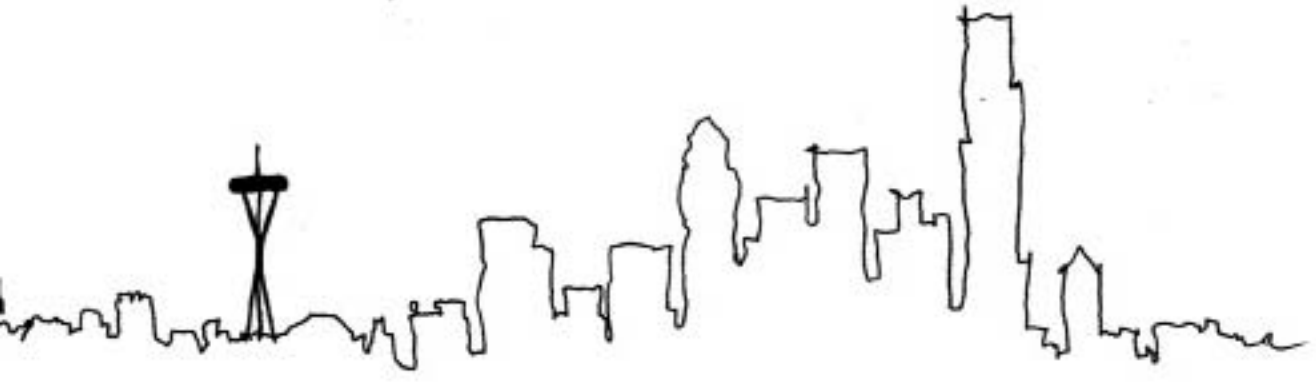
R e s i l i e n c y

Creating necessary connection
in an unstable environment



RESILIENCY

CREATING NECESSARY CONNECTION IN
AN UNSTABLE ENVIRONMENT

A DESIGN THESIS SUBMITTED TO THE
DEPARTMENT OF ARCHITECTURE AND LANDSCAPE ARCHITRECTURE
OF NORTH DAKOTA STATE UNIVERSITY

BY: NOAH HARVEY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF ARCHITECTURE

PRIMARY THESIS ADVISOR

THESIS COMMITEE CHAIR

MONTH AND YEAR
FARGO, NORTH DAKOTA

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Abstract

How can design create connections between people in a time of need?

This is a study of how connection are made between people in an extreme time of need and also what happens to those connections when they are not immediately in use. It is also a study on the resiliency and sustainability of a built project. Through careful and precise research and experimentation I hope to create an example of what design can be.

Narrative

The premise of this project is to develop a design example for resilient and sustainable practices and how they are more imperative in a seismically active zone. It is my intent to create a necessary connection between the citizens and each other along with disaster relief and also the outside world in the event of a natural disaster.

Society is beginning to realize that we have a major problem with how we are going about things such as energy use, building practices and natural resource use. I believe the only way to design is with resiliency in mind and I believe that once an example is set towards resiliency others will follow.

Claim: Create a public building that creates connections between people in a time of need and will stand the test of time.

Theoretical Research

Natural Disasters are an unfortunate part of life, they seem to come out of nowhere, leave a wave of destruction and then vanish as quickly as they appeared. They will always be apart of living on this planet, as citizens of this global community we have a false security that we are in control and can handle things in our lives, but these disasters teach us very quickly how little control we actually have. With the advancements of our society and the technology that we possess we ought to be able to prepare better for these events to help lessen the blows.

3 MAIN PROBLEMS WITH NATURAL DISASTERS

Besides the obvious problems that arise after a natural disaster, mainly the disaster itself, there are three main problem that have been highlighted as major hindrances for the relief effort. Addressing these issues and implementing solutions for each will greatly reduce time and effort spent after a disaster.

Tools

Tools are a critical necessity for those affected by a disaster and also those that are part of the relief effort, but not only are the right tools essential, what is equally as essential is the ability to utilize those tools the correct way.

In the event of a natural disaster major entities (such as FEMA), deploy massive relief efforts and provide a great deal of support in the form of tools. The issue with this is, is that an entity like this is usually given a specific task and once that task is completed they move on and leave the tools behind with the citizens to essentially figure things out on their own. Training is none existent and something that needs to be addressed.

Timing

After the effects of a natural disaster timing is of the utmost importance, according to google “50% of all the internet searches (pertaining to the disaster) occur in the first 7 days”. What this means is that people want to reach out and support the affected area but then after a week something new has come up in the news to take their attention away. The problem with all this attention so suddenly and swiftly is that the people receiving the attention have no idea how to respond initially and then when they have figured things out the support has vanished.

Data

Data follows the same trend as the first two issues in that if people knew their options or had an idea of necessities well the help was there and prevalent for them they could utilize that help much more efficiently. The problem being that the citizen affected by the disaster typically will have no clue what they need or how some of their decisions will affect the rest of the relief process.

Needs of a community

In the event of a natural disaster the 3 most essential needs to ensure recovery efforts are maximized:

Organization

Organization is a vital piece of the equation, after a disaster establishing a solid community driven organization effort will be the difference in a swift recovery process or the complete opposite. We live in a very connected world and that is great for creating support from all corners but the fact is that support will only last so long. To maintain the effort after the support has started to dissipate the community needs to organize as a whole.

Systems

Along the same lines as organizing the affected community also needs to create a system for handling everything from cleanup, to communication and managing the support. Without a system in place the whole relief effort can fall apart.

Preparedness

Preparedness is the most essential need in creating a successful disaster relief effort. We have the ability to implement all of these other idea and practices before the fact and that needs to be goal of cities, states, and our country as a whole. If we can create a solid idea of how to be prepared in the event of some sort of disaster that will greatly increase the resiliency of our communities and help to protect the safety of all its citizens.

Role of Design

The role of design in a problem like this is key, so many factors are present in the problem but the main issue that a can benefit from a design intervention is this idea of preparedness.

How can design help prepare a community for the unknowable?

How can an architect be a social leader and a disaster relief expert, prepared to utilize their tools to more efficiently handle a natural disaster?

The social aspect of this is key, the more people know and the more they allow themselves to prepare the better the outcome will be.

How to connect

Before:

All the information points to the importance of developing a plan, and a system to set in place before the event of a natural disaster. We live in "plugged in" society and we can get any information from the tiny devices we carry around with us everyday. The implementation of a disaster relief system is as easy as creating a way for people to connect to their community and also the goals and needs of the situation through the technology that we have established. The use of technology can be extremely powerful to create a system to set in place for anything that comes a community's way.

After:

Once we have these systems in place the only thing left to do is to activate them and make sure the plans stay organized. The implementation of these ideas will not only expedite the recovery process but it will more importantly create a sense of security for the members of a community. If the people understand the system and have that sense of connection during a disaster that will ease their mind and let them focus on the task of recovering.

Summary

Natural Disasters will always be apart of life, but that does not mean we can have nothing to say about them. We have the opportunity and responsibility to ourselves and our community as a whole to create and organized and systematic approach to dealing with these situations.

By presenting our communities with the tools and knowledge they need the process of recovering can be achieved. We live in an age of technology and that it a great tool we can utilize to establish these systems and practices to connect our communities.

Architecture and those that design it have a great responsibility to those in the community to create resilient and protective buildings. This project allows for us to utilize our skill set to create a social change in the way we look at the design and life-cycle of buildings and how those buildings can do more than ever to protect its inhabitants. Even if the design strategies that we implement are never fully realized, it is our duty to allow for the opportunity for them to be.

Typology

Public Safety Building
City building that houses all of the first repsonse services along with their dispatcher, and offers the community a safe haven in times of emergency.

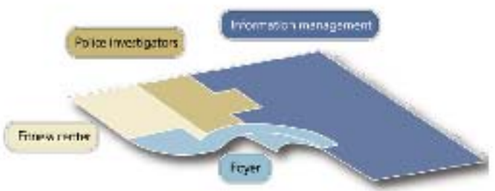
Typological Research

Salt Lake City Public Safety Building

Architect.....GSBS Architects
Project Type.....Public Safety Building
Location.....Salt Lake City, Utah
Completion Date...July 2013
Size.....335,000 square-feet

Fourth Floor

Third Floor



Second Floor

First Floor

Site Plan

Hierarchy

Elevation One

Massing

Elevation Two

Circulation

Geometry

Salt Lake City Public Safety Building: Summary

Program:
The proposed building will house police and fire administration, the Fire Prevention Bureau, the investigation division, interview rooms, and other central services for both departments.
Additionally:

Detective and investigative functions will be co-located and share common areas.
Circulation corridors will be designed to separate victims and suspects (in the current public safety buildings victims and suspects often use the same hallways and elevators, compromising investigations).
The building will be set back 50 feet from the street to ensure the structural integrity of the building in the event of a vehicular explosive device.
An Emergency Operations Center

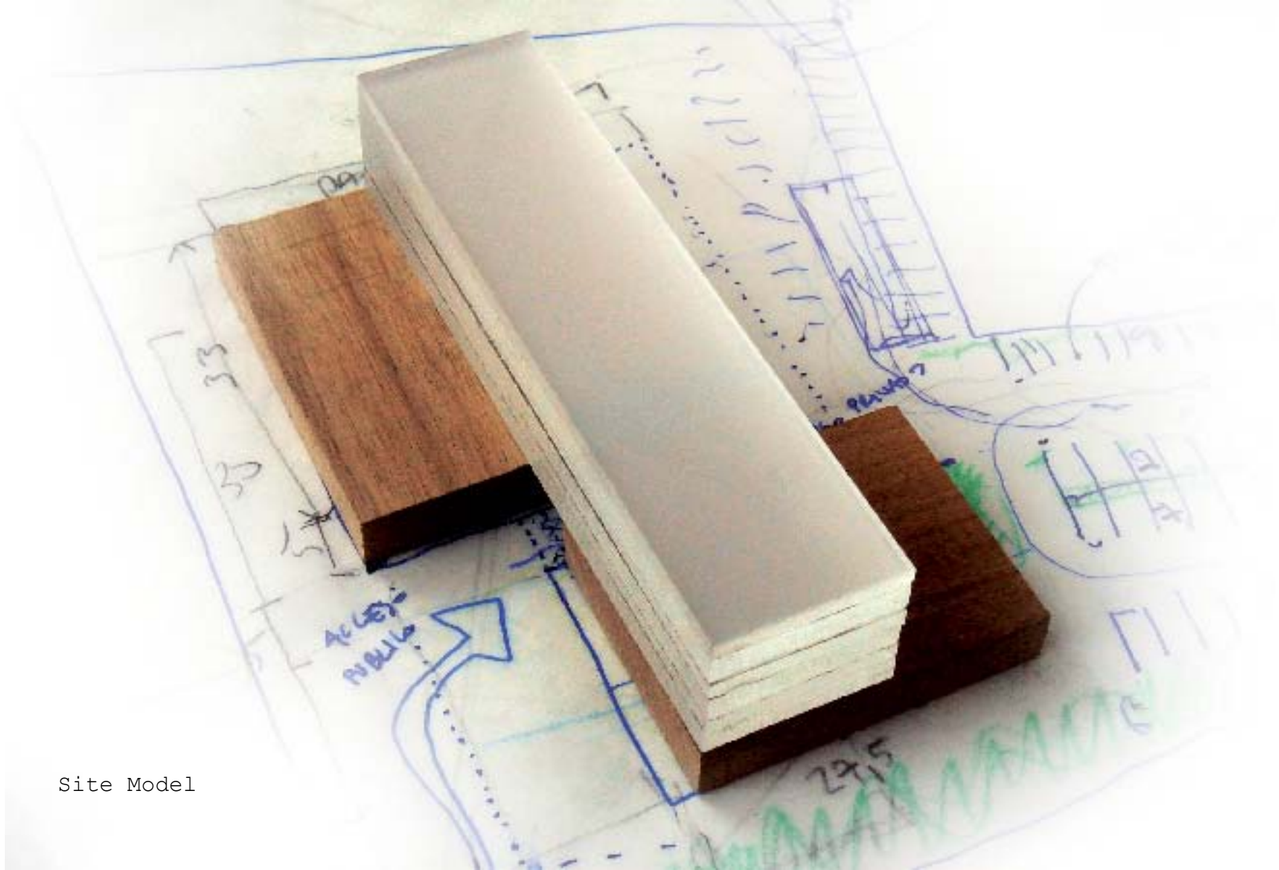
Summary:
The Salt Lake Public Safety building is a prime example of resiliency and a showcase for sustainable design, the main piece of its sustainable accomplishments is the fact that it is a "net-zero" building, which means that it actually makes enough energy to sustain its needs. Although we would assume most of this is done through active systems but actually a major factor in achieving this feat is through its use of passive daylighting strategies along with the extensive array of photovoltaic panels.

Along with its impressive sustainable design features the building also boasts one of the most well designed structures, the engineers and designers tested the building out with the goal of surviving for more than two-centuries with the building, people, and equipment fully intact. This study also focused on producing a super building in the area of seismic design by creating a structure that is given the ability to flex with the earthquake to withstand it. The designers even went a step further and ensured that even the partitions and equipment would withstand a major earthquake as well.

This design solution is a great beacon for how the design of buildings should be done. I fully intend to utilize as much data from this project as I can to try to achieve some of the same goals.

