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Blending Architecture with Nature: the Old Man in the Mountain

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BLENDING ARCHITECTURE
WITH NATURE:
THE OLD MAN IN THE MOUNTAIN

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April 12th, 2010

BLENDING ARCHITECTURE WITH NATURE: THE OLD MAN IN THE MOUNTAIN

Richard Hammer _____

Prof. Hasan-Uddin Khan _____

Dean Steven White _____

Title page in progress, but the title will be
Integrating Architecture: Tectonics, Society and Nature
Rethinking the Old Man in the Mountain

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THEORETICAL WRITINGS

•Thesis Abstract	p. 6-7
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THESIS ABSTRACT

The project is centered on the blending of tectonics, social context and nature in order to create a piece of architecture that becomes part of nature and part of the social fabric of the area.

The site is located at the base of the old man in the mountain in Franconia Notch, NH. It is nestled in a valley within the White Mountain National Forest. The Old Man fell off the cliff face in 2003 but for the purposes of the project I will assume that a proposed design for a replacement made of steel and glass will be built.

The building responds to the social fabric of the area by providing a place for people to experience their natural surroundings. It functions as a hotel as well as a museum for the area and a visitors center for the old man in the mountain. The hotel will allow each room views of old man.

The tectonics of the building help it function as a connection with the natural surroundings by stepping down the hillside to connect hiking, biking and highway as well as being in close proximity to ski areas and snow mobile trails. The building will function as a trail allowing travel along the roofs as well as throughout the interior.

The building will blend into the hillside in order to not tarnish the pristine nature of driving through the forest. It will pass over the highway and the stepping nature of the design will allow the 150,000 sqft building to be mostly below the treeline.





MANIFESTO

Introduction:

Architecture is a term used to describe the design of buildings, yet in reality it is so much more than that. Architecture is what orders our lives, it's what allows civilizations to function. Architecture is our cities, it is our towns, it is our houses, it is our communities. Architecture is the invisible janitor of our societies, never noticed until the job is not done well, yet essential to the daily workings of our civilizations.

The purpose then, of architecture isn't to just create a building, but to create an atmosphere that will enmesh itself within its context. If architecture goes unnoticed until it ceases to perform its intended duties, it therefore should also seek to blend itself in to the context in a way that enhances without sacrificing its own integrity.

There are multiple infrastructures that must be taken into effect when designing. The first is the most obvious, which is the built environment. The second is the social context which is interwoven due to the intimate nature with which our daily lives are intertwined within the tectonics of the surroundings. The last is the natural environment. This is perhaps the most ignored within the profession. Our built context needs to shift from one of domination towards one of integration.





MANIFESTO

Architecture as Built Environment:

Architecture is first and foremost a profession for the creation of functional spaces for the inhabitation of the population. It therefore must always perform towards its functional needs in a way that enhances the quality or reduces the effort needed for those tasks. Just as the building must respond to the internal environment it is being designed for, it must also respond to the built environment that surrounds it. This is true in the city with high density and constricted sites, but it is also true on a site where no other buildings are visible. The architects duty comes first to the surroundings before any stylistic whims. A building in the country that stands as a lone spire is far less meaningful then a building that folds with the land, making itself known in small subtle gestures. In the same vein, a building within a city needs to become a piece to a greater tapestry rather than trying to alienate its surroundings for the sole purpose of being different.

Architecture's Response to Nature:

The next aspect needed for good architecture is a connection with the natural environment. This is done through reacting to the exterior environment, including the sun, wind, weather patterns, and temperature. It is also done in an internal manor by reducing the amount of energy used by the building. In addition to the more functional aspects of relating to the environment, it should also work to visually bring the natural environment within the built one. This is the only way that true integration can occur and the result will be a blending of the nature and built contexts rather than having cities separate from the countryside.







MANIFESTO

Architecture with a Social Contract:

However difficult the above is to achieve it is not in itself enough. Alone it would create nothing but hollow shells to live in. What truly brings life to a building is the way that it engages the soul of the people. As with the physical characteristics of good architecture, there is an internal and external requirement to fulfill. The building must meet the psychological needs of the inhabitants as well as their physical ones. The needs for adequate lighting is balanced by the emotional need for natural lighting. The need for physical comfort is balanced by the psychological need to have a connection with the outdoors. The other half of the social contract that architects make when they design buildings is to meet the social needs of the people who surround the area. They need to feel welcomed by an entrance, but also the building must provide a greater connection with the surrounding areas, it must help to knit society together as part of a greater environment.

Conclusion:

Designing with just one of these three aspects in mind is perhaps easier but will result in an incomplete design. The most important thing to remember is that architecture is more than a building it is part of a greater social and built environment which is part of a larger natural environment. As such good architecture will become so blended together so as to begin to visual merge nature with built environment all in a manner that benefits society and the way we go about our lives. All of this will then fade into the background and people can inhabit and enjoy never realizing what they gain from their surrounds, but never feeling that something is missing from it.

SITE LOCATION



•Site Importance	p. 16-17
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•Site Nature Connection	p. 22-27



SITE IMPORTANCE

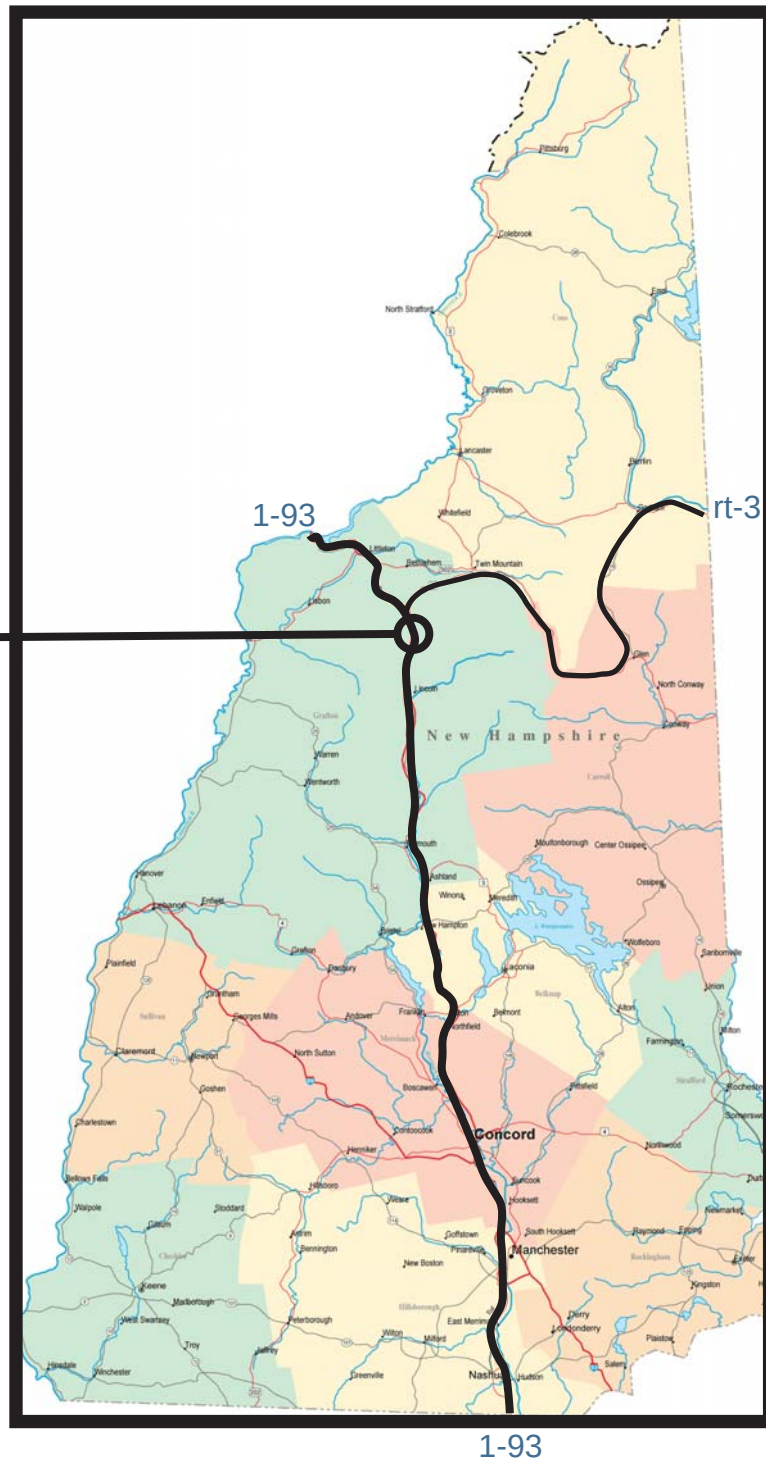
The old man in the mountain is a symbol for New Hampshire. It is on their quarters, and their road signs. It embodies the philosophy of the people who live in the state, that the connection between man and nature should be very strong. The location is also very prominent because it can be seen by everyone driving north, where all the ski areas are during the winter and where most of the outdoor activities like biking and hiking take place in the more temperate months. The problem is that it is never a place that people spend any time. It was a thing that people see on their way to somewhere else. This is the problem with so many attractions. My goal is to use architecture to create an environment that brings people to the site where they can enjoy the old man in the mountain not just as a nice thing to look at then leave, but as an object that people used to reflect upon.

The site itself lends itself to becoming a node for the area. It is almost placed at the gateway to all that northern New Hampshire has to offer. It is within 15 feet of a 30 mile bike path as well as a good staging area for many other activities. It is also on a lake which could be used for canoeing in the summer and ice skating in the winter. It also has existing parking that connects to cannon mountain which shares the same ridge. This also ties in to access up into the old man. Where the old man represents looking out over the surrounding nature. The base of the mountain is about grounding us as humans by being surrounded by mountains and nature. The man represents man standing above nature where the base would represent nature standing above man, creating the harmony that the old man has always represented to New Hampshire.

There is currently a proposal to rebuild the old man out of steel and glass. I feel this proposal is very successful because it recreates the monument without feeling like a fake. It also allows the visitor to go inside it and look out from the eyes of the old man. I will be assuming for the purposes of this thesis that it will be constructed.



OLD MAN IN
THE MOUNTAIN



SITE LOCATION

Route 93 is the main access route to all of the northern half of the state and the site is ideally located just off the highway. It is also located just before route 3 splits off I-93 to head east making the site a perfect stop before heading to wherever destination brought you north. It is 2 and a half hours north of Boston and an hour north of Concord.



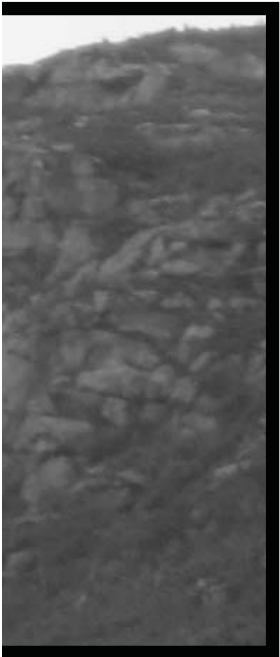
SITE SOCIAL CONNECTION

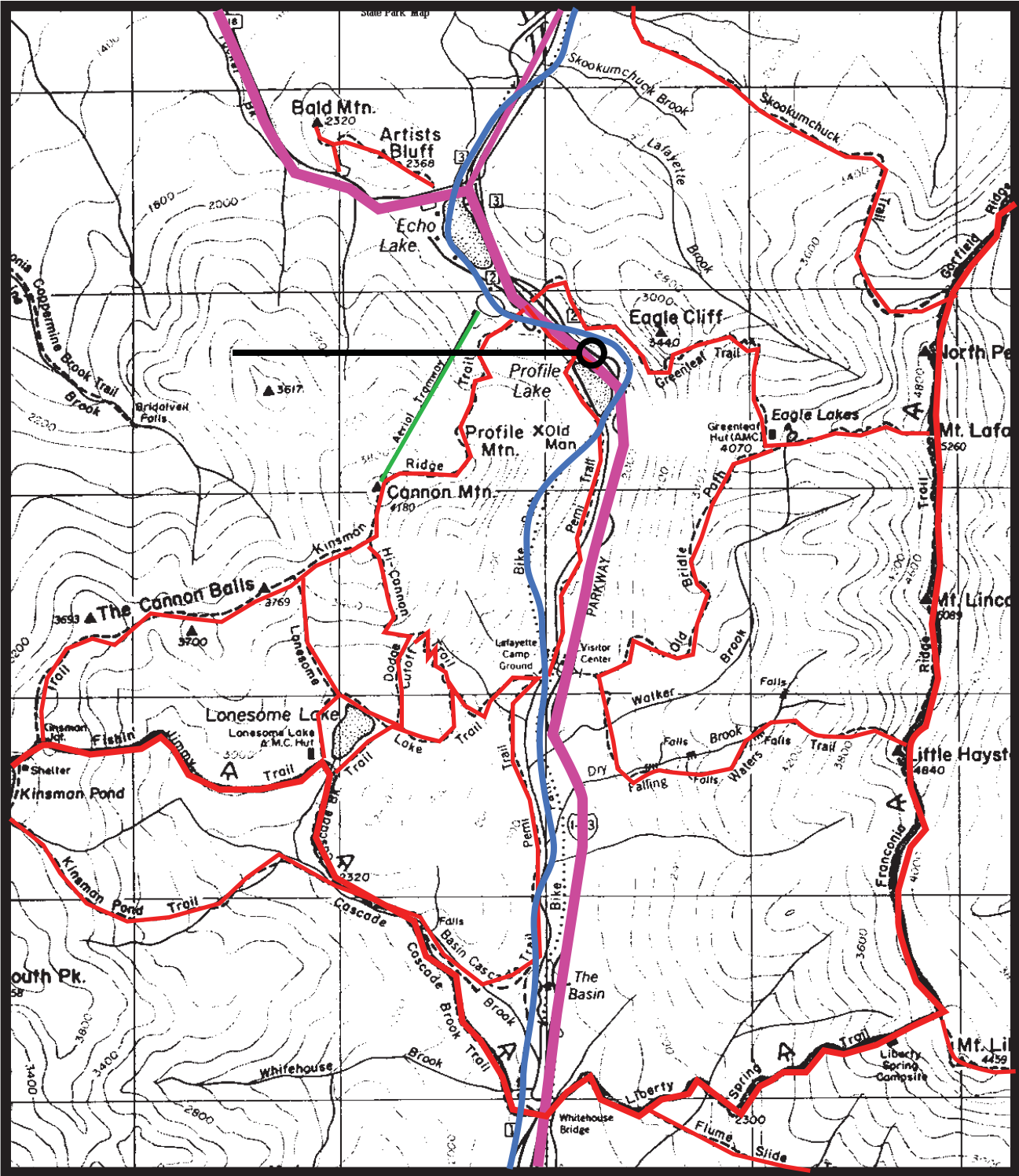
The old man in the mountain was not only a cultural icon for New Hampshire but it was also a huge tourist attraction that brought lots of revenue to many businesses in the area. Since its fall many businesses have noticed large drops in revenue and visitors. Three examples of this are “At the Profile Ice Cream Shop, sales decreased to \$46,000 in 2006 from \$146,000 in the 2002 season, New Hampshire parks officials said. Visitors to The Flume Gorge, located nearby in Franconia Notch State Park, dropped to 131,919 in 2006 from 172,113 in 2002. And riders on the Cannon Mountain Aerial Tramway dipped to 74,525 in 2006 from 99,389 in 2002.” That is a 66% drop in income for the ice cream store and anywhere from 20,000 to 40,000 less tourists in the area. That means less revenue for all businesses in the area. While rebuilding a version of the old man would be expensive, it would bring all those people back to the area to spend their money.

That is also why having a building or series of buildings that could bring in revenue for the state are so crucial to the project. If those 40,000 people came to the site and stayed in the lodging and rented equipment for their activities while looking at the old man, and spent an average of even \$100, that would bring in \$400,000 a year extra then if there was no old man. That is without the large base of people who would come regardless because of the natural beauty of the area and the extensive amounts of activities to do. This site would draw those people to the site because there are so many things to do and places to see in the area that sometimes it can be overwhelming. With a central location, people could drive north to stay with no plans in mind and then decide once they had all the information at hand and first hand experience of the other guests as to what they want to do.

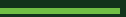
With all of the above factors the site could easily generate millions of dollars a year for the state, not to mention all the other businesses in the area that have suffered greatly from the lack of tourism since the fall of the old man.

(Ramer 2008)



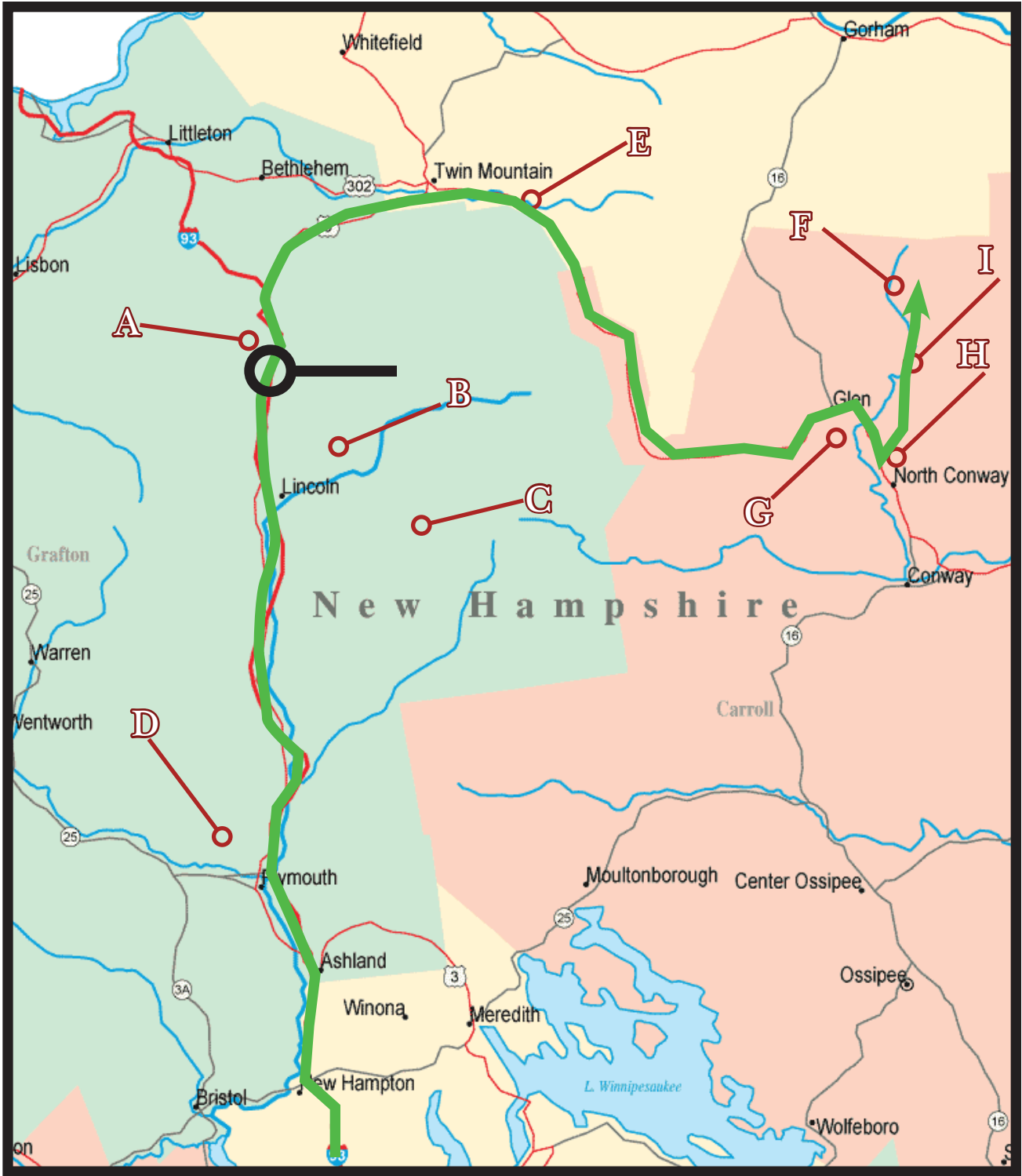


SITE NATURE CONNECTION

-  Location of The Old Man in the Mountain Site
-  Hiking Paths
-  Cannon Mountain tramway to peak of Cannon Mountain
-  Highways
-  Bike Path

The White mountains are one of the best hiking areas in the country. The Old man site ties directly into a network of trails that vary in difficulty. Also the Cannon Mountain tramway will take you to the ridge where you can traverse some of the best viewing trails with less hiking difficulty getting there.

The site is ideally located for those wishing to bike through the White Mountains. The recreational bike path is a approx. 30 mile path made just for bikers that winds its way through the Mountains and passing through the town of Lincoln ideally located 2/3 of the way around the path for a stop to rest or to replenish food and water. The path passes within 100 feet of the site making it easy to access. For those looking for a more intense experience there are multiple advanced paths within easy access for a day bike trip.



SITE NATURE CONNECTION



Location of The Old Man in the Mountain Site

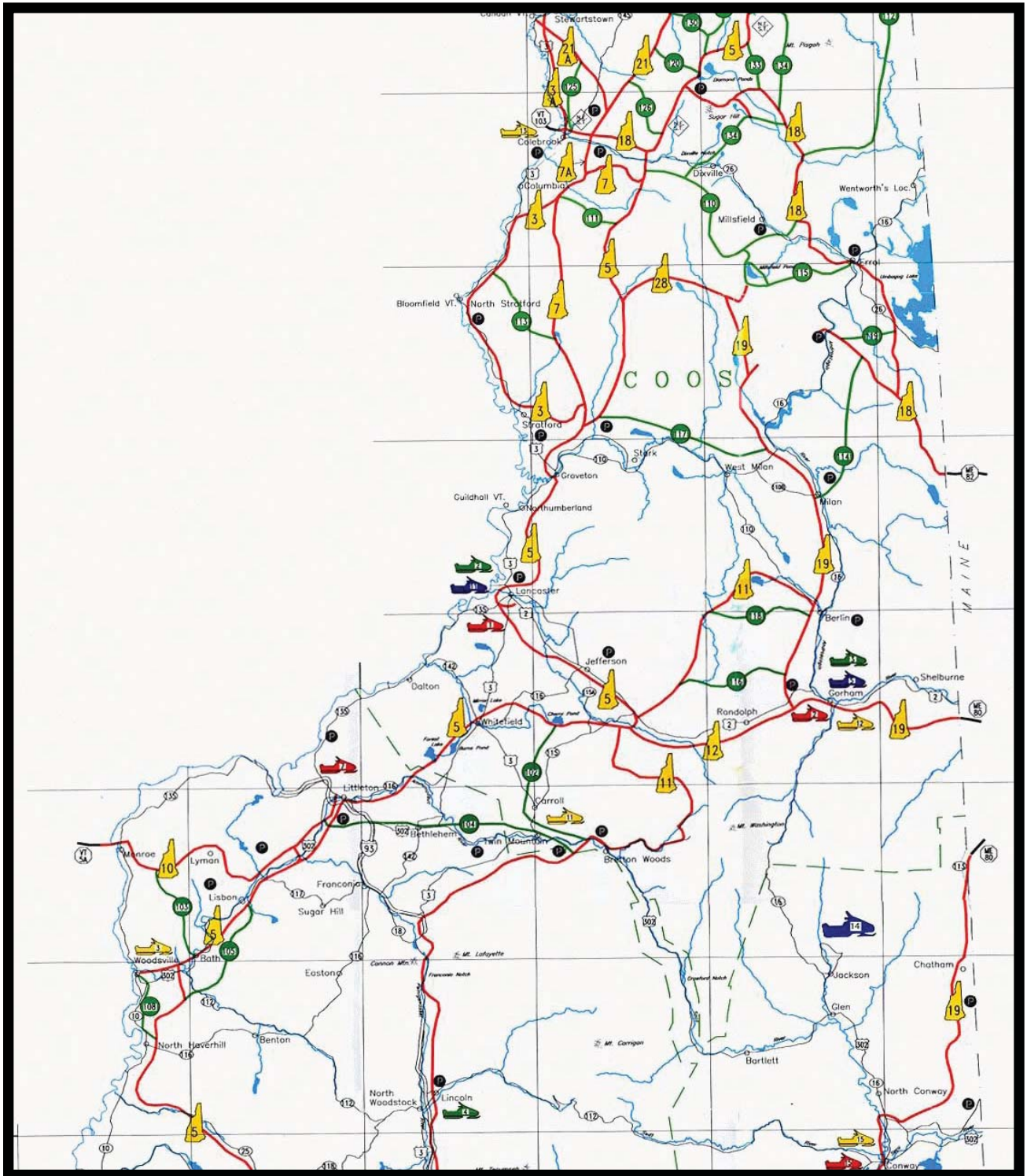


Fastest Route From All Points South

- A** Cannon Mountain
- B** Loon Mountain
- C** Waterville Valley
- D** Tenney Mountain
- E** Bretton Woods
- F** Wildcat Mountain
- G** Attitash
- H** Cranmore
- I** Black Mountain

Skiing in NH is one of the biggest attractions to the area. I-93 is the route used to reach all of the top mountains fastest, which runs directly next to the site at the base of the Old man in the mountain. Cannon Mountain is within a quarter mile of the site as well. The site is centrally located to allow easy day access to all of the above mountains. Bretton Woods is the largest ski area in the state. Along with skiing, during the summer months all of the ski areas offer other outdoor activities that range from horseback riding to water parks to hiking trails.





SITE NATURE CONNECTION

-  Main Trails
-  Secondary Trails

The site is connected to the larger network of snowmobile trails and would thus be a good base location for people looking to ride the trails up north.



HISTORY/FUTURE OF SITE

- 
-
- History of the Old Man _____p. 30-33
  - Old Man Memorial _____p. 34-35
  - Old Man Replacement _____p. 36-39



The Old Man

by Robert F Doane

Published 1939 at 13 years of age

Campton New Hampshire

On the crest of a mighty mountain
Looking over the lake below,
A face with a human expression
Watches many a century go.

It was made from a mountain of granite
With the skill of a sculptor's hand,
And guards the green valley below it
As time passes over the land.

