

## ABSTRACT

Title of Thesis: **RELIEF IN THE CITY:  
A COHOUSING COMPLEX FOR STRESSED  
MILLENNIALS**

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How can design induce relief? How can design create a stress-free living environment that fosters new relationships and community growth for millennials struggling to have a life outside work? This project focuses on implementing a cohousing community into the dense urban neighborhood of Shaw, DC. Due to the large millennial demographic and how Shaw is currently undergoing an urban transformation, the proposed program will assimilate well onto the site. The design is approached by understanding the social and environmental influences millennial workers go through in their daily lives, and how architecture, nature, and community can impact these users.

RELIEF IN THE CITY:  
A COHOUSING COMPLEX FOR STRESSED MILLENNIALS

by

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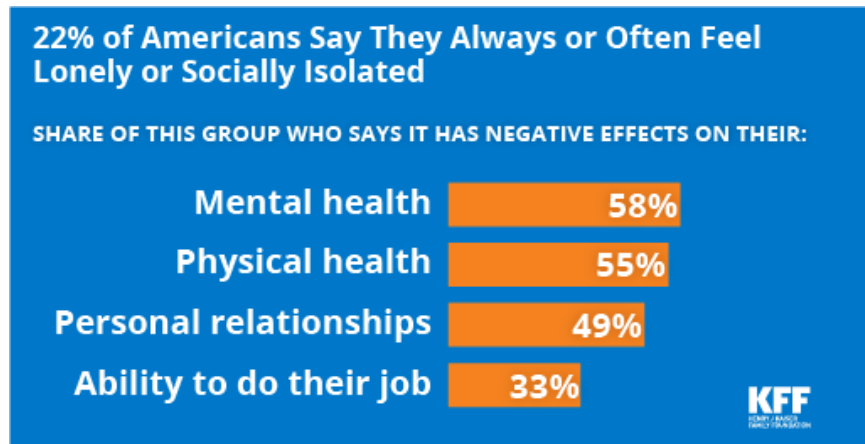
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## **Chapter 1: Social Isolation and Urbanism**

This thesis explores Washington D.C.'s urban condition, and how its contemporary urban designs and cultural aspects promote loneliness. While this thesis is focusing more on how to relieve millennial workers from anxiety and environmental stress, having a support system (or lack of one) contributes heavily on whether these millennial workers are relieved from these ailments. Loneliness is social isolation in its most obvious form, and understanding what it is and what is causing it will influence the kind of program that will be implemented.

In recent years, mental health issues, social isolation, and loneliness have garnered increased attention as societies grow and advance in technology. Back then, mental illness was largely neglected and ignored, treated as a separate and unrelated malady to physical illness. If one claimed to have it, they were expected to take care of their intangible symptoms by themselves instead of seeking professional help. After allowing these mental illnesses to fester, however, more and more people have begun to acknowledge mental illness as a major concern and the advent of social media has helped increase our awareness in little time. As our understanding of mental health and its overlapping relationship with physical health grows, it becomes more apparent that mental health problems affect not just the individual, as seen in fig. 1.0, but society as a whole.



**Fig.1.0:** Comparison of how much loneliness impacts different areas (Source: KFF)

### Social Isolation and Urbanism

Despite an urban population of nearly 700,000 (as of 2017), many people living in D.C are struggling to connect with their families, friends, and communities. Loneliness is found to be more prevalent in urban cities than rural cities. The size of a household inversely affects how you feel: the smaller the household, the lonelier you feel.<sup>1</sup> 70 percent of people living in D.C are single and unmarried, which is the highest rate in the country.<sup>2</sup> With D.C as a professional and economic hub, with above average housing and living expenses, there is an unspoken drive to stay busy in order to make ends meet. People work long hours at the office and at home, minimizing social interaction with neighbors, friends, and relatives. By sacrificing these personal relationships for the

<sup>1</sup> Craille Maguire Gilles, “What’s the world’s loneliest city,” *The Guardian*, April 7, 2016, <https://www.theguardian.com/cities/2016/apr/07/loneliest-city-in-world>.

<sup>2</sup> Matt Cohen, “Attention Lonely Hearts: Report Says D.C. Is Second Best City for Singles,” *Dcist*, February 2, 2015, <https://dcist.com/story/15/02/02/whatever-love-is-dead-anyway/>

sake of making that extra dollar, these workers are more susceptible to stress and burnout.<sup>3</sup>

Social isolation is defined as “the absence of social interactions, contacts, and relationships with family and friends, with neighbors on an individual level, and society-at-large on a broader level.”<sup>4</sup> Claude S. Fischer, an American sociologist and professor at UC Berkeley, delves further and defines social isolation as “the individual’s low expectancy for inclusion and social acceptance.”<sup>5</sup> Social isolation in cities is a growing epidemic: the percentage of American adults who say they are lonely has doubled since the 1980s from 20 percent to 40 percent.<sup>6</sup>

The likelihood of a person experiencing social isolation is influenced by many factors. Among these factors are an individual’s culture, social class, economic status, race, and access to amenities. In a survey done by Rokach et al., they analyzed how North American and Slavic culture (specifically Croatia’s) influence social loneliness based on five factors: emotional distress, social inadequacy, growth and discovery, interpersonal isolation, and self-alienation. They concluded that because North American culture had an emphasis on individual achievement, competitiveness, and impersonal relations, the North Americans scored higher in all five.<sup>7</sup> The survey also

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<sup>3</sup> Tim Leberecht, “It’s Time for Our Culture of Overwork to be Over,” *Psychology Today*, July 25, 2015, <https://www.psychologytoday.com/us/blog/the-romance-work/201507/it-s-time-our-culture-overwork-be-over>

<sup>4</sup> *The Second Fifty Years: Promoting Health and Preventing Disability* (Washington D.C: The National Academies Press, 1992), 243, <https://www.nap.edu/read/1578/chapter/16>

<sup>5</sup> Claude S. Fischer, “On Urban Alienations and Anomie: Powerlessness and Social Isolation,” *American Sociology Review* 38, no. 3 (June 1973): 311, <https://www.jstor.org/stable/2094355>

<sup>6</sup> G. Anderson, “Loneliness among Older Adults: A National Survey of Adults 45+,” *American Association of Retired Persons*, (2010).

<sup>7</sup> Ami Rokach, Tricia Orzeck, and Janice Cripps, “The Effects of Culture on the Meaning of Loneliness,” *Social Indicators Research* 53, no. 1 (Jan. 2001): 19, <https://www.jstor.org/stable/27526905>

pointed out the impact of mobility. North American people who lived in mega cities had high mobility rates, leading to a stronger dependence on computers and the internet to connect with loved ones. In contrast, Croatia had more infrequent mobility, and geographical distances between close friends and relatives are small and walkable.<sup>8</sup>

Another survey by Tigges et al. (2008) analyzes how race, social class, and neighborhood results in social isolation and loneliness between African Americans and Caucasians in Atlanta, Georgia. Lower class neighborhoods lack many of the amenities that upper-class neighborhoods can maintain and afford. Without these amenities, these neighborhoods become less appealing on the real-estate market, and in turn, causes an increase in housing vacancies. The disparity of people moving out and moving in creates an anti-social environment where lower class individuals lose social connections that also serve as opportunities to know about mainstream American society.<sup>9</sup>

Humans are social, and city builders and philosophers since ancient times have recognized the need for face-to-face meetings, interaction, and communication among communities. Yet today, conventional land-use zoning disperses people and strips social life from the landscape.<sup>10</sup> It focuses more on performance metrics, such as land-use and private property, and rarely on social connectedness, which is harder to reduce to a metric. Humans congregate in defined physical spaces, and having neighborhoods that take up one to three blocks create diverse program spaces that are comfortable

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<sup>8</sup> Rokach, Orzeck, and Cripps, "The Effects of Culture," 26-27.

<sup>9</sup> Leann M. Tigges, Irene Browne, and Gary P. Green, "Social Isolation of the Urban Poor: Race, Class, and Neighborhood Effects on Social Resources," *The Sociological Quarterly* 39, no. 1 (Winter, 1998): 53-54, <https://www.jstor.org/stable/4121011>

<sup>10</sup> Steve Price, "Loneliness, Urban Design, and Form-based Codes," *CNU*, October 20, 2016, <https://www.cnu.org/publicsquare/loneliness-urban-design-and-form-based-codes>

enough to get to know other people. These codes take away that diversity by labeling one block as strictly 'commercial', another one as 'residential', and so on, substituting what was once a diverse social place to an organized color-coded land-use map. The core of human nature is sociality, and if the built landscape deprives us of stimulation and isolates us, then it ushers in issues of poverty, health, and environmental degradation.

### **D.C's Urban Fabric and Conditions**

There is now a higher demand for walkable, vibrant neighborhoods with a mix of uses and access to transit. This demand is primarily being generated by the millennials, and older generations are slowly embracing this preference.<sup>11</sup> With limited housing and high demand, D.C land values are increasing so much that long-time residents can no longer afford to live in their neighborhoods.



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<sup>11</sup> Global Site Plans, "The Economics of Gentrification in Washington D.C.," *Smart Cities Dive*, <https://www.smartcitiesdive.com/ex/sustainablecitiescollective/economics-gentrification-washington-dc/232701/>

**Fig. 1.1:** 1968 Riots in Washington D.C after MLK’s Assassination (Source: Warren K. Leffler)

### **The 1968 Riots and Issues of Gentrification**

In 1968, the assassination of Martin Luther King Jr. sparked four days of riots in at least 110 cities, with Washington D.C, Chicago, and Baltimore among the most affected. Thousands of army soldiers, marines, and even the National Guard were required to quell the violence, and by the end of it all, at least 39 people died, 2,600 injured, and 21,000 arrested. The riots consumed 14<sup>th</sup> Street NW, U Street NW, H Street NE, 7<sup>th</sup> Street NW, downtown areas, and parts of Historic Anacostia.<sup>12</sup> Damages were estimated at 65 million dollars – which is roughly 385 million dollars today.<sup>13</sup>

After the 1968 riots ended, there was a desperate need for urban reform in many of D.C.’s Neighborhoods. Economic urbanists seized the opportunity to introduce new types of housing and amenities into the area, which unintentionally sparked a wave of gentrification. Gentrification is a prevailing issue in DC, with the process specifically replacing long-time black residents with newer, wealthier white residents. This change is most visually prominent in neighborhoods like Shaw, which had been nearly entirely black in the postwar era.<sup>14</sup> As shown in Fig. 1.2 below, only blacks have decreased in number compared to other ethnic minorities:

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<sup>12</sup> John Muller, “The Legacy of DC’s 1968 Riots,” *Greater Greater Washington*, April 8, 2011, <https://ggwash.org/view/8938/43-years-ago-today-dc-stopped-burning>

<sup>13</sup> “The legacy of the 1968 riots,” *The Guardian*, April 4, 2008, <https://www.theguardian.com/commentisfree/2008/apr/04/thelegacyofthe1968riots>

<sup>14</sup> Alex Baca and Nick Finio, “Gentrification in DC is not just a Black and White Issue,” *Greater Greater Washington*, September 6, 2018, <https://ggwash.org/view/68933/gentrification-in-dc-is-not-just-a-black-and-white-issue>

**Washington DC population counts by race and ethnicity, 1980 to 2011-2015**

	white	minority (non-white)	total	black	hispanic	asian	foreign born
<b>1980</b>	164,243	474,090	<b>638,333</b>	445,154	17,680	6,638	40,560
<b>1990</b>	166,124	440,761	<b>606,884</b>	395,207	32,708	10,733	58,888
<b>2000</b>	159,178	412,881	<b>572,059</b>	346,085	44,955	17,122	73,559
<b>2010</b>	194,908	389,492	<b>584,400</b>	305,426	51,302	20,522	76,057
<b>2011-2015</b>	230,487	416,997	<b>647,484</b>	310,678	65,801	23,495	91,588

**Fig.1.2:** Growth of Different Ethnic Minority Groups compared to Whites (Source: Eli Knaap)

From 1980 to 2015, there has been a steady decrease in blacks living in Washington D.C. Meanwhile, other minority groups – Hispanics, Asians, and Foreign born – have increased: Hispanic and Asian residents went up by 17,000 between 1980 and 2000. During that time period, Washington D.C’s status as an “international city” has gained momentum. This is shown clearly by the high increase in foreign-born residents: by 2015, 14% of DC’s population was born in a different country, more than doubling the 6% in 1980.<sup>15</sup>

**Urban Design Solutions**

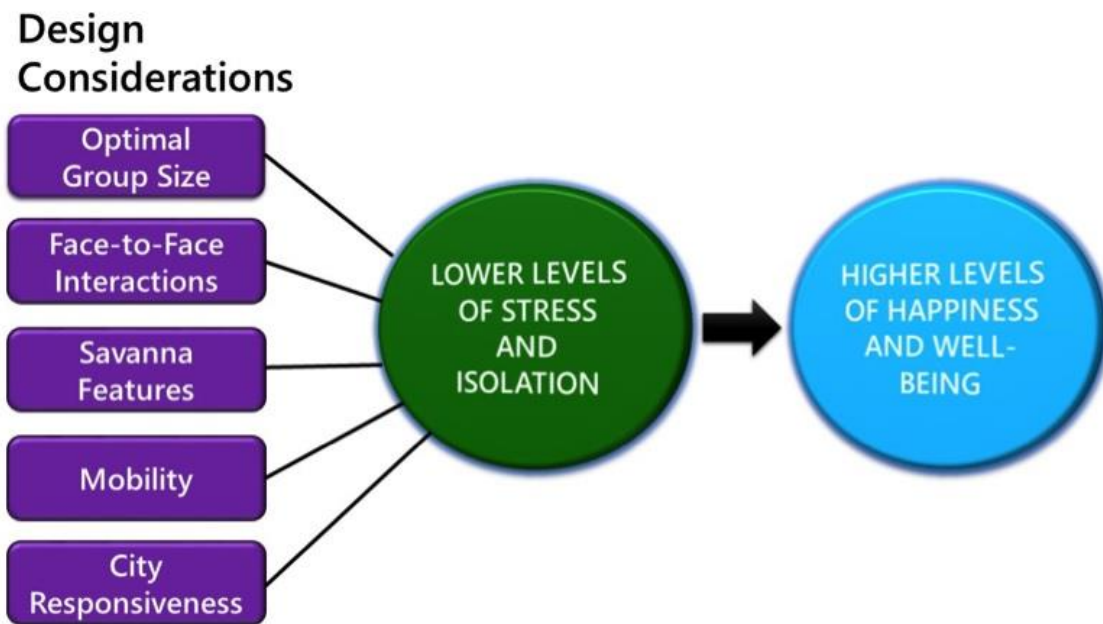
In an attempt to find alternative urban designs that minimize risk factors associated with mental health issues, Kevin Bennett, Tyler Gualtieri, and Becky Kazmierczyk from Penn State University approached this problem by comparing urban isolation to a prison. Historically, prison architecture feature designs with intentions to

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<sup>15</sup> Baca and Finio, “Gentrification in Washington.”

reduce contact between inmates for criminal activity, and solitary confinement is still a very common form of punishment for prisoner disobedience.<sup>16</sup>

They came up with five different design considerations (seen in Fig. 1.3) that aim to lower stress and isolation: optimal group size, face-to-face interactions, savanna features, mobility, and city responsiveness.



**Fig. 1.3:** Model of Urban Design Recommendations aimed to minimize mental health issues. (Source: Bennett, Gualtieri, and Kazmierczyk)

Optimal group size refers to how many people our brains can keep track of and are comfortable enough to be around, with 150 people being the optimal number. This size is referred to as Dunbar's Number, first coined by British Anthropologist Robin

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<sup>16</sup> Kevin Bennett, Tyler Gualtieri, and Becky Kazmierczyk, "Undoing Solitary Urban Design: A Review of Risk Factors and Mental Health Outcomes Associated with Living in Social Isolation," *Journal of Urban Design and Mental Health* 4, no. 7 (2018), <https://www.urbandesignmentalhealth.com/journal-4---solitary-urban-design.html>

Dunbar, who found a correlation between primate brain size and average social group size.<sup>17</sup> By reaching this desirable group size, we are more likely to stay true to our character- for example, acting like an extrovert in front of a crowd when one is really an introvert who prefers quieter spaces. This poses a problem to people living in major cities that have millions of occupants. The second consideration, face-to-face interactions, addresses the issue of relying too much on digital and social media to create and renew our social ties when in reality, it makes a poor substitute for satisfying our innate need to connect with others.

The “Savanna features” focuses on the relationship between stress and uncultivated outdoor settings. Researchers have discovered that passively viewing vegetation can improve work performance, induce positive moods, reduce stress, and diminish perceptions of pain in health care settings (Kellert, Heewagen, Mador, 2008).

Currently, walkable urban neighborhoods are in high demand. Americans’ housing preferences have shifted from auto-oriented suburbs to denser, more diverse neighborhoods in either large cities or transit-oriented villages. In a recent survey from the Urban Land Institute, 50 percent of people said that walkability is either the top or a high priority in deciding where they want to live.<sup>18</sup> These statistics are also reflected in real estate: while there is a growing shortage of multi-family housing, single-family homes are estimated to exceed future demand for at least the next 25 years. Instead of residential space, younger generations, particularly millennials, are attracted by the

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<sup>17</sup> Robin Dunbar, “Is there a Limit to How Many Friends We Can Have?”, *NPR*, January 13, 2017, <https://www.npr.org/2017/01/13/509358157/is-there-a-limit-to-how-many-friends-we-can-have>

<sup>18</sup> RPA, “Americans Want Walkable Neighborhoods,” *Strong Towns*, February 23, 2016, <https://www.strongtowns.org/journal/2016/2/12/americans-want-walkable-neighborhoods>

convenient mixed-use amenities and local transit systems. Providing ways for people to exercise during commutes, errands, and socializing can improve both physical and mental health. Some design consideration includes widening pathways and making them safe.

Unlike the other four categories, city responsiveness looks more to the future of cities. Just like how our cars provide GPS maps to tell us where to go, city responsiveness is about 'smart' or 'conscious' cities that can pinpoint urban issues in specific areas: locating areas of social isolation and where to increase work efficiency through advance technology. As our technology advances, then the city should also advance through using this new technology.

## **Chapter 2: Millennials, the Most Stressed Out Labor Force**

This chapter explores the lifestyles of millennials, who make up the largest generation in the U.S labor force since 2016. This chapter will first focus on who the millennials are and what makes their demographic unique from previous generations by examining the impact of the Internet, historic defining moments that occurred during the late 20<sup>th</sup> century, and general characteristics that emerge from educational and workplace environments. These characteristics will be cross-examined with how older generations perceive millennials and common social stigmas made about millennials. Finally, this thesis will explore how millennial culture, ideal expectations, and outsider perceptions have caused many millennials to become stressed work martyrs.<sup>19</sup>

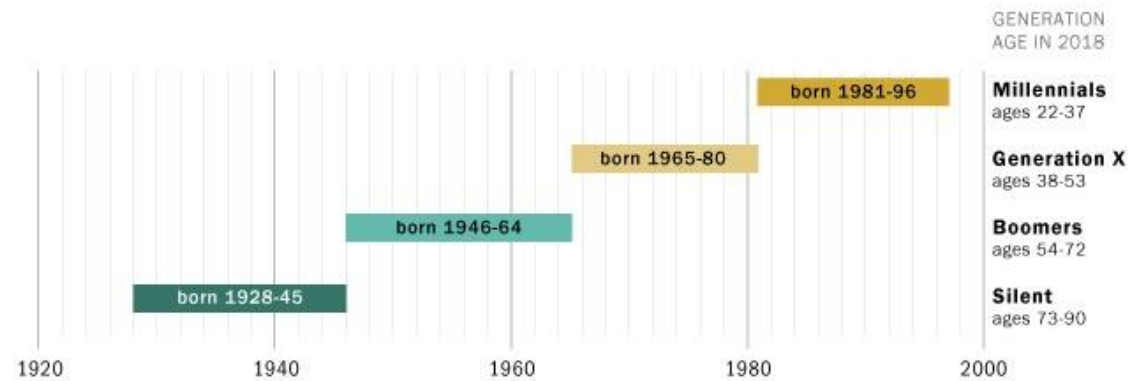
### **Who are the Millennials?**

Millennials, also known as Generation Y, are born between 1981 and 1996- the oldest in their late-thirties and the youngest in their early twenties (see Fig. 2.0). Originally, the cutoff age was set later to 2000, but it was changed to 1996 to mark a generation that is old enough to experience and comprehend 9/11, while also finding their way through the 2008 recession as young adults. Michael Dimock, President of the Pew Research Center, points out how technology also plays a role in the dividing lines between generations: Baby Boomers saw the TV as the dominant, Generation X experienced the computer

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<sup>19</sup> Rachel Dresdale, "Millennials, Stop Being Work Martyrs And Learn to Say 'No'," *Forbes*, Nov. 29, 2016

revolution, and Millennials grew up in an age where the internet became a way of life.<sup>20</sup>



Pew Research Center reports and data on the Millennial generation, those born between 1981 and 1996 and the first generation to come of age in the new millennium.

**Fig. 2.0:** Generation Cut-Off Years (Source: Pew Research Center)

## Cultural and Technological Impact

Between 1990 and 2000, the Internet has evolved into the World Wide Web, causing the economy to rapidly expand like never before. By 2002, the Internet reached over 800 million users worldwide.<sup>21</sup> These technological evolutions introduced unprecedented changes to the demographic makeup of the American population and it is what separates Millennials from the Gen X and Baby Boomers. Millennials grew up in the digital era, where any information they find can be accessed anywhere and anytime. They are comfortable around technology, and thanks to the Internet, they are more politically active due to how

<sup>20</sup> Jay Serafino, "New Guidelines Redefine Birth Years for Millennials, Gen-X, and 'Post Millennials,'" *Mental Floss*, March 1, 2018

<sup>21</sup> Claudia Rawlins, Julie Indvik, Pamela R. Johnson. "Understanding the New Generation: What the Millennial Cohort Absolutely, Positively Must Have At Work," *Journal of Organizational Culture, Communications, and Conflict* 12, no. 2 (2008): 1-2.

easy it is to know of current national and international issues from a few clicks on their laptops and iPhones.