Police Headquarters

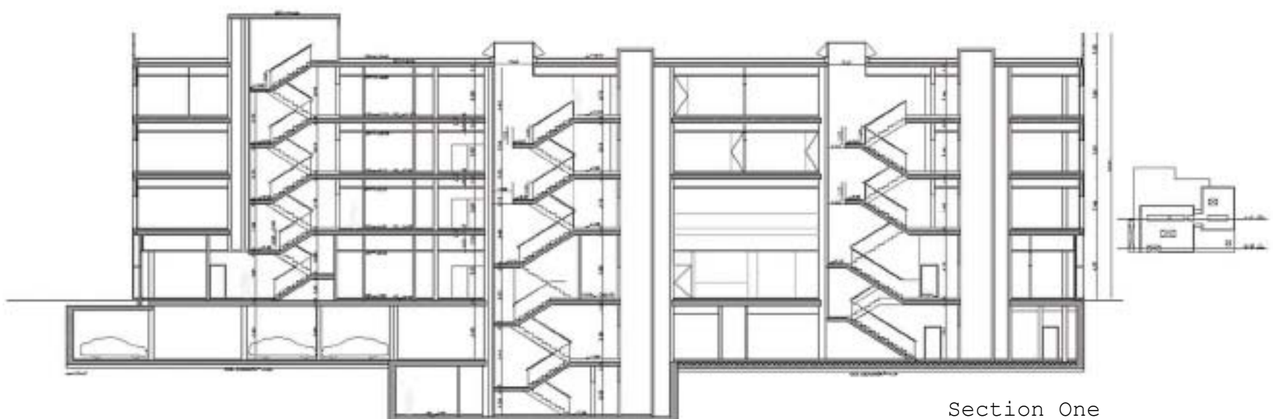
Architect.....Matos-Castillo Arquitectos
Location..... Calle Serradero, Logroño, La Rioja, Spain
Completion Date...2011
Size.....7,858 sqm



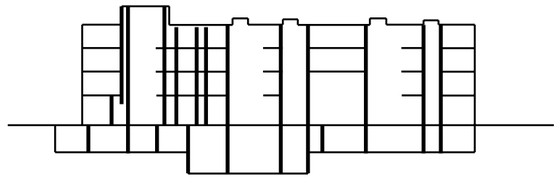
Site Model

Second Floor

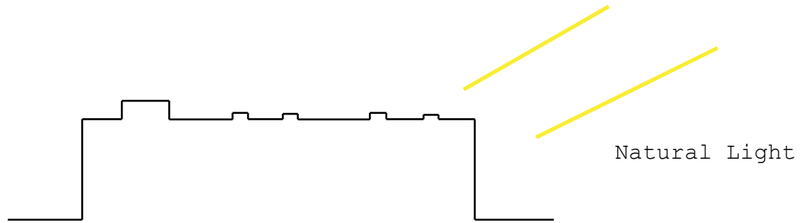
First Floor



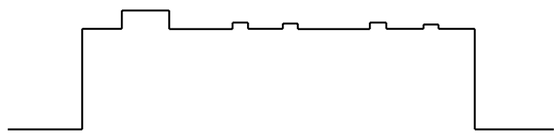
Section One



Structure

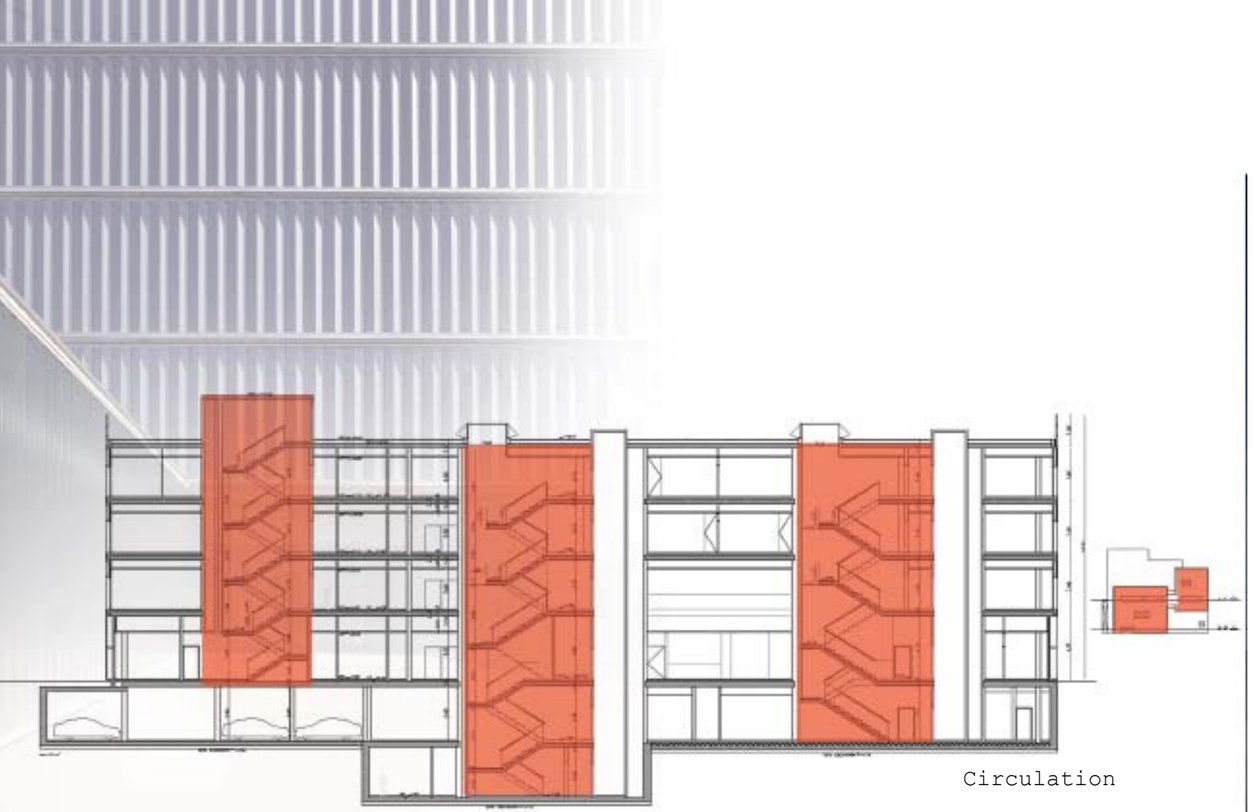


Natural Light



Hierarchy

Massing



Circulation

Elevation

Police Headquarter Building: Summary

Program:

Parking, locker rooms, guardroom, storage and a shooting gallery in the underground floors, consists mainly in offices as well as a customer service area located in the ground floor. In order to make easier the internal organization and the possible exchange of functions over time, a modular building, with lightweight and removable interior partition walls made of wood and glass, is constructed. Three vertical communication cores are integrated into a vertical strip of the plan and distinguish the needs of internal circulation between policemen, persons under arrest and public.

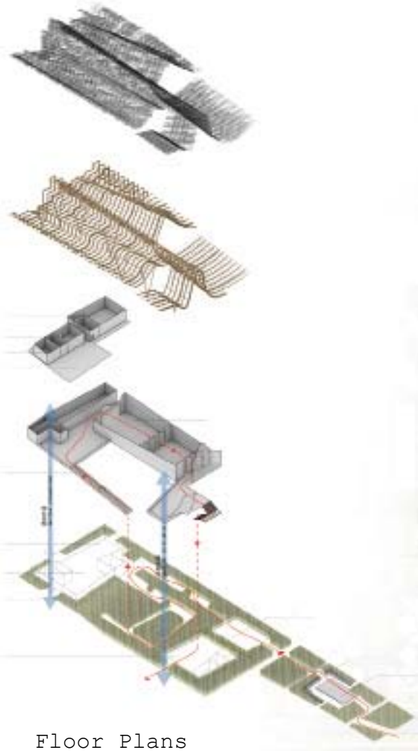
Summary:

The Police Headquarter building, is a great example of developing the circulation of a building to meet the specific goals of the users. In this building it was imperative to create a disconnect of the public and private portions while still leaving easy connections for the officers that occupy the building. The architects also utilized specific materials that differentiated the structure from its surroundings in order to establish itself as a federal building.

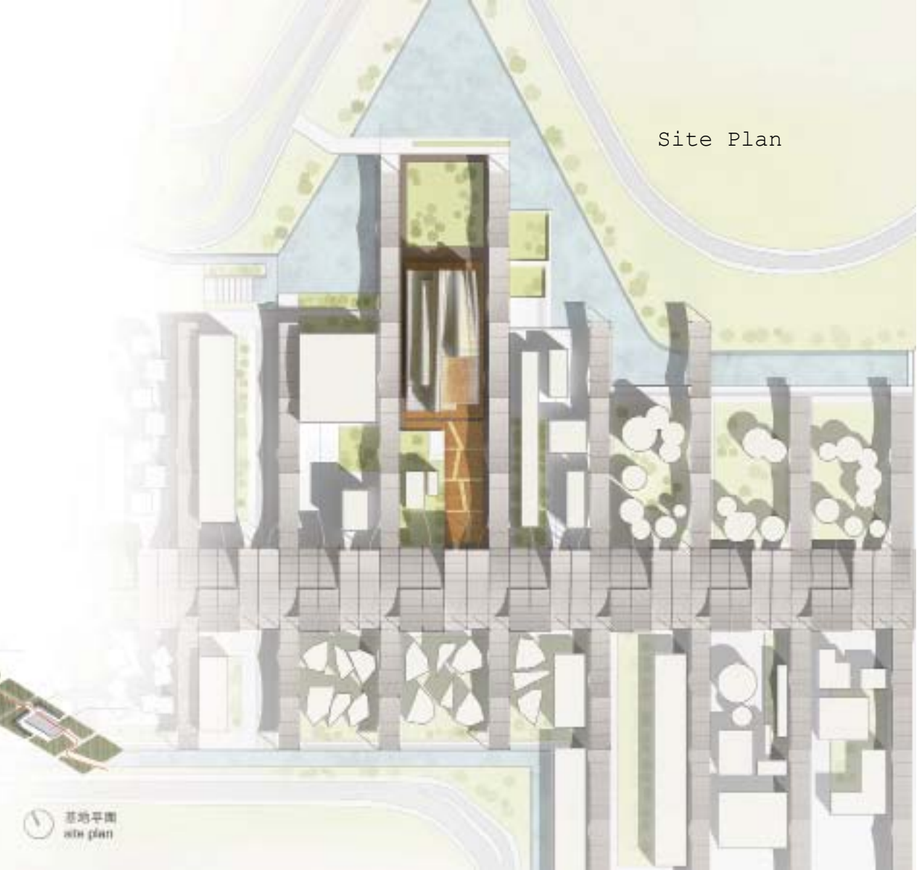
This is a prime example of the importance of developing a strong circulation pattern as well as the effectiveness of the material selection and the impact it can have.

China Pavilion

Architect.....Studio Link-Arc
Location.....Milan, Italy
Completion Date...2015
Size.....4,000 sqm



Floor Plans



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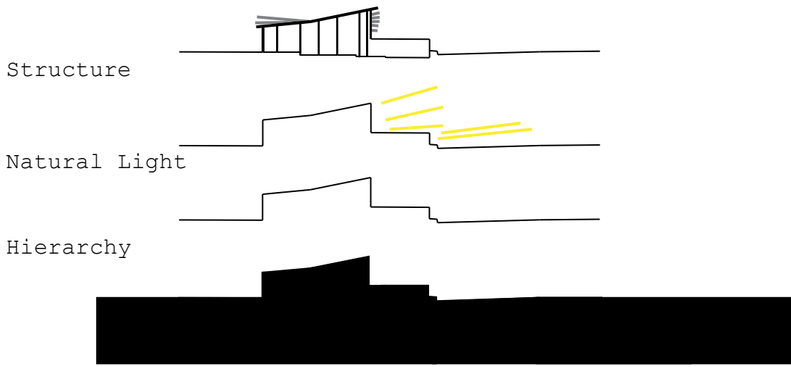
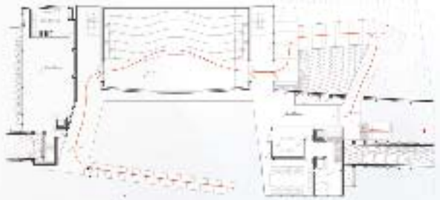
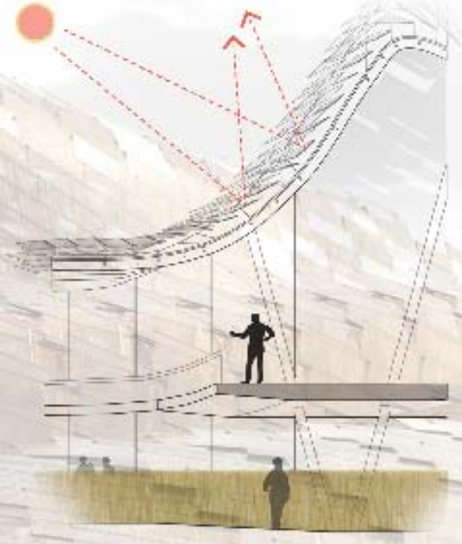


Circulation A

Circulation B





Detail A

Program:

Designed as a cloud hovering over a “field of hope”, the pavilion is experienced as a sheltered public plaza beneath a floating roof that incorporates the building’s cultural and exhibition programs. The roof’s distinctive profile creates an iconic image for the project and will foster a unique presence within the Expo grounds.

