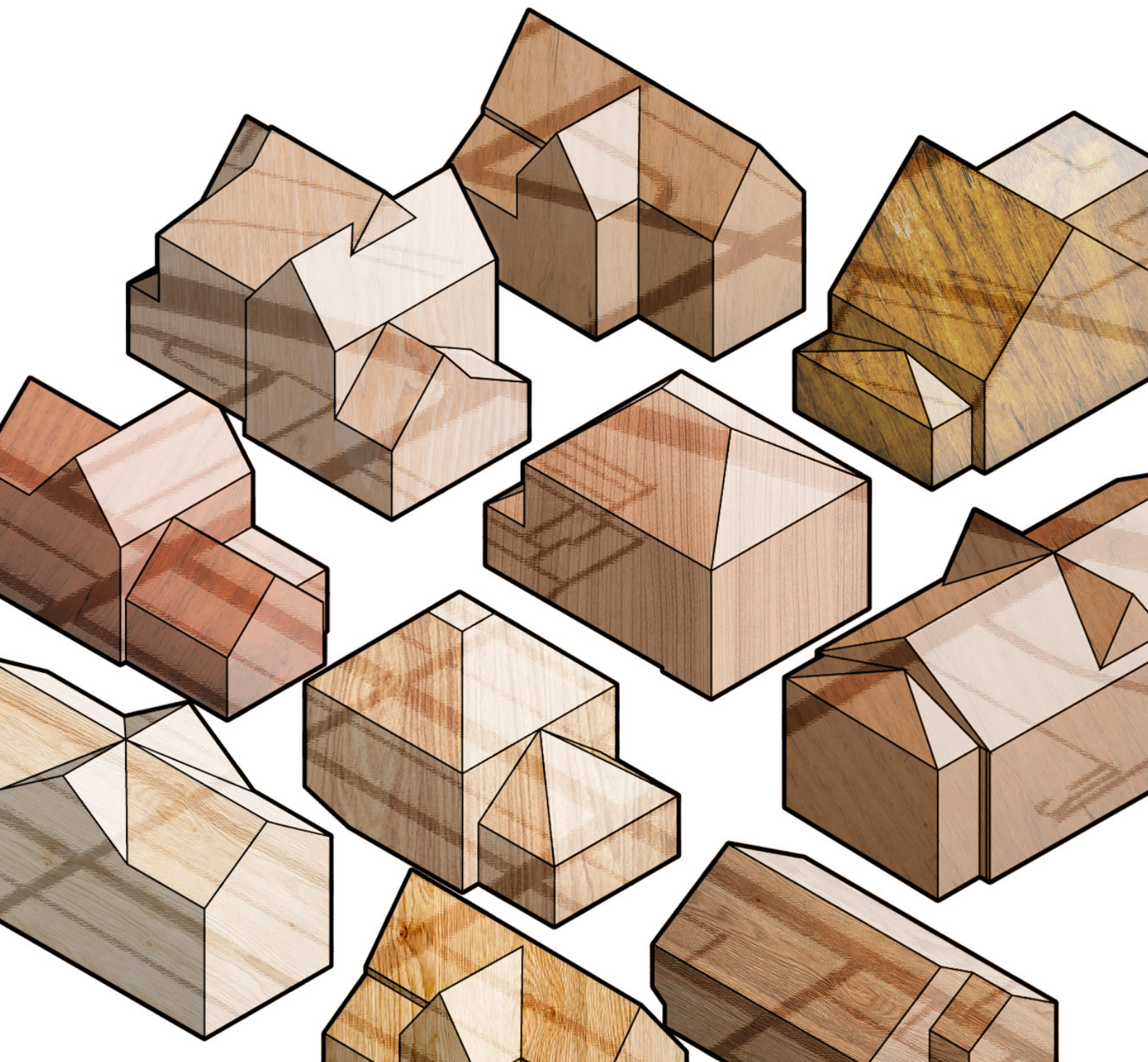


# BUILDING BLOCKS

Re-framing urban investment and community health  
through equitable empowerment







# BUILDING BLOCKS

A Design Thesis Submitted to the  
Department of Architecture  
North Dakota State University

By  
**Benjamin Djerf**

In Partial Fulfillment of the Requirements  
for the Degree of  
Master of Architecture

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**Dr. Ganapathy Mahalingam**

MAY 2021

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# ABSTRACT



The modern city is failing at embracing the value of difference and common ground is fading. The implicit effects of urban policy are dividing cities and putting their most marginalized communities in an even more vulnerable position. The narrow perspective through which city administration functions has made city policy willfully ignorant to all its implications and oversights. Consequently, these implications lie written between the lines in **invisible ink** and the fates of whole communities are laid out within them. Diversity is made into segregation and commonality swapped for polarization. And through this the **invisible barriers** to community relationship, class mobility, property ownership grow bigger.

But the city should be a place of confronting and celebrating differences combined with finding common ground through facilitating connections. Cities need urban policy reform that facilitates community investment through empowering ownership for those who have historically been prevented from accessing it. And the urban architecture within needs to encourage community interaction and reflect the needs of all community members while adapting to an evolving model of the city.

# NARRATIVE

---

*Changing how we invest in and value our neighborhoods as a tool for confronting inequity*

## CONTEXT

Historically speaking the city of Minneapolis has shown discrimination and implicit bias against the East Phillips neighborhood through redlining and a disproportionate exposure to polluting industries. While the city has begun to take responsibility these past offenses, recent changes in both city policy and practice have once again shown the city's disinvestment of this neighborhood. Again, and again the

city's actions have shown that there is a significant divide between what city planning in Minneapolis can provide and what communities need to grow organically.

The East Phillips community is no stranger to the ignorance of Minneapolis's city planning. Like many redlined communities in America, the East Phillips community contains many industrial sites that have polluted and continue to pollute the community to this day. One particular site in the community has been dubbed the "Arsenic Triangle" based on the amount



of toxic arsenic discharged there and surrounding neighborhood by a chemical plant which produced arsenic and lead based pesticides (Minnesota Department of Health). The East Phillips community has been exposed to pollution like this in large part due to its history as a redlined neighborhood and thus one that was considered by the city as an ideal industrial adjacent neighborhood. Unfortunately, the adverse effects of industrial zoning have continued to pollute this neighborhood since then and the city of Minneapolis' own plans for a consolidation of their public works in this neighborhood will only exacerbate this problem. Yet in all of this the East Phillips neighborhood

has fought rather to use this site to provide an indoor urban farm community space and affordable housing (EPIC).

In 2018 the city of Minneapolis passed the Minneapolis 2040 Plan which among other things removed single family zoning in favor of allowing up to three units on any city lot. Explicitly outlined in this plan the city claims that a removal single family zoning will lead to an increase in the housing stock that will inevitably reduce disparities through more access to affordable housing. Yet while the intention of this plan is to equitably increase the city's stock of affordable housing it has been met with se-

rious concern in many of the cities low-income neighborhoods where displacement through gentrification has been a growing problem.

## PREMISES FOR INVESTIGATION

***“There is a quality even meaner than outright ugliness or disorder, and this meaner quality is the dishonest mask of pretended order, achieved by ignoring or suppressing the real order that is struggling to exist and to be served.”***  
**- Jane Jacobs**

**1. Fostering social community ties through architecture and urban design in confronting rising inequality in affordable housing and environmental negligence.**

a. Gentrification and lack of access to affordable housing is a paramount issue in East Phillips

b. The city of Minneapolis

is responsible for disproportionately exposing the East Phillips neighborhood to environmental toxins and thus has an obligation to stop further pollution as well as reduce the existing pollution.

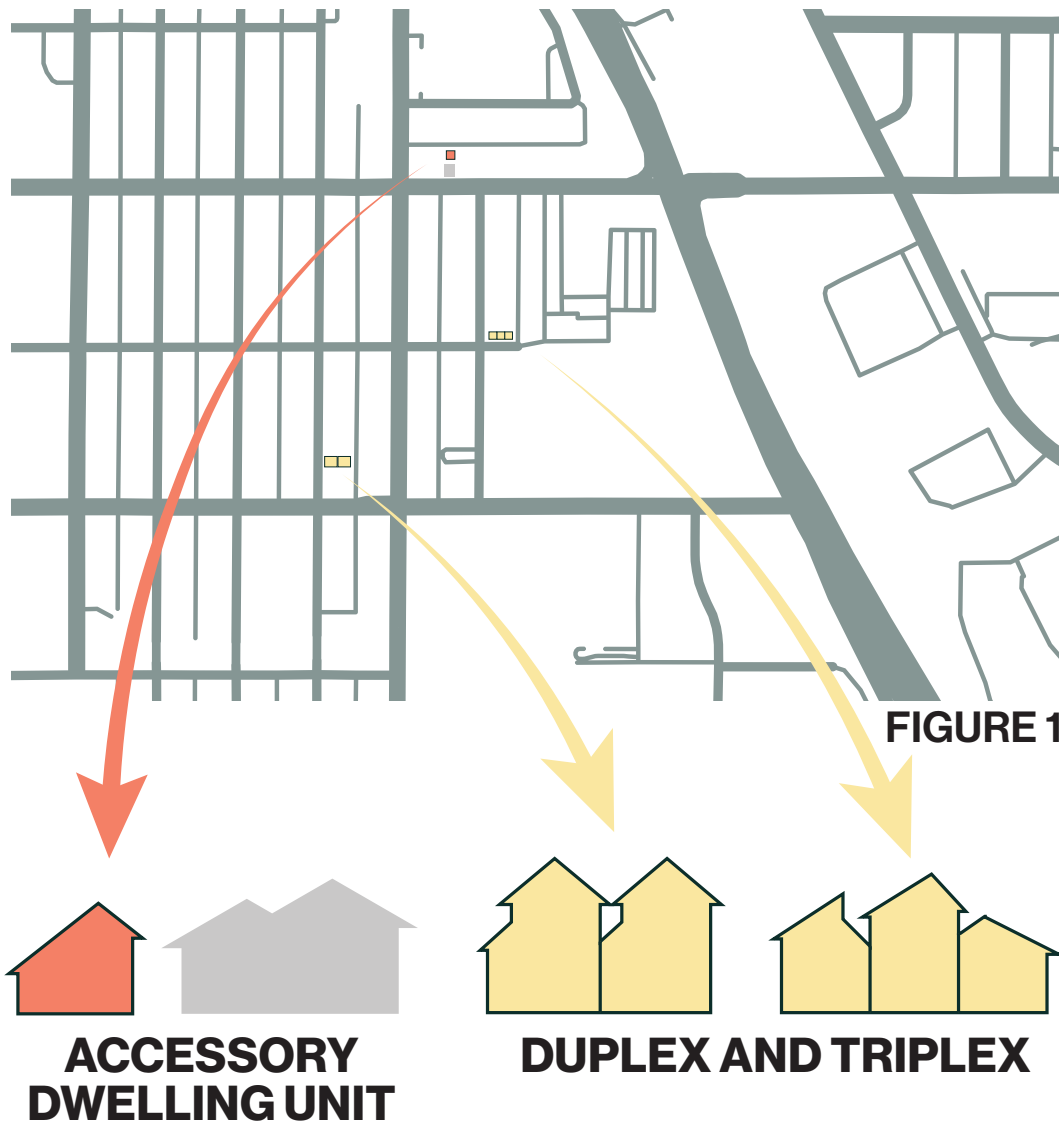
c. The Minneapolis 2040 plan has an inherent lack of perspective that has left communities like East Phillips more vulnerable than ever to gentrification.

d. Increasing social ties in a neighborhood to stimulate community investment and makes communities more resilient to gentrification through displacement.



# PROJECT TYPOLOGY

**The typology of this project falls into two categories that stem from the larger theme of this thesis focused around urban design and policy. Both typologies are modified in the context of a reevaluation of the Minneapolis 2040 plan.**



This typological element of this project is based around detached housing units that are built on lots with existing single-family homes. These units are often 1-2 bedrooms and most commonly are used as “Mother in law cottages” or Airbnb rentals for additional income. This thesis will focus on shifting the primary use of this typology to more independent units for affordable housing.

The duplex and triplex typology will be the other category of housing unit reanalyzed and redesigned as part of this thesis. This Typology consists of 2 or 3 separate units that share a site and other structure. This typology will be designed through a lens that focuses on affordable and equitable ways to redistribute greater opportunity and power to lower-income individuals. This model will be based around making ownership and building equity more accessible.



SLED Architects

# ALLEY CAT

FIGURE 2





LOCATION:

**SEATTLE,  
WASHINGTON**



YEAR  
COMPLETED:

**2019**



TPOLOGY:

**ACCESSORY  
DWELLING  
UNIT**

**800 SQ FT**

**FIGURE 3-5**

## CASE STUDIES





## INTRODUCTION

This Accessory Dwelling Unit in Seattle, Washington was designed by SHED Architects, a firm that mainly focuses on housing in the Pacific Northwest. This loft style unit shares a site with a more traditional house. Together both buildings share a garden space that makes good use of the limited size of the site. The prominence of this case study lies less on the face value of the architecture and more with its unique adaptation to an emerging typology.

### COMMONALITIES WITH TYPOLOGY

This case study is similar to other ADU's in the square footage of the floor plan and relatively simple plan. This ADU also is consistent with many others use of relatively open layouts that make a small sq footage seem larger than it is.  
fdfre

### DIFFERENCES FROM TYPOLOGY

The primary difference and arguably the most successful element of this design is how with a smaller sq footage than the primary house this design isn't overpowered by it. This challenges the notion that ADU's are an essential an unattached extension of an existing house rather than an independent unit.



FIGURE 6

## SITE AND IMPACT

### **Environmental:**

While the building is located on a small site in urban Seattle much of the design is focused on creating positive moments with nature. The strategic placement of windows and other openings fosters a deeper connection with the landscaping of the site giving it the sense of privacy that is often only found in rural communities.

### **Social:**

Because ADU's share a site with a traditional single-family home the social integration of the two buildings is an im-

portant aspect of its success. The alley cat design by shed architecture and design excellently encourages social interaction between people staying in both buildings while also establishing healthy boundaries between the two.

### **Cultural:**

This home is a sign of a growing shift in how we interact and view housing in cities that are seemingly built up. This cultural shift has led to a few cities, like Seattle, to adapt some allowance of different unit types in single family neighborhoods. Alley Cat is a significant design because of how effectively the design integrates into the neighborhood while simultaneously holding its own identity. It is a successful proof of cultural change that challenges the integrated nature of single-family zoning.

### **Political:**

well cultural change has spurred a reevaluation of how we view housing particularly affordable housing, political change is a hurdle that must be overcome before our neighborhoods can grow. The national adaptation of these principles will largely hinge on how they implemented in the early adapter cities like Seattle.



# ANALYSIS

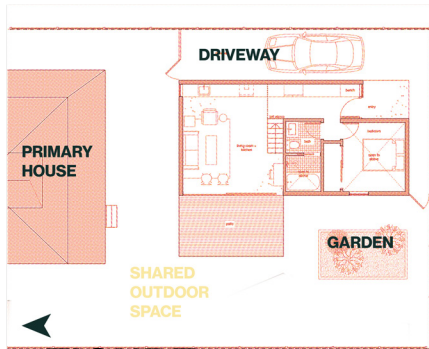


FIGURE 7

## SITE MASSING

The ADU was built on the alley side of the lot and matches the width of the primary house. This creates more balance between the primary house where neither is overpowered by the other.

## HIERACHY AND CIRCULATION

The unit is based around a central kitchen and living space from which both the bedroom and patio are accessible tertiary spaces in the bathroom and loft.

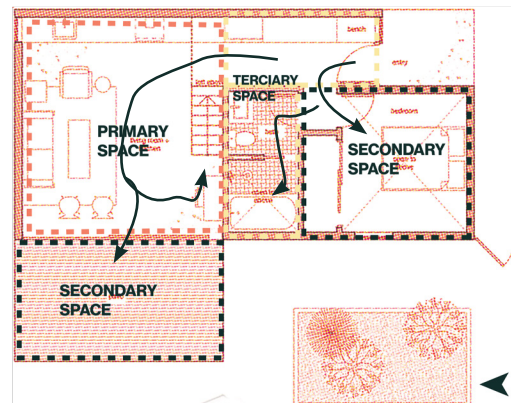


FIGURE 8

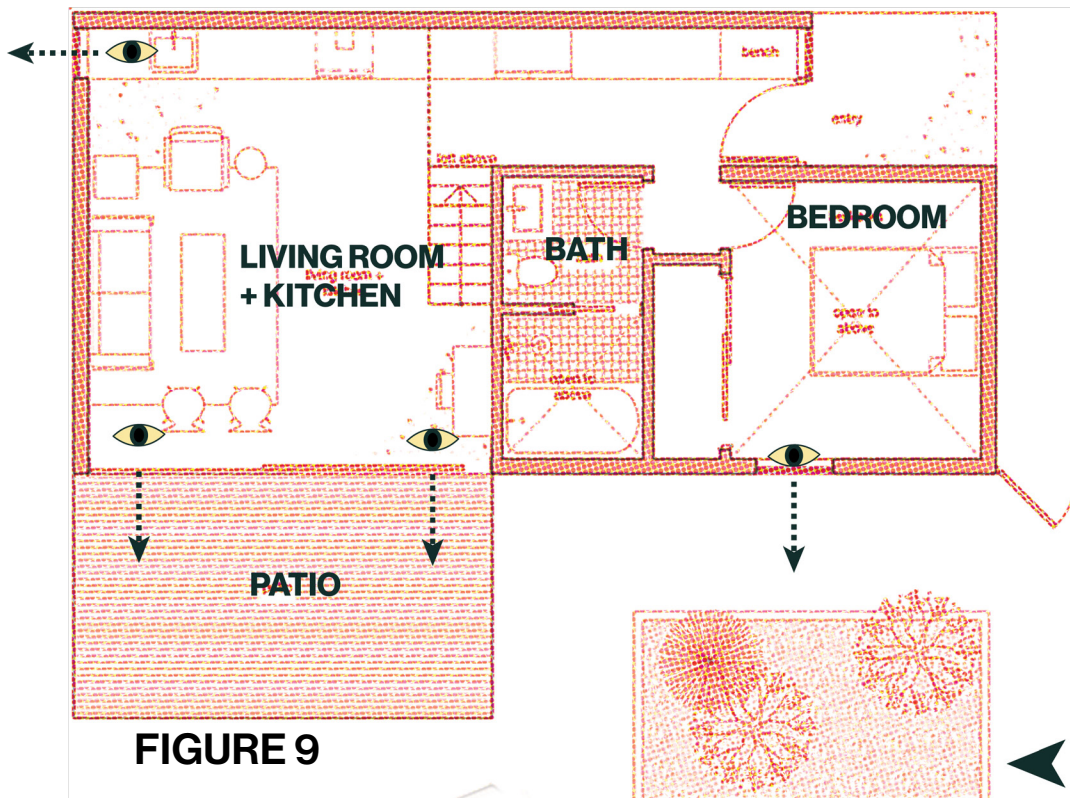
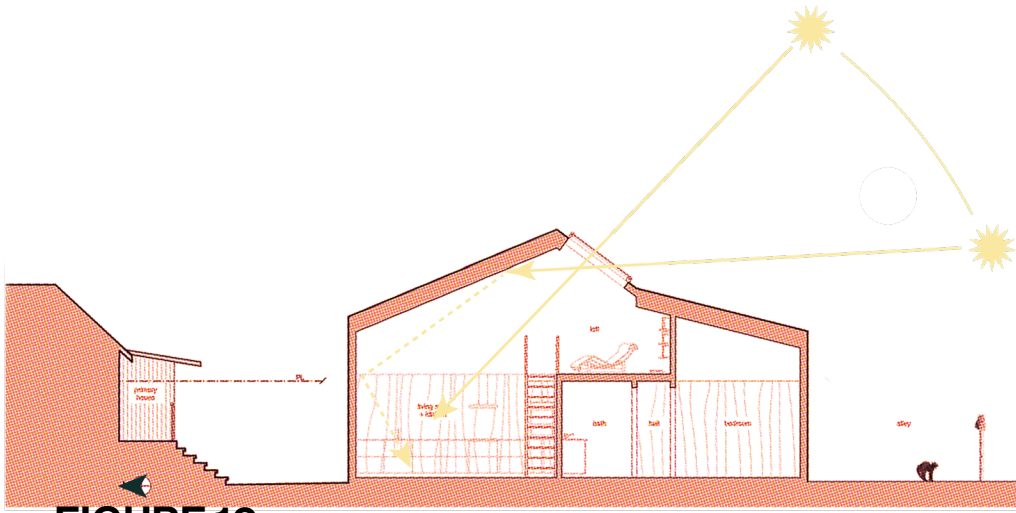


FIGURE 9





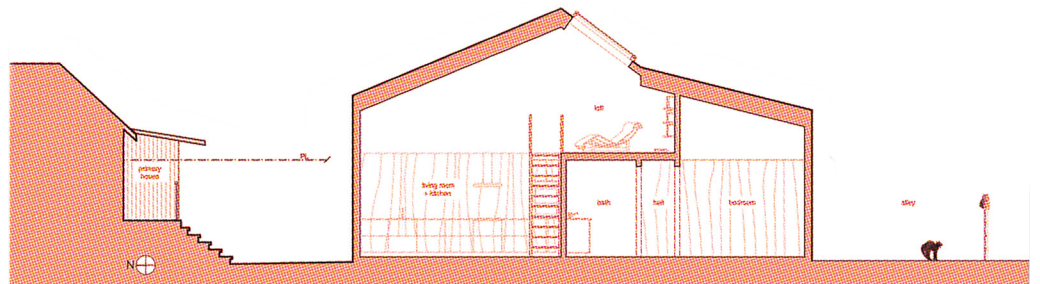
**FIGURE 10**

## NATURAL LIGHT

The highly intentional use of this skylight maximizes daylight while retaining privacy from its close neighbors.

## STRUCTURE

The structure is simple wood framing. a few large windows require wood beams that can span longer distances.



**FIGURE 11**

## PHOTOVOLTAICS

The ADU was designed with the use of solar panels in mind and thus the majority of the roof area faces south offering more area where these technologies could be used.



**FIGURE 12**

Workshop Architecture

# COLMAN TRIPLEX

FIGURE 13





LOCATION:

**SEATTLE,  
WASHINGTON**



YEAR  
COMPLETED:

**2010**



FIGURE 14-16

TPOLOGY:

**TRIPLEX**

**3750 SQ FT**





**FIGURE 17**

## INTRODUCTION

**This triplex in Seattle, Washington was designed by Workshop Architecture. This triplex contains 3 units of varying size. Together these units make good use of the limited size of the 40' by 100' lot. The prominence of this case study come from unique special organization and flexibility of space.**

### COMMONALITIES WITH TYPOLOGY

This triplex is similar with other triplexes in overall scale and is mostly based on a one unit per floor model. But this example does vary from that some points. It also bears a similarity with the box like triplexes often have that differs quite a bit from a traditional single-family house.

### DIFFERENCES FROM TYPOLOGY

This triplex is particularly unique in the use of a steel frame construction as well as the flexible manner in which the units can be organized. This is particularly interesting because from the exterior it is not clear how the three units are divided.

# SITE AND IMPACT

## Environmental:

The slope of the site was utilized to make the basement more accessible. This slope change allowed for some unique landscaping stepping around the lot. The building also contains a green roof that offer a private green space to the top floor residents.

## Social:

Inputting a triplex into a traditional single family neighborhood integrates the idea of more social housing that is not large apartment complexes. The configuration and the fact that the exterior light is shared fosters more social connection between the residents.

## Cultural:

What is the primary focus of this design is flexible and adaptable use of space. This is an important cultural issue because it acknowledges that with time housing needs change and thus our buildings should adapt to that. This building has multiple movable walls that are strategically

placed in ways that multiple configurations of units can be achieved.

## Political:

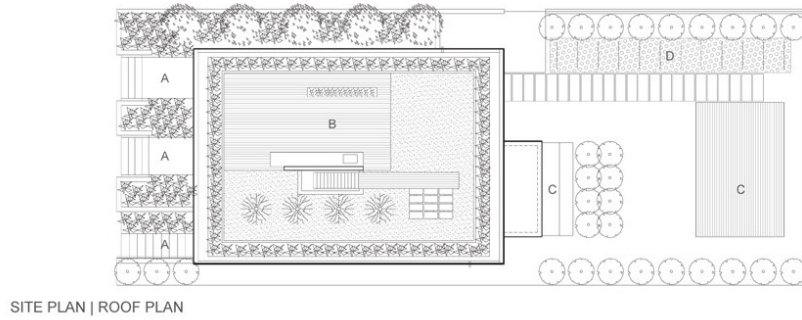
As well cultural change has spurred a reevaluation of how we view housing particularly affordable housing, political change is a hurdle that must be overcome before our neighborhoods can grow. The national adaptation of these principles will largely hinge on how they are implemented in the early adapter cities like Seattle.



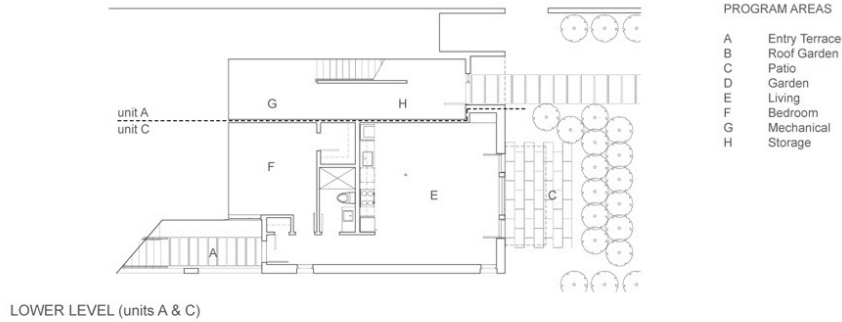
**FIGURE 18**



# ANALYSIS



SITE PLAN | ROOF PLAN



LOWER LEVEL (units A & C)

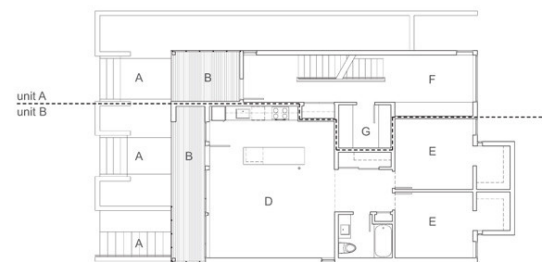
FIGURE 19

## HIERARCHY AND CIRCULATION

The hierarchy of the space is based on the top unit being the largest the middle unit being a medium size and the bottom unit being the smallest. All units bear a model that is based on the living spaces being sandwiched between porch space and the bedrooms. Because the triplexes stacked in makes circulation interesting, the lower unit is accessed thanks to the slope of the site on the back end. The circulation for the main unit is accessible from the front on the ground floor. The top unit its own staircase that is accessible from the side..

## UNITS AND ASYMMETRY

This building is interesting because while the geometries are simple rectangles nearly every other element is very asymmetrical. the unit sizes the window placements, and the facade all bear this asymmetry. This is a very effective strategy because the geometry balances out the often chaotic nature that this much asymmetry would bring.



