Natural Healing:
Physical and Spiritual Healing
(in a Powerful and Nurturing Setting)

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Natural Healing:
Physical and Spiritual Healing
(in a Powerful and Nurturing Setting)

A Design Thesis Submitted to the
Department of Architecture and Landscape Architecture
of North Dakota State University

By

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In Partial Fulfillment of the Requirements
for the Degree of
Master of Architecture

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"Conservation is getting nowhere because it is incompatible with our Abrahamic concept of land. We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."

-Aldo Leopold, *A Sand County Almanac*

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THESIS abstract

This thesis, Natural Healing: Physical and Spiritual Healing (in a Powerful and Nurturing Setting), examines how healing spaces in a clinical setting can influence the healing process of cancer patients undergoing treatment or who have been affected by the disease; providing a solution to incorporate both natural healing spaces and the necessary technological medical infrastructure. Nature and humans are interconnected with one another and should to be treated in a holistic way. The location for this cancer treatment and rehabilitation center is in Knife River, Minnesota, between Duluth and Two Harbors. The intent of this center is to help patients connect with nature to help aid in the healing processes. Nature has long been thought of as a source that can impact our wellbeing. Exposure to nature can not only make people feel better emotionally, but physically as well. Any environment a person is exposed to has the ability to either increase or decrease stress which in turn can impact our bodies. The things we see, hear, or experience can affect our moods and how certain systems in our bodies are working. Nature can also be soothing to people, we tend to find trees, plants, and water captivating which can distract us from physical discomfort. Architecture that incorporates nature can have an impact on its everyday users. Including such spaces, like healing spaces, in our healthcare system can have an influence on patient outcomes.

Figure 2 Image From Site

"Each time I have gone there I have found something new which has opened up great realms of thought and interest. For me it has been a point of discovery and, like all such places of departure, has assumed meaning far beyond the ordinary."

-Sigurd F. Olson, ***Listening Point***

NARRATIVE

Natural Healing:
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Every year, approximately fourteen million people are diagnosed with cancer worldwide. Of these fourteen million people, eight million will die of the disease. The United States alone will account for about 1,600,000 of the people who will be diagnosed and about 590,000 of the people who will lose their battle with cancer. Cancer patients often face difficult decisions, undergo intensive treatments, and deal with emotional distress. This thesis will examine how healing spaces in a clinical setting can influence the healing process of cancer patients undergoing treatment or who have been affected by the disease; providing a solution to incorporate both natural healing spaces and the necessary technological medical infrastructure.

Long throughout history healing spaces have been used as an aid in the healing process, from the temples of ancient Greece to the Japanese Zen Garden. With modern medical technology, the use of healing spaces as a way to help in the healing process has diminished. Hospitals and clinics today don't really give off positive feelings, but rather have the tendency to feel cold, sterile, and are very institutional, which can create a stressful environment for patients.

The environments people are exposed to can either increase or decrease stress, which can have an impact on our bodies. The experience of a patient during a hospital stay can have an effect on the person's healing process, physically, emotionally, and psychologically. The stress of an unpleasant environment can cause a person to feel uneasy, sad, and helpless. These feelings, in turn can elevate a person's heart rate, blood pressure, tension in the muscles, and can impact the immune system (University of Minnesota, 2014).

Research has shown that exposure to nature, by either being outdoors or being able to view nature, can reduce stress, fear, and anger, as it helps increase more pleasant feelings. Research has also proven that patients tend to heal faster if they are provided a view that incorporates some feature of nature. Nature is defined as "the phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations" (Merriam-Webster). In other words, nature is the physical world and everything in it that is not made by people. People have an innate human desire to connect with nature. Providing more natural settings in a healthcare environment could help eliminate stress and aid in the healing process of cancer patients. So why is there such a disconnection between nature and the built environment, and how can this be changed?

The healthcare system in Canada is known for being one of the best in the world. Healthcare settings in Canada try to address our innate human desire to connect with the natural environment and the necessity to still provide technologically advanced medical treatment. At the Peel Regional Cancer Centre in Mississauga, Ontario, patients were asked what their priorities would be for a new facility. The patients responded with: "Our spaces should give us hope." When they were asked about what would give them hope, they replied: "Something that is alive." (Stanwick, 2015).

Today, healthcare facilities are usually designed to be efficient with minimal thought being put into consideration regarding the overall environment and patient experience. This is why I am interested in this type of typology. I want to design a space that will focus on the patients' wellbeing by creating atmospheres that can change the mood of patients in hopes of positively influencing the healing process. Duluth is the perfect place for designing a cancer treatment and rehabilitation center such as this. The shoreline of Lake Superior offers a great opportunity for incorporating natural healing spaces, both indoor and outdoor, for patients and visitors who have been diagnosed or who have been affected by cancer.

Figure 3 Image From Thesis Site

"How many understand that Nature is the essential character of whatever is. It's something you'll find by looking not at, but in, always in. It's always inside the thing, and it makes the outside. And some day, when you get sufficiently proficient in understanding the use of the term, you can tell by the outside pretty much from what's inside."

-Frank Lloyd Wright, *1958*

project TYPOLOGY

The project typology for this thesis project is a healthcare facility. This cancer treatment and rehabilitation center will focus on natural healing spaces that will help promote healing and comfort within patients. The project is most related to a hospital and/or clinic in the healthcare field.

Figure 4 Image From Site

TYPOLOGICAL research

Duke Integrative Medicine - Duke IM

Project Type: Healthcare Facility
Architect: Duda/Paine Architects
Location: Durham, North Carolina
Area: 29,000 Sq. Ft.
Project Completion Year: 2006

Figure 5 Duke Integrative Medicine

Figure 6 Duke Integrative Medicine

Figure 7 Duke Integrative Medicine

Duke Integrative Medicine was the first healthcare facility built specifically for the collective practice of both conventional and alternative medicine in the United States. It is nestled in the woodlands of the Duke Forest and is surrounded by meditation gardens. They offer soothing spaces designed to relax and focus patients' senses as well as revitalize the spirit. The facility aimed for an inviting, nonclinical atmosphere for patients. The Mission of Duke IM is to approach healthcare as a holistic endeavor that embraces the mind, body, and spirit. Integrative medicine is about the relationship between the patient and healthcare provider. It uses the least invasive and most natural therapies, focusing on strengthening patients' innate healing response.

Duke IM offers patients natural healing spaces with the Sarah P. Duke Gardens and through the structure and materiality of the building, focusing more on the wellbeing of patients. Duda/Paine Architects describe it as a "human-centered healthcare design."

The design focused on reducing stress through environmental design in order to improve patient care as well as staff performance. Duda/Paine Architects used "positive distractions" in spaces that tend to cause anxiety. The two main waiting areas at Duke IM try to refocus patients' minds by engaging the senses. In the main waiting area, the hall is lined with a bench that faces towards a water wall and bamboo garden.

Figure 8 Floor Plan

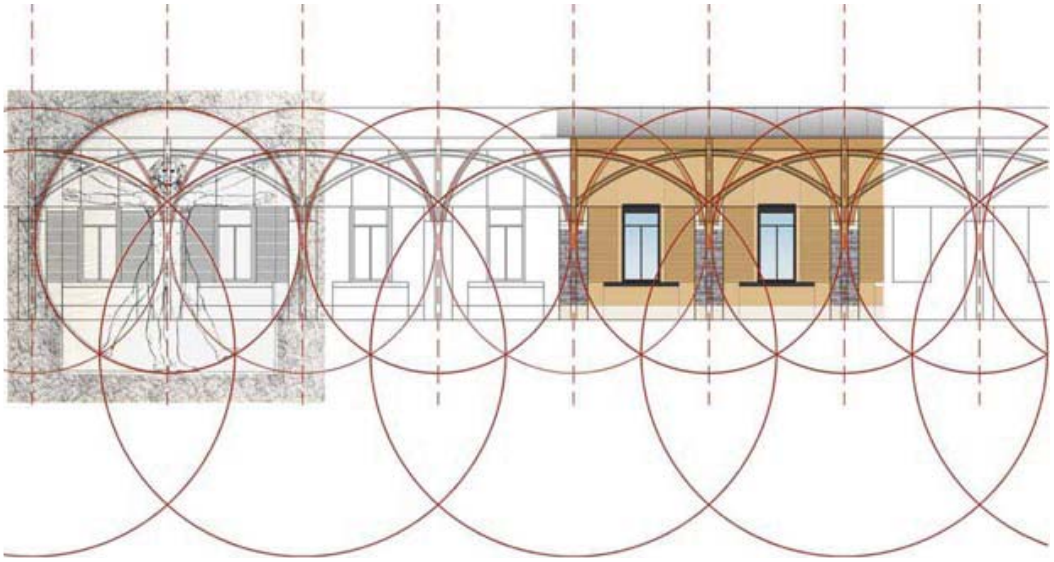


Figure 9 Leonardo da Vinci Inspiration

The building has a Gothic looking style that displays a sense of order with the building's axes and paths that are clearly defined throughout the spaces. Duke IM seems to blend the interior with the exterior creating an integrative approach to healing. There are three primary branches that extrude outward from behind the entry veranda that has a vaulted colonnade. As they reach out toward the Duke Forest, they simultaneously offer nature in with framed views, gardens, and fountains.

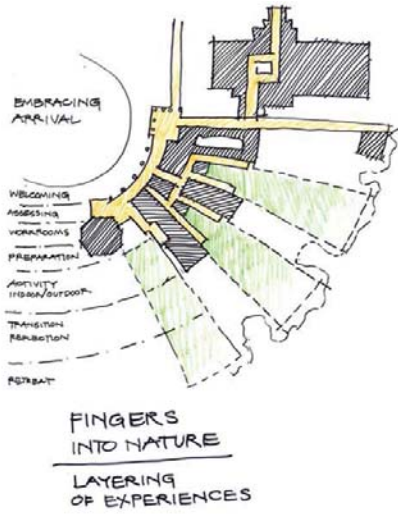


Figure 10 Sketch

Figure 11 Duke Integrative Medicine

Integrating nature in a healthcare facility through the design of the buildings gives the spaces a calming essence. Duba/Paine Architects incorporated nature in their design in a holistic way, creating a warm, relaxing environment for patients. The use of wood that is incorporated throughout the building gives the facility a more natural feel, accentuating the site in which it sits.

