


DESIGNING INCLUSIVELY:

INNOVATIVE DESIGN STRATEGIES FOR INCLUSIVE ACCESSIBILITY
IN THE BUILT ENVIRONMENT FOR THE BLIND AND/OR DEAF





“Blindness cuts us off from things, but deafness cuts us off from people,”
-Helen Keller

SIGNITURE PAGE

A Design Thesis Submitted to the
Department of Architecture and Landscape Architecture of
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Master of Architecture

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PROPOSAL

ABSTRACT

Individuality, freedom, and a chosen lifestyle improves with enough space for people to live with confidence and safety. This equitable value is not one which someone who is blind and/or deaf tends to benefit from. These groups of people live in a sighted, hearing world with minimal adaptations for them.

Designing for equity is essential for the disabled to participate in sighted and hearing activities. To improve this quality of life, how can we design a building whose organization and function makes inherent sense to the blind and/or deaf? In addition, how can the found strategies be applied within architecture to create a sense of community and safety? This thesis project will investigate how to effectively create a facility that functions well for the blind and/or deaf both physically and psychologically.

Choosing a typology where the focus group can develop healthy lifestyle and create positive community, I chose a wellness center to achieve this goal. Report from the Centers for Disease Control and Prevention states that “inactive adults with disabilities were 50% more likely to report one or more chronic diseases than those who were physically active” (Carroll et al., 2014). Those who are deaf or hard of hearing (HOH) experience social isolation which can result in a lasting impact on both mental and physical health. Each of these disabled groups would benefit from this typology while improving their lifestyle as individuals.

Research strategies include case studies and interviews. Case studies of wellness centers help understand how to successfully organize and create “whole” lifestyles. Other case studies, like Gallaudet University, successfully reflect the concepts used and showcase how these strategies can be successful. Interviews bridge the social gap by listening to the primary clients’ personal experience so designers can understand how to design a “world” for them. The applications found in these case studies and personal experiences of the blind and deaf can be used to design a successful wellness center for their needs.

NARRATIVE

When designing a world for the general public, often a group of people who adapt without being the primary client are people with vision and hearing loss. In the United States, Americans with Disabilities Act of 1990 (ADA) is not a design priority point, rather a minimum requirement which ensures occupancy, via ramps, elevators, braille, and signage. These methods of navigation are unreliable, leaving these groups of people unconnected and unsafe in their surroundings and the larger community. For the blind, it is not easy to simply go to the gym to work out, or “see” the latest movie, or go to a museum and be able to experience the same curiosity and entertainment others do. These sighted activities should not hold back the opportunity to effectively participate. It is easy to get lost if there are no distinguishing transitions from space to space, relying on the sighted to assist in everyday activities.

Establishing a sense of belonging for the deaf and hard of hearing (HOH) can be difficult. The need for communication and connection is a basic human need; its absence takes an emotional and psychological toll; the result is social isolation. Such barriers are created when others depend on the deaf and HOH to read lips and interpret facial expressions of the hearing. This communication is often inaccurate and a challenge to genuine engagement. Though new technology such as “talk to text” has made communicating easier, these recurring effects can result negatively on both mental and physical health (Robyn Correll, 2022). The deaf deserve a place where they can feel included and connected to those around them.

To improve this quality of life, how can we design a building whose organization and function makes inherent sense to the blind and/or deaf? In addition, how can the found strategies be applied within architecture to create a sense of community and safety?

In 2016, I was involved as a volunteer with the American Council of the Blind at their national annual convention. There they host advocacy sessions, vendor promoting blind products, and a variety of tours of the selected city for the convention that year.

Each year people have trouble navigating the convention hotel, despite precautions taken with textured tape and sound indicators. It can take an hour to get from one session to another, while a sighted person could find the location in 5-10 minutes. In the many tours



Figure 1.2

I have been apart of, I often see an item, painting, or experience, such as architecture in the tour that the blind are not able to experience because they are not able to feel it, reach it, or because no one points it out and describes it to them, and in those cases, every time I wished there could be a way to duplicate my experience. Although I do not have equal experience with the deaf, I share the value of community and want to create a space where they can find a connection.

Through this research, I hope to explore how the blind and deaf navigate buildings and their larger communities and what design concepts allows them to feel safe and included. When interacting with the objects and people in a building, what is the best organization to achieve this fluid sense for a blind and/or deaf person. Finally, what design technologies and textures help them understand the difference spaces they are walking to and from.

My hope through this research is to make an inclusive space where the sighted and hearing can share a common experience and improve their wellbeing and happiness. To create memories with their family and friends without having to ask for assistance, giving back some of their individuality and freedom.

PROJECT TYPOLOGY

The project typology most beneficial to improve the lives of the blind and deaf is a wellness center. Research from the Centers for Disease Control and Prevention states that “inactive adults with disabilities were 50% more likely to report one or more chronic diseases than those who were physically active” (Carroll et al., 2014). Those who are deaf or HOH experience social isolation which can have a lasting impact on both mental and physical health (Robyn Correll, 2022). Therefore, wellness centers allow people to improve through the mind and body. It is a place where individuals can create mutual connection through classes and improved physical health.

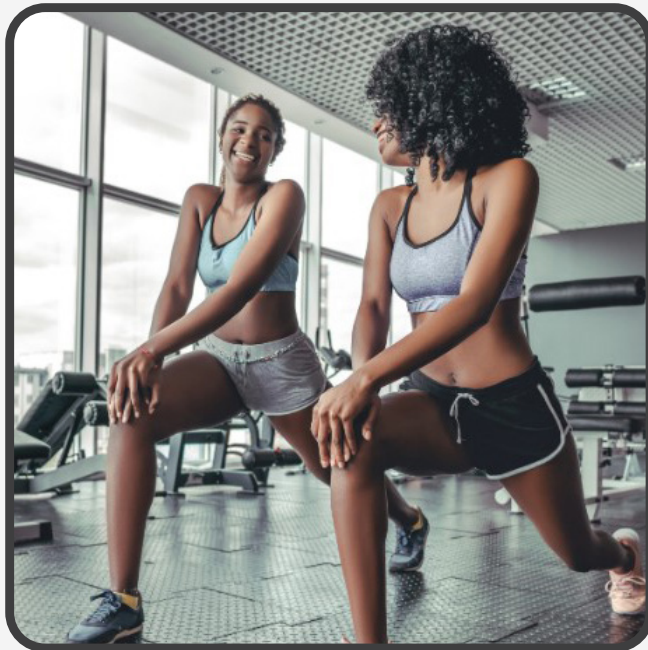


Figure 1.3

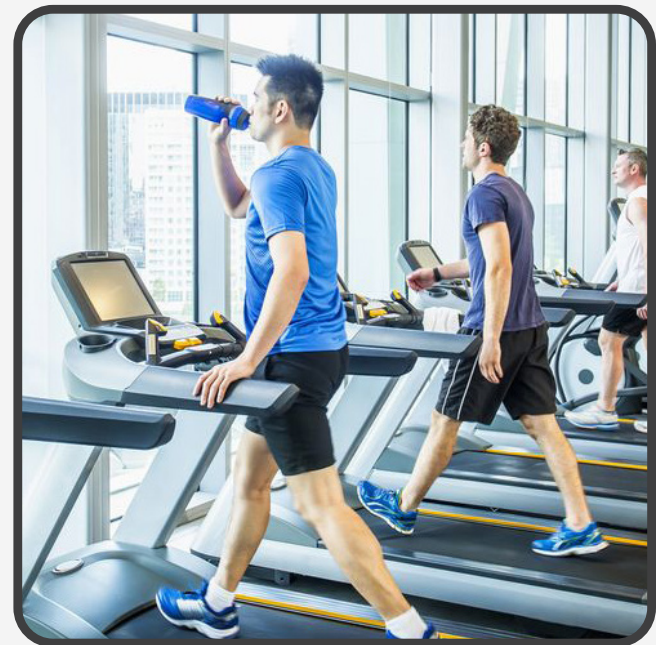


Figure 1.4

MAJOR PROJECT ELEMENTS

The wellness center will include these elements:



Lobby & Front Desk: A place where members will be greeted and assisted with questions they have about membership, the facility, and current activities in action.



Courts: Open courts with basketball, volleyball, and soccer courts for members to play the respective sport with other members. These open courts can also be used for large classes the wellness center leads.



Weight Rooms: A space filled with lifting equipment that develops a variety of muscles.



Fitness Studios: This is where lead classes and personal fitness sessions can take place for a more private place to work out. This is a place where people can connect with each other.



Track: A set looped area for walking, jogging, and running short and long distances.



Aquatics: An area for children and adults to participate in casual swimming activities. This includes small and large swimming pools, lap pool, water play area, hot tub, and sauna. This is also where swimming lessons will take place.



Locker Rooms: Where members can safely change, shower, use the restroom, and hold their belongings as they workout.



Childcare: A section roomed off for parents to drop off their children, so they are able to peacefully workout. Children will play and connect with other children within this supervised area.

Figure 1.5

PROJECT JUSTIFICATION

All people deserve to live as individuals with freedom and wellbeing. It is essential for human progress. Designers are always looking for new techniques and strategies to improve our experience, and rather than designing for the majority we need to focus on designing for disabled groups. Not only will it open up a variety of opportunities for the disabled, but it will also educate others about the challenges facing people with disabilities and how little has been done to support them. This further justifies why architects should design for diversity to showcase how this integration does not require a complicated process, just a mitigated one. If this thesis is done properly, it will be able to be replicated around the United States, and possibly around the entire world, as a function focused way to provide services to the blind and deaf. Architecture can lead this change for equity and diversity. As designers, we need to use the tools available and the people who know what is needed for that change. It is unnecessary to wait for ADA requirements to update when many times regulation like ADA often follows rather leads.

PROJECT EMPHASIS

Design a wellness center for the blind and deaf that is simple and organized for the blind to navigate and effective programming for the deaf to achieve connection. This will include integrating design strategies discussed previously to design a place which welcomes health habits and builds community and opens opportunities for disabled groups to partake in activities which might not have been accessible to them. These design strategies can smoothly integrate separate areas to communicate when the blind have entered in a new space as well as create a wider view range for the deaf to communicate to other around them. This will be done using strategies such as material, texture, and color.



Figure 1.6

SITE DESCRIPTION

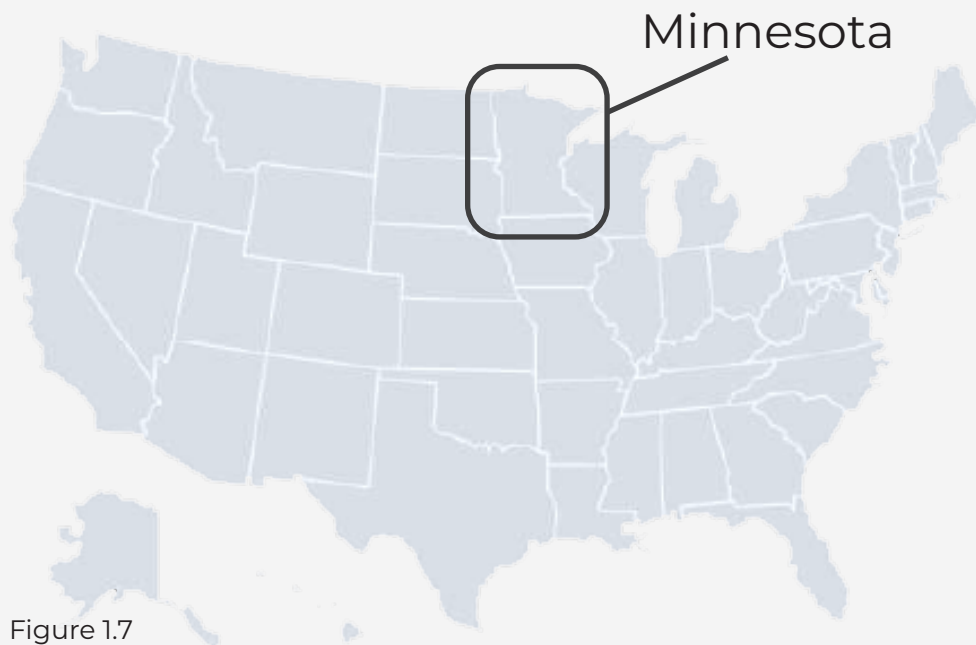


Figure 1.7



Figure 1.8

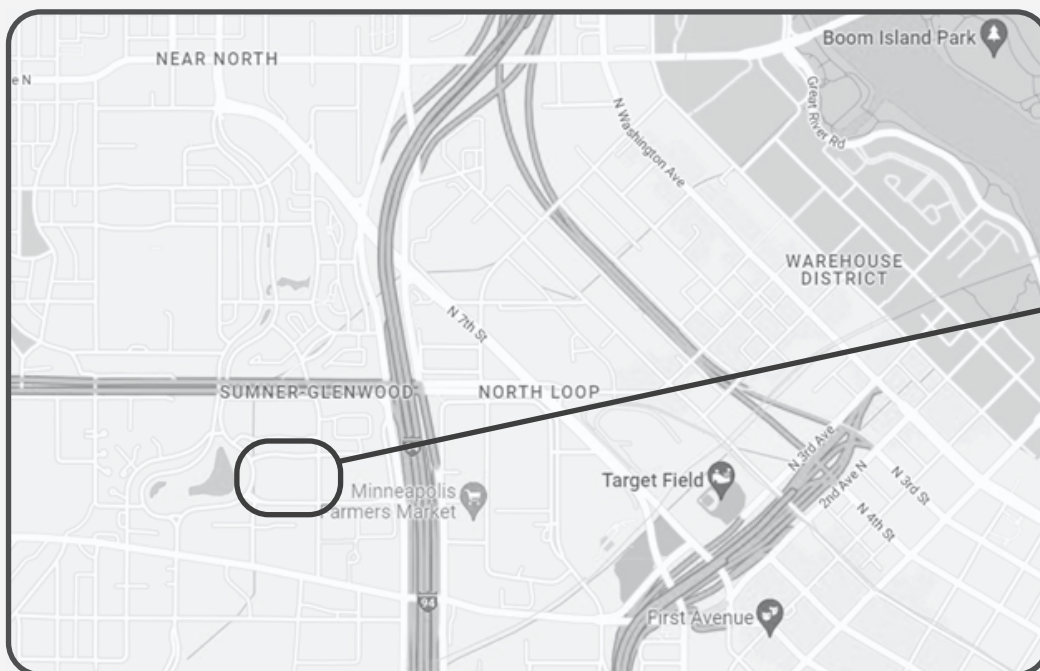


Figure 1.9

Sumner-Glenwood



Figure 2.0

 900 4Th Ave N,
Minneapolis 55405

RESTAURANTS

There are restaurants, bars, and coffee shops nearby the site location. There is a coffee shop, brewery, and soul restaurant about 5-10 minutes away. But the majority of restaurants are in the downtown area which is about a 10-15 minute walk from the site.

RESIDENTIAL

The site is mostly surrounded by a residential area. This could very beneficial to those living in the neighboring area being that they could walk to the local site.

ENTERTAINMENT

Being that is site is near the downtown area, there are many activities to do. There are parks, museums, the Minneapolis Sculpture Garden, art centers, and more.

TRANSPORTATION

There are many transportation options around the site. About a block and a half away is a bus station that connects to the inner downtown system. The C-line is close by which is a fast train system that travels through the downtown area to the US Bank stadium.

Minneapolis' transit system is wide spread and able to travel easily throughout the metro area.

CLIENT/USERS

Defining the target audience is essential to understand how to design. The client and users are primarily the blind, visually impaired, deaf, and hard of hearing, defined by the Oxford Dictionary:

Blind: unable to see because of injury, disease, or a congenital condition

Visually Impaired: a person whose eyesight cannot be corrected to a “normal” level

Deaf: lacking the power of hearing or having impaired hearing

Hard of Hearing: not able to hear well

The primary audience of this wellness center are the blind and deaf. Activities for these individuals include working out, fitness classes, swimming, jogging, learning, and much more. A target occupancy for the building might range from 50-300 people. Spaces are designed for their needs; therefore, it can be anticipated that this group would be the main client and audience.

A secondary client would be the friends and family who accompany the blind/deaf person. Their activities are very similar to the blind/deaf but with the intent to connect with each other and create memories. This group of people would not exclusively need to join blind/deaf individual at the wellness center but could visit as they pleased. Therefore, this secondary group could transition into a primary client. This number could be similar to the principal client/audience for this building is not exclusively for the blind/deaf. With this in mind, the number could range between 50-300 people.

Faculty and staff are necessary for the building to operate. They will manage the building, maintain it create programming, and interact with members. This number could range from 20-60 people.