STREET LEVEL (units A & B)

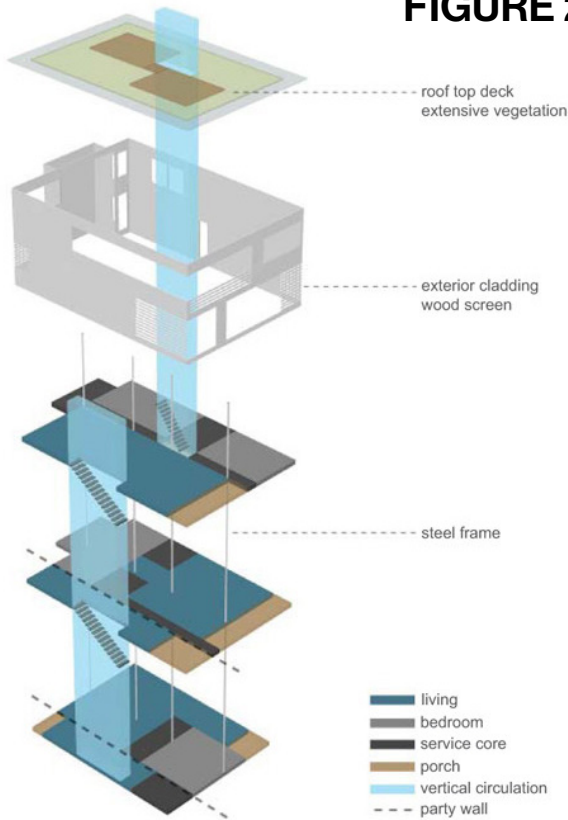


UPPER LEVEL (unit A)

FIGURE 20

### PROGRAM AREAS

- A Entry Terrace
- B Porch
- C Deck
- D Living
- E Bedroom
- F Office
- G Laundry
- H Light Well
- Roof Access

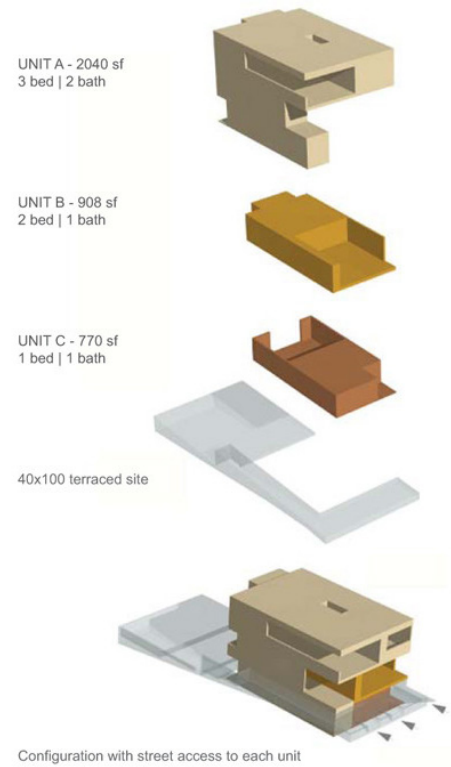
**FIGURE 21**

## STRUCTURE

The structure is based around a central steel frame that frees a lot of the exterior wall space usable for windows. The interior structure also makes spacial changes easier. It also helps to better support the green roof.

## NATURAL LIGHT

There is a considerable amount of glazing in this design, particularly the living room spaces in each unit have dual aspect light from two sides. Corner windows are also used a few time, this is highly effective at blurring the indoor/outdoor line makes this spaces more connected with nature.

**FIGURE 22**

## MASSING AND USE

The three units are stacked but also contain parts that exist outside of that. Together the spaces fit together like a 3D puzzle. The site slope also makes the basement floor accessible.

**FIGURE 23**

MSR Design

# AEON THE ROSE

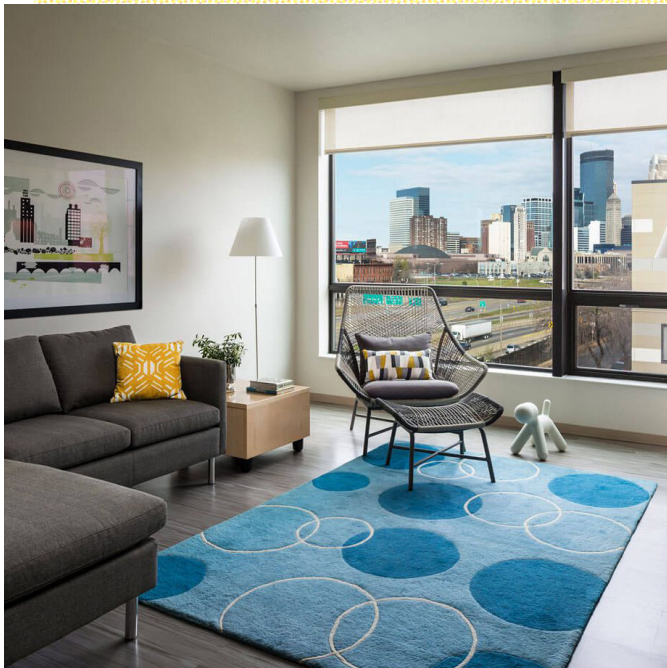
FIGURE 24





LOCATION:

**MINNEAPOLIS,  
MINNESOTA**



YEAR  
COMPLETED:

**2015**



TPOLOGY:

**MULTIFAMILY  
HOUSING**

**144,771 SQ FT**

**FIGURE 25-27**





**FIGURE 28**

## INTRODUCTION

The Rose is a four-story housing development with 90 units in it. The project was done in conjunction with the Hope Community Partners which is an organization That helps fund affordable housing in Minnesota. the project is a leader in sustainable design and is both net zero for energy as well as water. The complex contains a mix of both affordable and market rate units ranging from studios to three-bedroom apart-

### COMMONALITIES WITH TYPOLOGY

This housing development is like many others of this typology in overall scale and arrangement because of the four-story model with underground parking. Also, the unit layouts are pretty standard for this type of development.

### DIFFERENCES FROM TYPOLOGY

The biggest thing that sets this case study apart from others like it, is it's integration of sustainable principles into affordable housing in an economical manner. The building is energy that zero it has a comprehensive rainwater management system, and it was built for around \$140.00 per square foot which is the typical range off a similar project without sustainable integration (Minnesota Sustainable Housing Initiative, 2016).

# SITE AND IMPACT

## Environmental

The environmental side of this project is very important, being a net 0 project was a primary goal and they used multiple methods to achieve this including photovoltaics and very intentional choice of envelope materials. There's also a considerable amount of green space integrated in the site and offers residence gardening and relaxation space.

## Social

The social aspect of this design is important because it acknowledges and confronts the fact that sustainable design often excludes lower income individuals because of the cost it traditionally has to construct. Project manager Rhys MacPherson from MSR Design Sums this aspect of well when he said "The Rose works to resolve the inconvenient truths of affordability and social equity often glossed over in idealized sustainable design projects," (Architect Magazine, 2015).

## Cultural

The cultural aspect of this design goes hand in hand with the social because as social dynamics change, they can be ex-

amples that lead to larger cultural change. this design will help implement sustainable practices in lower income areas and thus help combat the unequal effect that climate change has on these demographics.

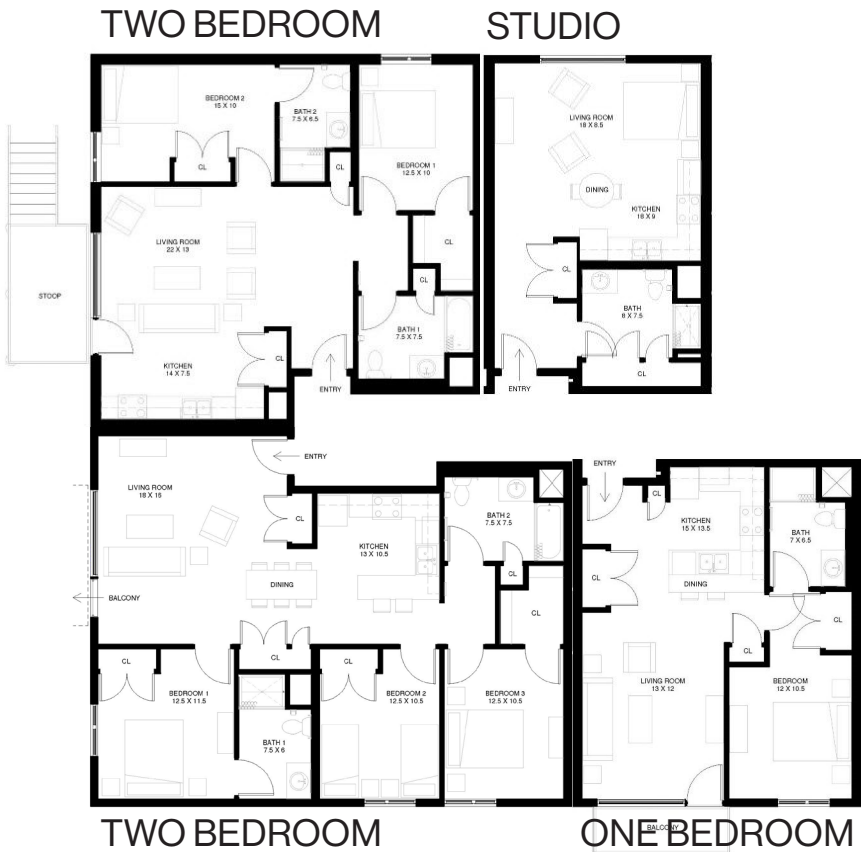
## Political

The political relevance of this design comes from its use of the low-income housing tax credit as part of its funding. This is a case where a program like that has been successful and thus will serve as a model for other projects like it.



FIGURE 29





**FIGURE 30**

## FLOORPLANS

The building integrates multiple unit types together and varies how they are placed throughout the floorplan

## HIERARCHY AND CIRCULATION

The two buildings are nearly identical but together their circulation completes them. The circulation in both buildings complete to a square that also has an axis that extends to the parking lot.



**FIGURE 31**

LEVEL 1 + SITE PLAN

NATURAL LIGHT

There is a considerable amount of glazing in this design, particularly the living room spaces in each unit have dual aspect light from two sides. Corner windows are also used a few time, this is highly effective at blurring the indoor/outdoor line makes this spaces more connected with nature.

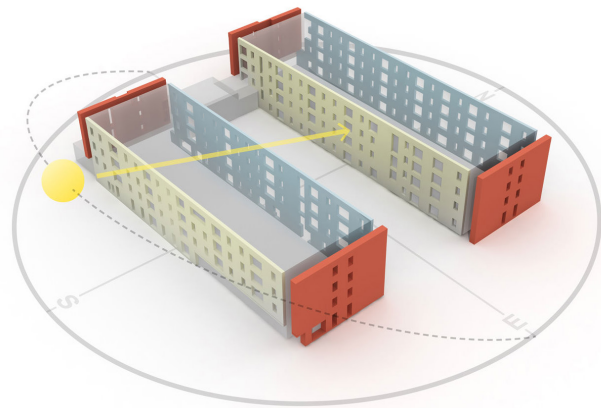


FIGURE 32

STRUCTURE

The structure is wood frame and CMU mix that makes construction economical and easy. This elements is reletively simple but its integration with sustainable materials is what sets it apart.



FIGURE 33

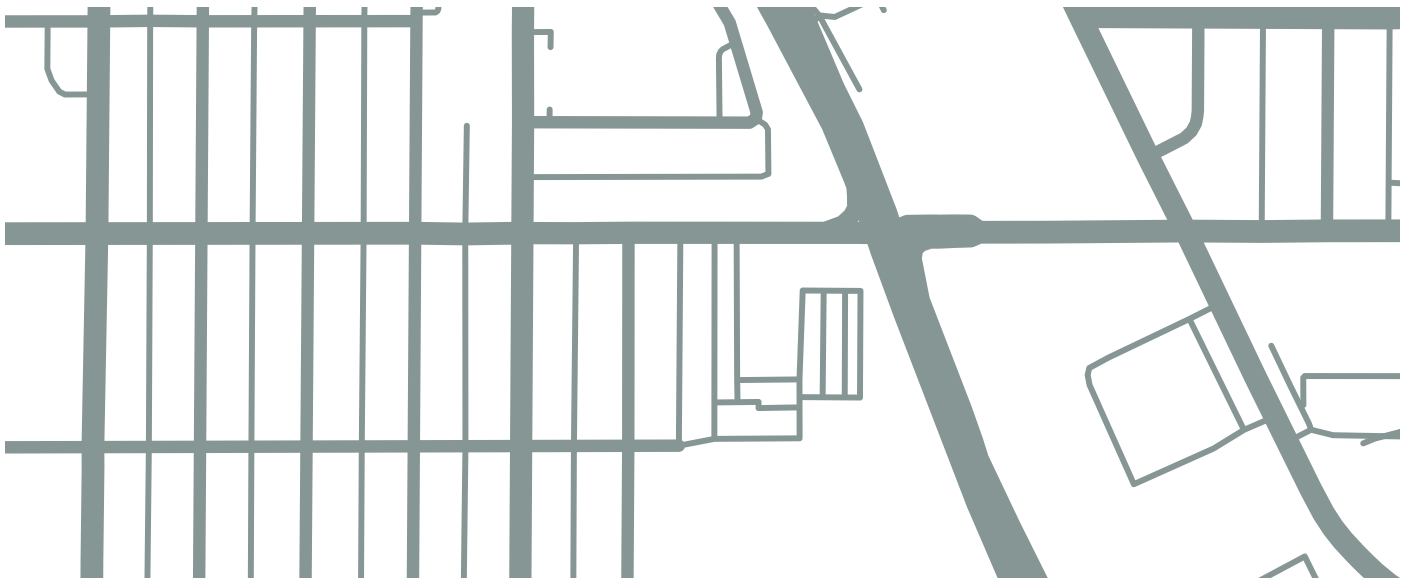
- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| 1 Pedestrian-Friendly Franklin Avenue | 9 Play Space                          |
| 2 Sun-Shading                         | 10 Rain Garden & Low-Impact Landscape |
| 3 Super Insulated Envelope            | 11 High-Performance Windows           |
| 4 Future PV & Solar Thermal           | 12 Low Emmissivity Roof               |
| 5 High-Efficiency Condensing Units    | 13 Rapidly Renewable Materials        |
| 6 Energy Recovery Ventilation Unit    | 14 Urban Agriculture                  |
| 7 Efficient Lighting & Equipment      | 15 Rain Water Harvesting              |
| 8 Parking                             | 16 Storm Water Management             |



# PROJECT ELEMENTS

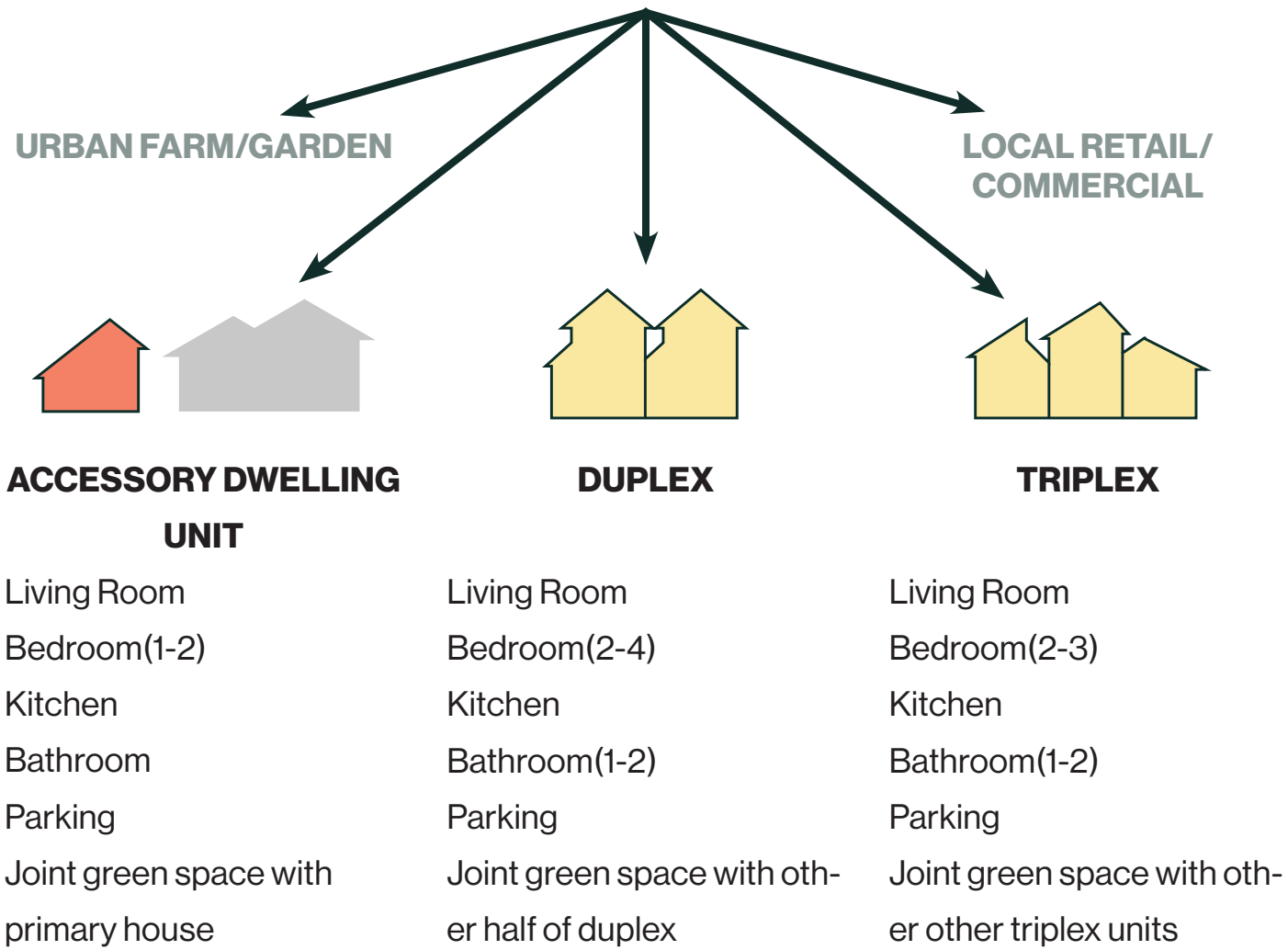
**All of the project typologies and the elements contained in them are part of a larger urban plan, this plan has multiple components and not all typologies will be explored or designed.**





**FIGURE 34**

# URBAN DESIGN



# USER/ CLIENT

Serving as both client and user, the **East Phillips Community** is the primary group addressed in this plan. This plan is based around the creation of a **community land trust** to fund some of the development and guarantee affordable housing on some lots. This trust, which will represent the interests of the community, is the primary client and will include many of the users of the project.



## **East Phillips Community**

The East Phillips Community is the primary group addressed in this plan. This plan is based around the creation of a community land trust to fund some of the development and guarantee affordable housing on some lots. This trust, which will represent the interests of the community, is the primary client and will include many of the users of the project.

## **Homeowners**

The homeowners or more particularly the lot owners in the community are a vital piece because much of this plan is based on integrating housing into the existing single family lots in the neighborhoods.

## **Renters**

Renters makes up a considerable majority of the residents in the East Phillips neighborhood and are a primary target for direct users of this project. A key element of this thesis is about making ownership more accessible to prevent displacement which means shifting some of the community's renters to homeowners.

## **Homeless**

The East Phillips Community has been dealing with homeless encampments along Hiawatha Ave for many years. Working towards equity means including this often overlooked demographic and confronting causes as well as considering solutions.

## **City of Minneapolis**

Much of this plan requires cooperation with the city of Minneapolis because it is based around a restructuring of the city's policy. The plan also aligns with the cities goal to increase affordable housing but confronts this issue in a different manner than the city has done so far.



# SITE



FIGURE 35



# EAST PHILLIPS NEIGHBORHOOD

## MINNEAPOLIS, MINNESOTA

This neighborhood is an bounded by 24th St to the north, Hiawatha Ave to east, East Lake St to the south, and Bloomington Ave to the west. An official Minneapolis neighborhood, East Phillips is home to over 4000 resident, **80% which are people of color**. The neighborhood also contains **Little Earth of the United Tribes** which was the country's first urban housing complex for Native people. Another key site in this neighborhood is the former Roof Depot which is a major point of tension between the city and the residents of East Phillips. The city of Minneapolis plans to consolidate thier water works operation on this site but the community has fought back based on concerns of further pollution in the community.



FIGURE 36



# PROJECT EMPHASIS

**All of the project typologies and the elements contained in them are part of a larger urban plan, this plan has multiple components and not all typologies will be explored or designed.**



### **Duplex/Triplex Model**

A key element of the Minneapolis 2040 plan, duplexes and triplexes are a crucial piece increasing density. Exploring and refining this typology is the primary focus of this thesis.

### **Affordable Housing**

To address the growing housing crisis in Minneapolis this project will prioritize integrating projects That work in conjunction with federal and city level low income housing initiatives like the Low-income Housing Tax Credit Or the Minneapolis Public Housing Authority's program.

### **Sustainable Housing**

Researching and creating sustainable housing is a highly important aspect of this thesis because Sustainable design helps work create more equitable cities because the effects of climate change disproportionately impact low income and minority groups.

### **Community Oriented Lot System**

To help further social integration in the neighborhood, an important focus of this thesis, it is important to create spaces outside of people's private homes that are shared between neighbors.

# PROJECT GOALS

The primary goals of this thesis project are re-evaluating and retrofitting Minneapolis neighborhoods to be more socially connected and sustainable places to live regardless of income or social status. These goals are directly correlated with key issues that the city is currently facing and thus directly confronting these problems is an important aspect these goals. The major problems that this thesis is addressing are the lack of affordable housing, the displacement of low-income individuals by gentrification, and socially isolated and segregated communities.

## REFORMING HOUSING POLICY

The reactive nature in which our city planners respond to problems in our cities is inherently flawed because they do not value organic growth and organic problem solving but rather with obscene confidence try to solve issues they created. this thesis is focused on using design as a tool to balance out the flaws in city planning. I believe that designing communities that remove barriers

to social connection will foster natural growth. It's a primary goal to change this model of policy to one that better confront the issue of base problem rather than the symptom. In this case this will mean working towards equity by fostering ownership and community investment.

## INCREASING COMMUNITY/NEIGHBORHOOD INVESTMENT

This goal is well summarized by Jane Jacob in her



revolutionary book “The Death and Life of Great American Cities” where she says ***“Cities grow the middle class. But to keep it as it grows, to keep it as a stabilizing force in the form of a self-diversified population, means considering the city’s people valuable and worth retaining, right where they are, before they become middle class.”*** (Jacobs, 1961). It is vital that this project is in the best interest all of those who are a part of the community and it based on helping them not displacing them as if they were the problem. The investment develop in the community not through outside investment because outside investment will shift much of the value outside of the neighborhood.

## **RESTORING COMMUNITY POWER**

This goal is based in the premise that the more localized policy, power, and authority are the more relevant and effective they will be. Closely tied with the last goal, restoring community power means fostering internal investment and ownership because that

will increase the power that the community has compared to the power that the city hold. Systemic racism and housing discrimination has historically dismantled the rights of particularly minority renters in our cities and thus this plan is based on shifting more power back to them by making ownership and equity building more accessible and affordable.

## **REMEDYING ENVIRONMENTAL DAMAGE**

Another goal is hinged on correcting some of the pollution of the East Phillips neighborhood because of the city of Minneapolis’s history of allowing and inflicting environmental harm in this community. Because of this it is of utmost importance that changes and new development not only avoids adding more pollution but it should also help alleviate the existing damage. This goal will be achieved through research and analysis through energy modeling and iterative design that makes net zero design possible and affordable.

# PLAN FOR PRECEDING

## RESEARCH DIRECTION

### 1. Theoretical Premise

- a. Analysis of key elements that promote ownership and community investment
- b. Identify environmental damage and alternatives
- c. Identify housing policies from federal to local

### 2. Project Typology

- a. Identify how typologies can be adjusted to better confront thesis issues.

### 3. Historical Context

- a. Research Arsenic Triangle history
- b. Research systemic racism in housing policy

### 4. Site Analysis

- a. Research Roof Depot building
- b. Interview neighborhood resident(s)
- c. Interview board member from East

Phillips Improvement Coalition

### 5. Programmatic Requirements

- a. Research housing needs for different unit types.
- b. Research Community Land Trust requirements/systems

## DESIGN METHODOLOGY

### 1. Mixed quantitative/qualitative analysis

- a. The quantitative data will mainly include reanalyzing demographic data through the lens of this thesis project.
- b. The qualitative data include interviews, site analysis and watching and analyzing previous community meeting on a variety of issues.

## DOCUMENTATION

### 1. Documentation will be compiled in a variety of types in the research book

- a. Much of the site data and analysis



will be made into maps that illustrate the key principles addressed

- b. Photographs will be used to show other key elements of the research
- c. The final building designs will be created in Revit and documented into drawings and renderers as well as physical models
- d. Other research elements will documented in writing and integrated into research book

## 2. Preservation

- a. Google drive with all writing, photos, videos, graphics, and digital models.
- b. Creation of file structure and consistent backup schedule.

## 3. Scholar Use

- a. The final book and presentation will be made available in the NDSU Archive

## 4. Presentation

- a. Main presentation will be a PowerPoint presentation
- b. Possible use of video
- c. Oral presentation to thesis jurors

## SCHEDULE

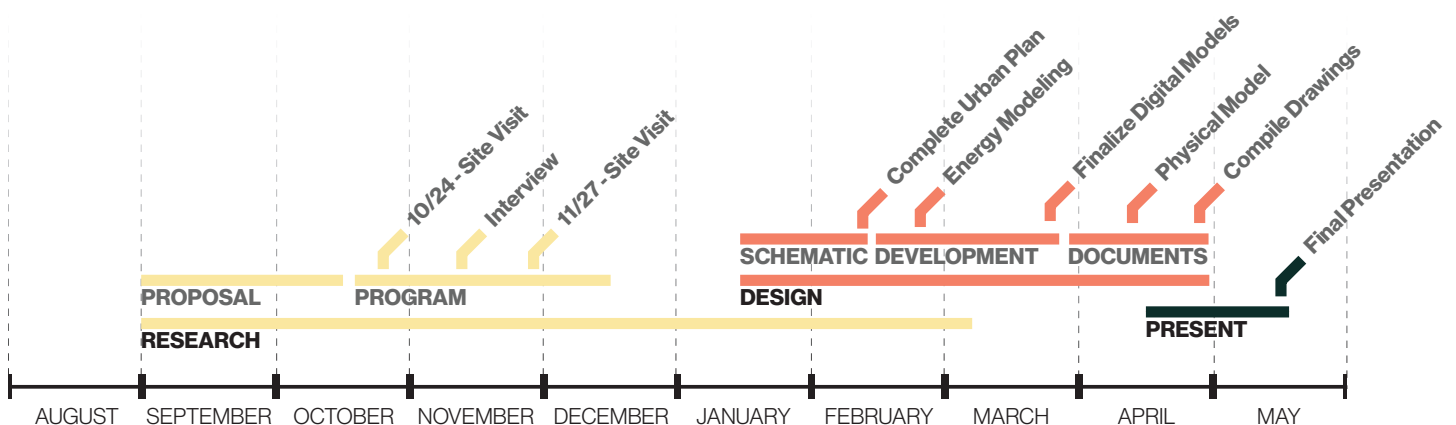


FIGURE 37







# **THESIS RESEARCH**



# LITERATURE REVIEW

## CRITIQUE OF CITY POLICY

The flawed nature of our city policy and governance has damaged and continues to damage the very things that make our cities great. Land use and housing policy in the US has destroyed the fundamental model of diversity that our cities have best functioned under. This policy ranges from both explicitly and implicitly racist housing policy to ignorant economic models and fundamental misconceptions about the use and value of land.

## DISCRIMINATORY HISTORY OF HOUSING POLICY

In the *Color of Law*, author Richard Rothstein strings together the layers of imbedded racism in American housing policy into a cohesive narrative on the systemic and present effects that discriminatory policy has on people of color. A resounding theme throughout, Rothstein emphasizes the intentional adaptability of racism in housing practices. The book follows a loose chronological order as Rothstein details the shift from the explicit segregation of the earliest policy to the increasingly implicit but deliberately discriminatory generations of new policies that have since followed.