Figure 12 Duke Integrative Medicine

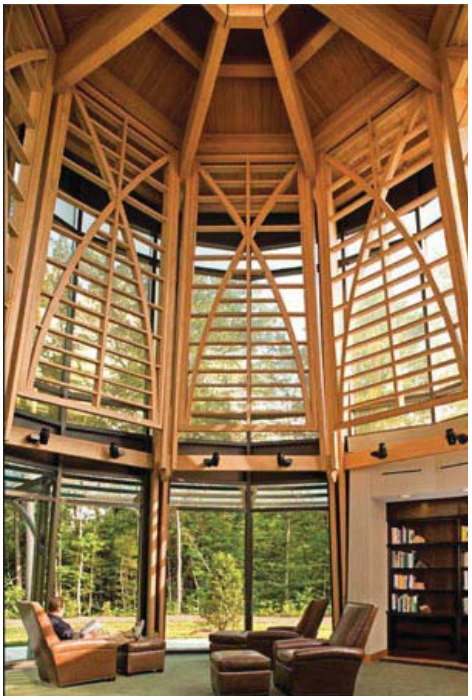


Figure 13 Duke Integrative Medicine

Mott Children's Center

Project Type: Children's Healthcare Facility
Architect: Zimmer Gunsul Frasca Partnership
Location: Puyallup, Washington
Area: 42,000 Sq. Ft.
Project Completion Year: 2000

Figure 14 Mott Children's Center

Figure 15 Mott Children's Center

Figure 16 Mott Children's Center

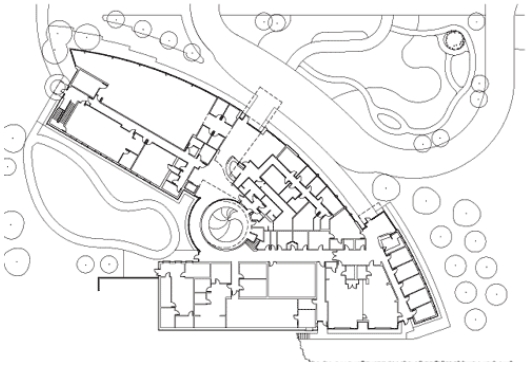


Figure 17 Site Plan

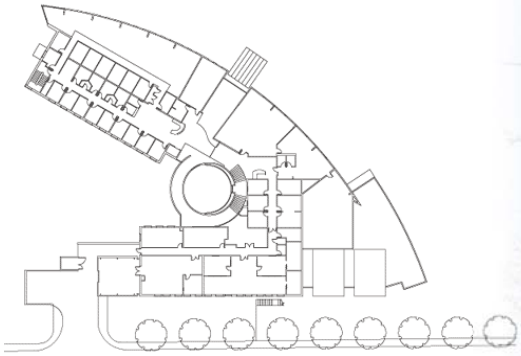


Figure 18 Floor Plan

Previously spread throughout the Food Samaritan Hospital campus, ZGF Architects consolidated the Children's Therapy Unit to a single location. The theme for the building was Noah's Ark, which is echoed throughout the facility. Mott Children's center features refurbished port-holes from a local shipyard, stained glass, and mosaic tile waves. The facility's is meeting therapy needs of infants and children, offering a variety of facilities such as a therapy pool, computer lab, treatment room, smaller private treatment rooms, an aerobics room, a gross-motor skills room, classrooms, exam rooms, a clinical research area, a specialty skills room, and a sensory skills center. Like the Duke IM, the Mott Children's Center is primarily a wood-frame structure and provides multiple outdoor spaces and gardens.

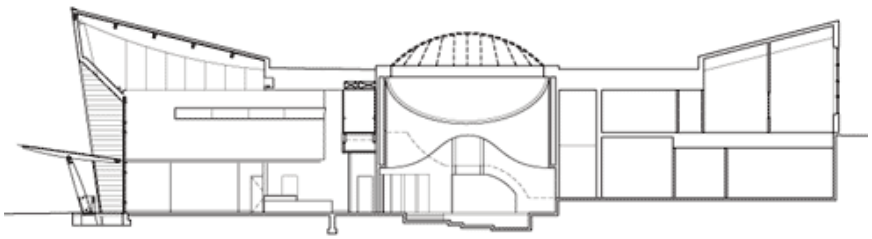


Figure 19 Section

The Mott Children's Center is a family-focused, medically based facility located on a three acre site on the hospital campus. The mission of the center is to help children with special healthcare needs reach their full potential (Olson, 2002). The center was designed to capture the imagination and spirit of both patients and visitors. The metaphor of Noah's Ark is shown through the exposed curved timber and ship form of the building. Horizontal cedar siding wraps around the curved wall plays a major role in creating a non-institutional feel to the center. The site itself was sculpted to imitate waves forming around the ark.

Figure 20 Mott Children's Center

Figure 21 Mott Children's Center

The metaphor of the ark is seen in the interior spaces through ocean themed mosaic walls and the winding circulation. The rehabilitation and therapy spaces features interesting views to the gardens in the front of the building with the slanted glass walls and port-holes. The glass wall gives the space plenty of natural daylight, while also providing shading from the sun by the slanted wall.

This use of materiality in the Mott Children's Center is similar to the Duke IM building in the sense that it gives off a warm, calming essence. They both are very focused on the overall wellbeing of patients. I feel as though that the sculpted landscape designed to imitate waves at the Mott Children's center wasn't really imperative, unlike the Duke IM building that was designed to accentuate the site, this center transformed the landscape to accentuate the building.

Figure 22 Mott Children's Center

Figure 23 Mott Children's Center

Figure 24 Mott Children's Center

Figure 25 Mott Children's Center

North Zealand Hospital

Project Type: Healthcare Facility
Architect: C.F. Møller
Location: Hillered, Denmark
Area: 1,334,725 Sq. Ft.
Project Completion Year: 2020 (Expected)

Figure 26 North Zealand Hospital

Figure 27 North Zealand Hospital

Figure 28 North Zealand Hospital

The North Zealand Hospital was an international design competition that C.F. Møller won first Prize for phase l and was a finalist for phase ll. His design integrates nature with architecture to improve patients' experiences, provide a safe environment for it's users, and a green recreational sanctuary for the citizens of Hillered. The intention was to create a landmark in line with the Frederiksborg Castle that is nearby. The location was important in order to bring people closer to nature inside and outside of the hospital. The facility would feature treatment buildings that include courtyards, gardens and green roofs.

Figure 29 Site Plan

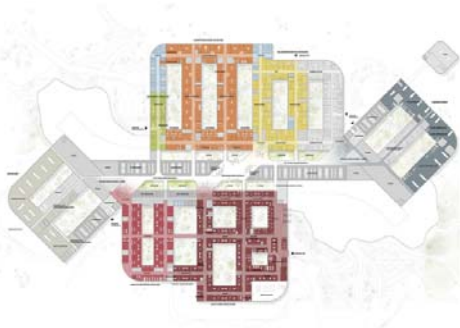


Figure 30 Plan 0 - Treatments Level

Figure 31 Plan 1 - Lobby Level

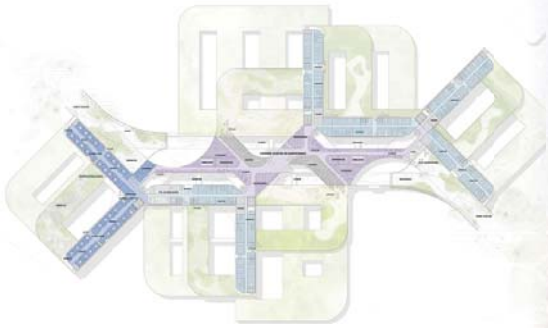


Figure 32 Plan 2 - Upper Lobby Level

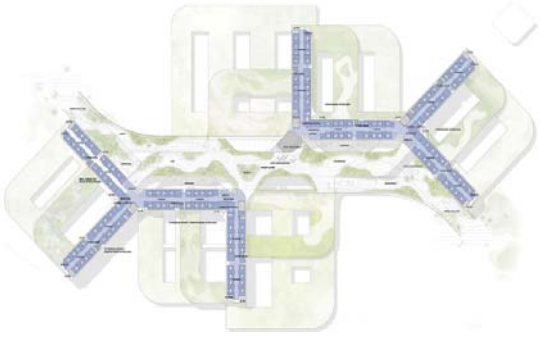


Figure 33 Plan 3 - Green Promenade Level

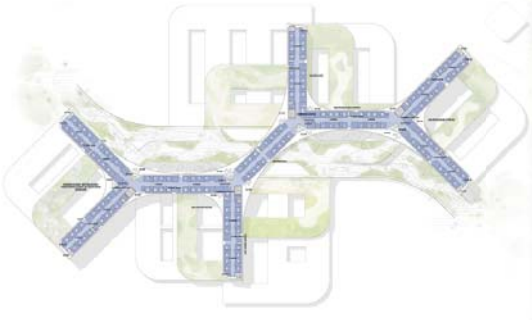


Figure 34 Plan 4-6 - Bed Wards

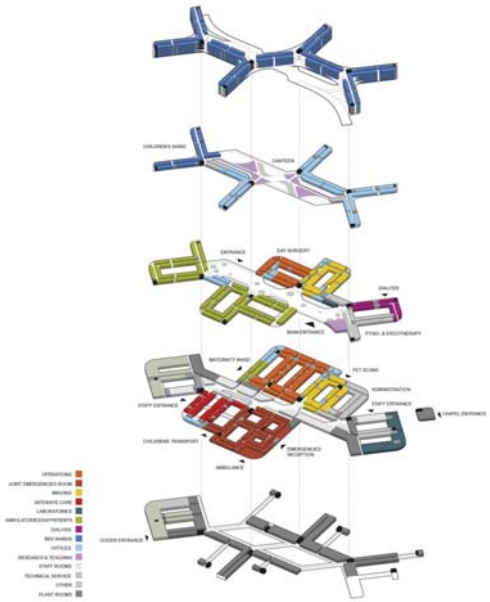


Figure 35 Functions Diagram

The building is divided into two elongated curves that mark the entrances to the building in addition to forming the organization of the units in a sinuous shape. The green promenade runs through the hospital creating a more open and accessible area. This space was designed to be a public space for anyone to come and enjoy the green roof that the promenade leads to without compromising the privacy of patients in the hospital.

The use of materials and textures create an atmosphere that is inviting and relaxing. The layout of the building guarantees functionality for the medical staff and provides efficient circulation for employees, leaving more time for patients.

All patient rooms provide views to the countryside and are designed with materials that make the spaces feel more homely.

Figure 36 North Zealand Hospital

Figure 37 East-West Elevation

Figure 38 North-South Elevation

Figure 39 Cut Away Bed Wards Level

Figure 40 Cut Away Lobby Level

Figure 41 Interior

Figure 42 Interior

Figure 43 Exterior

C.F. Møller's design for the North Zealand Hospital really accentuates the design into the landscape with the organic shape of the building and the outdoor and indoor green spaces, giving the users a natural, stress free environment. Creating such spaces in healthcare facilities like his design could help in a patients healing process where it feels more of a sanctuary than an institution. Møller also designed for the citizens of the city as well, giving the community a place to come and relax. I can definitely picture people using the outdoor spaces in his project. He also paid close attention to how the users of the building will move through the spaces, creating an easy way for medical staff, patients, and visitors to easily move throughout the facility. The glass facades make the interior feel more open and allows natural day lighting throughout the building.

"The proposal's strength is the landscape integration, which ties in very well with the building volumes and balances the stretch of the complex. The horizontal underlining of floors results in a calm and harmonious facade. Here, the link with the compelling landscape design is exemplary."

– Competition Jury

TYPOLOGICAL summary

I chose a cancer treatment center for my thesis because I wanted to create a positive atmosphere and experience for patients undergoing treatments. Connecting architecture and nature can help aid in the healing process of patients, emotionally, physically, and psychologically. The case studies I looked at for this thesis relate to the ideas I have for my thesis. Each case study had similar ways of integrating nature within healthcare, illustrating common characteristics. There were also some unique features in the three case studies.