Table 1: A description of generations

Generations	Birth years	Core Values	Defining Moments
Matures	1922-1943	Dedication, hard work, respect for authority	The Great Depression, the Second World War, Lindbergh, FDR
Baby Boomers	1944-1960	Optimism, personal gratification and growth	JFK, civil rights and women's movements
Generation X	1961-1980	Diversity, technoliteracy, fun, informality	The Challenger incident, AIDS, Rodney King
Millennials	1981 – 2000	Optimism, civic duty, confidence, achievement	Terrorism, Oklahoma City bombing, computers

**Fig. 2.1:** Generational Core Values. (Source: Scott Rood)

In an educational setting, teachers and professors alike are adapting to new teaching strategies to accommodate the millennial generation. Christy Price, a professor at Dalton State College, asks what her millennial students believe their ideal instructor should be like and what kind of learning environment would be the most engaging. The surveys revealed that millennial students preferred teachers who were techno-savvy, relevant, humorous, and relatable.<sup>22</sup> Generally, unlike Baby Boomers who grew up accepting the chain of command readily, millennials are resistant to authoritative power structures without rationale.<sup>23</sup> They prefer instructors who are more ‘down-to-earth’ and ‘informal’ because those traits are identifiable to their culture. Millennials want to be able to approach their instructors for feedback and develop a more personal relationship

<sup>22</sup> Christy Price, “Why Don’t My Students Think I’m Groovy? The New “R’s” for Engaging Millennial Learners,” *Essays from E-xcellence in Teaching* 9, (2010): 30-31.

<sup>23</sup> Christy Price, “Why Don’t My Students,” 33.

with them without worrying over rigid policies. Thus, instructors who are positive, open-minded, responsive to concerns, and possess a touch of humor, garner more appreciation and trust from millennials than instructors who are strict, uptight, and intimidating.

These ideal traits are also reflective of what makes an ideal teaching environment. Millennials are noticeably more inclined to a wide range of different teaching formats, such as discussion and group activities, that help students get to know each other rather than always sitting through the traditional lecture. One of the reasons for this preference is that millennials find it difficult to focus and absorb the information when active participation is not required. Living in the Information Age and an Internet-saturated society has molded millennials into active learners who are constantly taking in all the information that is thrown at them. They learn to filter out all the needless fluff and only concentrate on what is personal and relevant to them. If instructors strive to be approachable and up to date with current trends and technology, then their millennial students will be engaged with the content.

A millennial's ideal learning environment can also be translated to what makes their ideal work environment. Claudia Rawlins, a professor at the University of California, conducted a study to analyze what millennial students expect from their jobs upon graduation. A total of 382 students in 12 different

disciplines were surveyed. Only 356 surveys were usable, with nearly 60 percent of them being male respondents.<sup>24</sup>

When millennials are asked about what is a non-negotiable essential to their job, a majority of respondents expected more than just a paycheck. The table below (Fig. 2.2) is a comparison between the *Time* 2005 survey by Lev Grossman and the survey conducted by Rawlins of young adults in the US in 2007:

Table 2: Essential Considerations for Young Adults in Job Seeking		
Factor	<i>Time</i> 2005 Study	Non-negotiable 2007 Study
Job Security	71%	4%
Health benefits	63%	57%
Interesting work	60%	23% (combination of factors)
Good salary	56%	73%

**Fig. 2.2:** Comparison of what millennials find essential in a job. (Source: Rawlins)

While only 4 percent of the respondents in Rawlins’ survey mentioned job security specifically, there were a number of other interrelated factors mentioned. Some of these factors are companies who have “been successful long-term” and “a growing company or market” were mentioned by an additional eight percent of respondents.

Other reasons and values behind these statistics are unveiled in another study conducted by Robert Wendover (2004).<sup>25</sup> Similar to what the students expect from their professors, millennial workers expect their ideal employers to

<sup>24</sup> Rawlins, Indvik, and Johnson, “Understanding the New Generation,” 3-4.

<sup>25</sup> Rawlins, Indvik, and Johnson, “Understanding the New Generation,” 5-6

provide them a similar atmosphere. These expectations include flexible work hours, sick days with pay, 'fun-work' culture, laid-back management and coworkers, opportunities for diverse tasks and growth, teamwork, and duties that would allow them to interact with others. Just as they dislike the repetitive lecture-only format, millennials are highly unlikely to accept jobs that require them to work at a desk all day, doing monotonous work that makes their job "just a job". Many also expect to have medical insurance and retirement benefits as a non-negotiable, and when it came to commute length and where they live, the expectations were more realistic. Around 65 percent of respondents placed more emphasis on where they live rather than what they do, stating that they will "look for the best job in the place they would like to live" rather than letting the job dictate their living conditions.

Out of all these expectations, the most frequent one is the opportunities for training and growth. Rather than training to do better at what they are given, however, most millennials equate growth and training opportunities as "promotional opportunities" that are based on merit than tenure (as seen in Fig. 2.3).<sup>26</sup> It is under a general assumption that many millennials expect to be given a managerial position once they finish college, and are surprised that they have to work from the ground up. They also desire to jobs that provide meaning. They want to be involved in finding solutions to things they believed can be improved

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<sup>26</sup> Rawlins, Indvik, and Johnson, "Understanding the New Generation," 5

be the ones that “make a difference” and be “relevant” to society. Gaining a manager position is the first step towards that ideal goal.

Values	Older workers	Younger workers
Career	Company’s responsibility	Employee’s responsibility
Promotion	Tenure	Merit
Retention	Security	Growth
Management Style	Paternalistic	Peer
Organizational Chart	Admire	Ignore
Changing Jobs	Fear	Advancement

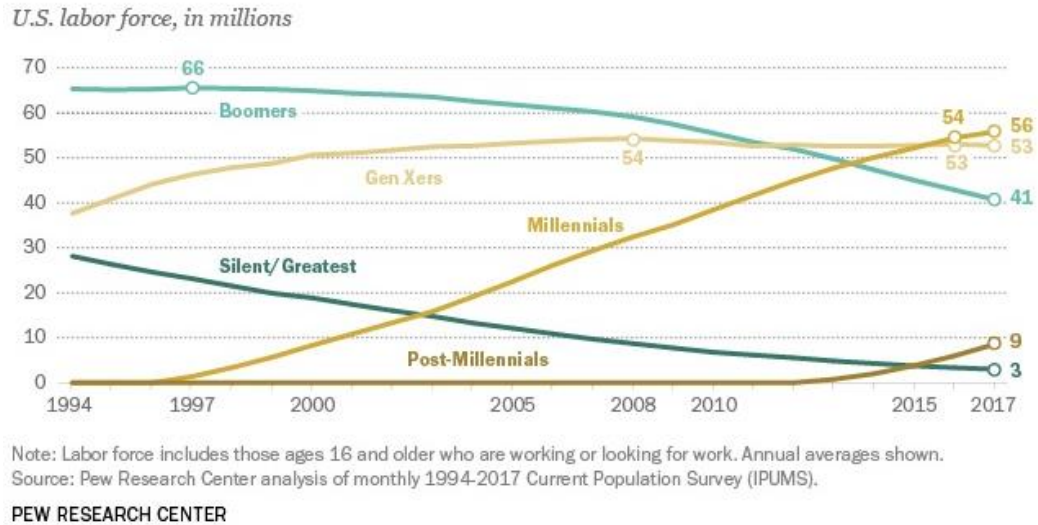
**Fig. 2.3:** Generational workplace values comparison (Source: Scott Rood)

### Perceptions and Stigmas

Currently, millennials (born between 1981 and 1996) are either in the workforce or pursuing a post-secondary education. Pew Research reports that “more than one-in-three American workers today are Millennials”. As seen in Fig. 2.4 below, Millennials have overtaken the Baby Boomers and even Generation X, as the nation’s largest living adult generation.<sup>27</sup> Employers would need to meet these demands in order to attract the best and brightest.

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<sup>27</sup> Richard Fry, “Millennials projected to overtake Baby Boomers as America’s largest generation,” *Pew Research Center*, April 25, 2016, <http://www.pewresearch.org/fact-tank/2018/03/01/millennials-overtake-baby-boomers/>



**Fig. 2.4:** Millennials as the Largest U.S Work Force (Source: Pew Research Center)

However, these high expectations run both ways, and it is not just the employers who are struggling to reach them. For Millennials, their entire generation and identity is stigmatized due to stereotypes associated with their age.<sup>28</sup> They are accused of being entitled and lazy while also assumed to be able to be technological know-it-alls. They are expected to perform better and faster because of the many privileges that come naturally from living in a digital era, such as adapting to new software and finding great amounts of resources in a shorter amount of time than their older coworkers. Millennials are poor money managers: spending everything on instant gratification rather than long-term deposits like housing and retirement.<sup>29</sup>

<sup>28</sup> Abigail Noel Kingsford, "They Work Hard for Their Money: A Narrative Analysis of Millennial Workforce Entry." (Thesis, University of Kansas, Lawrence, 2017), 7, KU ScholarWorks.

<sup>29</sup> Tiffanie Wen, "The unfair stigma surrounding millennials and their money," *BBC*, December 7, 2017, <http://www.bbc.com/capital/story/20171207-the-unfair-stigma-surrounding-millennials-and-their-money>

A more unknown trend among millennials is that roughly two-thirds of the millennial generation lack a post-secondary educational degree. According to the Pew Research Center (2014), earning a four-year degree is costlier for Millennials than any previous generation, and full-time workers with a four-year degree earn \$17,500 more annually than someone with a high school diploma. The wage gap between these different educational statuses has grown significantly, and it gets even harder for high school graduates to obtain a middle-class income.<sup>30</sup>

These generational stigmas, high expectations (from themselves and their employers), as well as financial burdens most millennial workers face on a daily basis are some of the reasons why millennials are the most stressed out generation. 76 percent of all millennials report that work is one of their biggest causes of stress.<sup>31</sup> Another survey from the Mental Health Foundation (MHF) also came to similar conclusions. After surveying 4,500 people, they discover that 27 percent of millennials state that stress interfered with their work, compared to 12 percent from Baby Boomers. About a third of millennials (34%) also felt that stress made them less productive, while only 19% of their older colleagues felt the same. The MHF believes that the underlying reason why millennials feel so stressed is because of increasingly insecure job prospects and overwhelming workloads upon entry. Similar to their older colleagues, millennials

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<sup>30</sup> Abigail Noel Kingsford, "They Work Hard," 3.

<sup>31</sup> Arianna Huffington, "Millennials Come of Age as America's Most Stressed Generation," Huffington Post, August 20, 2014, [https://www.huffpost.com/entry/millennials-stress\\_b\\_2718986](https://www.huffpost.com/entry/millennials-stress_b_2718986)

tend to keep quiet about their stress and anxieties, rather than approach their managers about the issue.<sup>32</sup>

### **Work Martyrdom and Why Millennials are Fine with It**

Despite experiencing less certain stressors by the older generations – kids, mortgages, and aging parents – millennials make up the majority due to a disproportionate percentage of them being “work martyrs”.<sup>33</sup> Work martyrs are individuals who willingly work 24/7 and are afraid to take breaks or go on vacation. Some key areas that give these stressed employees major headaches include unreasonable workloads and deadlines (cited by 33% of respondents), unrealistic managers (22%), and unattainable work-life balance (22%).

In a Forbes survey investigating why many millennials are work martyrs, there were two common themes found to explain this motivation:<sup>34</sup>

1. “No one else at my company can do the work while I am away.”
2. “I want to show complete dedication to my company and job.”

Millennials, who make up most of today’s work force, are the best at what they do when it involves technology. They take a shorter amount of time to adapt and train, compared to a Gen X or Baby Boomer worker, whenever firms implement

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<sup>32</sup> Sarah Young, “Mental Health Awareness Week 2018: Millennials Feel More Stressed in the Workplace than Older Colleagues, Study Finds,” *Independent*, May 2018, <https://www.independent.co.uk/life-style/millennials-stress-workplace-higher-baby-boomers-mental-health-awareness-week-2018-a8350631.html>

<sup>33</sup> Amelia Edelman, “Surprise: Millennials are Seriously Stressed, Says Science,” *Refinery29*, February 6, 2017, <https://www.refinery29.com/en-us/2017/02/139598/millennials-work-stress>

<sup>34</sup> Sarah Landrum, “Millennials are More Likely to Identify as Work Martyrs and Here’s Why,” *Forbes*, December 15, 2017, <https://www.forbes.com/sites/sarahlandrum/2017/12/15/millennials-are-more-likely-to-identify-as-work-martyrs-and-heres-why/#1ccd84562904>

new software. From a productivity standpoint, it makes sense for employers to have millennials specialize their talents, and millennials accept these duties willingly. Millennials have a fear of job insecurity, so having employers rely on them for a task only they can do, no matter how unrealistic, helps to relieve this fear and pushes them to work harder.

For the second response, millennials are strong supporters of merit-based systems. They believe in achieving their dreams through hard work and dedication, and this belief is enforced even more due to the generational stigma of millennials being 'lazy' and 'entitled'. Millennials are not afraid of challenges and trying to appease and prove their older colleagues wrong is another reason why they choose to become work martyrs.<sup>35</sup>

### **Creating a Work-Life Balance Through Space**

From a psychological point of view, the first thing millennials need to learn is how to say no.<sup>36</sup> Claire Karjalainen, a reformed office martyr, shares how she used to be the one to take on all the projects, have an endless to-do-list, and stay up late past work hours. She urges other work martyrs to first adjust their attitudes – using hard-work as a type of acceptance and security instead of trying to separate themselves from their job, learn to say no, embrace downtime (taking breaks does not mean 'slacking off'), and learn how to delegate – teach and trust others to do your tasks and give them opportunities to shine at work.

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<sup>35</sup> Sarah Landrum, "Millennials are More Likely"

<sup>36</sup> Claire Karjalainen, "A Reformed Office Martyr's Guide to Achieving Work-Life Balance," *Daily Muse*, 2018, <https://www.themuse.com/advice/a-reformed-office-martyrs-guide-to-achieving-worklife-balance>

Besides having a change in mentality, architecture can also play a role in designating spaces for breaks. For many of us, regardless of which generation we belong to, work is not just work – it is a place to meet people, to socialize, a source of identity, and even a second home for some.<sup>37</sup> Open office plans typically work well in creating spaces for face-to-face interactions, but it is also important to create another layer of private space within that public space for quiet and mental rejuvenation. This layering can be done using adjustable walls and moveable furniture. Maintaining good air quality and ventilation and providing outside views is essential for our wellbeing and productivity. These methods will be explained more in depth in the next chapter, which also discusses how our social behavior and habits play a role in generating work stress.

## **Conclusion**

Millennials, born from 1981 to 1996, are a generation that is molded by the advent of the Information Age and the internet. Millennials learn to use this technology to their advantage, allowing them to work faster and access knowledge more readily than any previous generation. Due to this access, they are more politically active and learn to filter out what information is interesting based on how rational and relatable the matter is. They also generally wish to experience various things they learned from the internet, opting for instant gratification rather than long-term investment in their spending habits.

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<sup>37</sup> “How Office Design Can Improve Work-Life Balance,” *Virgin*.  
<https://www.virgin.com/entrepreneur/how-office-design-can-improve-work-life-balance>

Modern technology has made daily life convenient, and this convenience translates into what makes up a Millennial's ideal work and learning environment. Just like how they pay more attention to relatable news, millennials seek to create personal relationships with those around them, opposing the rigid chain of authority for a more open and informal culture. By developing these relationships, millennial workers are more inclined to put in all their effort for the chance to grow, get promoted, and live a fulfilling life while believing their work will make the world a better place.

## **Chapter 3: Social Behavior and Environmental Influences**

### **Social Psychology and its Relationship with Architecture**

When we think of architecture, we do not immediately think about its relationship with social psychology. We instead think about art and design, and how these elements can enhance the building's features and programs. Then, we may think about the physics and engineering - how can the building should be put together and function on its own? What maintenance does it require? However, during these critical phases, architects also interpret how people would use these designed spaces and interact with them, and these considerations are what sets architecture apart from other design-oriented disciplines.

Social psychology is a study of how people's thoughts, feelings, and behaviors are influenced by the actual, imagined, or implied presence of others. It studies how human behavior is a result of interaction of mental states and social situations. Environmental psychology, another branch of social psychology, explores that interaction at a larger scale: it studies how humans interact in the physical environment, which includes architecture, nature, and the cultural context. In the backs of their minds, architects are constantly thinking about these social and environmental reactions.

This chapter will explore how people's social behaviors, specifically their extroversion or introversion, impact the people and architecture around them. Learning more about these social interactions will help generate reasons why millennial workers are so stressed. This chapter will also look at what kinds of

environmental factors influence work productivity at work and at home, and how architecture can become a solution.

### **Extroversion and Introversion**

As social creatures, we find out early on what kind of social behavior we have from our interactions with other people. Some of us like to speak what is on our mind and prefer going out with a large group of friends while others take time to process their thoughts before they speak, have only a few close friends, and prefer to stay in as much as possible. These two social extremes are categorized into two groups: extroversion and introversion. Extroversion is a state of or tendency to being concerned with and obtaining gratification from what is outside the self while introversion is a state of or tendency to be concerned with one's own mental life.<sup>38</sup> Carl Jung, a Swiss psychiatrist and contemporary of Sigmund Freud, first coined these personality types in 1961. After hearing a lecture by Freud's theory of the Oedipus complex and how our behaviors are caused by past, particularly childhood, experiences, Jung came up with his own behavior theory that expanded and contradicted Freud's, as seen in Figure 3.0 below.<sup>39</sup>

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<sup>38</sup> Arta Xhambazi, "Thinking Architecture through the Traits of Extroversion and Introversion," *International Journal of Contemporary Architecture* 2, No. 3 (2015): 11-24.

<sup>39</sup> Saul McLeod, "Carl Jung," *Simply Psychology*, 2014, <https://www.simplypsychology.org/carl-jung.html>

Assumption	Jung	Freud
<b>Nature and purpose of the libido.</b>	A generalize source of psychic energy motivating a range of behaviors.	A source of psychic energy specific to sexual gratification.
<b>Nature of the unconscious.</b>	A storehouse of repressed memories specific to the individual and our ancestral past.	A storehouse for unacceptable repressed desires specific to the individual.
<b>Cause of behavior.</b>	Past experiences in addition to future aspiration.	Past experiences, particularly in childhood.

**Fig. 3.0:** Differences between Carl Jung and Sigmund Freud.

(Source: McLeod)

While Carl Jung’s theories overall were not as well-known as Freud’s, his research on what made a person an extrovert or an introvert gained significant impact. He is the first to distinguish that our major attitudes or personality orientations are based on four basic functions: thinking, feeling, sensing, and intuiting.<sup>40</sup> His research findings today make up the origins of the Myers-Briggs test, with the addition of the last pair, judging and perceiving, and its foundation dedicated to learning more about these psychological types.

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<sup>40</sup> Saul McLeod, “Carl Jung.”

## **Susan Cain and the Extroverted World**

While it is generally known and accepted that there are two different types of social behaviors, not many are aware that we live in a society that structurally favors one over the other.

In 2012, Susan Cain, a former lawyer and author of *Quiet: The Power of Introverts in a World that Can't Stop Talking*, did a TED talk advocating the virtues of solitude-seeking people. She states that at least a third to a half of the whole population are introverts, and validates how this group has been consistently oppressed and looked over in a society that favors the more outspoken extrovert: education systems favor large and open classrooms just as businesses favor open floor plans to facilitate group interactions. Participation is measured by how often a person speaks and shares their thoughts in these institutions, and if it measures poorly, the person can risk losing a promotion and opportunity.

During her TED talk, Cain also quotes Carl Jung on how no one is characterized by a single personality type. Her argument is not about how one personality type is better than other, but that our society (and architecture) needs to consider both groups equally. Extroverts also need a space to rewind and reflect on their own, and if that space is not provided in those open floor office plans, it can be detrimental to a firm's progress.

In a separate interview, Cain states how group interactions are there to facilitate collective brainstorming. She argues that brainstorming as a group is

not as productive in creating ideas as brainstorming alone.<sup>41</sup> If businesses want to prioritize ideas and creativity, then there needs to be more freedom, autonomy, and privacy for individuals to reflect. This problem can first be solved through architecture.

### **Architecture and Social Behavior**

Just like social behavior, architecture can also be extroverted and introverted, and these distinctions are vital in creating spaces that are suitable for everyone. Large public spaces, such as assembly rooms, grand lobbies, maker spaces, and malls, would be considered extroverted because they encourage group interaction. Private spaces, such as study rooms, yoga rooms, and gardens, are introverted because they encourage reflection, solitude, and quiet relaxation.