Rothstein opens the books by directly challenging the commonly believed narrative that much of the segregation that exists today in the US is a result of *de facto* segregation. Rothstein goes on to explain *de facto* as

resulting “from private practices, not from the law or government policy.” (Rothstein, 2018, p.7). In other words, the belief that segregated neighborhoods came to be solely from prejudiced and collective action of white families to abandon integrated neighborhoods thus leading to devaluation and later deterioration. While individual prejudiced action was a major factor in the segregation of American cities, Rothstein argues it is rather an effect of *de jure* segregation. Rothstein defines *de jure* segregation as “segregation by law and public policy.” (Rothstein, 2018, p.8). The most prominent theme throughout this book, the theme of *de jure* discrimination through racist housing policy is one that is fundamentally applicable to housing policy at the federal, the state, and especially the local level. Racism cannot be uprooted, and segregation cannot be confronted until a more holistic view of the causes is accepted. First and foremost, our government must recognize the role it has played, the damage it has done, and the obligation it has to remedy that.

## REMNANTS OF THIS HISTORY

The theme of *de jure* segregation is consequently tied to our government’s obligation to take steps to change our policy to better confront these deep-rooted issues. Towards the end of the book, Rothstein insightfully summarizes and ties together the history of discrimination to the racial gaps



we see in income and more predominantly wealth. He first mentions this saying “Median white family income is now about \$60,000, while median black family income is about \$37,000 – about 60 percent as much. You might expect the ratio of black to white household wealth would be similar. But median white household wealth (assets minus liabilities) is about \$134,000, while median black household wealth is about \$11,000 – less than 10 percent as much.” (Rothstein, 2018, p.184). From that he goes on to explain that equity in homeownership is the primary source of wealth for the American middle class and thus the decades of discriminatory housing policy that historically made homeownership for black families either impossible or incredibly difficult is largely the cause of this wealth gap. This racist policy might not be legal or in effect anymore but that does not negate the damage it continues to do today. This “dead” policy has persisted this long because wealth or lack thereof is often passed down from generation to generation.

## **CURRENT GOVERNMENT ACTION**

So, what does government action on this issue look like? Rothstein acknowledges that this is not the point of his book nor his area of expertise but the little he has to say about it still very insightful. First and foremost, he stresses an acknowledgement about the partiality of policy saying “Actions of government in housing cannot be neutral about segregation. They will either exacerbate or reverse it. Without taking care to otherwise, exacerbation is more likely.” (Rothstein, 2018, p.190). The implication of policy always goes beyond its intention and if policy makers

aren’t considerate of the effects it can have, then their ignorance will continue to do damage. Even policy that is well intentioned to confront issues like the housing crisis can segregate neighborhoods further. Rothstein details this when he talks about a lawsuit in Dallas, Texas from the Inclusive Communities Project (ICP). This lawsuit was based on the cities alleged violation of the Fair Housing Act through its dispersal of Section 8 public housing vouchers. The vouchers were often placed in census tracts that were 70% or more minority resulting in even further segregation in the city (Rothstein, 2018, p.191). While the dispersal of these vouchers was not intended to segregate neighborhoods further, the city failed to consider segregation as an issue when they dispersed them and through this inaction worsened the problem. Government action confronting the history of its own discrimination needs to not only be intentional it needs to holistically see the problem from more than one angle.

## **REANALYSIS OF PROPERTY**

This carries well into Rafaella Lima’s paper “Repolicizing Property: Sem-teto movements and the regeneration of downtown São Paulo”. In this paper, Lima confronts the failures of the economic policy in regard to housing in São Paulo, Brazil and analyses a growing movement there to challenge the dominant model of property ownership. (Lima, 2015, p.1) Through this text she uses the sem-teto movement which is the occupation of vacated buildings in the city center to illustrate ideological challenges to the Brazil’s urban policy. While this is framed within in Brazil much of the policy there mirrors

the United States and Lima's analysis of it is highly applicable to both.

A prominent part of the urban policy that Lima challenges is the notion of "highest and best use". Lima explains this by saying "this notion is based on the idea of the 'rent gap', which is the divergence between the capitalized (current) ground rent and potential ground rent—the return that could be gained if the land were put to its 'highest and best use'" (Lima, 2015, p.9). In other words, the idea of "highest and best use" is used to justify redevelopment if it is believed the redevelopment will be more profitable than what is currently there. While economic improvement is important within cities it should not be the only or the most dominant factor in deciding how land is used. Furthermore, the idea of "highest and best use" is also a poor indicator of value and oversimplifies the role property ownership has in a city. Lima deconstructs the model for and the valuation of housing by saying "the value of property has come to be based completely on its exchange value. This remains the dominant way of thinking largely because property itself is seen as natural and self-evident, and so processes by which property is valued and exchanged are likewise viewed as inescapable." (Lima, 2015, p.8). This fundamental flaw values the growth of capital over the intrinsic need for housing, as well as the intangible power of community. Modern urban policy has boiled down the use of property down to its economic value and in doing so has discarded the social, cultural, and political voice of the city.

## **BROKEN ECONOMIC MODEL**

Within Strong Towns, Charles Marone confronts major failures in the current economic model that most of our cities run under. Challenging the prioritization of growth

over stability, Marone argues for a model of city investment that is based on incremental and hyper localized means. Marone's analysis of both city financing and city level economic growth is insightful and deeply relevant to the future of American prosperity. A reoccurring theme in Strong Towns is contemporary city government's propensity to oversimplify the complex and organic nature of cities and in turn overlook much of the cities value. In the first half of the book, Marone analyses what he refers to as the "Growth Ponzi Scheme" which he describes as cities' tendency to value new development and growth as a means to cover their own indebtedness from past infrastructure projects (Marone, 2019). He compares this to a Ponzi Scheme because the means they use to cover their debt only temporarily fixes the problem and in the long run actually creates more debt through building infrastructure that is ultimately a long-term liability. Most American cities have confidently accepted this belief, that through enough front-end investment they will stimulate growth that can fix their insolvency. However, unless these cities can maintain and nurture their existing tax base, new growth will ultimately fail. When talking about city government's priorities, Marone says "Our modern experiment in city-building has drained this reservoir, sacrificing the stability of the community for the short-term objectives of finite players." (Marone, 2019, p. 41) This reservoir he is talking about is the vast and embedded history of trial and error development in our cities. Through history, our cities have evolved in incremental steps that increased their stability, but our cities have begun to become detached from this history and have destabilized. This goes beyond the post war sprawl and urban renewal movements and Marone ties the remnants of these failures



into the current tactics of city administration. Our cities' model of growth is one in which in which they cannot support themselves and often the urban cores quite literally pay the price for these failures.

## **URBAN SPRAWL**

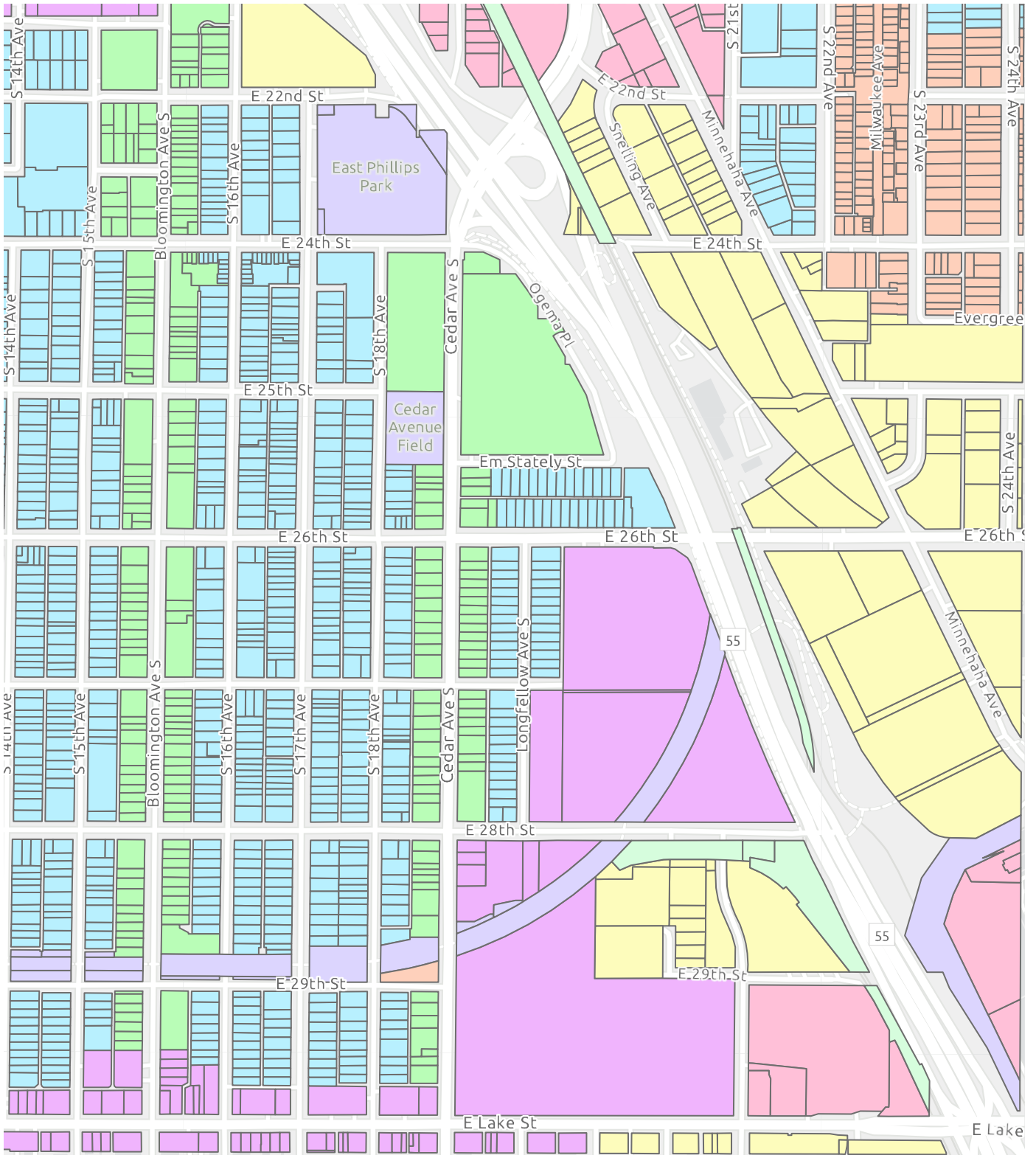
Marone discusses automobile era and the post war economic boom that enabled city growth at a rate never before experienced and, in a few decades, flipped the traditional economic and social model of city growth. Marone contextualizes the traditional model of incremental and evolutionary growth through talking about how his hometown of Brainerd, Minnesota developed. Before the 1950's, cities largely grew and built value in a largely organic manner where growth on the outside would only prove viable if the city core could sustain it. If the city could not sustain it, new developments would fail, and others would adapt and iteratively try again till something worked (Marone, 2019, p. 41). Through this process these developments would gain value and in turn add value to the city core. But failure or success, this model didn't jeopardize the core of the city. However, as the automobile enabled longer commutes the appeal of cheap land on the outskirts and increasing access to home loans caused unprecedented sprawl. And as the American people embraced this trend, cities rushed to embrace the growth through massive infrastructure investment. Unlike before, this investment often preceded any development and very little planning was put into how this infrastructure would be maintained. Marone discusses the reactionary and shortsightedness of this method by saying "with constraints removed, surrounded by abundance, we humans are hardwired to address the immediate problems in front of us, and to overlook, or dramatically dis-

count, the long-term consequences of that action." (Marone, 2019, p.60) As the suburbs grew, the upper and middle-class families who could easily get a home loan shifted their wealth out of the urban core. This largely devalued the tax base of many US cities urban cores; the tax base which had previously supported and sustained growth on the edge.

## **REANALYZING REDEVELOPMENT**

While Marone first discusses this history he more primarily focuses on how this outlook is still embedded in city government and the implications of has on the future of our cities. Mirroring Rafaella Lima criticism of "highest and best use", Marone condemns the idea of redevelopment of what the city considers "old and blighted" areas (Marone, 2019, p.133). However, his assessment of this is more directly economic and mathematically tied than Lima's combined social and economic argument. Once again contextualizing this within his hometown, Marone explains this through detailing how the city of Brainerd, MN has offered large tax subsidies (mainly through Tax Increment Financing) for business to move into "blighted" areas, and in almost every case these investments actually pay less on a per acre basis even before the tax break is given (Marone, 2019, p.134). As this process happens often perfectly function and largely more sustainable buildings are destroyed and replaced with cheap architecture that isn't built last more than a few decades. Alongside these effects, these TIF developments are almost exclusively for large corporate chain model companies the benefits of these tax breaks quickly flow out of the city (Marone, 2019, p.135).

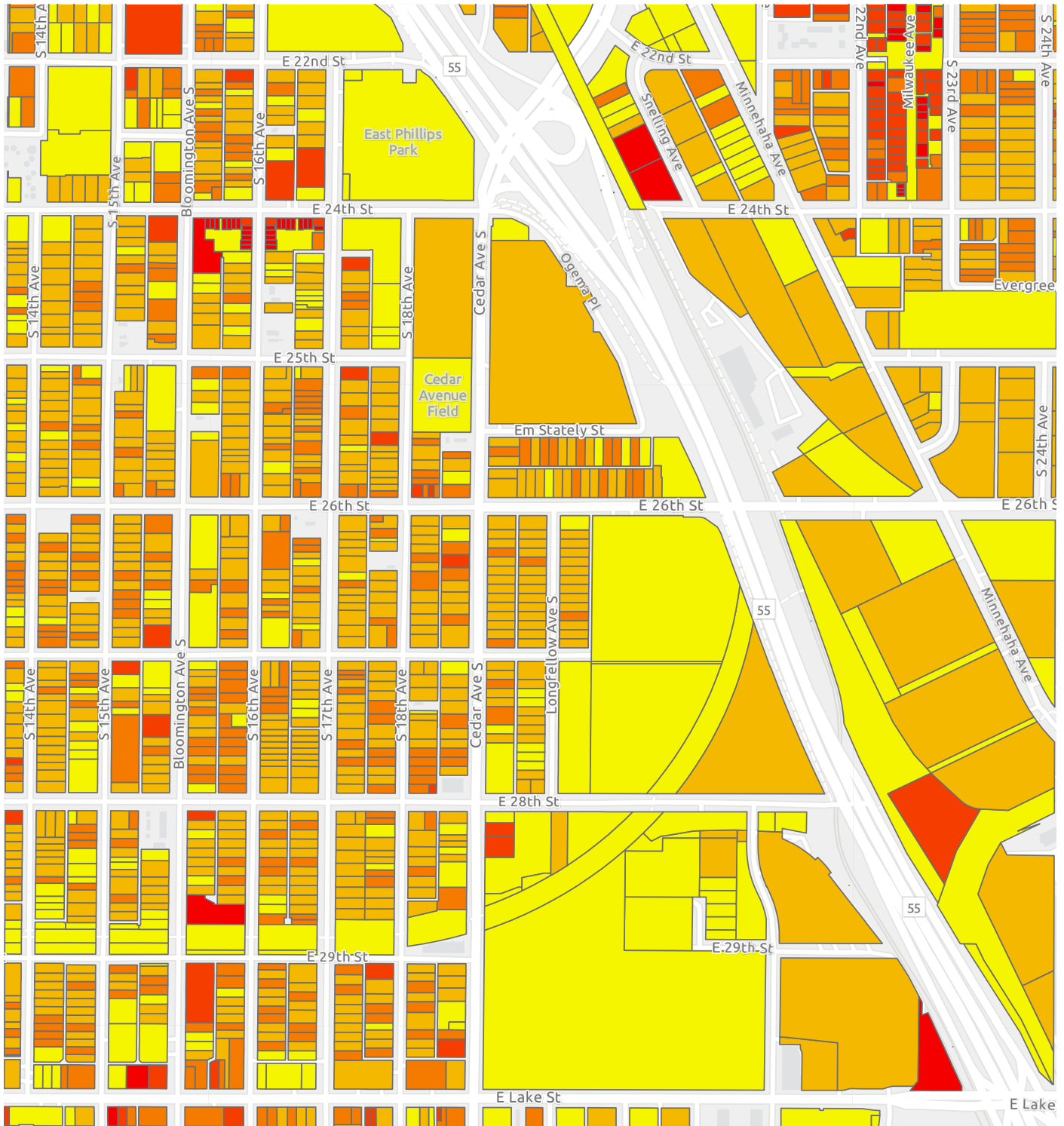
# 2040 PLAN LAND USE



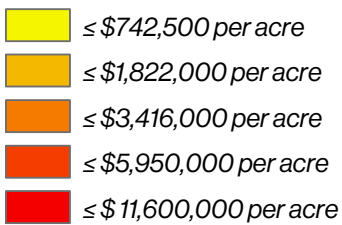
- Corridor 4
- Corridor 6
- Interior 2
- Interior 3
- Parks
- Transit 10
- Transit 20
- Transportation



# Value Per Acre



## Estimated Value Total / Acres



# PROJECT JUSTIFICATION

## PERSONALLY

Personally, I have chosen to pursue this topic because I am passionate about urban policy reform and the growing housing crisis in cities like Minneapolis. Over the last few years as I have learned more about the history of housing policy in the United States, I have had a growing concern for the future of it. Over this last summer I read the Color of Law by Richard Rothstein and it opened my eyes to very real and lasting damage that much of our urban policy has had over the last century. Not only do I believe that as designers we have an obligation to avoid our past mistakes, but we also have an obligation to begin to remedy present damage done by past policy. Through this project I will develop my knowledge of the role policy has had in shaping our cities. I will also develop a stronger understanding of how urban policy becomes practice and how policy shapes the architecture of our cities. This project will also be culmination that represents my academic progress throughout college. In terms of professional development this project will help me understand more than just the design stage of a project but also how they develop.

## ACADEMIC

as an academic exercise this thesis project is a way to merge many of the ideas that I have learned over the last year few years. This thesis project is also a transition from the academic world to the professional

world by developing professional skills in justifying the designs in many terms.

## ECONOMIC

As a thesis project it is important that the project is well thought out and well justified not just personal terms but in economic and societal ones. The justifications for this project come from a variety of areas. In 2018 when the city of Minneapolis passed there Minneapolis 2040 Plan, they opened a door to a whole new area of economic development within the city of Minneapolis in what were previously single family zoned neighborhoods. This came as a response to the growing housing crisis that has arisen in Minneapolis as well as many other cities across the nation. according to the city of Minneapolis this plan was also a response to help remedy the disproportionate affect this housing crisis, coupled with history of discriminatory housing practices, has had on disadvantaged groups particularly people of color. In economic terms this project is justified by the same argument brought forth in the Minneapolis 2040 plan, That the existing demand for housing will stimulate economic investment of supply.

The cornerstone of this thesis project, however, is largely based on the idea that the city's over prioritization of economic interests will fail to confront the base problem of housing discrimination and inequity in access to affordable housing. That is why I believe



within my project it is important that the economic justification is less geared towards outside developers and rather the city's longstanding residents as well as those in the city who are looking for affordable housing. This may mean that in some part city and federal housing money may be needed to help supplement some of the cost, but the primary funding will come from within the city's residents. This project is based less around the return on investment within it as a single project and rather the larger returns for the city if principles of this project were implemented on a larger scale. At the smaller scale the single units will be based on return investment for owners through their ability to gain equity in an accessible and affordable way. For the city, the return of investment will be an increase in density and subsequently the tax base as well as fundamentally confronting the core problems of its current housing crisis.

## **ENVIRONMENTALLY**

In environmental terms this project is justified because it helps increase the housing supply in neighborhoods that already have public works infrastructure and thus there is little increase in embodied carbon in these areas with these projects. Along those lines it is also environmentally justified because it will help increase neighborhood density which will encourage walking and use of public transportation. Another piece of the environmental importance comes from best projects focus I'm showing better environmental practices for this specific typology of accessory dwelling units as well as duplexes and triplexes.

## **SOCIAL/CULTURAL**

The social context that this project will be implemented within is woven through many of the other justifications. The basis of this thesis comes from the history of city policy too often overfocusing on a few areas of justification and inevitably creating policy that hurts marginalized groups. That is why its important that the economic, social, and environmental justifications for this project are fundamentally considered together. While the history of discriminatory housing practice/policy is a social issue it is strongly tied to the economic and environmental factors of a city. Racist housing policy has been a way to economically suppress minority groups and these policies disproportionately have exposed and continue to expose minority groups to environmental toxins. The project site located in the East Phillips neighborhood of Minneapolis was chosen because It is a prime example of the many ways that city policy has both been racist and discriminatory as well as neglectful and apathic of many of the city residents. These policies have kept it as one of the lowest income areas in Minneapolis and now with the Minneapolis 2040 plan it is an area that is even more susceptible to gentrification. However, through all of this the East Phillips neighborhood has had a strong base of committed residents and thus could serve as a strong catalyst for wider change in the city.

# TOPOGRAPHY

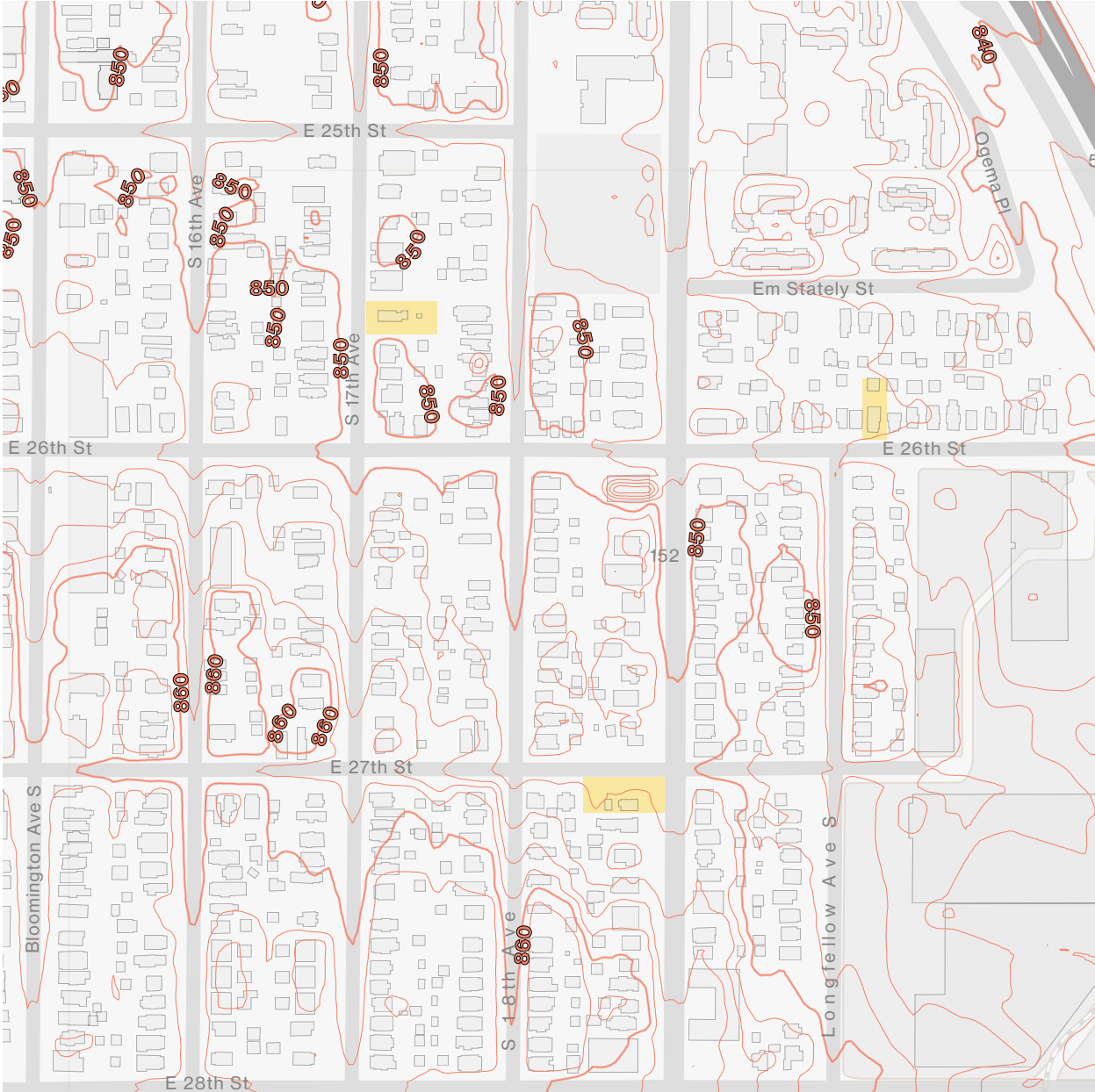


FIGURE XX - 2FT ELEVATION CONTOURS WITH 10 FT INCREMENTS



## **Introduction**

The topographical analysis of the East Phillips neighborhood in Minneapolis is relatively simple. Throughout the neighborhood the slope of the sites largely fall between 4-8 percent with some areas less than 4 percent. At most there is only about a 20 ft difference between the highest and lowest spots in the neighborhood. Within the smaller sites there isn't much notable, And all of the sites have less than 2ft in elevation change throughout.

# SOIL ANALYSIS



FIGURE XX - IMPERVIOUS LAND COVER

## SOIL CLASSIFICATION

### D64B

Urban land  
Hubbard complex  
Mississippi River Valley  
0 - 8 percent slopes

### D67B

Hubbard loamy sand  
1 - 6 percent slopes

### U4A

Urban land  
Udipsamments (cut and fill land)  
complex  
0 - 2 percent slopes



SOILS ANALYSIS

The soils in the East Phillips Neighborhood fall in three categories according to the Minnesota Web Soil Survey. The main category that makes 69.6 percent of the neighborhood is D64B. The second soil classification is D67B(8.5%) which is where the Pioneers and Soldiers Memorial Cemeterary is. Last is D67B on the east side of the neighborhood which is the result of cut and fill for Hwy 55.

