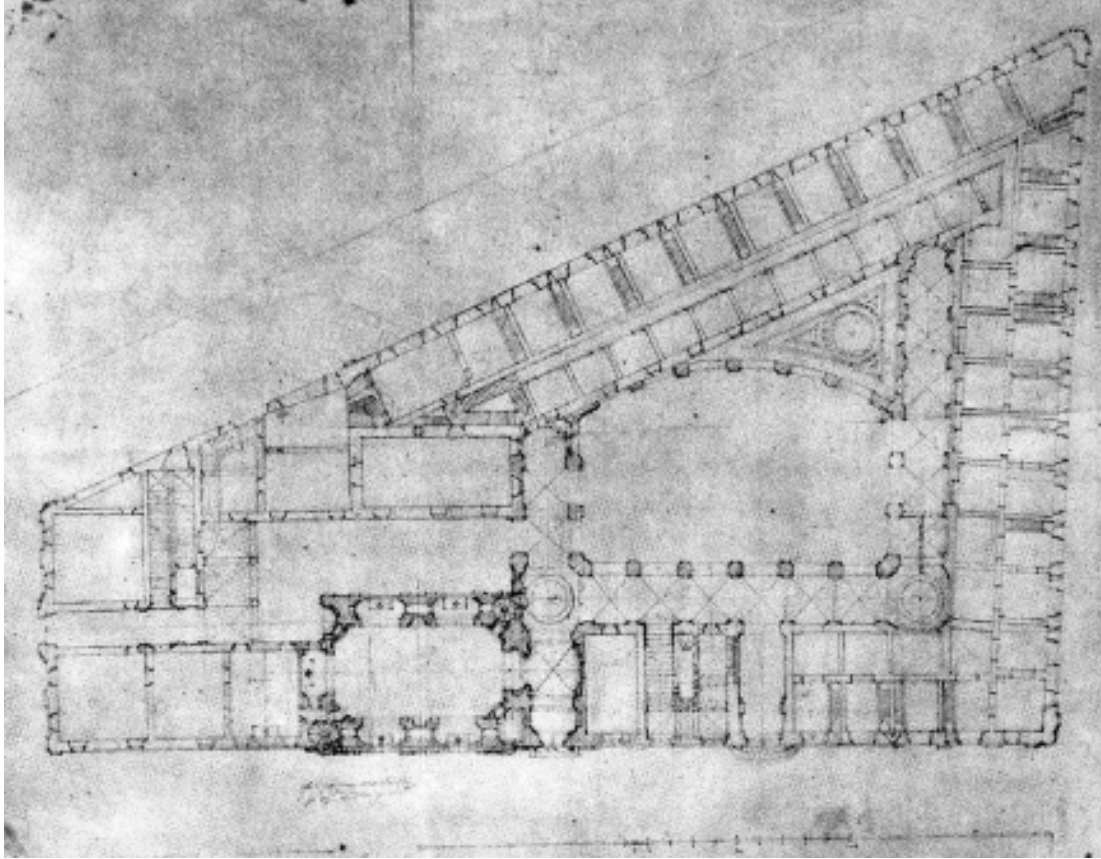


Figure 4



Figure 5

If the model of monastic living characterizes a favorable balance sought in living both in community and in solitude, a design can translate its working architectural and spatial principles into another program with parallel requirements. In the case of Villa Maderni, its growing density can find relief in an architecture which physically differentiates the student from the populace. While a student learns, achieves and experiences more in the communal setting, periods of solitude can give a student equally powerful responses through contemplation, rest and renewal. Thus the structure of the *cell*, like to a monk, is an essential place responding to the rituals of the student of the university. It must be of firm construction, useful, and delightful to inhabit. Its fabric must be such that a student can adapt or change its character to his or her liking, therein comfortably assuming its ownership for the longevity of the experience in Riva San Vitale.

The common response to the notion of living in a “cell” is one of reservation. The term conjures images of a cold, awkward and undersized room, perhaps like that of a monastery or one of solitary confinement, where the human condition is subjugated and one is left without choices. To the extent that the word defines a room for one dweller, however, it is an effective term for spatial definition. It purely represents one essential, repeating unit in a larger and rhythmic unified group.

Besides the expectations common in all of architecture, a cell for a student has its own more specific design requirements. The effective extension of Villa Maderni into its remaining property is dependent upon these rules being satisfied within the details of the design.

The cell must relate well with its dweller. The design of a small dwelling for a traveling student must recognize the rituals and typical habits of the student. The bodily movements associated with sleeping, washing, dressing, sitting, writing and collecting must all find a place in a spatially efficient room.

The cell must take a position on how it relates to other cells. The birth of the housing expansion purposely centered upon the opportunity for solitude and reflection. Knowing this, a cell must have the ability to either relate, or not relate, with other students’ cells. This differentiation provides students choices in how open or truly private the cell becomes. As most students welcome living with another, these issues invoke the question and possibility of designing a cell for two students as well as a cell for one.

The cell must relate to the villa’s places of community. Since Villa Maderni was first renovated and used by the University, its garden has been considered a sacred piece of the fabric of the villa. The property south of the casa, enclosed by walls of stacked stone, an aging brick washhouse, and a wide variety floral species, is a space not only appreciated but one maintained as a sanctuary and place of rest. Thus the structure of the cells must relate well to the presence of the garden, by respecting its fragility and offering the student gentle access to it from his or her cell.

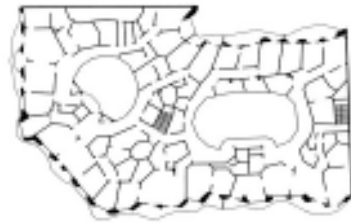
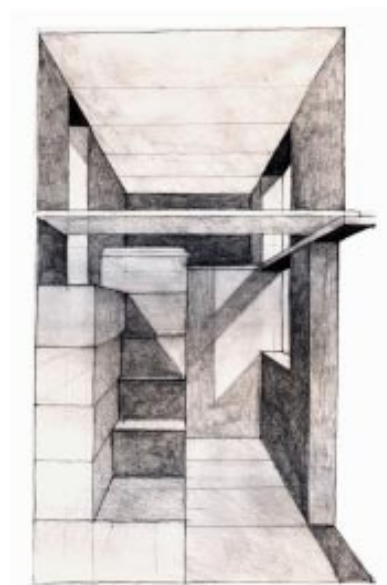
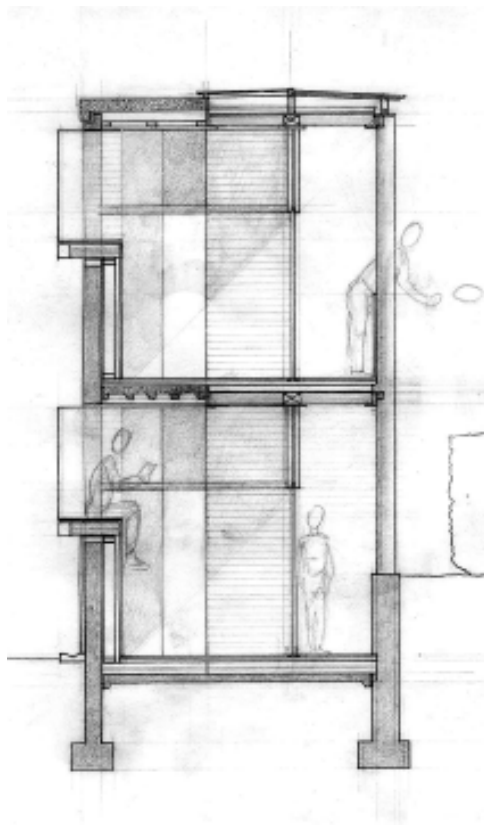


Figure 6



above and right: early design drawings for cells in the garden of Villa Maderni

left: Barcelona's Casa Mila, designed by Antoni Gaudí near the turn of the twentieth century, is a collection of dwelling spaces, each unit of which is unique in size and form. Although the design calls for an irregular geometry and no rooms repeat the form of the next, each unit plays a crucial spatial role in the fabric of the whole structure. right: This housing block in Berlin (architect: Andreas Becher) employs a more rigid spatial repetition opposite that of Gaudí, one with such remarkable craftsmanship that its space and materials are glorified in its predictability.

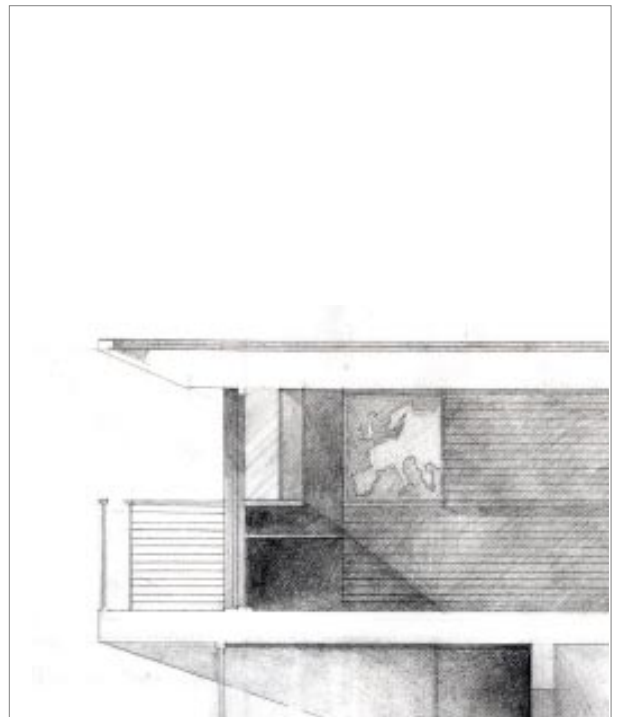


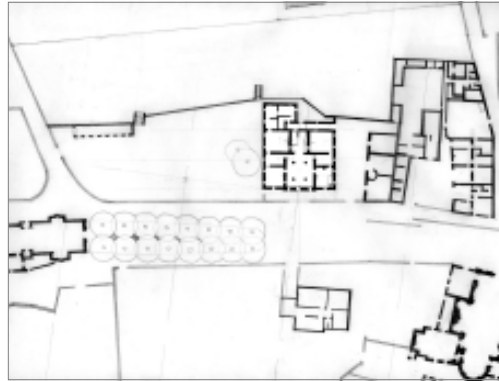
responding

SEVEN LOCI:
The Completion of Villa Maderni

Living in Community

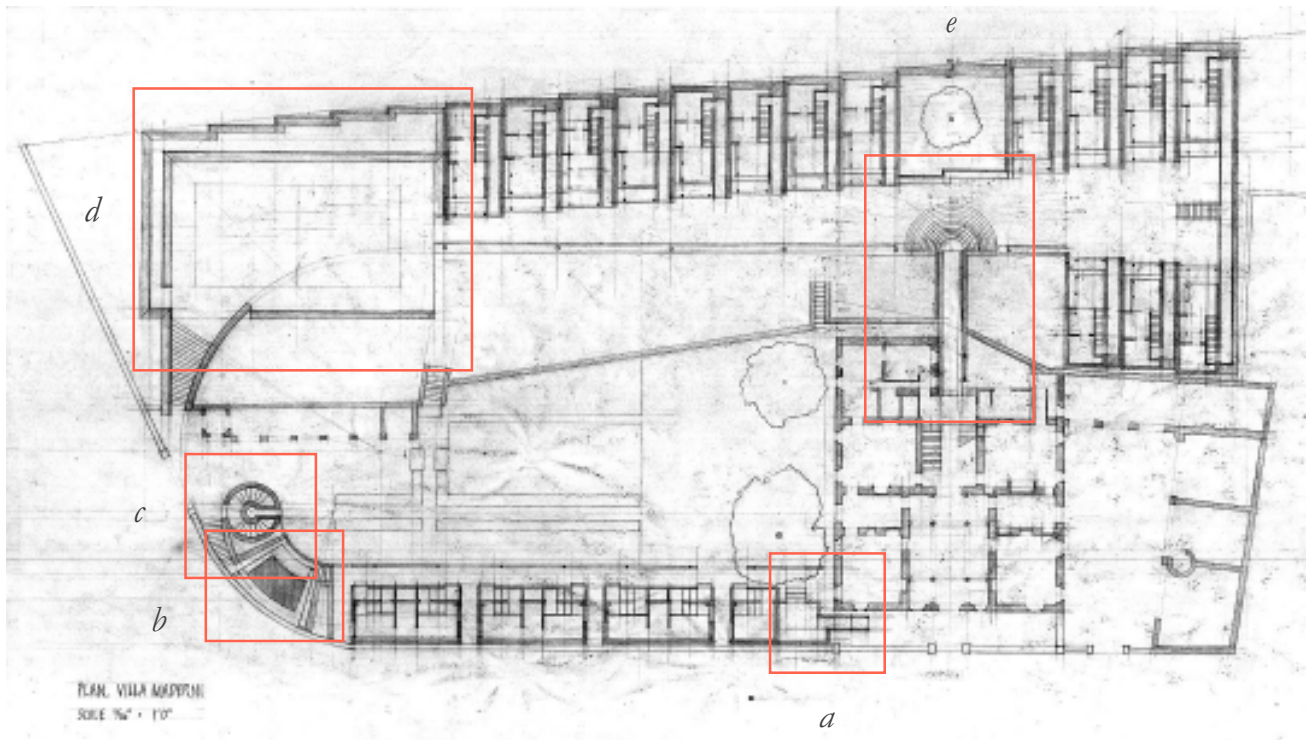
Living in Solitude





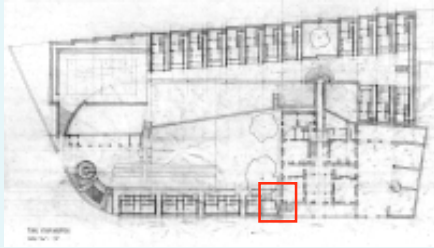
The primary goal for expanding the housing of Villa Maderni is to give students personalized dwelling places on the property, thus balancing the communal life with that of the individual. While the designs for student housing are the most essential pieces for the growth of the villa, five other loci, or “places,” are vital communal centers of activity for students in the outdoors.

Within the thick walls of Casa Maderni, classrooms, computing labs, bedrooms, living rooms and a dining room all coexist. The designs of these five other places around and beyond the axes of the garden recognize the totality of the property, and extend the value of learning, playing and socializing into the beautiful outdoor setting of the Ticino valley.



LEGEND

- a* threshold
- b* forum
- c* tower
- d* arena
- e* bridge

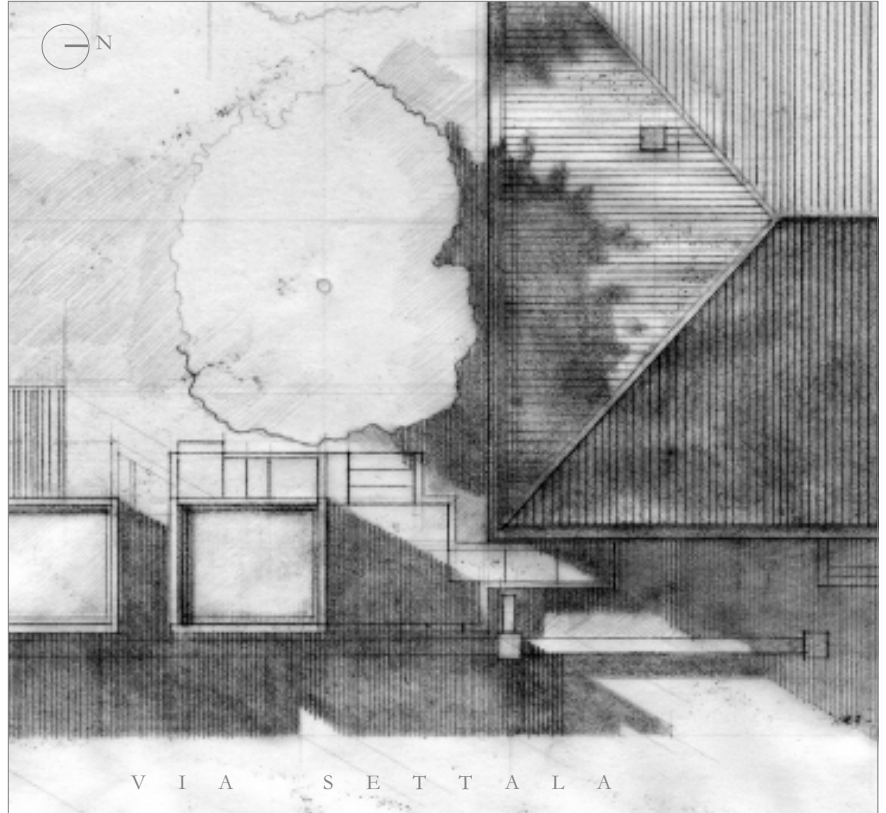
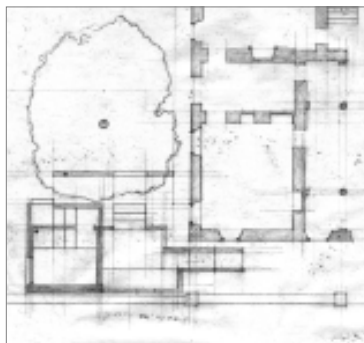
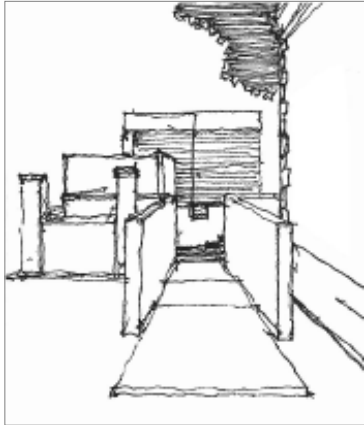


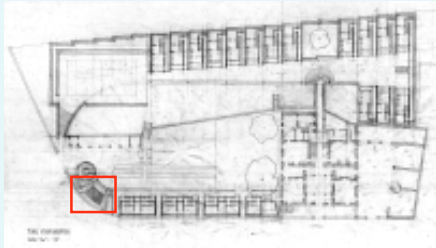
A threshold of sitecast concrete is a physical connection between the villa garden and the face of Casa Maderni and Via Settala. As an alternative to the existing stacked stone wall of the garden and the plastered walls of Casa Maderni, this design bravely introduces a modern building material inserted amongst those of the older structures. While the concrete subtly defines the floor condition with paving elements and chest-high walls, the overhead presence of the massive magnolia tree in the garden is a natural canopy over the space defining entrance and departure. Consistent with the villa's introverted posture and structure relative to the urban conditions of the site, the new threshold adds greater compression and definition to the experience.