The Pavilion’s floating roof is designed as a timber structure that references the “raised-beam” system found in traditional Chinese architecture, but is adapted to accommodate modern construction technology. The roof is clad in shingled panels that reference traditional Chinese terra-cotta roof construction, but are reinterpreted as large bamboo panels that reduce structural weight, create a shaded public space below, and further enhance the Pavilion’s unique silhouette.

Summary:

The China Pavilion, is an in-depth look at a complex structural system that invokes a specific feeling in its users and it seeks to embody this idea of the “land of hope”. The solution also pays homage to China’s agrarian past through modern technology and its use of LED light to simulate a wheat field.

A major design element is the progression of space and how this progression helps to convey the theme of the project and help to unify the project as one clear message. The Pavilion’s full exhibition and cultural offerings are experienced as a sequence of spaces, beginning with an exterior waiting area in the landscape, leading to a themed exhibition space with interactive installations and cultural offerings from forty Chinese provinces. After this, visitors are guided up a gently sloped public stair to a panoramic viewing platform above the LED matrix installation, after which they are guided into a multimedia space, which will feature a short film focused on returning home for the Spring Festival. This sequence concludes with visitors stepping outside onto a platform above the bamboo roof that enjoys expansive views of the Expo grounds.

Again I found a project that employees circulation as one of its major design factors, I believe this will be a very important piece to my personal design solution, as well as the use of a powerful structural system.

Summary

Throughout the preliminary design phases, I felt it was very important to take some time to look into some case studies to examine spatial arrangement, circulation, and other building practices. I chose three vastly different projects to study and I feel that each one brings something very unique to my studies. Even though each project is uniquely their own, there are however some common themes; each of these projects puts a great of value on the methods of circulation, high quality design and a great response to the site that they will inhabitate.

The Salt Lake Public Safety Building, focused immensely on the life of the building and ensuring that it not only met the requirements but also exceeded them. Along with the life of the building, a great deal of effort was put into thinking about how the building would actually impact the environment and also how the environment would impact the building.

The Police Headquarter Building, brought up interesting points on circulation and how it should relate to the public and private sides of a building. It also showed that even though there is that distinction we can still have a fully connected building.

The China Pavilion, looked at a different side of circulation, where rather than taking a systematic approach to how the users move this project looked at how the circulation and spatial progression could invoke its vision and ultimately strengthen the vision.

Each one of these three design instances will be a great help in moving forward through this design process. The uniqueness of each will help to give me direction in seeking my own focal points to my thesis solution.

Historical Context

Seattle started from very humble beginnings, of Native Americans inhabiting its lands for over 4,000 years before the European settlers began laying claim to the land in the late 1700's. The Denny Party, was enitially the first party to actually settle the area (although others had been through) and they settled on the present day site of Pioneer Square calling the settlement "Duwamps". Then in the mid 1800's the settlement was renamed after Chief Sealth (Seattle), leader of the Duwamish and Suquamish tribes.

In the late 1800's Seattle was established as the "timber town" of the NorthWest, and so began the repeating economic cycle of boom/bust throughout the area. The next of the booms to come through Seattle was at the end of the 1800's during the Klondike gold rush that would establish Seattle as one of the largest port cities.

Then in the early 20th century, during WWI, a major shipbuilding boom hit Seattle and the next world war would bring the establishment of major aircraft manufacturing (Boeing) to the area. Finally more recently Seattle has been a major hub for the technology sector, with companies such as Microsoft, Amazon.com, Nintendo, and major cell phone companies.

Seattle is now a major tourist destination; home to many professional sports teams, the EMP museum, Seattle Space Needle, and of course the Pike Place Market. Along with its many urban activities Seattle is home to a great number of outdoor activities; such as fly fishing, rafting, skiing, hiking, and they also have a pretty big paragliding community.

The natural environment has been very important to the culture and people of Seattle and they hold it in high esteem. Their local governments have established strict building and environmental laws to help preserve the land for future generations.

Seattle appreciates energy efficient and resilient design, they have even created their own energy code that meet very strict regulations that are very much so in accordance with the LEED standards.

Questions

How does this project relate to similar projects undertaken throughout history?

We have always tried to protect our societies, no matter what time period we were in or what our cultural background, security has always been one of the biggest issues. This project is centered around providing security for a region and a city, in hopes of inspiring other cities to do the same.

How does this project relate to social trends or developments within our society?

There has been a great deal of discusion lately in our societies on the topic of "sustainable design" and I think the idea of resiliency is the next big thing in sustainable design. Resiliency has the goal of creating the proper life-cycle of a building rather than just building it for the here and now.

What is the physical and social context within which your project is set?

Seattle is a very forward thinking environment, especially when it comes to design. The people of this city value good design, and they expect it to be energy efficient and they also want it to be beautiful.

Major Project Elements

Office Space
Office space shall be utilized by various emergency response teams, as well as other city entities.

Dispatch
Specific dispatch areas shall be integrated with the offices to allow for a state-of-the-art communication hub in the building.

Gallery Space
Gallery Space shall be established as a heritage area to showcase the regions culture, and it times of need can be easily converted into strategic disaster relief areas.

Parking
On-site parking will be provided for the primary users of the building

Auditorium
The proposal shall house an auditorium for city as well as public use, and shall be in times of need be easily converted into strategic disaster relief areas.

Landscaping/Park
Will offer the users a chance to engage nature on a daily basis and work as a retreat of the office life.

Pier
Will work in unison with the previously stated outdoor area but it will also allow the users a chance to more personally engage the surrounding water front.

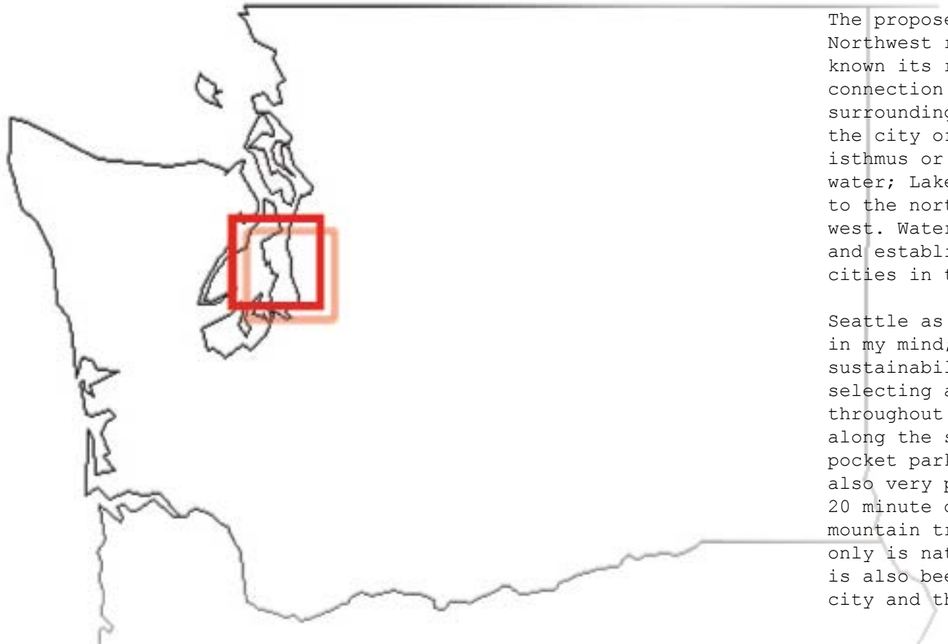
User/Client Description

The primary user of this space shall be city and other small entity employees. The secondary user will be the public that chose to engage the space. The last set of user would be the citizens of Seattle and the disaster relief workers that would utilize the space in the case of emergency.

Site Information

Seattle, Washington
King County
Engaging the Water

Site Analysis



The proposed site is located in the Pacific Northwest region of the United States, it is known its rain and clouds, mountain, and its connection to the Pacific Ocean and the surrounding landscape. Within that region lies the city of Seattle which is situated on an isthmus or peninsula surrounded on three sides by water; Lake Washington to the east, Lake Union to the north, and Elliott Bay/Puget Sound to the west. Water plays a major role in the cities life and establishes it as one of the largest port cities in the U.S.

Seattle as a city seems to emphasize three things in my mind; nature, technology, and sustainability which was a huge draw when selecting a site. Nature is kept present throughout the city whether its the massive trees along the streets, the rooftop gardens, or the pocket parks spread around the city. Nature is also very present around the city, within a 15-20 minute drive you can be making your way up a mountain trail or out for a horseback ride. Not only is nature held high in a physical sense it is also been upheld in the laws and codes in the city and the surrounding county.

Technology has been a huge part of the economic development of the city and surrounding area with technology based companies such as Amazon, Boeing, and Microsoft all calling the area home. Sustainability is very important to not only the people that call Seattle home but also the government, and they have actually gone as far as creating their own standards of building which emphasize sustainability as a tenant of design.

The last factor is the seismic nature of this area, with major faults running across the western edges of the city and its vulnerability due to the surrounding water and its areas of potentially liquid soil Seattle is a prime area for a major earthquake event.

It is the hope of this proposal to capitalize on the benefits of this region while creating a solution to deal with the potentially harmful nature of the area.

Project Emphasis

Introduction

This thesis will emphasize the study necessary connections needed in the event of a natural disaster and also the resiliency of a building.

Connection

Studying the connections needed by those people in an area affected by a natural disaster is the main focus of this thesis proposal. The specific connections will be various, from connecting them to loved ones and family members, to establishing a streamlined approach to disaster relief and so on. This will be a matter of logistics and urban planning and analysis of research to create an appropriate design solution.

Resiliency

We are a culture of now, we want everything quick and easy and we usually pay the price by settling for products that are cheap, the idea of resiliency is creating a product that will last. I intend to focus on creating a resilient solution through in depth research of building materials, structural systems, seismic design and sustainable practices. Through the incorporation of each of these aspects of research I believe I can achieve my vision of resiliency and it is my hope to become an inspiration for future investigation.

Thesis Goals

Academic

Over the past five years I have built a vast variety of knowledge through not only the academic study of architecture here at NDSU, but also through living. Life is a great teacher and if you let yourself be open to perceive the world it will teach you maybe things. I hope to utilize all of these tools to accomplish a well rounded and stimulating project that pushes the boundaries and challenges others to consider a new way to view architecture.

Professional

Building on my academic goals I hope to be able to realize a visually appealing and stimulating project that has the power to stand out amongst the rest. I believe that this thesis project will play a vital role in my ever growing professional portfolio.

Personal

To call this project a success personally I will meet the goals from both the academic and professional aspects but I also want to challenge myself to go past the those goals. To do that I will strive to achieve a holistic design solution, and by that I want to fully support any claim that I make to solidify those claims beyond a shadow of a doubt.

Project Justification

JUSTIFICATION

As architects we have a responsibility to create a safe environment for the public to occupy, I think this project will be a way to study how to better help the public engage the built environment and to prioritize aspects that can get overlooked in other projects.

This project will be a great way to showcase the skills I have gained thus far, as well as a way to challenge myself to dig deeper. It will offer the opportunity to investigate new opportunities for holistic building design, with the goal of create a sustainable and resilient solution.

Plan For Proceeding

Introduction

I plan to have more research-orientated design process to begin with to develop a strong foundation and from there I believe the design process will move into an experimental phase (through various mediums) that will continue throughout the project.

Research Direction

The focus of the research will be primarily on seismic-design/structure, sustainability, and psychology of the user.

Design Documentation

Initially documentation will be done through research, model building and sketching which will then morph into a digital documentation.