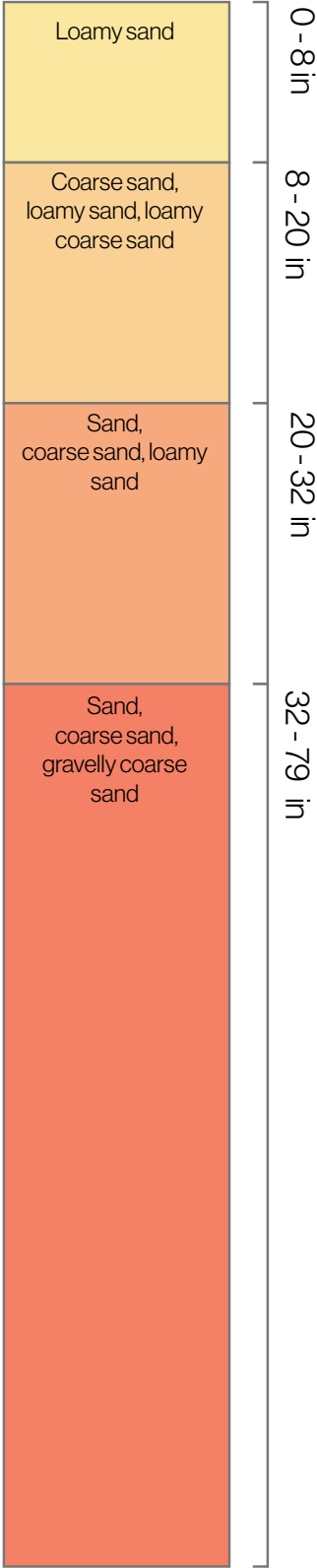
DESCRIPTIONS

**Sand** as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

**Silt** as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

**Clay** as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.  
(Websoilsurvey, 2020)

D64B



# VEGETATION AND SITE COVER

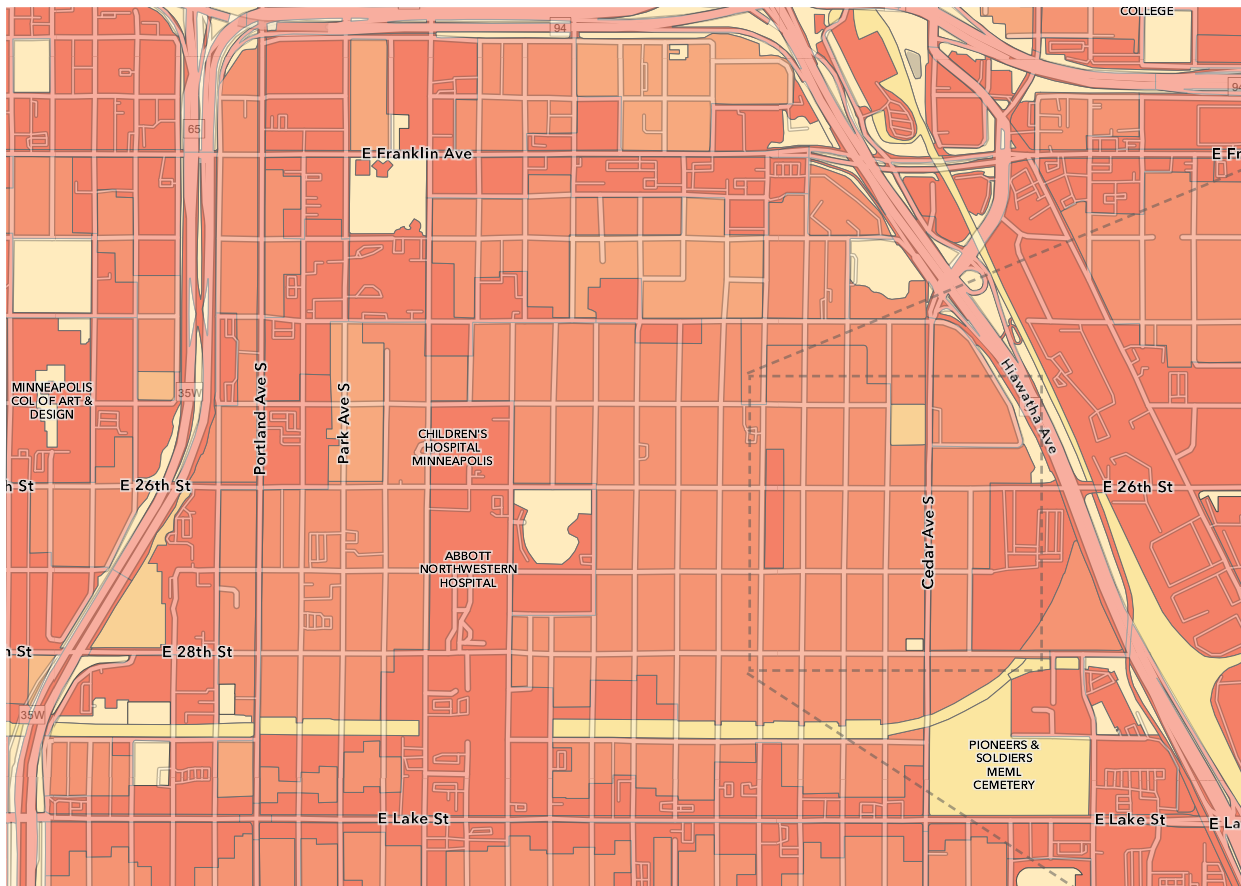
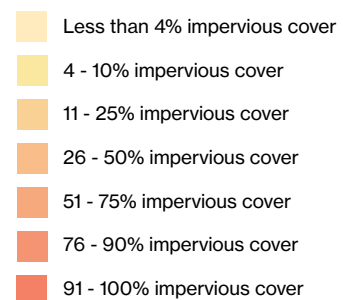


FIGURE XX - IMPERVIOUS LAND COVER

## Introduction

The essence of our cities often lies in the intangible aspects that are culminated within it. Fundamentally our cities are built through vast array of social exchanges and held together by social commonalities. Cities facilitate a complex and growing system of social, economic, cultural, and political value that is profoundly rooted in the value of difference. Cities allow us to exchange what we have for what we do not have. This is based on two key point, first, that there is unique value that everyone brings and second, that that everyone one need something someone else has.





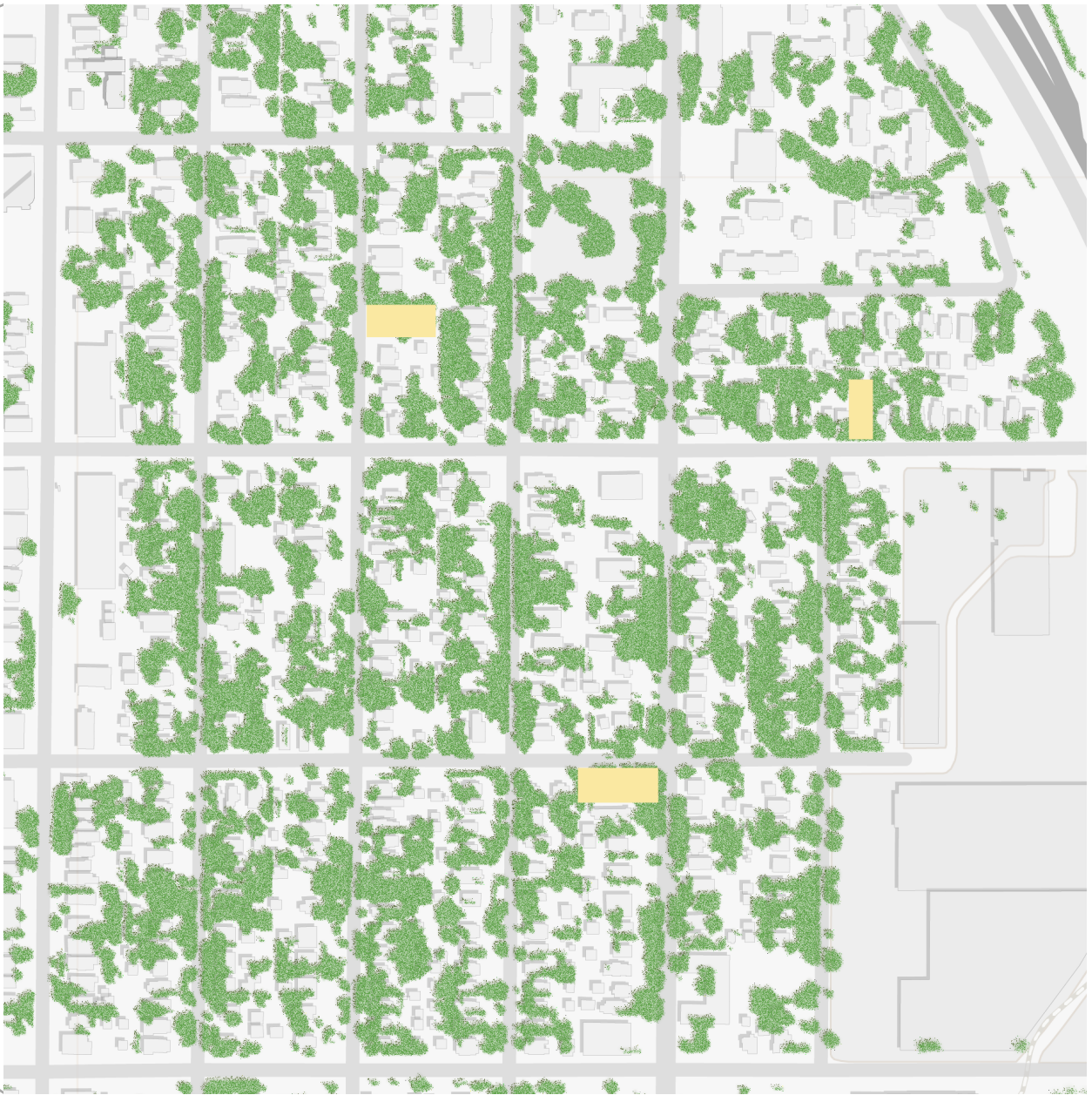




















FIGURE XX - TREE COVERAGE



## Legend

 LOW INCOMERENTAL	 COMMERCIAL-PREFERRED	 VACANT LAND-APARTMENT
 VACANT LAND-RESIDENTIAL	 TRIPLEX	 VACANT LAND - INDUSTRIAL
 RESIDENTIAL	 INDUSTRIAL-PREFERRED	 INDUSTRIAL-NON PREFERRED
 APARTMENT	 TOWNHOUSE	 COMMERCIAL-NON PREFERRED
 VACANT LAND-COMMERCIAL	 CONDOMINIUM	 VACANT LAND-INDUSTRIAL
 RESIDENTIAL-TWO UNIT	 NON 4BB COMPLIANT	 COMMON AREA



## **CURRENT LAND USE BY LOT**

# PEDESTRIAN ACTIVITY

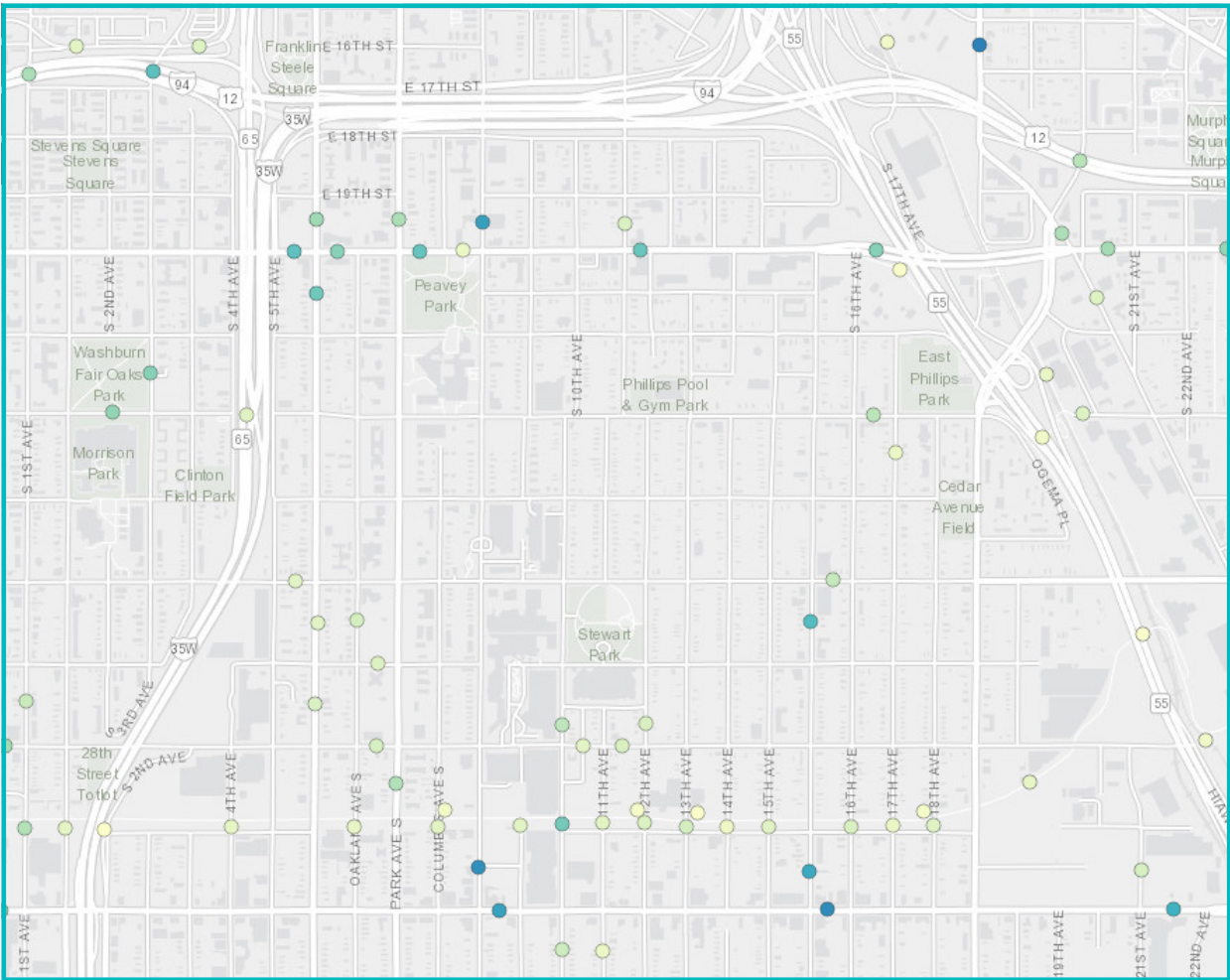
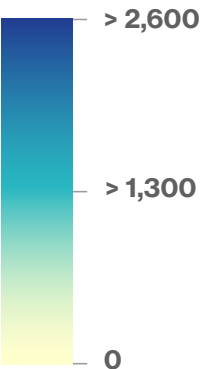


FIGURE XX -Pedestrian Counts





# BIKER ACTIVITY

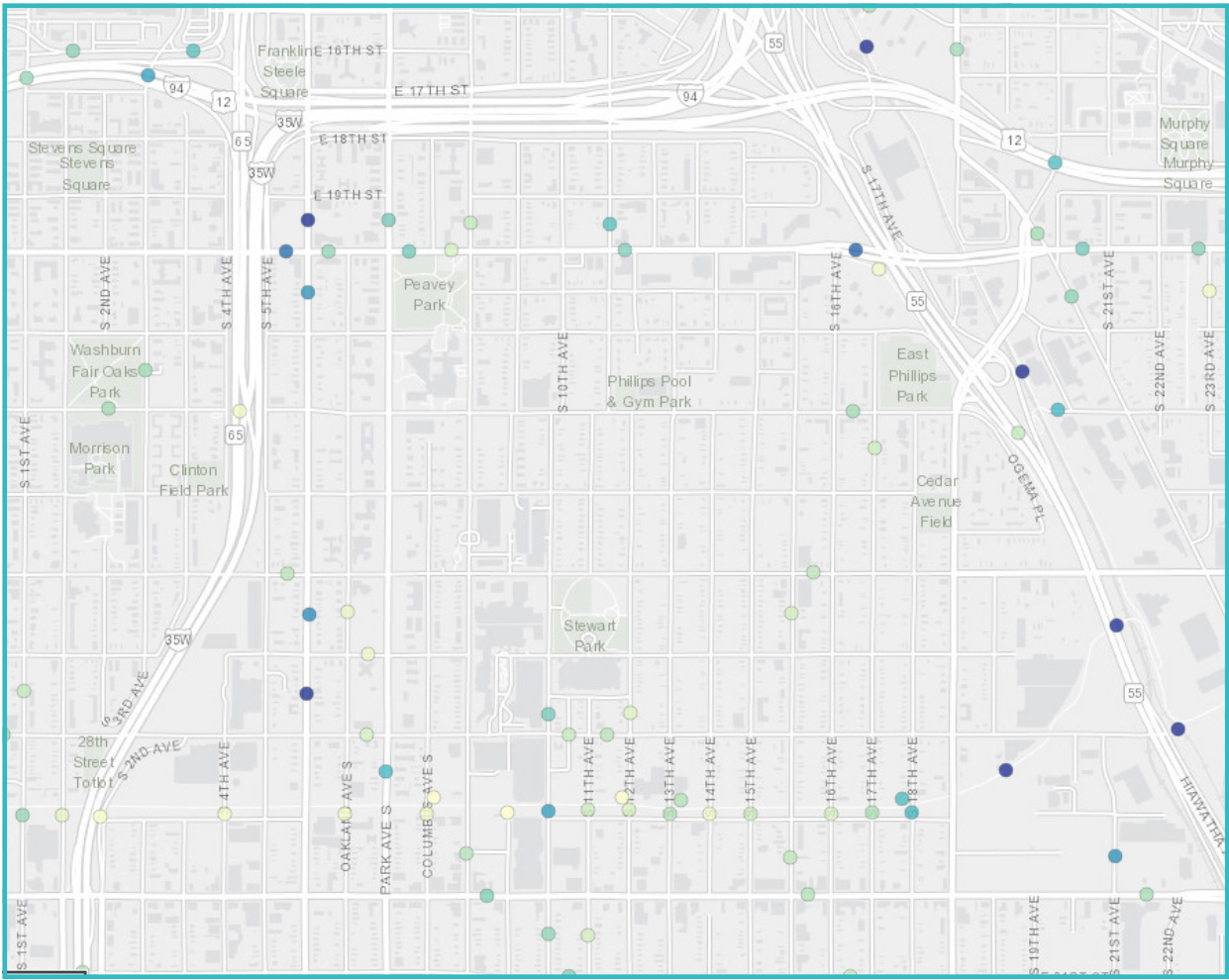
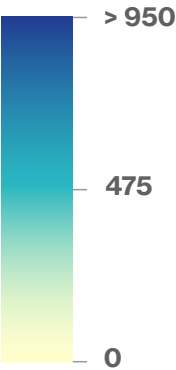