At dusk when the birds cease their carols
And the wind murmurs through the trees,
There's a sense of sadness about you,
As you stand in the evening breeze.

You feel that a great respect's due him -
So mighty beneath the blue sky,
There are few who have not been inspired
By that face as they've passed it by.

And to me, as to Daniel Webster,
The thought comes now and again
That in the great State of New Hampshire
The Master of Sculptors makes men.

HISTORY OF THE OLD MAN

Daniel Webster once said, ..."Men hang out their signs indicative of their respective trades; shoe makers hang out a gigantic shoe; jewelers a monster watch, and the dentist hangs out a gold tooth; but up in the Mountains of New Hampshire, God Almighty has hung out a sign to show that there He makes men." Thus it happens that New Hampshire has her Profile, "The Old Man of the Mountain," sublimely outlined against the western sky; a sign unique, distinctive, and inspirational as to the kind of men the sons of the Granite State should be. **

The Profile is composed of Conway red granite and is an illusion formed by five ledges, that when lined up correctly give the appearance of an old man with an easterly gaze, clearly distinct and visible from only a very small space near Profile Lake. When viewed from other locations in Franconia Notch, the same five ledges have a very rough and ragged appearance, and there is no suggestion of The Profile.*

Geological opinion is that The Profile on Profile Mountain is supposed to have been brought forth partly as the result of the melting and slipping away action of the ice sheet that covered the Franconia Mountains at the end of the glacial period, and partly by the action of the frost and ice in crevices, forcing off, and moving about certain rocks and ledges into profile forming positions. It is supposed that the Old Man of the Mountain was completed during the latter part of the post glacial period, from 2,000 to 10,000 years ago.**

The Old Man is formed on a shoulder of Profile Mountain, which juts out abruptly into space, some 1200 feet above Profile Lake. It is composed of five layers of granite ledge, one exactly above the other, the lateral distance being 25 feet. Of these five layers one forms the chin, another the upper lip, a third the nose and two layers make up the forehead. The Old Man has been measured as being forty feet and five inches in height. It is all together, just as it appears to be when viewed from the road or lake below.*

(Mountain n.d.)





The Old Man

By Cameron D. Tanguay
Written 2003 at 12 years of age
Chelmsford Massachusetts

Down fell a face
Of a million years counting

The king of the mountain
And guard of the valley below

The last generation
The very last era

Never to see again
From Gods sculpting hands

“The mountains of New Hampshire,
God Almighty has hung out a sign to show,
That there, He makes man.”

Only memories will do now the justice
Of Gods great creation
Of the man who peeks out from the mountain,
The monument,
The icon,

The Old Man in the Mountain

HISTORY OF THE OLD MAN

1905 > Rev. Guy Roberts of Whitefield, NH, discovered that the forehead stone of the old Man had begun to slip into the valley. Roberts brought this to the attention of the owner of the Notch, Col. Greenleaf.

1915 > Rev. Roberts located Edward Geddes, a granite quarry superintendent from Quincy, MA. Edward Geddes used a devise in the quarries to secure rocks. This was called a turnbuckle.

1916 > Rev. Roberts, Ed Geddes and 4 helpers came to work on the Old Man. Ed Geddes worked from sunrise to sunset for 6 days to secure the forehead stone. As a result, the fingers on one of his hands became frostbitten and were crooked for the rest of his life. But because of his work, the stone has not moved a measurable amount in over 80 years.

1954 > Another inspection was undertaken. The examination found that the crack Geddes had spoken of in 1937 had indeed widened by 3/4 of an inch. The Old Man needed help.

1955 > A bill was introduced into the NH legislature to appropriate \$25,000.00 for the repair of the Old Man of the Mountain. The bill passed in 1957.

1955 > A bill was introduced into the NH legislature to appropriate \$25,000.00 for the repair of the Old Man of the Mountain. The bill passed in 1957.

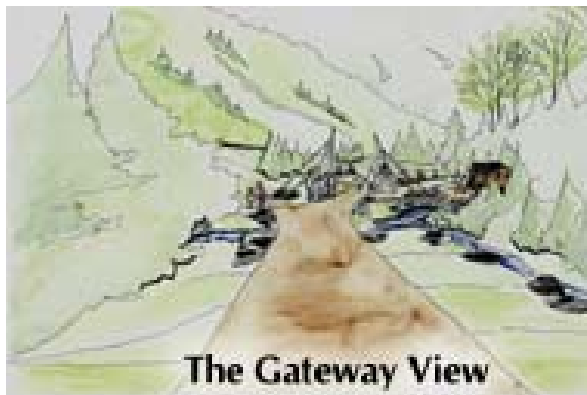
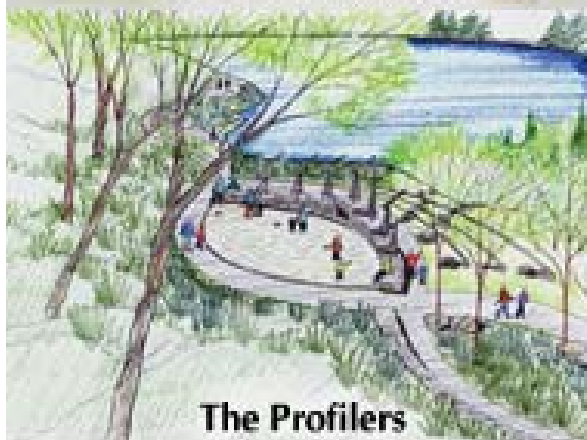
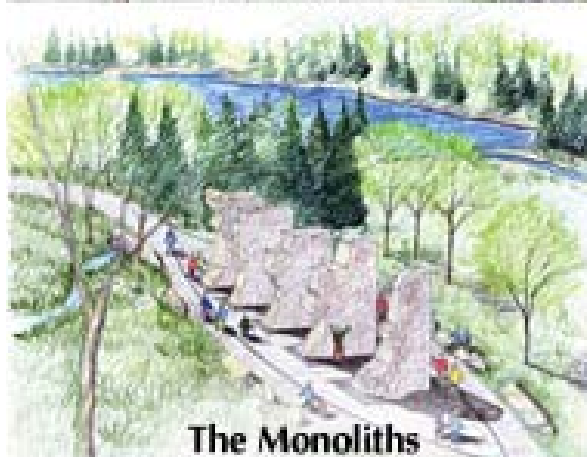
1969 > David Nielsen made his first trip to the Old Man with his father because his father told him that he had to give him a shave and a haircut. David has worked on the Old Man every year since then. David became the Second Official Caretaker of the Old Man of the Mountain. Seismology studies by the University of Maryland take place.

1972 > Niels sealed up the crack on the south face of the Old Man by creating a membrane of wire, cloth, and fiberglass. This covered the Old Man's ear.

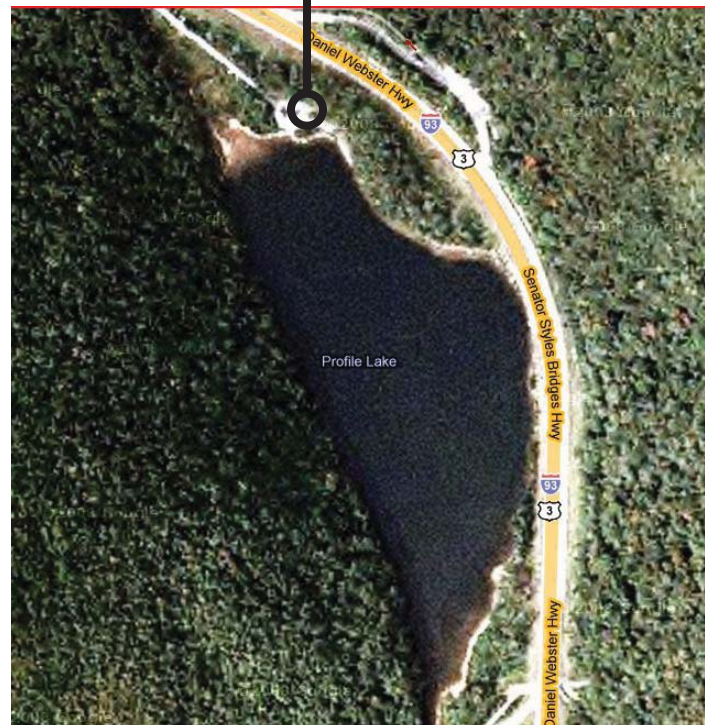
1973 > Niels installed 14 numbered tags across the Old Man's face in order to properly measure any movement. Those check points were checked annually.

2003 > The Old Man falls.

(fund: time line)



OLD MAN MEMORIAL



OLD MAN MEMORIAL

The memorial is composed of three distinct features spread out along the pathway from the base of Cannon Mountain to the shore of Profile Lake. Visitors will first walk through two standing stones to mark an entrance gateway, then encounter a series of five huge stones which, viewed from the right vantage point, create the outline of the famous profile. Finally, in a newly landscaped park at the water's edge, steel pointers that use similar technology will allow visitors to line up the pointer's irregular edges and restore the outline of the famous profile to its former perch.

Shelley Bradbury and Ron Magers were chosen from over 40 applicants from across the nation, by an independent jury of distinguished NH artists and citizens. Their submission was a unique combination of artistic sculpture and on-site experience, drawing inspiration from the original natural formation. Shelley and Ron bring a unique combination of fine art talent and consumer design skill to this historic project.

"This design reflects the natural ruggedness and beauty of the notch, and captures the awe-inspiring qualities and elusive imagery of the Great Stone Face," said Maura Weston, Chair of the Legacy Fund. "It respects the integrity and historical significance of the Old Man of the Mountain at the same time that it creates a wonderful new attraction for future generations."

(fund: park design)



OLD MAN REPLACEMENT

The design by New Jersey architect Francis Treves to replace the old man in the mountain with a replica made out of steel and glass won the award for best un-built project from the New Hampshire chapter of the AIA. At the moment it remains a theoretical project as it has met widespread resistance among New Hampshire residents. Treves has said that “a cultural divide” exists that is preventing his work from taking hold.

The design features a walkway that visitors can walk out on inside the old man to look out through his eyes. It also features a waterfall that is comprised of redirected water from off the mountain. There is a tunnel that would access the old man making it easy for people who aren't expert hikers to experience the view.

This design is in my opinion the best for the state as far as drawing people to the site but it also fits best with the feeling of the site. The old man represented man's relationship with nature and this embodies that relationship. It also would add an extra attraction of being inside it to draw people back again and also to give them a reason to stop at the site rather than just drive by.

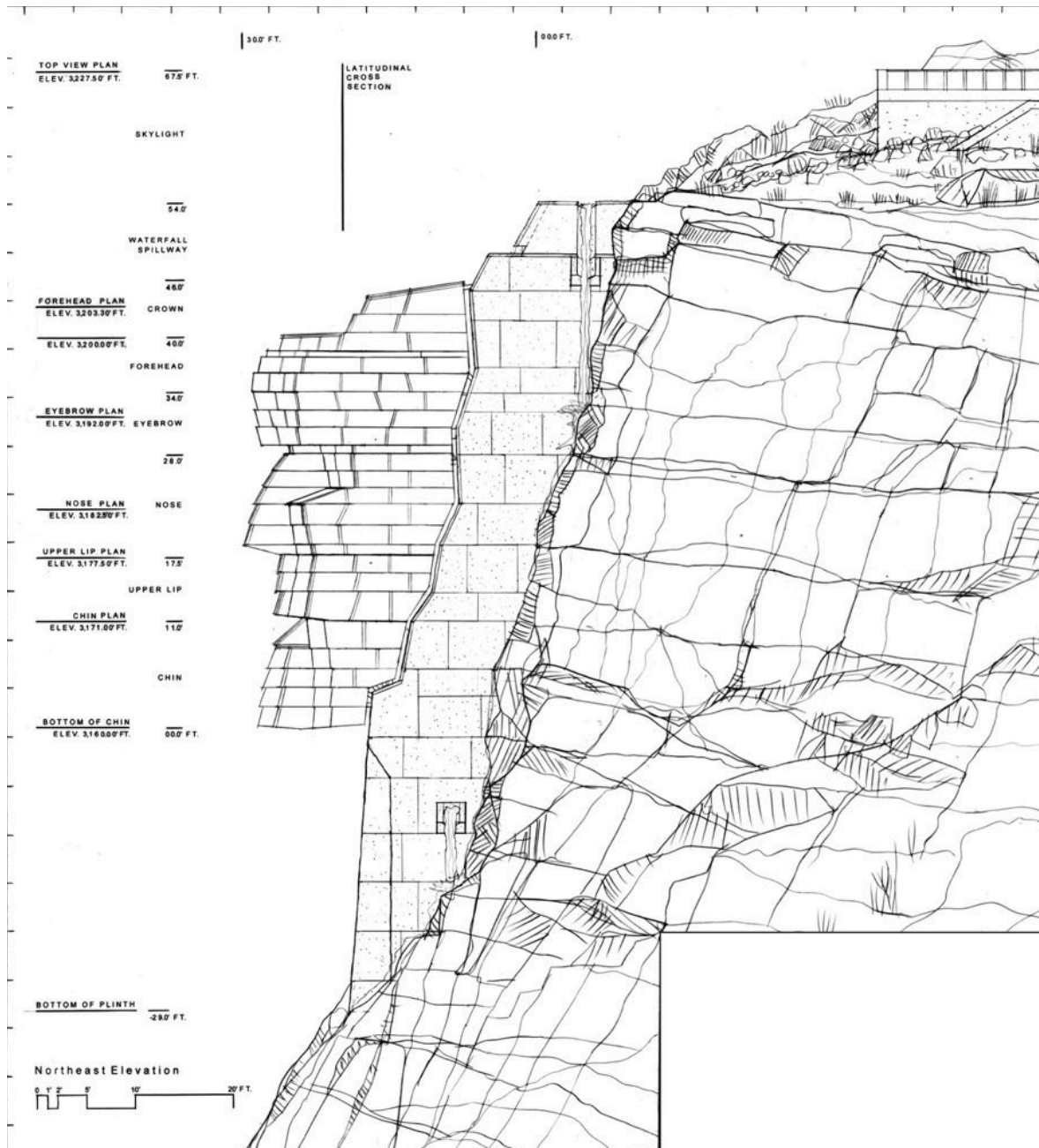
“The grand metaphor with this piece of glass on the mountain is it's not really a piece of glass, it's a piece of ice, the old man was sculpted by the glaciers; the ice gave it birth.”

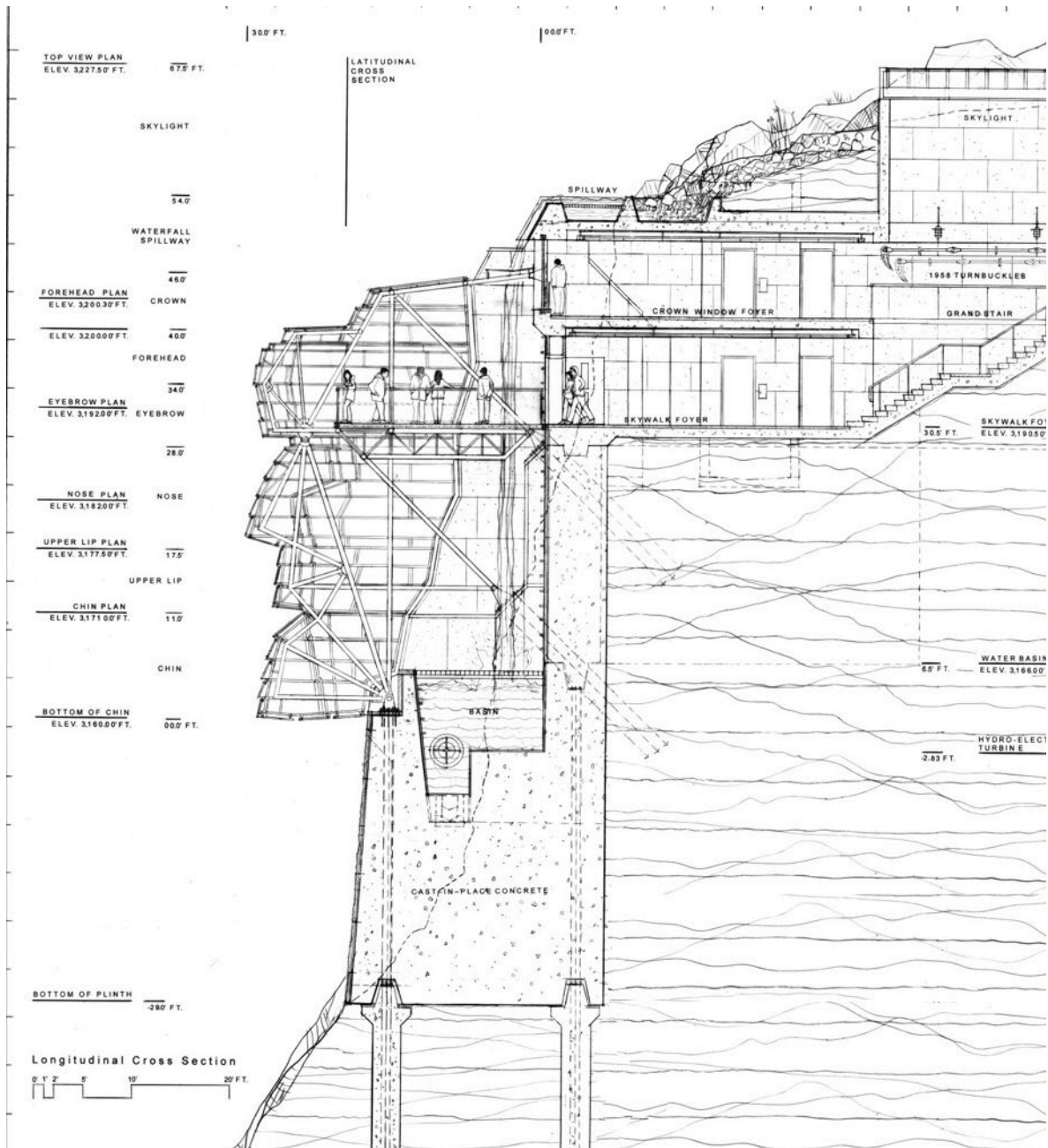
-Treves

“A very sophisticated, intellectual redefinition of the idea of what the Old Man was, which was really man's relationship to nature.”

-Treves

(MacQuarrie 2009)





•OLD MAN REPLACEMENT•

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BUILDING PROGRAM



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GENERAL PROGRAM

The program for the building will be split into three general sections.

The first section is the visitor's center. It will contain information about the surrounding area as well as rentable equipment for all outdoor activities including, bikes, skis, kayaks, fishing equipment, etc. It will also include a convenience store and gift shop for souvenirs for the old man in the mountain.

The second group of program is the Museum. It will also contain the history of the Old Man in the Mountain. It will include a series of spaces for artists and writers to rent as art has always been tied to nature and beauty.

The third group of program will contain the bulk of the square footage and will be a gathering place as well as lodging. There will be rooms for small parties or large families. It will contain space for weddings or conferences as well as it is a very tranquil and beautiful location with easy access from Boston, Concord or Manchester.





Building 1:**Welcome Center**

Lobby		800 sqft
Offices	20 @ 130sqft	2,600 sqft
Rent Center		1,500 sqft
Storage		4,000 sqft
Bathrooms	2 @ 200sqft	400 sqft
Gift Shop		600 sqft
Convenience Store		600 sqft
Mechanical Room		600 sqft
Loading Dock		300 sqft
Janitor's closet		200 sqft

Sub-Total	11,600 sqft
7.5% circ.	870 sqft
10% mech/struc	1,247 sqft
Total	13,717 sqft





Building 2:**Museum**

Ticket Booth			100	sqft
Galleries			10,000	sqft
Storage			1,000	sqft
Bathrooms	4 @	200sqft	800	sqft
Theater			3,500	sqft
Loading Dock			300	sqft
Offices	2 @	150sqft	300	sqft

Sub-Total 16,000 sqft

Artist Space

Rentable Studio Space	6 @	600sqft	3,600	sqft
Writer's Lounge			1,000	sqft
Storage			800	sqft
Bathrooms	2 @	200sqft	400	sqft

Sub-Total 5,800 sqft

Shared Space

Janitor's Closet	2 @	200sqft	400	sqft
Mechanical Room			800	sqft
Café			400	sqft
Lobby			800	sqft

Sub-Total 2,400 sqft

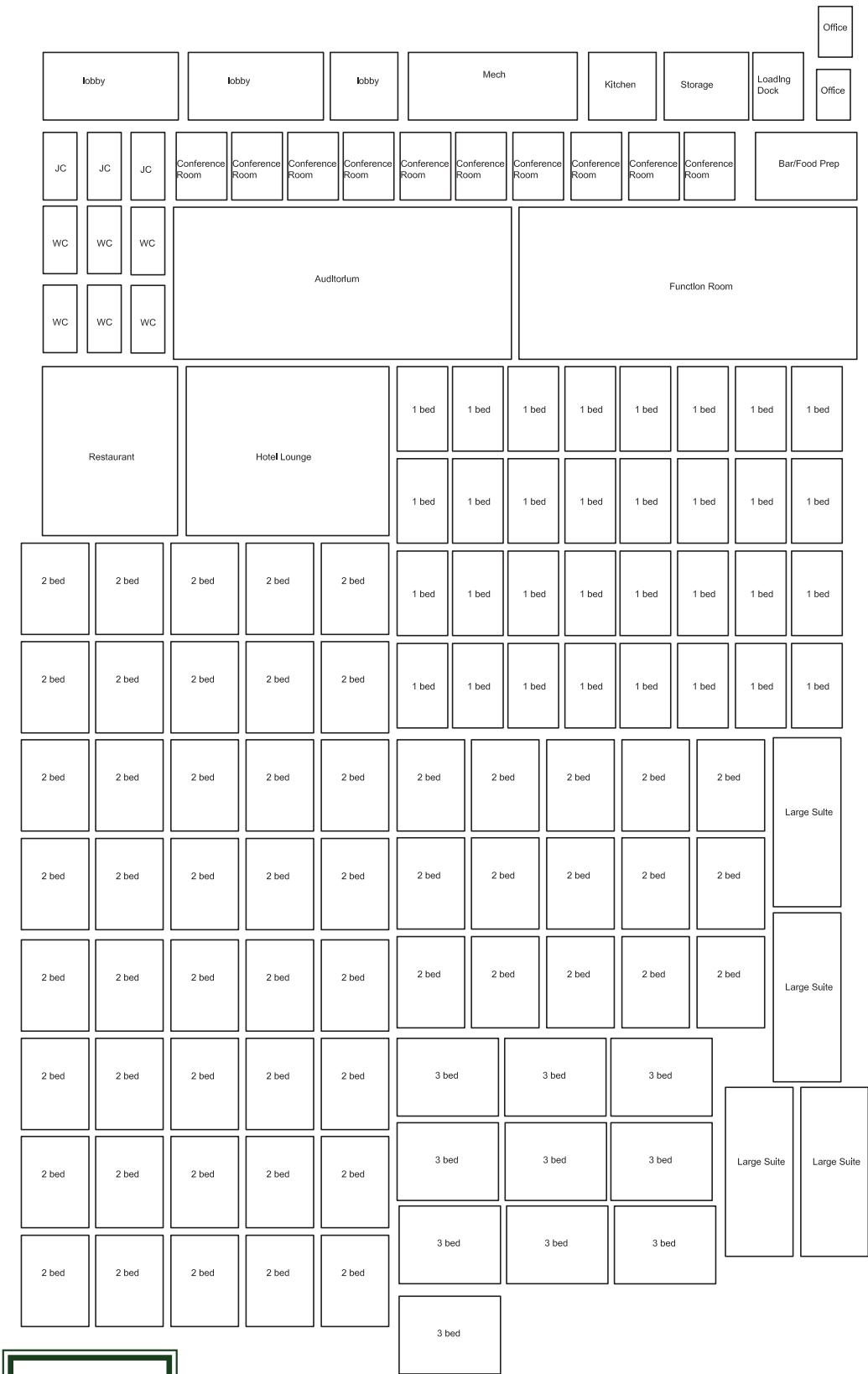
Sub-Total 24,200 sqft

7.5% circ. 1,815 sqft

10% mech/struc 2,601 sqft

Total 28,616 sqft





• 48 •

•HOTEL PROGRAM 1/40" = 1'-00"•

Building 3:**Lodging**

Office	2 @	150sqft	300 sqft
Lobby			800 sqft
1 bed Rooms	30 @	375sqft	11,250 sqft
2 Bed Rooms	55 @	550sqft	30,250 sqft
3 Bed Rooms	15 @	700sqft	10,500 sqft
Large Suites	4 @	1000sqft	4,000 sqft
Bathrooms	2 @	200sqft	400 sqft
Lounge			3,000 sqft
Bar/Food Prep			600 sqft
Loading Dock			300 sqft
Mechanical Room			1,000 sqft

Sub-Total 62,400 sqft

Conference Center

Conference Rooms	10 @	300sqft	3,000 sqft
Auditorium	300ppl		4,500 sqft
Function Room			4,500 sqft
Conference Lobby			800 sqft
Bathrooms	2 @	200sqft	400 sqft

Sub-Total 13,200 sqft

Restaurant

Dining/Bar			2,000 sqft
Bathrooms	2 @	200sqft	400 sqft
Kitchen			400 sqft
Storage			500 sqft
Restaurant Lobby			400 sqft
Janitor's Closet	3 @	200sqft	600 sqft

Sub-Total 4,300 sqft

Sub-Total 79,900 sqft

7.5% circ. 9,621 sqft

10% mech/struc 13,786 sqft

Total 103,307 sqft

Overall Total 145,640 sqft





PROGRAM SIGNIFICANCE

The first programmatic element will be a welcome center as well as a place where information and equipment can be purchased for use of any outdoor activities in the surrounding area. It will represent the future life of the site as a center for nature tourism for the state.