Figure 2.1

GOALS

Project goals include:

- Researching effective design strategies for the blind and deaf to educate and influence how they can be integrated into a wellness center.
- With these strategies, it will be possible to design a welcoming, inclusive facility for the blind and deaf to connect and improve their health., as well as a wellness center for all to use.
- In the design process, technical drawings, material representation, and rendering skills will be refined to illustrate the research completed and design choices for the project. This will be helpful when presenting the thesis to an audience who has never encountered such as facility.
- The completed thesis will contribute to the field of architecture as they adapt and revolutionize how they design. Hopefully with the intent of designing for disabled groups.
- Use this work to further my education and career as I join the architecture field. Remember to think from various cultural and social backgrounds so that I may start to understand the full scope of all perspectives when designing.

PLAN FOR PROCEEDING

Definition of Research Direction

Case studies will inform the direction of the project. The target case studies will provide useful information about design strategies, in regard to the blind and deaf's social and environmental needs. In addition to wellness center case studies which house a variety of equipment and programs that support the health of members.

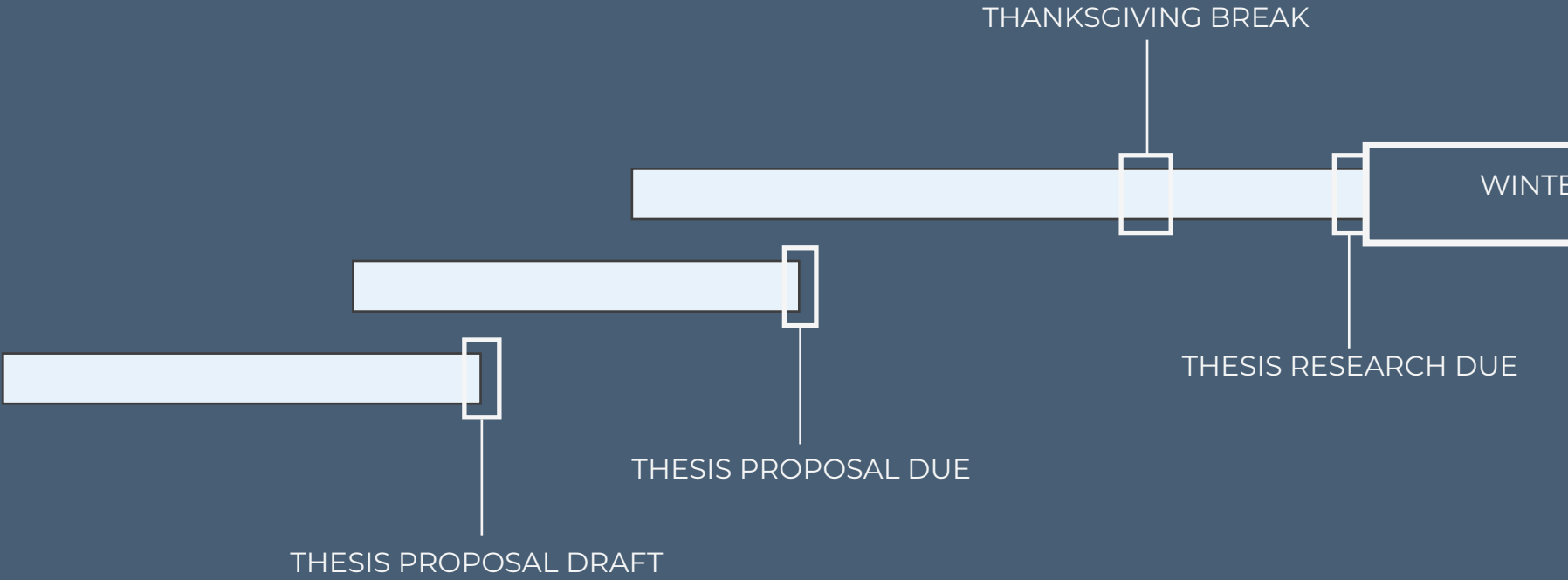
Plan for your Design Methodology

Use the design strategies and concepts of case studies to strategize improving the lives of the blind and deaf. Each will influence the design. Beyond applying the design strategies to each target disability, help them communicate with their surroundings with effective circulation.

Plan for Documenting the Design Process

The research phase will consist of writing drawn from case studies. Sketching will illustrate spatial relationship and organization. All are important for a complete understanding of the project. When research is complete, the design process will begin. Software such as Revit, SketchUP, and Auto CAD will be used to visualize various solutions. Final documentation and presentation will be presented as a hard cover book, presentation board, and presentation PowerPoint.

SCHEDULE



AUG

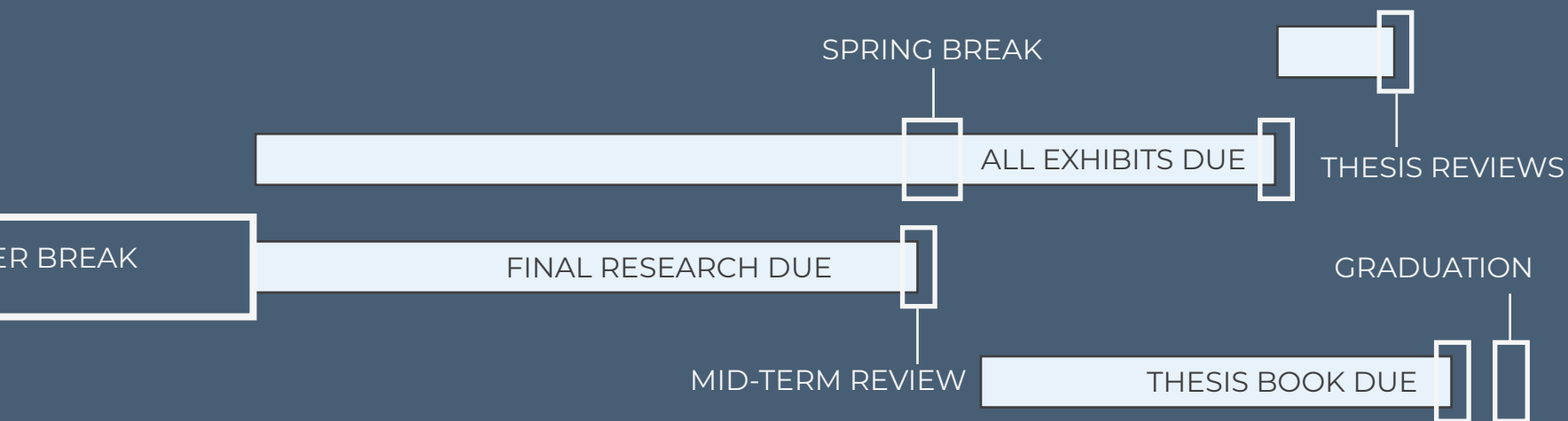
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Table 1



JAN

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RESEARCH



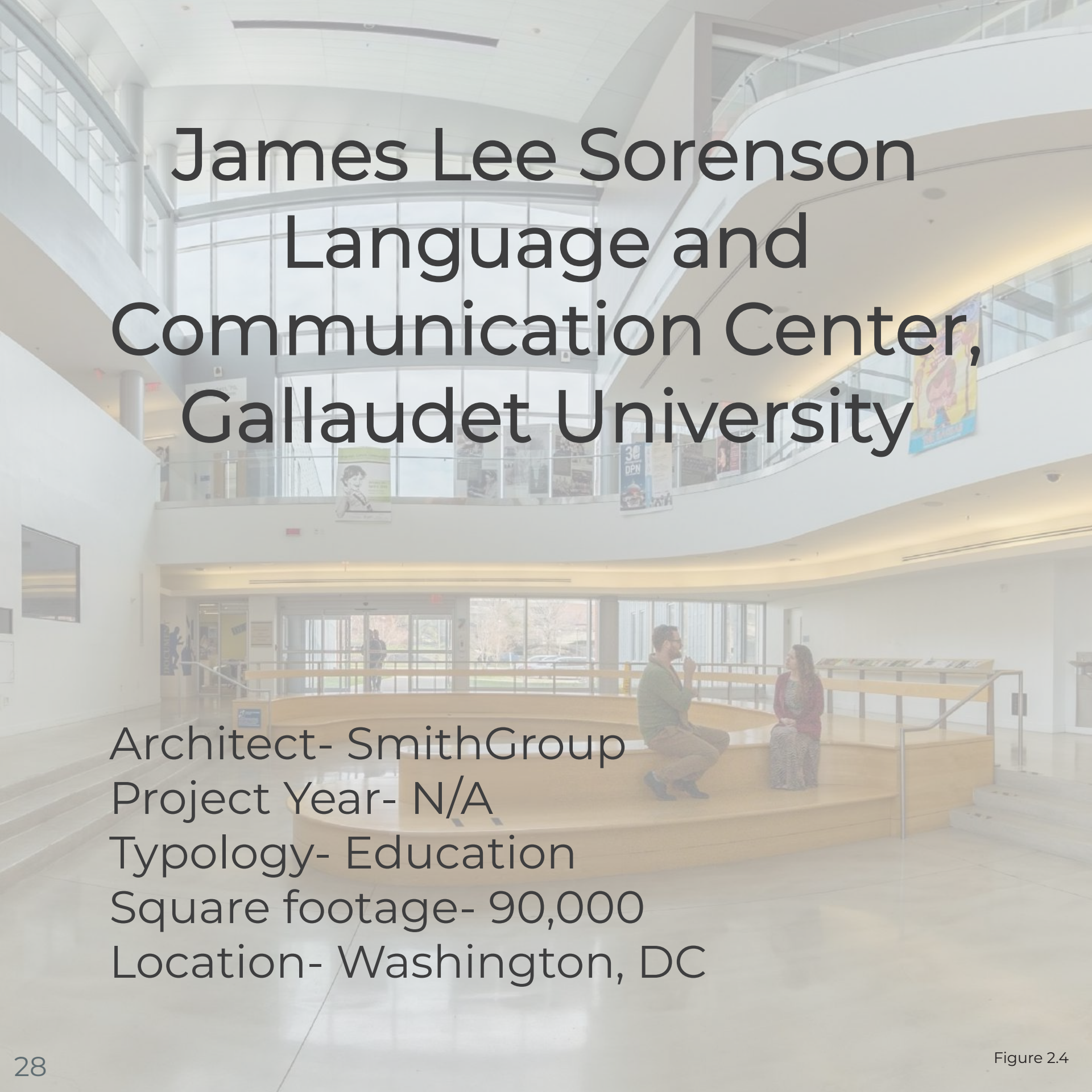
Figure 2.3

CASE STUDIES

In researching the following case studies, the primary goal has been to:

- Understand how the blind and/or deaf navigate and interact with their surroundings such as people or solid objects
- Find techniques that help guide the blind and/or visually impaired around buildings
- Find strategies that help reduce isolation
- How to design an optimal functioning wellness center

In identifying these goals, they can influence how to effectively design a wellness center for the blind and deaf and determine if will be successful.



James Lee Sorenson Language and Communication Center, Gallaudet University

Architect- SmithGroup
Project Year- N/A
Typology- Education
Square footage- 90,000
Location- Washington, DC

James Lee Sorenson implemented design concepts developed by the campus group Deafspace to demonstrate how to include deaf needs into the building design. The five concepts are space and proximity, sensory reach, mobility and proximity, light and color, and acoustics. From these five concepts, we can analyse specific elements in which they successful.

Design Strategies:

Classrooms are configured in U-shape so students can collaborate and effectively talk to each other in class. As Derrick Behm said this way “everyone has a front row seat”.

Wide hallways and stairs are also used so that two people have space to communicate with each other and enough room for others to pass by. Stairs, however, can sometimes pause a conversation because of the focus people have when climbing the stairs. Wide ramps allow a deaf conversation to continue seamlessly. Having visual range allows people use ASL from across the building as long as they are able to see the person talking to them. This is done with large and wide rooms. Figure 2.6 shows one person talking to another from the second floor.

Another method to expand visual range is by using wall curves instead of corners. This allows for each person to gradually approach one another rather than abruptly running into someone. Reflective mirrors can also help with this problem.

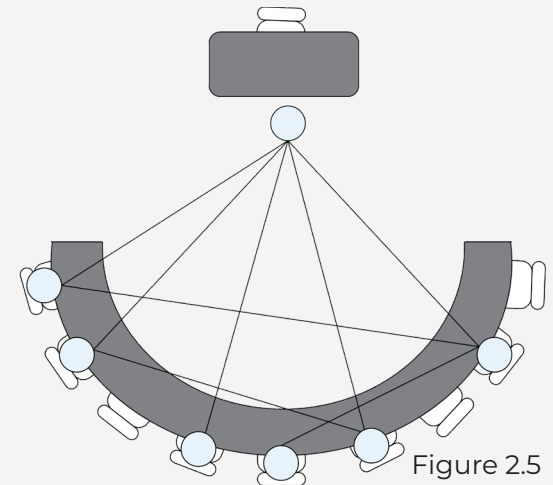


Figure 2.5

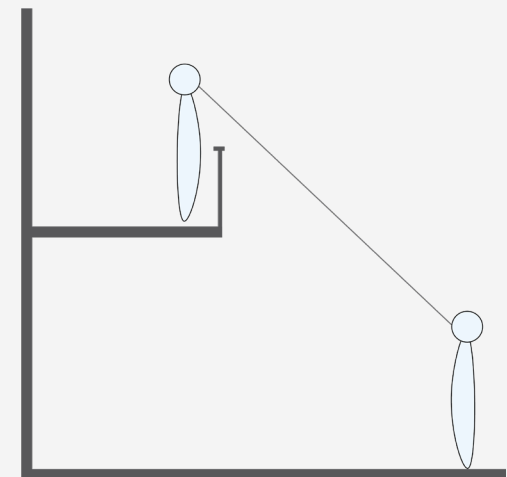


Figure 2.6

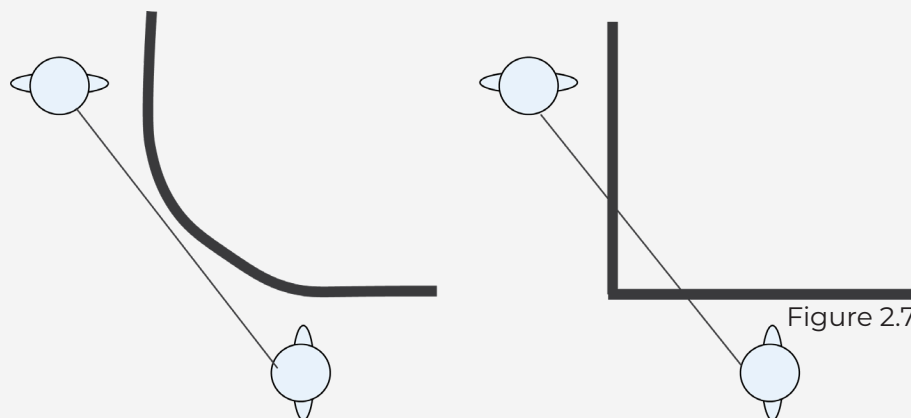


Figure 2.7

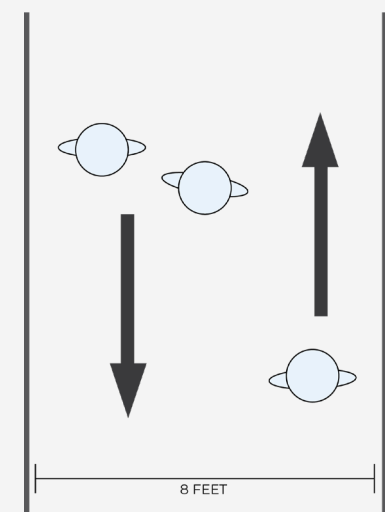


Figure 2.8



Figure 2.9

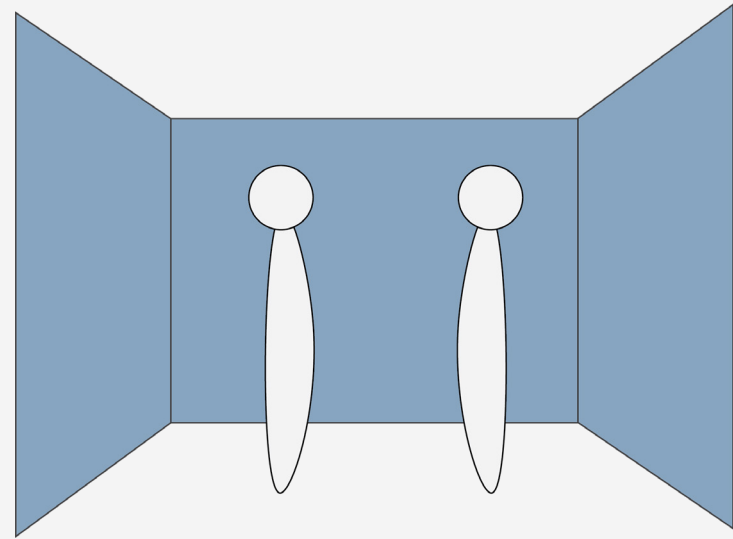


Figure 3.0

Color and lighting are used to help reduce eye strain. For example, muted blues and greens will contrast most skin tones making it easier to focus on the person rather than the background. Diffused lighting also helps with eye strain. Another primary way this is done is by using transparent materials such as glass. Some aspects of the building that use transparent materials are the wide windows, doors, elevators, and railings. Reflective materials help those who are deaf know if someone is approaching them where their peripheral range does not reach. Opaque glass can also let someone know if there is someone in the next room while giving the person in the room privacy. For example, this is done for office rooms to give professors privacy when speaking with students but a student waiting on the outside of the room can understand that the professor is busy. Although acoustics is not a direct deaf design strategy, it does affect the amount of noise pollution created from the large spaces discussed above. This building does not successfully show this resulting in echoing. This affects the hearing with unwanted noise but also affects the deaf. The vibrations from the echoes creates uneasiness as the sound bounces around the large atrium.

