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Title

INCLUSIVE OFFICE DESIGN: ADDRESSING THE NEURODIVERSITY SPECTRUM
IN THE WORKPLACE

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INCLUSIVE OFFICE DESIGN: ADDRESSING THE NEURODIVERSITY SPECTRUM IN
THE WORKPLACE

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ABSTRACT

When most people think of inclusive design, they think of those with physical disabilities. As architects, we strive to create inclusive spaces that can be experienced the same no matter if someone is differently abled, but what about those that have neurological disabilities that are not seen as obviously or as often? This project expands the typical understanding of what an inclusive workplace should look like by implementing the idea that the key to success is to focus the human experience. Hospitality-oriented offices provide an opportunity to personalize the journey you take throughout the workday. Expanding the range of available accommodations offered in an office setting can help create a closer community and find employees with a greater range of diverse skills.

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1. INTRODUCTION

1.1. Problem Statement

When most people think of inclusive design, they think of those with physical disabilities. As architects, we strive to create inclusive spaces that can be experienced the same no matter if someone is differently abled, but what about those that have neurological disabilities that are not seen as obviously or as often? My thesis will strive to explore, research, and design an architecturally detailed office building that can help the neurodiverse workforce thrive. By testing the boundaries and looking at case studies, this design will expand the typical understanding of what an inclusive workplace should look like. Many neurodivergent people get easily frustrated and distracted with their environment. Expanding the range of available accommodations offered in an office setting can help create a closer community and find employees with a range of diverse skills.

1.1.1. Research Questions

A large part of this research will be learning how neurodivergent friendly design is possible, and how it is different from a typical design approach. Along with this, questions include how to implement the found methods of design into a building for the specific site chosen in Utah and what sort of an impact this design approach can have on occupants.

1.1.2. Proposed Outcomes

The outcome of this thesis will be a concise framework of research to design a prototype office building intended to provide a framework for inclusive design standards. This framework will be displayed in the form of a fully developed office building on an existing site in Salt Lake City, Utah. This proposed project will help architects continue to move closer to being well

educated and empathetic towards neurodiverse people and take the next step to apply their knowledge into their everyday practice.

1.2. Objective

The objective of this thesis is to further explore and bring light to the topic of inclusive design for the neurodiverse community. The design of this project will provide a potential solution to the problem faced by employees with these non-visible disabilities which potential discrimination and lack of choice within the workplace. This research will contribute to the field of architecture by providing background and a potential solution to inclusive design for neurodivergent people in a structured office setting.

2. BACKGROUND

2.1. Background

When most people think of inclusive design, they think of those with physical disabilities. As architects, we strive to create inclusive spaces that can be experienced the same no matter if someone is differently abled, but what about those that have neurological disabilities that are not seen as obviously or as often? My thesis will strive to explore, research, and design an architecturally detailed office building that can help the neurodiverse workforce thrive. By testing the boundaries and looking at case studies, I hope to expand the typical understanding of what an inclusive workplace should look like. Many neurodivergent people get easily frustrated and distracted with their environment. Expanding the range of available accommodations offered in an office setting can help create a closer community and find employees with a range of diverse skills.

2.1.1. What Is Neurodiversity?

The word neurodiversity refers to the individual differences in brain functions and behaviors that vary from person to person. The word “neurodivergent” describes those with cognitive disorders including autism, ADHD, Tourette’s syndrome, dyslexia, Asperger’s syndrome, dyscalculia, and OCD. Neurodivergent people often have unique ways of thinking and processing information compared to those who are “neurotypical”. The neurodivergent population makes up almost one-fifth of the population and often are not given any thought about functioning differently in a work environment. The majority of people do not disclose their neurodiverse condition to their employers before they are hired, and some do not after they are hired either. In recent years, the stigma behind many of these neurological disorders has started

to break down, leaving us to acknowledge that we, as a society, can do better about designing inclusively.

2.2. Neurodivergent-Friendly Design

2.2.1. Acoustics

To some neurodivergent people, certain noises can cause discomfort and stress. Sounds such as running electronic equipment, squeaky furniture, sudden loud noises and even traffic can lead to distress. Using architecture to control the acoustical environment in order to minimize background noise, echo and reverberation can play a major role in the level of comfort of office occupants (Mostafa). Level of control should vary according to the level of user focus required within the space, as well as the skill of its users (Mostafa). Low-stimulation spaces require a high level of noise reduction while high-stimulation spaces require a more moderate level of acoustical regulation. Certain geometries will increase reverberation in a space, for example, spaces configured with parallel walls in long corridors or high ceilings are more likely to have acoustical issues.

2.2.2. Spatial Sequencing

Many neurodivergent people find comfort in patterns and schedules. Due to this fact, areas in an office should be organized in logical order, based on the typical scheduled use of the spaces as well as their logical sensory flow (Mostafa). Ideally, spaces should flow as seamlessly as possible from one space to the next to aid in anxiety reduction (Mostafa). The consistency of the spatial organization of a building can provide comfort to those who are easily agitated by a change in schedule.

2.2.3. Escape Spaces

Escape spaces are areas that, as described, provide physical or mental protection from the over-stimulation in public spaces. These spaces equip neurodivergent people with a physical space that is isolated enough from their standard environment to provide a sense of security and relaxation. Research has found strong positive effects of implementing escape spaces into public areas, especially in educational settings (Mostafa). These spaces can range from small, external, natural environments to escape alcoves along circulation pathways to freestanding furniture arrangements (Mostafa).

2.2.4. Compartmentalization

The idea of compartmentalization for sensory stimulation within architecture is to define and limit the sensory stimulation in each environment within a building. The building program should be organized into compartments at the master plan level all the way to interior design and material finishes of spaces. Sensory qualities of each space can be used to define its function, organize it programmatically, and separate it from neighboring compartments (Mostafa).

2.2.5. Transitions

Transition zones are standard in architecture; however, they are often overlooked or not paid much attention to. For neurodivergent employees, transition spaces help the user recalibrate their senses as they move from one level of stimulus to the next (Mostafa). Architecturally, transition zones can be strategically designed and placed to ease nervousness and overstimulation.

2.2.6. Sensory Zoning

Sensory zoning in spaces is important to help the neurodivergent population have a clear understanding of the use of each space within a building. This design approach aims to group

spaces together that engage and stimulate human senses in similar manners. Spaces should be organized in accordance with their sensory quality rather than typical functioning zoning (Mostafa). Grouping spaces according to their allowable stimulus level creates clear sensory zoning and emotional areas.

2.2.7. Safety

In general, safety should be more carefully considered when designing with neurodivergent people in mind. Individuals with extra vulnerabilities such as autism and other atypical sensory and mobility facilities are more likely to experience distress or anxiety when exposed to situations that may be overlooked by neurotypical people.

