

An aerial, top-down view of a parking lot. The ground is paved and marked with a grid of yellow diagonal lines. Numerous cars of various colors (white, black, red, blue, silver) are parked in the spaces. A single street lamp stands in the upper-middle section of the image. The overall scene is orderly and represents a traditional surface parking lot.

BEYOND SURFACE PARKING

Tactical Urbanism as a Path to Urban Transformation

Dakota B. Campbell

Beyond Surface Parking
Tactical Urbanism as a Path to Urban Transformation

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Abstract:

Using the post-positivist and perceptual frameworks, this thesis aims to confront the cumulative issues derived from surface parking on the American cityscape. These issues include water, air, and ground pollution, lack of spatial quality, poor use of space in urban areas, and improper compliance with policies surrounding surface materials, upkeep, and greenery.

Through the use of tactical urbanism, by which low cost scalable interventions are used to instigate change, this thesis aims to create new and flexible uses of surface parking lots in a way that activates them beyond the current use of storing cars. Within this study the use of four major components to dissect and address the problem allows for a multi-faceted approach to design and planning. These components include space use, environmental sustainability, public policy, and spatial quality.

This study uses the city of Detroit as an example to define a flexible framework that can be used across the entirety of the United States to combat the negative effects of surface parking. Currently, the city of Detroit's downtown is made up of 40% surface parking, and little action has been taken to address the issue at any scale. Through the use of historic and present mapping as a way to visualize change and development of parking, direct observation to document present conditions, case studies of previous parking reformation and replacement, and environmental data used to track the impact of surface parking on cities, a comprehensive understanding of parking and its impacts has been found.

The outcomes of this thesis are twofold: first, to provide a framework for addressing the negative impacts of surface parking in American cities, and second, to promote sustainable and livable urban spaces. However, this study acknowledges that there are other contributing factors, such as mobility, mass transit accessibility, and walkability, which exist alongside parking overabundance as symptoms of one another. Therefore, by utilizing Detroit as a case study, this thesis demonstrates the practicality of the framework in a real-world setting. By adapting the framework to local conditions, cities across the United States can use the framework to improve the quality of life for millions of Americans living in cities with a high concentration of surface parking all while improving the overall urban condition.

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Thesis Statement:

Working within the post-positivist and perceptual frameworks, this thesis aims to study the current overabundance of surface parking in the American city and its impact on everyday life. The main subject being studied is Detroit, Michigan, and will use Detroit as an example for future planning and development of cities in a way that is less disruptive to the streetscape and urban form.

The American obsession with cars has driven the design of cities since cars were widely implemented as a mode of travel, meaning that design has shifted away from the human scale and human needs, and has created a utopia for cars that breaks up urban areas and can make them entirely inaccessible without ownership or access to a car. The human scale when related to design is focused on the idea that a space is designed to feel welcoming to humans due to its sizing of elements and amenities that accompany the space. This obsession with cars also allowed the United States to own half of the world's cars starting in 1950 and continuing today as per studies done by Donald Shoup, which puts major stress on cities trying to house and store these cars (Shoup, 13). Many cities across the United States have succumbed to the plague of parking, but the way parking has been changed over time is what has differentiated each city. There are four main concerns brought to light by surface parking when working within the confines of high-density population areas. One, environmental impact, can ruin the quality of soil, air, and water in urban areas. Space use conditions change drastically between high-rise buildings and on-grade parking lots, which not only impacts the streetscape of cities, but also creates voids of space that are not meant to be inhabited by humans. Parking policy has drastically impacted the way that other policies including transit and public design are written. Some cities have not seen major parking policy changes over the last fifty years. Lack of flexibility in use, the way that people interact with parking lots is one-dimensional, solely relying on the use of a car to enter the space, which creates the phenomenon known as 'human alienation' and deters people

from using the space. Human alienation being the idea that humans are not the focus within a space when it is being designed, and are actively pushed away from using a space. Each of these concerns will guide this thesis process moving forward and will inform future development strategies for designers working with urban areas.

With the use of the following research questions, this thesis will aim to better understand the phenomenon of parking growth and density in the American city. Each question has connections to the four main concerns and aims to help in learning more on the topic and current situation surrounding parking:

What are the social, economic, and environmental 'costs' of surface parking?

How will current parking conditions be able to address any future influx of cars into cities?

Can parking policy be adjusted, or must it be entirely replaced?

Are current 'greening' requirements enough to combat the environmental impact?

Can parking be used in a way that combats negative environmental impact from other sources?

Surface parking has major detrimental effects on the built environment, and worsens the connection that people have within urban spaces. The implementation of surface parking lots breaks up urban spaces and creates void spaces within the urban fabric that not only lack visual quality, but are also designed out-of-scale for human use. It will be important to redevelop parking in cities like Detroit to allow for future growth. The current use for large surface parking lots does not suffice when developing cities aim to grow and bring in more people. Their use is solely based on storing cars and that is it. As time moves on, changes must be made that move away from the current. This will only further harm cities, and without change normal development will surely lead to the further expansion of parking and parking minimums. The act of human alienation will only further grow, and cities will become less built for people and will be more focused on cars than they are now. This study will lead to small scale redevelopment of parking lots to better benefit communities they serve.

Beginning with research and analysis of parking situations and car ownership in different American cities, and how they are used has led to different studies that further developed into a historic study of cars and parking lots in cities. Historic figure ground studies of Detroit, MI, Allentown, PA, and Indianapolis, IN have created a better understanding of how parking has developed. This study then led to tours of both Detroit and New York City where photographs were taken to show the lack of spatial qualities in these two cities. Studying them together allowed for comparison between the two highly different cities. Environmental impact reports then helped to gather information on how harsh the impacts on cities truly are. The significant issues stemming from rainwater runoff, urban heat island creation, and collection of exhaust fumes. These studies have led to individual studies of Detroit neighborhoods including Milwaukee Junction and Midtown. These included a thorough urban analysis looking at parking, building use, parks, and transit accessibility. These steps have led to the final idea of using a multi-step plan to implement parking reform and changes in use to better develop the city.

When focusing on parking as the main issue causing car dependence within cities there are many other aspects that affect this. Parking dependency is a symptom of these other aspects, but these aspects are also a symptom of parking. Included within this are mass transit accessibility, walkability, and accessibility. Each symptom must be solved in some way to address the others. Focusing on parking will only solve part of the problem at hand, and to combat the overall issue each must be addressed separately. This thesis focuses on parking because of its impact on the way cities are planned, and how parking lots truly take up space within the urban fabric, but are not capable of supporting other uses intrinsically.

Although parking is a symptom of other issues, the focus on it is important because of the holistic impact it has on the built environment and the natural environment surrounding it. When there is

more space to build and develop a city, then other issues of walkability and transit access can be directly addressed within these spaces and better connect the communities that they serve. This also can lead to the rethinking of outdoor spaces within cities to allow for more connectedness between those who inhabit the city. Working with parking does have limitations that stem from the American culture surrounding cars and parking needs, the act of changing cultural norms is a long and strenuous process that will inevitably have pushback, and without other action taken, citizens of Detroit would be upset that there is less parking close to their destination(s), which is a hurdle the city itself will have to deal with if there is planned growth in the near future.

The way cities are planned and developed surrounding parking is important because of the true impact that parking has on the environment surrounding it, the quality of the built environment, and how it is used only for one purpose. This affects everyone who lives within a city, and although currently they may not notice the lack of quality spaces, a drastic change that allows for more public space, businesses, and community amenities will show just how poorly handled development and parking has been handled in the city of Detroit.



Figure 1.1 - An Excess of Parking; Source: Author

The 21st Century Parking Problem:

As mundane as parking may seem, it is a major part of our every day lives. One way or another, most people within the United States interact with parking multiple times a day. This can be in the simple way of passing through a parking lot on your walk to work, or while driving to any destination, no matter what you'll need a parking space.

Vehicle ownership rates have continued to grow across the globe, creating congestion and growing need for parking. In a study done by Donald Shoup in 2006, the end of the 21st century is projected to see a rise in private vehicle ownership worldwide up to a number nearing 5.5 billion.

A consistent growth in car ownership will only increase the need for parking. A car needs a place for it to be parked, whether it's at home, at work, or for leisure purposes around town. This not only places additional stress on roadways, but also on densely populated areas: specifically cities.

This accumulation of parked cars is a direct result of lack of reliable access to mass transit, lack of accessibility through other modes of transportation, and lack of walkability. These deficiencies in turn create a focus or absolute need for cars, and a city without the infrastructure to prevent this will succumb to parking in one way or another. Within this, a study by H. Ibrahim in Cairo, Egypt showed how parking had taken over the very finite space within the city, and hindered the future development process.

The American solution to parking has been conducted in a way that has only made the problem worse. Increased amounts of parking lots, raising parking minimums, and placing additional focus on the automobile as the main form of transportation for over a century.

This problem has culminated into a situation that requires changes to be made to prevent an entire collapse of the American city.

The American Tradition:

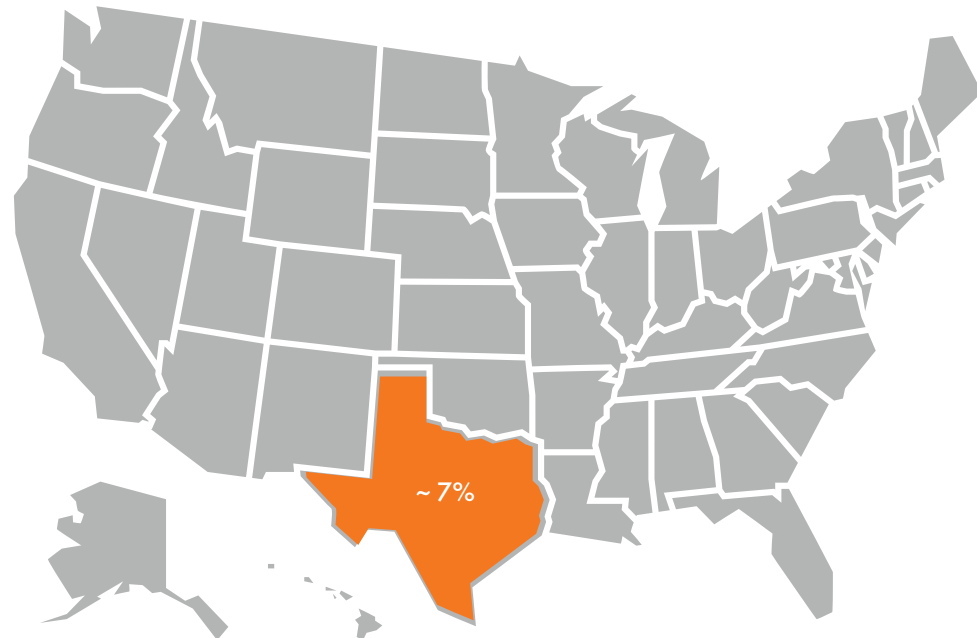


Figure 1.2 - American Parking Coverage; Source: Author

PARKING LOTS TAKE UP APPROXIMATELY 7% OF THE OVERALL LAND AREA OF THE USA, WHICH IS EQUAL TO THE ENTIRE LAND AREA OF TEXAS.



Figure 1.3 - European Parking Coverage

PARKING LOTS TAKE UP APPROXIMATELY 0.59% OF THE OVERALL LAND AREA OF EUROPE, WHICH IS EQUAL TO THE ENTIRE LAND AREA OF CROATIA.

The American Problem:

American culture has enamored the automobile since the early 20th century, and ownership of one has been seen as a rite-of-passage as well as a glimpse into the American ideology of freedom. The same culture has been heavily influenced by the auto industry and has had international influence. Professor of Urban Planning Donald Shoup has stated that this American problem is one that the rest of the world is doomed to repeat.

“Coming to grips with the parking problem is essential because the rest of the world is poised to repeat America’s mistakes”
 - Donald Shoup

Approximately 7% of the United States total land area is covered by parking in some form. As shown in figure 1.2, the total parking area is equivalent of the land area of Texas. Comparatively and as shown in figure 1.3 the same calculation was done for the entirety of Europe and concluded that 0.59% of Europe’s land area is covered by parking. This was calculated with data from the European Parking Association used with the total land area of Europe.

This comparison shines light onto the sheer size of the problem in the United States.

With the addition of cars into the planning of cities, this called for the creation of parking regulations that would replace previous laws that regulated the control of horses at the turn of the 20th century. Outlined by William Phelps Eno, also known as the ‘Father of Traffic Safety,’ the original regulations for driver safety, parking organization, and traffic control were published and adopted by New York City on 1909. The basis of parking planning was based on the taxi rank found in London at the time and original horse stall organization.

The original plans would create the framework for parking policy for the next one hundred years, and left openings that would be exploited by lawmakers and the auto industry to change the modern city-scape in a way that favored cars and ousted the human scale design of the past. The adoption of parking policy across the nation in the 1920’s started this problem in America and would not only damage the city-scape physically, but environmentally, socially, and economically.

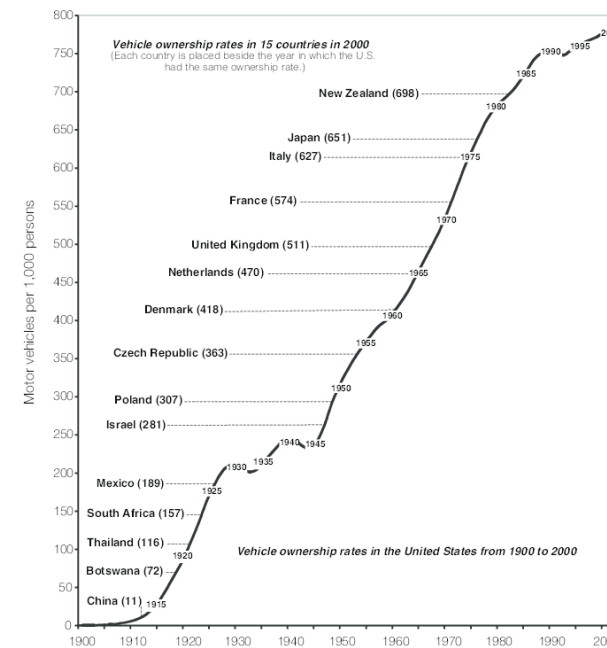


Figure 1.4 - Vehicle Ownership Rates: The United States from 1900 to 2000
 Source: The High Cost of Free Parking

The Real Cost of Parking:

The Social Cost:

Parking lots create a space devoid of life. They serve only as a place to store cars. Humans are essentially alienated from these spaces in a way that not only disrupts the urban fabric of a city, but also does little to foster a place for connection, communication, leisure, and movement. Humans are social creatures who seek relationships with others. Parking lots not only lack any amenities for social interaction, but culturally have been stigmatized as a relatively unsafe place, especially at night (Hamilton).

The thought of being approached in a parking lot late at night would strike fear into an individual. The lack of human life alone makes these spaces uninviting and an empty parking lot does little to support a city besides being an open space filled with concrete or asphalt. Most of the time, surface parking lots lack any life outside of the weeds growing up through the cracks in the pavement. Although, newer policy surrounding parking lot design do require small plantings of trees in islands or surrounding the lot, many older lots do not have to update their design to fit this requirement.

Many modern cities have adopted so-called 'greening' policies, but due to land value surface parking is rarely used unless it is in place of a future development as a way to fund the project. This phenomenon of using surface parking in lieu of building construction is present all over the world, but due to their temporary nature, they usually do not fall within the confines of parking regulations so that seemingly new parking development can still circumvent these attempts to make the spaces nicer for human occupants and to help with onsite drainage and other concerns.

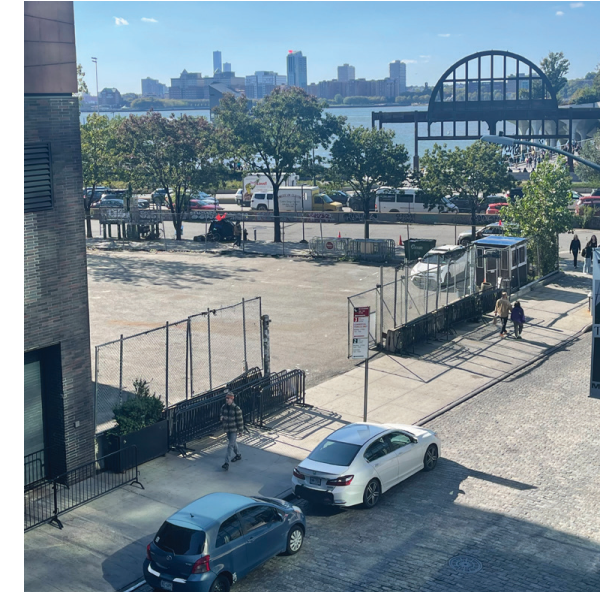


Figure 2.1 - An Empty Lot Surrounded by Parked Cars

Other policies also effect these spaces in ways that the untrained eye may miss. Shown in figure 2.10, the image depicts an empty surface parking lot surrounded by parked cars on the street. Located in New York City, why would a parking lot in such a densely populated urban area remain empty? Why is there no building on a lot that is estimated to be worth 1.5 million dollars by property shark?

