





**HOUSING X**  
RETHINKING HOUSING IN DALLAS

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SCHOOL OF ARCHITECTURE  
MASTER OF ARCHITECTURE  
2023



## committee members

Final Study Project submitted to the faculty of  
Texas A&M University in partial fulfillment of  
requirement for the degree of  
MASTER OF ARCHITECTURE, 2023

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Dr. Ahmed K. Ali / Chair of Committee

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Marcelo Lopez-Dinardi / Co-Chair of Committee

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Dr. Christine Wen / / Member of Committee

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Andrew G Hawkins / Studio Professor





Figure 1: Illustrated by Minh Tran (Tran, 2016)

***"A man who stands for nothing will fall for anything."*- Malcolm X**

"African American leader Malcolm X was a minister, human right activists and Black nationalist leader who served as a spokesman for the Nation of Islam during the 1950s and

1960s. He was assassinated in 1965 in New York City." (Editors, 2021)

## author's note

**"To everyone who dares to push the boundaries, thinks differently, and seeks discomfort."**

This project is dedicated to Malcolm X, whose unparalleled capacity to recognize the core causes of social and political crises continues to inspire us today. Malcolm X challenged individuals to question their own lives and communities, and his message of self-empowerment remains relevant as we strive for a more just and equal society. His legacy serves as a reminder of the importance of perseverance in the face of adversity.

Over the course of a year, this project presented me with numerous opportunities to delve deeper into the factors that influence architecture. Through extensive research and analysis, I learned that architecture cannot exist in isolation but must be deeply integrated with the surrounding community and built for the people.

My initial curiosity about this project was sparked during my first-year Design studio in the graduate program in 2021. The plot of land we were assigned to work on, despite being located in the heart of Dallas, had a remarkably low property value of only \$5000. This prompted me to investigate why this was the case, especially given that the surrounding properties were worth millions of dollars.

As I delved deeper into my research, I was confronted with the stark reality of life in one of the most developed metropolitan cities in the world. Homelessness, poverty, and a host of other challenges related to fulfilling basic needs were pervasive, and I struggled to understand why such issues persist in a city that is widely regarded as a beacon of success.

Throughout this journey, I became increasingly aware of a major road that crossed the location of our project site, S Malcolm X Blvd. My curiosity about the boulevard's namesake led me to learn more about Malcolm X and his beliefs. Reading multiple books about him allowed me to develop a deeper understanding of both the man and the country, America.

This project represents a bold attempt to rethink the American housing system, placing a greater emphasis on the needs and values of the surrounding community. By striving to create a space in which people and architecture can coexist in harmony, we hope to create a model for future projects that prioritizes the well-being of individuals and communities alike.



## acknowledgement

I am a firm believer in the fact that learning is an ongoing process, one can never stop exploring new horizons. As I approach the end of my Master's degree in Architecture, I cannot help but feel extremely grateful for the guidance and support I have received during my journey.

I would like to take this opportunity to express my gratitude to Dr. Ahmed K. Ali, whose unwavering support and mentorship have been invaluable in shaping my understanding of the field of architecture. Your guidance has taught me that asking the right questions to arrive at the correct answer is crucial, and for that, I am deeply grateful.

I would also like to extend my appreciation to Prof. Marcelo Lopez-Dinardi, whose insightful teachings have enabled me to recognize opportunities for architecture to take place. Your expertise has been instrumental in shaping my perspective on architecture.

Furthermore, I would like to express my gratitude to Dr. Christine Wen, whose encouragement and constructive feedback helped me make the most of my final study. Your spontaneity and humility made the journey even more worthwhile.


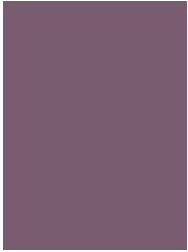



I would also like to extend my heartfelt appreciation to Prof. Andrew G Hawkins for making the studio sessions enjoyable and practical. Your clarity of work and guidance was indispensable in times of confusion.

Last but not least, I want to express my sincere thanks to my family and friends. Your unwavering support and belief in my abilities have been my foundation throughout this journey. Your encouragement has been a constant source of motivation for me.

Once again, I am incredibly grateful for all the support and guidance that I have received. It has been a phenomenal journey, and I consider myself privileged to have learned from all the experts who have shared their knowledge and expertise in the studios, lectures, and seminars that I have attended throughout my time at the university.



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## research question

The persistence of unmet basic needs among individuals residing in economically prosperous metropolitan areas of America raises a critical research question that demands attention. Despite the overall success of these cities, what underlying factors contribute to this issue? Abandoned plots, streets, or even entire urban sections represent significant challenges that require immediate revitalization efforts. Thus, a crucial inquiry that follows is how can these areas be effectively integrated into the larger solution framework of the city.

Moreover, it is essential to examine the role of architects, designers, and thinkers in forging connections between these issues and the opportunities they present. What innovative approaches can these professionals bring to bear on these challenges to facilitate sustainable urban growth and development? What measures, in particular, might be used to encourage community engagement and collaboration in the rebuilding process?

Furthermore, how can technology be harnessed to optimize the use of these spaces and enhance the well-being of residents in the affected areas? Also, what steps may be made to ensure that revitalization initiatives are equitable and inclusive, benefiting all people in the community?

## project intention

The primary focus of this project is on a municipal block located in Dallas. Despite its location in the heart of the city, this area has not seen significant development activity compared to its neighboring blocks. The objective of this project is to reconsider and reevaluate the current scenario of the S Malcolm X Boulevard block to provide affordable housing to a mixed-income group of people while avoiding the isolation of any particular community.

To achieve this objective, the project proposes a combination of income groups to ensure that the community is diverse and inclusive. Furthermore, the project aims to place a responsible architecture that considers both the community and the environment in which it is situated. This approach incorporates sustainable design attributes aimed at reducing the building's operating costs by using natural design strategies such as daylighting and cross ventilation, smart water usage, and solar energy.

The ultimate goal of this project is to serve as a prototype for analyzing isolated and abandoned areas and giving them back to the community and the city. It can be viewed as an igniter to address some of the housing affordability issues that many communities face today.

**affordable  
housing**





## rental homes

affordable and available per 100 extremely low-income renter households by state

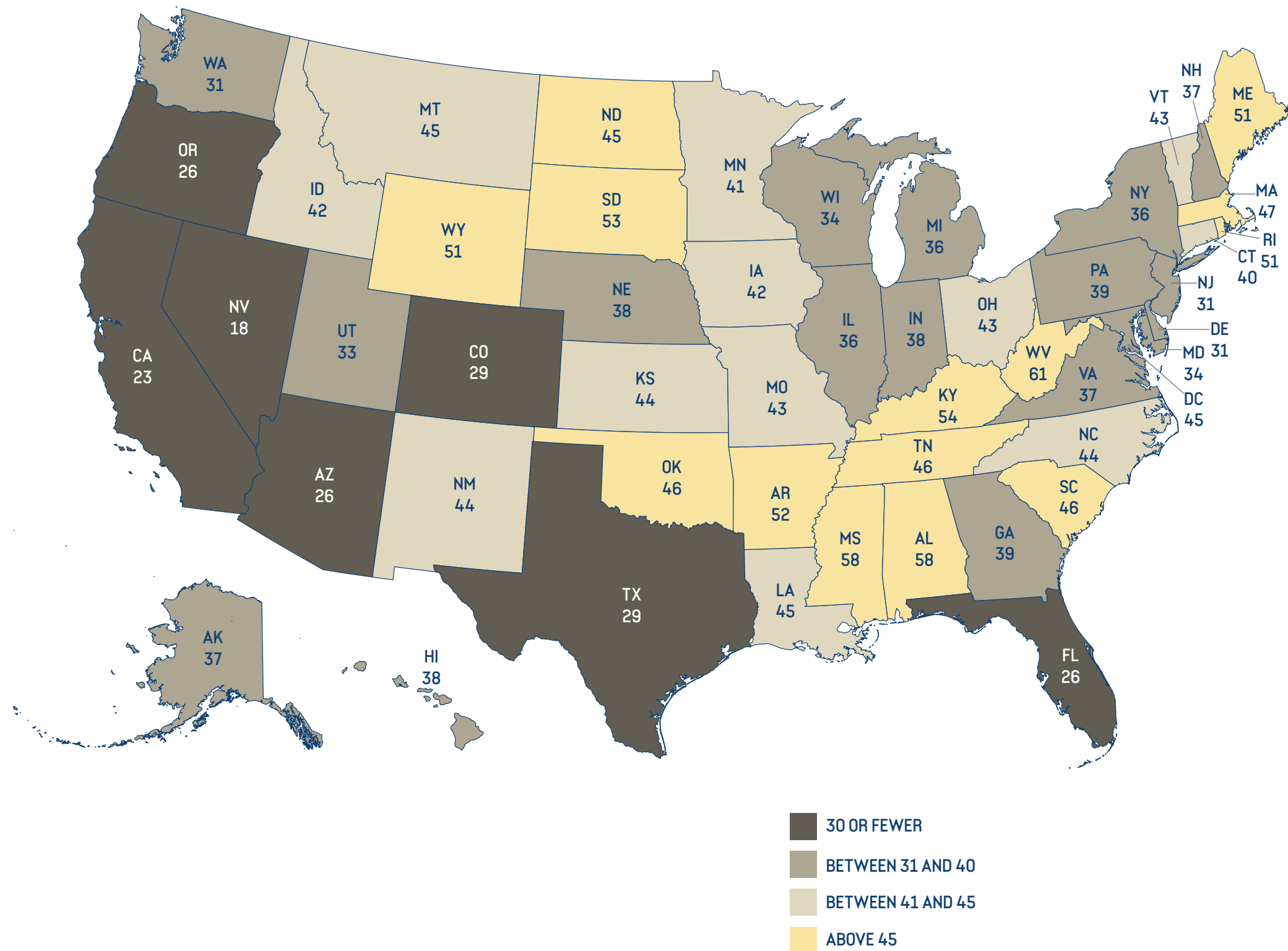


Figure 3: USA state map with rental affordability(Figure by Author)  
figure inspiration:(NLHC,2023)  
data source: (NLHC, 2023)

## affordable housing

"Affordable housing is housing that a household can pay for, while still having money left over for other necessities like food, transportation, and health care. That means that what's considered "affordable" depends on a household's income.

So, who needs affordable housing? Everyone.

From high-income earners to hourly wage workers, to people experiencing homelessness, and everyone in between. The rent or home price that is affordable may vary from one household to

next, but the need for housing that is affordable is shared by everyone." (LHS,2023)

## so how about renting?

In the United States of America, a significant income gap exists, which has made it challenging for many to purchase homes, forcing them to turn to renting properties. Unfortunately, the gap continues to widen, and an increasing number of people from various income groups are facing similar affordability challenges, even with renting properties. Regrettably, low-income workers, who earn the minimum wage of \$7.25 per hour, are the most vulnerable to this challenge.

issue has become more severe, and an average worker has to work over 50 hours a week to afford a one-bedroom apartment in metropolitan areas. To raise awareness of this issue, NLHC has published a data analysis research paper titled "The GAP."

Over the last two years, continuous inflation has increased the homeless population by 23%, exacerbating the housing crisis.

As per the National Low Income Housing Coalition (NLHC) 2023 report, the

This raises the question of how a basic human right, such as housing, can still be an issue in the most

economically strong country in the world. The stress of living in poverty or being homeless due to one wrong decision takes a significant toll on a person's day-to-day life.

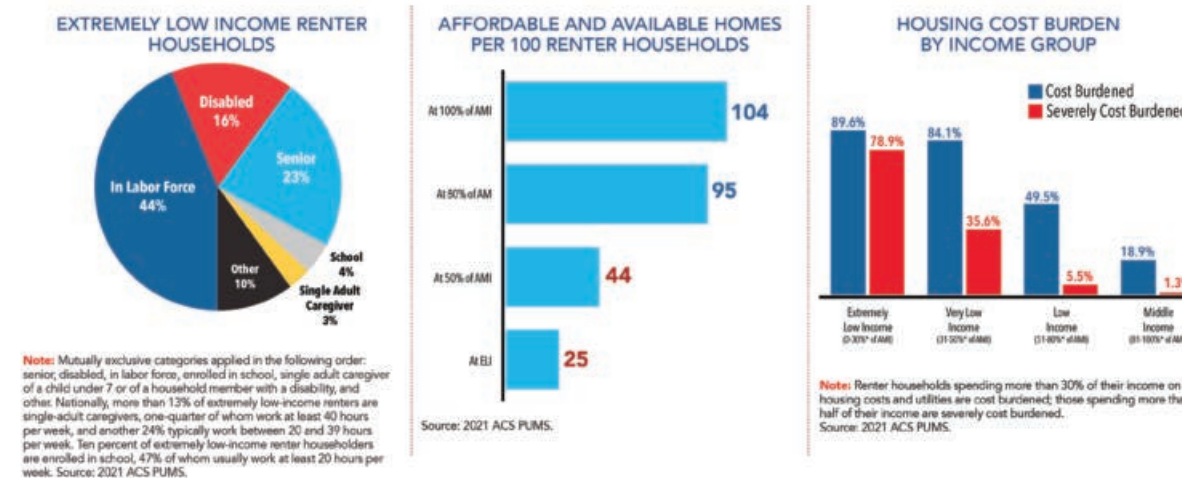


## scenario in texas

affordability data and housing profile

Across Texas, there is a shortage of rental homes affordable and available to extremely low income households (ELI), whose incomes are at or below the poverty guideline or 30% of their area median income (AMI). Many of these households are severely cost burdened, spending more than half of their income on housing. Severely cost burdened poor households are more likely than other renters to sacrifice other necessities like healthy food and healthcare to pay the rent, and to experience unstable housing situations like evictions.

SENATORS: John Cornyn and Ted Cruz



Note: Mutually exclusive categories applied in the following order: senior, disabled, in labor force, enrolled in school, single adult caregiver of a child under 7 or of a household member with a disability, and other. Nationally, more than 12% of extremely low-income renters are single-adult caregivers, one-quarter of whom work at least 40 hours per week, and another 24% typically work between 20 and 39 hours per week. Ten percent of extremely low-income renter households are enrolled in school, 47% of whom usually work at least 20 hours per week. Source: 2021 ACS PUMS.

Note: Renter households spending more than 30% of their income on housing costs and utilities are cost burdened; those spending more than half of their income are severely cost burdened. Source: 2021 ACS PUMS.

Updated: 03/12/2023  
1000 Vermont Avenue, NW, Suite 500, Washington, DC 20005  
WWW.NLIHC.ORG

Figure 4: Shortage of rental home in Texas(NLIHC,2023)

In Texas, the Fair Market Rent (FMR) for a two-bedroom apartment is **\$1,172**. In order to afford this level of rent and utilities — without paying more than 30% of income on housing — a household must earn **\$3,907** monthly or **\$46,889** annually. Assuming a 40-hour work week, 52 weeks per year, this level of income translates into an hourly Housing Wage of:

**\$22.54**  
PER HOUR  
STATE HOUSING  
WAGE

### FACTS ABOUT TEXAS:

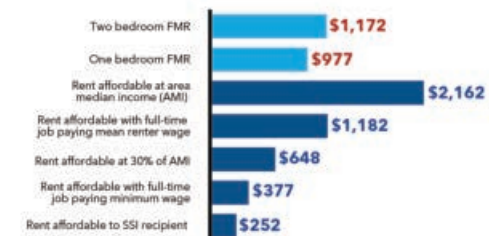
STATE FACTS	
Minimum Wage	\$7.25
Average Renter Wage	\$22.73
2-Bedroom Housing Wage	\$22.54
Number of Renter Households	3,737,262
Percent Renters	38%

**124**  
Work Hours Per Week At  
Minimum Wage To Afford a  
2-Bedroom  
Rental Home (at FMR)

**104**  
Work Hours Per Week At  
Minimum Wage To Afford a  
1-Bedroom  
Rental Home (at FMR)

**3.1**  
Number of Full-Time Jobs At  
Minimum Wage To Afford a  
2-Bedroom Rental Home (at FMR)

**2.6**  
Number of Full-Time Jobs At  
Minimum Wage To Afford a  
1-Bedroom Rental Home (at FMR)



MSA = Metropolitan Statistical Area; HMA = HUD Metro FMR Area.  
\* Ranked from Highest to Lowest 2-Bedroom Housing Wage. Includes District of Columbia and Puerto Rico.

OUT OF REACH 2022 | © NATIONAL LOW INCOME HOUSING COALITION

Figure 5: Earning facts in Texas(NLIHC, 2023)

## amount of hours needed to work

in Texas for renting a two-bedroom apartment for a low-wage occupation

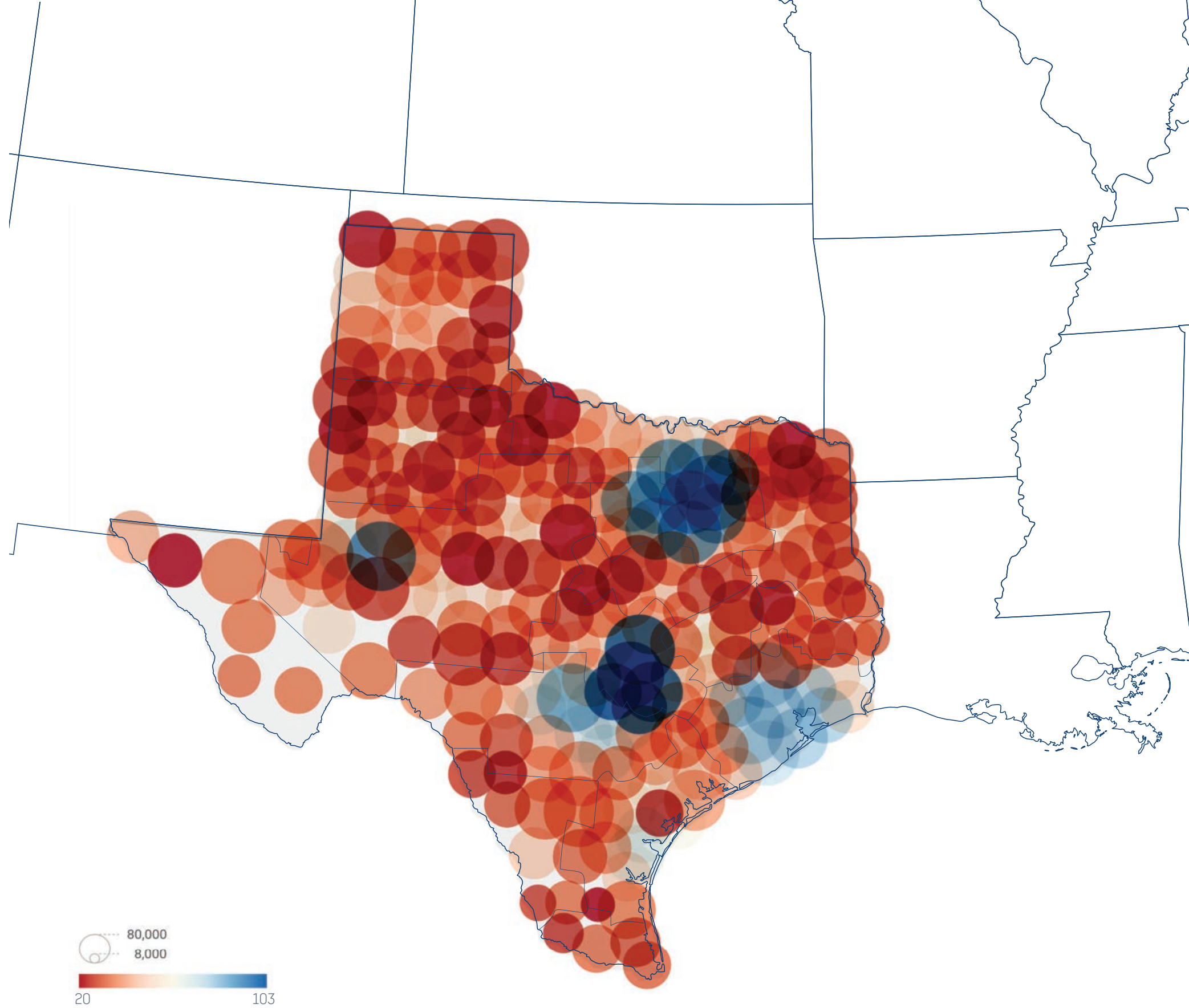


Figure 6: Texas state map showing work hours(Figure by Author) data source:(NLIHC, 2023)

## affordability scenario in Dallas, TX

When it comes to affordability, Dallas, Texas faces a frightening reality. It now has the unfortunate distinction of having the most residents living 185 percent below the poverty level of any city in America. Furthermore, it has the second highest number of people living 100 percent below the poverty line, after only Philadelphia, Pennsylvania.

These figures present a terrible picture of poverty in Dallas but they are only the tip of the iceberg. As stated by Buckner, (Buckner, 2017)

“Despite working full-time, more than 27,000 Dallas citizens live in poverty, illustrating the city’s difficulty in making ends meet.

Single mothers in Dallas are particularly vulnerable to poverty, with 48% living below the poverty level. This unpleasant fact strains their ability to provide for their children and jeopardizes the well-being of entire families. Surprisingly, this figure has been continuously rising since 2005, signaling a worrying trend. The condition of children in Dallas is very concerning.”

Currently, 38% of Dallas children are poor, with 28% having insufficient access to healthcare and 25% experiencing food insecurity.



## scenario in texas

housing wage required and wage earned by various occupations

Texas	
<b>Number of Households</b>	
TOTAL	9,906,070
RENTER	3,737,262
PERCENT RENTERS	38%
<b>Housing Wage</b>	
ZERO-BEDROOM	\$17.11
ONE-BEDROOM	\$18.79
TWO-BEDROOM	\$22.54
THREE-BEDROOM	\$29.52
FOUR-BEDROOM	\$36.67
<b>Fair Market Rent</b>	
Texas	
ZERO-BEDROOM	\$890
ONE-BEDROOM	\$977
TWO-BEDROOM	\$1,172
THREE-BEDROOM	\$1,535
FOUR-BEDROOM	\$1,907
<b>Annual Income Needed to Afford</b>	
ZERO-BEDROOM	\$35,583
ONE-BEDROOM	\$39,078
TWO-BEDROOM	\$46,889
THREE-BEDROOM	\$61,400
FOUR-BEDROOM	\$76,266
<b>Minimum Wage</b>	
MINIMUM WAGE	\$7.25
RENT AFFORDABLE FOR A FULL-TIME WORKER AT MINIMUM WAGE	\$377
<b>Work Hours/Week at Minimum Wage</b>	
ZERO-BEDROOM	94
ONE-BEDROOM	104
TWO-BEDROOM	124
THREE-BEDROOM	163
FOUR-BEDROOM	202
<b>Supplemental Security Income (SSI) Payment</b>	
SSI MONTHLY PAYMENT	\$841
RENT AFFORDABLE TO SSI RECIPIENT	\$252
<b>Income Levels</b>	
30% OF AREA MEDIAN INCOME (AMI)	\$25,939
50% OF AREA MEDIAN INCOME (AMI)	\$43,232

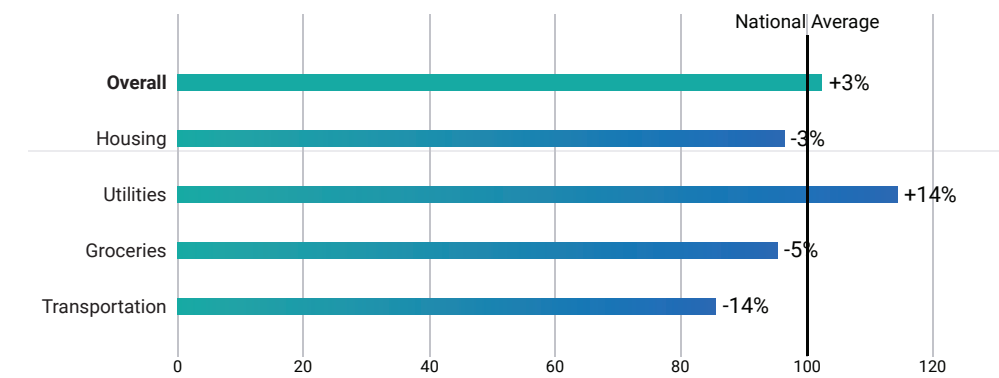
Figure 7: Housing wage required to afford and wages earned by occupations(NLIHC,2023)

### Median Wages for Largest Occupations

Occupation	Total Employment	Median Hourly Wage
WAITERS AND WAITRESSES	171,060	\$10.62
FAST FOOD AND COUNTER WORKERS	353,500	\$11.17
HOME HEALTH AND PERSONAL CARE AIDES	306,410	\$11.45
CASHIERS	305,460	\$11.68
TEACHING ASSISTANTS, EXCEPT POSTSECONDARY	89,130	\$12.02
JANITORS AND CLEANERS, EXCEPT MAIDS AND HOUSEKEEPING CLEANERS	169,050	\$13.62
RETAIL SALESPERSONS	321,980	\$13.80
COOKS, RESTAURANT	117,530	\$14.45
SECURITY GUARDS	88,700	\$15.08
FIRST-LINE SUPERVISORS OF FOOD PREPARATION AND SERVING WORKERS	110,190	\$15.21
LABORERS AND FREIGHT, STOCK, AND MATERIAL MOVERS, HAND	207,390	\$15.22
STOCKERS AND ORDER FILLERS	229,580	\$15.32
OFFICE CLERKS, GENERAL	235,230	\$17.31
CONSTRUCTION LABORERS	103,870	\$18.06
CUSTOMER SERVICE REPRESENTATIVES	291,260	\$18.49
<b>ONE-BEDROOM HOUSING WAGE</b>		<b>\$18.79</b>
SECRETARIES AND ADMINISTRATIVE ASSISTANTS, EXCEPT LEGAL, MEDICAL, AND EXECUTIVE	155,450	\$18.84
MAINTENANCE AND REPAIR WORKERS, GENERAL	118,570	\$18.88
FIRST-LINE SUPERVISORS OF RETAIL SALES WORKERS	116,060	\$19.53
<b>ALL OCCUPATIONS</b>	<b>12,226,170</b>	<b>\$19.86</b>
BOOKKEEPING, ACCOUNTING, AND AUDITING CLERKS	132,510	\$21.97
<b>TWO-BEDROOM HOUSING WAGE</b>		<b>\$22.54</b>
HEAVY AND TRACTOR-TRAILER TRUCK DRIVERS	202,270	\$23.89
SALES REPRESENTATIVES OF SERVICES, EXCEPT ADVERTISING, INSURANCE, FINANCIAL SERVICES, AND TRAVEL	105,780	\$25.63
FIRST-LINE SUPERVISORS OF OFFICE AND ADMINISTRATIVE SUPPORT WORKERS	148,390	\$30.43
SALES REPRESENTATIVES, WHOLESALE AND MANUFACTURING, EXCEPT TECHNICAL AND SCIENTIFIC PRODUCTS	88,310	\$30.69
ELEMENTARY SCHOOL TEACHERS, EXCEPT SPECIAL EDUCATION	135,560	\$30.98
SECONDARY SCHOOL TEACHERS, EXCEPT SPECIAL AND CAREER/TECHNICAL EDUCATION	102,360	\$31.06
REGISTERED NURSES	217,630	\$39.33
ACCOUNTANTS AND AUDITORS	104,490	\$39.50
GENERAL AND OPERATIONS MANAGERS	336,380	\$42.30
PROJECT MANAGEMENT SPECIALISTS	86,500	\$43.10
SOFTWARE DEVELOPERS	103,510	\$52.57

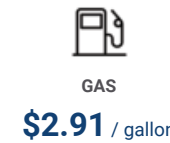
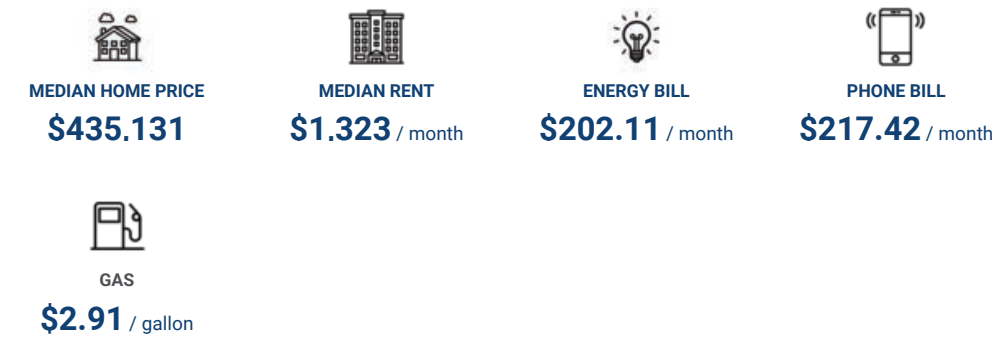
## cost of living

in Dallas, Texas by Expense category



### Housing, Utilities & Transportation

Dallas's housing expenses are 3% lower than the national average and the utility prices are 14% higher than the national average. Transportation expenses like bus fares and gas prices are 14% lower than the national average.



### Food & Grocery

Dallas has grocery prices that are 5% lower than the national average.



### Healthcare

Healthcare in Dallas is 13% higher than the national average.



Figure 8: Cost of living in Dallas(Payscale,2019)

These data underscore the numerous obstacles that poverty poses to Dallas' young, ranging from limited access to healthcare to a lack of basic nutrition. Policymakers and community leaders in Dallas must address the issue of poverty right away. It is critical to developing effective measures to reduce poverty and assist individuals who are struggling to make ends meet.