Design Methodology

This thesis aims for a research and experimental based design method, which will be achieved through:

- Case Studies
- Typological Research
- Structural Examination (Seismic Study)
- Specific Site Analysis
- Psychological Research
- Experimentation
- Play

Schedule/Plan For Proceeding

Project Documentation	120	05.11.2015
Context Analysis	25	02.02.2015
Conceptual Analysis	16	02.02.2015
Spatial Analysis	7	02.09.2015
Context Development	14	03.09.2015
Structural Development	7	03.09.2015
Digital Model Development	100	04.22.2015
Floor Plan Development	20	03.02.2015
Envelope Development	14	03.11.2015
Material Development	7	03.11.2015
Midterm Reviews	7	03.13.2015
Project Revisions	30	04.22.2015
Rendering	21	04.22.2015
Presentation Layout	7	04.22.2015
Plotting	7	04.22.2015
Exhibit Install	4	04.27.2015
Thesis Exhibit	20	05.15.2015
Final Thesis Reviews	8	05.07.2015
Final Thesis Documentation	2	05.11.2015
Commencement	1	05.16.2015

Thesis Schedule

Site Analysis

SITE INVESTIGATION

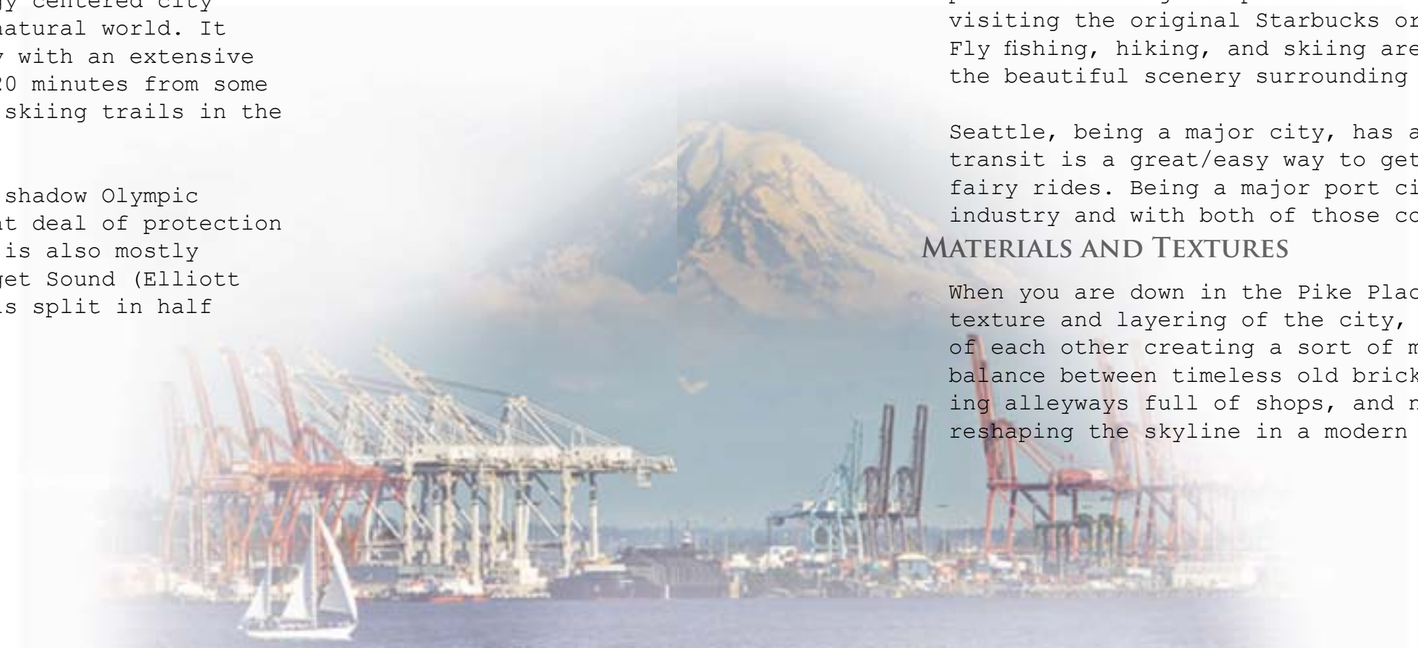
Site Narrative

Seattle, Washington

Site Character

Seattle offers an amazing juxtaposition between; a vibrant, modern and technology centered city and pure scenic beauty of the natural world. It is a bustling and populate city with an extensive metropolatane network that is 20 minutes from some of the best hiking, biking and skiing trails in the country.

Seattle is located in the rain shadow Olympic Mountains, which creates a great deal of protection from extreme climates. Seattle is also mostly surrounded by water, mainly Puget Sound (Elliott Bay), Lake Washington, and it is split in half (on the North) by Lake Union.



Features and Utilities

Seattle offers something for everyone; great restaurants, unique craft shops, some of the best coffee in the world, and it is also home to the famous Pike Place Market. The Marketplace offers locals the chance to purchase fresh grown produce from local farmers, and the tourists love visiting the original Starbucks or watching the fish get tossed around. Fly fishing, hiking, and skiing are all great ways to get out and enjoy the beautiful scenery surrounding the city.

Seattle, being a major city, has all the standard utilities, the public transit is a great/easy way to get around the city, and nothing beats the fairy rides. Being a major port city shipping and fishing are a huge industry and with both of those comes boats, of course.

Materials and Textures

When you are down in the Pike Place Market you get a great sense for the texture and layering of the city, the buildings seem to be stacked on top of each other creating a sort of massive stairway. There is also a great balance between timeless old brick buildings, that create very interesting alleyways full of shops, and new steel and glass structures that are reshaping the skyline in a modern way.

Grids

As you can see from this map from 1908 Seattle was set up on a major grid system that is, for the most part, orientated north/south. Although the grid becomes a bit skewed once the city encounters the main ports. The interstates of i-90 and i-5 create the major axis of the city and are reinforced by the secondary roads.

Water

Water played an essential role in shaping Seattle as a city and also established it as one of the largest ports in the United States. The main waterways are Puget (Elliott Bay) to the West (which connects to the Pacific Ocean), Lake Washington to the East, Lake Union to the North, and Duwamish Waterway and the Green River that cut through the Southern portion of the city.

Wind

Seattle is relatively protected by the wind, it is actually on the lower side of the spectrum when comparing to other U.S. cities. The little wind that Seattle does get comes typically from the west, whether that's the northwest or southwest, direction of the wind is also based on which side of the city you are on.

Light Quality

Natural light quality in Seattle is not the most optimal, being the cloudiest city in the U.S. sunlight is a rare thing, especially during the winter months. The city remains gray most of the year, but the cities lights play interesting games at night, especially if viewing them from the water, on the front of a fairy.

Geometric Relationships

The geometry of the site is very linear, running North to South, in plan. There is some differentiation in the grade of the sight, with a few gradual slopes. Towards the center of the site the trees clear a bit and there is also some walking paths near by.

Shade and Shadow

The majority of the site is heavily wooded which creates some great shadows when the sun decides to pop out, the trees also create a great sense of intimacy. The clearing towards the middle allows for a bit more light to enter and be utilized potentially.

Distress

The site is mostly free from distress, it is a very natural and overgrown area. No major signs of erosion or dying/dead trees. It is a very inviting site.

Vehicular Traffic

Most of the vehicular traffic is only present through the close proximity to i-90, which is less than a mile from the site. The immediate traffic is along Lake Washington Boulevard, which is not a major road so not much vehicular traffic engages this area.

Pedestrian Traffic

The majority of the traffic near or on this site is due to pedestrian traffic. The site is located near mostly residential areas and there are also a few walking/biking paths that run through the site.

Vegetation

Vegetation is a major feature of this site, it is heavily wooded towards the perimeter, also some shrubbery and plenty of grass. Directly across the street is also full of vegetation, which leads straight to Lake Washington.

HUMAN CHARACTERISTICS

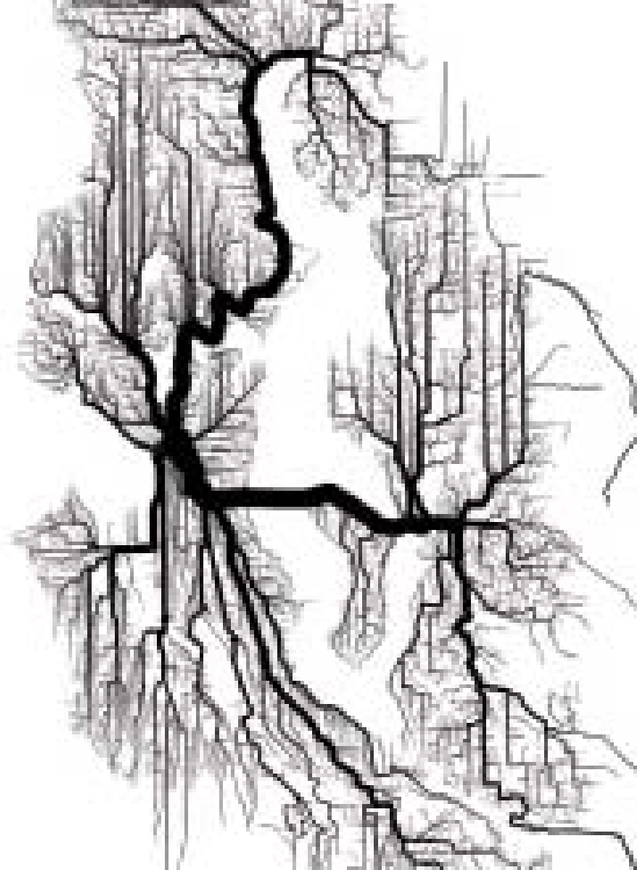
Most of the vehicular traffic is only present through the close proximity to i-90, which is less than a mile from the site. The immediate traffic is along Lake Washington Boulevard, which is not a major road so not much vehicular traffic engages this area.

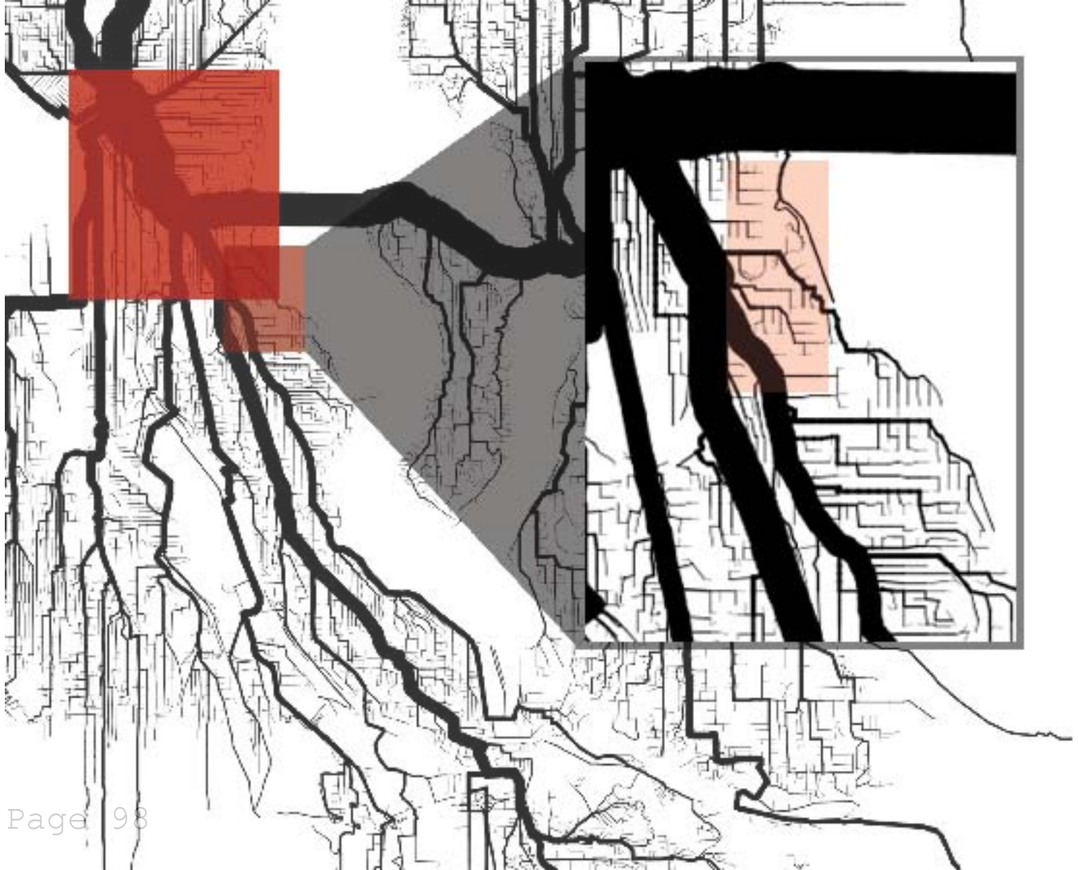
PARKING

Seattle is a vibrant city with 650,000 people in the immediate area and another 3 million people in the surrounding metropolitan area. The city is also a major tourist hub that welcomes nearly 9 million people in each year.

Patterns

Noise and Traffic Patterns



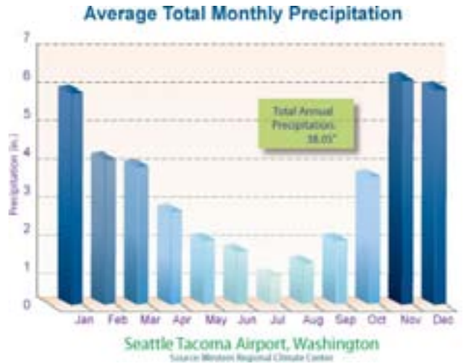


Busy DownTown

Busy Residential/Park

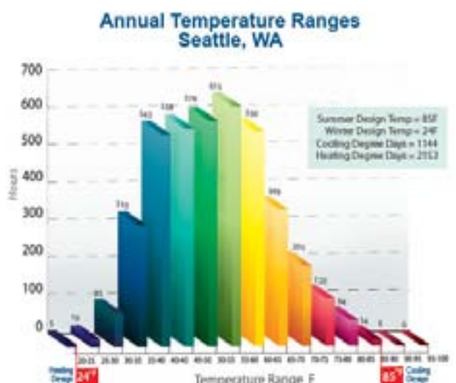
Heavy Pedestrian Traffic

Climate Data



Precipitation

Seattle is one of the top ten rainiest cities throughout its winter months but then dries out significantly and in July and August it falls to an average of 1.6 inches in both months combined.

