



Healthcare & Architecture

PROJECT TITLE AND SIGNATURE

A Design Thesis Submitted to the
Department of Architecture
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By
McKenna Vetter

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for the Degree of
Master of Architecture

North Dakota State University Libraries Addendum

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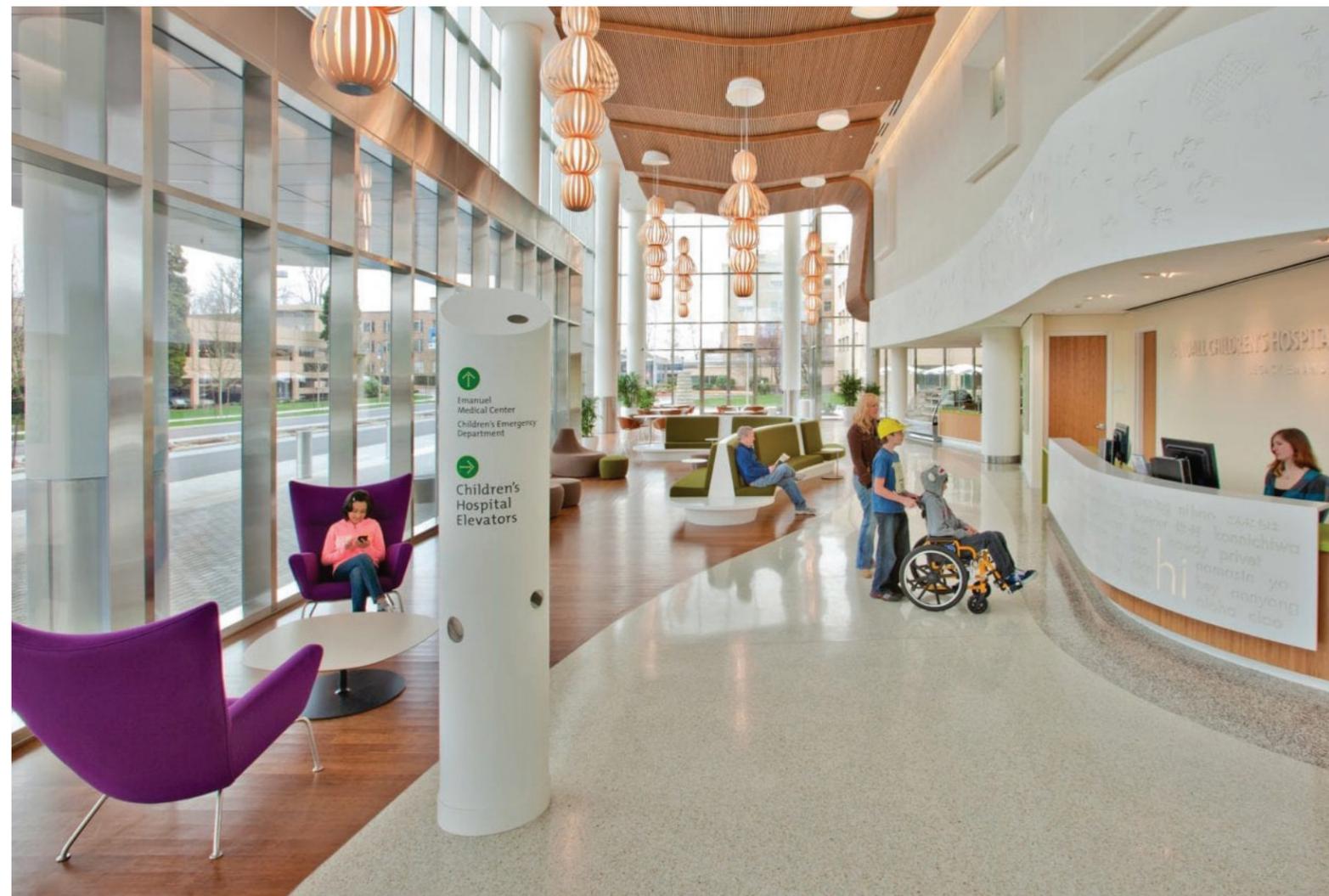


Figure 02 | Hoffman Construction, photo credit | Reception Space

Healthcare facilities are often hostile and cold environments for individuals who are just looking for relief in a time of distress and worry. The unifying idea aims to focus on the environment and health. Specifically, health in the relation to pediatric oncology patients and their families. Designing architectural environments for the care and treatment of children with cancer requires a well-rounded approach encircling understanding, sympathy, universal, and creative design. To take this further, in terms of the environment I am largely talking about the atmosphere in which we inhabit, the atmosphere that makes up the space in which each of you are sitting in right now. This sense of atmosphere is our most important sense in terms of our existence and survival (Robinson, p151-152). It plays an extraordinarily large part in the healing process in which we are all prone to within a healthcare facility setting. Looking at the art of healing in a round-about and atmospheric view will give you deeper understanding of the unfamiliar side of healthcare, being not the physicians themselves as our primary art of healing, as we often see it but, the environment, making up the missing half of that healing. Acknowledging this atmospheric sense comes about in order to create a sense of wholistic balance of the environmental healing within a healthcare facility setting. Within hospitals, it is said that the environment in which we heal best are environments that are therapeutic, supportive of family involvement, and make us feel connected. The frightening specter of cancer and its treatments may demise a person's feeling of control. It is essential for cancer patients to have a feeling of entitlement over their environment and in turn the disease along every step of the treatment and recovery cycle. Through a new and creative approach to architecture, atmosphere, and emotion...cancer healthcare facilities can encourage a growing hope, happiness, and healing in the best way possible for all involved.

Through the process of designing a cancer healthcare facility braced with sustainable architectural ideas while intertwining nature may bring the added benefit of returning the healthcare building to its original, representative form, with a dependent healing process focusing on nature, atmosphere, and sustainability itself. Through a new and creative approach to sustainability, green design, atmosphere, and emotion, cancer healthcare facilities can encourage hope, happiness, and growth in the best way possible.

Our ancestors most likely never saw a doctor or rarely went into the hospital, as hospitals were considered a last resort for those without caring families or caring neighbors. Care of the sick, birthing and dying were all part of the domestic life of home care. The idea of caring for the sick retains a special and coordinated approach as practical, necessary, and family-oriented, and most cost-effective. Hospitals' wards were often designed for patients who could not afford house calls from doctors. These patient wards were often unsanitary and very prone to the spread of disease. That trend began to change in the eighteenth century when the world was newly introduced to public hygiene by a French architect names Pierre Patte resulting in a fundamental shift of cities that later made its way into homes and buildings. Shortly after, the founder of modern nursing, Florence Nightingale, recognized this ongoing trend of unsanitariness and advocated for more sanitary hospital designs through the circulation of fresh air, windows to let in sunlight, open spaces, and fewer building elements that could harbor dirt.

After the modernization of architecture and standard sanitation came into play, healthcare facilities often portrayed an unwelcoming and industrialized focus completely disregarding one's inkling for comfort, healing, and emotional well-being. These facilities were stark and bland, diminishing opportunities and shutting down any idea of environmental healing from within as the spaces had to allow for easy cleaning, easy access, and enough room for the variety of equipment needed. There was a major emphasis on functionality, practicality, and sterilization within the healthcare facility rather than aesthetics or patient experience. Before we knew it, white walls, incandescent lights, and starkness replaced natural light, openness, and nature views.

The architect's job is to make you feel at home. This means to intensify a person's sense of purpose and belonging through framing daily life, the part of life that truly matters. This daily life involves our social body and our being with others that reflects on our environment a sense of purpose through our actions. Within hospitals, it is said that the environment in which we heal best are environments that are therapeutic, supportive of family involvement, make us feel connected, and have access to nature. The frightening specter of cancer and its treatments may decrease a person's feeling of control. It is essential for cancer patients to have a feeling of mastery over their environment, including positive interaction, community, and worthiness. These feelings must be present and tactical along every step of the cancer treatment and recovery cycle

Many of the up-and-coming problems related to healthcare can be linked to the long-standing topic of the environment within a facility and the surrounding built environment and various spaces that we inhabit within the built environment. No one ever enjoys a trip to the hospital as the trip is often associated with illness, pain, stress, and the unfamiliarity of a place away from the comforts of home. The field of healthcare encircles a variety of aspects and is always vastly and rapidly advancing in a variety of categories. Over the last few years, there has come about a rehabilitated awareness of natural environments and their role within a healthcare setting. This renewed consciousness becomes of the utmost importance in environments related to healthcare due to the already impaired nature of the patients' physical or psychological and emotional state. As designers, we have a large responsibility to develop high-quality environments that enable a deep connection between place and people while improving people's physical, psychological, and social well-being. It is our job as designers to put ourselves in the shoes of the visitors to try and experience, the best we can, how a particular setting or situation would impact our mental and emotional state. By immersing childcare patients in green infrastructure, nature, and a soothing atmosphere, patient recovery time and hospitalization will generate feelings of hope, happiness, and growth in contrast to distress and worry.

Humans should be dealt with and healed in an environment related to nature, especially the children who will be an enormous impact on generations to come. It is also critical to empathize that we, as humans, do not project our own moods on the natural or cultural environment of space, our moods are an imitative aspect of the architectural spaces that we inhabit. If our minds are the imitative aspect of the spaces that we inhabit, doesn't that mean we must design to the apparent comfort of the atmosphere we all inhabit? The environment, exposure to nature, and places in which we inhabit simultaneously affect the human body's response to comfort, stimulation, anxiety, stress, and the atmosphere plays a major role in the human body's ability to heal.



The background of this thesis project is supported through various studies of projects with similar programs and typologies, literature reviews, and research studies. To cover a topic that is seemingly always changing and growing, a variety of research sources were used in order to most effectively elaborate on the knowledge obtained. Due to the complexity and the variety of representation within the realm of a healthcare project each typological case study represents a portion of the individual goals and methods for this thesis project. These case studies will help you obtain a deeper knowledge of the programs and design initiatives my thesis programs aims towards. The literature reviews are to make aware of the theoretical ideologies that surround this ever-growing topic of pediatric healthcare. Overall, this research process was meant to obtain knowledge from a wide variety of sources and giving a deeper understanding of the root cause and its externalities relating to the larger thesis project at hand.

TYOLOGICAL CASE STUDIES:

Woy Woy Rehabilitation Center | Australia

Maggie's Leeds Centre | United Kingdom

Nemours Children's Hospital | United Kingdom

LITERATURE REVIEWS:

Mind in Architecture: Nested Bodies | Sarah Robinson

Atmospheres | Peter Zumthor

Mind in Architecture: Mood & Meaning | Alberto Pérez-Gómez

Designing for Wellness: Therapeutic Landscapes | Reuben M. Rainey

Figure 03 | Hoffman Construction, photo credit | Randall Children's - Portland

Typology: Healthcare Facility

Premise: Facility for pediatric oncology treatment, rehabilitation, and development focusing on natural healing spaces to help promote well-being and comfort within patient through the realm of atmosphere, sustainable design, and biophilic design.

The focus of this thesis project points towards the environment and health, in simplest terms. Specifically, health in the relation to children's oncology patients and their families. To take this further, in terms of the environment I am largely talking about the atmosphere in which we inhabit...the atmosphere that makes up the space in which each of you is sitting right now. This sense of atmosphere is our most important sense in terms of our existence and survival (Robinson, p151-152). It plays an extraordinarily large part in the healing process in which we are all prone to within a healthcare facility setting. Looking at the art of healing in a round-about and atmospheric view will give you a deeper understanding of the unfamiliar side of healthcare, being not the physicians themselves as our primary art of healing, as we often see it but, the environment, making up the missing half of that healing. Acknowledging this atmospheric sense comes about in order to create a sense of wholistic balance of the environmental healing within a healthcare facility setting. Within hospitals, it is said that the environment in which we heal best are environments that are therapeutic, supportive of family involvement, and make us feel connected. The frightening specter of cancer and its treatments may demise a person's feeling of personalization. With the patient being the number one priority of this healthcare facility, they must feel comfortable, be at peace, and have the freedom to allow for the individual, and their family, to utilize the facility to the best of their advantage based on their personal healing needs.

With the motive for wholistic engagement within the environment combined with cancer treatment and rehabilitation, the potential for spaces of multiple-use, care, treatment, and socialization are apparent. This healthcare facility will reflect on its environmental surroundings, treatment options, and the patients and their families. To allow the patients and their families a heightened essence of interaction and personalization, each overnight patient room will be unique in layout, spaces, and rooms to fit the comfort of the individual just right. Patients in a healthcare facility are not the only ones to design for, as there are specialists and doctors involved and with a diagnosis such as cancer, it often stretches to affect those close to the patient such as family members and friends. Through a new and creative approach to architecture, atmosphere, and emotion, this design will encourage a growing hope, happiness, and healing in the best way possible for all involved.

The design of this facility is to challenge the ideals that are defined in current health care industries by developing and creating a space for cancer treatment and rehabilitation for children through an intense look at the atmosphere and environment and the imposing impact it has on our emotional state. This concept of atmosphere and environment submerged in the late eighteenth century, where it was stated that our feelings are located, bound to a particular place with its specific temporality and qualitative character (Perez-Gomez). The spaces that we inhabit, the environment, the atmosphere, and the exposure to nature have a direct impact on the human body in relation to comfort, stress, anxiety, and conscious stimulation, which entices a role in the human body's ability to heal.

*WOY WOY REHABILITATION UNIT**WOY WOY REHABILITATION UNIT***Location:** Woy Woy, Australia**Project Type:** Healthcare Rehabilitation Center**Architect:** Woods Bagot**Size:** 23,681 SF**Construction Date:** 2013**Distinguishing Characteristics:**

To play off the existing health services complex, the added rehabilitation unit is an extension to the clinical program of the hospital and can accommodate the patients that require interdisciplinary restorative care following a multitude of injuries, surgery, or a variety of illnesses. "Homes in the Park" was a central theme in the design of the rehabilitation center. Through these "homes in the park" the idea was to create a healing environment for the visitors in each of their rooms through the provision of generous solar gain, and lush, green therapeutic outdoor courtyards. Intertwining the landscape design with the architectural aspect allowed a landscape that complemented the existing surroundings with visual connections integrating interior and external spaces of each rehabilitation unit.

The Woy Woy Rehabilitation Unit design differentiates itself from conventional institutional architecture through private interior spaces and a sanctuary to cultivate patients through an ecological healing process. The added park scape environment within the rehabilitation center concurrently sits directly into the existing facility and creates an astonishing architectural gesture engaging the two into one. The entrance to the structure encompasses an origami-inspired, triangulated roof and fades into a distinctive used of timber and brick to give the unit center and exterior residential feel.



Figure 04 | Peter Bennetts, photo credit | Unit Entrance

WOY WOY REHABILITATION UNIT

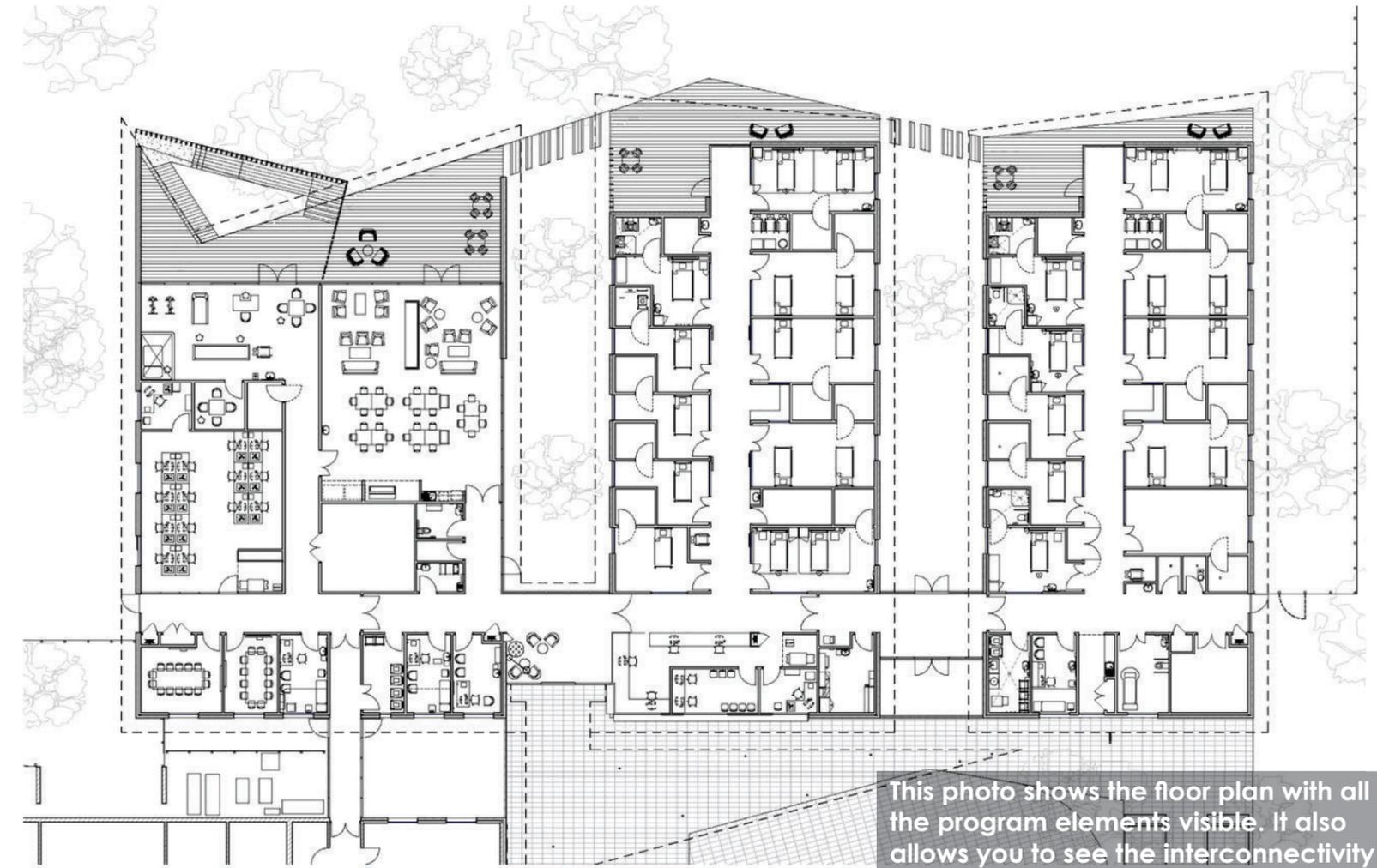
Program Elements:

- 30 patient beds, two inpatient rooms
- Multiple courtyard therapy areas
- Gymnasium
- Kitchen Area
- Staff facilities and office
- Linen Holding Areas
- Waste Collection Facilities
- Additional Parking and new car park to serve the entire campus
- Upgraded back-of-house



Figure 05 | Peter Bennetts, photo credit | Back Patio Space

WOY WOY REHABILITATION UNIT



This photo shows the floor plan with all the program elements visible. It also allows you to see the interconnectivity between the outdoor environment and the patient rooms throughout the rehabilitation center.

Figure 06 | Peter Bennetts, photo credit | Main Floor Plan

WOY WOY REHABILITATION UNIT



These graphics show the environmental healing atmosphere that is created all throughout the rehabilitation center. The space is full of natural daylight, open spaces, and distinct features to set it apart from the conventional institutional architecture creating an ecological healing environment for people in all walks of life.

Figure 07 | Peter Bennetts, photo credit | Nature Environment



Figure 08 | Peter Bennetts, photo credit | Interior look at Nature

WOY WOY REHABILITATION UNIT

Research Findings:

This case has the most common values of a traditional health care facility with a striking balance between patient needs and operational efficiency. The facility took an origami-inspired shape featuring a triangulated roof at the entrance with the distinctive use of brick and timber details throughout. Environmental design has become an up-and-coming architectural norm especially around the design of a healthcare facility, in this way the Woy Woy Rehabilitation Unit is very common in incorporating multiple design realms with green architecture and natural environmental design.

This case is different or unique in the way in which they incorporated solar access and an environmental healing environment. The building is broken down into three separate series on a residential scale. These series of buildings form "L" shapes around the green courtyards for patients in all rooms to be able to experience the added nature of the site. The architects and designers wanted to circle around the theme of "homes in the park" insinuating natural environmental healing.

This environmental healing will consider social and cultural interactions as well. Socially the inhabitants of this facility experience feeling of prolific restorative care from the visual connections integrating interior and external spaces of the room that they are in. They are able to interact with others in many protective interactive spaces that create nurturing and mitigate their worries.

MAGGIE'S LEEDS CENTRE

Location: Harehills, United Kingdom

Project Type: Healthcare Center

Architect: Heatherwick Studio & Balston Agius Landscape Architects

Size: 4,973 SF

Construction Date: 2020

Distinguishing Characteristics:

Maggie's Centre is a charity organization that provides practical and free emotional support for people with cancer. This specific Maggie Leeds Center is the charity's 26th center in the United Kingdom. The philosophy of Maggie's circles around the idea that a great design can help people feel better. Maggie's Leeds Center uses several healthy and green materials enhanced by a multitude of energy-saving techniques.

The structure of the Center is built from a prefabricated and sustainably sourced spruce timber system. The interior of the naturally ventilated building consists of materials that help maintain the interior humidity. The various rooftop gardens were designed by Balston Agius Landscape Architects. The concept idea was inspired by Yorkshire woodlands and contains a variety of native plants from the area

MAGGIE'S LEEDS CENTER



Figure 09 | Hufton+Crow, photo credit | Exterior Rooftop View

MAGGIE'S LEEDS CENTRE

Program Elements:

- Three Separate Counseling Rooms (the heart)
- Kitchen
- Social Aspects
- Library
- Exercise Room
- Rooftop Garden
- Open Spaces
- Biophilic Design



Figure 10 | Hufton+Crow, photo credit | Social Center

MAGGIE'S LEEDS CENTRE



Figure 11 and Figure 12 | Hufton+Crow, photo credit | First Floor & Second Floor Plans

This graphic represents the ground floor plan, emphasising the three counseling rooms encircling the social space, kitchen, and library. The space is open with many windows to let in natural daylight.

The floor plan above showcases the mezzanine level and open space with a multitude of rooftop gardens in order to captivate the feel of nature, creating a natural healing environment.

MAGGIE'S LEEDS CENTRE

MAGGIE'S LEEDS CENTRE



These graphics show the environmental healing atmosphere that is created all throughout the rehabilitation center. The space is full of natural daylight, open spaces, and distinct features to set it apart from the conventional institutional architecture creating an ecological healing environment for people in all walks of life.

Figure 13 | Peter Bennetts, photo credit | Healing Place

Through these section cuts you are able to see how Heatherwick Studio incorporated and emphasized the sloping of the site. This slope plays a major role in the spatial layout of the Maggie Leeds Centre, as well as enhancing the natural views from the site to create a space for contemplation and acalmng atmosphere.