Many cities allow air rights to be sold so that buildings above a certain height may be constructed by purchasing neighboring lots' 'air'. This example is a site whose air rights have been sold to such an extent that only a three to four story building would be able to be constructed, which wouldn't be profitable enough, but also would be a 'waste of space' to the city's standards.

Social Connections:

The built environment has a major effect on how humans communicate and form bonds. Certain spaces foster social connections by being inviting and providing pleasant spaces to be in. Although there are more than just physical aspects that affect social interaction, the built environment has an impact on how humans interact within space as well as how they use it. Based on perception of a space, the impact comes from social perception as well as physical aspects like lighting, enclosure, and overall cleanliness.

Parking lots usually surround social spaces, homes, parks, businesses, and other important places for many of us, but they don't have the same effect as a park where people go to relax or spend time in nature. Many lots act in a way that breaks up the urban fabric of a city, but also break up the social impact of a space. When leaving a restaurant with friends you usually say goodbye in the parking lot, but that's usually the extend of your communication in them. There isn't a social connection to parking contrary to what may happen in the case of a park or a bar.

Although there are outliers to this, parking lots are simply a place that cars are stored for humans to navigate out of and on their way to their true destination. A large outlier within this happened during the height of the COVID-19 pandemic, where many businesses and social spaces were shut down, so friends and family would meet in parking lots to socialize face-to-face instead of online. This practice, which did breathe some life into the social aspect of parking has since been discontinued. Parking lots have assumed their original role as a place where humans are not the main focus of the space.



Figure 2.2- Parking Day 2018; Source: ASLA San Diego

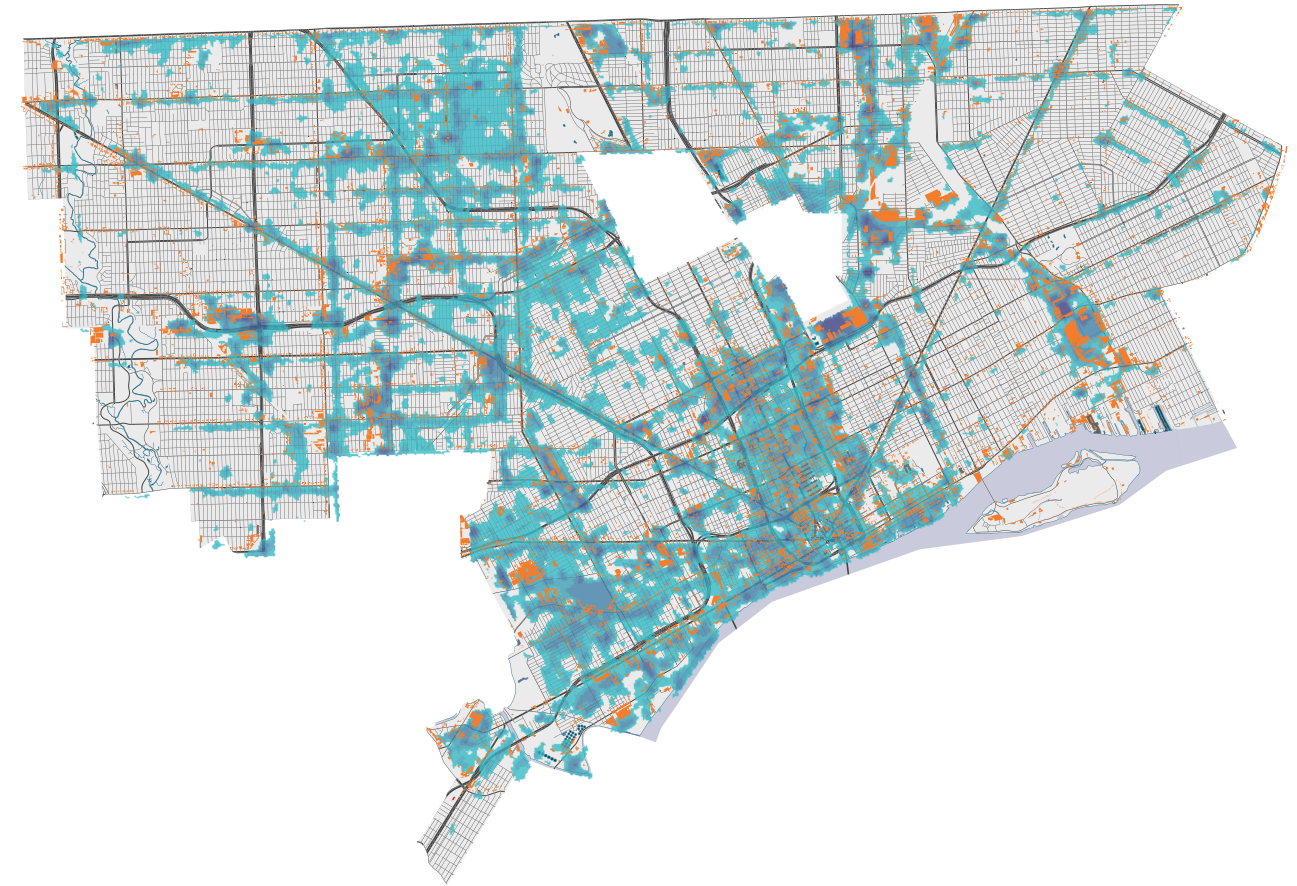
In a world where designers work to create cities for humans, they still haven't been able to break free from the confines of the automobile.

“They paved paradise and put up a parking lot”

- Joni Mitchell - Big Yellow Taxi, 1970

Allowing cars to drive the use of a space makes it hard for humans to inhabit it as the space usually lacks the amenities needed for human leisure or socializing. This is only perpetuated by the continued use and prioritization of surface parking lots that serve a singular purpose and contain no other amenities like small businesses, places to relax, and community assets. This phenomenon acts as a way for people to dislike parking lots, and ignore them when looking for spaces that could be turned into lively gathering spaces that house community events and similar uses that bring a community together.

Figure 2.3 - Parking Map of Detroit Overlaid With Urban Heat Island Mapping; Source: Author



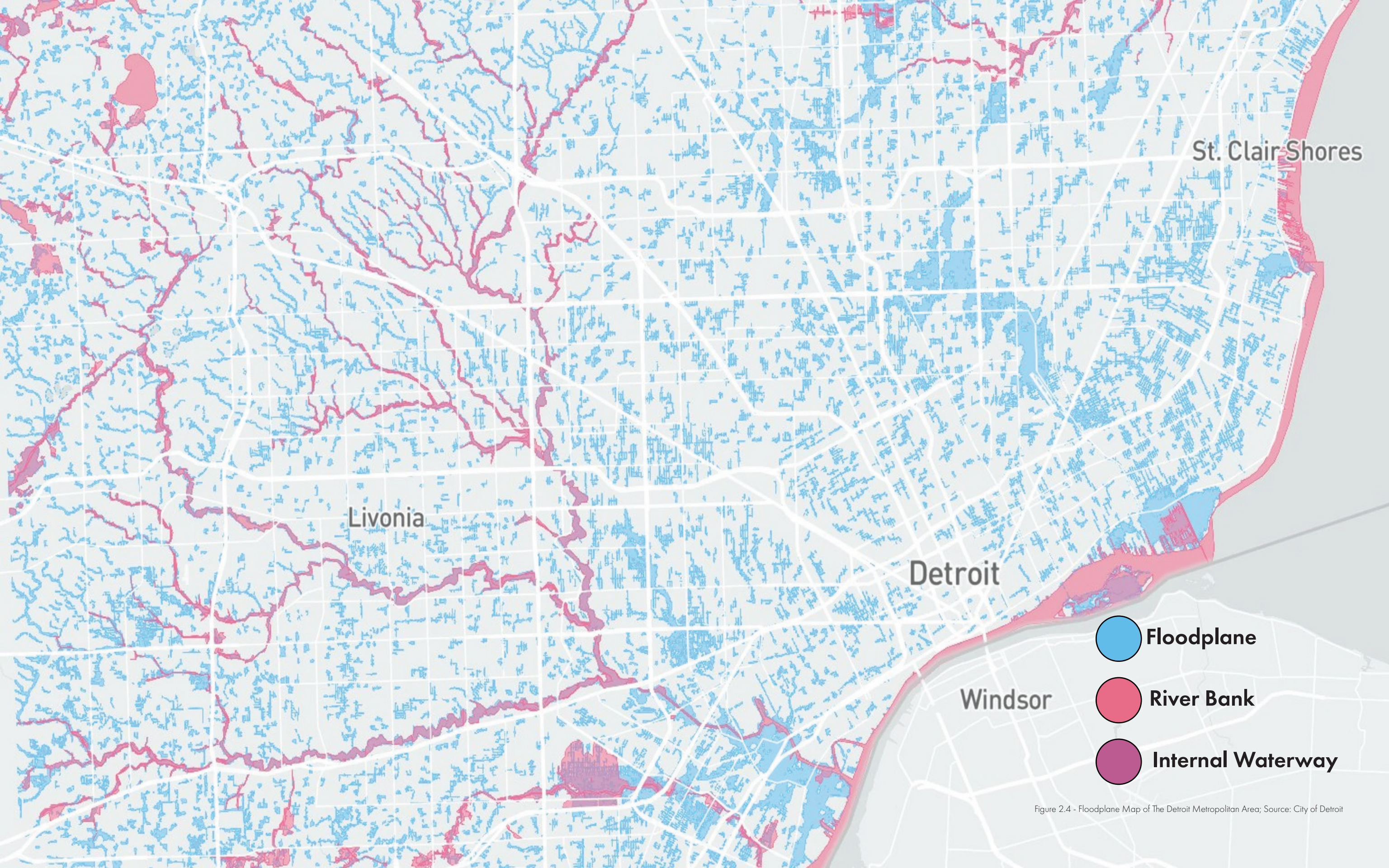
The Environmental Cost:

Surface parking as a whole create multiple environmental impacts that harm the air quality, air temperature, soil, and create excess rainwater runoff. This stems from the poor development of land in a way that includes impermeable surfaces and lack of drainage support.

Urban heat islands are a major aspect of surface parking, and they impact not only the surface of the parking lot, but the air that surrounds it. Large amounts of developed land using mainly asphalt and concrete as the finish surface reflect sunlight and UV radiation into the air, raising air temperatures surrounding parking lots.

This raise in air temperature not only makes it hotter within proximity of the lot, but damages ecosystems surrounding parking lots. The mixture of high temperatures and exhaust fumes create a high density cloud of air above these spaces that collect heat from the sun reflecting surface below that spreads throughout cities, lowering air quality and raising air temperatures.

This lowering quality of air makes cities air harmful to the people who inhabit them. It damages life in the city and changes the climate within the city to unacceptable levels. Heat islands, though not the only negative impact of surface parking, have some of the largest impact against cities.



St. Clair Shores

Livonia

Detroit

Windsor




-  Floodplane
-  River Bank
-  Internal Waterway

Figure 2.4 - Floodplane Map of The Detroit Metropolitan Area; Source: City of Detroit

Rainwater Runoff:

Another side-effect of excess surface parking is an increased amount of rainwater runoff. Rainwater must go somewhere. In most cases it flows into the cities' stormwater management system. In the city of Detroit this system is unable to manage most storms that hit the city. Currently the system is a combined stormwater and sewage drainage system that when overwhelmed dumps excess rainwater and raw sewage into the Detroit river as a way to relieve stress on the system, not only stopping the treatment of water, but also polluting the river with sewage and other pollutants located within the water.

Surface parking when created with impermeable surfaces creates major amounts of runoff, which not only can overload drainage systems, but in the process picks up heavy metals left by car exhaust fumes, rubber from tires, and oil. All of which can be spread to the nearby soils and water sources that surround parking lots and damage the surrounding ecosystems. Runoff also creates a flood risk for nearby homes, businesses, and key infrastructure that will harm the wellbeing of owners and those who have frequent use of the space(s).

Flooding can make traversing cities difficult, especially when there is very little difference in elevation.



Figure 2.5 - Flooding After Heavy Rainfall in Detroit 2022

The lowest areas are much more flood prone than others, making them less desirable to live in when flood control is hampered by poorly developed land.

Overall, rainwater runoff and flooding are major issues that damage the city and environment around them. Making sustainable living harder, and without change will damage cities further leading to even more environmental concerns. Enhancing the stormwater system of a city isn't enough to prevent these issues, and is too costly and time consuming to be effective over time. Shifting the focus onto part of the source, parking, is a start to solving this issue by altering the materials used, allowing for water capture, and changing the way that space is allocated for parking lots.

“Pollution is nothing but the resources we are not harvesting. We allow them to disperse because we’ve been ignorant of their value”

- R. Buckminster Fuller



Figure 2.6 - Flooding After Heavy Rainfall in Detroit 2021



Figure 2.7 - Belle Isle

Soil Contamination:

Alongside water runoff, there are multiple other factors that will leave pollution and debris in parking lots. Car exhaust contains multiple types of heavy metals including Lead, Nickel, Zinc, etc. These metals are washed away in storms and contaminate soils. This not only pollutes the ground, but also damages the plantlife and wildlife. Parks are heavily effected by this, and parking lots within or alongside parks allows for these pollutants to spread throughout them.

Motor oil, coolant, and other fluids used within cars are also spread throughout parking lots that make their way into the soil. Only some plants can live with contaminants like these in the soil and many of the plants used within cities aren't capable of surviving within contaminated soil. This not only harms plants, but also humans as we consume food grown from the contaminated soil

and use the land for leisure activities. Contaminated land harms the environment and the people who inhabit it.

The largest environmental impact on human lives comes from this contamination of the world, and not only affects humans but also the flora and fauna of a city.



Figure 2.8 - Nature Shared With Cars; Source: Author

Air Pollution:

With a large grouping of cars in one small area there are other effects caused by this concentration. One of them that effects much of the surrounding area is the air pollution created from vehicle exhaust. Laden with chemicals and metals there is a lowering of air quality, a collection of greenhouse gasses in the form of toxic carbon, and creates a heavy cloud that aids in the creation of heat islands.

Air pollution is not only harmful to humans, but the entire environment around it. This collection of polluted air creates smog clouds that harm the light quality in densely populated spaces where daylight availability is already at a minimum, it aids in raising temperatures as the gas collects solar energy and magnifies its effect on the ground, and this polluted air can be harmful to humans through inhalation. The inhalation of smog from exhaust fumes can lead to different health conditions like asthma and other breathing issues that would come from smoking or weak lungs.



Figure 2.9 - Smog in Delhi, India
Source: ABC27

Parking lots aren't the only contributor to this issue, but the localized concentration of exhaust fumes can create issues for smaller areas like parking lots. This allows this phenomenon to occur in less dense cities as well.

“There’s so much pollution in the air now that if it weren’t for our lungs there’d be no place to put it all”

- Robert Orben, 1927

Air pollution as a whole has a large negative effect on life, but the addition of privately owned personal producers of air pollution and the current American dependence on them only aids in the already growing issue.

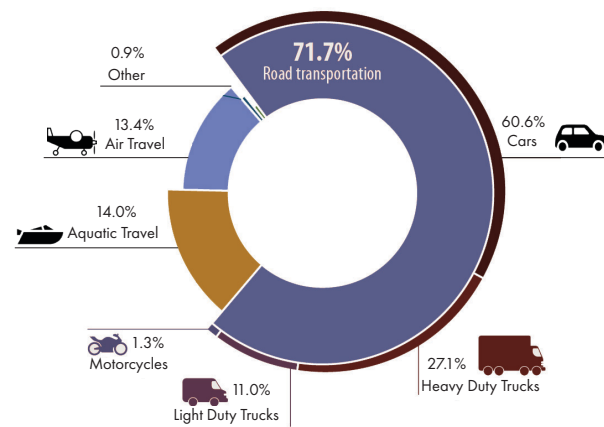
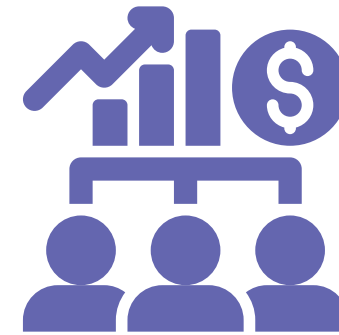


Figure 2.10 - CO2 Emission by Transportation Type

Currently in the United States, road transportation vehicles produce 71.7% of all carbon-dioxide emissions, and within this personal cars produce 60.6%. Although this number has been falling with the introduction of electric vehicles, it hasn't been enough to significantly alter carbon emissions, and electric vehicle manufacturing has a whole other aspect to it that has a similar if not larger impact on the environment.