2.3. Case Studies

In the realm of office architecture, embracing neurodiverse design principles is paramount for creating an inclusive and conducive work environment. Previous works can be used as case studies to make informed decisions about how to move forward with the design for this thesis project.

2.3.1. Contentful Workplace

Contentful is a software company with five locations, one of which is in Berlin, Germany. Designed by T3 Creative Studios, this office houses a variety of adaptable spaces for both social interaction and productivity. An open-concept cafeteria and event space provides diversity, along with flexible meeting rooms varying in size, design, and layout (Luco). The design incorporates a large outdoor terrace with employee gardens that brings continuity to the organic interiors, integrating plant life at every level (Luco). T3 utilized wayfinding strategies by making custom signage for the office highlighting tea kitchens, washrooms, lockers, meeting rooms, and collaboration zones (Luco). The workplace supports neurodiversity and inclusivity

with multidirectional dimmable lighting, automated sunshades, phone booths, ergonomic height-adjustable workstations, and Zoom interactive screens in all team rooms. Quiet to loud zones, and the application of acoustic treatments, help balance functionality with open and closed workspaces (Luco).

Figure 1
Contentful Workplace Interior



Koy + Winkel Fotografie Contentful Workplace https://www.archdaily.com/996840/contentful-toi-toi-toi-creative-studio?ad_source=search&ad_medium=projects_tab

2.3.2. Westmark Lower School

NBBJ has designed a nature-focused immersive school for neurodiverse students in Los Angeles, California. NBBJ recognizes that the education system caters to neurotypical students, which can significantly affect the amount of information learned and retained by those with different needs. This net-zero carbon design includes an indoor-outdoor, community-based

approach that will replace the 1950s style modular schoolhouses (Stouhi). Different learning zones are integrated within each classroom, such as creative labs and reading nooks, to provide students with a range of customizable and choice-driven learning spaces (Stouhi). A centralized network of programs, such as occupational and speech therapy, theater space, and school counselor space, will foster a “continuum of care” throughout the campus (Stouhi). Construction of the project began in June of 2022.

Figure 2
Westmark Lower School



Westmark School <https://www.nbbj.com/work/westmark-school>

2.3.3. James Turrell

James Turrell is an American artist who studied perceptual psychology and mathematics and became a world-renowned artist for his ability to manipulate space and color. Most of his work was designed to be a place of contemplation, deep thought, and self-reflection (Rellihan). Turrell invented signature forms that intensified the experience of sight and perception in his more than 80 “skyspaces” in public and private venues worldwide (Mancoff). Turrell built

environments with strategic apertures and hidden LED displays calculated to “bring the cosmos down” into the viewers’ space. His “ganzfields” fill interior spaces with a luminous colored haze and seemingly palpable planes of light. As a result, his illusory works sometimes created a sense of disorientation (Mancoff).

Figure 3

James Turrell’s Skyspace at Culiacan Botanical Garden



<https://www.designboom.com/art/james-turrell-encounter-skyspace-culiacan-botanical-garden-mexico-08-13-2015/>

2.4. Project Issues

2.4.1. The Start of the Modern American Cubical

American offices as we know them today began to show up around the country largely due to technological advances in the 1960’s. Some of these new technologies – including the

typewriter and the cubical – caused large societal changes. The original cubical was designed in 1964 by Robert Propst after studying how people worked and wanted to improve on the open-bullpen office that he had grown up with (Baer). Although the concept was not an instant hit, it eventually became the most widely implemented office furniture in corporate America.

Businesses found this modular system incredibly useful for cramming people into smaller spaces, while upper management still enjoyed windowed offices on the perimeter of the buildings (Baer). During the ‘80s and ‘90s, even more people were structuring their offices based around functional cubicles and businesses arranged offices driven by economics (Baer). Cubicles were believed to be the only logical solution to improve employee efficiency and worker productivity.

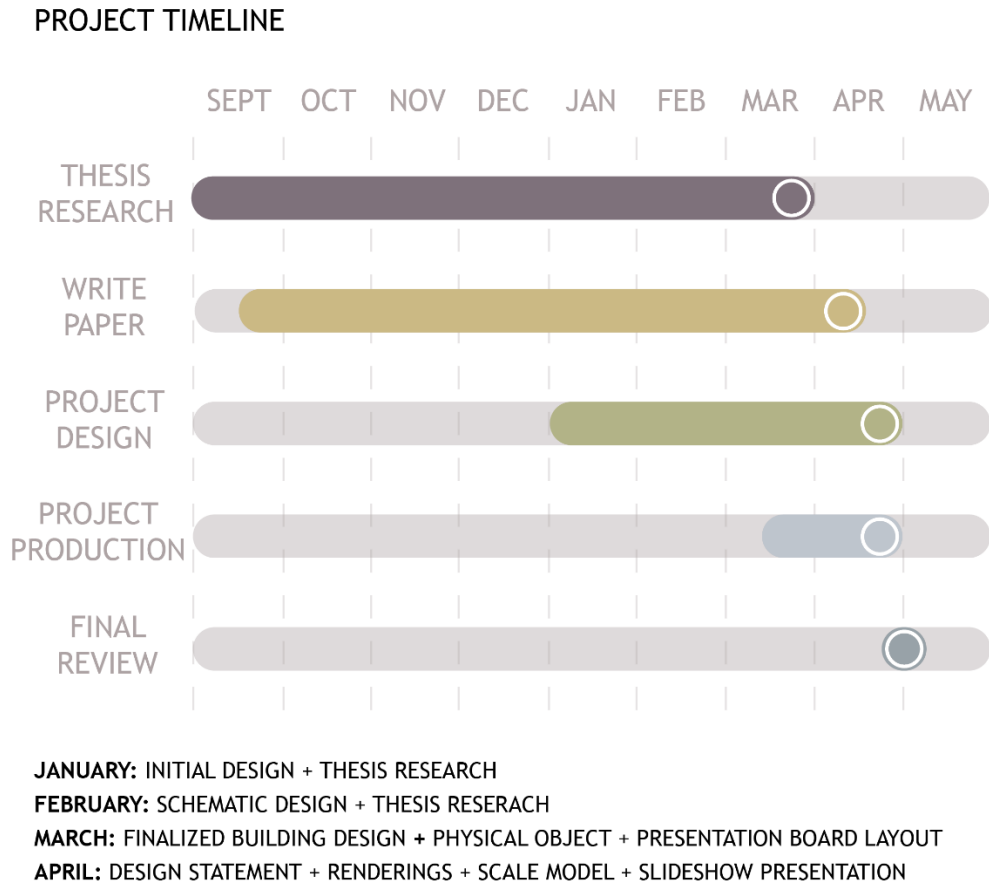
2.4.2. Modern Cubicles are Problematic for Everyone

Today, so-called “cubical culture” is widely complained about due to lack of privacy, variety, individuality, or noise control. Psychologist Franklin Becker, PhD, and director of the Cornell University International Workplace Studies Program found that open workspaces foster more employee productivity, learning, and camaraderie than do closed offices or cubicles, which are also more expensive (Murray). New studies such as this one have proven how this environment can have serious negative impacts on employee mood, productivity, and social interactions. Cubicles can create a sense of isolation and disconnection from our co-workers, leading to decreased collaboration and communication (Murray). Although this does affect all office workers, neurodiverse employees can be especially distraught in these socially closed-off, boring and noisy environments.