FIGURE XX - Biker Counts

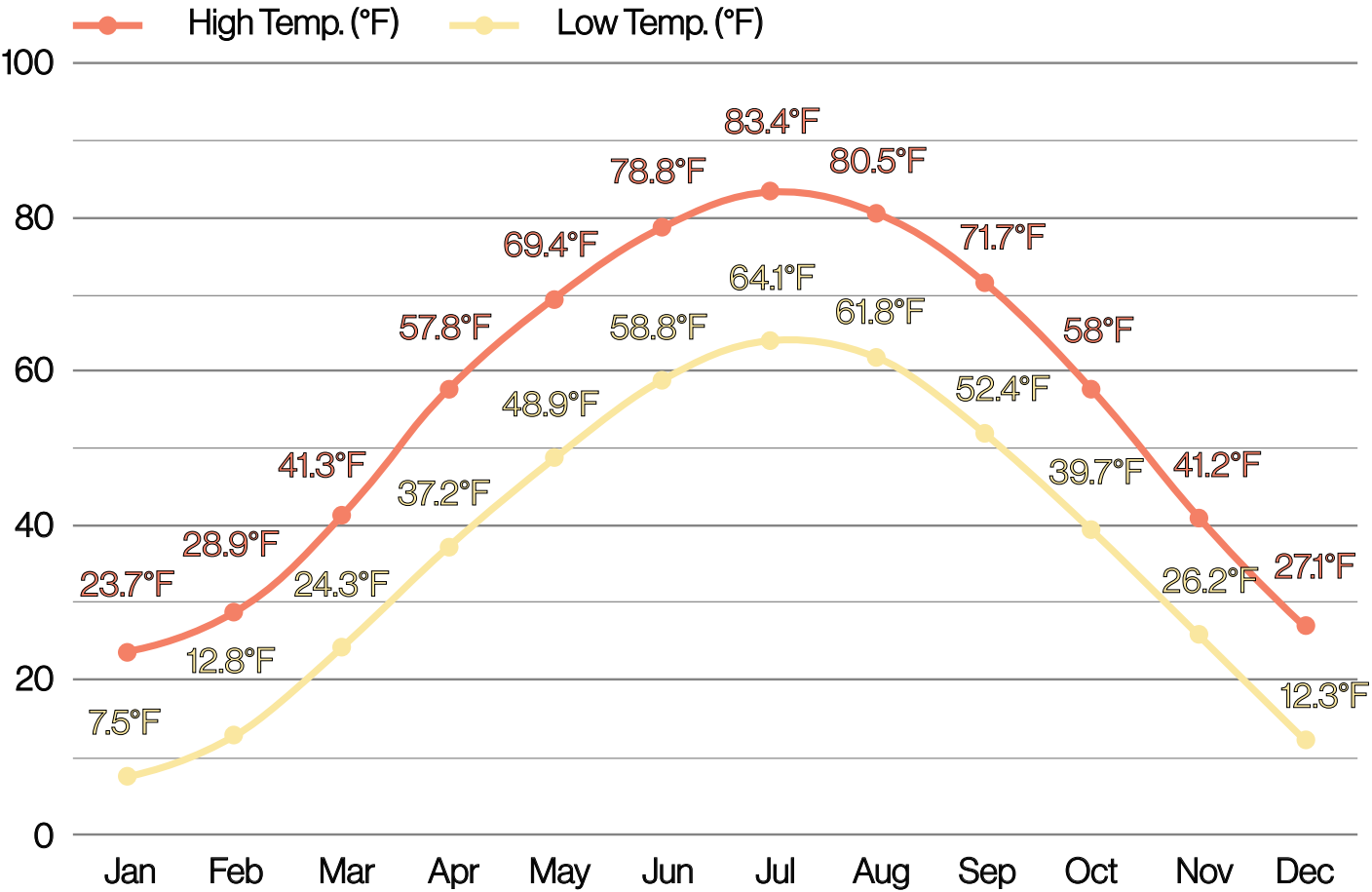




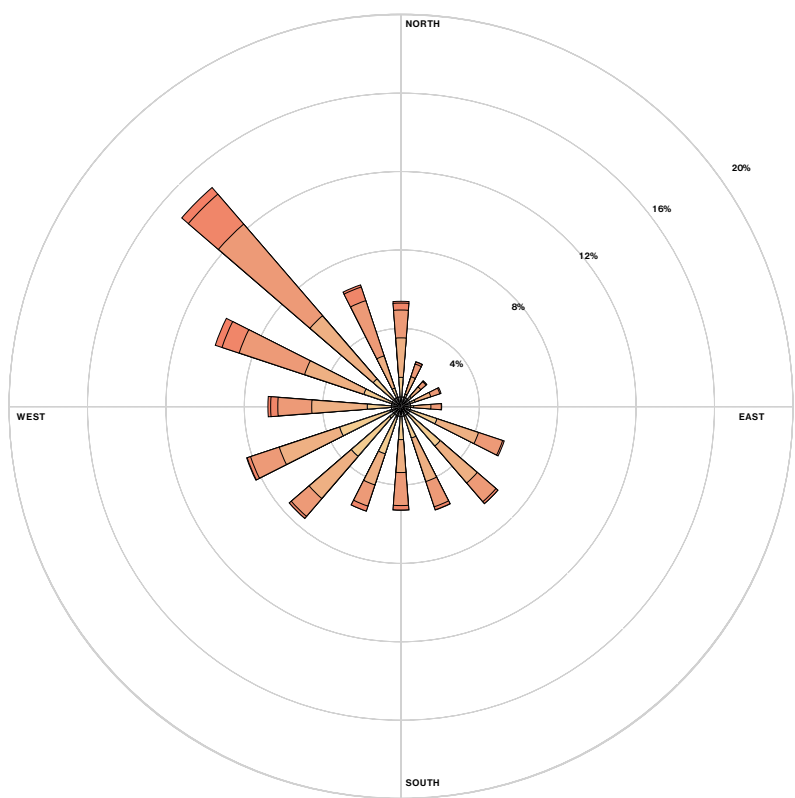
# CLIMATE



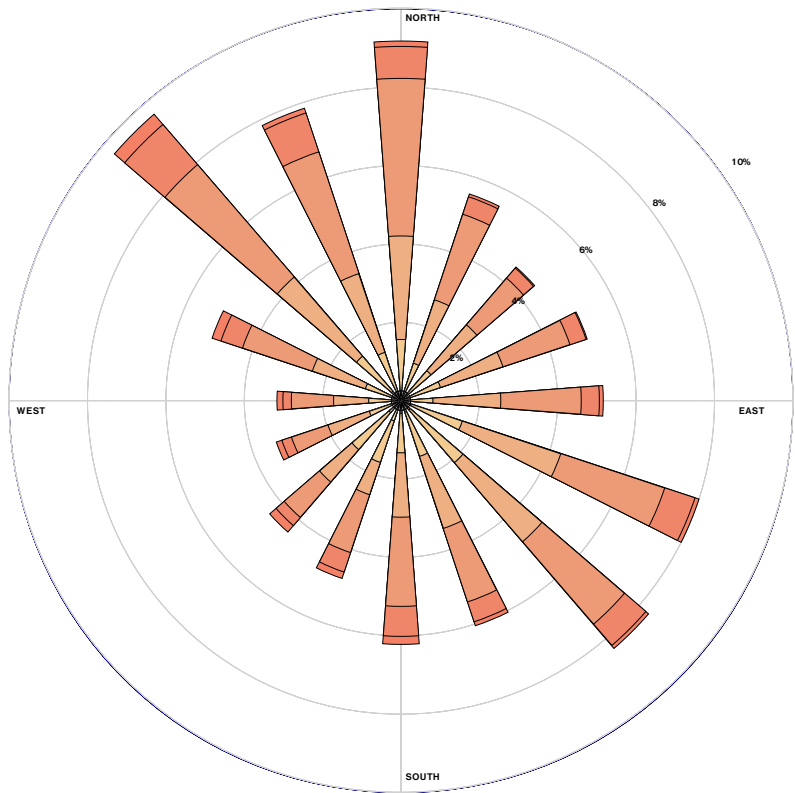
Temperature - Minneapolis, MN



JANUARY

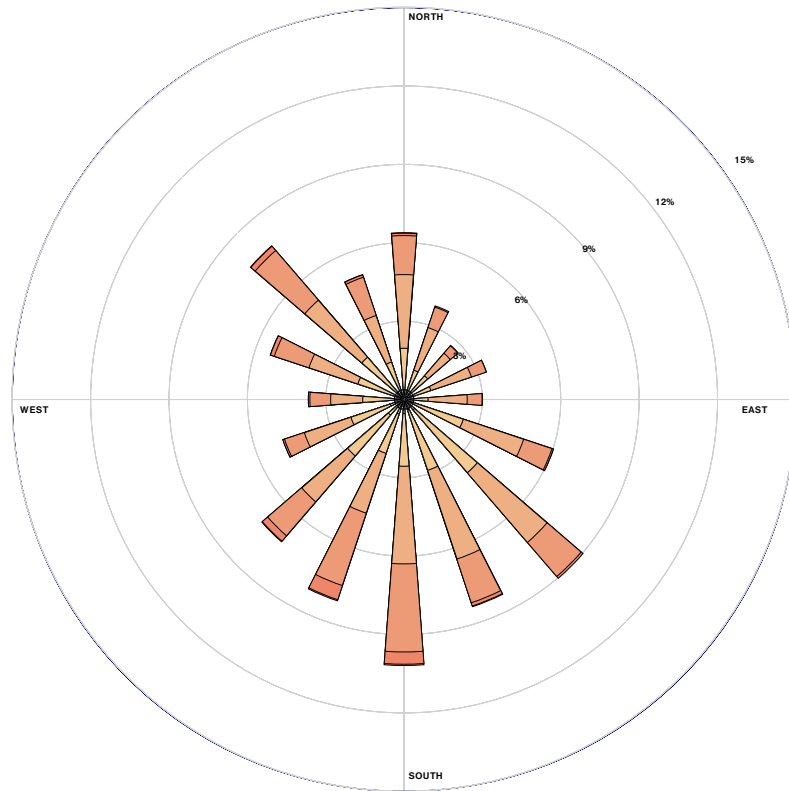


APRIL

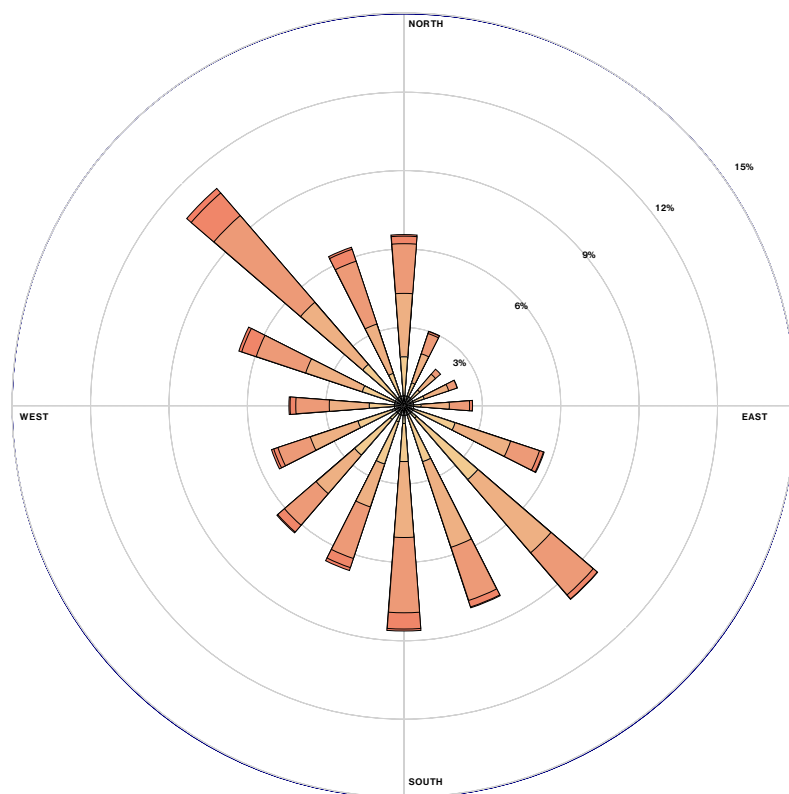




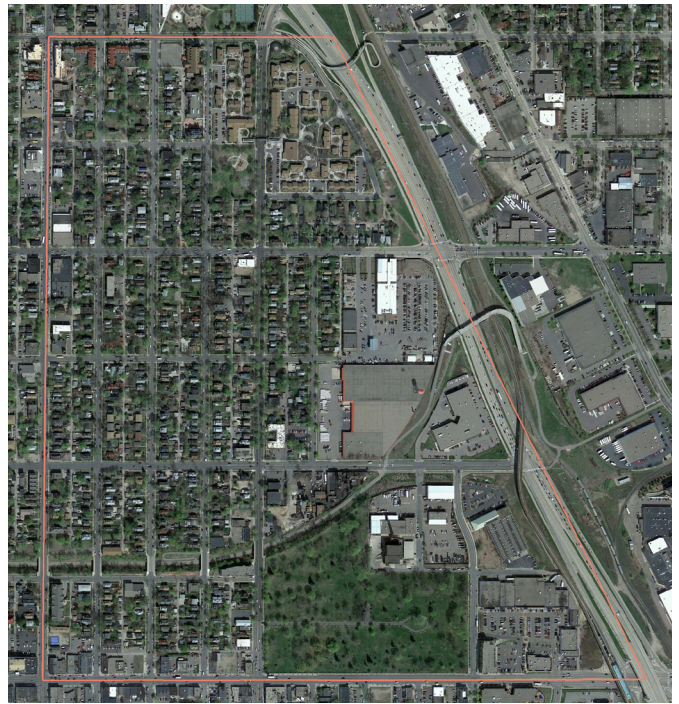
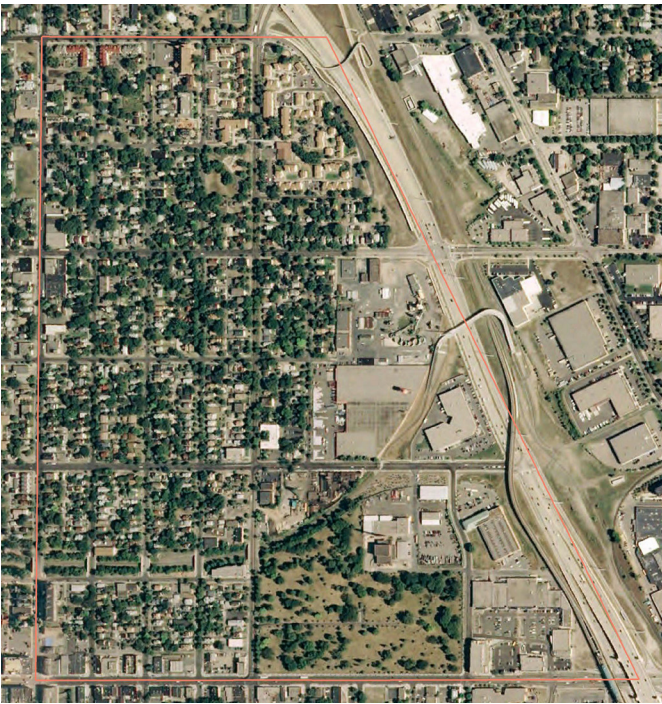
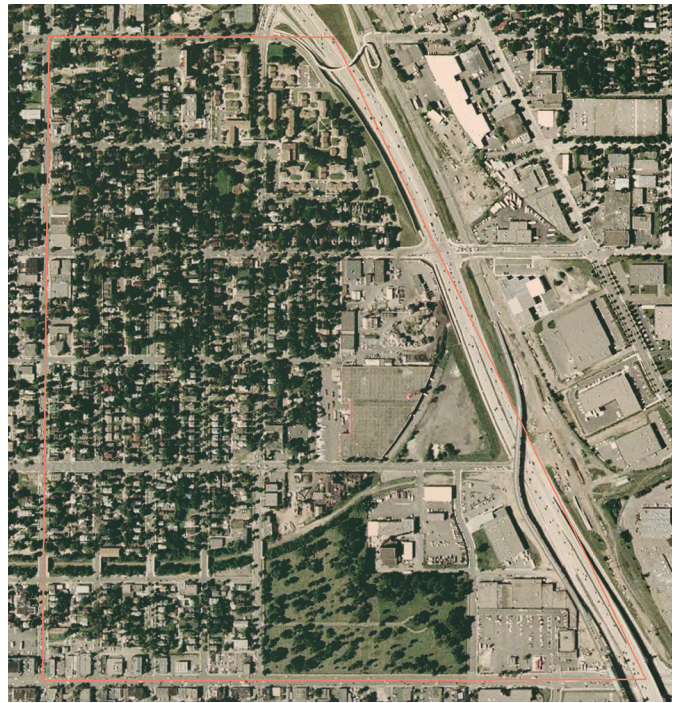
# JULY



# OCTOBER









## **SITE CHANGE OVER TIME**

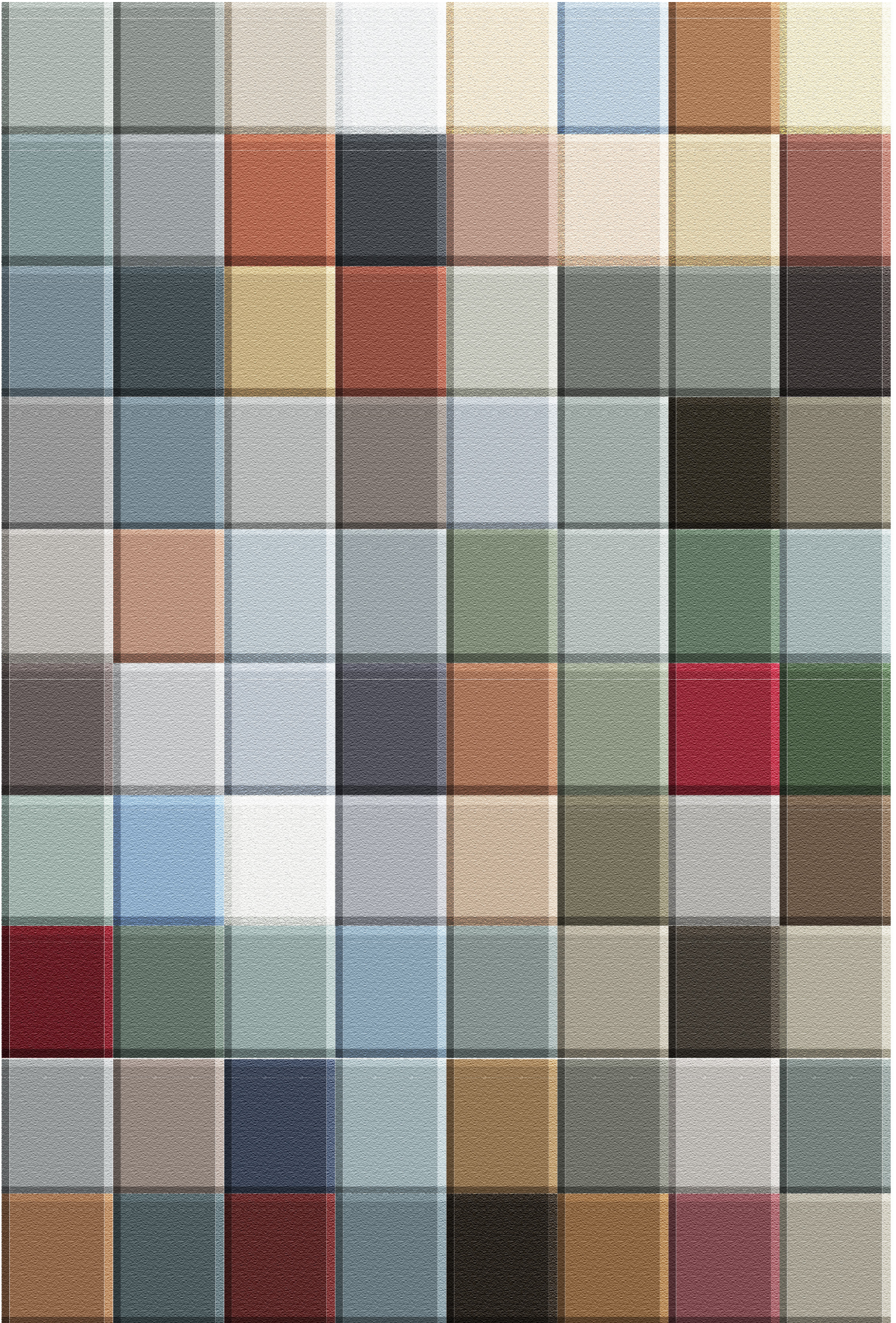


# ARCHITECTURE OF THE BLOCK

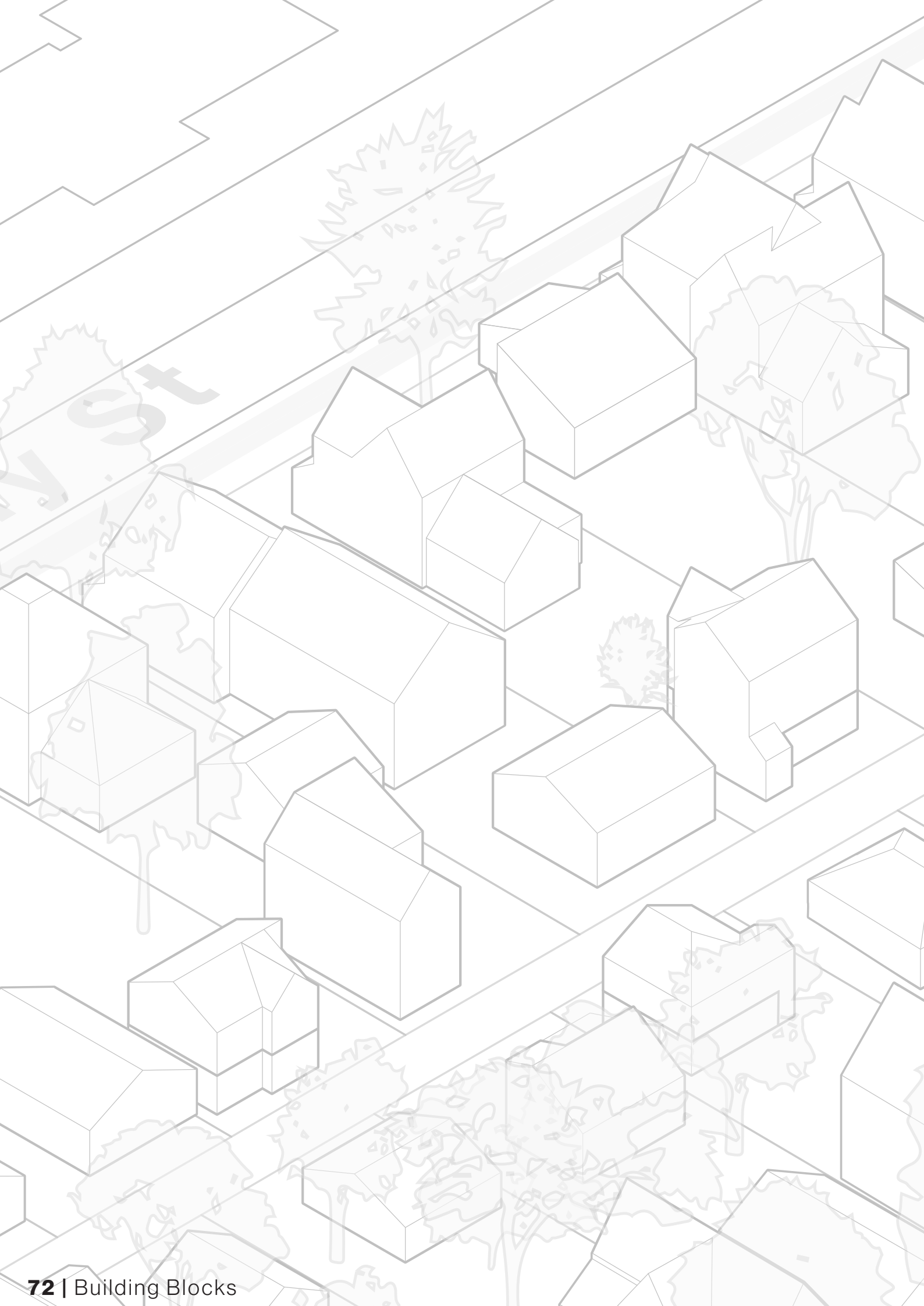




# COLORS OF THE BLOCK







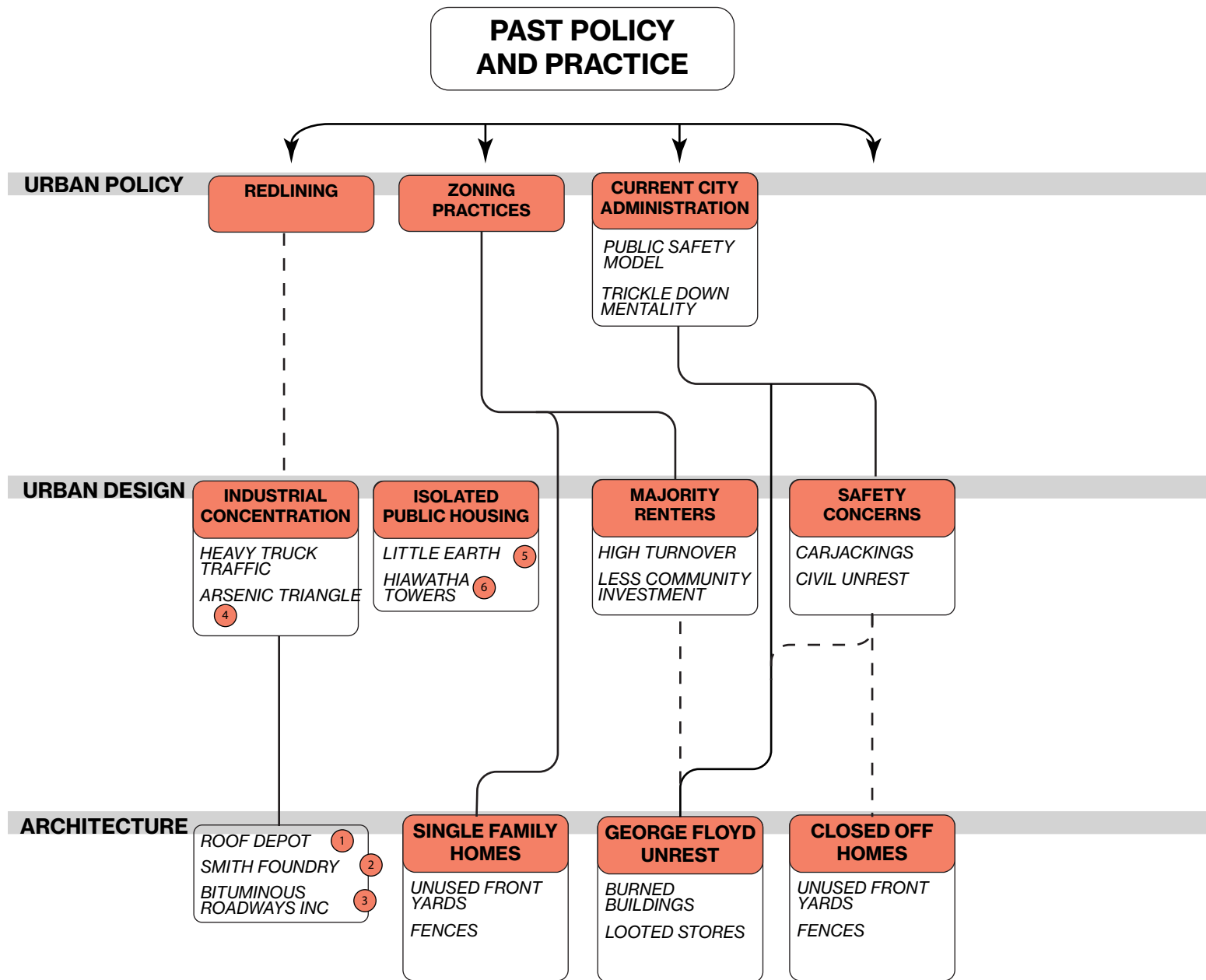


An isometric architectural drawing of a city block. The drawing shows various building footprints of different shapes and sizes, some with gabled roofs and others with flat roofs. There are also several stylized trees scattered throughout the block. The drawing is rendered in a light gray line-art style on a white background. The text "THESIS DESIGN" is overlaid in the center in a large, bold, black sans-serif font.

# THESIS DESIGN

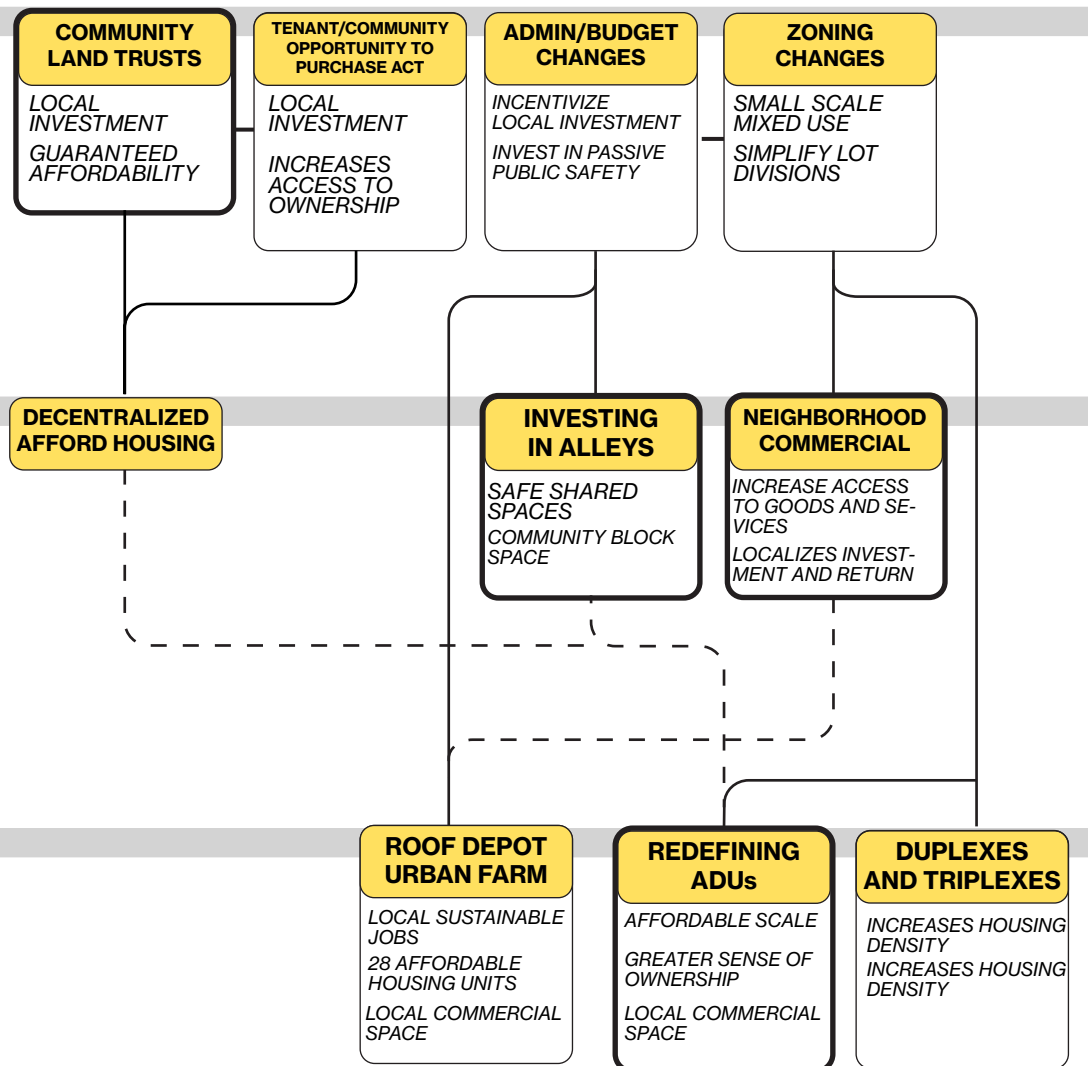
# Process Documentation

## IDEA DEVELOPMENT CHART



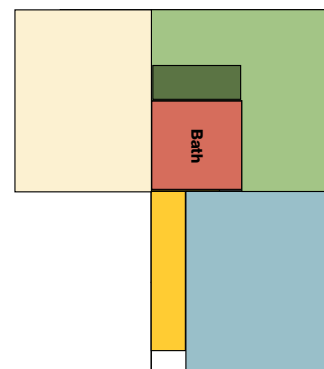
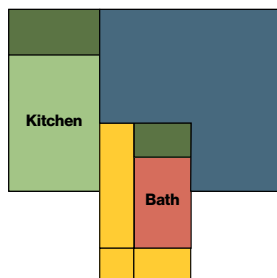
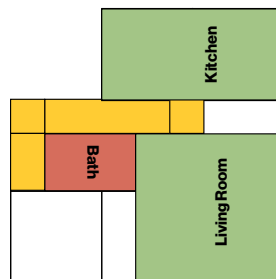
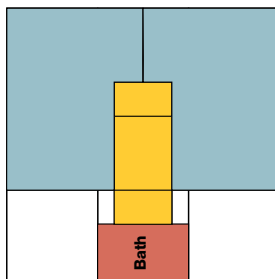
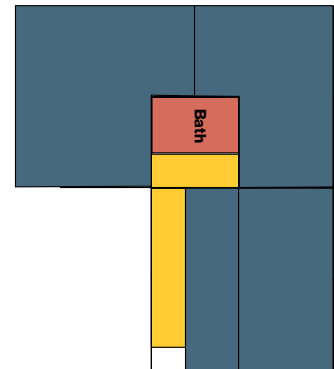
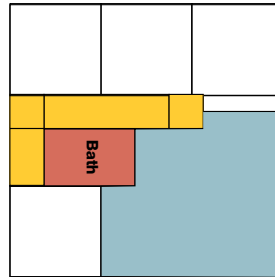
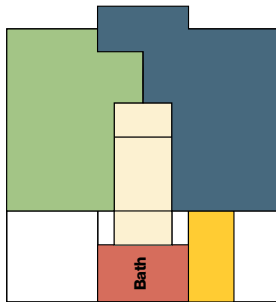


## RECOMMENDED POLICY

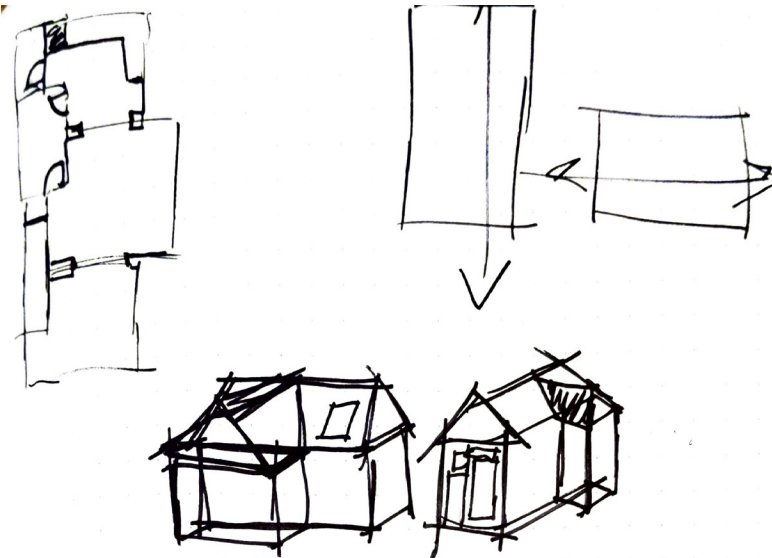


# Process Documentation

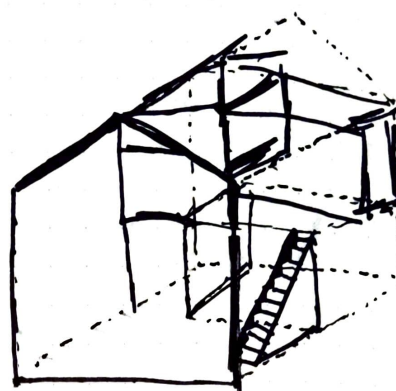
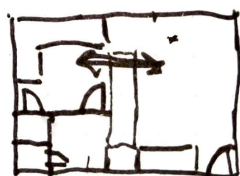
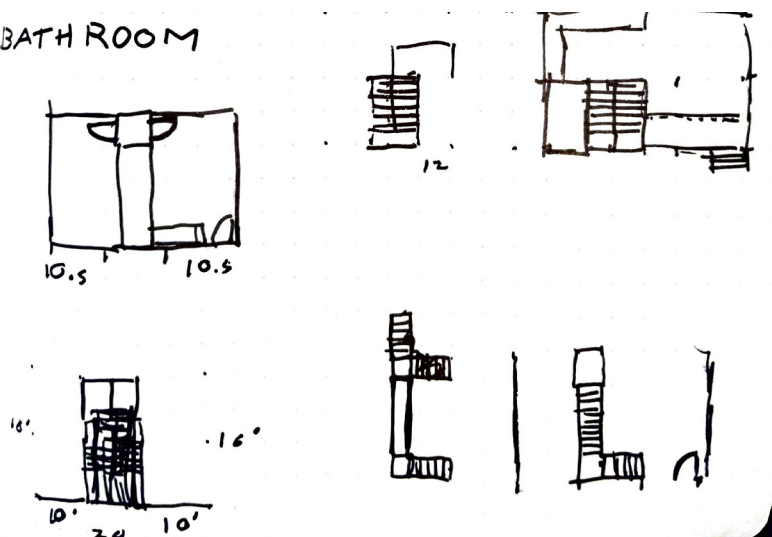
## FLOORPLAN TESTS