The making of an entrance was to Carlo Scarpa a magnificent opportunity for architectural definition. At both the Brion-Vega Cemetery and the Castelvecchio Museum in the Veneto region, thresholds of concrete exhibit the power of the floor condition passing through an entrance.

threshold





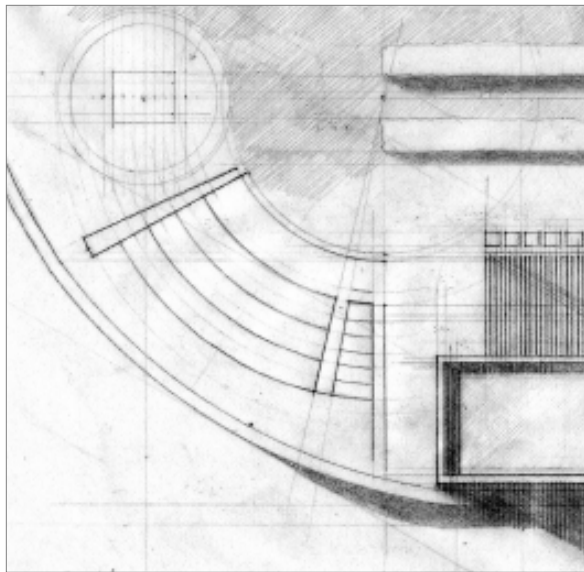
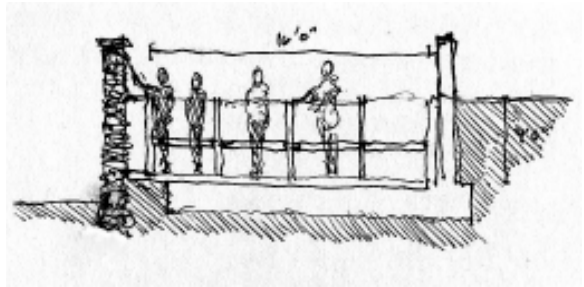
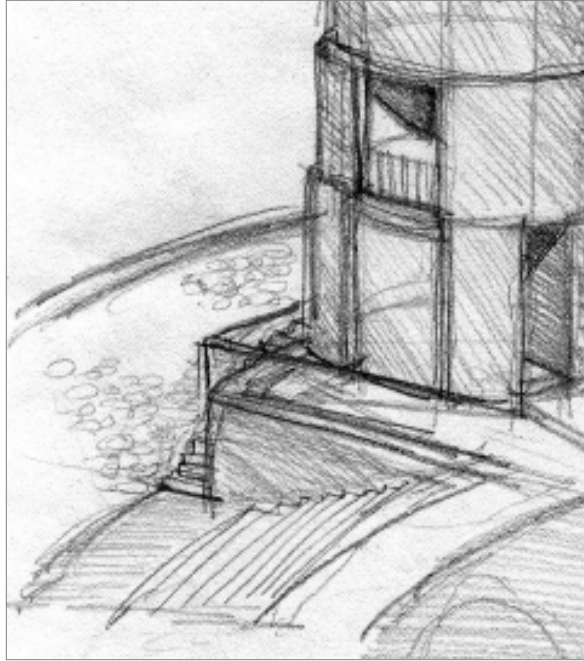
Past the student cells along the existing east garden wall of stacked stone, an outdoor classroom, or *forum*, is a recessed and stepped area of concrete. Open to the sky, it could accommodate the assembly of twenty or more. Its strongest qualities are its ambiguity to function and its relationships to the curving stone wall and the neighboring tower. As any student who has formerly lived at the villa will remember, to have time to experience the garden in the fall or spring is as enriching as it is restful. Like the threshold, the forum is a physical response to magnify a previously existing ritual: that of being in the outdoors.

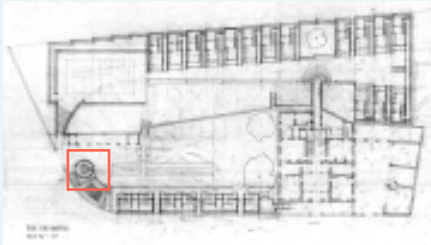


The Wesner Center for the Arts, in Columbus, Ohio exhibits an architecture which extends well beyond the building envelope. For Peter Eisenmann, the stepped exterior becomes a place of gathering and rest as well as a means of elevating an entrance.



Figure 7



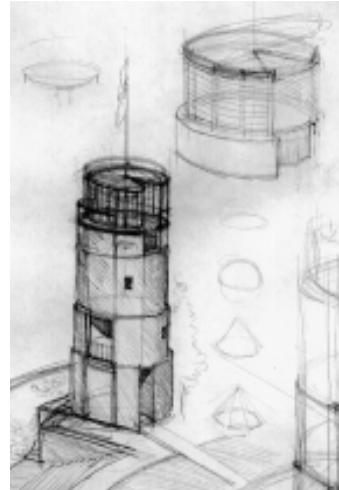


Riva San Vitale enjoys several towers rising above the roofs of the town. The churches of Santa Croce, Riva San Vitale and San Rocco are seen and heard daily, standing and echoing as symbols of the rich religious tradition of Riva San Vitale and providing points of orientation in the streets.

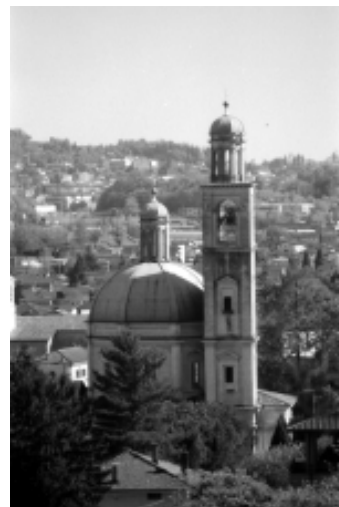
In the southernmost portion of the new villa design, within the radius of the stone wall, stands a round tower also primarily of sitecast and precast concrete. It stands forty-four feet high (13.4 m), and its diameter of seventeen feet (5.2 m) is a physical space large enough to be ascended and inhabited as a place of recreation and wonderful views of the town and valley.

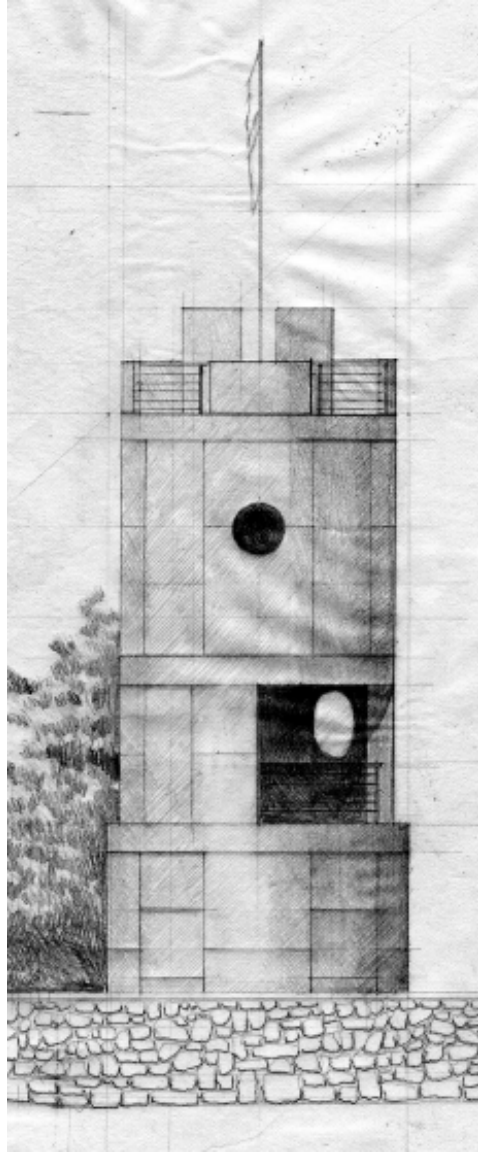


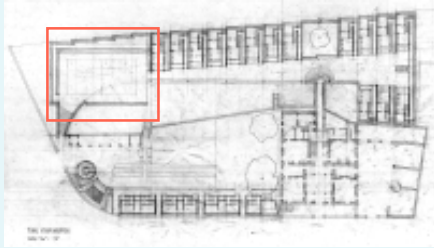
Figure 8



While Riva San Vitale sits deep in the Ticino Valley, its towers juxtapose this phenomenon and acquaint the town with the sky. The towers of her churches are to the town like those seen across the skyline of Florence, opposite.







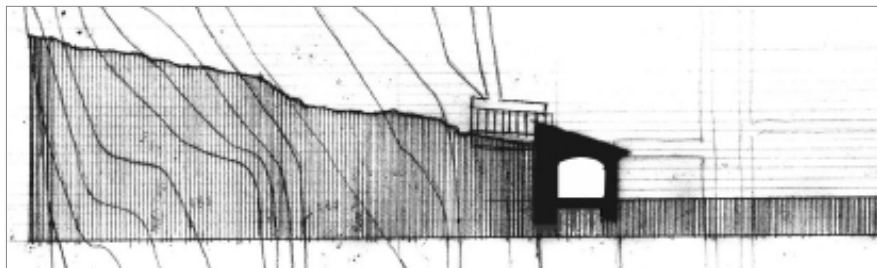
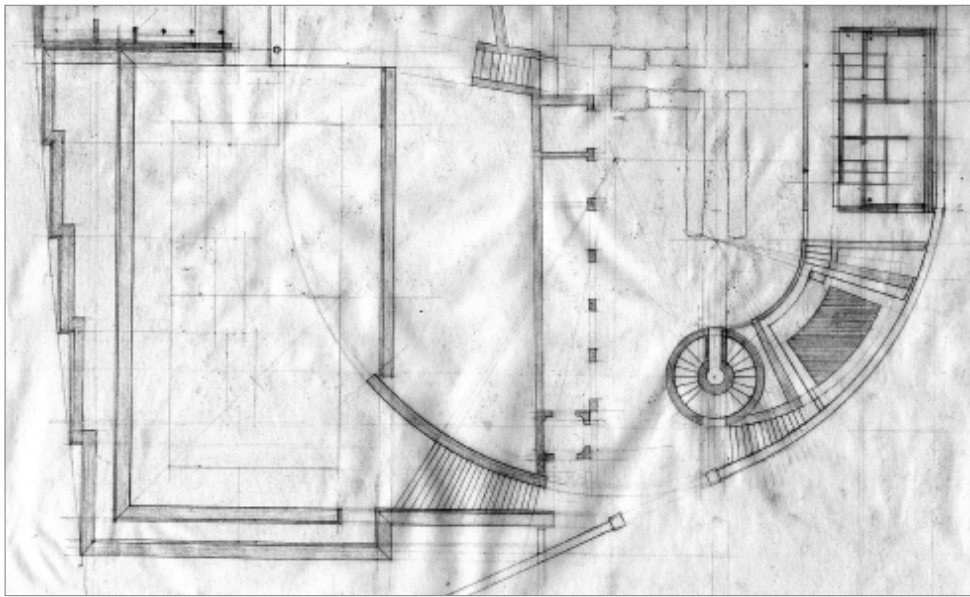
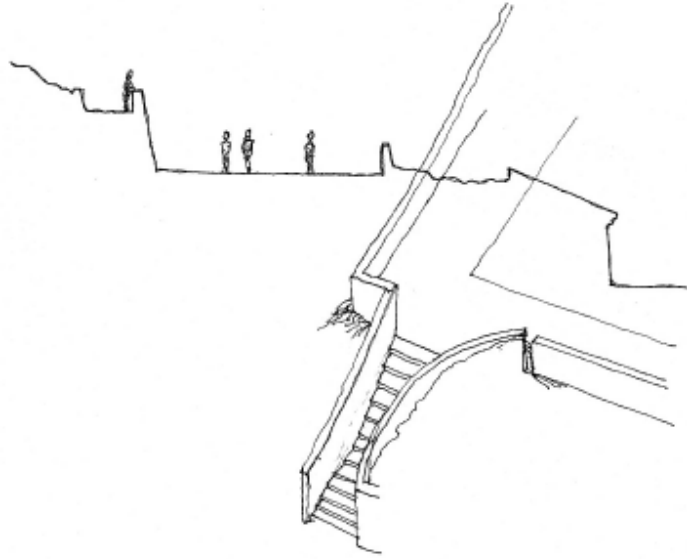
The expansion of Villa Maderni responds to the need for a place of recreation, as well as those for academic pursuits and needed housing. While many may consider the dynamic topography of much of the site unworkable, the existing land is actually quite suitable and receptive to new construction.

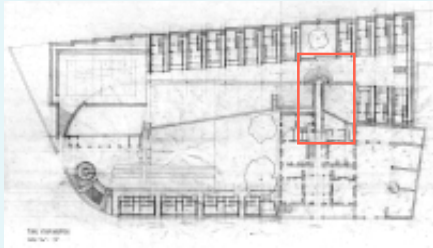
In the southwest corner of the villa property, a place for sport, or “arena” of retaining walls and level playing surface invites activity. This portion of land is the highest elevation of the property, but is the furthest from the casa itself. The small existing space currently used for sport can be replaced with this more generous and well-defined space for play, thus transplanting a typically noisy portion of the site to an ideal place.



The castle renovation in the Ticino town of Bellinzona exhibits the architect's mastery of working modern building materials into a medieval context. This new castle courtyard has elements of sitecast concrete and concrete masonry units within the old existing stacked stone walls, which for the design of the villa expansion are a strong precedent for a parallel way of thinking and building.

arena

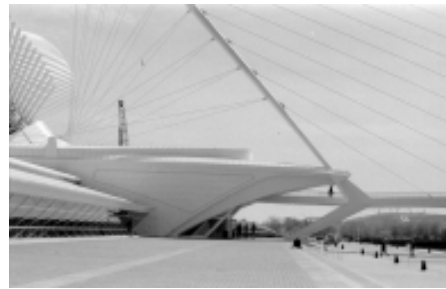




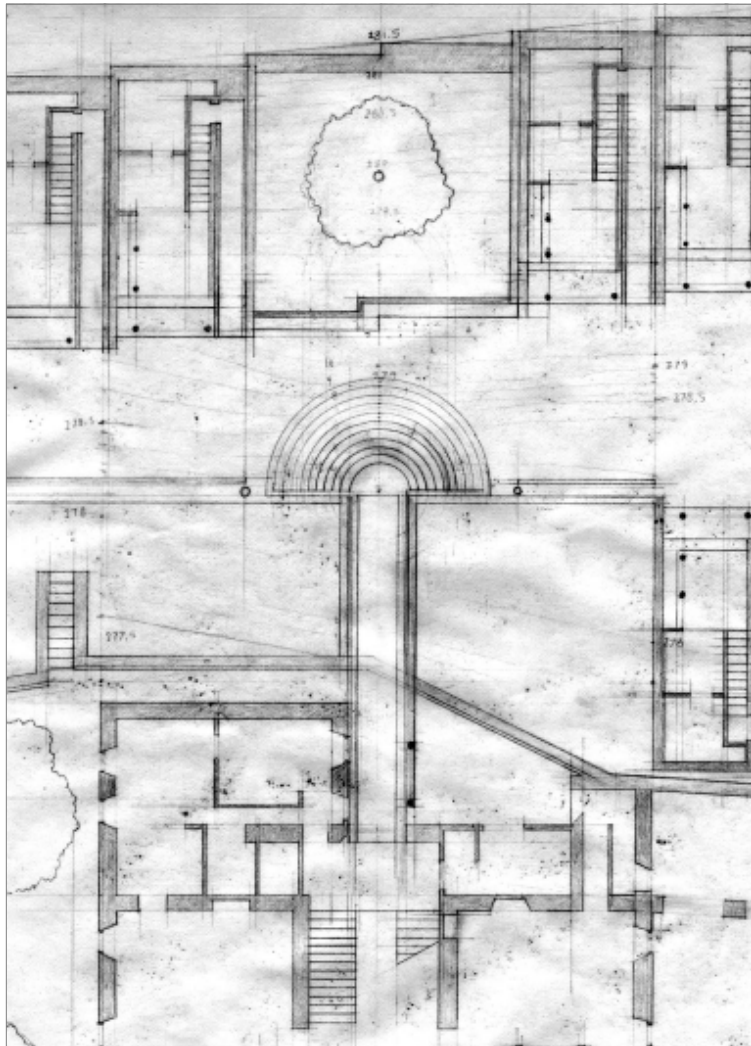
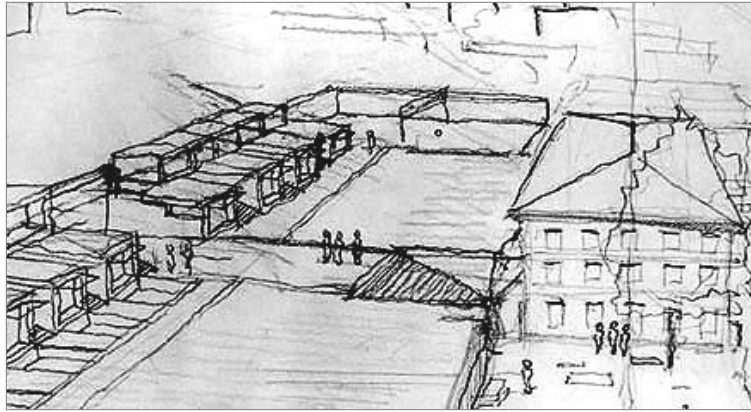
At several points, the line between the individual and communal life is blurred. As one departs Casa Maderni for his or her cell, the experience of being in this gap begs for architectural definition. A physical structure which transports, or bridges the communal life with the solitary life can be as subtle as a change in direction or as complex as a magnificent threshold. Along the weak axis of the geometry of the villa, a new west entry and a footbridge of pre-cast concrete, steel and wood, complemented by a radiating stair of masonry construction are new responses to this transitional experience.