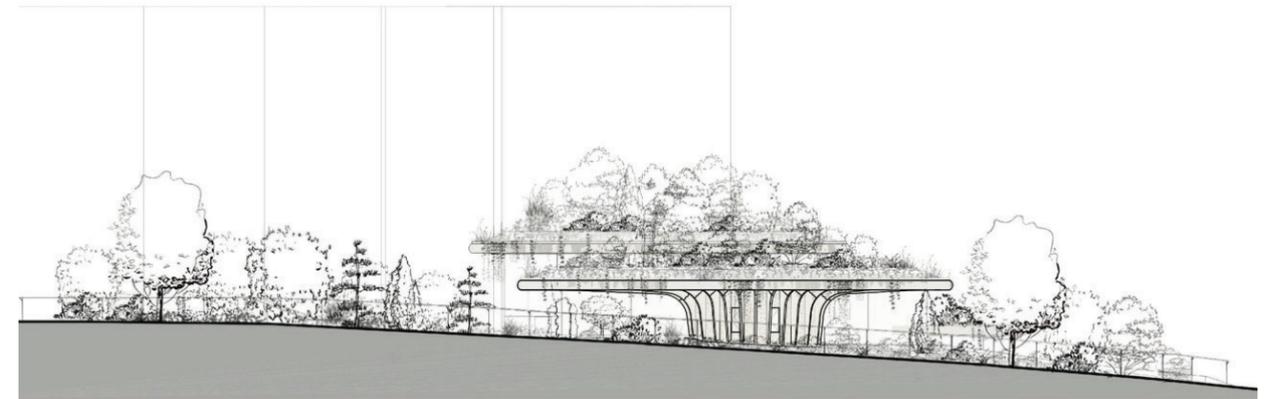


Figure 16 | Heatherwick Studio, photo credit | Longitudinal Section Cut

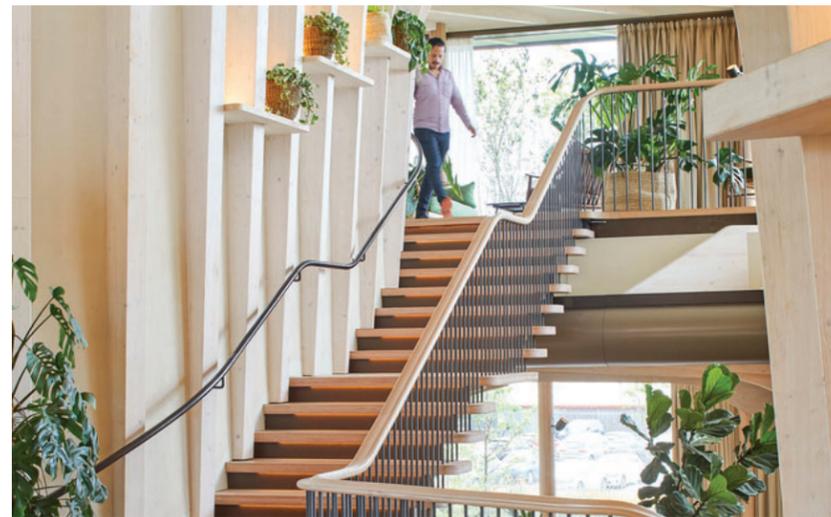


Figure 14 and Figure 15 | Peter Bennetts, photo credit | Kitchen & Green Design

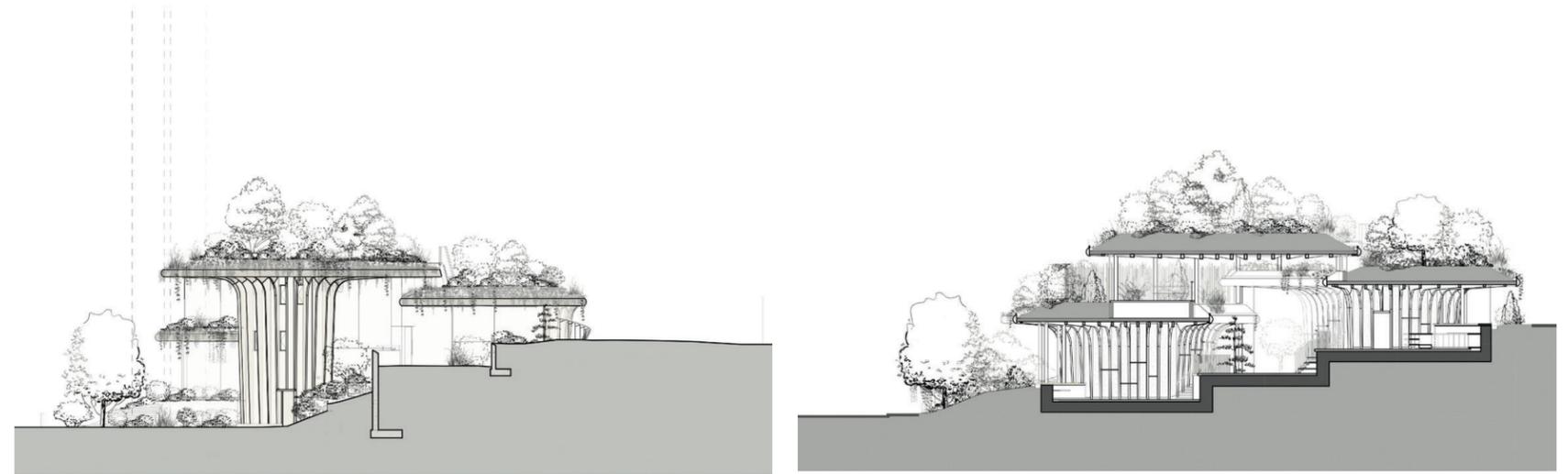


Figure 17 and Figure 18 | Peter Bennetts, photo credit | Transverse Section Cut 1 & 2

MAGGIE'S LEEDS CENTRE



MAGGIE'S LEEDS CENTRE

Research Findings:

This case has incorporated many sustainably sourced materials, resources, and techniques to help people feel better and heal faster. The commonality of this type of building is becoming a driving point for most architectural design nowadays and sustainable design is often said to be the new standard for the future of buildings.

This case is different or unique in the way that instead of taking on a whole approach to the healing environment such as a hospital, they took one portion of that environment and focused on it. By focusing on the practical and emotional support of people with cancer. They created a healing environment without the context of a hospital, including exam rooms, rehab centers, operating rooms, their sole focus is the patient's recovery and healing process. To do this they have incorporated multiple spaces to recharge that use 'healthy' materials and energy-saving techniques.

Environmentally, the building almost takes on the role of an inhabitable greenhouse, with vegetation and plants galore. Bouncing off that, the Centre's environmental footprint is very small. The building's structure is built from a prefabricated and sustainably sourced spruce timber tree system with porous materials making up the interior to maintain the humidity of the naturally ventilated building. The Maggie Leeds Centre also has a variety of rooftop gardens for visitors to take in nature and escape to.

Socially, the Maggie Centre evokes a sense of healing just within the interior environment and spaces that are programmed within the building. There are various spaces that are designed to encourage social opportunities and quiet contemplation completed with soft lighting, natural materials, and a sense of home. Maggie's Leeds Centre is a charity providing support for people with cancer. There are currently 26 centers in the United Kingdom. The projects are strongly based on their specific environment and location mending into the landscape. This specific Maggie's Centre was the charity's first healthcare project.

*NEMOURS CHILDREN'S HOSPITAL***Location:** Orlando, Florida**Project Type:** Children's Hospital**Architect:** Stanley Beaman & Sears; **Interior Designers:** Perkins and Will**Size:** 630,000 SF**Construction Date:** 2012**Distinguishing Characteristics:**

The design of the children's hospital evokes a life-affirming quality to comfort parents and excite the children. A new design standard has been met with this architecture and is evidence of the term "healing architecture". The architectural design challenge resonated with all and arose from a strong collaboration from stakeholders, administrators, practitioners, and the advisory board of the family committee with parents and children. The philosophy encompasses all ages from infancy to adulthood and cares for children with chronic conditions, rare medical diagnoses, and a variety of life-threatening illnesses.

With patient rooms with overnight accommodations for two parents, laundry facilities, and an easy-to-navigate circulation system, the hospital was able to support families from all walks of life and give them a sense of reassurance in a frightening time in their lives. The hospital is equipped with lounges and various playrooms overlooking and giving access to the outdoor green spaces designed for reflection and recreation. The outdoor spaces include rooftop terraces, water features, a discovery garden, and a community stage for performances.

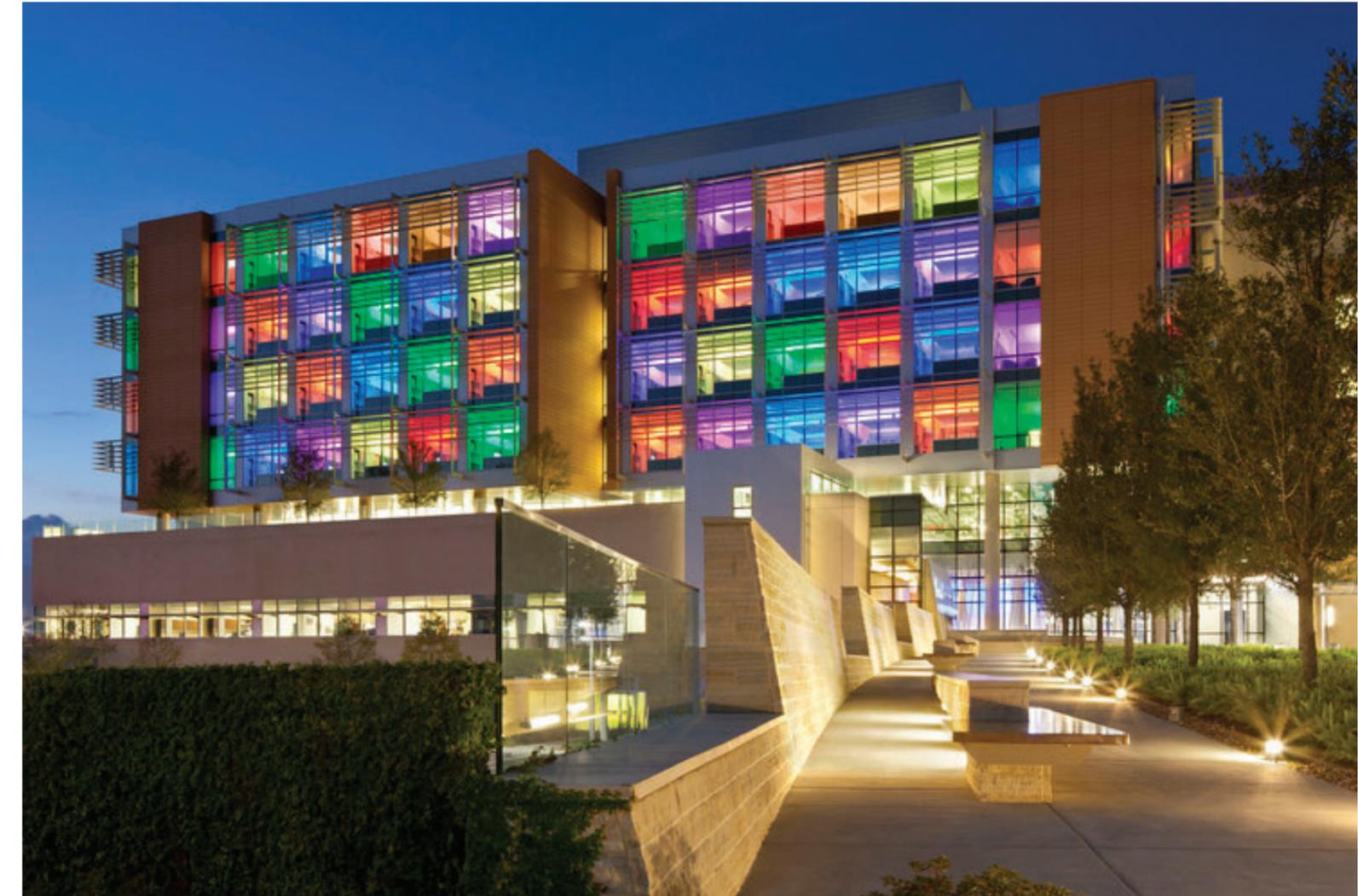
NEMOURS CHILDREN'S HOSPITAL

Figure 20 | Jonathon Hillyer, photo credit | Children Patient Rooms

NEMOURS CHILDREN'S HOSPITAL

Program Elements:

- 95 Inpatient Beds
- 76 Exam Rooms
- Emergency Facility Care
- Specialty Care
- Child Life Program (various activities for all ages)
- Free Parking
- Ronald McDonald House on campus
- Play Areas for All Ages
- Pharmacy on site
- Autism-friendly Care Spaces
- Cafe and Cuisine
- Green Spaces for Healing
- Rooftop Gardens
- Aquarium
- Nondenominational Chapel
- Social Work
- Spiritual Care
- Shell Space for 32 Beds & 24 Exam Rooms



Figure 21 | Jonathon Hillyer, photo credit | Reception Lounge Area

NEMOURS CHILDREN'S HOSPITAL

This graphic shows the first floor plan of the children's hospital. The spaces are laid out in an efficient circulation pattern to ensure ease of access.

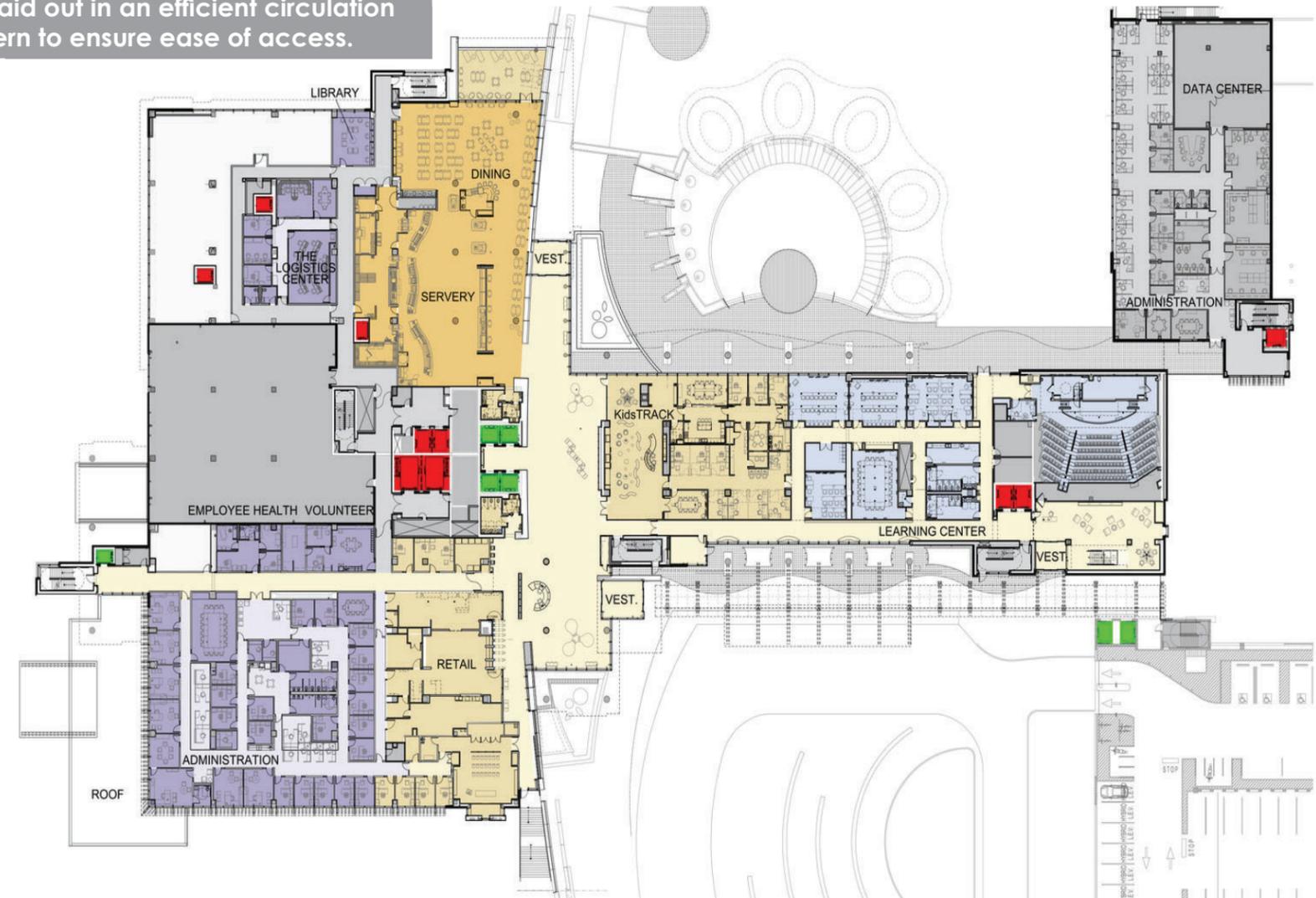


Figure 22 | Jonathon Hillyer, photo credit | Hospital First Floor

2.5 TYPOLOGICAL RESEARCH | CASE STUDY

NEMOURS CHILDREN'S HOSPITAL



This graphic shows the second floor plan of the children's hospital. The spaces show the roof garden, recovery center, surgery centers, etc.

TYPOLOGICAL RESEARCH | CASE STUDY 2.5

NEMOURS CHILDREN'S HOSPITAL

This graphic shows the fourth floor plan of the children's hospital. The spaces show the roof garden, infusion center, open activity commons, etc.

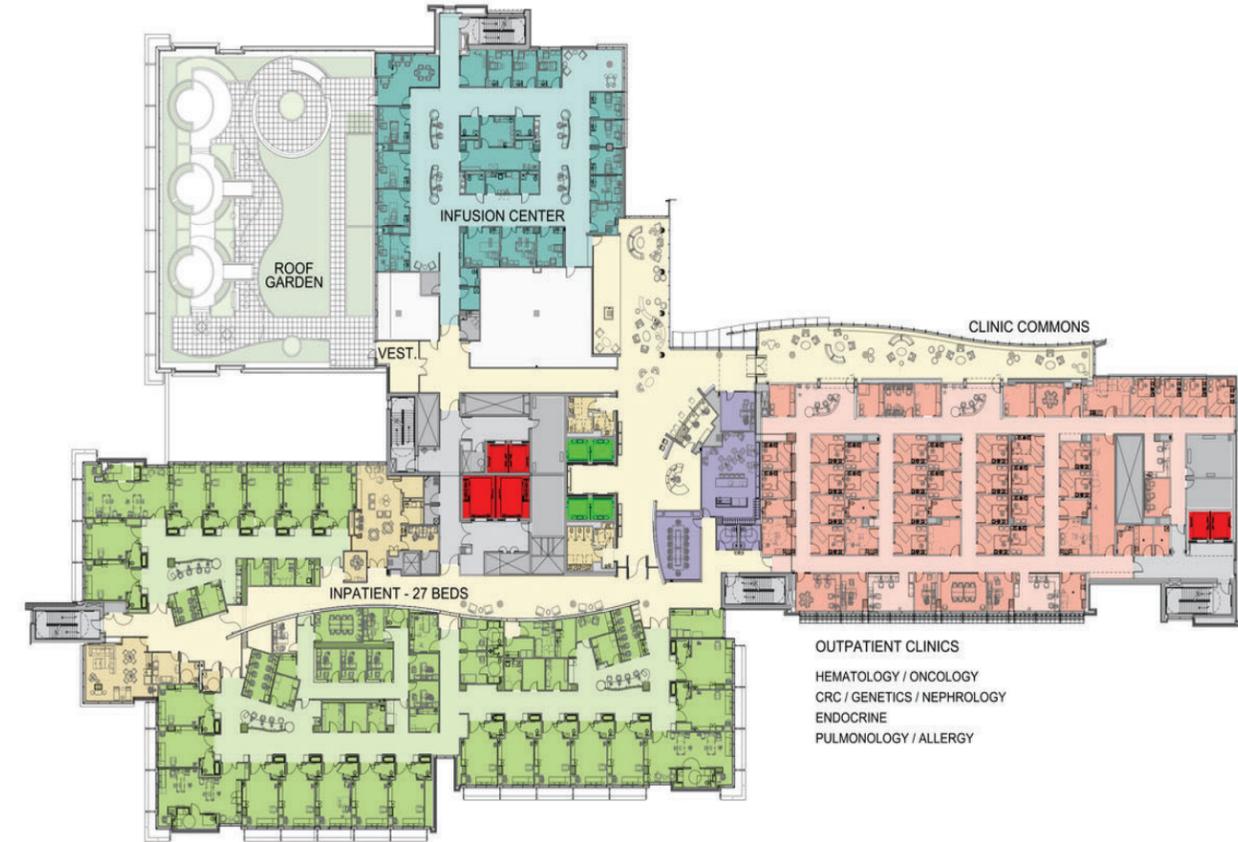


Figure 24 | Jonathon Hillyer, photo credit | Hospital Fourth Floor

NEMOURS CHILDREN'S HOSPITAL



The spaces within Nemours Children's Hospital are full of vibrant colors, a variety of alternative activity locations, waiting areas, and patient rooms in order to provide the best care for the child and their family, while making their stay as comfortable and calming as possible to reassure patients and delight children.

Figure 25 | Jonathon Hillyer, photo credit | Activity Space



Figure 26 and Figure 27 | Jonathon Hillyer, photo credit | Play Room & Reception

NEMOURS CHILDREN'S HOSPITAL

Nemours Children's Hospital is setting a new design standard focusing on creating a healing environment all throughout the facility. The use of large windows in waiting rooms to let in natural daylight and a variety of accessible rooftop gardens for patients and their families allow for a new holistic approach to architecture.



Figure 28 | Jonathon Hillyer, photo credit | Rooftop Garden



Figure 29 and Figure 30 | Jonathon Hillyer, photo credit | Waiting Area & Site

NEMOURS CHILDREN'S HOSPITAL



NEMOURS CHILDREN'S HOSPITAL

Research Findings:

This case has commonality with the basic programmatic structure and care philosophy. The hospital features specialty finishes and high-performance materials to give a clean and modern feel, taking major concern for the sunny and humid environment of Orlando. Solar studies were a major integrative design approach, like any project, resulting in shaded outdoor spaces, sunscreens, and the use of natural daylight to the interior spaces.

This case is different or unique in that the philosophy supporting the hospital embraces children "across the continuum of care" from babies to adulthood. The hospital is designed with the child in mind and many times during the various phases of the design process Nemours leadership responded with the question of "Is this in the best interest of the child?". By situating all decisions this way the design team was able to find its way to the heart of their priorities with the child, their families, and the environmental atmosphere at the peak affirming hope and happiness in the patients.

Environmentally, the hospital features a variety of green roofs and landscape features throughout the design. A landscape feature and outdoor space continue through the building and beyond. The green roofs offer a place of refuge and quiet contemplation for children and families after a long day of navigating the strenuous healthcare system. The hospital is a "smart" building in many ways with a monitoring center of all facility-related metrics, consisting of functional and fun technology integration, aiming further than just energy savings.

Socially, Nemours Children's Hospital offers care to families in all walks of life. The design was intended for both children and parents in mind, with overnight patient rooms accommodable for two parents, laundry service, and ease of accessibility. The children really are at the center of the design when implementing patient room layout and technologies. The children can adjust their own room accent lighting that is able to be seen on the outside facade, creating an ever-changing facade and playful design. The spatial layout of the hospital was created with needs and social circulation in mind.

MIND IN ARCHITECTURE:
NESTED BODIES

AUTHOR: SARAH ROBINSON

Within the book titled *Mind in Architecture*, is a chapter called *Nested Bodies* by Sarah Robinson. Within *Nested Bodies*, Mrs. Robinson attempts to illustrate the effect our mind and body have on our environment through studies and neuroscience. In making her case, she relies heavily on the history of science and architecture, other philosophical theorists, and nested entities within the body. The connections made by Robinson create great importance in the understanding of our mind and body and how this then impacts our sense of place, connection with the surrounding environment, and the atmosphere we are submerged in, beyond that of its physical one.

By citing the references and ideologies of other theoretical philosophers, Robinson seeks to frame how your brain, your body, and your environment are detrimental to how we experience our own worlds. Most of us think we know what our body is..flesh and bones, fingers, toes, veins, and blood. It's our body that in-habitats a space, our eyes experience something for the first time, we take in the surrounding atmosphere, the murmur of voices, the beeping of machines, the smell. Then we stop to think, how does this particular space make us feel? Within our body, is our mind. The mind is nested in the body, where our body is placed within the contents of the room and building. Conscious awareness is closely associated with the cerebral cortex, an intricately folded and connected sheet of nervous tissue. Each experience corresponds to a specific set of neural activities called the neuronal correlates of consciousness. "Each of our conscious state and every cognitive function –emotion, thought, perception, desire, memory, imagining –is generated in the mind" (Robinson, p138). And the cognitive function of emotion, thought, perception, etc. then stems from our environmental world acting simultaneously together. Neuroscientists are continuously expanding their vocabulary in order to nail down our complex interrelated activities that occur in our bodies and because of our bodies. From recent studies it is said that we can no longer consider the organism, which is our body, and the environment to be completely independent beings; they must be thought of as one unit acting together, affecting one another.

MIND IN ARCHITECTURE:
NESTED BODIES

AUTHOR: SARAH ROBINSON

"The meaning and presence of a building does not stop at the surface of its skin any more than your body does"
- Sarah Robinson

Another key point is made within the literature stating that buildings, like our bodies, are made up of a series of interrelated systems each possessing unique identities and offering differing affordances. Since we are made up of this uniqueness, the architecture of each person's brain is unique, our experiences of places inherently different from person to person. Why do we love and vividly remember certain places and not others? How do we create places that people will care for and cherish? This is where the Finnish architect and philosopher, Juhani Pallasmaa, comes in to help us decipher how we feel in differing places and what are interactions within that environment tell us. He introduces a sixth sense called atmospheric sense and claims it is our most important sense in terms of our existence. This atmospheric sense is described as fundamental and includes the other five senses –our entire being—in an ambient awareness of spaces as an all-inclusive being. Our architecture and the atmosphere that it portrays must mirror our overarching idea of design and set the stage for those who inhabit it to be able to immerse themselves into a wholistic experience to "transport" them away and shift their feelings or experience to a positive correlation, as we are so united with the environment.

Robinson ends her chapter, bringing forth the idea that the work of art, whether that be art itself, music, architecture, is not judged by the standards of right or wrong, but by how it moves us –how it deepens us—how it opens a variety of different dimensions within our minds, creating a newfound potential for the life you are living. Without the understanding of our environment, atmosphere, and our mind, a project finds success a difficult area to achieve. Robinson has various thoughts that could go on and on, but this reading should be of use to anyone who is looking into the environmental effects of people and how certain aspects can have a positive or negative effect.

ATMOSPHERES

AUTHOR: PETER ZUMTHOR

The atmosphere in which we live creates a strong emphasis on how we perceive the objects around us, the people around us, and the spaces around us. In Peter Zumthor's book, *Atmospheres*, he explains the impact of atmosphere, a haven created to temper with the feelings and consciousness of the human body and the experiences we face. The reading offers insight into the role aesthetic atmosphere plays in his work and what it means to him.

Zumthor, with this architecture, creates a perfectly tempered feel within his spaces that is immediately communicated to the viewers, offering a good place for people to go and free their minds. Throughout his writing, he emphasizes the idea that architecture does not follow a straightforward, linear path, yet a convoluted process. Zumthor states that quality architecture is when a building manages to move someone. Often this feeling we associate with space is spurred from, what we call our first impression. First impressions often seem out of the ordinary, but they are something we experience every day. You enter a building, see a room, and in less than a second comes an overarching mood taken on by just being there. Zumthor states that our perceived atmosphere comes from our emotional sensibility, which happens in the blink of an eye but is something we most definitely depend on. Zumthor compares atmosphere and emotional sensibility to music, where it is able to take you to a place outside of where you are and that is what architecture should be able to do and consist of. Peter Zumthor plays off a large variety of ideas in his own reality to solidify this idea of a body of architecture creating a sense of purpose and atmosphere that allows others to relax and meditate to another dimension.