The second programmatic element will be for lodging and gathering. It will be a place where people can go to stay and be centrally located to all the activities that northern New Hampshire has to offer. It also is a place where people can gather to share experiences and stories, also a place where people could get married or have conferences. The architecture must create the feel of a getaway in the woods rather than being in a hotel the same as any other in a city. It will represent the here and now of the site, allowing people to interact and spend actual time where the old man in the mountain is rather than coming then leaving. It will allow time to reflect. A calm atmosphere of contemplation.

The last programmatic element represents the past of the site. It will be a museum for the remembrance of the old man but also for the whole white mountains region. The areas main goal is the preservation of the beauty that exists naturally in the land. This is what the museum will represent both programmatically as well as architecturally. It will contain areas for artists to work documenting the nature around them as well as a place to display those works and the full history of the old man. At one point in the display there will be a framed view up to where the newly designed old man of steel and glass will reside upon the mountain. It will also be tied to the sculpture made to represent the old man that will soon be built on the site.



EXISTING CONDITIONS



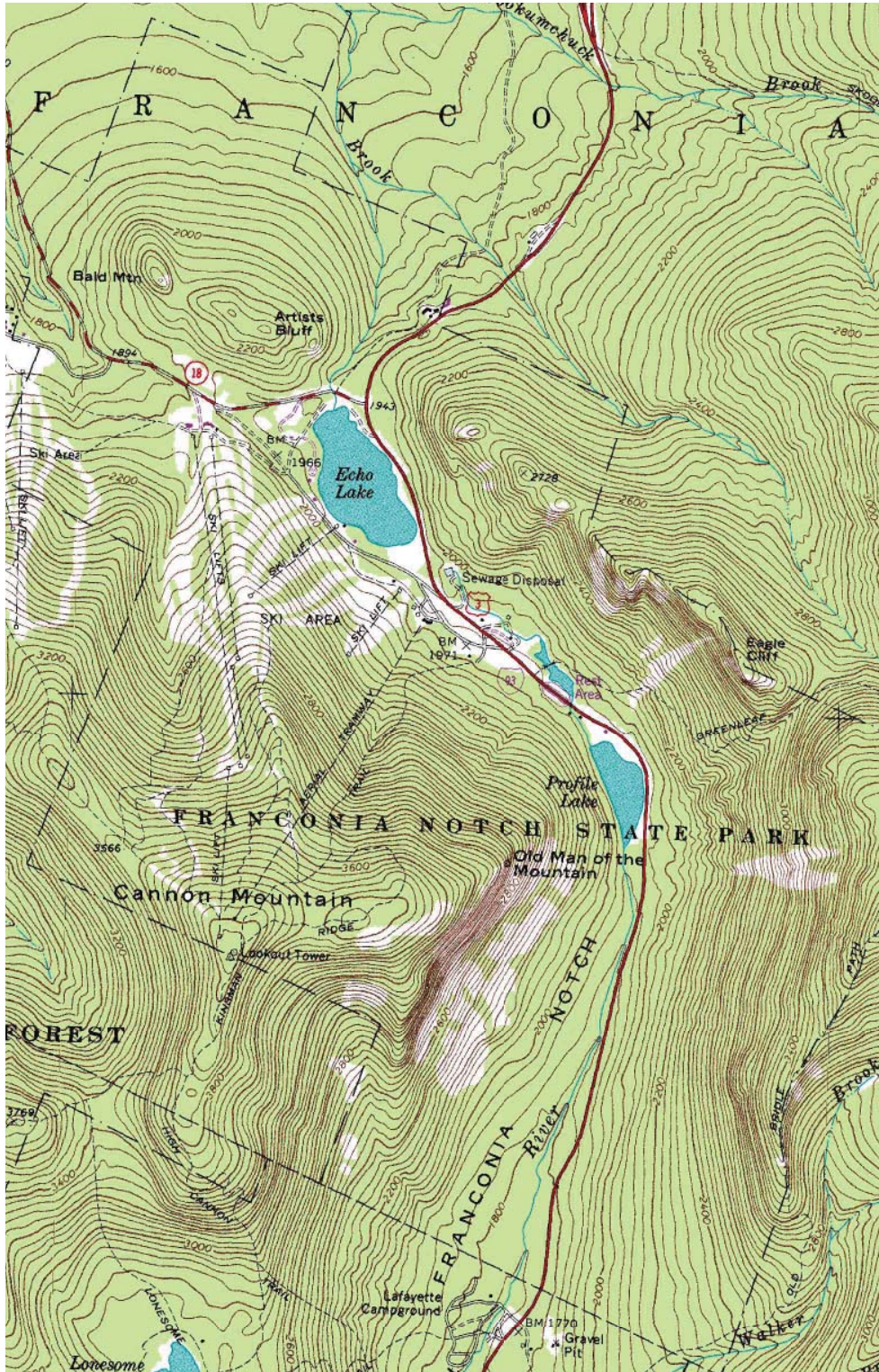
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•Weather Data	p. 60-63





•EXISTING SITE PHOTOS•

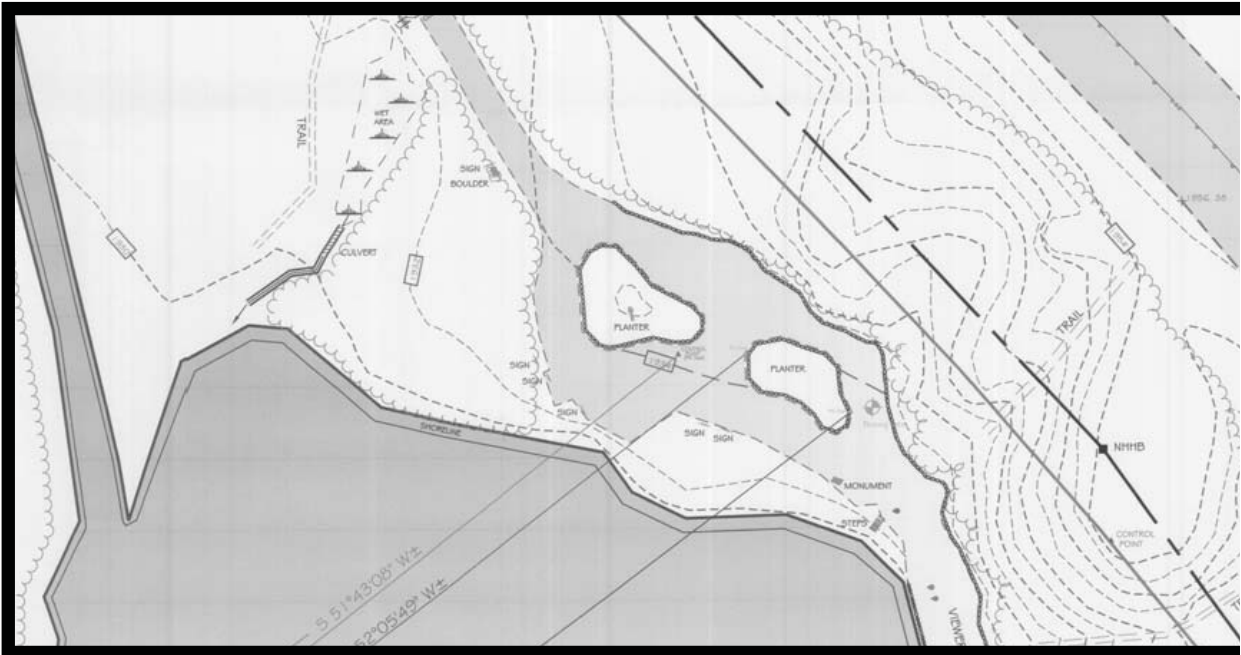






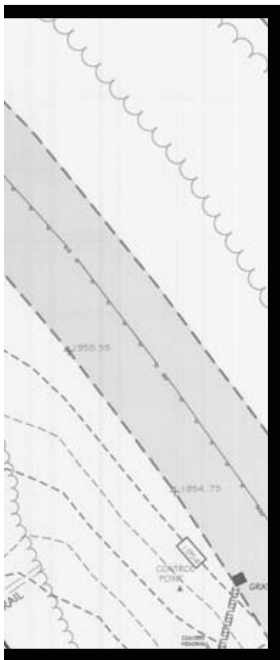
•2' CONTOUR MAP•

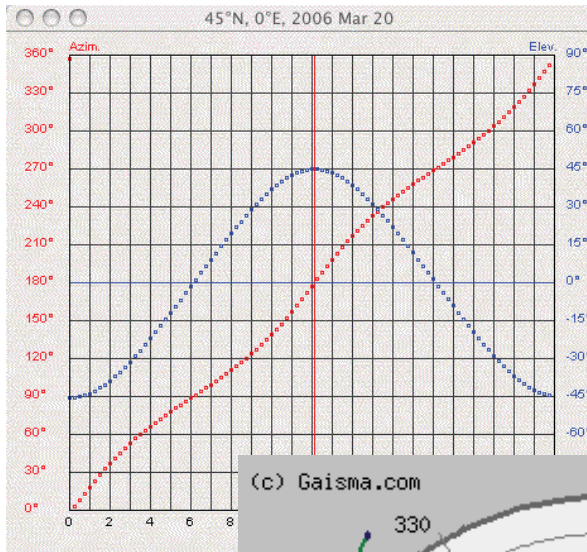
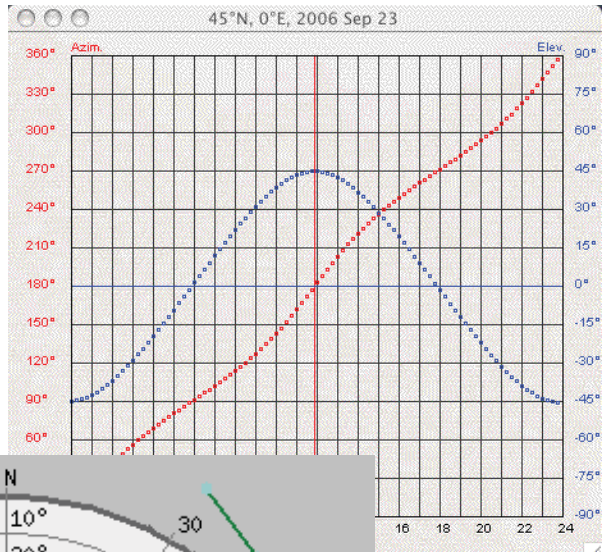
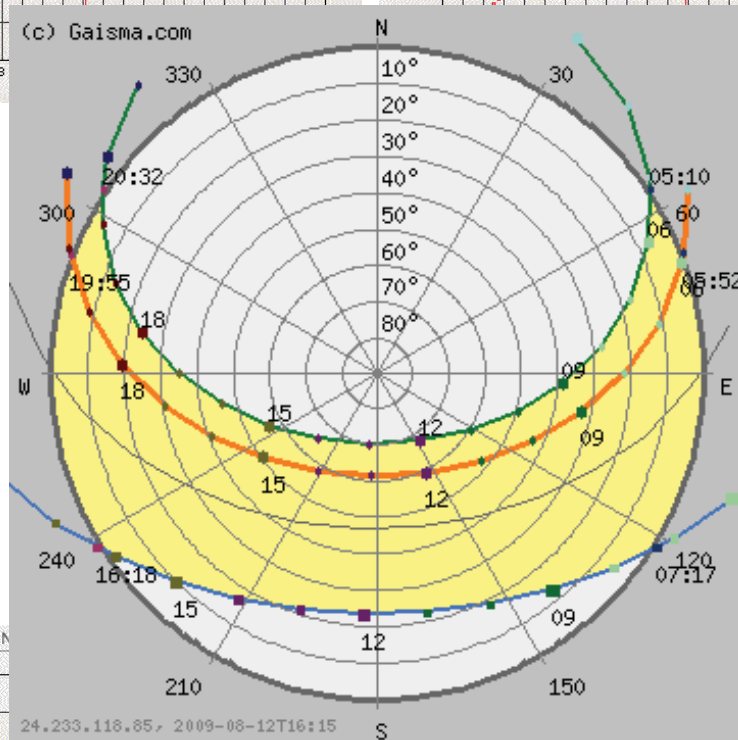
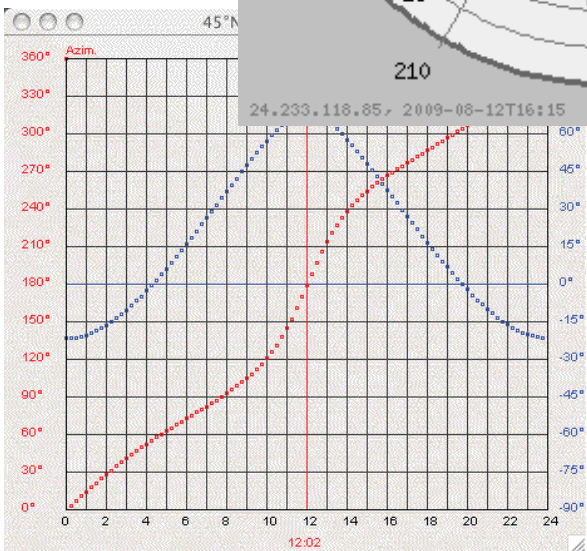
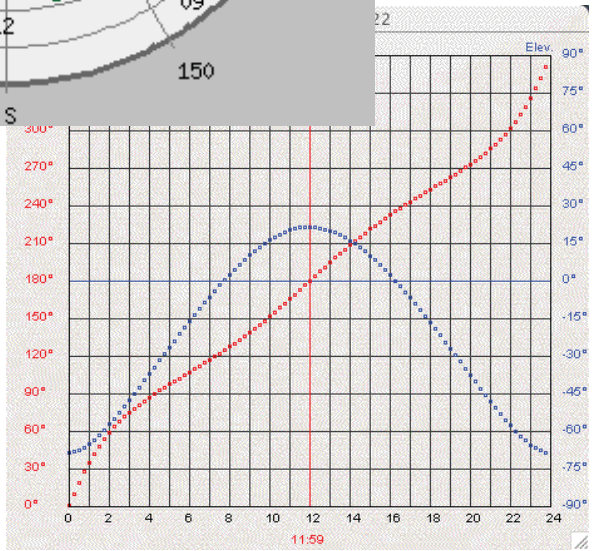
• 57 •



SITE CONNECTIONS

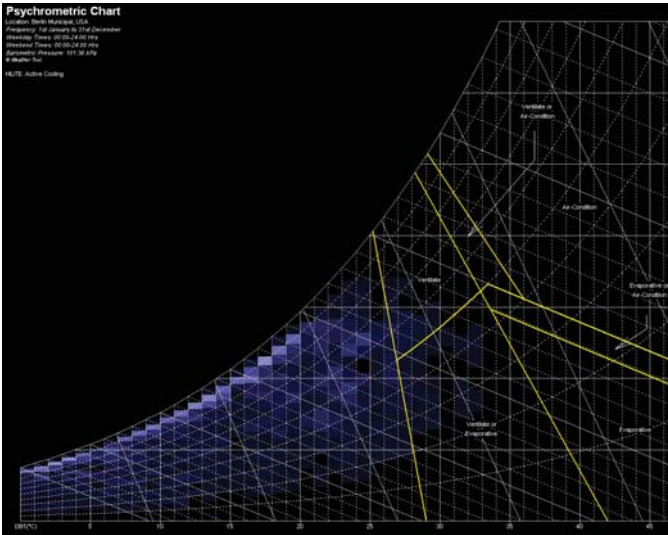
The site is ideally located at a node of connections. There is an existing parking facility and exit ramps for the old viewing area of the Old Man in the Mountain. It also connects with a bike path and other hiking trails. Its proximity to route 95 also allows it to function as a node for people traveling north.



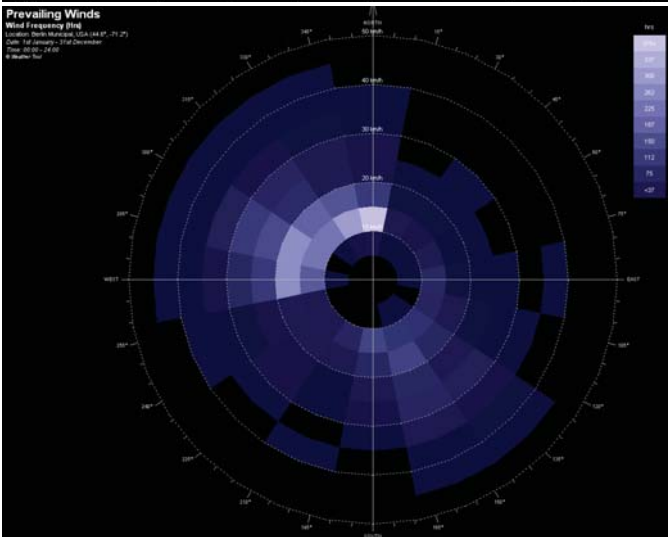


WEATHER DATA

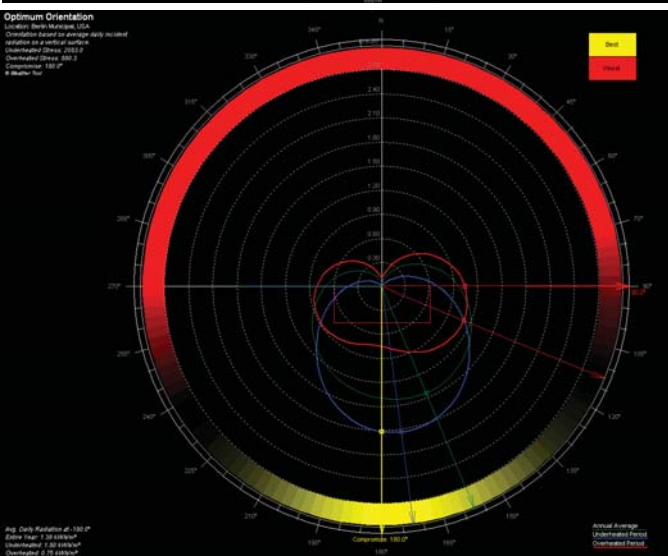
Jan Temp	6 to 26 F
Apr Temp	30 to 53 F
Jul Temp	55 to 79 F
Oct Temp	35 to 55 F
Annual Precip	39.3 inches



COMFORT DIAGRAM



WIND DIAGRAM



ORIENTATION DIAGRAM

WEATHER DATA

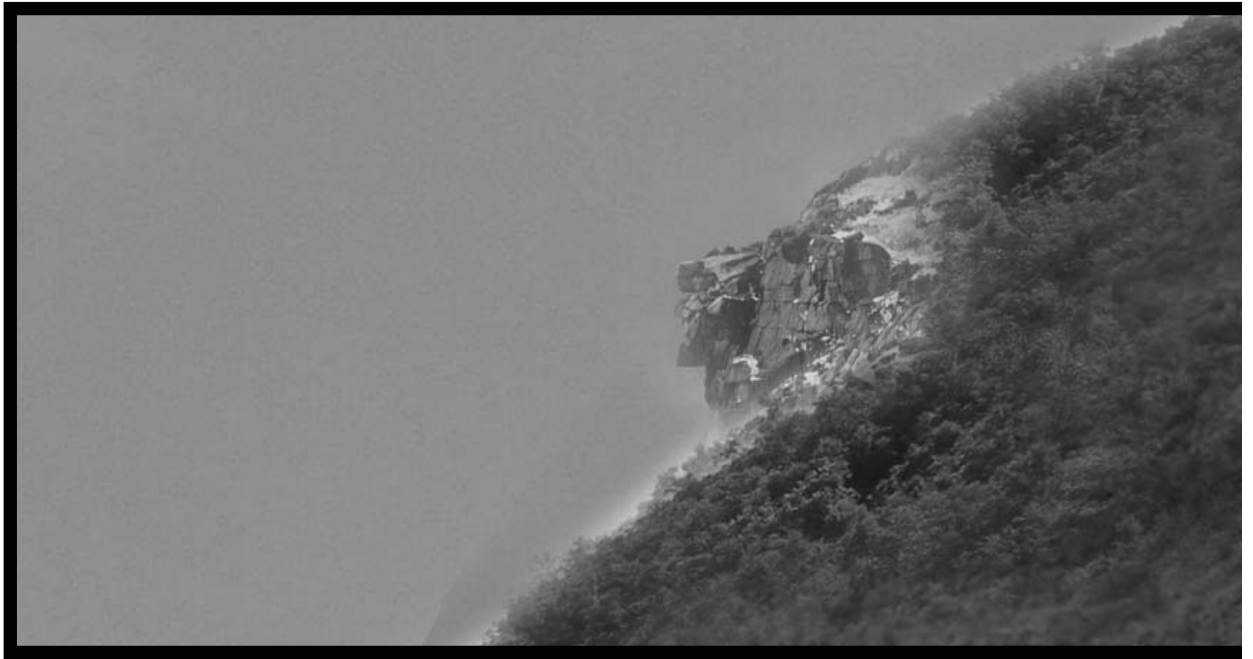
The first diagram on the left is the comfort diagram. It shows in blue the range of comfort levels throughout the year. The yellow lines delineate what means of cooling would be needed to provide these comfort ranges. At peak times in the year, the only cooling that would be needed is natural ventilation. This shows that there is no need for air condition throughout the building.

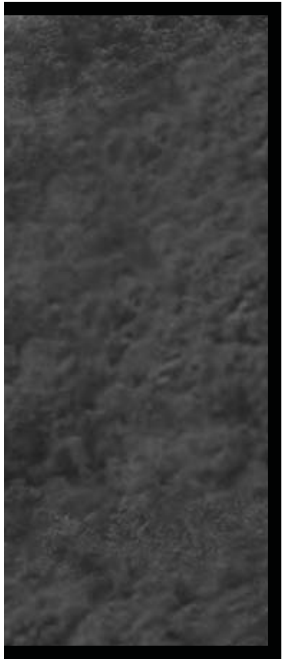
The second diagram shows the average wind speed and direction throughout the year. The lighter the color, the more the wind is coming from that direction.

The third diagram shows the optimum orientation for the building. Up is north. The yellow range is the optimum direction for the building to face to have the greatest energy efficiency.

BUILDING PARAMETERS

•View of Old Man	p. 66-67
•Linking Transportation	p. 68-69
•Blend into Landscape	p. 70-71
•Initial Parti	p. 72-73



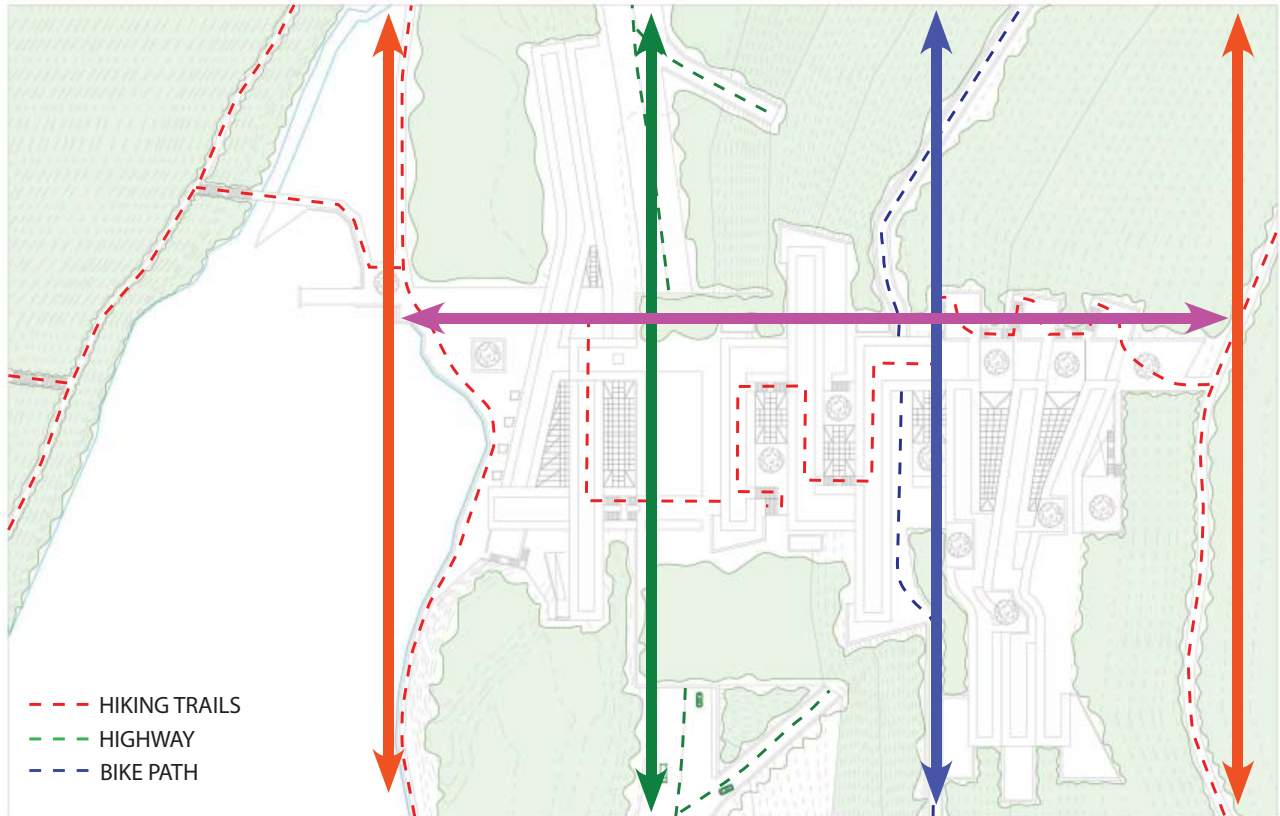


VIEW OF OLD MAN

One of the most important parameters for the site is for all of the rooms and spaces to be given a view of the old man in the mountain. This is crucial for the placement of the building on the site, as the profile can only be seen from a specific angle, from any other angle it is just a rock outcropping. This is constricting in that it forces the building to a specific site but also allows for a definitive reason for the exact placement on the chosen location as opposed to the others in the area.

It is important that people be allowed to see the old man from the building because part of the concept behind the project is to allow people to view the monument in a way that is more than just a passing glimpse. This allows the viewer to contemplate on the true meaning behind the old man and what it symbolizes rather than seeing it as just another tourist attraction.