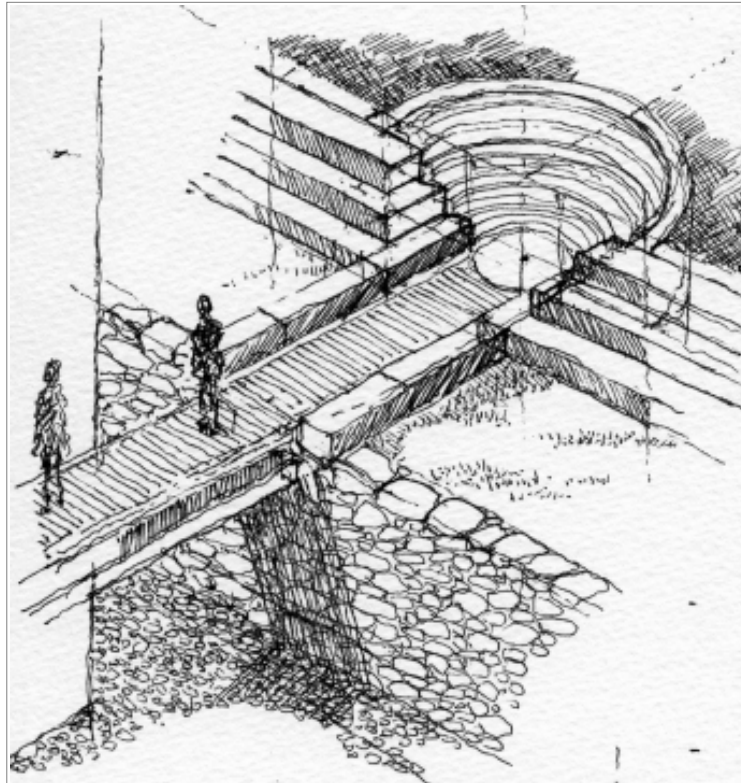


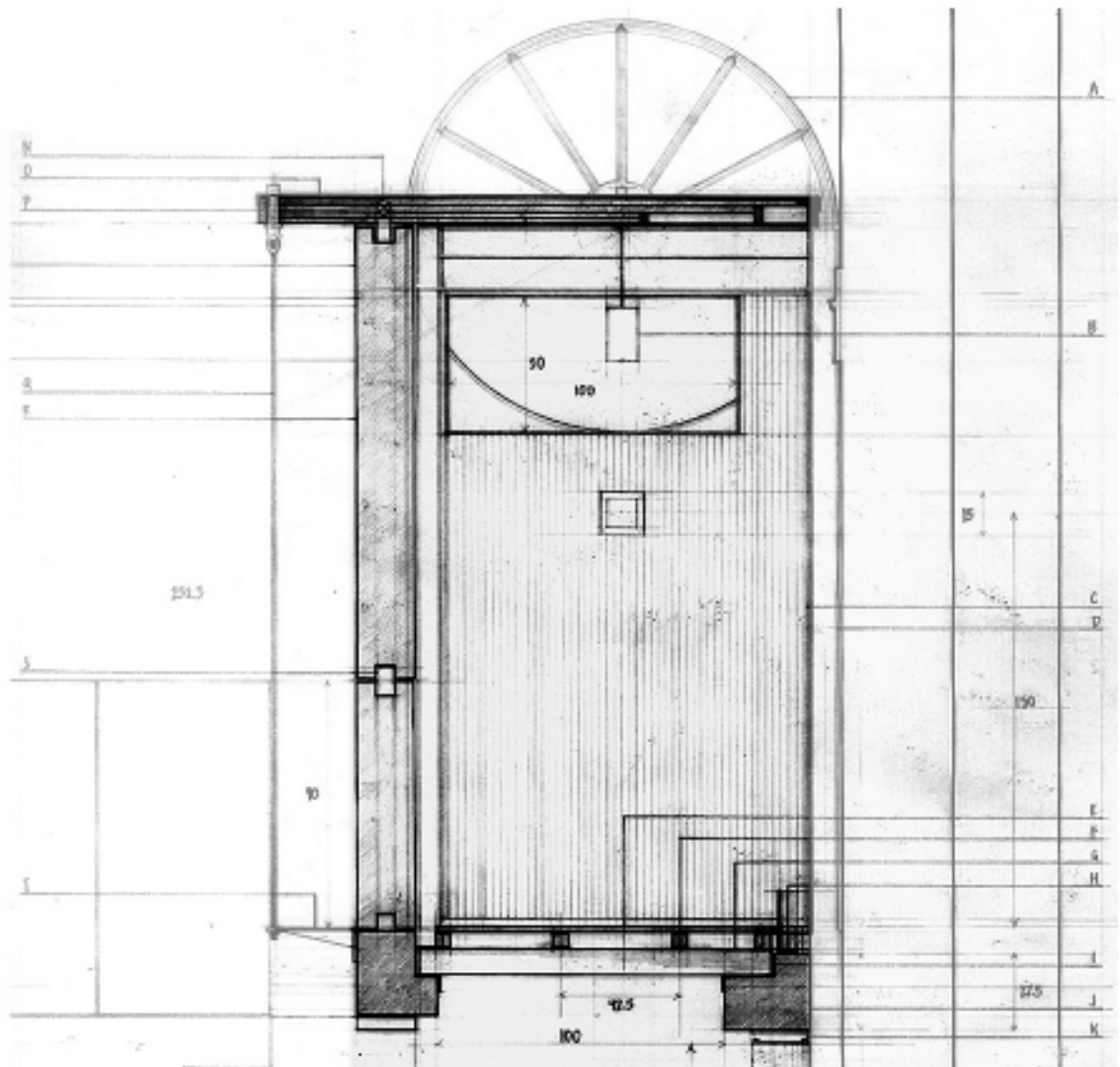
Figure 9



The making of a footbridge can range in construction from a handcrafted assembly of beautiful materials to a more acrobatic posture exhibiting the capacity of the latest technology. The Querini Stampalia Foundation in Venice, Italy enjoys the iron, wood and brass bridge of Carlo Scarpa while Santiago Calatrava spans a town to a museum in a recently completed design.

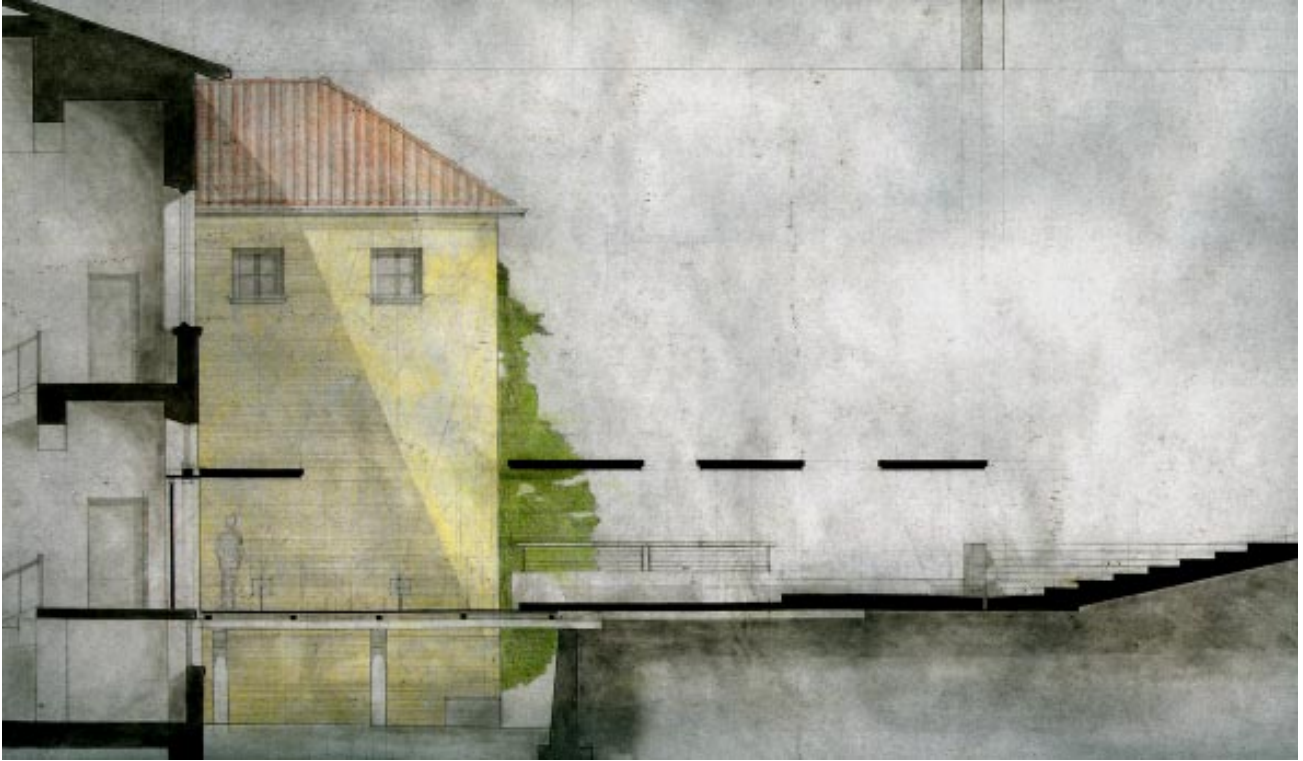






TRANSVERSE SECTION, BRIDGE ASSEMBLY (facing east)

A	existing window sash (fixed)	K	bearing plate
B	lighting fixture, aluminum	L	200 mm sitecast column
C	65 mm oak frame door	M	375 mm existing wall
D	jamb, galvanized steel	N	steel pin connection
E	50 mm wood flooring	O	waterproofing membrane
F	60 mm hardwood battens	P	laminated wood assembly
G	100 mm timber joist 122 mm leng.	Q	steel tension cable
H	lighting fixture, aluminum	R	200 mm precast concrete unit
I	flashing, copper	S	rod and bearing plate
J	280 mm precast concrete beam	T	bracket and cable tie



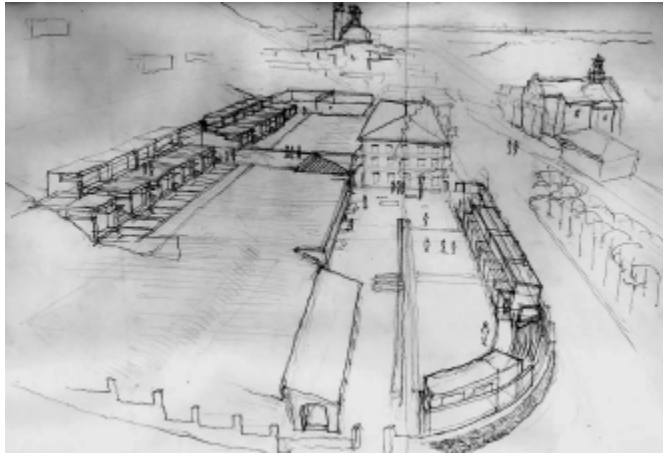
longitudinal section of the bridge assembly by day

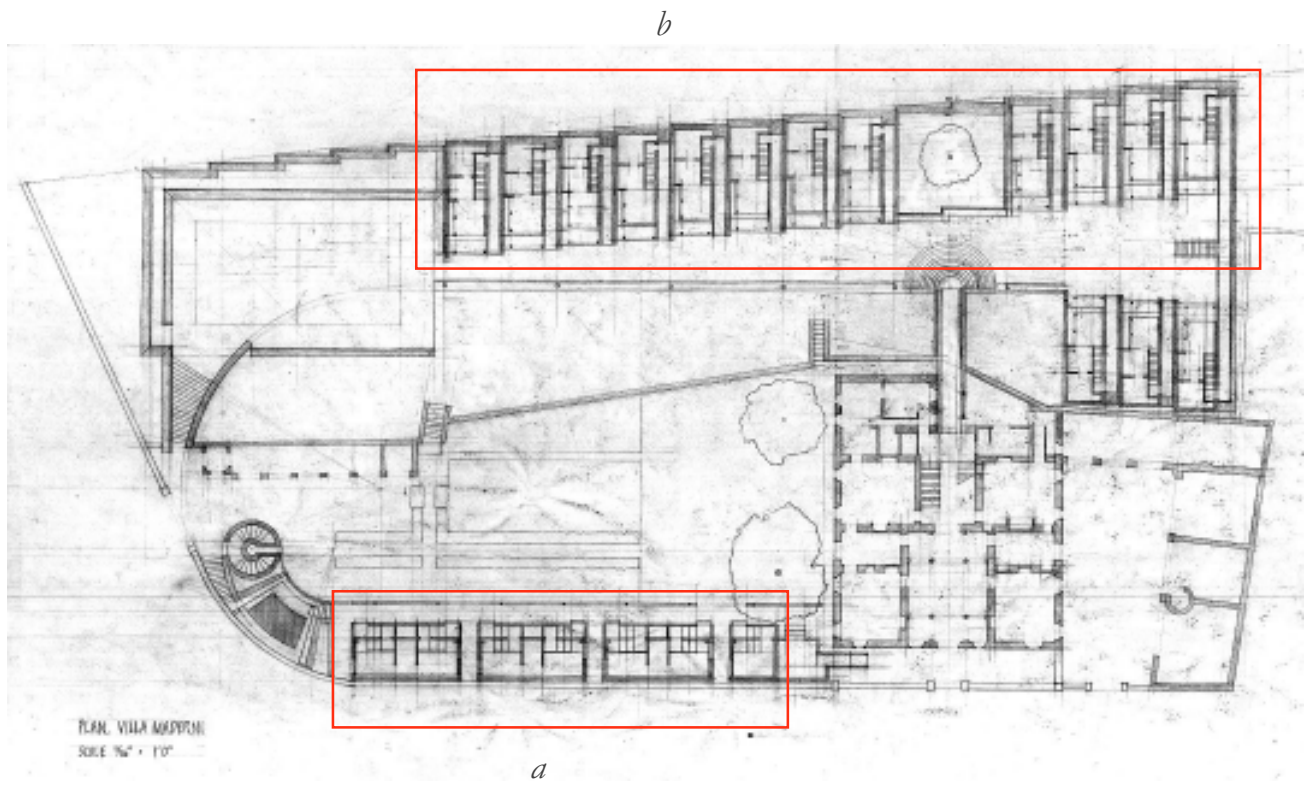


north elevation of the bridge assembly by night

The real differentiation between living in solitude and in community is most acutely experienced in the expansion of student housing. Modeled around monastic living, like in a convent or *certosa*, the inhabitable cells are complements to Casa Maderni and the entirety of the villa. In the *inhabitable garden wall*, a student lives in a cell to himself, one of remarkable craft and efficiency. In the *inhabitable retaining wall*, two students share a dynamic cell of sitecast concrete, glass and the finest hardwoods, like those which construct the garden wall.

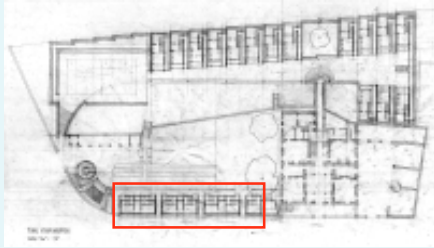
Both inhabitable walls face the garden and enclose its sacred qualities from its previous exposure to Via Settala. In this sense, the cell structure is one of introversion, concurrent with the common historical tradition of villas in the region. The combination of the cells' efficient use of space and effective use of natural lighting and ventilation make them delightful places in which to spend time apart from Casa Maderni.



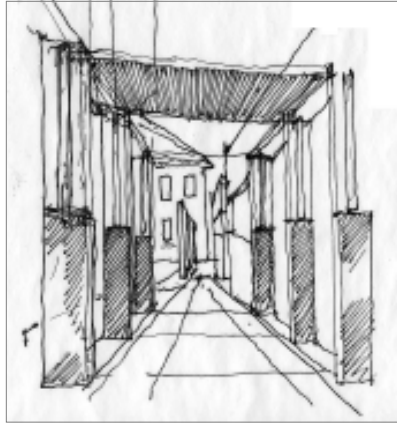


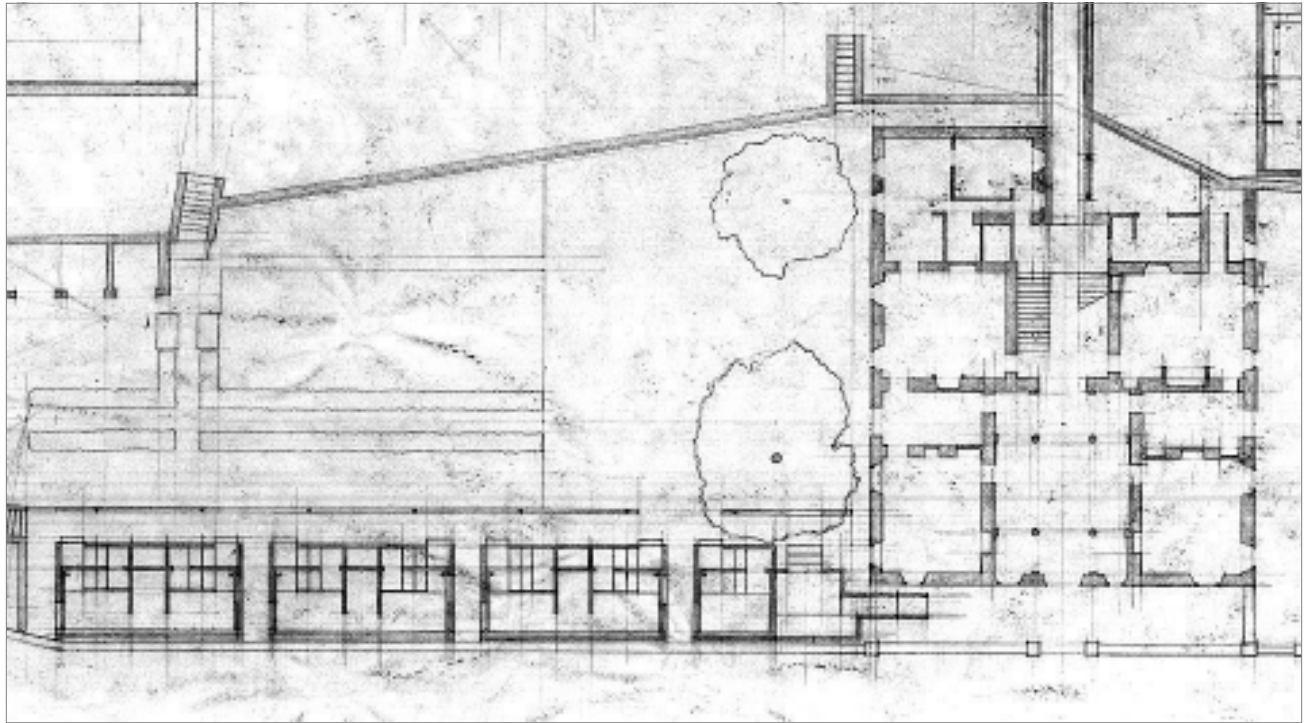
LEGEND

- a* inhabitable garden wall
- b* inhabitable retaining wall



The geometric plan of the existing villa garden reflects its sacred qualities, much like the cloister of monastery. The busy vehicular traffic along Via Settala, however, produces frequent and noticeable noise through the garden. A higher wall, one that is inhabitable as cells for students, could mitigate noise from the street and enclose the garden. These cells must have a proper relationship with the fabric of the garden and use space efficiently as well. The following design proposes linked structures which are not only delightful places to inhabit, but also ones which respect the nature of the garden and the entirety of the villa. Six students will inhabit six spatially generous cells, which open to the air, light and views enjoyed in the garden.





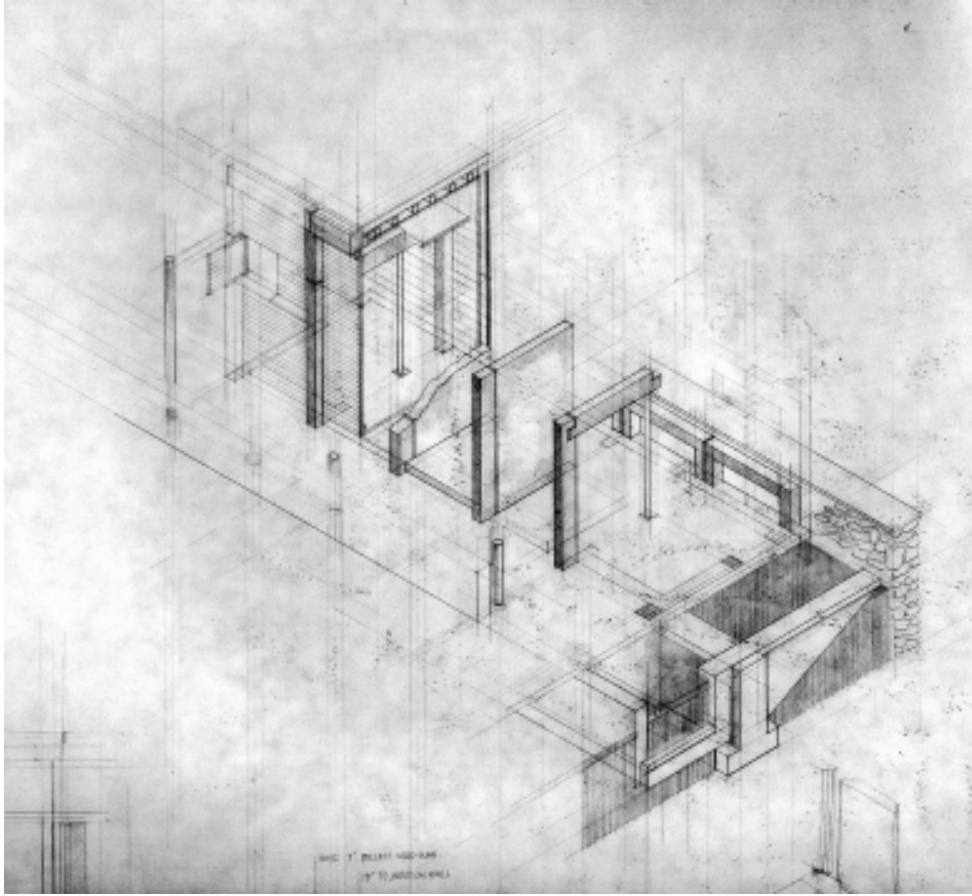
Building in the old Baroque garden of Villa Maderni requires sensitivity to various elements, both visible and invisible. One example of an existing physical presence in the garden is the wall which defines the edge of the property along Via Settala. Like most garden walls and retaining walls of the region, it is constructed of stacked stones pulled directly from the site. It most likely has existed since the making of Casa Maderni itself, more than two hundred years.