Until recently, our society and economy has been geared towards extroverts, and architecture has developed and changed to reach its demands. In our major institutions, in the classroom and workplace, there is a call for more collaboration, interaction, and conversation. There are more open spaces than closed spaces to support an extrovert's need for stimulation.<sup>42</sup> While interaction and collaboration is not necessarily a bad thing to endorse, having an excess amount of these activities can be very draining both physically and mentally for everyone, regardless of what kind of social behavior they possess. This balance between what is public and what is private should reflect in the building's design

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<sup>41</sup> Ian Tucker, "Susan Cain: Society has a Cultural Bias Towards Extroverts," *The Guardian*, March 31, 2012, <https://www.theguardian.com/technology/2012/apr/01/susan-cain-extrovert-introvert-interview>

<sup>42</sup> Vanessa Quirk, "In Defense of Introverts," *ArchDaily*, March 9, 2012. <https://www.archdaily.com/215055/in-defense-of-introverts>

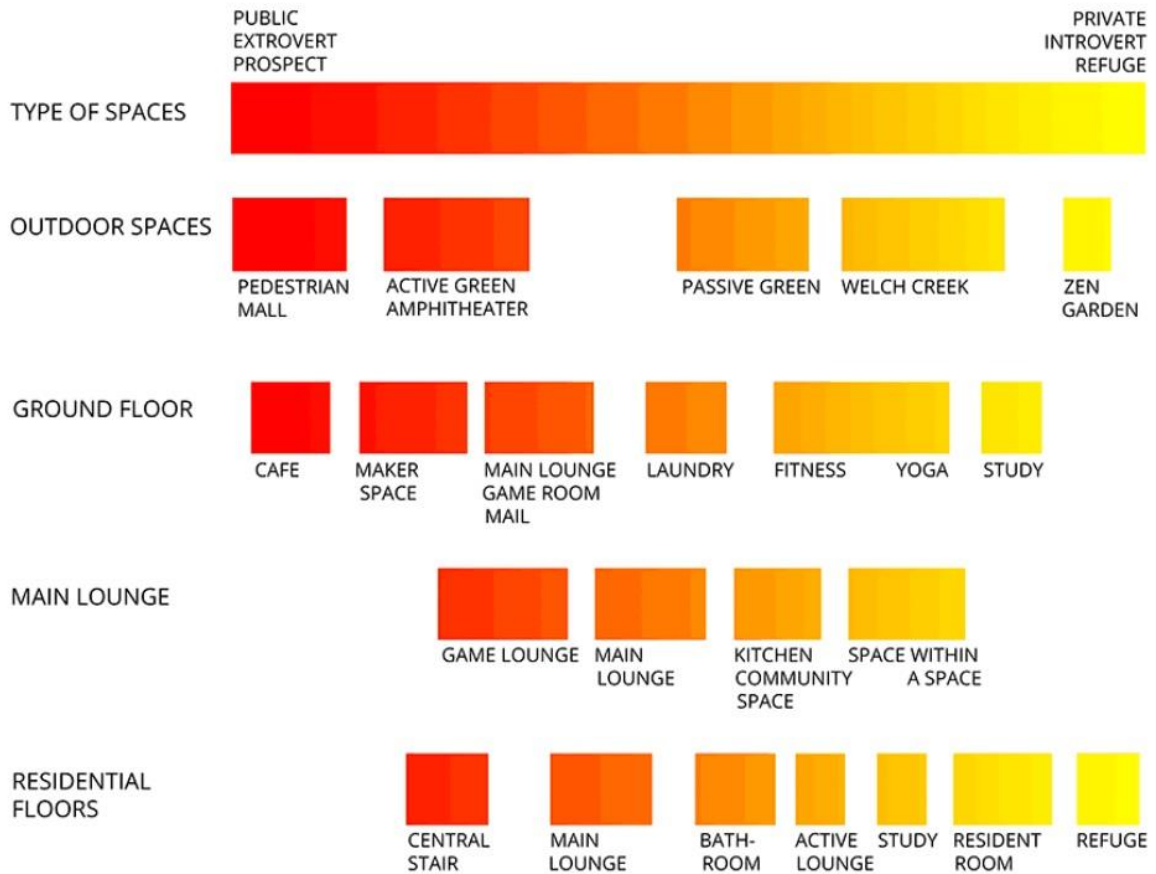
and the spaces generated from them. Architecture is supposed to be for everyone, but unfortunately, that criteria is only met halfway.

In light of Susan Cain's best-selling novel and viral TED talk, many others who share similar experiences have started to speak out and shed light on this issue of society favoring extroversion. Vanessa Quirk, in one of her Arch Daily articles, challenges the conventional classroom approach of open floor plans and advocates for introverted elements like adjustable walls and technology as a medium for group work.<sup>43</sup>

For architects, this growing awareness of what makes an extroverted or introverted space, and how there is a disproportional ratio between the two, has created a new perspective on how to approach design. In 2018, NAC Architecture partnered with Anderson Mason Dale Architects and designed a new residential hall for the Colorado School of Mines. The design goal of this project is to create living and learning spaces that introverts and extroverts can enjoy (Veen and Bentley, NAC). In Figure 3.1 below, NAC Architecture developed a graphic scale to represent a mix of spaces ranging from public or extroverted space to private or introverted spaces. Both firms have decided to take Susan Cain's claim of "institutions are designed mostly for extroverts' need for stimulation" as a design challenge.

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<sup>43</sup> Vanessa Quirk, "In Defense of Introverts"



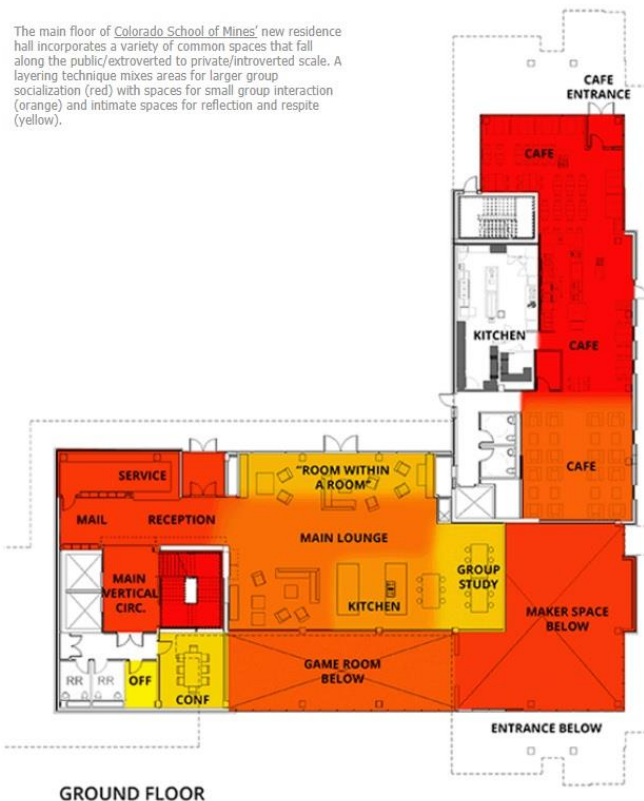
**Fig. 3.1:** Graphic Scale of Programs based on Introversion/Extroversion

(Source: NAC Architecture)

During early schematic phases, NAC Architecture and Anderson Mason Dale Architects dived deep into the Mines' campus culture in Colorado through student interviews and research. They wanted to know what an extroverted and introverted student would want and need on campus. Their findings discovered that there is a high percentage of students that fall between the extroversion and

introversion spectrum, and those who are more introverted are socially pressured to act more extroverted out of fear of coming across as antisocial or unfriendly.<sup>44</sup>

In attempting to create a layered design of public and private spaces, the decision to use biophilic design principles was a must to create a connection to nature; a place for students to observe and retreat. Smaller, protected spaces of refuge are contained within larger, open public spaces to achieve that wide program spectrum and experience. Students can be in intimate spaces without sacrificing their sense of connection and belonging to a larger group. This “room within a room” approach is based on their graphic scale (shown in Figure 3.2) and it has allowed shy and introverted students “feel at home.”



<sup>44</sup> Ron ver der Veen and Jason Bentley, “Designing on a Scale: Creating Living/Learning Spaces that Both Introverts and Extroverts Enjoy,” NAC Architecture.  
<https://www.nacarchitecture.com/NACLab/introverts-extroverts.aspx>

**Fig. 3.2:** Ground Floor of Colorado School of Mines' Residential Hall

(Source: NAC Architecture)

**Environmental Influences and Dichotomies**

As architects, we strive to create compelling and holistic designs that can either fit or change the environment we live in. We take into account different environmental influences such as landscape, sound, and existing activity so that the final design is not only accepted, but also demonstrates our respect to future users. Similarly, there is a multitude of environmental factors that influence how we live and work, and from these influences, we generate unique social habits. The following dichotomies: order and disorder and silence and noise will help determine how these influences impact people in their daily life.

**Order v. Disorder**

How a person manages their personal spaces can often be very telling of their personality and who they are. Are their work spaces always neat and tidy? Are their spaces always disorganized and filled with messy papers and food crumbs? Or do their personal spaces switch back and forth between these two extremes? Order and disorder refers to how we manage our personal spaces at work and at home, and how our society and own psychology perceives these conditions.

In the professional world, it is commonly encouraged to always keep our work spaces clean. It demonstrates a degree of competence, respect, and courtesy from the user, especially if that space is shared. Clients are also more likely to hire a firm whose work environment is orderly because it is seen as

'controlled' and 'competent'. In our homes, however, there is more leeway: our homes are where we express our identities and beliefs, and whether that expression is done in an orderly or disorderly manner is up to us. Despite this freedom, however, order is often preferred when we expect guests. Just like how clients perceive an orderly firm as 'competent', guests would expect the same degree of competence and social control from their hosts.

This orderly conduct and its overall perceptions is reminiscent of the Broken Windows theory, which states that if small acts of crime are left alone, then it will inevitably lead to more crime. In the same way, if disorderly conduct is left unpunished, then that disorder will continue while escalating.<sup>45</sup> There is a general fear towards disorder because of its unpredictable and lawless nature. In contrast, order is perceived with positive connotations. In society, order meant safety,

When there is order present, however, our minds are more likely to focus, stay productive, and keep our spaces clean and tidy.

However, this theory poses unexplained challenges, and scientists have begun to question it. Having order all the time is not necessarily advantageous. While an orderly environment may lead to less crime and good actions, disorder can also encourage people to break out of the norm and pursue fresh insight.<sup>46</sup> In schools of design, process drawings are always 'messy', 'ugly', and 'chaotic'.

Students are encouraged to create these less than orderly drawings so that they

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<sup>45</sup> Adam J. McKee, "Broken Windows Theory," *Encyclopedia Britannica*, <https://www.britannica.com/topic/broken-windows-theory>

<sup>46</sup> Wray Herbert, "What a Mess: Chaos and Creativity," APS, February 20, 2013, <https://www.psychologicalscience.org/news/were-only-human/what-a-mess-chaos-and-creativity.html>

can showcase their creative thinking and thought process. Messiness depicts a break from convention, and creativity is more likely to occur when it is not bound by rules.

### **Silence v. Noise**

In our world today, silence is a rare commodity. We hear sirens and vehicular engines running outside, the ticking of a watch, the humming of a fan, and the buzzing of our computer monitors all the time that we have become accustomed to living a daily life filled with noise. Some people have even adjusted to working productively only when there is noise involved, such as listening to the radio or turning up the music on their iPhones during work hours.

But how much noise is too much? One study found out that a little bit of ambient noise (between 50 and 70 decibels – the average noise level in a coffee shop) slightly disrupts the mental process. A higher level of noise, around 80 decibels – a garage truck or dishwasher- becomes so disruptive that it becomes hard to think at all.<sup>47</sup> Another study looked at children who went to a school located near the Munich airport before the airport was relocated. Researchers found that students attending that school performed worse on long-term memory and reading comprehension tests when the airport was near the school, and that these scores improved after the airport's relocation.<sup>48</sup>

General daily noises can also prove detrimental to our work ethic. While open-plan spaces are great for group interaction, it is also a source of daily noise

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<sup>47</sup> Cody C. Delistraty, "How Environment Can Boost Creativity," *The Atlantic*, September 19, 2014, <https://www.theatlantic.com/health/archive/2014/09/how-environment-can-boost-creativity/379486/>

<sup>48</sup> Belle Cooper, "The Power of Silence: Why You Need Less Noise for Work and Your Health," *Zapier*, February 2, 2017, <https://zapier.com/blog/silence-health-productivity/>

that involves interruptions and distractions. Collaboration is important, but so is focus and the creativity that generates from silence.

### **Nature and its Restorative Properties**

As seen in this chapter's precedent, NAC Architecture knew they wanted to use biophilic design and create views to nature, so the introverted students can have a place to reflect and retreat. Just looking at nature helps us rewind and relax, but how does the sight of vegetation relieve our mentality?

Rachel and Stephen Kaplan, professors of psychology at the University of Michigan, approached this question by first defining what mental fatigue is before addressing how nature restores someone from these ailments.<sup>49</sup> They distinguish mental fatigue from stress, stating that the latter involves the preparation for an anticipated event seen as threatening or harmful. Running from a bear, for example, is a stressful event, but it does not necessarily cause mental fatigue.

Mental fatigue comes from our difficulty to focus. Paying attention to something that is uninteresting is burdensome, but if it is something interesting, then it takes no challenge at all. Rachel and Stephen Kaplan label these two circumstances as involuntary and voluntary attention, before changing voluntary to directed attention for clarification. They concluded that involuntary attention can 'sustain itself' because it does not require extra mental capacity. This self-sustainability balances out with directed attention, in which using it too frequently will not give us the chance to recover and cause us fatigue. Therefore, if a person is feeling the costs of using too much directed attention, then they would

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<sup>49</sup> Rachel Kaplan and Steven Kaplan, *The Experience of Nature: A Psychological Perspective* (New York: Cambridge University Press, 1989), 177

often act irritable, uncooperative, incompetent, and socially irresponsible. These symptoms can cause someone to become alienated from others and lose the support and protection they need from group members.<sup>50</sup>

The struggle to pay attention in cluttered and a confused environment will cause us to seek out a more 'restorative' place to inhabit. The reason why the wilderness fulfills that wish is because it exhibits four central aspects: being away, extent, fascination, and compatibility.<sup>51</sup> Being away provides us distinctiveness and a separation from our work day experiences. Extent refers to the scope of the setting and sense of relatedness. We feel like we are part of the larger context and get feeling of connectedness from gardens and natural settings. We exhibit a soft fascination with creatures that share the same planet as us: trees, animals, etc. and we can also be fascinated by growth, succession, predation, and survival and find them aesthetically pleasing. There is also a certain compatibility that Rachel and Stephen Kaplan found while interviewing people who like to 'experience nature'. Just like how disorder is presumably more beneficial to creative people, the lack of structure and order seen in nature can help fatigued and stressed out individuals relax and let go of their struggles more easily than in our orderly society. Nature is where they can adapt and function according to their own standards. With these four aspects combined, nature becomes an overwhelming source of mental (and physical) relief.

In a case study conducted by the South Australian Department of Environmental, Water, and Natural Resources, researchers explored how

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<sup>50</sup> Rachel and Stephen Kaplan, *The Experience of Nature*, 180-181

<sup>51</sup> Rachel and Stephen Kaplan, *The Experience of Nature*, 195

people's perceptions of nature can affect their well-being in a hospital environment.<sup>52</sup> Interviews were conducted between 14 park users and 14 non-park users. The participants reported a range of mental health benefits from their time spent at the park. These benefits include positive emotional responses, stress alleviation, elevated mood, and lowered anxiety and reflection.

Another case study analyzed the benefits of gardens in a hospital located on the outer suburb of Melbourne, Australia. 72 users, which comprised of staff, patients, and visitors, of the hospital garden were interviewed. Once again, the findings indicated that the hospital gardens provided users a range of mental health and well-being benefits. These studies have provided resultant economic implications spread among healthcare providers.

## **Conclusion**

When designing a space, it is important to account for how people would use the space through their social behavior. Susan Cain and her studies on how extroverts and introverts view the world differently reveals a disproportional balance between public and private spaces. The Colorado School of Mines' concept of layering and establishing thresholds between public and private areas is a viable design reaction to this ongoing problem. Learning more about environmental dichotomies such as order and disorder, silence and noise, and access to nature will help determine the types of activities and thresholds this thesis needs to connect people with different social and environmental behaviors.

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<sup>52</sup> Claire Henderson-Wilson and Rona Weerasuriya, "Feel Blue, Touch Green: Examples of Green Spaces Promoting Mental Health," *BJPsych Int*. Nov. 2017. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5663020/>

## Chapter 4: Spatial Perception and Architecture

This chapter explores the phenomena behind the 'Indoor Generation', and how our excessive time indoors can adversely impact our spatial perception and work performance while inducing stress and a multitude of health disorders. This research will also cover the Circadian House principles and how the Hawkes House addresses these problems. These findings will determine how people perceive exterior and interior spaces, personal spaces, and community spaces, and how the size of these spaces can impact a user's work efficiency and health conditions.

### The Indoor Generation

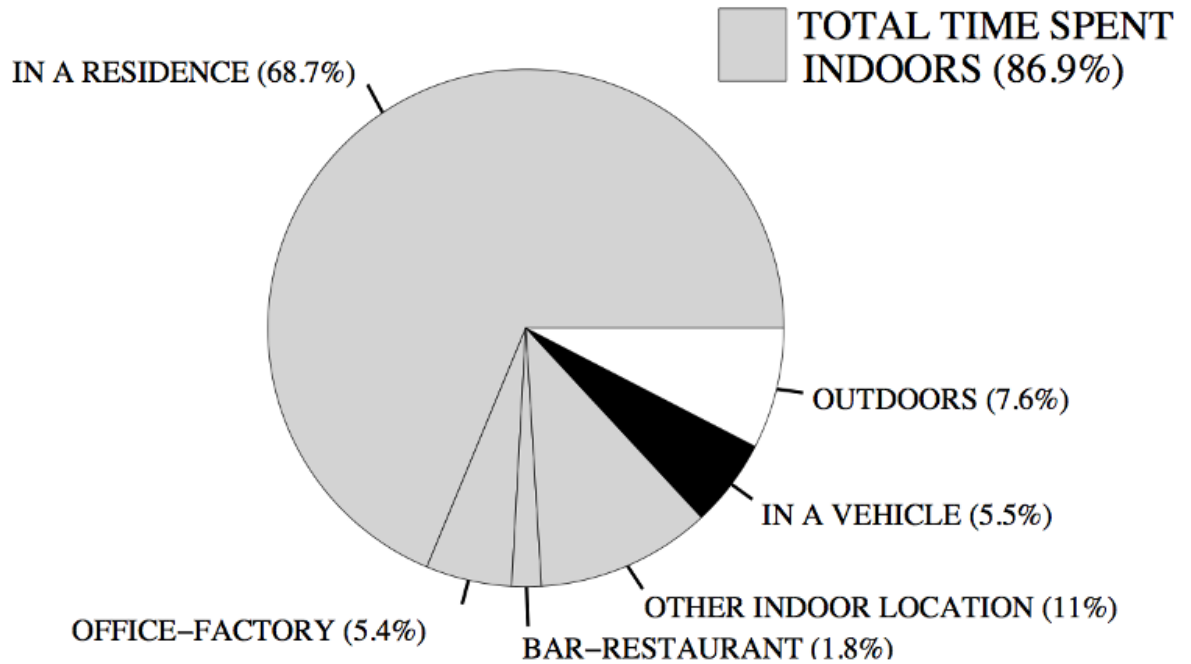
According to the Environmental Protection Agency (EPA), we spend 90 percent of our life indoors. At least 22 hours of our day is spent inside a building, and these findings have emphasized a need to address health and wellness concerns within the architectural community.<sup>53</sup> We are dubbed 'the indoor generation' – about 1 in 4 Americans spend almost their entire days indoors without going outside. In Figure 4.0 below, the National Human Activity Pattern Survey (NHAPS) breaks down these general statistics even further and found that roughly 68.7% of our time is spent in our residences and another 6% is spent in an enclosed vehicle. These proportions are consistent across the United States and Canada.

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<sup>53</sup> Tristan Roberts, "We Spend 90% of Our Time Indoors. Says Who?" *Building Green*, December 15, 2016, <https://www.buildinggreen.com/blog/we-spend-90-our-time-indoors-says-who>

## NHAPS – Nation, Percentage Time Spent

Total n = 9,196



**Fig. 4.0:** Pie Chart depicting overall percentages of where people spend their time. (Source: NHAPS)

Our society endorses this 'indoor generation' lifestyle: Modern amenities like the television, phones, and internet has made it convenient for us to get whatever we need without taking a step outside. This is especially noticeable in our workforce. Back then, most workers would be outside in the fields and farms, basking in natural sunlight, compared to today's cubicles and offices, in which

workers sit behind the glow of a computer screen. While modern technology has made life quick and easy, it has also placed a toll on our health and happiness.<sup>54</sup>

### **Disruption to Natural Cycles**

People do not comprehend how much time they are spending inside. It easily slips our attention, and we can spend days in the comfort of our homes without feeling anything wrong about it. A YouGov study, which surveyed 16,000 people across fourteen countries in America and Europe, discovered a disparity between how many hours people think they are spending inside versus the reality of how much time is spent indoors.<sup>55</sup> While most of the surveyors believe they spend two-thirds of their time indoors, the actual time is much higher: 90 percent of people spend close to 22 hours indoors each day, with one in six respondents admitting that they practically never go outside. The 'indoor era' has created a detachment from the natural world, and this can cause a disruption to our circadian rhythms and cause adverse health effects.

The circadian rhythms are physical, mental, and behavioral changes that follow a daily cycle. They respond primarily to light and darkness in an organism's environment.<sup>56</sup> Our body's natural clock controls most circadian rhythms by telling our brains when we are tired and need to sleep. When these

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<sup>54</sup> Stephanie Walden, "The "Indoor Generation" and the Health Risks of Spending More Time Inside," *USA Today*, May 15, 2018, <https://www.usatoday.com/story/sponsor-story/velux/2018/05/15/indoor-generation-and-health-risks-spending-more-time-inside/610289002/>

<sup>55</sup> Walden, "Indoor Generation"

<sup>56</sup> "What are Circadian Rhythms?" *US Department of Health and Human Services*, <https://www.nichd.nih.gov/health/topics/sleep/conditioninfo/circadian-rhythms>

rhythms are disrupted, our body can experience anxiety, depression, sleep disorders, and mood disorders.

Our circadian rhythms rely on natural sunlight, and because most of our time is spent indoors, our biological clocks are thus disrupted. We now live in a “social clock society” where we are expected to be available at a moment’s notice in our work and social duties. According to another YouGov report, around fifteen percent of the world’s population is affected by different levels of Seasonal Affective Disorder (SAD) or winter depression, which is caused by a lack of natural daylight. Our physical health is also jeopardized: indoor air can be up to five times as polluted as outdoor air.

### **Disruption to Spatial Perception**

A disrupted circadian rhythm leaves us more likely to be sleep-deprived and stressed. These symptoms also inhibit our spatial perception, which, in turn, also impacts our work performance. Spatial perception is the ability to be aware of your relationship with the environment (exteroceptive processes) and with yourself (interoceptive processes).<sup>57</sup> Someone with good spatial perception would have the ability to situate themselves, make multiple decisions, and analyze situations and representations of their surroundings and their relationship with their body to it. An example of this ability is organizing boxes into a storage cabinet. We need to know where to put the boxes, which requires

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<sup>57</sup> “Spatial Perception,” *CogniFit*, <https://www.cognifit.com/science/cognitive-skills/spatial-perception>

a sense of direction, and be able to mentally assess a combination of positions to place the boxes.

One way in which stress impacts work performance is by distorting our perception of space and time.<sup>58</sup> When we experience stress, our attention spans narrow and restrict our information processing from the environment. Our performance, which relies on our ability to process information and pay attention, suffers, and as a result, tunnel vision or tunnel hearing can occur. Using the previous example of organizing boxes into a storage cabinet, if a person is stressed and their spatial perception is impaired, that person would take a longer time organizing the boxes or finding their way to the storage cabinet.