Addressing the underlying causes of poverty, such as economic disparity and a lack of affordable housing, can aid in breaking the cycle of poverty that has afflicted the city for far too long.

It is also critical to address the unique needs of vulnerable populations, such as single moms and children, to ensure that they receive the resources and assistance they require to thrive. While poverty is a big issue in Dallas, it is not impossible to overcome. We can strive towards a brighter future for all Dallas citizens by taking action and implementing effective solutions.



**site &  
context**



dallas/fort worth  
map

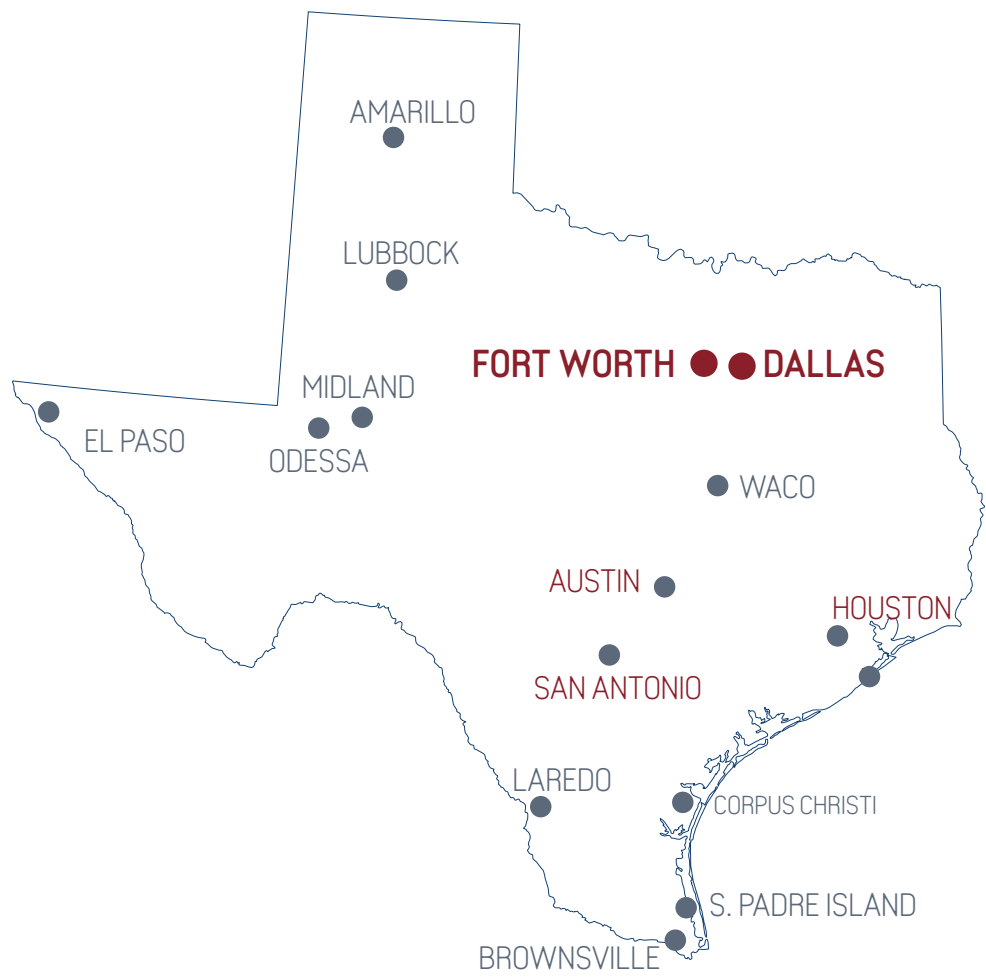
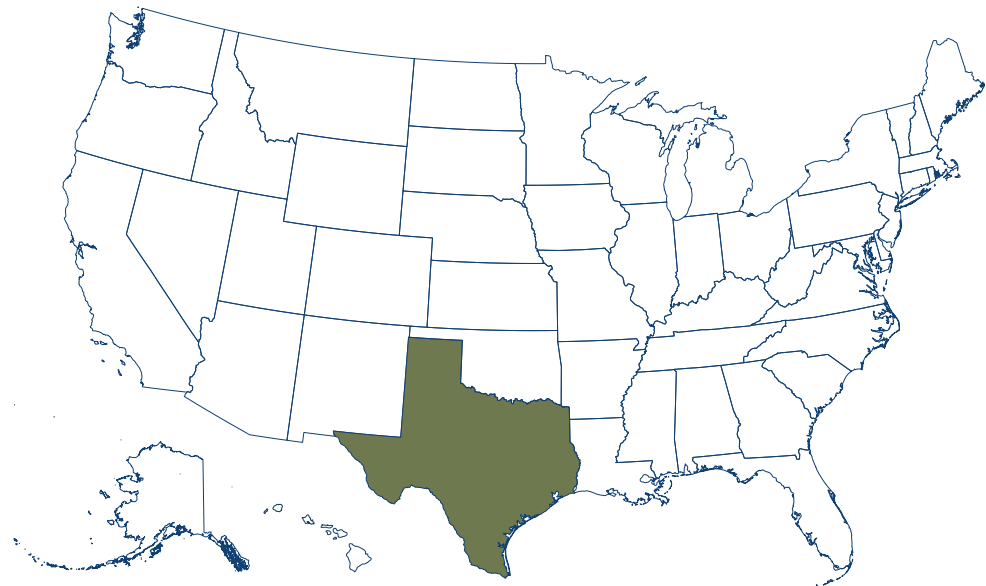


Figure 9: Texas Major Cities(Figure by Author)

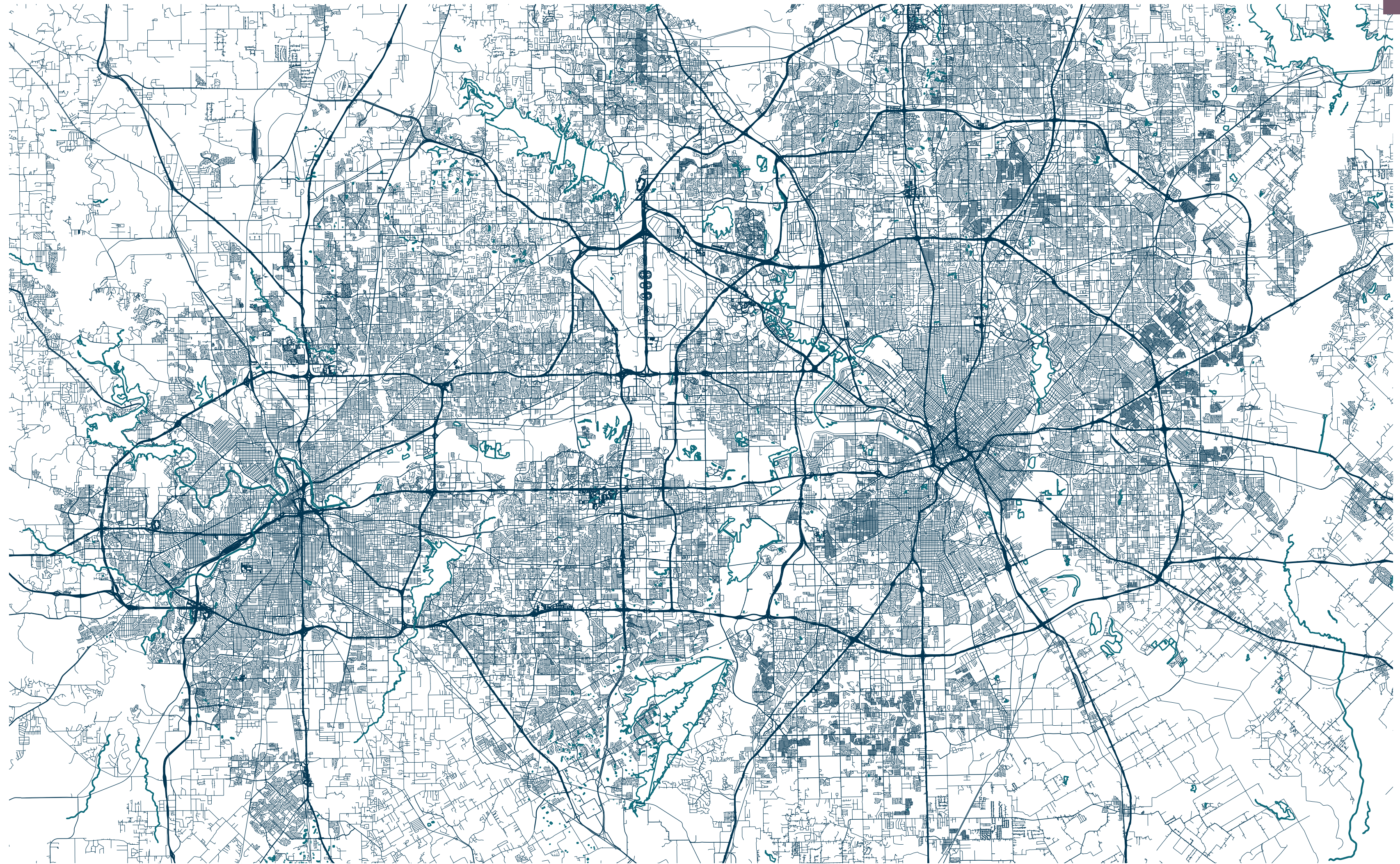


Figure 10: Dallas-Fort Worth Map(Figure by Author)



## surrounding allocation

Dallas county

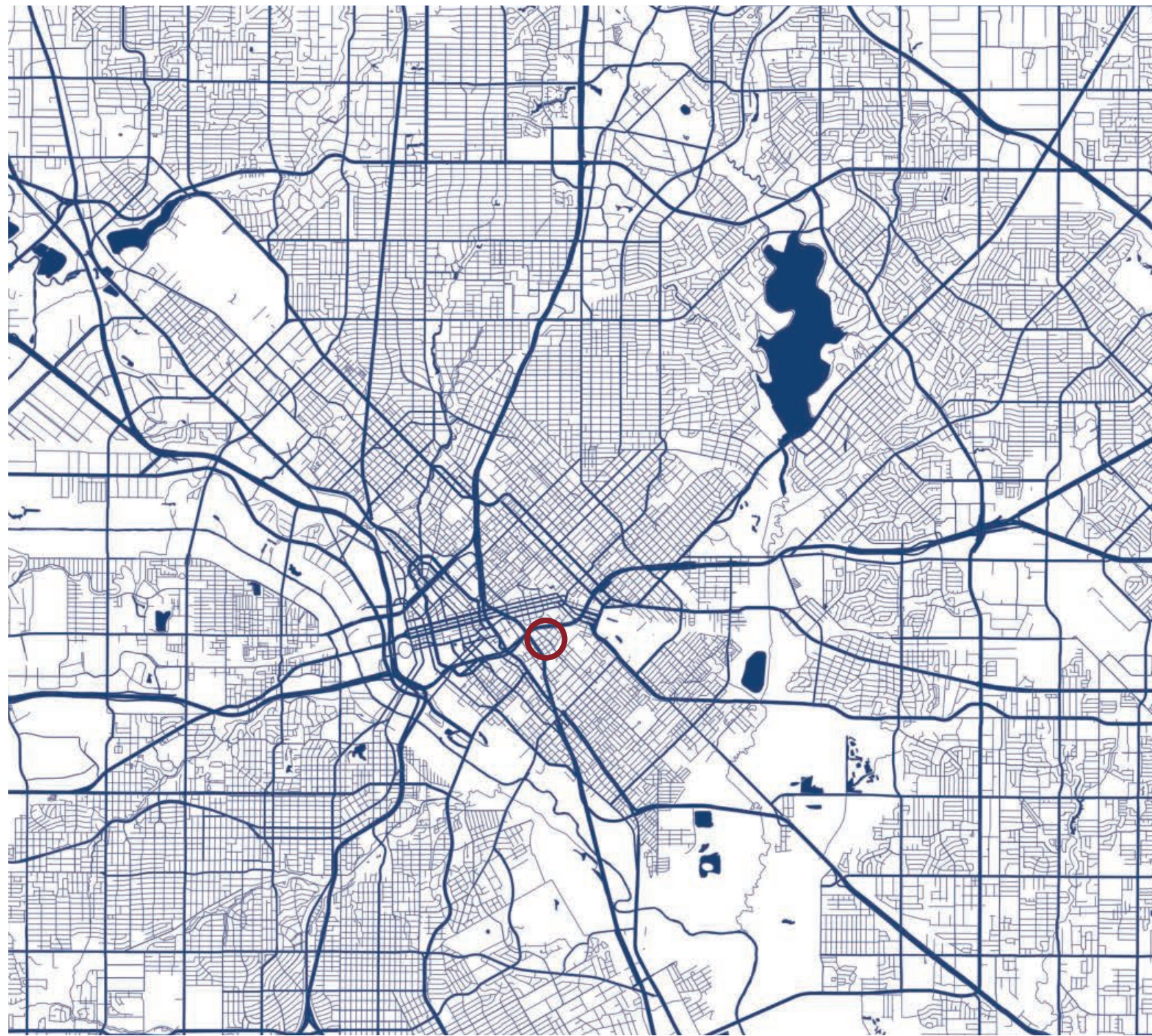


Figure 11: Dallas Map(Figure: Adobe Stock)

“The Dallas metropolitan area in North Texas is a rapidly growing region comprising multiple cities and towns across several counties. With a population of over 7.8 million in 2020, it is the fourth-most populous metropolitan statistical area (MSA) in the United States. Several factors have contributed to the growth and success of the Dallas metropolitan area. Its favorable business climate, low cost of living, and abundant job opportunities have attracted many people to the region. Its central location has also made it a major hub for transportation

and logistics. In recent years, the Dallas metropolitan area has seen significant investment in transportation and housing infrastructure. The region is well-positioned for continued growth and success, with a talented workforce, diverse economy, and robust infrastructure. With its dynamic business environment and entrepreneurial spirit, the Dallas metropolitan area is expected to remain a major player in the national and global economy.” (TexasGov,2023)

## site study block

Dallas central area



Figure 12: Site study area(Figure by Author)

Situated within the central region of Dallas, the site study block has been demarcated by a red circle on the allocation map. The research endeavors in this area commenced with an in-depth investigation of the land value. Despite its location in the central area of Dallas, the properties within this municipal block have been appraised at a value 76% lower than those in its neighboring areas across the highways.

The physical barriers have hindered the development and growth of the site, despite its prime location within Dallas. Therefore, any future development initiatives for the site study block must consider the block’s inaccessibility and isolation.



**surrounding development**  
past vs present



Figure 13: Image from 1974(Haskin,1974)



Figure 13: Image from 2022(Figure Google Earth)

The Haskins-photographed site area comprises solely a limited number of manufacturing buildings, alongside residential and school zones. The second photograph showcases the subsequent establishment of a swimming pool facility within the site. As of now, merely a handful of houses, constructed during the



1900s, endure. The remainder of the block is currently occupied by factory structures, vacant lots, shelters, service centers catering to the homeless population, or has been abandoned.

**redlining in Dallas**  
and ads published for area habitability

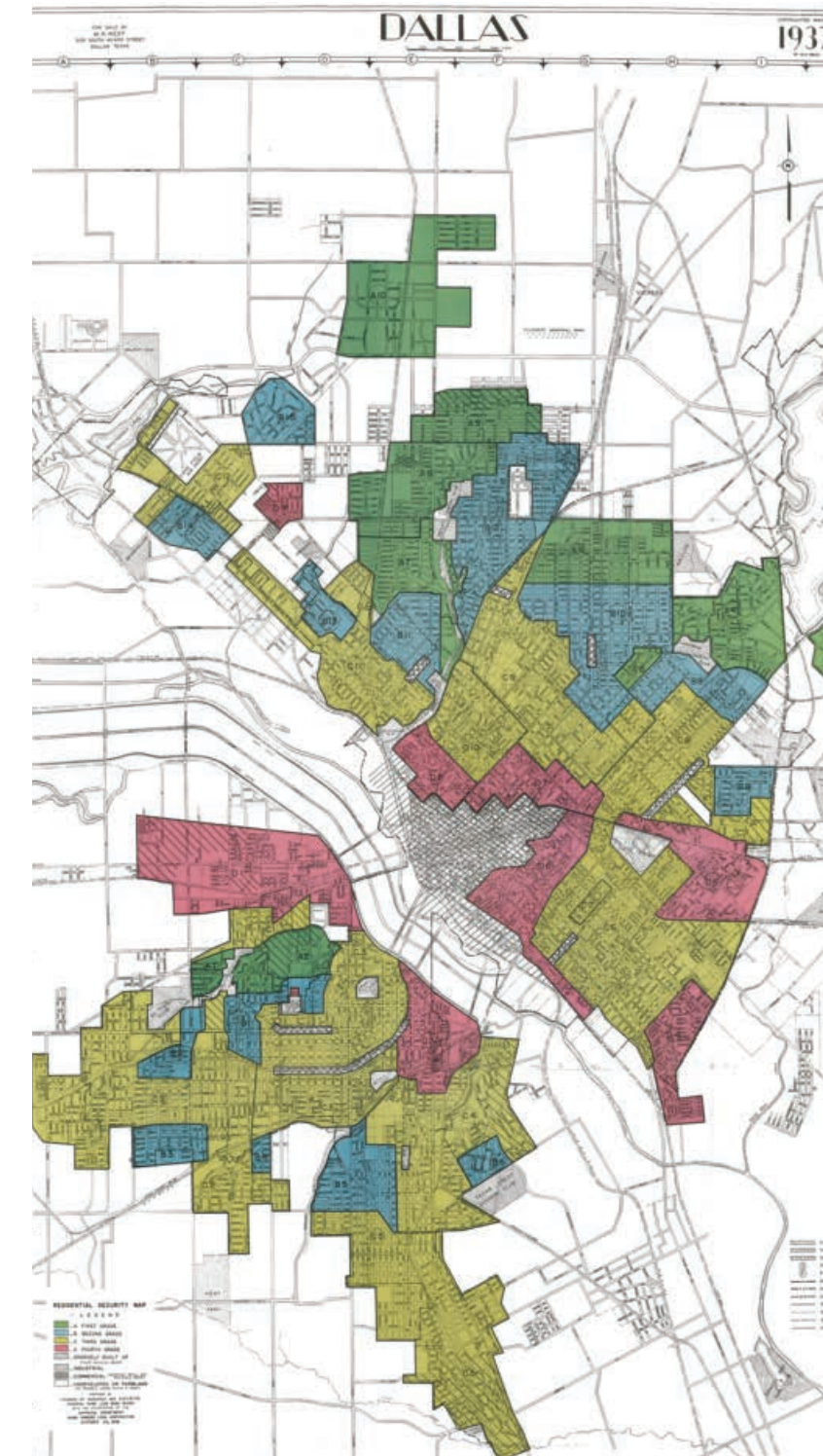


Figure 14: Dallas Redlining Map(Richmond, 2023)

The studied site block in Dallas, Texas is located in a redlining zone, which is a discriminatory practice that denies loans, insurance, and financial services to certain neighborhoods or communities based on their racial or ethnic composition. Dallas has a history of redlining, with the Federal Housing Administration creating maps that designated red zones as high-risk areas typically occupied by minorities. Redlined areas were deprived of public services and

NO FORM 8  
10-1-37

**AREA DESCRIPTION - SECURITY MAP OF Dallas, Texas**

- AREA CHARACTERISTICS:
  - Description of Terrain: Level to rolling.
  - Favorable Influences: Small park playground in area. Good Senior High School joins on east. Major portion of area comparatively new. Southwestern part some distance from stores.
  - Detrimental Influences: Shuttle Bus transportation along Jefferson somewhat inconvenient. Distance to principal business center.
  - Percentage of land improved 40 %; e. Trend of desirability next 10-15 yrs. Static to upward
- INHABITANTS: Clerical, business and
  - Occupation Professional men ; b. Estimated annual family income \$1800-3000
  - Foreign-born families None; - predominating; d. Negro None ; %
  - Infiltration of None ; f. Relief families None
  - Population is increasing Slightly; decreasing ; static
- BUILDINGS:
 

	PREDOMINATING 80 %	OTHER TYPE 20 %	OTHER TYPE %
a. Type	Singles 5/7 rms.	Singles 5/6 rms.	
b. Construction	Brick	Brick	
c. Average Age	2 Years	10 Years	
d. Repair	Good	Good	
e. Occupancy	95 %	95 %	
f. Home ownership	80 %	80 %	
g. Constructed past yr.	60-1,750	None	
h. 1929 Price range \$	100% \$	2000-6000 100% \$	100%

NO FORM 8  
10-1-37

**AREA DESCRIPTION - SECURITY MAP OF Dallas, Texas**

- AREA CHARACTERISTICS:
  - Description of Terrain: Level.
  - Favorable Influences: All city conveniences, schools, churches, stores in area. Adequate transportation.
  - Detrimental Influences: Mixed type of construction and population. Unpaved streets. Cemetery in southeastern part of area.
  - Percentage of land improved 90 %; e. Trend of desirability next 10-15 yrs. Down
- INHABITANTS: Clerical, laborers, skilled
  - Occupation unskilled, none ; b. Estimated annual family income \$800-3000 small business men.
  - Foreign-born families 5 %; Italian, Russian-Greek predominating; d. Negro 10% ; %
  - Infiltration of lower grade slowly; f. Relief families Few
  - Population is increasing ; decreasing ; static Yes
- BUILDINGS:
 

	PREDOMINATING 70 %	OTHER TYPE 20 %	OTHER TYPE 10 %
a. Type	Singles 4/7 rs.	Singles 8/12 rs.	Apts. 4/16 units-3/5 rs. Duplexes
b. Construction	Frame	Frame	Frame & brick
c. Average Age	25 Years	30 Years	17 Years
d. Repair	Fair - poor	Poor	Fair
e. Occupancy	90 %	85 %	85 %

infrastructure, and financial institutions refused to lend money to residents, leading to a cycle of disinvestment and decay. The effects of redlining can still be seen in Dallas today, with many designated red zones struggling with poverty, crime, and poor access to basic services. Efforts are underway to address this legacy of discrimination, but it will take sustained action and investment to create more equitable communities.



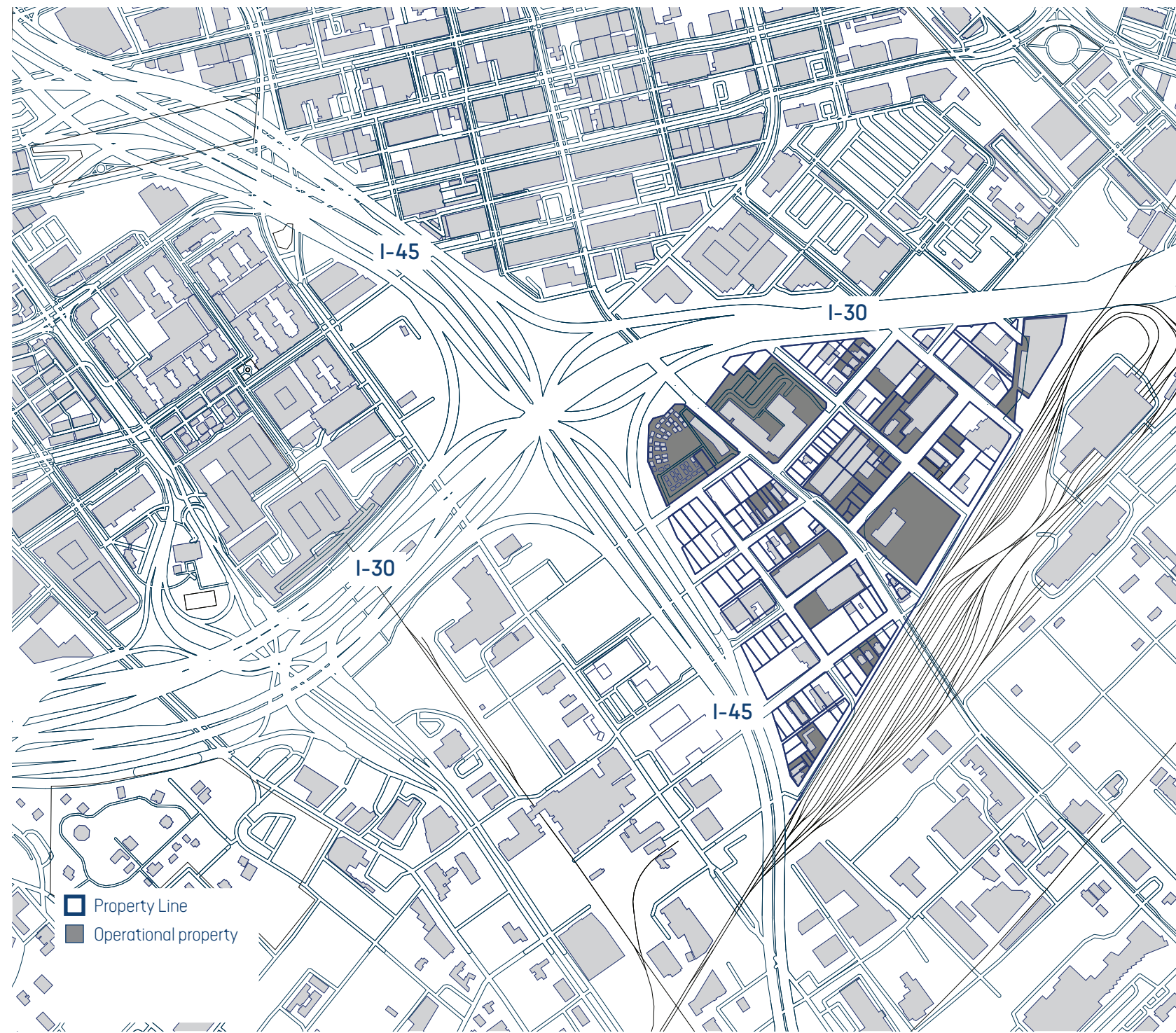


Figure 15: Site area property lines study(Figure by Author)

Initially, the most important objective was to do a thorough investigation of the municipal block in issue and identify the critical programs that are required for the site. To do this, a detailed analysis of the property lines spanning the entire block was conducted, which aided in determining the overall plot size of the region as well as the city's block division.

Furthermore, the drawing's grayed-out section defines the property that is now functioning within the block. Only two pieces of this space are allocated to the industrial building, which is centrally located on the property, while the remaining sections are under the care of the police department, shelters, or non-profit organizations.

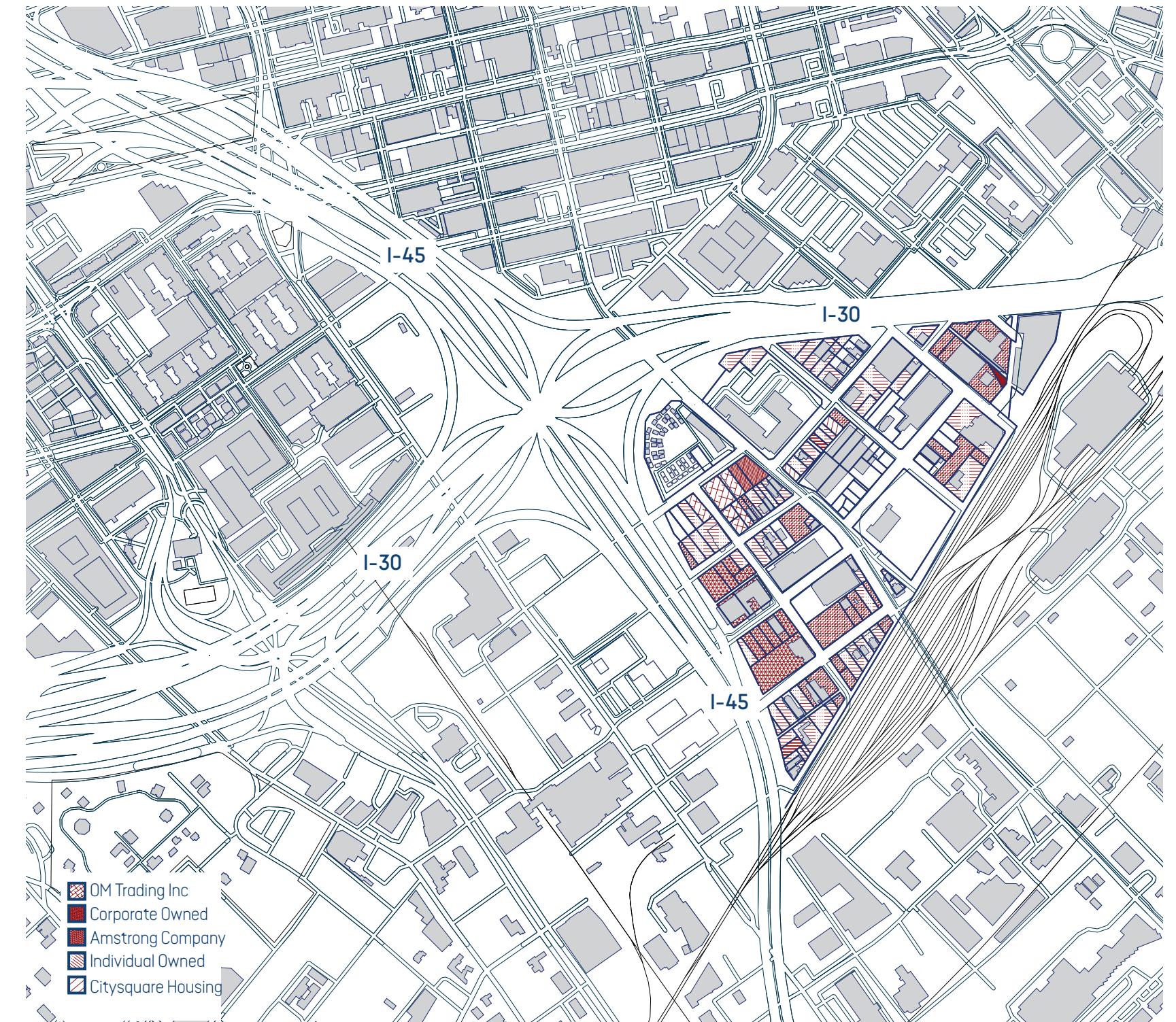


Figure 16: Site Area Ownership study(Figure by Author)

Given the project's goal of insertion into the urban setting rather than redevelopment of a full city block, a thorough examination of property ownership was conducted. This analysis was beneficial in assessing the current state of the site and the potential for its future properties. The majority of plots were privately owned and largely consisted of single-

family homes; but, as the region has decreased, many have been purchased by corporate entities or manufacturing firms. The Citysquare housing plots are the largest of these sites, and they offer basic shelter to persons who have been homeless for a lengthy period of time.