3. METHODOLOGY

3.1. Project Timeline

Figure 4
Project Timeline

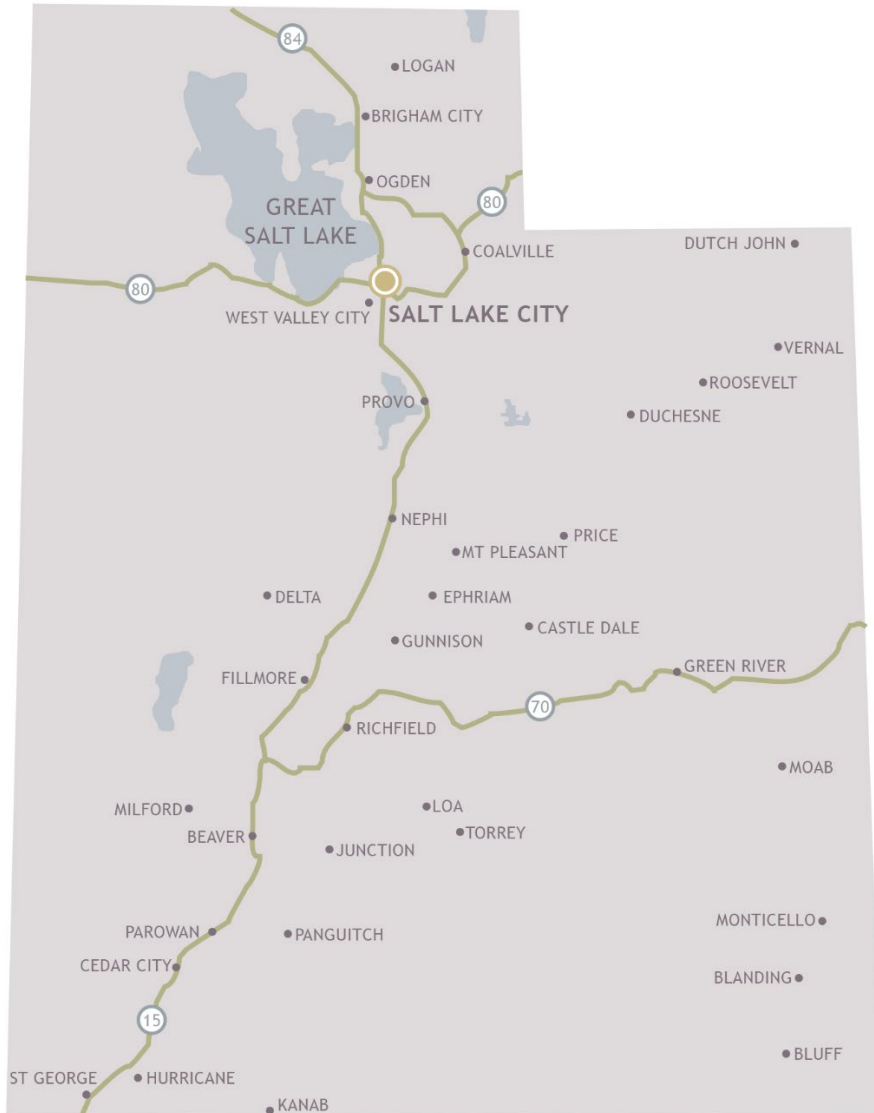


3.2. Project Site: Salt Lake City, Utah

Salt Lake City, the capital of Utah, is in the central northern part of the state. It was founded on July 24, 1847, by a group of Mormon pioneers who were the first non-native people to settle in the Salt Lake Valley (Salt Lake, n.d.). Within a few days of settling, plans were drawn for Great Salt Lake City, named after the salty inland lake which dominated the desert to the west. Out from the center of the city, now Temple Square, blocks were arranged on a grid pattern in 10-acre squares, separated by streets 132 feet wide - wide enough for a team of four oxen and a covered wagon to turn around (Salt

Lake, n.d.). Today, the state capital is largely known for its religious tourist attractions and outdoor recreation.

Figure 5
Utah Map



A large environmental concern for the citizens of Utah is the quickly disappearing Great Salt Lake. Recently, when water levels reached historic lows, the lakebed was examined and found to contain toxins including mercury, arsenic, and selenium (Weir, 2023). As mud turns to dust and dust becomes airborne, the health of locals becomes an increasing concern. Scientists

believe that the soil revealed at the bottom of the lake could poison the lungs of more than 2.5 million people (Weir, 2023). Further drying of the Great Salt Lake could lead to even more pollution for the people in this area who already suffer some of the worst winter air pollution in the country (Weir, 2023). Dense particles in the air sink lower in the sky and heavy air particles settle in the valley.

3.3. Site Location

Figure 6
Downtown Site Map



In December of 2023, I traveled to Salt Lake City and viewed a couple of sites – listed as A and B. Both sites are located in the downtown business district and are within just a couple of blocks of the public transportation network. Site A is an empty lot on the corner of University Boulevard and South West Temple Street. From an initial viewpoint this looked like the perfect site with flat, open land, good public access, and mountain views.

However, after being there and observing for a while, I realized that I didn't love this site as much as I did on paper. The intersection was very loud, and it was very busy despite it being mid-afternoon on a weekday, and the location felt too disconnected from the rest of downtown. It felt like a better location for a public project like a library or a museum, not quite right for my project that had a much more personal intent.

Figure 7
Photograph of Site A



Figure 8
Intersection at Site A



Figure 9
Site A Surrounding Context



I then walked over to site B which sits along South 200 East Street just a few blocks from site A. Immediately, this site felt much better. It was far calmer and quieter, surrounded by buildings with similar topology, but still located publicly downtown and close to public transportation. So, moving forward with my design into the spring semester, this is the site this office project was designed for.