Zumthor then adds to his idea, which I feel creates a strong contrast, is material compatibility. Within a space material selection helps in obtaining the overall essence of the atmosphere; think of concrete and think of wood. Which creates more of a feeling of pleasure? The concrete creates a hard, cold feeling where the wood creates a warm, cozy feeling. But there are thousands of different possibilities for the material alone, as a stone can be polished, ground, split, or drilled into. The idea of things reacting together creates radiance among the material composition and creates a feeling of soothing connectivity, one that brings life to the architecture, Zumthor states.

ATMOSPHERES

AUTHOR: PETER ZUMTHOR

"...perhaps one of the buildings will come back to them 25 years later, involuntary, and they'll remember a corner, a street, a square –with no thought for it's architect."

-Peter Zumthor

Just like music, the sound of space matters. Interiors are like very large instruments, collecting all sorts of sound, amplifying it, and transforming that elsewhere. This sense of sound and the volume of it comes from the shape of each room, materials applied within the room, and how those are applied. In designing many of his spaces Zumthor, known to play off the atmosphere, enriches his spaces with sounds to soothe, relax and take in the surrounding atmosphere. Zumthor emphasizes how each element in the room is a factor in the mood of the room, from the sounds to materials, to what you experience while in the space, to how you move through it. Architecture is thought of to Zumthor as a spatial art and a temporal art through connection with space and experience that is not limited. Take for example Zumthor's *Thermal Vals*, it was important for Zumthor to create an induced sense of freedom, where the people did not feel directed on a path through the building yet, they took their own journey at their own pace. The *Thermal Vals* brought separate parts together, forming attachments with people and their places as they see fit.

Throughout the various forms of Zumthor's architecture, the people were always placed at the center of his architecture. He thought through and carefully designed spaces and elements to coincide with people's moods, their feelings, their experiences, encompassing all those into one whole building. Through this he was able to imagine how someone else would use this space, what statement can it make to the people inhabiting it. I find it extraordinary when architecture is able to impact the human environment and experiences. Zumthor has a passion for architecture stating that architecture should not be forced. It shouldn't be made into something obtuse, that only cares for the architectural form but does, in fact, relate to the human experience in some external way. Zumthor not only has a passion for architecture but people as well and that is something to be seen in every design Zumthor puts on the table.

MIND IN ARCHITECTURE:
MOOD & MEANING

AUTHOR: ALBERTO PÉREZ-GÓMEZ

Within the book titled *Mind in Architecture*, a particular chapter portrays the connection between his previous book, *Architecture and the Crisis of Modern Science*, and the perception of mood and scientific consciousness in relation to our environment today, called *Mood and Meaning in Architecture*.

Gómez starts off by stating how Western Architecture was very affected by the 17th-century scientific revolution, bringing in a set of intentions that were modern before the changes of the Industrial Revolution took place. Gómez plays off the words of the 17th-century writing of Claude Perrault, architect, medical doctor, biologist, and theoretician. He believed that architecture has a way of communicating its meaning to a soul, that being the consciousness, bypassing the body, with its intrusive feelings and emotions. Through further development of this discussion, Romantic philosophy, and turning back to point of view of Western architecture, neuroscience starts to become useful to architects all over, after the "invention" of neurophenomenology. Through the term cognitivism and this newly discovered psychology, we are able to stop depending on analytical philosophy and computer brain models and start acknowledging the relations between cognitive processes and the environment. In exploring this analytical process of cognitivism, it is known that perception is something we do and is not something that happens to us, our intellectual and motor skills are a strong, fundamental piece to our cognition and help us to understand our surrounding environment in which we inhabit. This part of the external world—the environment, the city, architecture—really matters and comes to us through interpretation after we have the world in hand, allowing architecture to affect us in the full range of our conscious awareness, from beginning to end stages of reflection. Through our individual and unique experiences, we form a self-awareness that is profoundly affected by our environment, Gómez says. He goes on to state that neurophenomenology's understanding of architecture is very capable of complementing the process of human consciousness, seeking to create a balance between purposeful action and reflective, purposeful, understanding of our place in this world. By becoming aware of our surroundings through our consciousness and self-awareness, Gómez states, opened the doors for a new look at architecture.

MIND IN ARCHITECTURE
MOOD & MEANING

AUTHOR: ALBERTO PÉREZ-GÓMEZ

"...our architectural experience is always ultimately dependent upon our participation in an event housed in the space; it is in such circumstances that architecture 'means'"

- Alberto Pérez-Gómez

In Gómez's discussion on mood and meaning, later he relays that our consciousness does not end with our skulls and it becomes easy to solidify the immense responsibility that our built environment plays within our everyday lives. This too solidifies the fact that neurophenomenology points to the crucial importance and relation to our surrounding environment. Rather than just merely accepting the fact that technology and computer intelligence are the major factors, as the rise of the Industrial Revolution portrayed, as our experiences are nothing in relation to a computer screen, such spaces we inhabit must embody appropriate moods or atmospheres to further support our health and well-being.

Gómez also touches lastly on the idea of *Stimmung*, meaning 'mood', an attunement that evokes interiority. Gómez relates *Stimmung* to the concept and central questions of harmony, music, philosophy, and architecture. This idea is the background of Gómez's overarching idea of mood and meaning, setting the tone for future architectural creations.

While Gómez does not provide a framework for designing places with mood and meaning in mind, he creates an alternative approach to the way we look, feel, and are attracted to architecture through philosophical and theoretical ideas. Without the notion of mood and atmosphere and how that projects meaning, our buildings that we design would leave no lasting impact on those who inhabit them.

**DESIGNING FOR WELLNESS:
THERAPEUTIC LANDSCAPES****AUTHOR: REUBEN M. RAINEY**

In the article *Designing for Wellness*, Reuben M. Rainey discusses the traditional hospital environment alongside the now modern hospital environment. Over the past 40 years, architecture has made a great transformation, specifically in the many healthcare facilities in the United States. Five years ago, you would have encountered a completely different environment: a poorly lit library, white or beige walls, chrome surfaces amplifying the intercom announcing medical emergencies, low ceilings with fluorescent lights, and a maze of hallways. Your family member or friend would have been sharing a room and bathroom with one other person, given a single vinyl curtain to separate the two spaces. The room would often only be comfortable for the patient and potentially one other person is given the small chair in the corner of the room. The view out the small window would be nothing more than a parking lot or a brick wall. The overall experience was one that was unpleasant, filled with aromas, too bright of lights, and aesthetically sterile, where leaving the hospital would have been a great relief.

As this type of situation seems stressful enough, this is a great advancement in the healthcare industry half a century ago. In the late nineteenth century, before the germ theory of disease took hold, hospitals were often considered death traps for the poor. Medical care was in the home, for those who could provide it, and hospitals were shunned as one had a little chance of getting out. Thanks to the discovery of germs by scientific pioneers Louis Pasteur and Robert Koch, our understanding of how germs and diseases spread grew at a rapid rate. By the mid-twentieth century, the hospital was equipped with high-tech equipment and a highly trained staff of specialists from all over. The hospital facility was designed to accommodate physicians and staff efficiency as well as designed to be sterilized easily. Patient perceptions of the environment and the feelings it evoked were of secondary importance, however. As recently as 50 years ago, scientists thought the patients' perception of the medical environment had little to no effect on the outcome of their treatment, soon to find out that they were blindsided by that. But because they thought the environment played little to no factor in our everyday lives the medical facilities reflected the science faced throughout the day: keep the facility as germfree as possible with easily cleanable materials such as tile and chrome and make the space as functional and efficient as possible. As time went on, research of clinical settings, such as a healthcare facility, was

**DESIGNING FOR WELLNESS:
THERAPEUTIC LANDSCAPES****AUTHOR: REUBEN M. RAINEY**

“We have the knowledge. What is required is the will to use it.” - Rueben M. Rainey

proven that the patients perception of their seeable surroundings and their surrounding environmental atmosphere profoundly affects their well-being. The overarching idea from this being that, the more their environment brings out stressors, the less positive their health outcomes, treatment, and rehabilitation will be.

With the extent of research and advances in science, Reuben M. Rainey states that hospital healthcare facilities were able to undergo this metamorphosis like stage to promote a better environment than the one we are often use to. Rueben explains the experience we are prone to in hospitals today and the vast difference it creates in the patients, their visitors, specialists, and medical staff. As you enter one of these spaces today, you walk in to a spacious lobby filled with sunlight and natural materials at every glance. Acoustical ceiling panels absorb the sounds and it is suprisingly quiet. The walls are filled with regional landscapes, flowersing blooming, and birds. You family members room is secluded from others with a generous window to fill the room with natural light. You have a place to sit, a lounging couch with soft fabric, that is most comfortable than a domestic chair. Your family member is able to adjust the lighting and blinds at their own free will from the touch of a button. They have free range to select television programs, make phone calls, and call for help from a handheld remote. This then gives the patient a sense of control, something they were not used to previously and seems as if you are visiting a high-tech facility with the latest equipment and clinical protocols providing the utmost effective patient-centered care.

The designs that are produced from a healthcare standpoint, Rueben says, must combine the aesthetic sensibility of the architectural design as well as the strict functional demands of the practice of medicine. The main concern in the patients, but we must also be concerned with those who work in the medical facilities, as they spend the majority of their waking hours in these buildings. The workers compassion, knowledge, and efficiency combine to form outstanding healthcare and they deserve the very best designed environment as well. Although, Ruebne M. Rainey does not intentionally build said buildings, he keeps us aware of the mission these facilities should be leaning towards to aid in the recovery and healing of these patients.

TITLE: *View Through a Window May Influence Recovery from Surgery*

AUTHOR: *Roger S. Ulrich*

ABSTRACT

Between 1972 and 1981 records on recovery were examined of patients in a suburban Pennsylvania hospital to determine whether or not being assigned to a room with a window view of nature and natural settings would have restorative influences on their overall healing. This study took into consideration 23 surgical patients that were given rooms with windows looking out on natural scene. Matched with the first 23 patients were patients in similar rooms with windows facing a brick building wall. These 23 patients with views to nature had shorter postoperative hospital stays, received fewer negative evaluation comments in nurses' and took fewer medications to relieve pain or discomfort. The study took into effect the investigations of aesthetics responses to outdoor visual environments, and how this in turn affected the patients overall healing longevity. The impact of the environment and natural elements that we are subject to are able to sustain interest and attention more effectively than urban views.

KEYWORDS

Recovery	Natural Elements	Patient	Psychological	Hospitalization
Anxiety	Analgesics (pain medication)		Therapeutic	Understimulated

INTRODUCTION

Investigations have been ongoing to get a better look into the affective responses of patients to out-door visual environmental stimulation. It has been noted that American and European groups show a tendency of preferring natural scenes more than views that lack natural elements. It was noted that views of vegetation, water, and nature attain effective attention far greater than urban views of the equivalent information rate. Also noted was that natural views tend to enforce more positive feelings and emotion, reduce fear and reduce stressful thoughts. Being subject to natural views is also known to foster restoration from anxiety and gloomy thoughts that tend to flow through a hospital facility setting. This restorative effect of certain feelings was thoroughly examined in a suburban Pennsylvania hospital. The patients who were subject to the research study were ones who often experienced a considerable amount of anxiety, and the hospital confinements limits their access to outdoor environment almost completely through the views out the windows. These outdoor views are especially important to the individual who spends a great deal of time in the same room for a majority of the day. With this study it is possible that the window view of the natural environment may influence the patient's emotional state and may positively affect the rate of recovery.

METHODOLOGY

This research study was conducted in a hospital setting in Pennsylvania with windows on one side of the wing looking out to either a brown brick wall or a small stand of deciduous trees (Figure 33). Each nurse was assigned to the same room on a given floor and the nurses stations are located closer to the wall-view rooms on both floors. Every patient room are double occupancy and are almost identical in terms of dimensions, window size, arrangement of furniture, bed, and other characteristics. Each room was suited with a single window (1.83 m X 1.22 m) with the size and placement of the window allowing for an unobstructed view to the outdoors for the patient lying in bed. The patient rooms differ only is what is seen through the window, either a brown brick wall or a grove of trees. Each patient is then assigned their room as they become vacant. The patients chosen for this research study were ones who had undergone cholecystectomy, a common gall bladder surgery. Only cholecystectomies between May 1st and October 20th, 1972 through 1981, were taken into consideration because that is when the trees have

foliage. Excluded patients from the study were patients who were younger than 20 years of age or older than 69 years of age, and those who had complications during surgery or a history of psychological disturbances. The patients were then matched by sex, age (within 5 years), smoker or nonsmoker, obese or normal weight limits, year of surgery (within 6 years), floor level, general nature of previous hospitalization, and the color of their rooms (blue or green depending on the floor). For each matched pair, one member had a room with a view of the trees and the other had a view of the brown brick wall. The data base consisted of 46 patients grouped in 23 pairs, 15 females and 15 males. The data was extracted from the records by a nurse given 5 types of information taken from each record: number of days in hospitalization; number of strength and analgesics taken each day; number and strength of doses for anxiety; minor implications (headache, nausea, etc.), and all nurses' notes relating to a patient's condition or course of recovery.

[DATA COLLECTION AND ANALYSIS]

For each patient the length of the hospitalization is defined as day of surgery to the day the patient was discharged from the hospital. The records showed that patients who had the window showing the view of the trees spent less time in the hospital than those with the views of the brick wall: 7.96 days compared to 8.70 days per patient. The notes taken by the nurses were written during the postsurgical period were designated either positive or negative. Negative notes would include something to the effect of "crying and upset" or "needs encouragement", where positive notes included things such as "in good spirits" or "moving and eating well". The more negative comments were made by the nurses with the patients in the window looking out to the brick wall: 3.96 per patient compared to 1.13 per patient with the window view of the tree grove. Within the research study they conducted various multivariate studies. One of the multivariate testing's done was a two-sample Hotelling test used to compare groups for analgesic (pain medication) intake. The doses on average per patient were computed for first, the day of surgery and first recovery day, then days 2 through 5 after surgery, and then days 6 and 7 after surgery. For the first period of this multivariant study it was expected that there would no differences in analgesic intake between the two groups, brick view and tree view, because

the patients would all be simultaneously too drugged or in too much intense pain to pay attention to what they saw out their specific window. On the final days, day 6 and 7, there also was not expected to be a significant variation of changes in the patients. It was noted the only 45% of the patients in the research study took any analgesics after the 5th day. The data for the patients would all be simultaneously too drugged or in too much intense pain to pay information is summarized in Figure 33 below.

Table 1. Comparison of analgesic doses per patient for wall-view and tree-view groups.

Analgesic strength	Number of doses					
	Days 0-1		Days 2-5		Days 6-7	
	Wall group	Tree group	Wall group	Tree group	Wall group	Tree group
Strong	2.56	2.40	2.48	0.96	0.22	0.17
Moderate	4.00	5.00	3.65	1.74	0.35	0.17
Weak	0.23	0.30	2.57	5.39	0.96	1.09

Figure 32 | J. Stor , photo credit | Dosage Chart

[DATA COLLECTION AND ANALYSIS]

The days of primary interest for the research study were days 2 through 5, which showed a significant variation between the tree-view and wall-view patients in the number of medication doses taken by the patients. Shown in the table above, patients with the tree-view took fewer moderate and strong pain doses than the wall-view patients. Like mentioned earlier, an experiment was also done in respect to antianxiety drugs, but this showed no significant variation between the tree and wall-view groups. The intake of narcotic analgesics by patients with the wall view could have lowered their use of the drug to that of the patients with the tree view because the observed frequency of doses was lower than the nurses expected.

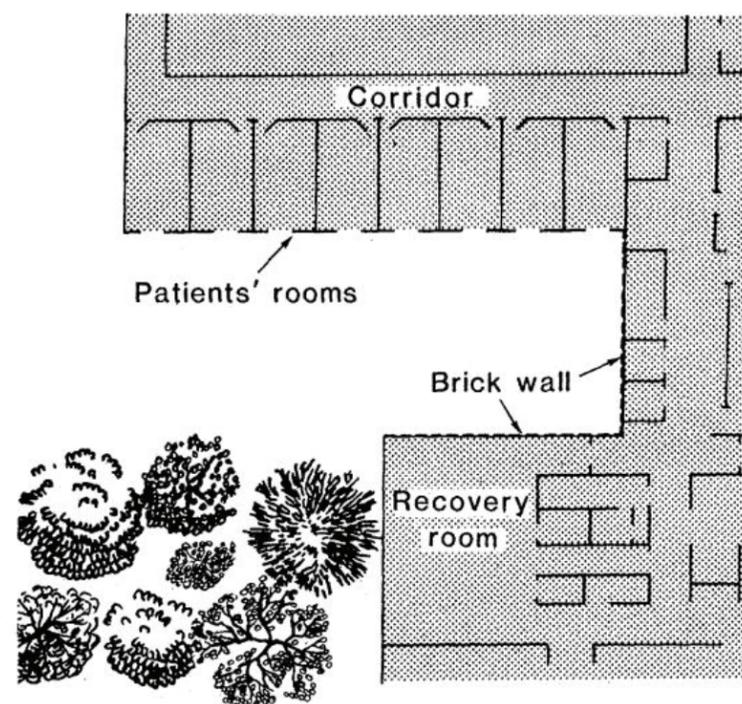


Figure 33 | J. Stor , photo credit | Study Diagram

RESULTS & DISCUSSION

Using various multivariate studies within the signifying research study, the evidence found can strengthen the idea of incorporating natural views, materials, and atmosphere within a setting such as a healthcare facility. Although this study was done a few decades ago it shows that people have not changed and they have always been attracted to the natural way of the world, as it's inviting and enticing to the mind and parts of the body. In comparison with the wall-view groups of patients, the tree-view patients had a shorter postoperative stay at the hospital, while taking fewer strong analgesic doses of medication. The tree view patients also received fewer negative comments back from the nurses and portrayed a more positive, lively attitude.

Although the study did show that the natural scene had a comparatively more therapeutic influence on the patients, it should be noted that the "built environment" in this study was a very monotonous, featureless brick wall. Based on this alone, the conclusions should not be drawn or put in place for all built environments or other patient groups (long term, low arousal, or boredom patients) rather than anxiety problems that are typically associated with patients who undergo surgery. But, with all that aside, the study 'View Through a Window May Influence Recovery from Surgery' implied that hospital design and the physical siting environment should take into consideration the quality of views and what the patient is submerged to every day while they are in their hospital room recovering from any type of surgery, disease, or just received news of a diagnosis. The physical environment of the hospital, as well as the surrounding environment of the hospital, play a pivotal role in the healing process of an individual.

The three precedent architectural case studies analyzed in the above sections were used to further develop and deepen the understanding of the thesis project being developed. The case studies that were examined were: The Woy Woy Rehabilitation Unit in Australia, Maggie's Leeds Centre in the United Kingdom, and Nemours Children's Hospital in Florida. Each of these case studies was thoughtfully and uniquely chosen based on their individuality, typology, context, impact, and innovation they bring to the table. The three case studies showcase significant and overarching similarities in their design approach, problem-solving, and implementation of their core characteristics. All case studies exemplified various forms of sustainability, green design, attention to space and atmosphere, programmatic structure, and an overall feeling of a healing environment. These case studies work as a guide of examples for how the design can be achieved and was aimed at supporting the unifying idea of the thesis but did not change the outcome of the thesis idea being developed.

The Woy Woy Rehabilitation Unit is a rehab center located in Australia is a co-located and integrated design with the Woy Woy hospital on the Central Coast of New South Wales. This case study looked extensively into the nature of design, intertwining history, geography, culture, and environment into the design. This study showcased a great example of a care facility that offers a variety of healing options, the central focus being a natural healing environment. This rehabilitation unit serves as an extension of the hospital's clinical program with a central theme of "homes in the park". The functional relationships of the spaces are integrated with the natural environment in mind, allowing every patient's room to have access to the green space through visual connections of the interior and exterior spaces of the units, fusing them together. Throughout the rehabilitation unit, there are interior spaces of sanctuary and nurture to also align with recovery and healing. The design encompasses an exterior residential feel with attention to color, materials, and form that frames green spaces, enabling a flooding of ideas for growth and regeneration of the healing process.

Maggie's Leeds Centre's started in the United Kingdom and are a very popular institution throughout the country. The Maggie Leeds Centre is a charity that's unifying idea focuses on practical and emotional support for people with cancer. By paying close attention to the surrounding site, the site itself, and the interconnectivity, the Centre became a utopia in the realm of healing. Maggie Leeds Centre consists of an open spatial layout that is functional and efficient for all users. There are a variety of places for relaxation, socialization, and activities that cultivate around the unifying idea of longevity, support, and healing.

An uncommon characteristic that seems out of context with the building is the site location. It is located in the heart of the city with towering buildings and a busy road. The overall landscape of the site hides the surrounding environment to the best of its ability to coincide with the unifying idea. The building takes on the site and is built into it, giving all the more power to the added green roofs and vegetation located around the site. Not only is the functional layout beaming but adding to that is the use of 'healthy' materials and sustainable, energy-saving techniques throughout the building coming full circle to a holistic approach to regenerative healing.

Nemours Children's Hospital is situated in the Lake Nona Medical City, a mixed-use development in Orlando, Florida. The unifying idea of this design was to emphasize a healing environment enriching the lives of those who enter with reassurance, hope, and delight. This idea and solution came from a strong collaboration with stakeholders, practitioners, administrators, and various family advisories of children and their parents. In caring for children with often chronic, complex, and strenuous medical conditions the hospital is designed to reinstall hope, inspire, and engage the patients and their families mirroring the role of nature in the life of a child. In supporting families from all walks of life the hospital is equipped with ample lounges, various playrooms, extensive outdoor spaces designed for retreat and contemplation, and interactive technological features. The program of the hospital consists of inpatient and outpatient rooms, recovery units, an oncology center, social work, a child life program, an on-site pharmacy, and so much more. Of these programmatic units, they all reflect the unifying idea of dedication to the child's health through a healing environment. The spaces are functionally efficient and accessible to allow for an easy understanding of spaces in an already frantic and emotional time in our lives. The uniqueness of the site adaptations and the play of the design create recognizable importance to a healing environment.

Together, these three precedent architectural case studies pertaining to various aspects related to the purposed healthcare design. The Woy Woy Rehabilitation Unit focuses on a healing environment through nature and incorporates that throughout the whole facility, similar to what the Maggie Leeds Centre does within their design. The Maggie Leed Center also focuses on the materials used within the design, which I feel is a detrimental aspect of the overarching idea of my project. The materials used within the Maggie Centre are sustainable and local, which adds to the atmospheric sense of the building as a whole. The Nemours Children's Hospital pertains to the family aspect that is wanting to be incorporated into the proposed design. The hospital design enriched the lives of all those who enter, pertaining to the specialists, nurses, families, patients, and visitors. Incorporating a healing sense for all people within the design shows through in Nemours Children's Hospital is a great example set for the design of the healthcare facility.

To coincide with the precedent case studies done previously and to support the proposed thesis design four literature reviews have been reviewed and analyzed. Each literature review pertains to differing theoretical and philosophical aspects as well as designing for the future of healthcare facilities. Through the use of the theoretical literature reviews, new perspectives can be opened allowing a light to be shed on the underrepresented elements that arise in the realm of a developing project. The four literature reviews that are discussed are *Nested Bodies and Mood & Meaning within Architecture*, within the book *Mind in Architecture*, *Atmospheres* by the famous architect Peter Zumthor, and *Designing for Wellness: Therapeutic Landscapes*. This summary will analyze the four literature reviews by comparing and contrasting their underlying meanings and perspectives.

Within *Nested Bodies*, Sarah Robinson makes us aware of how we each experience our own part of the world, separate from what anyone else does. She takes into consideration the development of the study of neuroscience. Neuroscience must be understood to nail down our interrelated activities that occur within our bodies because of our experiences interpreted by our minds. The body can be compared to buildings as each is made up of interrelated systems possessing unique ideas and differing identities. Whereas Robinson has a very scientifically explained theoretical premise it contrasts well with a few points in the thinking of Peter Zumthor in his book *Atmospheres*. Zumthor states that the impact of our atmosphere is based on our experience of a space, unlike Robinson he does not go into depth but relates this feeling to something we all know as a first impression. Zumthor uses his architecture to create a sense of purpose within the space and believes that it is one's own experience that creates that sense of purpose. Through this overarching idea, it is seen that Zumthor not only has a passion for architecture but a passion for people as well. Zumthor states that quality architecture is something that moves someone and should not be an activity that is forced in any way. Now, in relation to Robinson and *Nested Bodies*, this positively correlates as she also talks up the idea of architecture moving the people who are experiencing the space without judging the standards of a right or wrong design. Together these two theorists work well with each other and their overall understanding of the realm of atmospheric architectural space. With these ideas compared we can understand past, present, and future architecture and where we need to push designs to impact the people who inhabit them.