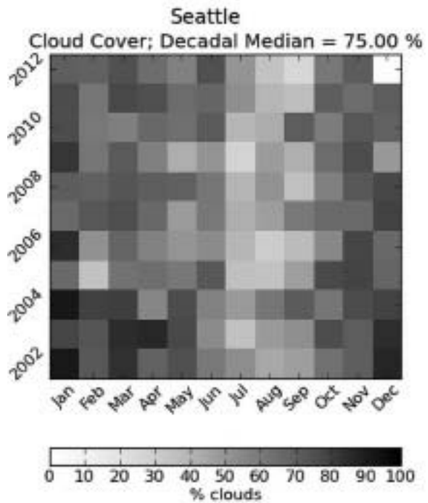


Temperature

Seattle’s climate stays pretty mild throughout the entire year, yet it still receives all four seasons. Through the winter months the city stays pretty cool and wet with temperatures in the 40-50’s °F, only 28 days a year does the low drop below the freezing mark. Summer time stays pretty consistent from 70-80s °F, only 3 days does the temperature exceed 90 °F.

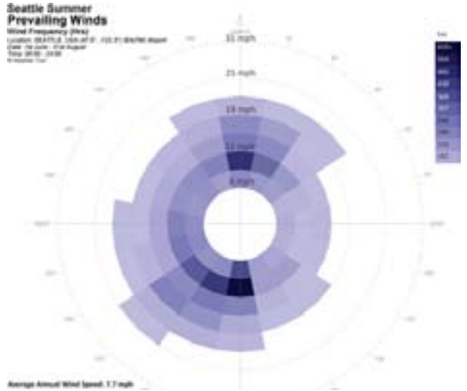
Cloud Cover

Seattle tops the list of cloudiest city in the United States, with a total of 226 (heavy) cloud days which is equal to 62% of its days, and 308 total cloud days (including partly cloudy) which is equal to 84% of its days. Seattle's climate is considered oceanic or temperate marine, the swing of temperatures are very mild although it does experience all four seasons. Seattle is located in the rain shadow of the Olympic Mountains, which confuses people into thinking that it is the rainiest city in the country. It does sit close to the top of the list but in reality it is usually rainy through the winter and then dries out through the summer months. Seattle gets its rainy reputation mostly from its constant and consistent cloud cover.



Wind Rose

A wind rose gives detailed information about wind directions and frequency for a year or portion of a year. This can be vital information when investigating the use of wind as a power source or especially when considering natural ventilation techniques. The radial bars show the percentage of time that wind blows from each direction for various ranges of speeds. Seattle is in a very protected region and usually sits at the lower end of the average wind speed spectrum (about 5-6 mph).

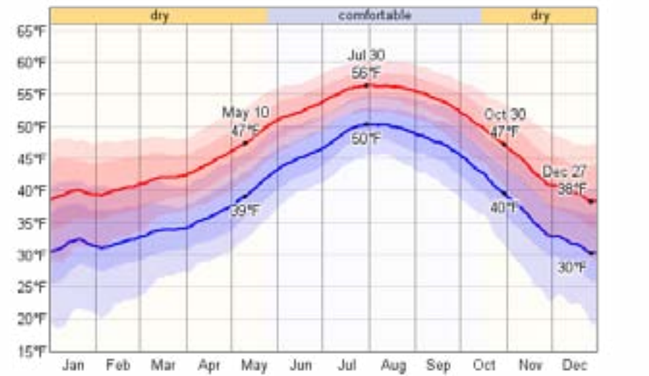


Incident Solar Radiation

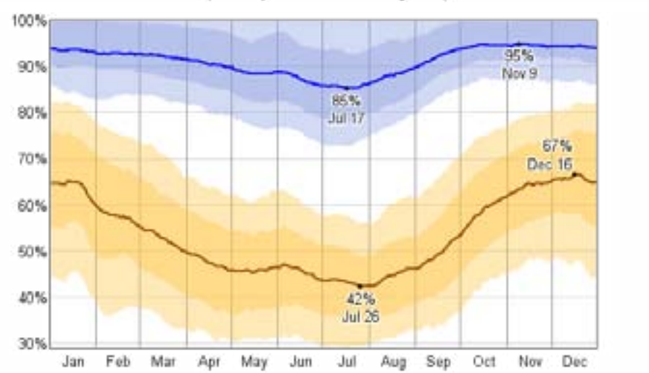
Incident Solar Radiation is the total amount of solar energy that reaches the Earth's surface at a certain location. This measurement is a great indication of the potential power production of a site with the implementation of photovoltaic systems. Seattle happens to be on the lower end of the spectrum when it comes to incident solar radiation averages in the U.S. due to its typically cloudy days.

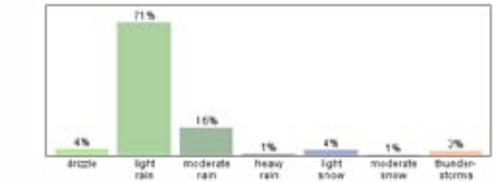
Other Graphs

Dew Point

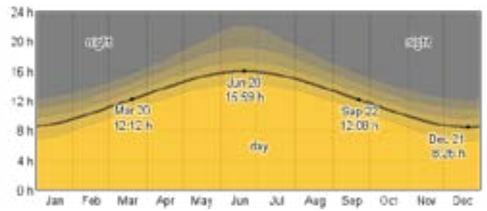


Relative Humidity

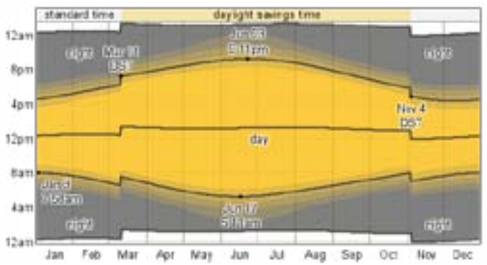




Type of Percipitation

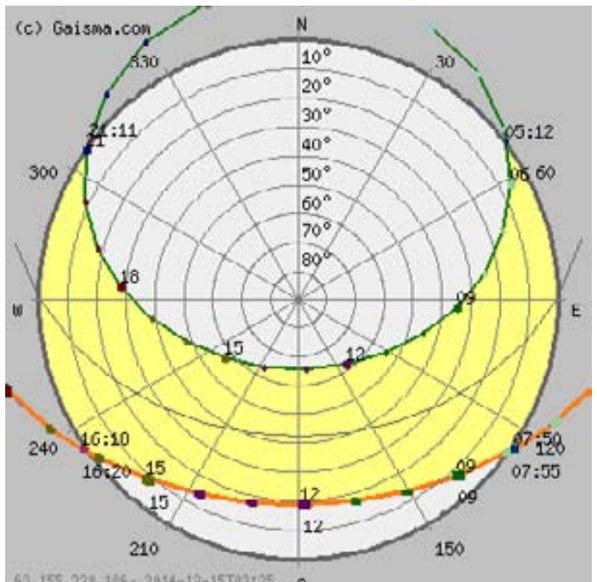


Daily Hours of Daylight and Twilight



Daily Sunrise and Sunset

Sun Path


(c) Gaisma.com
N
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120
150
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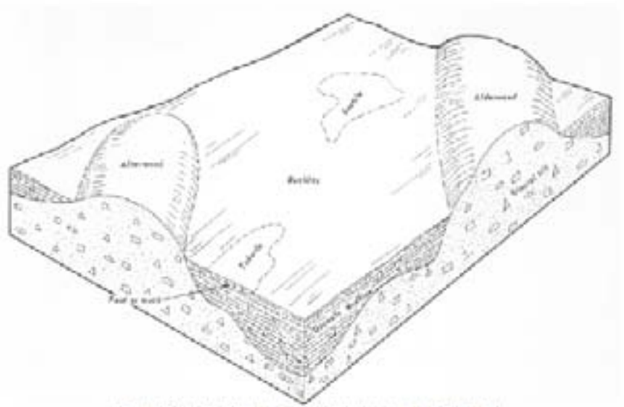
12
09



Soil Analysis

Buckley-Alderwood Association

Poorly drained and moderately well drained, nearly level to rolling soils that have dense, slowly permeable and very slowly permeable glacial till at a depth of 20 to 40inches; on glacial till plains and uplands.

This association is on glacial till plains and uplands in the southeastern part of the survey area. It is about 60 percent Buckley soils and 35 percent Alderwood soils (fig. 3). The rest is soils of minor extent.

This association occupies about 7 percent of the survey area. Buckley soils are nearly level, poorly drained silt loams and gravelly loams. They have a very dense substratum.

Alderwood soils are undulating to rolling, moderately well drained gravelly sandy loams. Their substratum is consolidated glacial till.

Among the minor soils are level, poorly drained peat and muck soils of the Seattle, Tukwila, and Shalcar series and moderately steep Beausite soils that have bedrock at a depth of 20 to 40 inches. Most of the farms on this association are dairy farms. Seasonal wetness and gravelly soils are the main limitations for row crops.

Residential development on this association is of moderate extent and has been mostly on Alderwood soils. Alderwood soils have moderate limitations for homesites, and Buckley soils have severe limitations. Both have severe limitations for septic tank filter fields. Seattle, Shalcar, and Tukwila soils have severe limitations for homesites and septic tank filter fields.

Views and Vistas

South

North

East

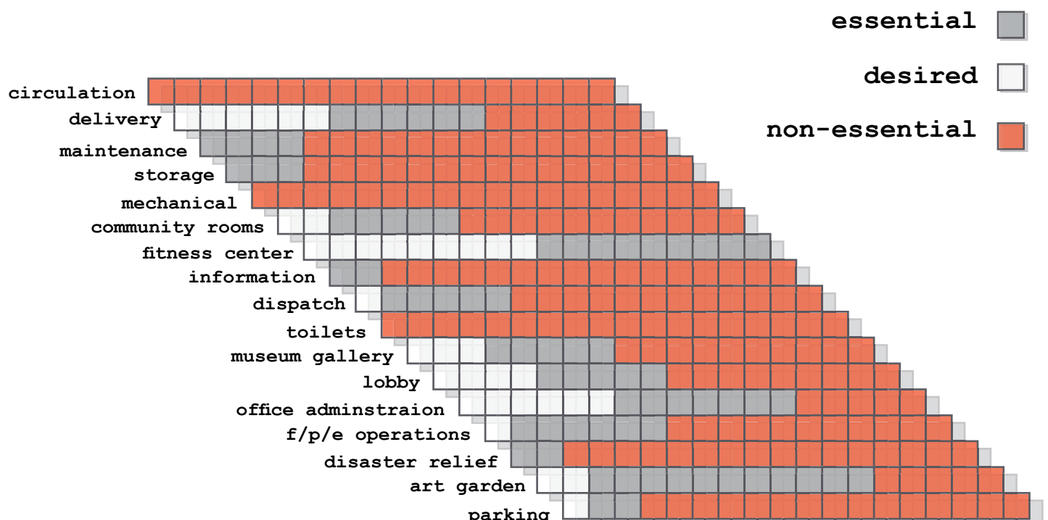
West

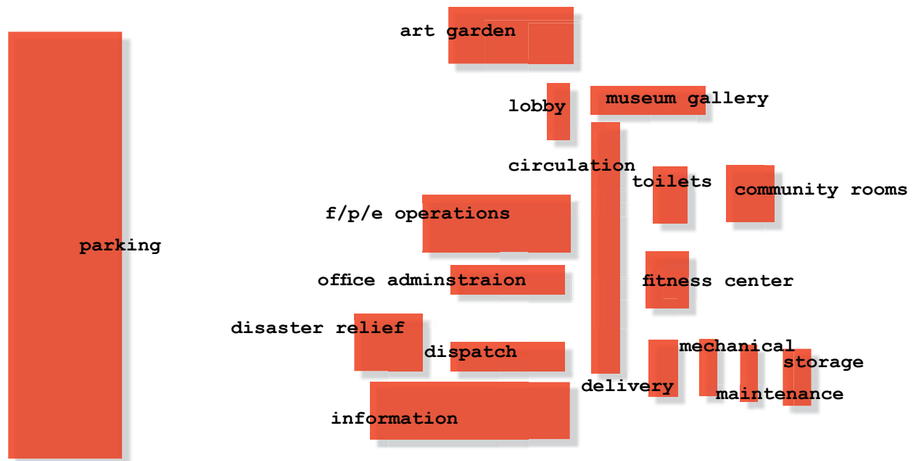
Topography

Latitude: 47.6097° - N Longitude: 122.3331° W - Elevation: 182 ft

Space Allocation

INTERACTION NET & MATRIX





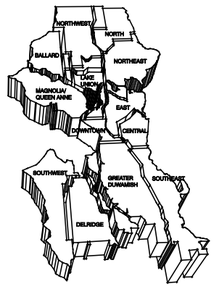
Spaces

Mechanical.....1,000 sq/ft
Maintenance.....1,000 sq/ft
Storage.....2,000 sq/ft
Circulation (15 percent).....,000 sq/ft
Toilets.....8000 sq/ft
Delivery.....200 sq/ft
Lobby.....4,000 sq/ft
Museum/Gallery.....4,000 sq/ft
Community Rooms.....4,000 sq/ft
Office/Administration.....2,000 sq/ft
Dispatch Center.....10,000 sq/ft
Information Center/Record Keeping.....10,000 sq/ft
Communication/Disaster Relief.....Adapted space
Disaster Housing (indoor/outdoor).....No Space Allocated
Fire/Police/Emergency Operations.....10,000 sq/ft

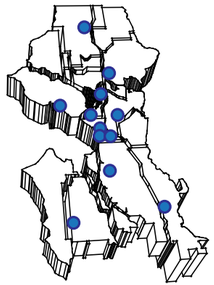
Programed Area.....30,000 sq/ft
Public Plaza/Art Garden (outdoor).....10,000 sq/ft
Parking.....10,000 sq/ft
Total Area.....50,000 sq/ft

The Work

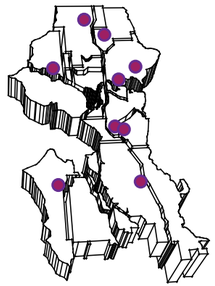
PROCESS INVOLVED IN DESIGN WORK.