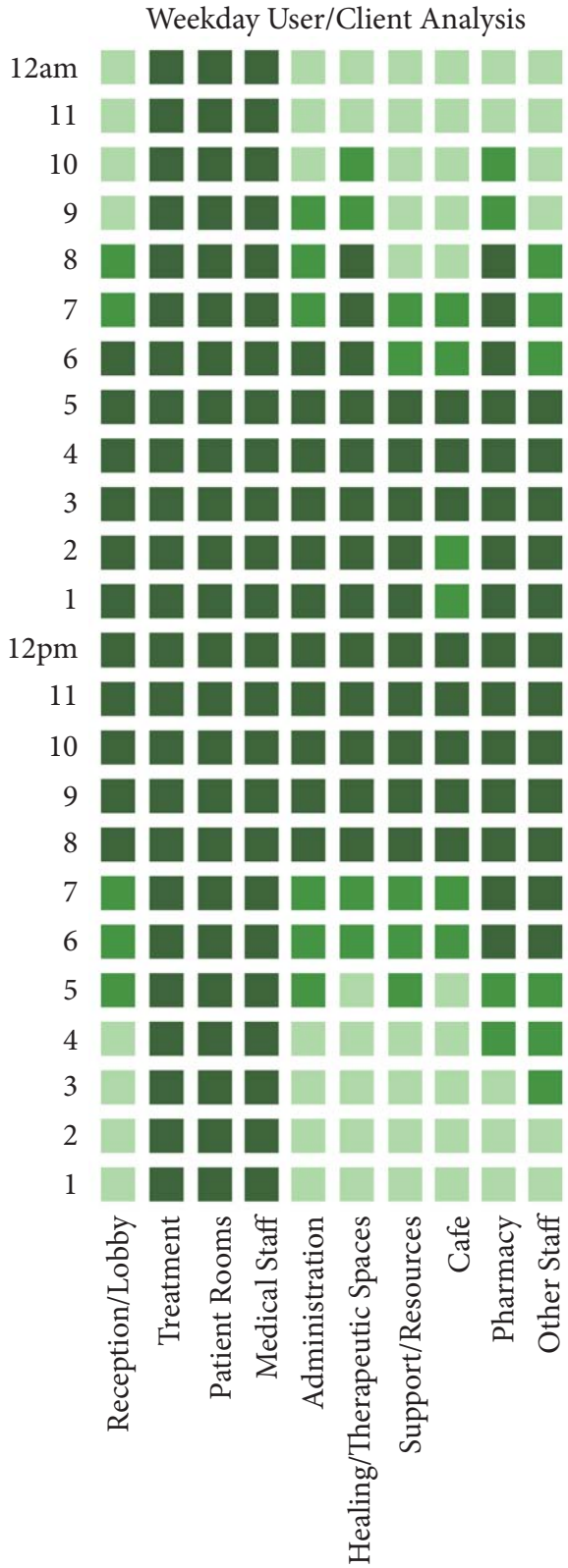
Duke Integrative Medicine was designed to accentuate the site with the use of a vaulted colonnade with three primary branches that appear to reach out toward the Duke Forest. Not only is the nature integrated within the facility, but the facility has been integrated within the site. The North Zealand Hospital also integrated the facility with the site, creating a type of sanctuary not only for patients, but the community as well. I think these two case studies both displayed how materiality of a building can give it a more natural, calming feel.

The Mott Children's Center was unique from the other two case studies in that the architect used a metaphor to integrate nature within the facility. Noah's Ark was the inspiration behind the design. This is shown on the exterior of the building with the curved wood walls that form the "ship," as well as on the port-hole windows in the rehabilitation room. The one thing I didn't like with this design is that the site was sculpted to form "waves" around the building. The site was sculpted to accentuate the building. I feel as though it should be the other way around where the building is designed to accentuate the site, as shown in the other two case studies.

major project ELEMENTS

- LOBBY
- RECEPTION / RECORDS
- CHECK-IN / CHECK-OUT
- LAB
- CARE TEAM STATIONS
- WAITING AREAS
- PRIVATE INFUSION ROOMS
- EXAM ROOMS
    - MEDICAL ONCOLOGY
    - RADIATION
- PATIENT ROOMS
- HEALING SPACES / THERAPEUTIC SPACES
    - INDOOR
    - OUTDOOR
- WELLNESS SPACE
- RESOURCE CENTER
- LINAC VAULT / LINAC CONTROL
- SIMULATOR ROOM / SIMULATOR CONTROL
- PHARMACY
- OFFICES
    - PHYSICIAN
    - ADMINISTRATION
    - BUSINESS
    - FINANCIAL ADVOCACY
    - RADIOLOGY TECHNICIAN
    - DOSIMETRY
    - SURVIVORSHIP
    - NURSING MANAGEMENT
    - SOCIAL SERVICES
- RESTROOMS
    - PUBLIC
    - PATIENT
    - STAFF
- CONFERENCE ROOM
- MEDICAL/CLEAN SUPPLY ROOM
- STAFF LOUNGE
- NOURISHMENT SPACES
- CAFE
- STORAGE
- SOIL HOLDING

major project ELEMENTS



Key:

- High Usage
- Medium Usage
- Low Usage

Figure 44 Weekday User/Client Analysis

major project ELEMENTS

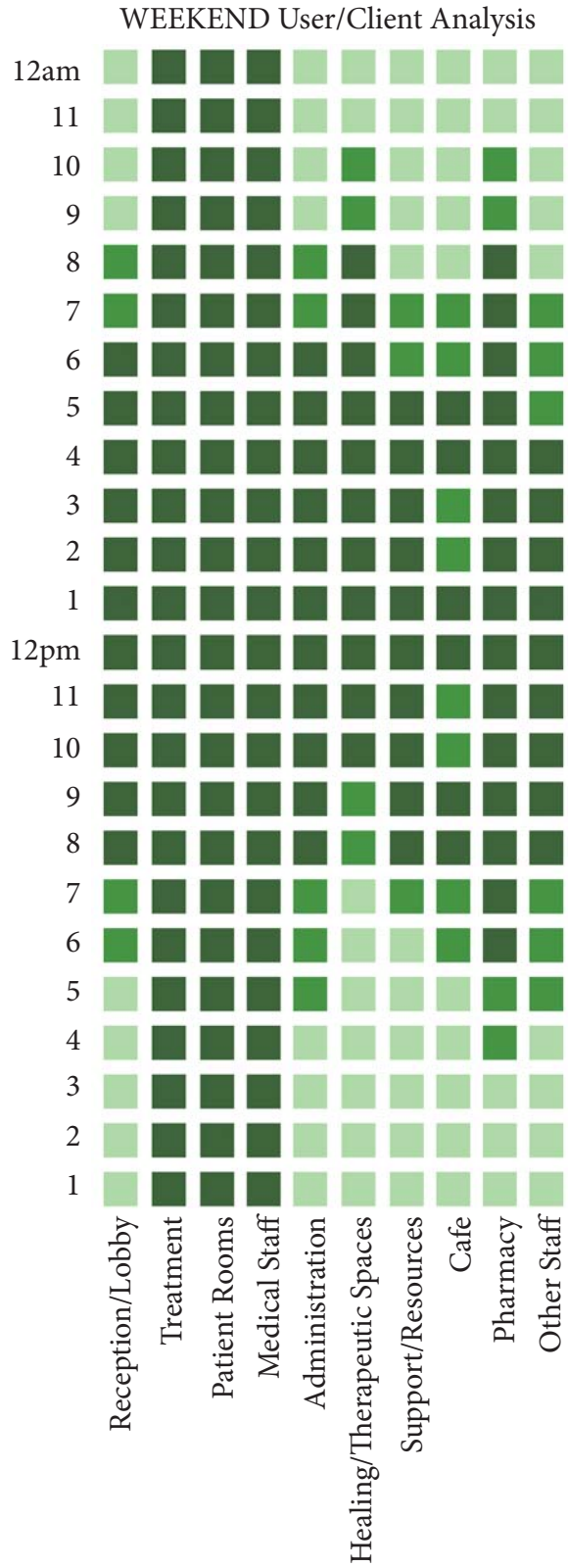


Figure 45 Weekend User/Client Analysis

USER/CLIENT description

USER/CLIENT GROUPS:

Employees: 25 - 30
- Physicians
- Nurses
- Receptionist
- Administrator
- Social Worker
- Therapists
- Other office personal
- Technicians

Clients: 30 - 40
- Patients
- Families

CONSIDERATIONS AND REQUIREMENTS

Employees:
- Parking
- Offices
- Work stations for nurses
- Break room space
- Offices with views and natural daylight

Clients:
- Parking
- Ease of access
- Drop off area
- Circulation

USER/CLIENT description

OWNER
The owner of the cancer treatment and rehabilitation center will be a private healthcare entity that would be partnered with one of Duluth's hospitals

MEDICAL STAFF + SUPPORT STAFF
The medical and support staff's main responsibilities will be to provide treatment, diagnose patients, provide support and resources, and create a positive and warm environment to the patients. All staff will have 24-hour access to the center to meet the needs of their patients.

ADMINISTRATION
Administration will ensure that the medical staff are performing and meeting their duties and that the centers patients are receiving the best quality of care. The roll of the administration oversees all the centers policies and financial work.

PATIENTS
The patients of the cancer treatment and rehabilitation center will be people who have been diagnosed with cancer and who are in need of treatment, support, relaxation, or information. Patients will also have 24-hour access to the center.

VISITORS
Visitors will include family and friends who are visiting with patients while they are at the center. Visitors will also have access to support resources, information, and the healing spaces.

the SITE

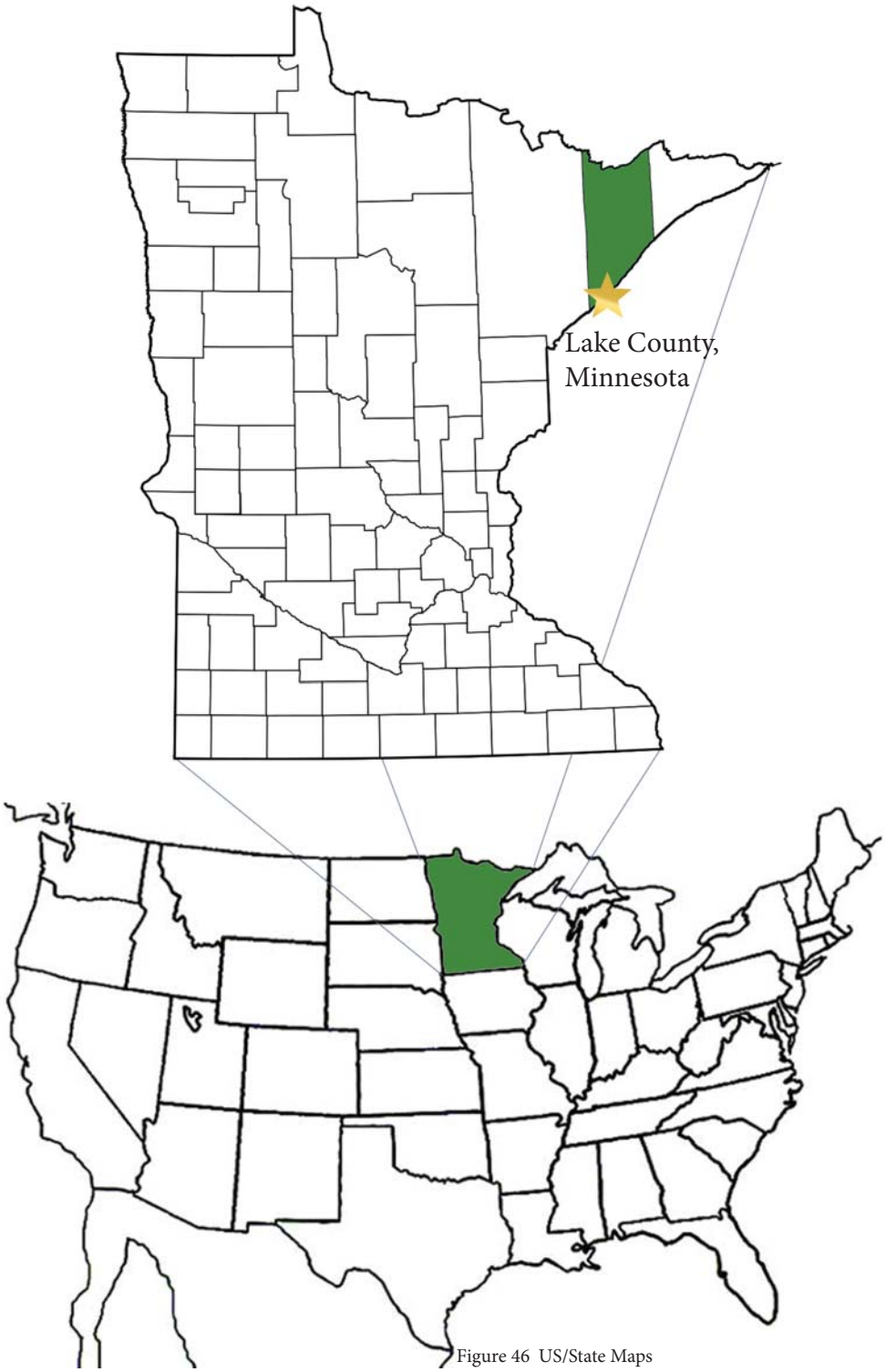


Figure 46 US/State Maps

the SITE

Figure 47 Region Context - Two Harbors, MN

REGIONAL CONTEXT:

Located along Lake Superior shoreline in northern Minnesota. Minnesota is located in the Midwest region of the United States. It is bordered by Canada to the North, Wisconsin to the east, Iowa to the South, and North Dakota and South Dakota to the west. It is best known for being the "Land of 10,000 Lakes".