LINKING TRANSPORTATION



Bike Path



Hiking Trail



Highway



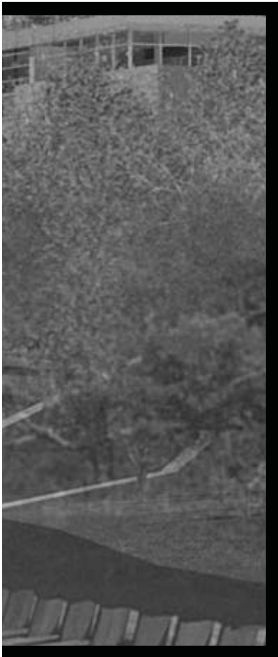
Building Connection Between Them

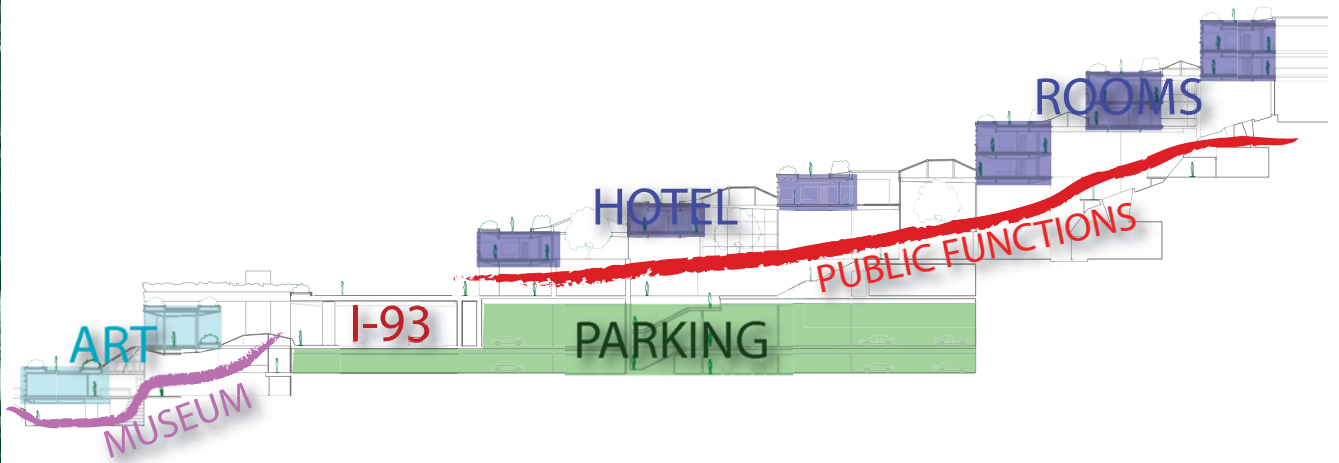
There is an interesting dynamic existing upon the site. There are two hiking trails that run on either end of the site. In between the two are the existing highway and bike trail. This is an interesting dynamic as it allows for the building to become a literal bridge, joining the different modes of transportation from the most man made, the car, to the most like nature with the hiking trails. In this situation the building becomes a node for the different routes.



BLEND INTO LANDSCAPE

The area as it exists is a pristine landscape around the existing lake. One of the key parameters for the project is to design the building so that as you are driving by, the building is barely visible and when inside the hotel rooms, the building drops away so that your view is only of nature.





INITIAL PARTI

This initial parti diagram combines the above parameters into an initial design concept. The building bridges over the highway so that the people within the hotel don't look down at it and can travel freely from one side of the highway to the other. The building on the side of the lake will contain the museum and artist studio spaces. The visitors center and hotel amenities will flow between the bars of the hotel and the parking garage underneath. The hotel and artist studio spaces will act as bars that cover up the initial excavation, almost as the earth stitching itself back together. They step back into the hillside so that upon approach the building is mostly buried in the trees where the large functions are beneath the level of the earth. Key views can then be made to the old man from in between the bars of the hotel and artist studio spaces.

FINAL DESIGN

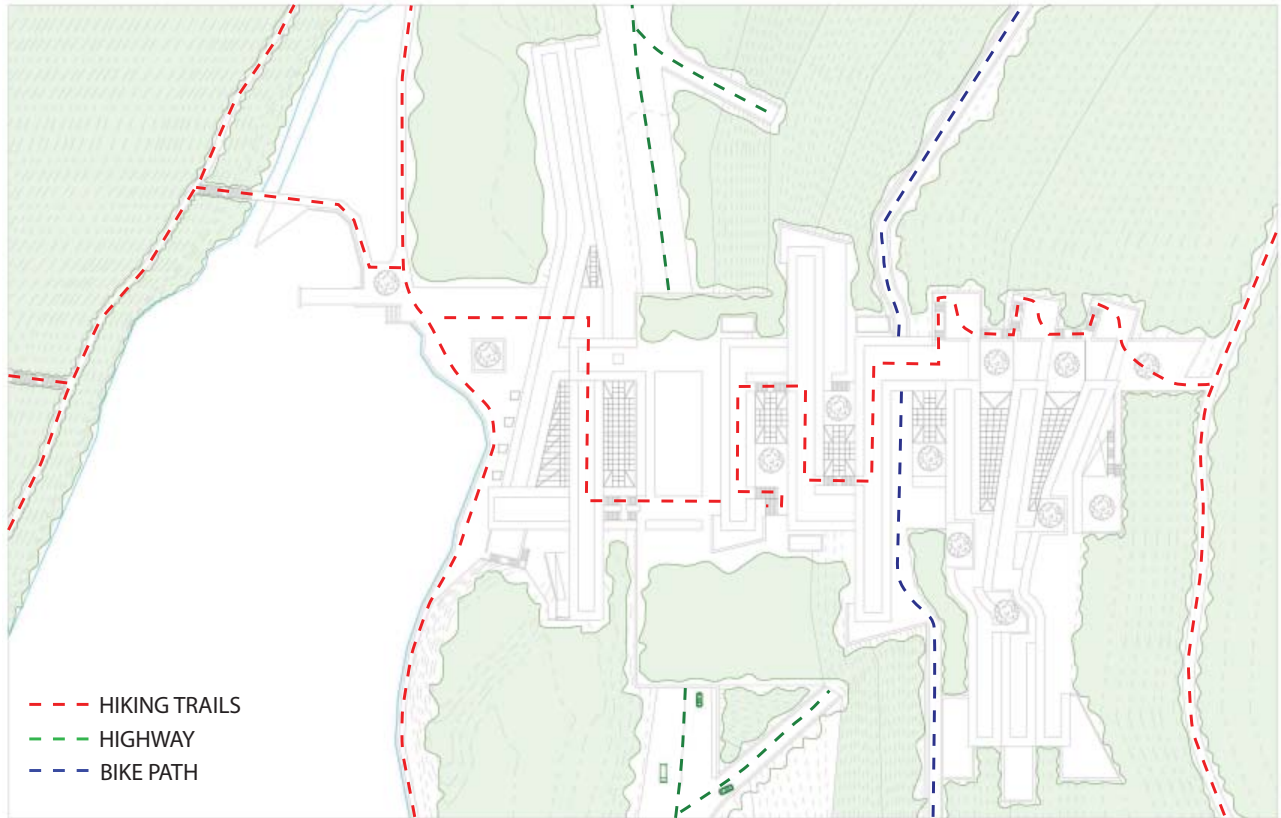
•Renderings	p. 76-77 + 88-101
•Diagram	p. 78-87 + 130-136
•Plans	p. 104-124
•Sections	p. 125-128
•Site Plan	p. 102-103



AERIAL VIEW

This view shows the building as designed in its context. It shows the hotel bars and how they extend out into the landscape, allowing the forest to begin to creep into the building and merge the two together.





SITE CIRCULATION DIAGRAM

This diagram shows the relationship the building takes in integrating the different modes of circulation throughout the site. The building acts as a hiking trail connecting either side of the highway as well as the highway and the bike trail. All of the roofs of the building are terraces so that it feels like you are walking through a garden in the forest rather than on a massive building.

HOTEL ROOMS

LUXURY SUITES

PUBLIC AMENITIES

- 1: SPA
- 2: LOUNGE
- 3: GYM
- 4: THEATER
- 5: BAR
- 6: CAFE
- 7: LIBRARY
- 8: RESTAURANT
- 9: EQUIPT. RENTAL
- 10: RECEPTION HALL
- 11: GIFT SHOP
- 12: LECTURE HALL

PARKING

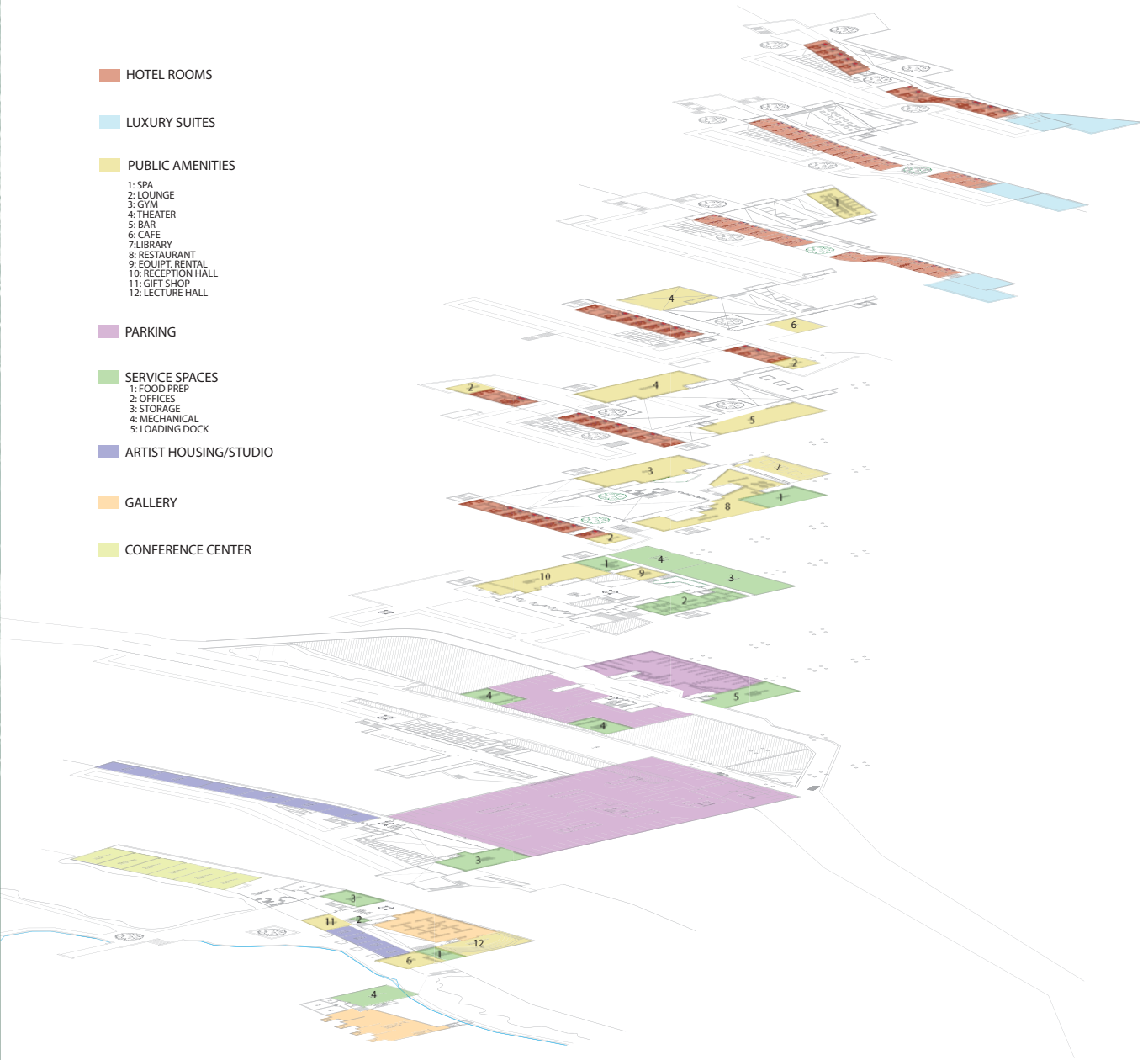
SERVICE SPACES

- 1: FOOD PREP
- 2: OFFICES
- 3: STORAGE
- 4: MECHANICAL
- 5: LOADING DOCK

ARTIST HOUSING/STUDIO

GALLERY

CONFERENCE CENTER

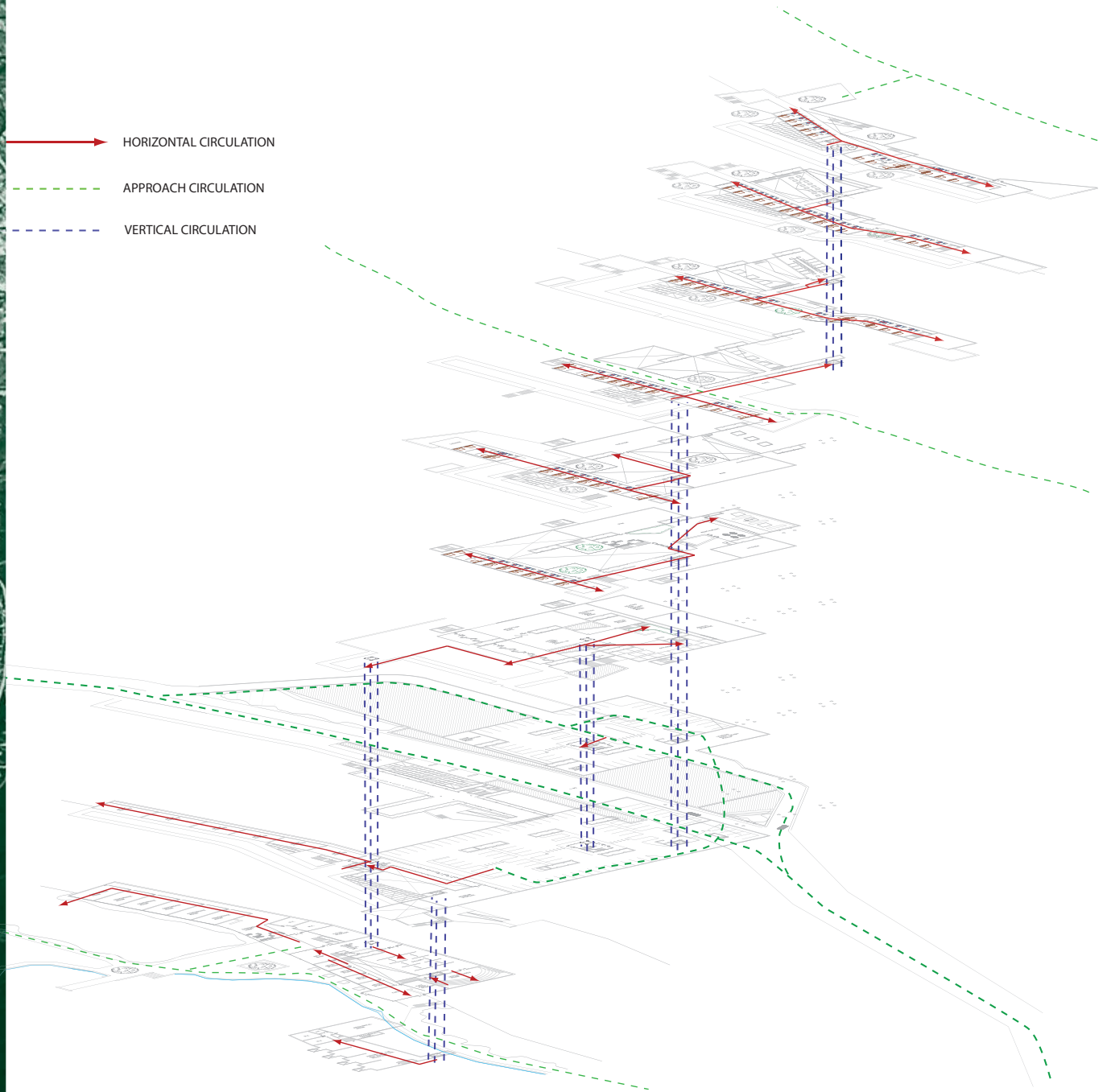


PROGRAM DIAGRAM

This diagram is an exploded plan axon of the building. It is not to scale but is meant to show the relationship of the different programs to one another. This diagram expands upon the parti diagram and while the building still follows the same basic idea set forth in that earlier diagram, it takes on a more complex integration when the practicality of a functioning building comes into reality.

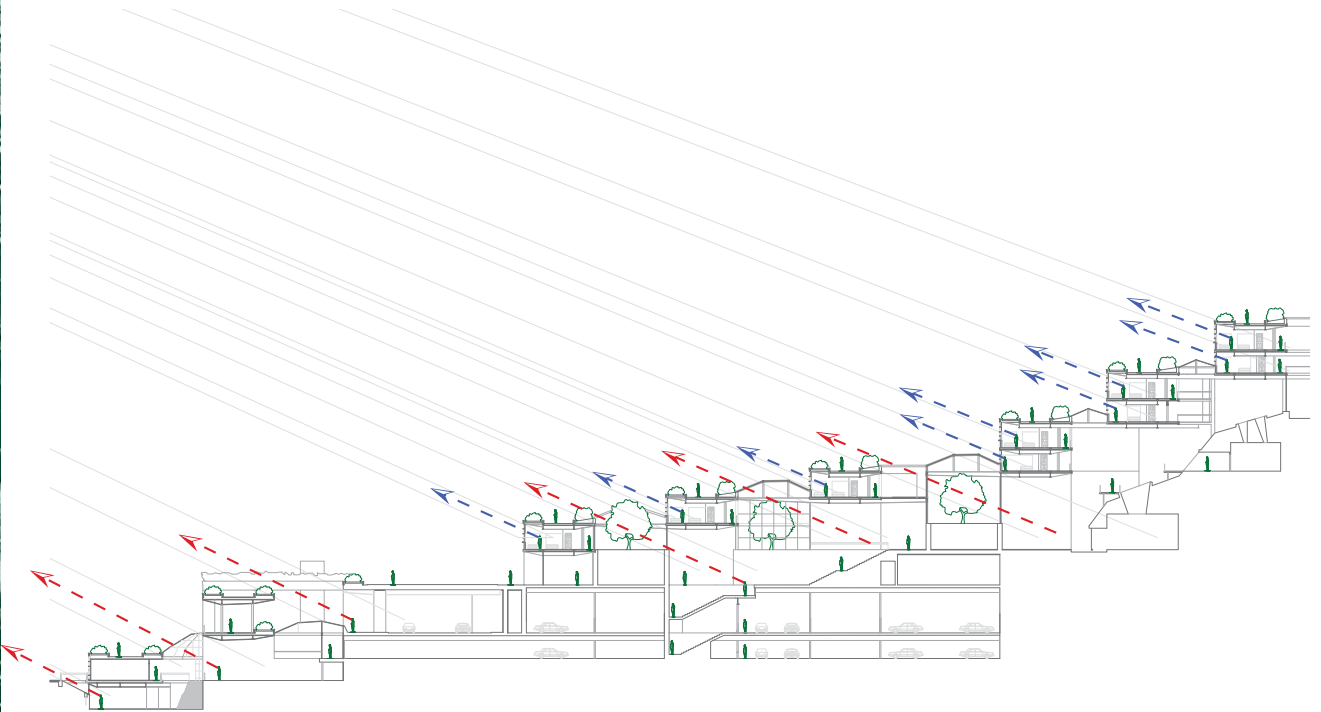


→ HORIZONTAL CIRCULATION
- - - APPROACH CIRCULATION
- - - VERTICAL CIRCULATION



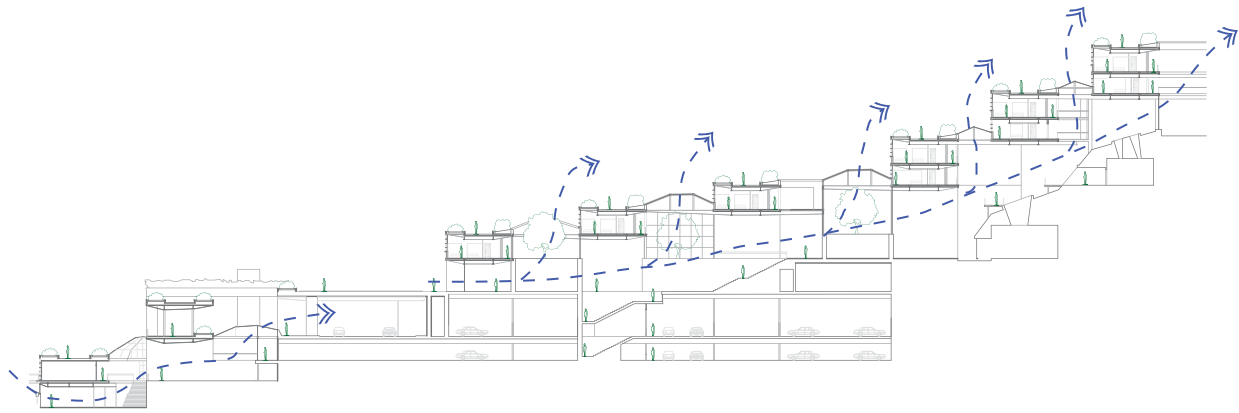
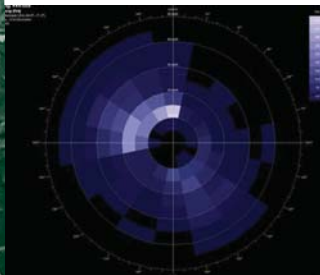
CIRCULATION DIAGRAM

This diagram is set up similarly to the above. It is meant to show the different circulation paths. The green line shows the approach to the building by car, bike or hiking. Because of the stepping nature of the project, the vertical circulation becomes crucial. The blue cores show the elevator shafts. The hotel rooms are grouped into two sections each linked by a separate elevation core to reduce the number needed. The circulation is also more complex due to the desire to reduce the amount of excavation required. Because of this the interior steps back as well, thus not allowing one central core.

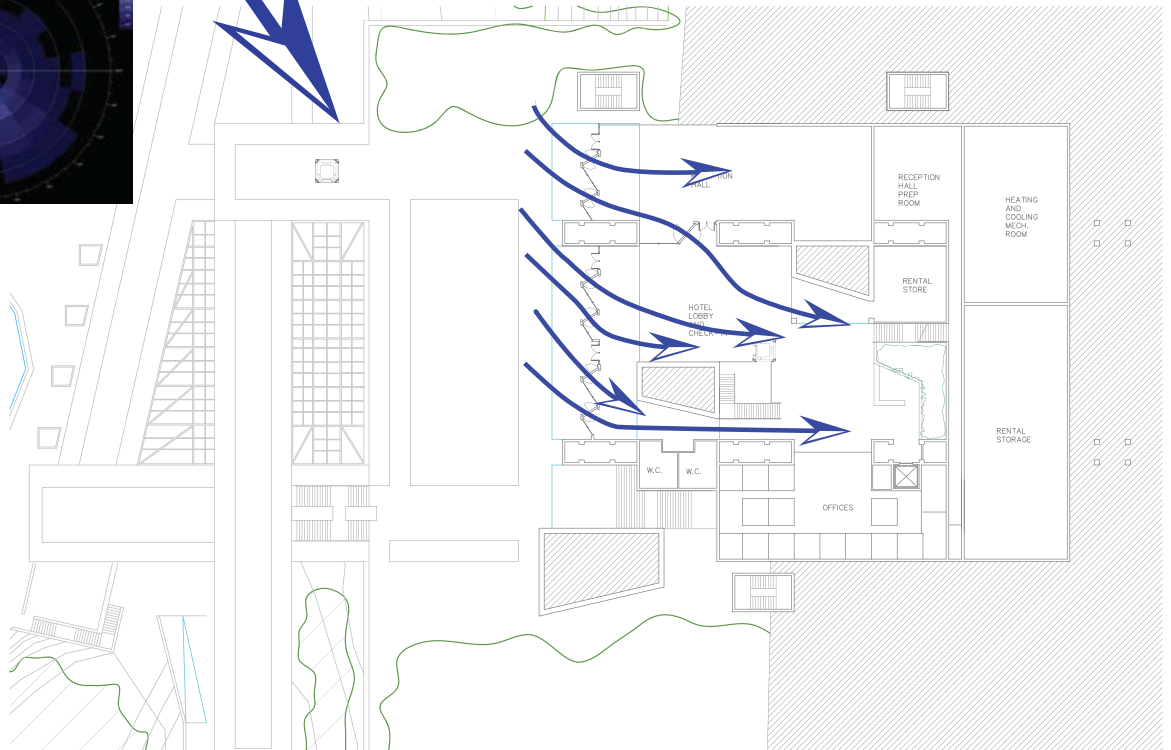


VIEW DIAGRAM

This diagram shows the viewing angles to see the old man in the mountain. The blue arrows show the angle from the hotel rooms where the red arrows show that even the underground spaces can view the monument through the skylights.



WIND DIRECTION



WIND DIAGRAMS

The area that the building is located is within the climatic zone where proper ventilation can take the place of air conditioning. To use this the underground portion of the building will be able to be opened up in the summer to allow the breezes to vent through. It uses a natural occurring stack effect to move air through even with no wind due to changing temperatures and pressures. This in turn will cool the slabs under the hotel rooms. To help with this the entrance has swinging panel doors that open in to catch the wind from the direction it is blowing to help funnel it through.