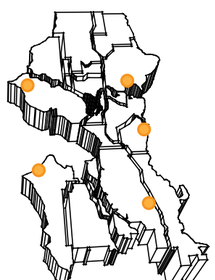
DISTRICS



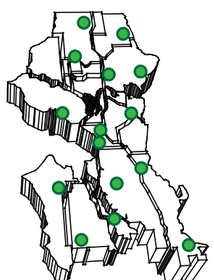
POLICE STATIONS



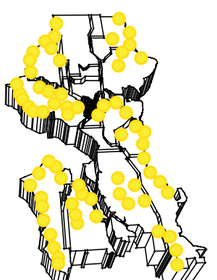
HOSPITALS



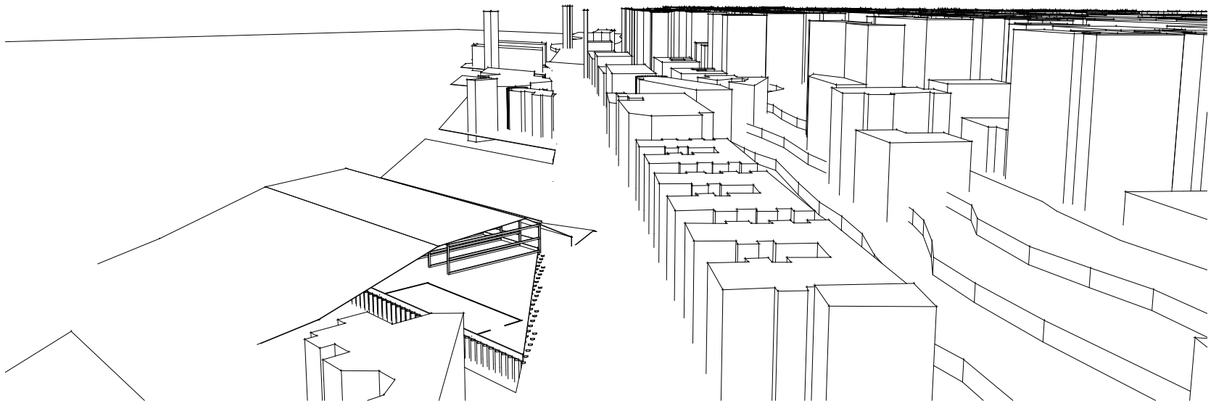
POP-UP SITES



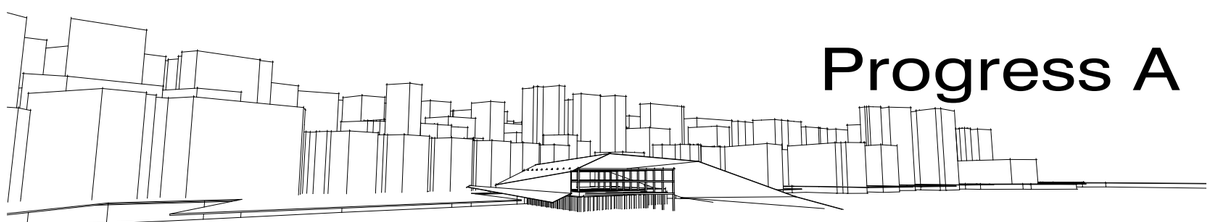
FIRE STATIONS



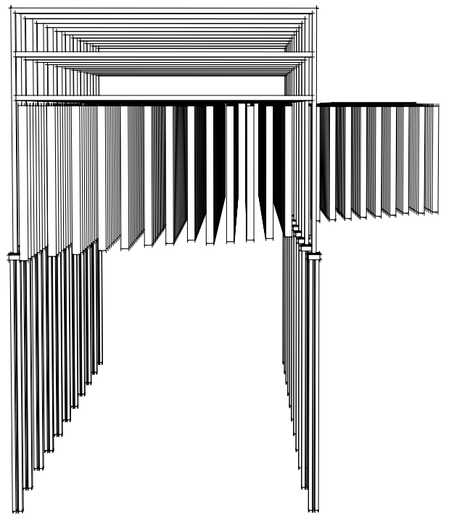
LANDSLIDE ZONES

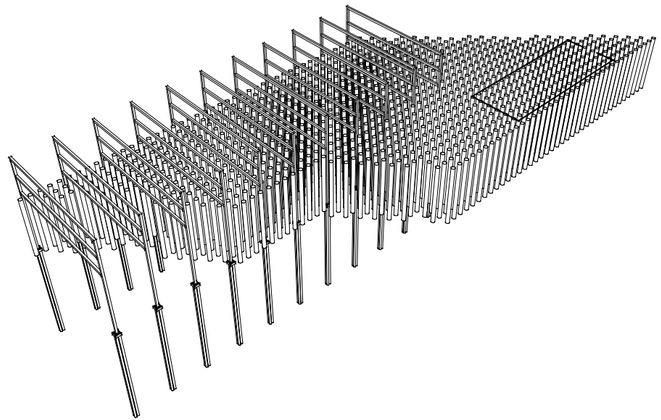


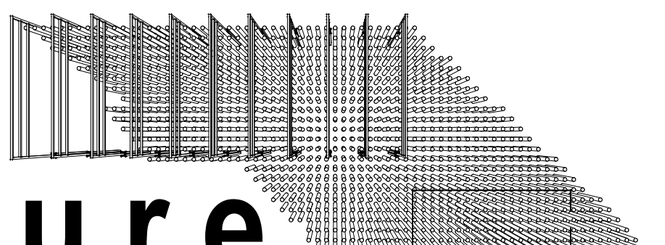
Progress B



Progress A



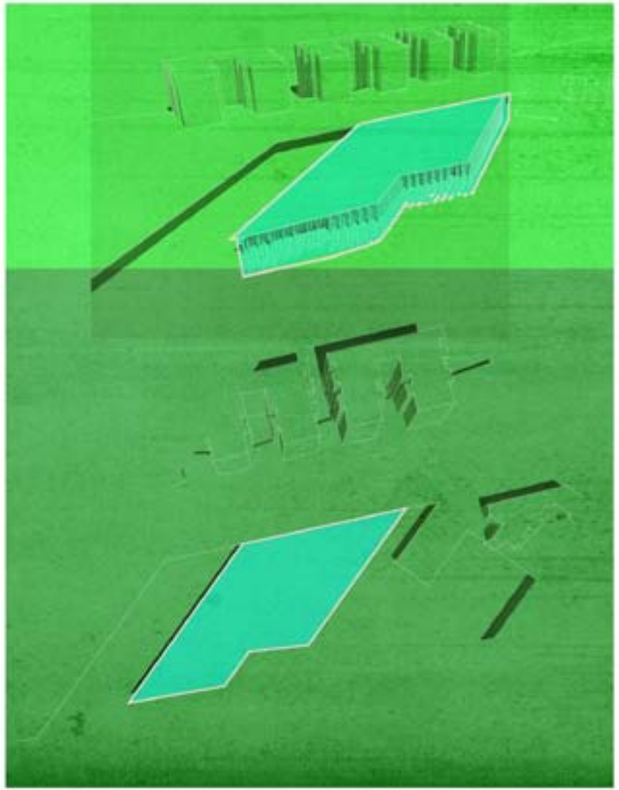
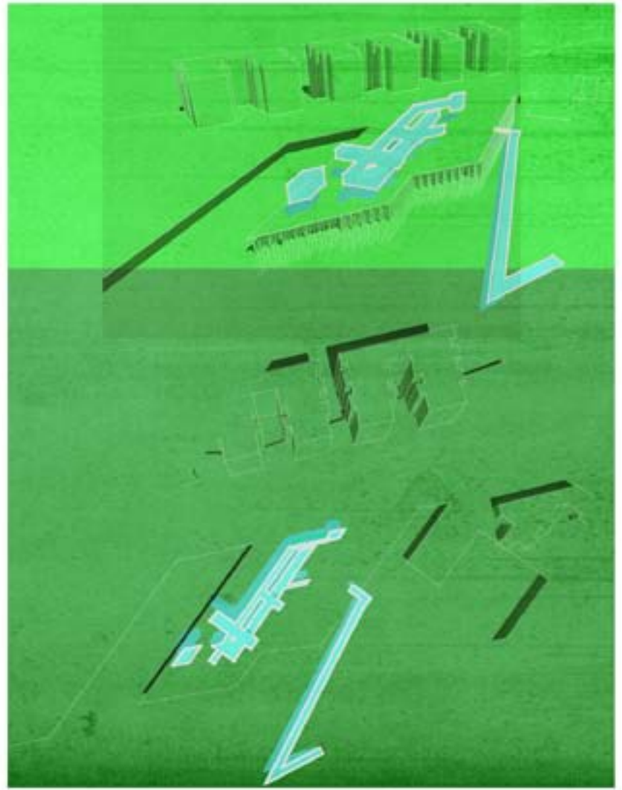
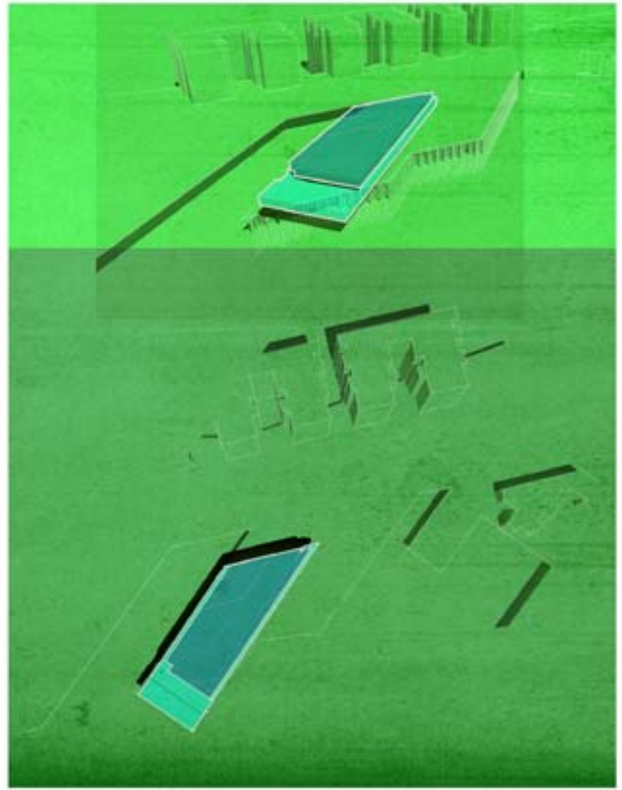
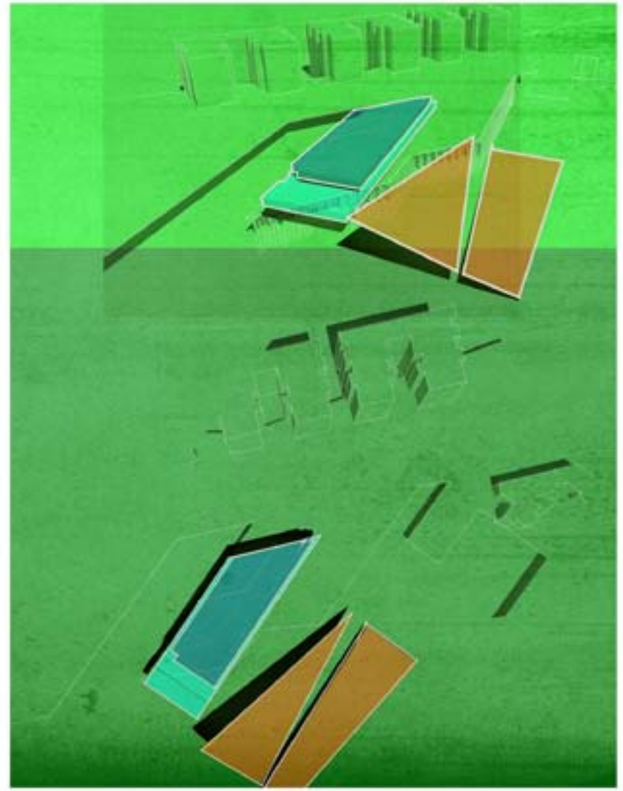