In the earliest stages of designing student housing in the villa garden, removing the old wall and replacing it with a new boundary defining the edge condition of the property seemed the most proper response to the changing needs of the site. However, the challenge and possibility of integrating the old element as a physical layer in a new architecture was an opportunity with more dynamic results.

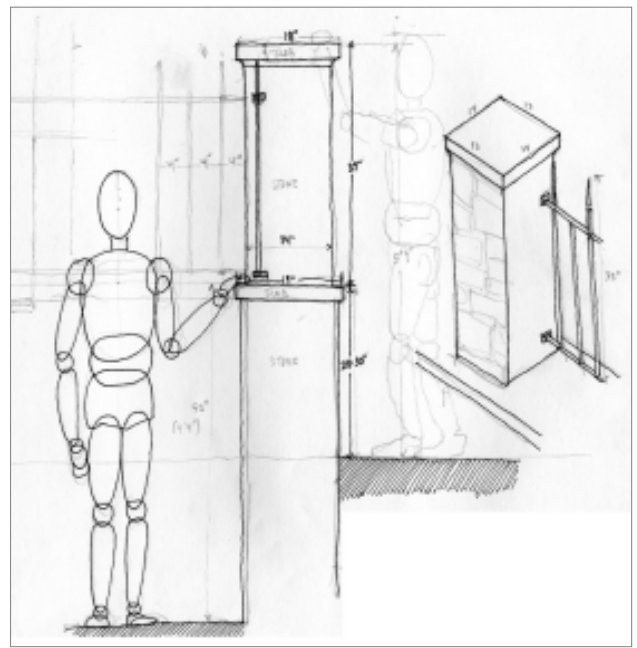
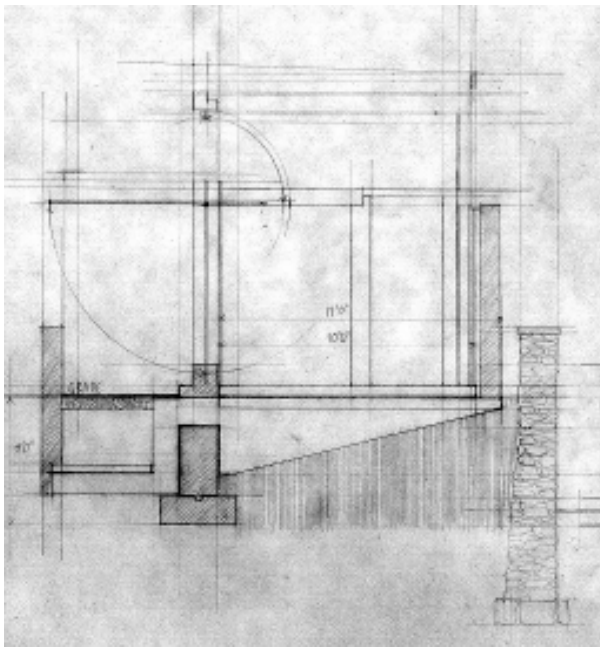
As an alternative to destroying the wall, or depending upon it structurally in a new design, the inhabitable garden wall acts as a new background for it. In this synthesis, an old building technique intersects new materials to form a rare relationship which proclaims the living history of the place.

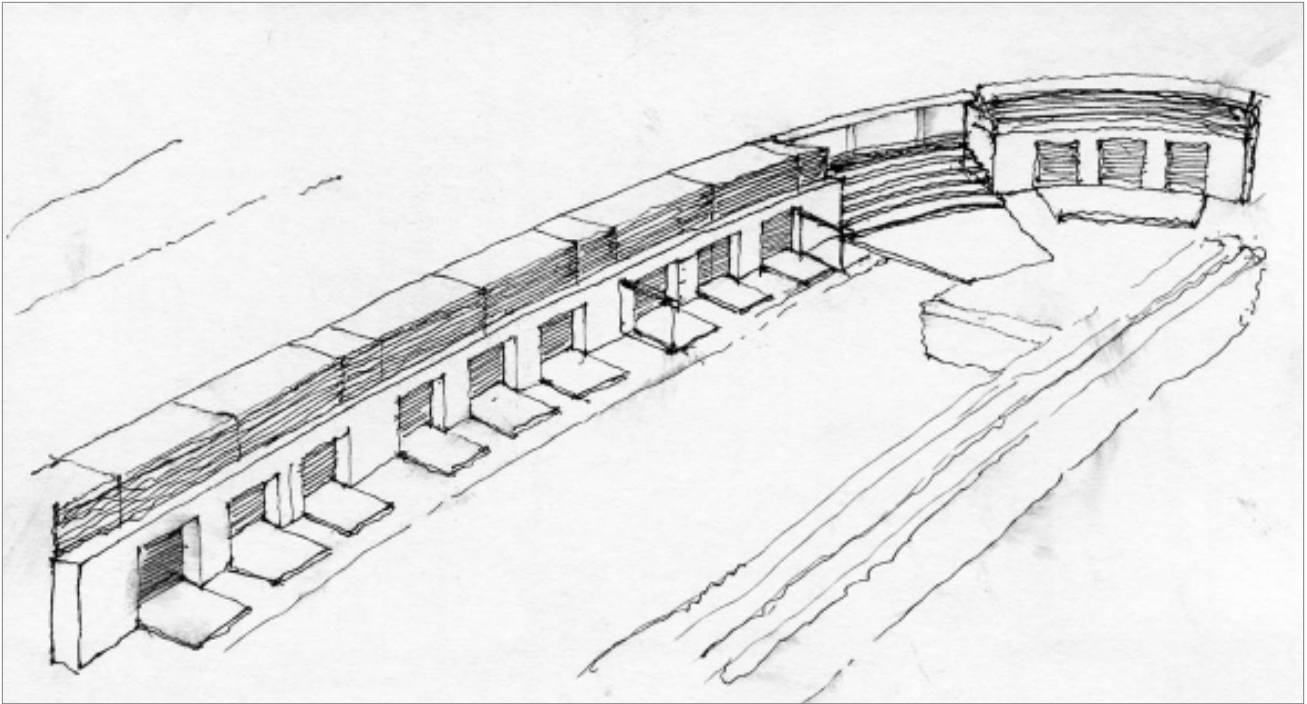
In order to achieve this unique structural condition, the foundation of the new garden cells must not place loads upon the stacked stones, but reach up to it without making direct contact. Using the stacked stone wall as formwork for a sitecast concrete foundation is another alternative to making this condition an affordable possibility. Thus, resolving the issue of the presence of the old wall, the design can move from the cell's limitations to its possibilities.

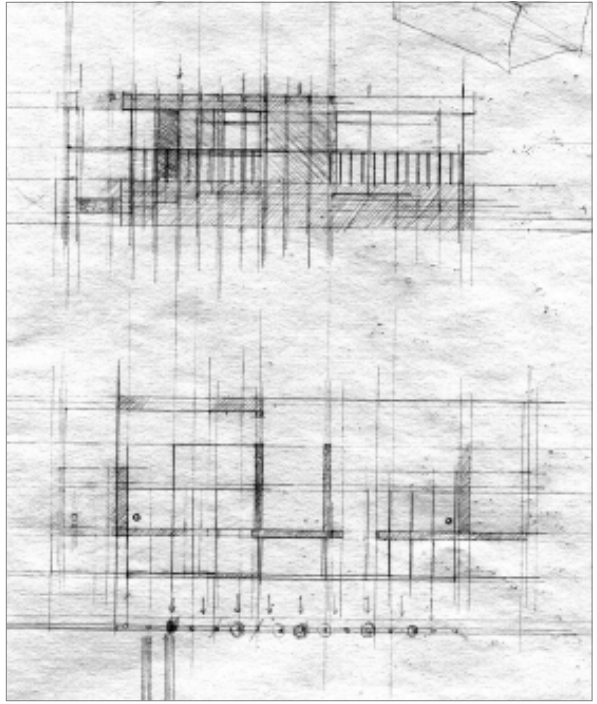
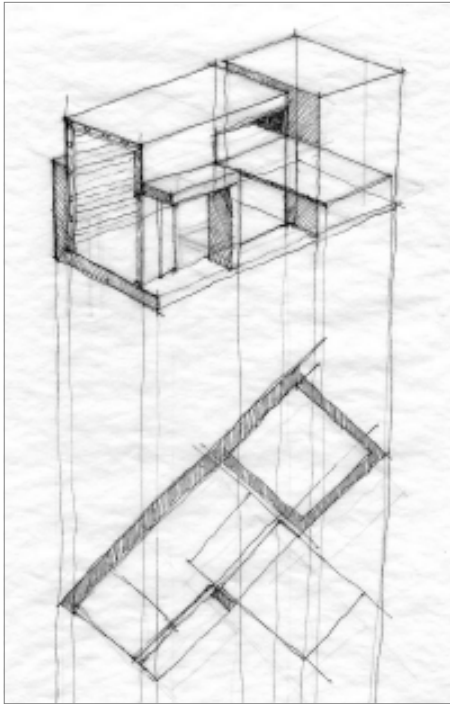


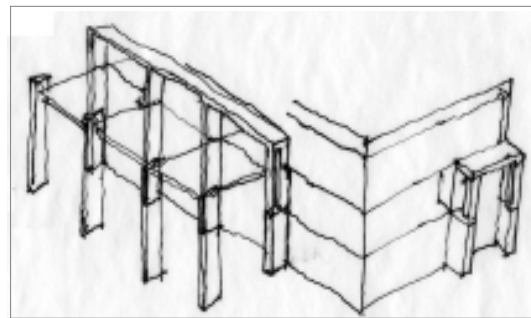
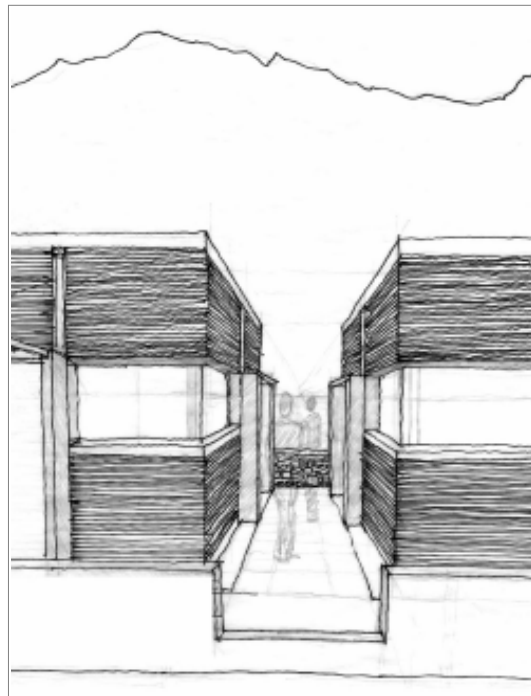
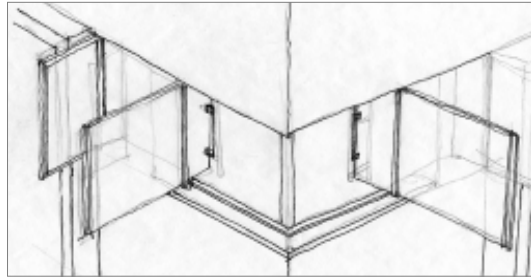


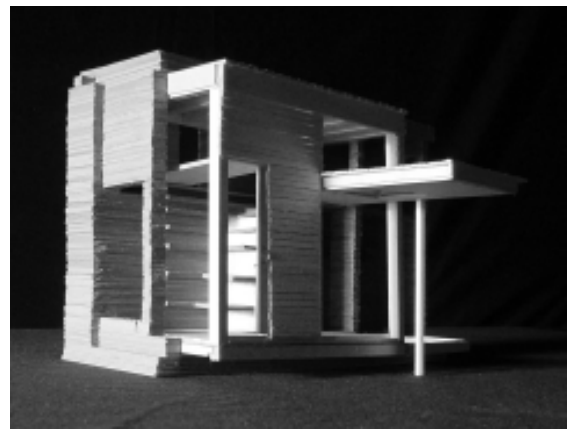
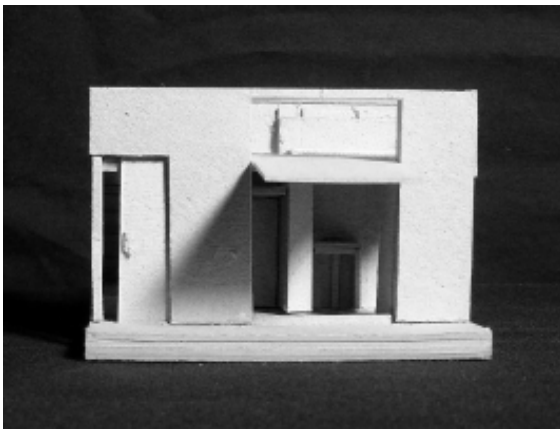
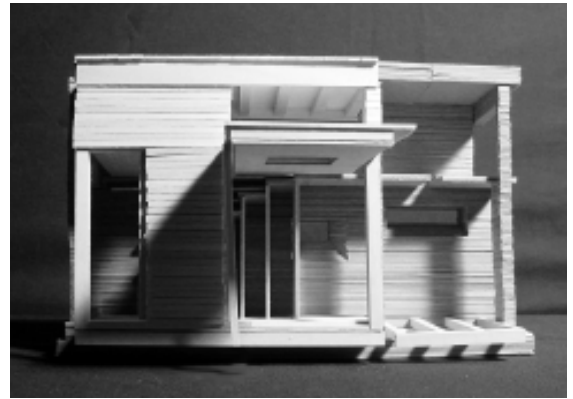
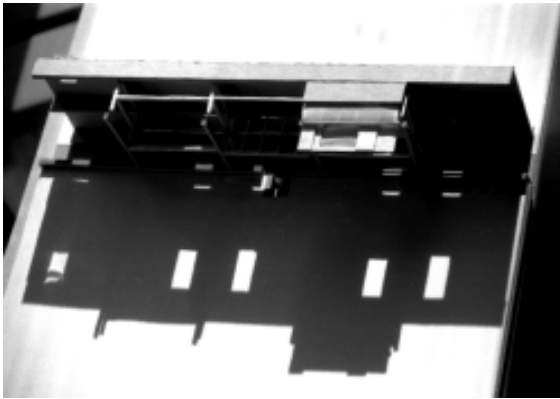
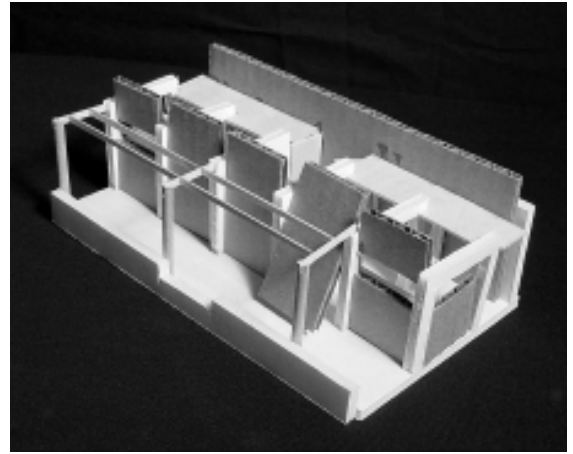
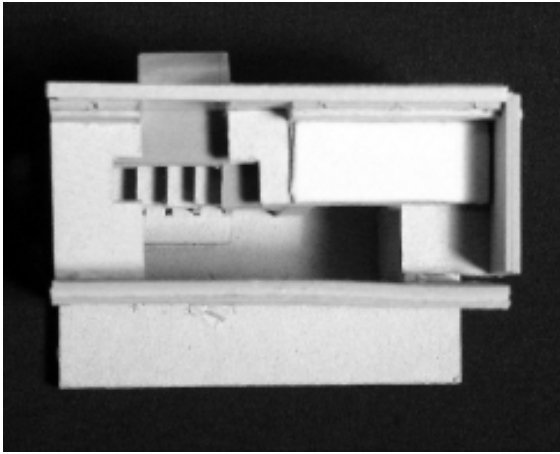
below: The existing stacked stone garden wall defines the eastern edge of the villa property along Via Settala. The grade of the garden varies from 22 inches to four feet higher than that of the street.