Gómez in his book called *Mood & Meaning within Architecture* touches on analytical philosophy, computer brain models, and neurophenomenology in distinct correlation to the ideas of Robinson in her

book. The differing aspect that Gómez touches on pertains specifically to how our consciousness comprehends our entire built environment that each of us experiences within our everyday lives and how we become aware of those surroundings influencing our mood. He plays off the idea of Robinson with the consciousness being a part of our experience but digs deeper into creating that balance between our cognitive processes and our surroundings. Through Gómez's writing, he plays off the ideas of the 17th-century scientific revolution and the views of Western Architecture, which sets him apart from the writings of Robinson, through talking through those perceptions. He states that the part of the external world, as in architecture, the city, the environment, all matters and comes to us through our interpretation and experience of a space. Our first impression as Peter Zumthor would think of it as. A differing point of Gómez, his pride and joy, is his idea of *Stimmung*, or mood. He relates this to common comings of ideas like harmony, music, philosophy. With this overarching idea, he is setting a different tone than most are used to when it comes to future architectural creations. Without the notion of mood and atmosphere, the design of our buildings would leave no lasting impact on those who inhabit them.

The last literature review, *Designing for Wellness*, encompasses all three of the previous literature reviews into one. Architecture has made a grand transformation over the past 40 years and it is all due to new knowledge gathered through philosophers, neuroscientists, specialists, theorists, and many more. We cannot understand how to design spaces if we do not take into consideration; the atmosphere, mood, the mind, the body, and the meaning behind it all. Rueben uses the advances in research, writings, and science to explain the stages of change hospitals have gone through to promote a better environment for all that enter the building, space, or experience. Through the understanding of the first three literature reviews the sheer realness of a built space, a hospital space, can be attested and put into the spotlight, where it was not before.



Figure 34 | Texas Children's Hospital, photo credit | Joy

As healthcare and hospitals, today are becoming a place where many people, specialists, nurses, and other workers are spending many of their days, given the circumstances of the current worldwide pandemic, we must be a strong advocate for our very atmosphere, environment, and how our physical and mental healing is affected by those.

As healthcare facilities are often ever-changing and always in need, it is imperative need to find an equilibrium between our everyday, normal life and sickness. Sickness represents a loss of equilibrium in not merely just a medical state but a historical and social process of life. Sickness or a diagnosis creates an unwavering feeling, and you tend to fall out of your normal state of life, missing something that was previously enjoyable due to that sickness. Given this, the patient is always determined to return to the normal state of life, one without all the treatments, hospital visits, and doctors. Doctors should look beyond the diagnosis they are treating and create compassion and gratitude for the human being, that person's particular life situation, and their friends and family because doctors have the ability to successfully allow patients to return to their normal state of life, what we now know as their equilibrium. To maintain this sense of balance one must take into consideration the social and atmospheric environment of the space they are inhabiting, looking at a variety of features to ensure a natural healing environment. Not only taking into consideration just the patients themselves but their families, friends, doctors, nurses, specialists, etc. because as long as they are a part of the patient's journey, they should benefit from the environmental features as well. Without regard for those who live day in and day out to give you the best possible care, the healing process would not be in existence. With help from those along the journey of recovery, as well as the impact of the environmental stimulation factors, atmosphere, and the balance of that the human body's ability to heal will be immaculate.

From years of medical research, we now know and understand how the medical environment is proven beyond a doubt that the patients' perception of their surroundings profoundly affects their well-being and sense of healing. This proposed project will demonstrate how a healing environment is able to encourage a strong healing process for patients, parents, and specialists. Through various case studies, literature reviews, interviews, and research I will combine the knowledge gained to the spaces that we inhabit, the environment, the atmosphere, and exposure to nature in a way that will have a direct impact on the human body in relation to comfort, stress, anxiety, and conscious stimulation, which entices a role in the human body's ability to heal from such a frightening disease such as cancer.

Historical, Social, and Cultural Context

The environment has been a central part of curing illness and restoring health within various cultures, until the discovery of modern medicine, in particular the development of antibiotics in the twentieth century which were said to eliminate the threat of infectious diseases. In the ancient Greek culture, at the shrines of the god of medicine, Asclepius, the sick went to be healed. In China and India, the geometric ordering of buildings is taken into consideration, relating closely to the everyday balance of bodily functions. The word 'hospital' derives from the Latin hospes, or the common word guest, so a hospital was originally a place meant to care for guests and not the sick. When 'modern' hospitals began to take refuge in Europe in the 18th century, their architects set considerable configurations and proportions, particularly of inpatient wards. These wards were often unsanitary and very prone to the spread of diseases for all. Although, no one was more explicit in linking the designs of wards to patients' recovery than Florence Nightingale, the founder of modern nursing. In her Notes on Nursing of 1859, she wrote, "they [patients] should be able, without raising themselves or turning in bed, to see out of the window from their beds, to see sky and sun-light at least, if you can show them nothing else, I assert to be, if not of the very first importance for recovery, at least something very near it."

With this change in thinking back then, five years ago today you would have still encountered a poorly lit lobby, white walls, and tile surfaces that amplified noise. Not to mention a confusing maze of hallways, fluorescent lighting, and low ceilings. Your overall experience would not have been great and the thought of leaving would have been relieving.

As the evolution of therapeutic environments took the world by storm, two concepts became apparent in such spaces. The first concept of being able to unite the mind and the body together in such a nature. The second concept being the pre-eminence of nature as an agent to heal. Through research and modern medicine, it was found that daylight, fresh air, scent, modulated sound, views of greenery and gardens affects the body's physical mechanisms, as well as the mind in the perception of the simple notion of being cared for. The achievements of scientifically based medicine by the twentieth century shifted the outlook of healing entirely to the body and even elevated the physician specialist as a sort of all-knowing being of cures. A new architectural paradigm came from all this found knowledge increasing the acknowledgment of the patient's experience and thrived in the area of Ann Arbor whose medical professionals were one of the best in the country.

Historical, Social, and Cultural Context



Figure 35 | St. Luke's University, photo credit | 1800's

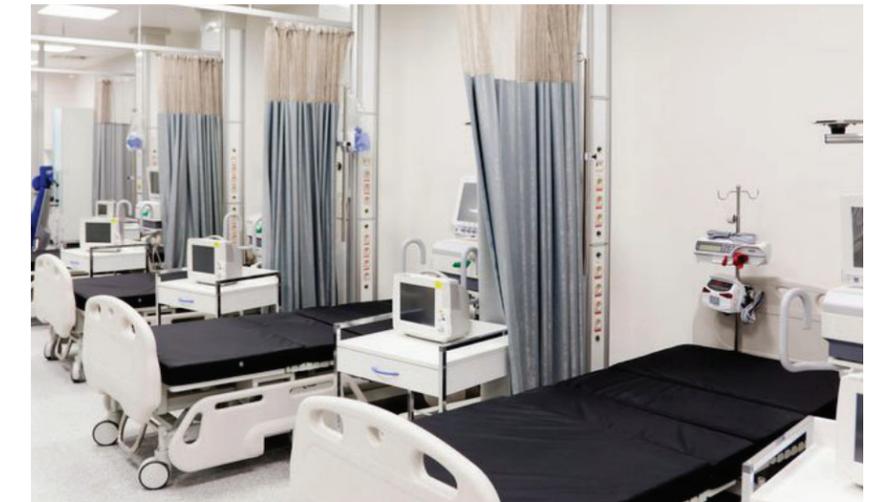


Figure 36 | Smithsonian Magazine, photo credit | Sterile

Historical, Social, and Cultural Context

Ranking as the 7th most prestigious hospital city in the world, Ann Arbor is known for its attention to health, patients, and the utmost care when it comes to healthcare and hospitals. Before Ann Arbor was to become this prestigious healthcare city, they went through tragedies, crises, and disasters. Ann Arbor was founded in 1824 by John Allen and Elisha Walker Rumsey, after a long decade of wars and massacres. The town was named after the founder's wives, both named Ann, and the stands of bur oaks in the 640 acres of land they had just purchased. The town became known as a regional hub in 1839 with the arrival of the Michigan Central Railroad, and a railway heading north to south connecting Ann Arbor to Toledo. This made Ann Arbor a central location for settlers in the 1800s, with emigrants from Greece, Italy, Russia, and Poland. With this, the city of Ann Arbor began to see increased growth in manufacturing, particularly in milling, and made a name as an agricultural trading center, connecting it to Detroit. The University of Michigan soon moved to Ann Arbor in 1837 from Detroit and played a massive role in Ann Arbor's growth as a new city. The events of the students soon dominated the life of the city, while the complex of hospitals and the University's medical campus soon made Ann Arbor a leading medical center.

It was not an easy start to make this town into one of the most leading medical cities in the world. In the years after the Civil War, debate set out to decipher whether it was enough for students to gain medical knowledge by just sitting in a classroom. After all, don't students in that field learn best with hands on experience in an actual hospital? The professors soon came to believe that the University should have its own hospital and with the funds from the newly appropriated state legislature, the idea was approved. Although the idea was approved, there was not enough money for a new building and converted a house into a medical facility, treating the first patients in December 1869. It could barely be called a hospital. This little enterprise began to grow an increasingly steady pace for so long that in 150 years it would no longer be called a hospital. It would become a major health system, now called "Michigan Medicine" –encompassing several major treatments and research centers, laboratories, several major hospitals, laboratories, and hospitals. Ann Arbor's University of Michigan defied the odds, starting from nothing to become one of the world's greatest medical schools, staffing 3,000 physicians, scientists, and surgeons, 5,700 nurses and support staff, who, together, would care for 2.1 million patients, perform 60,000 surgeries, treat 100,000 emergencies, and deliver 4,600 babies annually, spreading its wings into 25 other cities and towns across the country.

Historical, Social, and Cultural Context



Figure 37 | Thornapple Rail, photo credit | RR System



Figure 38 | U of M, photo credit | 1st U of M Hospital

Historical, Social, and Cultural Context

As we have noticed, hospitals become outdated fast and soon no longer keep up with the trends, architecturally and technologically, and the space becomes outdated, crowded, and overburdened. A design that was once at the height of efficiency was becoming archaic to its counterparts. Within the University Hospital, as medical specialists multiplied, Ann Arbor's population grew, and the hospital was asked to house more patients, change was needed to take place. After a prolonged battle over size and price was settled, a new hospital was proposed to be built in place of the standing one located on Old Main, in 1981. After months of being deserted by staff and patients, the empty structure of Old Main, with asbestos in the floors, doors, ceilings, and pipes becoming unsafe, the building that had once represented the state of the medical arts was taken down. The new hospital was only part of the intended project as adjoining Health Centers, Arthritis Cooperative Clinic to X-Ray, Rogel Cancer Center as of 2007, C.S. Mott Children's Hospital and Von Voigtländer Women's Hospital as recent as of 2011 welcomed their first patients. The healthcare system seems to be ever-growing in Ann Arbor with a go-ahead to begin planning for a new inpatient facility and additional space to be used for University Hospital's most highly specialized care.

“To the members of the teaching staff and the medical alumni who had to put up with the inconveniences of the Old Catherine Street Hospital, the new hospital is still hardly believable.”

- Dr. Peterson



Figure 39 | U of M, photo credit | Old Main Hospital

Historical, Social, and Cultural Context



Figure 40 | University of Michigan, photo credit | New Medical Center Campus

VARIOUS PATIENT ROOM LAYOUTS

With various rooms to choose from, patients and families will feel comfortable and at ease in a room that suits their child and their individual their needs.

RETREAT & REJUVINATION SPACES

After enduring a strenuous chemotherapy session, children should be able to relax and unwind in a space separate from their treatment area including indoor and outdoor areas.

INPATIENT & OUTPATIENT SERVICES

There is not one cancer patient a-like, there are differentiating factors that require childcare patients to stay overnight or patients that come from states away. These services should also accommodate spaces for two parents to accommodate an overnight stay.

QUIET ROOMS & FAMILY LOUNGES/ LIBRARY

Childcare patients and parents spend lots of time in a space that is unfamiliar to home. The challenge will be to design a space that is simultaneously providing comfort, reassurance and a sense of hope. Incorporating a library will allow serenity, comfort, and a new world. These spaces should be located away from the clinical and patient areas to allow for the most intimate space.

SUSTAINABILITY ASPECTS/AIR FILTRATION SYSTEM

Incorporating a variety of sustainability aspects in relation to material, energy-efficiency, green space, air intake can cultivate a positive experience and atmosphere.

EASE OF ACCESS/WAY FINDING

In an already stressful situation, an efficient ease of access that is not challenging to navigate can exemplify the building and positively impact the patient's experience.

ACTIVITY/WELLNESS SPACE

As an escape from the scary and always looming diagnosis of cancer, board games, ping pong, four-square, blocks, legos, etc. will be accessible but in turn, no electronic games or devices.

CARE TEAM WORKSPACE/NURSE STATION

Spaces should be provided for caregivers in the room or spaces just outside the room in a centralized station with clear sight to the occupied room while still allowing considerations for privacy and collaboration.

ATTENTION TO MATERIALS, COLOR, AND DAYLIGHT

Materials, color, and daylighting are huge factors to consider. Creating a space that is positive to be in through warm materials, bright/natural colors, and exposure to adequate daylight are shown to positively impact the healing process.

OFFICES/STORAGE SPACE

Office layout and location should allow for collaboration, create privacy, and be close enough to patient treatment rooms to provide the utmost efficient care. Creating multiple zones of offices throughout the facility close to the specific specialization area in efficient as well with needed storage for all the medical necessities should be near by.

EXAM/CONSULTATION ROOMS

The patient must feel safe and preserve dignity of the patient in the exam room design. The design should consist of soundproof wall, location of the exam table and equipment, privacy curtains, and the placement of the door and door swing should all reflect comfort and confidentiality for the patient and patient's family.

PATIENT PRIVACY/SENSE OF HOME

Privacy is a must for patients and their families. Doctor and nurses are an exception but privacy will make the patient more comfortable in a space that is sometimes far from home.

CAFE AREA

Food is always a staple of comfort when you are in a stressful and unknown situation. There also may be patients and families staying at the center for an extended amount of time, where this is needed.



The project will be designed for childcare cancer patients, their families, physicians, and nurses who will be the most impacted and influenced by the various design decisions that will be taking place. Although the child cancer patients are of utmost concern, patient visitors and families are under a great deal of pressure and anxiety as well, watching their child fight for their life. Spending time with those critically ill loved ones in a healing atmosphere can help reduce the stress of everyone involved.

Not as directly impacted but still plays a detrimental role in the process are the healthcare staff, physicians, and nurses. Designing spaces in such a way that will allow them to work as efficiently and accurately as possible while obtaining the most critical of care to their patients is just one of the ways the healthcare staff can be impacted. Also, working in a healing type environment can help reduce their stress and help them relax. Working with patients who are in such a critical condition can be taxing and can often cause their own issues. Through a positive atmosphere, they are able to create a stronger focus on their patient's well-being.

This building will be a small healthcare facility and will not tackle all the programmatic requirements of a modern hospital. The building will serve as a refuge for children and families to seek extra care and healing in a complex and intricate disease such as cancer. The project, being a smaller healthcare center would be owned by the nearby hospital facility and act as a secondary center. The hospital facility in proximity to this proposed design would be able to help with costs and own a share of the building. Due to the smaller stature of the building proposed, the number of specialists, employees, patients, and room for guests will need to be decided on but would not be more than 50 inhabitants. This facility could also serve as an overflow space for the hospital at the scene of an influx of patients of any kind for any reason.

Restrictions and requirements for the healthcare facility like parking would coincide with the hospital but have enough available spaces for a full capacity building. The site, as well as the building, will need to be handicap accessible for all guests, patients, and medical professionals to lessen the burden and effort of the patients and guests. Hence the facility is a healthcare facility, it must have direct access to specialists, doctors, and nurses in the case of any on-site emergencies or complications.

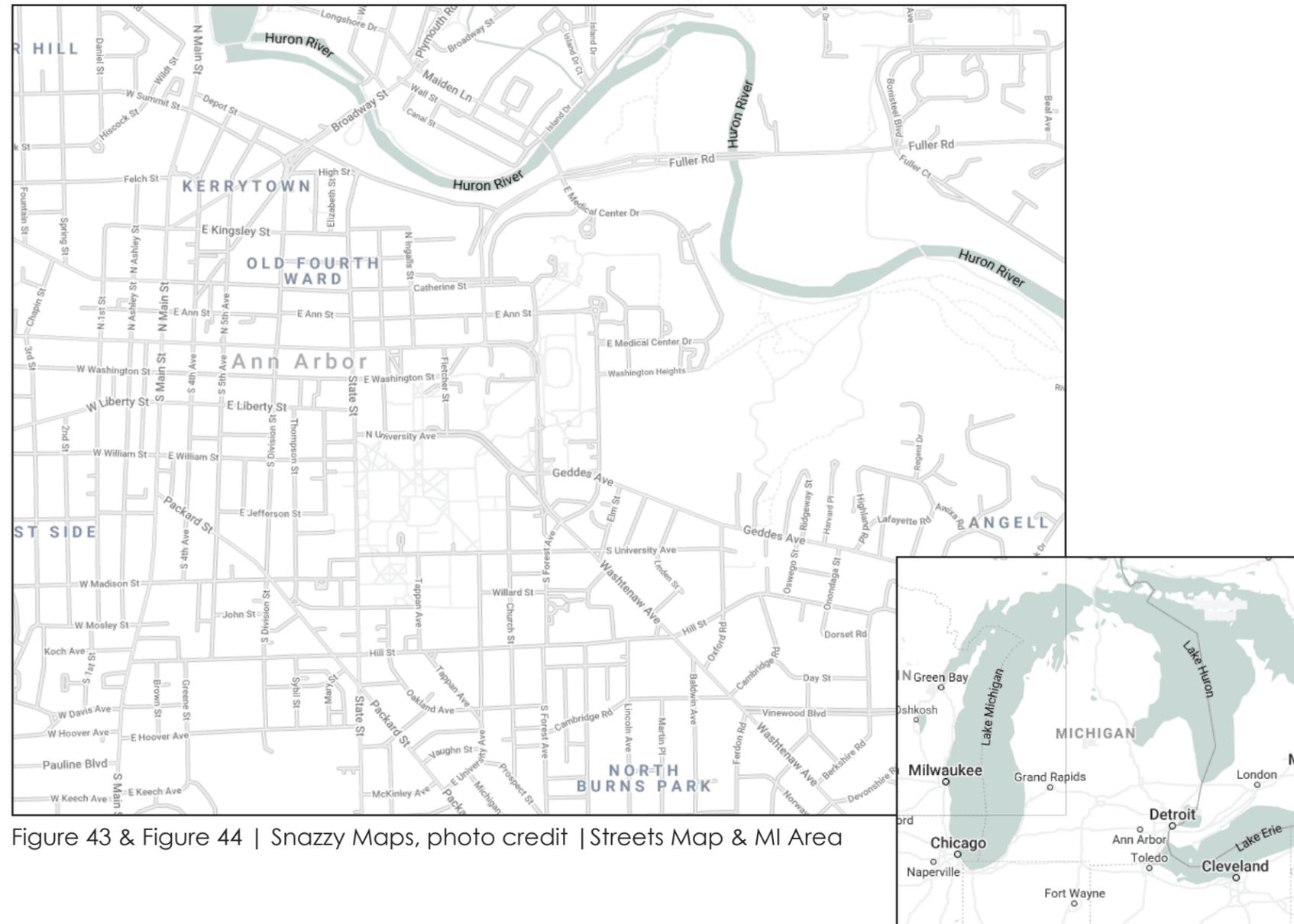


The site where the design is located is as crucial as the design of the building. The design of the building must not merely focus on the occupants and programmatic requirements of the build, but the surrounding natural environment. The site and the building design must fit together like puzzle pieces, they must act simultaneously to one another and complement each other in a variety of aspects. To understand these aspects, it must first start with a thorough and complete understanding of the complexity of the site to engage in an in-depth design process harmonious to the site.

Located on the east side of Michigan, situated between Lake Michigan and Lake Erie sits the city of Ann Arbor, Michigan. Ann Arbor has a total of 29 square miles of area, of which about 1 square mile of it consists of the Huron River. With a recorded population of 113,934, Ann Arbor is home to the University of Michigan and is also ranked the seventh-best hospital city in the world. Being situated on the Huron River, they are known for productive agriculture and their fruit growing with a beautiful landscape of hills and valleys creating various changes in terrain throughout the city. "Tree town" is Ann Arbor's nickname seeming from its dense forestation in parks and residential areas, making quite the site in the fall months and an everchanging environment. The Huron River flows right through the heart of Ann Arbor, flowing northwest to the southeast, and serves as an icon of the landscape.

The proposed site is located to the north of the central hub of healthcare facilities such as the CS Mott Children's Hospital, University of Michigan Cancer Center, and Samuel and Jean Frankel Cardiovascular Center. The site will play off the scenic landscape and environment of the Huron River and Fuller Park. The proposed healthcare facility would become the missing piece between healthcare and the environment to entice an effective healing atmosphere aside from the local hospital and professional facilities located in proximity. The site was chosen for its close proximity to medical professional buildings, the atmosphere of the surrounding environment, and nature. My site is near grocery stores, restaurants, hotels, and museums, as well as a secluded landscape to retreat to.

REGION & CITY



Site Selection:

Ann Arbor, Michigan was chosen as the site location for my thesis due to its spectacular relation to incredible healthcare, its lively city, and beautiful scenic environment. The proposed healthcare center will be located in Fuller Park, surrounded by the Huron River to the east, north, and west. This site location provides close proximity to major healthcare facilities, a variety of restaurants, museums, and great views of the Hudson River and the surrounding environment. To the west of my site lies the University of Michigan Medical School, with the University of Michigan - Main Campus to the north of my site.