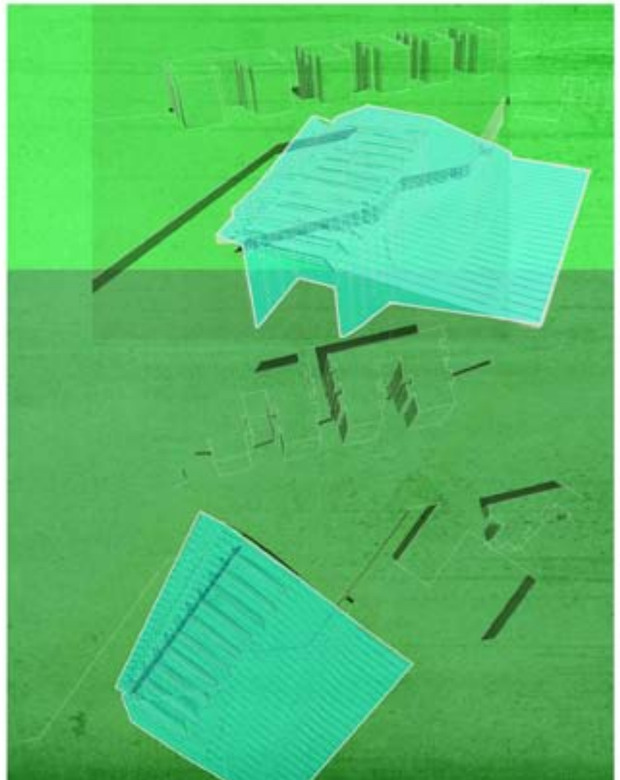


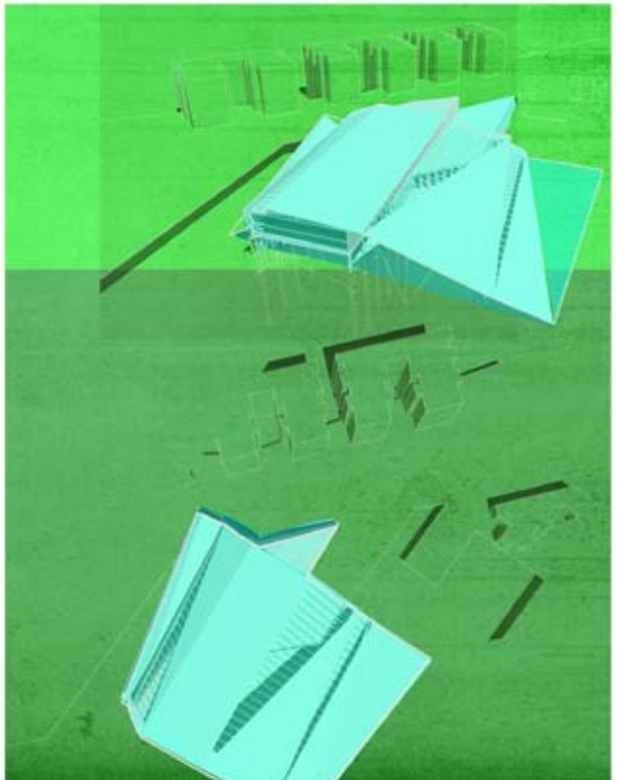
structure

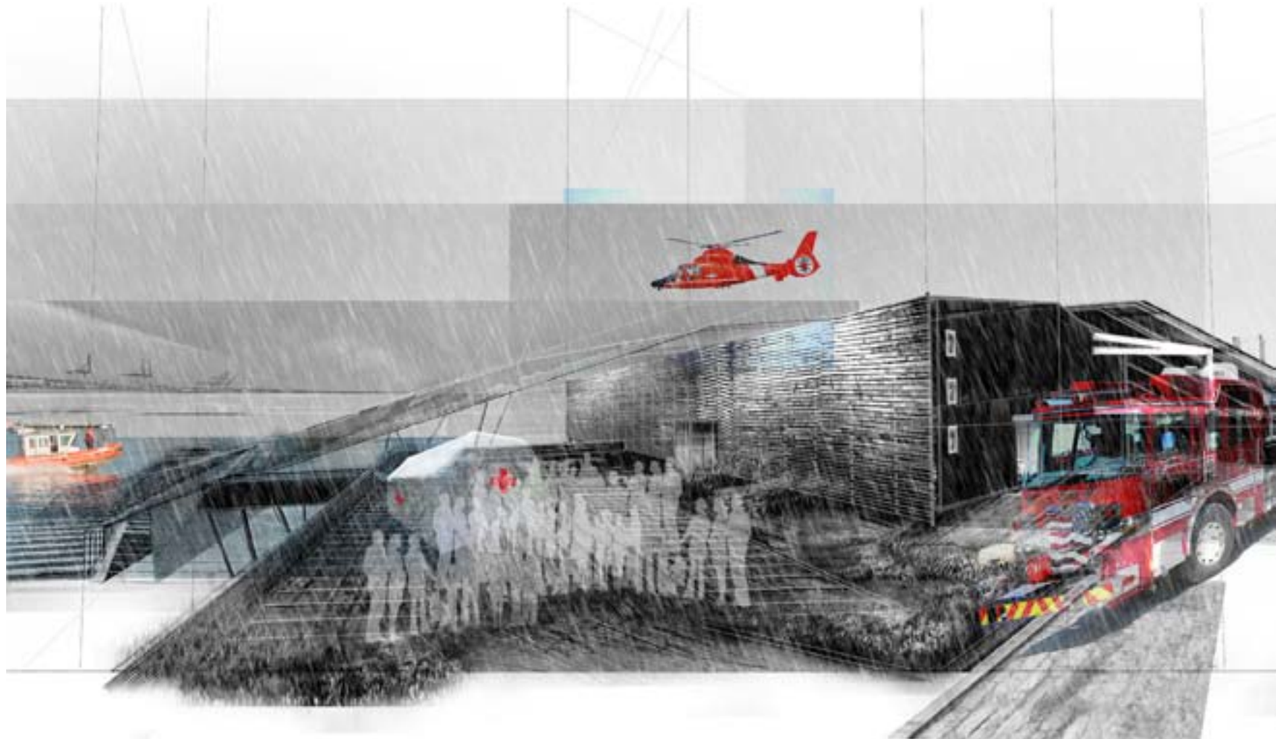
The Presentation

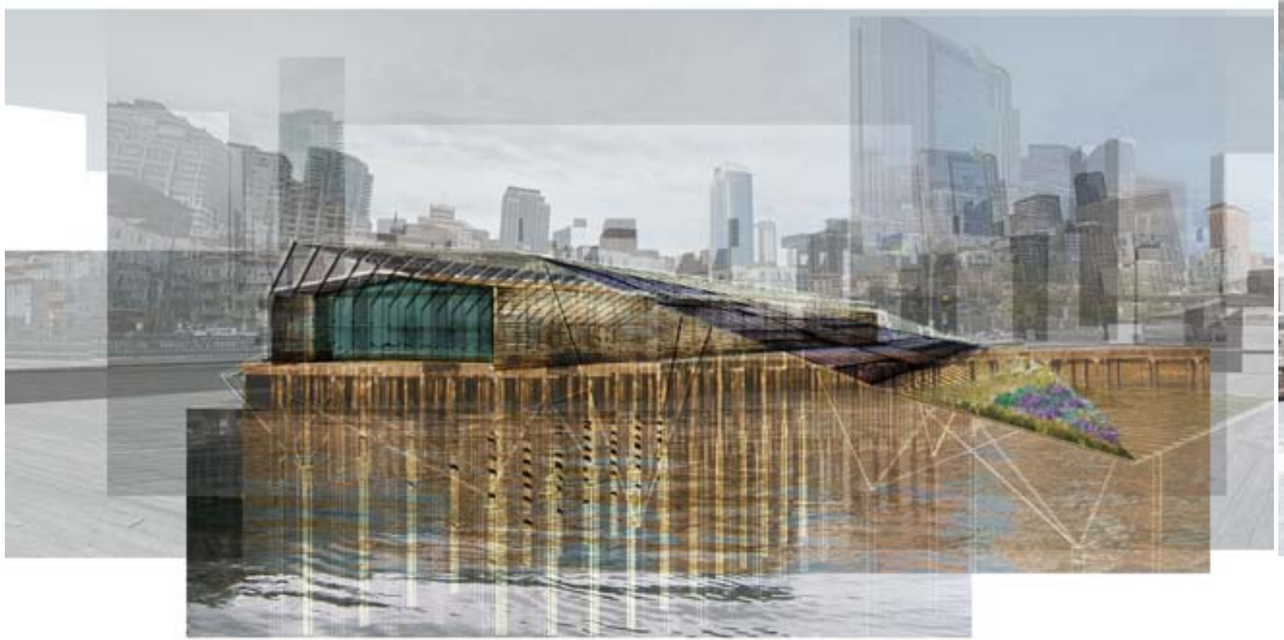
THE BOARDS AND PRESENTATION DOCUMENTS

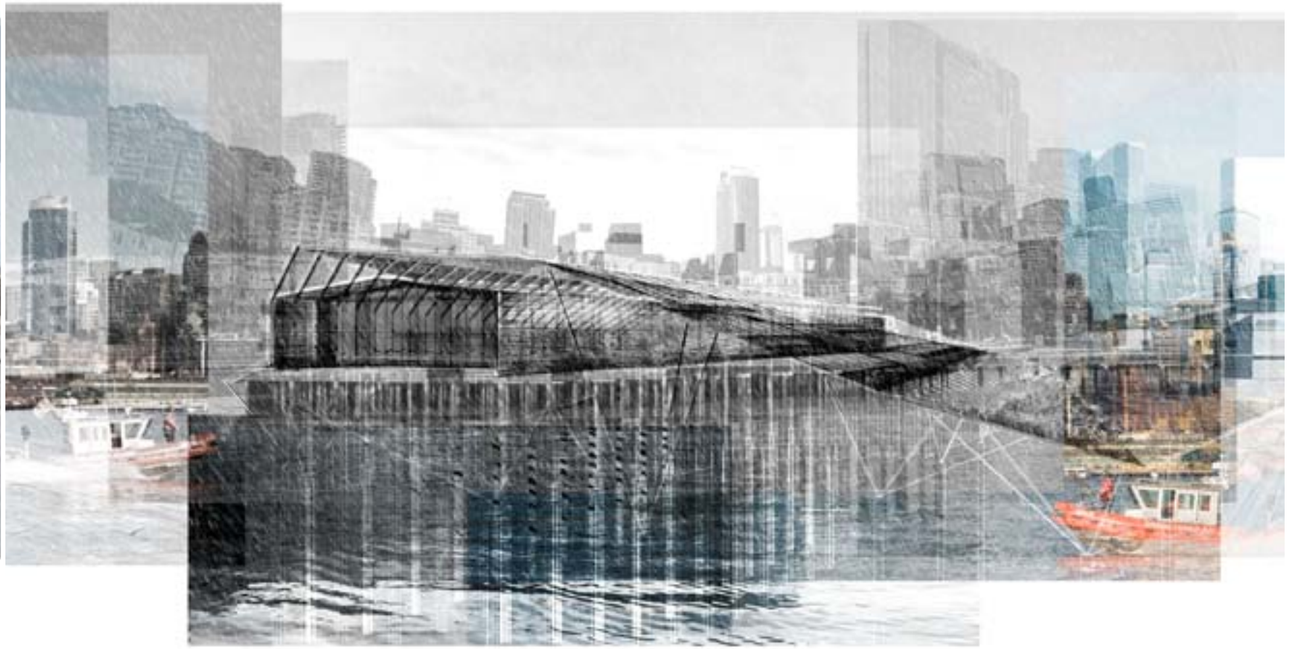





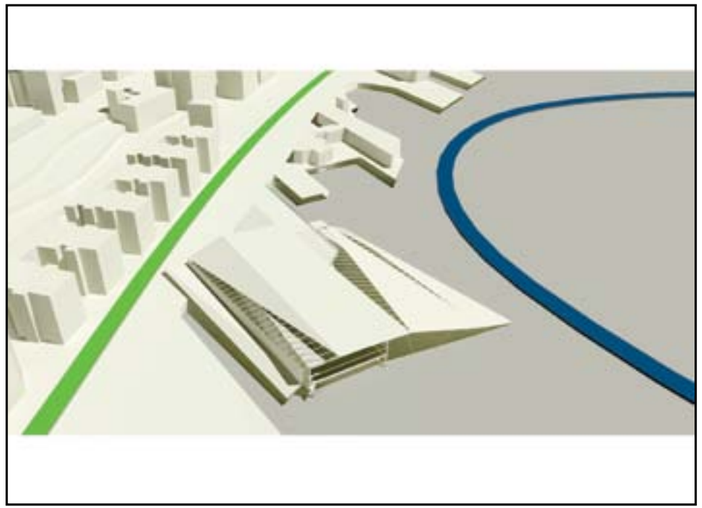


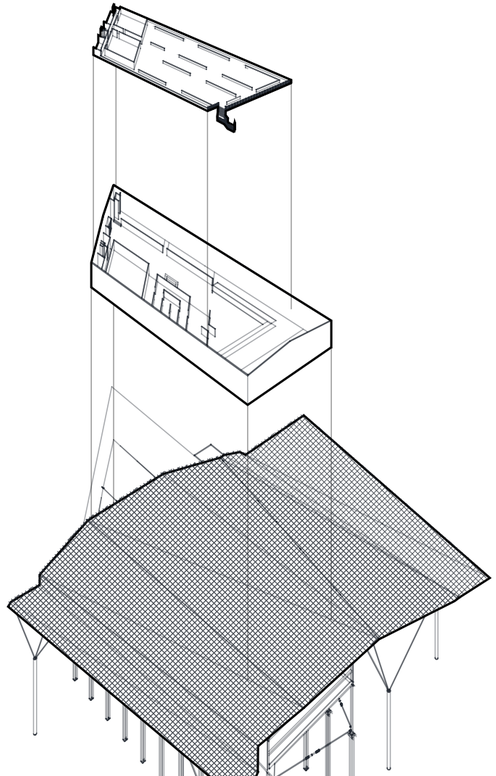


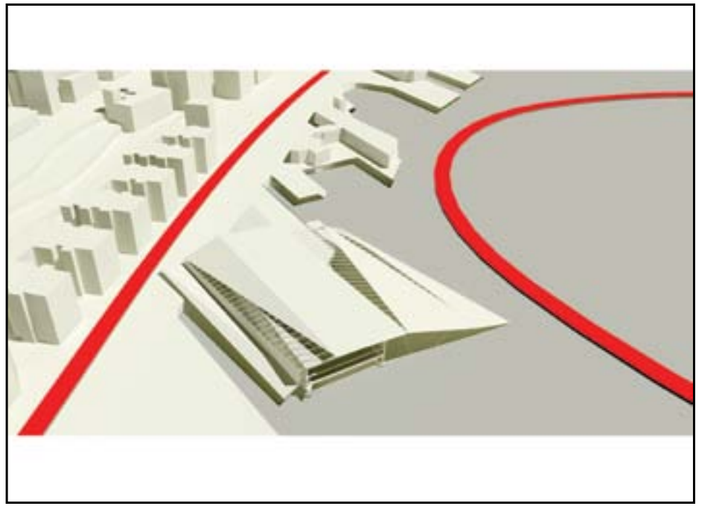


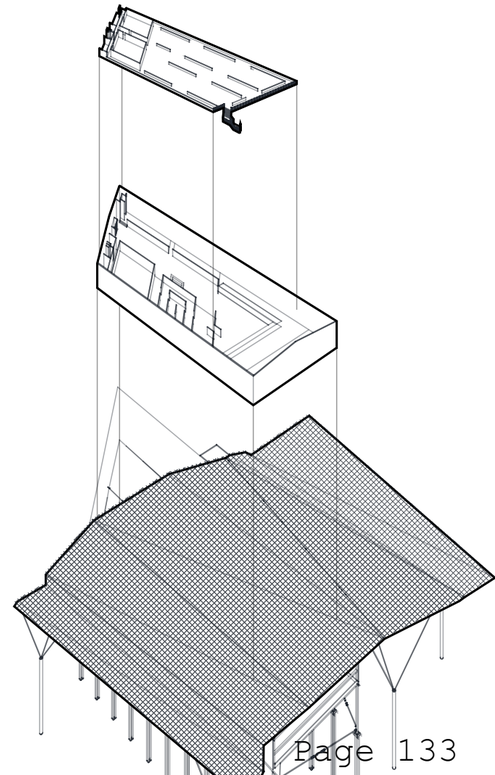


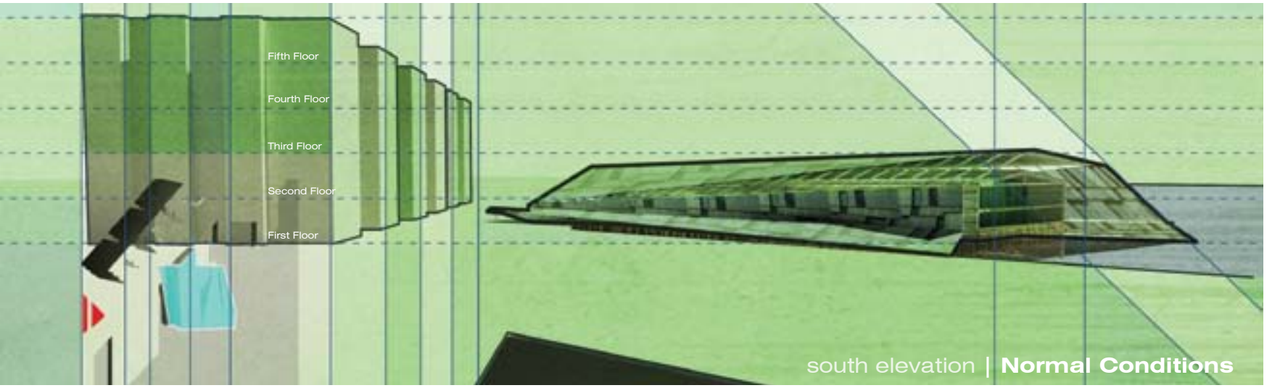




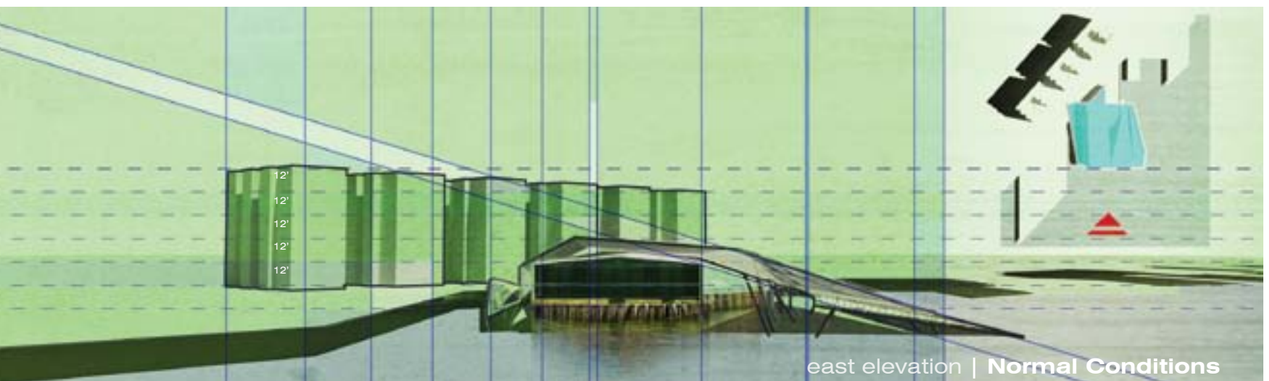




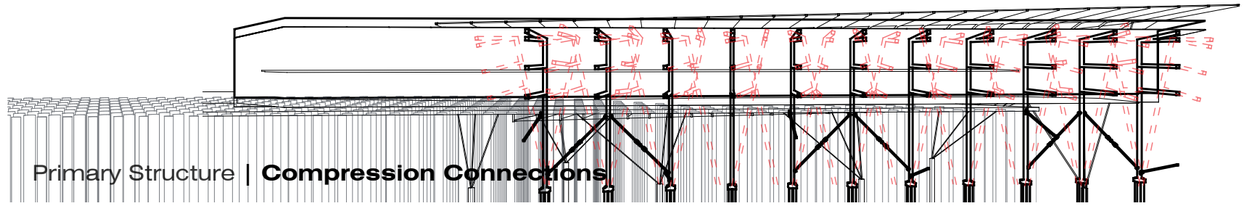




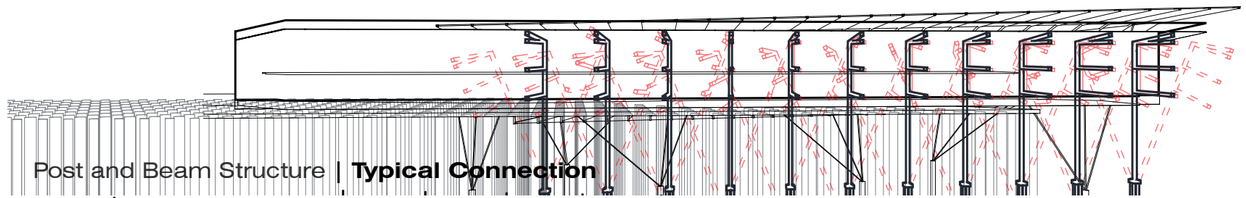
south elevation | **Normal Conditions**



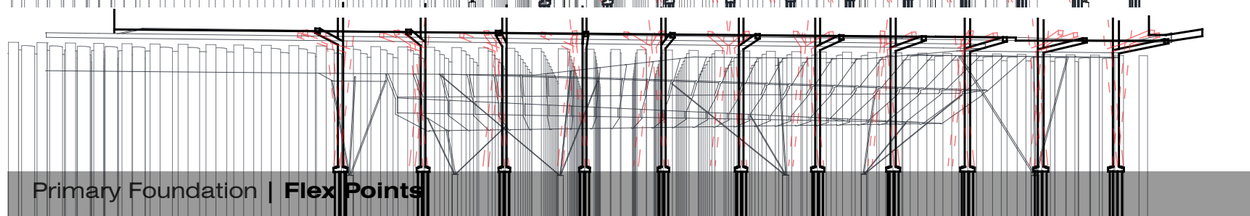
east elevation | **Normal Conditions**



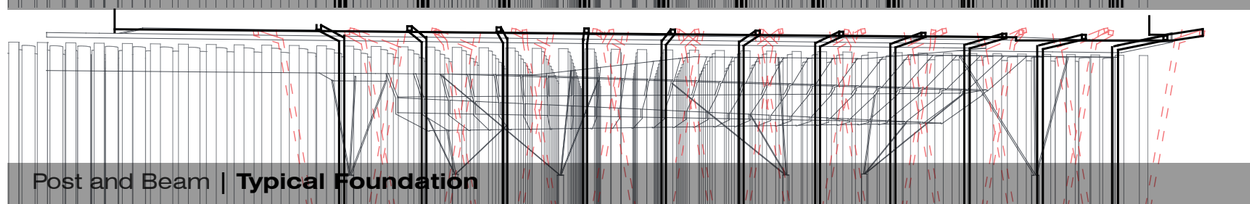
Primary Structure | **Compression Connections**



Post and Beam Structure | **Typical Connection**



Primary Foundation | **Flex Points**



Post and Beam | **Typical Foundation**

Program Appendix

Relevant Links

http://blog.ted.com/2012/08/14/hit-by-a-natural-disaster-the-first-6-things-to-do-for-your-communitys-relief-effort/

http://www.microsoft.com/about/corporatecitizenship/en-us/serving-communities/disaster-and-humanitarian-response/

file:///C:/Users/Noah/Downloads/Microsoft%20Disaster%20Response%20Brochure%20Pamphlet.pdf

http://www.resilientdesign.org/new-public-safety-building-in-salt-lake-city-a-model-of-resilience/

http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/washington/WA633/0/wa633_text.pdf

http://www.pae-engineers.com/sdc_articles/2012/06/climate-considerations-in-sustainable-design/

Thesis Appendix

References

"Police Headquarters in Logroño / Matos-Castillo Arquitectos" 09 Mar 2014. ArchDaily. Accessed 22 Oct 2014. <http://www.archdaily.com/?p=483259>

Rosenfield, Karissa. "Milan Expo 2015: Tsinghua University with Studio Link-Arc to Design China Pavilion" 08 Mar 2014. ArchDaily. Accessed 22 Oct 2014. <http://www.archdaily.com/?p=484524>

Wilson, A. (2014, June 30). New Public Safety Building in Salt Lake City a Model of Resilience. Retrieved October 23, 2014, from http://www.resilientdesign.org/new-public-safety-building-in-salt-lake-city-a-model-of-resilience/

Welcome to Salt Lake City - The Official City Government Website. (n.d.). Retrieved October 23, 2014, from http://www.mocamanage.com/slcweb/

Previous Studio Work

2nd Year (2011-2012)

Fall 2011-Professor Joan Vorderbruggen