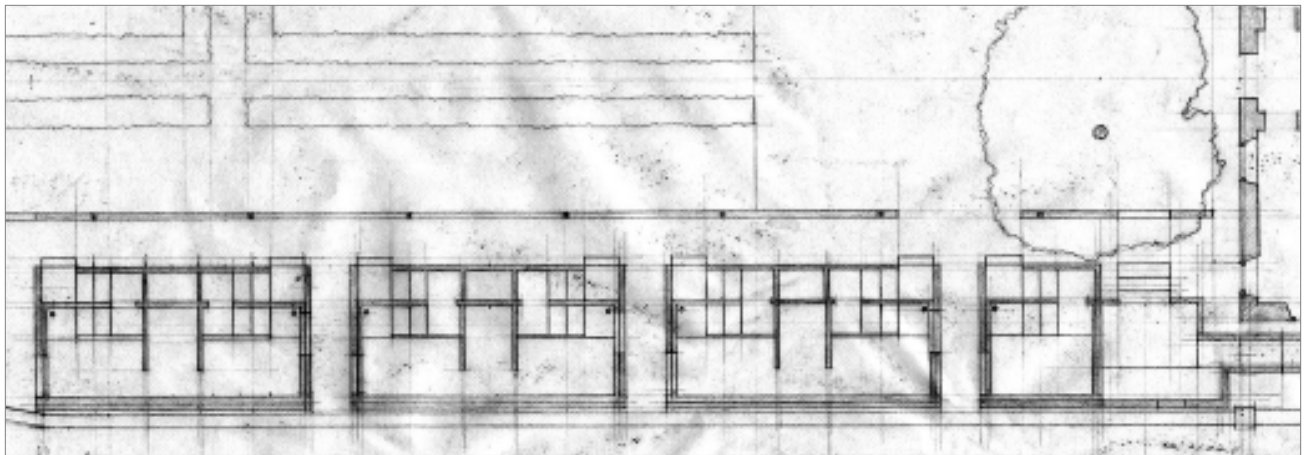
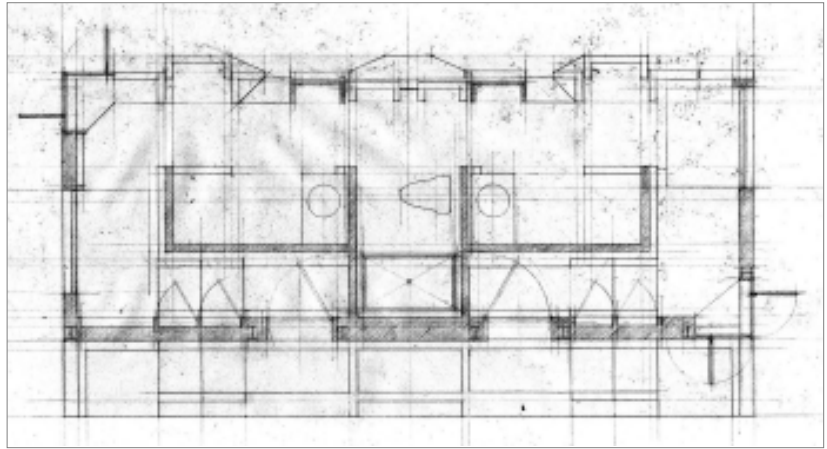






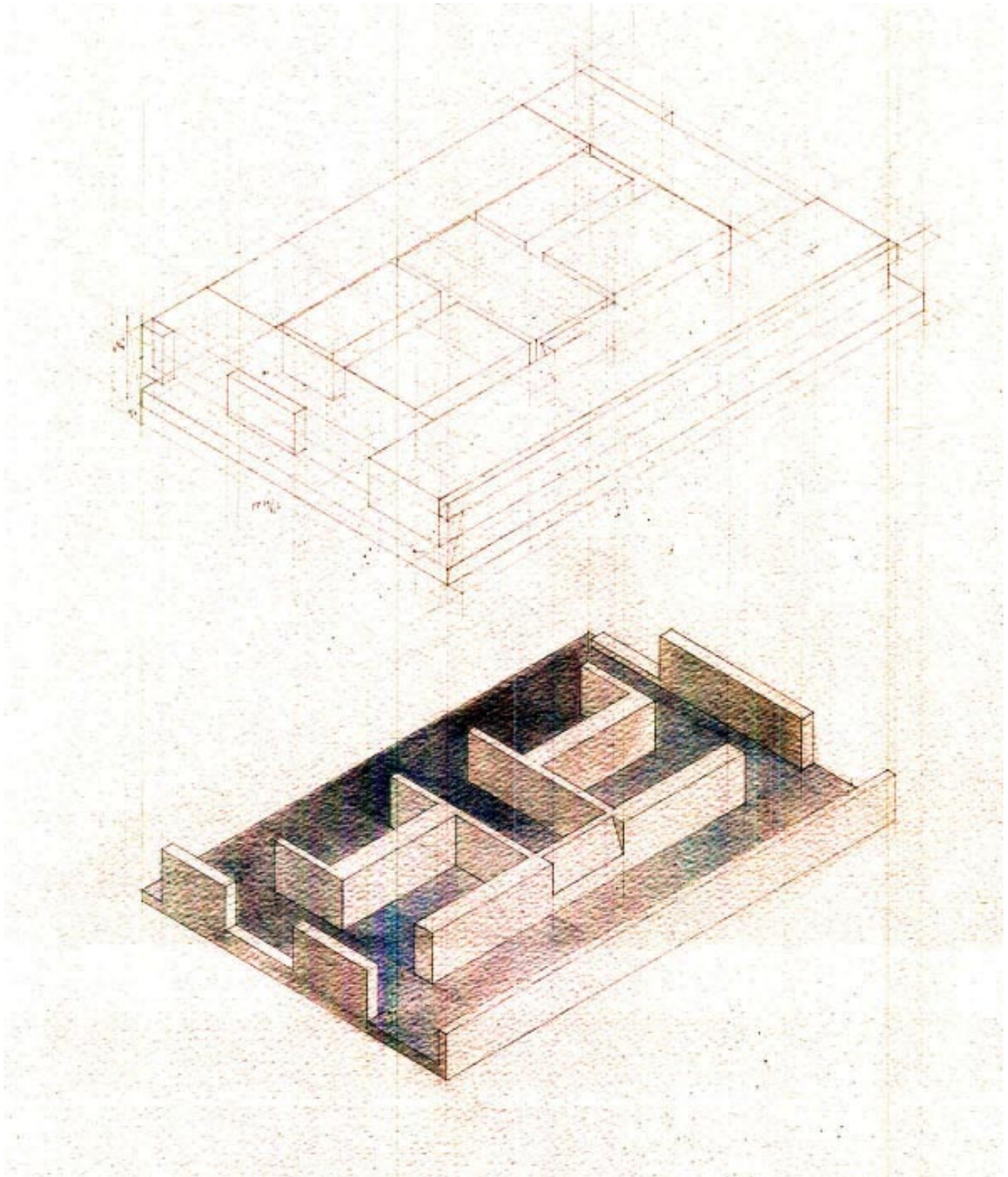


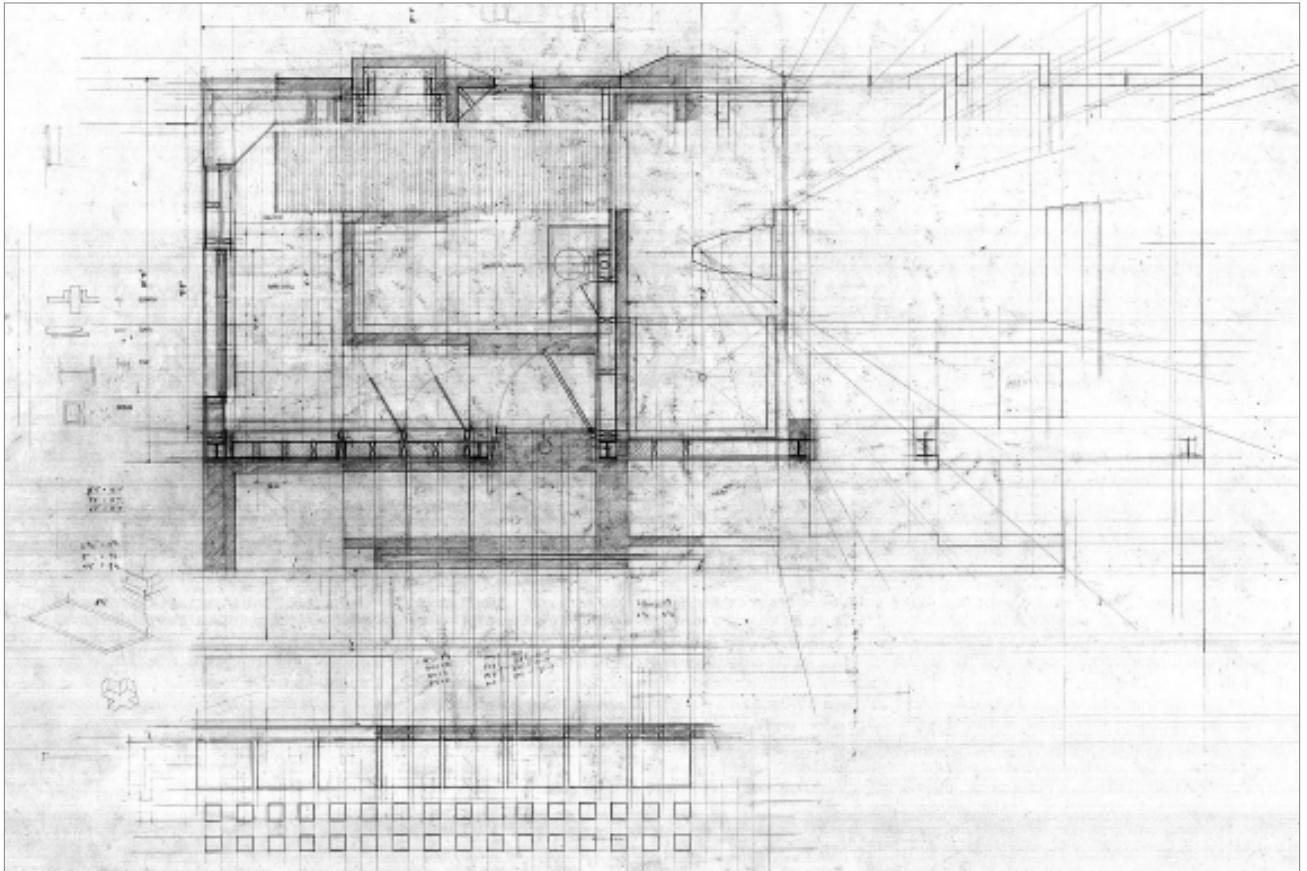
After numerous explorations of varying structural systems for the garden wall cell in sketch and model form, these plans for six cells in the garden (below) and two cells sharing one washroom (right) satisfied the aforementioned requirements for the student living in the villa. The following formal drawings present a much more detailed cycle of decisions made in the latter stages of the project's development.





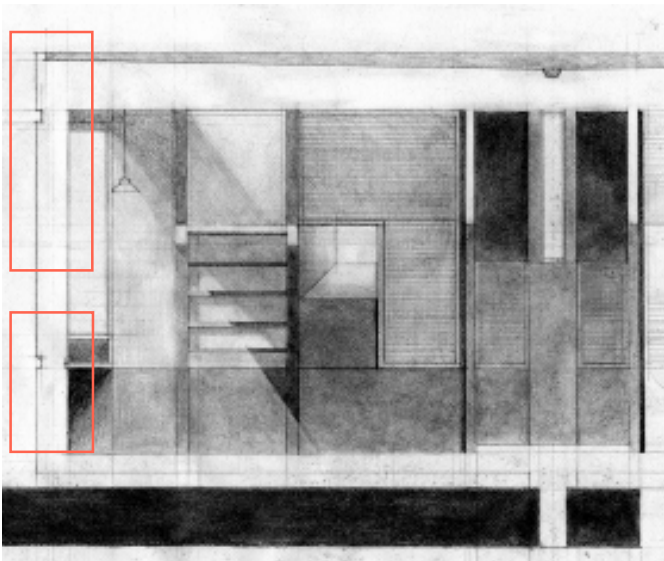
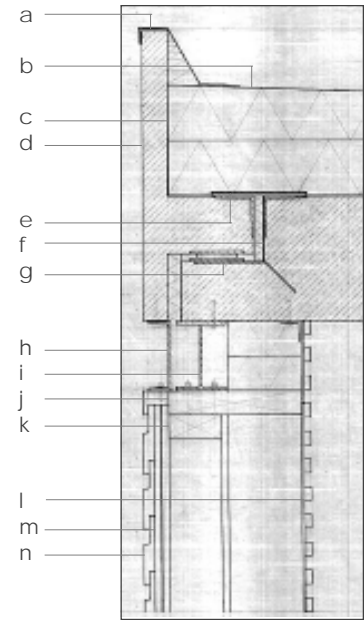
inhabitable garden wall





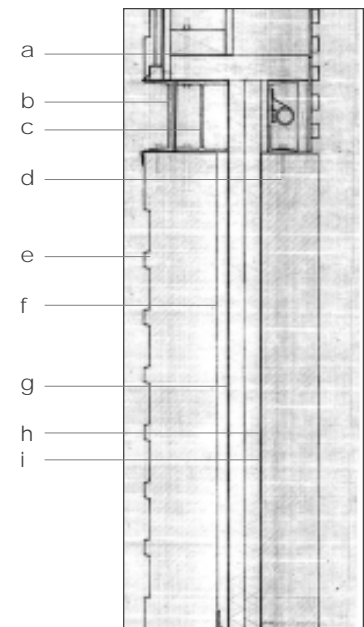
ROOF AND WALL ASSEMBLY

- a copper flashing
- b roofing membrane
- c 10" extruded polystyrene insulation
- d fibre reinforced precast concrete panel
- e weld plate
- f 10" one way precast slab
- g bearing plate
- h 6" steel channel
- i 6" steel wide flange
- j 2x10 oak frame header
- k 2x4 oak frame
- l birch and oak finishing
- m 1/2" battens
- n 3/4" larch siding elements



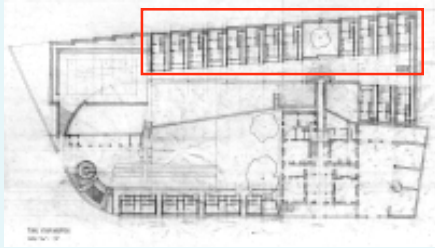
LOWER WALL ASSEMBLY

- a 2x10 oak framing
- b 6" steel channel
- c 6" steel wide flange
- d electrical conduit channel
- e 8" precast ribbed concrete panel
- f 1" air space
- g 2" rigid foam board insulation 2x
- h waterproofing membrane
- i 6" sitecast concrete





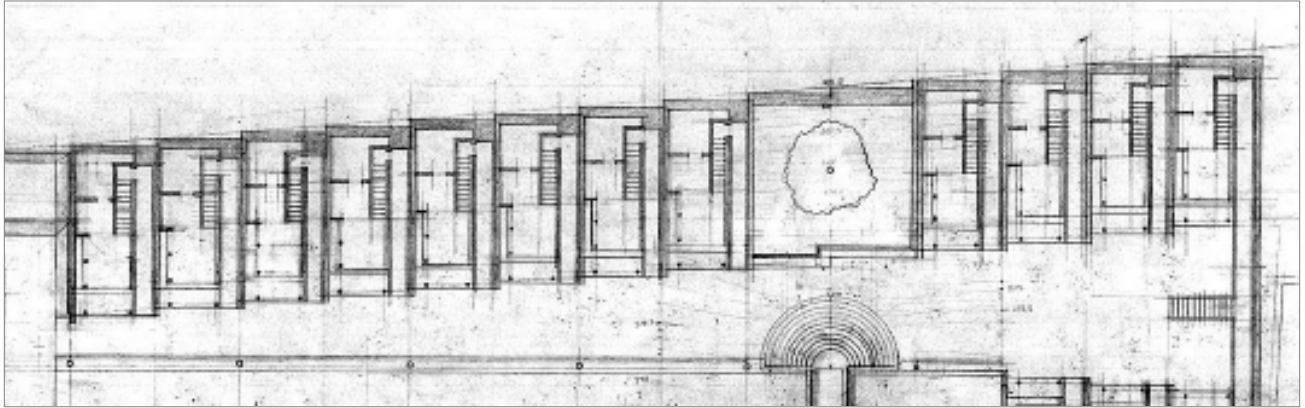
inhabitable garden wall

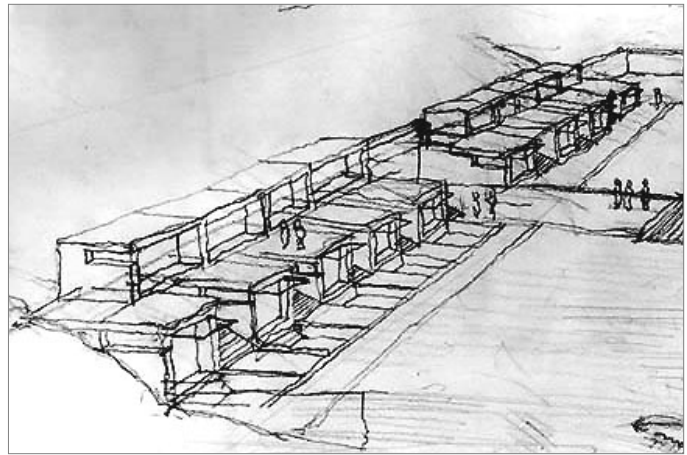
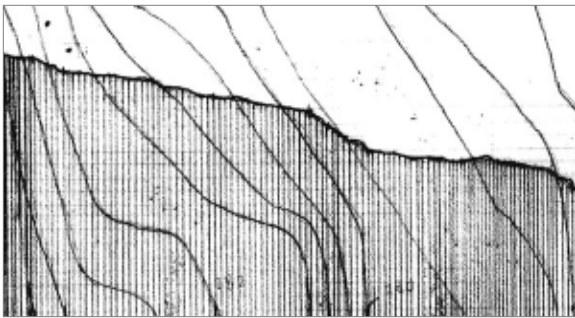
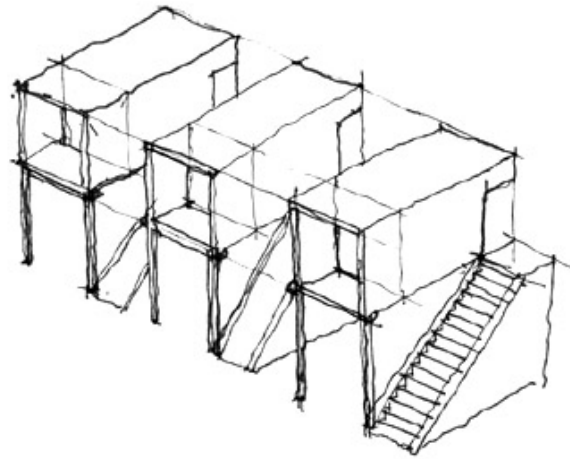
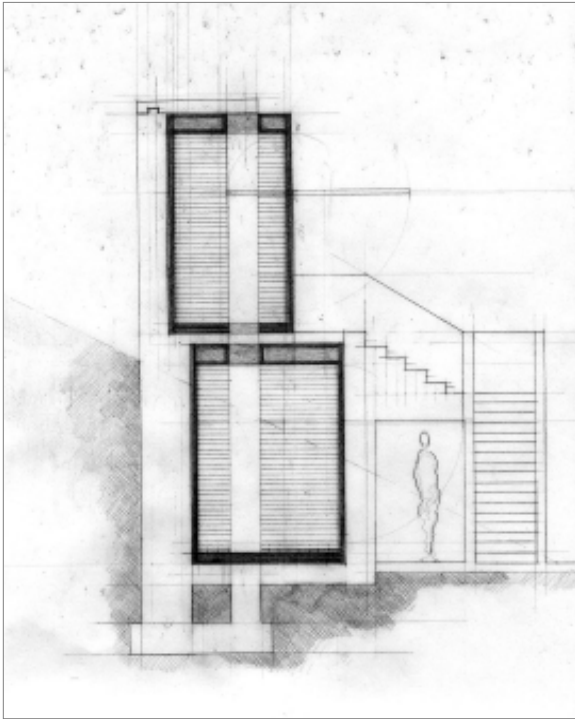