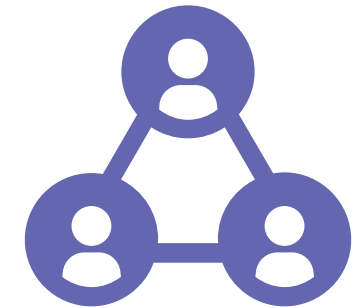
Socioeconomic Factors:



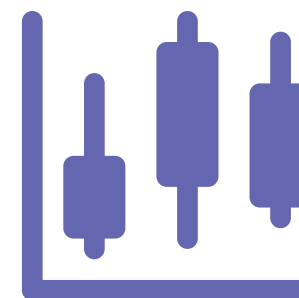
- Parking is a void between urban spaces
- Cars are valued above humans
- Very little time is spent in parking lots
- Cost varies and follows demand

- Parking lacks social conductors
- People converse outside of parking lots
- Cultural norms make parking lots seem scary
- Lacks human focused amenities

Social Aspects:



Economic Impact:



- Cheap to develop compared to buildings
- Turns profits quickly
- Different tax codes and regulations
- Uses valuable land for ground level parking

Figure 2.11 - Illustration of Surface Parking Space Use



THROWN AWAY

VACANT

DESOLATE

VOID

UNOCCUPIED

DECAY

AMBITION

HOPE

Detroit, MI As An Example:

So Why Detroit:

Also known as the motor city or Motown, Detroit, Michigan is home to the three largest American automobile manufacturers, which as a whole have prompted shaping of the city around cars. In comparison to most American cities, Detroit ranks the highest in downtown district parking coverage percentage and still is the heart of the American automobile industry even after much of the manufacturing has left the city. Currently, Downtown Detroit is made up of 40% surface parking. This includes all developed and undeveloped land within the district. Compared to other cities across the United States this trumps their percentages by a minimum of 10%, and the city of Detroit is seen as the worst example of parking planning in the country, which according to Angie Schmitt from Streetsblog USA says that it is the best example to learn from for future city planning.

The city itself has been shaped by auto-industry influence on parking policy for the past century. Over this time Ford, GM, and Chrysler have had a major influence on the drafting of policy to put a larger focus on cars.

“From an urbanist’s standpoint, the forces at work in Downtown Detroit have historically conspired to produce bad outcomes...”

- Francis Grunow, 2020

The convenience of owning your own car has taken precedent over the convenience of reliable transit, v, and accessibility in a majority of the city. Multiple highways cut throughout its’ streets and the only form of mass transit present within the city since the 1960’s is an unreliable bus system that sprawls throughout. Scattered schedules, a lack of bus lanes, and traffic congestion slows down the bus system and cause this unreliability. The lack of available transit options puts a focus on car ownership in and around the city, which makes the need for better transit systems less of a concern for the city.

Past attempts at other mass transit solutions in Detroit have all been removed other than the bus system and the small scale attempts at a modern streetcar and light rail system that have yet to expand past the downtown.

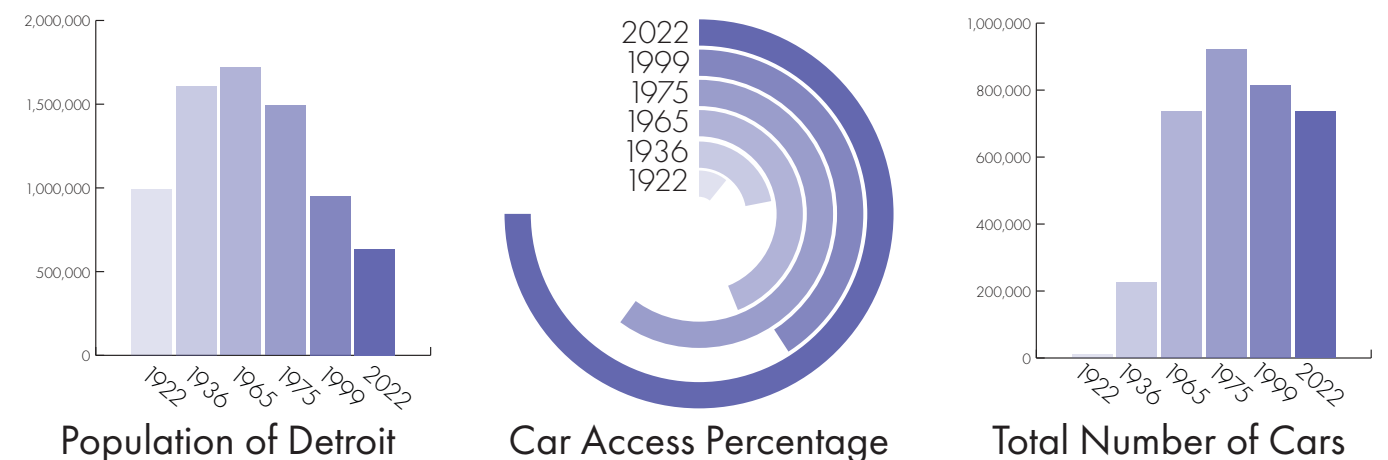


Figure 3.1 - Population, Car Ownership, and Car Data Charts; Source: Author

Parking Conditions in Detroit:

Currently in Detroit, 79% of the population has access to at least one personal vehicle. Connected with the actual population of Detroit this means that nearly half a million people have access to a car. Although these numbers fluctuate yearly, they continue to grow alongside the population as public transit falls further behind demand.

Alongside access to vehicles, the average Detroit household owns 1.59 cars. This number is constantly growing with the lack of access to mass transit options, and according to the Detroit Free Press is set to grow by ~0.15 over the next five years, which will only create more problems for parking availability with an increase in cars.

For a city of its size, Detroit is functionally impossible to traverse without a car, and the bus system hasn't been able to alleviate the congestion caused by commuters from throughout the metropolitan area and being home to four major league sports teams, the city has points of peak demand for parking throughout the week that exceed normal numbers for the area. These peaks have set the tone for parking needs, and the easiest solution for a city as large as Detroit is to build surface parking. In countless studies on parking access, most Americans will only walk upwards of two-hundred feet to their intended destination. This is a historic figure as much as it is a modern one, and would go on to influence parking minimum policies. This partially influenced the demolition of buildings surrounding stadiums in favor of parking to meet this demand. Currently, there are over 800 parking lots spread throughout Downtown Detroit, nearly 150 of which were solely developed to support these sports venues. A majority of the lots are owned by two families, the Illich and the Gilbert families, totaling 58% of total ownership, which also happen to be the families that own the major league sports teams in the city.



Figure 3.2 - Parking Coverage of Downtown Detroit Illustrating 40% of the land area is used for parking

Detroit is also a perfect example for the rest of the country as it tries to re-brand itself in a time of prosperity and growth. Economic development throughout the city, rising median incomes, and a slight decrease in crime rates have the city poised to rebuild. The main limiting factor though will be parking and lack of transit if nothing is changed in the near future. The city is plagued by parking lots in a way that will only suffocate progress made to better the city.

Detroit as a case study will serve in this thesis investigation to create a framework that can be expanded and changed to fit other cities facing similar issues. Current solutions to parking reform have been ineffective, and the history in Detroit and many other American cities have created problems deeply sown in their urban fabric.



Figure 3.3 - Nearly Empty Parking at Midday; Source: Author



Figure 3.4 - Small-Scale Lot Hardly Filled; Source: Author

Shown in figures 3.3 through 3.6, most of these parking lots lack the qualities that make most urban spaces attractive to those who inhabit them, and overall lack connection to much of the surrounding context. This lack of connection is only exemplified when their parking lot is fenced in like these examples.



Figure 3.5 - Fenced and Gated Parking Lot; Source: Author



Figure 3.6 - Parking lot used as Storage; Source: Author

Historic Framework:

Detroit has a long history of working with the auto industry. Currently home to what is known as the 'Big Three' auto manufacturers Ford, Chrysler, and General Motors. These companies each chose Detroit to be their home at the beginning of the 20th century, and have had a major effect on the way the city has developed.

Although only one company headquarters lies within the city of Detroit, all three have had major influence on policy creation, development along the Detroit River, and the layout of the street-scape. A few policy examples include jaywalking, parking minimums, and traffic control, each of which has affected how people interact with the urban fabric of the city. The development of major thoroughfares that extend to the outskirts of the city made traveling by car much easier for the average Detroit resident, and when the auto industry had employed over half of Detroit's population it was easy to incentivize the purchase of a car with discounts and payment programs for employees.

The desertion of Detroit by the auto industry and their factories in the mid 20th century left a gaping hole in the city, which has slowly been repaired, but the lasting effects on policy have yet to be replaced. Alongside this desertion, the public transit had started to fail once every Detroiter had access to a car, which has left its scars on the way that each and every city dweller travels.

The lasting effects of the auto industry have created major road networks, invited the Interstate Highway System, and destroyed communities like Black Bottom and Paradise Valley in the 50's and 60's. The future of Detroit is unclear, but the only way to continue down this path is to dissect the past and find what caused this influx of parking and destruction of historic sites throughout the city in favor of the automobile.

Overall, the city of Detroit has been influenced majorly by industrialization, but was 'left behind' when other cities were developing subway systems, bus lanes, and many other infrastructure changes that support a walkable, accessible, and traversable city. Many different ideas have been introduced at small scale, but ultimately failed. Contrary to this though, the Ford Motor Company has been working to revitalize the Corktown neighborhood into a so-called 'mobility sector' that supplies electric scooters, added bus lanes and routes, and many other amenities that surround the innovations with self-driving vehicles as a way to supplement the community and shift workplaces into a neighborhood with a single commercial corridor to lighten the vehicular load on Downtown Detroit. Although these innovations are only at a developmental phase, they shine some light onto the future of Detroit, which is in stark contrast to the past that has allowed Detroit to develop into a city focused on the automobile in its many different forms.



The Rise of The Auto Industry in Detroit: 1922

At this point in Detroit's history, very few people own cars, the road system has been designed for travel done on horseback or in a horse drawn carriage. The planning at the time was based on two overlaid patterns, a radial pattern starting in Campus Martius, and a grid pattern that isn't based on the Roman style North/South grid found in many other cities worldwide. The planning of the city was entirely reworked after the Great Fire of 1805 when the Woodward Plan was instated as the new framework for the city.

Currently there are approximately 30 small surface parking lots and 12 privately owned garages for the nearly two thousand cars that call the city home. At this time the auto industry that has started mainly in Europe has made its way to the United States, and hundreds of small scale auto manufacturers start to produce cars. Detroit would become home to what would become the world's largest auto manufacturers around this time.

In Detroit by 1922 the auto industry would employ over two hundred thousand of its residents and influenced the purchase of cars by giving employees discounts, payment programs, and other incentives to not only own the car they were working to produce, but also as an advertisement technique.

At this point in time, the city of Detroit would be home to over half of the entire world's auto manufacturing capabilities, which brought record economic growth to the city. Because of this rail lines would sprout up throughout the city and its outskirts to transport cars all over the country, which would also lead to international exports from coastal port cities like New York. This major economic growth would also influence more people to move into the city looking for work over time.

Figure 4.1 - Parking Figure Ground Study of Downtown Detroit 1922

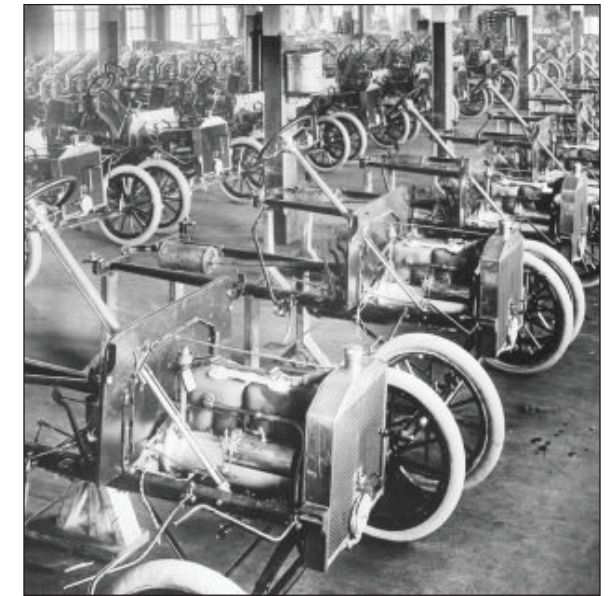


Figure 4.2 - Original Automobile Factory , Source: Ford Motor Company



Figure 4.3 - Ford Motor Company Factory, Circa 1920; Source: PBS



Population Boom in Detroit: 1936

As the auto industry flourished in Detroit, there was a drastic rise in population, manufacturing capabilities, and economic growth which led to the auto industry having a hold on the city entirely. At this point Detroit's population would reach 1.5 million people by 1935 and would continue to rise over the next decade.

This boom in population would bring with it a major rise in the number of automobiles within the city limits. Because of this hundreds of historic buildings were destroyed each year to make way for parking lots and parking decks, changing the usage of Downtown Detroit. As residential buildings were being abandoned and destroyed in favor of parking, many businesses would lose the communities they served, and would either close or be forced to move farther towards the outskirts of the city. By this point in time Detroit was the world's number one auto production city, and would continue on that way for the next two decades bringing along with it higher population and economic growth.

The destruction of many of the buildings Downtown would cause a population shift away from the city center. Neighborhoods would sprout up further and further from the downtown in favor of suburban living where there were less cars and less pollution from factories. Also, people preferred living closer to work, and many factories had been located away from the city center so as to not disrupt life there. This shift away from Downtown would also begin the culture of commuting to work, which when nearly every family in Detroit owning at least one car was the easiest solution when you lived far away from work.

Figure 4.4 - Parking Figure Ground Study of Downtown Detroit 1936

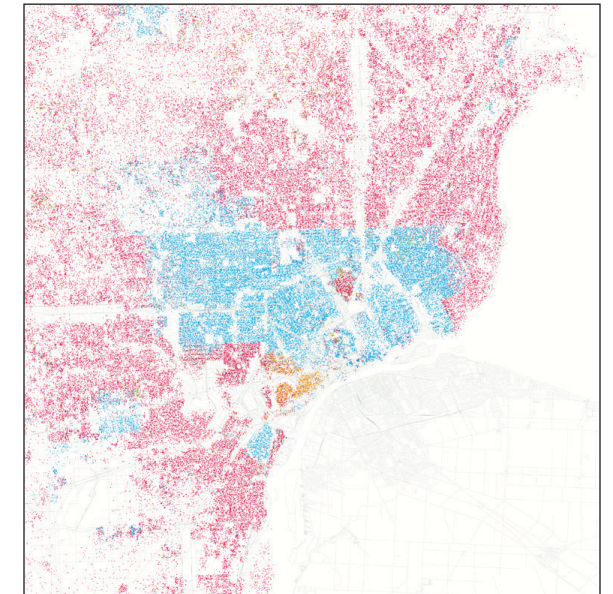
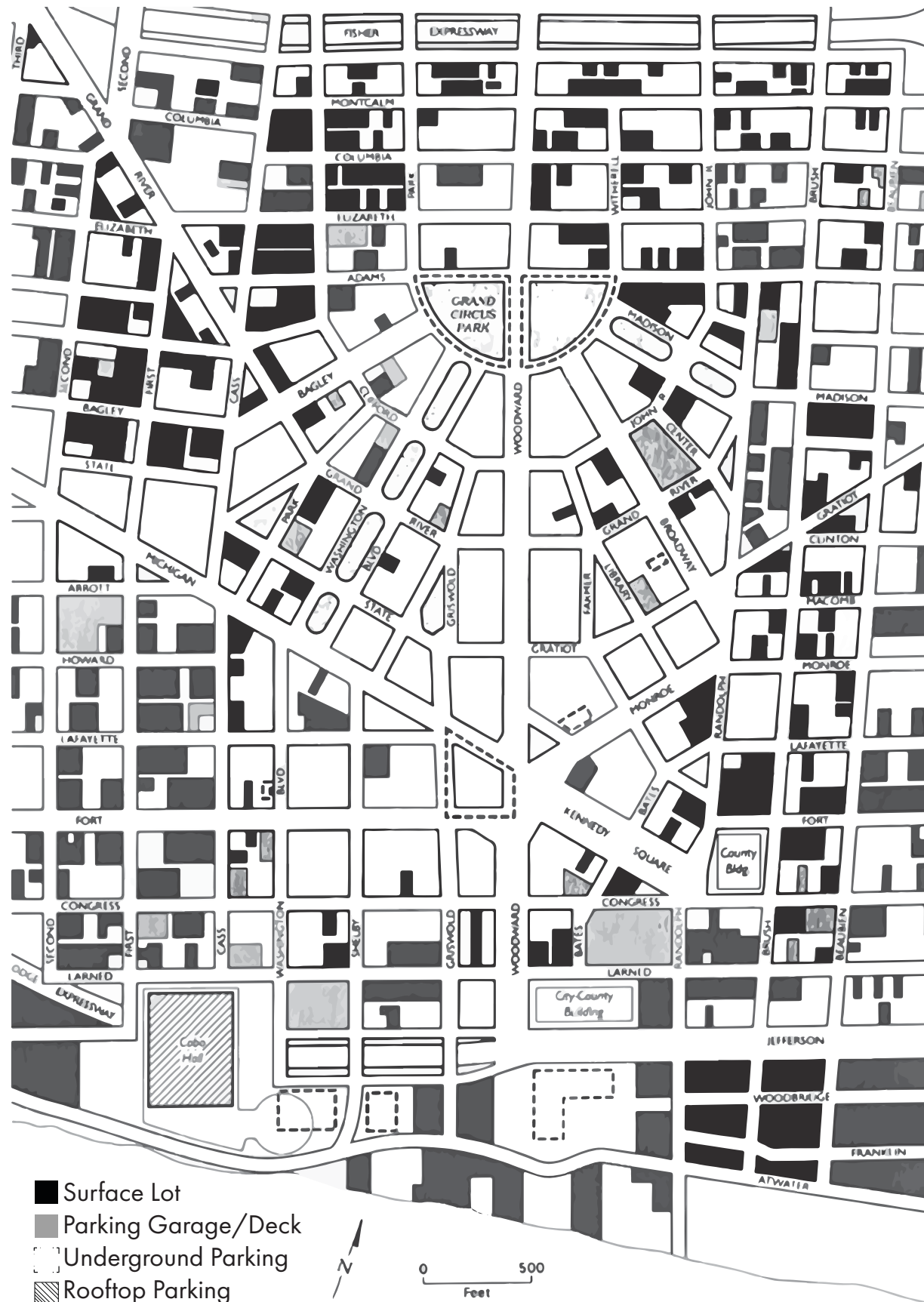