Major Landmarks:

- University of Michigan
- Ann Harbor Hands-On Museum
- Nichols Arboretum
- Arborcrest Cemetary
- University of Michigan Hospital
- University of Michigan (North Campus)
- Museum of Natural History (U of M)
- CS Motts Children's Hospital
- Michigan Stadium
- University of Michigan Museum of Art

Site:

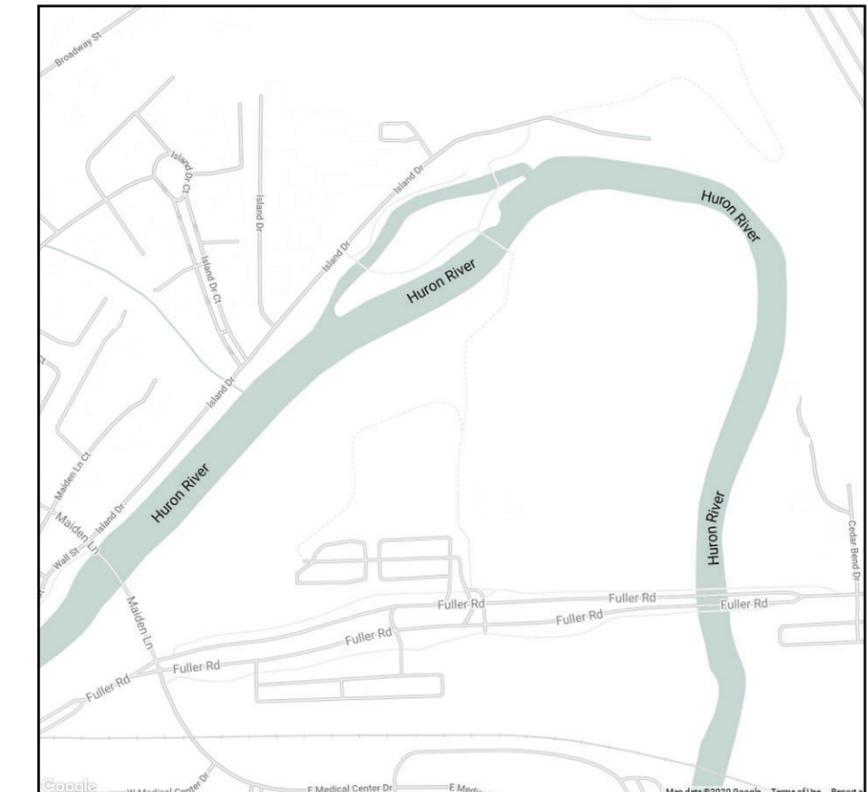


Figure 43 & Figure 44 | Snazzy Maps, photo credit | Streets Map & MI Area

Figure 45 | Snazzy Maps, photo credit | Site Location

MAJOR LANDMARKS

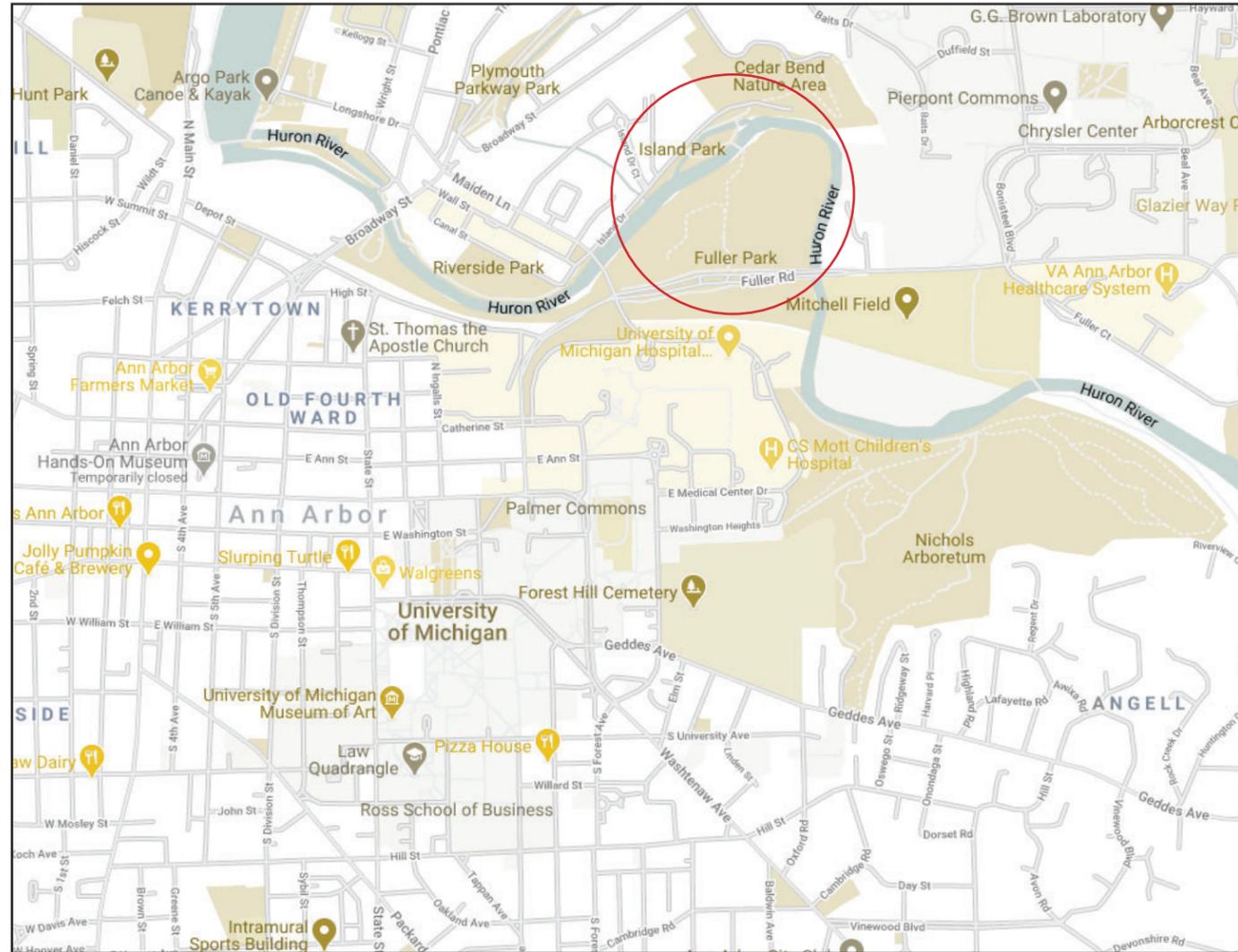


Figure 46 | SnazzyMaps, photo credit | Major Landmarks

ANN ARBOR CLIMATE

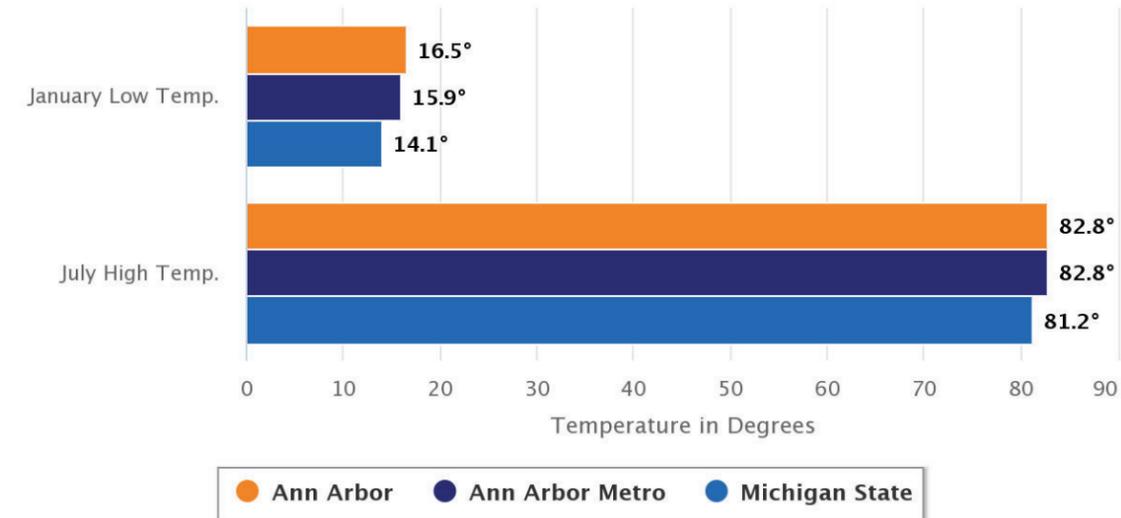


Figure 47 | Best Places, photo credit | Climate

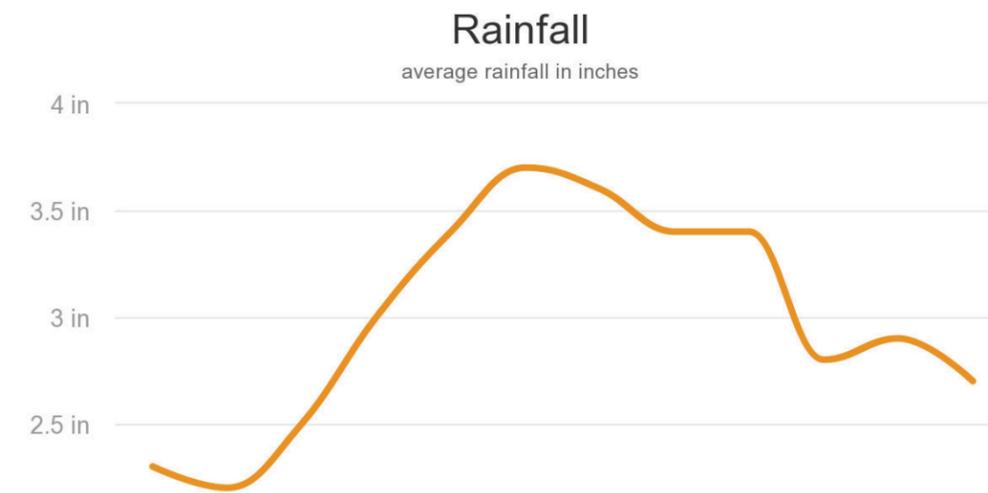


Figure 48 | Best Places, photo credit | Rainfall

Ann Arbor, Michigan gets 36 inches of rain, on average, per year and averages 36 inches of snow. With June being the wettest month in Ann Arbor and February being the driest month, Ann Arbor is wetter than most places in Michigan.

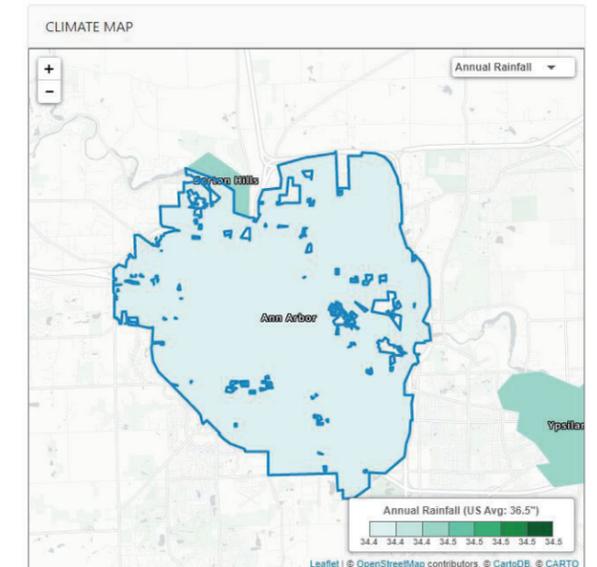


Figure 49 | Best Places, photo credit | Climate Map

ANN ARBOR CLIMATE

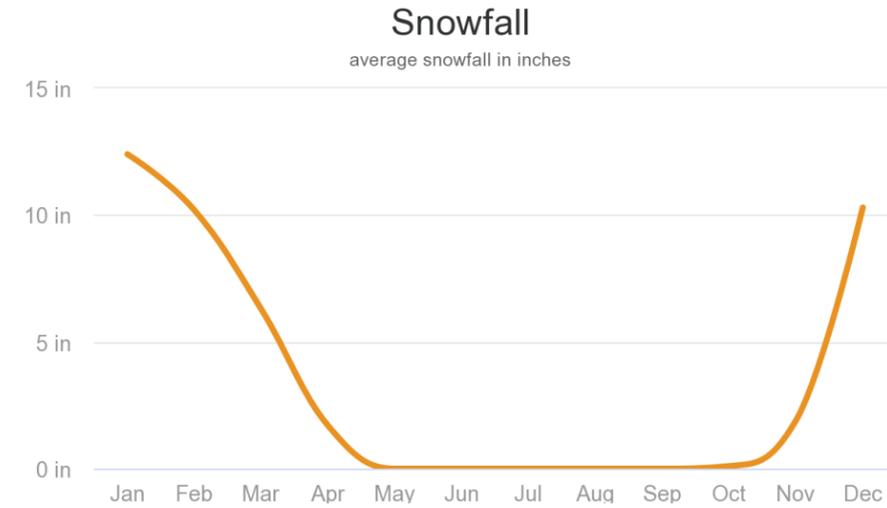


Figure 50 | Best Places, photo credit | Snowfall

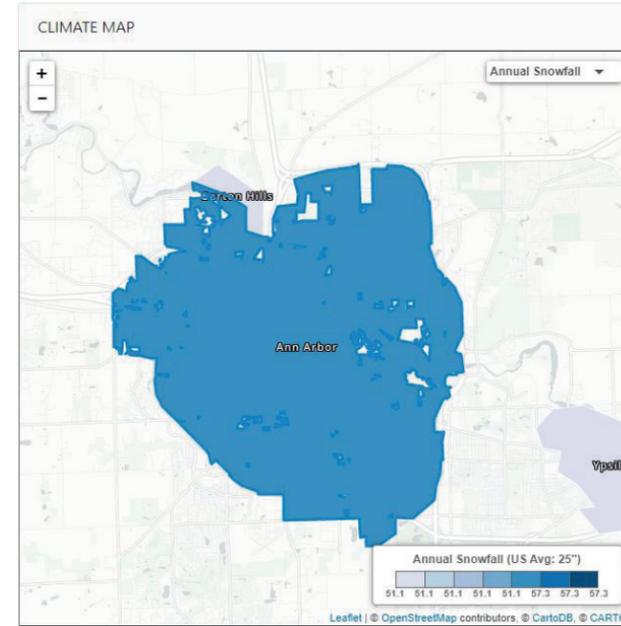


Figure 51 | Best Places, photo credit | Snowfall Map

Ann Arbor has a typically Midwestern humid continental climate, which is influenced by the Great Lakes surrounding Michigan on three sides. Ann Arbor lies roughly 900 feet above sea level, creating a cold and temperate climate. Ann Arbor experiences four distinct seasons: winters are cold and snowy, with average highs around 34 °F (1 °C). The summers are hot and humid with average highs around 81 °F (27 °C) and with slightly more precipitation as seen in the chart on page 71. Precipitation tends to be more frequent in the summer months, but more consistent in the winter months with both rain and a fair amount of snow. The best time to visit Ann Arbor is from mid-June to early September when the temp is warmer, and the trees begin to change color creating a beautiful landscape of rolling oranges and yellows.

ANN ARBOR CLIMATE

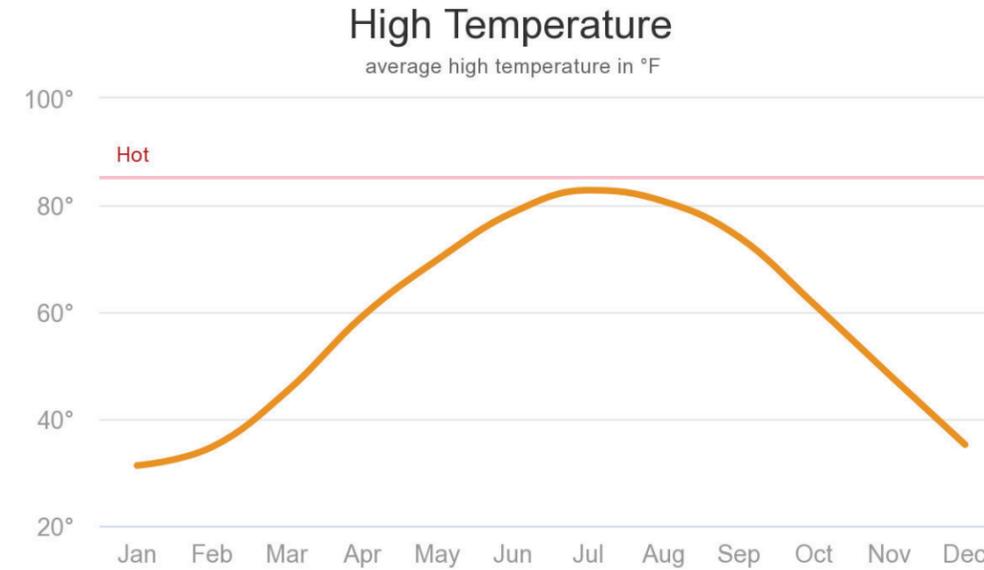


Figure 52 | Best Places, photo credit | High Temp.

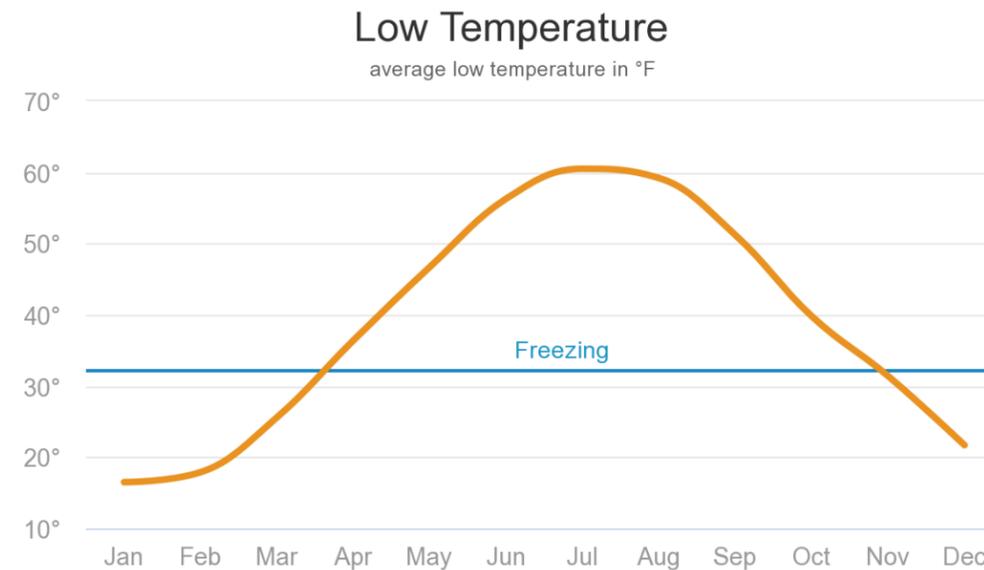


Figure 53 | Best Places, photo credit | Low Temp.

In terms of temperature, Ann Arbor's warm season lasts for about 3 and a half months with a daily average high of 73 °F. The cold season lasts for roughly 3 months with an average high of 41 °F from November to March. The remaining months make up an average of comfortable temperatures, with fall being the most liked seasonal temperatures.

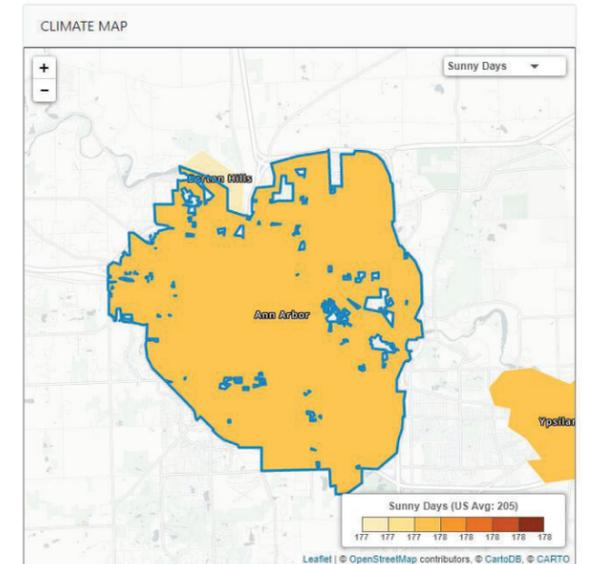


Figure 54 | Best Places, photo credit | Sunny Days Map

ANN ARBOR CLIMATE

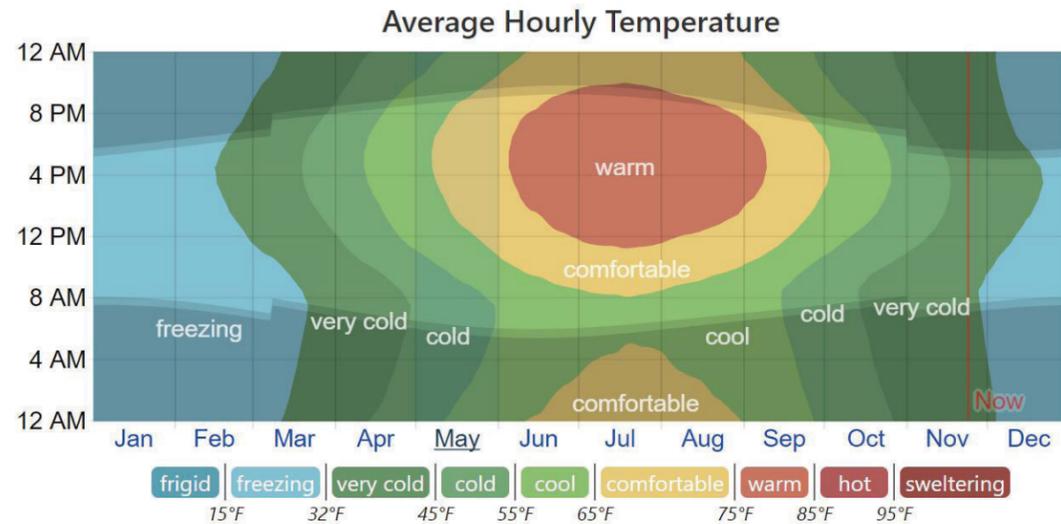


Figure 55 | Weather Spark, photo credit | Temperature

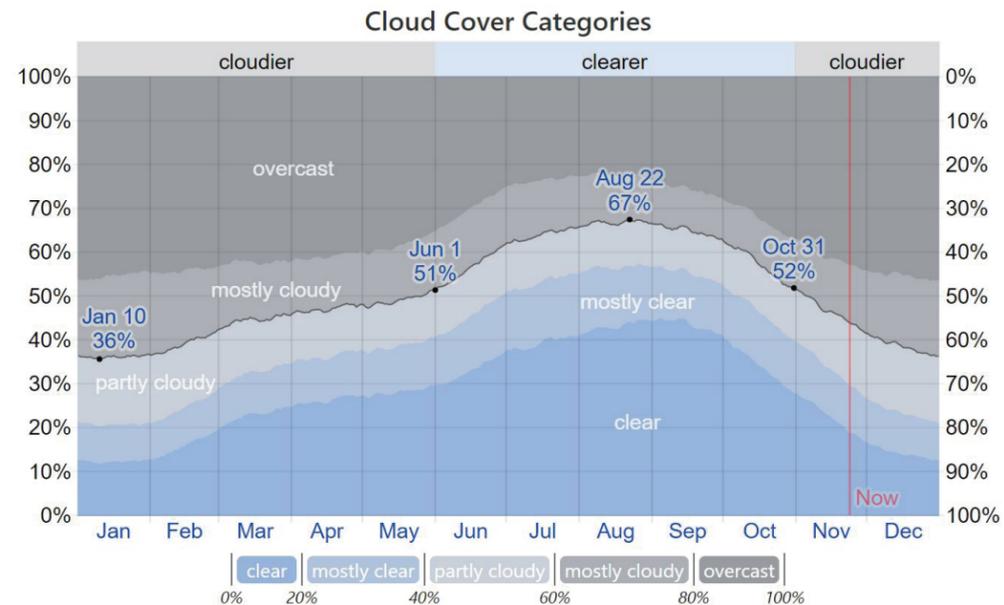


Figure 56 | Weather Spark, photo credit | Cloud Coverage

The figure to the top left shows a compact characterization of the entire year of hourly average temperatures. The horizontal axis is the day of the year, the vertical axis is the hour of the day, and the color is the average temperature for that specific hour and day.

Ann Arbor is often covered by clouds but experiences significant seasonal variation over the course of the year. The cloudy part of the year begins at the end of October and lasts for roughly 7 months, ending around June. The clearer part of the year begins around June. Cloud cover will be something to take into consideration within the overall design of my healthcare facility.

SUN & WIND DIAGRAM

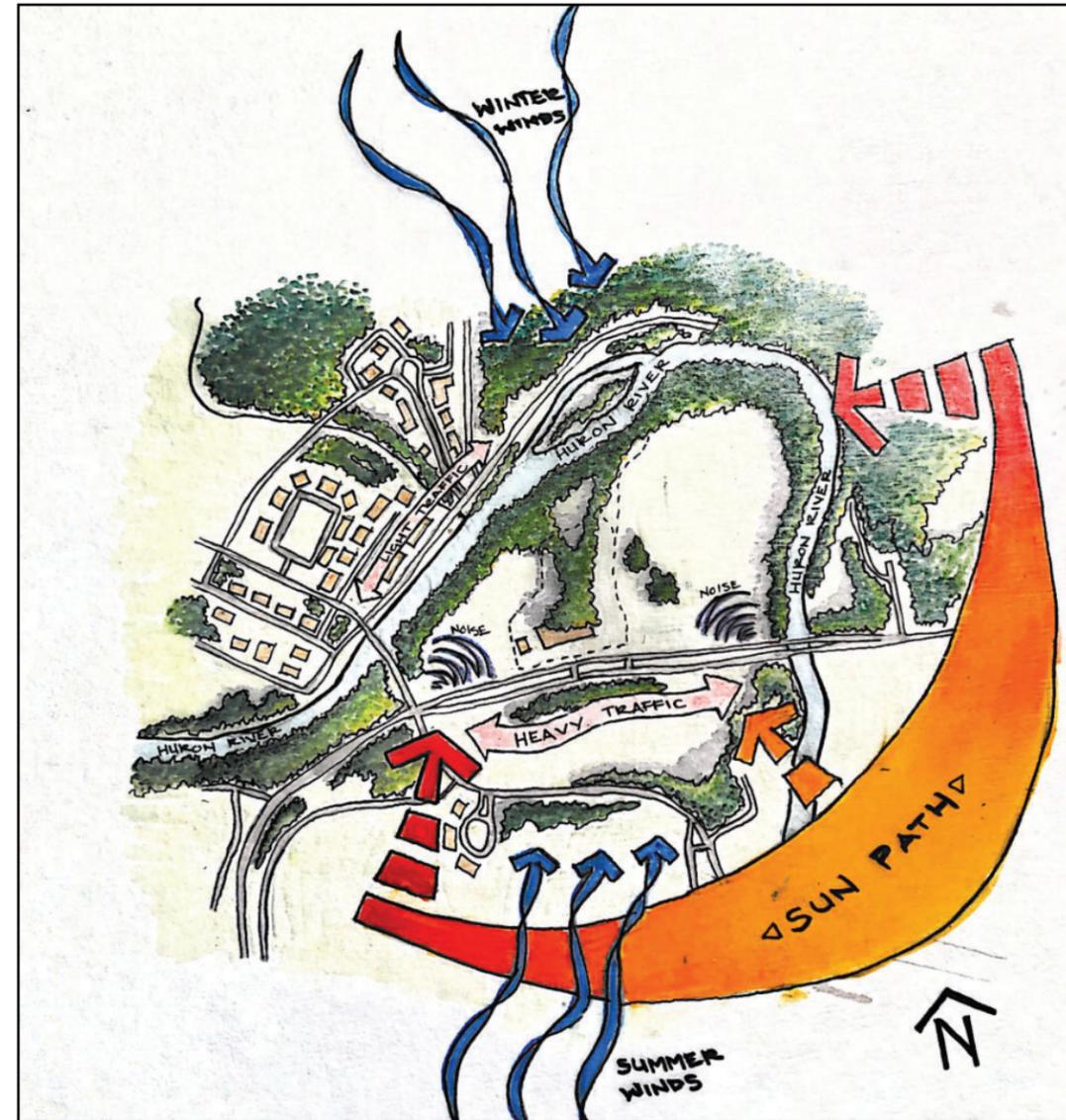


Figure 57 | Hand Drawn, photo credit | Site Diagram

The site diagram situated to the left depicts my proposed site for my healthcare facility. The site is located just north of Michigan Medical Campus and is nestled between the banks of the Huron River. Part of the site now is designated for Fuller Park, fit with a pool, soccer fields, walking trails, and a jungle gym for kids to play. I plan on using the portion of Fuller Park that is not frequently inhabited for my proposed healthcare facility. I chose this site because of its close proximity to the Michigan Medical Campus as well as its closeness to the natural environment, flowing water, and forest trees. The site is approximately a 5-minute drive from the University of Michigan Medical Center, including the Comprehensive Cancer Center and CS Mott Children's Hospital.