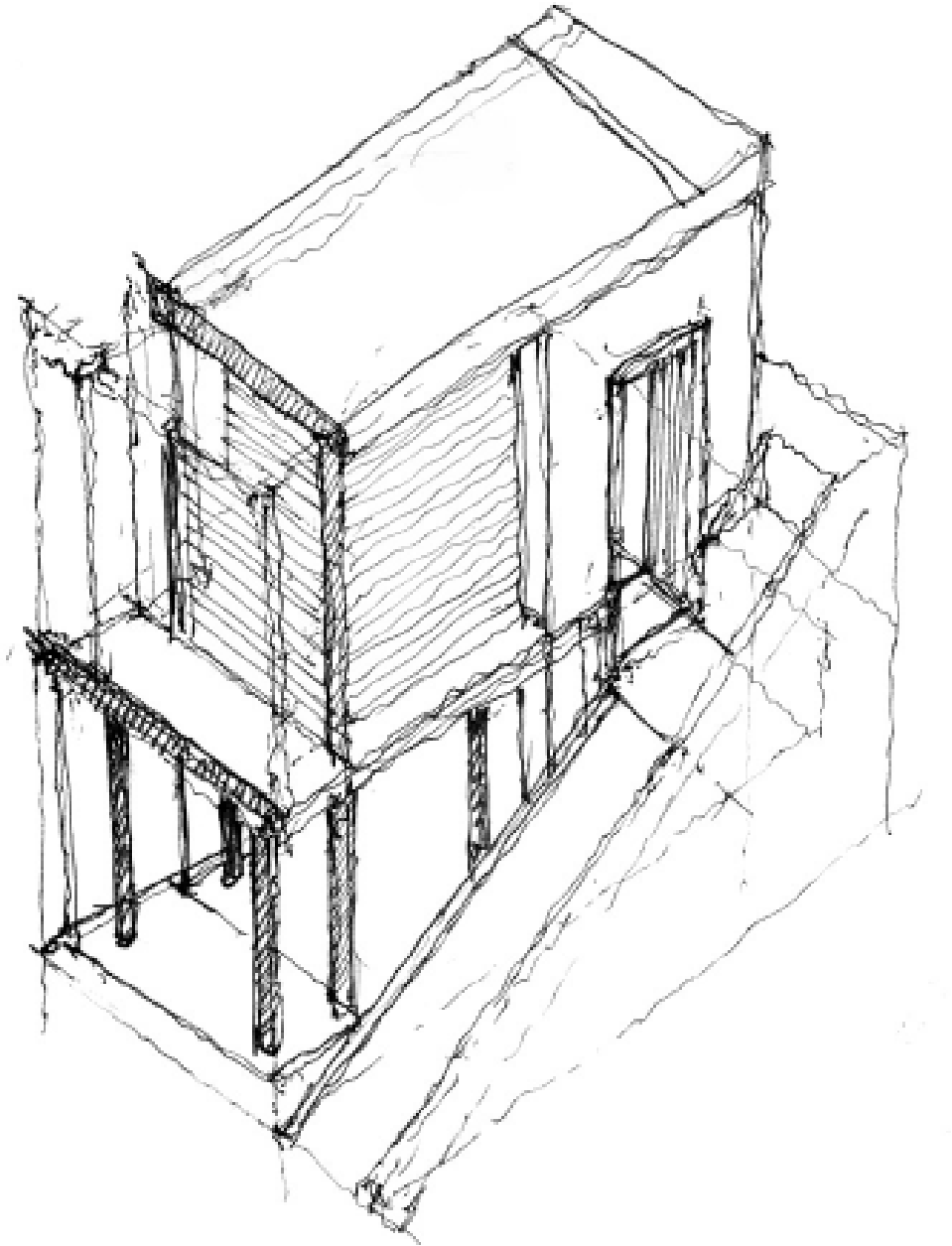
The slope of the land behind Casa Maderni can be harnessed into powerful design and translated into a proper architectural response. The following designs for a series of cells in an inhabitable retaining wall exhibit this possibility. They extend the idea of solitary living into spatially dynamic rooms. Twelve cells, each of which could be inhabited by two students, are alternatives to the solitary cell. The line of cells breaks for a radial stair and bridge design, but continues again to maximize the use of space in the undeveloped land.

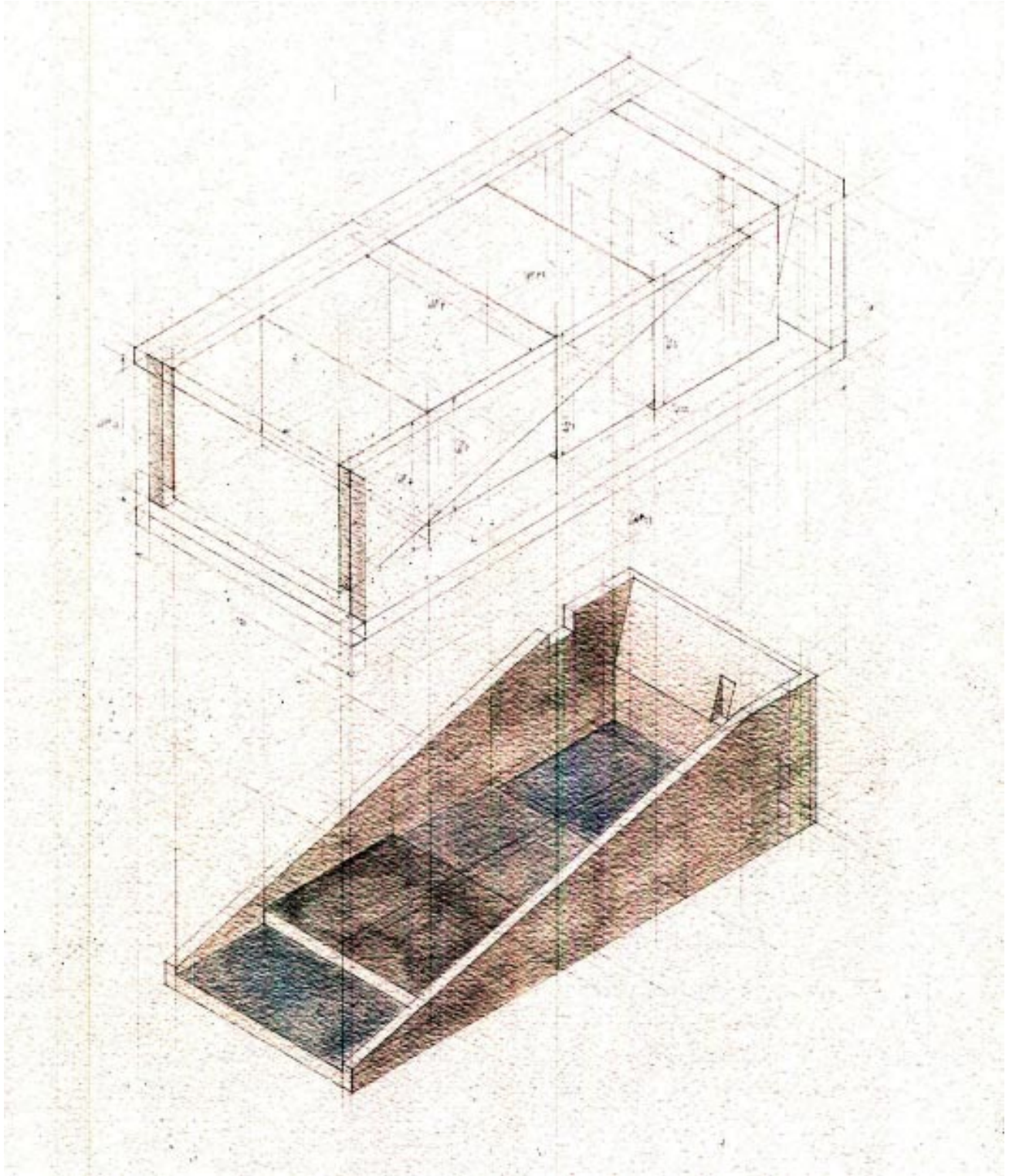


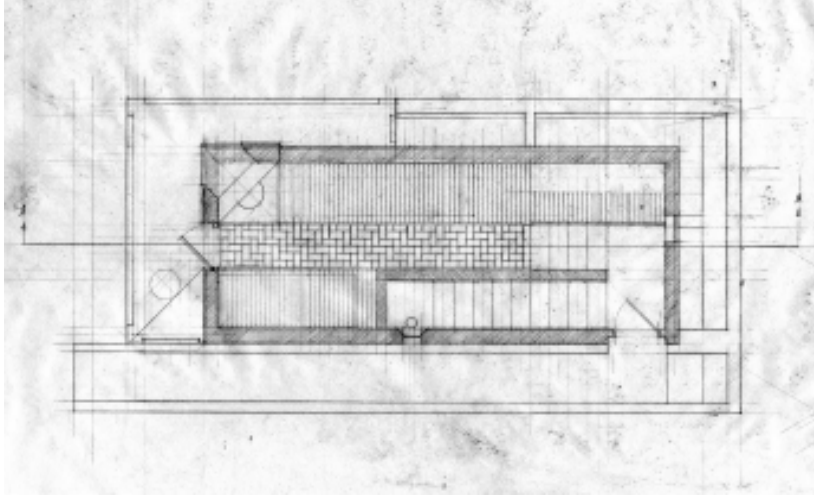
In a region where retaining wall construction is often the first critical act in the building process, the hillside towns of Gandria and Rovio are stacked insertions into the landscape.



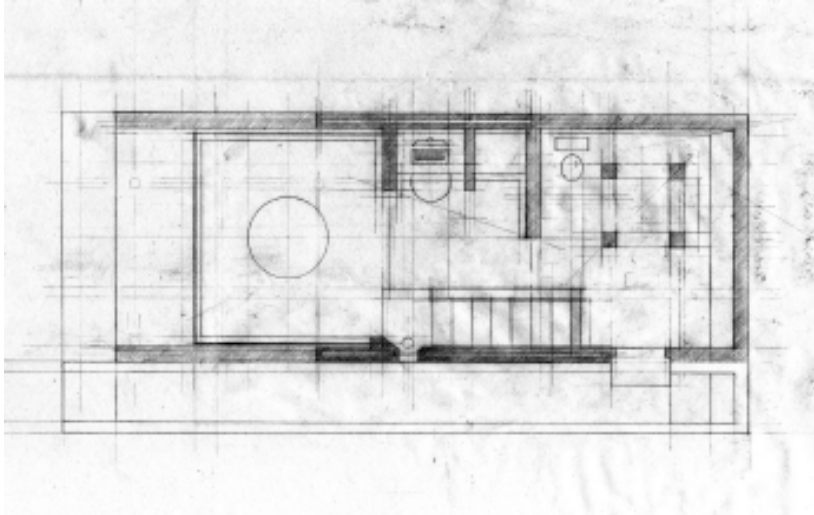




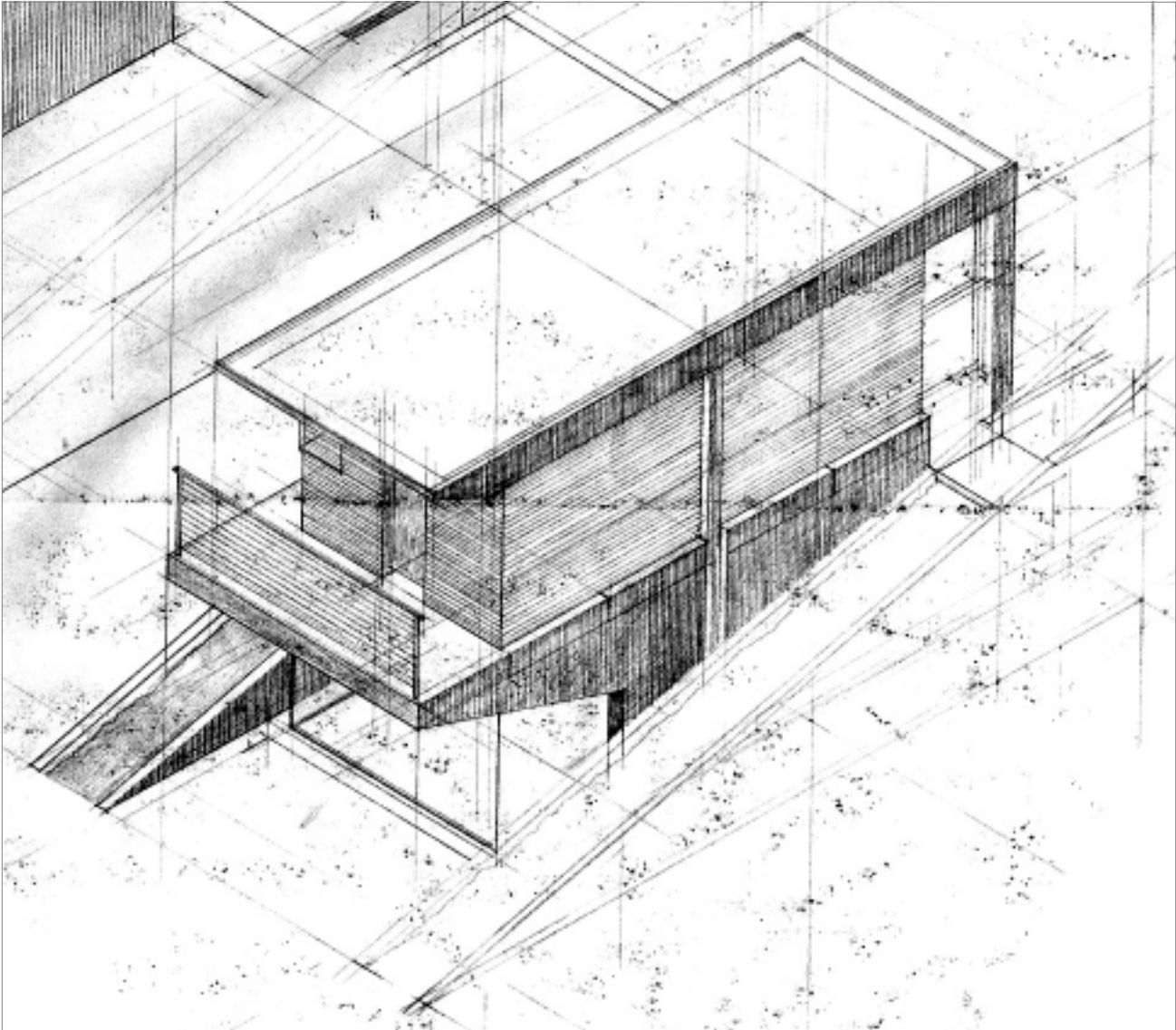


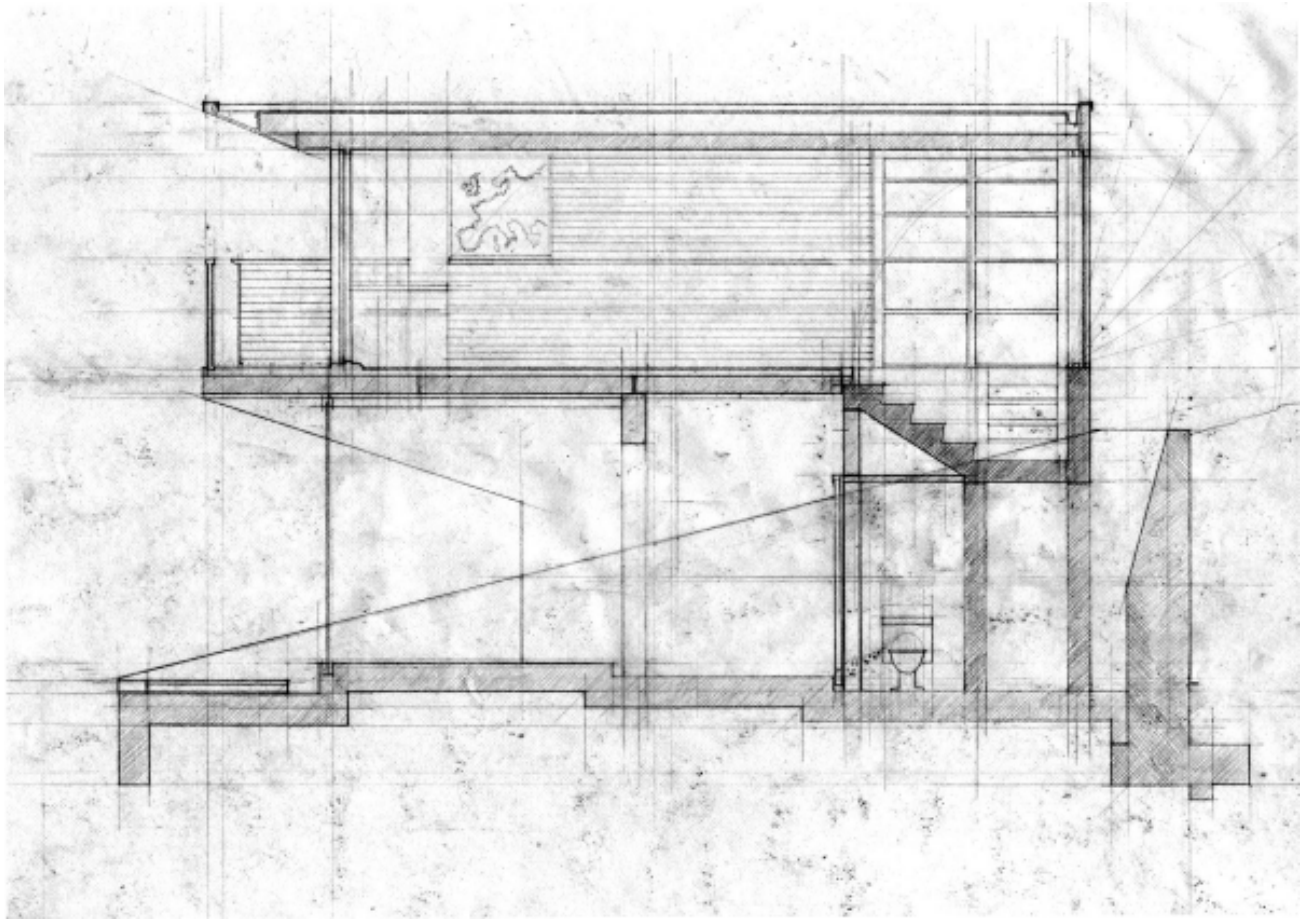


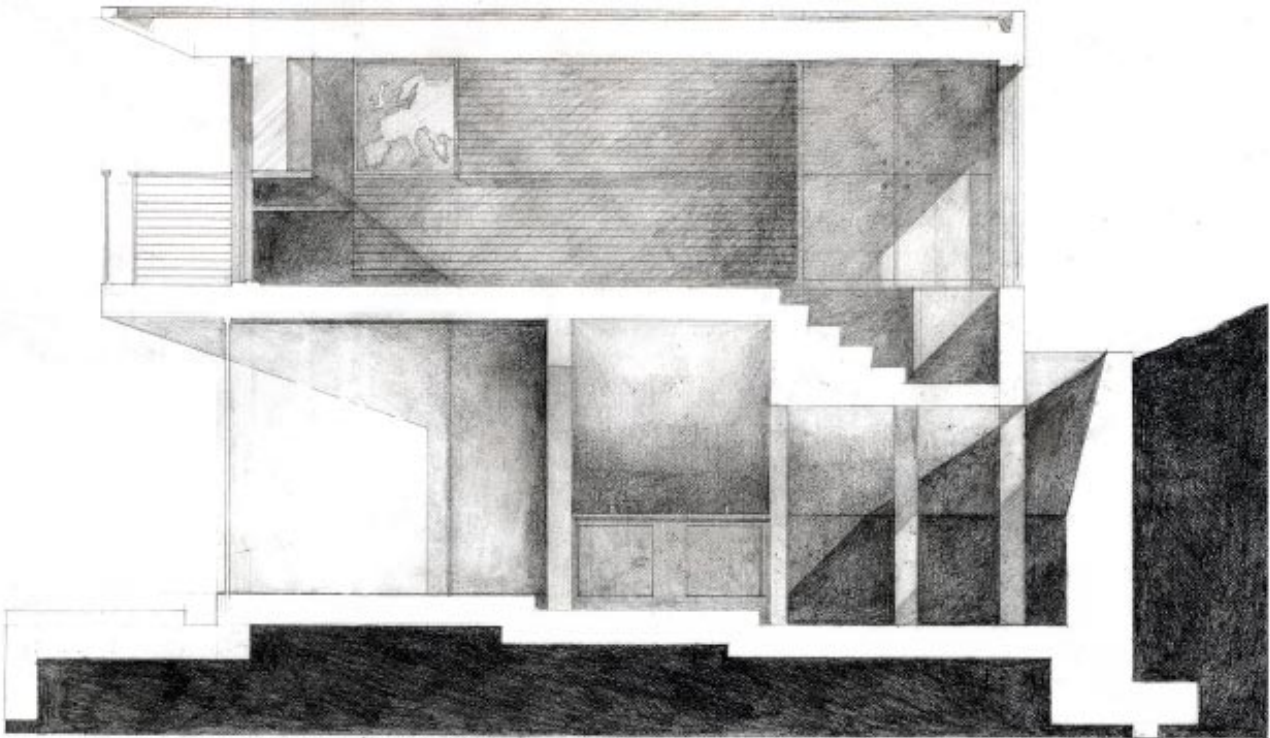
The second floor of each retaining wall cell is a steel framed structure with an infill construction of oak and larch, much like the hierarchy of the garden wall cell. The interior space is one large room for beds, shelves, closets and a desk. A balcony off this second level opens the cells east toward Monte Generoso and morning sunlight. The floor of this room is reminiscent of the floor of Casa Maderni, incorporating elements of terra cotta tiles within its oak framing.