Figure 10
Photograph of Site B



Figure 11
Site B Surrounding Context



4. RESULTS AND CONCLUSIONS

4.1. Final Project Description

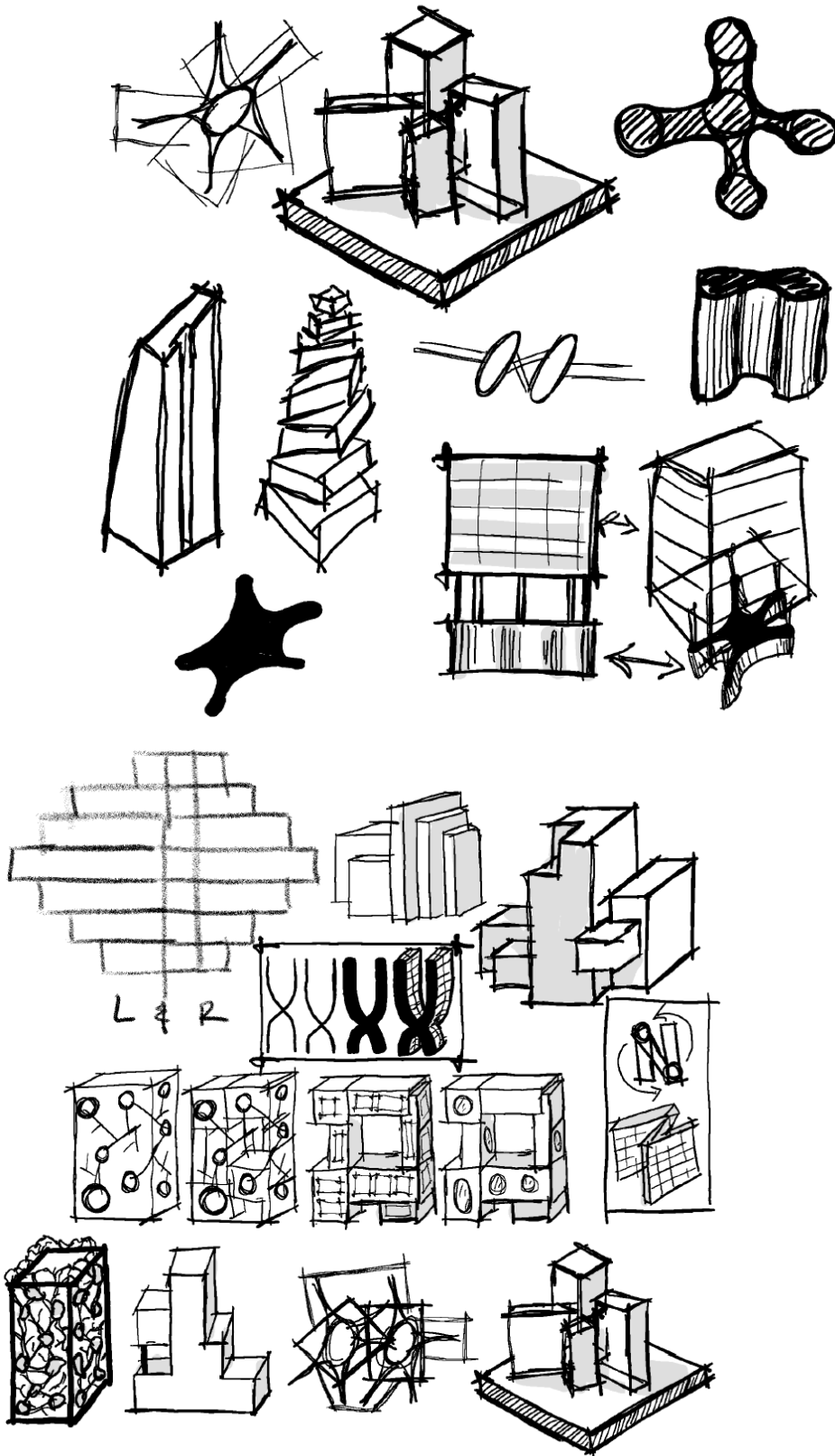
This is a research-based design project of a modern office building in Salt Lake City that focuses on inclusivity for employees with non-visible disabilities and neurodivergent tendencies. This Thesis describes the thought process behind the topic selection, site selection, and how research influenced the final design decisions. This project uses architecture to support companies that are keen on embracing neurological differences and support individual strengths within the workplace.

4.2. Project Design and Documentation

4.2.1. Design From Research

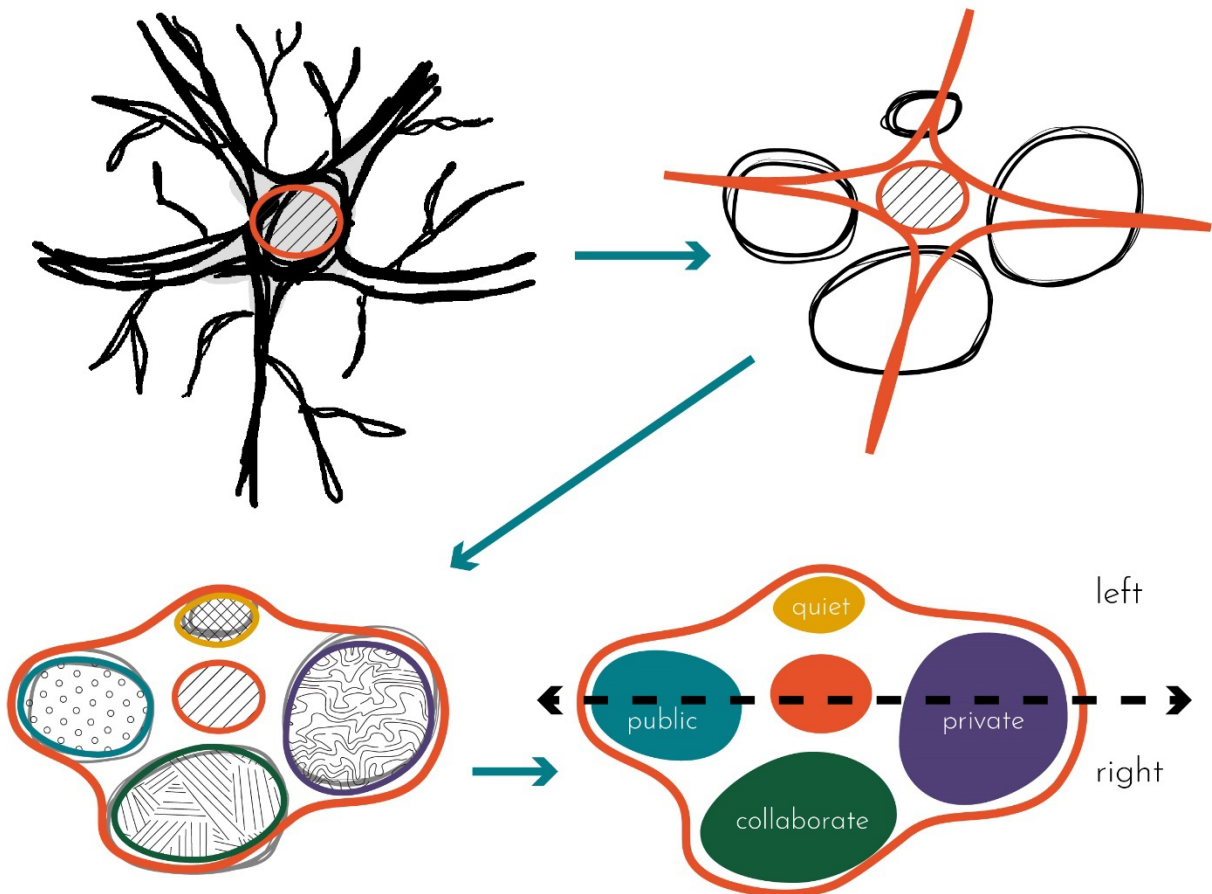
When I started my design concept, I looked at all my research on brain function, connectivity, and processes. This previous research helped set the stage for the form and function of the office building moving forwards. The final design uses research, case studies, and municipal codes for the site to brainstorm and sketch ideas.