### **The Circadian House**

In response to the many studies and negative health surveys found from indoor living, the Circadian House, named after the circadian rhythm, was developed as a principle and guideline in 2013 by the VELUX Company of Denmark to create healthy and sustainable housing. The Circadian House key principles are as follows:

- Live in Balance with Nature
  - Allow occupants to live with and follow daily (circadian rhythm and sleep-cycles) and seasonal cycles of the outdoor environment

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<sup>58</sup> Craig E. Geis, "The Distortion of Time and Space Under Stress."

- Have views to the outside
- Adaptability
  - A house whose space and occupants can adapt to changing conditions (seasons, daily) and needs.
- Sensibility
  - Provides protection against harmful substances
  - Allows freedom to control parameters (ex. Thermal temperature)<sup>59</sup>

These principles were derived from a series of five workshops held in Copenhagen from November 2012 and August 2013, and are made to be applicable to all types of dwellings. The Circadian House was highly influenced by the VELUX international award winning design of the Hawkes House in 1991, which had put these principles and guidelines to the test.

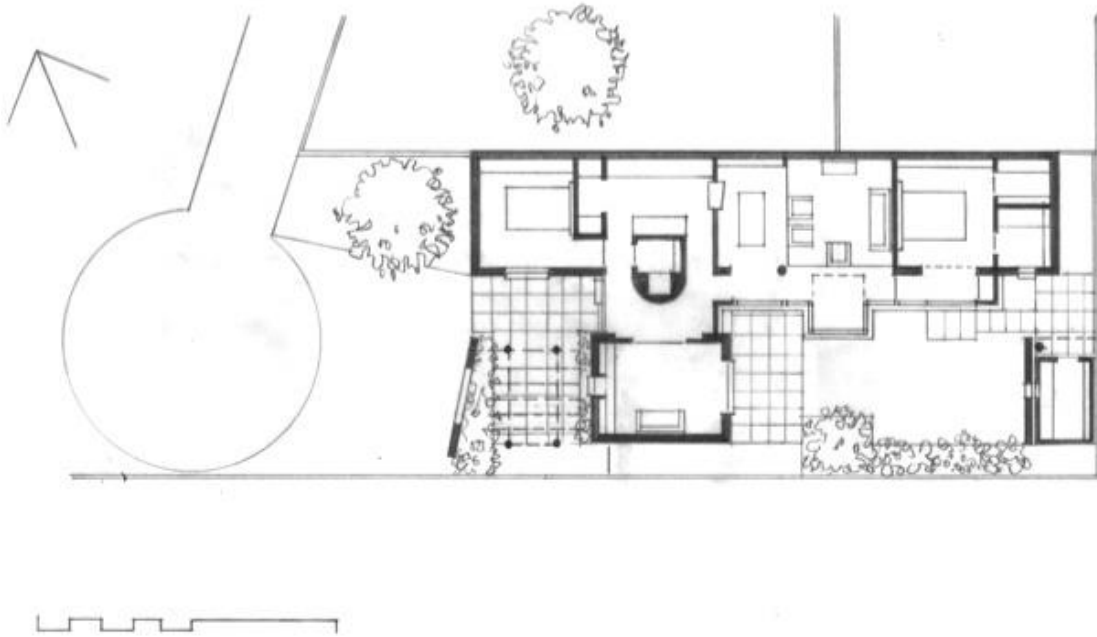
### **Case Study: The Hawkes House, Cambridge**

The Hawkes House, designed in 1991 by architects Greenberg and Hawkes was designed to be the permanent senior residence for Dean Hawkes and his wife, who were now in their 70s. Dean Hawkes was one of the contributors to the VELUX research project of 'Circadian Living' and this research is evident in the final design. In the Hawkes House Plan and sections, seen in

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<sup>59</sup>Peter Foldbjerg, "Circadian House: A Vision for Homes Designed to be Healthy and Human-Centric," *ResearchGate*, September 2017, [https://www.researchgate.net/publication/319703017\\_Circadian\\_house\\_A\\_vision\\_for\\_homes\\_designed\\_to\\_be\\_healthy\\_and\\_human-centric](https://www.researchgate.net/publication/319703017_Circadian_house_A_vision_for_homes_designed_to_be_healthy_and_human-centric)

Figures 4.1 and 4.2, the sun's orientation is taken into account so that all the principal rooms are south-facing.<sup>60</sup>



**Fig. 4.1:** Hawkes House Plan (Source: Dean Hawkes, VELUX)

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<sup>60</sup> Dean Hawkes, "The Circadian House: Hawkes House – Designing for the Aging," *VELUX*.



**Fig. 4.2:** Hawkes House Sections (Source: Dean Hawkes, VELUX)

The Hawkes House is a single-story dwelling with an open arrangement of spaces and few internal divisions, making it easier for elderly occupants to move around in. The arrangement also makes it easier for future adaptability, such as raised access to external doors for wheelchair users. The house utilizes large windows and natural materials and finishes (seen in Figure 4.3) as well as

vaulted ceilings over part of the living room and kitchen for a balanced thermal, luminous, and acoustical living environment.<sup>61</sup>



**Fig. 4.3:** Interior Spaces of the Hawkes House (Source: Dean Hawkes, VELUX)

### **Transitional Spaces between the Exterior and Interior**

When it comes to our homes, the interior and exterior are commonly seen as two distinct spaces – one for living and one for recreation. According to William Dohe, principal of R+D architecture, an architectural firm in Easton, architecture “does not end at the outside of the home, but extends to the grounds

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<sup>61</sup> Dean Hawkes, “Circadian House”

in which the house resides.”<sup>62</sup> Recently, architects and interior designers alike are embracing the new design philosophy of “bringing the outdoors in” and attempting to create a smoother transition between indoors and outdoors. Rather than as a separate space, this philosophy views the outside as an extension of the home, and nature-inspired designs are being utilized to merge these spaces.

The primary design devices that architects use to connect indoor and outdoor spaces fell into three basic categories: viewports, thresholds, and projections.<sup>63</sup> Windows, as seen in the Hawkes House case study, provide views to the landscape. Thresholds provide a point of entry and transition from outside to inside. Architects favor using different kinds of porches and vestibules to control the way of demand and climate while minding the orientation and frontage. Projections, which include outward opening casement windows, bay windows, balconies, sunrooms, and other attachable window boxes, reaches into the landscape. Often, a design would have a combination of these projections so users can experience a variety of views from different parts of the house.

### **Personal Space and the Built Environment**

We all have personal space, and we value that physical space that surrounds us because it makes us feel safe. When our personal space is threatened, we feel uncomfortable and feel an instinctual need to step away until we feel safe again. We start to learn about personal spaces during our childhood,

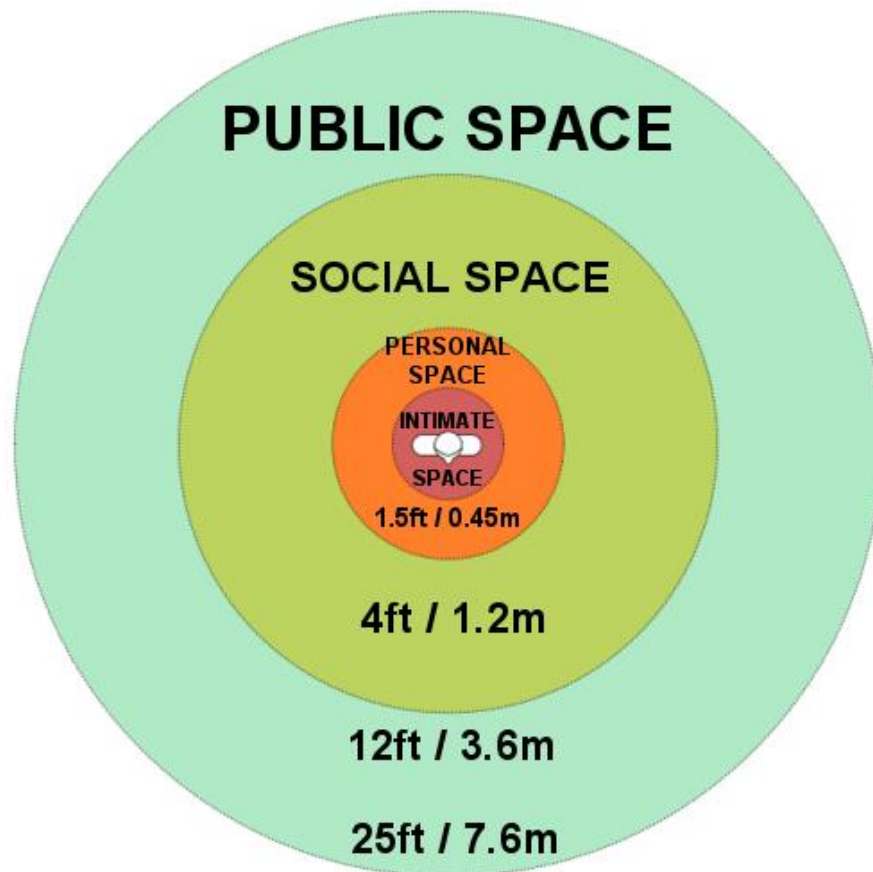
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<sup>62</sup> Hirsch article.

<sup>63</sup> Tucker, Page 3 of PHD article Transitional Spaces: Blurring the Line Between Interior and Exterior <https://arcc-journal.org/index.php/arccjournal/article/view/857663541/63>

and depending on our cultural backgrounds, the boundaries that make up our personal spaces may differ as well as our reasoning for them.<sup>64</sup>

Proxemics is a study of the human use of space within the context of culture. It began in 1966 by Edward T. Hall, an anthropologist. In Figure 4.4, Hall started to put a numerical distance to these personal spaces.



**Fig. 4.4:** Personal Space Diagram (Source: Edward T. Hall)

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<sup>64</sup> Karin Gonzalez, "Personal Space in Psychology: Definition, Cultural Differences, and Issues," *Study.com*, <https://study.com/academy/lesson/personal-space-in-psychology-definition-cultural-differences-issues.html>

According to Hall, this perception of the levels of intimacy in these spaces is culturally determined. People from different cultures perceive space (and place) differently. If the spatial experience is different or perceived different by another individual through a 'selective screening' from our senses, then a place one would think crowded would not necessarily feel crowded to another person.<sup>65</sup>

Hall approached his thesis through long term observation to determine how people of different culture use and react to space, and from there, come up with a pattern for proxemics behavior.<sup>66</sup> His observations led him to conclude that our spatial perception is not only dependent on culture, but also on the relationship, activity, and emotions present in a given situation. For Americans, a comfortable social distance is roughly four to seven feet apart, but for Europeans, the distance is cut in half.<sup>67</sup> American cities are set on a grid (similar to English cities), but in France and Spain, a star pattern is preferred, and this arrangement creates different expectations of how furniture, for example, should be placed in a room and the interactions that come with it.

### **Micro-Housing in Urban Cities**

Home is supposed to feel like a safe haven, but for some tenants living in densely populated cities, it can feel like a claustrophobic cage. In 2013, a "micro-apartment" project, designed by nARCHITECTS (seen in Figure 4.5), has taken

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<sup>65</sup> Hall, Proxemics article. Pg. 87

<sup>66</sup> Hall, page 88

<sup>67</sup> Nina Brown, on Hall and Proxemic Theory

over New York City to provide more affordable housing units.<sup>68</sup> While these small units are beneficial for young single professionals in their twenties, it can pose health concerns for small families attracted by the affordable price tag.

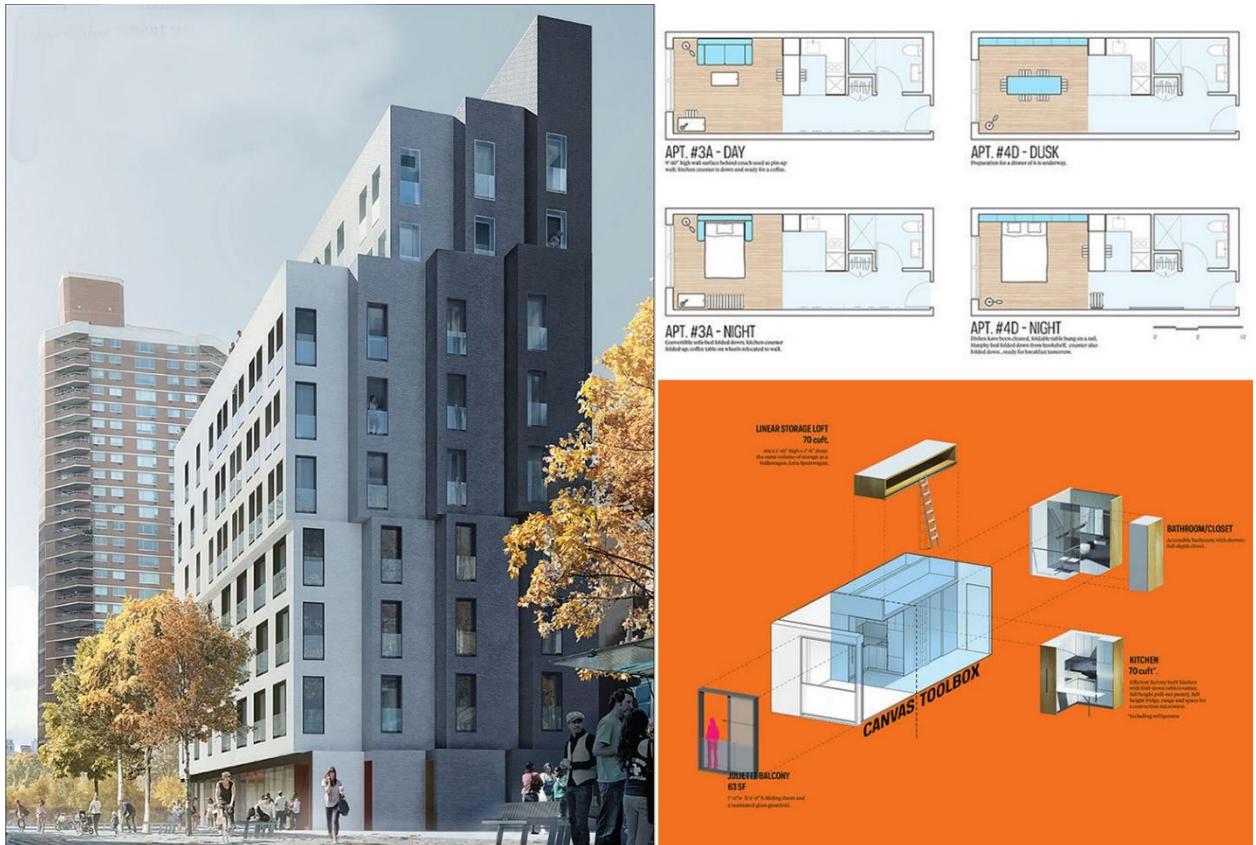
According to Susan Saegert, a professor of environmental psychology at the CUNY Graduate Center, tiny living conditions are terrible, especially for children, no matter how well the unit is designed. Small units lack the fundamental privacy a child needs in their daily life, and excessive crowding can cause a child to feel withdrawn and have trouble studying and concentrating. Small apartment units are as aversive to adults as it is to children. Our homes also serve an important role in communicating our values and goals, which are a demonstration of our identity. We feel happier and healthier when we can bring others into our space and share who we are and what is important to us.

Despite these issues of mental and physical wellness, however, New York City is still seen as an ideal place to live. Residents might be losing physical space, but they are compensated with access to a series of amenities, such as a gym with floor-to-ceiling park views, a lobby with a public garden, and a Juliet balcony.<sup>69</sup> Until a new type of housing development is created to satisfy these health inquiries while also addressing the affordable housing problem in New York, buyers are content to trade personal living space for community space.

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<sup>68</sup> Jacoba Urist, "The Health Risks of Small Apartments," *The Atlantic*, December 19, 2013, <https://www.theatlantic.com/health/archive/2013/12/the-health-risks-of-small-apartments/282150/>

<sup>69</sup> Jacoba Urist, "The Health Risks"



**Fig. 4.5:** Winning Micro-Apartment Design for NYC (Source: nARCHITECTS)  
**Community and Public Spaces**

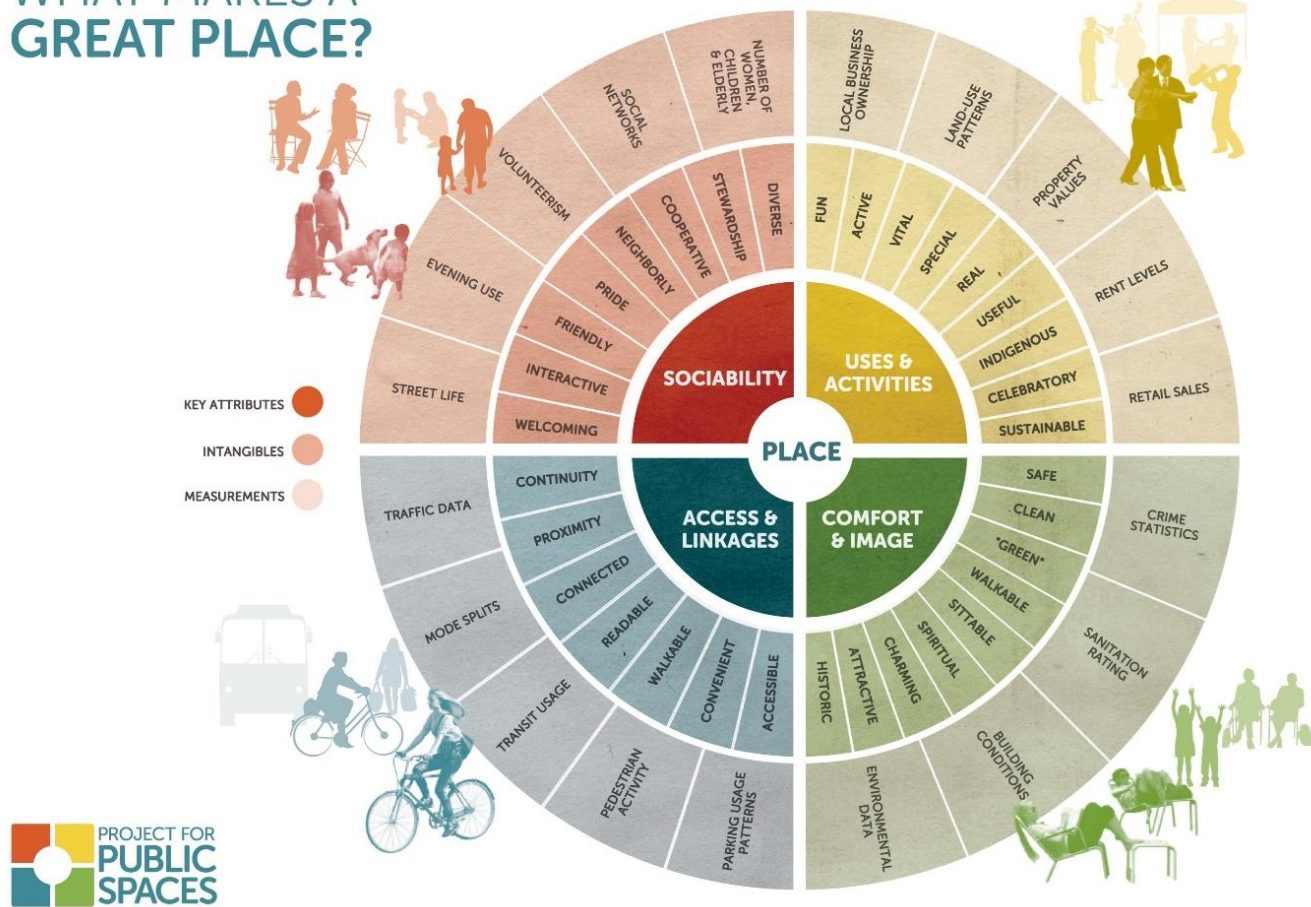
As mentioned in the previous chapter, humans are social creatures. We have an innate need to be connected with the environment, and stay connected with others in order to find our place and sense of belonging in society.<sup>70</sup>

People perceive community spaces as a place that is accessible, attractive, and full of activity. In Figure 4.6 below, the diagram depicts four essentials that make a place successful: sociability, uses and activities, access

<sup>70</sup> Kaplan and Kaplan, 1982, page 2

and linkage, and comfort and image. When these four essentials are met, any place can become successful, memorable, and long-lasting.

## WHAT MAKES A GREAT PLACE?



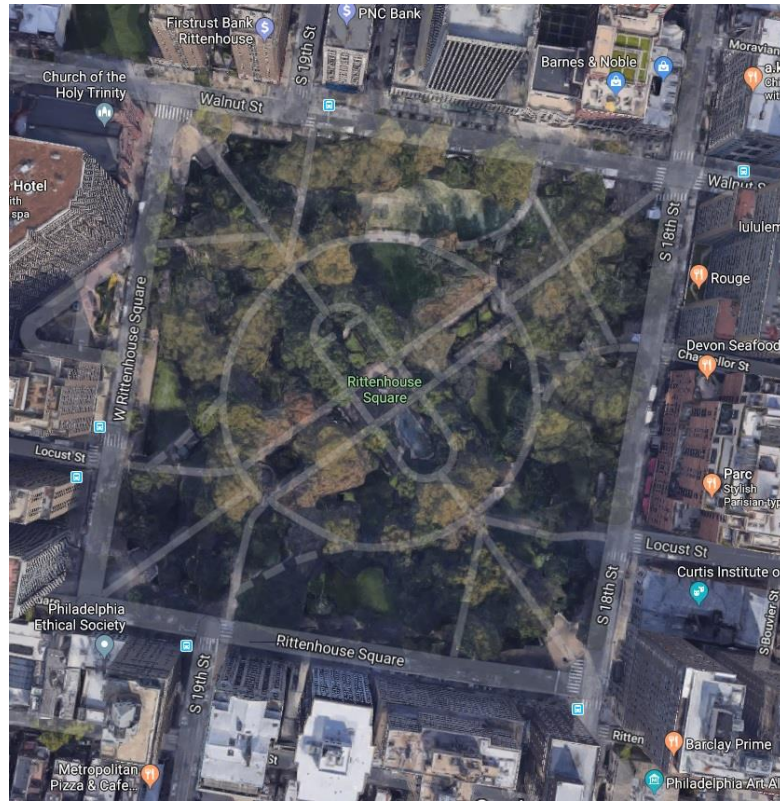
**Fig. 4.6:** Diagram of what makes a place successful (Source: PPS)

Philadelphia's Rittenhouse Square is an example of a successful public space. Designed by William Penn and surveyed by Thomas Holme in the late 17<sup>th</sup> century, Rittenhouse Square is considered one of the finest urban public spaces in the United States. The park is surrounded by high-rise retail, luxury apartments, and historic buildings and filled with luscious, sun-shading trees,

historic monuments, and wide pedestrian paths for joggers and dog walkers that connect to all four intersections, as shown in Figure 4.7 and 4.8.