PATHWAY CIRCULATION

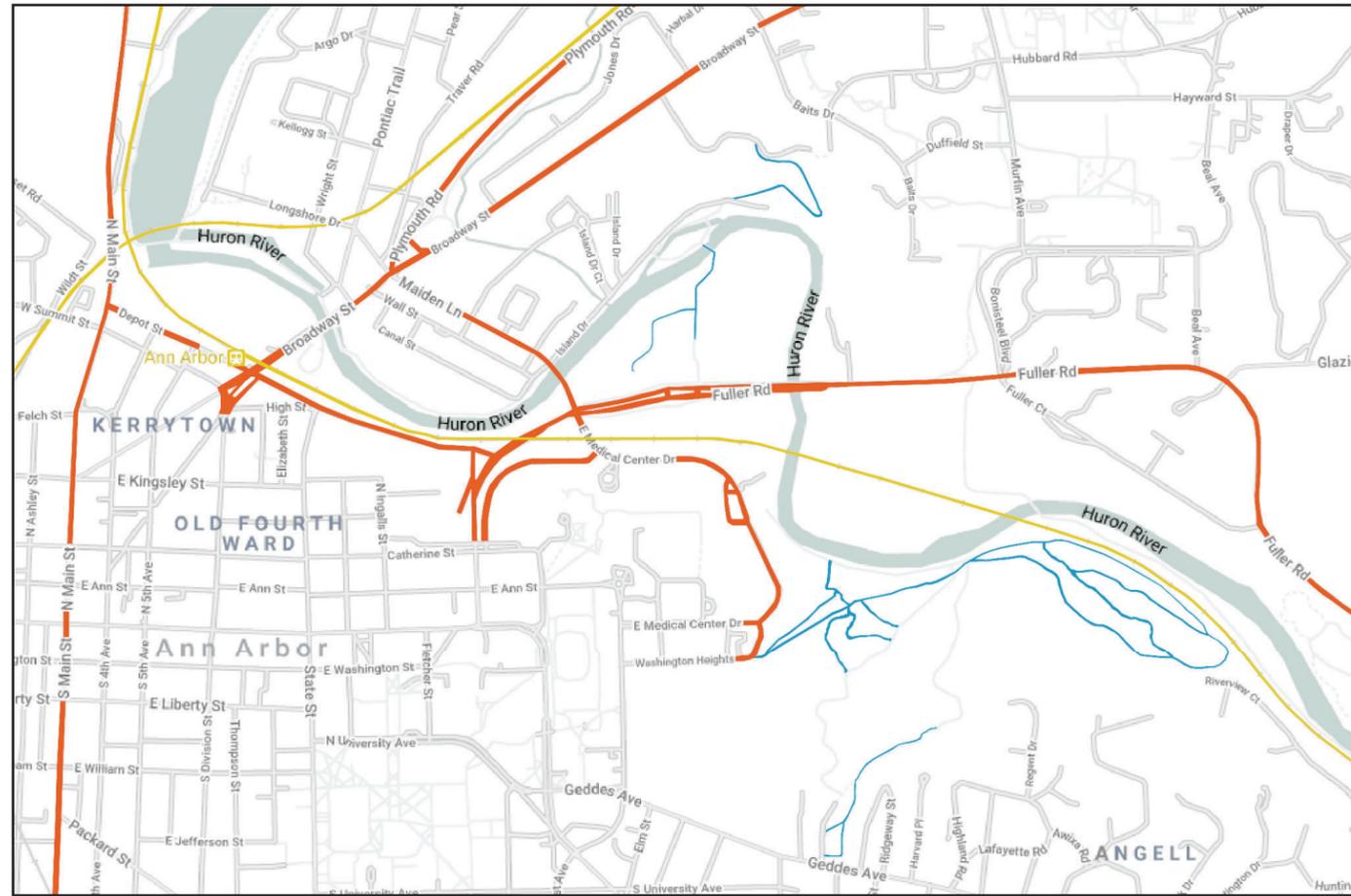


Figure 58 | SnazzyMaps & Illustrator, photo credit | Pathway Circulation

- Heavy Vehicle Traffic
- Bus/Transit
- Pedestrian Paths

ZONING & SPATIAL USAGE

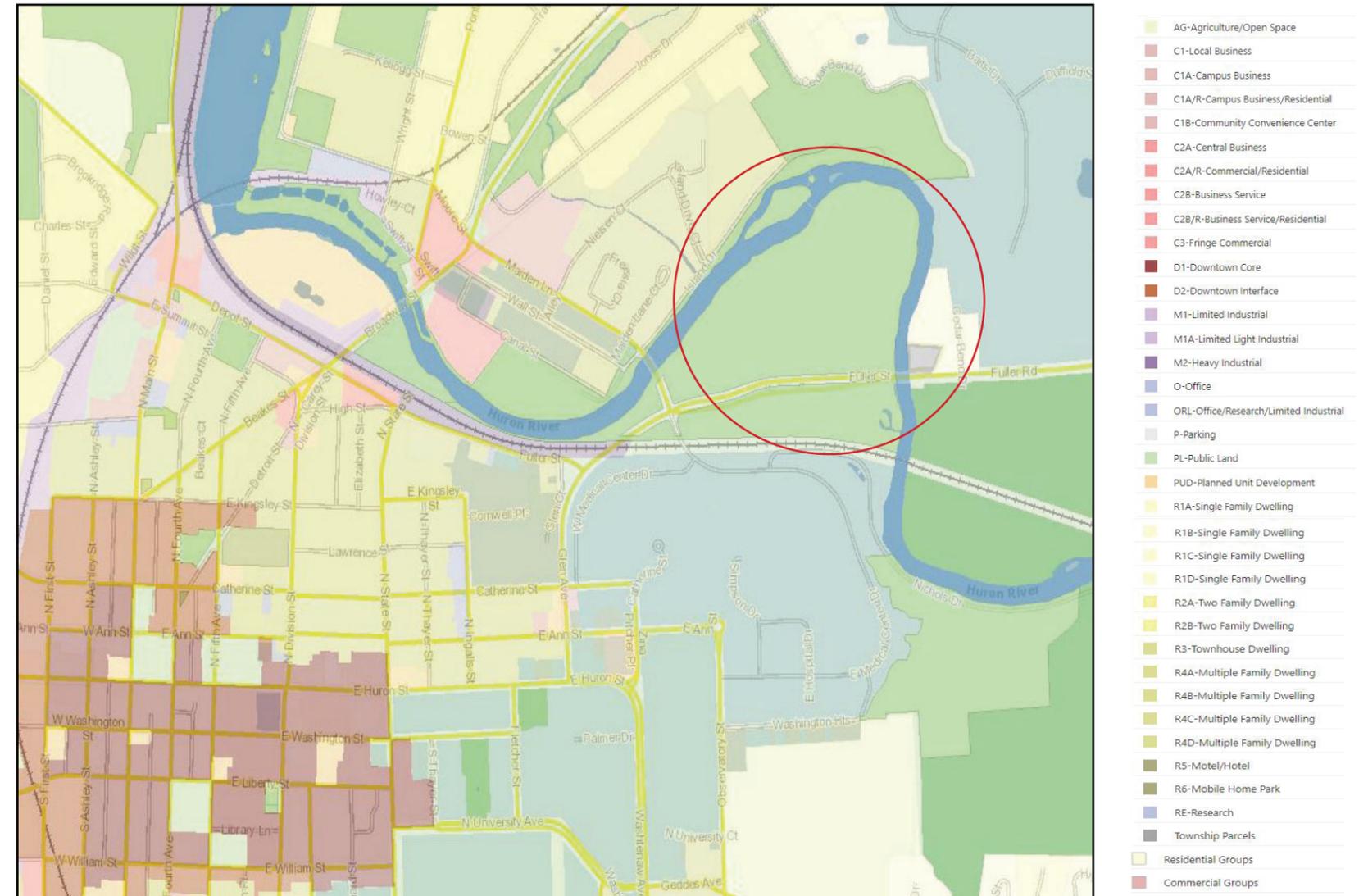


Figure 59 | Michigan GIS, photo credit | Zoning Usage



Through my thesis project, I will explore the atmosphere, oncology treatment, care, and rehabilitation for children, and sustainable environments. I intend to use my picked site location to further explore the effects of atmosphere and environment and the strong impact they have through healing and encouraging positive outlooks. With patients and families coming from all walks of life, the design must entail a variety of healing and treatment environments to show that every child is different and requires a variety of needs. This variety of options is designed to make every child and family comfortable often in a time of distress and worry. Healthcare facilities tend to have a large focus on efficiency and sterilization, lacking in environmental or atmospheric characteristics. For my project, I will focus on comfort, atmosphere, peace, encased in a healing environment to prioritize patients and their families, and their road to recovery.

My idea is to shift the perspective to largely encircle around the idea of a home-like atmosphere of patient care, considering the families and sustainability while still encouraging efficiency and sterilization within the healthcare facility. In large, the cancer treatment and rehabilitation center's utmost attention should be paid to the patients, their well-being and emotional state, as well as their family's well-being. In a time of serious illness, such as cancer, it is frightening, anxious, and overwhelming. Through this pediatric oncology center, I plan to turn those emotions into hope, happiness, and growth; to encourage healing and give a sense of comfort and empathy to patients and families. This complex and fundamental disease consists of many appointments, treatments, diagnoses, and medications. To gain a comfortable and flexible atmosphere, the design will revolve around the needs of the patients and their families, requiring a rounded understanding of a sustainable approach to the design at hand.

The performance criteria for this project are quantifiable by the atmosphere, material, and the surrounding environment. The proposed design, while intending to have a major impact on its patients and visitors, staff, and specialists, while having a minimal effect on the environment. Being that the environment and material will have a substantial role in the design, focusing on the principle of sustainability and a small incorporation of biophilic design will meet that criteria.

The proposed healthcare facility will serve as a “home away from home” for child cancer patients and their families. The years of being a child and growing up are the most critical years of the development process. Children are growing physically, socially, and emotionally. They are being developed and shaped for when they grow up and their surrounding environment has a lot to do with it. As a child with a diagnosis such as cancer, it creates a frightening aspect to life and creates a loss of control in a life that once had a stronghold on the future ahead. Making sure the spaces in which we design must be developmentally suited and inspire an environment with healing, growth, and meaning. One aspect that must be taken into consideration in terms of patient well-being and health is the atmosphere and environment in which they inhabit. Creating a strong notion of green design and sustainability will set the tone for a healthy, healing environment. Environmental design of spaces and atmosphere should support and enhance the experience and lives of the users by being in the space. Aside from the physical environment influencing our well-being, the atmosphere, and our mood the develops from that possess a strong connection to healing. I will also be looking into the psychology and theoretical findings and research of the human body’s response to atmosphere and mood to create the utmost influential and efficient design for children and their healing.

Materiality plays a big part in the basis or framework of the project, as well as biophilic design. I will be considering the longevity of the resources and their impact on the environment. Biophilic design is known to have quite an impact on our atmosphere, mood, and overall healing. Incorporating this type of design, along with attention to material usage will serve as one of the performance criteria aspects I will hold myself to. Through studying the area, atmosphere, environment, material resources, and providing evident data, the performance criteria for this proposed facility will be influential throughout the entirety of the design and site design.

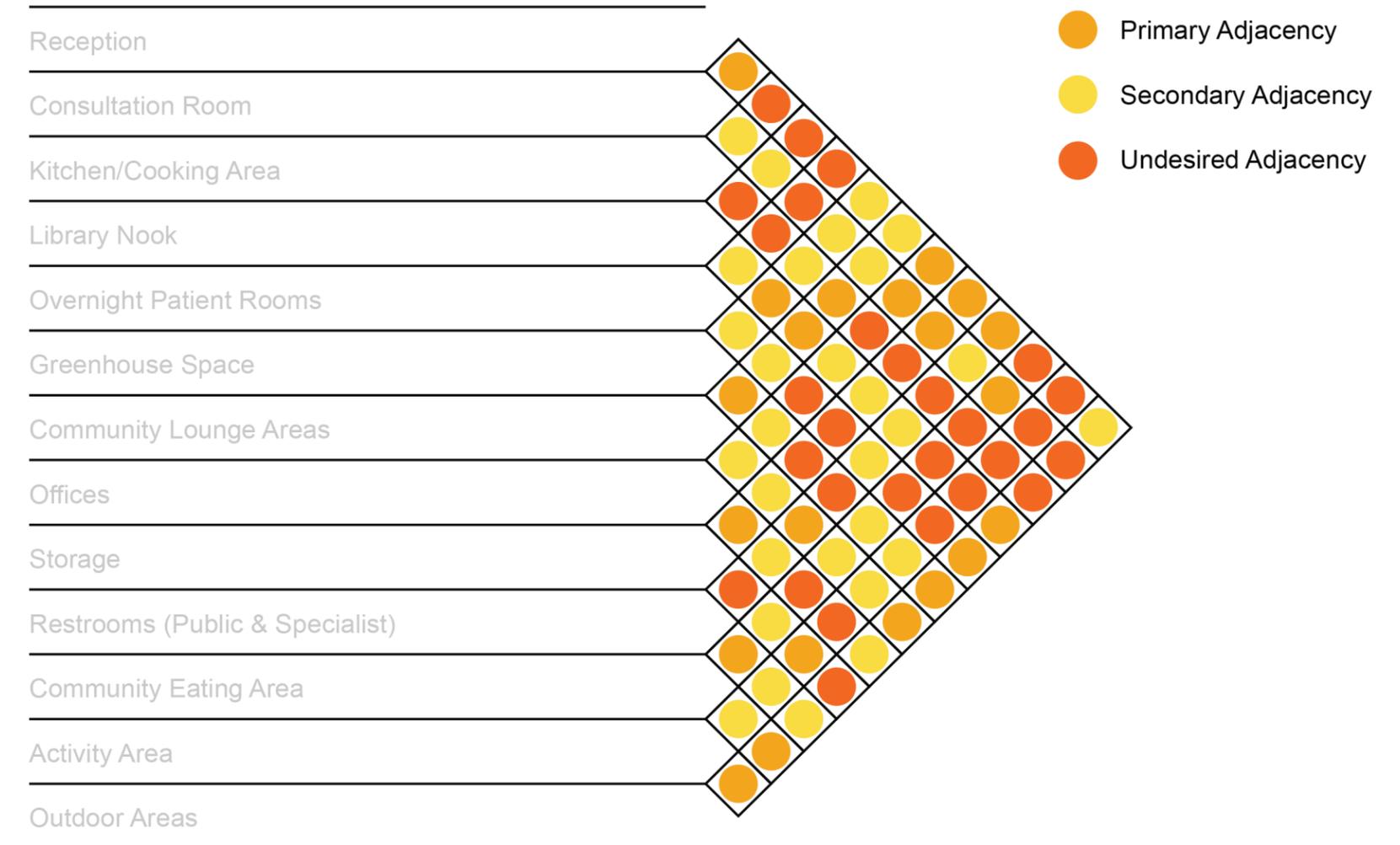


Figure 61 | Carolyn Matthews-Daut, photo credit | Adjacency Matrix

Proposed Healthcare Facility		
Room Type	Intended Use For	Approx. Square Footage
Reception	Specialists	75 SF
Office (each)	Specialists	150 SF
Community Eating Area	Patients/Families	775 SF
Kitchen/Cooking Area	Staff	1,000 SF
Library Nook	Patients/Families	200 SF
Restrooms	Patients/Families	165 SF
Activity Area	Patients/Families	200 SF
Outdoor Areas	Patients/Families	1, 000 SF
Consultation Room(s)	Specialists	175 SF
Storage Room(s)	Specialists	100 SF
Community Lounge Areas (each)	Patients/Families	145 SF

Overnight Patient Getaways	
Room Type	Approx. Square Footage
Bedroom 1	100 SF
Bedroom 2	125 SF
Bathroom	65 SF
Lounge Area	155 SF
Office Space (w/in Lounge Area)	15 SF
Laundry	36 SF

Space Allocation Summary

The main spaces within the healthcare facility will consist of a specialist area, kitchen, and large dining space, and relaxation/lounge spaces for patients and their families. The facility will encompass the standard everyday cycle of life with areas for eating, activity, meditation, and revitalization, and sleep. Through these areas the patients and their families are able to feel a sense of home being away from home, some thousands of miles.

This design should be able to make visitors feel comfortable and at home, including access to the highest care and specialists while they are going through the healing process after a strenuous diagnosis such as cancer. With a designated specialist area, patients and their families will have access to unlimited care. It will consist of consultation space and offices to provide check-ins for patients and ensure patients are receiving adequate healing and nourishment they need based on their prior or present diagnosis. This area will also allow for a sense of authority and securement for patients and their families if something is out of the ordinary.

With the added community spaces, they will allow people to meet, interact, and share similar experiences with one another. Patients being confined to a room for so long, need a space where they can interact with others. These community spaces will serve as spaces for learning, creativity, and exploration for the patient and their families. They will also allow for indoor/outdoor access as the community spaces will be directly adjacent to the greenhouse and outdoor areas.

1. Psychological & Atmospheric Impact

This part of my performance criteria will look into the psychological mood that is felt by the patients and that affects their particular healing process. With this, I hope to establish a design philosophy that sets an example for all other healthcare facility buildings in the near future. The most challenging element we face as architects in this generation is delivering a design that is efficient in impacting their overall health and well-being.

2. Environmental Performance

With sustainability being an up and coming standard for future generations, focusing on how my design impacts the surrounding environment will be my goal. I will focus on materials, sourced locally, and their embodied energy. This specific criterion will require extensive research of materials and efficient strategies obtained in other related projects. This aspect of the performance of the design will be measured using performance and embodied energy checks using research gathered from strong sources.

3. Space Allocation

By researching and analyzing similar projects and case studies I will be able to gain a better understanding of spatial requirements and programming. Through this, a design will be able to make the most efficient and effective spatial design for my intended project. By taking into consideration the circulation of spaces, type of patients, and ADA requirements these findings will be used to create an impactful, developed, appropriate, and effective design of spaces for all who enter the healthcare facility.

4. Behavioral Performance (Home Away from Home)

Architecture is made to be used by people of all types. To be able to design a building that moves people, that makes them feel something, that creates an escape from the frightening aspect of their reality, they will have been done to the highest standard. This building may be a place where a child grows up and spends most of their time, depending on their diagnosis, becoming a large part of a family's life. This building to be remembered as a grand masterpiece by an architectural magazine, but a place that is remembered by people who experienced it and it made a difference in their lives. To effectively design like this, taking into consideration those elements of a design that make us feel comfortable and at home will be greatly looked into.

5. Energy Consumption

Being that building a sustainable building is a primary focus within the proposed healthcare design facility, developing energy consumption criteria is very important. For a base template of energy consumption, the utilization of the 2030 Challenge will be used as a standard of design. To measure the success of the proposed design, a majority of the 2030 Challenge goals will need to be compliant within the healthcare facility. I will also be looking into Sefaira, a Green-Design Program, allowing easy and efficient use of updated analysis of energy, carbon, thermal comfort, and renewable energy.

6. Code Compliance

Code compliance will be met using in-depth research from various code sites such as UpCodes and looking into city/region documents that contain region-specific code compliance. Through this design, code compliance will be 100% met as well as ADA will be addressed and considered throughout the entire design process from schematic design to the finished product.

7. Cost

Cost is an enormous factor when you are designing any type of building, structure, or space. Cost is the first thing designers typically ask their clients because then the design can be developed around the overall set cost. Being that this project is just a proposed design, not being built or a project that will be bid out it will be challenging. With the design, the hope is to set a financially plausible design that can fit into the spectrum of building costs around the area. Since this building will be a secondary product of the Michigan Medical Center, there may be a perceived loan from the Medical Center. The total project budget has not been stated yet but is something that must be tangible but efficient enough to create a design that can be a sacred home away from home to many.

Summary of Main Performance Criteria

1. Sustainable and environmental criteria
2. Space allocation and efficient circulation
3. Social, atmospheric, and psychological criteria

The primary performance criteria that the proposed healthcare design facility will be compared to will be a strategic list of goals or standards that must be met according to the 2030 standard. In order to obtain this sustainable, environmental, and energy use goals must be set in place and met from the very start of the design process. The 2030 Challenge investigates fossil fuel consumption, reduction goals, carbon-neutral, etc. The targets set up by the 2030 Challenge are separated by building typology to keep the building along with a standard of design criteria that is to be potentially met by that typology.

The second criteria involve proper space allocation and efficient circulation of the building and site as a whole. Nothing is more frustrating than not being able to find your way to a particular room or space. By studying the designs of similar structured buildings to the proposed healthcare facility, will help determine the perfect layout and circulation flow for the intended healthcare facility. Within the circulation of spaces, the atmospheric and psychological aspects of the design will also be taken into consideration. Designing a space that is an efficient and sustainable means one thing but if the design is not able to create a sense of comfort from within there will a gap in the design moving forward.

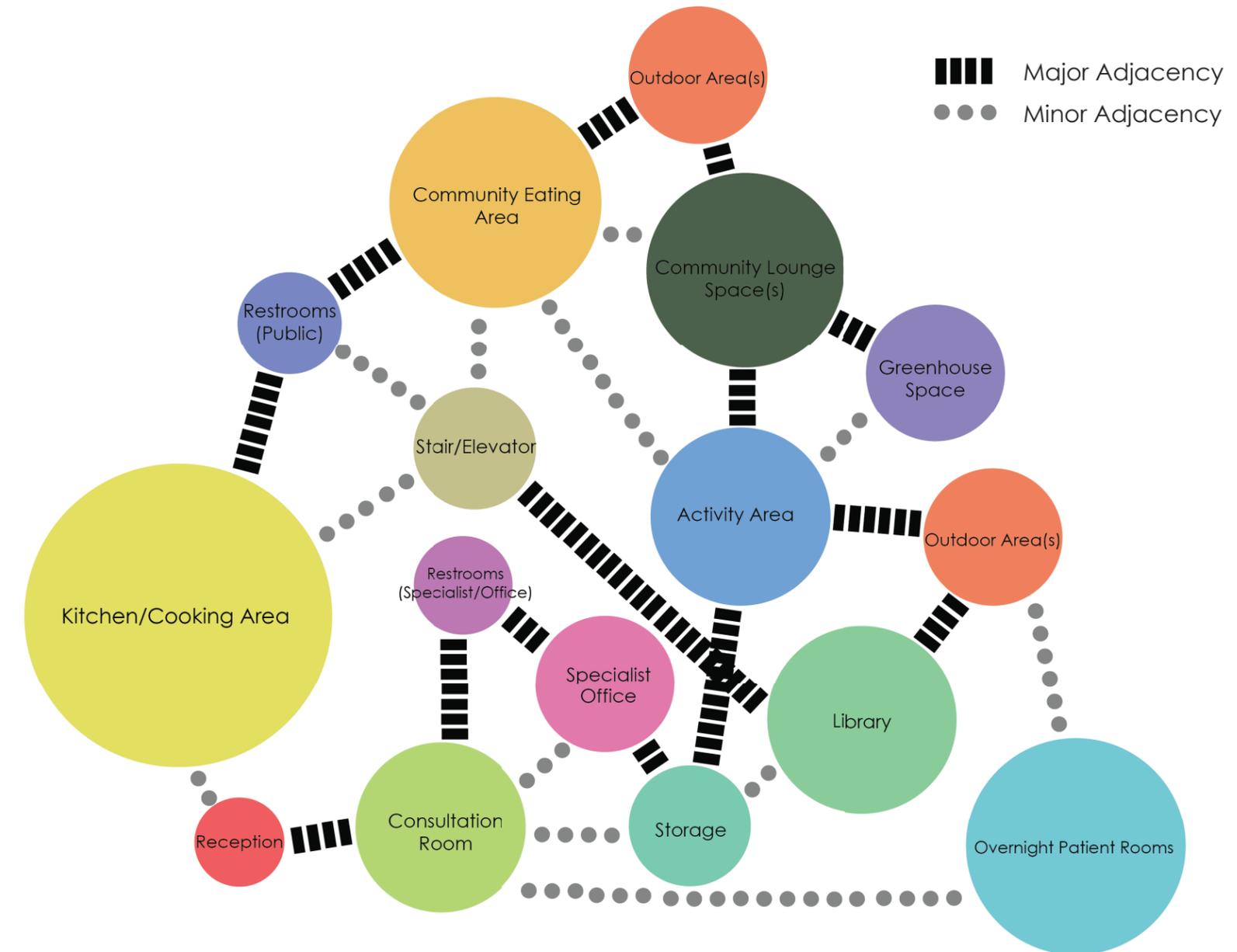


Figure 62 | Illustrator Drawn by Spaces | Space Interaction Net

ACADEMIC GOALS



EDUCATE OTHERS ON HOW CREATING A POSITIVE ATMOSPHERE WITH NATURAL, WELCOMING HEALING SPACES CAN IMPROVE CHILDCARE PATIENT RESULTS.

Observe and measure the recovery of patients before and after the implication of the green space and sustainability into the environment, also known as correlation research.