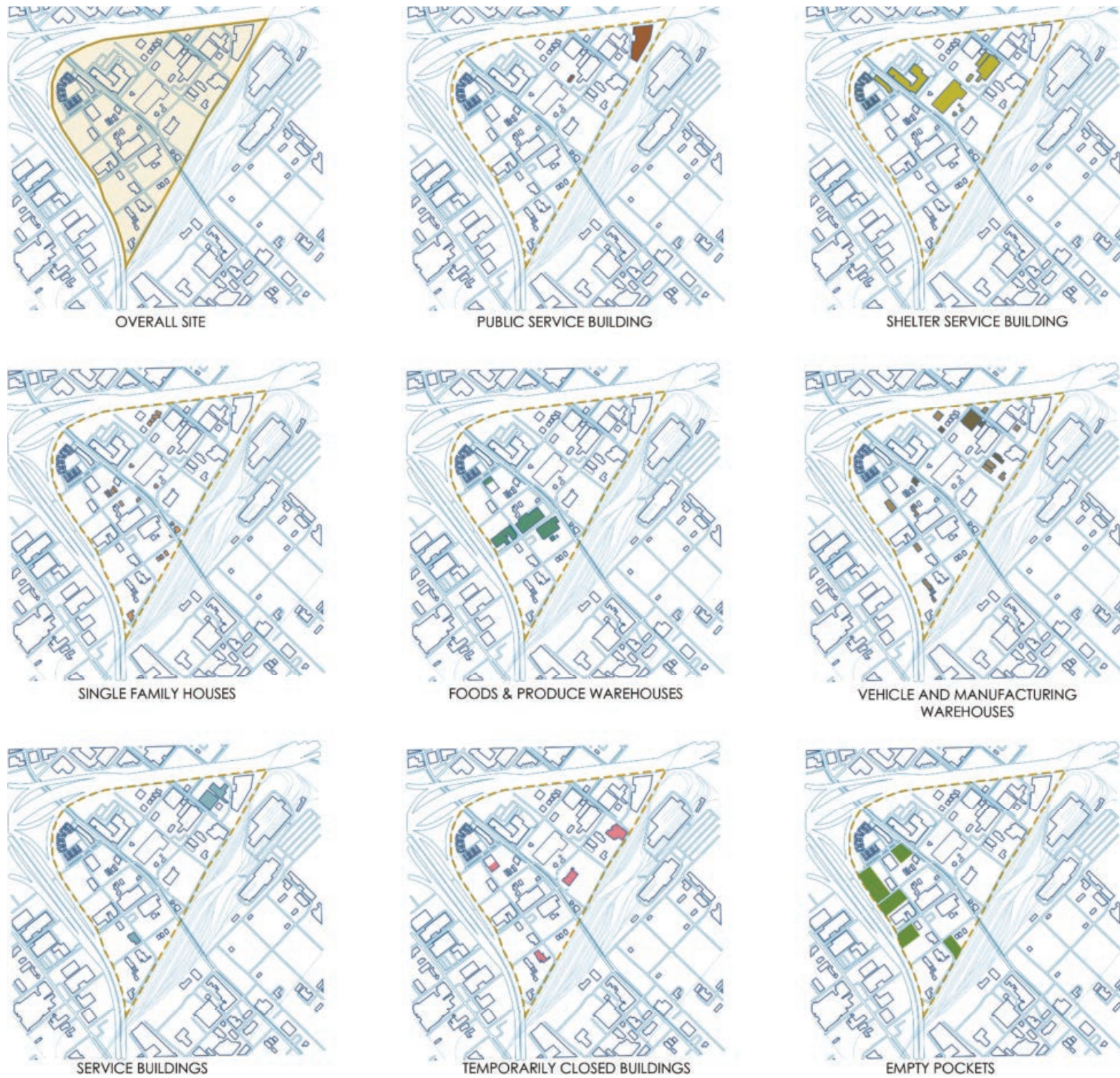


Figure 17: Site area building types study(Figure by Author)

A study was done into each building to identify its activity in order to determine the status of the buildings that are currently in use and those that are currently not in use inside the municipal block. The majority of the structures on the block are warehouses for food and produce vehicles, as well as manufacturing companies.

A large share of the structures that were temporarily closed were single-story factory buildings made of corrugated sheets that needed intensive maintenance. Plots that were either uninhabited or had closed buildings were chosen for continued development in accordance with the project's goal.

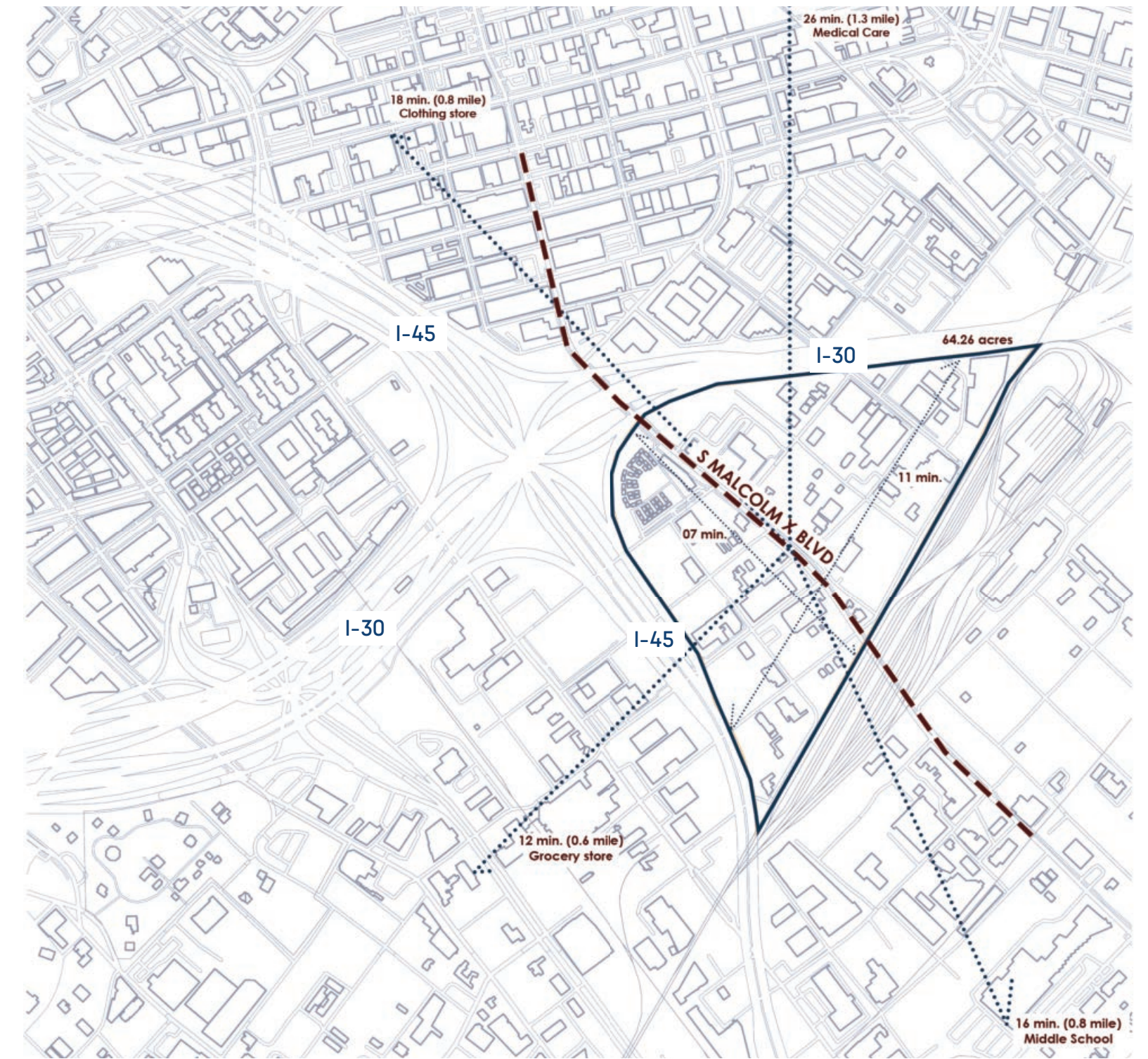


Figure 18: Site area walkability and public transportation(Figure by Author)

In consideration of the necessary basic amenities for a well developed neighborhood, a study was conducted to evaluate the walkability of the area and its proximity to nearby amenities. The study revealed a lack of essential facilities, such as grocery stores, retail shops, schools, and medical facilities in the immediate vicinity of the site.

The closest amenity to the area was found to be a grocery store, which is located 12 minutes away. Based on these fundamental findings, appropriate programs were developed to address the lack of basic amenities in the neighborhood.



**FUNCTION**

**PEOPLE**

The project should provide affordable housing to mixed-income and former homeless individuals through innovative approach to housing development.

CONCEPT: Affordable construction in cheap lands

**ACTIVITIES**

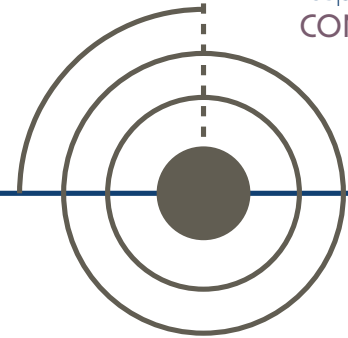
The project should provide varieties of amenities and activities to support the needs of the community within the street level and encourage walkability.

CONCEPT: Mixed use development

**RELATIONSHIPS**

The project should cultivate and promote quality interactions within the community through interactive spaces for collaboration while respecting individuality.

CONCEPT: Cohesive community



**SITE**

The project should make use of the site's location and infrastructural development in phases while respecting the history and character of the neighborhood.

CONCEPT: Prefabricated Construction

**ENVIRONMENT**

The building and landscape must embrace strategies that are environmentally aware, and the project should make the most of alternative energy sources.

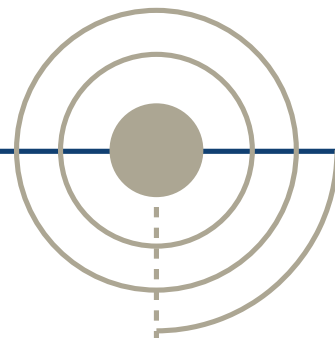
CONCEPT: Environment Responsive Strategies

**QUALITY**

Through appropriate streets and inviting spaces for interaction, the project must be connected to and accessible by the neighborhood.

CONCEPT: Community Connectivity

**FORM**



**ECONOMY**

**INITIAL COST**

The project's initial cost should be reasonable and effective through proper land use and construction methods.

CONCEPT: Efficient building construction

**OPERATING COSTS**

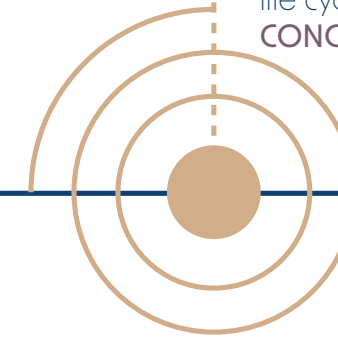
The project should strive to run smoothly while producing enough money from the ground level to operate the entire complex and subsidize the cost of the operating.

CONCEPT: Cost Analysis

**LIFE-CYCLE COSTS**

The project should consider the accessibility and adaptability of the spaces to meet the needs of the development while analyzing the life cycle cost.

CONCEPT: Adaptability



**PAST**

The project should have proper analytical reports which helps to design for thriving community of the future while restoring and respecting the past of the site.

CONCEPT: Analysis; Move from the past

**PRESENT**

The project should focus on revitalizing the site block and connecting it to the surrounding neighbor through mixed used development and adaptive reuse of the existing building.

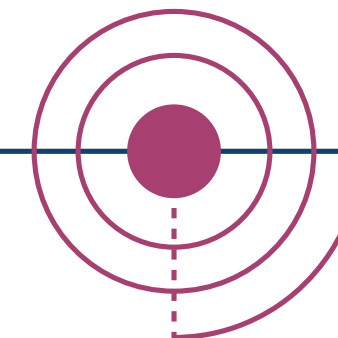
CONCEPT: Community Connectivity

**FUTURE**

The project should have strategic development plan that gives room to future development without present development fully occupying the site.

CONCEPT: Prototype

**TIME**





**precedent study - 01**  
**La Valentina Affordable Housing**  
 Sacramento, CA



Figure 19: Views of Entrances(Archdaily, 2013)

Architects: David Baker + Partners  
 Area : 67,356 ft<sup>2</sup>  
 Built Year : 2012  
 Density: High density (76 units/acre)  
 No. of Affordable homes: 63 units  
 Types of units: Studio, 1, 2 & 3 bedrooms



Figure 20: First Floor Plan(Archdaily, 2013)

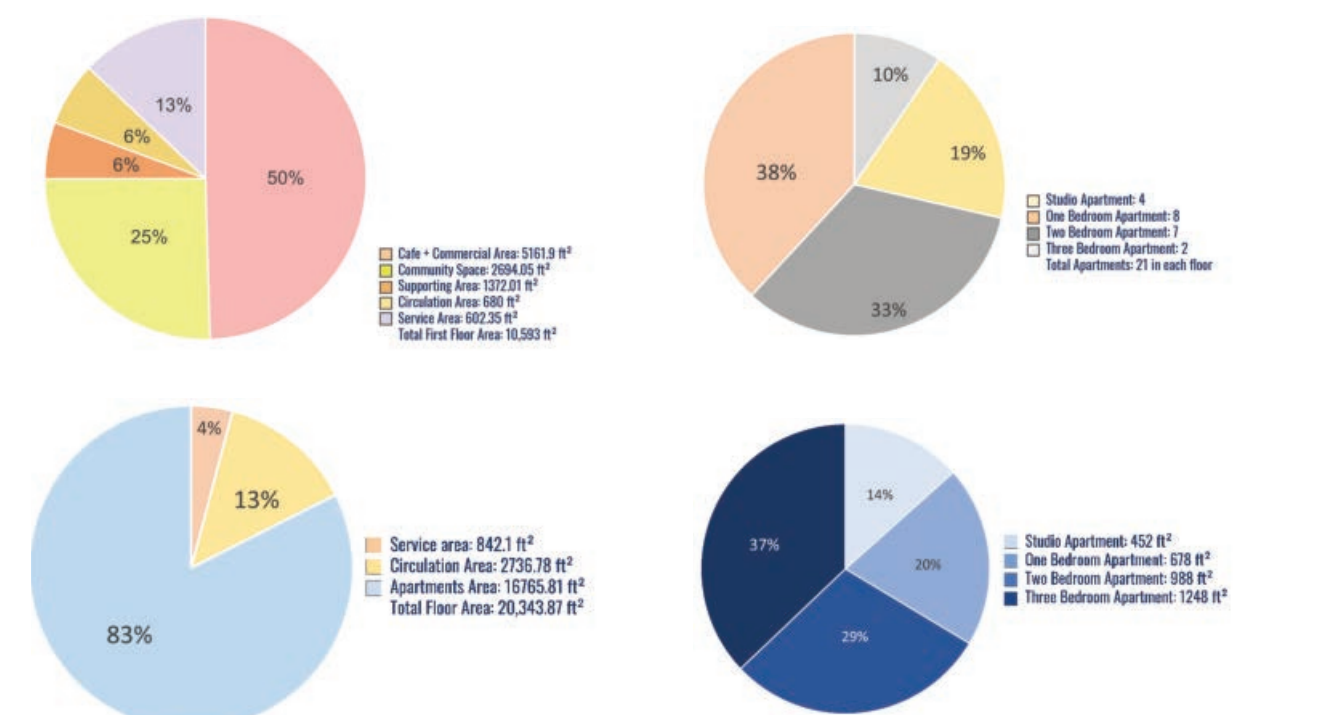
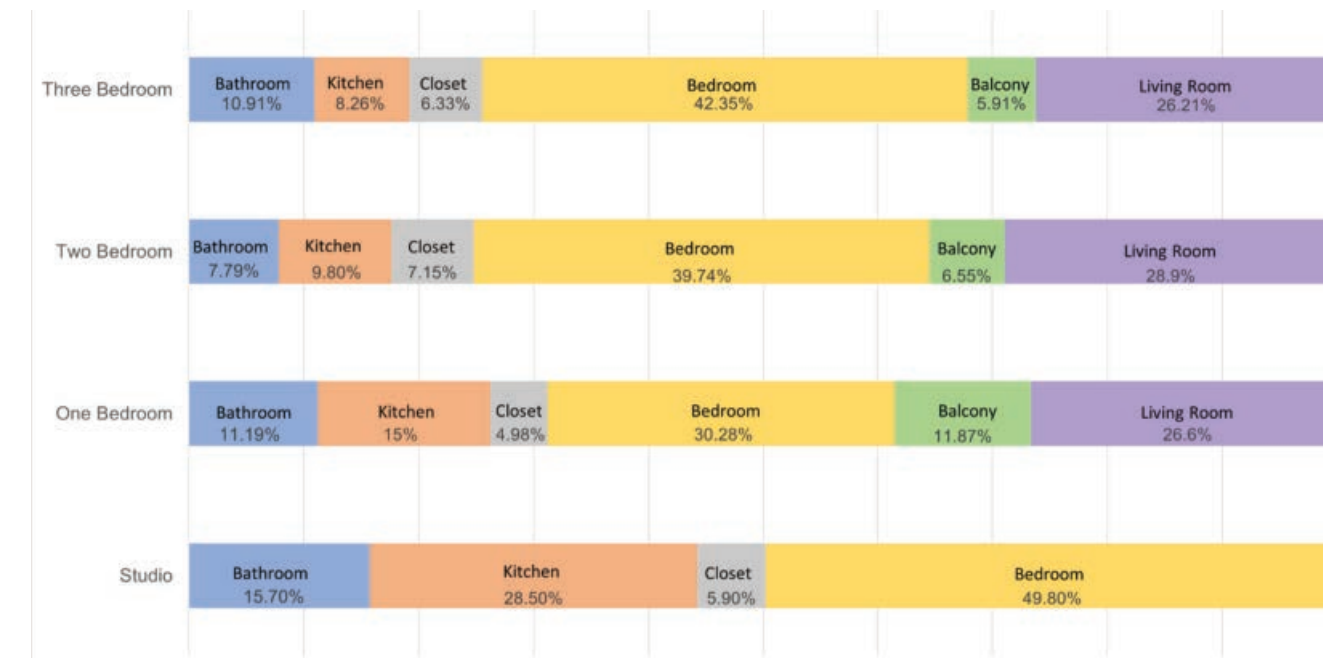


Figure 21: Program Analysis(Figure by Author)

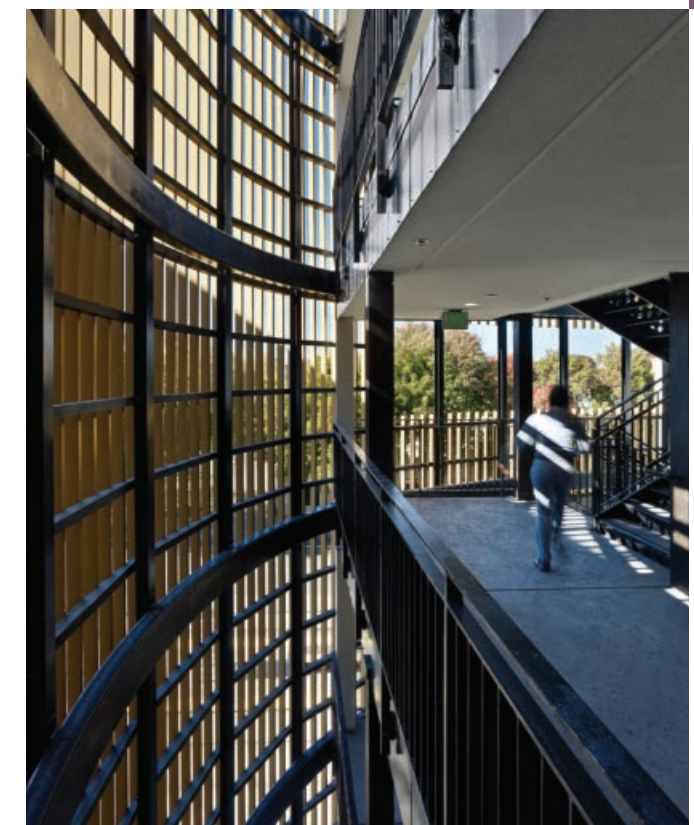


Figure 22: Main Circulation(Archdaily, 2013)

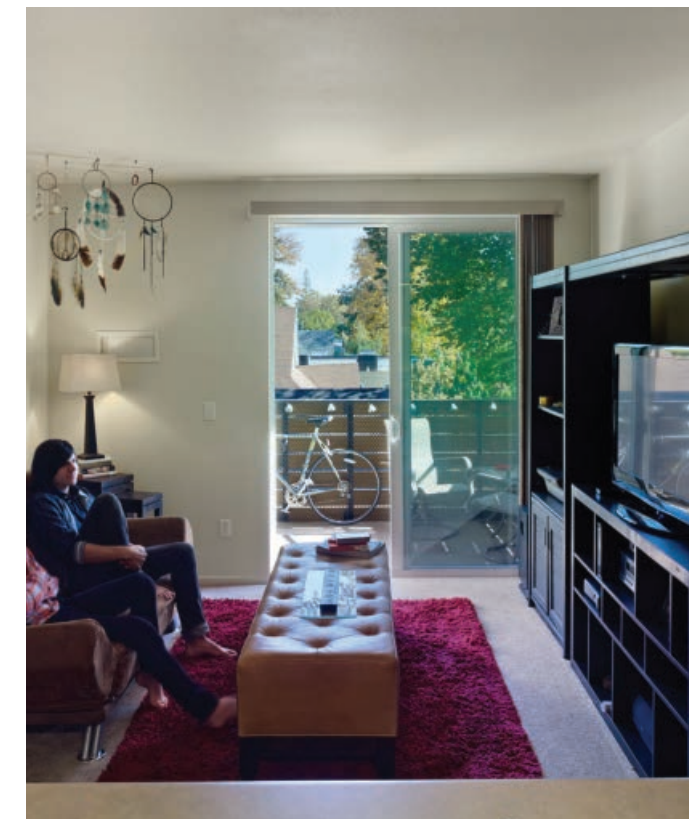


Figure 23: Views of the unit(Archdaily, 2013)



Figure 24: Access to railway(Archdaily, 2013)



precedent study - 02

**Crest Apartments**

Los Angeles, CA



Figure 25: Views of Entrances(Archdaily, 2018)

Architects: Micheal Maltzan Architecture  
 Area : 45,000 ft<sup>2</sup>  
 Year : 2016  
 Density: Mid density  
 No. of Affordable homes: 64 units  
 Types of programs: Studio, 1 Bedroom, Community Spaces



"Crest Apartments is in Van Nuys, Los Angeles, CA, United States. The complex for the Skid Row Housing Trust transformed an existing open site in suburban Los Angeles into a 64-apartment complex for formerly homeless veterans. The client's permanent supportive housing model includes individual efficiency apartments with on-site social services and community spaces. These combined programs effectively support the highly vulnerable residents in an effort to reduce chronic homelessness."(Archdaily,2018)



Figure 26: Floor Plans(Archdaily, 2018)

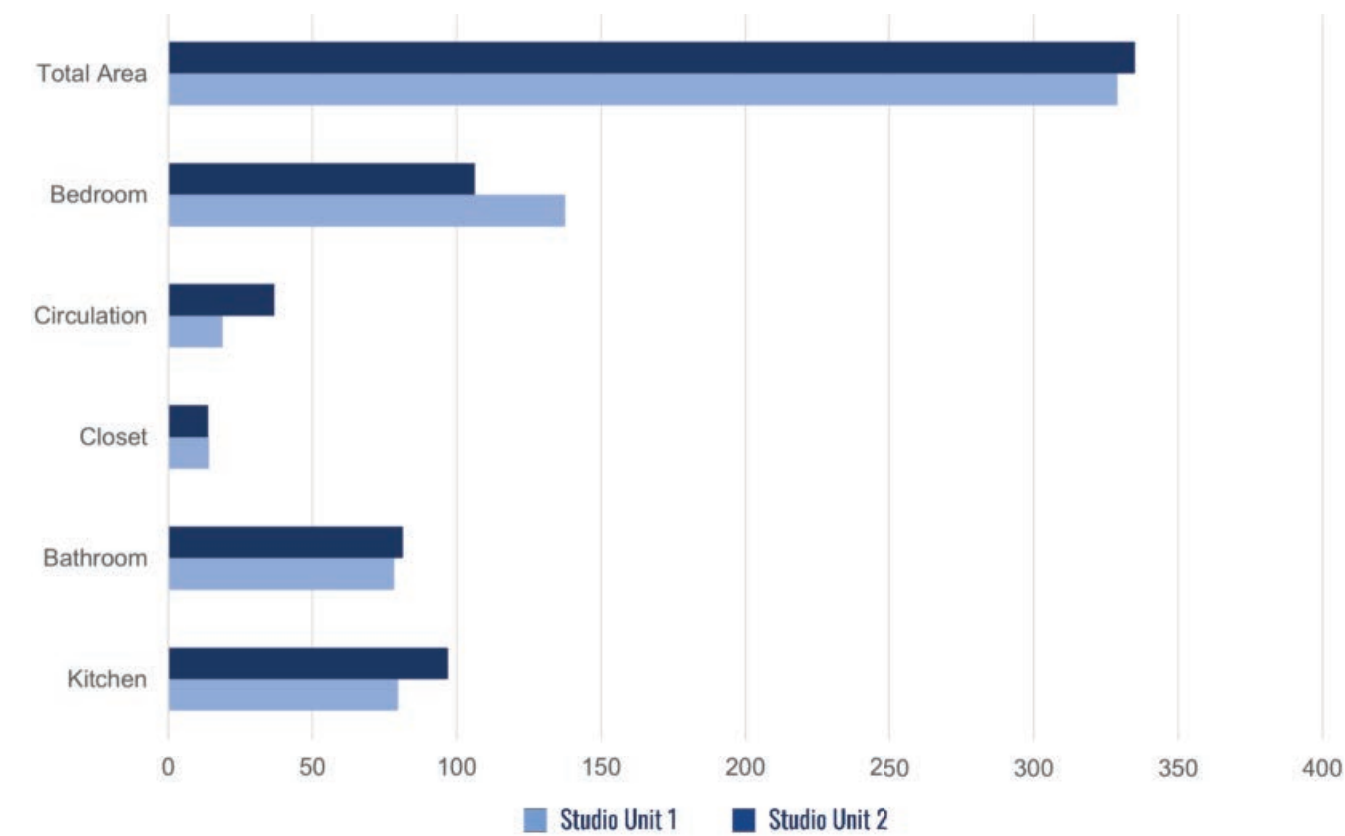


Figure 27: Program Analysis(Figure by Author)

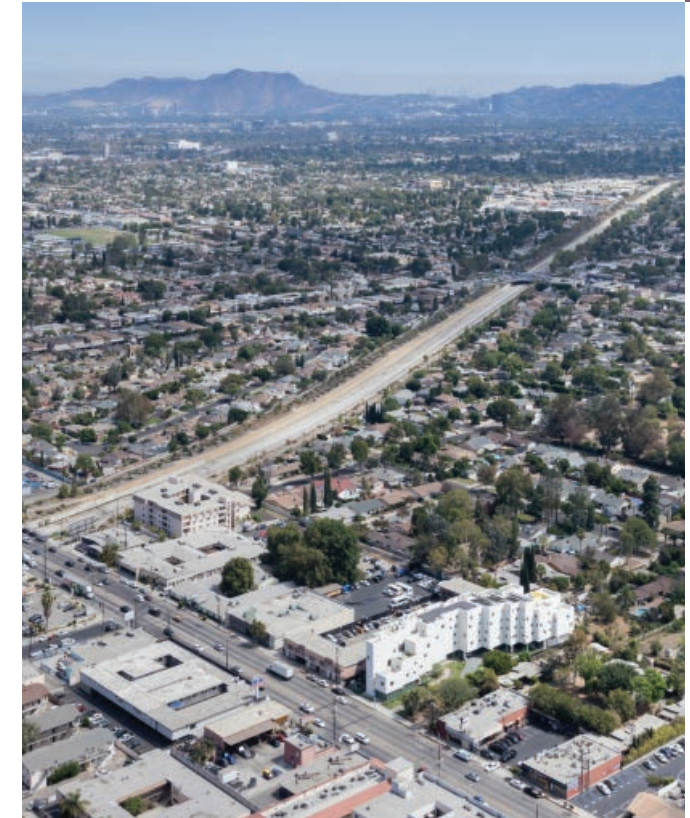


Figure 28: Surrounding view(Archdaily, 2018)