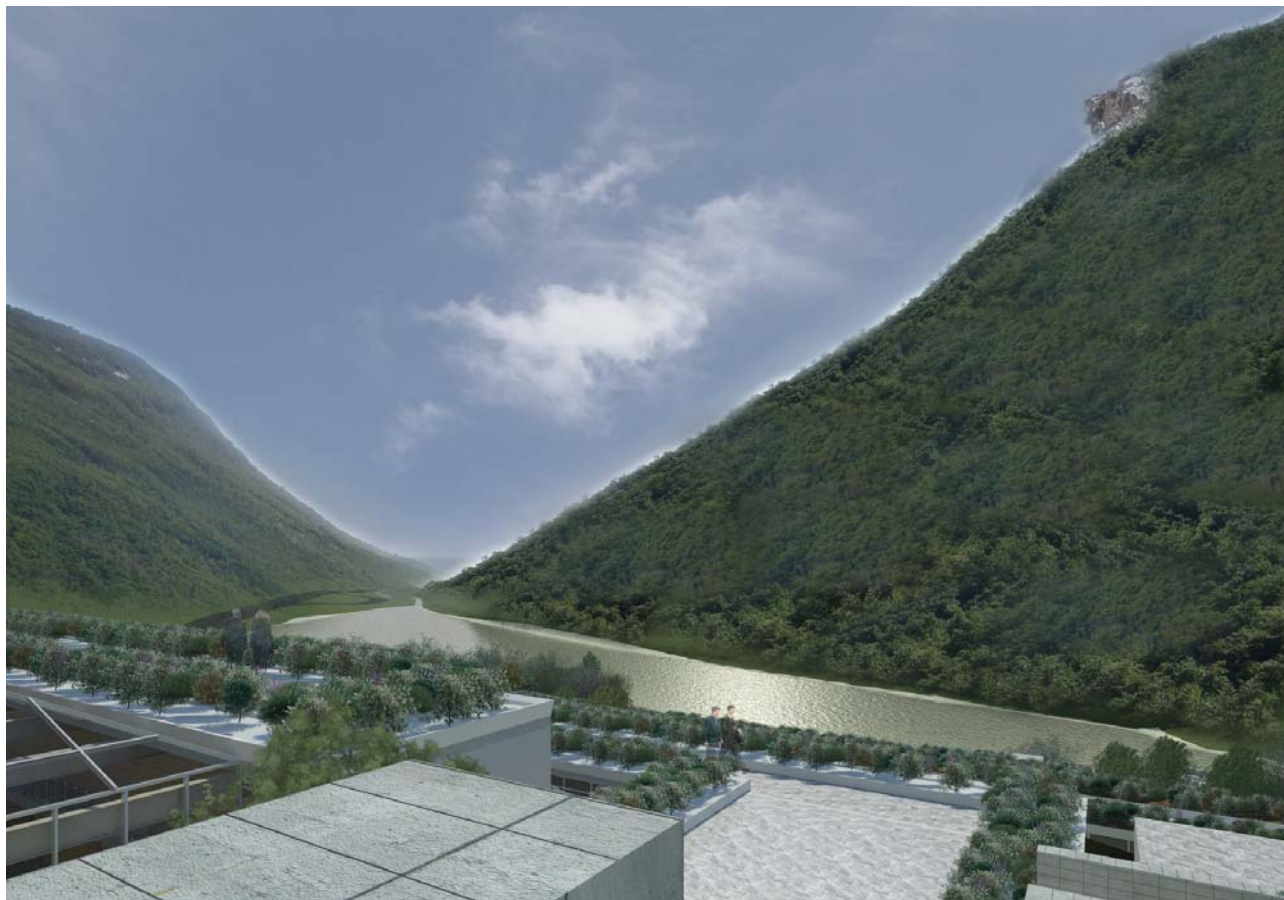
In the winter the skylights will allow the spaces to heat up during the day and then that heat can flow up into the hotel rooms at night when the people are occupying those spaces.



APPROACH VIEW

This view is crucial to the project. It shows the building from the view of someone driving on the highway. The building spans from the water on the left to the very right of the image yet it is barely visible. This proves that the building would have minimal impact visually upon the site and the feeling of driving through the woods.





VIEW OF OLD MAN

The other important view to understand the impact visually, is this view. It is a view from on one of the terraces. As you look out at the old man they building drops away and becomes green terraces with stone walkways, but beyond the terrace directly below there is no visual impact from the 8 others beyond.





VIEW FROM WATER

This view shows the building from the water looking back upon it. The water is very activated due to the museum entrance and the presence of the highway is gone. As the building steps back it begins to fade into the hillside beyond it.







ENTRANCE VIEW

This is a view from the hotel entrance. The space is large yet engaging due to the different levels that all look into and engage the space in unique ways. There are multiple heights and even exterior spaces that look into the space. It is meant to give a sense of connection with others as you move throughout the space. It cannot be seen in this view but the balconies from each level of hotel rooms also look down into this space.







RESTAURANT VIEW

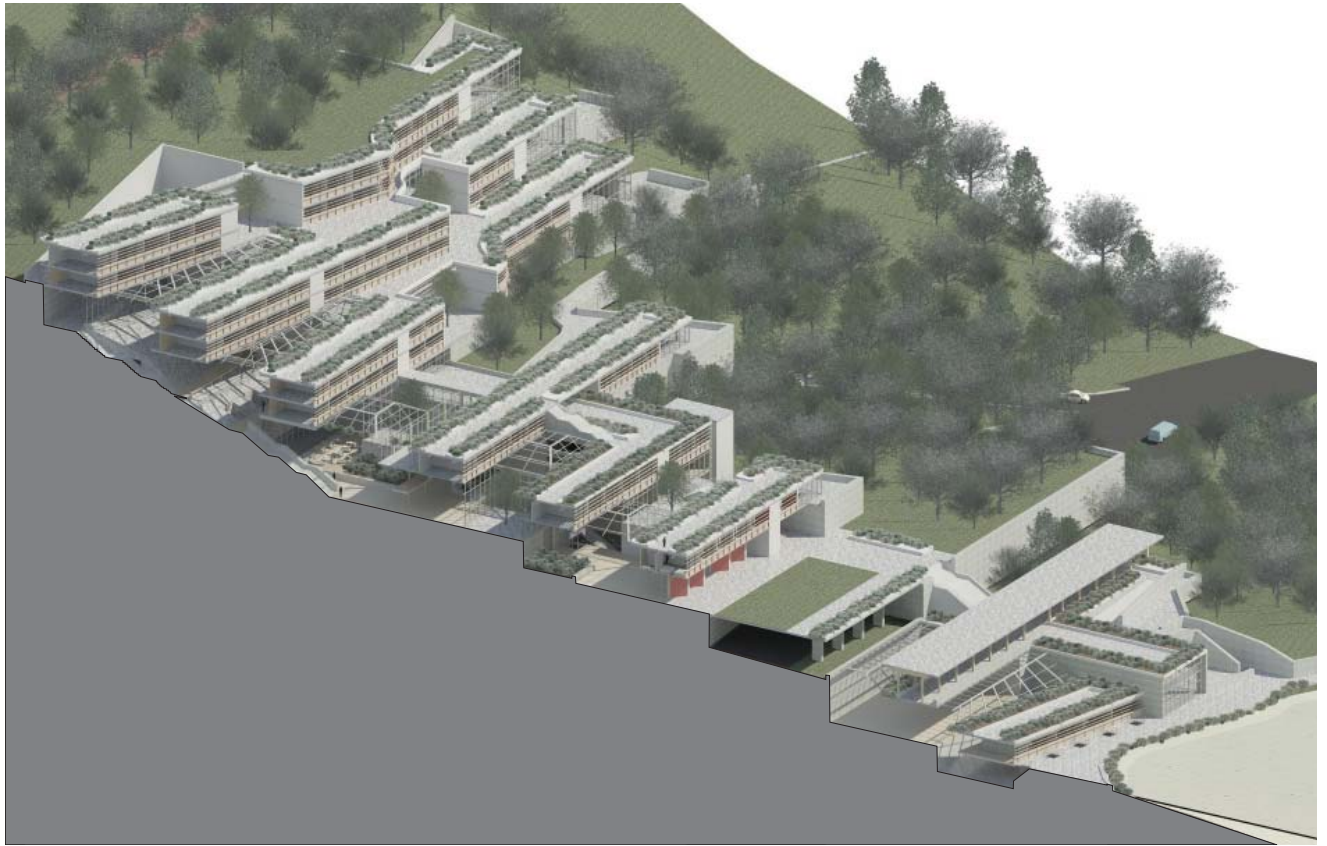
This view is of the upper underground space as it begins to engage the hillside. This shows that the interior of the building can be seen as a hiking trail as well. Someone could walk from the entrance all the way through the building and come out at the top at the hiking trail. It also shows how the light filters through the different layers into the library.





SECTIONAL PERSPECTIVE

These views show the how the interior spaces engage the exterior ones and begin to mix together.



• 100 •

•SECTIONAL PERSPECTIVE•

SECTIONAL PERSPECTIVE

This view shows the entire building sectionally and how the interior space is one large continuous space that flows under the hotel rooms.



• 102 •

• SITE PLAN •

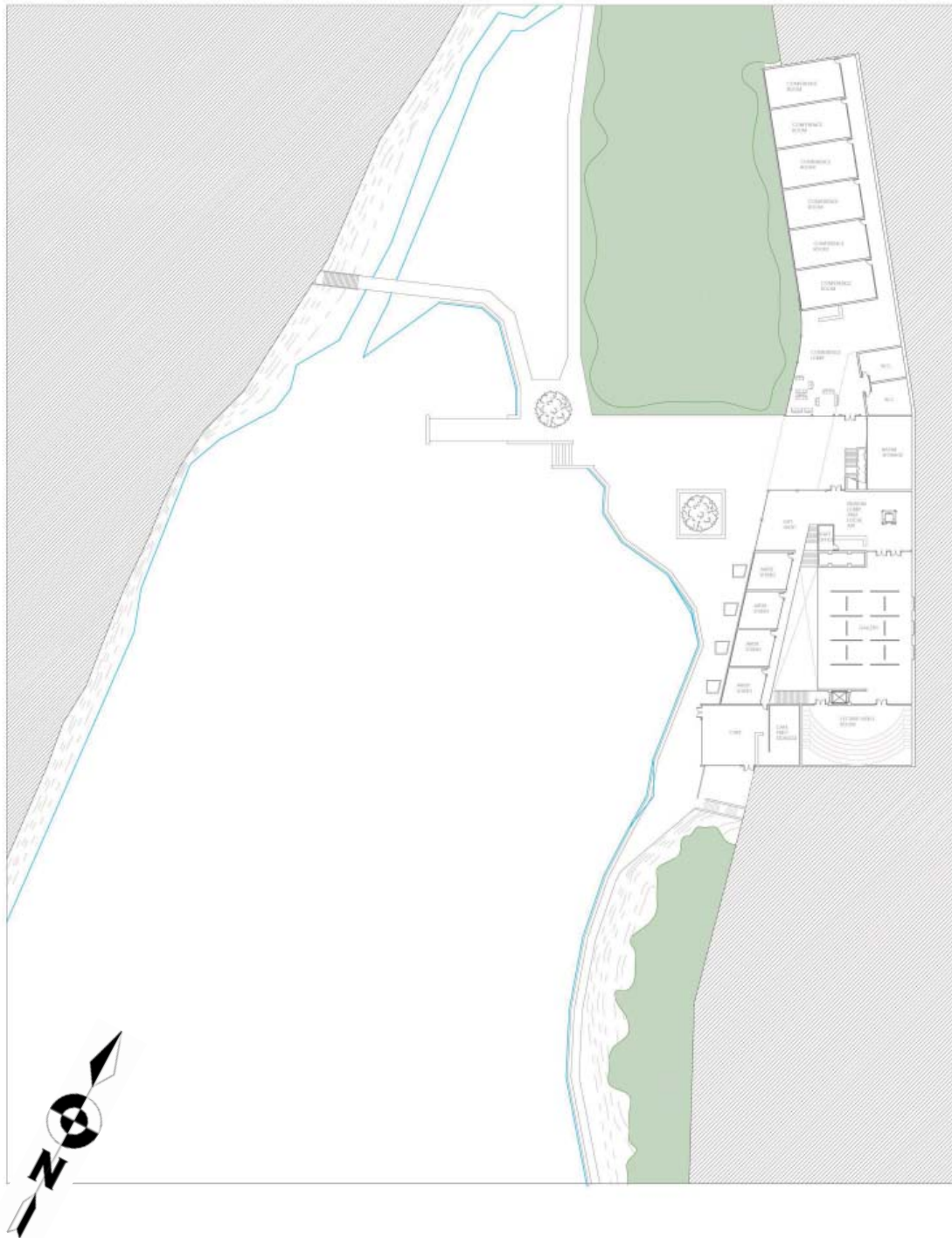
SITE PLAN

The site plan shows the organization of the masses in relation to the surrounding context. It shows the contour lines of the hillside as well as the forested areas. It also shows relations to the existing paths, roads and the lake.



PLAN 1

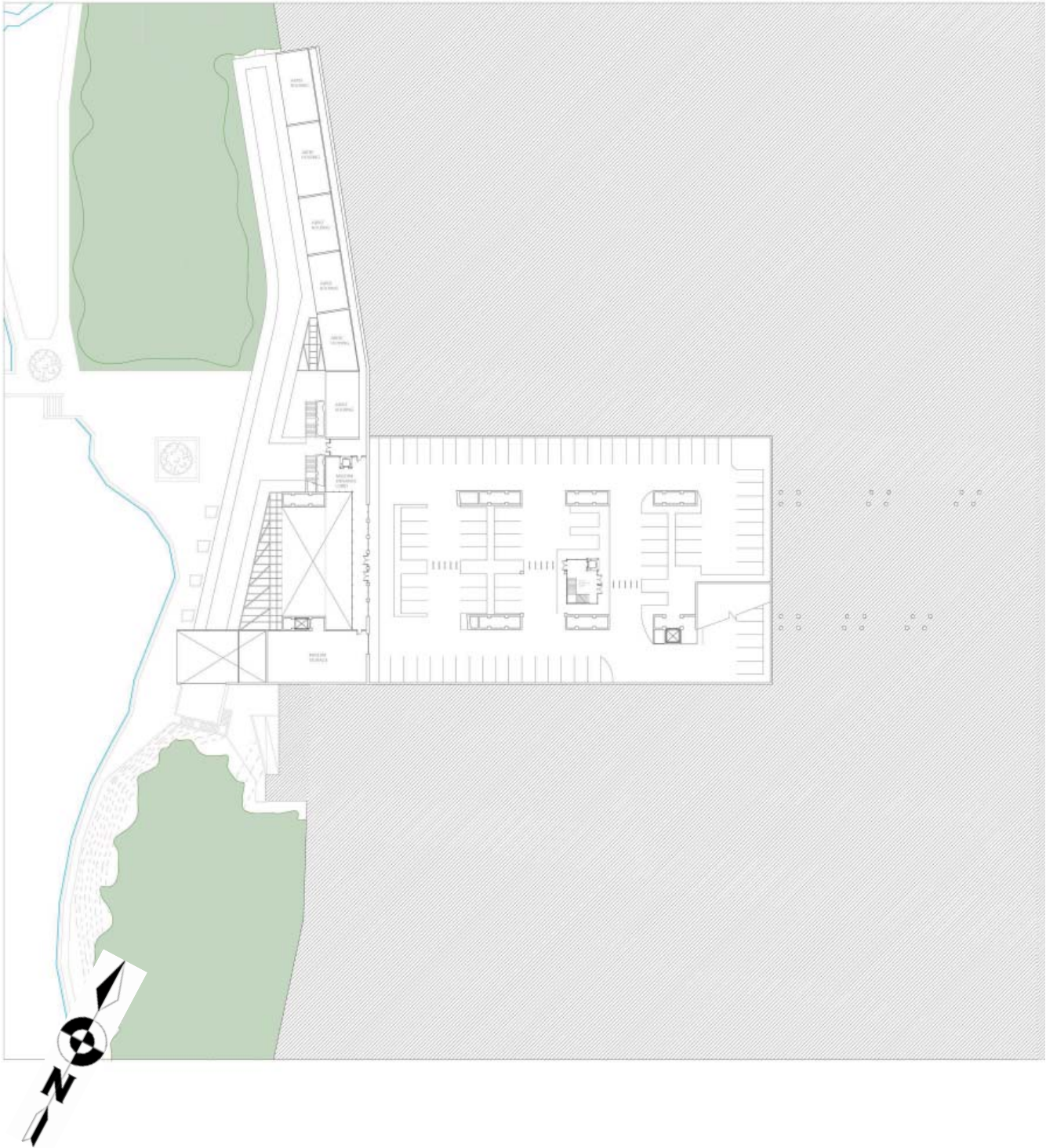
The lowest floor is underground in close proximity to the lake. It contains the lowest level of the museum gallery space. In particular it is the area which deals with the history of the old man in the mountain. There are four notches cut into the ground. Each of these contains a specific time within the history. The visitor is then able to look up a shaft at the old man with a filter to create the image at the time. The floor also contains the mechanical room for the west side of the highway.



PLAN 2

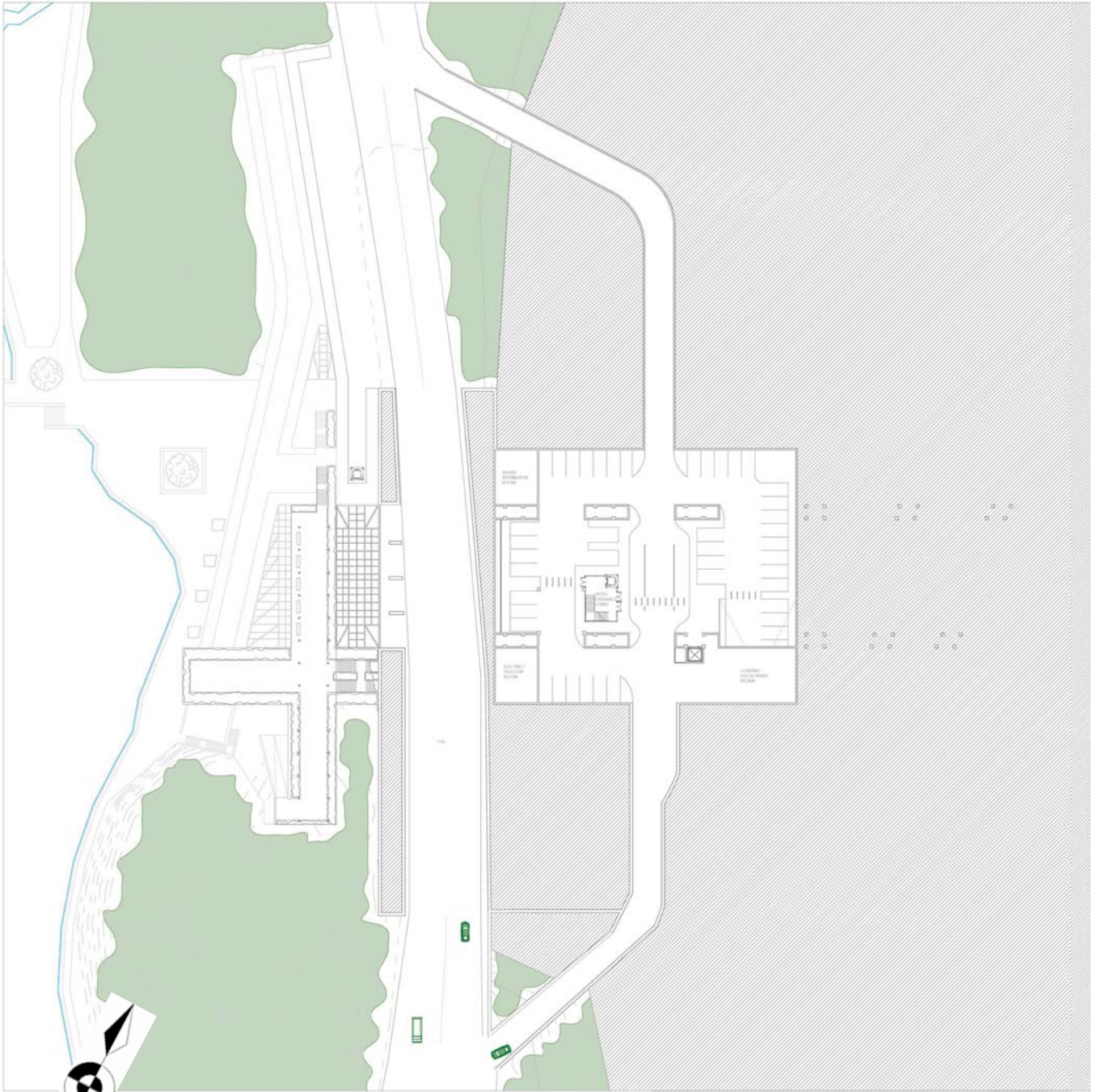
This is the first floor above ground. It is level with the lake. This is the floor where you enter the museum. As you circulate through the museum you can see into the rooms where the artists are working and then out beyond into nature. This floor also contains the conference center in the northern wing. Along the southwest corner is a cafe where hikers can stop and rest from the walk around the lake or up the mountain. The western side of the lake is where the climb up the mountain to the Old Man begins. Due to the steepness of the climb there are stairs cut into the hill. There is a built in dock to allow people to rent kayaks or canoes to experience the calm nature of the water.





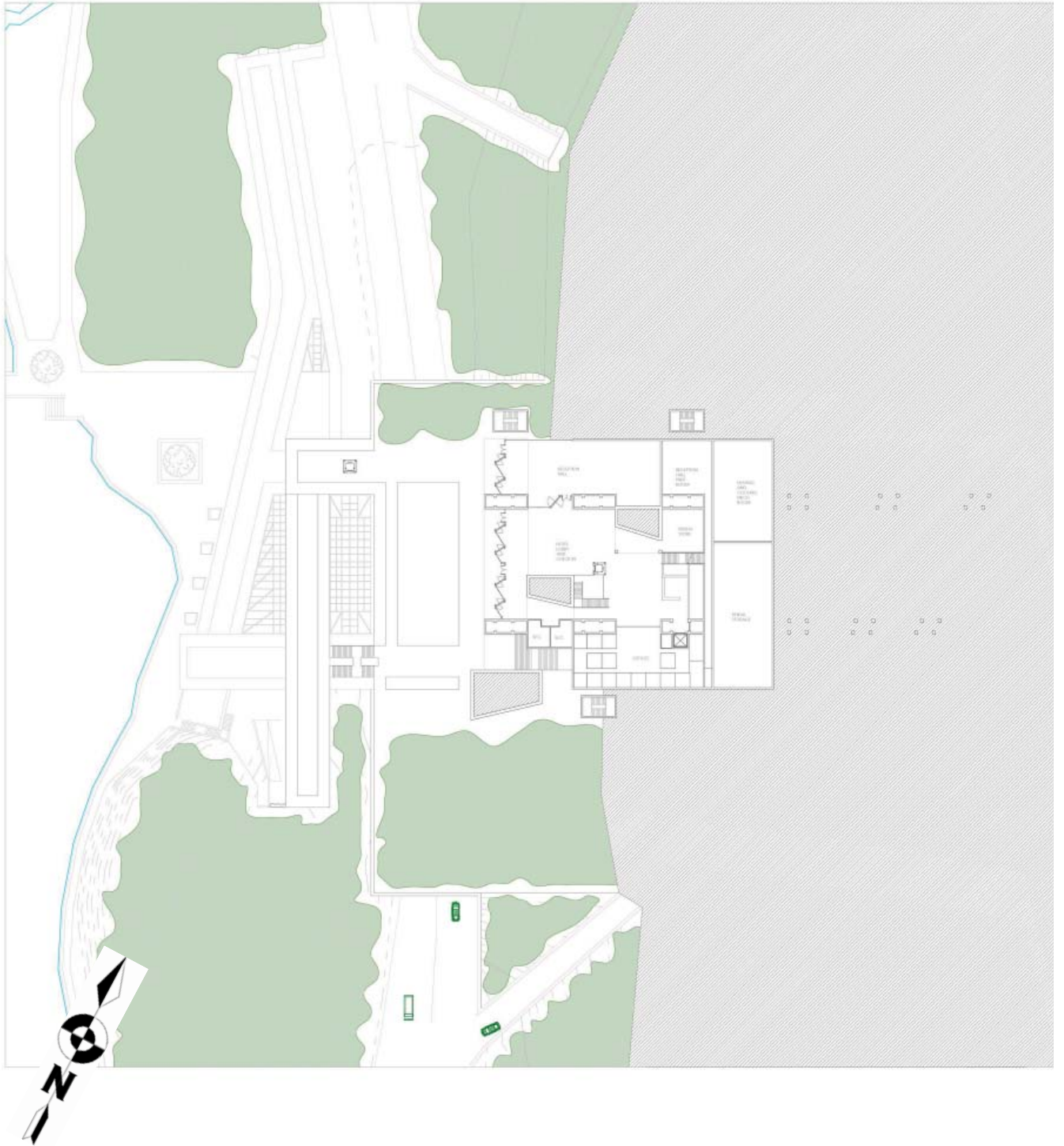
PLAN 3

This floor contains the lower parking garage level. This is also where you would enter the museum from car. You enter in and take a glass elevator down to the entrance level. The northern bar contains the housing units for the visiting artists. If parking on this level for the hotel there is a lobby with a glass elevator to take you up two levels to the main hotel lobby.



PLAN 4

This level is on the same elevation as the highway. East of the highway is the first parking level containing a lobby identical to the one below it. There is also a loading dock for deliveries. The west side of the highway contains a terrace that leads up to the plinth over the highway.