Figure 48 City Context - Two Harbors, MN

CITY CONTEXT:

The location of the site is in Lake County, Minnesota, the site sits between Duluth and Two Harbors, right next to Stoney Point. Duluth is a seaport city on the shoreline of Lake Superior. It is the fifth largest city in Minnesota with a population of 86,285 and the second largest city on the shores of Lake Superior, after Thunder Bay, Ontario. It does, however, have the largest metropolitan area on the lake. Duluth is a major tourist destination in the Midwest with the Great Lakes Aquarium, the Aerial Bridge which spans the canal, scenic trails, Lake Superior shoreline, and the city's history

Two Harbors is also located on the shoreline of Lake Superior, 27 miles up the shore from Duluth. With a small population of 3,611, Two Harbors is also a major tourist destination with Split Rock Lighthouse located just five miles northeast of the city, and many hiking trails.

the SITE

Figure 49 Site Context - Two Harbors, MN

SITE CONTEXT:

Address:

5790 Scenic Highway 61
Knife River, Minnesota 55804

Site Area:

14.33 Acres
624,215 Square Feet

The site for this thesis was important due to it's location in the region. It is centrally located in the northern part of the United States. One of Minnesota's major metropolitan cities is only 26 miles away, and this region of Minnesota offers a great opportunity for natural healing spaces due to the vast majority of the land being undeveloped. The landscape offers a peaceful environment for this type of healthcare facility. The site is a preserved wetlands that is currently being sold off for residential development.

project EMPHASIS

INTEGRATING SPACES THAT PROMOTE HEALING IN A CLINICAL SETTING

Integrating healing spaces both inside and outside the clinic to help in the healing process and the comfort of patients. This includes spaces that are both relaxing and comfortable for patients and other users, but also through the use of materials and the layout of the spaces.

INTEGRATION OF SUSTAINABLE DESIGN STRATEGIES

Integrating sustainable design strategies will also help in promoting the comfort and healing process of patients by minimizing the impacts on the users of the clinic and the environment as well.

PRESERVE THE NATURAL SURROUNDINGS

Using nature as a form of healing in this project, it will be important to minimize the impact of the site and natural surrounding area by assessing the landscape.

EMPHASIZE BIOPHILIA WITHIN THE PROJECT

Paying close attention to the relationship between the natural and built environment and how the users will interact and connect to the two.

GOALS of the THESIS PROJECT

(1) *[Academic]* **LEARN ABOUT THE THEORIES OF NATURE AND ITS RELATION TO PEOPLE'S WELLBEING.**

Look at studies and theories of how nature can influence our wellbeing and what affects it can have on us, physically, emotionally, and psychologically.

(2) *[Academic]* **RESEARCH THE HISTORY OF THE IMPACTS OR INFLUENCE NATURE HAS HAD ON PEOPLE.**

Research how nature and the idea of "healing spaces" have impacted humans throughout the years. In addition, how spaces that incorporate nature have influenced a healthcare setting.

(3) *[Professional]* **LEARN ABOUT MINIMIZING THE EFFECTS OF A SITE DURING BOTH THE DESIGN AND CONSTRUCTION PHASE OF A PROJECT.**

Look at sustainable design strategies that help minimize the effects of a site and the surrounding area during the construction phase as well as design strategies that minimize the impacts of a site.

(4) *[Professional]* **BECOME MORE EFFICIENT IN CONSTRUCTION/TECHNICAL DRAWINGS TO HELP ILLUSTRATE FINER DETAILS OF THE DESIGN.**

Gain a better understanding on how to create detailed technical drawings in Revit and/or AutoCAD.

GOALS of the THESIS PROJECT

(5) *[Personal]* **PRIORITIZE TASKS THAT NEED TO GET DONE AND CREATE AND STICK TO A SCHEDULE OF WHEN THESE TASKS NEED TO BE COMPLETED.**

(6) *[Personal]* **EDUCATE ON HOW ADDING NATURAL HEALING SPACES TO A HEALTHCARE SETTING CAN HELP IMPROVE A PATIENTS RESULTS.**

a plan for PROCEEDING

Research Direction

Research for this thesis will be continuously conducted through the entire thesis process. An in depth research will be done early in the thesis in order to support the Theoretical Primes/Unifying Idea, Project Typology, Historical Context, Site Analysis, and Programmatic Requirements. Resources such as books, articles, journals, and case studies of existing projects will be used to conduct the research during the thesis process.

Design Methodology

A concurrent transformative design method will be used during the design and research process for this thesis. This design methodology includes mixed methods of both quantitative and qualitative research. Quantitative research will consist of data and statistics, while qualitative research will include gathering information by visiting case studies of existing healthcare facilities related to this thesis and archival searches.

Documentation of Design Process

Documentation will include drawings, sketches, photographs, and digital models. Documentation during the research and design process will be done over the course of the thesis project. It will be physically published as a book as well as being made accessible to the Institutional Repository.

a plan for PROCEEDING

thesis Schedule

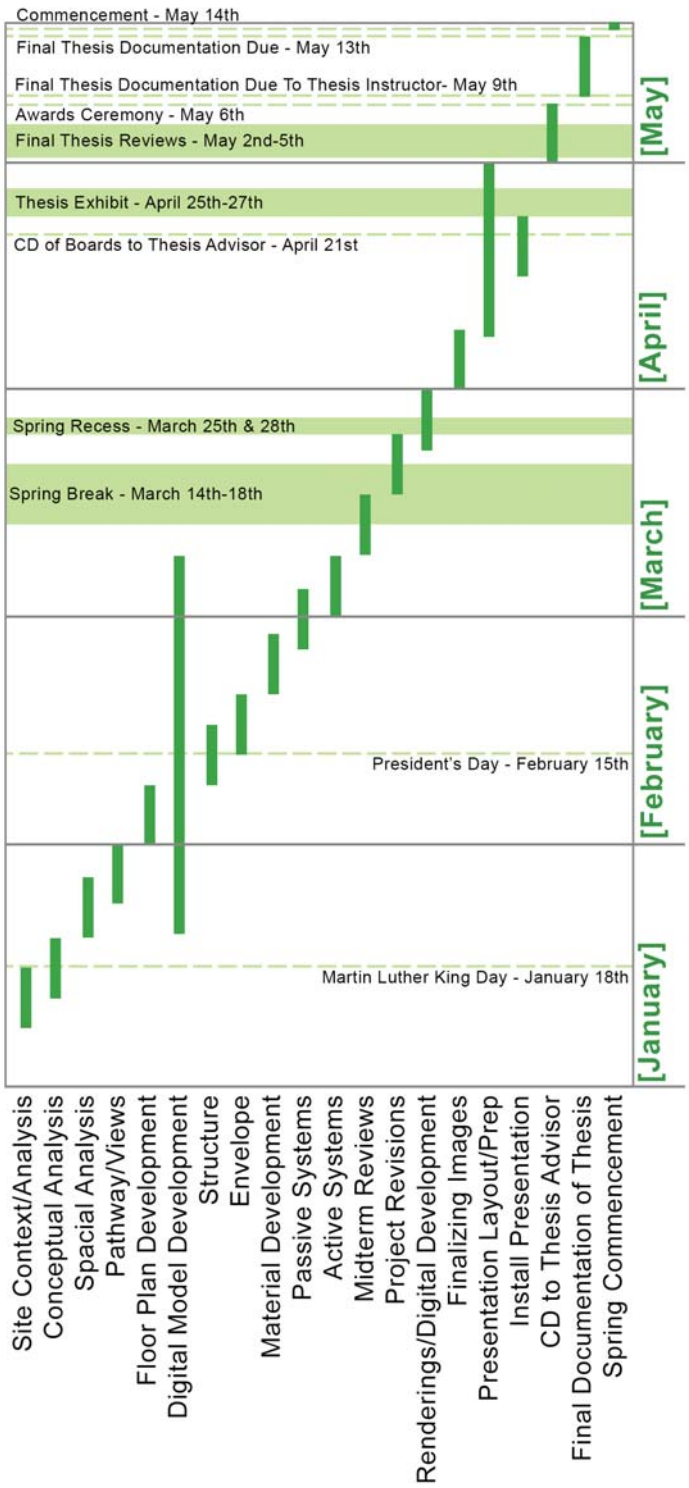


Figure 50 Thesis Schedule

thesis PROGRAM

UNIFYING IDEA research

Healing Spaces

Long throughout history healing spaces have been used as an aid in the healing process, from the temples of ancient Greece to the Japanese Zen Garden. With modern medical technology, the use of healing spaces as a way to help in the healing process has diminished. Hospitals and clinics today don't really give off positive feelings, but rather have the tendency to feel cold, sterile, and are very institutional, which can create a stressful environment for patients.

Biophilia

Biophilia first defined in 1984 by biologist Edward Wilson in which he described humans as having an innate connection with Nature. It was later defined as "a complex of weak genetic tendencies to value nature that are instrumental in human physician, material, emotional, intellectual, and moral well-being. Biophilia is rooted in human biology and evolution, it represents an argument for conserving nature based on long-term self-interest" (Kellert S.R., 2008). There is a wide range of hard and natural sciences that take part in defining and understanding the relationship between humans and biophilia.

If biophilia is incorporated in the built environment it could cause both physical and economical benefits for humans. People would be able to enjoy a more holistic well-being.

Healing Environments

The environments people are exposed to can either increase or decrease stress, which can have an impact on our bodies. The experience of a patient during a hospital stay can have an effect on the person's healing process, physically, emotionally, and psychologically. The stress of an unpleasant environment can cause a person to feel uneasy, sad, and helpless. These feelings, in turn can elevate a person's heart rate, blood pressure, tension in the muscles, and can impact the immune system (University of Minnesota, 2014).

Designing with Nature

Nature has long been thought of as a source that can impact our wellbeing. Exposure to nature can not only make people feel better emotionally, but physically as well. Any environment a person is exposed to has the ability to either increase or decrease stress which in turn can impact our bodies. The things we see, hear, or experience can affect our moods and how certain systems in our bodies are working. Nature can also be soothing to people, we tend to find trees, plants, and water captivating which can distract us from physical discomfort. Architecture that incorporates nature can have an impact on its everyday users. Including such spaces, like healing spaces, in our healthcare system can have an influence on patient outcomes.

Research has shown that exposure to nature, by either being outdoors or being able to view nature, can reduce stress, fear, and anger, as it helps increase more pleasant feelings. Research has also proven that patients tend to heal faster if they are provided a view that incorporates some feature of nature. People have an innate human desire to connect with nature. Providing more natural settings in a healthcare environment could help eliminate stress and aid in the healing process of cancer patients. So why is there such a disconnection between nature and the built environment, and how can this be changed?

HISTORICAL context

Introduction

This thesis project is located on the shore of Lake Superior, just 23 miles up the shore from Duluth, Minnesota. The context of this project relates itself to Minnesota, the city of Duluth, and Lake Superior. This site resides in Minnesota, but faces out towards the Wisconsin countryside, directly across the lake. The Minnesota/Wisconsin border is marked by both Lake Superior and the St. Louis River.

Minnesota was the 32nd state to enter into the union in May of 1858 and is known for its 10,000 lakes. About 60 percent of Minnesota's population is located in the Minneapolis/St. Paul area which is the state's center for transportation, government, business, and education. The remainder of Minnesota consists of prairies in the west that have been given over for intensive agriculture research, deciduous forests in the south that have been partially cleared and settled, and the North Woods which is used for mining, forestry, and recreation.