**Fig. 4.7:** Rittenhouse Square, Philadelphia (Source: author)



**Fig. 4.8:** Aerial View of Rittenhouse Square (Source: google maps)

## Conclusion

It is important to take into account how much time people spend their lives indoors and the environmental and health issues to come from this prevalent lifestyle. The Circadian House illustrates how design is used to enhance indoor living while also blurring the transitional spaces between interior and exterior spaces. The Hawkes House utilizes its orientation and local resources to create a healthy and sustainable home. Learning about proxemics and the cultural reasoning behind our concept of personal space will help shape this thesis projects' private and public spaces, and how community assets and amenities are a must. The Rittenhouse Square's success as a public park and how it

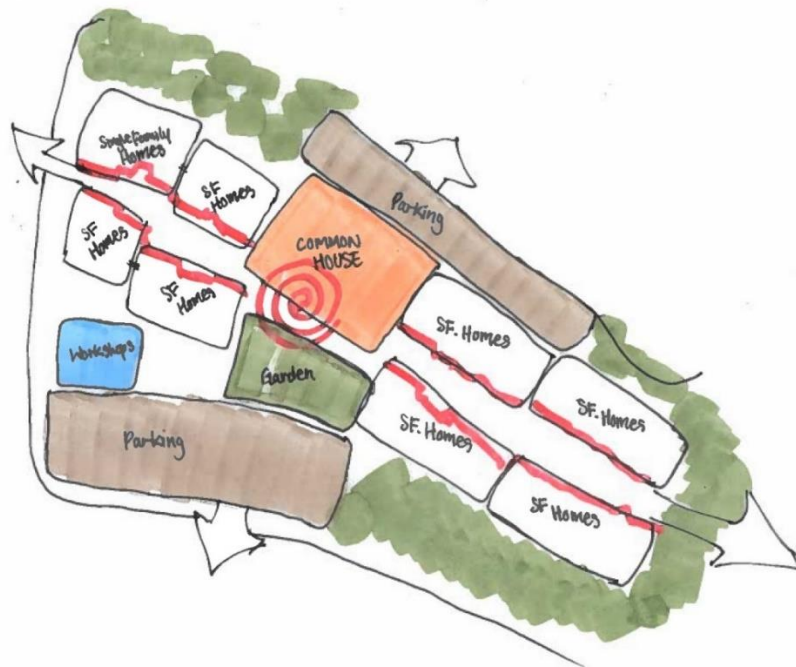
connects to its surrounding programs will act as a large scale precedent for the open-air programs implemented in this thesis.

## Chapter 5: Precedent Studies

### COHOUSING

#### Muir Commons – McCamant & Durrett Architects - Davis, California – 1991

Muir Commons is the first new construction cohousing development in the United States. It was developed by M&D Architects to encourage face-to-face interaction and sense of community for its residents, who handles its maintenance.<sup>71</sup> Residents are expected to contribute some hours in maintaining the shared amenities, as well as cook one monthly meal for the rest of the community. There is a central communal building that includes various recreational facilities, a sitting room with a fireplace, large dining room, and children's playroom.



<sup>71</sup> "Muir Commons Community," Muir Commons Organization, accessed November 20, 2018, <http://www.muircommons.org/>

**Fig. 5.0:** Diagram of Programs and Spaces in Muir Commons (Source: author and underlay by the Muir Commons Organization)

The community allows only bicycles and foot traffic within its living environment to promote the child safety, but parking is available as seen in Figure 5.0. Single-family houses, along with an automotive and woodworking workshop, share a central circulation path that also acts as a central courtyard and numerous trees surround the edges of the property to cancel out unwanted noise from the surrounding urban blocks.

## **MIXED-USE HOUSING**

### **Swan's Market + Cohousing – Pyatok Architects - Oakland, California – 2000**

Unlike Muir Commons, Swan's Market and Cohousing is not a new construction project. Pyatok Architects repurposed Oakland's downtown shopping district into a small village-like community contained within a city block. A majority of retail space is street-facing and on the ground floor while twenty cohousing units and eighteen affordable housing units are organized around a central alleyway that allows residents to gather and socialize outside.<sup>72</sup> The community shares a live/work space, commercial office space, and public courtyard. This ambitious mixed-use project managed to preserve over 75 percent of the original exterior and created public and private outdoor spaces (seen in Figure 5.1) that connects its diverse market and retail activities with the rest of the urban community.

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<sup>72</sup> "Swan's Market + Cohousing," Pyatok Architects, accessed November 20, 2018, <http://www.pyatok.com/work/project/112/SWANS-MARKET>



**Fig. 5.1:** Swan's Market's outdoor and indoor activities. (Source: Pyatok)

### **Torr Kaelan – Rob Wellington Quigley – San Diego, California – 2015**

Torr Kaelan is a five-story live/work building in downtown San Diego. “Torr Kaelan”, which means rock outcropping or boulder in Gaelic, describes the unorthodox and angular façade and white concrete aesthetic very well. The building rests on a 42-by-100 foot lot.<sup>73</sup> The ground floor is for parking, the second and third floors are office spaces, which are occupied by Quigley’s firm and a graphic design company, while the fourth and fifth floor contains two penthouses each. The pop-outs of the front façade, seen in Figure 5.2, along with a variety of unique aluminum windows makes the building a beacon in this

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<sup>73</sup> Dirk Sutro, “Torr Kaelan,” *The Architect’s Newspaper*, February 24, 2015, <https://archpaper.com/2015/02/torr-kaelan/>

downtown neighborhood.

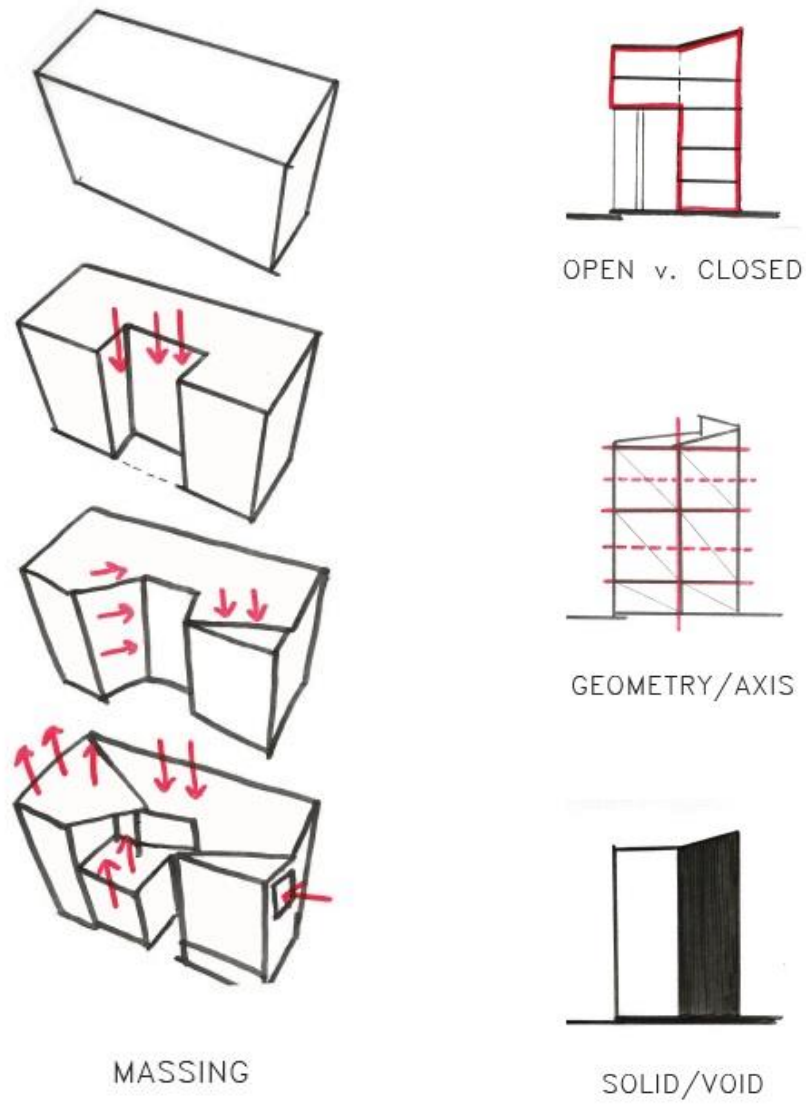


**Fig. 5.2:** Torr Kaelan’s façade seen at different angles. (Source: Dirk Sutro and Rob Quigley)

What makes the Torr Kaelan unique from the previous housing and mixed use projects is how all the programs are stacked vertically: there is a shared outdoor and indoor community courtyard cut into the side of the building. As seen in Figure 5.3, sunlight penetrates into the central atrium and stairway.<sup>74</sup> There is also a balcony that acts as open planned living space seen in Figure 5.4. This shared space and amenity is ideal for cohousing and unifies the whole building and its different users.

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<sup>74</sup> Sutro, “Torr Kaelan.”



**Fig. 5.3:** Volumetric Massing and Facade Studies of Torr Kaelan. (Source: author and underlays by Rob Quigley).



**Fig. 5.4:** Open-Air Living Space and central stairway in the Torr Kaelan. (Source: Sutro and Quigley)

## **AFFORDABLE HOUSING**

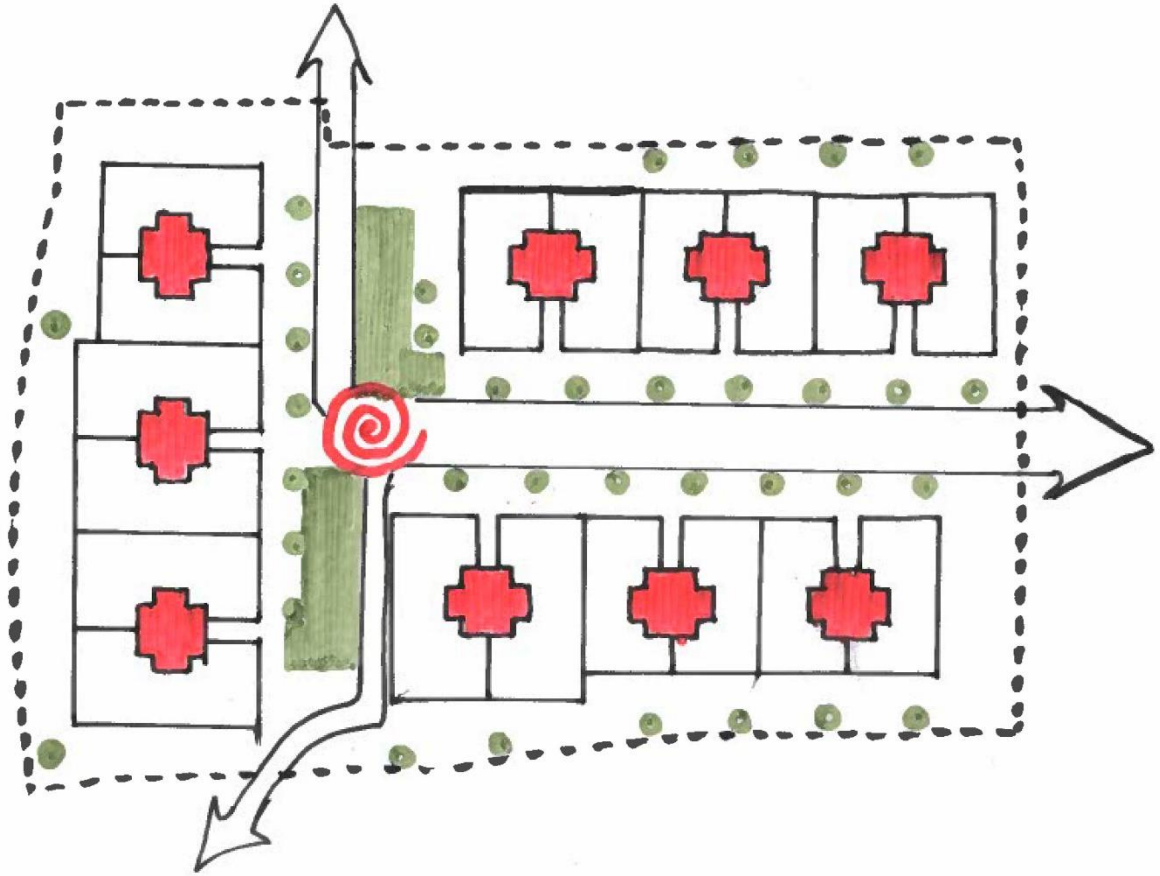
### **Ganei Shapira – Orit Muhlbauer Eyal Architects – Tel Aviv, Israel – 2014**

Ganei Shapira is an affordable apartment complex with large open communal spaces and green spaces. The center communal spaces serves as a passage between the neighborhood and a large park nearby.<sup>75</sup> In Figure 5.5, the buildings are joined together by this circulation and garden path that provides a direct access to the neighboring park.

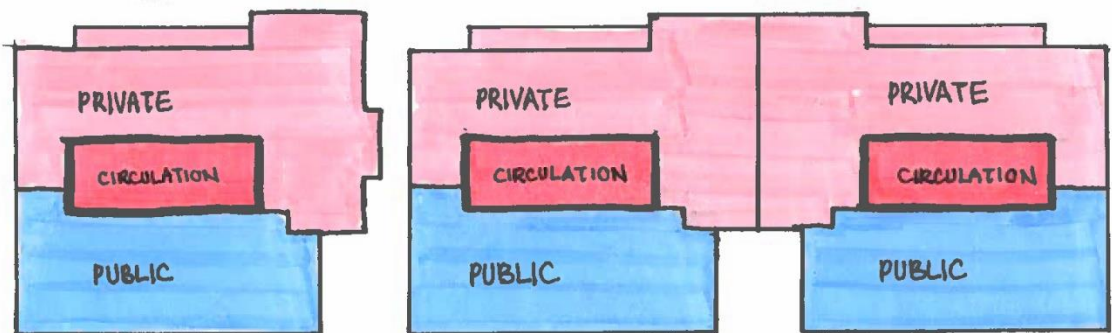
In Figure 5.6, the floor plans are organized evenly between public and private spaces with a central circulation core. The private bedrooms share a balcony that provides occupants views to the park.

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<sup>75</sup> “Ganei Shapira Affordable Housing / Orit Muhlbauer Eyal Architects,” ArchDaily, July 21, 2015. <https://www.archdaily.com/534569/ganei-shapira-affordable-housing-orit-muhlbauer-eyal-architects>



**Fig. 5.5:** Diagram of Ganei Shapira Plan (Source: author and underlay from ArchDaily)



**Fig. 5.6:** Public v. Private Spaces in Ganei Shapira Floor Plan (Source: author and underlay from ArchDaily)

## **URBAN PARK**

### **MFO Park – Burckhardt + Partner and Raderschall– Zurich, Switzerland – 2002**

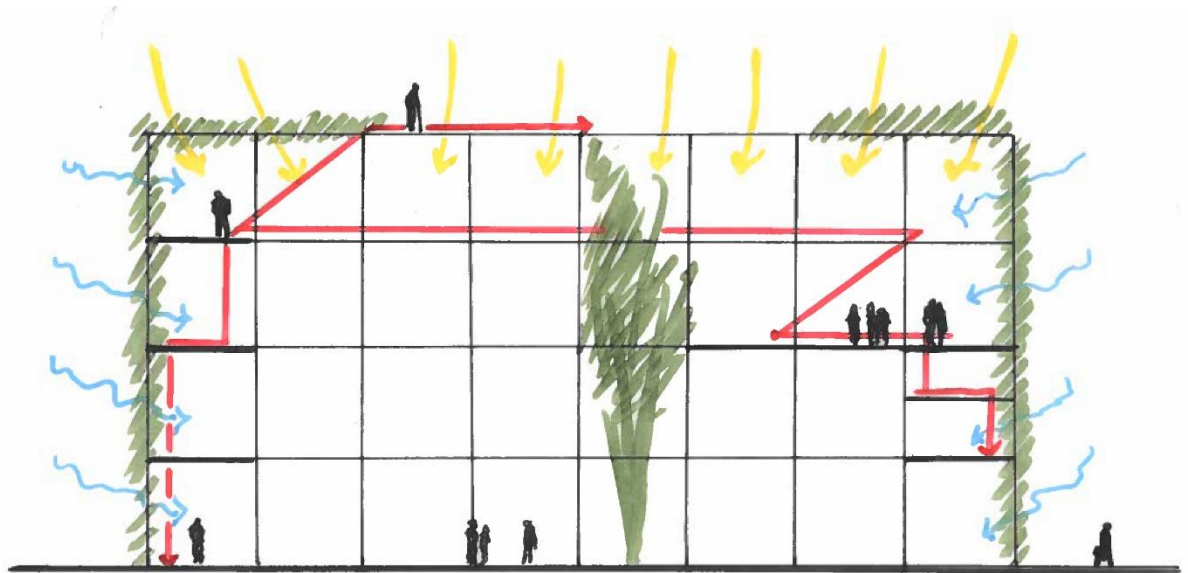
The MFO Park in Switzerland redefines what makes a park and a greenhouse. Burckhardt + Partner worked with landscapers Raderschall to design a unique “park house” with an emphasis on the vertical. They decided on a double-walled steel structure seen in figure 5.7 for transparency and as a reminiscent indicator of Zurich’s industrial past, using different kinds of “latticework” with climbing plants so visitors can also interact with nature above ground.<sup>76</sup> Depending on the season, MFO Park’s vegetal walls are either sparse, full, or colorful, allowing returning visitors to gain a different experience.



<sup>76</sup> Sara Rebollo, “Revisiting the 90s: MFO Park in Zurich,” *Metalocus*, November 23, 2015, <https://www.metalocus.es/en/news/revisiting-90s-mfo-park-zurich>

**Fig. 5.7:** MFO Park's vegetative steel walls (Source: *Daily Dose of Architecture*)

Green vegetation spaces have a high therapeutic value, especially in dense urban environments. Unlike other urban parks, MFO Park builds itself up vertically so visitors can travel via stairs, sun decks, loggias, and cantilevered lookouts that allow them better views around the surrounding city at different levels, as seen in Figure 5.8. Through MFO Park, B + P created a seamless flow between its exterior surroundings and interior vegetative experience.



**Fig. 5.8:** Section Diagram of MFO Park Circulation and Interaction (Source: author and underlay by *Landezine and Raderschall*).

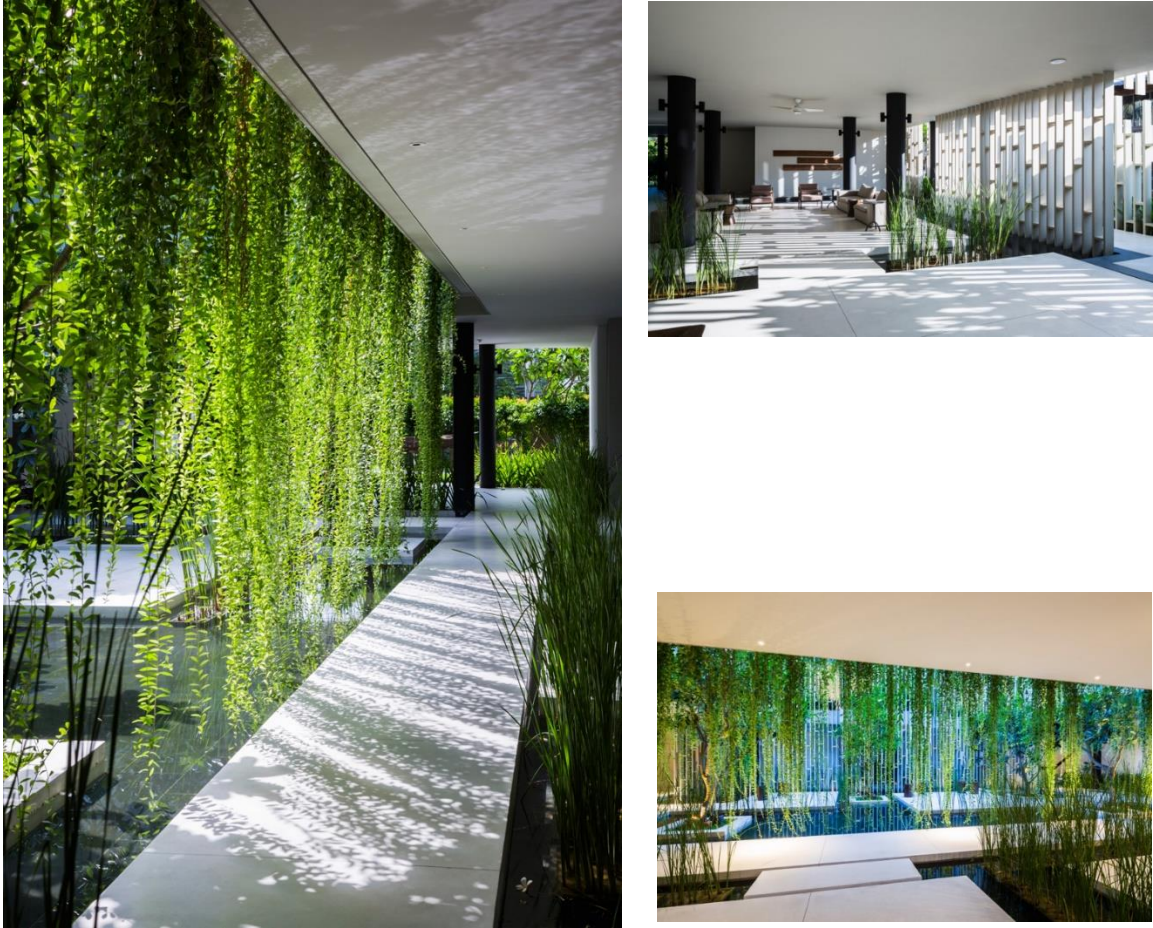
## THERAPEUTIC ARCHITECTURE

### **Naman Spa – MIA Design Studio – Da Nang, Vietnam – 2015**

While urban parks are popular places to view the local vegetation outdoors, there is also great value in bringing the local greenery indoors and creating that similar relaxing and therapeutic environment. MIA Design Studio uses this knowledge to their advantage for their design of Naman Spa, a spa resort. Architecturally, Naman Spa is well-known for using local plants and lotus ponds as an aesthetic that not only provides natural ventilation, but also enhances its healing environment. Similar to MFO Park, MIA Design Studio uses climbing vines as a façade screen and around its main corridors. In Figure 5.9, the plants and lattice patterns creates a ‘pleasant play of light and shadow’.<sup>77</sup>