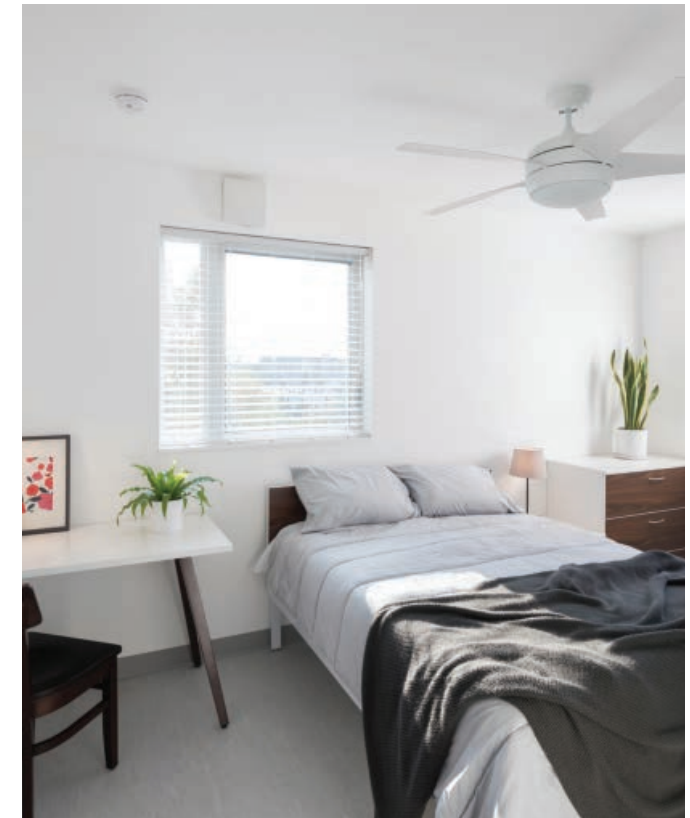


Figure 29: Views of the unit(Archdaily, 2018)



Figure 30: Access to yard(Archdaily, 2018)



**precedent study - 03**  
**Bastion Community Housing**  
 New Orleans, LA



Figure 31: Views of Entrances(Archdaily, 2019)

Architects: OJT  
 Area : 56,600 ft<sup>2</sup>  
 Year : 2018

Density: Low density

No. of Affordable homes: 58 units

Types of programs: Single-Family Homes, Two-Family Homes



"Bastion Community Housing is in 1901 Mirabeau Ave, New Orleans, LA 70122, United States. The housing development centered on the needs of post-9/11 combat veterans, many with lifelong medical challenges, and their families and caregivers. Bastion leverages this concentration of services members with shared life experiences towards a community health model for long term care, support, and integration into the world." (ArchDaily,2019)

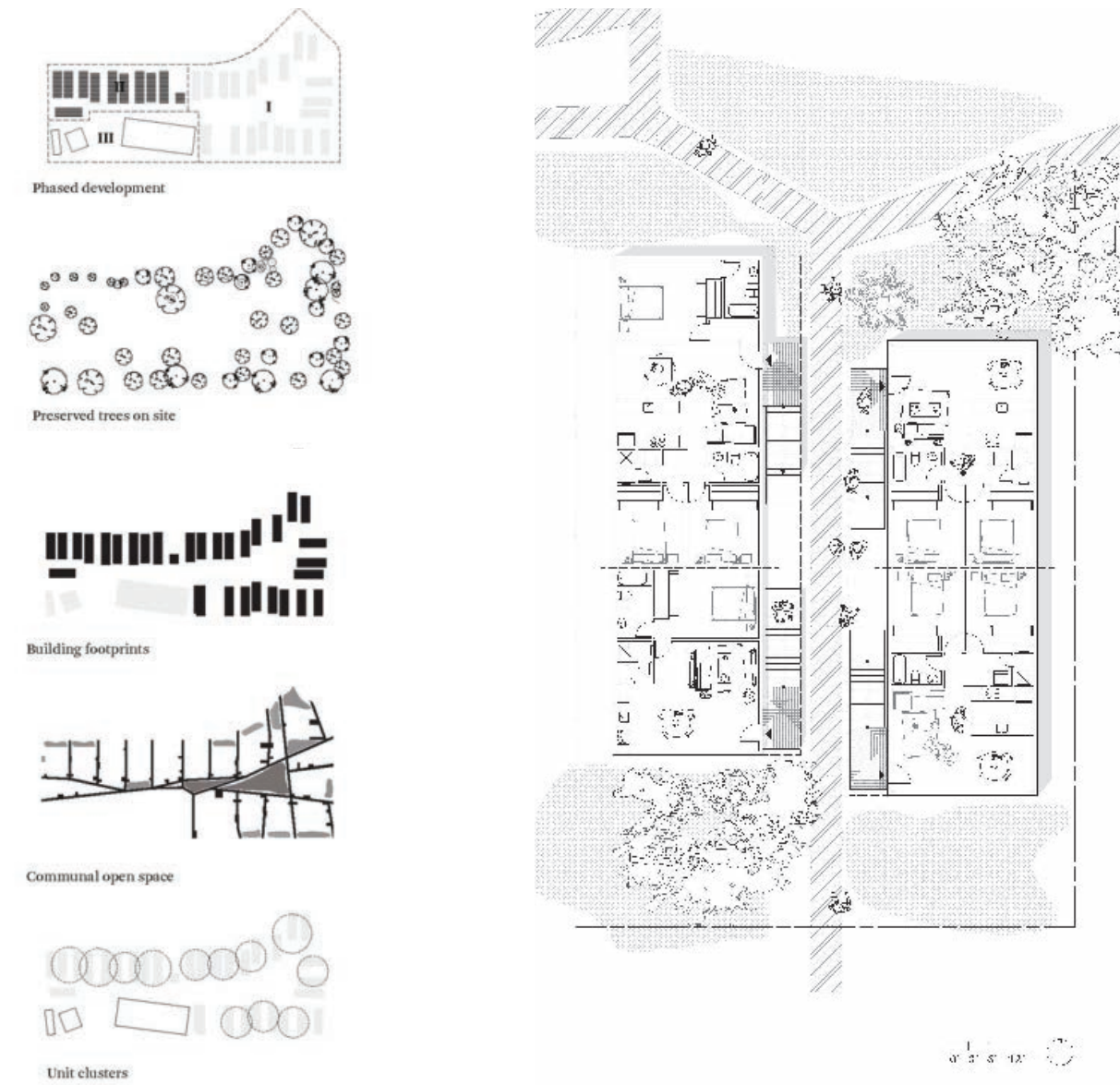


Figure 32: Development and Floor Plan(Archdaily, 2019)

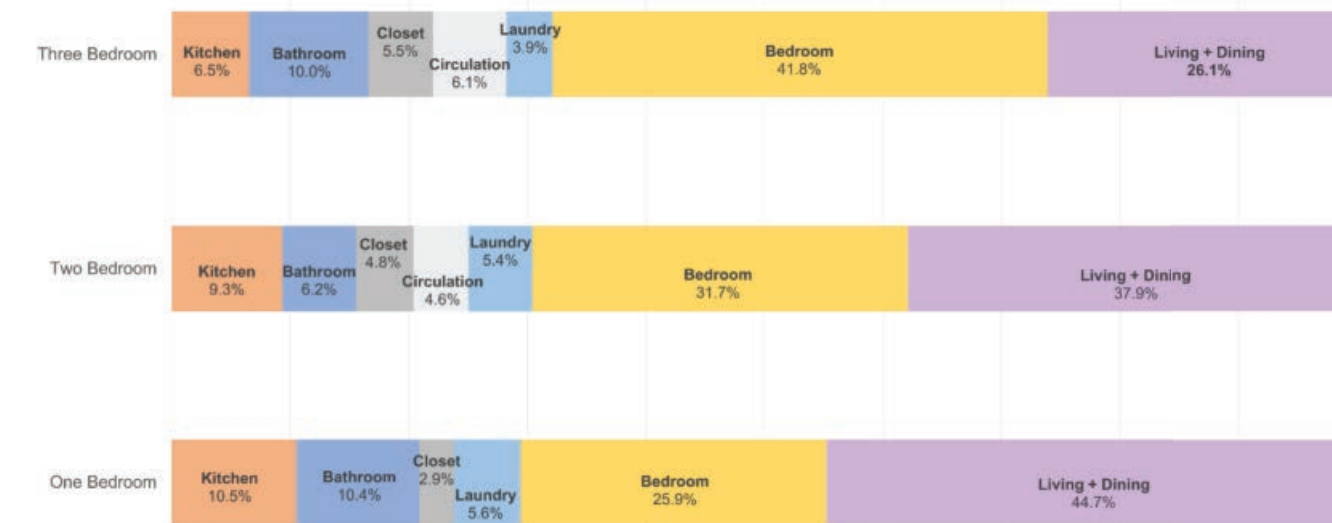


Figure 33: Program Analysis(Figure by Author)

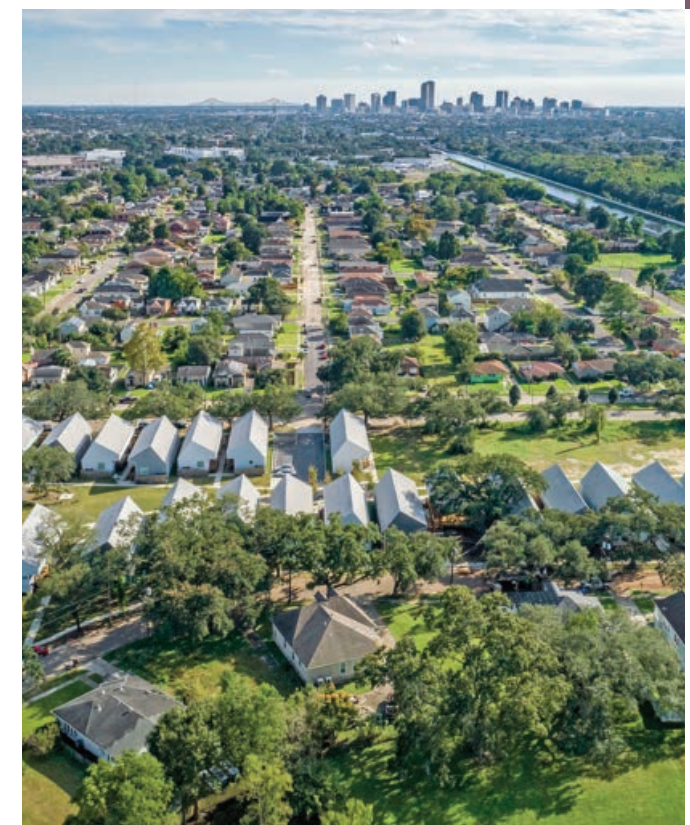


Figure 34: Surrounding View(Archdaily, 2019)



Figure 35: Views of the unit(Archdaily, 2019)



Figure 36: Spaces in between(Archdaily, 2019)



## materials

being used in the project

### structure



Figure 37: Mass Timber, CLT and Glulam (Structurlam, 2016)

### enclosure



Figure 38: Ceramic Facade (Archello, 2012/3)

### interior



Figure 39: Dry Wall, Exposed CLT and wooden finishes (R&O, 2023)

### railings



Figure 40: Aluminum Railings (Archdaily, 2023)

## cross laminated timber

benefits for the project

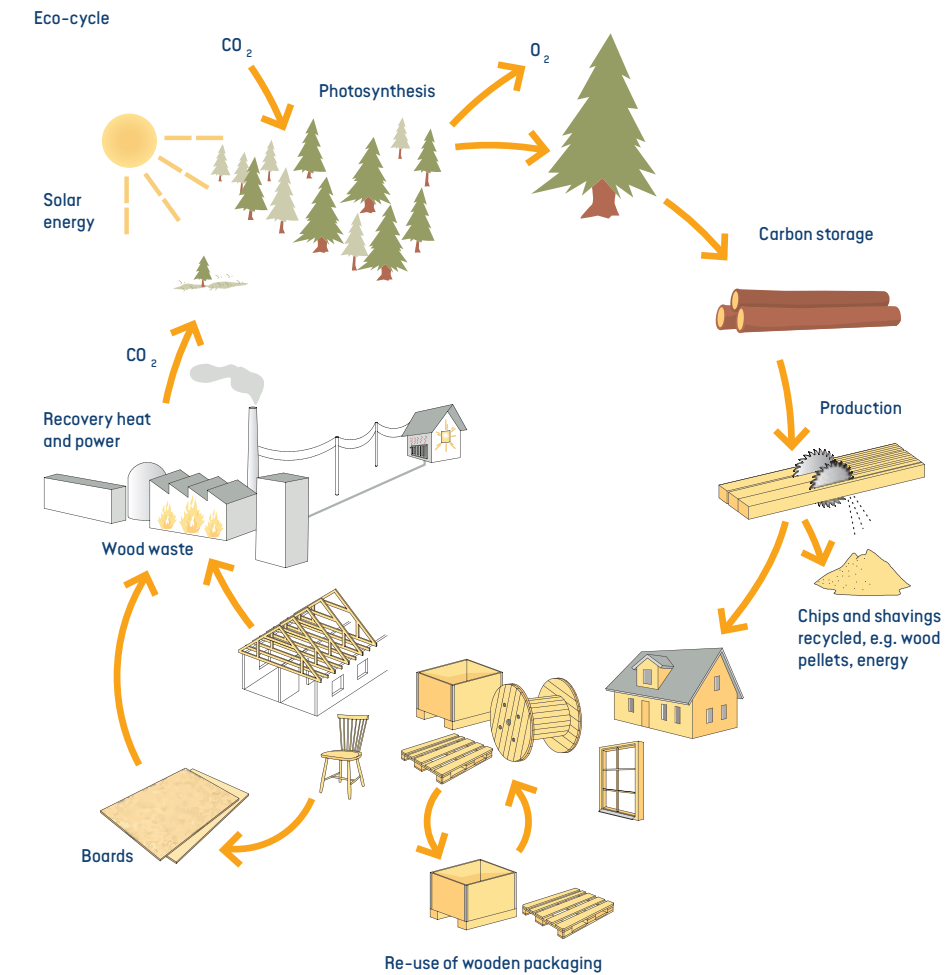


Figure 41: CLT in the Eco-cycle (SwedishWood, 2019)

### eco-cycle

“Manufacturing CLT is an energy-efficient process. And the by-products (wood shavings and wood waste) are used to produce energy, which is used to heat the drying kilns, for example, thus reducing the need for fossil energy during manufacture.”

In order for CLT to be sustainable it must be sourced from a forest managed according to the principles of sustainable forestry. Sustainable forestry means that the extraction from the forest does not exceed growth, the raw material is constantly regenerated, and the wood

can be returned to the eco-cycle without adding harmful greenhouse gases to the climate.” (SwedishWood, 2019)

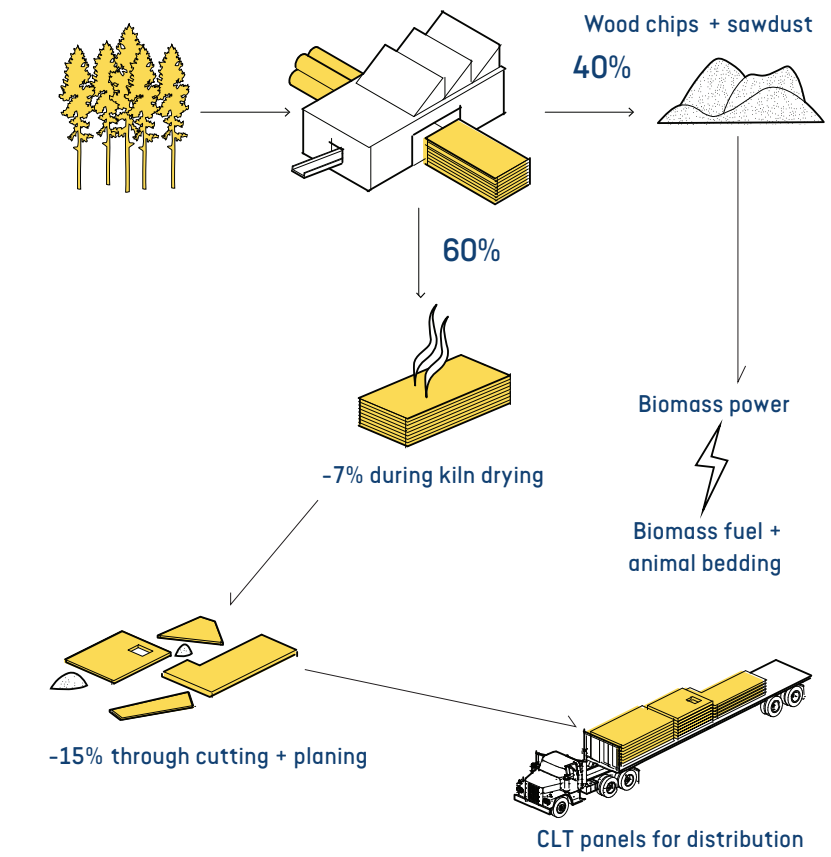


Figure 42: Closed loop of CLT construction (Waugh Thistleton, 2018)

### manufacture

“CLT is made from boards of timber, approximately 1-2 inches (20-40mm) thick, which are sorted, finger-jointed together into long strips, and arranged side by side to form layers. These are glued and pressed to form panels of multiple layers (minimum of 3). Each layer is at 90 degrees to the one before, forming the cross-lamination.”

Lumber boards are kiln dried to a moisture content of 10-14% which assists with adhesion and reduces dimensional variations and surface cracking. Defects that influence the strength of the boards, such as large

knots are removed and the boards are trimmed and finger-jointed to obtain the desired lengths and quality of lumber.

The panels are assembled by placing the boards side-by-side to form solid wood layers. Each successive layer is laid perpendicular to the preceding layer with adhesive being applied between layers. Once assembled the board is then pressed, in either a large hydraulic or vacuum press, and finally cut to size and/or milled to specification.” (Waugh Thistleton, 2018)



## materials

precedent study 01  
for CLT construction

### Wohnhochhaus in Heilbronn

Heilbronn, Germany

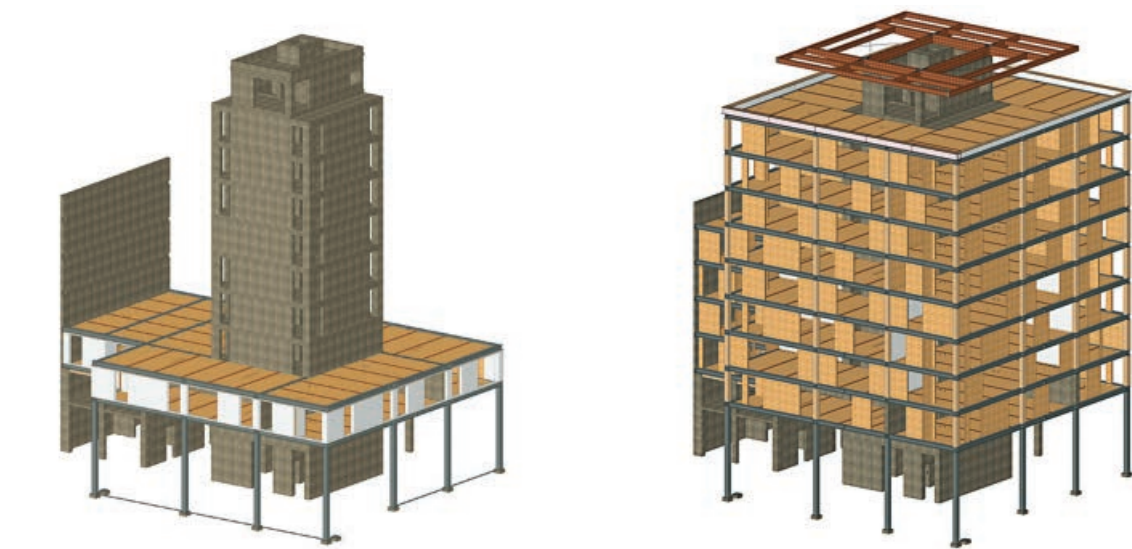


Figure 43: Wohnhochhaus (Detail, 2019)

Architects: Kaden+Lager  
Area: 56,600 ft<sup>2</sup>  
Year: 2019  
Building type: Mid-rise  
Types of programs: Housing Units, Cafe

“With an overall height of 34 m, the ten-storey Skaio is at present the tallest housing tower in a timber form of construction in Germany. Strictly speaking, the load-bearing structure consists of a large amount of timber, some concrete and only a few steel beams and



Directly adjoining a six-story peripheral block development, this corner tower marks the end of the Neckarbogen district, the first section of which was completed for the opening of the Federal German Garden Show (BUGA) 2019 in Heilbronn. Loggias and

in Heilbronn. Loggias and the communal roof terrace serve as extensions to the 60 compact rented dwellings and rooms. A ground-floor cafe forms a social meeting point for the neighborhood.” (Detail, 2019)

## materials

precedent study 02  
for CLT construction

### Puukuokka Housing Block

Jyvaskyla, Finland

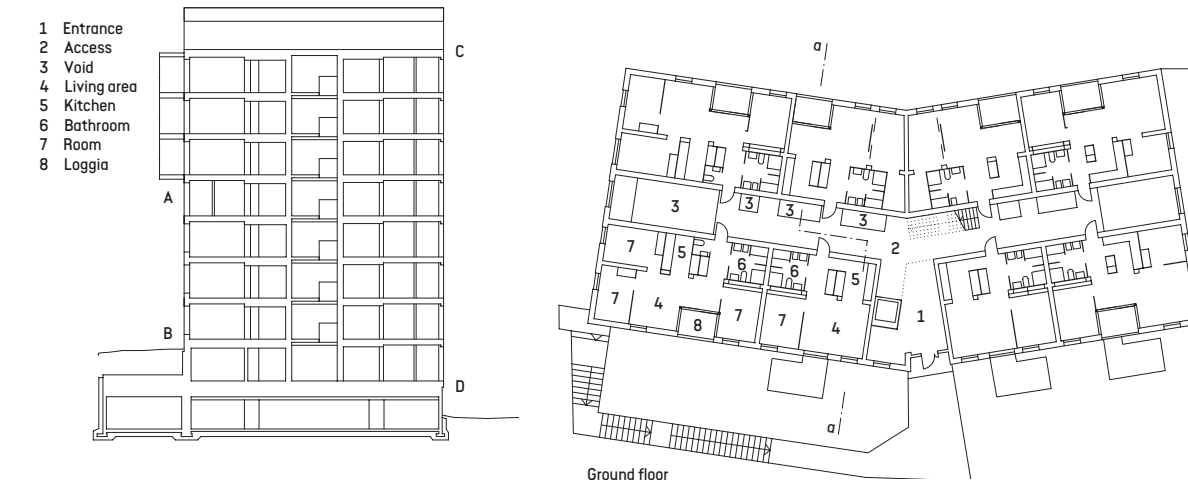


Figure 44: Puukuokka Housing (Detail, 2022)

Architects: OOEPA  
Area: 20074 ft<sup>2</sup>  
Year: 2022  
Building type: Mid-rise  
Types of programs: Housing Units

“The first 8 storey, timber built residential building in Finland is a pilot project of the urban planning authority to create ecologically high quality and, at the same time, cost-effective flats: the tenants make a moderate down payment and become the owners of their flats after 20 years.



The project distinguishes itself by an innovative application of room modules: in every flat, the facade-facing spatial layer, consisting of a bedroom, a living room and a loggia, is accommodated in one room module, while a second module houses the inside zone, with bathrooms,

Installations are integrated into the corridor walls, enabling independent maintenance.” (Detail, 2022)

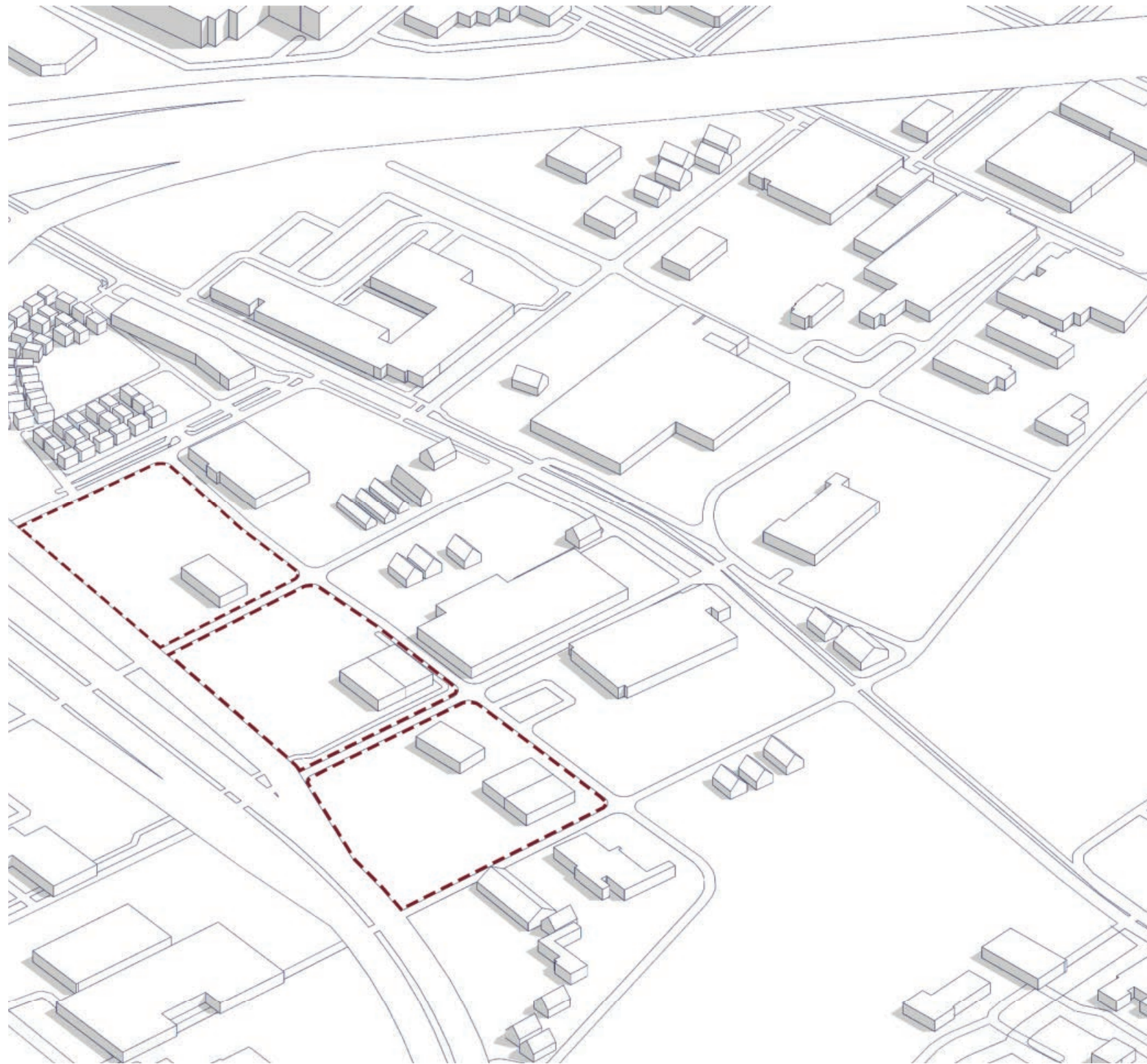


**planning &  
analysis**



## masterplan development

allocation of empty/  
abandoned plots

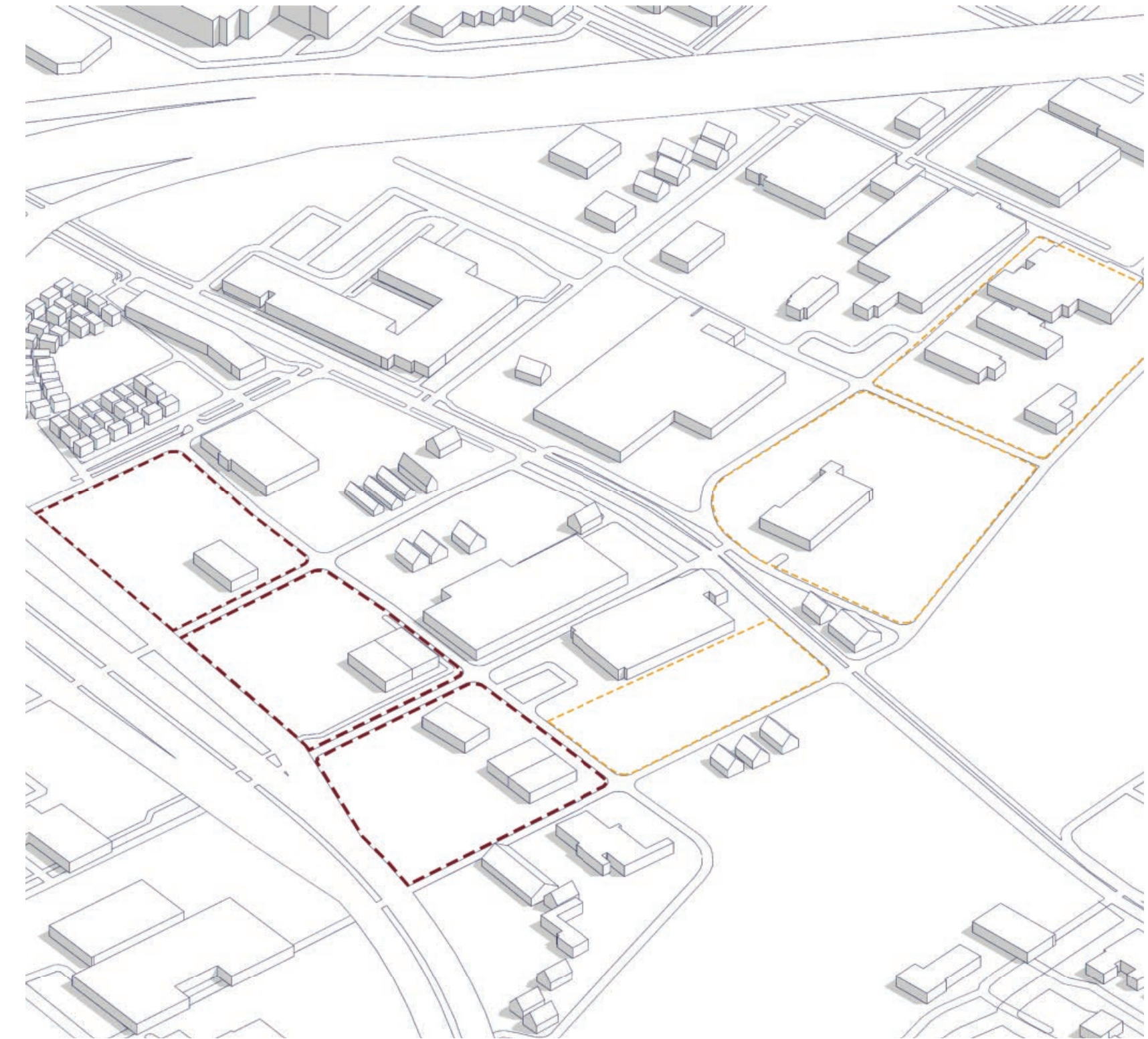


Following a thorough analysis, a proposal for a comprehensive master plan is to be developed for the first three blocks. The development process will be conducted in stages, and a meticulous review of all three city blocks in the vicinity will be

be undertaken. The red-highlighted plots, which constitute a land area of 5.2 acres, currently represent the most underdeveloped land within the municipal block. To create an effective plan, the initial phases will be carried out iteratively, taking into account

## masterplan development

allocation for future  
development



the insights gleaned from prior stages. One of the main challenges of this project is the proximity of the blocks to the elevated highway. Consequently, the development plan must consider the potential impact of the highway on the surrounding

community and take appropriate measures to mitigate any adverse effects. Furthermore, after the success of the first three phases the yellow highlighted plots of 6.7 acres could be used for future development.