PROVIDE THOROUGH RESEARCH OF MY TOPIC LEADING TO A COMPLETE AND WELL DESIGNED FINAL PROJECT.

Through providing research and information relative to my project, that will ensure a well thought out project that is designed to the best of my understood and gained knowledge.

CREATE AN EMPHASIS OF IMPACTFUL ARCHITECTURE, AFFECTING PATIENTS, THEIR FAMILIES, AND THE SURROUNDING COMMUNITY

Architecture should make us feel something, always, or we did not do our jobs as architects. In architecture the most rewarding experience is seeing the occupants enjoying the space with smiles on their faces and being grateful for what you designed for them, their situation, and their community.

INTEGRATE SPACES THAT PROMOTE HEALING IN A HEALTHCARE SETTING

Creating healing spaces both inside and outside the clinic to help in the healing process and comfort of the patients. These spaces will be relaxing and comfortable for patients and other users through the use of spatial layout and the use of materials.

COMPLETE AN INTRIGING AND COMPLETE DESIGN, ATTRACTING THE INTERESTS OF PEOPLE FROM VARIOUS BACKGROUNDS INTERESTED IN THE DEVELOPMENT OF HEALTHCARE ARCHITECTURE, ENVIRONMENT, AND ATMOSPHERE SURROUNDING THEM.

LEARN ABOUT THE HISTORY AND UP & COMING DATA OF CHILDHOOD CANCER RESEARCH.

Research childhood cancer through looking at case studies, research, personal interviews, and the best practices to solidify a solid foundation of knowledge on the topic at hand.

PROFESSIONAL GOALS

FURTHER DEVELOP DESIGN SKILLS, PRESENTATION SKILLS, AND CHALLENGE ABILITIES IN ORDER TO HELP OBTAIN A FUTURE ENDEAVOR OF BECOMING A LICENSED ARCHITECT.

Becoming a better designer is always the goal in the years to come, to add additional skills and help continue to grow toward future goals.

OBTAIN A JOB IN RELEVANCE TO ARCHITECTURE THAT I AM PASSIONATE ABOUT, WHERE I AM ABLE TO IMPACT THOSE WHO I DESIGN FOR.

Going to work doing something you are interested in and passionate about is something everyone wants, making it happen seems to be the hard part but that is one thing many should strive to do.

USE MY THESIS PROJECT AS A PORTAL INTO MY INTEREST IN ARCHITECTURE POST GRADUATION.

By creating a thesis project around a strong interest: healthcare and environmental sustainability, will portray those interests and allow others to get a better look at the passion behind the interest.

PERSONAL GOALS

PRIORITIZE TASKS AND STICK TO A SCHEDULE FOR COMPLETION OF A SUCCESSFUL THESIS PROJECT.

Creating a schedule early on and maintaining a strict regime for it will allow for the best possible outcome of a successful thesis project that many are proud of.

ATTAIN A HEALTHY BALANCE BETWEEN WORK, SCHOOL, AND SOCIAL ACTIVITIES THROUGHOUT THE SCHOOL YEAR.

School is always busy and there is always something to do but finding the right balance between it all will ensure a happy, healthy, and productive use of time throughout the process of thesis.

FOSTER AN ENVIRONMENT IN ALL ASPECTS OF LIFE FOR CREATIVITY, EFFICIENCY, POSITIVITY, AND PRODUCTIVITY

Allowing yourself an environment that hones in all your values and your path in life, work, and the future will set you up for great success in all you do.

DEFINITION OF RESEARCH DIRECTION

THE THEORETICAL PREMISE/UNIFYING IDEA

To research the theoretical premise, the theory of the Enigma of Health by Hans-Georg Gadamer must be understood as well as Peter Zumthor's text, Atmospheres. These readings will dig deeper into the realm of health and the environment in which we inhabit. These texts will be read, analyzed, and recorded to stem as the foundation of my research.

PROJECT TYPOLOGY

To get the best look into project typologies, a variety of case studies were analyzed. The proposed project fits into a single typology with a multitude of defining characteristics that must be looked at in-depth to fully comprehend the proposed project. The case studies serve as an underlying example of the various characteristics that make up the thesis project.

HISTORICAL CONTEXT

To research the historical context, looking into the theoretical premise texts as well as diving into the research and other case studies will provide a backbone for my historical context. This research must investigate how the older characteristics and design of healthcare facilities do not provide the highest potential healing environment as the modern system and proposed idea.

SITE ANALYSIS

To provide an accurate site analysis for the proposed project site, one must investigate various maps, GIS maps, city regulations, and restrictions, as well as the surrounding environment. Besides looking at various maps, an indepth in-person site analysis of the proposed location should take place to allow for the most accurate site analysis.

PROGRAMMATIC REQUIREMENTS

The programmatic requirements in place so far came from idealistic interpretations of what the design needs and what the design is intended for. Moving forward, based on on-site analysis, location, design implications, and form the programmatic requirements will shift to best fit the needs of the intended design of the healthcare facility.

The thesis method that will be utilized is a mixed-method quantitative and qualitative analysis as well as single or group interviews. These methods will follow a concurrent transformative strategy they will be guided by the theoretical unifying design idea to employ with the qualitative and quantitative research being collected. The information from the research findings as well as the interviews will be collected and analyzed based on the requirements of the theoretical unifying design idea. The gathered information will occur at various stages throughout the process of this research and will be implemented into the design where it best sees fit. The information gathered will be represented in most texts, but graphics will be presented with the research findings based on the characteristics and analysis of the premise of design. Below is a schedule to follow based on my research direction and plan for proceeding.

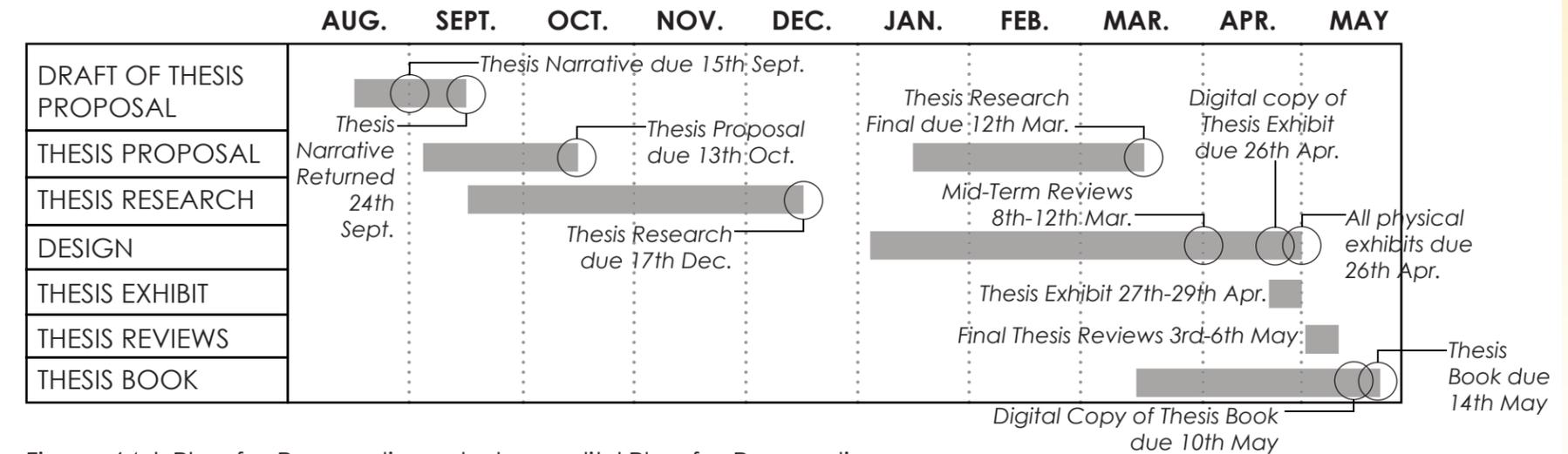


Figure 64 | Plan for Proceeding, photo credit | Plan for Proceeding



COMPILATION FOR DESIGN INVESTIGATION:

- Hand Sketching
- Model Building
- Computer Representation

SOFTWARE FOR INVESTIGATION:

- Autodesk Revit
- Sketchup 2021
- Autodesk AutoCAD
- ArcGIS

SOFTWARE FOR REPRESENTATION:

- Adobe Photoshop
- Adobe InDesign
- Adobe Illustrator

DESIGN PRESERVATION METHODS:

- Creation and investigation of proposed project design
- Feedback from advisor(s)
- Research material documented
- Back up computer files
- Thesis book updated weekly per schedule put in place
- Drawings and diagrams created to support proposed project design

PUBLICATION/PRESENTATION OF MATERIAL:

Material for proposed thesis project will be recorded & credited in Thesis Book available:

- NDSU Institutional Repository
- Hard Cover Book Format

Oak Arbor Pediatric Healing Center

Through a new and creative approach to architecture, atmosphere, and environment; a healing center for families with children with cancer provides space for hope, happiness, and healing intrinsically.

It is essential for cancer patients and their families to have a feeling of control within their environment due to the exponential change this diagnosis put on the patient and their family. It is equally important to provide space for positive interaction, community building, and emotional recharge for families with a child undergoing cancer treatment. Designing architectural environments for the care and treatment of children with cancer requires empathy, universal and creative design to ensure an effective and positive outcome in the healing process.

Main Entrance



Figure 66 | Oak Arbor Main Entrance



Sense of Home/Personal Belonging:

- Patient privacy
- Various patient room layouts to suit each individuals and family needs
- Cafe area to provide a staple of comfort in a stressful and unknown situation far from home



Rejuvenation & Retreat:

- Quiet rooms or library to provide comfort, reassurance, and serenity
- Activity and wellness space
- Green space with various plant types, sunlight, views, and fresh air



Sustainability & Efficiency:

- Attention to materials for sustainability and comfort
- Use of green space to stimulate positive impact on the healing process
- Adequate daylight and energy efficiency to rejuvenate the atmosphere through LEED/WELL
- Raised Access Floor System incorporated with green roof system



Ease of Access & Way Finding:

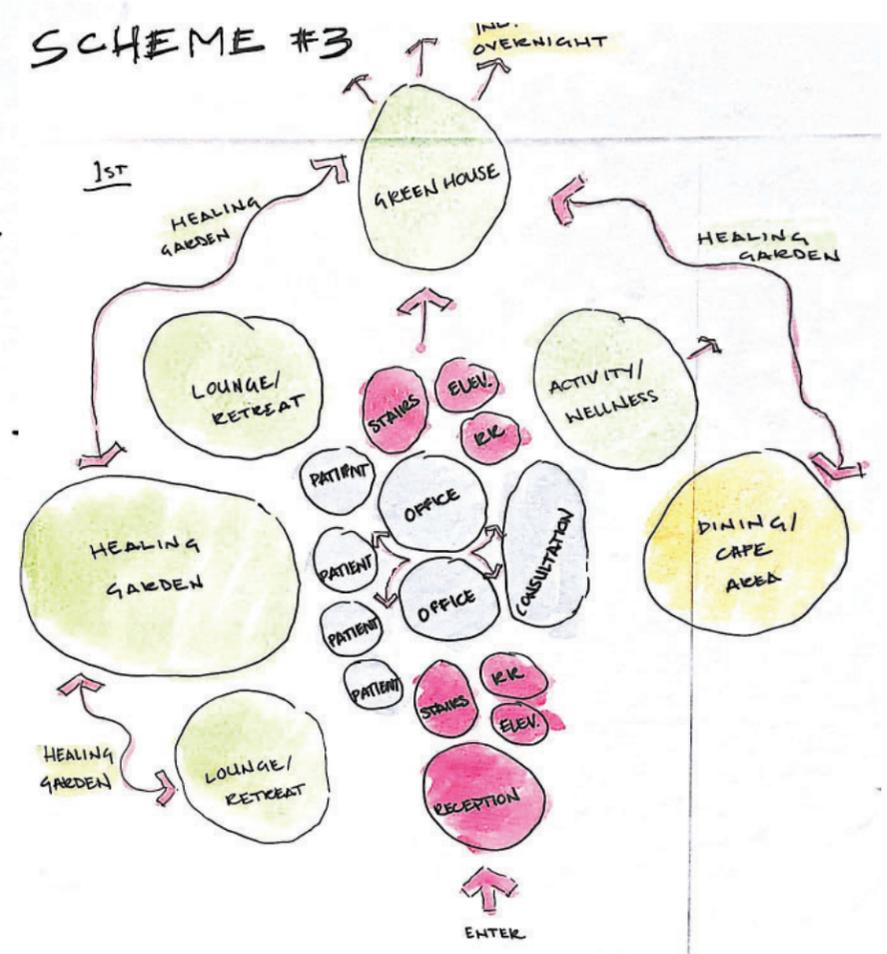
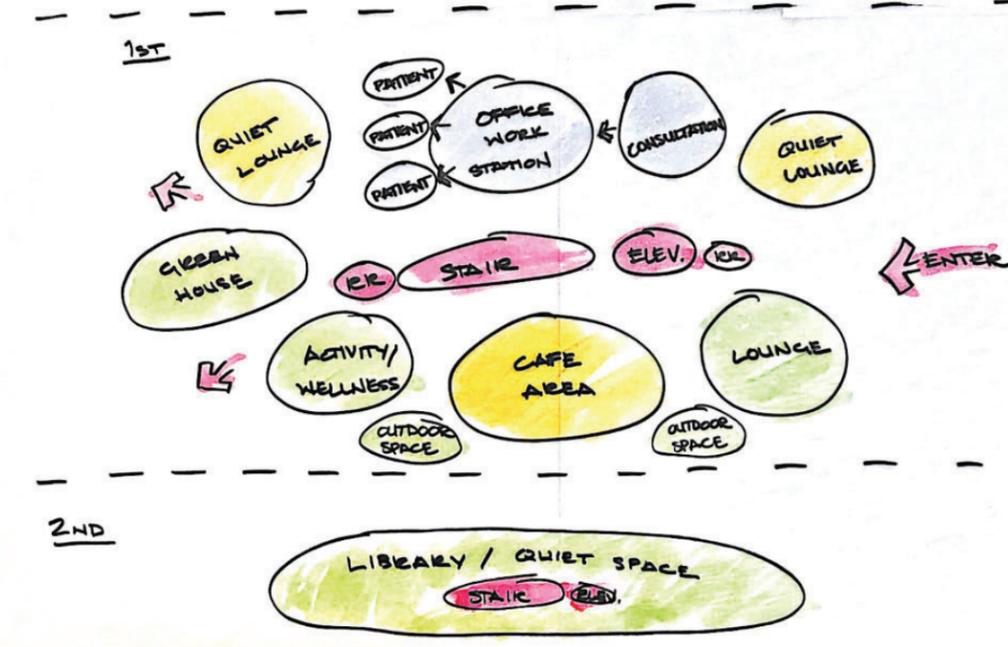
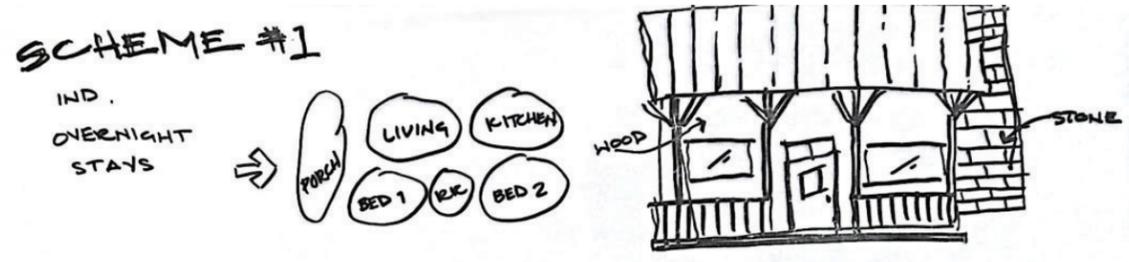
- Good way finding and convenient travel distance
- Spaces stay connected for collaboration but allow for privacy in situations where it is needed
- Logical circulation for daily and overnight guests



Caregiver/Specialist Space:

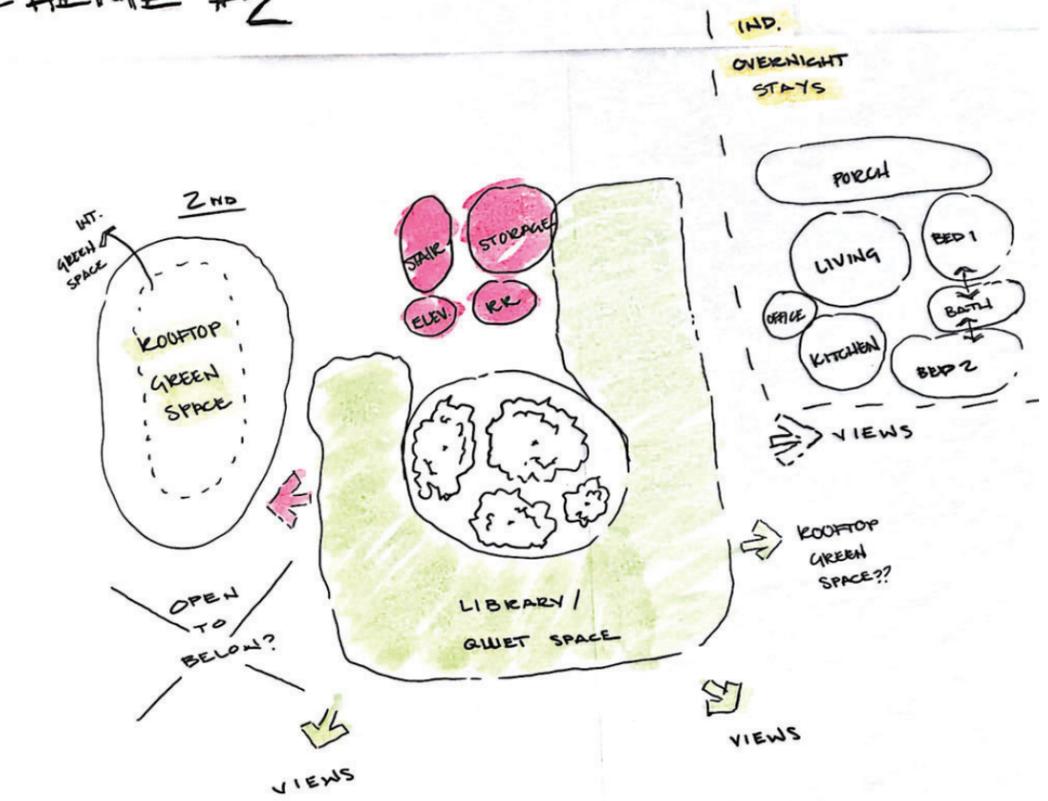
- Spaces that accommodate staff and specialists
- Location of offices, exam rooms, and consultation rooms linked to provide ultimate collaboration
- Easy for specialists to focus on the outcome of the patient and is accommodating to each person and space

“The architect’s job is to make you feel at home. This means to intensify a person’s sense of purpose and belonging through framing daily life. Within hospitals, it is said that the environment in which we heal best are environments that are therapeutic, supportive of family involvement, make us feel connected, and have access to nature” (Gadamer, The Enigma of Health).



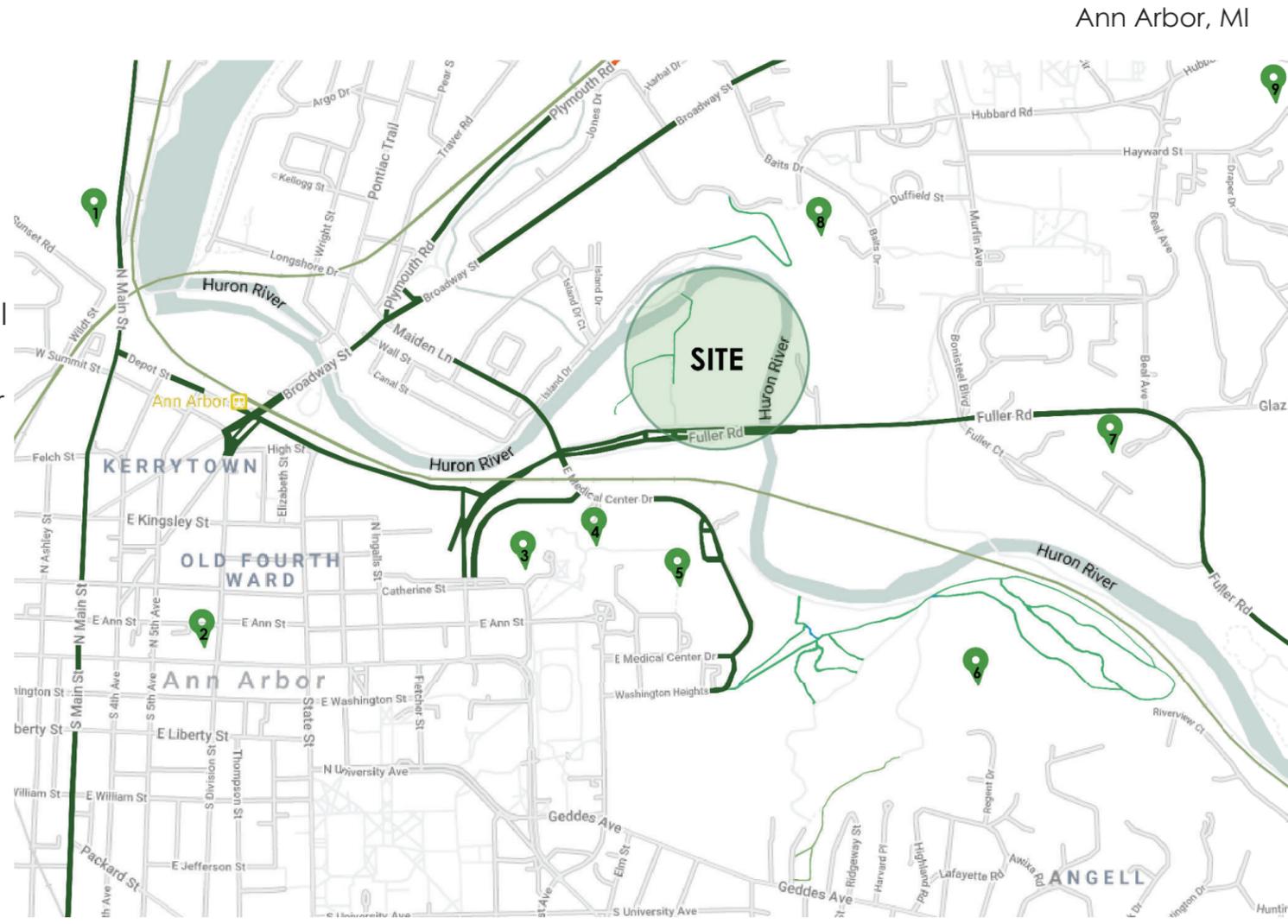
SCHEME #2

Natural materials, green space, and an open concept were early developmental ideas that stuck throughout the whole design process.