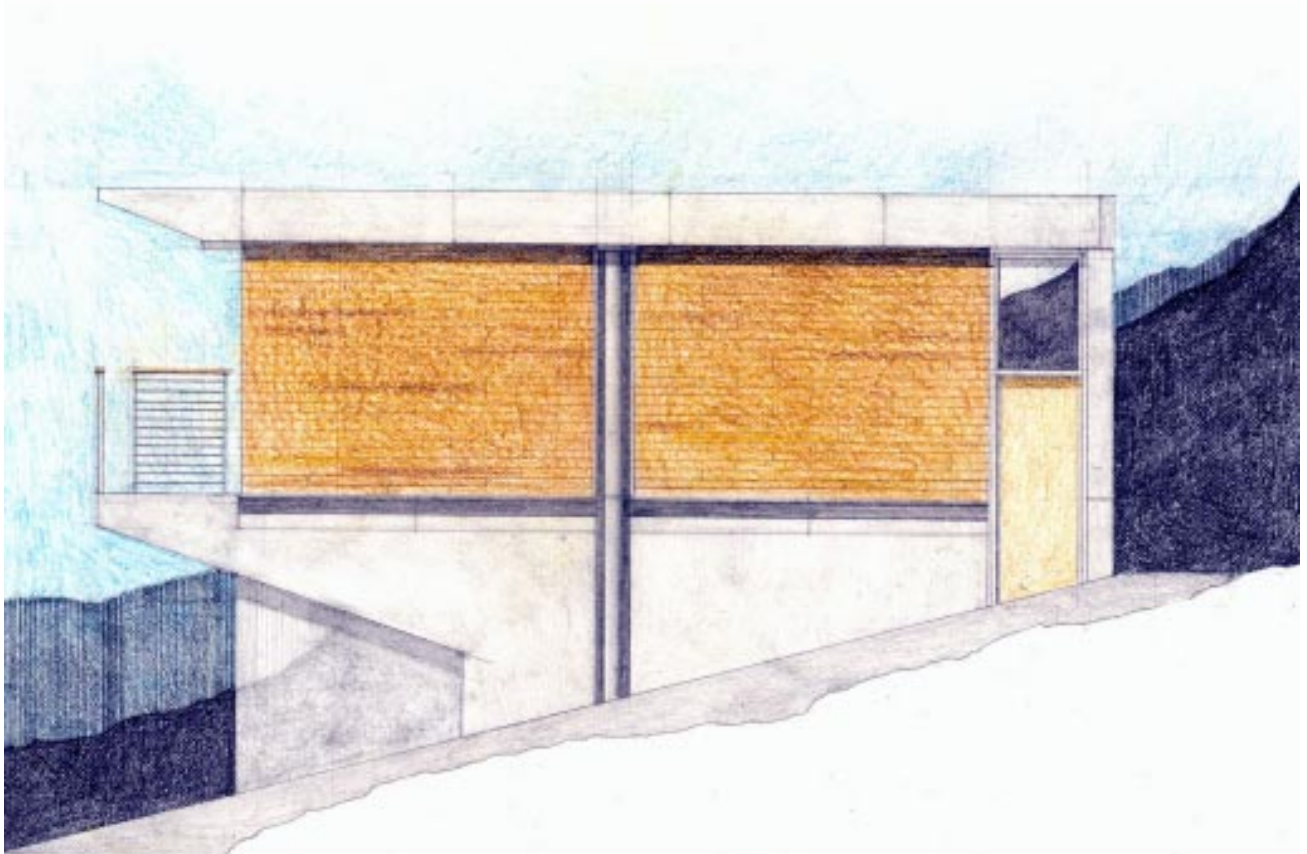


The first floor of each retaining wall cell is a sitecast reinforced concrete structure with large glazing elements in key moments. Upon entering the cell at a level between the first and second levels, a student will descend into a lounge area with a large glass wall enclosing the room. A smaller space for an ethernet connection and a place for storage are between the lounge and the bathroom in the rear of the cell. The four square columns of the bathroom define the space and bear the loads of the second floor. This design allows the bathroom to achieve a unique character.





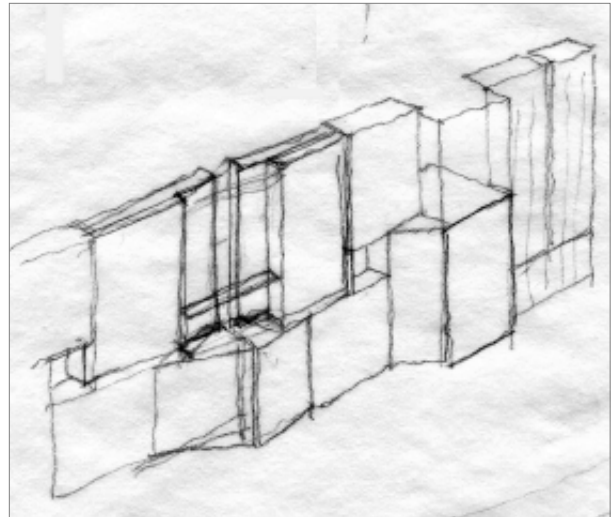




making

FROM DRAWING TO MAKING

Concrete as Core
Concrete as Shell
Concrete as Canvas



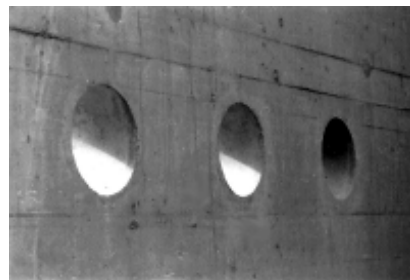
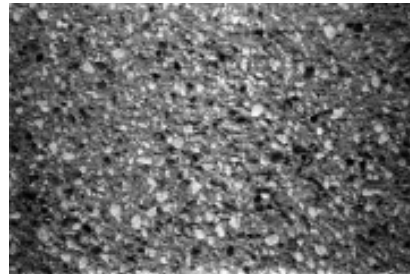
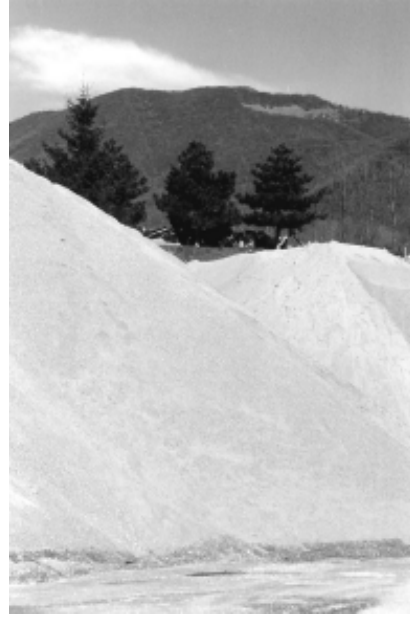
CALCESTRUZZO

The established reputation of the Ticino region as a birthplace of some of the world's finest artisans extends centuries deep into its history. Stone cutting, woodworking, painting, and sculpting are all still recognizable crafts shaping the landscape.

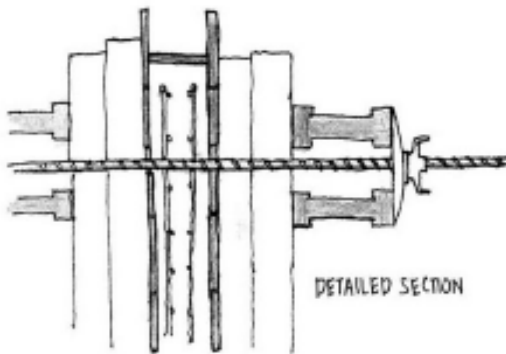
For the twentieth century Swiss, however, the development and frequent use of reinforced concrete enabled the construction of critical building projects in concrete, such as tunnels through the Alpine regions and sprawling bridges over vast expanses.

Sitecast concrete, precast concrete (“calcestruzzo prefabbricato”), and concrete masonry construction all soon infiltrated the work of Ticino architects, as expertise of the new craft and availability of the material and its related products expanded. Still a relatively inexpensive trade, even smaller residential projects employ the material extensively and creatively.

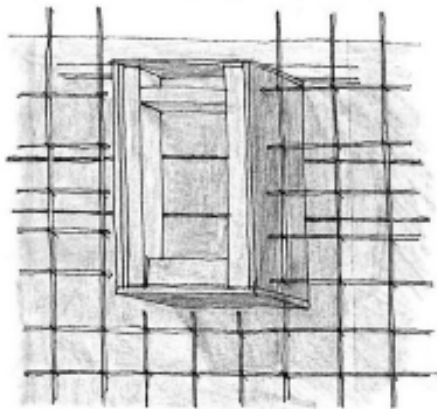
The architect can consider concrete a material with such plasticity and variability, both in its substance and its range of use. It can be expressed anywhere in the hierarchy of a structure from the primary skeletal system to the more tertiary elements in the skin or shell of a work. In the design for the completion of Villa Maderni, concrete can be interpreted as a core, as a shell and as a canvas.



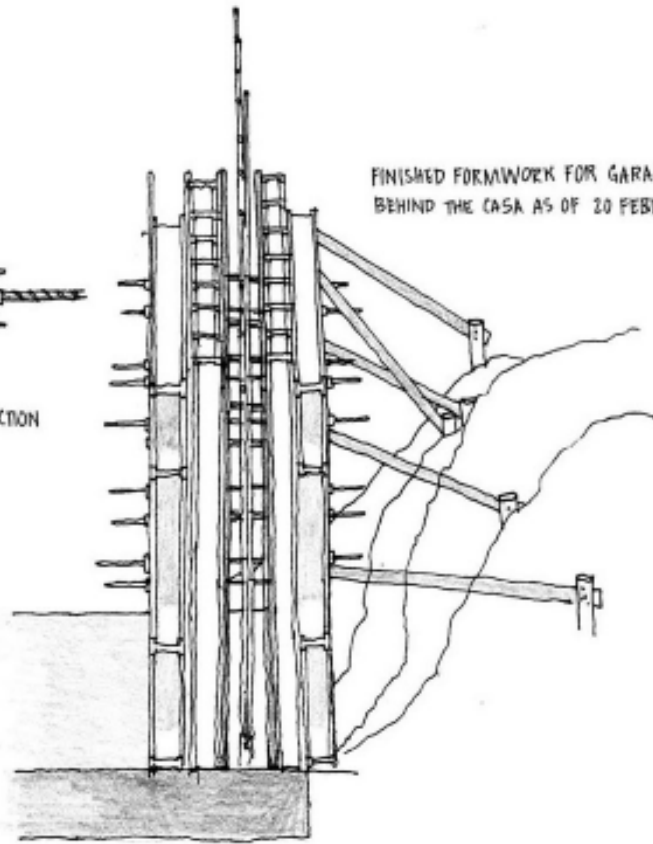
from drawing to making



DETAILED SECTION



A WINDOW HOLDOUT
(SURPRISE: NO DIAGONAL REINFORCEMENT)



FINISHED FORMWORK FOR GARAGE WALL
BEHIND THE CASA AS OF 20 FEBRUARY



Figure 10

Basel, Switzerland enjoys the concrete, steel and copper train repair facility by Herzog and de Meuron, whose design recognizes the possibilities and the beauty of a sitecast skeleton in a strictly utilitarian program. Likewise, this housing block in Kassel, Germany is a clear articulation of a hierarchy of concrete and wood (architect: Alexander Reichel, Munich).

Every architect must develop for him or herself a framework, or principles through which to ponder and make architecture. From structural systems to materials and evolving technologies, construction and criticism in the development of a work may result in an intelligent form if the architect works from those principles consistently but is flexible in the approach to a changing number of issues arising and affecting that work. Thinking of architecture in metaphor, or through symbols and those physical things existing outside the art entirely, can provide a rich and objective source of parallel models guiding vital choices in the design process.

The human body is for the architect an excellent model through which to understand design. From the levels of its structural assembly to its circulation, skin and joints, its many systems directly parallel those issues arising in the making of a good building. As a building must maintain safe, working and efficient mechanical systems, so too must the nervous, digestive and circulatory systems of the body work in harmony.

Understanding this anthropomorphosis of forms extends clearly into the realm of the structural systems of architecture. As the aforementioned theorist Jacques Gubler noted, we can judge the integrity of a structure through its likeness to a skeleton and those things which complete, or fill it. For an architecture involving the small dwelling of one or two persons, as in the expansion of Villa Maderni, these principles are suitable for direct application. The inhabitable garden wall is a structural morphosis of natural forms, as is the inhabitable retaining wall.

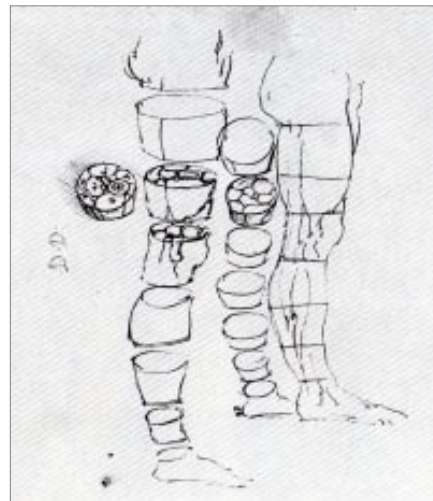
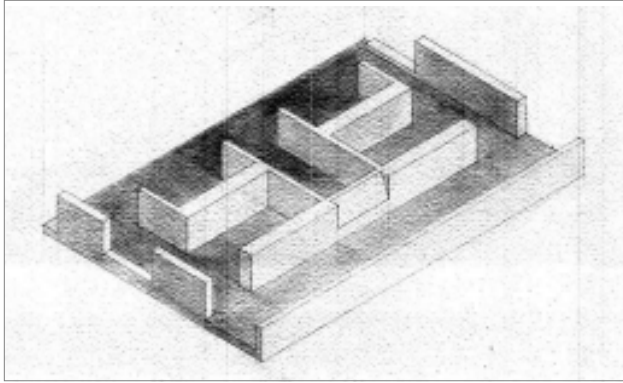
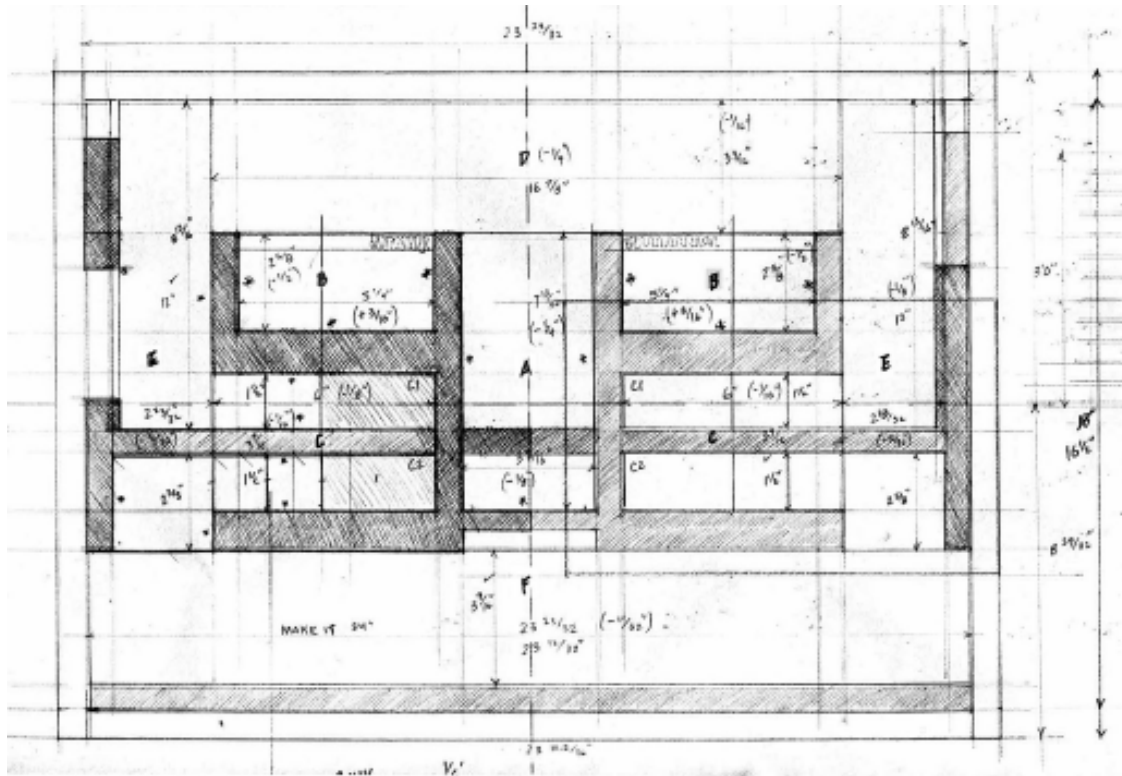


Figure 11



To assert the workable plasticity of sitecast concrete as the primary element in the hierarchy of a construction immediately demands the making of its antecedent: its formwork. It is often remarked that to make a building of sitecast concrete demands the making of two buildings, one of wood and the other of concrete. For the Swiss architect, the design of a beautiful set of forms can in itself justify the making of a concrete structure. Throughout the thesis design of the inhabitable garden wall, the design and making of formwork for the modeling of one cell was paramount in furthering the understanding of concrete as the core of the structure. To consider the cast as the core of the structure demanded it be a single, central unit. Thus the primary element in the morphosis of the hierarchy was satisfied, all the while integrating the sensitivities of the site.