BATH ROOM



2

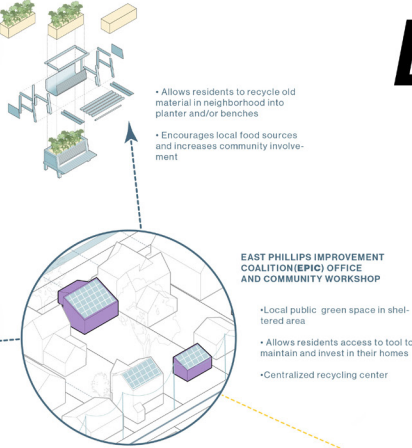
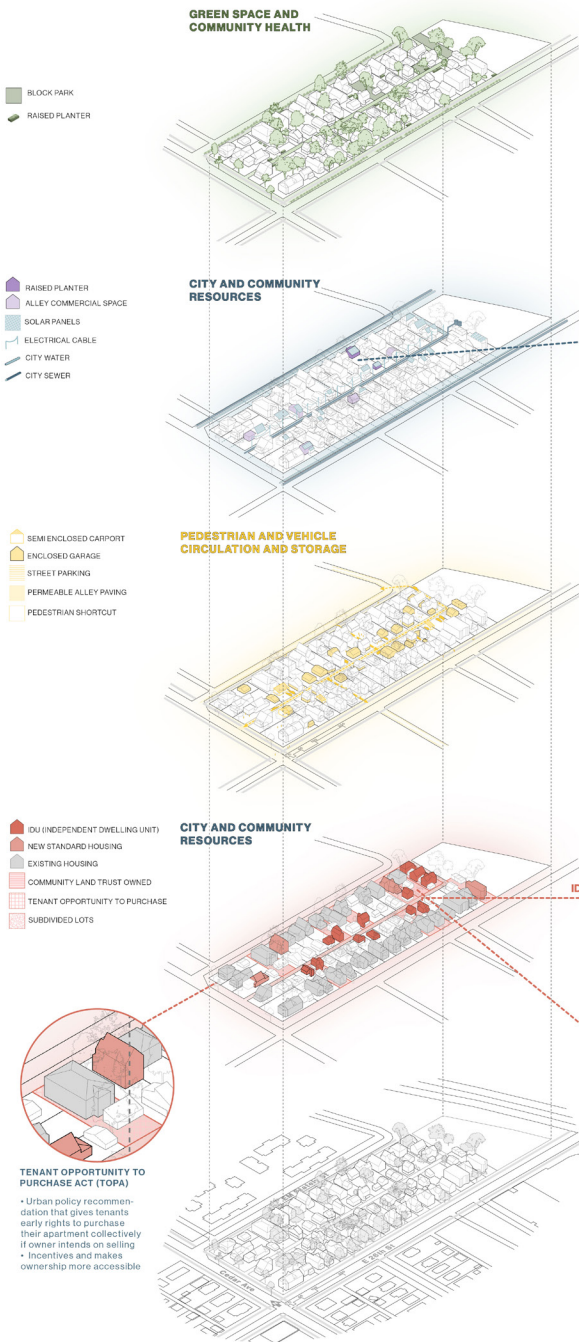
# **Project Solution Documentation**



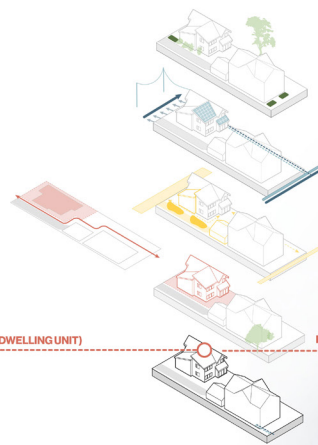
# BUILDING BLOCKS

Re-framing urban investment and community health through equitable empowerment

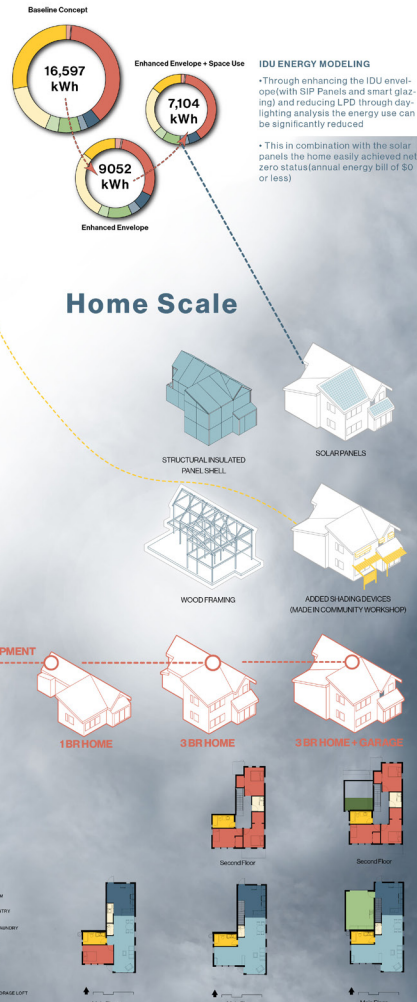
## Block Scale



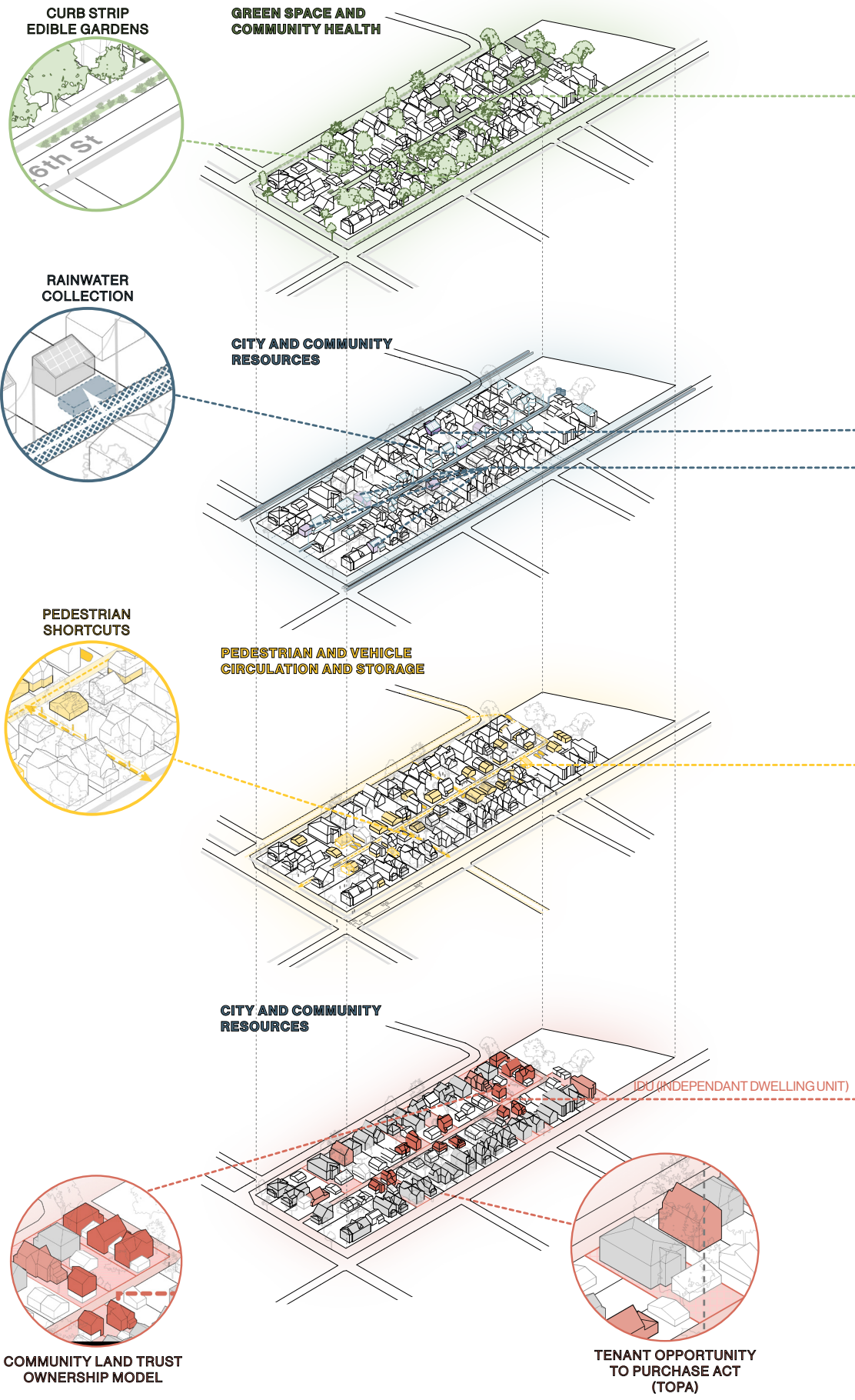
## Lot Scale



## Home Scale



BLOCK SCALE





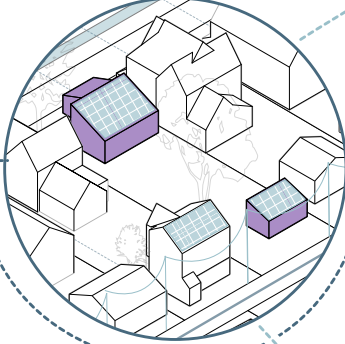
# LOT SCALE

# BUILDING SCALE

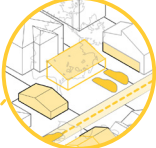
SHARED BLOCK PARK



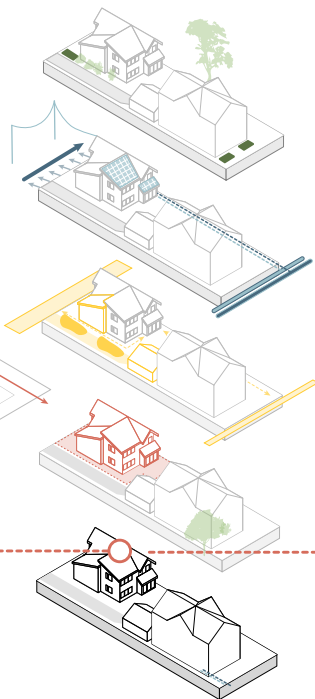
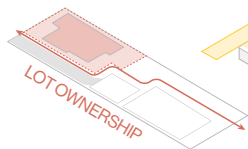
COMMUNITY RESOURCE CENTER



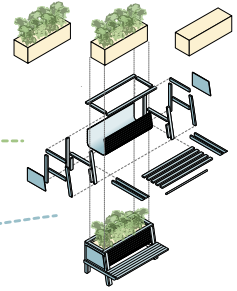
MULTI-USE CARPORTS



BUILDING ABOVE GARAGES

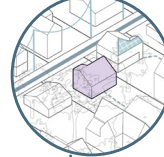


RECYCLED MATERIALS  
PLANTER AND BENCH

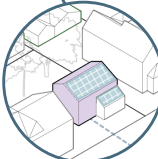


MADE IN COMMUNITY WORKSHOP

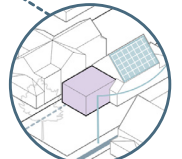
DAYCARE



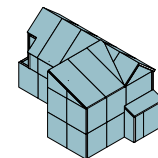
OFFICE SPACE



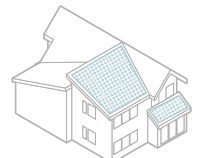
OFFICE SPACE



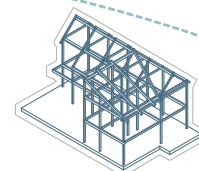
OFFICE SPACE



STRUCTURAL INSULATED  
PANEL SHELL



SOLAR PANELS

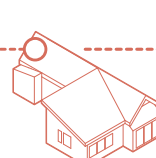


WOOD FRAMING



ADDED SHADING DEVICES

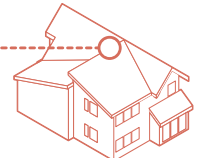
INCREMENTAL DEVELOPMENT



1BR HOME



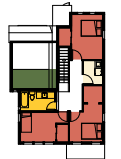
3BR HOME



3BR HOME + GARAGE



Second Floor

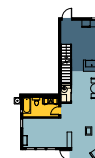


Second Floor

- LIVING ROOM
- KITCHEN/ENTRY
- STORAGE/LAUNDRY
- BATHROOM
- BEDROOM
- GARAGE
- GARAGE STORAGE LOFT



Main Floor



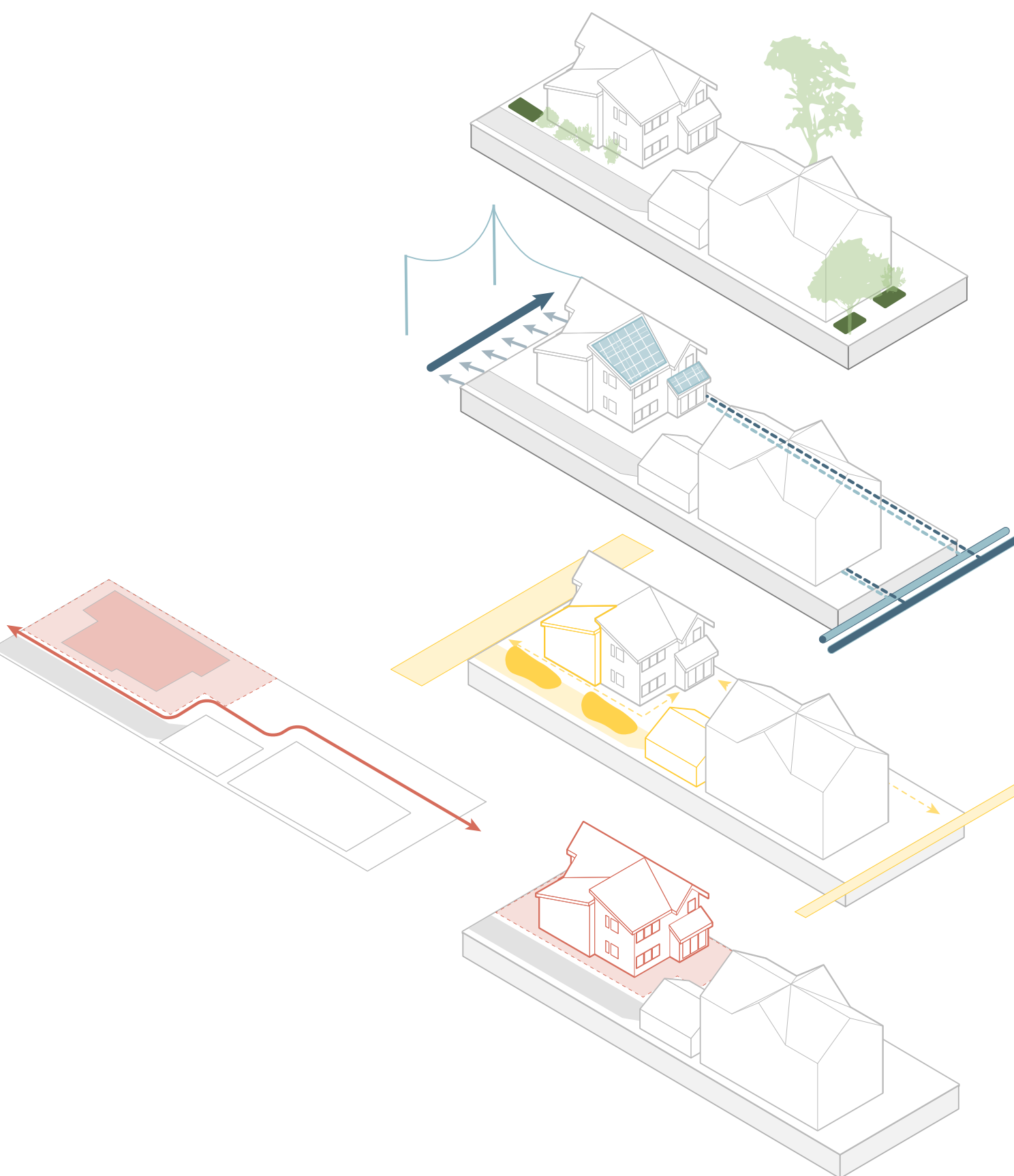
Main Floor



Main Floor

# **Performance Analysis: Response to the Site or Context**

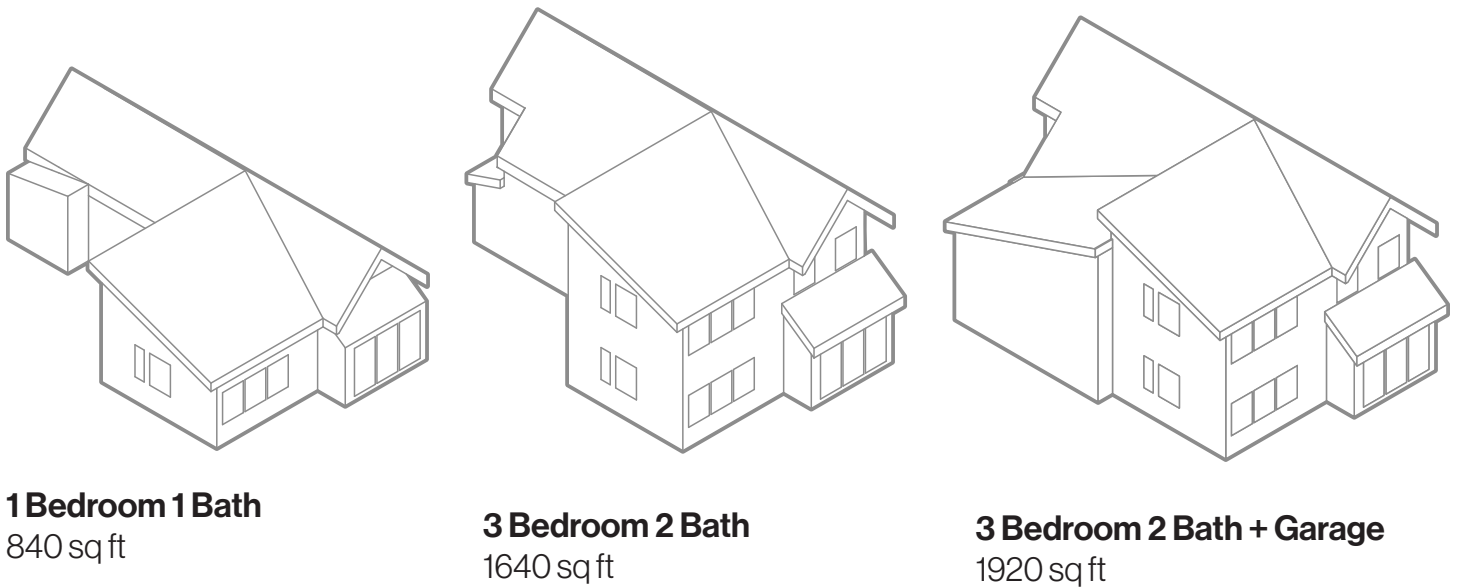




# Performance Analysis: Response to the Typological or Precedent Research

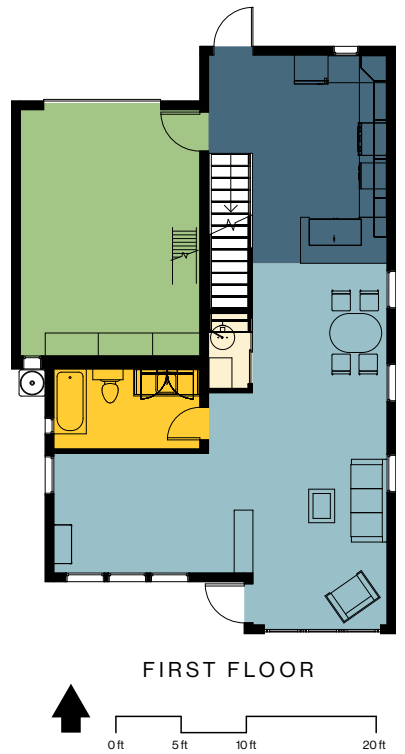
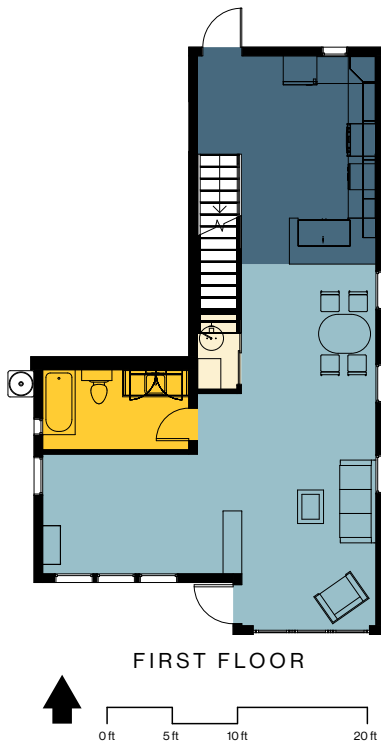
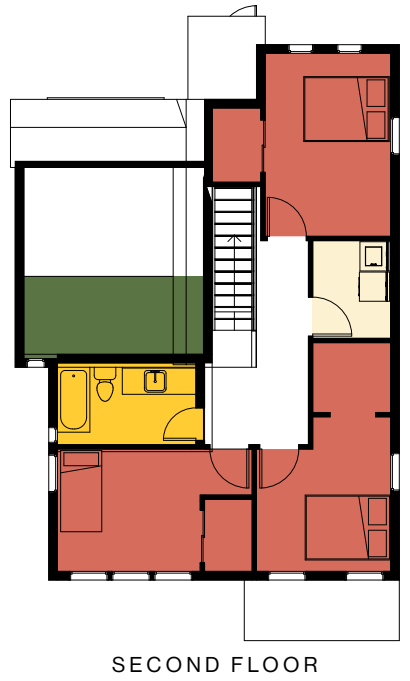
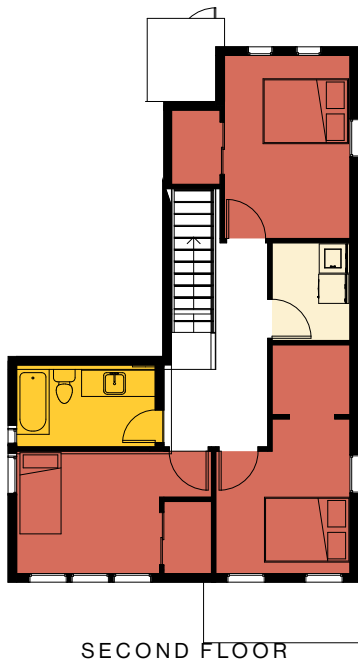
## INDEPENDANT DWELLING UNIT(IDU)

A key tenant of the IDU is allowing for low initial invest while still have the capacity of growth. This is achieved through the incremental nature of the design and the floorplans are meant to adapt to changing families