Duluth

Duluth is a seaport city in Minnesota and is located in Saint Louis County. The Ojibwa have inhabited the Lake Superior area for well over five hundred years. In the early 17th century, the fur trade came to the Great Lakes area due to the fashion for beaver hats. Later, in the 1850's, a more permanent settlement formed after copper mining began in the north which eventually led to iron ore mining. In 1855 the canal at Sault Ste. Marie opened, making Duluth the only port that had access to the Atlantic and Pacific Oceans. By the 20th century Duluth became the leading port in the United States.

Currently the city has a population of about 86,238 people, making it the second largest city on Lake Superior's shore. Duluth is accessible to vessels from the Atlantic Ocean via the Great Lakes Waterway and the Saint Lawrence Seaway.

Lake Superior

Lake Superior is the world's largest freshwater lake and is the largest lake of the Great Lakes in North America. It is thought that the first people who came to the Lake Superior region were the Plano, nearly 10,000 years ago. Lake Superior has been a vital link in the Great Lakes waterway, giving route for transportation of iron ore, grain, and other mined and manufactured materials to and from the Atlantic Ocean. Large vessels as well as freighters transport these materials across the lake. Lake Superior, however, is closed from January to March due to ice.

Lake Superior has had many shipwrecks spanning over hundreds of years. One of the most famous being the SS Edmund Fitzgerald. The SS Edmund Fitzgerald was also the last major shipwreck on Lake Superior. The ship sank about 17 miles from Whitefish Point during a storm on November 10th, 1975. All 29 crew members of the ship vanished as no bodies were ever found. The SS Edmund Fitzgerald was 729 feet long and was split in half during the wreck. There is a legend of Lake Superior, in that "she seldom gives up her dead." This is widely due to the fact that the water of Lake Superior is cold year round and bodies tend to sink and not resurface.

There have been over 80 different species of fish found in Lake Superior. Many have been intentionally introduced, and many accidentally. Lake Superior has less dissolved nutrients in relation to its water volume compared to the other Great Lakes making fish populations significantly less than the other lakes. This is due to Lake Superior having underdeveloped soils.

SITE analysis - qualitative

Views

View looking to the South-East. The South-East side of this site faces Lake Superior.

View looking to the North-East. The North-East side of this site faces Stoney Point.

View looking to the South-West. The South-West side of this site faces an adjacent lot that is being developed for residential use.

View looking to the North-West. The North-West side of this site faces towards Scenic Highway 61.

D U L U T H
Knife River
Knife Island
Granite Point
Stony Point
S U P E R I O R

Built Features

The only built structure on this site is a very small, old log structure. The space has no floor or roof. It looked as though the site inhabited around and in the structure over the years.

Light Quality

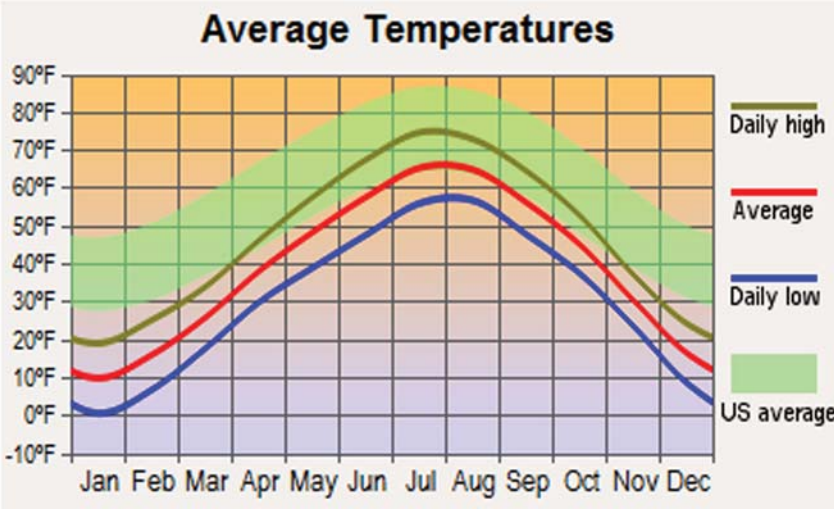
The site is densely populated with trees and vegetation except for the few pathways and road that is carved out through the site from just being driven on. Light only gets through these narrow spaces as well as from the shoreline side of the site.

Textures and Vegetation

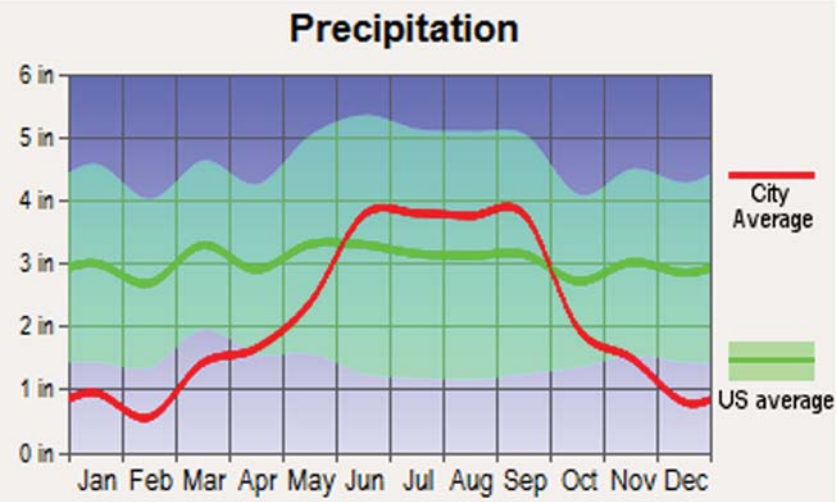
Wildlife

Climate

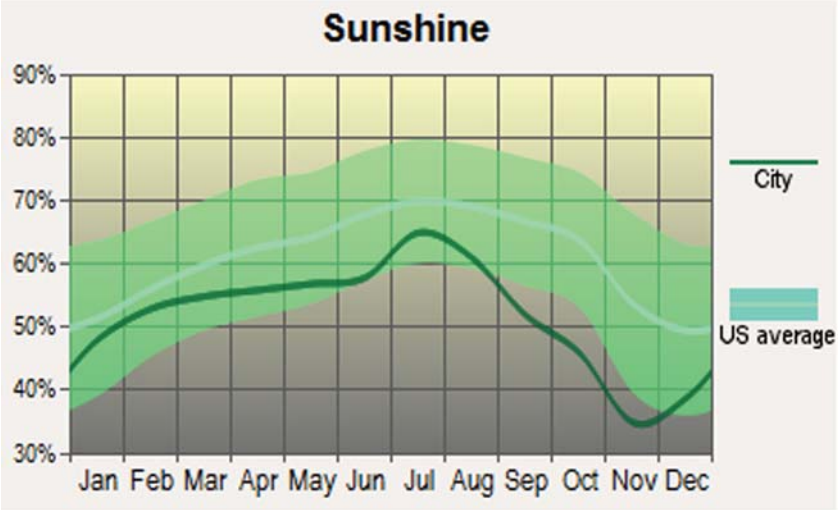
Temperature

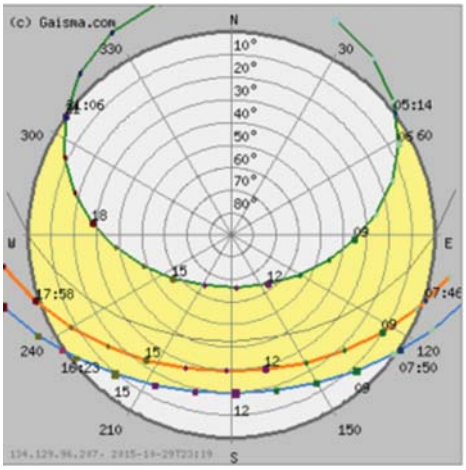


Precipitation

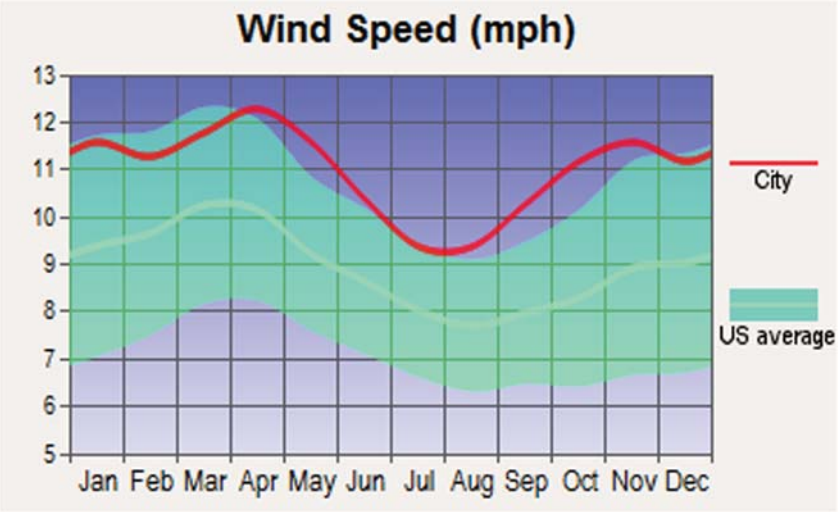


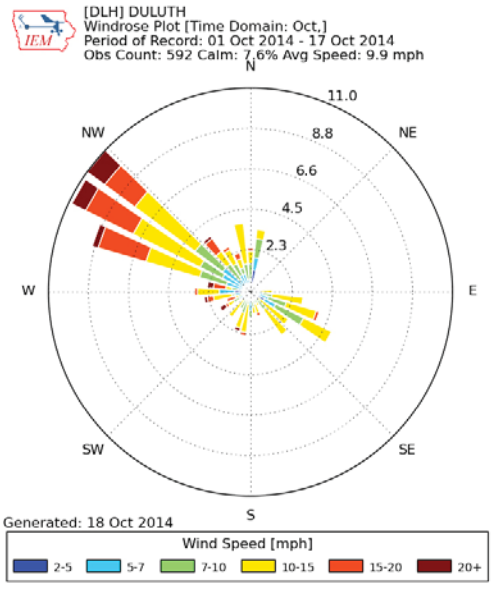
Sun


Sunshine
90%
80%
70%
60%
50%
40%
30%
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
City
US average

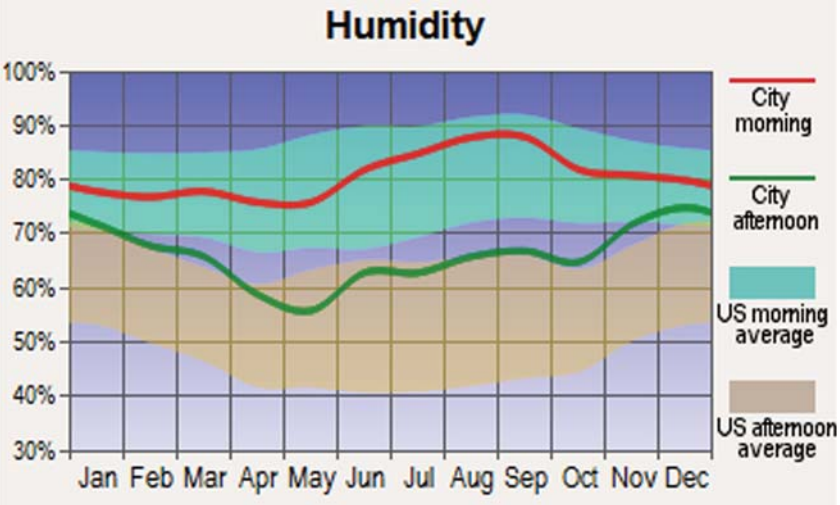

(c) Gaisma.com
N
E
S
W
330
30
300
240
120
210
150
05:14
07:46
07:50
17:58

Wind

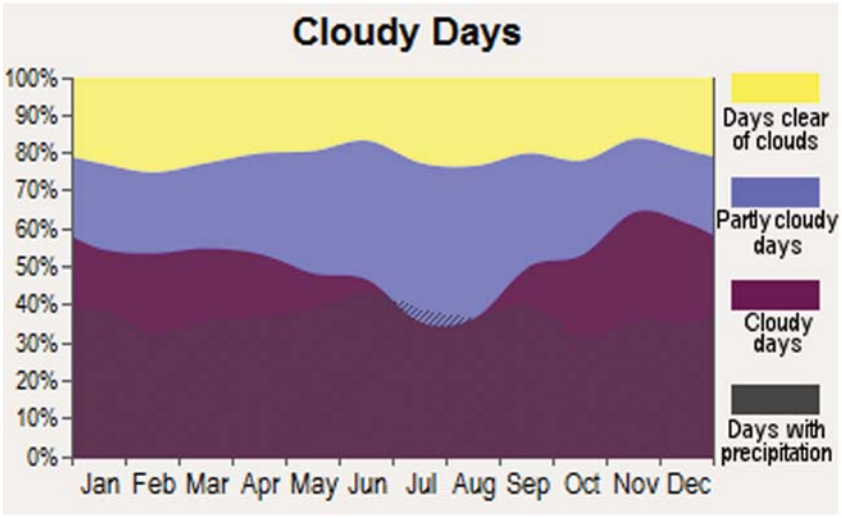

Wind Speed (mph)
13
12
11
10
9
8
7
6
5
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
City
US average