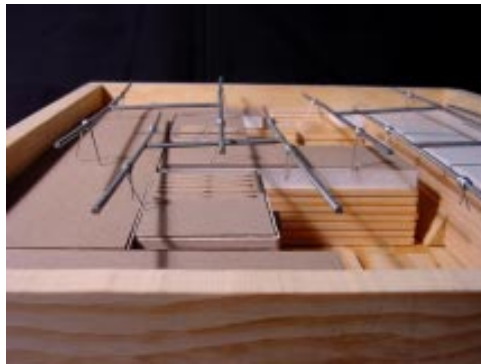






Figure 12

La Tourette exhibits the mastery of Le Corbusier with the plasticity of concrete. The hierarchy of the sitecast frame and pilotis frees the walls of the structure to achieve a remarkable thinness. Concrete window mullions cast at one and a half inches thick are matched in beauty by the gridlike balcony walls for each individual cell, also cast on the site before being assembled as parts of the whole.

Likewise, the concrete frame of the housing block in Kassel allows the infill of its form to vary from wooden installations to fibre-reinforced concrete panels. In this way, concrete acts as a shell as well as the core of the structure.

To maintain a framework through which to learn architecture demands that one consider that the very materials which make up the assembly of a structure have characteristics which are inseparable from their nature. The firmness and compressive strength of concrete is a basic quality of all its forms. However, its range of workability allows it to be a fundamental piece of a construction, as a core, or become integrated as a smaller but still essential unit in the fabric of a structure.

As we can consider concrete the primary element of a hierarchy, or skeleton, we can likewise consider it to take the same qualities as the shell or skin of a body. In this sense, its presence is more that of an envelope, one which is flexible but protective of the other vital systems of the structure. Assuming these qualities means, for instance, that a wall is an assembly of several smaller units into a whole, or one tertiary unit simply blanketing the structure from the elements. While industrial standards differentiate the methods and properties of making concrete into the familiar terms, such as *precast*, *sitecast* and *concrete masonry units*, we can understand the flexible nature of concrete through metaphors just as easily. Again, the metaphor of the human body as it relates to concrete can help in the understanding of its nature.

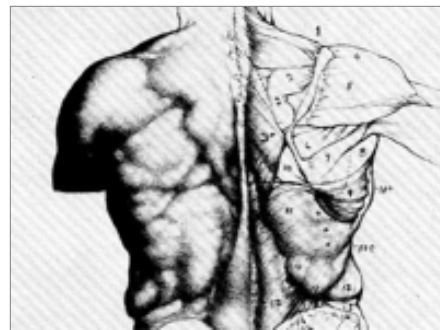
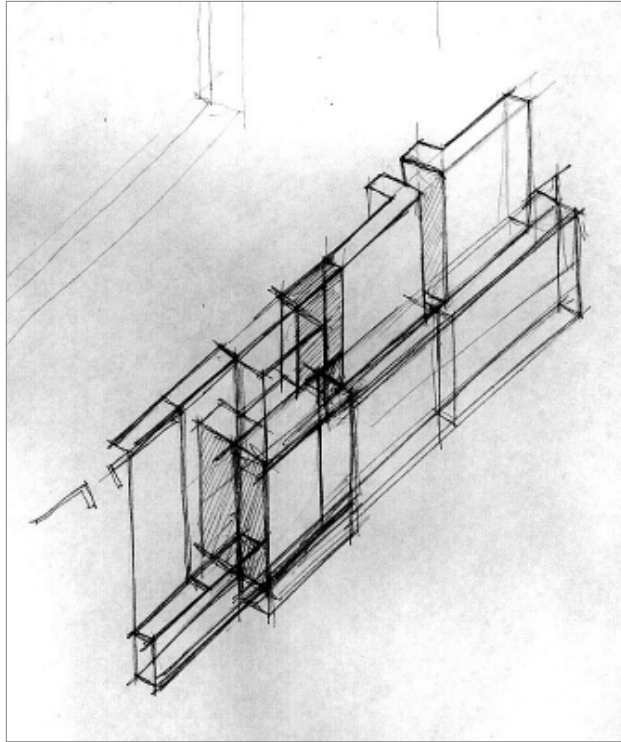
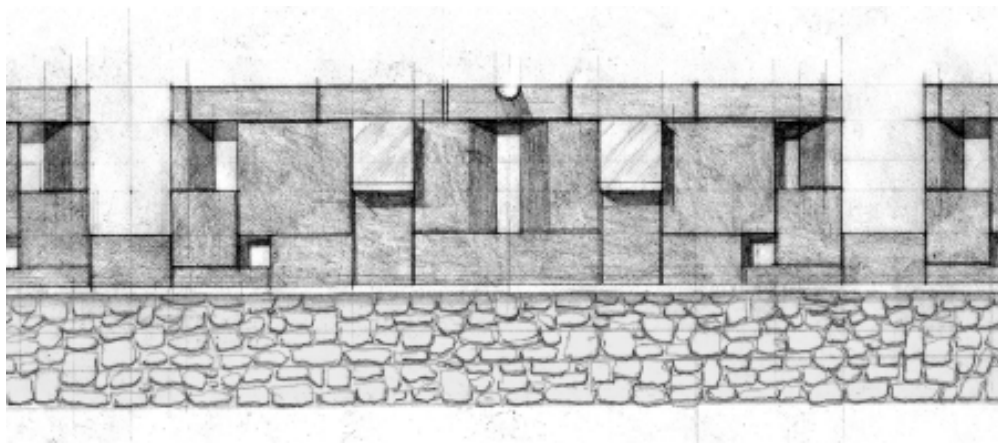
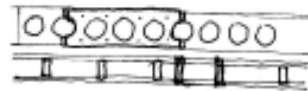
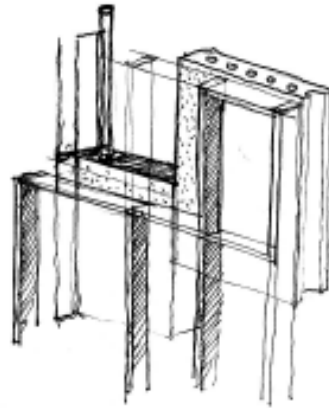


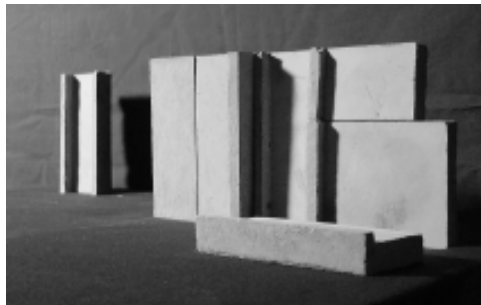
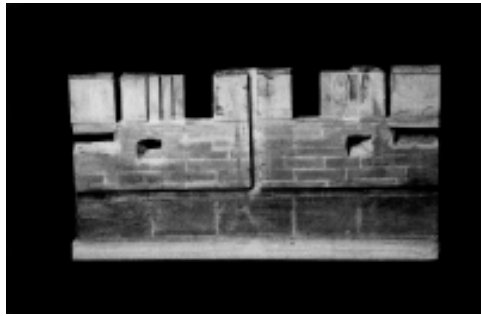
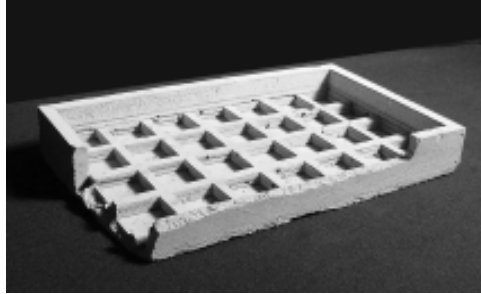
Figure 13

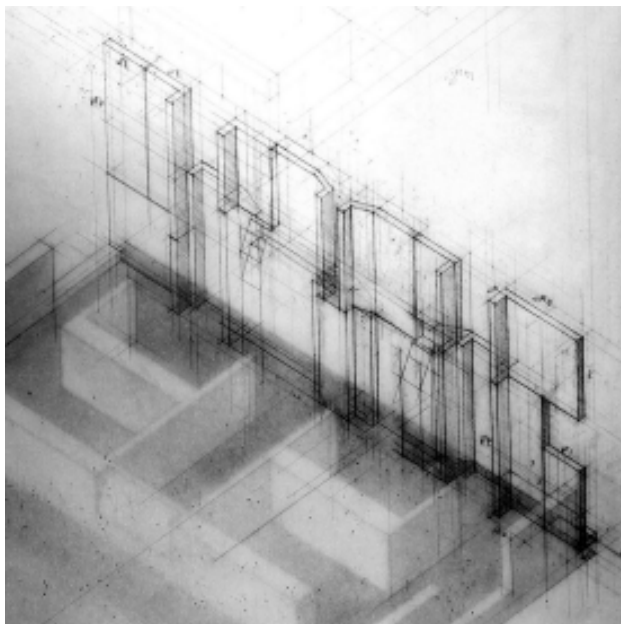
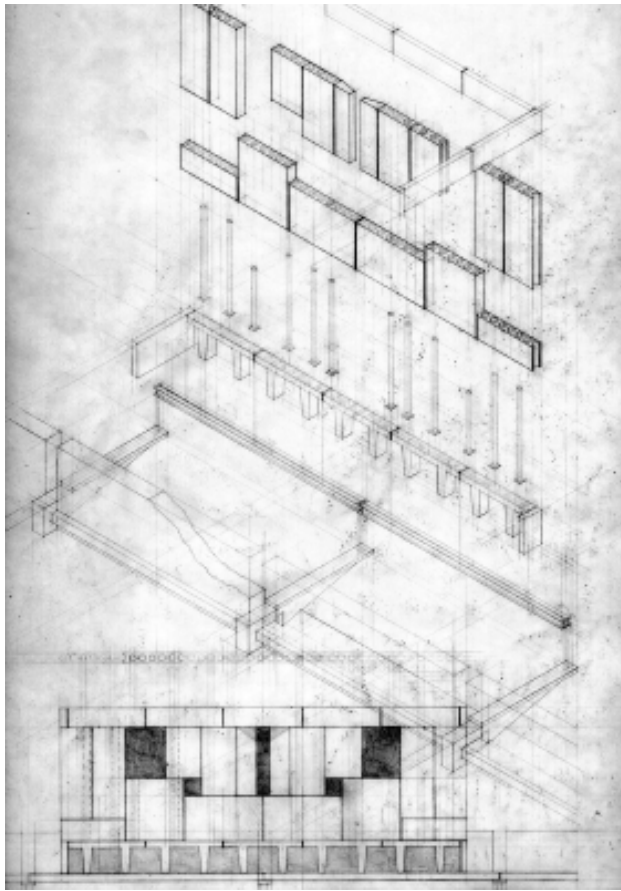


The inhabitable garden wall of Villa Maderni exhibits concrete as a shell as well as a core. The wall defining the eastern edge of the villa property along Via Settala investigates how precast concrete units can be parts of an assembly achieving all the needs of an insulating building envelope, while simultaneously not endangering the fragile existing stacked stone wall adjacent to it.

The stacking pattern of rectilinear precast units of varying sizes is structurally reminiscent of the traditional stone stacking characteristic of the Ticino region. Historically, removing stones from the land and making garden walls of them shaped the landscape and freed the soil for the planting of vineyards. Thus the design respects and responds to those visible elements which are inseparable from the character of the people.







concrete as shell

The structurally impressive capabilities of concrete, whether or not cast at the building site, leave the material an innate handicap in its appearance. Without admixtures, the material itself is dependent upon its shaping and texture for its beauty. Thus its permanent form is literally left in the hands of its craftsman, or those constructing its formwork.

When its monolithic and colorless nature is exposed to spectrums of light, however, concrete is a canvas. In this sense, we depart from understanding concrete through the metaphor of the human body, and observe it through a phenomenon brought to it when it is introduced to a more powerful force: the sun.

The naves of cathedrals present the likeness of stone and concrete to a canvas, when direct sunlight passes through nearby stained glazing. Chartres Cathedral in France and the Church of St. Ignatius, in Basel, Switzerland are prime examples of the power of the supposedly blank, cold and meaningless surfaces of concrete.

Likewise, a monolithic concrete surface can act as a canvas in the sense of being a backdrop for another material, as in the case of the inhabitable garden wall. As the new and old walls of the villa garden harmonize structurally, the view of the two walls from the street dynamically presents the stacked stone of the eighteenth century as the thing still worthy of one's attention.

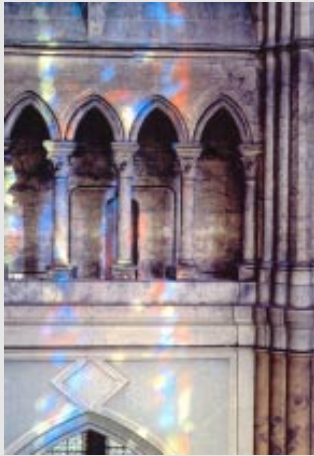
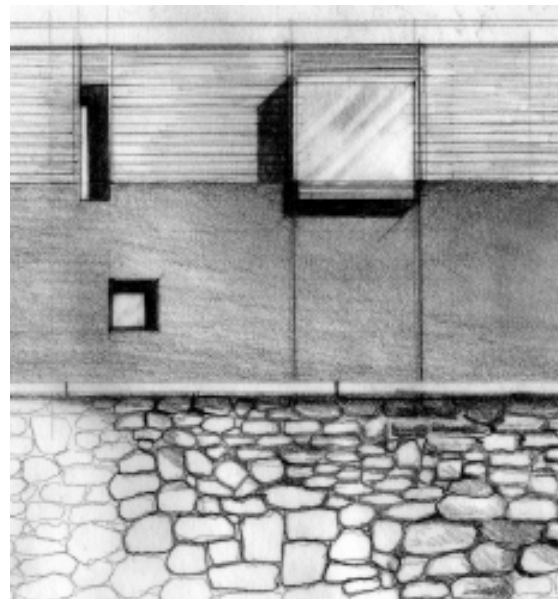


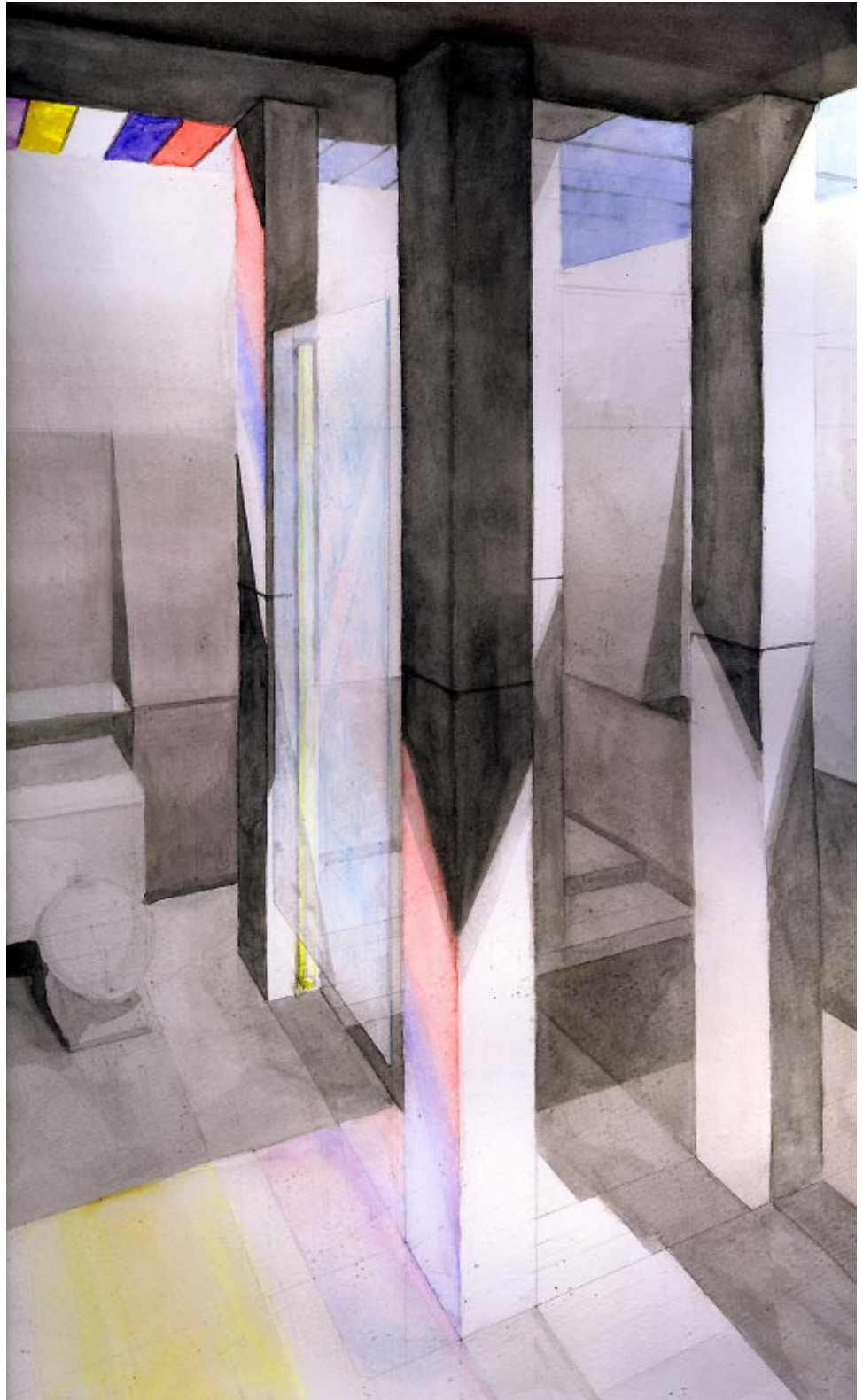
Figure 14



Figure 15



The retaining wall against the slope of the land is an ideal opportunity for making an often unremarkable room one which is quite dynamic. The filtering of natural sunlight through colored lenses in the space between the wall and ceiling makes the smooth grey concrete a canvas for changing palette of reds, yellows and blues.



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This work is a culmination of more than simply a design project for a masters' thesis. It represents and reflects a three year process of continuous learning, both in classrooms in the United States and the piazzas of western Europe. I would like to personally thank my professors for their guidance from the beginning to the completion of each work, from painting twelve shades of green to full scale wall sections. Heiner Schnoedt, Hans Rott, Hunter Pittman, Mike O'Brien, Lorenz Moser, Bill Galloway, Bill Brown. Many thanks go to my classmates, who were more than colleagues, but roommates, teammates and lifetime friends. Three years, three continents, three berber rugs. Ben Jordan-Downs, William "Mac" Ngutter, Yusef Nawas, Marcus Brown, Phil Cosco, Todd Christopher, Doug Satteson. Most of all I want to thank my parents and the wonderful love of my life for their prayers, companionship, trust and love. Mom, Dad, Jennifer.

"We want to swim in life, not architecture. And the best moments are when, by swimming in life, we catch exactly what we need to take back and make our buildings."
Renzo Piano, Genoa, 1993



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