## masterplan development

typical single housing  
development

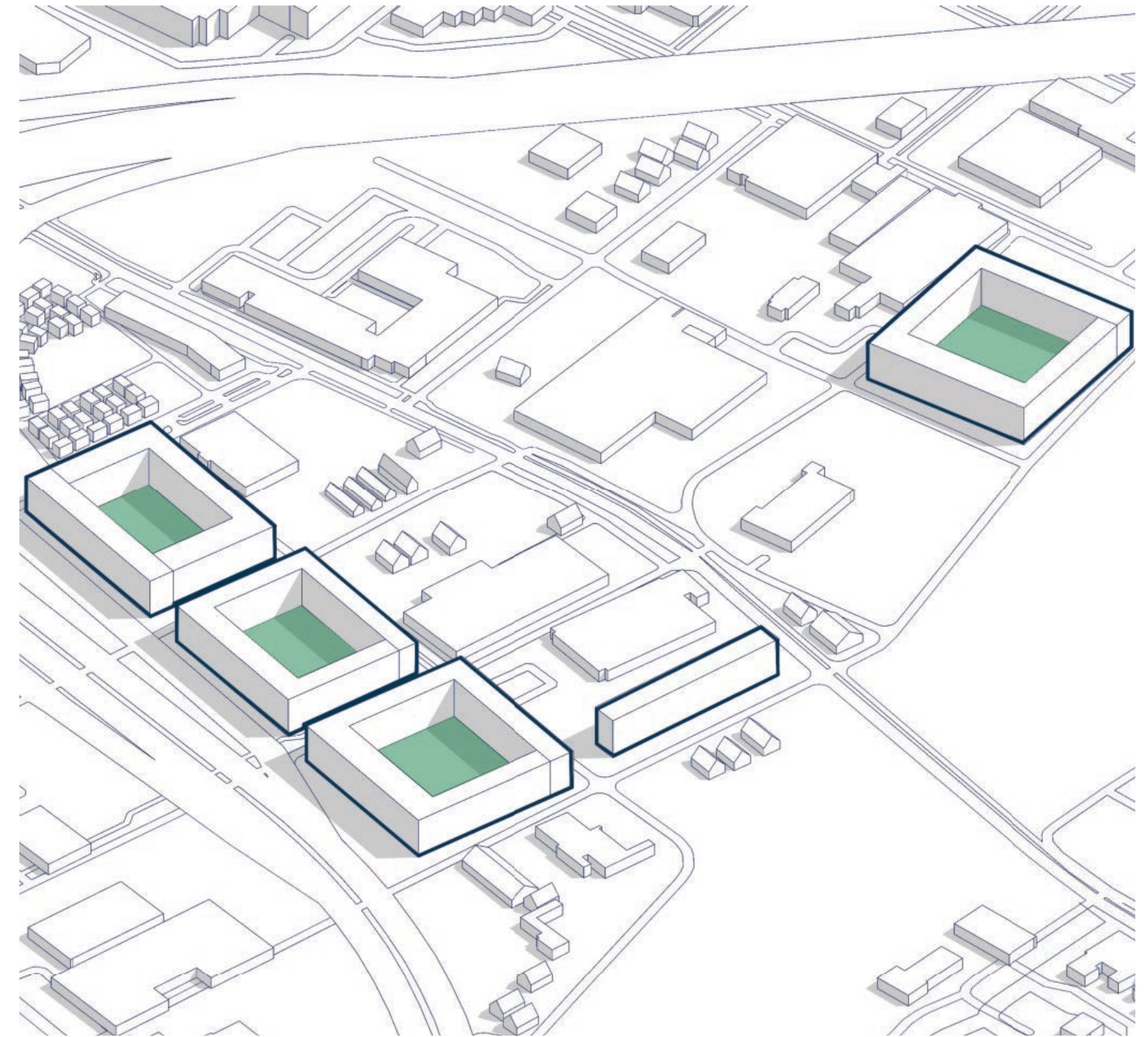


Because of the limitations of the project, a conceptual master plan has been developed, which includes the formation of several typologies within the overall development area. To accomplish this goal, the initial strategy was to subdivide all available blocks into single-family housing plots. However, after careful consideration, it was discovered that this approach could only

fit about 90 residences, with center plots missing access to drives. Furthermore, while single-family homes could be built, social spaces for inhabitants were insufficient, and the resulting layout did not correspond with the project's goals.

## masterplan development

typical mid rise housing  
development



The second approach was developed through the development of typologies based on the housing complexes built in adjacent municipal blocks. The usual module used by developers in this technique is a mid-density structure with a courtyard that is only accessible to the residents. While this system accommodates a greater number of people, the design is limited since it isolates inhabitants and prevents relationships among community members.

Furthermore, the lack of dedicated locations for public activities makes it difficult to invite individuals from other areas to interact with the block and, eventually, the city. To solve this issue, including common activity spaces may assist in the formation of a more inclusive community, which may foster more connectivity amongst the residents.



## masterplan development

mid-density development  
with repetitive buildings

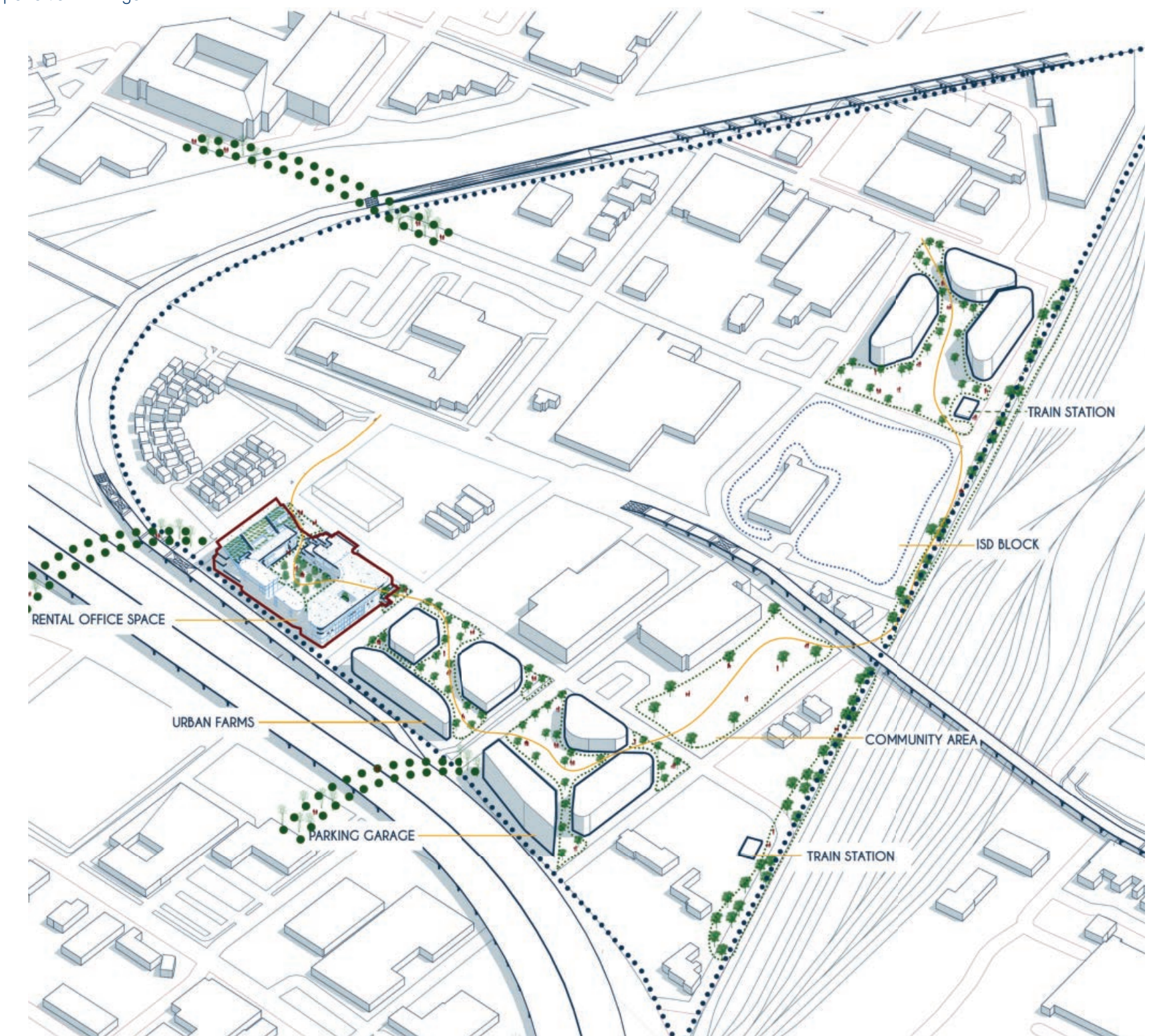


The programming process resulted in a review of effective ways to develop the region, and it was found that using prefabricated buildings would be the best option. As a result, modular mid-rise buildings were developed as an additional strategy. Four separate building typologies were established through the juxtaposition of the units, with a master plan in place to provide communal places throughout the entire neighborhood.

To address the severe issue of noise pollution in the development, a concept of using non-residential activity buildings as a buffer was implemented. This method was successful in meeting the majority of the design objectives. However, the placement of the typical building throughout the site did not sufficiently account for its surroundings.

## masterplan development

mid-density development  
with site responsive buildings



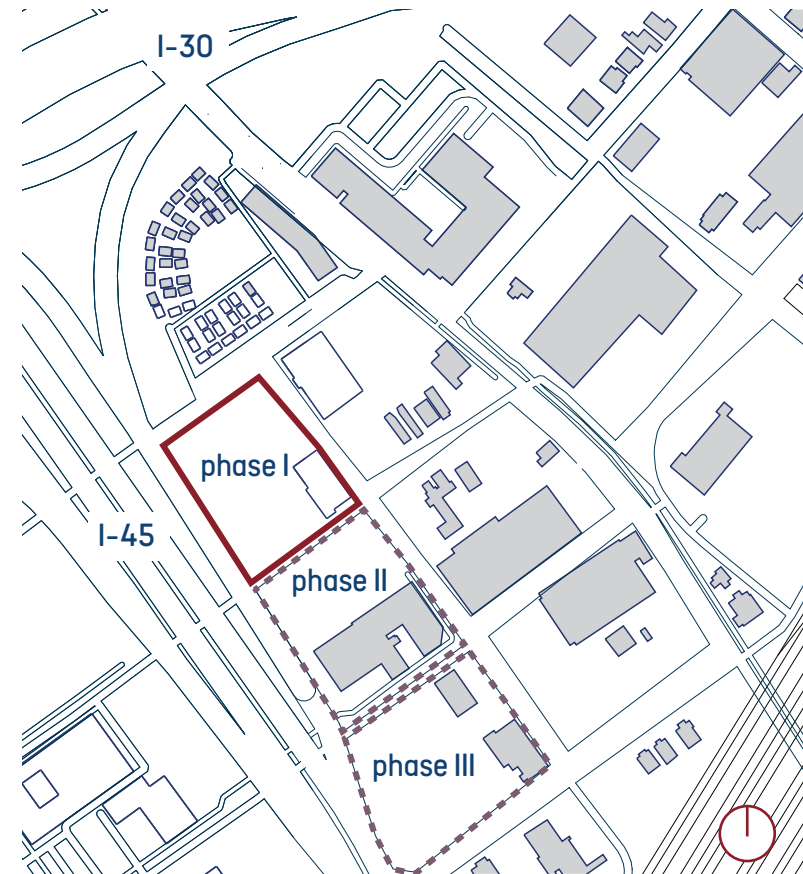
As a result, additional consideration must be given to the location of the building typologies to ensure that they effectively respond to the surrounding environment. The final strategy takes into account the location of the building and develops it according to the site's specific requirements. This approach has resulted in the narrowing down of the final study to the detailed development of a building, which

constitutes the first phase of the master plan. The subsequent chapters provide a comprehensive description of the development process for this initial phase. By employing this methodology, the building's design and construction can be precisely tailored to its unique surroundings, maximizing its potential and ensuring that it is fully integrated into its environment.

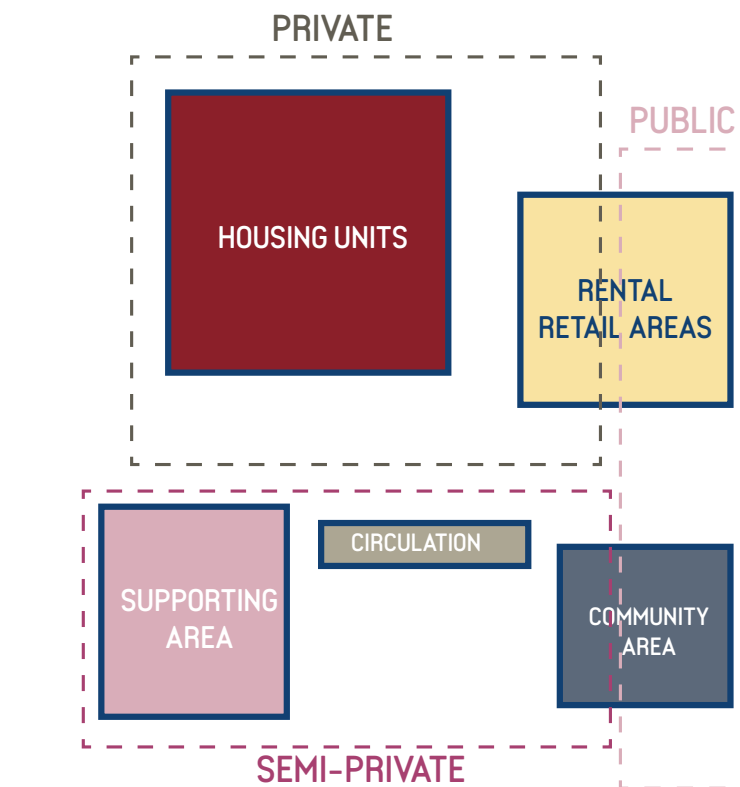


The proposed project is fabricated as an idea for the first part of the project, which is located in the northwest corner of the overall block, as outlined in red in the image to the right. The project takes into account housing for both mixed-income groups. Subsidized housing units, transitional housing units, market-rate rental units, and ownership housing solutions are available in a variety of housing typologies ranging from studio to four-bedroom units.

This phase block has nine plots, one of which has a closed warehouse that needs extensive repairs. Two of the remaining eight plots are owned by private owners and are located near to the roadway, where noise may be undesirable for single-family homes. The remaining plots are owned by the developer. It is critical to emphasize that this development is visualized as a result of a collaborative effort between multiple parties and that the first construction is subsidized and government-funded.



The complex encompasses six distinct categories – Housing Units, rental retail units, supporting areas, community areas, and circulation. Rental offices and retail shops are also included to generate revenue for operational costs and maintenance. The unit's layout is further categorized into three



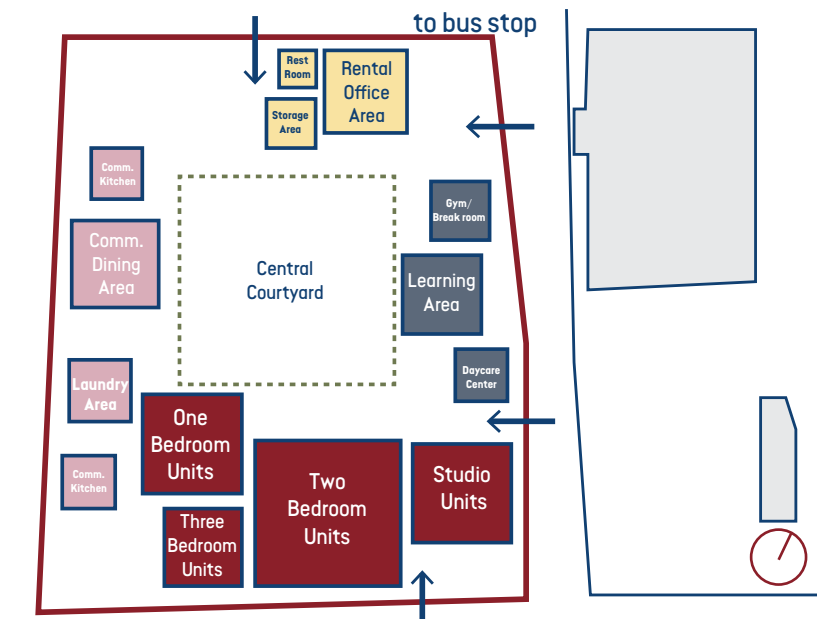
types of areas: private, semi-private, and public. A central courtyard was deemed necessary in the design programming, offering benefits to both communities and natural design strategies. In order to determine the optimal program for further development, a variety of gaming diagrams were tested.

**Opportunities**

- Easier access to the spaces
- Central Courtyard
- Semipublic space as a buffer from Highway

**Limitations**

- No clarity of spaces in blocks
- Access of semi-public spaces to the residents

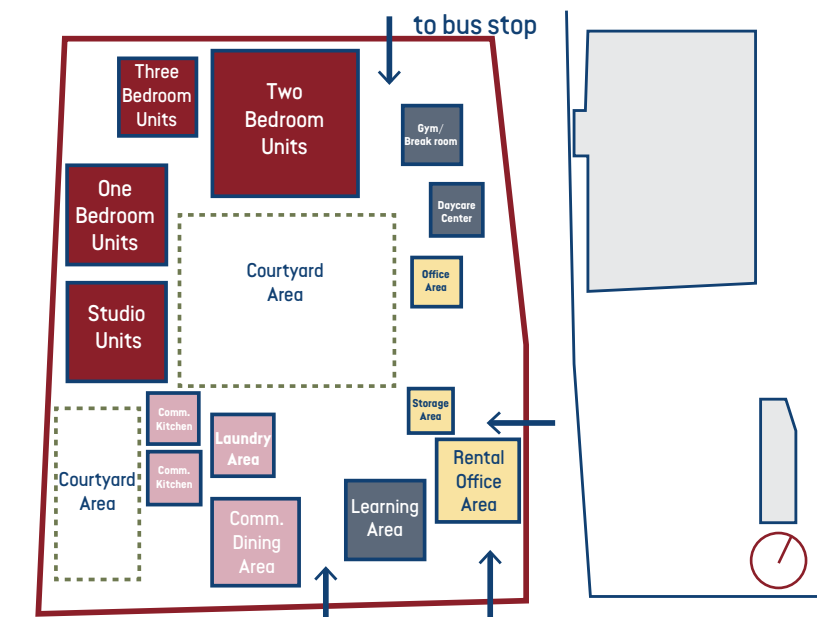


**Opportunities**

- Clarity of public and semi-public access and use for the residents
- Multiple courtyards for support of the spaces
- Semipublic space could be shared by future phases of development

**Limitations**

- Public space far from the Bus stop route
- Should provide a stop area if the focus of public space is for vehicular access

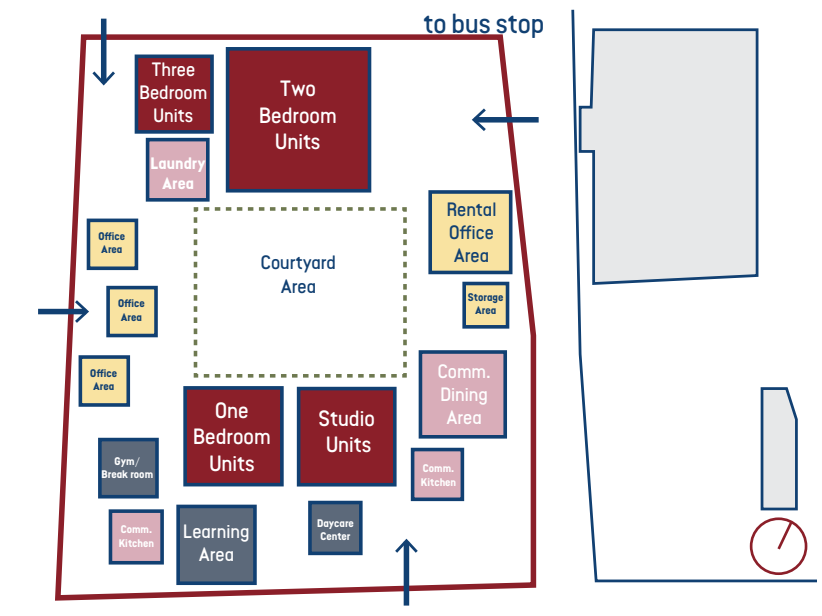


**Opportunities**

- Division of private space creates a more vibrant way to use supportive areas
- Clarity of access
- Courtyard space for the residents
- Access to the rental area on the way to bus stop

**Limitations**

- Development further needs to be vertical
- Service and fire way access





## design decisions

lessons and goals

The user mix in the project not only justifies the project's economic viability, but also provides an opportunity for people to live in the city center, where job opportunities abound, and also avoids further isolating the pocket if the housing solution was only available to a certain income group of people.

The conclusion was reached after researching low-income housing near the site, where housing solutions for long-term homeless people are provided, but the project and its output are not sustainable.

To further develop the project's program certain project goals were established while designing the project.

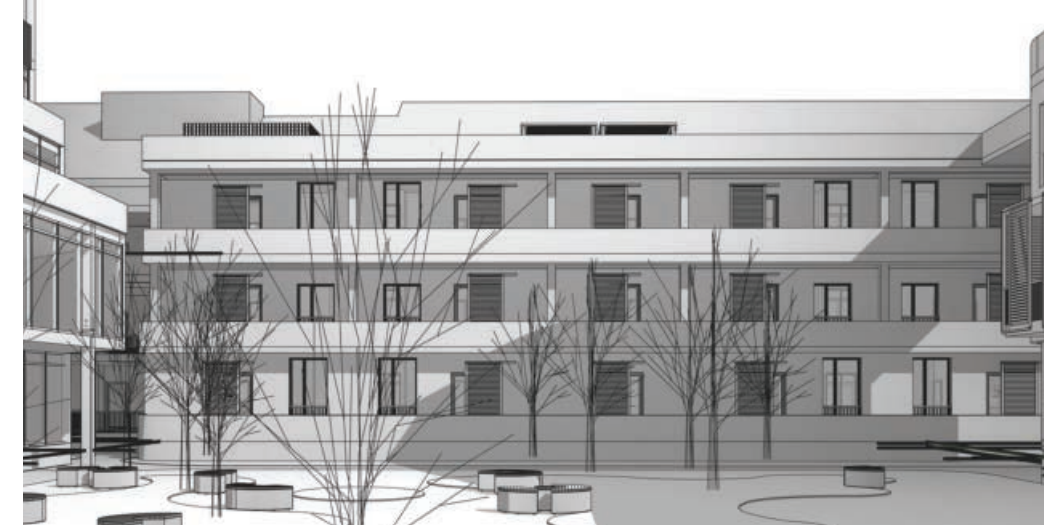
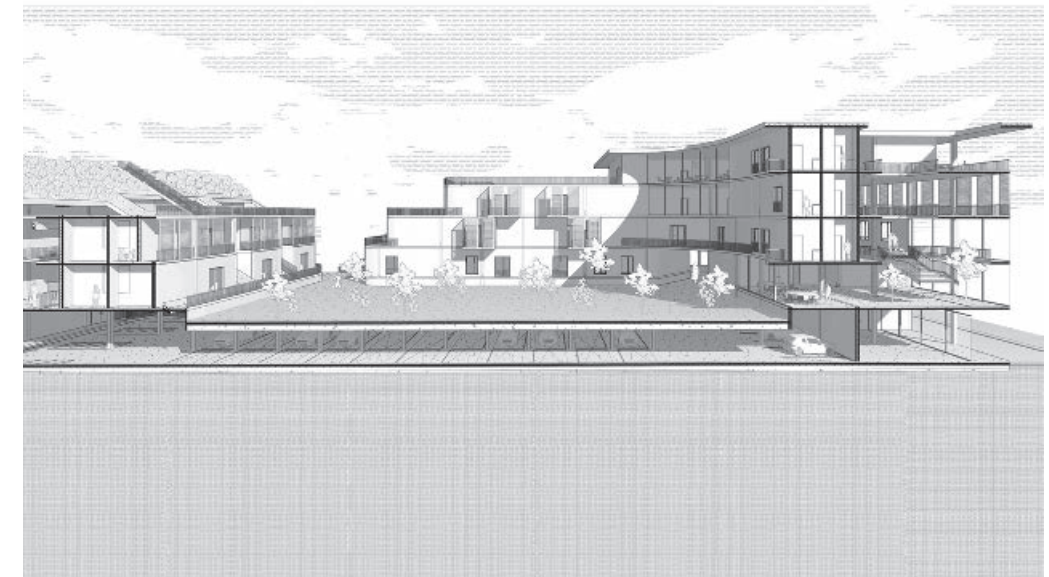
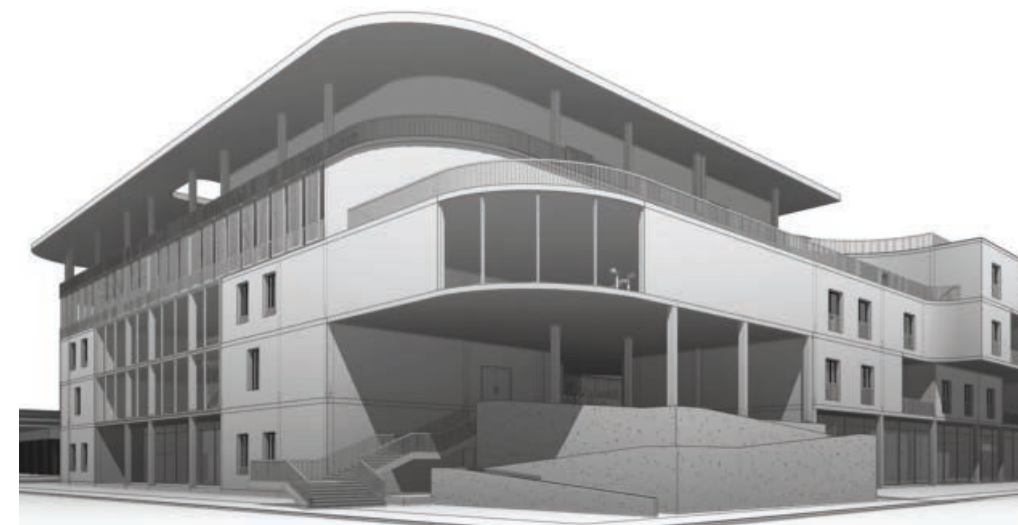
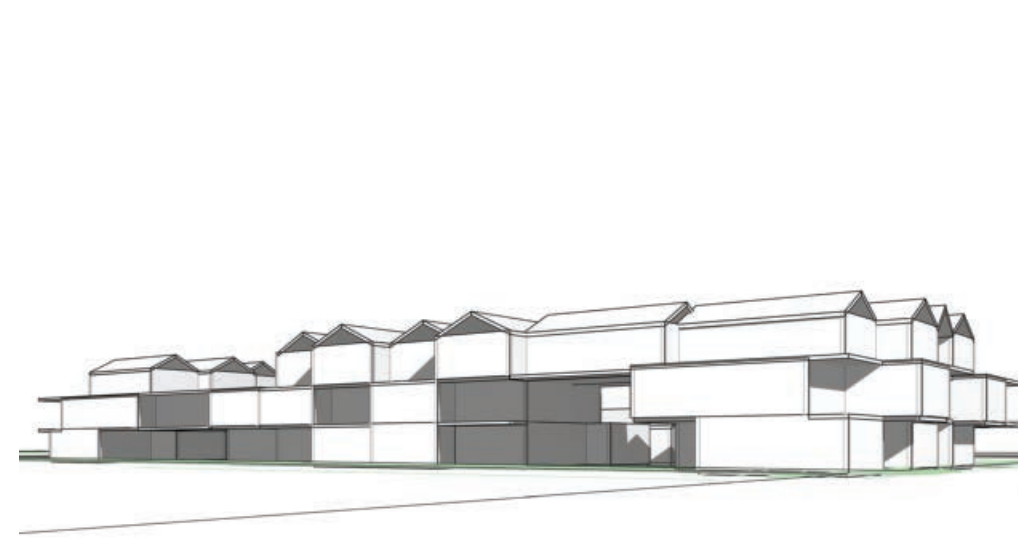
- a. The project should be a human-scaled, walkable community;
- b. A mixed-use development where a community can thrive;
- c. However, the project should not impose community on the people, but rather be a safe and private place for an individual.