Social Effect:

The various design aspects explained allow the students to have a strong cultural identity built around the space they connect, learn, and grow as individuals. Building these communities, from the DeafSpace principles which this building was influenced by, starts with effectively giving people ways to communicate with each other. As the building has proven to show this with the number of students who chose to enter this building as a way to connect with peers.



Figure 3.1

Summary:

Space for visual communication is key when implementing and developing design strategies for the deaf. Open space gives the deaf room to have a conversation walking down the hallway or passing another group, and room to see everyone around the space. Using materials and colors encourages connection to others. The building overall successfully uses these strategies to create a sense of community. Although this building did not successfully implement acoustic concepts, resulting in unwanted noise, I can learn from this and adapt. These deaf design strategies will influence the project design and help understand how to effectively design for the deaf.

The LightHouse for the Blind and Visually Impaired

Architect- Mark Cavagnero
Project Year- 2016
Typology- Community Center
Square footage- 37,800
Location- San Francisco, CA

Design Influence:

The focal point in designing the San Francisco Lighthouse for the Blind was to efficiently help the blind and visually impaired navigate their way around the building. This includes designing with selected materials that impacts movement, acoustics, and lighting.

One of the primary clients is the visually impaired, and about 90% of visually impaired people have slight vision which can be hindered when high glare and illumination is present. This design problem is avoided by using soft lighting and low brightness.

Textured materials on walls and handrails help the blind and visually impaired navigate their ways down hallways. In figure 3.3 shows a man guiding himself with his cane down a hallway with a touch from the horizontal wood wall texture. He can feel the different textures and know when he has reached a new section.



Figure 3.3

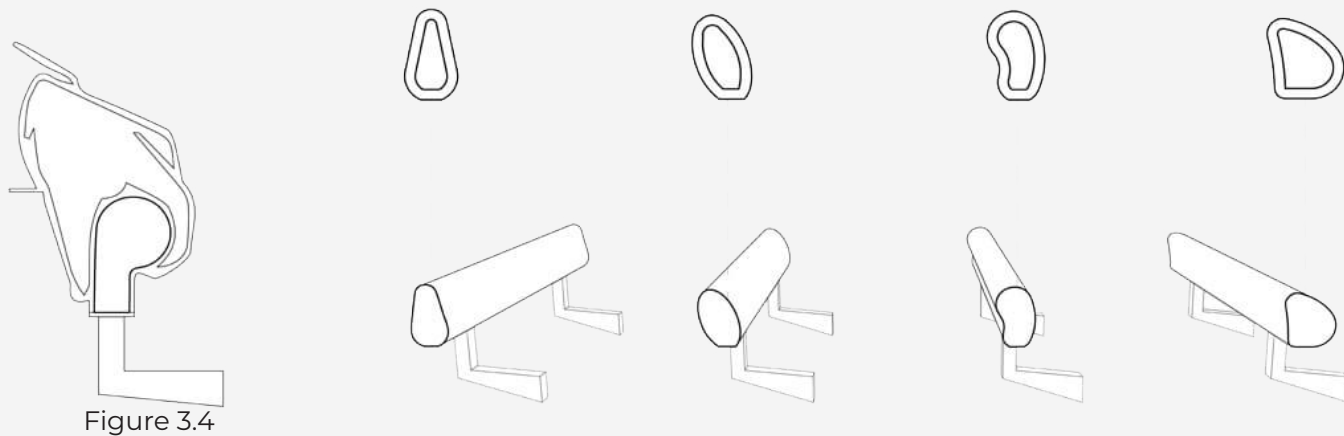


Figure 3.4

Handrails were specifically fabricated for an ergonomic grip, making it easier to follow the rail and for hand positioning. Many iterations profiles were created and the one which was most effective was a triangle organic shape with curve edges that give the palm a firm grasp and the thumb and relaxed spot to follow. A model can be seen in figure 3.7. Polished concrete floors helps the blind understand their surroundings through acoustics. They can hear someone's footsteps approaching or a cane as it hits the floor. Metal transition strips on the floor to indicate when they are entering a new space that is not clearly defined by walls. This can be seen in figure 3.6. Using stairs can be dangerous for the blind, especially when the standard tread nosing finish is used. These cause cane tips to catch. To resolve this, polished stainless-steel treads were used to provide contrast at the bottom and top of the stairs.

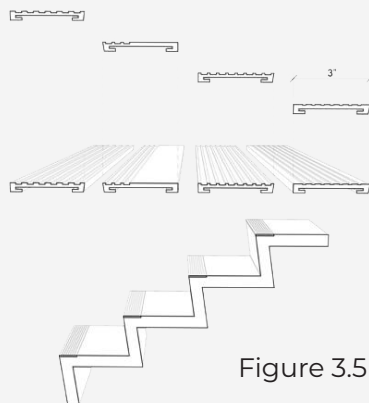


Figure 3.5



Figure 3.6

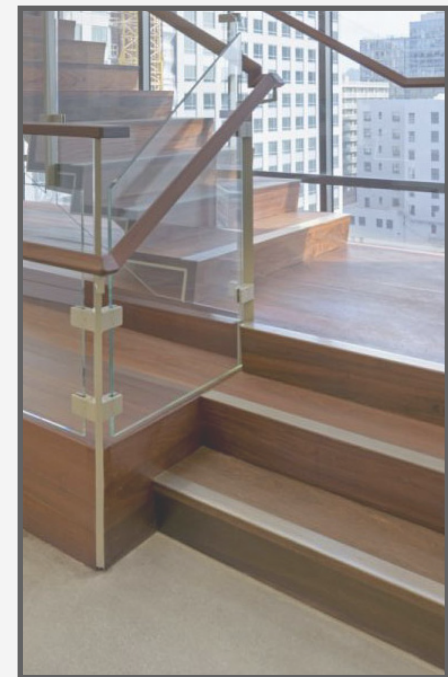


Figure 3.7

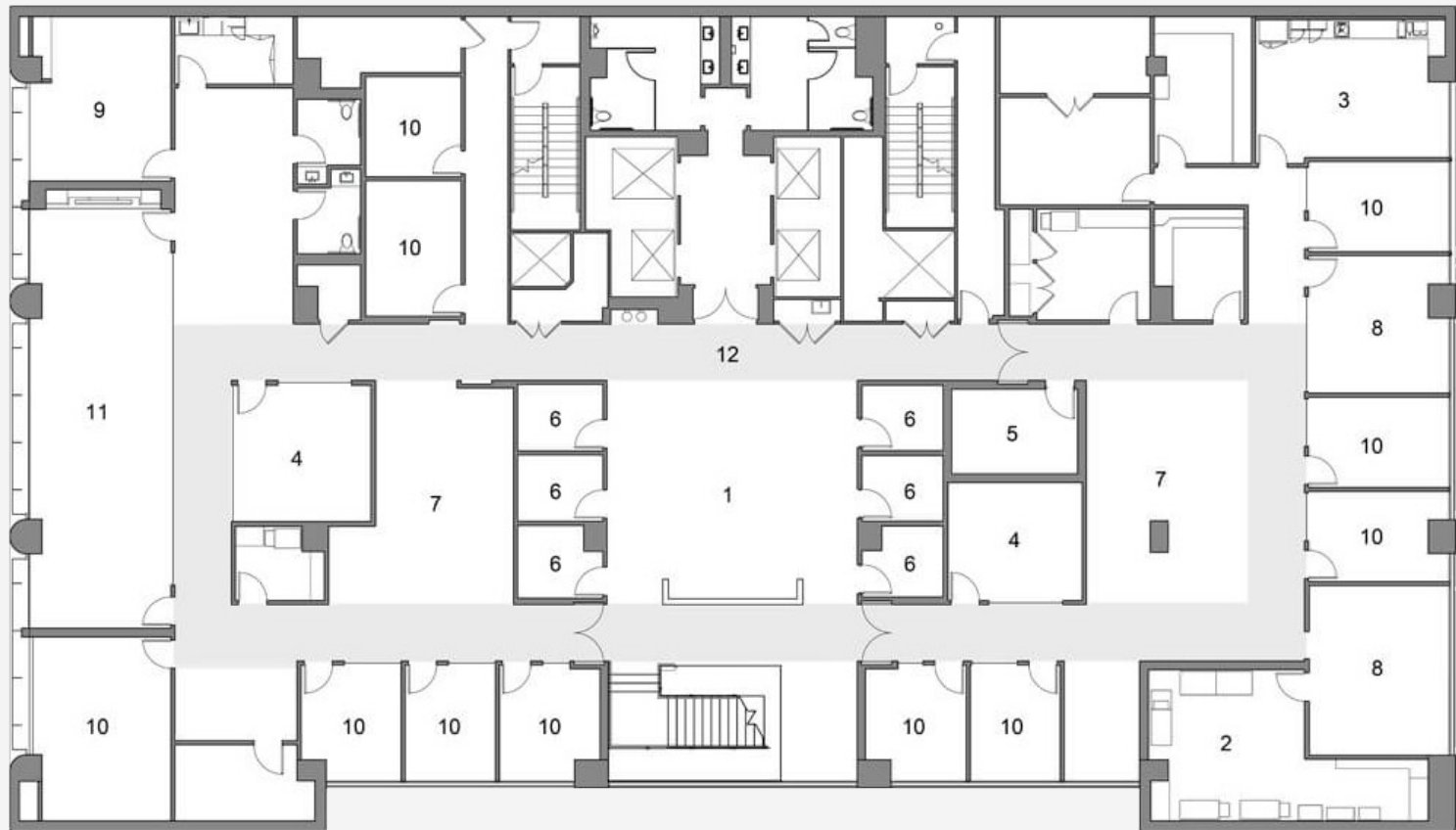


Figure 3.8

LEGEND

- | | |
|--------------------|----------------------------------|
| 1. RECEPTION AREA | 7. OPEN OFFICE |
| 2. GRAPHICS ROOM | 8. SHARED OFFICE |
| 3. BREAK ROOM | 9. MEETING ROOM |
| 4. CONFERENCE ROOM | 10. PRIVATE OFFICE |
| 5. AUDIO ROOM | 11. BOARD ROOM |
| 6. TRAINING ROOM | 12. CONCRETE CIRCULATION "TRACK" |



Circulation:

This building has long hallways with very few four-way intersections. This strategy is used so when the blind use their cane to follow the edge of the wall, they can lead themselves to where they want to go without getting lost. Four-way hallway intersections cause them to lose their path line resulting in walking “blindly” till they find the other side of the intersection. Three-way intersections are easier to navigate. Once familiar with the space, one knows when travelling on one side of the hallway they will continue straight, while the other turns them around the corner.



Figure 3.9

LEGEND

1. RECEPTION AREA
2. VIDEO CONFERENCE ROOM
3. ADAPTATIONS STORE
4. MULTI-PURPOSE ROOM
5. DEMONSTRATION ROOM
6. PRE-FUNCTION SPACE
7. ADAPTAVE TECH ROOM
8. OFFICE
9. TRAINING KITCHEN
10. OPTOMETRIST OFFICE
11. LOW VISION EXAM ROOM
12. TRAINING ROOM
13. CONCRETE CIRCULATION "TRACK"

10TH FLOOR PLAN



0' 5' 10' 20'

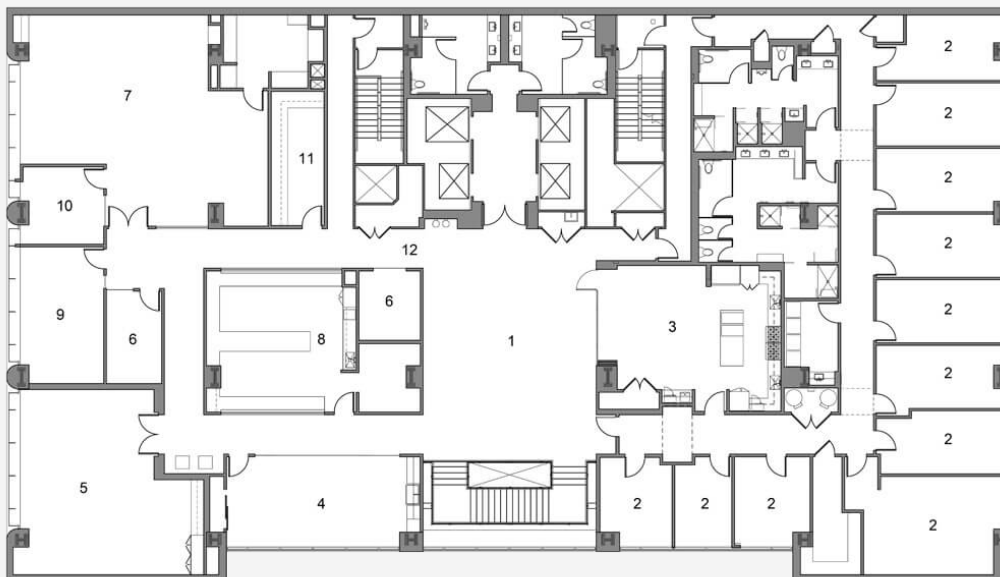


Figure 4.0

LEGEND

1. LOUNGE
2. STUDENT DORM ROOM
3. STUDENT KITCHEN
4. CRAFT ROOM
5. FITNESS ROOM
6. TRAINING ROOM
7. OPEN OFFICE
8. S.T.E.M. ROOM
9. MEETING ROOM
10. PRIVATE OFFICE
11. HAM RADIO ROOM
12. CONCRETE CIRCULATION "TRACK"

11TH FLOOR PLAN



0' 5' 10' 20'



Figure 4.1 - 4.4

Summary:

These design strategies help the blind understand how to effectively navigate around the building and how to be aware of their surroundings. Acoustics, material, texture, color, and circulation strategies are successful examples in the LightHouse for the blind and visually impaired. They create safe spaces to travel in without getting lost or hurt. These strategies will be implemented in my project design to create a replicated experience.

TouchBase Pears



Figure 4.5

Architect- Glenn Howells Architects
Project Year- Completion July 2017
Typology- Community Center
Square footage- 13,261
Location- Selly Oak, Birmingham,
England



Figure 4.6

Social Effect:

This facility aims to be a welcoming place where people with disabilities can be supported and cared for while enjoying activities with the local community. The visitors who come to this community center are the locals in Birmingham, parents and children, and local businesses. With the variety of visitors, this creates a space for people of all backgrounds to create connections and build a stronger community.



Figure 4.7



Figure 4.8

Design Strategies:

This building has many open spaces for meeting rooms, lounges, and networking opportunities. This typically is not effective for the blind to navigate; however, these large, open spaces are split using furniture. The furniture is organized in grid patterns so they can walk between the rows. Although this is useful in some spaces of building. There are other high traffic areas such as the café where there is not a clear edge to follow, causing people to bump into each other. In addition to the furniture organization, it has bright colors for the visually impaired to see objects. This is another strategy that allows for the open space but defined areas through objects. Bright lighting is used to help the visually impaired see their surroundings. The building offers both natural and incandescent lighting. Natural lighting is healthier for the eyes as well as positively affecting the mood of people throughout the day. Incandescent lighting is reliable throughout the day but can cause strain for those with vision.

Circulation:

The circulation of the building functions as a tree with many branches. The long hallways give directional guidance and branches off when a new section is introduced. This helps in not getting lost and being able to find where you are going. The branches split the space to new areas, such as the administration, health and wellness, and day service areas where there are lounges and lobbies for those areas. These spaces Furthermore split into more branches for offices and breakout rooms. These branches help the blind narrow down their destination.