Figure 4.5 - Detroit Population by Race , Source: The New York Times



Figure 4.6 - Dense Detroit; Source: Transit Maps



The Fall of The Auto Industry: 1965

The 1950's led to a major shift in the location of auto manufacturing, which would cause many factories to leave the city in favor of coastally located modernized factories. Some of which would only move fifty to one hundred miles away, but others moving over five hundred miles to the east coast or thousands of miles towards the west coast. These new factories had larger spaces for more production and would attract people away from Detroit.

Without the majority of the world's auto manufacturing capabilities, Detroit saw a huge change in the way its people lived. Cost of living within the city skyrocketed without the industrial influence and forced many people out of the Downtown area or even entirely out of the city.

This shift in population would leave many buildings vacant Downtown, which leads to their demolition. Hundreds of buildings, some of which were less than ten years old at the time would succumb to the parking plague that had infested Detroit. This is a notable point in the city's history as it signified the end of the auto industry behemoth that was Detroit for over 40 years at this point.

The loss of population and economic influence from cars also left its mark on the transit options for Detroiters. Streetcars and other light rail options would be dismantled around this time in favor of commuting by car to work. This raises the need for parking throughout the city and entire blocks within the city would now be used to hold cars for some of the larger buildings Downtown.

Figure 4.7 - Parking Figure Ground Study of Downtown Detroit 1965

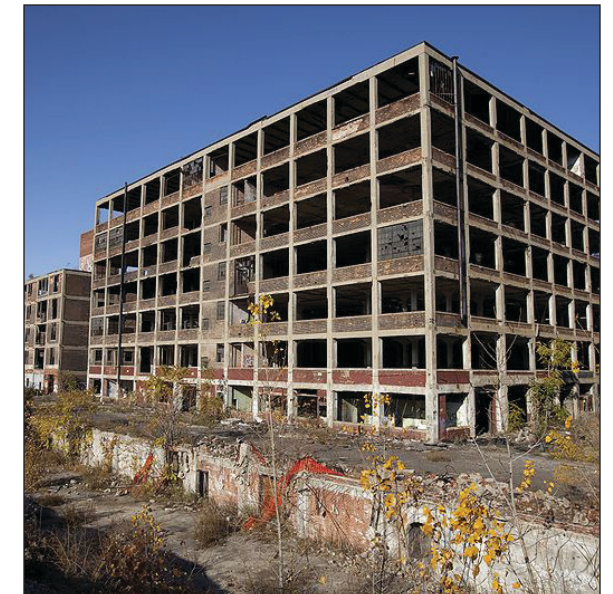
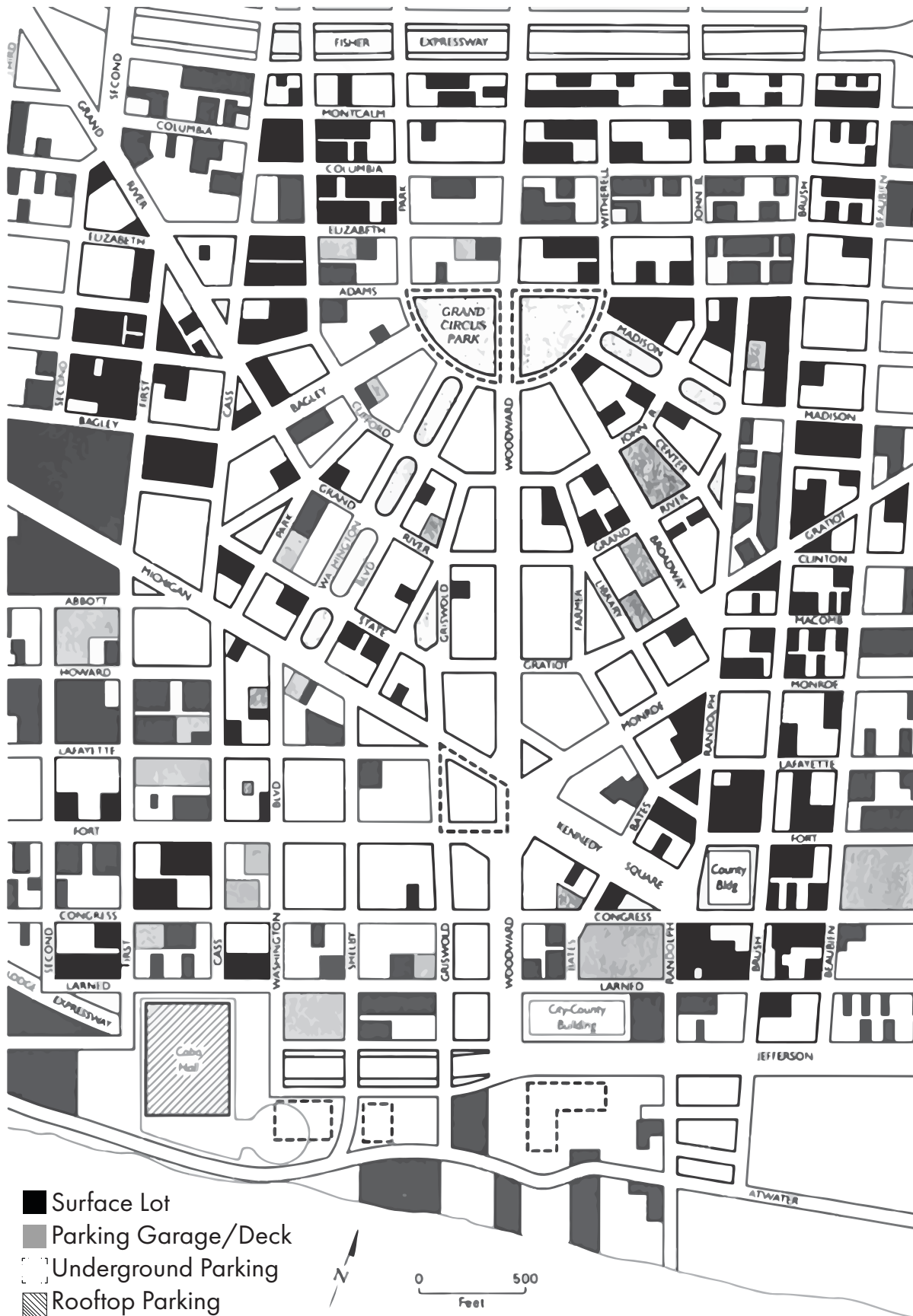


Figure 4.8 - Car Factory in Disrepair, Source: Author



Figure 4.9 - Motor City's Woes; Source: NBC News



The Detroit Exodus: 1975

By 1975, the city of Detroit had lost almost all of its manufacturing capabilities for cars, and lost many of the economic opportunities for individuals within the city. This led to the city losing over 12% of its population escaping recession within the city limits.

Also, around this time is when original parking minimums would be updated within the city limits to include higher amounts of parking for easier access to tourists, commuters, and the average Detroit. This changed the city scape of Detroit as more parking decks and parking garages sprung up to meet these demands. It wouldn't be enough to fully concentrate the cars in Downtown though, because large amounts of business growth and development throughout the city in other sectors besides the auto industry would take over Downtown Detroit. This business growth accompanied by parking minimum changes would lead to more building destruction and their replacement being surface parking lots that are easy to develop after demolition of an existing building.

This demolition would lead to the favoring of privately owned parking. This was seen as a cheap to construct and easy to manage alternative to building construction and development. The profitability of owning the closest parking lot to an event would outweigh the costs of building larger parking decks, or garages underground. Without more building development the city would only accelerate in its spiral downwards to becoming a city of parking lots.

Figure 4.10 - Parking Figure Ground Study of Downtown Detroit 1975

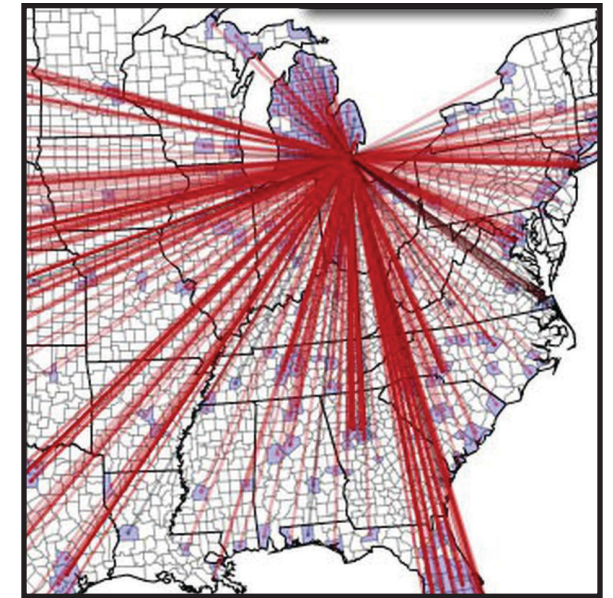
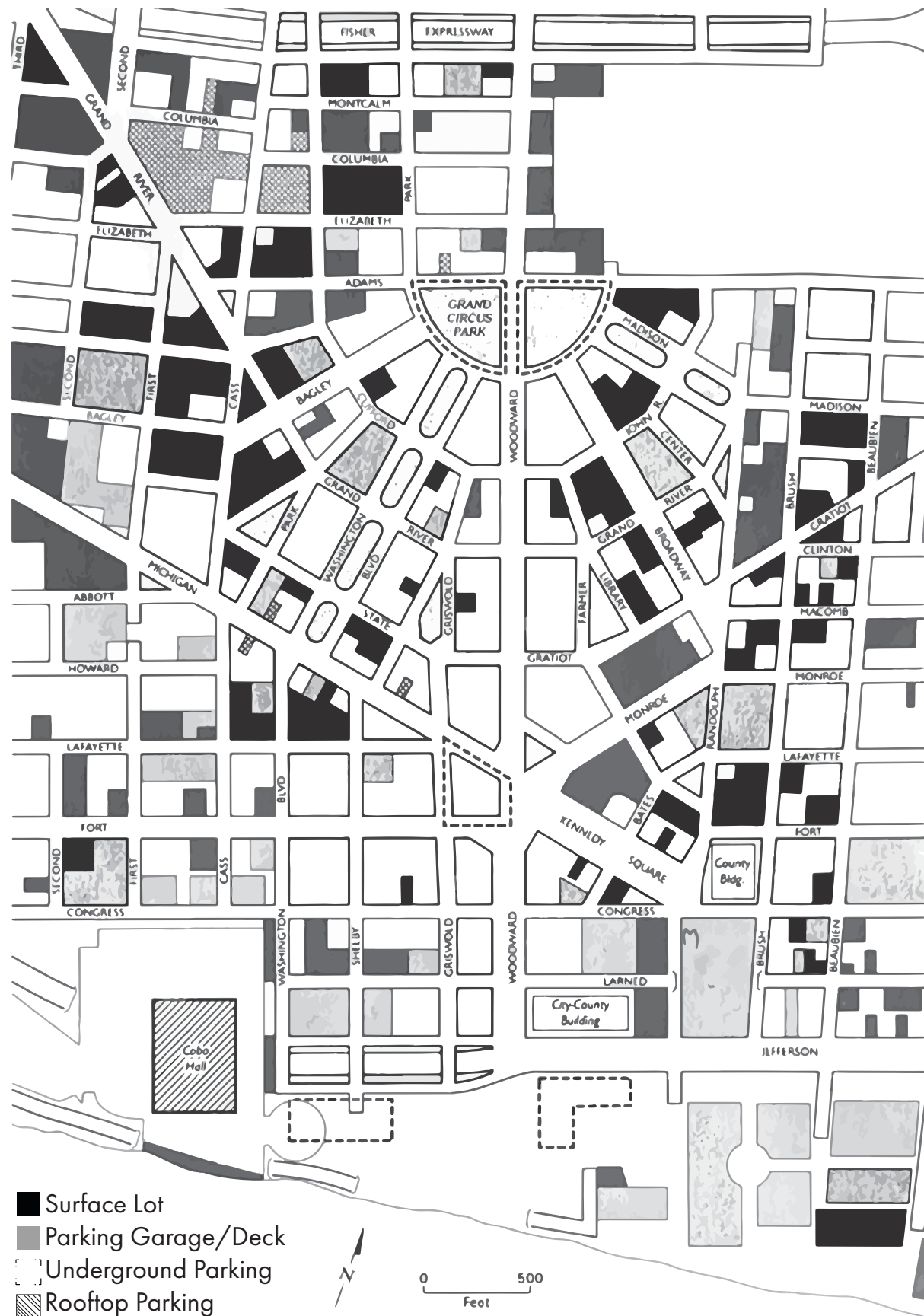


Figure 4.11 - The Detroit Exodus, Source: ArcGIS



The Completion of The Interstate Highway System: 1999

Just before the 21st century had begun, the Interstate Highway System (IHS) would officially be completed. This made interstate travel easy and more efficient, but this wasn't the only benefit to its completion. It made it easier to commute in and out of cities, which only widened the gap between the average Detroiters and their connection to the city. This essentially would shift even more population away from the city center as a way to escape rising rental costs and land value which was being purchased for the development of stadiums, parking lots, and large corporations like the auto manufacturers who had made Detroit an economic powerhouse in the past.

The IHS did have a lot of benefits for travel over long distances, but many cities much like Detroit had included it into their structure in a way that would displace tens of thousands of people from neighborhoods that were majority minority. This forced even more people either entirely out of the city or towards the outskirts where car ownership would be necessary to commute to work.

One beneficial outcome did however help reshape the city. Urban renewal started throughout the city, but the main focus of this is on Downtown and only along the Woodward corridor if it was outside of the city center, which left many of the benefits useless to a majority of the population. This set the stage for urban renewal to expand into different neighborhoods, but other economic issues needed to be solved first.