[DLH] DULUTH
Windrose Plot [Time Domain: Oct,]
Period of Record: 01 Oct 2014 - 17 Oct 2014
Obs Count: 592 Calm: 7.6% Avg Speed: 9.9 mph
N
NE
E
SE
S
SW
W
NW
11.0
8.8
6.6
4.5
2.3
Generated: 18 Oct 2014
Wind Speed [mph]
2-5
5-7
7-10
10-15
15-20
20+

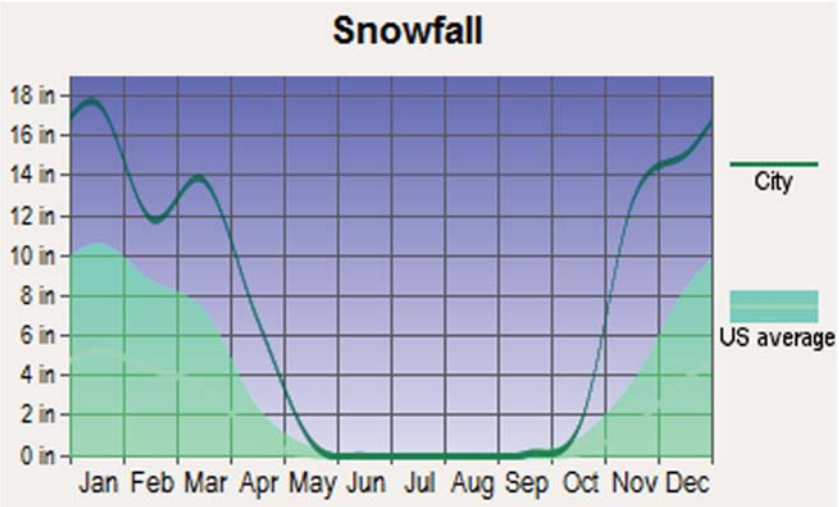
Humidity


Humidity
100%
90%
80%
70%
60%
50%
40%
30%
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
City morning
City afternoon
US morning average
US afternoon average

Cloud Cover


Cloudy Days
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Days clear of clouds
Partly cloudy days
Cloudy days
Days with precipitation

Snowfall


Snowfall
18 in
16 in
14 in
12 in
10 in
8 in
6 in
4 in
2 in
0 in
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
City
US average

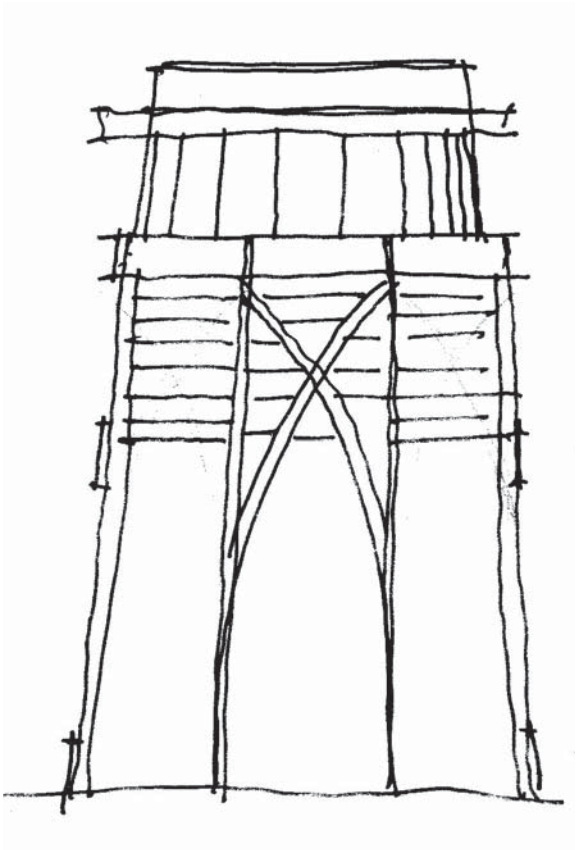
final building PROGRAM

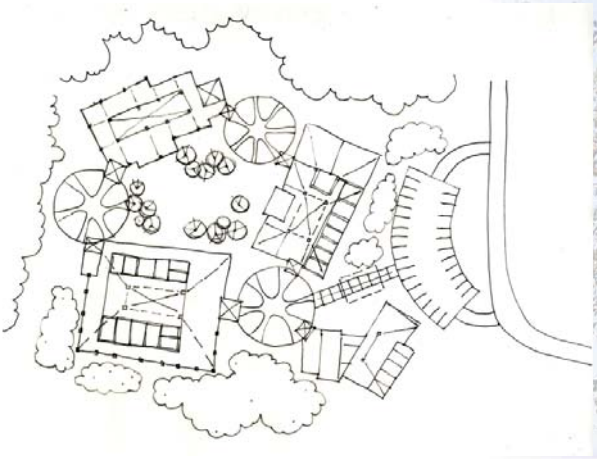
"For this is the great error of our day, that physicians separate the soul from the body".

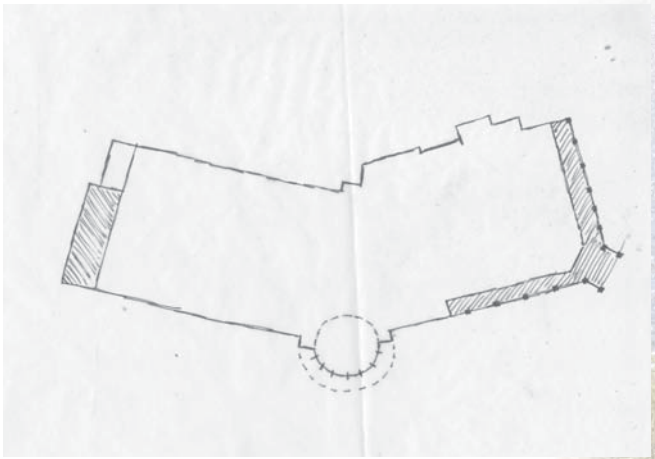
-Plato

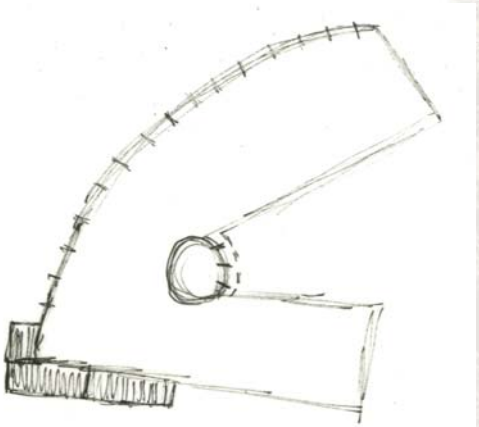
Natural Healing:
Physical and Spiritual Healing
(in a Powerful and Nurturing Setting)