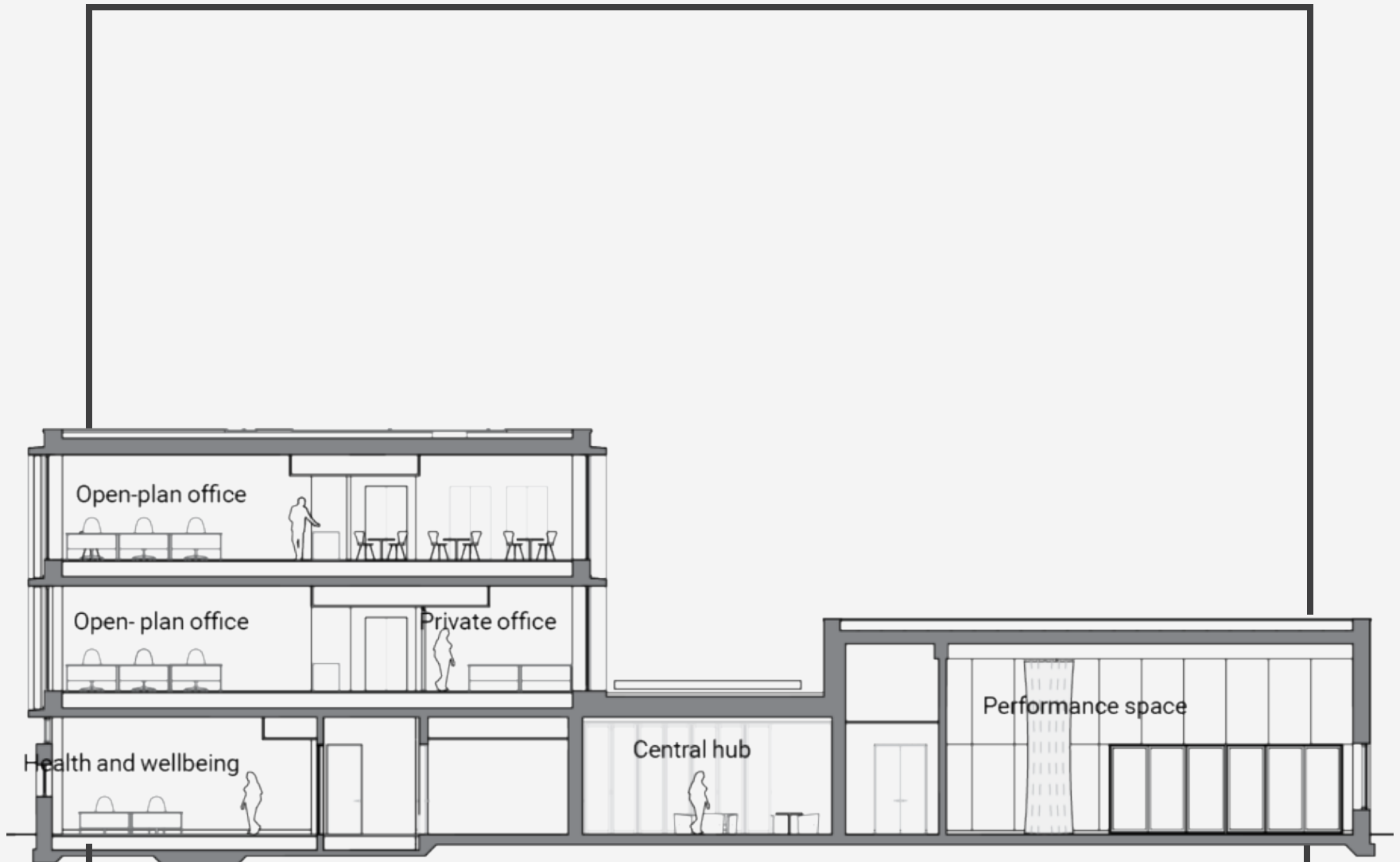
Figure 4.9



Figure 5.0

Summary:

The blind design strategies found help organize large spaces and help me understand some effective ways to do so through furniture and branching. Although there were some that were not as effective in high traffic areas, this can be a learning moment so this project can adapt from those challenges. Bright colors and lighting play an important role for the visually impaired in navigation. Bright colors point out important objects and areas of attention for people to approach or avoid. Lighting helps with showing color and positively influences people's experience with lighting.



SECTION CUT

Figure 5.1

Two Rivers Activity Center (TRAC)



Architect- Zerr Berg Architects

Project Year- 2017

Typology- Fitness Gym

Square footage- 135,000

Location- Jamestown, ND



Figure 5.3

Contents:

The Two Rivers Activity Center (TRAC) was created for the local residents of Jamestown, about 15,000, to create a community recreation center for all ages to support health and wellness. This fitness center includes a variety of activities, programs, and services. The aquatics center has an activity pool with two water slides, lap swim area, lazy river, zero-entry play area, climbing wall, warm water lesson pool, spa, and sauna. There is a preschool learning center and childcare for children 3-5 years old and before, after, and summer programming for school age children. Other activity and group services include individual cardio and strength training equipment group fitness activity classrooms, multi-use courts (basketball, tennis, volleyball, pickleball, etc.), walking/jogging track, multi-use indoor field turf, multi-purpose rooms for parties, meetings, etc., and locker rooms (companion, men's, women's)

Programming:

Their work focuses on health and wellness programming, recreational and leisure activities, and youth development. To keep up these values they provide community, quality, integrity, and inspiration to members.



Figure 5.4

Circulation:

This facility has two floors. The first floor consists of four tennis courts, gymnastics area, waterpark, basketball courts, day care center and workout room. All of these areas of the gym are separated and only connected through hallways. There is not little view range between the separate areas. The details of the first floor can be seen from the floor plan provided. The second floor consists of a running track, cardio area, motion equipment, and fitness equipment. The running track surrounds the basketball courts from the second floor. Radiating around the track are individual rooms of studios, cardio, fitness, and motion areas. Because the second floor is open to the first floor, there is a wider view range. This is helpful for parents to see their children as they workout.

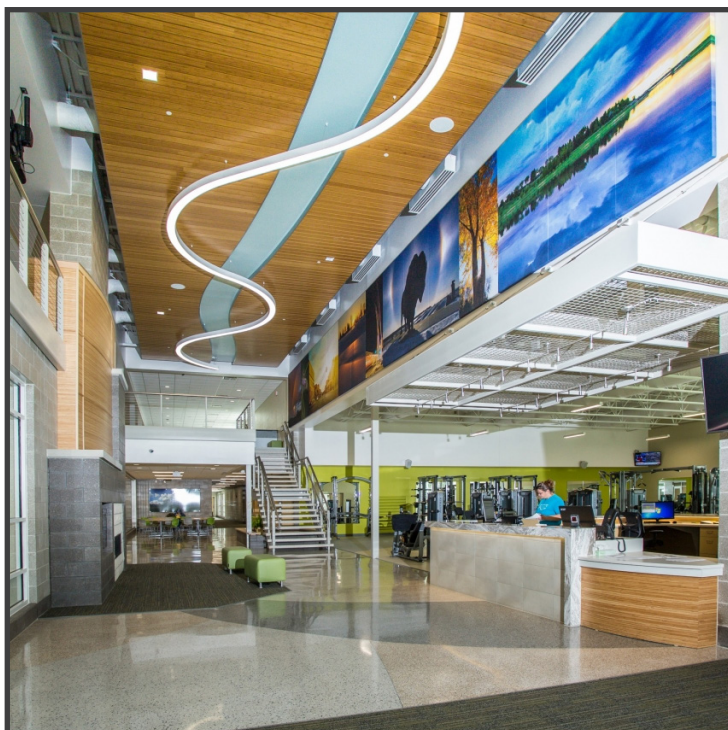


Figure 5.5

Social Effect:

Many of the members that come to this facility are families from the local area, which is a major reason for offering programming for parents and children using the fitness center. It is a place for children to connect with others, stay physically healthy and learn what it means to be a part of a community. While the children are playing at the basketball courts or in the childcare facilities, the parents can focus on their physical health to maintain a good lifestyle. For individual members, this facility offers a range of equipment to improve health and a place to connect with the Jamestown community.



Figure 5.6

Summary:

This facility successfully offers a range of activities for members of all ages. This is important to give members the fitness opportunity to explore different activities, sports, and hobbies to expand their healthy lifestyle. Their programming makes this possible so both children and parents can have a healthy, connected community they can go to. Although a design challenge is visual range, the individual areas are large and open to clearly see others. This building is located in a small town; therefore, it might not have been a focus for visual range. I can take these design successes and challenges into the project to allow for effective programming and increased visual range to encourage a safe community.



Figure 5.7

North Dakota State University Wellness Center

Project Year- Built in 2001 (Student Health Service), 2007 (Disability Services and child care facilities addition), 2016 (Aquatic addition)

Typology- Wellness Center

Square footage- 136,000

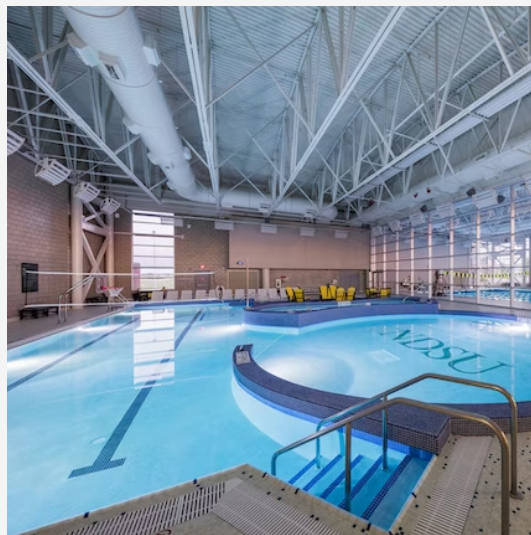
Location- Fargo, ND

Contents:

The North Dakota State University Wellness Center was designed for the students and local Fargo residents, over 10,000 people. It provides services for hundreds of students a day and has a variety of activities and events it hosts. This includes strength and cardiovascular equipment, a 34-foot climbing wall, racquetball and basketball courts, group fitness studios, a cycling studio, martial arts studio, multi-activity court, walking and running tracks and locker rooms. An aquatic addition was completed in 2016, offering a lap pool, leisure pool with activity space, vortex circle, fire pit, spa, lounge space, wet classroom, locker rooms, gender-neutral locker rooms and a sauna. Student Health Service provides access to quality health care while promoting overall student well-being. Aquatics features a lap pool, leisure pool with vortex circle, 23-person hot tub and gas fire pit for relaxation. The lap pool is six lanes and 25 yards in distance. It hosts many events including community swim lessons, sunrise and night swim, canoe battleship, indoor triathlon, and floaty night. Two basketball hoops and a volleyball net are set up at all times for use in the leisure pool. Aquatics also offers SwimTrain, a personal training style swim program available to new swimmers or someone looking to refine their swim strokes. The west classroom is used for scuba diving instruction and safety education classes such as: CPR/AED/First-Aid, lifeguard certification and water safety instructor.

Circulation:

The three levels of this building are open to one another making each level inviting to the next. It allows members to visually see what is happening from each level without having to travel to that specific level. This keeps members involved with all spaces of the facility so they can utilize



everything available to them. This is done through many atriums. The first one in the lobby which views up to the second floor where the cardio equipment is located. The second main one is in the center of the building. This one can be seen from the first floor, in the rock wall area, to the third floor, at the start of the track.

Another design aspect which allows circulation is the open, wide, and connected spaces on each floor. There are very little walled rooms, other than the studio rooms, making workout space wide and visible from across the floor. This encourages members to recognize and try new equipment as they pass by. A more comfortable approach to utilizing all parts of the wellness center. In addition, this allows members to be involved with all activities throughout the floor. For example, a member could watch a basketball game on the West end of the floor, while being on the East end using the treadmill in the cardio area. This circulation design gives a well-rounded experience for members to be involved throughout the entire building.

First Floor Spatial Diagram

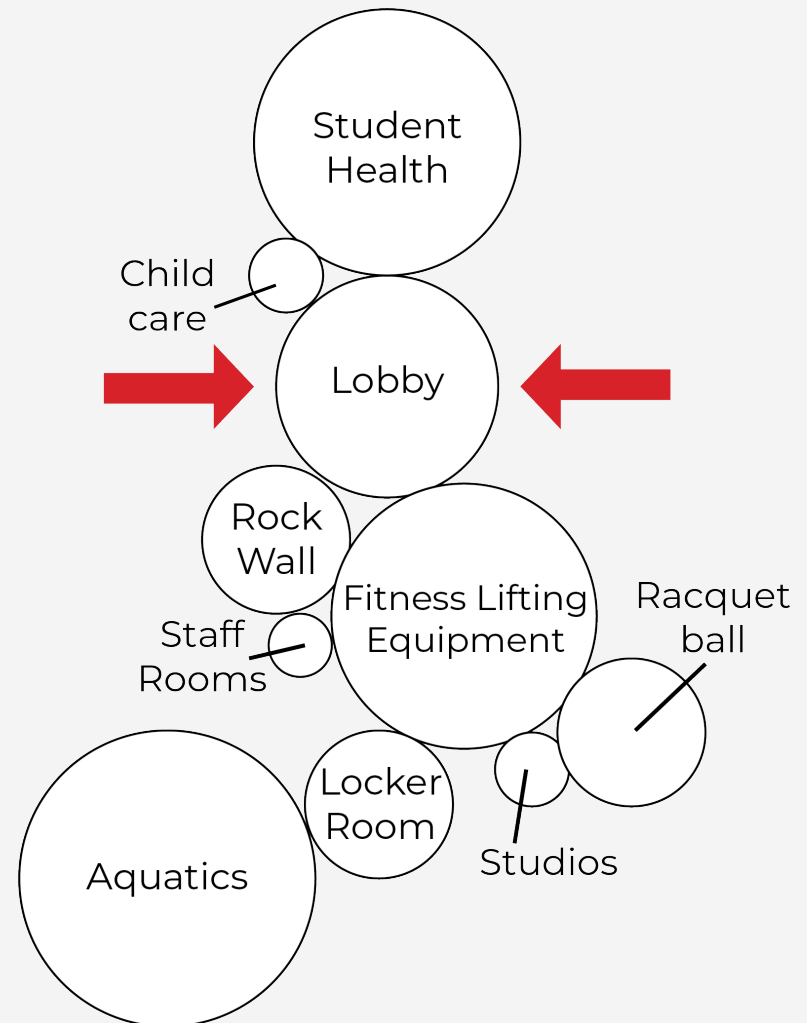


Table 2

Figure 5.8 - 6.4



Programming:

It promotes the 7 Dimensions of Wellness to support making healthy lifestyle choices regarding mind, body and spirit. These include mental, physical, social, financial, spiritual, environmental, and vocational. There are many beginner classes that allow students to explore a variety of activities and sports. This not only gives people an opportunity to expand their fitness knowledge but connects them with others who are also trying the activity for the first time. All of these programs support and encourage their members to live healthier lifestyles.



Figure 6.5

Social Effect:

This facility provides a place for students to connect with each other and to build relationships with the commonality of exercise. Whether this be through sports intramurals, joining a team, practicing, and competing against other teams, or joining a workout session where members in Zumba feel empowered and confident with the support of others. This wellness center allows their members to grow independently and around others. W

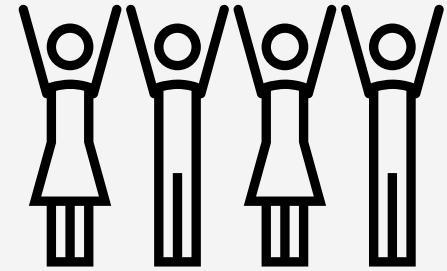


Figure 6.6

Summary:

This facility effectively creates an active, safe sense of community for their members. They accomplish this through programming. Beginner classes create a sense of community, and the variety of sport activities motivates members to learn and connect with each other, a quality I wanted to reflect in my project. The circulation and range of sight encourages members to feel like they are connected to each part of the wellness center, and not excluded from any activity. An aspect that should be included in an effective wellness center.

Case Study Summary

Reviewing the case studies and comparing them to the set goals, I determined that these case studies demonstrate how we can effectively design for the blind and deaf. They show how the blind and/or deaf people interact with one another through spatial awareness and acoustics of their surroundings, using material and sight range. This has also been shown through the building's use in texture, light, color, etc. An unanticipated conclusion was that, even though these separate disabilities have each their own challenges, they have similar design solutions. Comparing The Lighthouse design elements and the DeafSpace concepts used at the James Lee Sorenson Language and Communication Center at Gallaudet University both speak of using diffused lighting, neutral colors, curved corners, and reduction of noise reflectivity. Because these strategies have been successful, they can successfully inform other designs for the blind and/or deaf to be successful.