Figure 45: The Cottages at Hickory Crossing, Dallas, Tx(Google Maps, 2020)

## design exploration

form finding

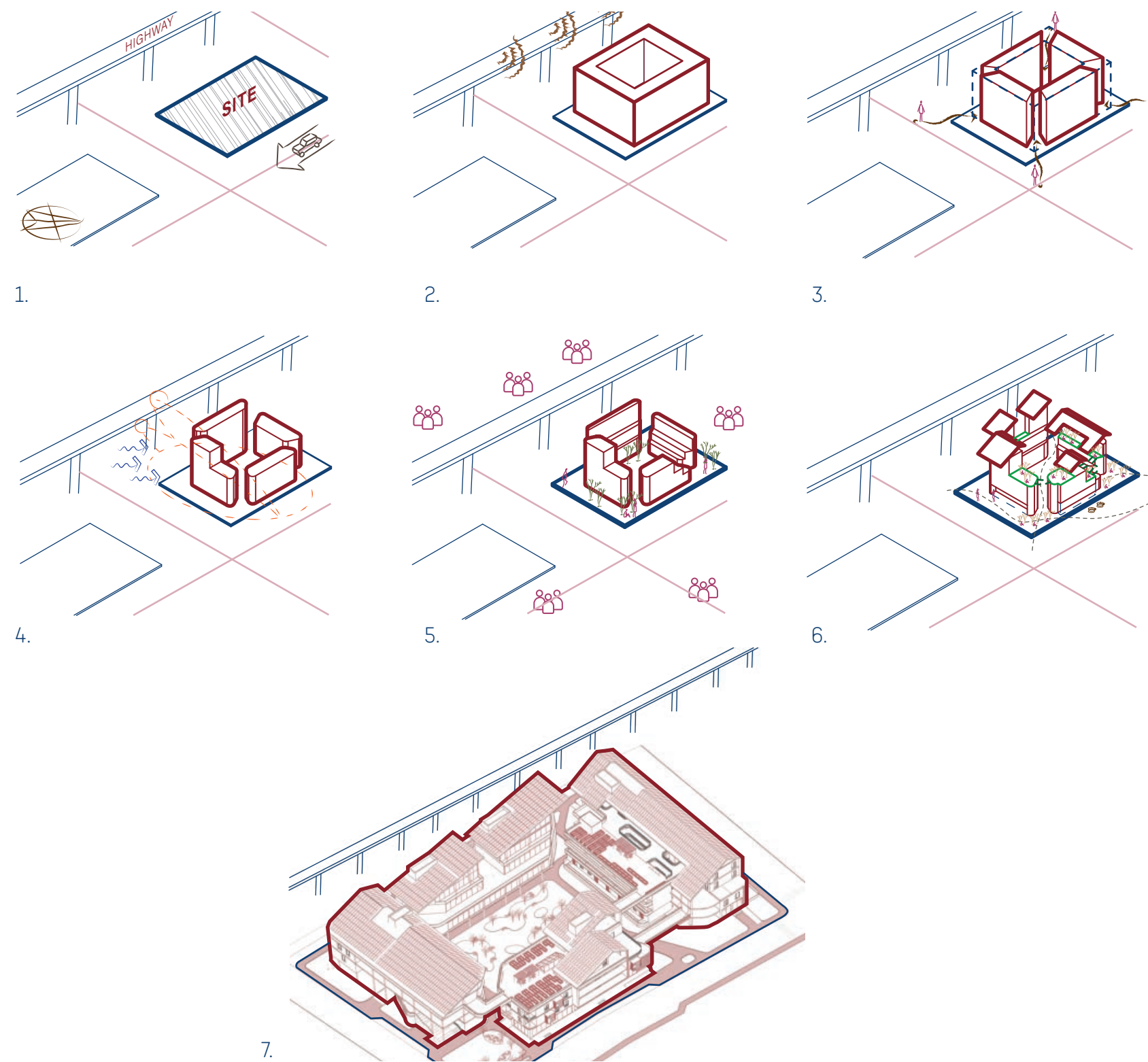




**proposed  
project**



## form exploration



For the first phase of the project, a site of approximately two acres has been selected, which boasts access to secondary roads on three sides, as well as the highway on the western side. The project has been aligned to design a mid-density housing complex, and as such, the allowable built area has been extruded with a focus on the total buildable volume.

One major concern for the site is noise, which has led to the tallest building in the complex being situated on the western side, which contains office spaces, and acts as a buffer against noise pollution. Additionally, the four corners of the building have been opened up, creating an inviting and accessible atmosphere for the surrounding neighborhood.

## building with surrounding area



To further enhance the accessibility and comfort of the building, the corners have been softened, mimicking the ease of turning a corner. These corners have also been stepped down in height, which has served to humanize the building and provide a comfortable pedestrian experience. This design choice has also resulted in the creation of opportunities for

views within the building, including views of the courtyard. Finally, the form of the building has been further influenced by the potential to benefit from natural resources and to encourage community interaction on multiple levels.



site plan



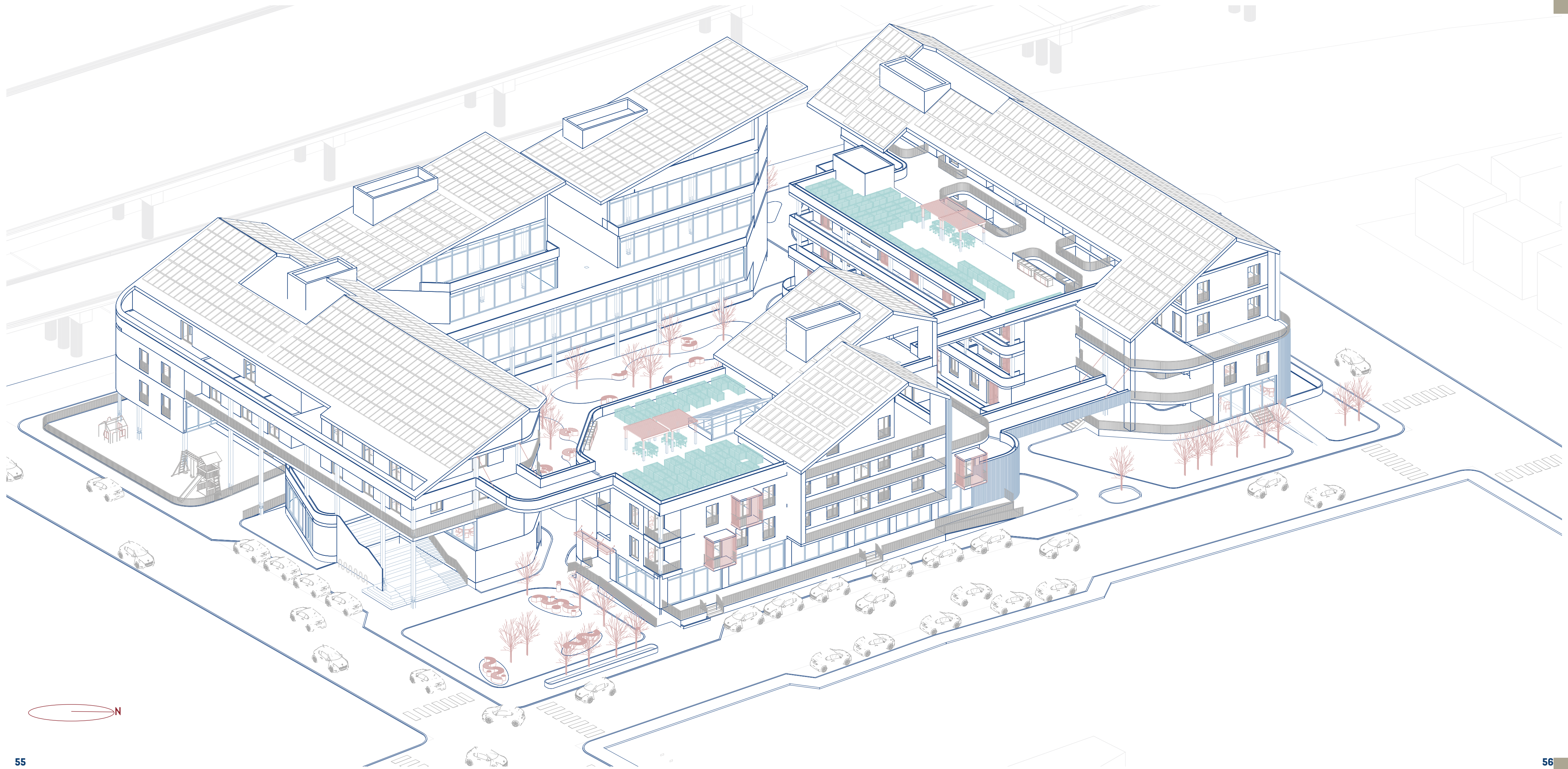
view from northern entrance



The complex comprises four buildings. The north, south, and east buildings incorporate housing units and supporting amenities and are interconnected through bridges located on the upper floors. For easier access, the northeast corner is opened up as the bus station is only a two-minute walk from the block. The northern block accommodates 26 apartment units, out of which 11 are subsidized rentals, while the rest are market-value rental units. The eastern building, as shown in the image above, features retail spaces on the first floor.

The vision for this space is to serve as a quick stop for coffee or food on the way to the bus stop. The floor is designed to provide an extended platform to gather people from the neighborhood. The upper floors of the eastern building offer ten units for long-term housing. Tenants of these units make a moderate down payment and become the owners of their flats after a certain period.







## first floor plan

overall plan



### LEGEND

1. MANAGEMENT OFFICE AREA
2. MIXED INCOME HOUSING BLOCK
3. RETAIL AREA
4. CENTRAL COURTYARD
5. DAYCARE CENTER
6. RENTAL OFFICE AREA
7. NORTHERN ENTRANCE
8. SOUTHEAST ENTRANCE

## first floor plan

view of southeast entrance



The majority of community spaces are located in the southern building. On the first floor, there is a daycare center spanning 5200 sq. ft, as well as a private play area designated for children. The second floor encompasses a communal kitchen and dining area, a multipurpose room designed for community use, and a fitness area. The southeast corner of the complex has a connecting space that serves as a transition point between the second floor of

community space via a set of stairs, which could also function as a gathering space for the neighborhood. Furthermore, this area also serves as a transitional space and connects to the central courtyard through pathways. The central courtyard features a variety of landscapes and water features that are uniquely designed to provide people with a relaxing environment to unwind. The courtyard is visually connected to the office and rental spaces, but there is no direct access to these areas.



## first floor plan

Northern block



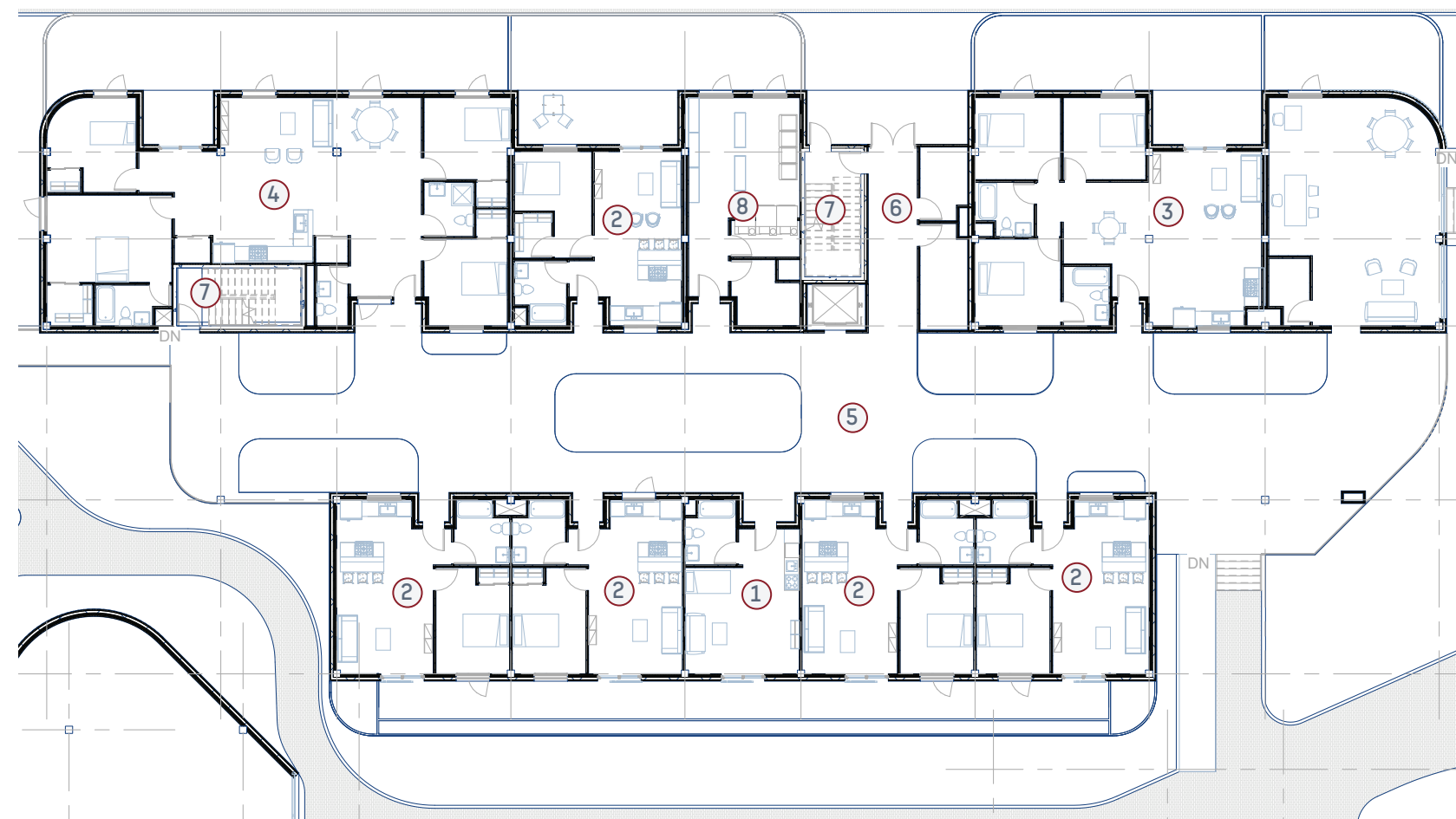
## first floor plan

corridor design



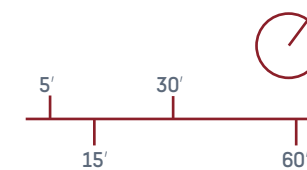
The complex offers ample opportunities for fostering relationships among the residents. One of the challenges encountered in this design concerned the corridors. The conventional long corridors in housing design primarily served the purpose of facilitating access, but they were not good for fostering relationships. A place that could have been utilized by neighbors to greet each other and engage in conversation was merely a space for brief nods and quick departures.

The design explored ways to increase the width of the corridors, which had numerous benefits. Firstly, it provided ample space for social interaction. Secondly, it allowed each unit within the complex to benefit from natural light and cross ventilation. Moreover, the design prioritized individual privacy, which is achieved through the incorporation of punctures in the upper story corridors, which created a bridge that gave each unit a sense of private access to their place.

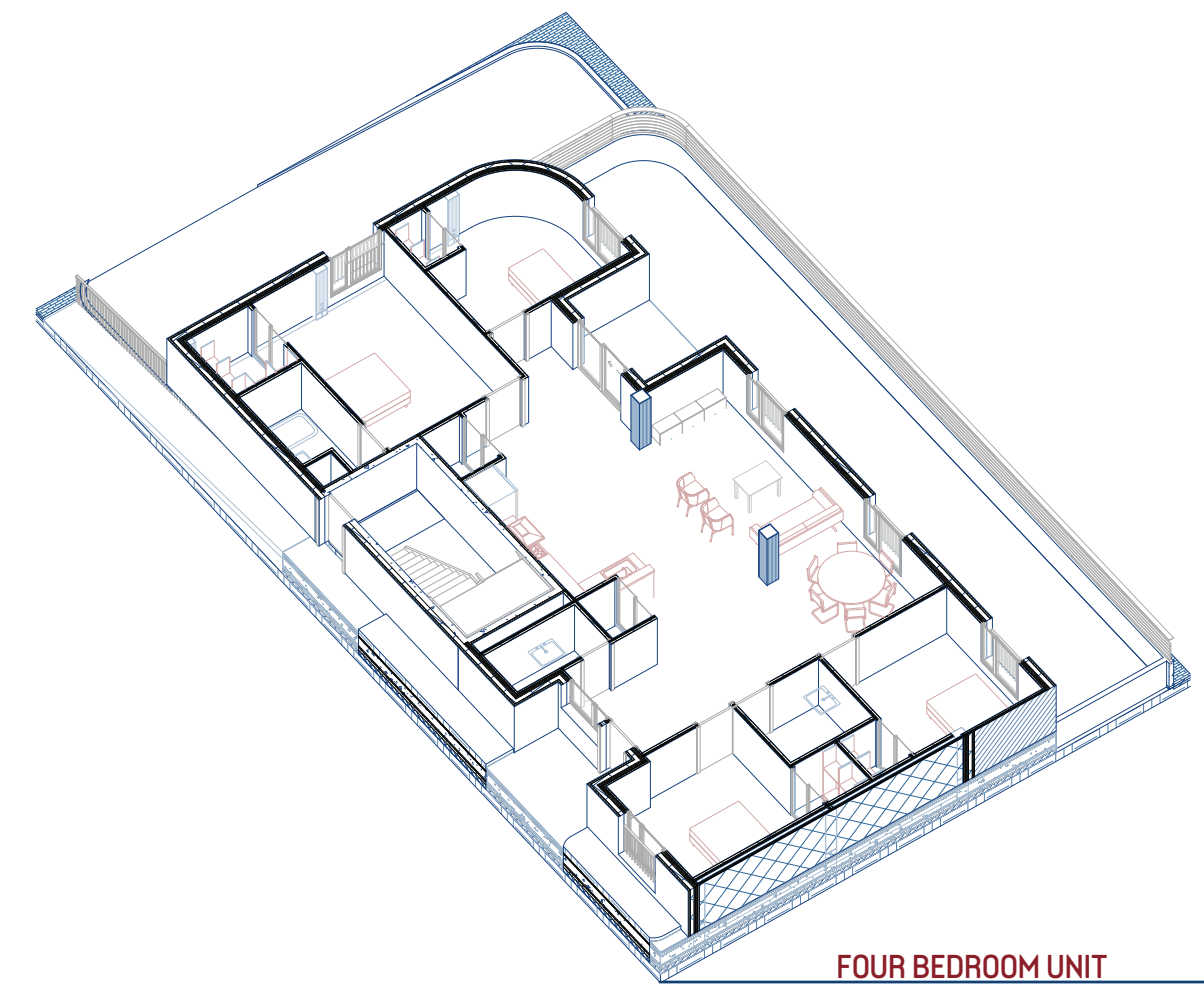
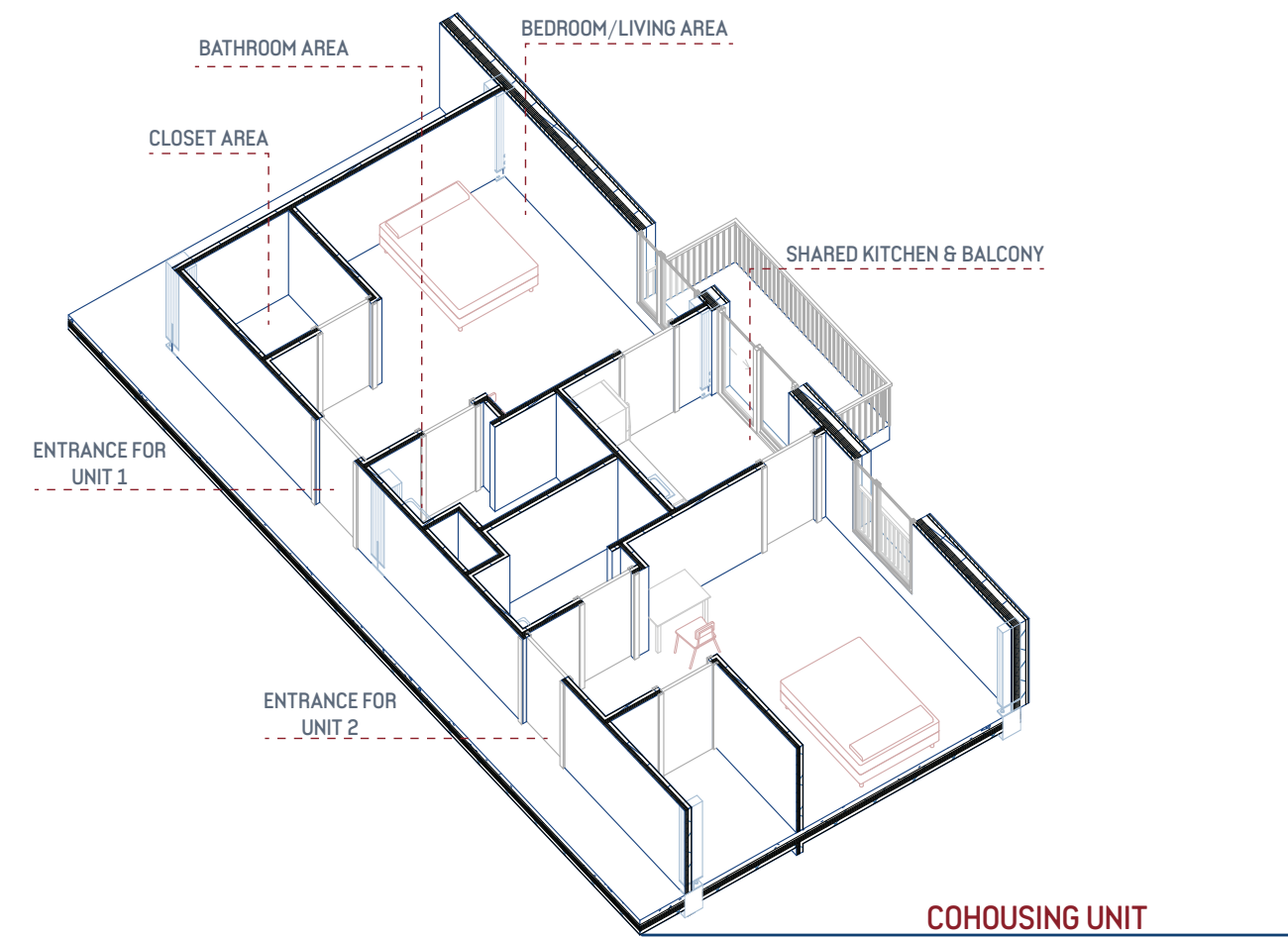
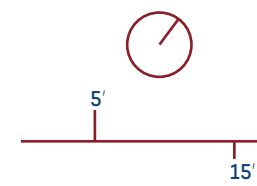
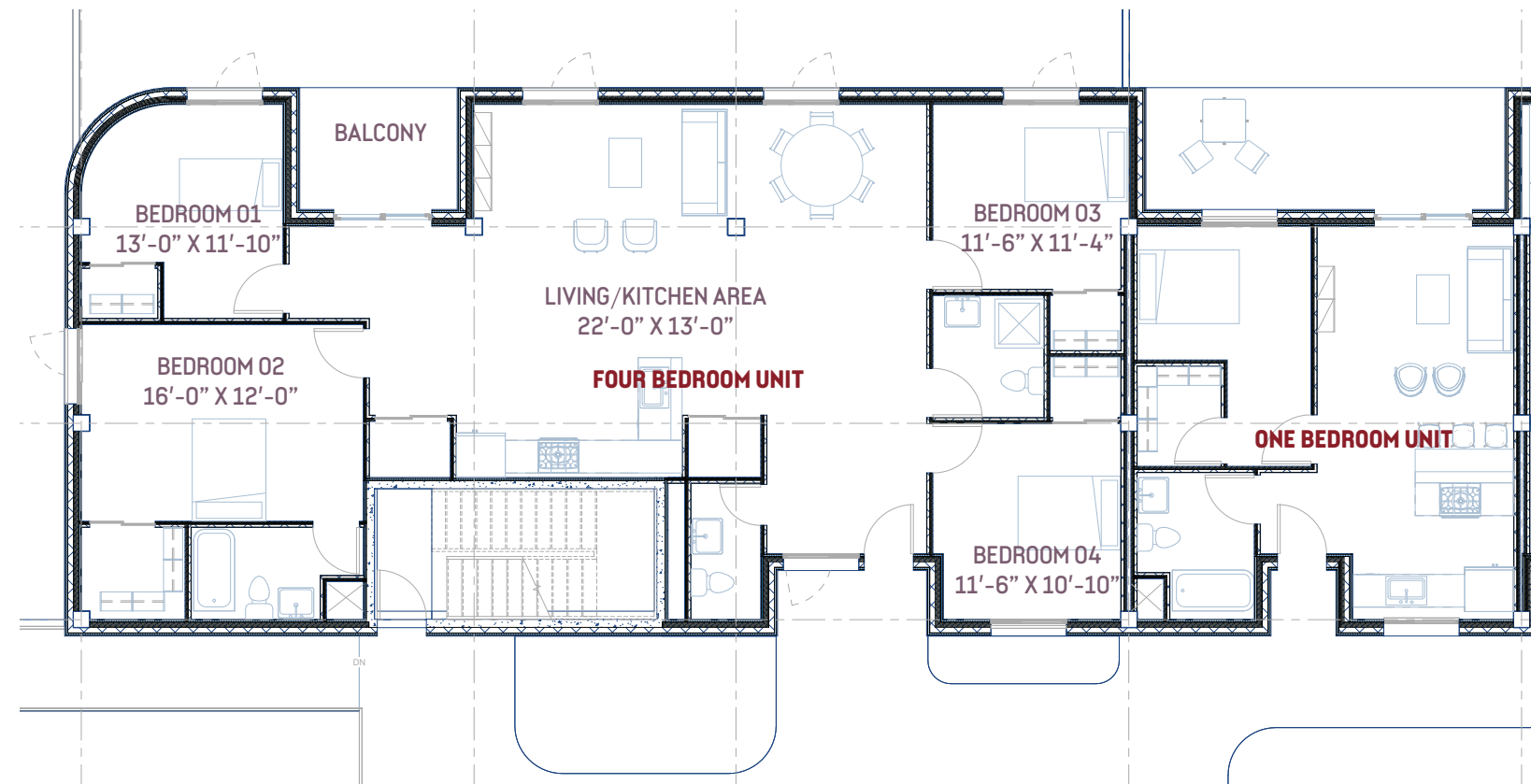


### LEGEND

1. STUDIO UNIT
2. ONE BEDROOM UNIT
3. THREE BEDROOM UNIT
4. FOUR BEDROOM UNIT
5. CORRIDOR
6. SERVICES AREA
7. FIRE ESCAPE
8. LAUNDRY ROOM