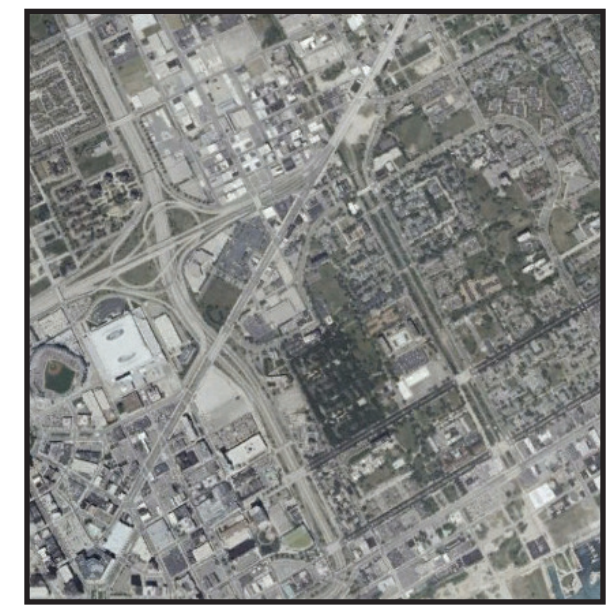


Figure 4.13 - The Interstate Highway System , Source: Hemstreet

Figure 4.12 - Parking Figure Ground Study of Downtown Detroit 1999



Who knows what the future holds

A New Chapter in Detroit's History: 2022

As time moves on, and through many economic downturns, the city of Detroit has had very little change in the way it was developed. Due to the Housing Crash in 2008 development had stopped almost entirely within the city for nearly a decade. This pause would allow for plans to be created for the future of the city, while speculating on the influx of business and a possible renaissance for the city.

Over the last decade, Detroit as the first American city to be acknowledged by the United Nations Educational, Scientific and Cultural Organization (UNESCO) has been awarded the title of "City of Design" which has connected it with 34 other cities around the world. Each, with a focus on placing creative and cultural industries at the heart of their development plans at the local level, while working with other cities internationally to foster the design of a better world. This has opened Detroit's 'rebuilding' phase to the rest of the world and has invited designers of all kinds into the city to assist with development planning and rebuilding efforts.

Other plans that have been created to assist in the redevelopment of Detroit are the Detroit Future City plan and many smaller scale neighborhood development plans that have spawned from the future city. Overall, the city aims to re-brand and redevelop in international markets like technology and innovation in the way we move throughout a city.

Figure 4.14 - Who Knows What The Future Holds for Detroit



Figure 4.15 - Detroit Future City Plan Logo, Source: DFC

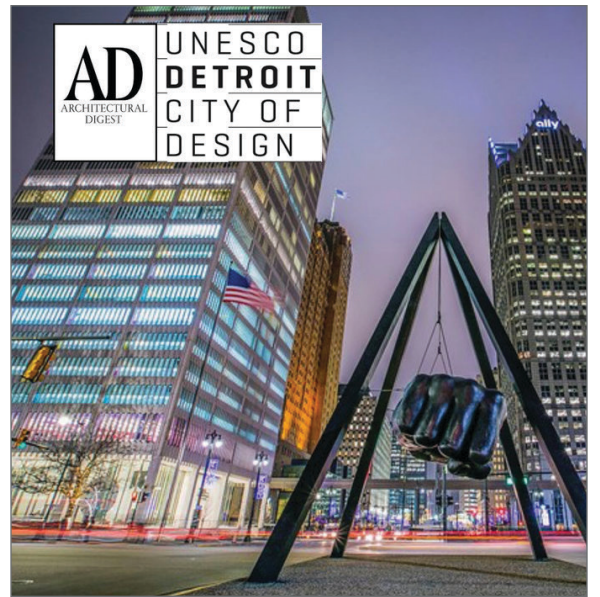


Figure 4.16 - Detroit City of Design, Source: UNESCO

Pieces Of The Solution:

Better Understanding Parking:

Parking as a whole is not a new idea, and has been cemented into the cities we live in for over a century. There have been many attempts at solving this crisis, but in cases involving the addition of parking, which makes up nearly half of solutions across the United States, they have only made it worse. A great example of a 'Cure that Kills' not related to parking is how lead was used as a medicinal agent, and it took centuries to discover that lead poisoning was only making things worse for those with ailments, and took even longer before the use of lead was prohibited altogether. The same goes for parking, with the reformation of parking policy that raised minimum requirements to make cities more accessible for those with cars, but in turn bulldozed large historic portions of the city and made the Downtown area less desirable to live in. The issue would remain relatively unnoticed until nearly 100 years after the spread of parking in many cities.

This problem affects a large majority of urban areas in ways that go unnoticed because of how ingrained parking is into everyday urban experience. While finding a solution that can adapt to the needs of a community, and the people who inhabit the nearby space, many considerations must be made. Starting with the overall makeup of a city and the current needs of a community can set a baseline decision, but needs will change over time in ways that can't be predicted. A flexible solution must be made that can adjust and be reassessed as time goes on as to best help these communities.

This flexible and adaptable base will also allow for the use of this solution in other contexts that require different action to be taken. Basing the overall system on a reassessable baseline is going to create the best overall way to address parking.

First, the implementation of new parking minimum policies that require much less parking and requiring the calculations to be done for each neighborhood or area following the strict principles set forth by the Greater Boston Metropolitan Area Planning Council. These principles use the peak use times of each building or business to determine how much parking is needed by area instead of by individual building.

Next, finding ways to implement better parking construction practices outlined by the Montgomery County Planning Commission in their Sustainable Green Parking Lots Guidebook. This includes several practices that allow for parking lots to better serve their communities while minimally disturbing the environment around them. These guidelines also aim to create community connections in parking lots instead of around them.

Lastly, when finding new uses for parking lots, there needs to be a library of interventions that can be accessed to find the best replacement of each parking lot. A light handed approach to this will best suit many neighborhoods and will allow for future development where needed if it is assessed that a parking lot can be fully replaced.

Typologies of Parking:

Parking can be categorized based on many traits. These include materiality, whether or not it is stacked, the autonomous nature of it, size, and many other factors, but to best categorize parking, there are three main categories that stand out: surface parking, stacked parking, and mechanically stacked parking. Shown in Figure 5.3 are some simplified examples of these types and the number of vehicles they hold compared to their ground area. For the remainder of this study they will be the three main categories being looked at, as the stacked parking deck and surface parking lot are the majority of the parking conditions located in the city of Detroit.

Surface parking as a whole has many external factors that affect how it is designed and how the space is used, but only occupies the surface of the land it's constructed on. Within the city of Detroit there are a mixture of privately owned surface lots and publicly owned surface lots; ownership changes how they are managed, as well as the cost of use.

Stacked parking can be above or below ground. Above ground parking decks take up the surface level of the site, but also expand upwards to hold more cars per square foot than a surface lot. Detroit uses both types and has also incorporated the use of mixed-use design to place businesses on the ground that incorporates it into the continuity of the street-scape.

Mechanically stacked parking comes in many forms, and Detroit currently only has one example, but this uses minimal ground space to hold large numbers of cars, and can be expanded indefinitely.

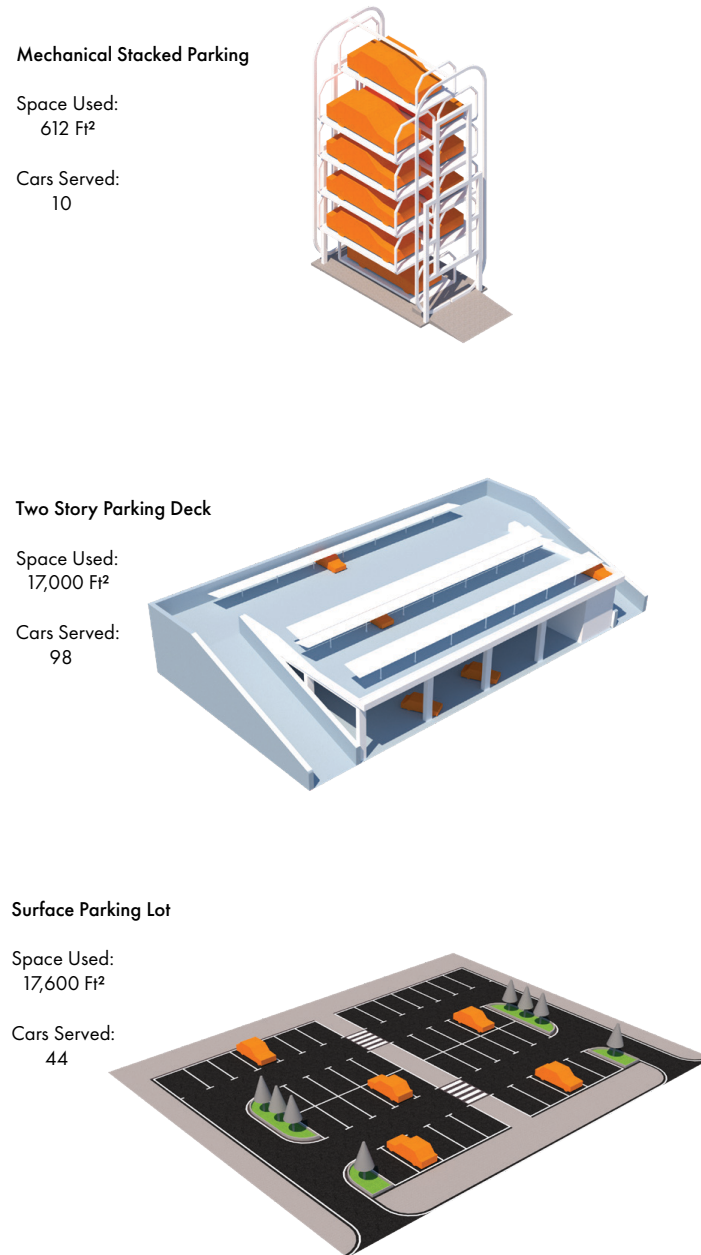


Figure 5.1 - Typologies of Parking Being Studied

Coming to a Solution:

After studying the examples in Detroit, and how the city has changed over time, the current situation is not ideal for the city to further develop and grow. Within this, there are many different factors that must be taken into account when truly finding a solution so a multi-faceted approach must be taken to adequately change the future of the city and many others like it.

Space use is the first facet, and the largest change needed to facilitate better development strategies, and include reorganization of parking and a restructuring of how it connects to the city/street-scape.

Parking policy must also be revised surrounding parking minimums and requirements. There are several ways to go about this. The removal of parking minimums entirely, or at least as a start for new policy to be drafted. A system of Shared parking minimums, which affect how parking is allocated by building type and peak use times may be the best replacement for parking minimums. Shared parking creates certainty of planning, so that there is concrete evidence in the need for certain types of parking. Lastly, incentives for options other than surface parking to encourage other types of parking over the cheapest option.

Flexibility of use will be encouraged so that required surface parking that is underutilized can shift into another use so that the space doesn't sit empty.

Environmental considerations should include rainwater runoff protection, materiality changes, semi or fully permeable surface use, and native plant use to reduce carbon density in the area.

Innovations in the Way We Park:

Currently there are many plans to automate parking and the way that we inhabit parking garages so that they do not interfere with the city and it is simply a place where a car can be dropped off on the outside and stored until it is needed again. Alongside this there are also startups planning to use companies like Uber and Lyft to change the way we employ self-driving vehicles so that a single car could be shared by multiple different individuals on their commutes and drive itself out of the city when not needed to save on space needed for parking.

Although these technologies aren't going to be fully established in the near future, they are a way to design so that spaces can be adapted once they are fully implemented into a city. These considerations can make a shift towards a car sharing or automated culture without needing to entirely rebuild the systems we use today.

Across the country there are many different companies working with fully automated and semi-automated parking systems that use algorithms based on when the owner will return to pick-up their car and rush hour times to store cars in a concise way so that it can be seamlessly interacted with. A company called 'ParkPlus' out of Jersey City, NJ has multiple systems being employed in different ways nationally that store cars underground in place of parking, works with law enforcement so that police precincts can be smaller and require less parking, as well as working for car dealerships as a way to store cars that are for sale on in stacked forms that make it easy to move and access cars for the sale and testing required when working in that field.



Figure 5.2 - ParkPlus Automated Parking System, LA; Source: ParkPlus

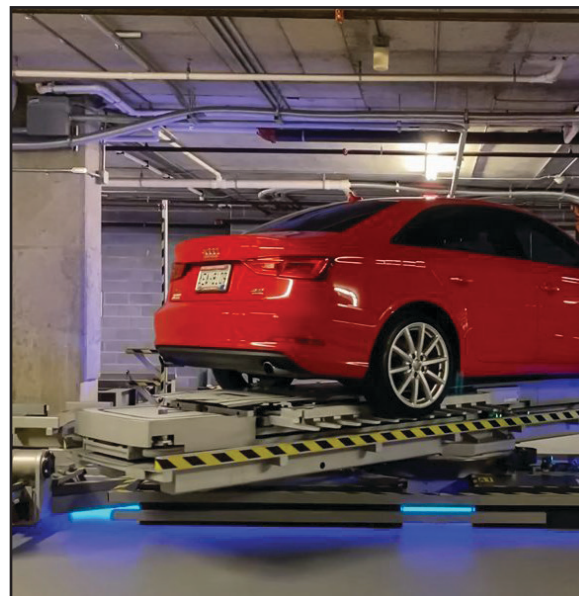


Figure 5.3 - ParkPlus AGV Automated Parking; Source: ParkPlus

An Exploration of Change in Milwaukee Junction, Detroit:

Many neighborhoods throughout Detroit have seen much less development than Downtown. This stems from the lack of funding to redevelop the entire city, but still has a promising outlook for those neighborhoods much further away from the city center. Milwaukee Junction is a small neighborhood located along the Woodward Corridor of Detroit, and has many cultural, industrial, and commercial amenities that have served the city for decades. Currently the neighborhood is made up of approximately 38% surface parking lots, and has no stacked parking options. The looming development of the neighborhood with new apartments and higher density living options alongside the current single-family homes will call for more access to transportation, therefore requiring more parking and other transit options.

Milwaukee Junction is home to just over one thousand people, but is projected to double in population over the next ten years. This is alarming because of the lack of amenities for the neighborhood to be self-sustaining as well as the lack of leisure options throughout the neighborhood for children and young adults.

The following exploration will be into the neighborhood as a whole while implementing shared parking policy, planning for redevelopment, and finding parking lots that can be repurposed into flexible uses that support the growth of the community. Overall, this exploration will be used as an initial test of future frameworks for cities.

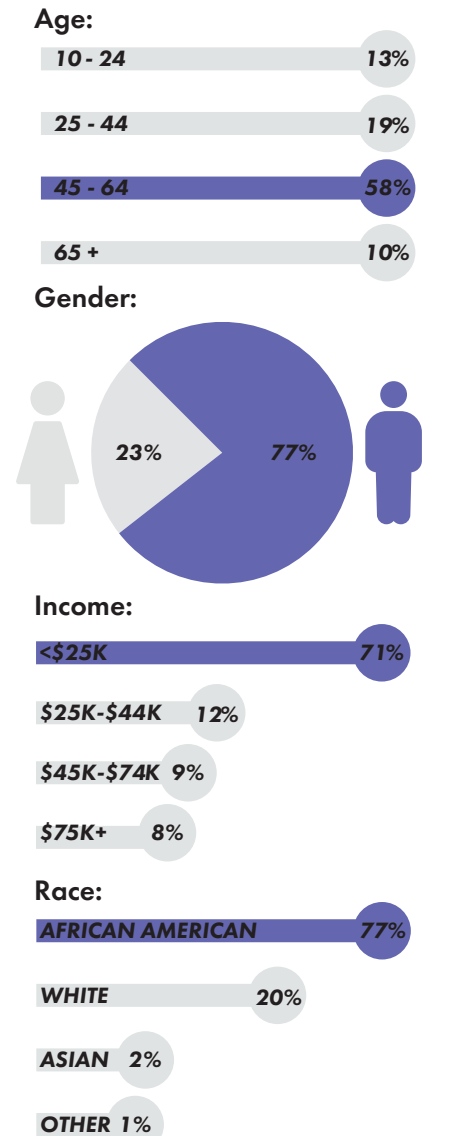
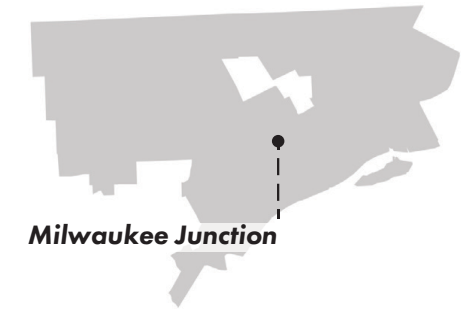


Figure 5.4 - Milwaukee Junction Demographics; Source: Author

Milwaukee Junction Detroit, MI



Milwaukee Junction:

The location and overall density of Milwaukee Junction makes it the perfect neighborhood within the city of Detroit to study the effects of shared parking minimums. As defined by the Greater Boston Metropolitan Area Planning Council, this plan will contribute to the overall reduction of parking in theory, but needs to be put to the test in a different context to prove its usefulness outside of a high density city like Boston. The smaller scale, and lack of density allows this to study to be stretched and adjusted so that these new parking minimums can truly help the community without disrupting the flow of the neighborhood, and allow for more development throughout.