Figure 12
Sketch Concepts for Office Design



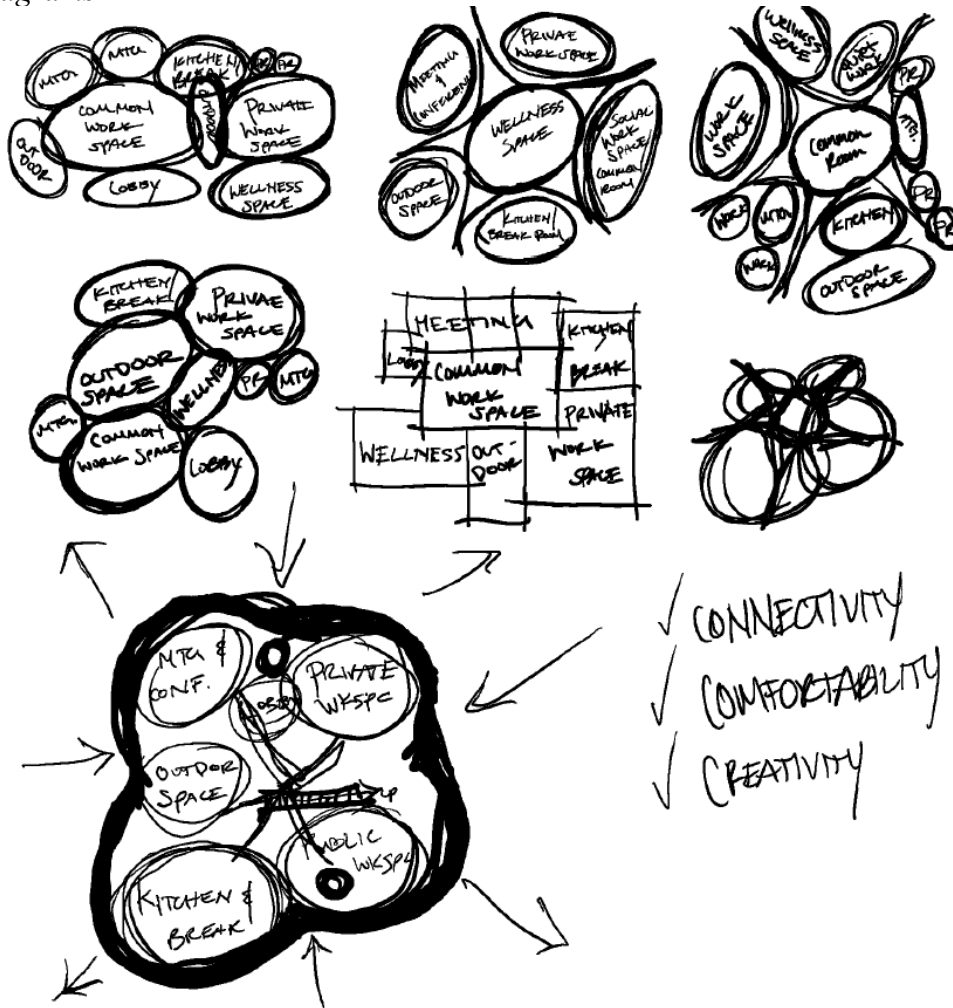
The biggest driving force behind the form and layout is this sketch I made early on in my research process of a brain neuron. I was really fascinated by the function of the neuron and how the branches of the dendrites reach out to send and receive information. The cell body hosts the nucleus which houses the cell's genetic information. I ended up translating a diagram of how the human brain functions into a workable building and floor plan. I dissected the shape and function of a singular neuron to create a curved form with inner bubbles that serve different purposes and designated each area into a function of the building.

Figure 13
Parti Diagram



I used bubble diagrams to further narrow down each space into public and private, collaborative and quiet, and indoor and outdoor. Earlier, I talked about left and right brain function. This same theory is applied to the building form, dividing spaces into left and right sides that determine the use of the spaces in each location. The form uses an intricate network where both hemispheres can either collaborate or function independently, allowing for the integration of diverse cognitive abilities. This way of design encourages connectivity, comfortability, and creativity within the workplace.