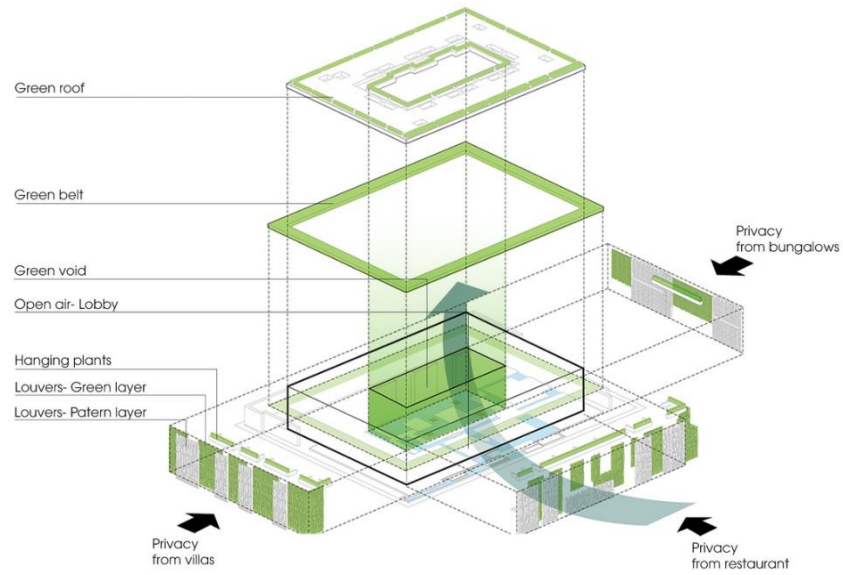
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<sup>77</sup> “Naman Spa / MIA Design Studio,” ArchDaily, July 21, 2015. <http://www.archdaily.com/770560/naman-spa-mia-design-studio/>



**Fig. 5.9:** Naman Spa's Corridor around central atrium pool using local plants and lattice work. (Source: ArchDaily)

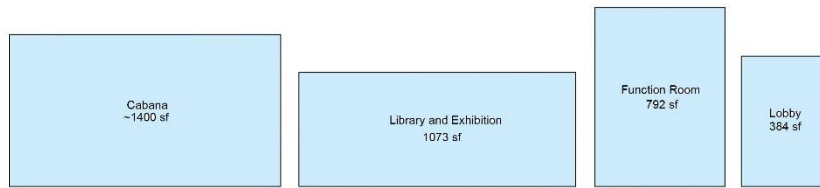
Some design goals of Naman Spa is to create a peaceful retreat where visitors can enjoy a luxurious wellness in privacy. There is a playful merging of what is outside and inside through green infrastructure (as seen in Figure 5.10), and this dual experience is what this thesis is about.



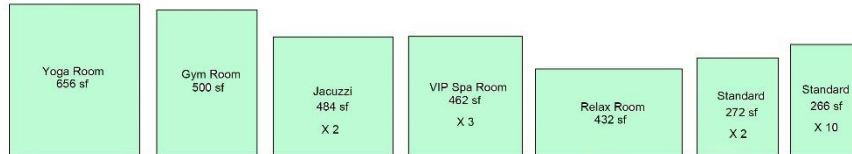
**Fig. 5.10.** Naman Spa Exploded Axon of Green Structures. (Source: ArchDaily)

Since this thesis is about providing a peaceful living environment within a busy urban context, the way MIA Design Studio organized and sized Naman Spa's program spaces, especially the private rooms, is of particular interest. In Figure 5.11 below, Naman Spa's various programs are categorized under public assembly, recreation spaces, and service with a gross square footage for each. This programmatic study is done to understand the overall proportions between Naman Spa's public and private areas, and serves as a program size reference for this thesis.

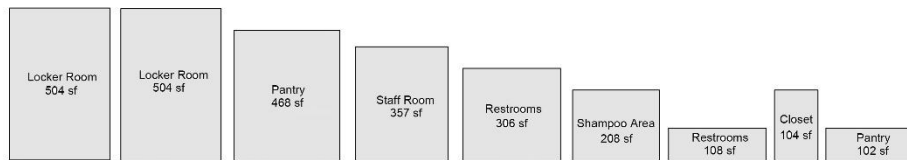
PUBLIC ASSEMBLY GROSS AREA: 3,649 SF



RECREATION GROSS AREA: 7,346 SF



SERVICE GROSS AREA: 2,367 SF



**Fig. 5.11:** Program Block Sizes of Naman Spa (Source: author).

## **Chapter 6: Site Selection and Design Approach**

This chapter explores the DC Neighborhood site selection process, and what specific sites are chosen within that selected neighborhood based on its proximity, context, and overall design potential. This chapter will also highlight the challenges, opportunities, strengths, and weaknesses of each of the site options.

### **Neighborhood Site Selection Process**

Before selecting a site, design parameters are made to narrow down the number of DC Neighborhoods to consider for this thesis. In Figure 6.0 and Figure 6.1, the following two charts list which DC Neighborhoods are in the 'worst' urban condition based on data collected on unemployment rate, population density, home values, crime rates, and median income, and which neighborhoods have the most millennials since 2015. Millennials are the primary target users for this thesis project, and it is also important to find a site where this thesis can leave a positive and noticeable impact. The lists are cross-referenced, and it is discovered that the Columbia Heights, Shaw, Downtown, and Capitol Hill neighborhoods appear on the top of both charts.

## Detailed List Of The Worst Washington Neighborhoods

Rank	Neighborhood	Population	Median Income	Median Home Values
1	Brentwood	27,501	\$49,237	\$319,182
2	Deanwood	27,514	\$38,948	\$200,508
3	Anacostia	110,610	\$39,289	\$203,680
4	Stadium-Armory	20,783	\$60,146	\$365,474
5	Fort Totten-Upper Northeast	23,924	\$63,623	\$373,632
6	Catholic University-Brookland	54,553	\$65,144	\$381,053
7	South West	10,350	\$74,074	\$326,680
8	Brightwood	15,553	\$74,288	\$532,508
9	Downtown	8,177	\$91,559	\$354,550
10	Petworth	11,791	\$85,678	\$618,292
11	Ledroit Park	11,055	\$84,403	\$513,970
12	Columbia Heights	35,739	\$71,515	\$507,721
13	Mount Vernon Square	5,264	\$81,294	\$459,833
14	Capitol Hill	52,181	\$94,105	\$530,582
15	Foggy Bottom	15,970	\$67,353	\$341,890
16	Shaw	12,508	\$79,725	\$552,608
17	Adams Morgan	16,510	\$94,042	\$538,406

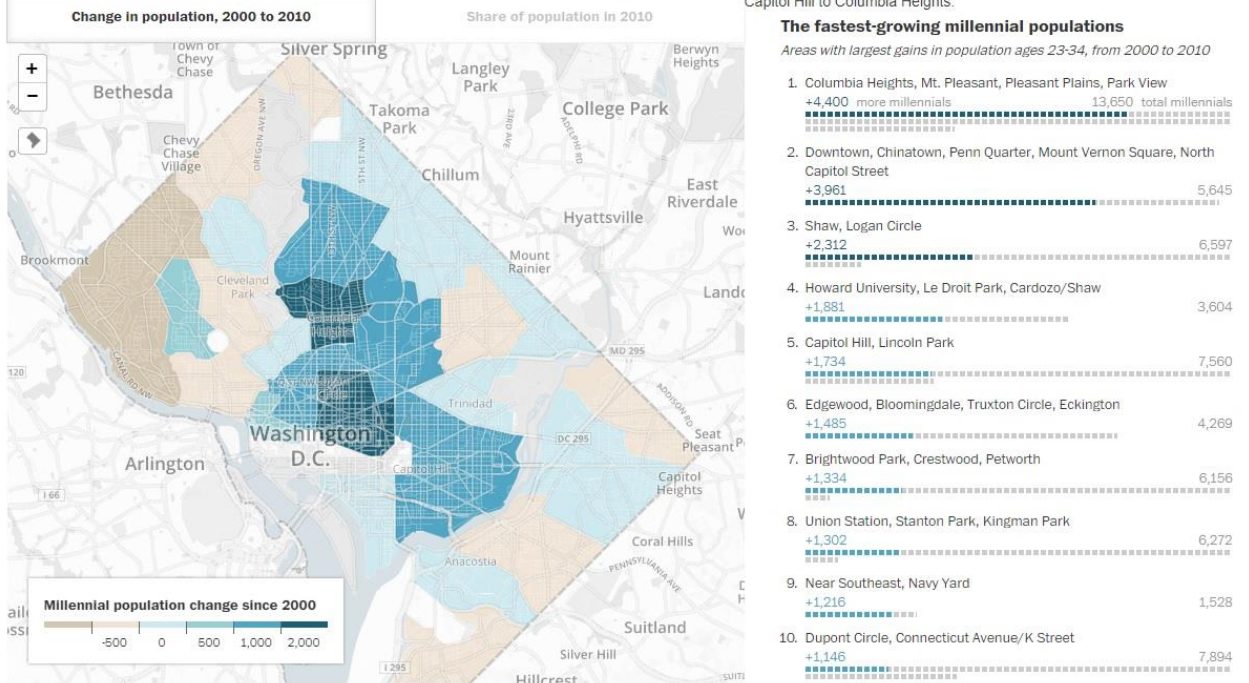
**Figure 6.0:** Worst DC Neighborhoods List based on unemployment, median income, population density, crime rates, and home values.

(Source: Roadsnaacks)

**Graphic 18** Oct 2013 How many millennials live in each D.C. neighborhood?

## How many millennials live in each D.C. neighborhood?

By Ted Mellnik, Katie Park and Laris Karklis The millennials influence changes across the District. They move into homes in neighborhoods that their grandparents' generation may have left for the suburbs. They're a prime target of the dozens of new apartments and condos, coffee shops and restaurants and other businesses that are remaking a central swath of the city from Capitol Hill to Columbia Heights.



SOURCE: U.S. Census, D.C. Office of Planning neighborhood clusters. GRAPHIC: Ted Mellnik, Katie Park and Laris Karklis.

**Figure 6.1:** Largest Millennial Population in each DC Neighborhood (Source: US Census, DC Office of Planning)

Using a site selection matrix, seen in Figure 6.2, these neighborhoods are broken down and compared even further based on access to the metro and bus stations, urban revitalization, proximity to natural or recreational parks, amenities, and entertainment, and a dense and varied urban typology. Public safety is also considered, as well as how the housing prices fare against the national average. Using these site parameters, the Shaw and Columbia Heights neighborhoods are scored higher than Capitol Hill and Downtown due to having more variety in urban typologies and access to public transportation, retail, and civic amenities.

DC NEIGHBORHOOD	COLUMBIA HEIGHTS	SHAW	DOWNTOWN	CAPITOL HILL
METRO STATIONS	8 One metro stop available. Georgia-Ave metro closeby.	10 Shaw-Howard University and Mt. Vernon Metro Stops. Even dist.	10 Four metro stop available.	10 Two metro stop available.
BUS STATIONS	10 Many bus stops available.	10 Many bus stops available.	10 Many bus stops available.	10 Many bus stops available.
PARKS	9 Meridian Hill Park and small parks, mostly on southwest side	7 A recreational park, baseball field and smaller green spaces.	8 Some memorial parks. Close to Logan Circle and Lafayette Sq.	9 Two major parks and small park with some green squares and botanic garden
URBAN DENSITY	10 Very dense. Good balance between open and closed spaces.	9 Very dense. Not too many public open spaces other than sports.	7 Mostly high density areas (D6). Little low density areas.	10 Very dense. Some townhouses and green spaces.
WALKABILITY	9 Sidewalks and bike routes available in most areas.	8 Sidewalks and bike routes available in most areas.	6 Bike routes available. Very wide streets for vehicular traffic.	5 Mostly vehicular. Near Constitutional Ave. Some bike routes.
AMENITIES	10 Libraries, shopping malls, restaurants, recreational center	10 Many shopping, retail, and restaurants. Libraries, schools	6 Museums, restaurants, and retail available. Churches.	7 State libraries and an elementary school. Eastern Market.
URBAN TYPOLOGY	7 Largely residential with some mixed-use areas	9 Mixed-Use and Residential with arts zoning.	6 Split between government civic buildings and mixed use areas	8 Retail Mixed Use street. Judiciary areas with residential.
MILLENNIAL DEMOGRAPHIC	9 Mostly single, non-family households with white collar jobs.	9 Mostly white and African Americans (40 and 42%). Mostly 20s.	8 Predominantly white, younger adults in early and mid-20s.	7 Mostly white, Median age is mid-30s. Even male/female ratio.
REVITALIZATION	5 30% own and 70% rent housing Medium home price above avg.	10 30% own and 70% rent housing History of gentrification. House prices above avg.	9 23% own and 77% rent housing Medium home price below DC avg.	6 45% own and 55% rent housing Medium home price above avg.
ENTERTAINMENT	9 One movie theater, bars and night clubs, music halls	9 One movie theater (Howard Theater), art gallery, night clubs, bars	4 Mostly museums and exhibits.	2 Mostly civic museums and libraries.
PUBLIC SAFETY	7 Violent and property crime. 8% higher than Washington DC avg.	3 Violent and property crime. 65% higher than Washington DC avg.	7 Violent and property crime. 7% over than Washington DC avg.	5 Mostly property crime. 27% higher than Washington DC avg.
TOTAL SCORE	93/110	94/110	81/110	79/110

**Figure 6.2:** Neighborhood Site Selection Matrix (Source: author)

Although Columbia Heights was a strong site option, the proposed program would not have as strong of an impact than it would in Shaw. While both neighborhoods faced destruction from the 1968 riots and experienced a surge of growth and transformation, Columbia Heights has reached its peak density while Shaw is still growing. Many of the blocks in Columbia Heights are filled with new housing, retail, and civic amenities, making it difficult to select a specific site and have a viable reason why the proposed program is better than what is existing.

### The 1968 Riots Impact on Shaw

The Shaw neighborhood was once the epicenter of African American culture during the Harlem Renaissance before it was devastated by the 1968

riots.<sup>78</sup> Its U Street housed the famous Black Broadway, as well as numerous nightclubs, churches, and retail that were owned exclusively by African Americans. All of this changed on April 5, 1968 when over 200 businesses along the 7<sup>th</sup> street NW corridor in Shaw were hit with looting and fires following the assassination of MLK. Roughly 15 percent of the property was destroyed. Troops had to stay an entire week to quell the riots, and a considerable amount of federal and city money was needed to clear the rubble.<sup>79</sup> The riots have caused irreparable damage to Shaw, but the destruction also brought in economic opportunists who took advantage of the situation and paved the way for new urban renewal programs that transformed the neighborhood.

Starting in 1972, many church and nonprofit organizations in Shaw took part in funding affordable housing and adaptive reuse projects. This includes the Immaculate Conception Apartments, a 137-unit affordable housing complex named after the church that funded the project. The Gibson Plaza Apartments were also built on site, funded by another church, during the same year.

As more of these large-scale housing complexes are erected around the neighborhood, it also unintentionally pushed out long term residents. Shaw went through a period of gentrification, bringing in stylish residential condos and

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<sup>78</sup> Rachel Nania, "New Retail Transforms Once Devastated D.C. Neighborhood," WTOP, January 6, 2016, <https://wtop.com/life-style/2016/01/new-development-transforms-shaws-historic-streets-into-retail-destination/slide/1/>

<sup>79</sup> Drew Hanson, "Then and Now: D.C.'s Riot-Ravaged Blocks 50 Years Later," *Washington Business Journal*, March 30, 2018. <https://www.bizjournals.com/washington/news/2018/03/30/dc-riots-1968-then-and-now.html>

mixed-use retail shops into what was once a predominantly low-income area.<sup>80</sup>

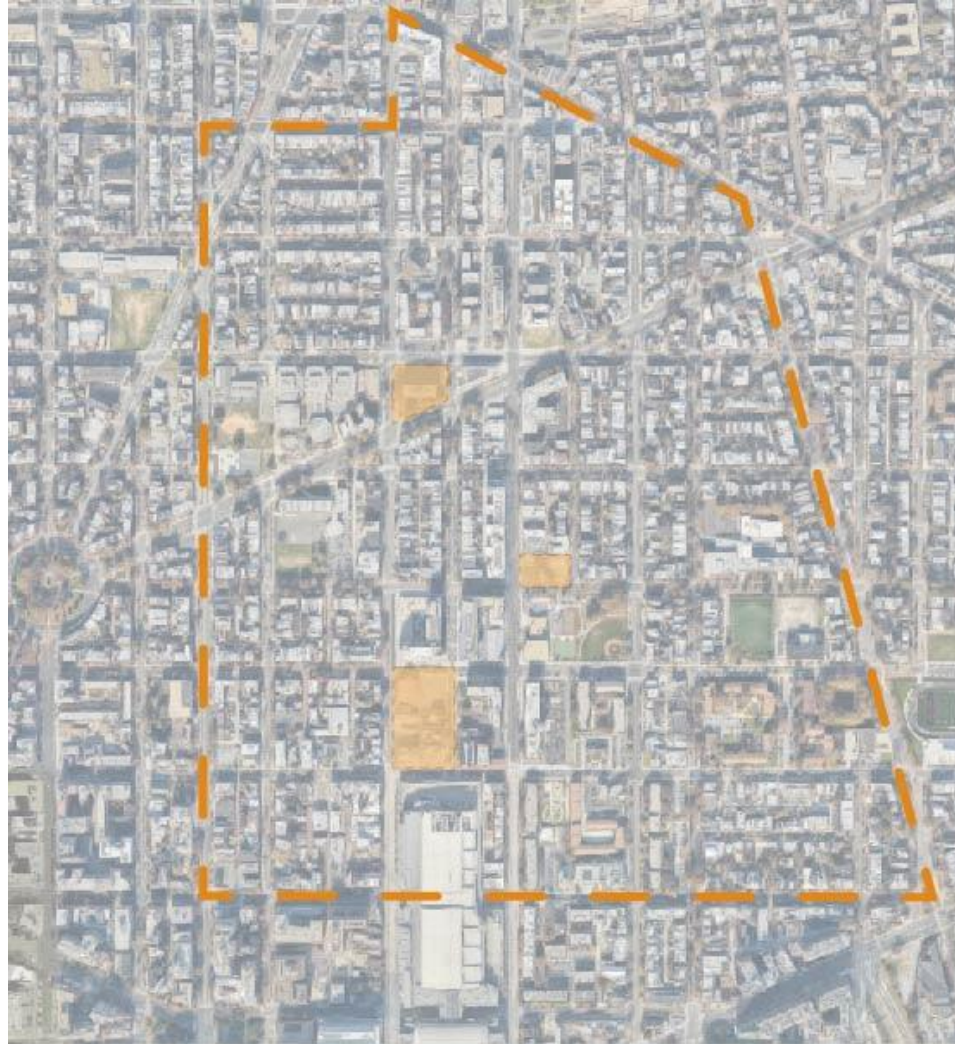
These urban renewal programs have successfully attracted a large white, single, and millennial class. With two metro stations and an influx of new mixed-use retail and housing options, Shaw has slowly gone from one of the worst neighborhoods to the most desirable, especially for small retailers and the city's creative artists.

### **Specific Site Options in Shaw**

Within the Shaw boundary marked in Figure 6.3, the following site options have close proximity to existing amenities, major streets, and are situated between the two metro stations. A new set of design parameters are used to determine which of these three specific sites is the most suitable choice for the proposed program.