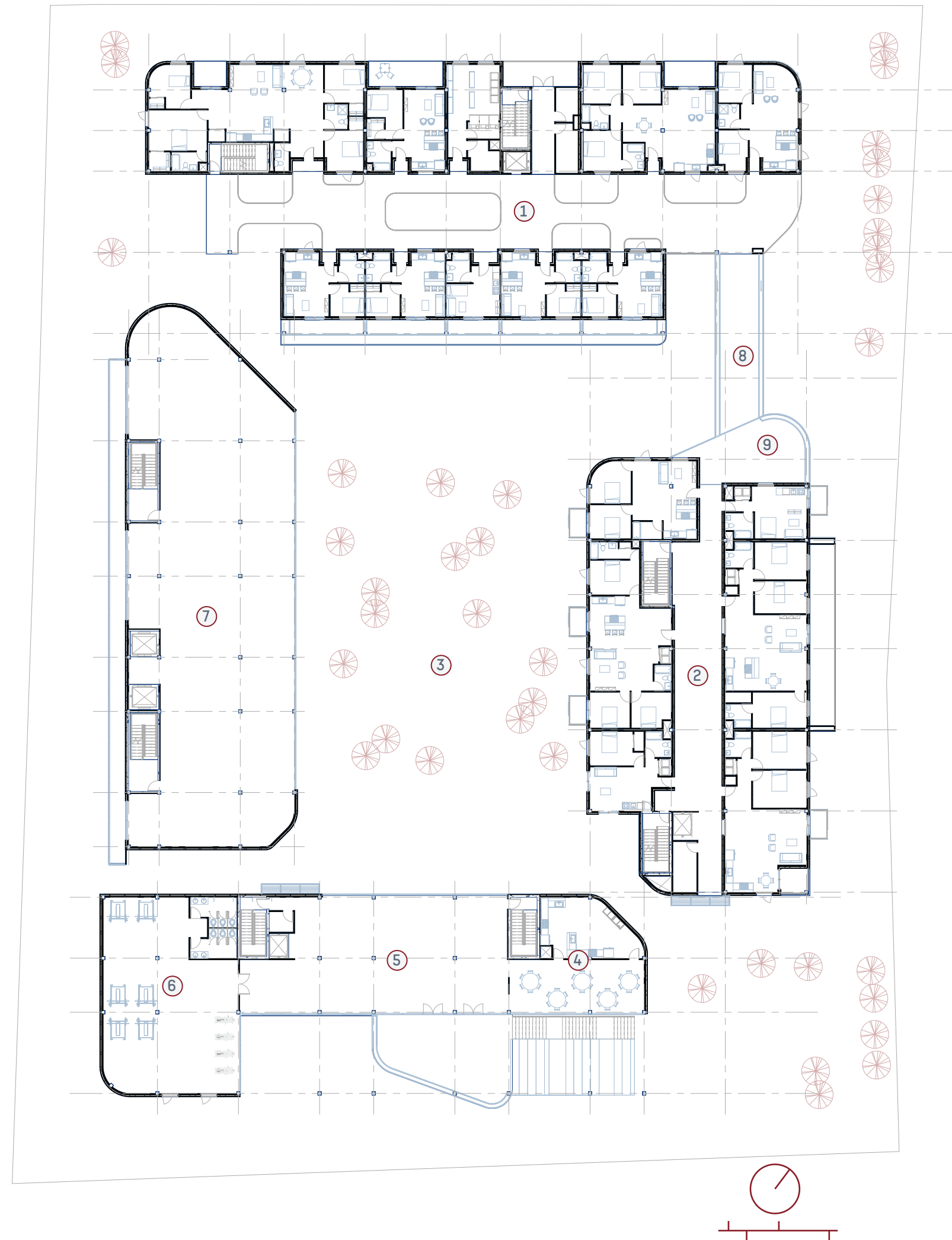






## second floor plan

overall block



### LEGEND

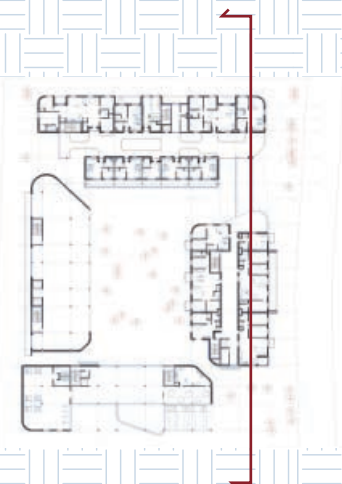
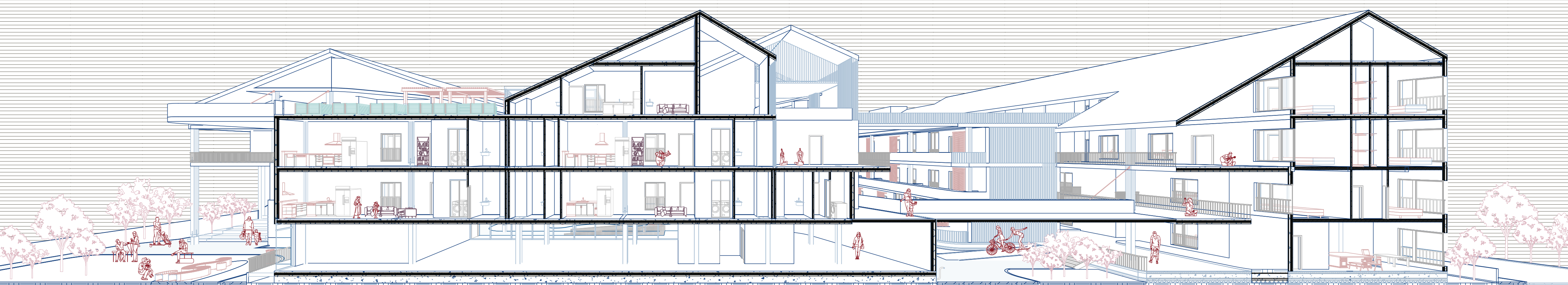
1. MIXED INCOME HOUSING BLOCK
2. LONG TERM HOUSING
3. CENTRAL COURTYARD
4. COMMUNAL KITCHEN & DINING AREA
5. COMMUNITY ROOM
6. FITNESS AREA
7. RENTAL OFFICE AREA
8. BRIDGE
9. COMMON BALCONY

## community areas

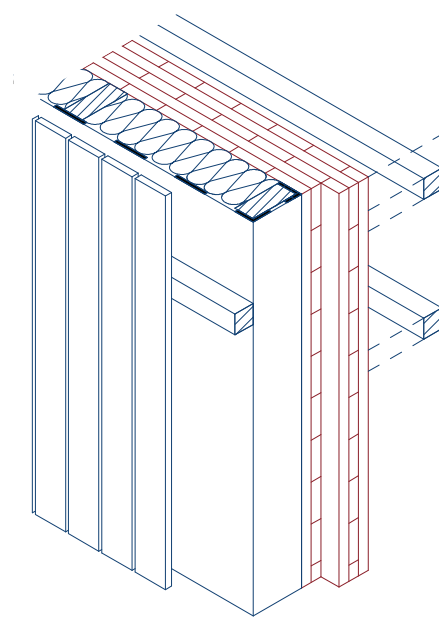
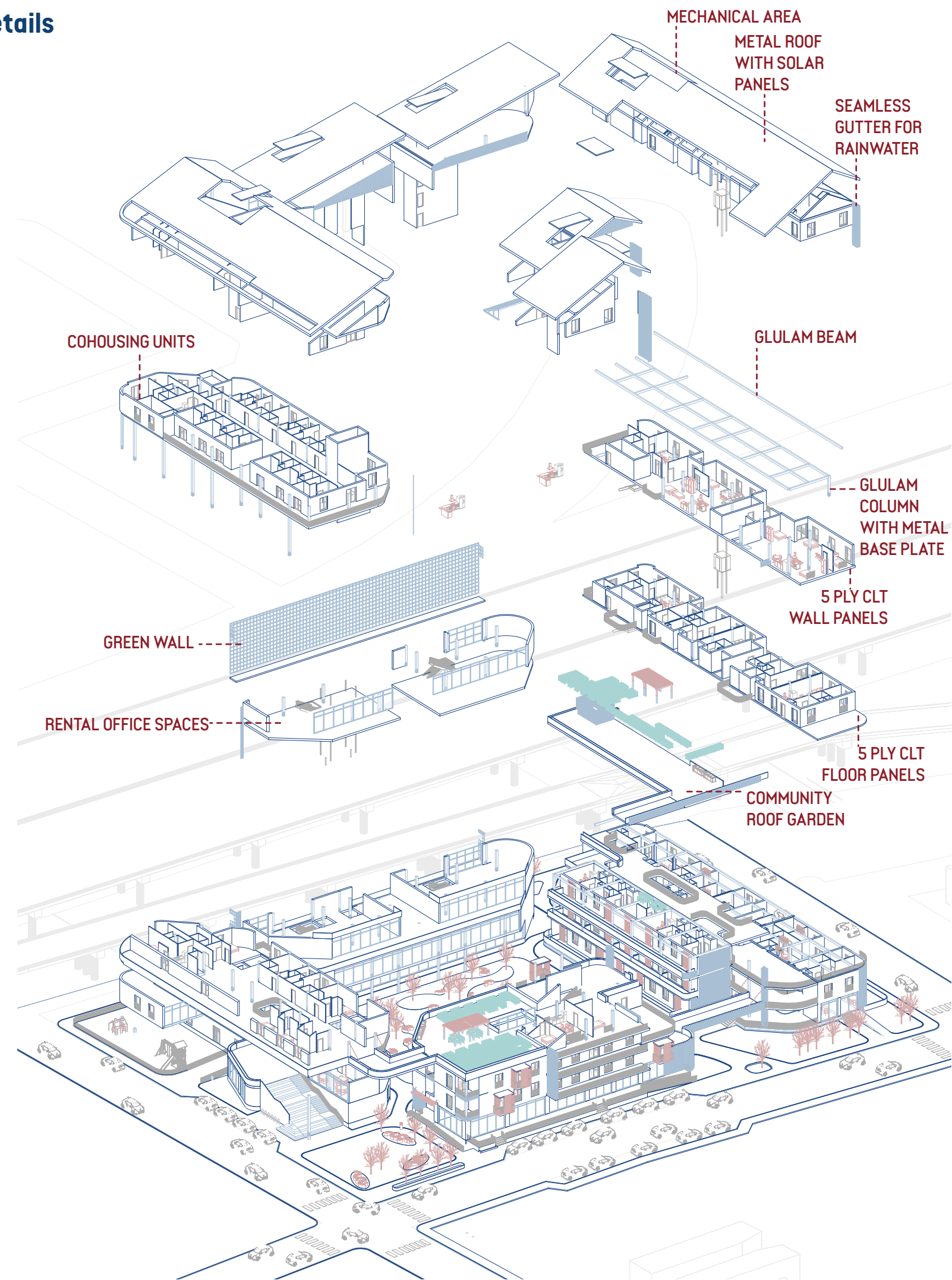
connecting bridge, terraces and roof gardens



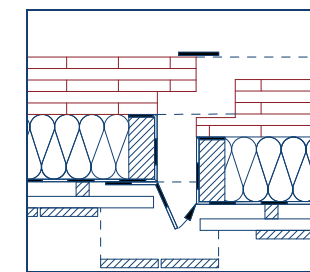




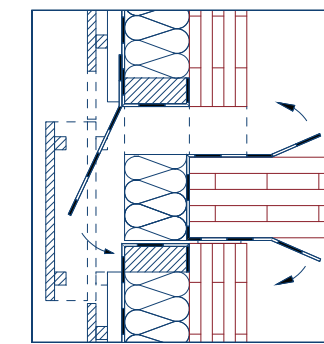
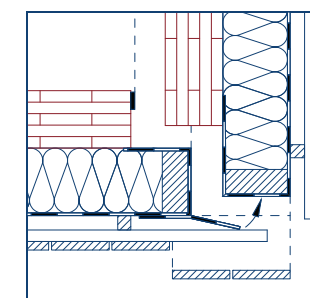




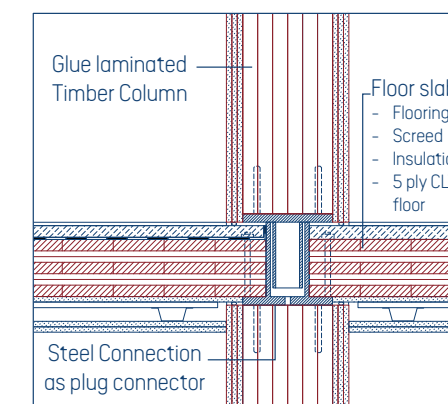
Structure insulated on the outside



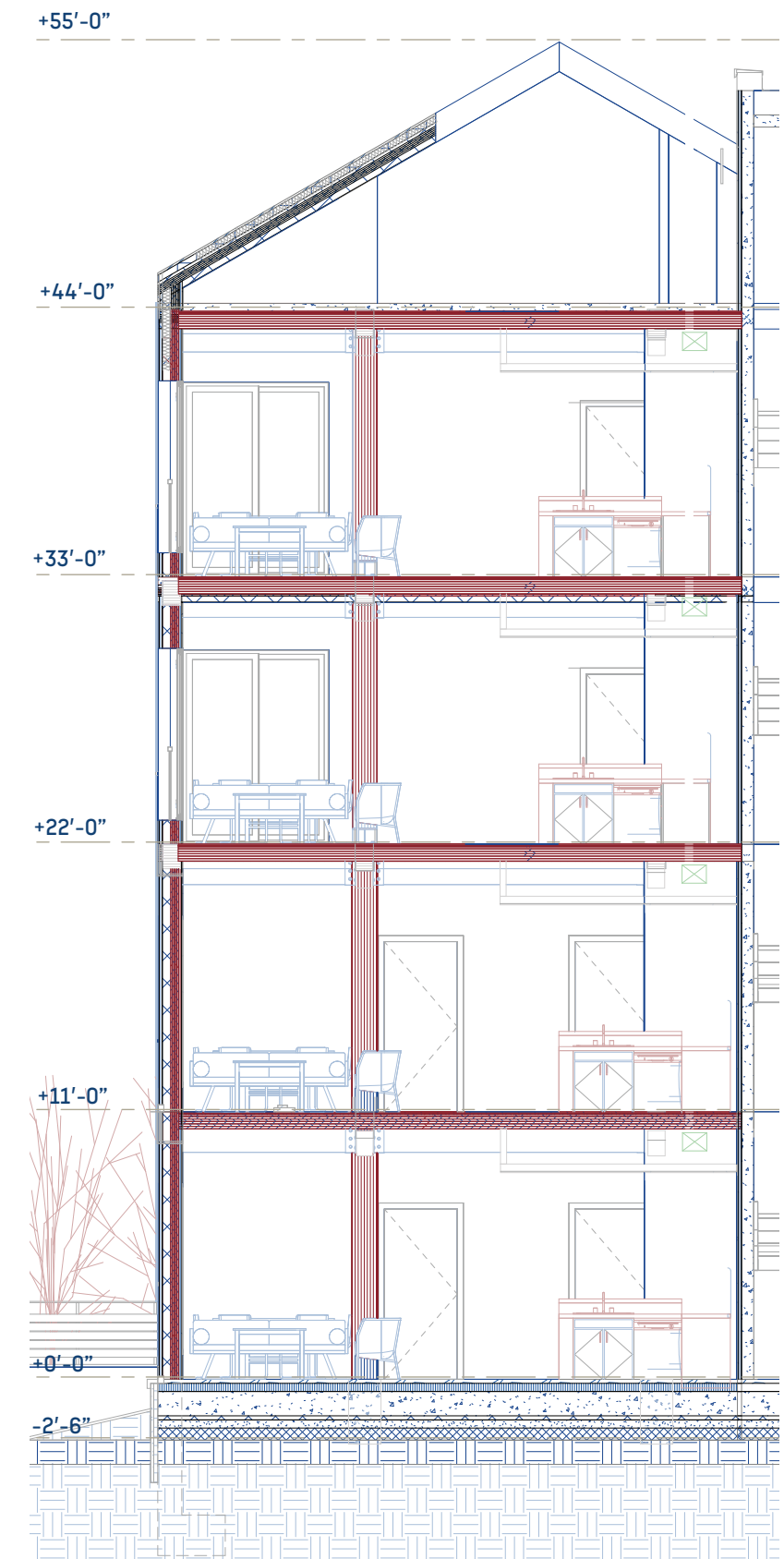
Horizontal element joint



Vertical structural component joint

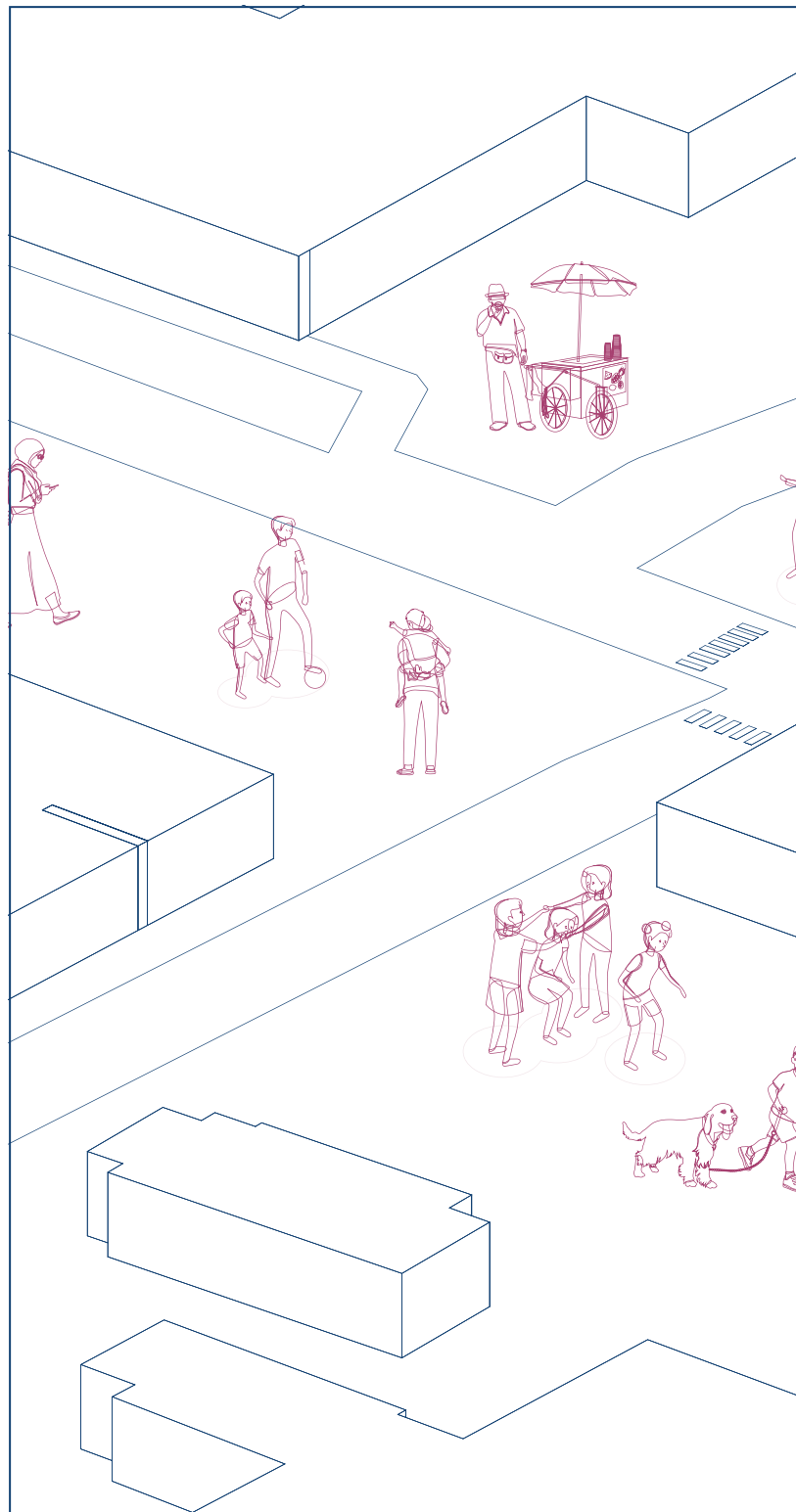


Column joint details



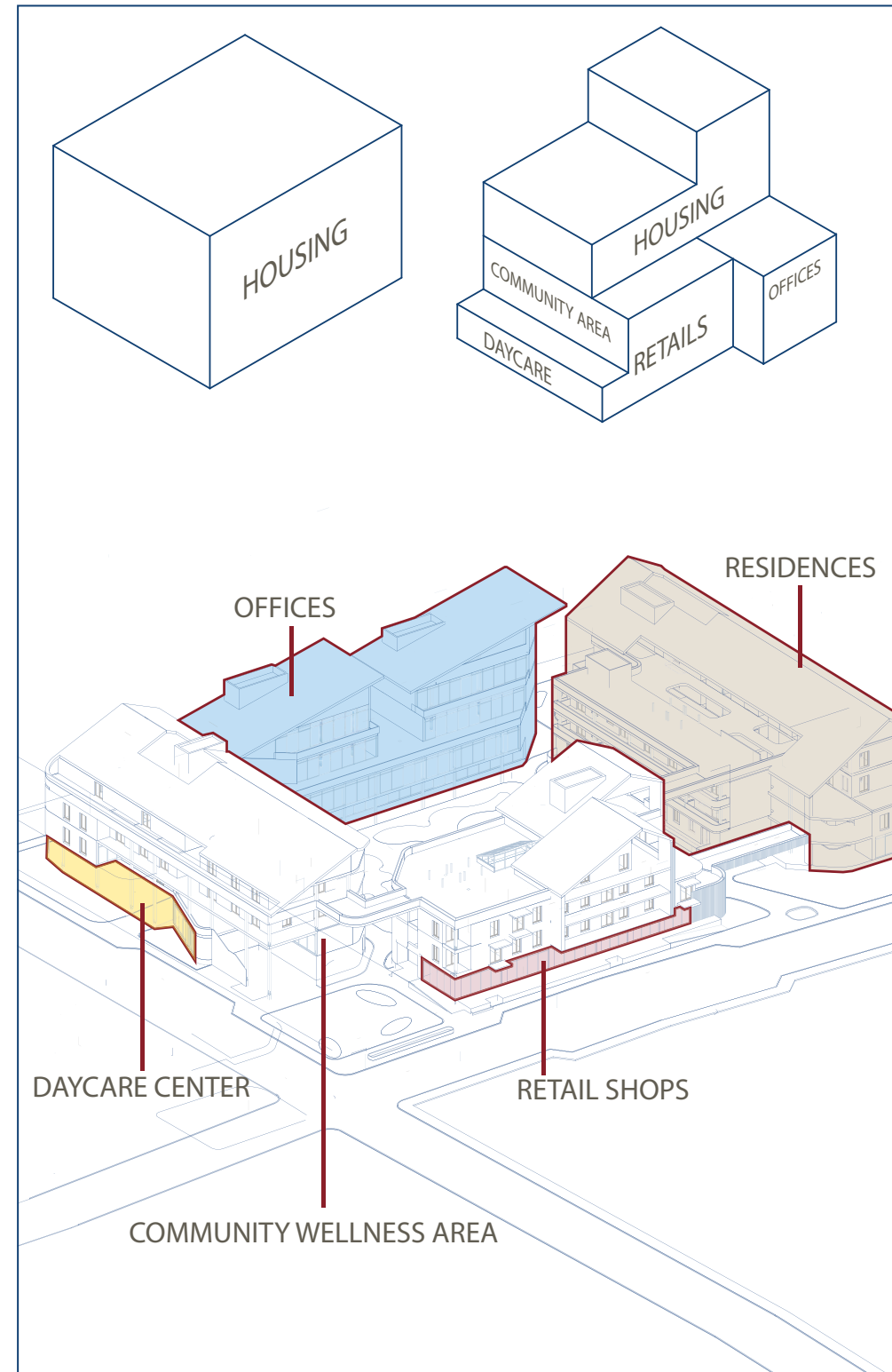
data source: 5 ply CLT panel floor and wall structure (Kaufmann, 2018)





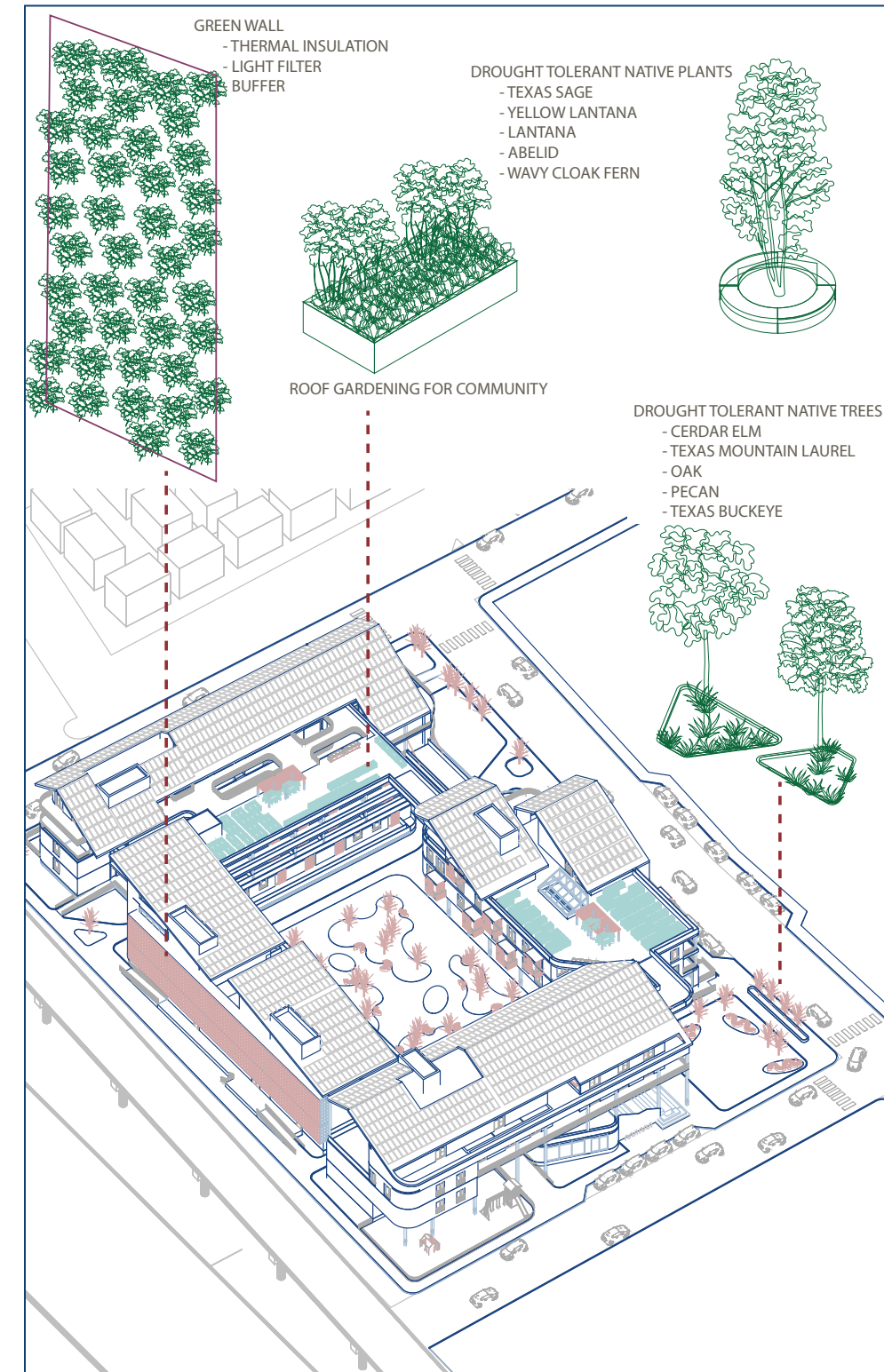
**for integration**

In conclusion, sustainable strategies have had a significant impact on the design of the apartment complex. The arrangement of the blocks has been optimized to allow for the intake of northern ambient light, while mitigating the harsh



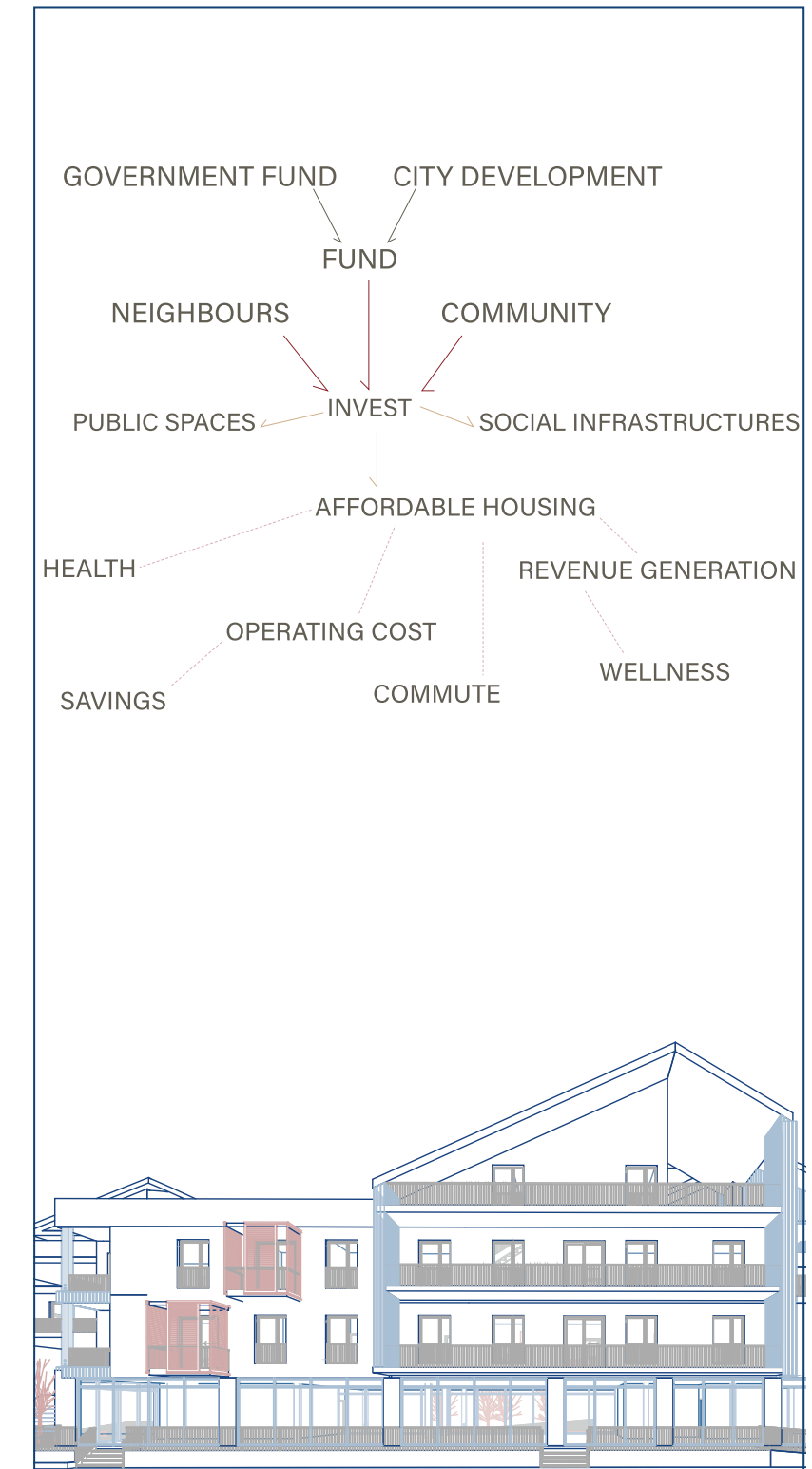
**for equitable communities**

glare of western lighting. The incorporation of large overhangs and solar shading shutters has been used to minimize heat gain in areas with direct sunlight. And the use of natural ventilation and lighting has been implemented to provide occupants with the opportunity to reduce their operating expenses.