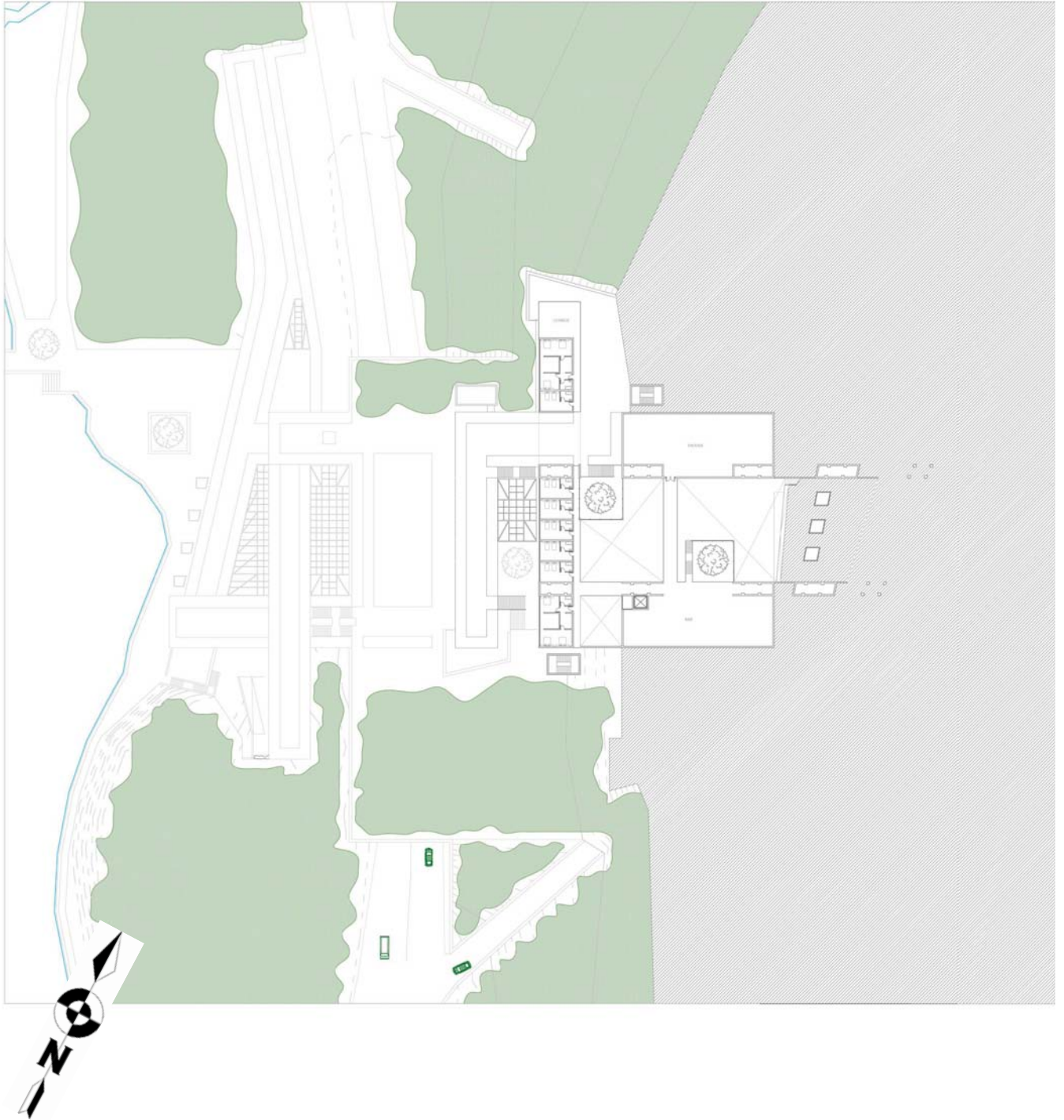
PLAN 5

This is the first level that the entire building is on the east of the highway. It contains the entrance lobby for the hotel as well as a reception hall for weddings and large parties. The east side of this floor contains the visitors center and rental storage as well as the mechanical room for the hotel.



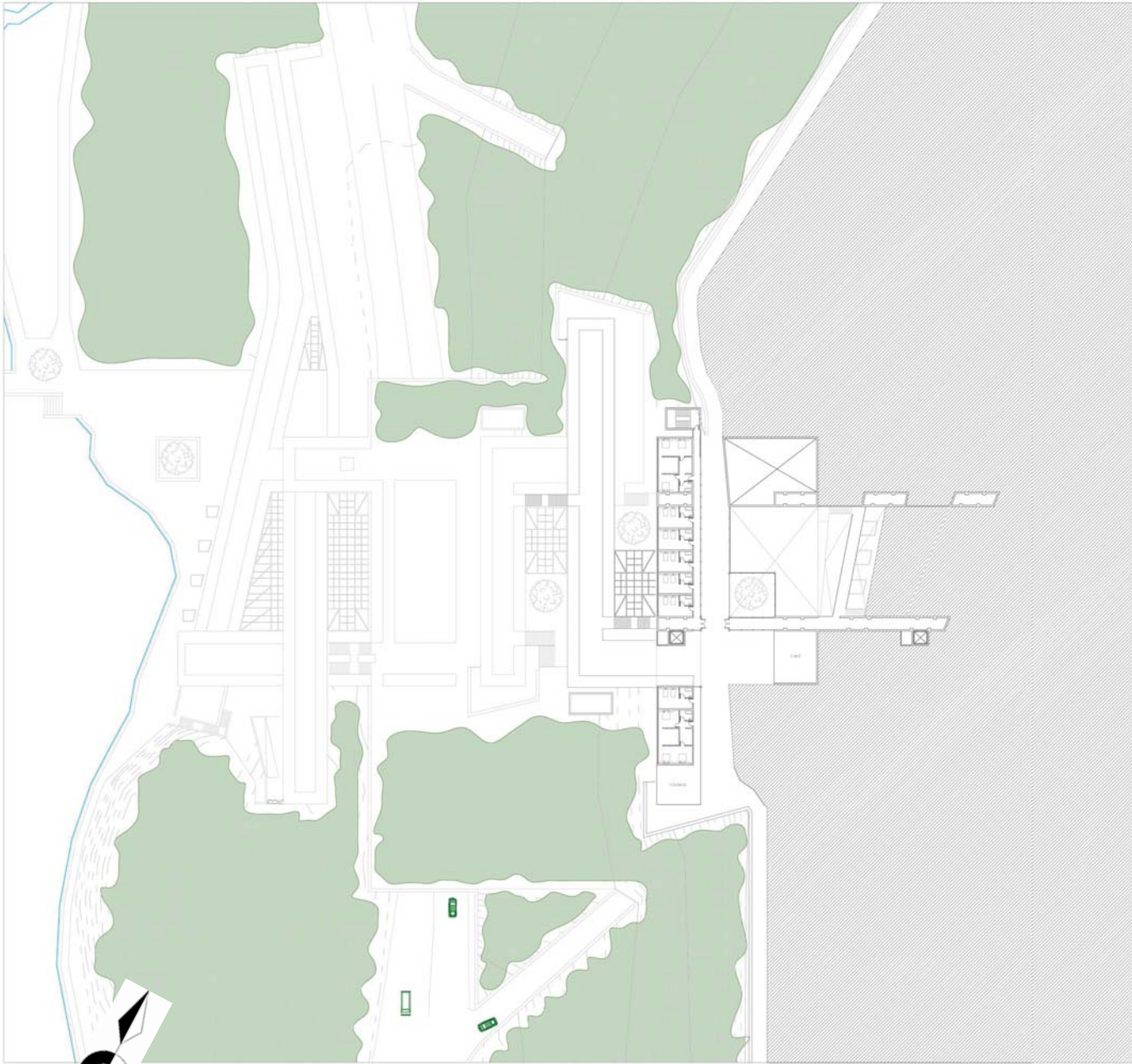
PLAN 6

This floor contains the first strip of hotel rooms along the western side. The south and east contain different public functions such as library, restaurant, bar, and gym.



PLAN 7

This floor contains the second hotel level as well as a theater and pool room. At the end of the hotel strip is a small gathering area that is both interior and exterior.



PLAN 8

This floor contains the third hotel level. It is also the level that the bike path connects to. You ride by and look at hotel rooms on one side and down into the restaurant on the other. You can also park your bike and take an elevator down to the lobby.



PLAN 9

This is the first upper bar of housing and represents two plan levels of identical hotel rooms. There is also the spa which is connected to this level. At the southern end of this bar is one of the luxury suites which are double story and have private balconies. There is also an area where the hallway opens up to the outside and there is a small courtyard with a tree. On the northern side there are multi tiered gathering areas.



PLAN 10

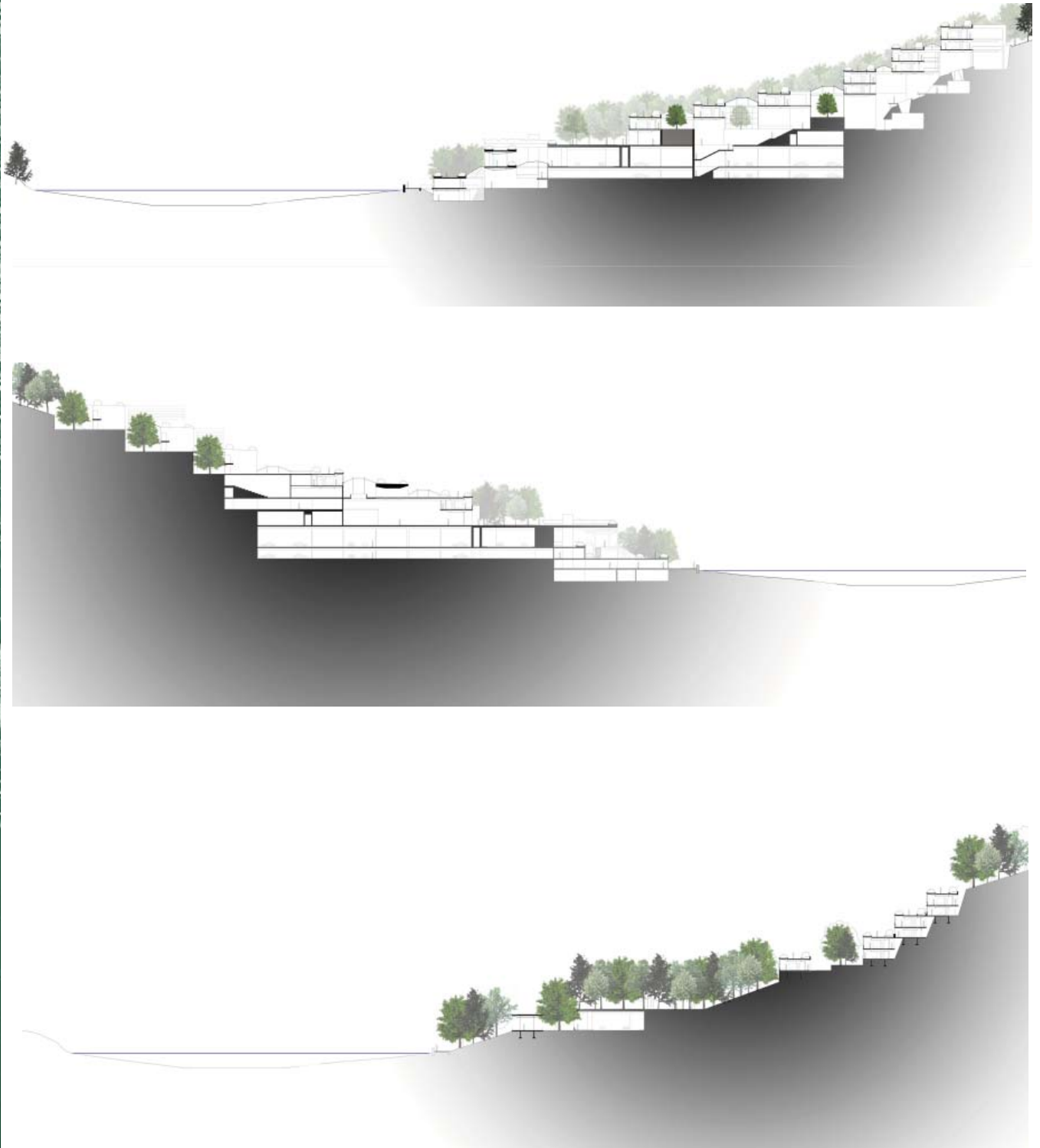
This is the second upper hotel level and contains the same basic layout as the previous plan except that the northern portion of the bar begins to shift to orient itself more carefully into the hillside.



PLAN 11

The upper level is the same as the previous two except that the northern part shifts even further to fully integrate itself into the hillside.

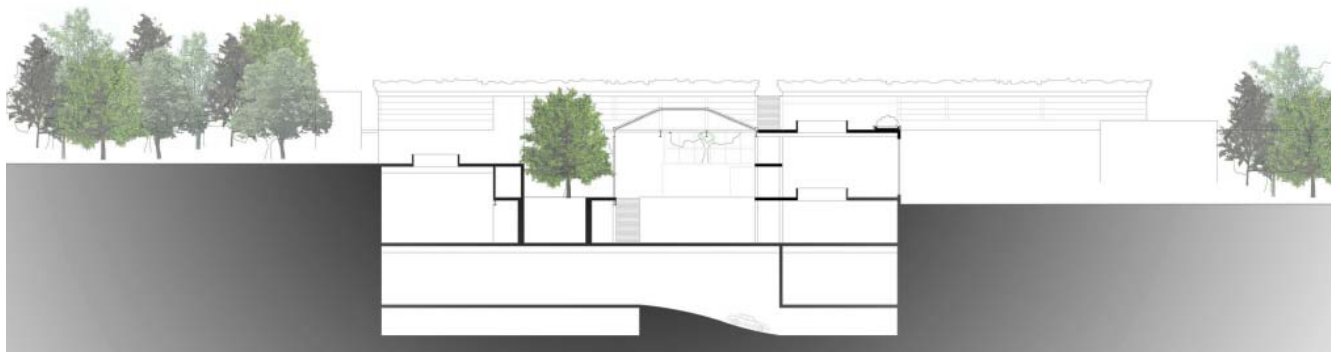
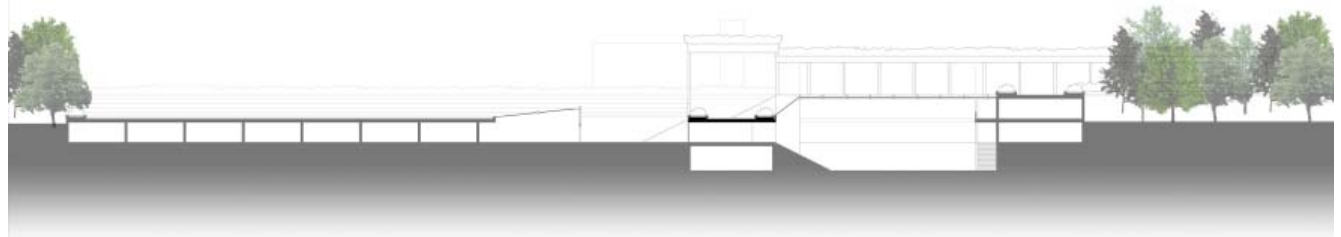




LONGITUDINAL SECTIONS

These three sections show the relationship of the building to the hillside. The first section is cut through the center space showing how it engages the back of the slope and connects to the parking. The second section is cut through the northern portion of the building and shows the upper terracing as well as the interlocking double height spaces of the public amenities. The third section is cut through the southern wing of rooms to show how they are imbedded within the will and also to show the relationship of the treeline with the building behind it.

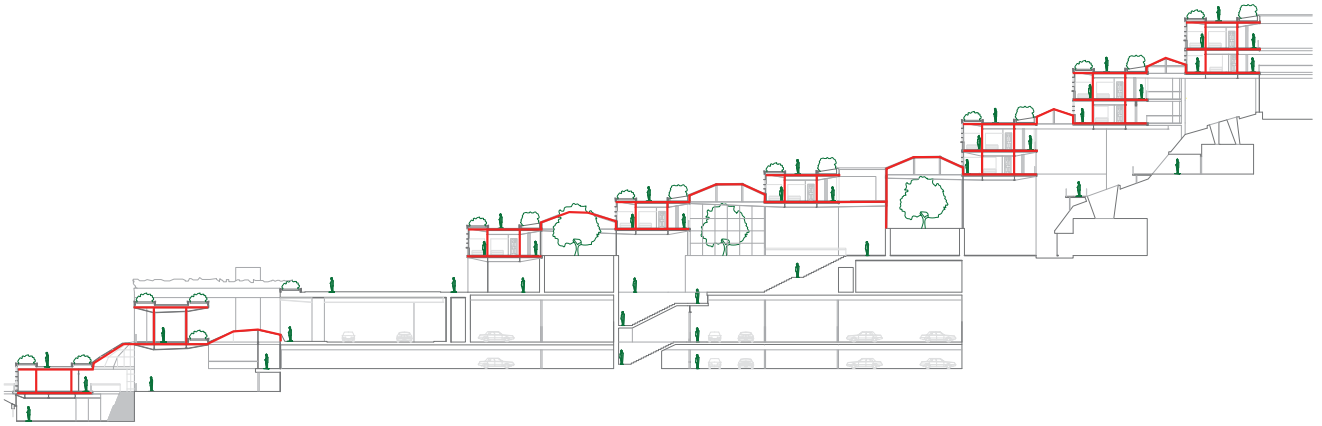
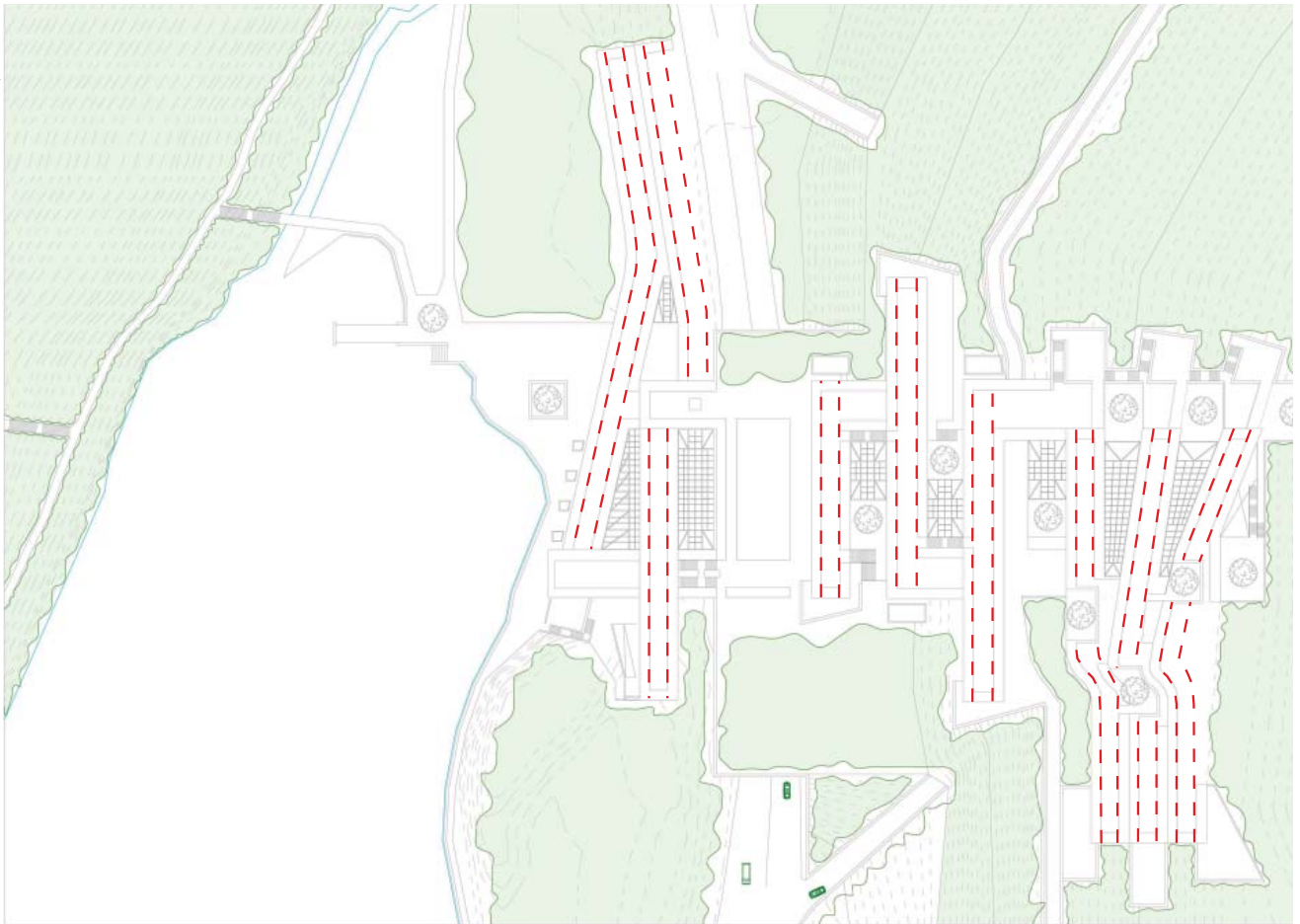




CROSS SECTIONS

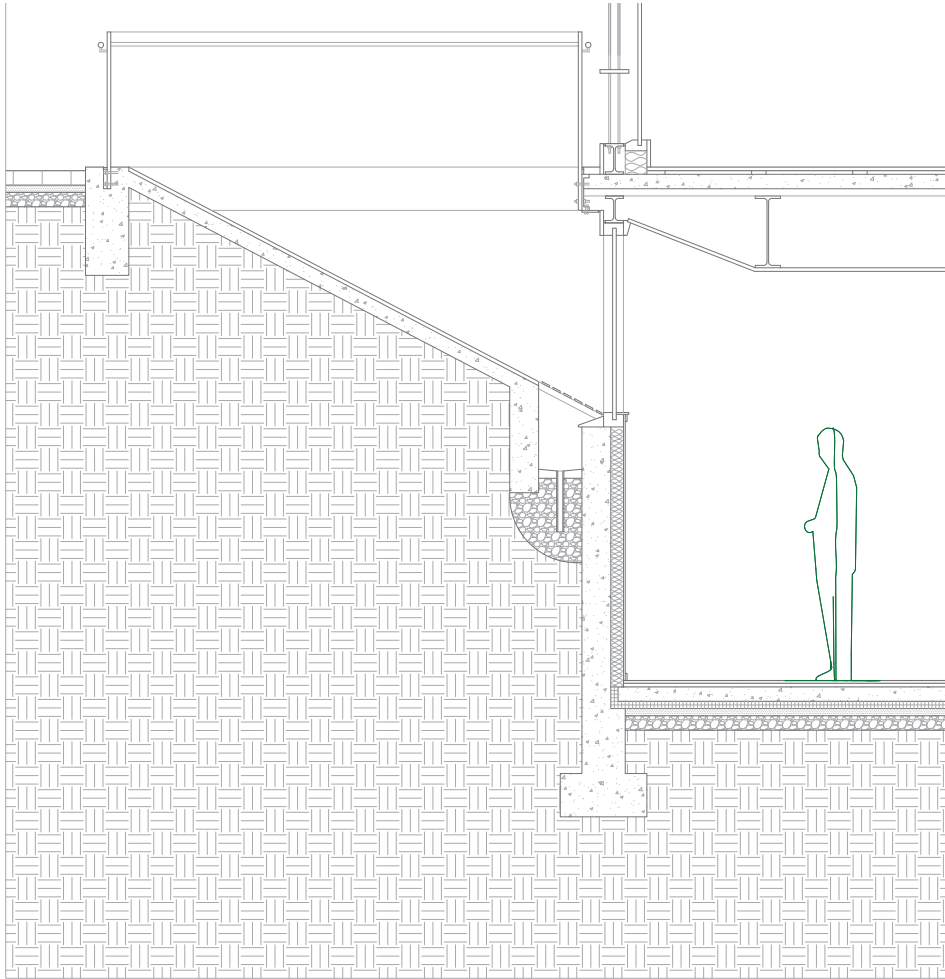
These two sections are two samples cutting up the hillside. The first is cut through the lobby of the hotel and shows the parking garage as well as the multiple vantage points looking into the center space. The second section is cut through the museum and shows more of the elevation behind.

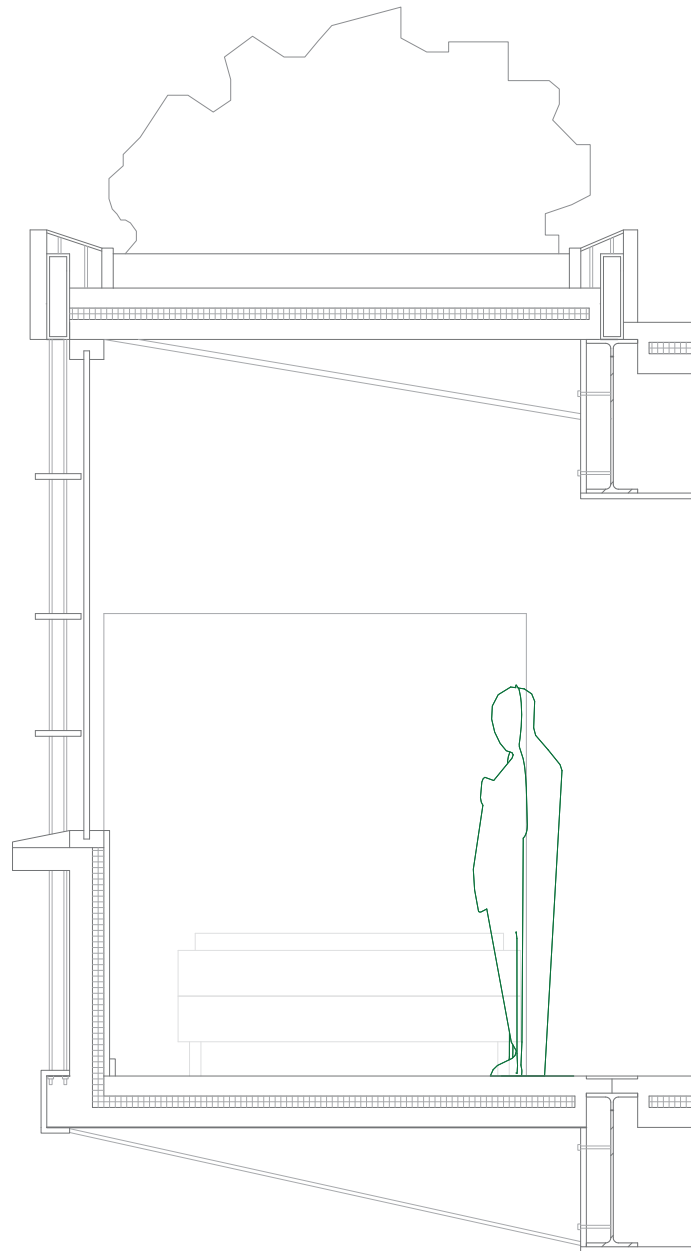




STRUCTURAL DIAGRAM

These two diagrams show the structure for the building. The sectional diagram shows the framework supporting the hotel bars where the plan diagram shows the general structural lines throughout the building.