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<sup>80</sup> Eugene L. Meyer, "Washington's Shaw Neighborhood Is Remade for Young Urbanites," *The New York Times*, December 1, 2015. <https://www.nytimes.com/2015/12/02/realestate/commercial/development-redefines-character-of-washingtons-shaw-area.html>



**Figure 6.3:** Shaw Site Options (Source: author)

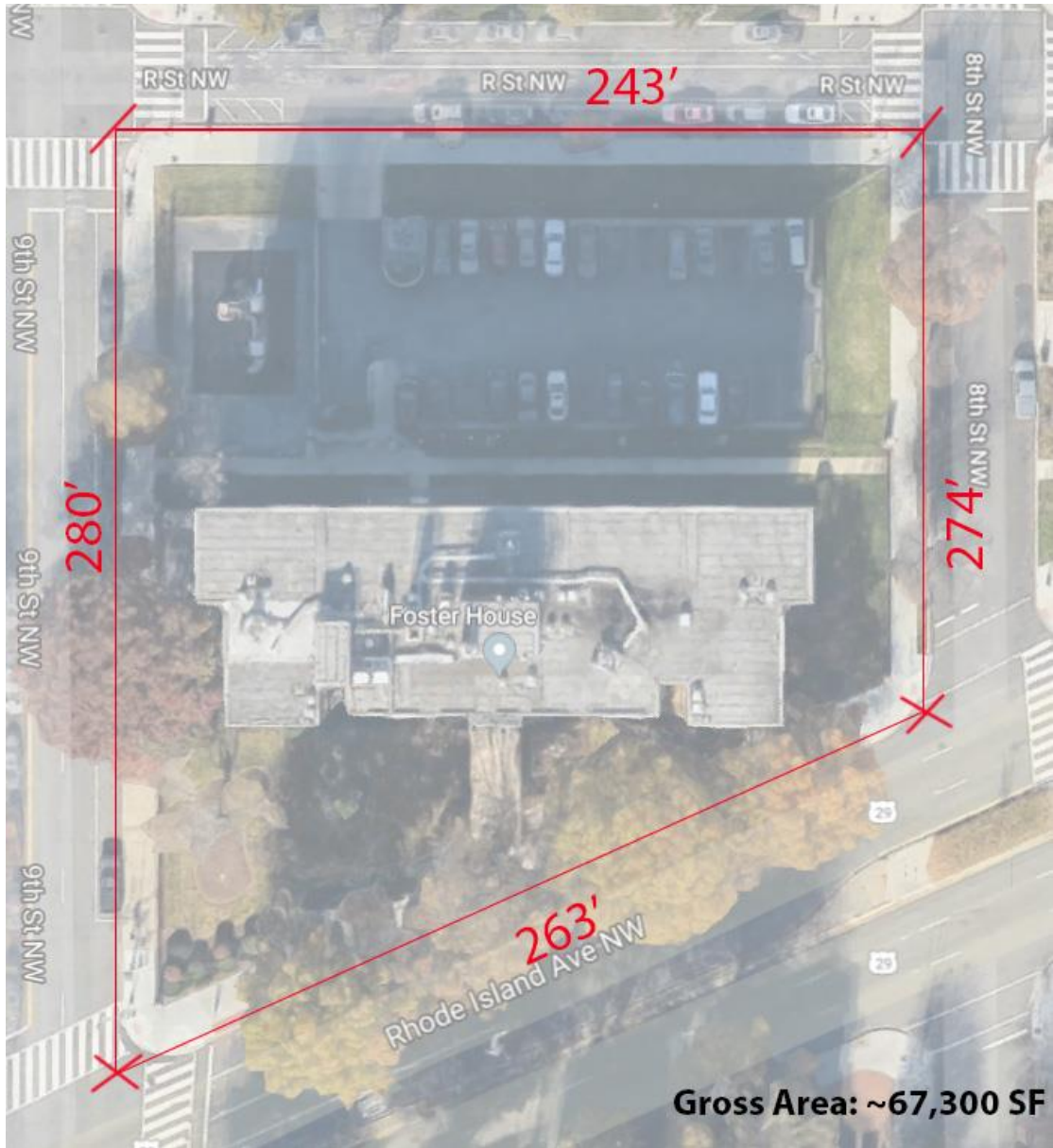
The following parameters were used for this specific site selection:

- **ACCESSIBILITY**
  - Transportation (any metro and bus stops?)
  - Streets (are there bike lanes? How is the traffic?)
  - Local Amenities (what are the available amenities around it?)
- **SITE CONDITIONS**
  - Site Flexibility (what is the available gross area?)
  - Visibility (Daylighting conditions, potential views, urban presence)

- Context (How well can the program fit in?)
- DESIGN POTENTIAL
  - Site boundaries (how will the shape of the site influence design?)
  - Existing programs on site (what needs to be demolished? Will the new program be more beneficial to the public?)
  - Impact on Site

### **Site Option 1: Rhode Island Ave Block**

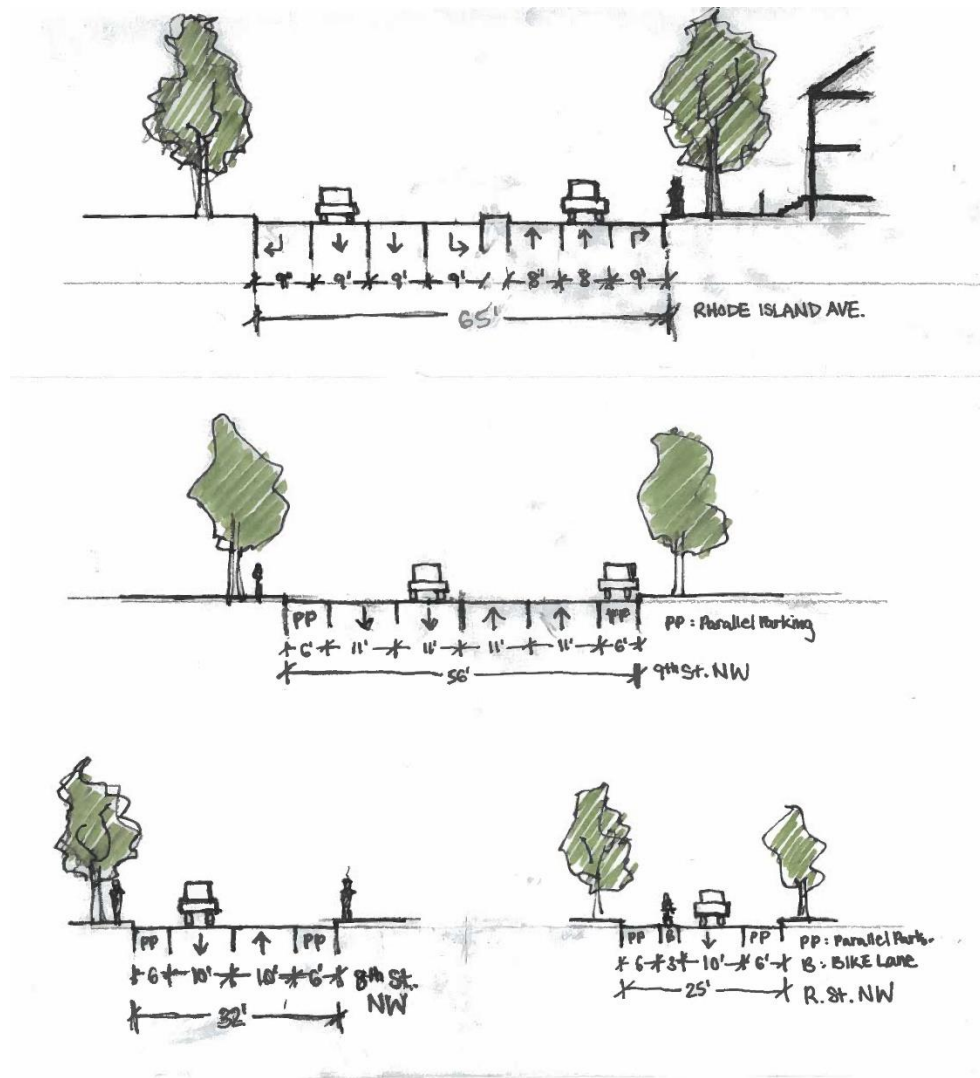
For Site Option 1, there is an existing foster house and parking lot. The site is open to all four sides, has a gross area of roughly 67,300 square feet (seen in Figure 6.4) with its south side facing Rhode Island Ave, a major mixed-use street. The diagonal edge also provides interesting design potentials for the proposed program. The site is adjacent to the Shaw Neighborhood Library on the east and on the west, there is a public high school. As seen in Figure 6.5, site 1 has various transportation options: a metro station, a bike station, and three bus stops. Users on this site would also have close access to the Woodson Memorial Park.



**Fig. 6.4:** Site 1 Aerial View and Gross Area (Source: author and Google maps)



**Fig. 6.5:** Site 1 Boundaries and Proximity to Amenities and Transportation (Source: author)



**Fig. 6.6:** Street Sections of Rhode Island Ave, 9<sup>th</sup> St. NW, R St. NW, and 8<sup>th</sup> St. NW (Source: author)

### Site Option 2: Kennedy Recreation Center

Site 2 is adjacent to the Kennedy Recreation Center and children’s playground. There are multifamily and mixed-use buildings from 7<sup>th</sup> St NW and over with rowhouses on the right side of Site 2. The site is open on three sides, with its north side backed against an alley street and retail stores. It is between 7<sup>th</sup> St. NW and Marion St NW, the former being a 2-way street and the latter a one-way residential street with parallel parking on either side (as seen in Figure 6.9).

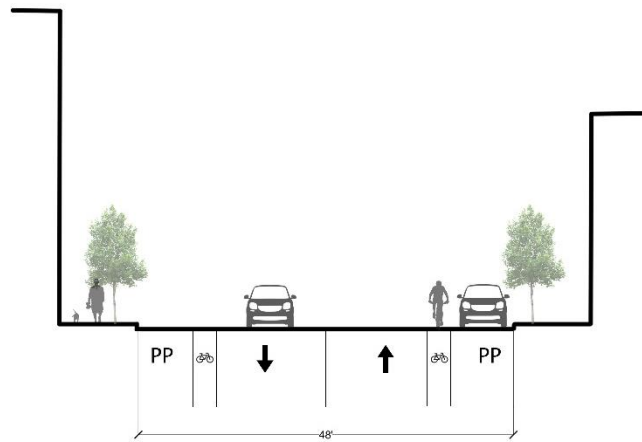
Although the site has plenty of access to many local amenities, the available gross area of the site is smaller in comparison and therefore presents potential design constraints and challenges not seen in the other options.

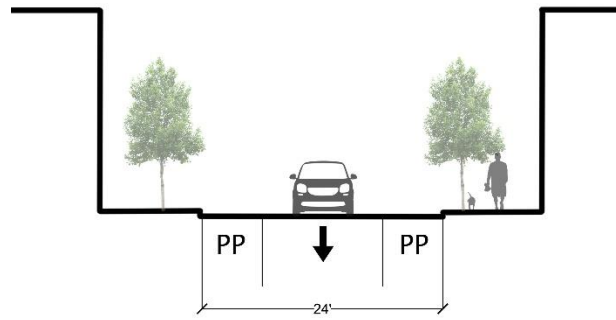


**Fig. 6.7:** Site 2 Aerial with Dimensions and Gross Area (Source: author)



**Fig. 6.8:** Site 2 Boundaries and Proximity to Existing Programs (Source: author)





**Fig. 6.9:** Street sections of 7<sup>th</sup> St. NW (above) and Marion St. NW (below)

(Source: author)

### **Site Option 3: Walter E. Washington Convention Center**

Site 3 is located north of the Walter E. Washington Convention Center with close access to the Kennedy Recreation Center located northeast. While the site is surrounded by mixed-use retail, its visibility is hindered by high-rise residential buildings on two of its sides and the convention center on its south side. This would prevent solar orientation challenges and clear viewports for users of this site.



Fig. 6.10: Site 3 Aerial with Dimensions and Gross Area (Source: author and Google Maps)



**Fig. 6.11: Site 3 Boundaries and Proximity to Amenities and Transportation**  
(Source: author)

## SELECTED SITE

Based on these site design parameters, as shown in Figure 6.12, Site Option 2: The Recreation Center is the most suitable choice out of the three. Unlike Site 1 and Site 3, Site 2's available gross area of 32,000 square feet is manageable and defines this thesis' main challenge: adopting traditional cohousing programs into a dense urban site. The chosen site also has access to a variety of transportation options and local amenities such as the Kennedy Recreation Center, which provides physical wellness programs for all ages and serves as a registration area for voting polls for politically-inclined millennials.

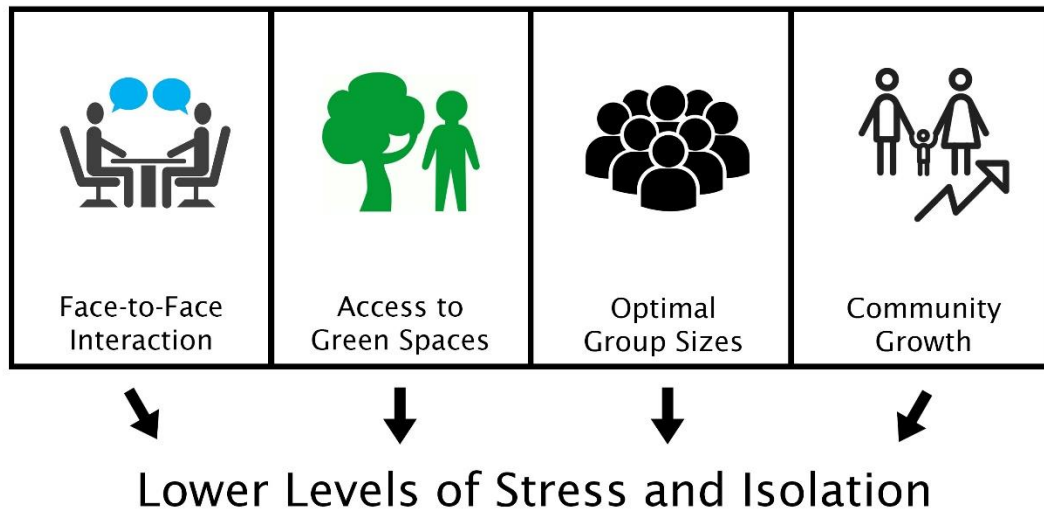


**Fig. 6.12:** Selected Site and how it fulfills each of the site parameters.

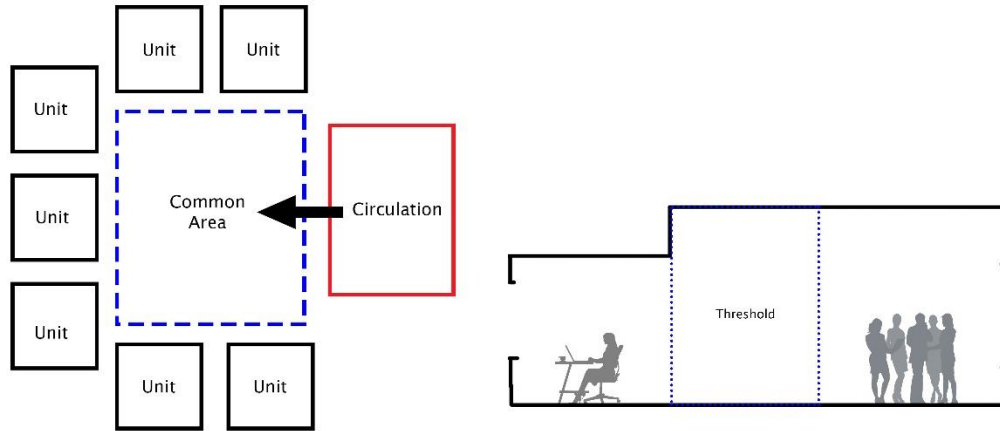
(Source: author)

## Chapter 7: Program and Solutions

The purpose of this thesis is to create a community of millennial workers who are seeking a work-life balance, willing to create new social relationships, and engage in community activities. These social solutions (see Figure 7.0) are gleaned from the mentioned study done by Bennett, Gualtieri, and Kazmierczyk in Chapter 1. Cohousing fulfills these social considerations by traditionally having residents forego private space for common area spaces, providing a common house and courtyard, and enforces face-to-face interaction by having residents prepare meals together and manage their work schedules. After designing the architectural typology, design concepts (see Fig. 7.1) to address these social considerations.



**Fig. 7.0:** Social Solutions (Source: author)



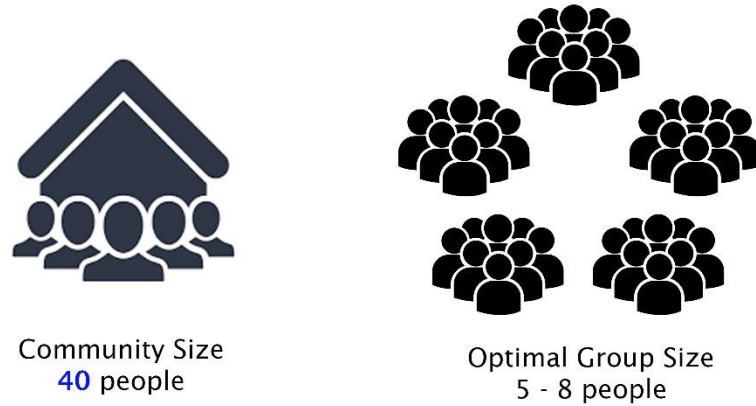
**Fig. 7.1:** Design Solutions (Source: author)

### Ideal Community and Group Sizes

As a part of the social and design solutions, optimal community and group sizes need to be established. According to Chuck Durrett from the cohousing organization, a community that has over 50 adults makes it difficult for decisions to be made and have a consensus.<sup>81</sup> For optimal group sizes, it is preferred that groups consist between five to eight people so that everyone will have a chance to speak out and feel empowered for sharing their views to others.<sup>82</sup> Using these numbers, this thesis strives to have a community of 40 people as its optimal community coefficient (see Fig. 7.2).

<sup>81</sup> "Cohousing for Seniors: A Solution for Today," Cohousingco, last modified April 16, 2019, <http://www.cohousingco.com/blog/2019/4/10/cohousing-for-seniors-a-solution-for-today>

<sup>82</sup> Anne Gomez, "What is an ideal group size?" *Clear Concept*, June 19, 2017, <https://clearconceptinc.ca/what-is-an-ideal-group-size/>



**Fig. 7.2:** Optimal Community and Group Sizes (Source: author)

### **Design Goals and Site Integration**

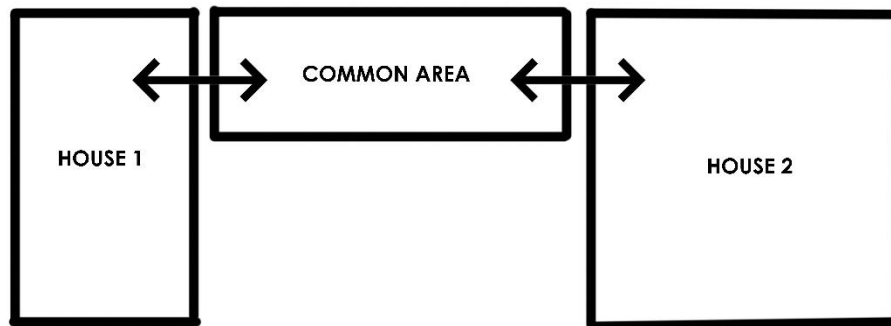
This design goals of this thesis are as follows:

1. **Enforce** face-to-face interaction
2. **Establish** optimal group sizes in an ideal community size
3. **Create** thresholds between public and private areas
4. **Access** to vegetation and quality light and air
5. **Integrate** the program onto the site

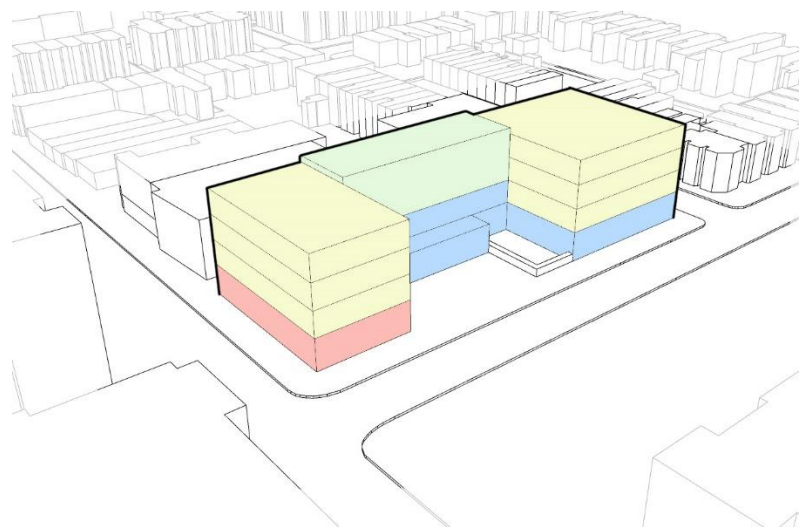
These goals are realized in the design parti (see Fig. 7.3), building program (see Fig. 7.4), and floor plans. Instead of calling these 'parts' of the building as a left or right wing, they are called 'Houses' because the units are more like 'rooms' while the smaller communal kitchen and public lounge are an extension of each floor residents' living space. House 1 describes the left wing of the building facing 7<sup>th</sup> street NW, with two retail spaces and a restaurant on the ground floor. House 2 describes the right wing of the building that faces the

pedestrian and quiet Marion Street and accommodates the communal kitchen, dining area, and underground parking ramp. The residential floors are accessed by two circulation cores with rooftop decks on each wing.

The common area that connects House 1 and House 2 consist of the leasing office and administration on the ground floor, the public lounge and balcony on the second floor, and a two-story solarium with a mezzanine.