5.3 SITE PLAN AND INFORMATION

- 1 Argo Park Canoe & Kayak
- 2 Downtown Ann Arbor
- 3 U of Michigan Hospital
- 4 U of M Cancer Center
- 5 CS Mott Children's Hospital
- 6 U of M Nichols Arboretum
- 7 VA Ann Arbor Healthcare System
- 8 Cedar Bend Nature
- 9 U of Michigan North Campus



SITE PLAN AND INFORMATION 5.3

- ① Oak Arbor Pediatric Healing Center Main Entrance
- ② Oak Arbor Site Trail
- ③ Oak Arbor Healing Garden with Kids Play Area
- ④ Daily Parking Lot
- ⑤ Overnight Parking Lot
- ⑥ Entrance to Oak Arbor
- ⑦ Huron River
- ⑧ Existing Fuller Park Building/Pool
- ⑨ Existing Fuller Park Parking Lot
- ⑩ Fuller Road

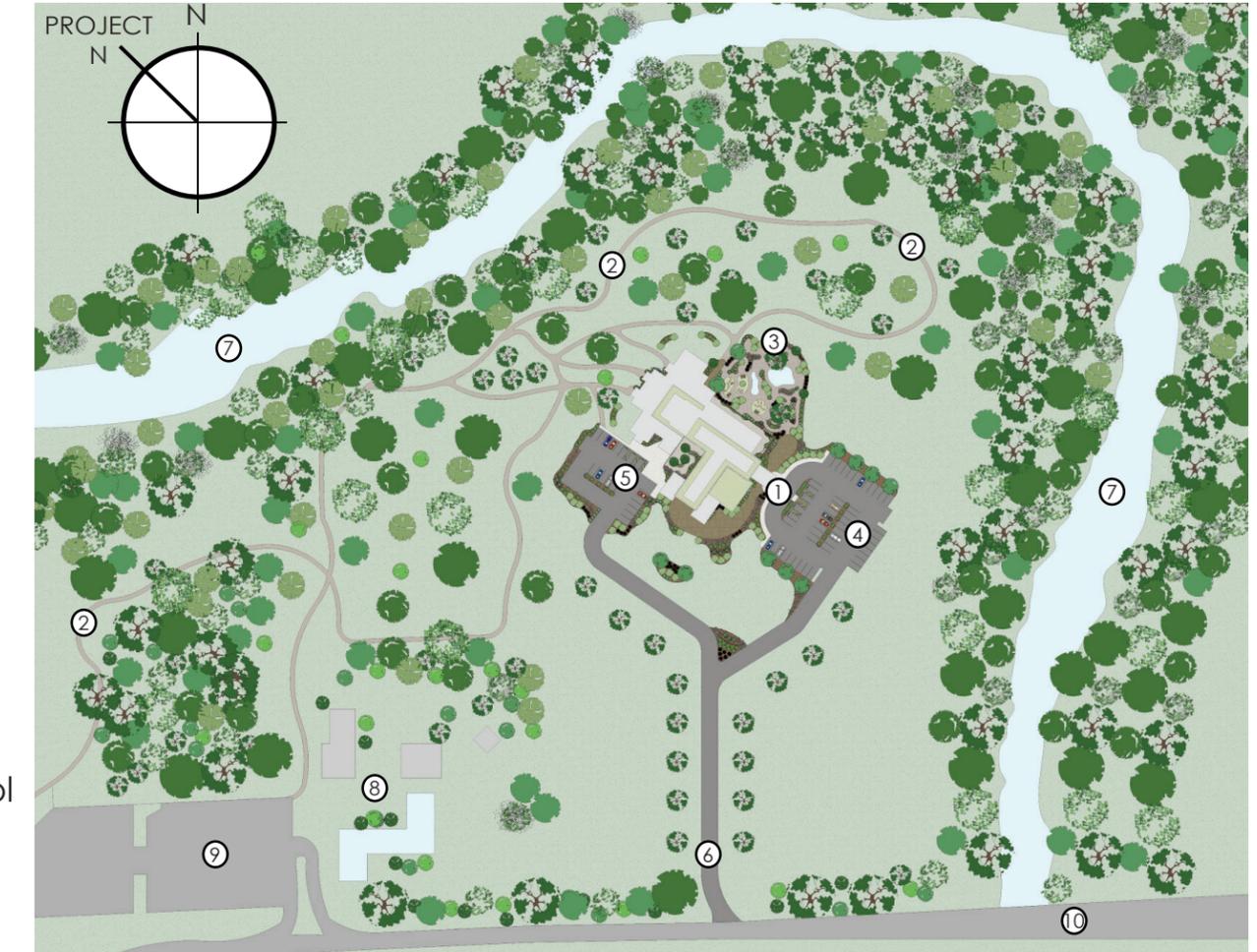
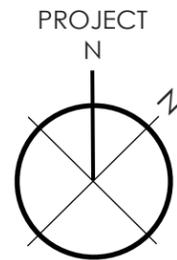


Figure 67 | Oak Arbor Site Plan

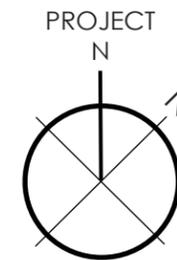
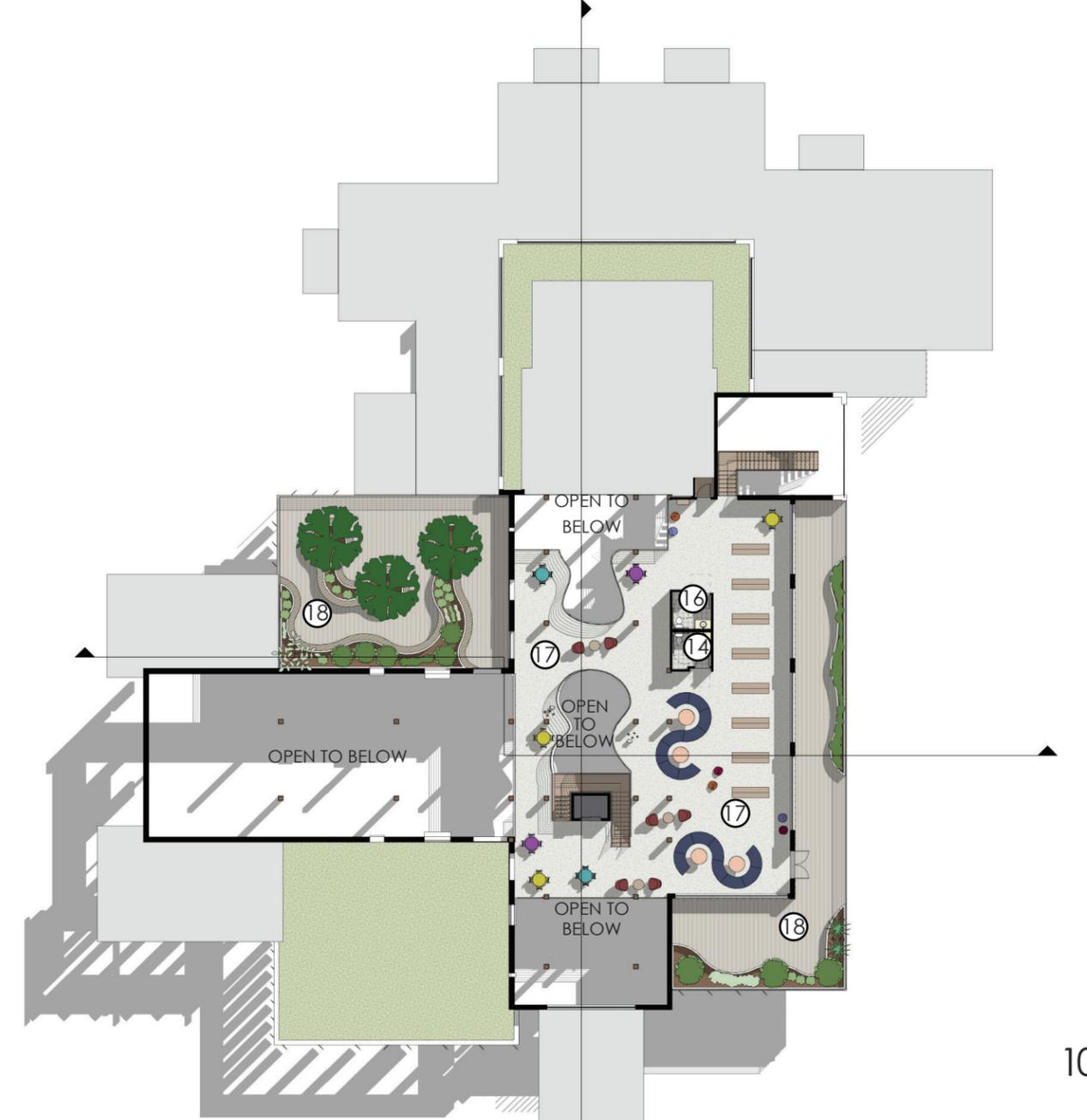
5.4 FLOOR PLANS - MAIN LEVEL

- ① Reception
- ② Rejuvenation Therapy
- ③ Family Therapy
- ④ Specialist Office
- ⑤ Individual Consultation
- ⑥ Art Therapy
- ⑦ Music Therapy
- ⑧ Lounge
- ⑨ Wellness Therapy
- ⑩ Cafe
- ⑪ Kitchen
- ⑫ Mechanical
- ⑬ Overnight Stay Room
- ⑭ Restroom
- ⑮ Interior Greenhouse



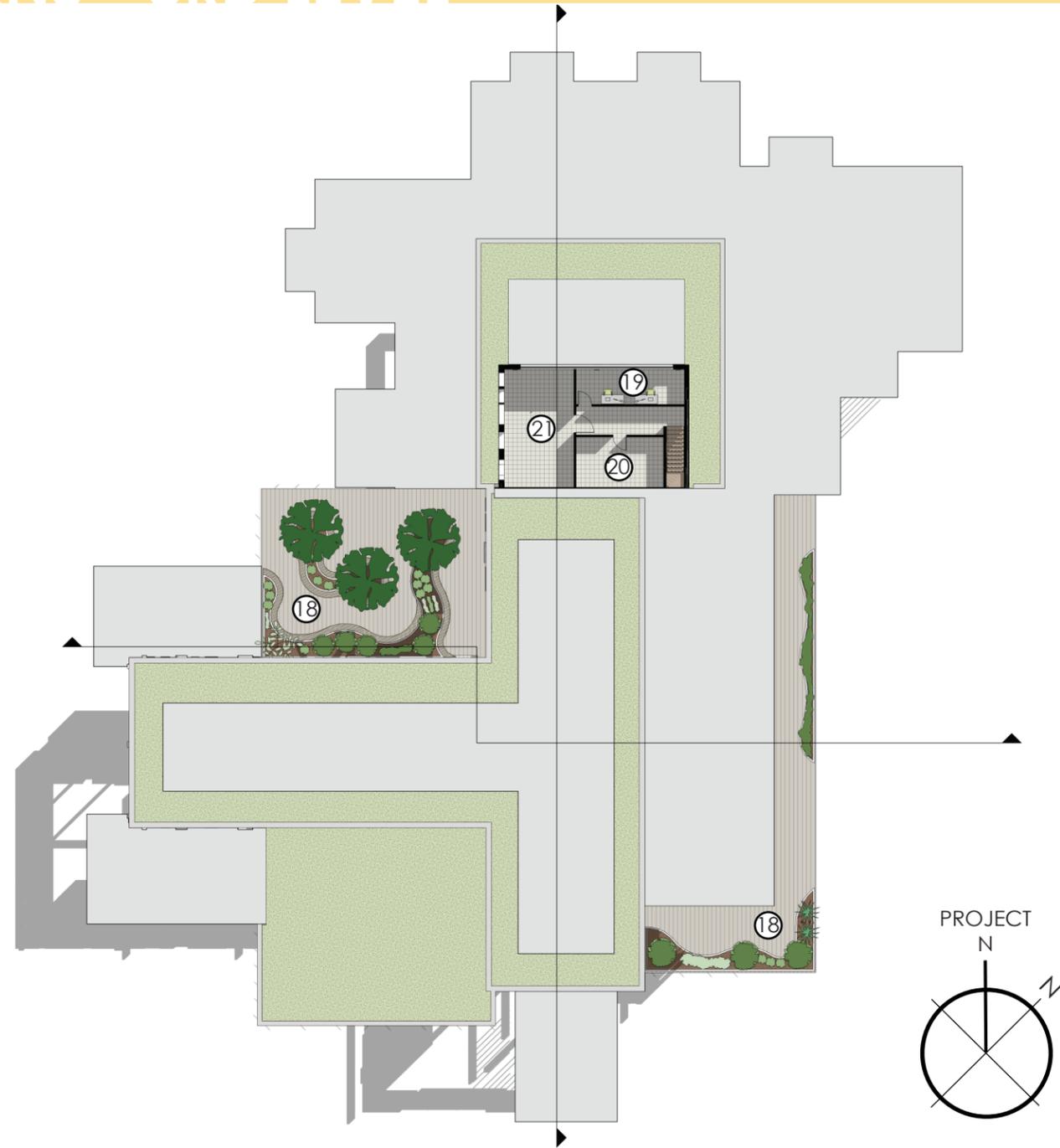
- ⑭ Restroom
- ⑮ Youth Restroom
- ⑯ Library Quiet Space
- ⑰ Walkable Green Roof

FLOOR PLANS - 2ND LEVEL 5.4



5.4 FLOOR PLANS - 3RD LEVEL

- ⑱ Walkable Green Roof
- ⑲ Facilities Office
- ⑳ Electrical
- ㉑ Mechanical



RENDERINGS 5.5

Overnight Entrance



Figure 68 | Oak Arbor Overnight Entrance

The cafe area offers a place of comfort to enjoy the cycle of everyday life.



Figure 69 | Oak Arbor Cafe

Family Resource Therapy provides a private space to discuss therapies, treatment options, and healing.



Figure 70 | Oak Arbor Family Therapy

Rejuvenation & Retreat space for families relax and enjoy the space with views to the outdoors.



Figure 71 | Oak Arbor Rejuvenation

Healing Garden with kids play area, various plant species, and water features.



Figure 72 | Oak Arbor Healing Garden



Longitudinal Section 0 4 8 12 24

Transverse Section 0 4 8 12 24

These section cuts show the relationship between the green roof system and raised floor system. In the transverse section at the bottom, you are able to see the intensive green roof planters, which are about 3-4 feet deep to allow for large bush and tree roots. With this in place, it allowed the perfect opportunity to introduce a raised access floor system, which will be explained in a few slides.

The section cuts also allow you to get a better understanding of the large open clerestory space throughout the design in relation to the lower more intimate overnight stay spaces.



North Elevation

East Elevation



South Elevation

West Elevation



Material: Stone Veneer Ledge-tone
Color: Marin Fog



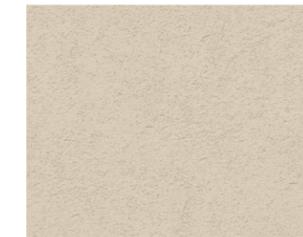
Material: Timber Structure
Color: Oak Wood



Material: Horizontal Fiber-Cement Hardie Siding
Color: Burnt Orange



Material: Board & Batten Fiber-Cement Hardie Siding
Color: Granite Grey



Material: Stucco Siding
Color: Abalone



Mass Timber Structure

In a world where the construction industry is responsible for 40-50% of Co2 Emission, renewable materials such as wood can help mitigate the rate of global warming. The potential of wood as a high building performance is a viable substitute to steel and concrete. The use of a Mass Timber structure accelerates the speed of construction, reduces structural weight, and has great thermal performance through natural insulating properties. It creates biophilic design benefits which is known to have a positive impact on human well-being as well as a low environmental impact since wood is 100% renewable carbon sequestering resource



Raised Access Floor System

A raised access floor is made up of panels supported by pedestals, creating an area of space below the floor to store servers, wires, duct work, and more. This system keeps wires and mechanical systems out of sight, allowing for a clean and crisp look to expose a unique structure. The removable floor allows for simple and easy fixes and easy access for maintenance or swap outs if something goes wrong or a piece is damaged. Within this system the space can be air conditioned from the floor due to the air moving in a more efficient way, cooling the space faster as well as preventing servers or other electronics below the floor system from overheating.



Insulated Glass

With a large amount of glass making up the façade, insulated glass allows better insulation due to the air gap between double or triple glazed systems. This air gap within insulated glass also makes a great noise insulator, causing sound waves to hit the pocket of air between the glass. The building also receives lower energy bills with better heat control, causing your HVAC system to work less. Double pane insulated glass windows also allows for easy maintenance just like normal glass.



Efficient Daylight

Efficient daylight was the goal when creating large clerestory atrium spaces. Daylight is able to transform spaces from an uninspiring atmosphere to a psychologically uplifting experience but requires careful consideration and understanding for just the right amount.



Efficient Indoor Air Quality via Green Walls

Having efficient indoor air quality through green walls or sustainable systems allows occupants to breathe easier and reduce stress levels. Cleaner air means the ability to rest will be easier and you are less likely to get sick due to the removal of allergens and pollutants in the air. In addition to all this, it also lowers the utility bill by avoiding the temperature dips by turning on and off AC units causing them to work harder.



Sun Shading Devices

With efficient daylight, glare and allowing for too much light cause occupants discomfort. Sun shading devices allow you to enjoy the space while also being expressive. Inviting a rich shade of light and shadow to the building, adding rhythm, color, and texture to the appearance of the building.



Figure 73 | Oak Arbor Intensive Green Roof

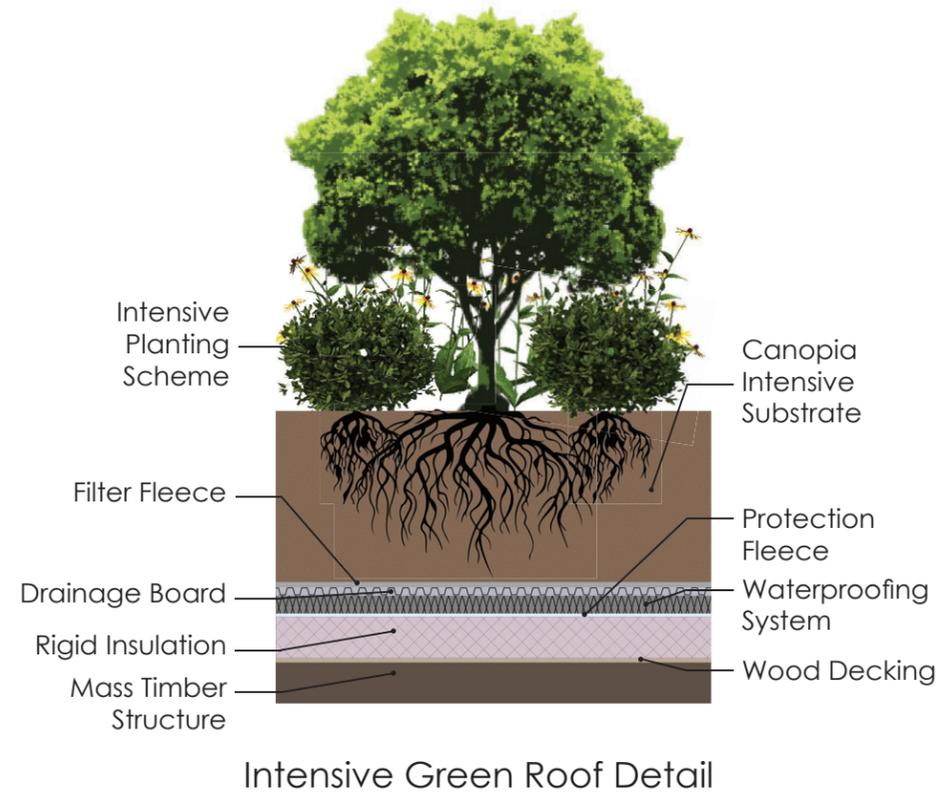


Figure 74 | Oak Arbor Extensive Green Roof

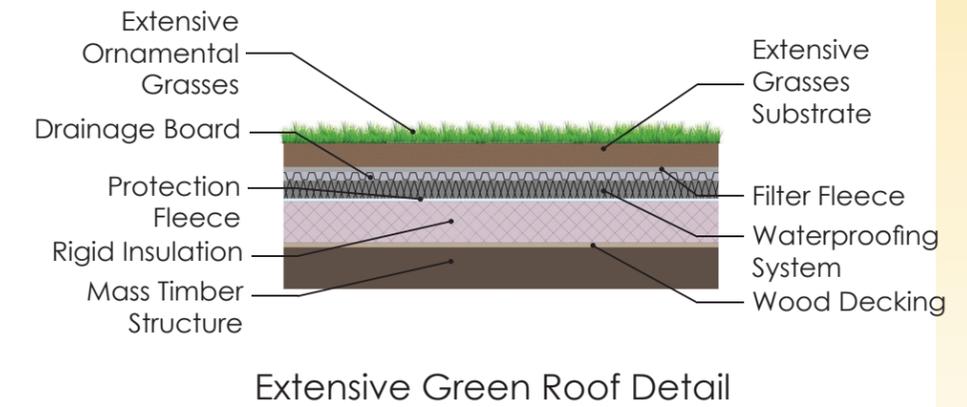
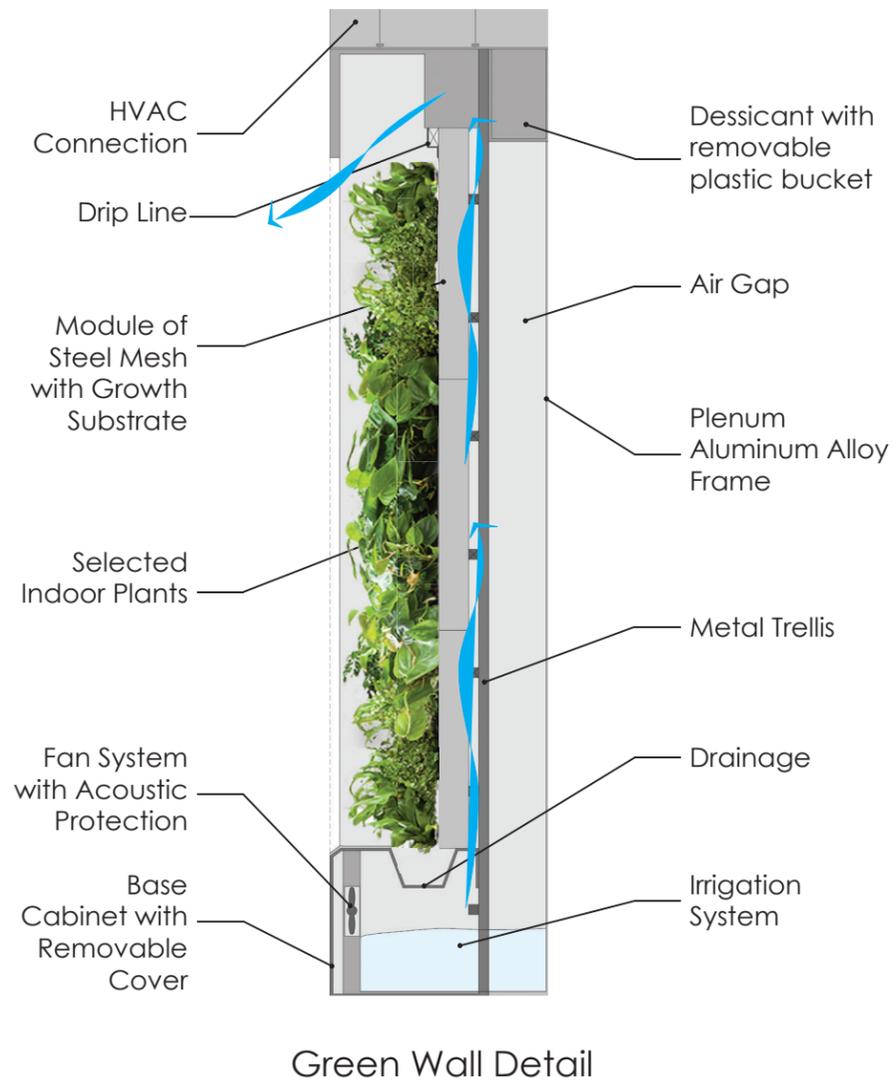




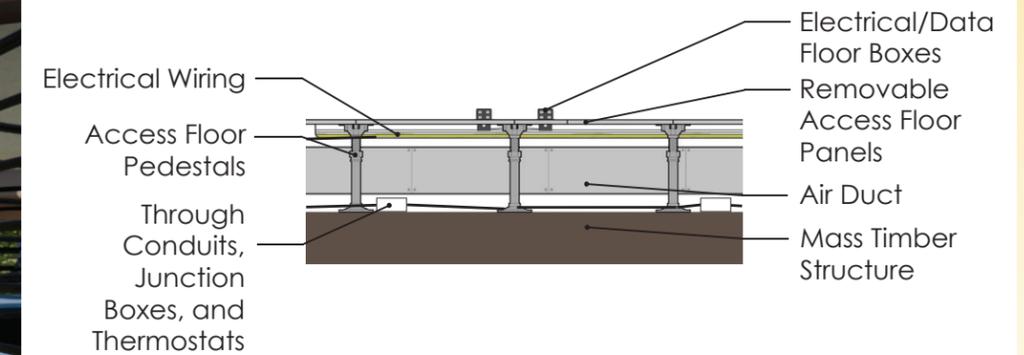
Figure 75 | Oak Arbor Green Wall



Green Wall Detail



Figure 76 | Oak Arbor Raised Access Floor System



Raised Access Floor Detail



*To my professors, classmates, family, friends,
and everyone else who helped me along the
way...I could never say thank you enough for
always pushing me, encouraging me, and
supporting me along this journey.*

2017-2018

FALL

Daryl Booker

Tea House
Project Name: Serenity
Location: Moorhead, MN

Boat House
Project Name: N/A
Location: Minneapolis, MN

SPRING

Milt Yergens

Dwelling
Project Name: River's Residence
Location: Marfa, TX
**Team Awarded 1st Place*

Multi-Use Apartments
Project Name: North Pacific Apartments
Location: Fargo, ND

Pritzker Architect Birdhouse
Architect: Richard Rogers

2018-2019

FALL

Regin Schwaen

Visitor Center
Project Name: Oscar Zero Visitor Center
Location: Coopertown, ND

Design Competition
Project Name: Viewpoint of the Fjords
Location: Norway

SPRING

Emily Guo

Assisted Living Community
Project Name: Senior Assisted Community
Location: Xi'an, China

Native American Museum
Project Name: Cultural Loom
Location: Moorhead, MN

2019-2020

FALL

Mark Barnhouse

Capstone Studio
Project Name: 1629 Miami
Location: Miami, FL

SPRING

David Crutchfield

Marvin Windows Competition
Project Name: Caper Cottage
Location: Fargo, ND
**Competition Award Finalist*

Urban Design of Main Ave.
Project Name: Off the Rail
Location: Downtown Fargo, ND

2020-2021

FALL

Stephen Wischer

Graduate Research Studio
Theoretical Research Readings
Location: N/A

SPRING

Jennifer Brandel

Graduate Design Studio
Project Name: Oak Arbor Pediatric Healing Center
Location: Ann Arbor, Michigan

“Your life is about breaking your own limits and outgrowing yourself to live your best life. You are not in competition with anyone else; plan to outdo your past, not other people”

- Unknown

NAME McKenna Vetter

ADDRESS 2509 39th Ave. South
Fargo, ND 58104

EMAIL mckenna.r.vetter@ndsu.edu

PHONE (701) 541-5109

HOMETOWN Fargo, North Dakota



Figure 78 | NDSU Career Fair, photo credit | Personal Identification

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Figure 79 | Behance, photo credit | Nationwide Children's - Ohio