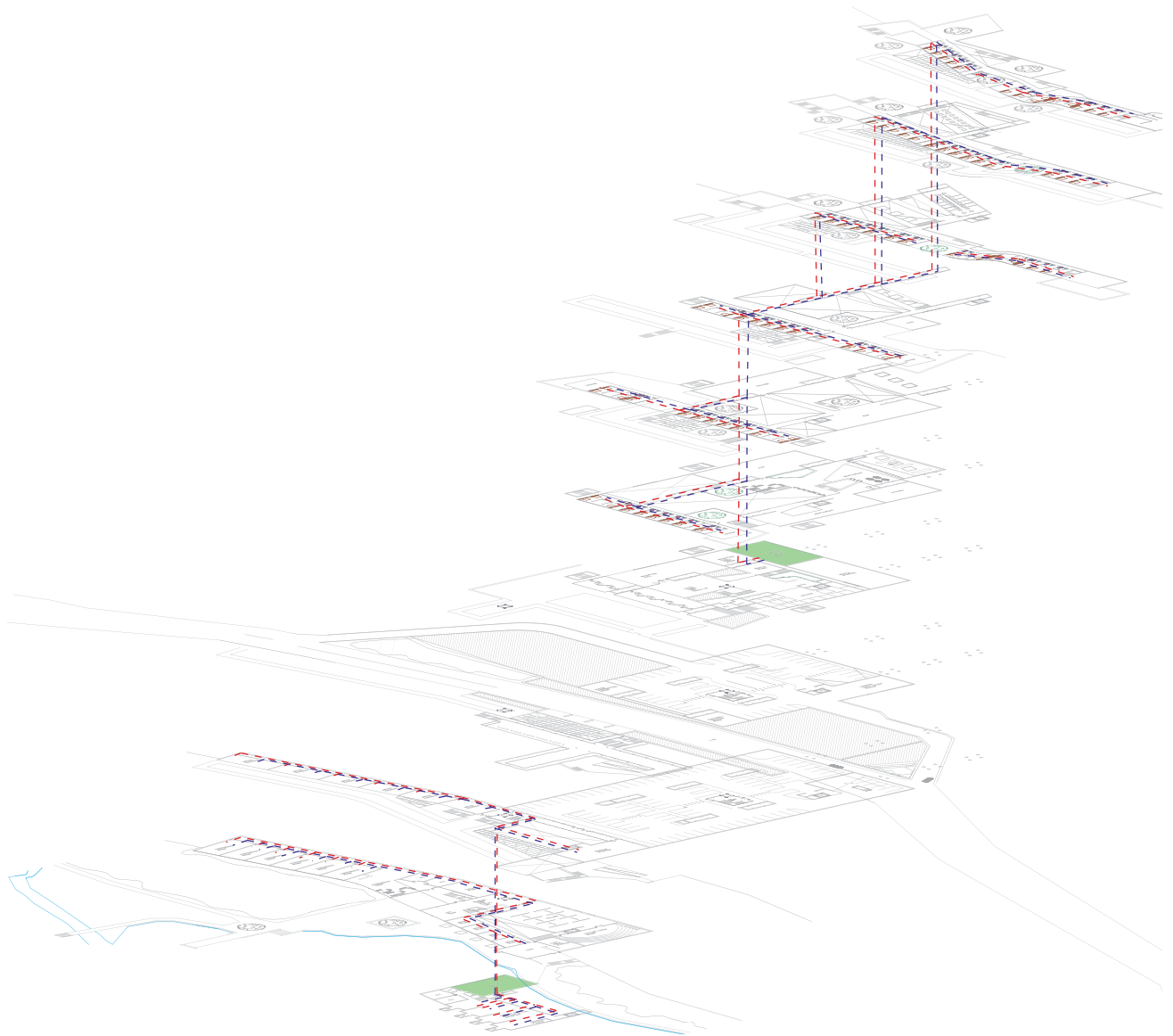




•STRUCTURAL DIAGRAMS•

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MECHANICAL DIAGRAM

This diagram shows the supply and return duct paths as they make their way from the respective mechanical rooms throughout the building. They utilize the northern structural cores as shafts to travel up in.

SOURCES

•Bibliography	p. 138
•Image Sources	p. 139



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APPENDIX A: PRECEDENTS

•Kandalama Hotel	p. 142-147
•Bath House	p. 148-153
•Michigan U Library Addition	p. 154-159
•Tadao Ando	p. 160-165



KANDALAMA HOTEL

The Kandalama Hotel by Geoffrey Bawa is a great example of architecture blending in with nature. It is built in a nature reserve so it has to be sensitive to the area visually. It winds its way along a cliff side, bending to follow the contours of the land. The building opens up on the cliff side and to the panorama. This allows the spaces to vary from intimate to expansive. The building also has plant life growing up the face of it so that from a distance it appears as part of the hillside.

This precedent informed the design thesis in many ways. It shares the main programatic elements and modern style that was a key element in the design. Each room has a distinct modern style yet still blends and merges with nature. It also takes a unique position regarding its prominent views. To one side of the building is a broad vista of lush jungle and on the other is the mountain. Bawa treats each side equally and creates both expansive views and intimate moments looking back toward the cliff. He also uses living materials such as vines and plants and grasses to break up the monolithic character of the steel and concrete structure.







•KANDALAMA HOTEL•

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•KANDALAMA HOTEL•

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BATH HOUSE

The bathhouse by Peter Zumthor is a particularly relevant precedent due to the setting in which it resides. It was built in a small village in the countryside. As the image to the left shows, it blends itself into the landscape so completely that upon first glance it isn't even recognizable, and doesn't take any focus away from the surrounding landscape.

The use of materials and color choice also helps the very modern building fit into the surroundings. The stone in the walls have the same feel and color as the mountains and the grass on the roof blends into the actual grass of the hillside.

Another strong aspect of the building is the way that it frames views of the mountains. Large openings with solid walls on two sides directs the focus of your gaze to a specific point. This is a crucial technique with an important monument like the old man in the mountain on the site.

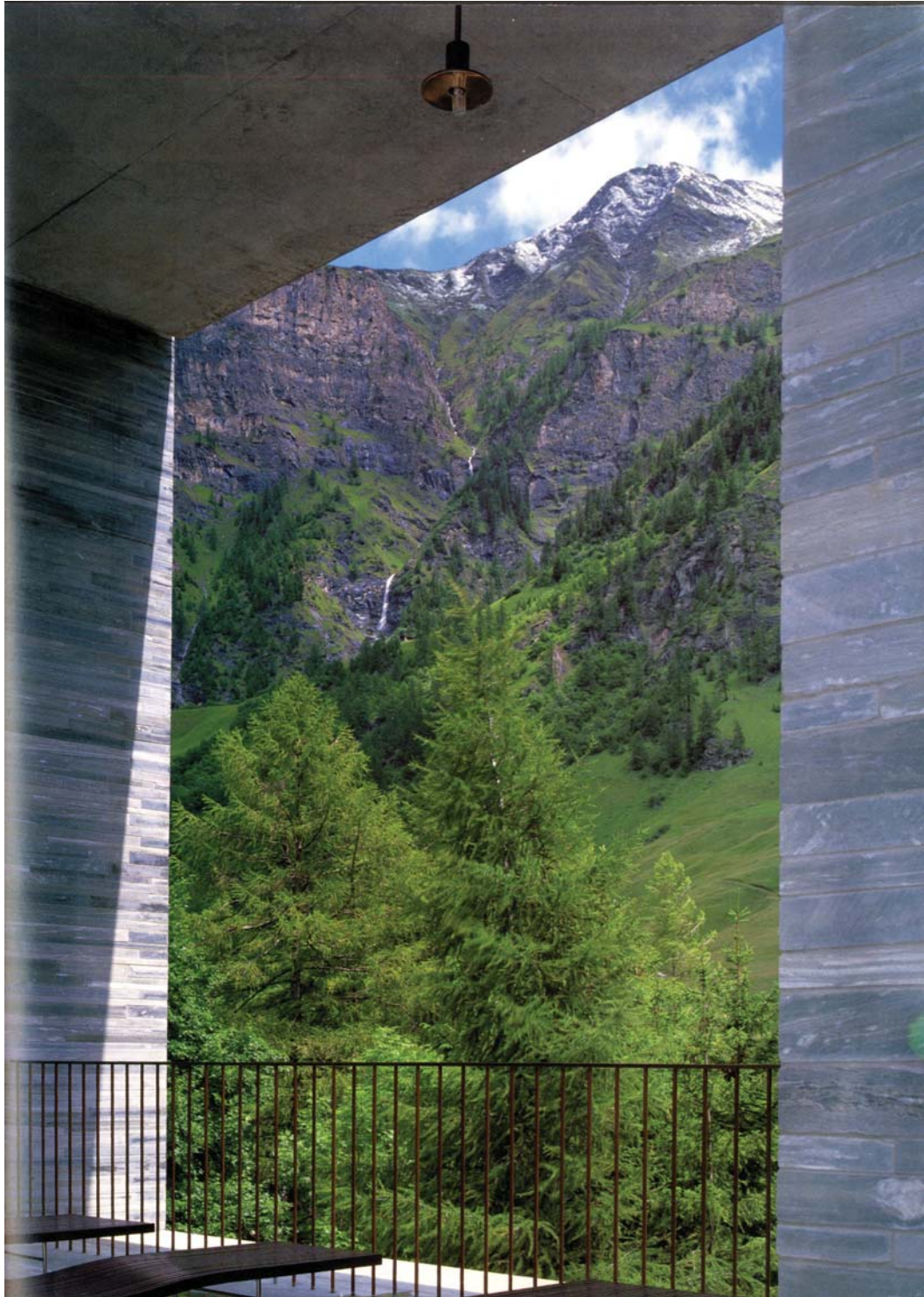
In the plan you can see how he uses large massive elements to frame out the views to the outside making the hillside seem light in contrast

Lastly, the construction gives it a very earthy heavy feel too it that fits in with the positioning in the hillside. The walls and piers are thick and placed in a way that allows the person in the building to flow on their own path



• 150 •

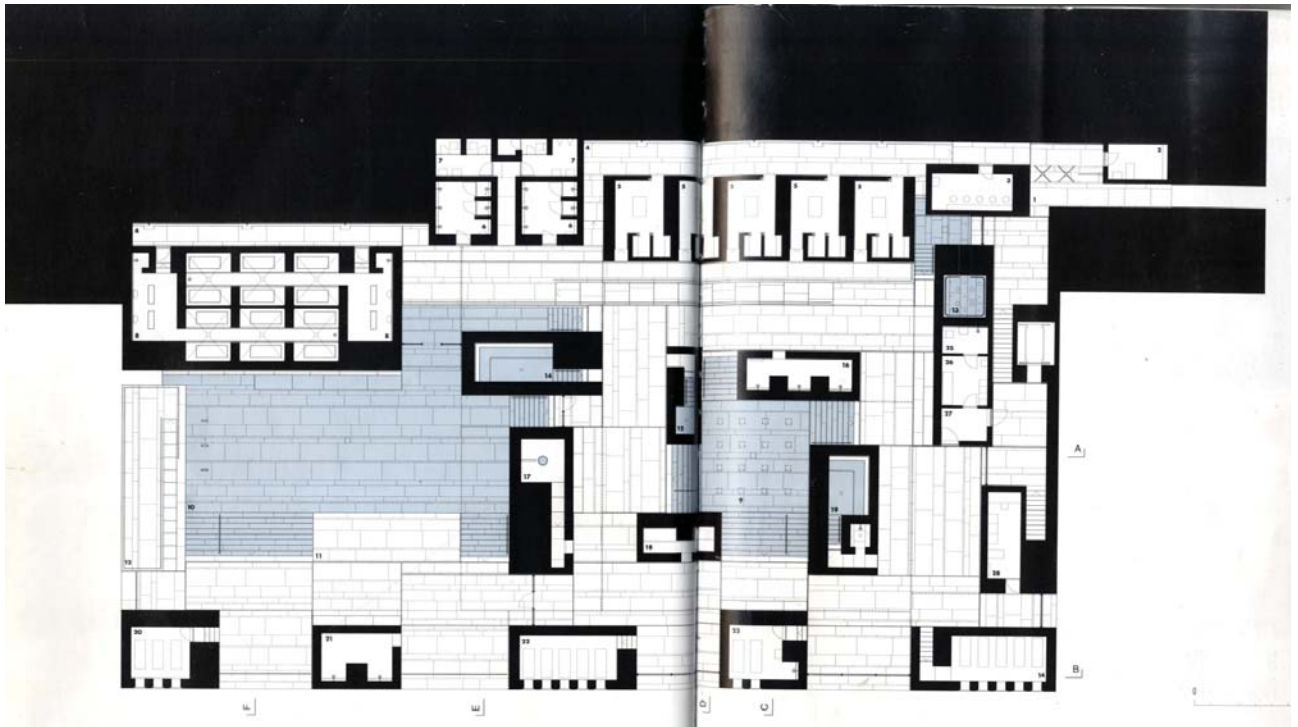
•BATH HOUSE•

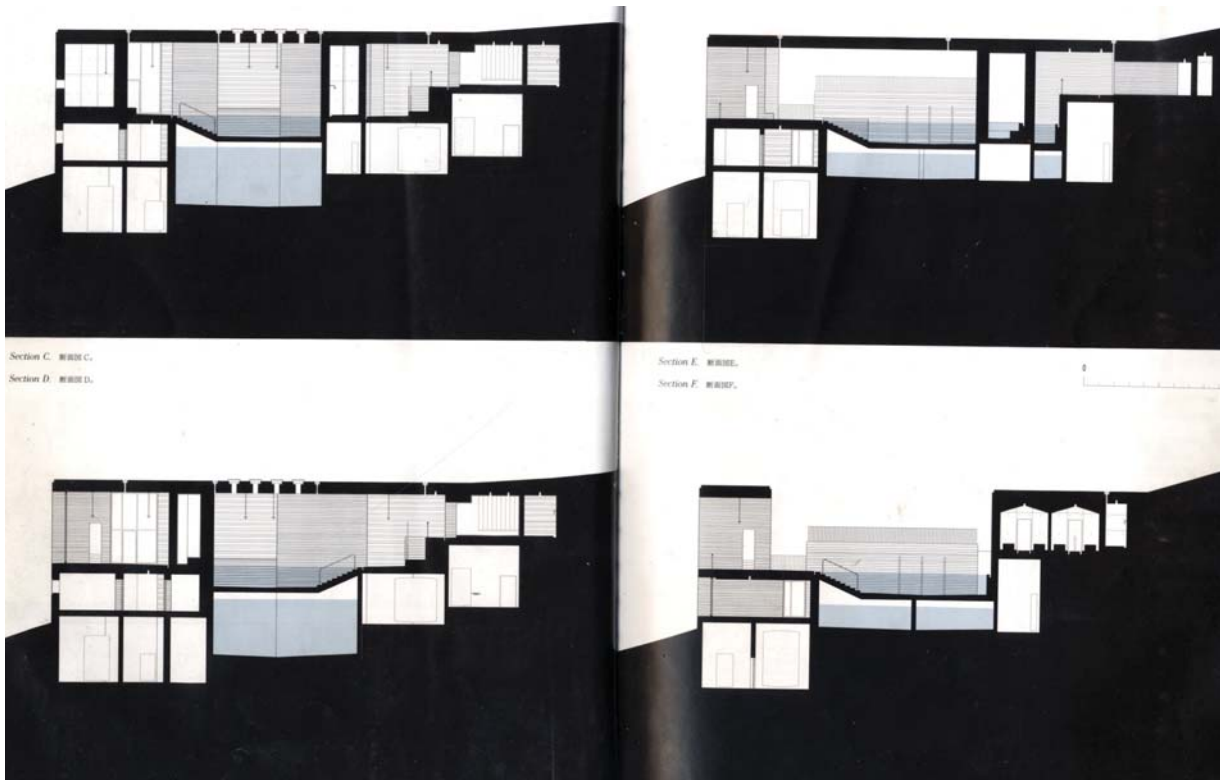


•BATH HOUSE•

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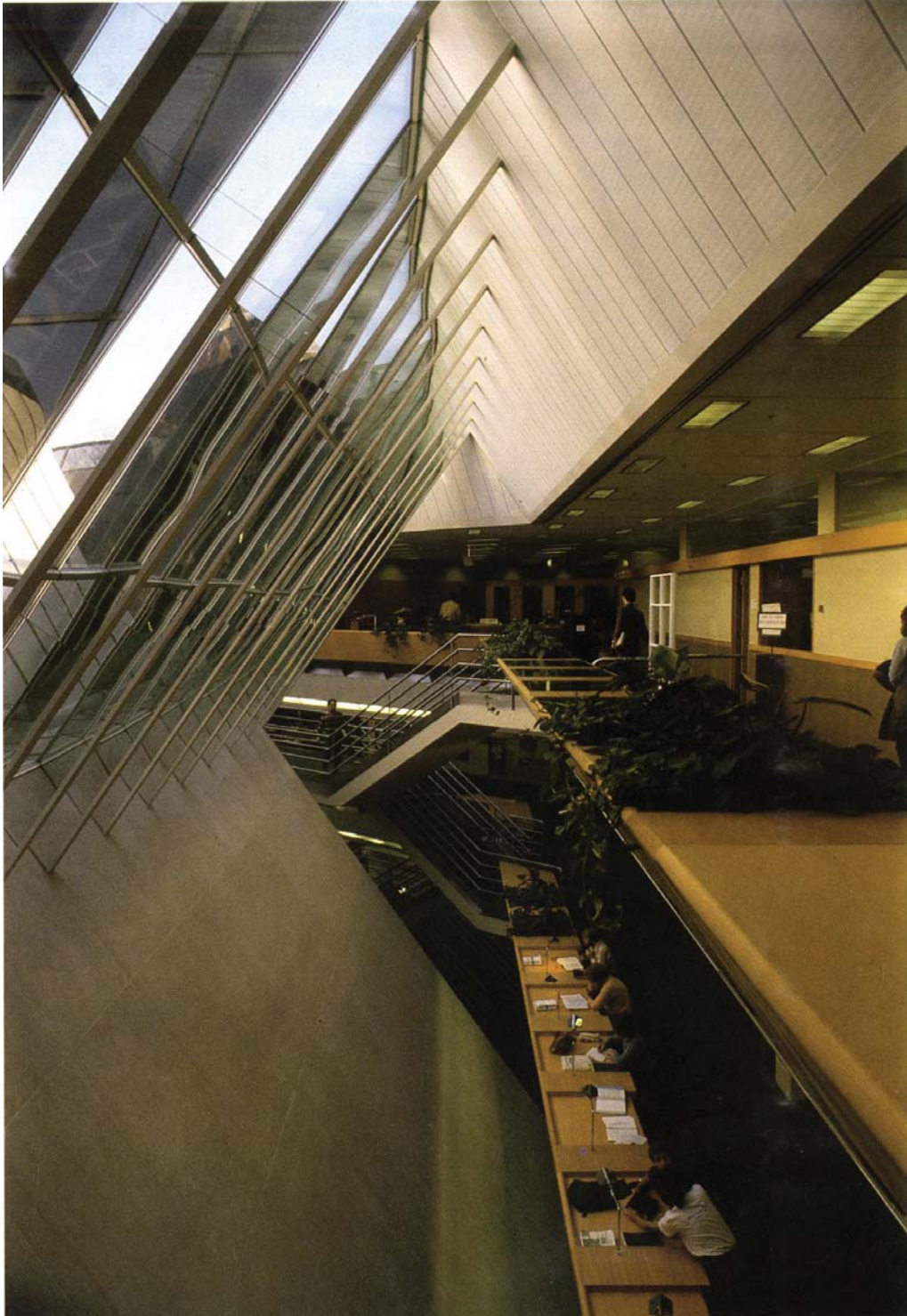


MICHIGAN U LIBRARY ADDITION

The Michigan University Library addition by Gunnar Birkerts is another good example of a building that has to blend into the environment because of its surroundings. This building unlike the Zumthor building above has the need to blend because the existing library is a landmark for the area and thus it has to minimize its own appearance to enhance the old building.

This building doesn't have the advantage of being on a sloped site so they need to take other measures to bring light into the depths of the building. The solution was to create light shafts on either corner of the building. The walls of the shafts are sloped to help light enter the depths. On the building side there are also mirrored structural fins that serve two purposes. The first being to help the light scatter to create a more even light and also to allow those inside to receive glimpses of the outside. This system allows three stories below ground to receive light.

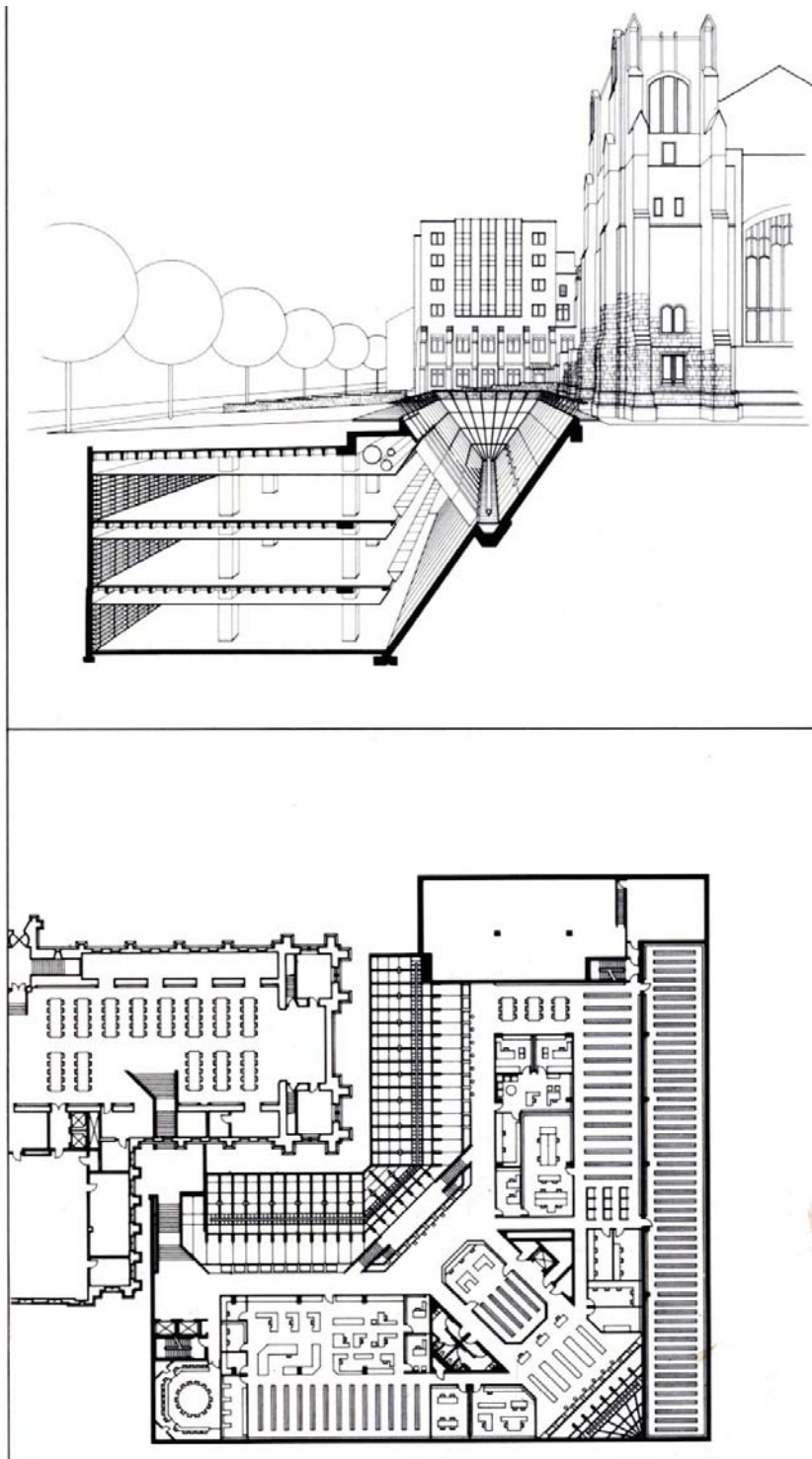
This precedent was useful to study how they brought light down into the deeper spaces which is crucial in the design at the old man in the mountain.