RESULTS FROM THEORETICAL PREMISE

Theoretical Framework

Designing functionality for the blind and/or deaf helps them gain a sense of individuality, secureness, and connection that they previously had to seek out themselves. Through a wellness center, they can enhance healthy habits with a variety of equipment and provided activities to choose from. Providing a wellness center will give a designated space for the blind to act on healthy habits, decreasing their health risks, as well as giving the deaf a space to meet others to not feel as isolated. As this is a building for anyone to access, this can help those without disabilities understand how differently the blind and/or deaf function everyday through interacting and creating relationships with each other. Some ways in which this can happen is through programming: classes, sessions, and events held at the facility. Exercising helps physical and mental health, general brain health, weight strengthens bones and muscles, and improves the ability to do everyday activities (Benefits of physical activity, 2022). By integrating the found research strategies into a unified design, it will improve quality of life with a spatial organization which makes fluid sense to a blind and/or deaf person.

Strategies

The majority of design strategies for the deaf were found on Gallaudet University's DeafSpace page as well as one case studies from their university, the James Lee Sorenson Language and Communication Center. They have been the leader in finding successful design strategies to implement within building for the deaf. These strategies include space and proximity, sensory reach, mobility and proximity, light and color, and acoustics. Space and proximity maintains a comfortable distance to see facial and body expressions, as well as gives each person a comfortable amount of space to communicate. Sensory reach helps with spatial orientation and awareness of their surroundings. Mobility and proximity keeps an appropriate distance from others to keep clear visual

communication when walking together in conversation. Designing wider hallways and curved corners has proven to help this. Having good lighting conditions allows the deaf to clearly see their surroundings without glare or shadows, and color helps make others stand out from the background.

Lastly acoustics helps decrease vibrations so those who use assistive devices, such as hearing aids or cochlear implants, can hear clearer.

Blind strategies were found from the case studies of buildings designed for the blind. Many of these strategies were similar to the deaf strategies.

Light and color helps the visually impaired people who have slight vision which can be gendered when high glare and illumination is present. This design problem is avoided by using soft lighting and low brightness.

Without the proper acoustics, excess noise can distract the blind. This hinders their ability to hear their surroundings. This can be reduced by using materials with sound absorption and minimizing the amount of background noise created.

Circulation and proximity help the blind understand how to navigate the overall building. This can be done with three-way intersections. They are easier to navigate without losing sense of direction and allow the blind to continue following the edge of the wall rather than finding the other side of the intersection.

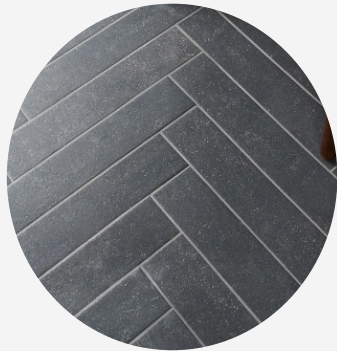
Creating a hierarchy of spaces allows large rooms to divide into smaller spaces, which is easier to navigate. This can also be done with strategic furniture organization.

Texture and touch assist the blind in direction and differentiating spaces. Textures in can guide the blind a specific direction, such as the grain of wood. Or let them know when the have reach new area, smooth to ridged. The types of materials and textures that assist the blind will be discussed further on in the paper. Touch can be utilized through other means to guide the user. Handrails are used to direct users through along the wall. This is an easy, fast method to get around the building. Rather than using standard stair treads, stainless steel treads provide contrast at each end of the stairway without catching the tip of the cane. Metal transition strips can be placed on the floor to indicate when they are entering a new area that is not clearly defined by walls.

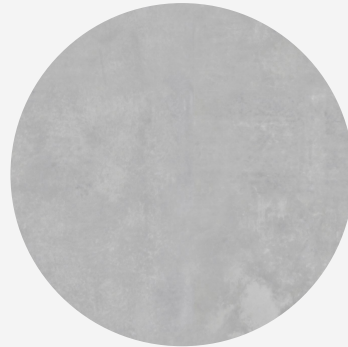
Materials



WOOD



TILE



POLISHED
CONCRETE



STONE

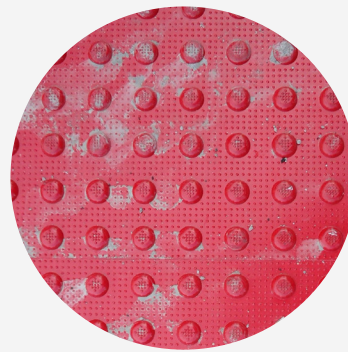
Textures



SMOOTH



ROUGH



BUMPY



SOFT

Figure 6.7 - 7.4

WOOD

This material has directional properties which means it interacts with the user differently depending on the direction it was cut and laid. With these properties, it can inform the user how to navigate a space by following the cut direction. Although the wood grain does not effectively guide the user, it distinguishes itself from other materials.

TILE

This material can be used to identify separate spaces through the tile design and pattern. The tile design can distinguish its own shape compared to other tile shapes and the tile pattern can direct the user to navigate them through a building. Giving this material a variety of uses.

POLISHED CONCRETE

Polished concrete is the preferred concrete material because of its acoustical properties. As two blind people approach each other, their canes tap the ground. With this subtle noise, the concrete is able to reflect it far enough of the other person to hear without creating an echo of noise throughout the room. Its smoothness also prevents tripping and allows the cane to glide smoothly.

STONE

Stone can be used directionally; however, it can be a hazard to guide your hand on or walk on without tripping. Stone is a material that can signal when a room change is happening.

HISTORICAL TIMELINE

The Social Security Amendments of 1960 were signed into law. These amendments included provisions that, for the first time ever, allowed those under 50 with disabilities to receive Social Security Disability Insurance benefits

The Rehabilitation Act was signed into law. Section 504 of The Rehabilitation Act banned discrimination on the basis of disability for organizations that received Federal funds

1964

The Civil Rights Act was signed into law. President Lyndon B. Johnson signed this Act into law, however, did not directly address disabilities

1960

1973

1988

The Congressional Task Force on the Rights and Empowerment of Americans with Disabilities was created. Congressman Major Owens established the Task Force in order to educate Congress and the public on discrimination against those with disabilities

The historic "Capital Crawl" took place in Washington, D.C. Members of ADAPT (Americans Disabled for Accessible Public Transit) walked up the Capital Steps in the National Mall to pressure Congress to pass the Americans with Disabilities Act

1990

JULY 26, 1990

The Americans with Disabilities Act was signed into law by President George H.W. Bush

HISTORICAL CONTEXT

ADA was developed over many years from those who sought justice for the disabled. From small towns to big cities, all desired change and fought for a cause they believed in. No one person started the movement; rather thousands organized to form the disabilities rights movement through protests, licking envelopes, sending alerts, drafting legislation, speaking, testifying, negotiating, lobbying, filing lawsuits, and even being arrested. They challenged societal barriers which excluded them from their communities, and parents fought against the exclusion and segregation of their children (Mangal, 2020).

SOCIAL CONTEXT

Communicating with the sighted and hearing world can be difficult when the blind and deaf do not have one of their senses. They have adapted and created tools to help assist them in communicating and navigating the world. These include guiding tools, technologies, and other items that assist them in their daily lives. The blind and visually impaired use some of these assistive technologies to help them: long canes, guide dogs, smart phone, phone with enlarged buttons, magnifying glasses and prescription glasses, video magnifiers, large-print books, audiobooks, touch watch, books in braille, walking aids, etc (Assistive technology products). The HOH and deaf also use alerting systems, instant messaging, internet captioning, telephone services, internet relay services, video chat, and more. Signing is also used to communicate with others who know the language (Assistive Technology for the Deaf and Hard of Hearing). Though these tools make communication with people and their surroundings easier, there is much more that can be done through design, all of which will be discussed.

HEALTH CONTEXT

A range of health conditions come with physical disabilities. According to the CDC, “adults with disabilities are more likely to have obesity, heart disease, stroke, diabetes, or cancer than adults without disabilities”. This can be due to stress and inactivity. Certainly, those with visual impairments are less likely to be physically active. Barriers in being physically active can hinder them from a healthy lifestyle. “Physical activity can reduce the risk and help manage these chronic conditions” (CDC, Physical activity for people with disability, 2022).

Challenges to the deaf can include mental barriers, such as social isolation. This happens through lack of interaction with those around you. But according to Robyn Correll a Public Health Consultant, about “nine in 10 deaf children are born to hearing parents, yet less than a third have family members who sign regularly” (Robyn Correll, 2022). This is mentally taxing and takes an emotional and psychological toll when someone is trying to do something as essential as communication. Correll spoke with Ben Soukup, founder of the nonprofit Communication Service for the Deaf, of his personal experience as a deaf person surrounded by hearing people. “I remember feeling alone, even when around a lot of people, because of communication barriers... I knew that most people were not malicious and that communication barriers exist only because of limited exposure to deaf people and a lack of understanding” (Robyn Correll, 2022). Creating actual spaces to form communities can help reduce the feeling of social isolation.



Figure 7.5

LITERATURE REVIEW

DeafSpace

This literary review of the “DeafSpace” article from Gallaudet University will cover the design concepts found to help deaf communication a building. The concept of DeafSpace was established in 2005 by the architect Hansel Bauman along with the American Sign Language Deaf studies Department at Gallaudet University. Together they developed “five major touch points between deaf experiences and the built environment”: Space and Proximity, Sensory Reach, Mobility and Proximity, Light and Color, and Acoustics. These points are all principles of community, visual language, promotion of personal safety, and well-being. Their goal is to encourage architects to use them in designing, not only in schools, whose primarily student body is deaf, but integrating the concepts more broadly. The article explains each of the following concepts to clearly represent how they should be used.

Sensory Reach:

“Spatial orientation and the awareness of activities within our surroundings are essential to maintaining a sense of well-being. Deaf people “read” activities in their surroundings that may not be immediately apparent to many hearing people through an acute sensitivity towards visual and tactile cues. These clues include vibrations, shadow movement, and reading subtle shifts in the expression of others. Designers can facilitate spatial awareness ‘in 360 degrees’ to improve deaf people’s orientation and wayfinding.”

Space and Proximity:

“To maintain clear visual communication, signers stand at a distance where they can see facial expressions and the full dimension of the signer’s “signing space.” Because of this, the space between two signers tends to be greater than that of a spoken conversation. As conversation groups grow in number, the space between individuals increases further, allowing visual connections for all. This need for space has a great impact on the layout of the furnishing in the room.”

Mobility and Proximity:

“While walking together in conversation, signers often maintain a wider distance for clear visual communication. The signers also shift their gaze between conversation and their surroundings, scanning for hazards and maintaining proper direction. If one person senses even the slightest hazard, they alert their companion, adjust and continue, without interruption. The proper design of circulation and gathering spaces enable signers to move through space uninterrupted.”

Light and Color:

“Poor lighting conditions such as glare, shadow patterns, and backlighting interrupt visual communication and are major contributors to the causes of eye fatigue that can lead to a loss of concentration and even physical exhaustion. Electric lighting and architectural elements used to control daylight can be adjusted to provide a soft, diffused light “attuned to deaf eyes.” Color can also be used to contrast skin tone and highlight sign language, facilitating visual wayfinding.”

Acoustics:

“Deaf people can have a range of hearing abilities, and many use assistive devices, such as hearing aids or cochlear implants, to enhance sound. These devices can often amplify reflected sound waves, which can be distracting and even painful. Designers should be aware of this and try to reduce sources of background noise and reverberation.”

SITE ANALYSIS



Figure 7.6



LAND AREA:
3.89 acres



COORDINATES
44.982339, -93.292339



LOCATION:
900 4Th Ave N,
Minneapolis, MN
55405



CLIMATE:
hot-summer humid
continental without dry
season

Figure 7.6



POPULATION:
2,967,000

Figure 7.7

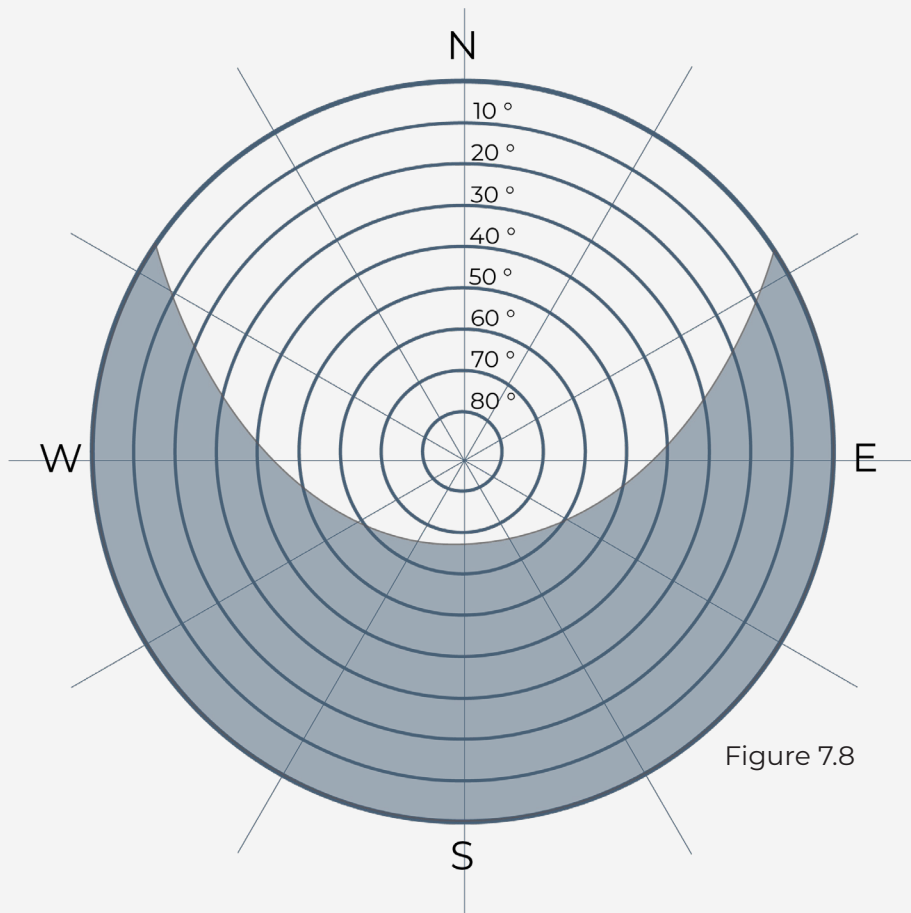


Figure 7.8

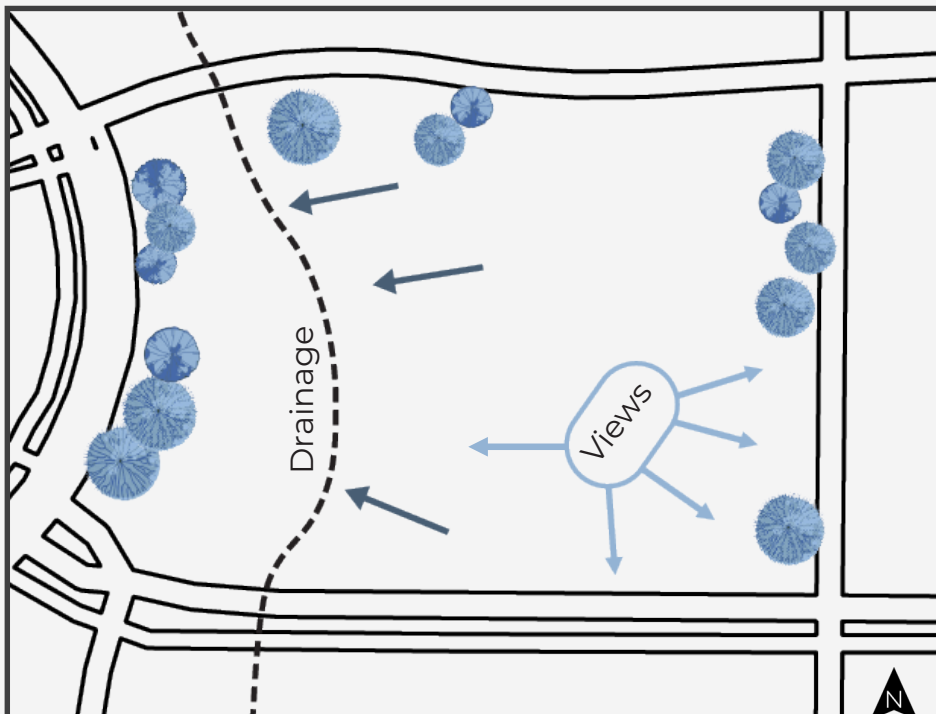


Figure 7.9

SUN PATH

The sun will have the greatest impact on the South side of the site. Designing shading components on this side will be important to keep unwanted heat out. The morning sun on the East side and evening sun on the West side will give a steady amount of heat onto the site.