The aim of this study is to prove the efficacy of shared parking minimums in cities, while still allowing for expanded development and growth of community. Overall, the neighborhood of Milwaukee Junction is only a stepping stone towards a larger exploration, but can be used to influence changes and implementation into different size, density, and populous neighborhoods. This will also help when designing the future framework for use in different cities other than Detroit which struggle with the common issue of surface parking overabundance.

Although this neighborhood is away from what would be considered the city center of Detroit, it still has access to the three main arterial roadways that run through the city and has direct access to much of the city via automobile or bus.



Step One & Two:

When determining what parking lots should be used for new uses, it's important to find the largest lots, and the ones with a connection to more than one type of use. Also, it is important to make sure there are other nearby parking lots to supplement the lost space so that the shared parking minimums can still be met.

In the case of this neighborhood, there are six lots that show the most potential, which are marked with a star in figure 5.8. Each has the ability to share their space with nearby lots, and will reduce the total number of parking lots in the neighborhood. These lots are designated for new development to occur, whether it be in a permanent or semi-permanent fashion to help bolster the available amenities within the neighborhood that are missing currently.

After these lots have been found, it is necessary to determine what the peak use times are for each business, institution, or industrial site as to best find how much of these lots can be repurposed. In this case each lot was chosen because they could be fully repurposed without requiring more parking to be created elsewhere in the neighborhood.

These two steps aim to catalogue and make decisions on each of the available parking lots within the neighborhood. This also sets up the final stage of simple policy implementation that can be measured to see how effective the change can be without fully implementing the changes.

Figure 5.7 - Milwaukee Junction Parking Designation; Source: Author



Figure 5.8 - Milwaukee Junction The Final Step; Source: Author

The Final Step:

The final step of this process is used as an evaluation tool for the previous two steps. Comparing the set peak usage times to the available parking lots a simple chart can be used to determine the new required parking based on time of day. The highest peak on the chart would become the new minimum for the entire neighborhood and would free up space allocated to parking for use as other developments.

After completing this study to determine how much parking area can effectively be removed from the neighborhood, there is an overall 30% reduction in the required parking compared to what was previously present. If used in other contexts this will vary, but will usually show similar results and will allow for new infrastructure to be present in the neighborhoods that need it the most.

The Impact:

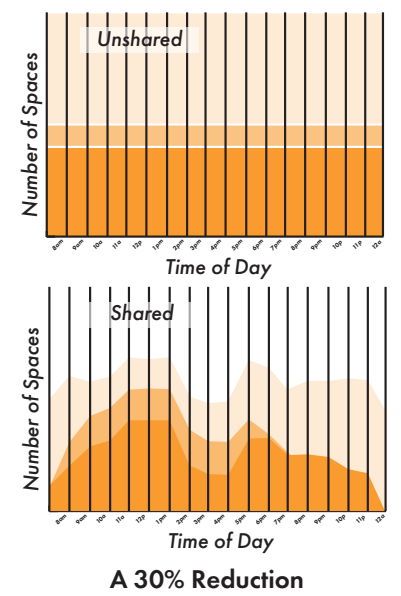


Figure 5.9 - The Impact; Source: Author



Figure 5.10 - Tactical Urbanist's Guide to Materials and Design; Source: Tactical Urbanism Guide

Tactical Urbanism:

Tactical urbanism, as defined by the Tactical Urbanist's Guide, is a short-term or flexible project that aims to better a community through the use of space that otherwise does little for the community it is within. The goal of tactical urbanism is to create long-term change with short-term action. This idea of flexibility is important when dealing with the difficult terrain of parking, because many cities have used parking in different ways, and access to flexible uses can allow for change over time without long construction and organization times.

These interventions can range from something as simple as using the open and unused space as a canvas for art to something as complicated as a workshop space where a community can gather to learn or teach one another a specific set of skills. Accessible on their website, the Tactical Urbanist's Guide outlines materials, uses, community engagement strategies, and many other ways that tactical urbanism can be used to better a community.

The use of these strategies can allow for multiple new uses to be explored over a short period of time without needing to fully develop a lot. This also allows for the uses to be reassessed annually to adjust for changes in the needs of the community they serve. Main takeaways from this publication are the way that parking can be reused to bolster a community lacking amenities, infrastructure, public space, or leisure space without needing large capital investment and full development times.

The use of this within this overall study will aim to create flexible and interchangeable strategies for the reuse of parking lots that can in turn help communities to grow in whichever way is necessary to form a better place for those who inhabit it.

Types of Intervention:

Aligning with the tactical urbanism approach, the types of interventions must be outlined that can be categorized by their impact on the community. The designation of five separate categories that each aim to provide different spaces for a community will best allow for future decisions to be made that place and fully locate the interventions within the built environment.

These typologies include: Public Space, Seasonal Leisure Space, Year-Round Leisure Space, Community Amenities, and Community Infrastructure. Public space would be created for areas with little access to parks or open spaces that can allow for community gatherings, meetings, and other uses that need a less organized space to function. Seasonal leisure is used to serve communities during holidays, events, or other short-term activities that happen in many areas around the country. Year-round leisure is used to create areas like parks, small business access, and other forms of leisure that aren't specifically associated with a particular season or event. Community amenities are spaces that provide access to spaces that can bring value into a community through cultural or economic means. Community Infrastructure is used to provide needed infrastructure to an area that combats specific problems within the community like food security, healthcare access, and education access.

Each of these typologies have been defined to provide usable space for pedestrians who should be valued over the cars that inhabit their communities.



Figure 5.11 - Public Space Stewardship Guide; Source: Tactical Urbanism Guide

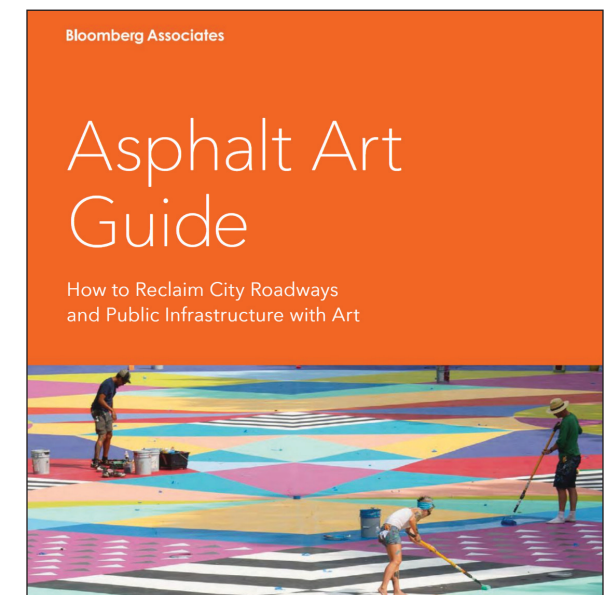


Figure 5.12 - Asphalt Art Guide; Source: Bloomberg Associates

Laying The Framework:



Figure 6.1 - Midtown Detroit Aerial View; Source: Skyline Scenes

The Case Study:

When looking for a mixed density neighborhood in Detroit, the best of the best was the neighborhood or district of Midtown. The connection to the main arterial roads that run through the city of Detroit, as well as large institutions, mixed-use buildings, single family homes, highrise apartments, and various other building types makes for the perfect example to build and test the framework for parking planning.

The current situation in Midtown is that the area boasts an astonishing 122 different surface parking lots that make up around 30%-40% of the overall land area. This neighborhood is home to around 2,250 people and has a collection of small locally owned businesses and larger national chains that create a highly sought after area to live and work for many detroiters.

To fully be able to test this framework, the use of a mixed density neighborhood with plenty of parking is important to find the different conditions that may be present throughout Detroit or any other city that this plague of parking may effect. Midtown has seemingly plenty of transit options, with the Q-Line that runs from Downtown Detroit through this neighborhood having three stops along Woodward Avenue, as well as abundant bus stops that should be able to connect this neighborhood to much of the city.

There are many lacking factors though that makes this area ripe for change: lack of access to parks, a disconnect between residents and commercial businesses, an overabundance of surface parking, and many others that negatively affect the overall makeup of the neighborhood.

Midtown Detroit, MI

Learning More:

Midtown is a unique neighborhood in Detroit that has been seldom studied by urban planners because of its seemingly well put together makeup. Overall the neighborhood relies on its connection to Downtown Detroit for many amenities and infrastructure pieces that are needed in every neighborhood for them to be successful. Its central location within the city makes this a prime location for change that could soon spread throughout the rest of the city over time.

To better understand the current conditions of the city, the mapping of current conditions revolving around transit, parking, accessibility, and other features will aid in creating a thorough framework that will not only help the community, but also inform future changes made when planning other neighborhoods outside of this very central corridor of Detroit. These maps will cover the current land usage and building typologies, parks, transit, and parking. With this, a separate study that pertains specifically to parking will be conducted to understand ownership, parking lot size, and connections to residential and commercial sites within the neighborhood.

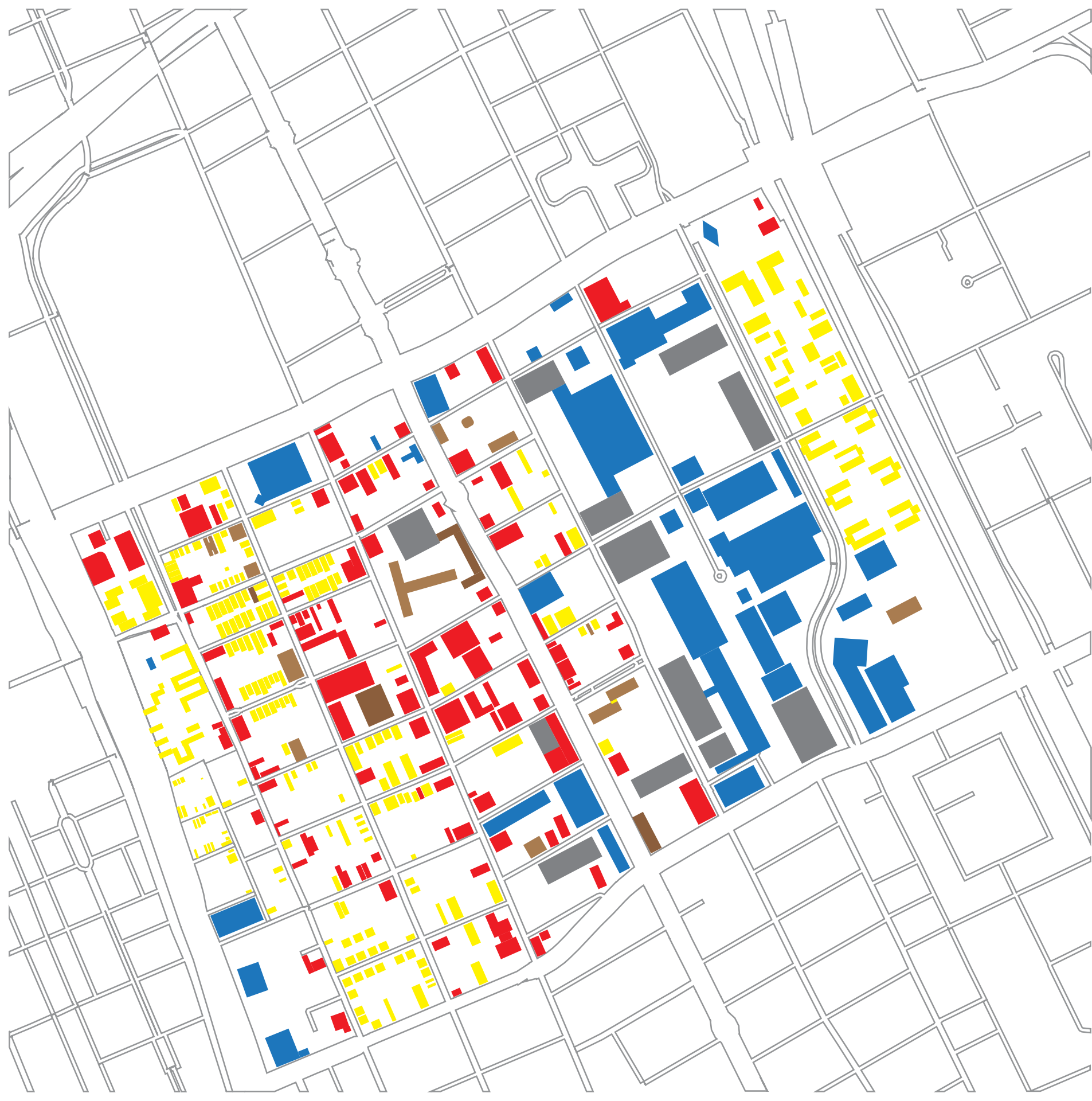
This mapping study will be used as a baseline tool that can be applied in other areas or cities to determine how parking should be addressed based on the current conditions. Overall this study will be used to determine how the neighborhood of Midtown Detroit can best be re-planned in an attempt to use parking lots as community bolstering devices instead of seemingly vacant open spaces that serve little to no purpose outside of storing cars.





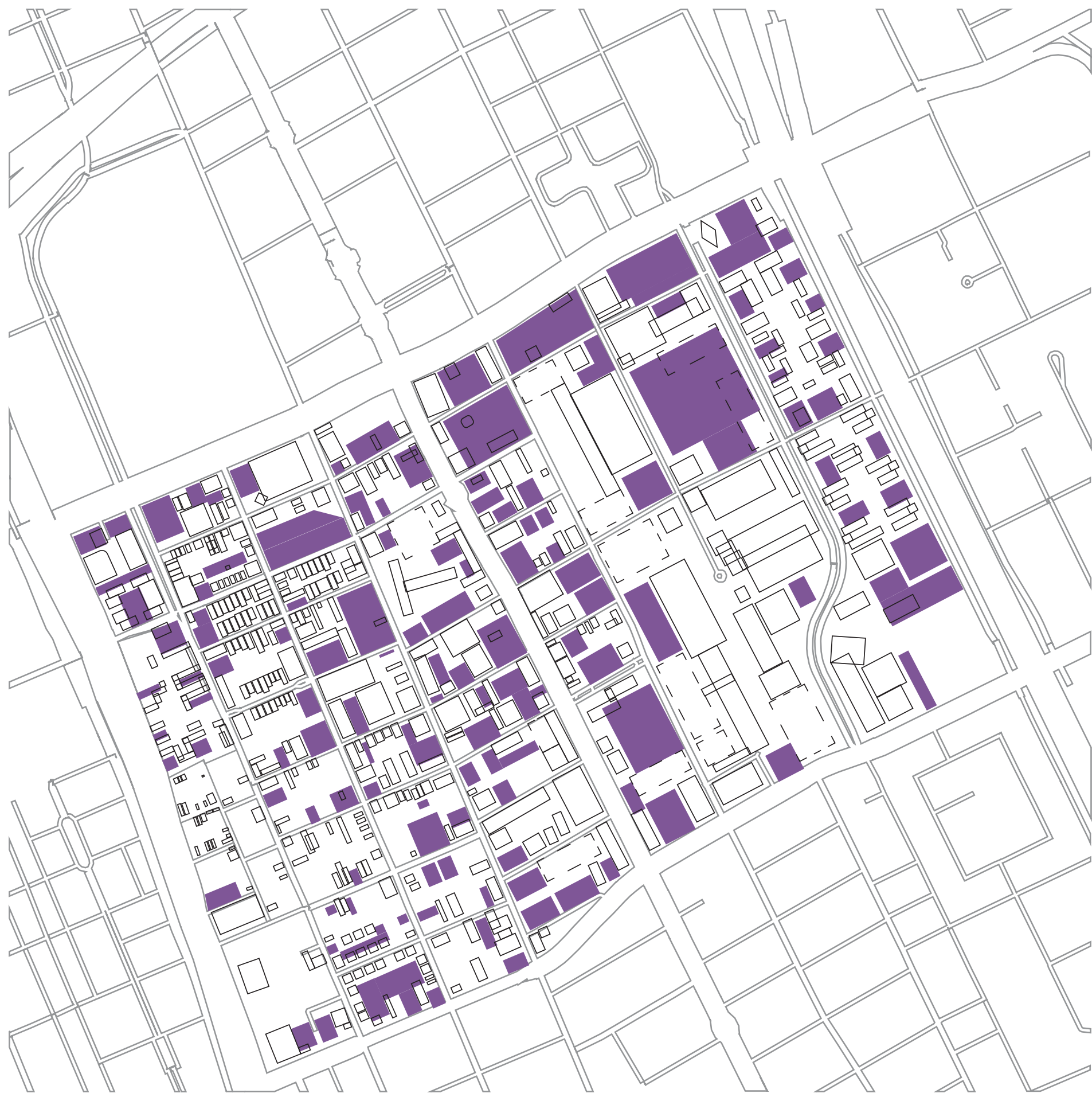
Structure

Figure 6.3 - Abundant Open Space; Source: Author



- Low Density Residential
- High-Density Residential
- Mixed-Use
- Commercial
- Institutional
- Parking Deck