Process

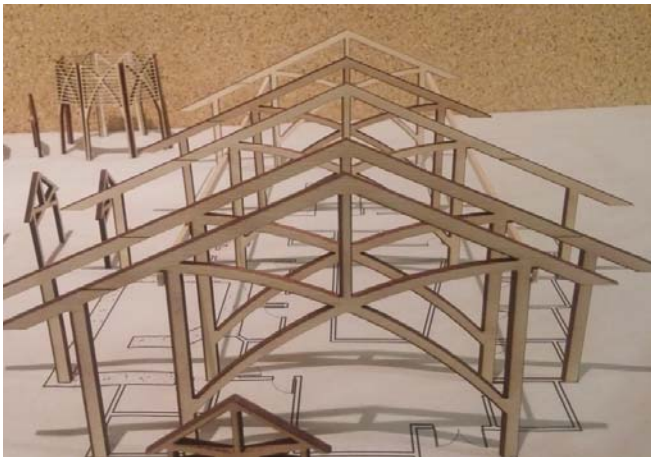


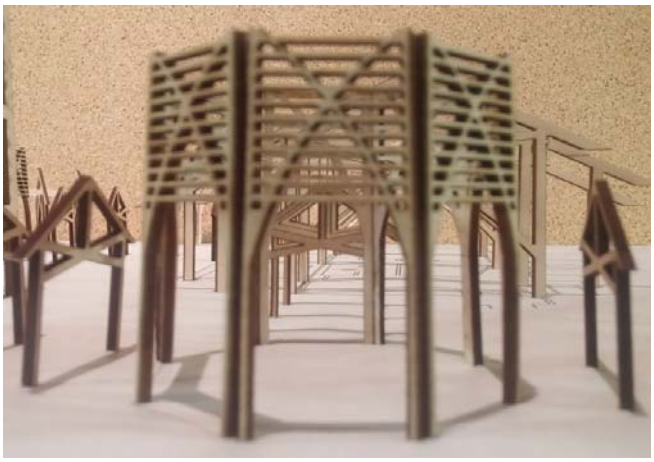


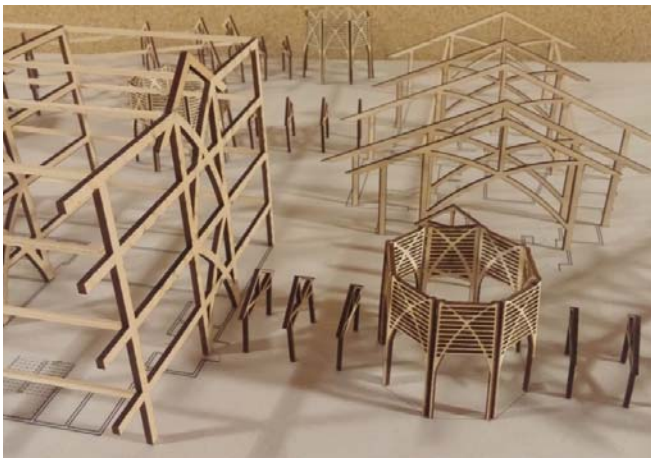




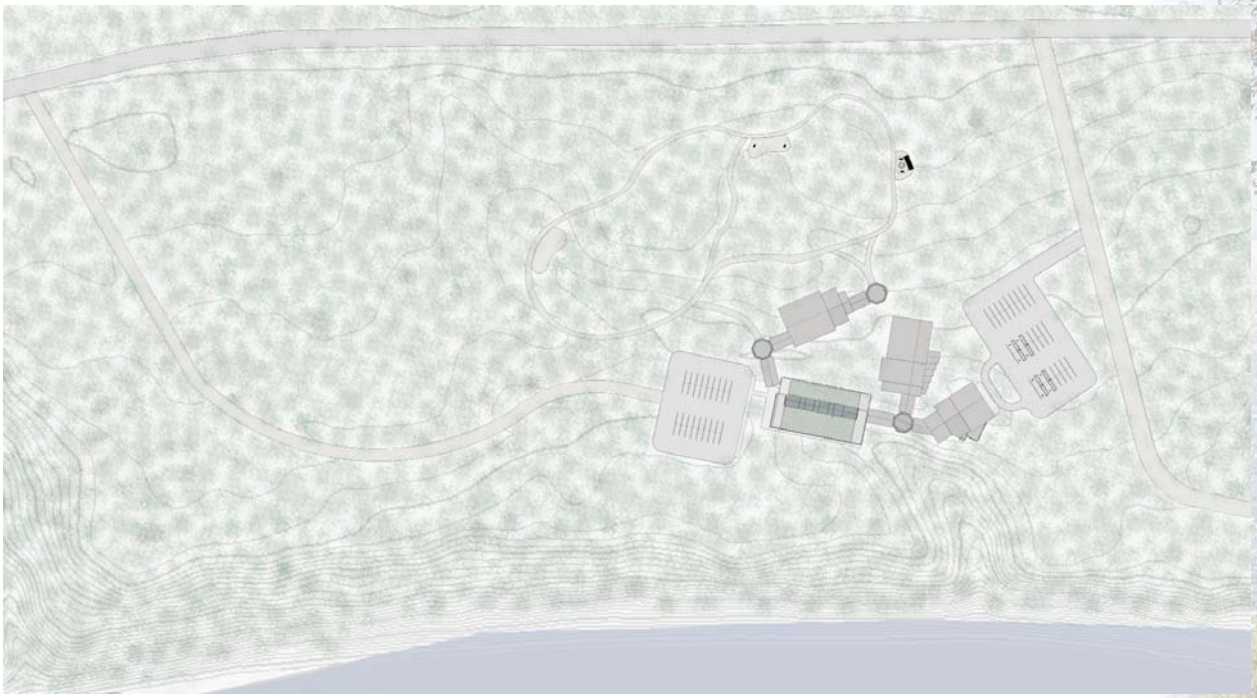
structural MODEL







ENCLOSURE



The natural barrier that encloses the site will help patients and visitors connect with nature to help aid in the healing process. A space that is full of life and that appeals to all of the human senses such as color, sound, smell, touch, and even taste can greatly impact human well-being.

Entry

SECOND LEVEL

FIRST LEVEL

EMPOWERING

Certain spatial conditions, like organic architecture, have the potential to lift spirits and inspire hope. Tranquil spatial conditions that empower and evoke these feelings were important when considering how visitors would first approach and move through the center.

Radiology

Reception
Garden
Consultation
Office
Team Space
Radiation Treatment
Storage
Restrooms
Mechanical
Rotunda
Enclosed Pathways

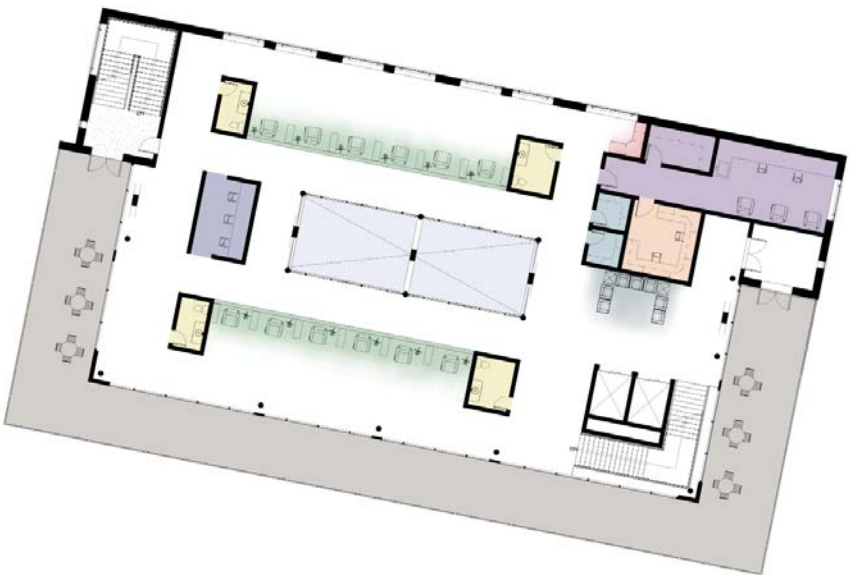
REASSURANCE

Soothing spaces were designed to relax and focus patients' senses as well as revitalize the spirit. The design offers patients natural healing spaces with the interior garden and through the structure and materiality of the building, focusing more on the wellbeing of patients. Using positive distractions, such as interior gardens, in clinical settings will help refocus patients; minds by engaging the senses and ultimately decrease anxiety. Such spaces can be calming and Reassuring.

Oncology

- Reception
- Atrium Garden
- Private/Open Infusion Spaces
- Nursing Team Space
- Restrooms
- Pharmacy
- Clean/Soiled Linen
- Nourishment Nook
- Mechanical/Laundry/Janitorial
- Enclosed Pathways
- Waiting/Seating Areas
- Lab
- Balcony
- Consultation
- Medical Staff Room
- Imagery
- Patient Rooms
- Storage/Supplies

SECOND LEVEL



FIRST LEVEL

FOURTH LEVEL

THIRD LEVEL

INTERVENTION

The word intervention came to mind when designing the special conditions of this building. Exploring different avenues and resources for healing and transformation - blending interior with exterior, body and mind, heart and technology, and science and spirit. Combining natural healing spaces with the necessary medical infrastructure.

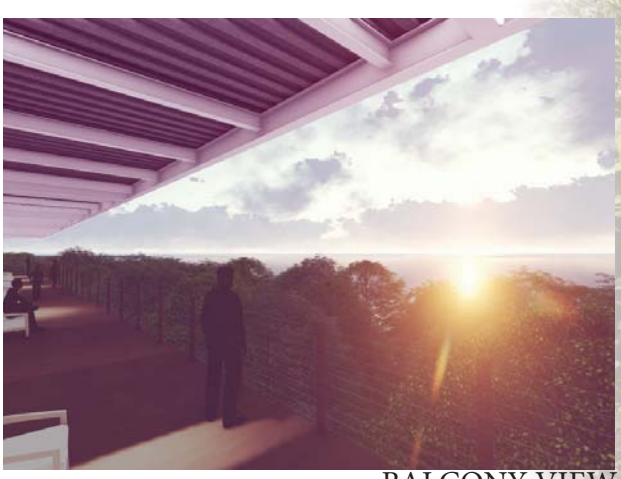
ATRIUM GARDEN

GATHERING AREA

PRIVATE INFUSION ROOM

OPEN INFUSION SPACE

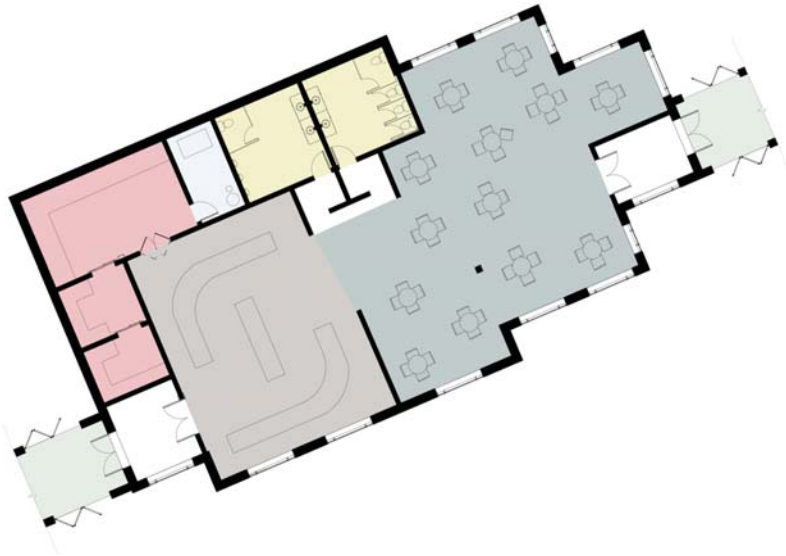
OVERNIGHT PATIENT ROOM



BALCONY VIEW

Cafe

Seating
Cafe
Kitchen
Mechanical
Restrooms
Enclosed Pathways



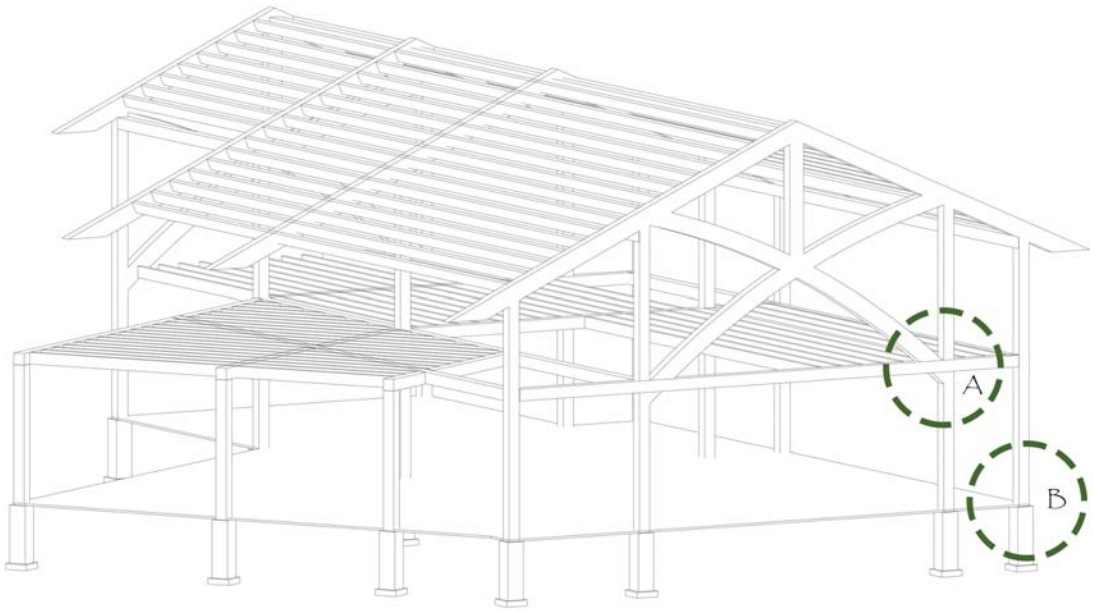
COMFORT

I wanted to incorporate a space for nourishment for both visitors and staff. The open dining space is surrounded with views of the site, providing both a physically relaxing and spiritually comforting space for patients and other users.