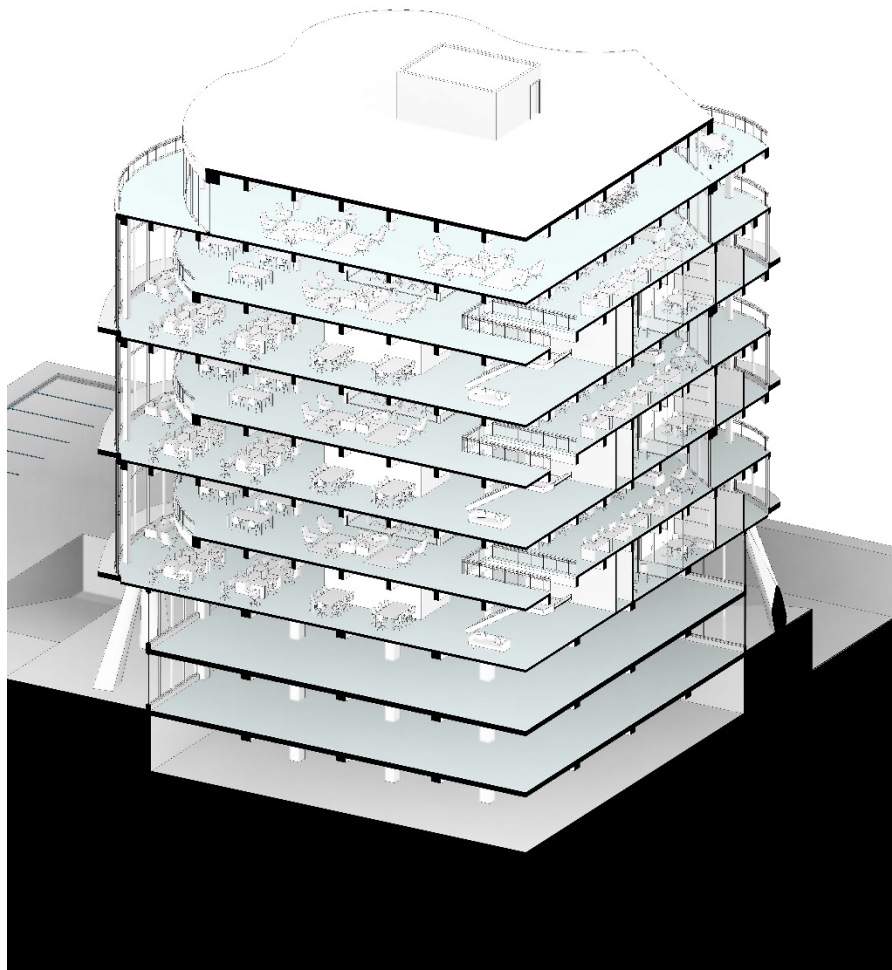
Figure 14
Bubble Diagrams



4.2.2. Final Design

The final office design is seven stories of mass timber structure on top of a three-level concrete podium. The office layouts allow for tenants to have “choice” throughout the day. Choice enables people— neurodivergent and neurotypical alike—to manage their own needs more effectively with dignity and autonomy. Versatile environments that provide for a range of preferences make differences less apparent, fostering equality and integration. The environments