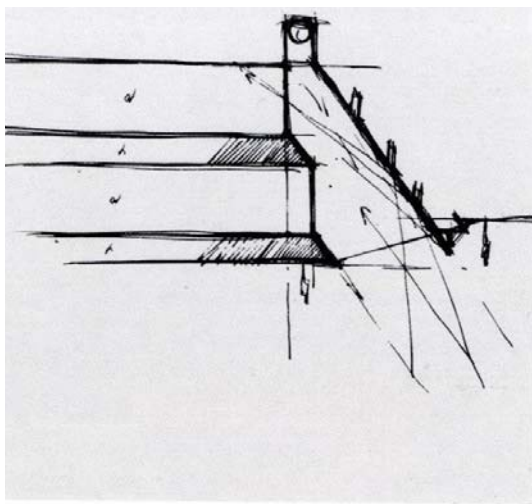
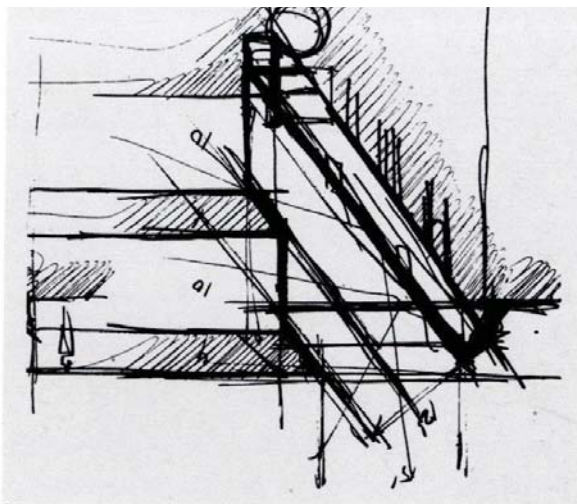
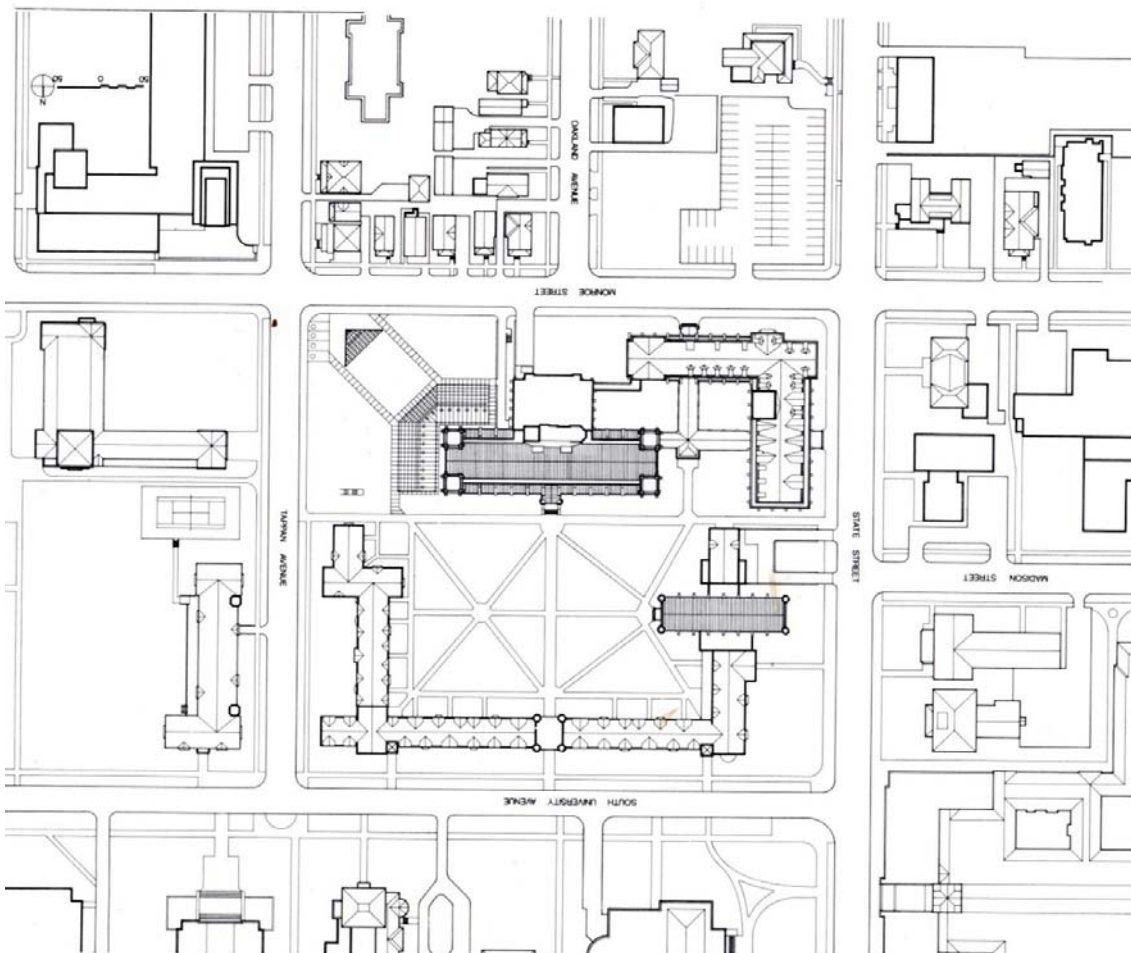




•MICHIGAN U LIBRARY ADDITION•

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•MICHIGAN U LIBRARY ADDITION•

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TADAO ANDO

There are many examples of Tadao Ando's architecture that serve as good precedent. The first are his Rokko housing projects. They work their way into the hillside in a way that blends them into the surrounding forest even though they are over ten stories tall. They also allow the users to wind their way over the tops of the roofs from bottom to top.

His other projects work with the ground plane in unique ways that give different perspectives on light and views of the sky or framed views.

Ando's Rokko housing project was a usefull precedent to understand the nature of how a stepped housing project can look. He did multiple projects all in that same area which helps to see slightly different ways of going about solving the same issue.







•TADAO ANDO•

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•TADAO ANDO•

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APPENDIX B: WRITINGS

•Hotels and Cultural Identity _____p. 168-179



Rick Hammer

Arch530 Asian and African Architecture

December 15th, 2009

Hotels and Cultural Identity

As the world becomes smaller, cultures that once had no contact with the outside world, are now finding themselves face to face with it. The countries at the forefront of globalization are also being introduced to these new cultures which in many cases are very different from their own. The danger for these cultures is nothing less than the loss of their cultural identity. The only way to preserve their individual cultures is through the spread of awareness of that culture. Without the representation of their culture manifest within their nation, they then end up adopting the more prominent cultures of the outside world to fill the apparent void within their own.

One way of spreading culture is through the use of architecture. One of the most important building types for this use in modern society is Hotels. Hotels are a building type that has a high percentage of occupants from other cultures. This is important because the hotel is a place that people receive most of their essential needs when away from home. They receive shelter, and often food. Therefore it becomes an essential way to infuse differing ideas about these aspects to the occupants. Architecture can affect the way these aspects are perceived in five distinct ways. Each approach has its pros and cons that sometimes sacrifice either cultural accuracy or architectural style.

The first approach is the most representational of the true culture of the area. This method of design focuses around giving the occupant an authentic experience of the culture and

way of life of the area. While this may not provide the best vacation or business experience, these hotels are usually cheaper or offer experiences unique to that place.

One approach to achieving this is to take a historic cultural building and renovate it for a new use. One example of this is the Rustem Pasha Caravanserai in Edirne Turkey. The original use of the building was as a caravanserai. It was built in the 16th century and restored in 1972. The building has split uses. It retains its use as a



Figure 1: Rustem Caravanserai

caravanserai while also taking on the role of hotel. The buildings program as well as its appearance and style both reinforce its representation of culture as genuine. In Turkish history the caravanserai was a building used as a place to stay for caravans as well as a market and place of shelter. The new building functions as a market around the exterior parameter. The building surrounds a courtyard; the hotel rooms are positioned off of a covered walkway that runs the length it. This creates an inward looking focus away from the modern city surrounding it (ArchNet8 n.d.).

This building is very successful in creating an authentic feel of the culture. It combines one of the oldest building types in the desert cultures of the Middle East with a hotel. In addition the hotel portion is very modest and doesn't feel like a luxurious version of Turkish culture, but more of a vernacular one.

Where the Rustem Pasha Caravanserai was very rural in scale and feel, the next project is of a larger, more palatial scale. The building is the Palace of the Buqshan family in Khaylah,

structure are original. The only change during the rehabilitation was a repainting of the facades (ArchNet2 n.d.).

This building is equally successful at filling its role as the caravanserai. This shows that rehabilitation projects can be equally successful at large and small scales, and also from local vernacular style to ancient palatial architecture.

Another method of creating architecture for the expression of cultural realism is by the creating of new buildings. This is usually more difficult because there isn't any base to start with.

One building that successfully accomplishes this is the Sand Island Beach Cottages in Tiwi, Kenya. The Cottages incorporate multiple aspects of the traditional vernacular within the design. The first aspect is in the use of materials. Each of the huts is built

with thick white washed walls to protect from the heat and thatch roofs which use available local materials. The second way that they adhere to the vernacular is with the construction process. The scale of each building is small because that is how the local materials allowed them to build. The greater composition of the buildings starts to resemble local villages. The buildings also respond to the local climate. The thick walls are punctured at the peak of the roofs with small



Figure 2: Buqshan Family Palace



Figure 3: Sand Island Beach Cottages

These buildings are very successful in that they provide a vernacular designed complex that is an accurate representation of the culture and style of living.

A second approach to representing culture is to take some of the vernacular elements of the culture and idealize them in combination with a more western idea of how a hotel should function. This caters to tourists who enjoy the comforts of a modern hotel but still gives them a slightly different experience based upon the culture. This method also allows greater freedom for experimentation with the architecture as the building forms and construction methods are not as strictly adhered to.

One hotel that uses this method is the Tripoli hotel in Tripoli, Libya. The hotel has a white plastered façade that is used throughout the Mediterranean. It also incorporates a repetitive arched façade and crenellated roof used in many buildings in the Islamic world. The entrance



Figure 4: Tripoli Grand Hotel

makes use of the horseshoe arch which is found mostly in northern Africa and Moorish Spain. At the same time the building is a five star hotel and has views of the Mediterranean as well as beach front property. This is not how people in Libya live but it represents their architectural culture fairly well (ArchNet11 n.d.).

Halfway across the world in a completely different climate and culture as the Tripoli hotel, Geoffrey Bawa was designing hotels that accomplished the same goals. One of the most successful of these is the Triton Hotel in Ahungalla, Sri Lanka. The climate is one major difference in Sri Lanka from Libya. The climate is very humid and it rains for a large part of the

culture. Bawa incorporates these general climatic responses into his design in a way that works to idealizes them, showing only the good aspects and none of the negative. He brings water into the design in a way that guides you from the entrance through the building to the ocean on the other side. He does this by having views from one body of water to the other. From the entrance reflection pool one can see through the lobby out to the swimming pool and then to the ocean beyond. The building also begins to play with the traditional roof style of the area. They are large overhanging roofs that protect



Figure 5: Triton Hotel

during the monsoon season and provide shade during the hot dry season. The main lobby is also open to the elements which allow natural breezes to flow through to help cool the space (Robson 2002).

Another example is the officer's club and conference center in Abu Dhabi, UAE. This building uses two main vernacular styles to incorporate the local culture into the building. The first is the tent structure which they have use in the main building for the structure of the roof. The second is the idea of the oasis. The exterior space is flanked by two wings of the hotel which divide the green inner area from the desert on the outside (ArchNet4 n.d.).



Figure 6: Officers Club and Conference Center

At first glance this hotel stands out from its context because of the barren nature of the desert. This makes it seem that it isn't using any vernacular elements, yet upon further review it shows just how much local influence can be infused into such a foreign building.

While these buildings impart a less authentic experience, they achieve a greater architectural one. They also still respond to the respective climates as well as making references to the cultures they originate from.

Where the above two styles are very successful at conveying the culture of the area, the next style does the exact opposite. The next style butchers the culture and puts forth something that is more of a fairy tale complex than any true representation of place or culture.

The best example of this is the Sheraton Miramar Hotel in El Gouna, Egypt by Michael Graves. Egypt is one of the most culturally rich places in the world, yet when looking at the Miramar hotel complex you begin to wonder if you



Figure 7: Sheraton Miramar Hotel

are even experiencing any of it. A quote from their website shows that this is their intentions “Welcome to your very own fairy-tale hotel designed by world famous architect Michael Graves. An inviting, magical mix of Arabic and Egypt’s Nubian styles, Sheraton Miramar Resort El Gouna is a signature experience we’re excited to share. (Hotels n.d.)” The first part of that statement shows that they are aware that they are creating a place that does not exist in reality so therefore is not an accurate representation of culture as it exists. The second part is a true representation of what the project is a mixing of every style from the surrounding area all in one complex.

while jarring to look at, actually works in a way because it is trying to be jarring and different rather than trying unsuccessfully to blend together. The whole complex doesn't self implode architecturally because of this. If it was trying to pass as something it was not then it would be very destructive to the image of African culture. On the other hand even with their intentions set, many people could still see this as a true representation of their culture which is why I feel that it is overall a very unsuccessful project both architecturally and culturally (Hotels n.d.).

Another building that represents a falsified culture is the Al-Moughtara Farm in Riyadh, Saudi Arabia. The site is one million square meters and is comprised of two housing units, one for the family and one for the hotel of 480 rooms. It also has a guardhouse and mosque. The building grounds take up most of the square footage. The



Figure 8: Al-Moughtara Farm

hotel gives the experience of living the life of a Saudi Prince. It is a very false experience of the true culture of Saudi Arabia where the occupant can pretend to be whomever they want. The building contains many elements of traditional Saudi fortress architecture, but has turned it into a fantasy resort (ArchNet1 n.d.).

This building is very successful in what it is trying to accomplish, but at the same time it begins to corrupt the cultural ideas of the fortress in that area as well as hides the true cultural elements that are very rich in that area, by masking them.

While the above three hotel types are driven by representation of local cultures, the next

could be anywhere. They may have slight cultural indications but the majority of the design is based off of providing exactly what the tourist expects from a resort hotel; pools, beach front access, air conditioning, etc.

An example of this is the Novotel in Antalya, Turkey. The building functions mainly as a backdrop for the outdoor environment. There are 250 rooms located in a square with little variation. The spaces outdoors are what matter, with beaches, pools and a central courtyard; the



Figure 9: Novotel in Antalya

building becomes a place to go to sleep and little more. Its design is meant to be a reinterpretation of a caravanserai but it retains none of the true character of one and because of that it is not truly expressive of such to the occupant (ArchNet5 n.d.).

The building becomes less successful because it has very little role in defining the sense of place. It could easily have performed the same functions while incorporating more of the character of the area. Architects sometimes get caught up in only designing exactly what the client asks for where in some cases it is possible to create better architecture that still fulfills the goals of the owner.

Another building that fits this category is the Intercontinental Hotel Corporation in Abu Dhabi, UAE. The hotel is meant as a getaway for people in Abu Dhabi. The main floor fronts



use of it. The main building has very little cultural defining architecture that places it in its context. It is catering more towards people who want a luxurious place to stay rather than people who want a cultural experience. It begs the question if the hotel isn't designed for tourists but for locals, should it still require cultural elements? (ArchNet4 n.d.)

The clientele for the building changes the approach and therefore makes the design more acceptable as it is without the infusion of cultural identity. If the building were designed for tourists, the lack of cultural elements would come across as being more detrimental.

The last category of building types is the universal business hotel. This type is very similar to the above except that it functions for the business person rather than the tourist. It is usually located in closer proximity to the business district than to the beach. It is usually even more functional because the occupants are not there purely for pleasure.

One example of this is the Riyadh Marriott Hotel in Riyadh, Saudi Arabia. The building is located on the main access road and is within close proximity to the business district. Its structure is very basic; it consists of two main bars that flank a central atrium space. There is a pool in the rear of the building which is one of the only amenities (ArchNet7 n.d.).



Figure 11: Riyadh Marriott Hotel

While it is understandable that when catering to business men there are going to be fewer

every stay, there could still very easily have been more thought placed into the architecture. The hotel could be anywhere in the world and that is the opposite direction that architecture should be heading in, especially in an area of the world that is trying to find their place in the world, not get lost in it.

Another hotel catering to the business clientele is the Conference center and hotel complex in Surt, Libya. The complex is composed of administration building a conference center and hotel. The conference center is the only building on the site that begins to make cultural references. The hotel and administration buildings are related to one another by trellised pathways and they create an office park like atmosphere (ArchNet3 n.d.).



Figure 12:Conference Center and Hotel Complex

The hotel is in itself nothing special architecturally, but in conjunction with the conference center it becomes even more obvious that hotel itself has little to no culturally defining elements. On its own it is just a hotel that could be anywhere in the world but the conference center is reminiscent of the tent like structures used in the desert cultures. Therefore the hotel should have been given the same architectural design care that the conference center was given.

All five of these styles are valid in their own right but within the context of analyzing how the architecture conveys the culture of the place, some become more valid and successful than others. The least successful is the falsified culture. While it still attempts to integrate the



culture then it is good. The two styles that deal with the more universal of the cultures are successful in what they are designed to do but with more design effort they could achieve a better sense of place and cultural identity. The most accurate representation of culture would appear at first glance to be the most successful but as architecture it begins to fall short due to its lack of creative freedoms. The most successful of all the styles is the use of idealized cultural elements within the architecture. This is because it respects the culture and identity of the place while not becoming static but helping to enhance the culture through the use of architecture.

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APPENDIX C: CODES

- 
-
- Building Type Groups _____p. 182-185
  - Area and Building Height Limits ____p. 186-187

303 Assembly Group A**303.1 Assembly Group A (part 1 of 2)**

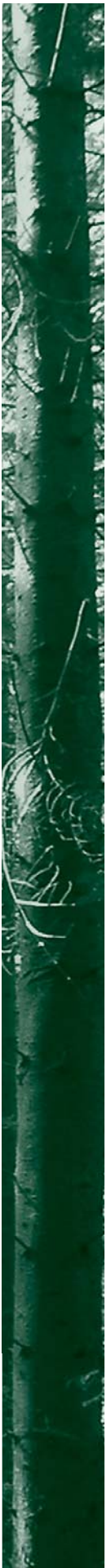
- Buildings or parts of buildings where people gather for activities such as the following:
  - Civic.
  - Religious.
  - Waiting for transportation.
  - Social.
  - Recreation.
  - Consumption of food or drink.
- A gathering space is part of the occupancy served where both the following apply:
  - The gathering space has < 50 occupants.
  - The gathering space is accessory to the occupancy served.
- Assembly spaces are divided into the following designations:
  - A-1:
    - For the production and viewing of the following:
      - Performing arts.
      - Motion pictures.
    - Includes the following building types among others:
      - Theaters and movie theaters.
      - Television studios with audience seating.
      - Radio studios with audience seating.
      - Typically with fixed seating.
  - A-2:
    - For the consumption of food and/or drink.
    - Includes the following building types among others:
      - Banquet halls.
      - Taverns and bars.
      - Night clubs.
      - Restaurants.
  - A-3:
    - For the following functions:
      - Worship.
      - Recreation.
      - Amusement.
      - Gatherings not assigned to other assembly categories.
    - Includes the following building types among others:
      - Amusement arcades.
      - Funeral parlors.
      - Art galleries.
      - Gymnasiums.
      - Auditoriums.
      - Indoor swimming pools.
      - Bowling alleys.
      - Indoor tennis courts.
      - Churches.
      - Lecture halls.
      - Community halls.
      - Libraries.
      - Courtrooms.
      - Museums.
      - Dance halls.
      - Passenger waiting areas.
      - Exhibition halls.
      - Pool and billiard parlors.
  - A-4:
    - Spaces for viewing indoor sporting activities with spectator seating, including the following:
      - Arenas.
      - Skating rinks.
      - Swimming pools.
      - Tennis courts.
  - A-5:
    - For the following functions:
      - Participating in outdoor activities.
      - Viewing outdoor activities.
    - Includes the following building types among others:
      - Amusement park structures.
      - Bleachers.
      - Grandstands.
      - Stadiums.

304 Business Group B

304.1 Business Group B

- Includes buildings or parts of buildings used for the following:
  - Offices.
  - Professional transactions.
  - Service transactions.
  - Storage of records.
  - Storage of accounts.
- Includes the following building types among others:
  - Airport traffic control towers.
  - Electronic data processing.
  - Animal hospital, kennel.
  - Engineer's office.
  - Animal pound.
  - Fire station.
  - Architect's office.
  - Laboratories, testing and research.
  - Attorney's office.
  - Laundry pick-up/drop off.
  - Bank.
  - Laundry, self-service.
  - Barber shop.
  - Motor vehicle showroom.
  - Beauty shop.
  - Physician's office.
  - Car wash.
  - Print shop.
  - Civic administration.
  - Police station.
  - Clinic, outpatient.
  - Post Office.
  - Dentist.
  - Professional services.
  - Dry cleaning pick-up/drop off.
  - Radio station.
  - Dry cleaning, self service.
  - Telephone exchange.
  - Educational functions above 12th grade.
  - TV station.

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<http://site.ebrary.com/lib/rwu/Doc?id=10153054&ppg=84>



309 Mercantile Group M

309.1 Mercantile Group M

- Includes buildings or parts of buildings used for the display and sale of merchandise as follows:
  - Involves stocks of the following incidental items accessed by the public:
    - Goods.
    - Wares.
    - Merchandise.
  - Includes the following functions:
    - Department stores.
    - Drug stores.
    - Markets.
    - Motor vehicle service stations.
    - Retail stores.
    - Wholesale stores.
    - Sales rooms.

309.2 Quantity of hazardous materials

This section addresses hazardous materials stored or displayed in an occupancy M control area.

- The total amount of the following hazardous materials must be within permitted limits:
  - Nonflammable solids.
  - Nonflammable liquids.
  - Noncombustible liquids.

Note: IBC Table 414.2.4, "Maximum Allowable Quantity Per Indoor and Outdoor Control Area in Group M and S Occupancies: Nonflammable Solids and Nonflammable and Noncombustible Liquids," is cited as listing quantity limitations.

310 Residential Group R

310.1 Residential Group "R"

- Includes buildings or parts of buildings with sleeping accommodations as follows:
    - Those not classified as occupancy I.
  - Residential spaces are divided into the following designations:
    - R-1:
      - Buildings where residents are primarily transient as follows:
        - Stay is < 30 days.
      - Includes the following building types:
        - Hotels.
        - Motels.
        - Transient boarding houses.
    - R-2:
      - Buildings with > 2 dwelling units.
      - Where residents are primarily permanent.
      - Includes the following building types:
        - Apartment houses.
        - Dormitories.
        - Fraternities.
        - Sororities.
        - Monasteries.
        - Permanent boarding houses.
        - Convents.
    - R-3:
      - Buildings with ≤ 2 dwelling units.
      - Residents are primarily permanent.
      - Not classified as any of the following:
        - R-1, R-2, I.
      - Includes day care facilities as follows:
        - Care is provided for ≤ 5 persons.
        - Care is for persons of any age.
        - Care provided < 24 hrs/day.
    - R-4:
      - Residential Care /Assisted Living Facilities as follows:
        - Number of residents served is > 5 and ≤ 16.
      - Must meet height and area limitations based on the following:
        - Occupancy.
        - Type of construction.
      - Otherwise, R-4 must meet the same construction requirements as does R-3.
- Note: Section 503, "General Height and Area Limitations," is cited as governing these characteristics of R-4 buildings.*

503 General Height and Area Limitations**503.1 General** (*part 1 of 3*)

- Building height and area are limited by this section as per construction type and occupancy.
- Each part of a building enclosed is considered to be a separate building as follows:
  - Within the exterior walls.
  - Within the exterior walls and fire walls where applicable.
- Height and area limitations are subject to modification elsewhere in the code.
- Maximum area per floor and building height by occupancy are as follows:

Table 503.1a Maximum Building Height and Area per Floor

		Type of construction								
Occ.	Height	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
Occupancy A: maximum height in stories and feet										
A	Feet	UL	160	65	55	65	55	65	50	40
A-1	Stories	UL	5	3	2	3	2	3	2	1
A-2	"	UL	11	3	2	3	2	3	2	1
A-3	"	UL	11	3	2	3	2	3	2	1
A-4	"	UL	11	3	2	3	2	3	2	1
A-5	"	UL	UL	UL	UL	UL	UL	UL	UL	UL
Occupancy A: maximum area per floor in square feet										
A-1	SF	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
A-2	"	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-3	"	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-4	"	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-5	"	UL	UL	UL	UL	UL	UL	UL	UL	UL
Occupancy B: maximum area in square feet										
B	Feet	UL	160	65	55	65	55	65	50	40
B	Stories	UL	11	5	4	5	4	5	3	2
Occupancy B: maximum area per floor in square feet										
B	SF	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
Occupancy E: maximum height in stories and feet										
E	Feet	UL	160	65	55	65	55	65	50	40
E	Stories	UL	5	3	2	3	2	3	1	1
Occupancy E: maximum area per floor in square feet										
E	SF	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500

Source: IBC Table 503.

UL = unlimited, Occ. = occupancy, SF = square feet.

Patterson, Terry L., Illustrated 2000 : Building Code Handbook.
 Blacklick, OH, USA: McGraw-Hill Professional Publishing, 2000. p 162.
<http://site.ebrary.com/lib/rwu/Doc?id=10153054&pgg=162>

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503 General Height and Area Limitations**503.1 General** (part 2 of 3)**Table 503.1b Maximum Building Height and Area per Floor**

Occ.	Height	Type of construction								
		IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
Occupancy F: maximum height in stories and feet										
F	Feet	UL	160	65	55	65	55	65	50	40
F-1	Stories	UL	11	4	2	3	2	4	2	1
F-2	Stories	UL	11	5	3	4	3	5	3	2
Occupancy F: maximum area per floor in square feet										
F-1	SF	UL	UL	25,000	15,500	19,000	12,000	35,500	14,000	8,500
F-2	SF	UL	UL	37,500	23,000	28,500	18,000	50,500	21,500	13,000
Occupancy H: maximum height in stories and feet										
H	Feet	UL	160	65	55	65	55	65	50	40
H-1	Stories	1	1	1	1	1	1	1	1	NP
H-2	"	UL	3	2	1	2	1	2	1	1
H-3	"	UL	6	4	2	4	2	4	2	1
H-4	"	UL	7	5	3	5	3	5	3	2
H-5	"	3	3	3	3	3	3	3	3	2
Occupancy H: maximum area per floor in square feet										
H-1	SF	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
H-2	"	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
H-3	"	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
H-4	"	UL	UL	37,500	17,500	28,500	17,500	36,000	18,000	6,500
H-5	"	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
Occupancy I: maximum height in stories and feet										
I	Feet	UL	160	65	55	65	55	65	50	40
I-1	Stories	UL	9	4	3	4	3	4	3	2
I-2	"	UL	4	2	1	1	NP	1	1	NP
I-3	"	UL	4	2	1	2	1	2	2	1
I-4	"	UL	5	3	2	3	2	3	1	1
Occupancy I: maximum area per floor in square feet										
I-1	SF	UL	55,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500
I-2	"	UL	UL	15,500	11,000	12,000	NP	12,000	9,500	NP
I-3	"	UL	UL	15,000	10,000	10,500	7,500	12,000	7,500	5,000
I-4	"	UL	60,500	26,500	13,000	23,500	13,000	25,500	18,500	9,000

Source: IBC Table 503.

UL = unlimited, Occ. = occupancy, SF = square feet, NP = not permitted.

Patterson, Terry L., Illustrated 2000 : Building Code Handbook.
 Blacklick, OH, USA: McGraw-Hill Professional Publishing, 2000. p 164.
<http://site.ebrary.com/lib/rwu/Doc?id=10153054&pgg=164>

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