VEGETATION

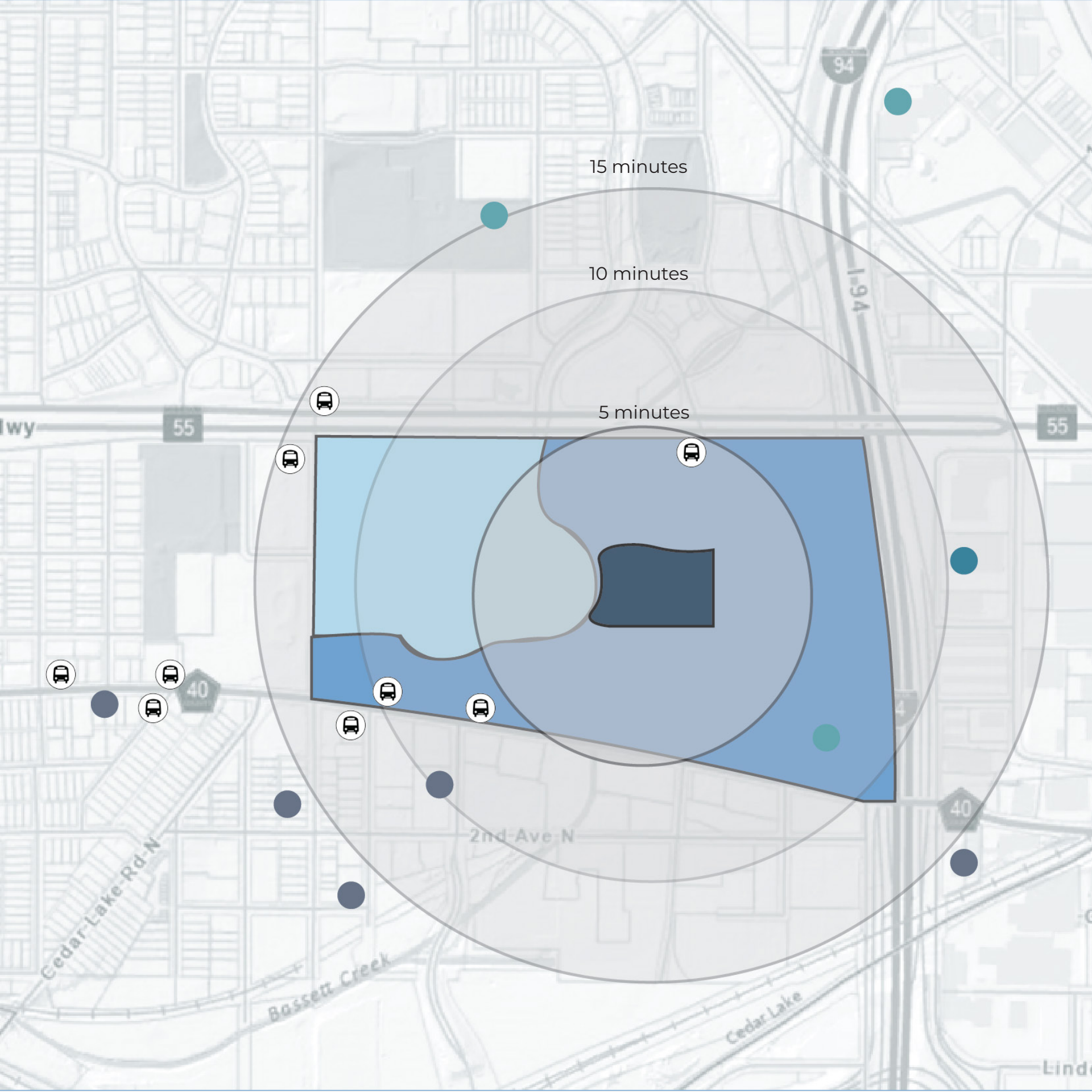
This site is a cleared lot meaning that there is little vegetation. Adding vegetation will help shade the site and absorb the surrounding city noises.

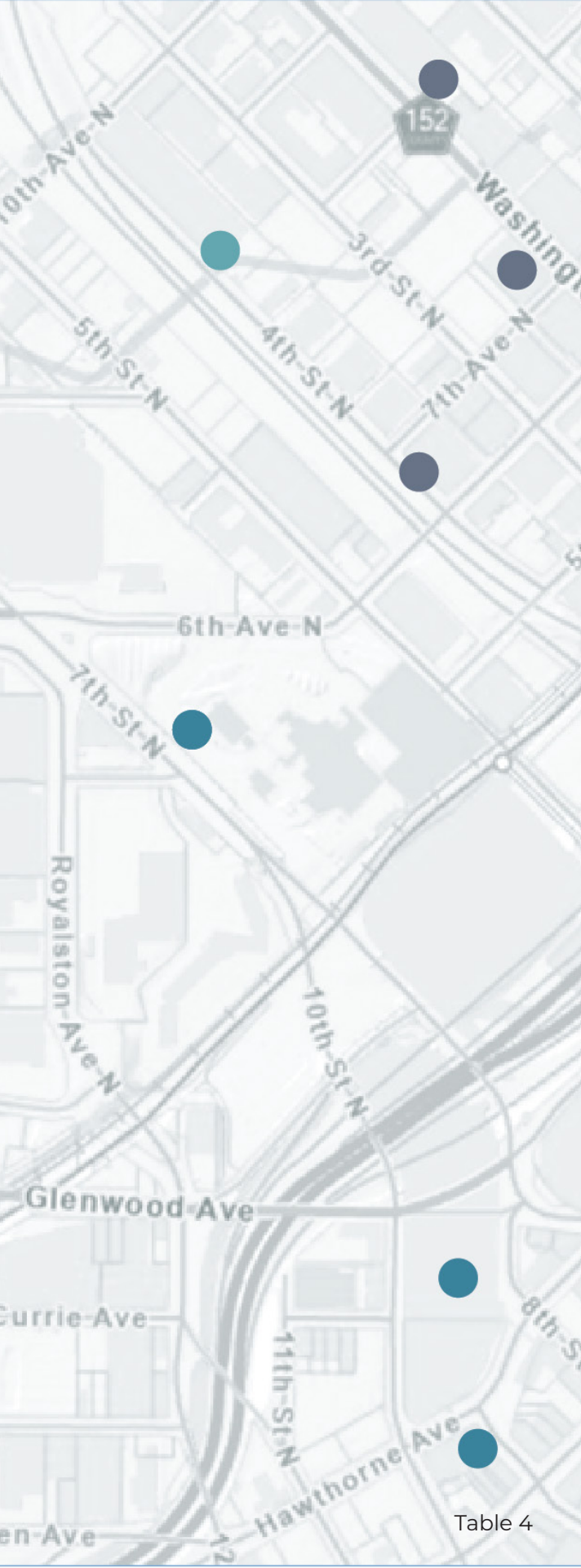
DRAINAGE

There is a pond near the West side of the site. This is where the rainfall will drain to. Additionally, even though this site is a couple miles from the Mississippi River, this area is not in a flood zone.

VIEWS

Views towards the West and Southeast side of the site are preferable because of the nearby park and the downtown skyline.





NEARBY LOCATIONS & ZONING

- BUSINESSES
- ATTRACTIONS
- RESTAURANT
- RESIDENCIAL ZONE
- COMMERCIAL ZONE

76

WALK SCORE

Very Walkable
Most errands can be accomplished on foot.

61

TRANSIT SCORE

Good Transit
Many nearby public transportation options

95

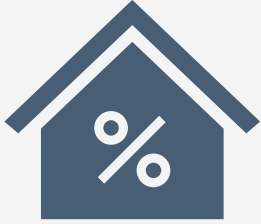
BIKE SCORE

Biker's Paradise
Daily errands can be accomplished on a bike

Figure 8.0

Table 4

PERFORMANCE CRITERIA



Space Allocation: The space allocation for the wellness center should reflect the required square footage for sports and equipment, as well as the number of people expected to use the building. This can be determined by looking at space allocation percentages from case studies and applying those ratios to this wellness center. The spaces that will be included in this design are lobby/front desk, courts, weight rooms, track, aquatics, fitness rooms, locker rooms, and daycare.



Energy Consumption: The energy consumption will reflect in the amount of energy it uses to make the building function. The different items that require energy are lighting, outlets for cardio equipment, outlets for general use, energy for HVAC, etc. Although the building is not using a large amount, sustainable practices will be used to reduce the amount needed.



Environmental Performance: The thermal and acoustical components will be important when designing a building where people exert energy and heat, as well as reducing noise for the blind to clearly hear their surroundings. These issues can be solved by using efficient air circulation and materials that have absorption properties.

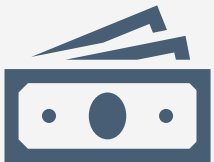


Behavioral Performance: Observing a wellness center can calculate the time frequency and day patterns which people use each space. This can determine frequent walking patterns and usage of the space to influence the size of exercise spaces and circulation spaces.

Figure 8.1



Psychological Impact: The wellness center will have a positive psychological impact on the members as they workout, connect with other members, and make healthy life choices. As this is a wellness center designed for the blind and deaf, those members will have a space where they can feel independent, connected, and safe within the wellness center community. For members in general they can have a complete workout space. Exercising activities naturally make people psychologically happier and more confident with themselves. This is what the design strives to achieve and instill in its members. In addition to what the space offers is the impact the design has on the person. If the design does not look inviting, people will not have a positive impact.



Cost: The cost of the building will reflect size, the operational cost, cost of materials, and miscellaneous expenses. This is predicted to be significant but offset by the sustainable design making the long-term facility and maintenance cost lower.



Code Compliance: All local codes, ADA and International BuildingCodes+ will be used as required to design a recreational building.



Environmental Impact: To decrease the environmental impact, the building will strive to use sustainable design to decrease its carbon footprint. To do this the building will use local resources, an efficient HVAC system, energy efficient openings, etc. These selections will be based on the climate of Minneapolis to achieve optimal results.

Figure 8.2

SPACE INTERACTION MATIX

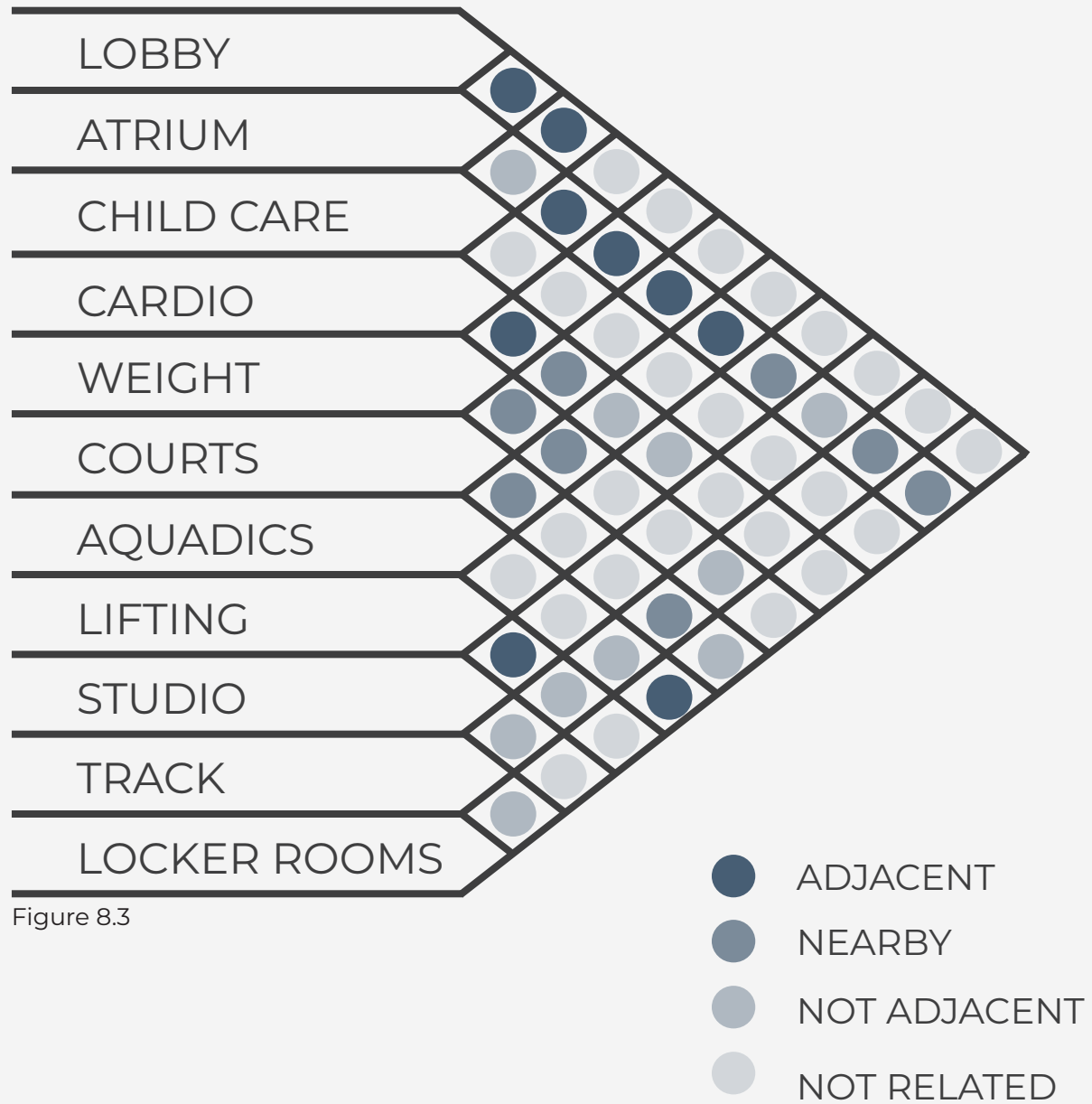


Figure 8.3

SPACE INTERACTION NET

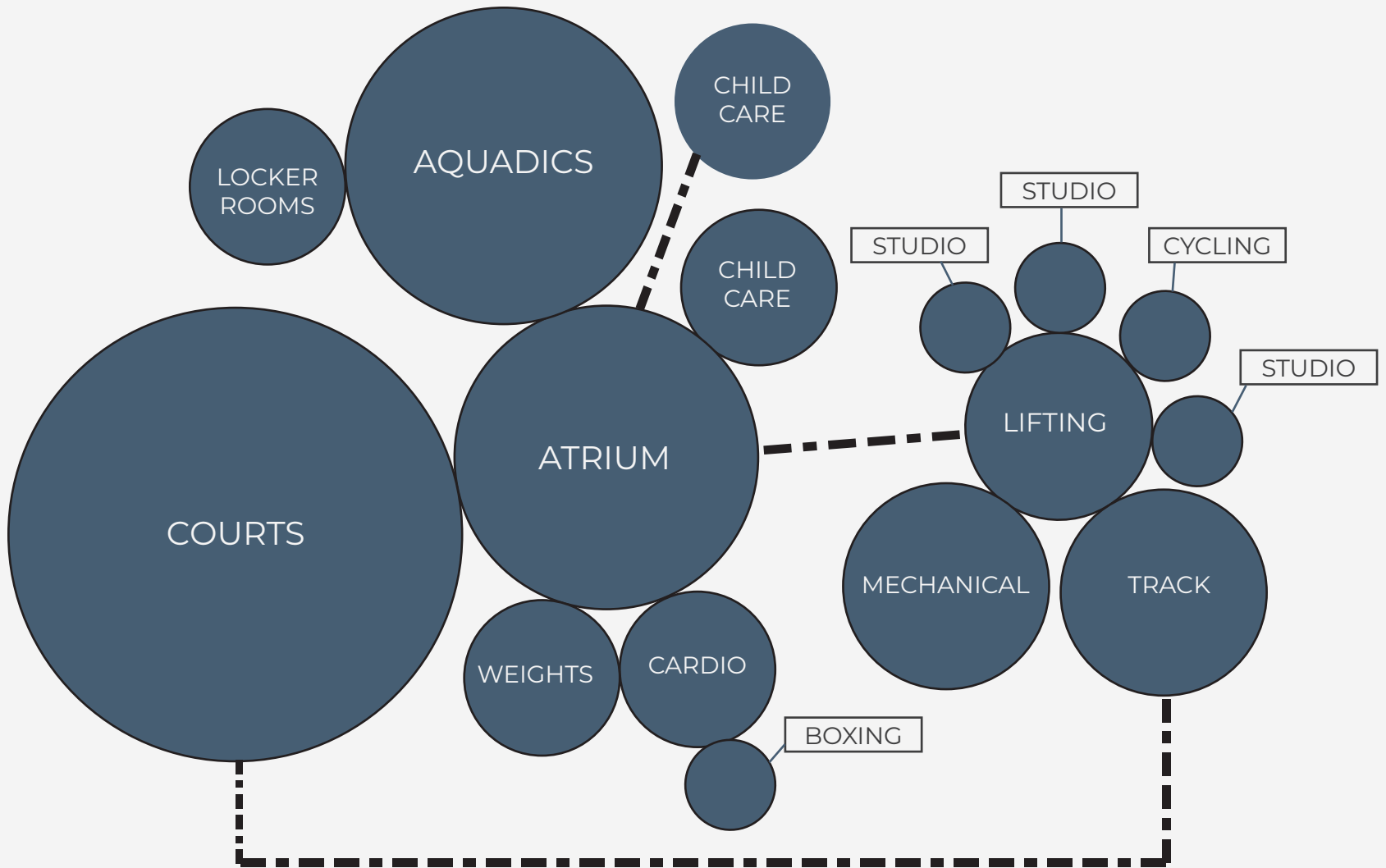


Figure 8.4

--- NEARBY SPACES



CONNECTED SPACES

SPACE ALLOCATION TABLE

	SMALL		MEDIUM		LARGE	
LOBBY	1000	4.6%	2000	5.4%	3000	4.8%
ATRIUM	1000	4.6%	200	5.4%	5000	7.9%
CHILD CARE	400	1.8%	750	1.9%	2000	3.2%
CARDIO	1000	4.6%	2500	6.7%	4000	6.3%
WEIGHT	1000	4.6%	2500	6.7%	4000	6.3%
COURTS	8000	36.5%	10,000	26.9%	16,000	25.7%
AQUADICS	1000	4.6%	5000	13.4%	8000	12.7%
LIFTING	3000	13.7%	4000	10.8%	6000	9.5%
STUDIO	2000	9.1%	3000	8.1%	5000	7.9%
TRACK	2500	11.4%	3500	9.4%	6000	9.5%
LOCKER ROOMS	1000	4.6%	2000	5.4%	4000	6.3%