- LIVING ROOM
- KITCHEN/ENTRY
- STORAGE/LAUNDRY
- BATHROOM
- BEDROOM
- GARAGE
- GARAGE STORAGE LOFT



# Performance Analysis: Response to the Typological or Precedent Research

INTERIOR PERSPECTIVE: LIVING ROOM





## INTERIOR PERSPECTIVE: KITCHEN/ENTRY





# Performance Analysis: Response to the Typological or Precedent Research

EXTERIOR PERSPECTIVE: BACKYARD





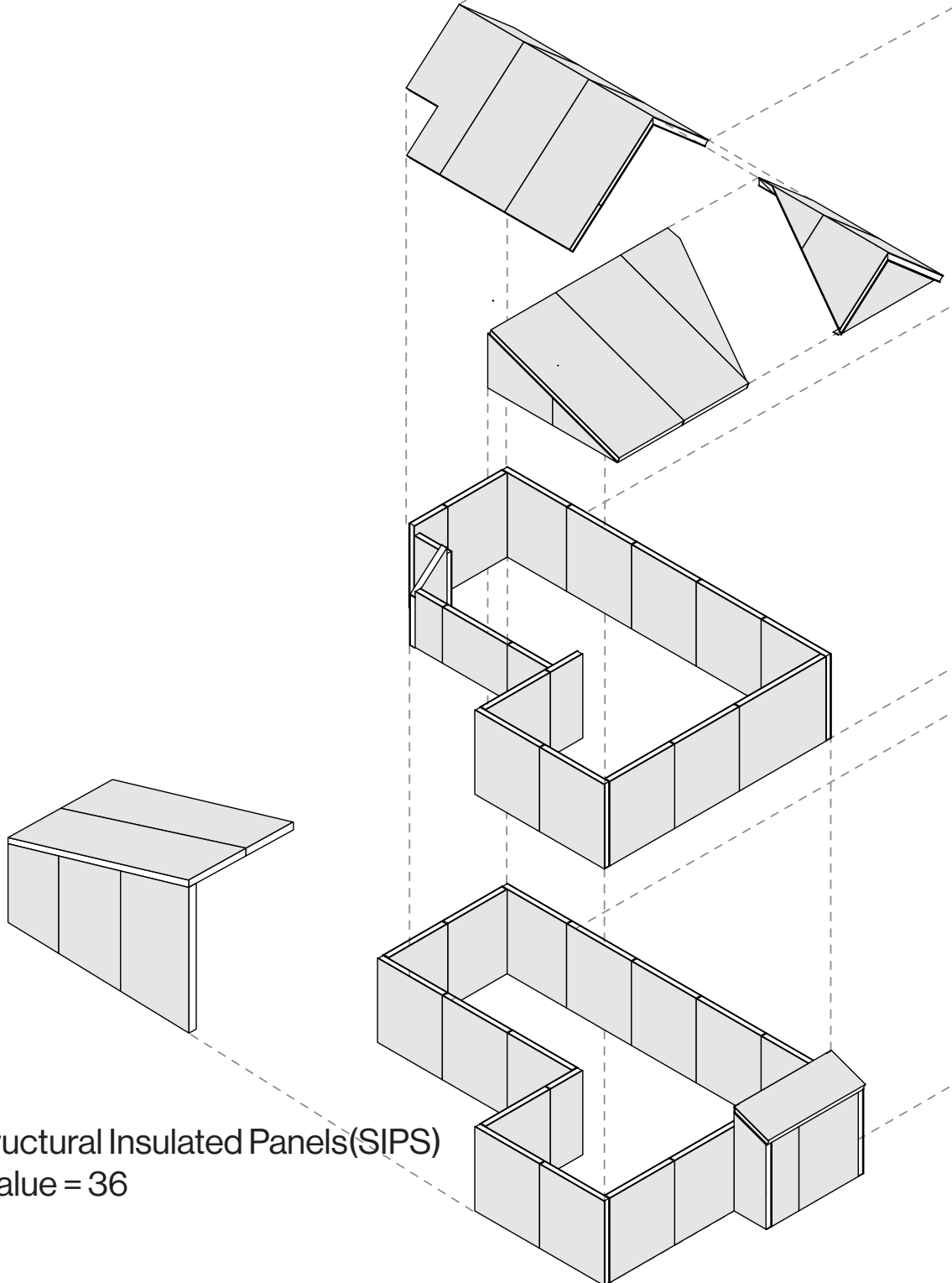
## EXTERIOR PERSPECTIVE: ALLEY SIDE



# Performance Analysis: Response to the Typological or Precedent Research

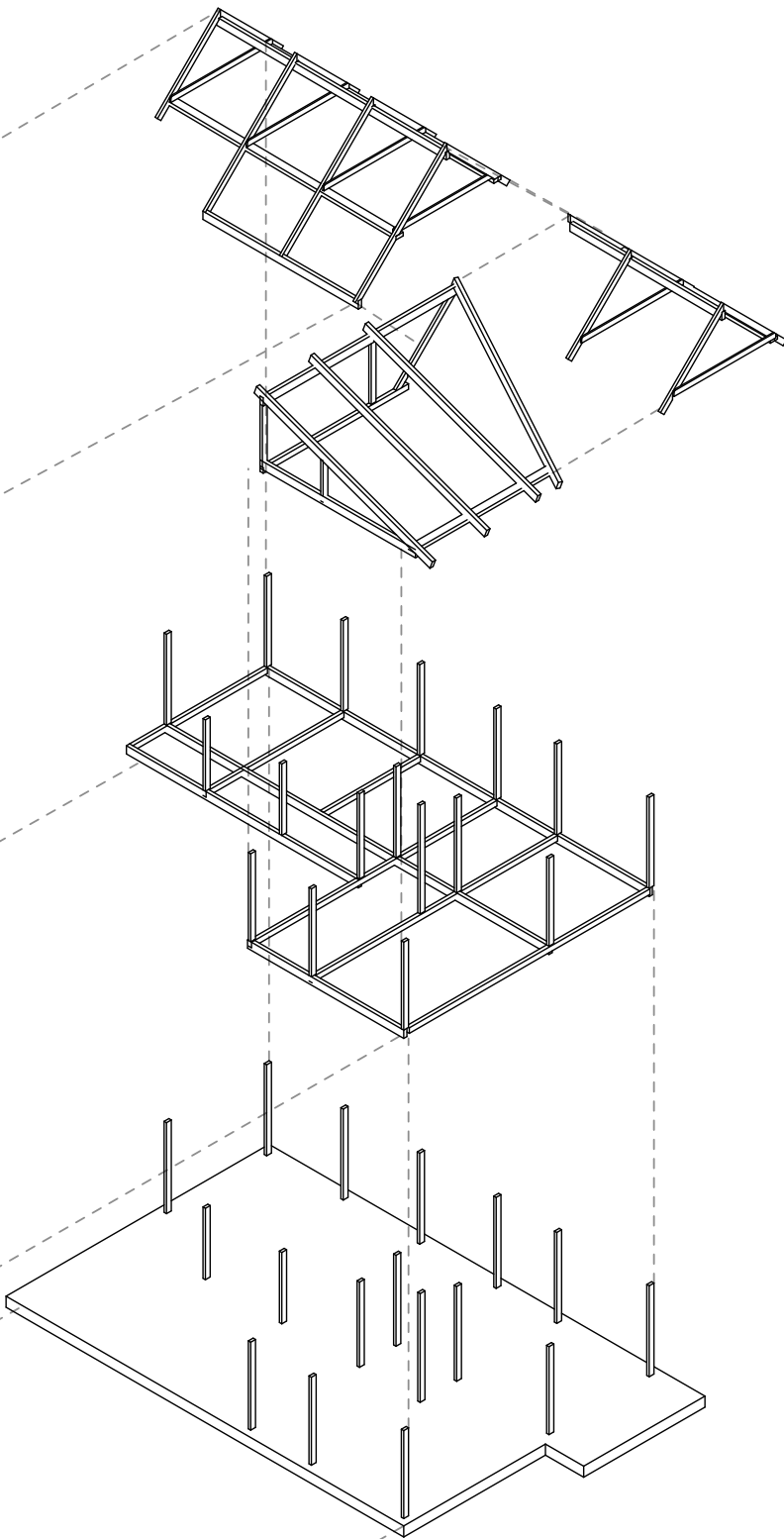
## STRUCTURAL INSULATED PANELS

12 inch Structural Insulated Panels(SIPS)  
R-Value = 50



8 inch Structural Insulated Panels(SIPS)  
R-Value = 36



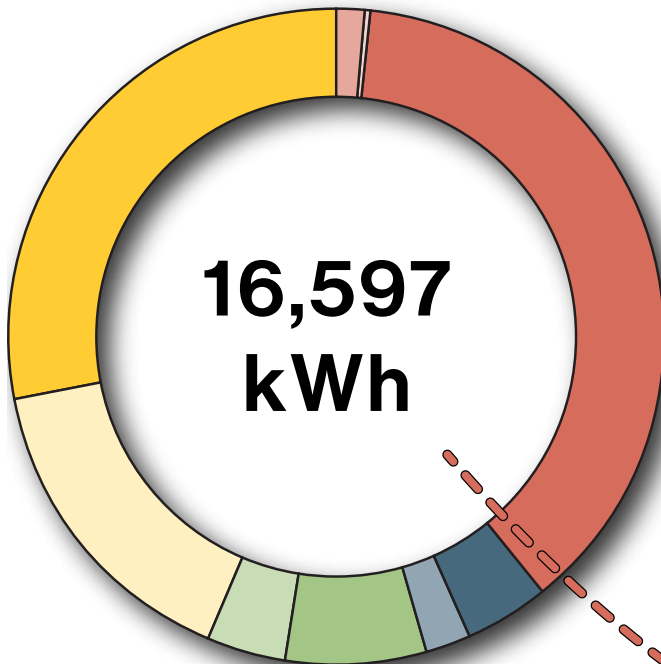


2 x 6(x2) Wood Structure Between Panels

# STRUCTURAL FRAMING

# Performance Analysis: Response to Goals and Project Emphasis

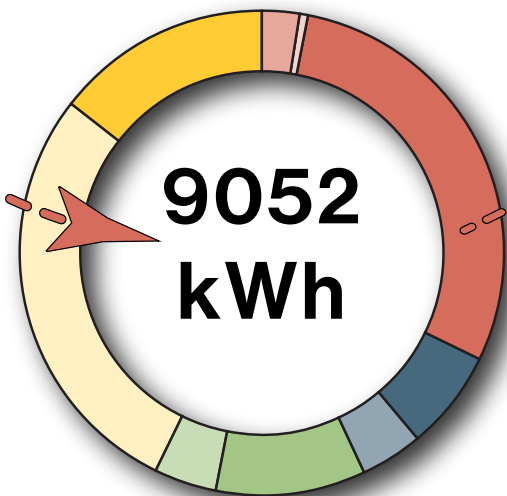
**Baseline Concept**



**Annual Energy Cost: \$1,265**

ASHRAE 90.1 (ZONE 6)  
HVAC: PTHP/ Split System  
Walls R- Value = 20  
Glazing U-Value = 0.42  
Roof R-Value = 30

**Enhanced Envelope**



**Annual Energy Cost: \$818**

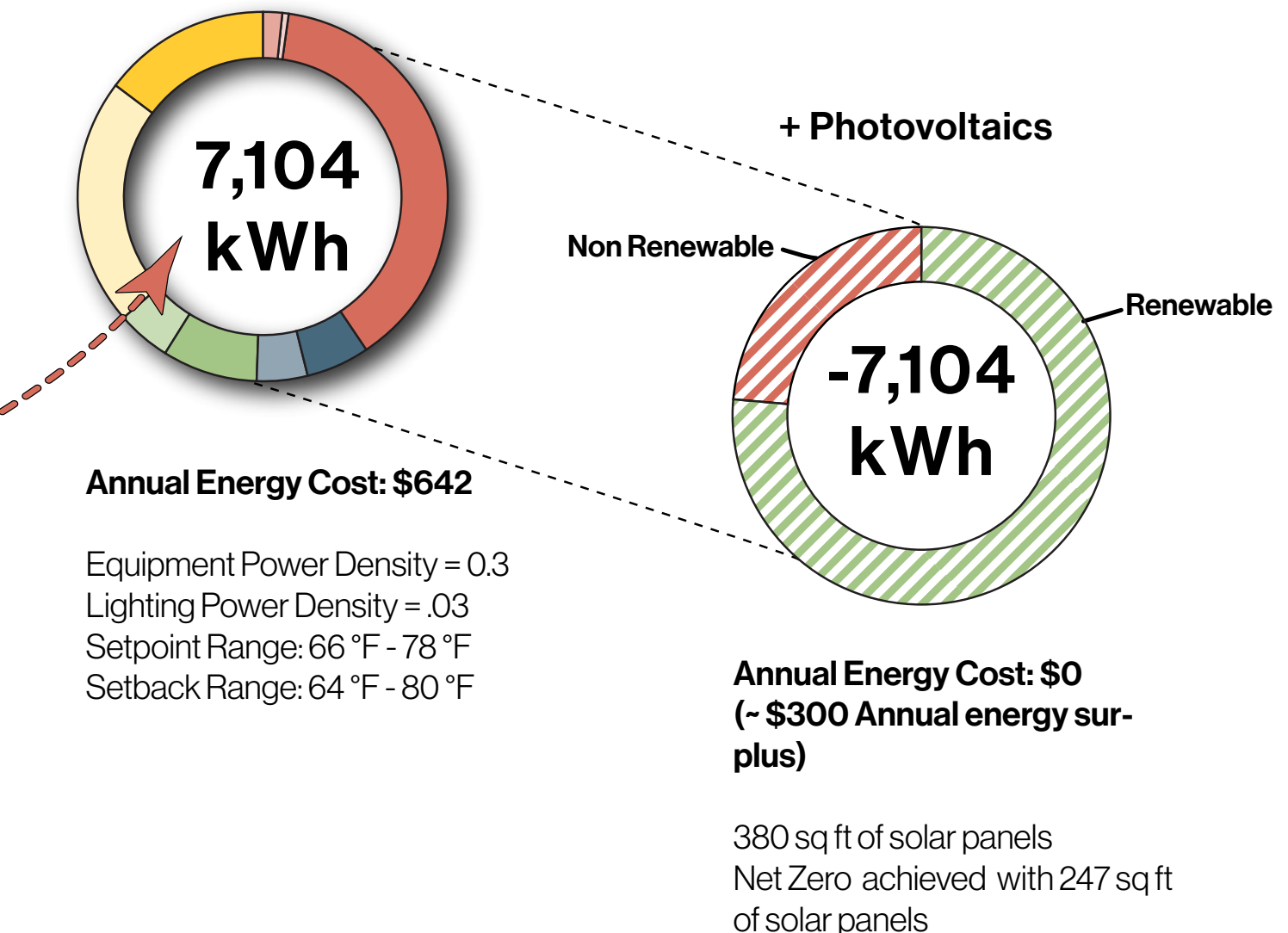
Walls R- Value = 36  
Glazing U-Value = 0.34  
SHGC= 0.52  
Roof R-Value = 55



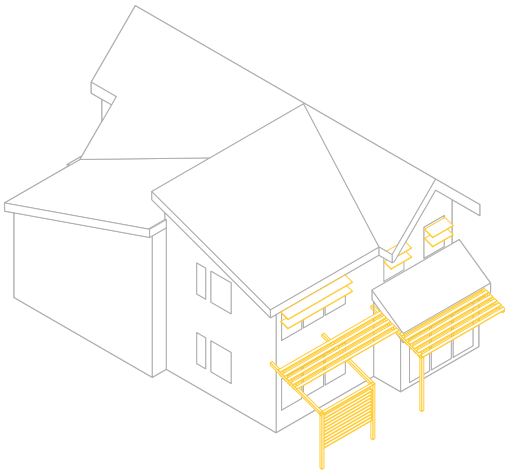
# Energy Use

An important concept that goes along with this design and this thesis is the idea that for design to be equitable it must be green. Neighborhoods like East Phillips know this better than most that climate change and environmental damages disproportionately affect communities of color. Sustainability and energy efficiency is not a bonus item to add on top of design, it is a vital core element necessary if cities are to grow equitably.

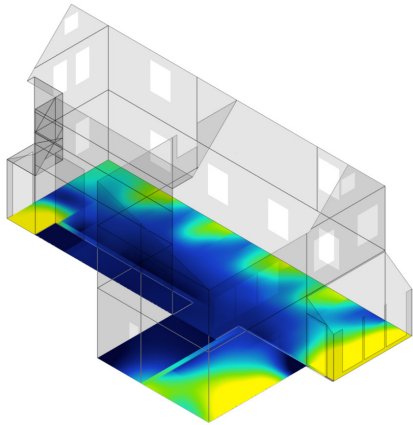
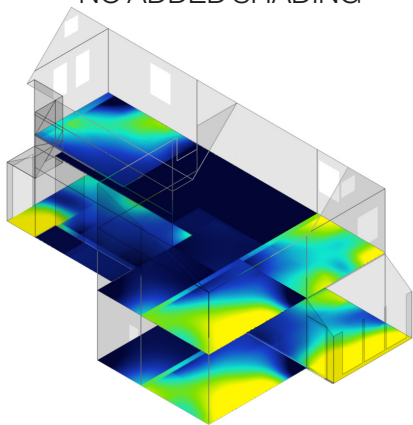
## Enhanced Envelope + Space Use



# Performance Analysis: Response to Goals and Project Emphasis



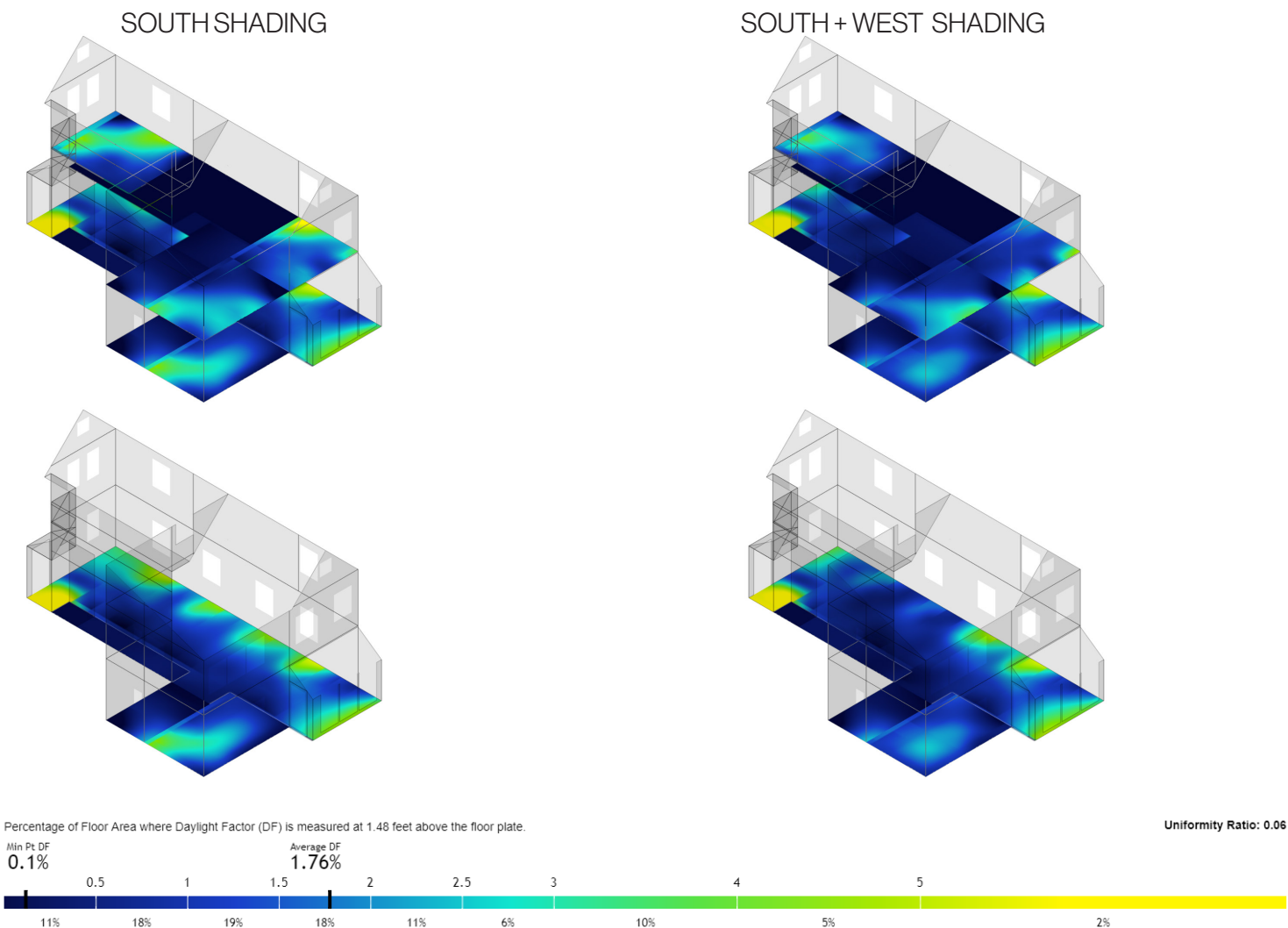
NO ADDED SHADING





# Daylighting

The shading devices pair along with the incremental nature of the home and are can be made and applied to façade when the homeowner can make that investment. This element pairs with the community resource center I cause the shading devices are designed to be created by the resident utilizing the community tool and resources.

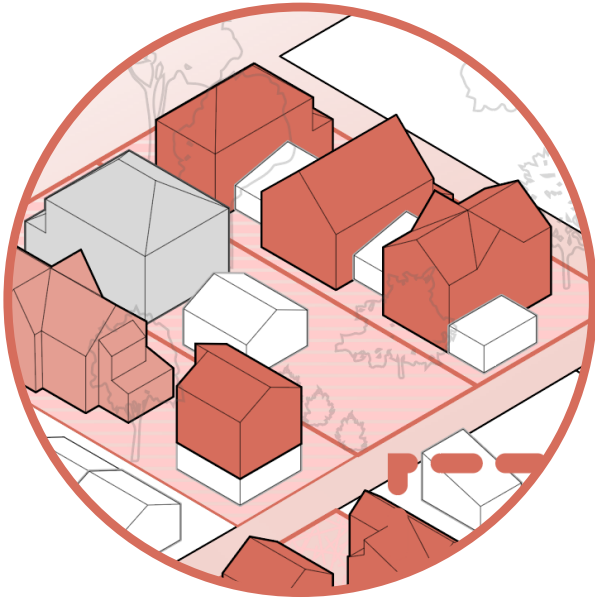


# Performance Analysis: Response to Goals and Project Emphasis

## HOUSING AND LAND USE

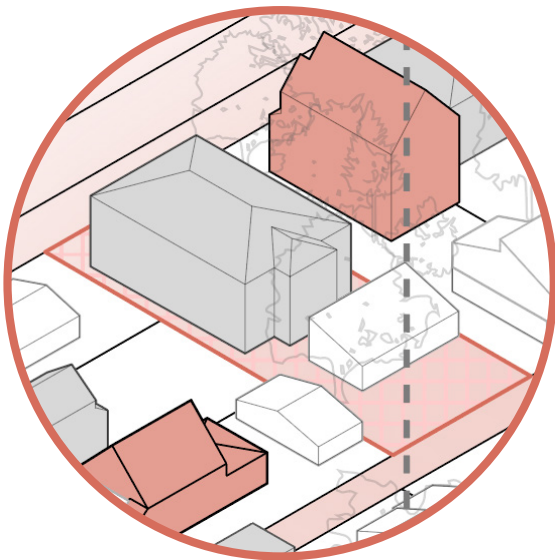






## Community Land Trust (CLT)

- Nonprofit run by a community that holds land in a community to guarantee affordable housing for those who meet a certain criteria
- Allows residents to gain equity through the ownership of the house on the lot while ownership of the land remains in the trust and is leased out to the resident
- Typically funded through various partnership models that include variations of residents, community members, city administration and or stakeholders

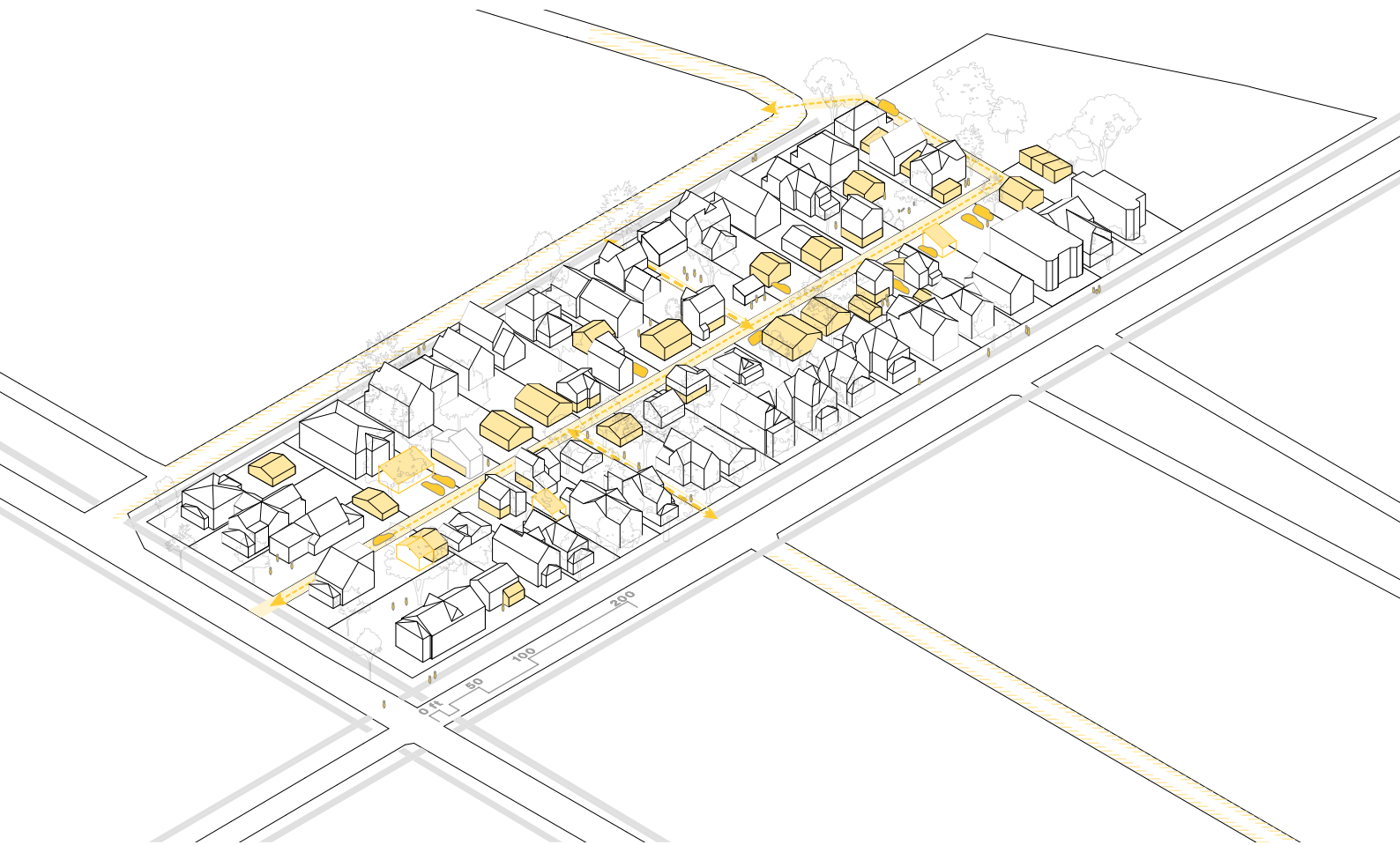


## Tenant Opportunity to Purchase Act (TOPA)

- Urban policy that requires landlords to give advance notice of sale to tenants and present tenants an opportunity to purchase the building as a collective
- Fights displacement by giving existing tenants a path to ownership
- Requires purchasers to preserve affordability in building

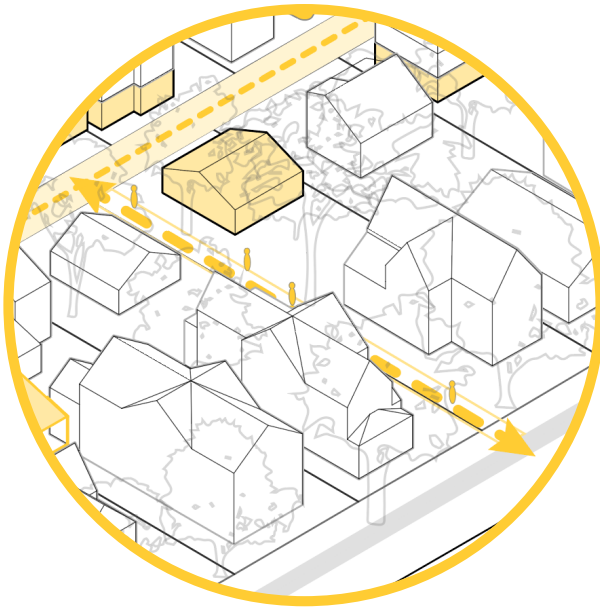
# Performance Analysis: Response to Goals and Project Emphasis

## CIRCULATION:PEDESTRIAN AND VEHICLE

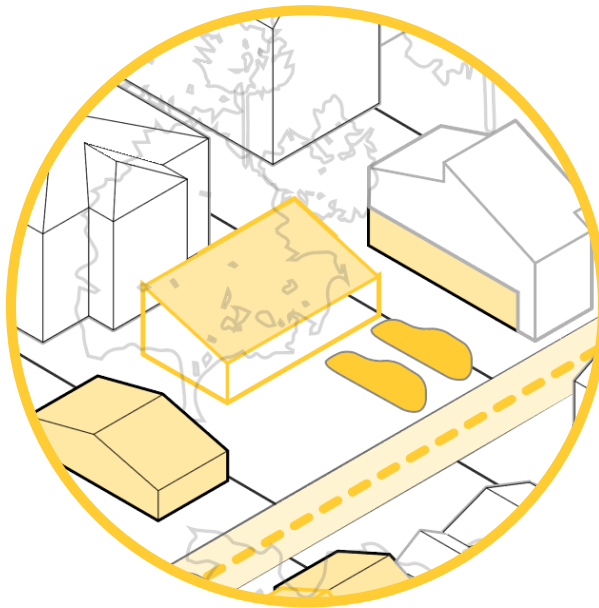


To help vitalize buildings on the alley side, this design reworks some of the circulation elements of the blocks. This includes things like more considerate placement of garages to help with flow throughout the block without reducing parking. It also includes pedestrian paths that cut through the sides of the lots to favor pedestrian access.