**Fig. 7.3:** Parti Diagram (Source: author)

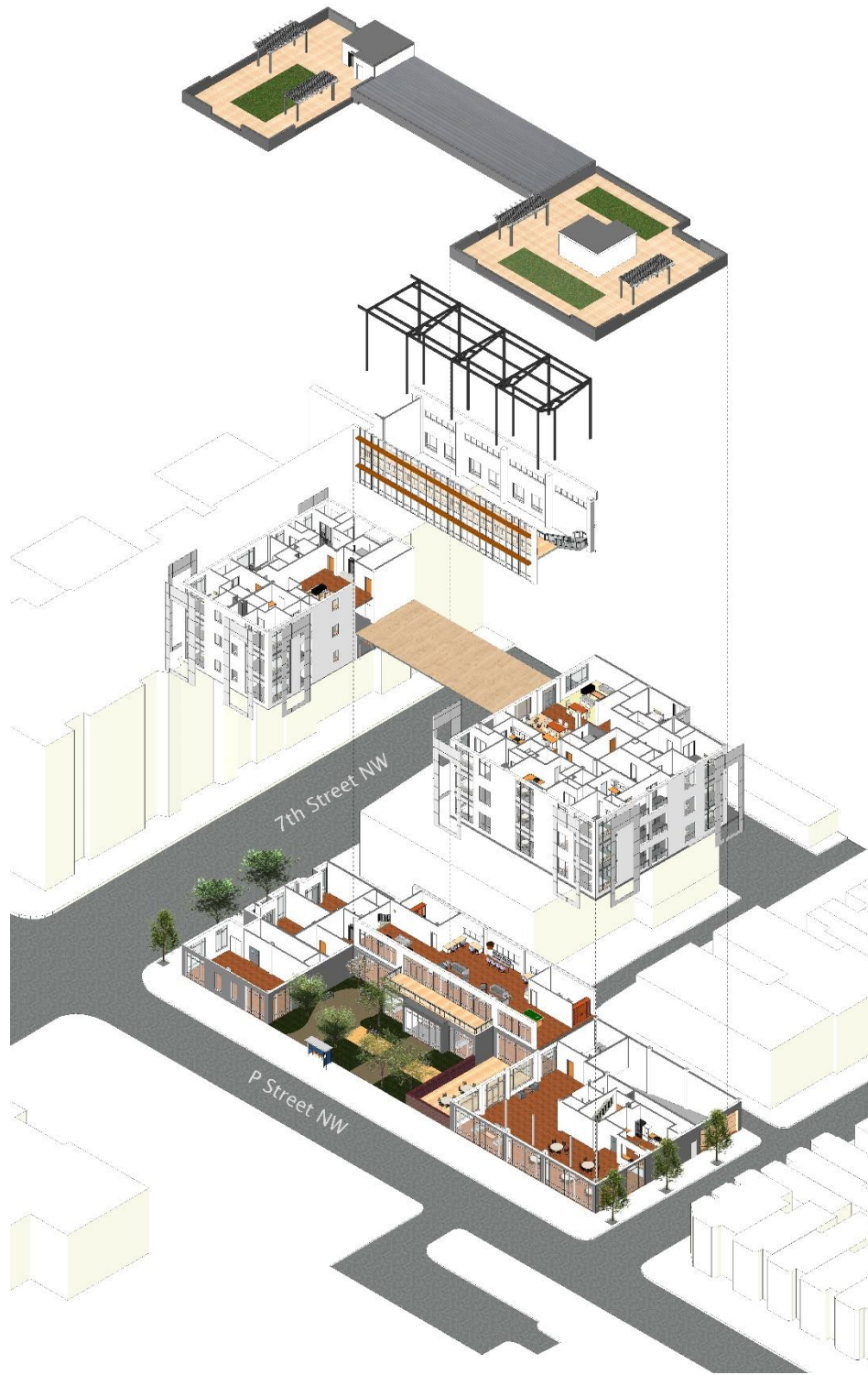


**Fig. 7.4:** Program Massing with Context using land-use colors (Source: author)

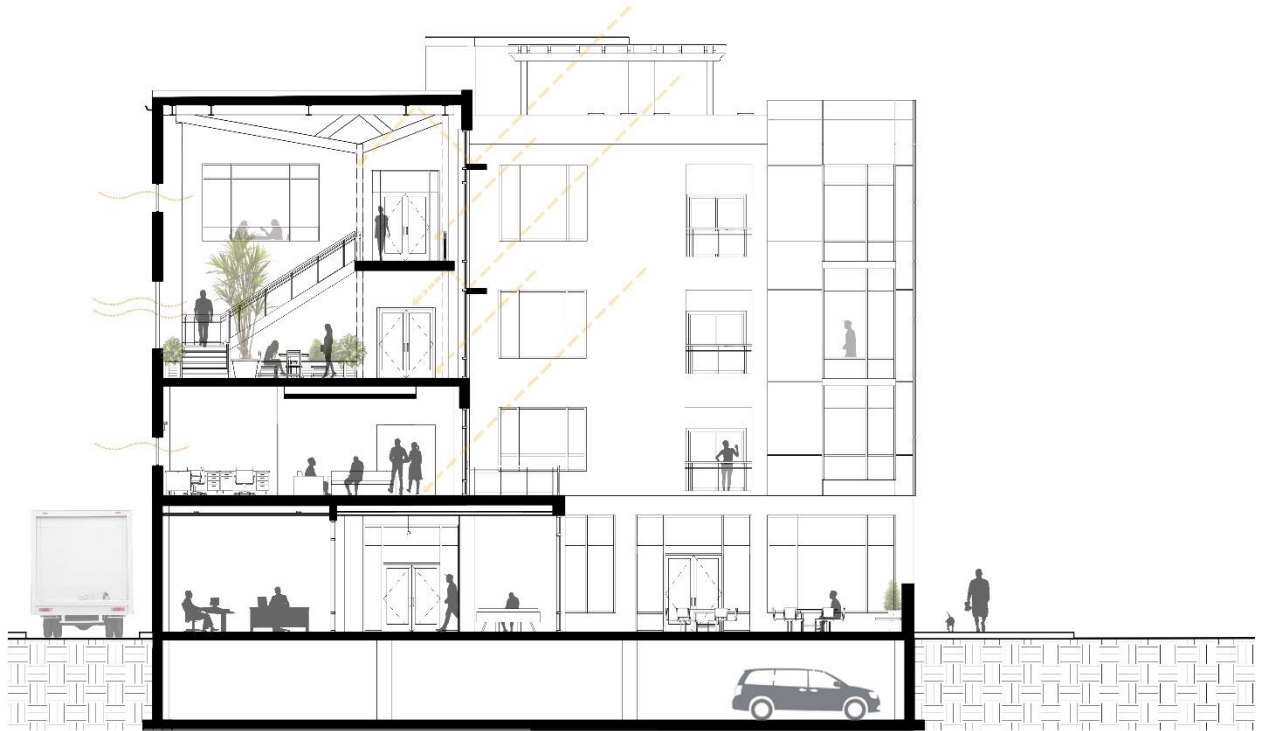
**Illustrative Site Plan, Floor Plans, Sections, and Perspectives**



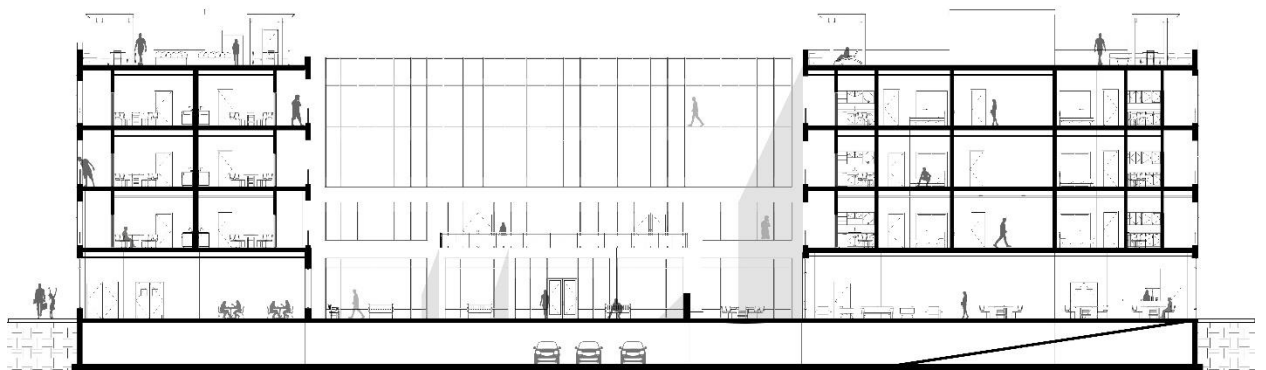
**Fig. 7.5:** Illustrative Site Plan with Roof Plan (Source: author)



**Fig. 7.6:** Exploded Axon on Site (Source: author)



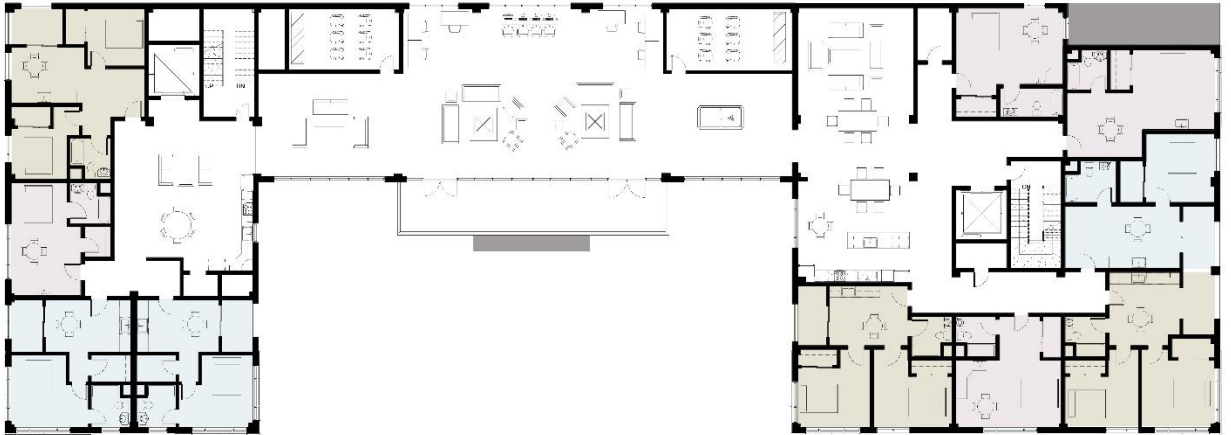
**Fig. 7.7:** Section through Common Area Bar (Source: author)



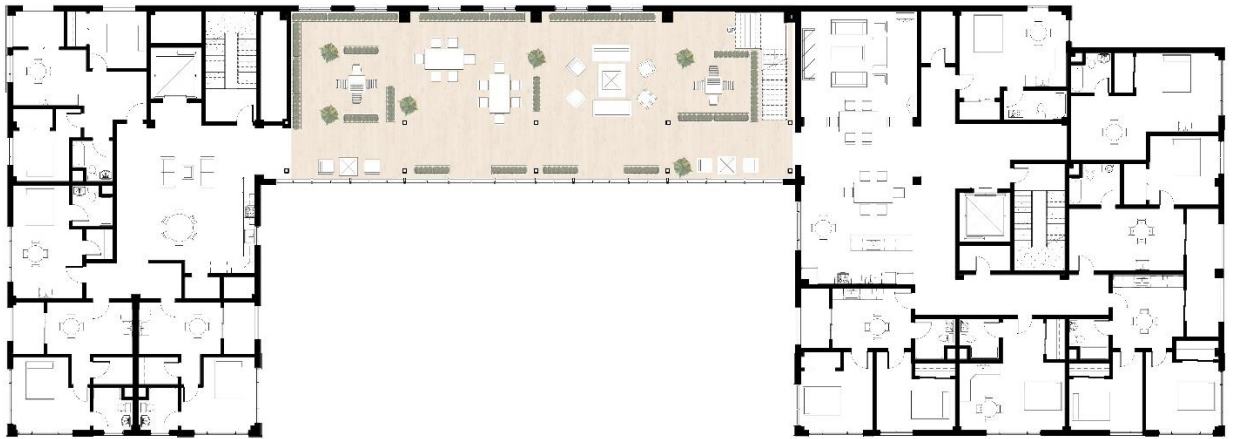
**Fig. 7.8:** Section through House 1 and House 2 (Source: author)



**Fig. 7.9:** Aerial view of proposed design on site (Source: author)



**Fig. 7.10:** First Floor Plan (Source: author)



**Fig. 7.11:** Second Floor Plan with Solarium (Source: author)



**Fig. 7.12:** Public Lounge on First Floor (Source: author)



**Fig. 7.13:** Outdoor Balcony facing P Street (Source: author)



**Fig. 7.14:** Solarium (Source: author)



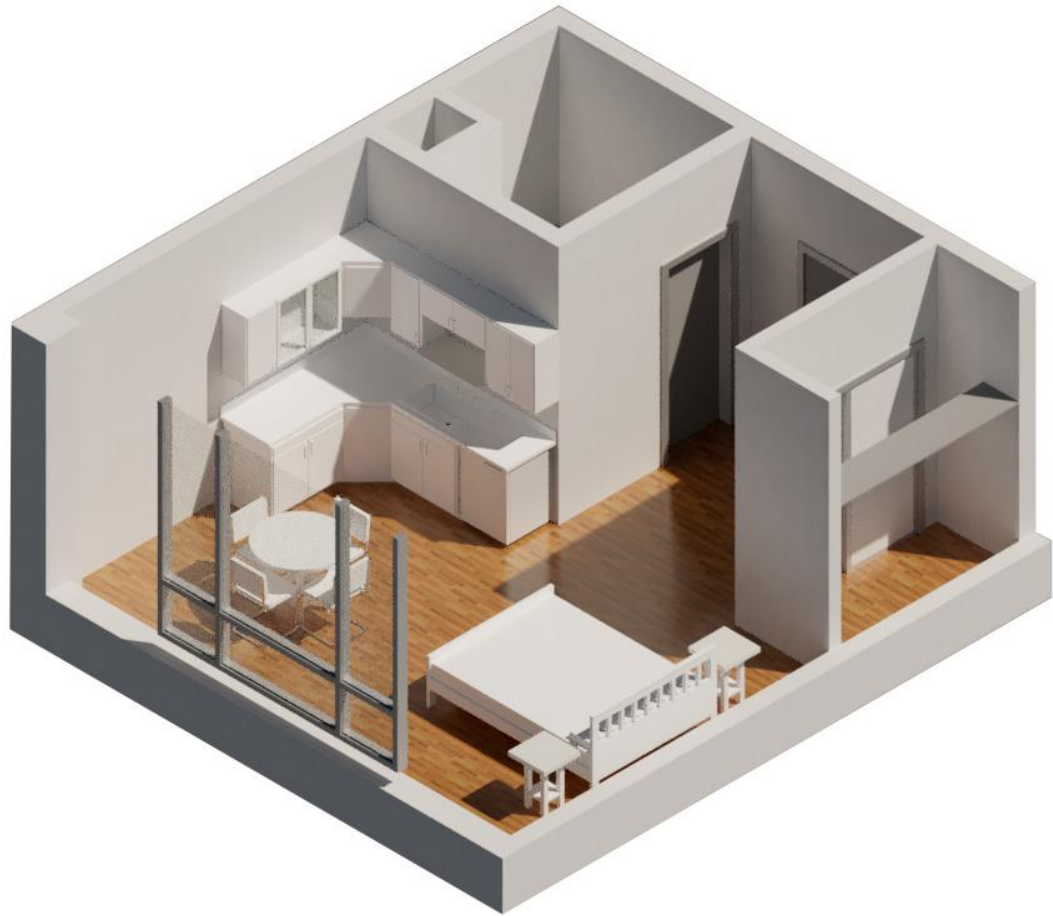
**Fig. 7.15:** Rooftop Deck on House 1 facing 7<sup>th</sup> Street (Source: author)



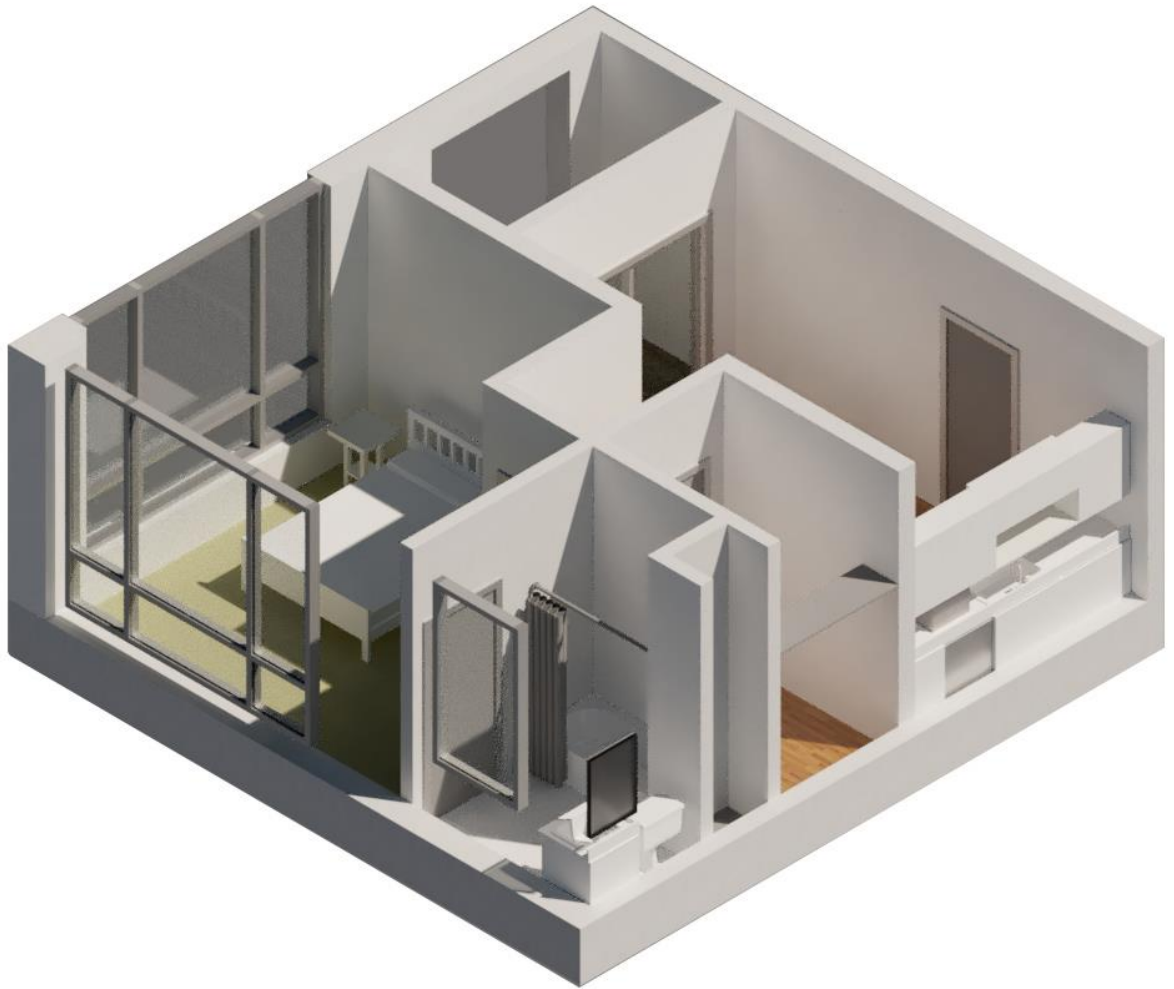
**Fig. 7.16:** Perspective View on 7<sup>th</sup> Street NW (Source: author)

### **Unit Types**

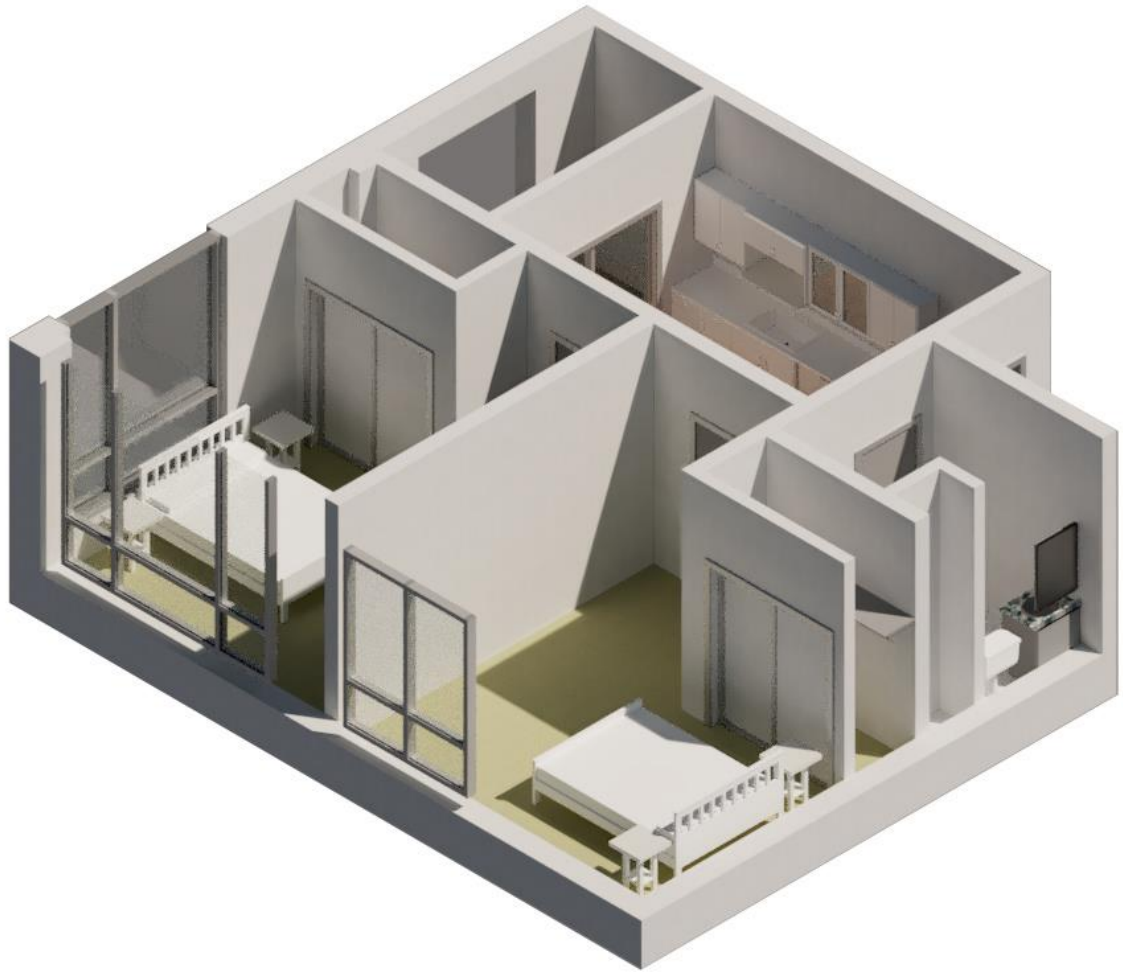
To accommodate 40 new residents, a total of thirty units occupy three floors in House 1 and House 2. There are three different unit types in this cohousing community: studio, 1-bedroom, and 2-bedroom units (see Fig. 7.3). A Kit of Parts is used to provide a standard bathroom and storage space for each of the units. Individual balconies are given to the 1-bedroom and 2-bedroom units as an outdoor gathering space to develop personal relationships with their roommates. Each unit is given kitchen cabinets, a sink, small fridge, toaster, and microwave while larger appliances such as dishwashers and stoves are in the common areas.



**Fig. 7.17:** Studio Unit Axon (Source: author)



**Fig. 7.18:** 1-Bedroom Unit Axon (Source: author)



**Fig. 7.19:** 2-Bedroom Unit Axon (Source: author)

## **Conclusion**

After the final review, there are many steps that can be taken to develop this thesis even further. Since the site is in a high revenue area in D.C, there were many suggestions of raising the courtyard on a platform and allow for more retail stores on the ground floor. Introducing more retail would also help residents financially by splitting the cost of occupying this space. Another suggestion

involves improving the alley condition, perhaps opening it up further and using green alley precedents to further its design.

When it came to units, since the tenants are busy workers, bedrooms can be switched with the living spaces to utilize the natural light coming in from the bay windows. There should be less cabinets and kitchen appliances in the units to encourage more time spent in the communal kitchens and lounges. The Solarium was received positively, but the space can be celebrated more if it was extended down to the ground floor to allow the outside community to participate in garden related activities with the residents. House 2's elevation can also differ more from House 1 so that it resembles the dialogue of Marion Street's two-story houses and place emphasis on having the proposed design act as an urban mediator not just from a height standpoint, but also from its materiality.

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