within the building also allow for individual and operational changes, helping to make an organization more adaptable.

Figure 15
Axon Building Section



The building has two levels of commercial retail space - per municipal and zoning code requirements, three two-level offices, and a top floor filled with community spaces and amenities all above one level of underground parking.

Figure 16
Office First Floor Plan

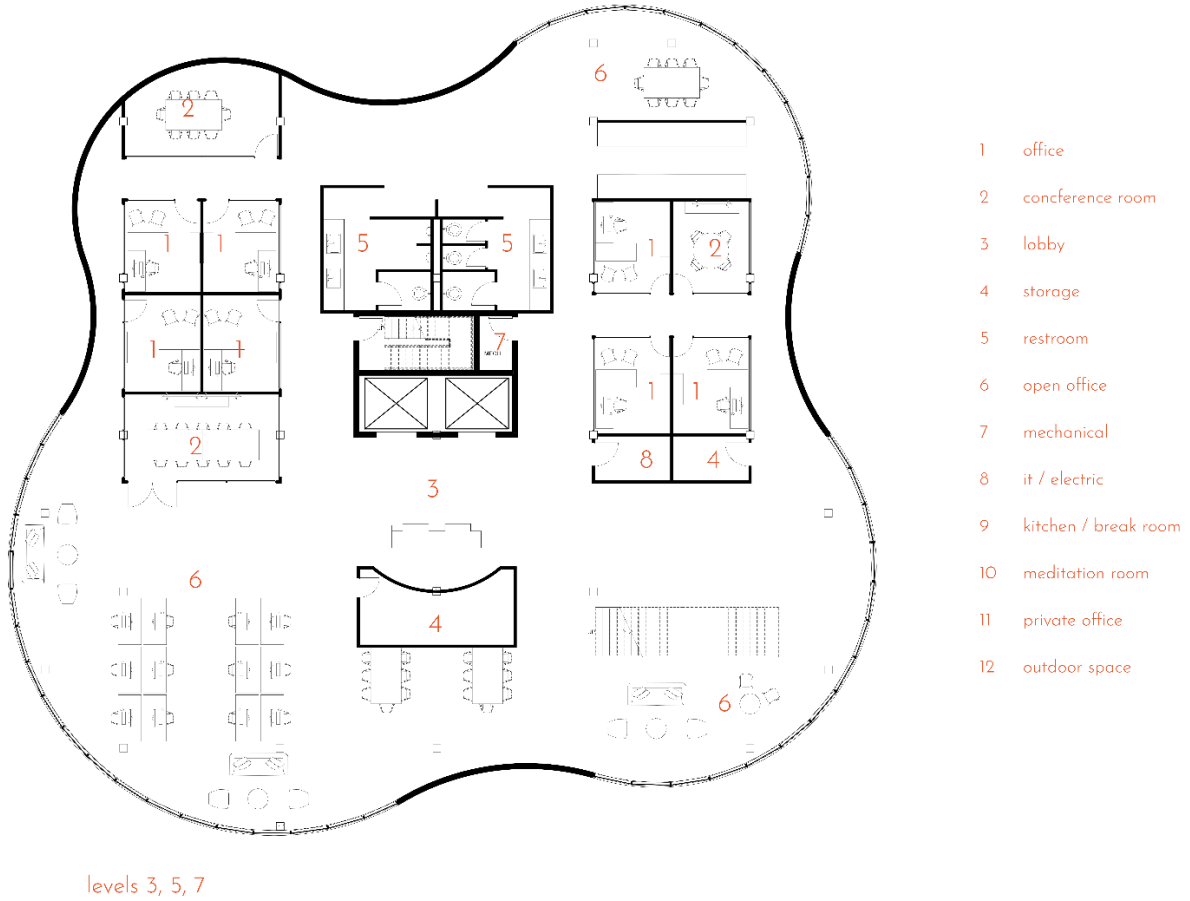
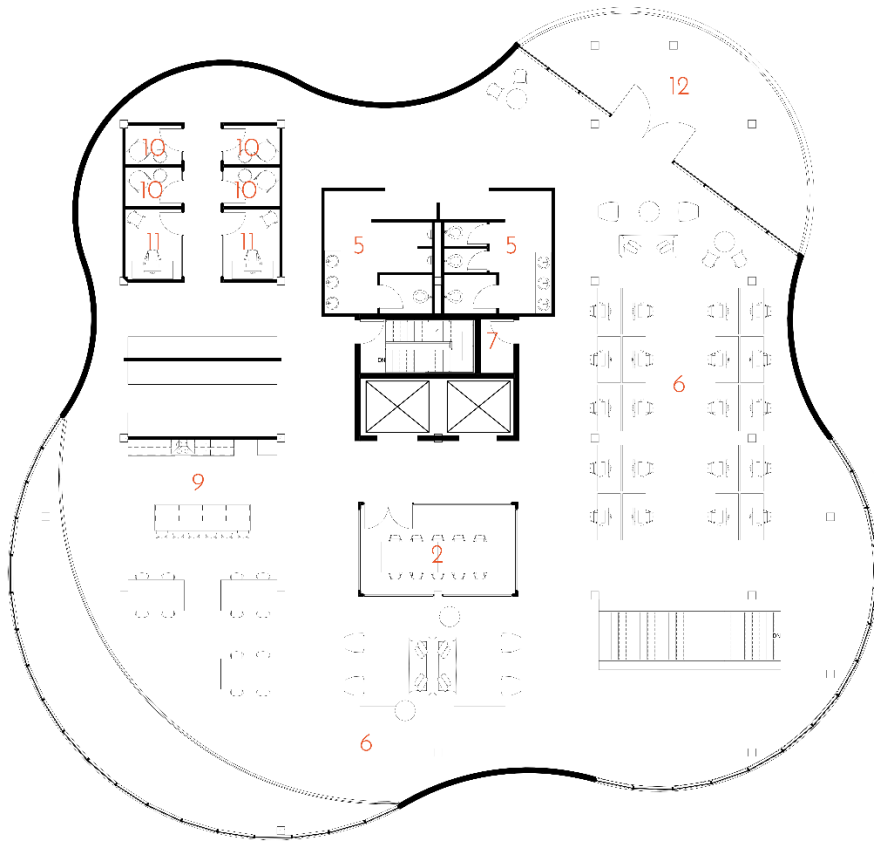
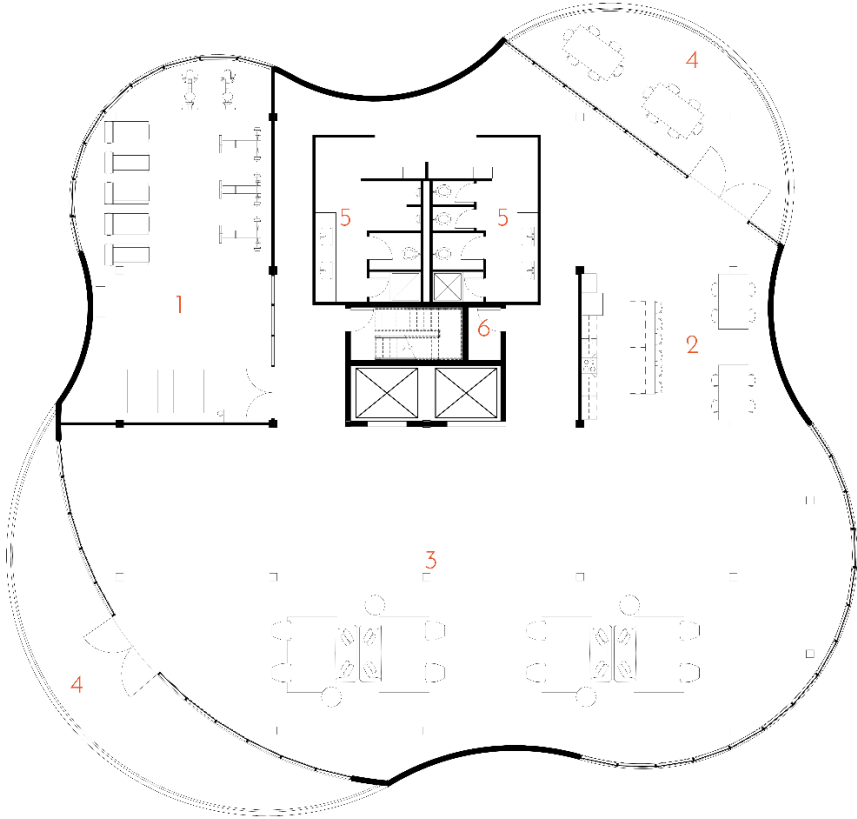