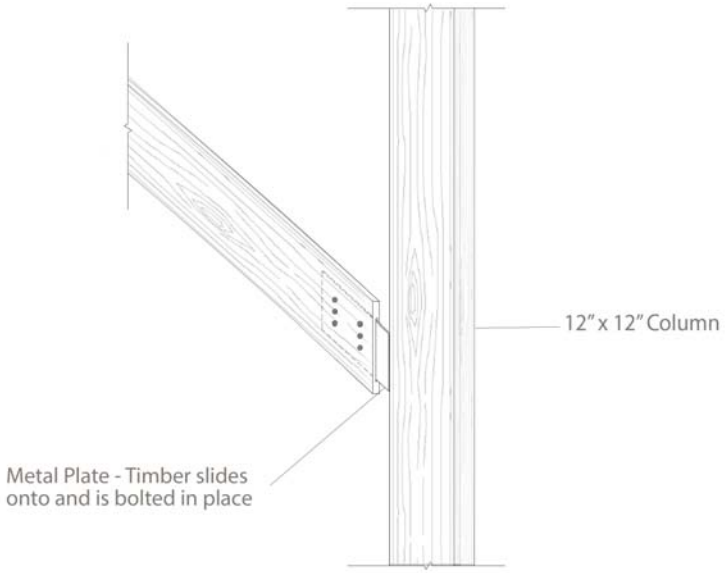
Rotunda and Enclosed Pathway

Exterior Gardens and Paths

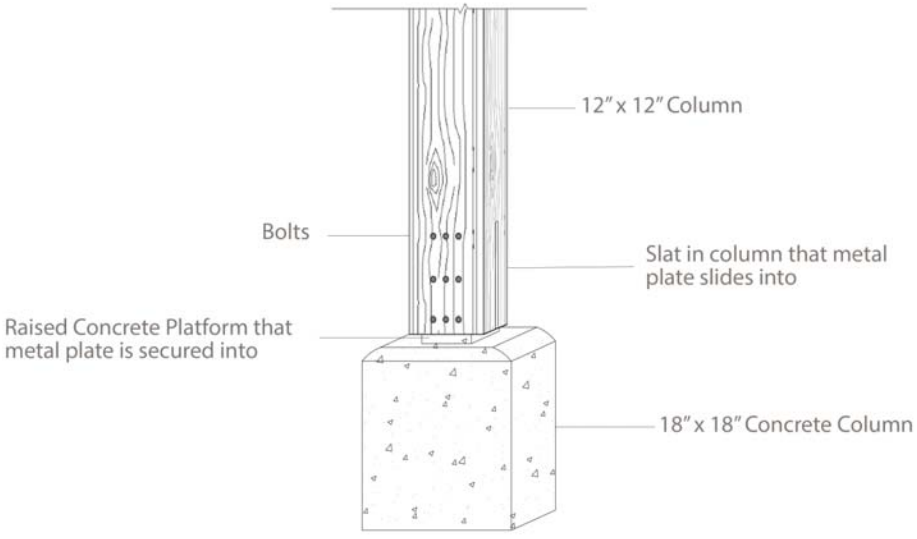
Glulam Structure



Glulam Structural Details

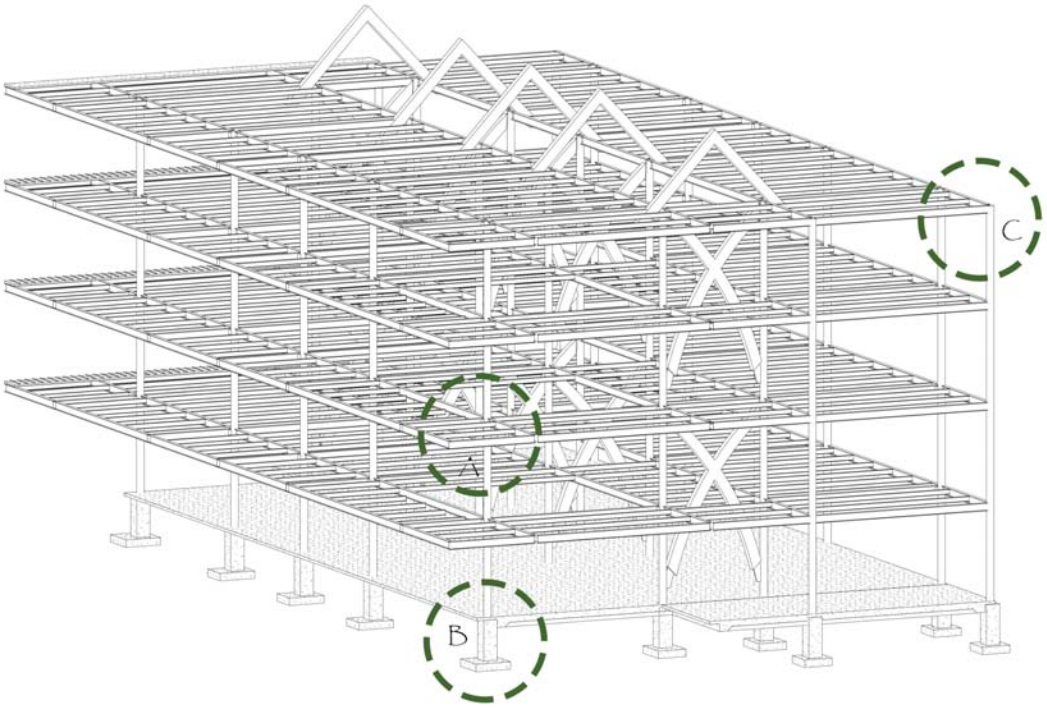


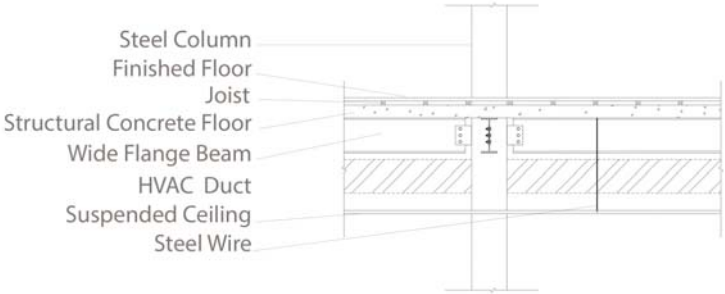
B - GLULAM STRUCTURAL DETAIL



A - GLULAM FOUNDATION DETAIL

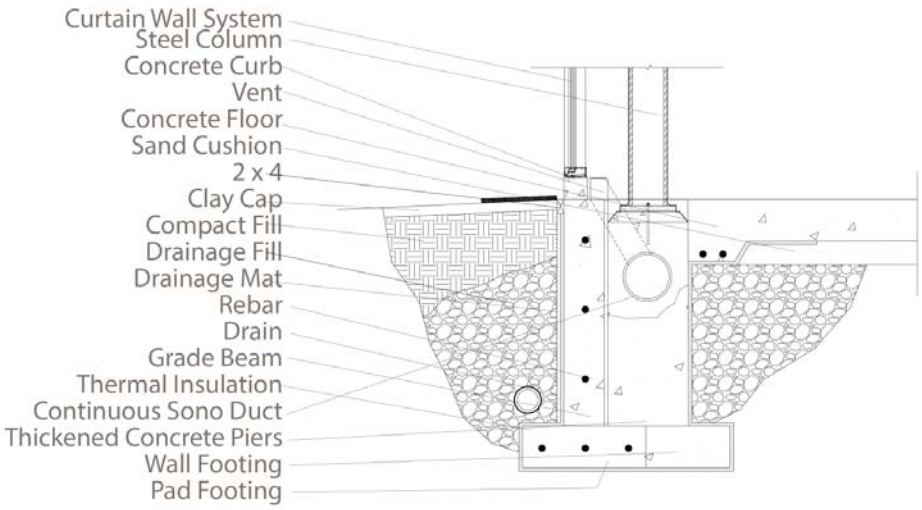
Oncology Structure



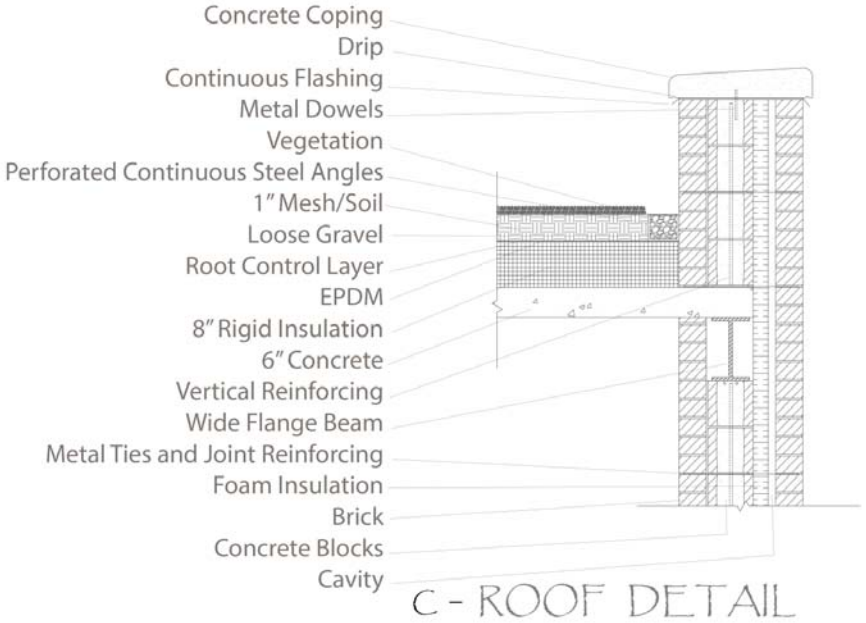


A - STRUCTURAL DETAIL

Oncology Structural Details

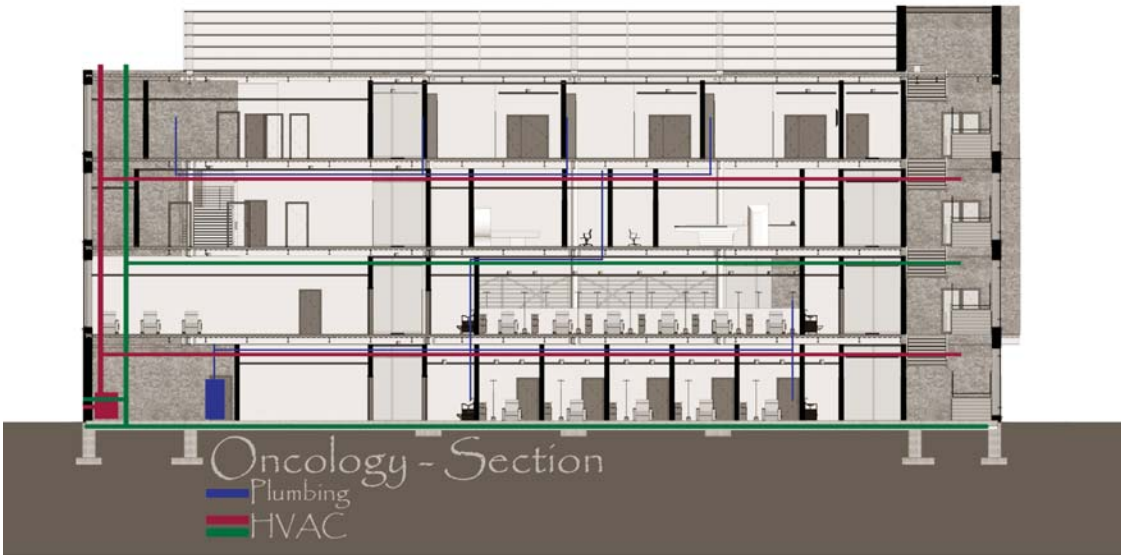


B - FOUNDATION DETAIL

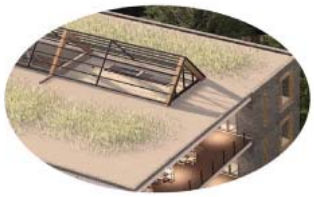


C - ROOF DETAIL

Oncology Section



sustainable DETAILS



Green Roof - Planted with sedum, which retains stormwater and absorbs heat.

Low Flow Appliances – Low Flow Appliances were used to reduce the amount of water on site.

Pervious Pavement - Pervious pavement was used for all hardscape surfaces on the site.

Interior Gardens – Improve indoor air quality, reduces noise pollution, and enhances aesthetic values.

APPENDIX

Reference List:

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APPENDIX

Previous Studio Experience:

5th Year

Fall 2015: Mark Barnhouse, Instructor
Water Property Analysis: Animation
Wetlands Research Laboratory: Project
Hawley, Minnesota

4th Year

Spring 2015: Paul Gleye, Instructor
Brussels Urban Design: Interboton Project
Brussels, Belgium

Fall 2014: Bakr Aly Ahmed, Instructor
High Rise: Project
San Francisco, California

3rd Year

Spring 2014: Frank Kratky, Instructor
Star Institute: Steel Project
Fargo, North Dakota
Community Center: Concrete Project
Chicago, Illinois

Fall 2013: Paul Gleye, Instructor
Moorhead Revitalization: Wood Project
Moorhead Revitalization: Masonry Project
Morrhead Revitalization: Streetscape Project
Moorhead, Minnesota

2nd Year

Spring 2013: Phil Stahl, Instructor
Dance Studio: Project
Moorhead, Minnesota
Unconventional Dwelling: Project

Fall 2012: Stephen Wischer, Instructor
Tea House: Project
Moorhead, Minnesota
Boathouse: Project
Minneapolis, Minnesota

APPENDIX

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