**for ecosystem**

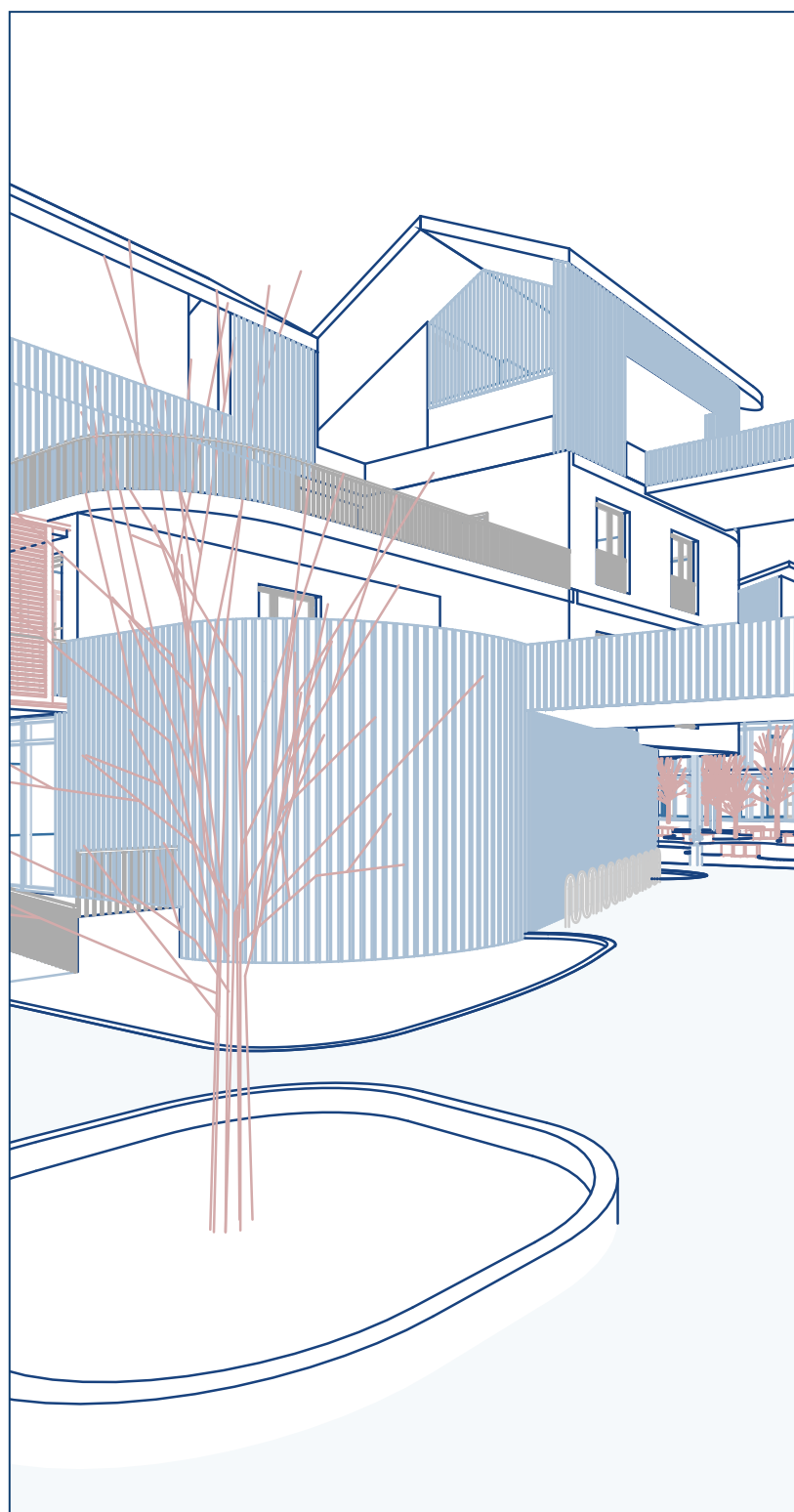
The design of the roof has been influenced by the sun path, with the angle of the roof designed to maximize the efficiency of solar panels. The building's rainwater harvesting system and the use of drought-tolerant and native plants for landscaping have been implemented to reduce water demand,



**for economy**

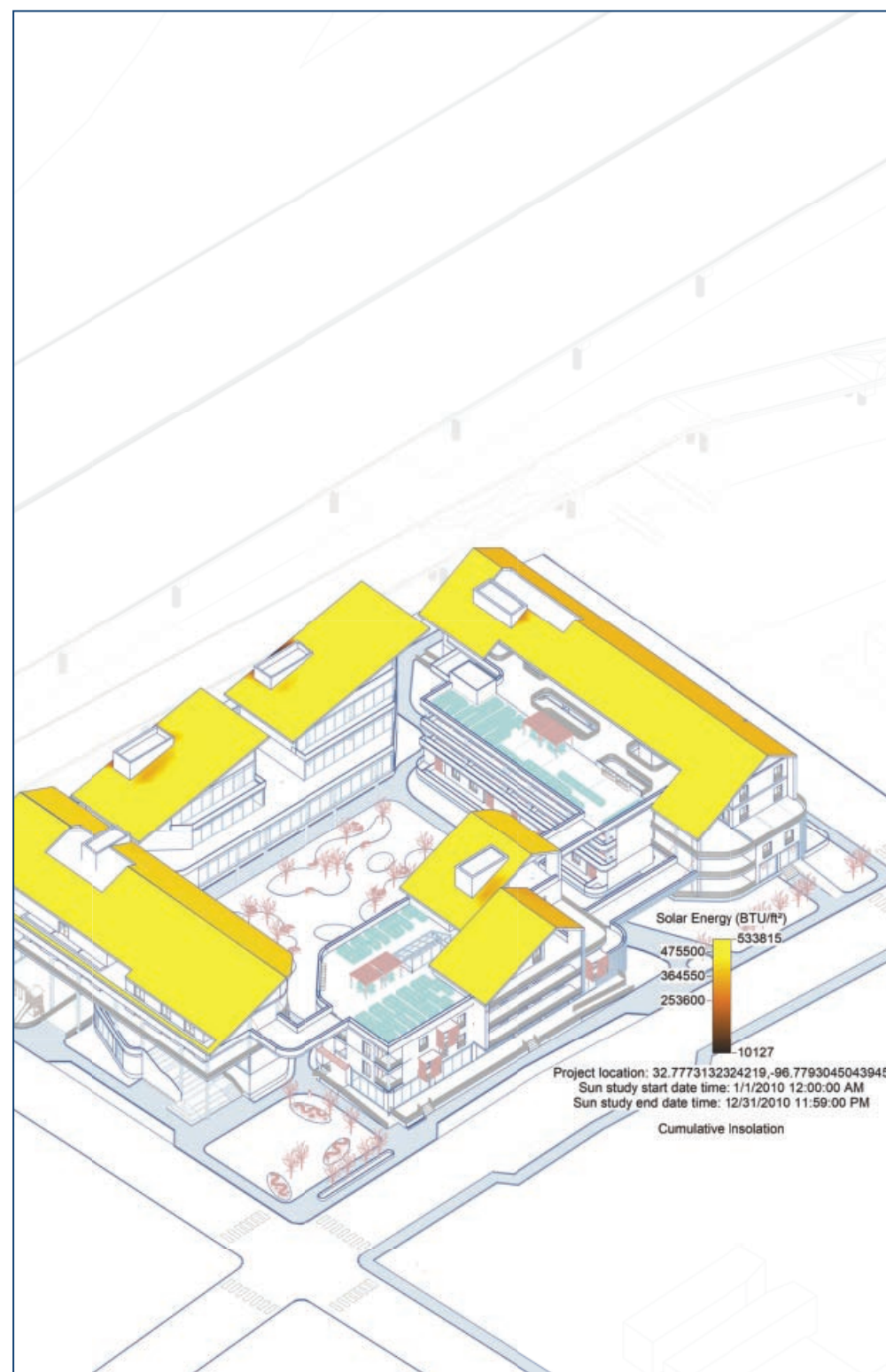
efficient fixtures installed to further reduce water consumption. The use of locally sourced CLT panels as the main building material has been incorporated for both affordability and the reduction of the building's overall carbon footprint.





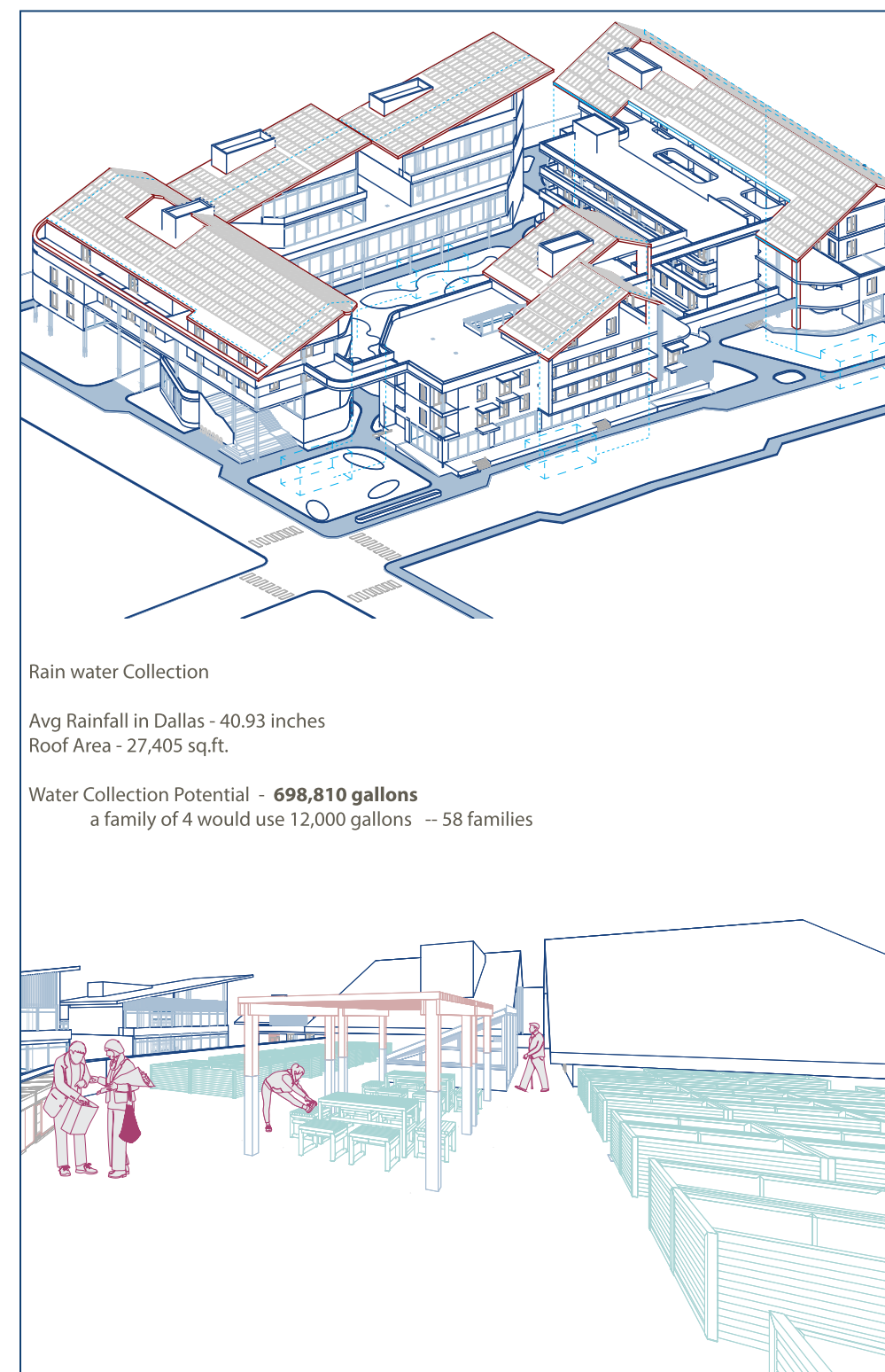
### for well being

Finally, the communal roof garden has been developed to enable residents to grow their own foods. The design approach has taken into consideration physical, mental and social well-being, resulting in an accessible, diverse, walkable and human-scaled



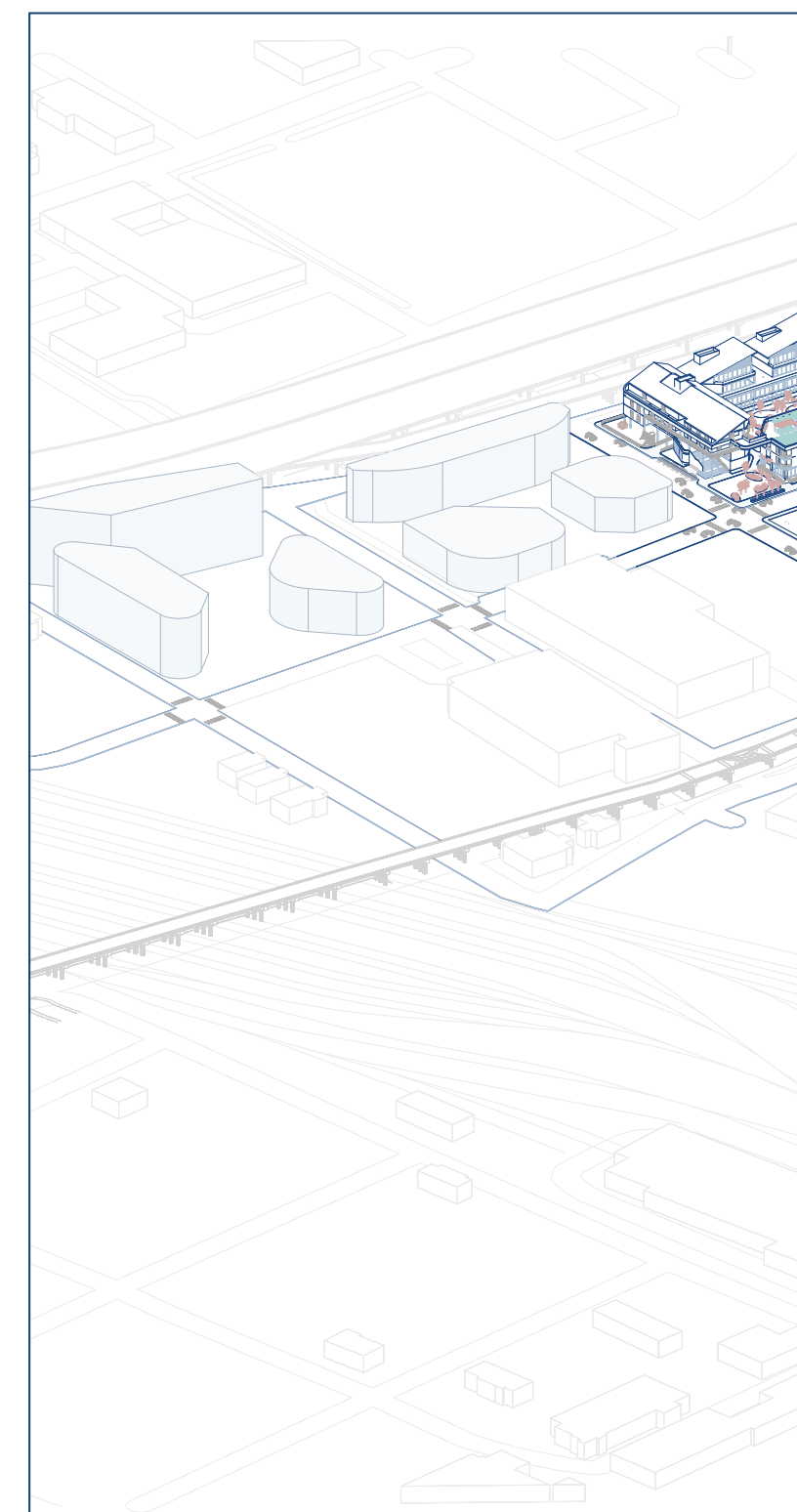
### for energy

community. The walkscore.com rating of 67, transit score of 64, and bike score of 70 out of 100 reflect the area's excellent walkability and accessibility. In Nigel Crisp's words, „Health is made at home,“ and this apartment complex design prioritizes the well-being of its occupants through the implementation



### for water

of sustainable strategies. These strategies, when evaluated against design excellence standards, have enhanced the project's objectives and clarified its purpose. This exercise has also prompted me to contemplate the project's future and its potential for continuous improvement throughout each



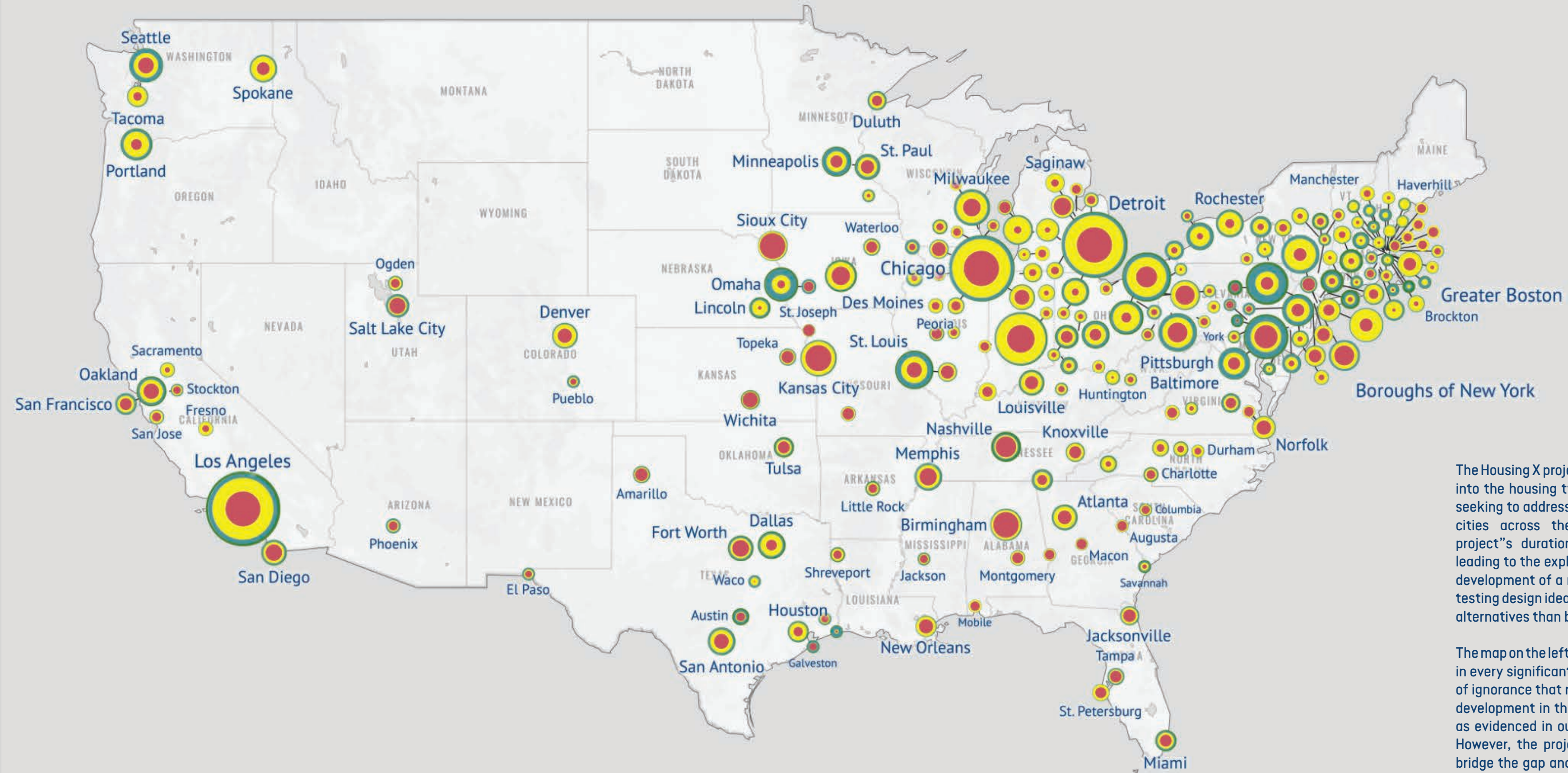
### for change

subsequent phase. As a result, this experience has emphasized the importance of holistic and sustainable design practices that prioritize the health and well-being of end-users, and the potential for continual refinement and development of projects towards these goals.









The size of each circle represents the area in that city that HOLC graded, with each color representing the proportion of the city graded and colored.

- BEST
- STILL DESIRABLE
- DECLINING
- HAZARDOUS

The Housing X project spanned a year and aimed to delve into the housing typologies of American communities, seeking to address the housing crisis that has affected cities across the United States. Throughout the project's duration, a series of questions emerged, leading to the exploration of new solutions through the development of a range of designs. It was a process of testing design ideas, and simultaneously seeking better alternatives than before.

The map on the left shows the areas affected by redlining in every significant metropolis in America. The decades of ignorance that resulted from redlining have hindered development in these areas, leaving many abandoned, as evidenced in our exploration of the block in Dallas. However, the project also revealed an opportunity to bridge the gap and connect people back to the city by experimenting with innovative solutions.

As architects, designers, and thinkers, our responsibility is to create solutions that benefit society holistically. Given that the gap in affordable housing has widened due to multiple crises and inflation, we must persist in exploring new approaches to tackle this issue and contribute to benefit our communities.

Figure 47: Mapping Inequality in USA (Richmond, 2023)



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list of

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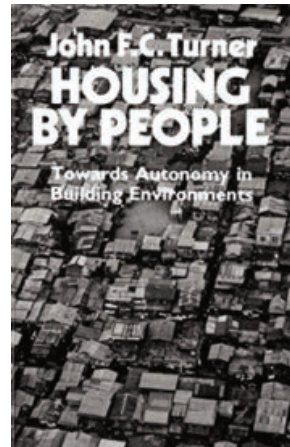
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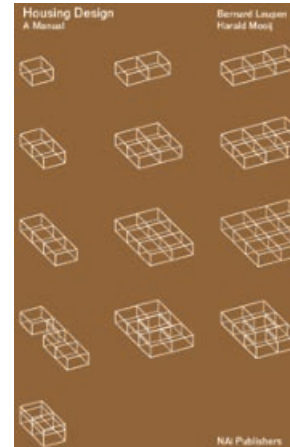


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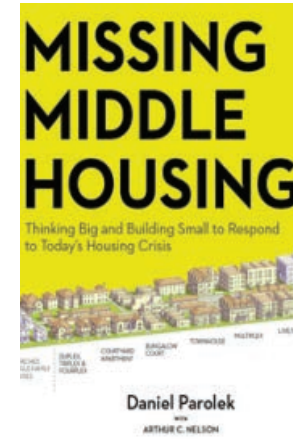
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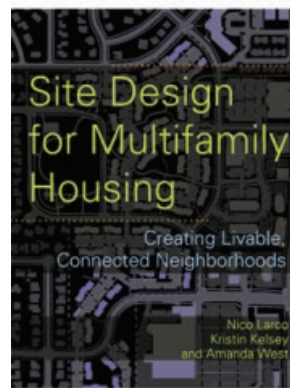
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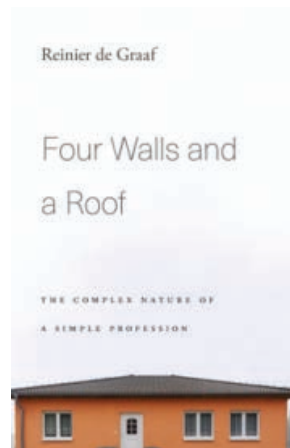
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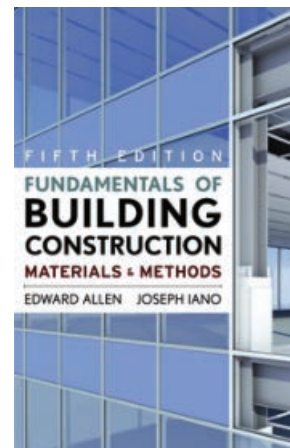
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Title: Site Design for Multi  
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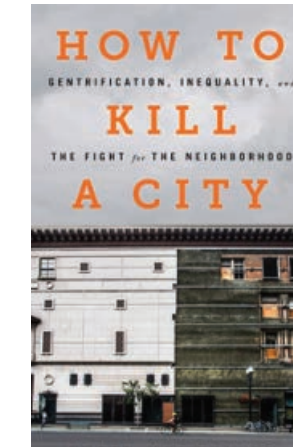


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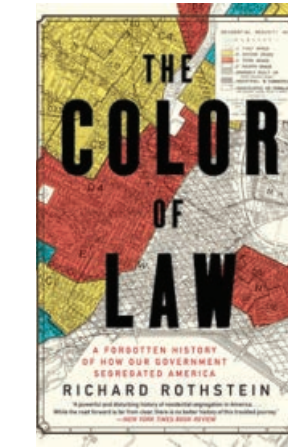


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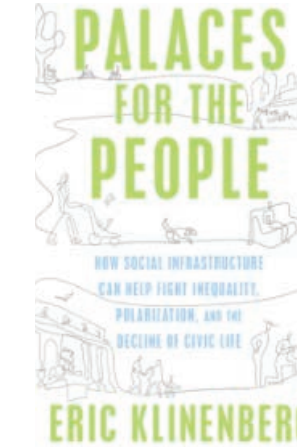
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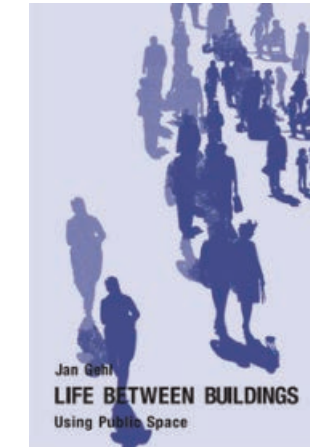
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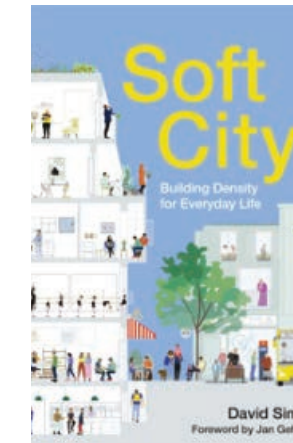
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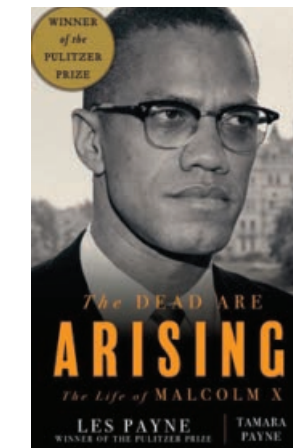
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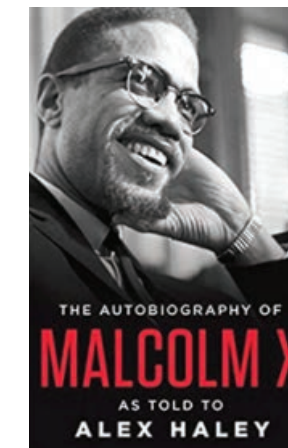
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**SUVECHHA TANDAN**