Figure 6.4 - Waning Density; Source: Author



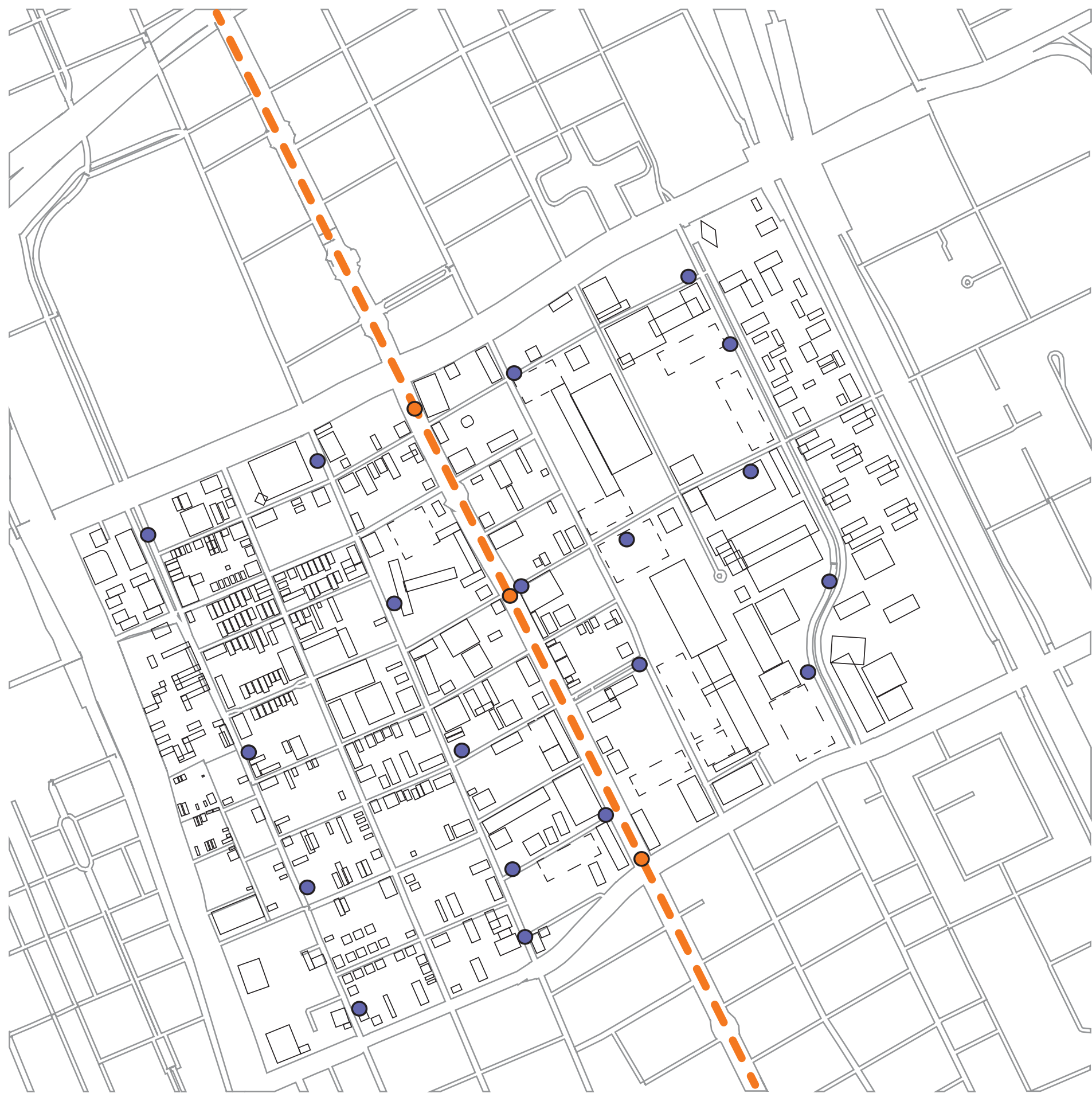
- Surface Parking Lot
- Parking Deck

Figure 6.5 - A Sea of Parking; Source: Author



Community Park

Figure 6.6 - Too Few Parks; Source: Author



- Bus Stop
- Light Rail Stop
- - - Light Rail Line

Figure 6.7 - Lack of Transit Access; Source: Author



Publicly Owned Lots



Privately Owned Lots

Figure 6.8 - Private vs. PublicOwnership; Source: Author






-  Connection to Residential
-  Connection to Commercial
-  Connection to Residential and Commercial

Figure 6.9 - Lack of Mixed Connecitons; Source: Author





-  Lot Size > 10,000 ft²
-  Lot Size < 10,000 ft²

Figure 6.10 - Too Many Small-Scale Lots; Source: Author

How Does This Affect Planning?

Midtown has a very unique connection to the rest of Detroit as the current planning of this neighborhood is different from much of the city. Because of this, and shown in the mapping, applying an adjustable and analytical system that can assess the needs over time will be needed to best help this neighborhood. This system will need to be applied in phases so that a focus area can be created to implement the flexible interventions in a manner that will help the community in the best possible way.

These interventions must be something that has little effect on the site it inhabits, and must be able to be removed or adjusted over time so that the needs of the community can be best met. The types of interventions will fit into one of five categories previously defined: Public Space, Seasonal Leisure, Year-Round Leisure, Community Amenity, and Community infrastructure. Through the use of two decision matrices, different decisions can be made on how to properly plan the new uses of parking lots alongside a designation for redevelopment or an 'enhanced' parking designation that will include the change of surface material, shading conditions, and other environmental sustainability options that will create parking lots that help the community instead of harming it.

This first decision matrix shown in figure 6.11 will be used to determine what actions would best suit each parking lot based on current characteristics. In order to show the best option as well as the next best option, a closed and open circle was used when connecting the characteristics to what type of intervention should happen. A closed circle being the best option and an open circle being the next best option for intervention.

Parking Characteristics	Intervention Type						
	Redevelop	Replace Surface Material	Replace Use of Whole Lot	Replace Use of Partial Lot	Greening and Landscaping	Addition of Bike Infrastructure	Community Event(s)
Size over 10,000 sq/ft Size under 10,000 sq/ft	○	●	○	●	●	○	●
Low Usage at Peak Times (Midday)			●		○		
High Usage at Peak Times (Midday)		●		○	○	○	
Connection to Commercial Connection to Residential		●		○		○	●
Access to Transit (Bus or Q-Line)			○	●			
Lack of Greening Efforts		●			●	●	
Impermeable Surface Material(s)		●		●		○	
Private Ownership Public Ownership	○	○			○	●	○
	●	●			●	●	●

Figure 6.11 - Intervention Identification Matrix; Source: Author

Flexible Intervention:

In order to create flexible interventions, a study of previously used interventions across the United States was conducted to catalogue them into the previously defined types. Each of the interventions seen in figures 6.12 through 6.15 are examples of semi-permanent or flexible options that have been used as full-scale or partial replacements for surface parking lots in neighborhoods lacking in access to amenities or infrastructure to bolster their sense of community.

Although each of these has been used in cities other than Detroit, they show promise for being adapted to the Motor City in a way that can benefit communities lacking these interventions and their benefits. The categorization of these interventions has been done in a way that connects them to their benefits to the greater community and not their own listed benefits from those who designed them.

Current infrastructure and amenities must be taken into account when determining the use of each of these interventions as each neighborhood or district of a city will have different starting conditions, and supplying an already present amenity or public space will have little benefit to the current situation. To best divide the use of these interventions up each individual parking lot should be assessed using the surrounding context as a guide to what is most needed versus what is already abundant within the community. Other pieces to take into account are access to transit opportunities so that these interventions can be accessed by those who may reside across the neighborhood or those with mobility difficulties who still need access to different infrastructure or amenities.

Shown in figure 6.12, the seasonal leisure intervention of 'Movies in the Park(ing)' is the revival of the drive-in movie theatre which can inhabit parking lots that are still used during the day for parking, and as the workday comes to an end can be re-purposed to bring the community together to enjoy a movie as well as concessions from local businesses. Although this does still use the space for cars, it activates the mono-functional idea of parking as a social and leisure space.

Urban gardening is an example of community infrastructure. Shown in figure 6.13 is a urban farm located in Seattle, Washington that aims to reduce food security concerns for those who live in the nearby community. This space is also uses the many planted 'fields' as classrooms to teach community members how to grow their own produce and aims to better the community.

In cities with a large population of homeless individuals, the open space of a parking lot could easily be used as an impromptu shelter or community that helps to protect those faced with homelessness. Figure 6.14 is an example of this being done in Los Angeles, California in a twenty-thousand square foot parking lot by converting donated sheds into tiny homes that protect those without a home from the elements. This micro-community serves nearly 200 homeless individuals and aims to grow over time.

Leisure and park space can be limited in many cities, and access to these spaces can be difficult for those in dense urban areas. Shown in figure 6.15, the creation of 'Parklets' in San Diego aim to solve this through the use of small scale parks that only need to occupy a portion of a parking lot or even a single parking space to provide for the community.

Movies In The Park(ing)



Seasonal Leisure

Use of parking lots at night to show movies either in a drive-in style or through a 'bring your own chair' policy for the local community to enjoy a moment together while enjoying a film.

Figure 6.12 - Movies in the Park(ing); Source: Let's Pave LLC

Homeless Shelters



Community Amenity

Influenced by the COVID-19 Pandemic, lots can be used as temporary housing for the unhoused and include job centers, food banks, shelter, and other needed amenities for those without their own shelter.

Figure 6.14 - Parking Homeless Shelter; Source: Curbed

Urban Gardening



Community Infrastructure

Communities with food security concerns can partially or fully turn parking lots into a garden to support the citizens and create healthier options for lower income households.

Figure 6.13 - Seattle UpGarden; Source: Convene PLLC

Parklets



Year Round Leisure

Parklets create small outdoor gathering spaces that occupy partial lots and are created with tables potted plants and shade that can be enjoyed nearby businesses during the day.

Figure 6.15 - Parklets; Source: ASLA San Diego





The Midtown Approach:

To properly address the Midtown neighborhood, a large scale map will be created that uses current conditions to determine how each parking lot should be changed to best benefit the community. Due to the large size of this neighborhood, a designated priority area has been defined as the "Area of Study" as shown in figure 6.16. This map shows how each parking lot should be designated based on the surrounding context, lacking amenities, and transit access as a way to connect with the community.

The areas designated for development are mainly surrounding major corridors through this neighborhood and surround commercial sites and institutional sites. These lots will be placed on a list of locations that should be developed and the city should prioritize new projects to break ground on these locations over any other within the neighborhood.

New Flexible Use lots will receive at minimum a singular flexible use as defined by their connections to both commercial and residential sites, access to transit, and lacking amenities usually found in urban neighborhoods like this one. These sites are spread throughout the entire neighborhood, but are a priority when close to both commercial and residential buildings.

The lots designated under 'Enhance Parking' will undergo a redevelopment process following the five guidelines set forth by the Montgomery County Planning Commission that include surface material change, natural drainage, and other factors that create more sustainable parking lots.

-  Designate for Development
-  New Flexible Use
-  Enhance Parking
-  Area of Study

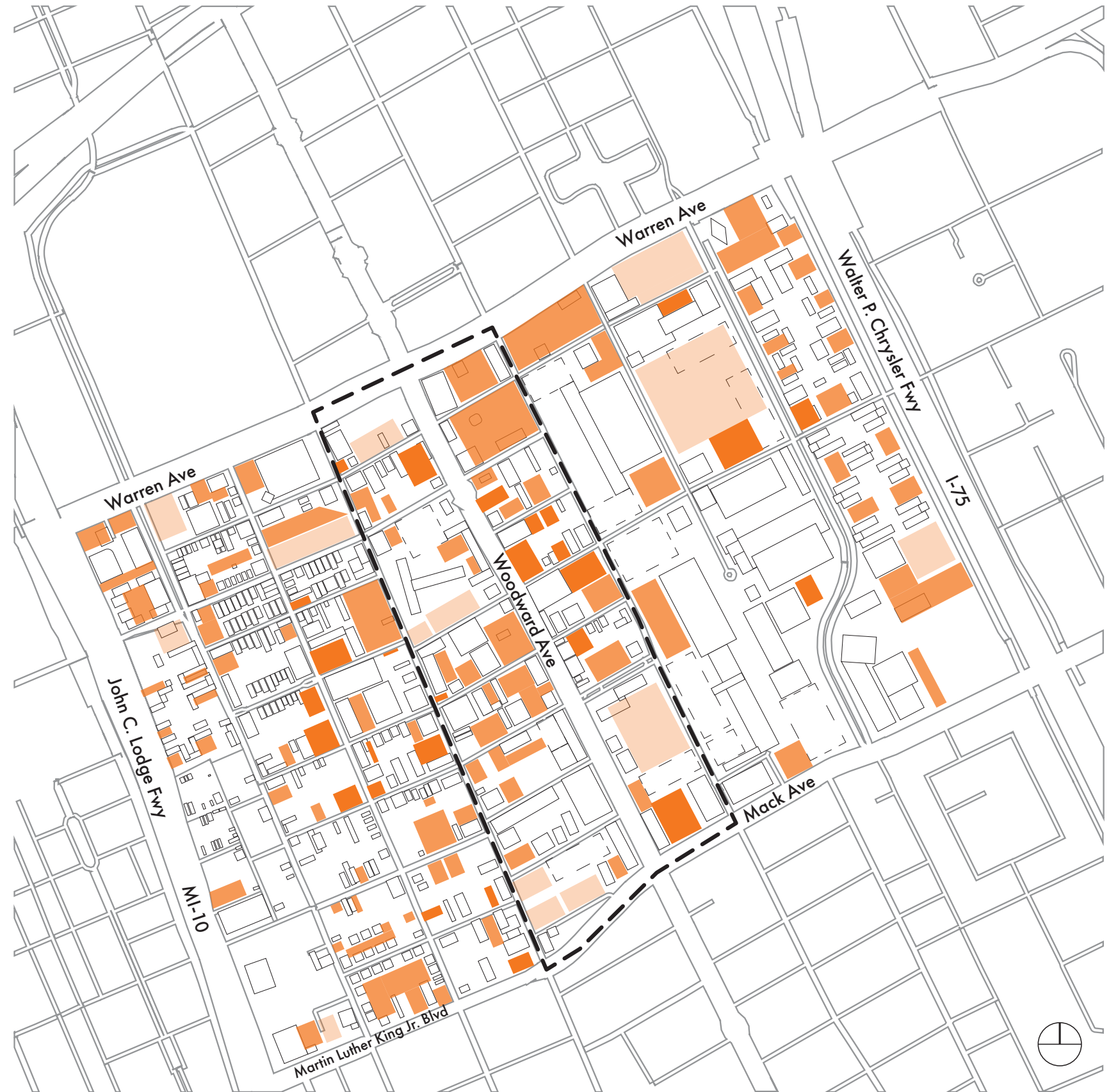


Figure 6.16 - Midtown Neighborhood Assessment; Source: Author

Phasing the Approach:

Due to the size of the midtown neighborhood a phased approach will need to be taken to ensure that a thorough development can occur. This is a simulated phasing approach that focuses on the Woodward corridor of the neighborhood first, and slowly spreads out over a period of approximately 10 years. Although development of new buildings cannot be accounted for due to permitting, funding, and other outside factors, the locations of new developments are estimates and the true locations of each of these developments will vary.

Phase one has a focus along Woodward Avenue. This high traffic area of the neighborhood will see change first, and is planned to conclude within the time-frame of one to three years. These immediate changes will provide the most benefit to those who need transit to access this area from the outskirts of the neighborhood as well as those who live within this corridor.

Phase two is much less direct, and aims to slowly spread the development outward from Woodward Avenue so that the disruption caused by this change can be mitigated through the use of the new interventions and enhanced parking lots created within the central corridor. This phase aims to be completed between three to six years.

Phase three is the final phase of this plan and will bring change to the outskirts of the neighborhood last. This phase will effect mostly single family residential areas and lower density commercial areas in an attempt to connect to the rest of the neighborhood through the flexible intervention network that will have started to change the landscape of the neighborhood. This phase is planned to complete in a time-frame of around six to ten years.