Tea House: Ceremonial Japanese tea house, that responded to a specific site near downtown Fargo, ND. The Importance of substance, finding meaning in
a project.

Spring 2012-Professor Darryl Booker
Dance Studio: Design centered around the idea of incorporating the styles and movements of hip-hop dance into a built product.
Dwelling: Craft a personal dwelling unit as part of a sustainable community located in Marfa, TX. The Uniqueness of each project.

3rd Year (2012-2013)

Fall 2012-Professor Steve Martens
YMCA Camp Cormorant Gathering Center: Design of a camp gathering/reception area that can be utilized through four seasons, located on Cormorant Lake, MN.
Delightful Undertakings: Design of a mortuary chapel located in Hawley, MN. How a building goes together and the impact it can have on people's lives.

Spring 2013-Professor David Crutchfield
Galactic Hotel: Unique hotel development created as a part of the Virgin Galactic, commercial space flight center located in Las Cruces, New Mexico.
Chicago Folk-Art Museum: Design challenge to
establish the home of the new Chicago Folk Art Museum located in Chicago, IL. Branching out and experiencing things that we haven't.

4th Year (2013-2014)

Fall 2013-Professor Don Faulkner
High Rise: Creation of an efficient, additive, and beautiful tall building in the SOMA district of San Francisco, CA. Universal design and thinking big along with team collaboration.

Spring 2014-Professor Don Faulkner
Fargo Redevelopment/Marvin Windows Competition: Part one of the studio was to analysis the city of Fargo, ND and propose a redevelopment plan for the city. Part two of this studio was to finalize our design proposal and submit to the Marvin Windows Design Competition. My design
received an honorable mention being number 4 out of 25. Looking at architecture as a social influence and how it can impact more than the built environment.

5th Year (2014-2015)

Fall 2014-Professor Mike Christenson
House 1000 People: This design studio focuses on the explosion of growth in the western part of North Dakota due to the oil boom and how as
architects we respond to the boom. We are
challenged to find the appropriate way to house 1000 new residents in cities throughout the western half of the state. How the culture and economic environment impacts architecture and how architecture can impact it.

Personal Identification

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"Inspiration is for amateurs… All the best ideas come out of the process; they come out of the work itself."
-Chuck Close