Table 5

RESEARCH SUMMARY

The design of this thesis project will incorporate found strategies from case studies and literature to integrate them throughout the building. This will help the blind and/or deaf navigate their surroundings. A variety of suggested design aspects will be used in this thesis project to allow the clients to successfully interact with the building and each other. An atrium will be an important aspect to the building design as it is used to represent a main hub where room and people will be able to connect. The blind can navigate themselves to and from this space and the deaf have a wide view range to see their surroundings. Flooring and wall material will be another important aspect in this design. The flooring between the walkways and equipment will contrast to signal the blind when they are approaching equipment. Additionally, the wall texture will differ when walking into another room type. Lastly making sure this building has the facilities to provide active programming will be important to improve the physical and psychological health of the blind and/or deaf.



DESIGN SOLUTION

FORM

SHAPE

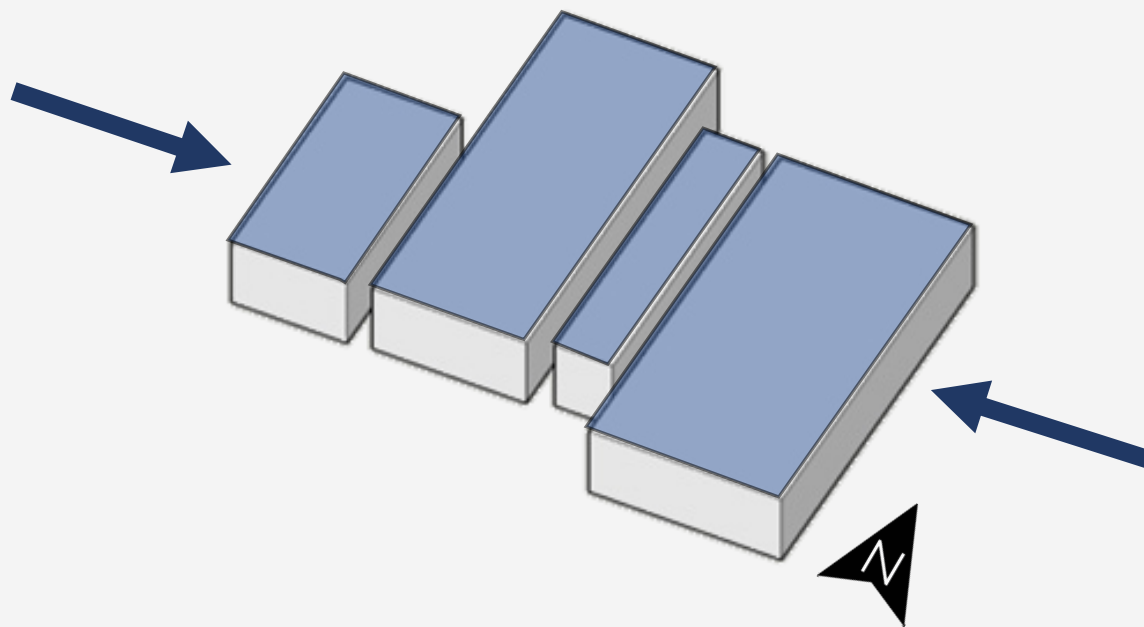


Figure 8.6

HIERARCHY

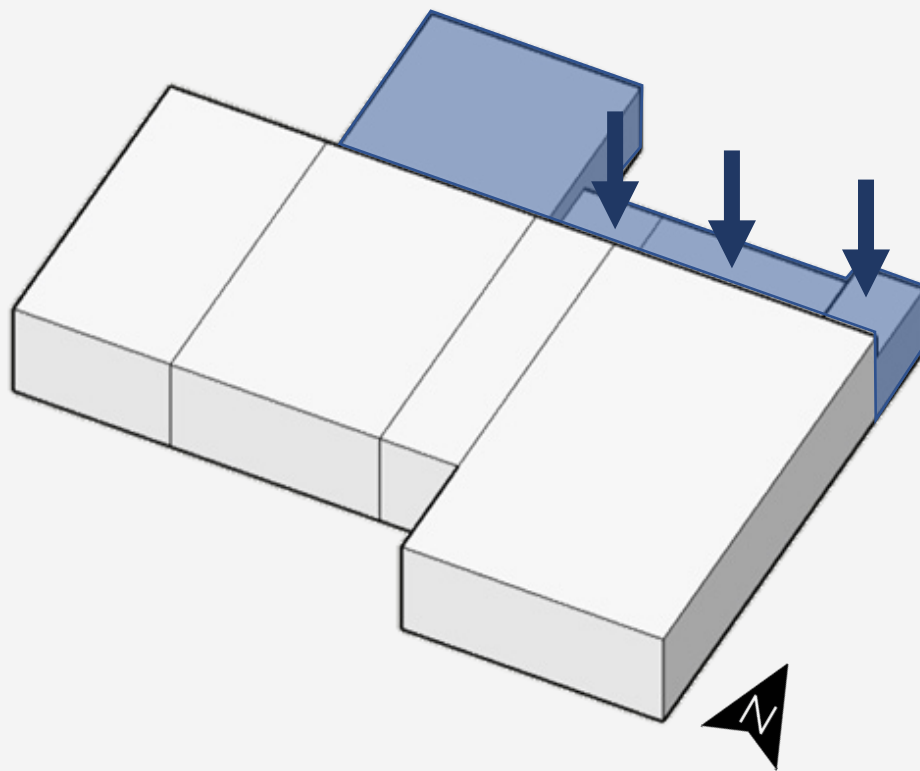


Figure 8.7

DISTINCTION

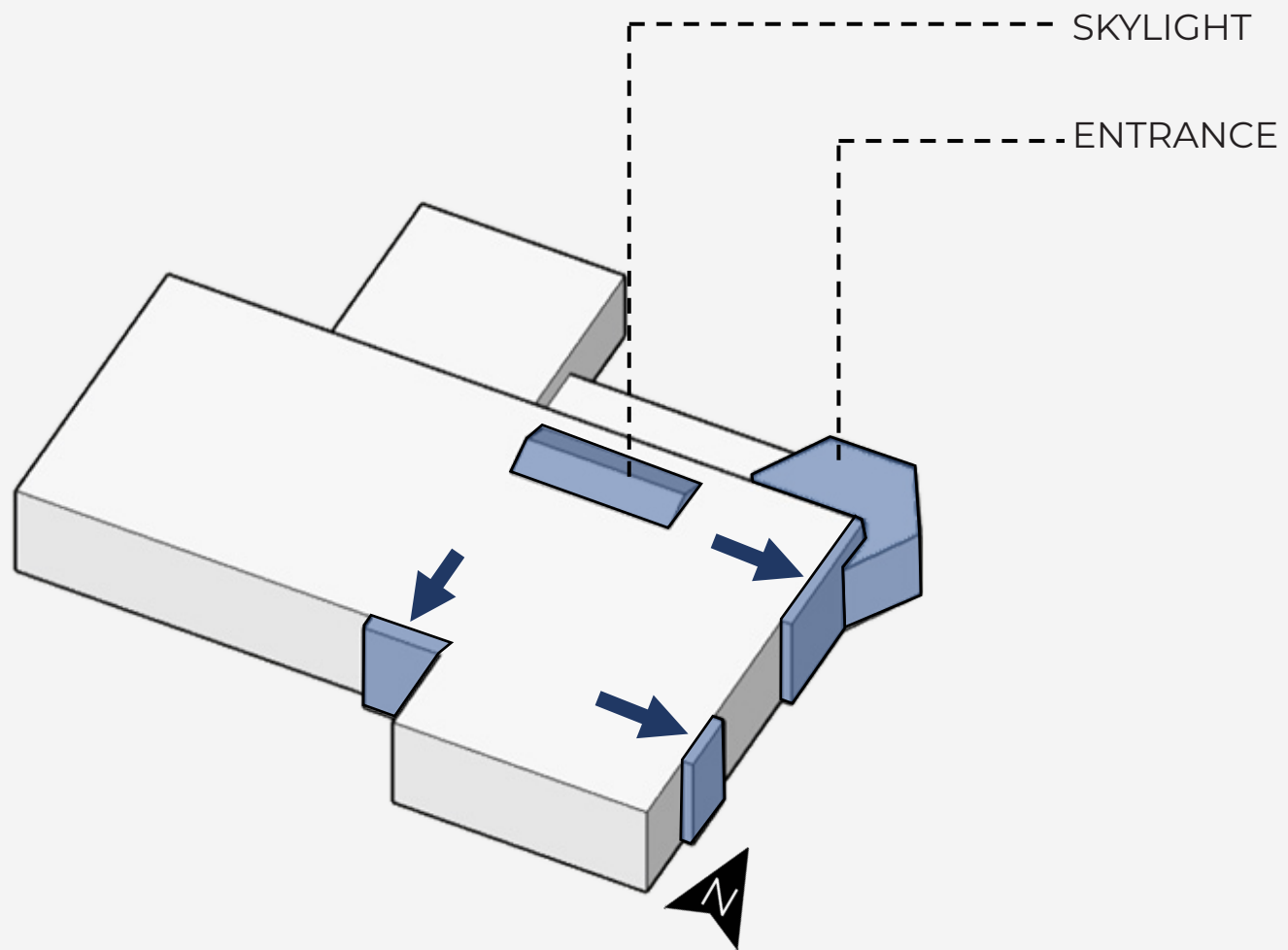


Figure 8.8

ROOM LEGEND

1. Lobby
2. Administration
3. Boxing Room
4. Cardio Room
5. Weight Room
6. Atrium
7. Courts
8. Childcare
9. Men's Locker Room
10. Women's Locker Room
11. Aquadics
12. Dog Relief Station
13. Lifting Space
14. Studio A
15. Cycling Room
16. Studio B
17. Studio C
18. Mechanical Room
19. Track

FIRST FLOOR

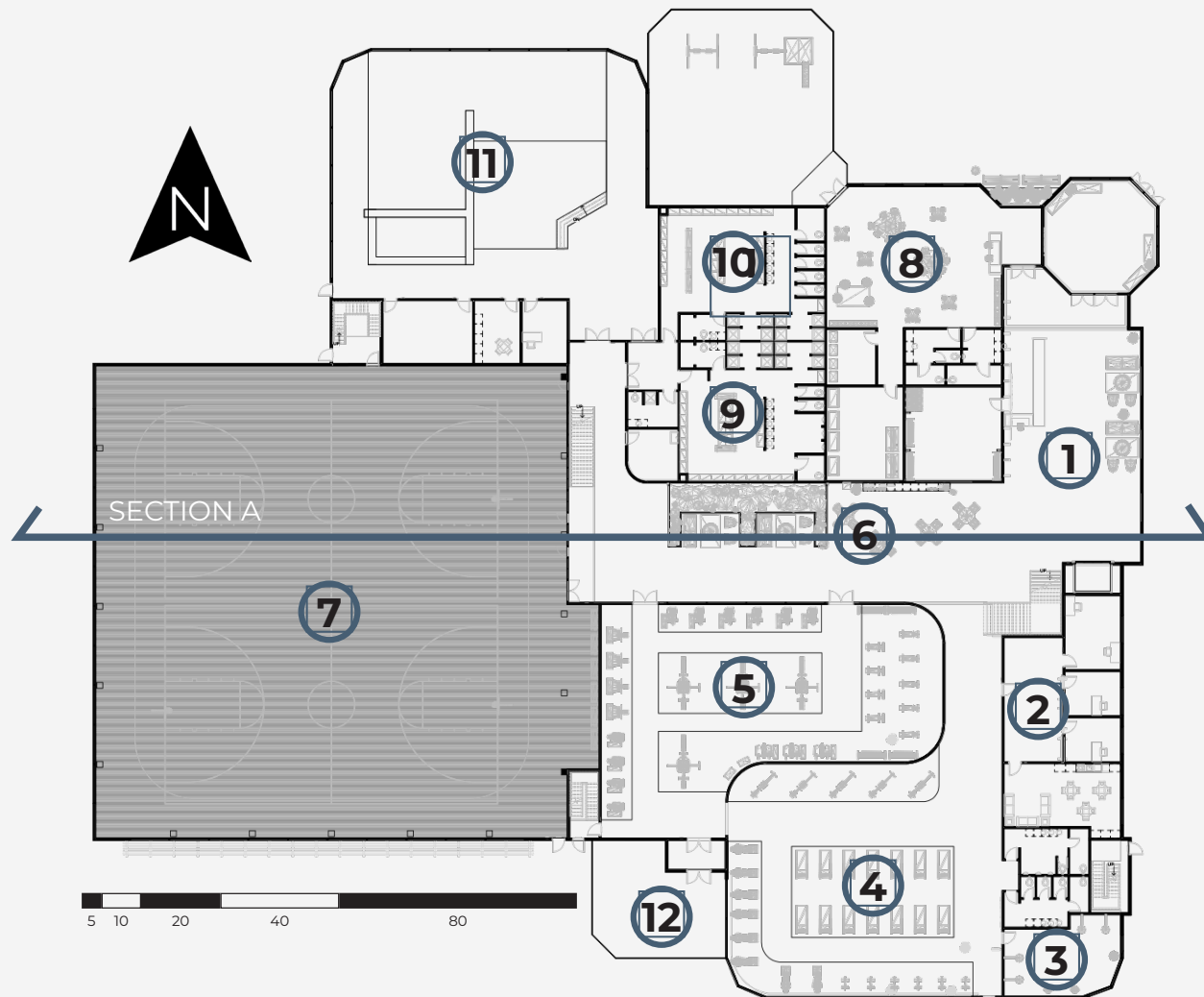


Figure 8.9

As you can see there are many amenities in The Wellness Studio. This facility includes a variety of amenities and features including modern equipment, an aquatics area, and gender-neutral locker room. The atrium hosts lounge seating, a green wall, and a grab-n-go station full of snacks, fresh coffee, and bottled beverages. Additional lounges are distributed throughout the building to relax and connect with others.