Figure 17
Office Second Floor Plan



levels 4, 6, 8

Figure 18
Office Top Floor Plan



- 1 fitness center
- 2 community kitchen
- 3 open event space
- 4 outdoor space
- 5 restroom
- 6 mechanical

level 9

Figure 19
Open Office Interior Render

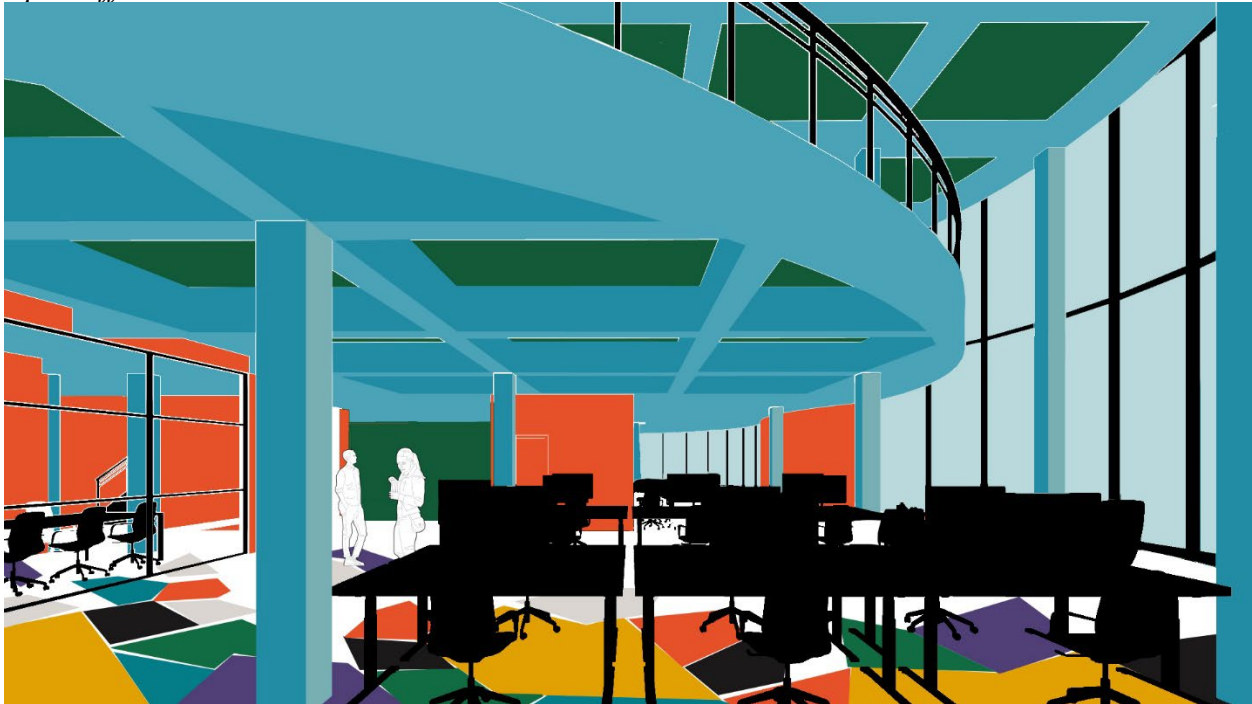


Figure 19 is a view of the open office on the first floor of a two level office. Large windows provide natural daylight to this space which is in the “collaborative” zone of the building. The open office part of the design offers a multitude of benefits that foster collaboration, creativity, and flexibility in the workplace. By breaking down physical barriers and promoting an open layout, this design encourages spontaneous interactions among colleagues, leading to enhanced communication and idea exchange. The absence of cubicles or partitions promotes a sense of equality and transparency. Moreover, open office designs maximize natural light and space efficiency, creating an inviting atmosphere that can boost employee morale and productivity. With adaptable configurations and communal areas, this open office design facilitates connectivity and synergy among team members, ultimately contributing to the overall success and vibrancy of the modern workplace.

Figure 20
Kitchen Mezzanine Interior Render

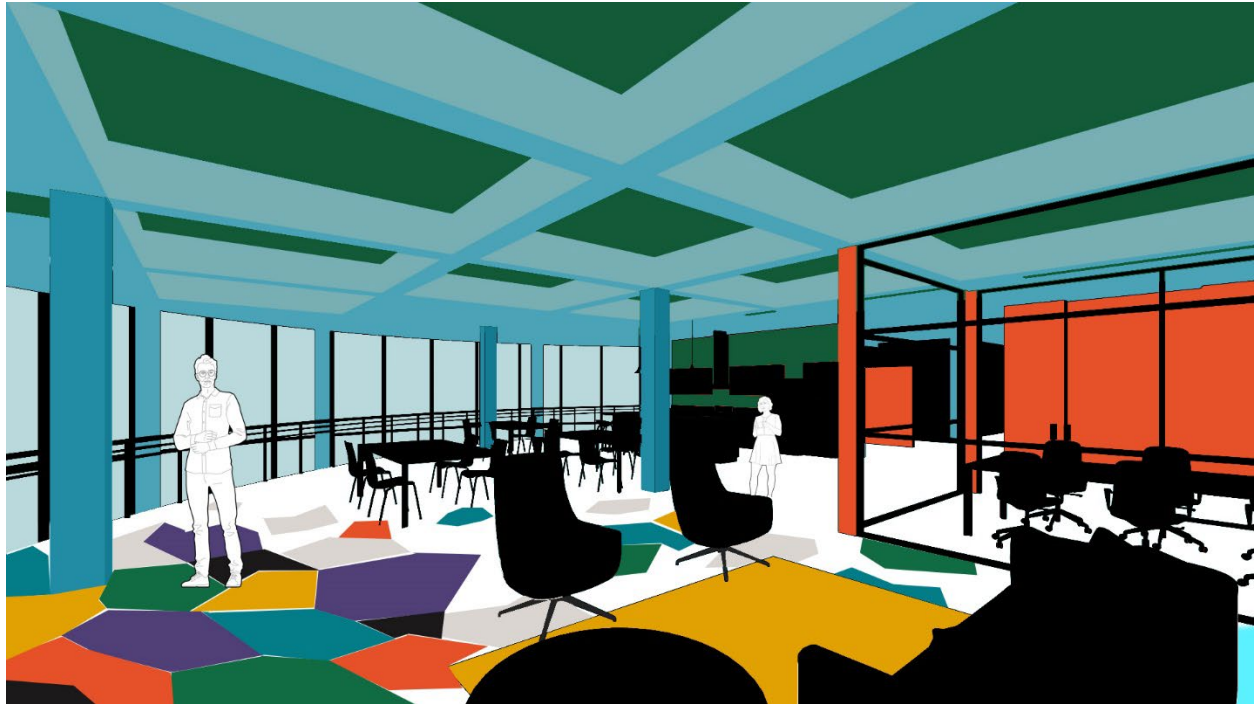


Figure 20 is a rendering of the kitchen mezzanine space on the second floor of an office. Social spaces like these offer invaluable benefits that extend beyond just relaxation or leisure. These spaces are intended to serve as hubs for spontaneous collaboration, idea generation, and team bonding. Social spaces like this one encourage informal interactions, enabling colleagues from different departments or levels of hierarchy to connect on a personal level, thereby breaking down traditional office standards. These spaces can also serve as venues for informal meetings or brainstorming sessions, offering a more relaxed and creative environment compared to traditional conference rooms. By prioritizing social spaces, this office not only promotes employee well-being but also nurtures a vibrant and inclusive workplace culture.

Figure 21
Sunken Garden Render



Figure 21 is a rendering of the sunken garden on the exterior of the building. Providing outdoor access to spaces like this one for employees is extremely important for their overall well-being and productivity. Exposure to natural light and fresh air has been shown to positively impact mood, energy levels, and mental health. Access to outdoor spaces such as gardens and patios throughout the building allows employees to take breaks and recharge amidst nature, which in turn reduces stress and promotes relaxation. Another great benefit is that outdoor access encourages physical activity, whether it's a leisurely stroll or outdoor exercises during breaks, which can boost both physical and mental health. By incorporating these outdoor elements, the project prioritizes the health and happiness of employees.

Figure 22
Exterior Office Render



4.3. Conclusions

It is key that we continue to move forward on the path of understanding and gaining new knowledge about the neurodiverse community. This research-based thesis project helps to not only encourage people to access the increasing amount of information on the subject, but then take another step and apply their newfound knowledge into their everyday practice. Architects can take on responsibility by implementing concepts into office design such as acoustical sensitivity, recognizing the importance of textures and patterns, and by offering spaces that are essential to a productive workplace and provide tenants with choice throughout the day. Access to technology, outdoor space and amenities can contribute greatly to the level of comfort, creativity, and social connections experienced throughout the workday.

Using research from this project, as well as research from similar projects and case studies, architects can learn to create buildings that have an extremely positive and powerful

impact on neurodiverse people and those with non-visible disabilities. It is crucial moving into the future that members of the neurodiverse community are able to work in an ecosystem that supports their lifestyle. Architects must not only recognize this, but also use research and resources to equip employees with the tools necessary to succeed within their workplace.

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