**INCREASED PEDESTRIAN ACCESS**



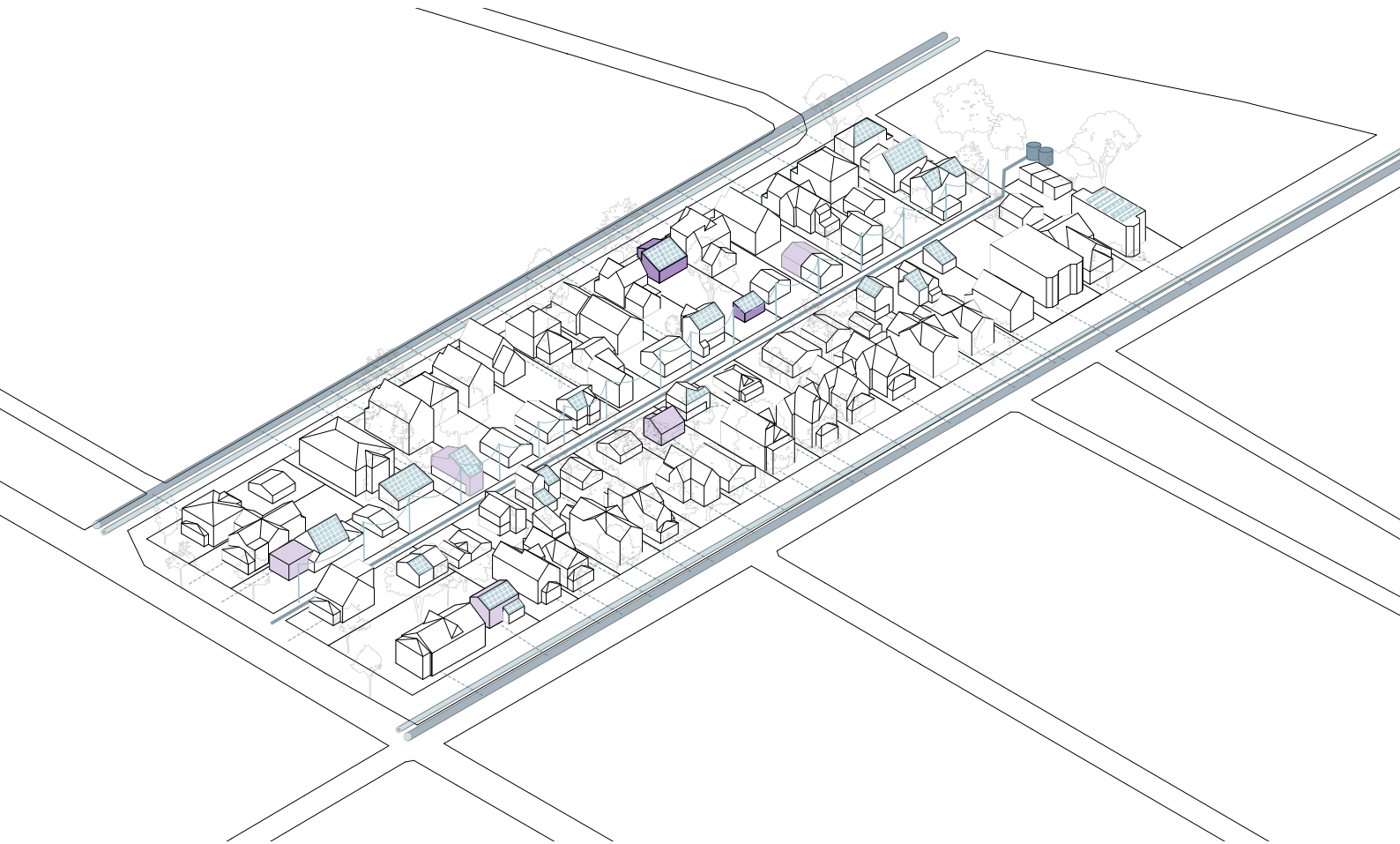
**CARPORTS/COVERED PARKING**



**BUILDING ABOVE GARAGES**

# Performance Analysis: Response to Goals and Project Emphasis

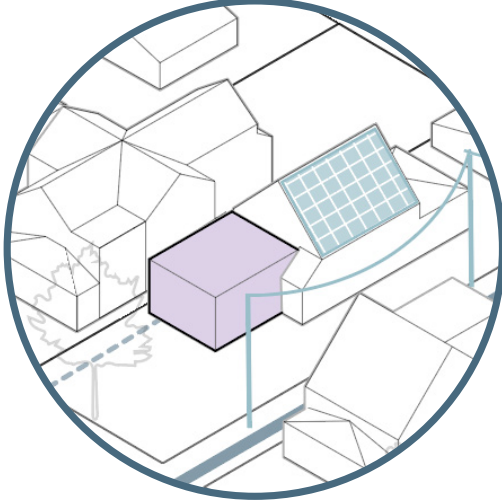
## COMMUNITY/CITY SYSTEMS



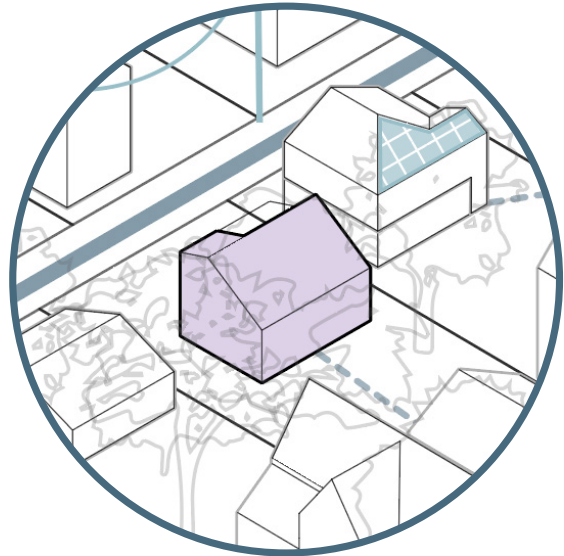
By legalizing small scale commercial spaces, this plan would allow for a variety of uses on the backside of lots. These uses would be particularly geared towards small business owners who live on the lot. These model would help lower the initial investment to owning a business and reduce the financial risk.



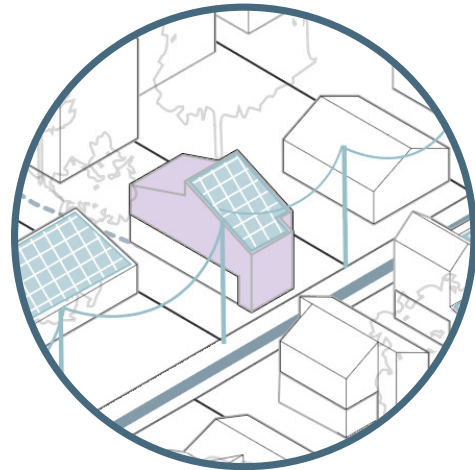
**LOCAL SHOP**



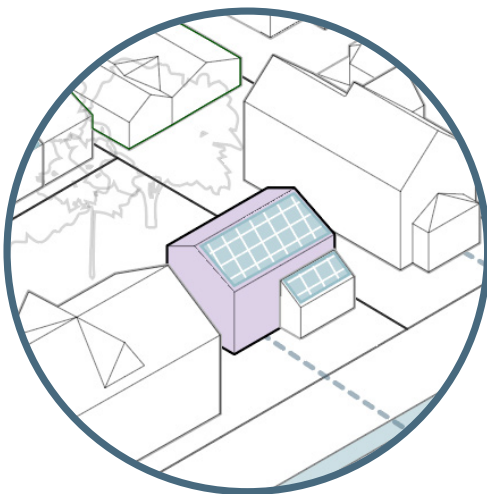
**DAYCARE**



**OFFICE/WORK SPACE**

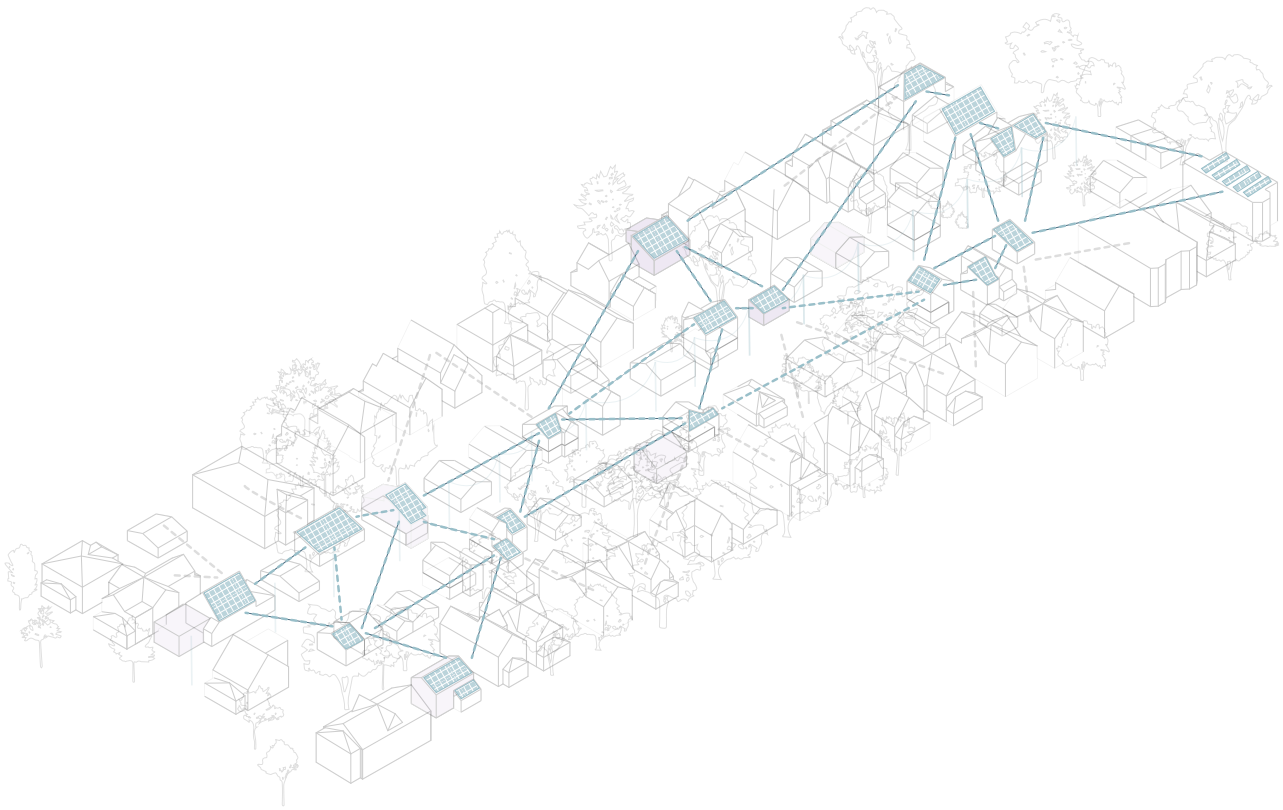


**COMMERCIAL WORKSHOP**



# Performance Analysis: Response to Goals and Project Emphasis

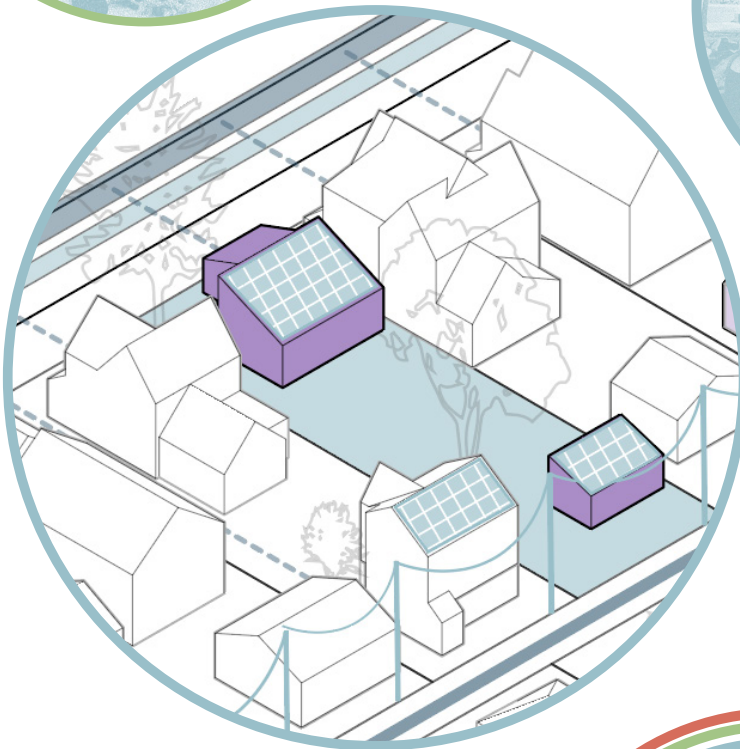
## SOLAR ENERGY NETWORK



The solar network helps stabilize the cities energy by first reducing the load on the system as well as offering a backup system that can offer emergency power when the main system fails.

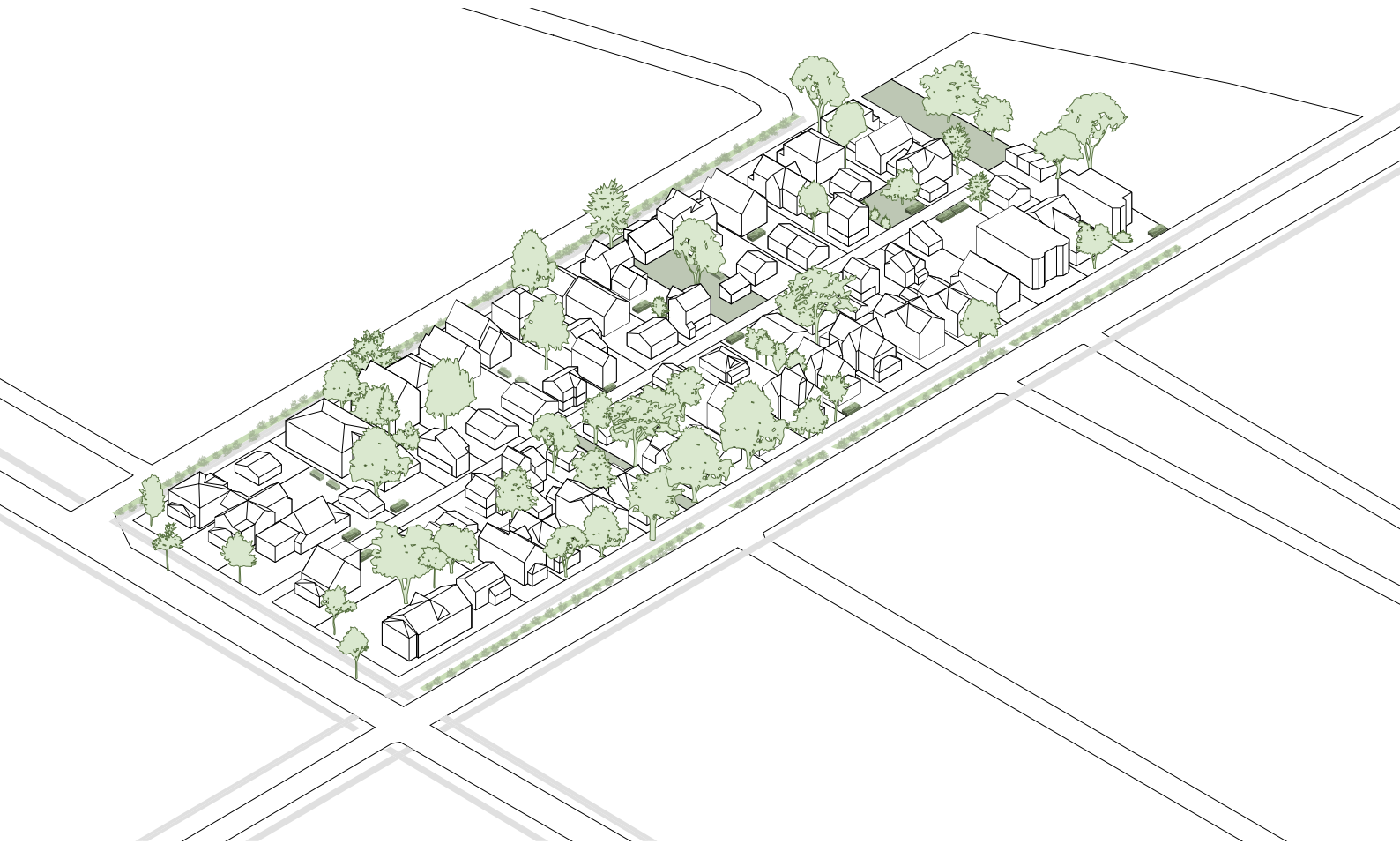


**COMMUNITY RESOURCE CENTER**  
*WORKSHOP*  
*GATHERING SPACE*  
*RECYCLING HUB*  
*GARDENING RESOURCES*



# Performance Analysis: Response to Goals and Project Emphasis

## GREEN SPACE/COMMUNITY HEALTH







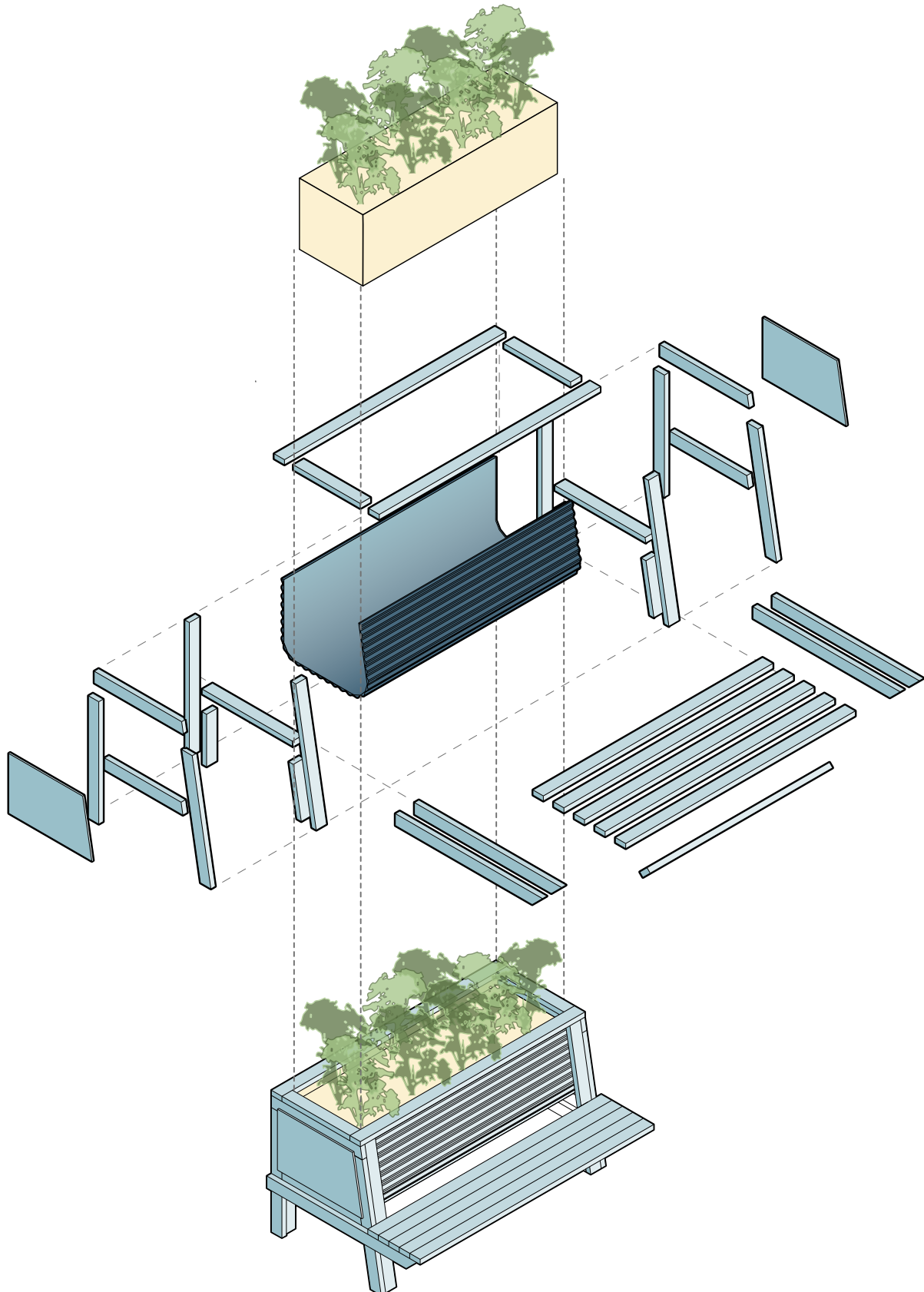
**RAISED PLANTERS**  
(Made from recycled resources)



**CURBSIDE GARDENING**

# Performance Analysis: Response to Goals and Project Emphasis

## RAISED PLANTER + BENCH





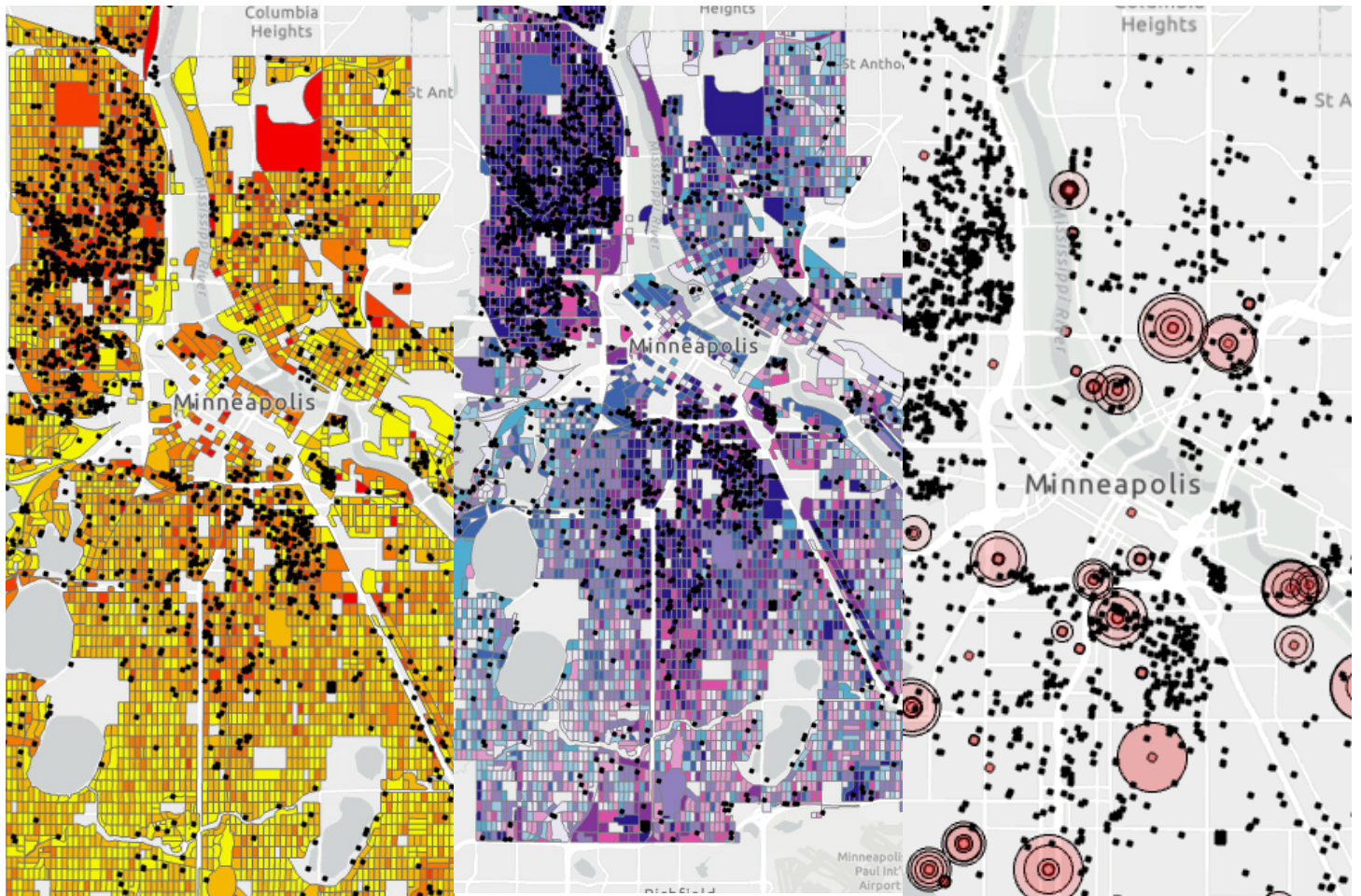


The design uses many of the recycled materials from structures on the block. It is designed to be made with the tools from the community resource center and the gardening can be maintained through these resources as well.



# Critique of applied research methods used in the thesis project

## ARC GIS Data Mapping



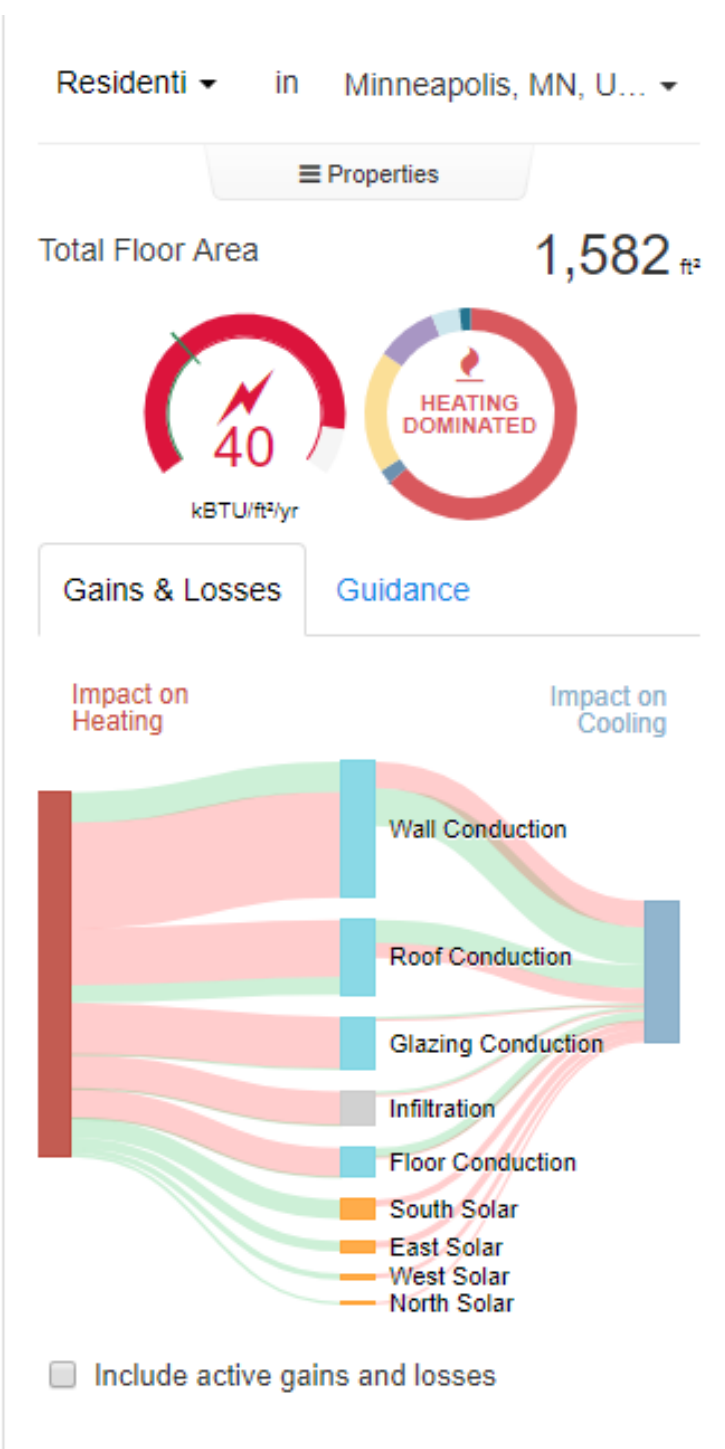
Through the research process of this thesis, I used arc GIS to map many different factors affecting the city of Minneapolis. this helped in understanding complexity and multiple layers of my thesis problem. while this tool had a steep learning curve it was very useful, and I ended up enjoying using it quite a lot. I use this tool in conjunction with open-source data from the city of Minneapolis as well as Hennepin County to examine things like land value, demographics and change over time.

AHU Design Airflow ▾ Cooling Equipment ... ▾ EUI ▾ Annual Energy Cost ▾

	Baseline Concept 1,643 ft <sup>2</sup>	HVAC System Type PTHP / Split System (System 2) ▾	116 (cfm)	2.1 ton	34 kBTU/ft <sup>2</sup> /yr	\$1,265
	Clone Del Export Idf					
	Enhanced Envelope	PTHP / Split System	116 0%	1.9 9%	19 44%	\$818 35%
	Enhanced Envelope + Spa...	PTHP / Split System	87 25%	1.7 19%	15 55%	\$642 49%
	Enhanced Envelope + Spa...	PTHP / Split System	87 25%	1.7 19%	8 76%	\$345 72%
	Clone of Enhanced Envelo...	PTHP / Split System	87 25%	1.7 19%	-8 76%	\$0 100%

## Sefaira Energy Modeling

Another key part of my research was the use of Sefaira energy modeling which helped me take simplistic 3D spatial models and simulate energy use and efficiency based on a variety of different factors. this allowed me to make early design decisions such as massing and orientation to make my building more energy efficient before it was fully designed. This tool was fundamental as a development tool straight from the beginning of my design. this tool allowed a simple path to net zero energy use in my building. This tool also had daylighting analysis that I used to influence my shading devices and daylighting design.





# APPENDIX

## REFERENCE LIST

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Workshop AD. (2015). Colman Triplex. Retrieved October 8, 2020, from <http://workshopad.com/coleman-triplex>