SECOND FLOOR

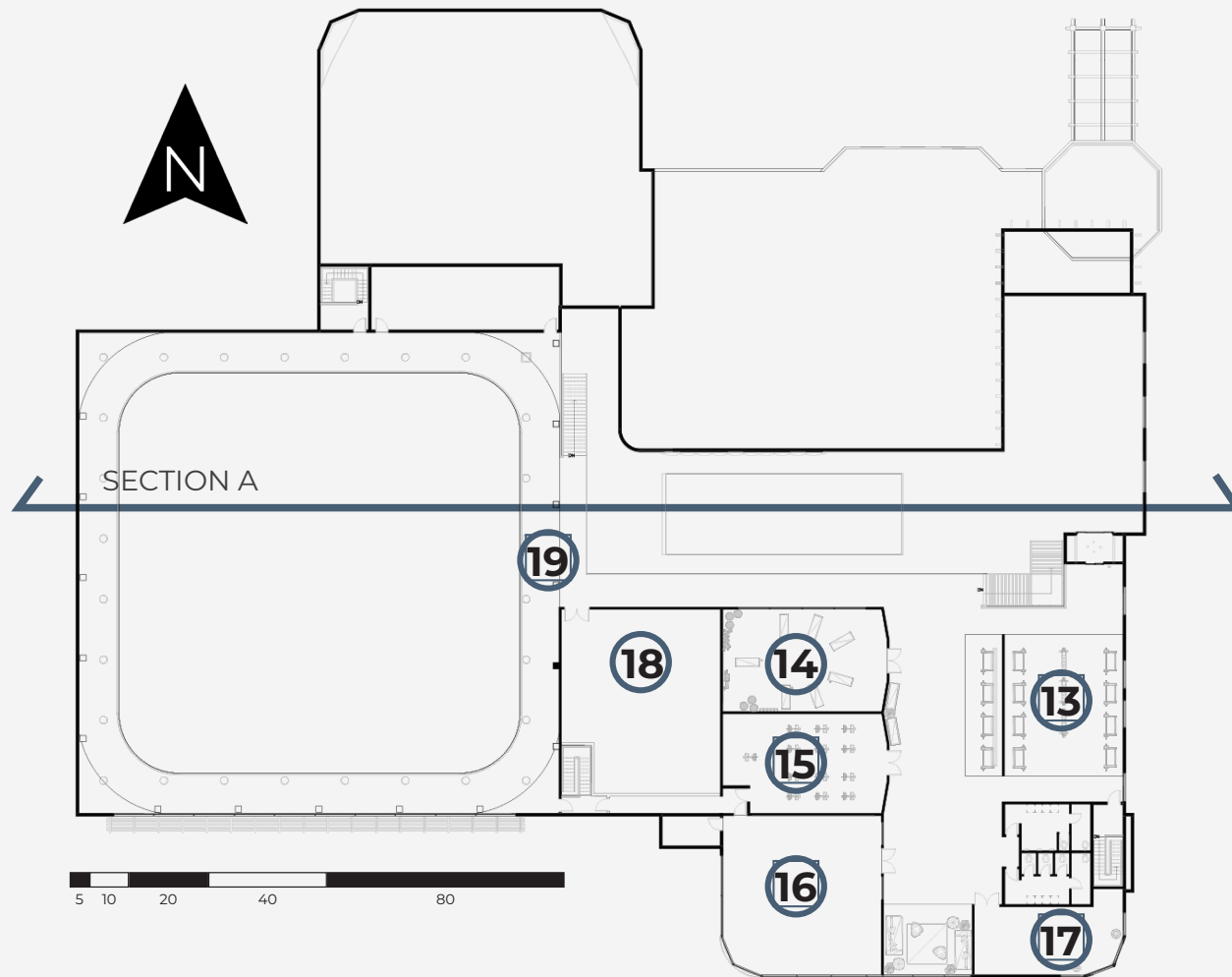


Figure 9.0

The second floor houses the lifting space with various weight sizes, studio rooms that can accommodate a variety of activities, and a track that loops around the first floor courts. Lounge seating is also located between studio B and C.

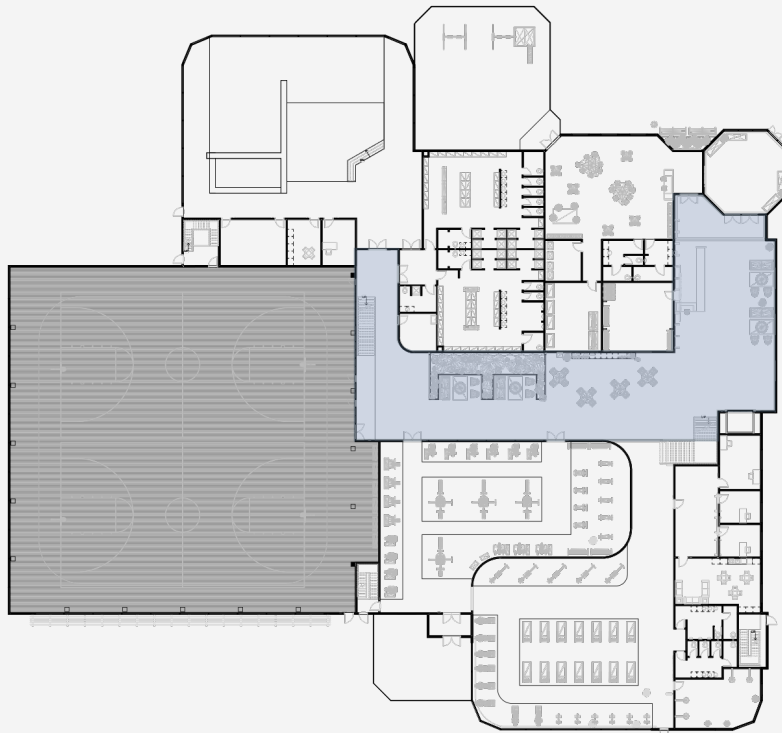


Figure 9.1

CENTRAL NAVIGATION

The lobby and atrium serves as the main hub to navigate to connected spaces. It connects to almost every area of the wellness studio. Even though staff assistance will be provided as new members join the wellness studio, the atrium can be recognizable by the large bright open space and the smell of vegetation from the green wall.

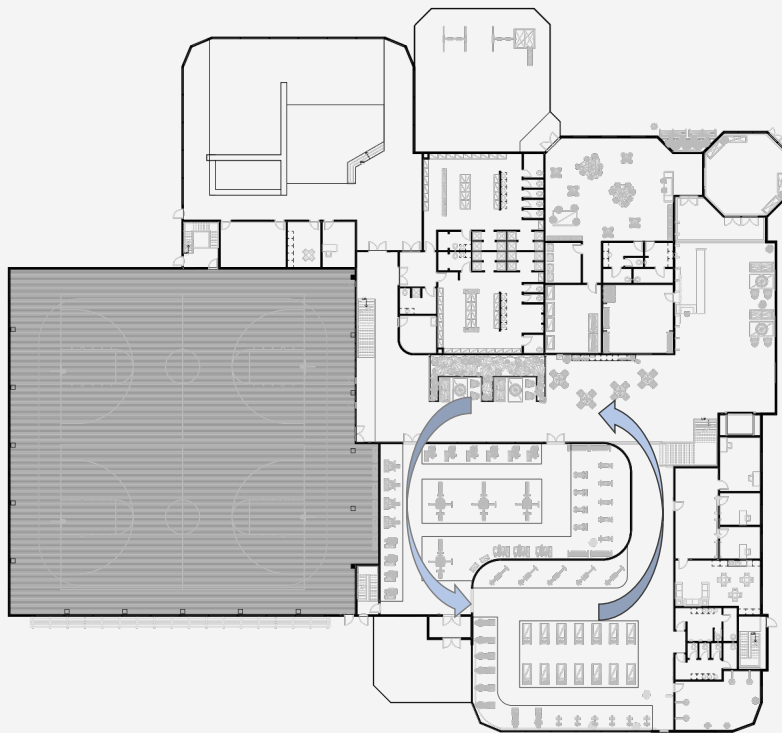


Figure 9.2

CIRCULATION

As mentioned earlier, circulation is important to understand sense of direction. By creating the loop seen through the atrium, cardio space, and weight room, users are able to smoothly use one equipment type to another without walking back into the atrium again. A branch system is also used to break down the spaces into more manageable areas.

FACILITY PROGRAMMING



BEEP BALL



GOAL BALL

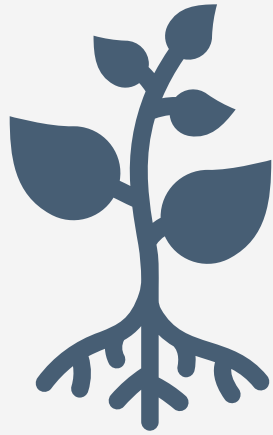


VISUALLY IMPAIRED TENNIS

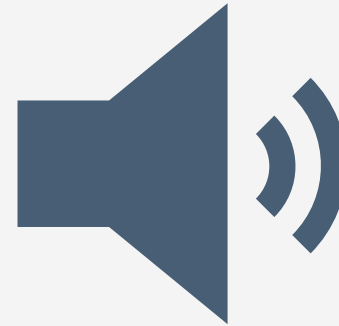
Programming will be important in creating a sense of community. It allows members to connect with one another and have positive experiences with the space. It encourages members to follow wellness practices, such as mind and body, to develop healthy habits. Beep Ball, Goal Ball, and visually impaired tennis gives the blind the opportunity to participate in team sports.

Figure 9.3 - 9.8

SENSE ORIENTATION



SMELL



SOUND



TOUCH



SIGHT

Although the blind and deaf may not have all of their senses, they are able to use their remaining abilities to navigate their surroundings. From the fresh smell of plants in the atrium, to the sound of bouncing basketballs from the courts, the touch of the textured materials, and the natural sunlight from the windows that surround the building. By using these secondary senses the blind and/or deaf can take the stress off of their primary senses.

Figure 9.9 - 10.2



Figure 10.3

ENTRANCE EXTERIOR

Welcome to The Wellness Studio. This is the main entrance which is on the Northeast side of the building. On the right is a covered drop off spot for friends and family to drive their loved one to the Wellness Studio or for metro mobility to drop someone off. As the these slides continue there will be a mini map in one of the corners to help navigate you around the building.



Figure 10.4

LOBBY

At the lobby where members can join, check-in, and check out equipment that might not be out on the floor.



Figure 10.5

ATRIUM

This is the atrium. In this space you can see the use of polished concrete, natural lighting from the skylight, visual range from the first to second floor. A perfect space for a meet up before or after a workout.



Figure 10.6

CARDIO ROOM

This is the Cardio space where a variety of cardio equipment like treadmills, ellipticals, standing bikes, and row machines are available.



Figure 10.7

TRACK & COURTS

This is the court and track area. There are two courts on the first floor and a track that wraps around the courts on the second floor.



Figure 10.8

WEIGHT ROOM

The weight room has a variety of fitness equipment for members to improve their physical strength. Floor material changes from the polished concrete to a soft raised padding to indicate when you are approaching equipment.



Figure 10.9

LIFTING SPACE

This is the lifting space located on the second floor. There are free weight racks and dumbbells for any skill range.



Figure 11.0

STUDIO

This is one of the studios, specifically Studio A where currently there is a yoga class in session. However, a variety of activities could occur in this space. You'll notice on the right side the use of translucent glass. The deaf are able to understand the room is occupied without interrupting those inside.



Figure 11.1

TEXTURE CHANGE

Throughout the building there are material and texture changes that indicate a separate room usage. Between the lobby and atrium the texture changes from a diamond wall pattern to a geometric wall pattern.



Figure 11.2

DOG RELIEF STATION

This is the Dog relief area where members with guide dogs are able to have a designated space to relieve their dogs.

SECTION A





Figure 11.3

DESIGN SUMMARY

Integrating these blind and deaf design strategies within architecture will better assist the blind and/or deaf navigate their surroundings and bridge the disabled education gap between people. Architects can be leaders in designing well-rounded buildings. By setting these groups of people up for success they can thrive more as individuals to gain a sense of community and safety in any building they visit.

APPENDIX



Figure 11.4

CAMILLE BECKER

on after my graduation at NDSU and hopefully as an alumni I will be able to pay it forward to future architecture students. A special thanks to my parents, family, friends, and professors who have supported me throughout my 5 years at NDSU. Thank you to all who were able to attend my thesis presentation. I could not have done it without any of you!

I have thoroughly enjoyed this thesis project, specifically what it has meant to me and the blind and/or deaf people I personally know. Being able to research and design this project has changed my perspective on the challenges the blind and/or deaf overcome. I can apply this thesis project to my architectural profession and daily life. Although I do not plan to continue researching this topic, I would like to continue understanding how to design for disadvantaged groups.

Throughout my educational career I have had the pleasure of working with my professors and peers who have taught and guided me to becoming the designer I am today. They have taught me how to be open-minded, hardworking, and confident in my work. Additionally, they have taught me to be a well-rounded person; to step away and connect with others and be apart of the studio culture that the NDSU architecture department is know for. These experiences and connections will carry far

FIRST YEAR

Fall 2018
Environmental Design | Jason Moore

Spring 2019
Environmental Design | Heather Fischer

SECOND YEAR

Fall 2019
Studio | Emily Guo
Land Artist Studio - Red River, Moorhead, MN

Spring 2020
Studio | Ron Ramsey
A-Frame Dwelling - Cripple Creek, CO
BB Retirement & Grill - Fargo, ND

THIRD YEAR

Fall 2020
Studio | Bakr Aly Ahmed
Environmental Design Hall - Fargo, ND
Petra Olympic Restaurant - Santa Monica, CA

Spring 2021
Studio | Paul Gleye
New American Exposition Center - Fargo, ND
Future of Fargo: Farmer's Market - Fargo, ND

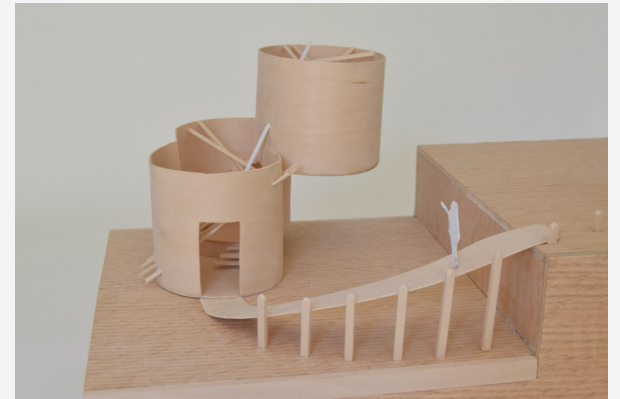


Figure 11.5



Figure 11.6



Figure 11.7

FOURTH YEAR

Fall 2021

Studio | Mark Barnhouse

High Rise - Miami, FL

Spring 2022

Studio | Paul Gleye

Marvin Residential Competition

Re-Vision Moorhead - Center Ave Moorhead, MN

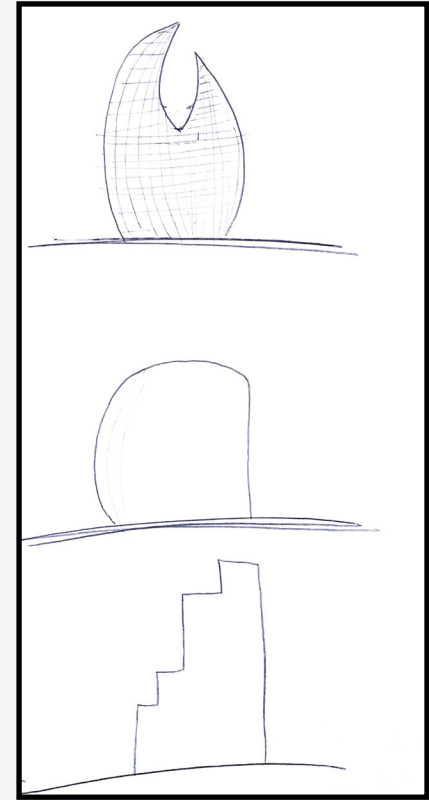


Figure 11.8

FIFTH YEAR

Fall 2022 & Spring 2023

Studio | Ronald Ramsey

Thesis Project: Designing Inclusively

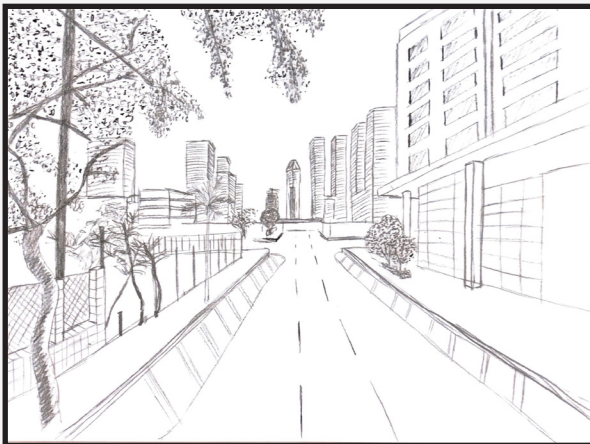


Figure 11.9



Figure 12.0

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