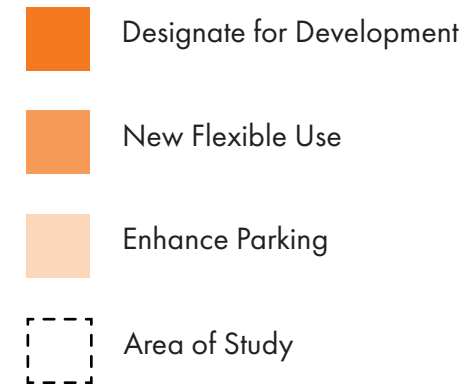
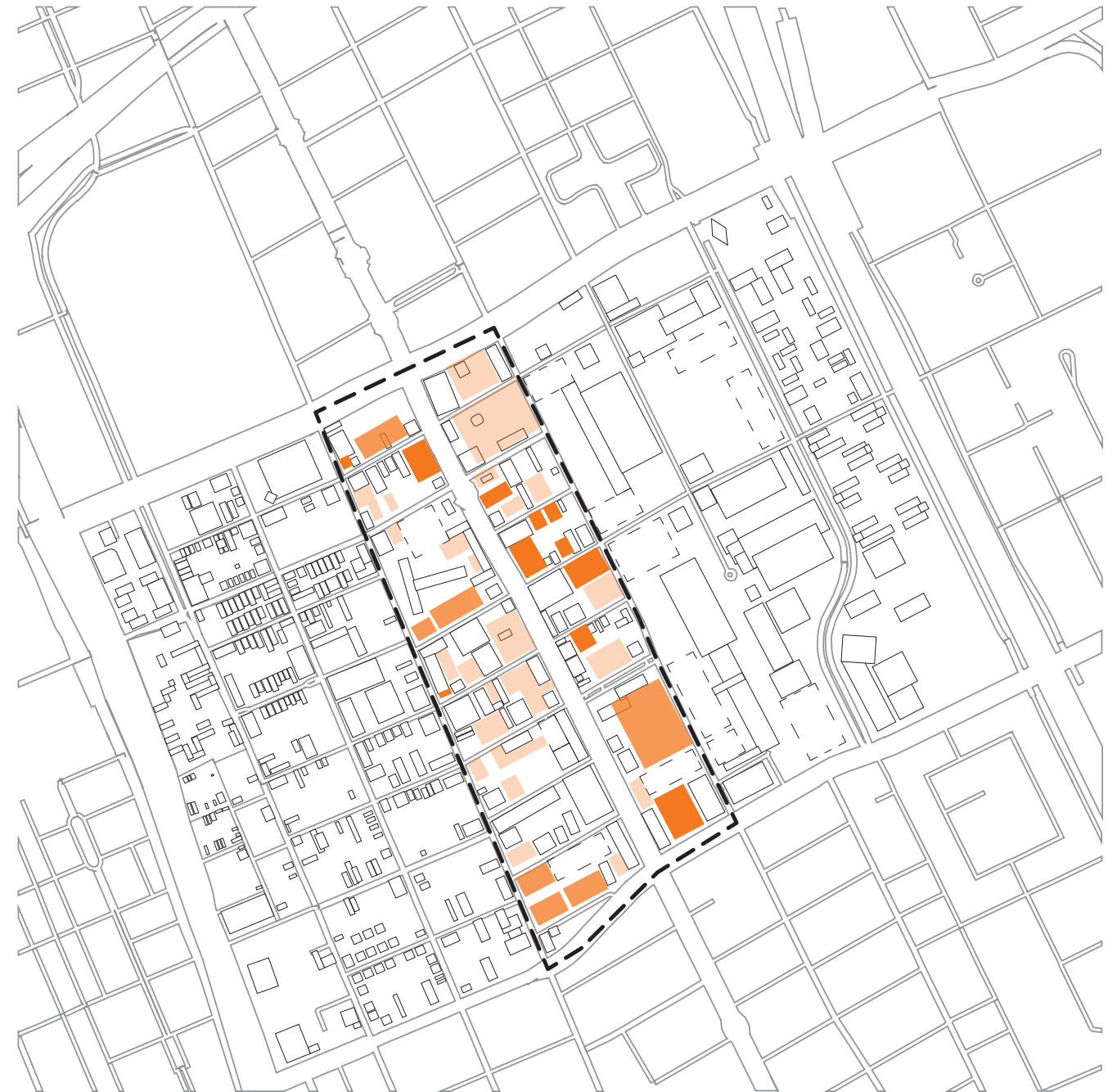


Figure 6.17 - Phase One; Source: Author

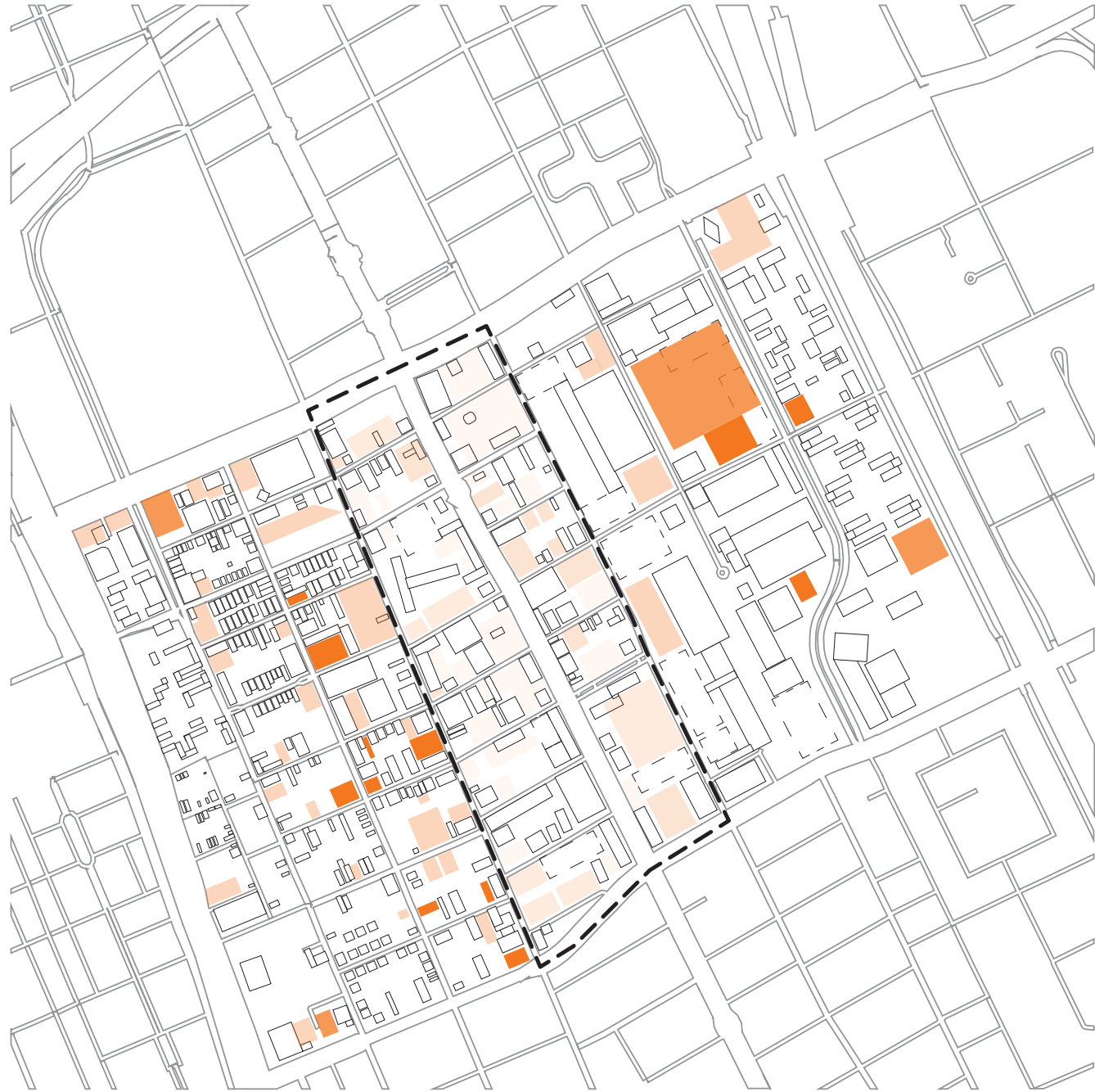


Figure 6.18 - Phase One; Source: Author

- Designate for Development
- New Flexible Use
- Enhance Parking
- Area of Study



Figure 6.19 - Phase One; Source: Author

- Designate for Development
- New Flexible Use
- Enhance Parking
- Area of Study

A Deep Dive into Enhanced Parking:

Enhancing the existing parking situation will be key to protecting the environment surrounding the remaining parking lots after this plan goes into effect. As mentioned before, following the guide laid out by the Montgomery County Planning Commission, enhancing the surface parking will best benefit the community that surround these parking lots.



Figure 6.20 - Sustainable Green Parking Lots Guide; Source: MCPC

There are five points that are highlighted in this guide. Each of which aims to reduce rainwater runoff, remove heavy metals from the parking surface, preserve local plant life, provide shading to reduce temperature changes, and promote community connections. These five points include: using permeable surface materials, use of natural shading devices, promoting natural drainage, adding connections to bioswales, and promoting connections within the community. These principles when implemented can create sustainable parking lots that will replace the current situation that is harming the surrounding environment.



Permeable Surface Materials



Natural Shading Devices



Natural Drainage



Bioswale Connections



Community Connections

Figure 6.21 - Sustainable Green Parking Lots Points; Source: MCPC

The Next Step:

After the neighborhood has been assessed and a phased approach is implemented when needed, the next step will be to plan which type of intervention will be needed in each of the designated lots. The use of a decision matrix that takes into account the nature of each prescribed intervention type against the current parking condition can be used to best place each of the different types of flexible intervention. These decisions are then used to plan the entire neighborhood or study area that will benefit the community in a way that will be connected to parking lots that will remain, as well as the new developments that are expected over time.

This decision matrix, which uses both open and closed circles, helps to outline the best option as well as the second best option when choosing a flexible intervention. With these decisions, the neighborhood can be programmed without choosing individual interventions, which can be chosen later in the process due to the short creation time for many of these flexible interventions.

In order to more precisely program the neighborhood, the use of mapping that takes into account the different conditions that are currently present in the neighborhood need to be used alongside other research at a community level to find the solutions that best benefit those who inhabit the neighborhood.

Intervention	Parking Condition						
	Large Lot Size	Low Usage at Peak Times	High Usage at Peak Times	Connection to Commercial	Connection to Residential	Access to Transit (Bus or Q-Line)	Park Adjacency
Seasonal Leisure Activity			●	○			
Year Round Leisure Activity	○	●					
Community Infrastructure	●				●	●	○
Community Amenity	○			●	○	●	
Public Space	●		○			○	●

Figure 6.22 - Intervention Decision Matrix; Source: Author

Making The Choice:

The decision matrix shown above in figure 6.22 depicts how choosing an intervention type should be done when planning the flexible intervention types of a neighborhood. Each of the five classifications of intervention will be chosen through the current parking conditions and each intervention coincides with a best choice and second best choice based on these conditions. Although there is some overlap on best choices, the discretion is to be placed on the planner who uses this matrix and site based understanding must be used to pick the best intervention.

Shown in figure 6.23 is the Midtown Detroit intervention classification map that takes into account all previous research as well as the intervention decision matrix to plan where each intervention will reside as the phased approach is being completed. This plan evenly distributes each type of intervention throughout the neighborhood in an attempt to best benefit the community, as well as serving as a baseline for future analysis of the neighborhood to address new problems over time. Using this map as a baseline will allow for changes to be made without starting from scratch as well as finding which intervention types inhabit a space if change within this prescribed type is needed.

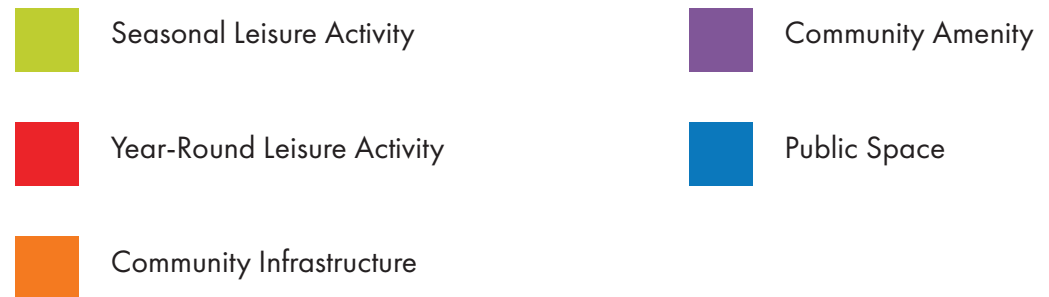
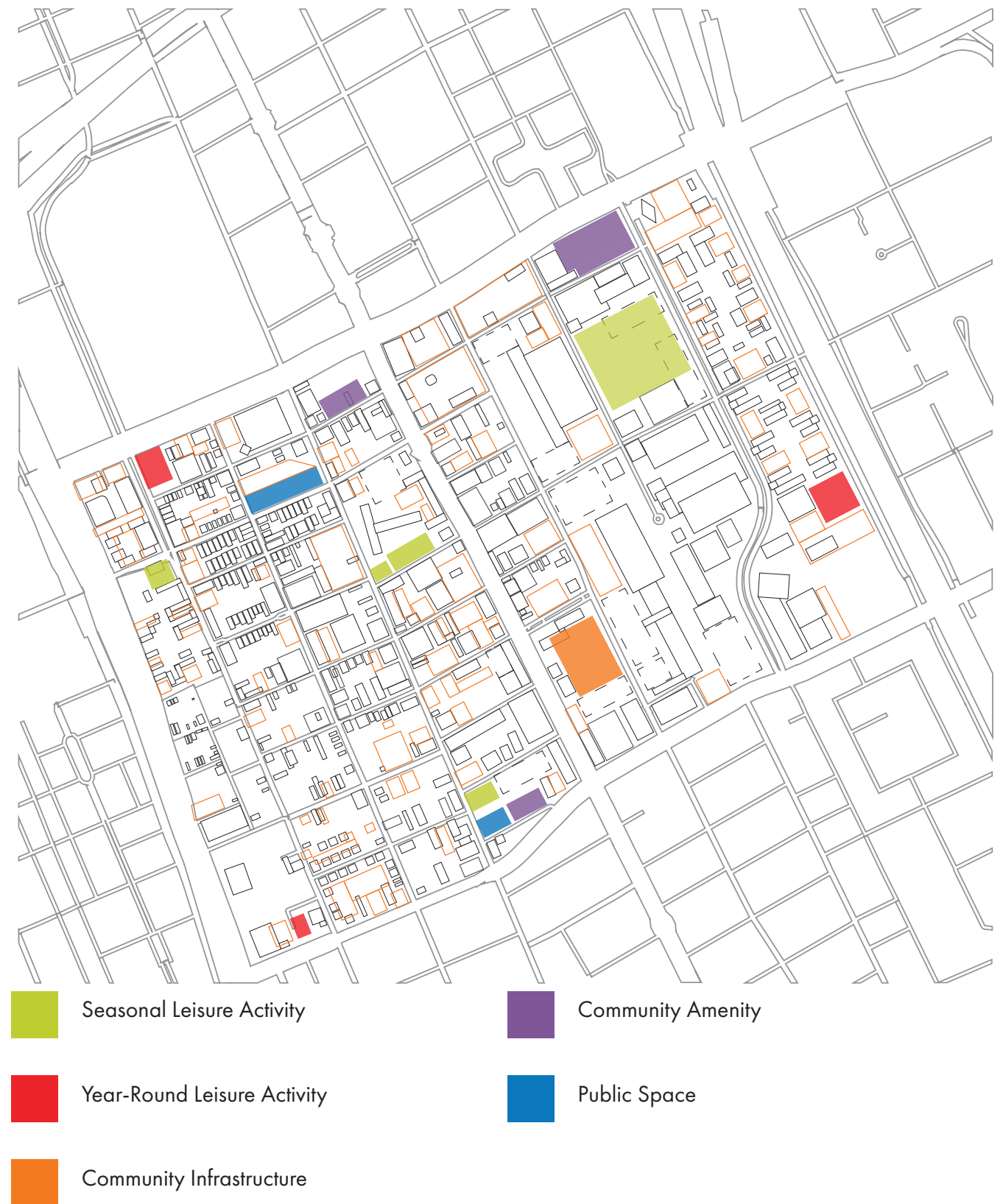
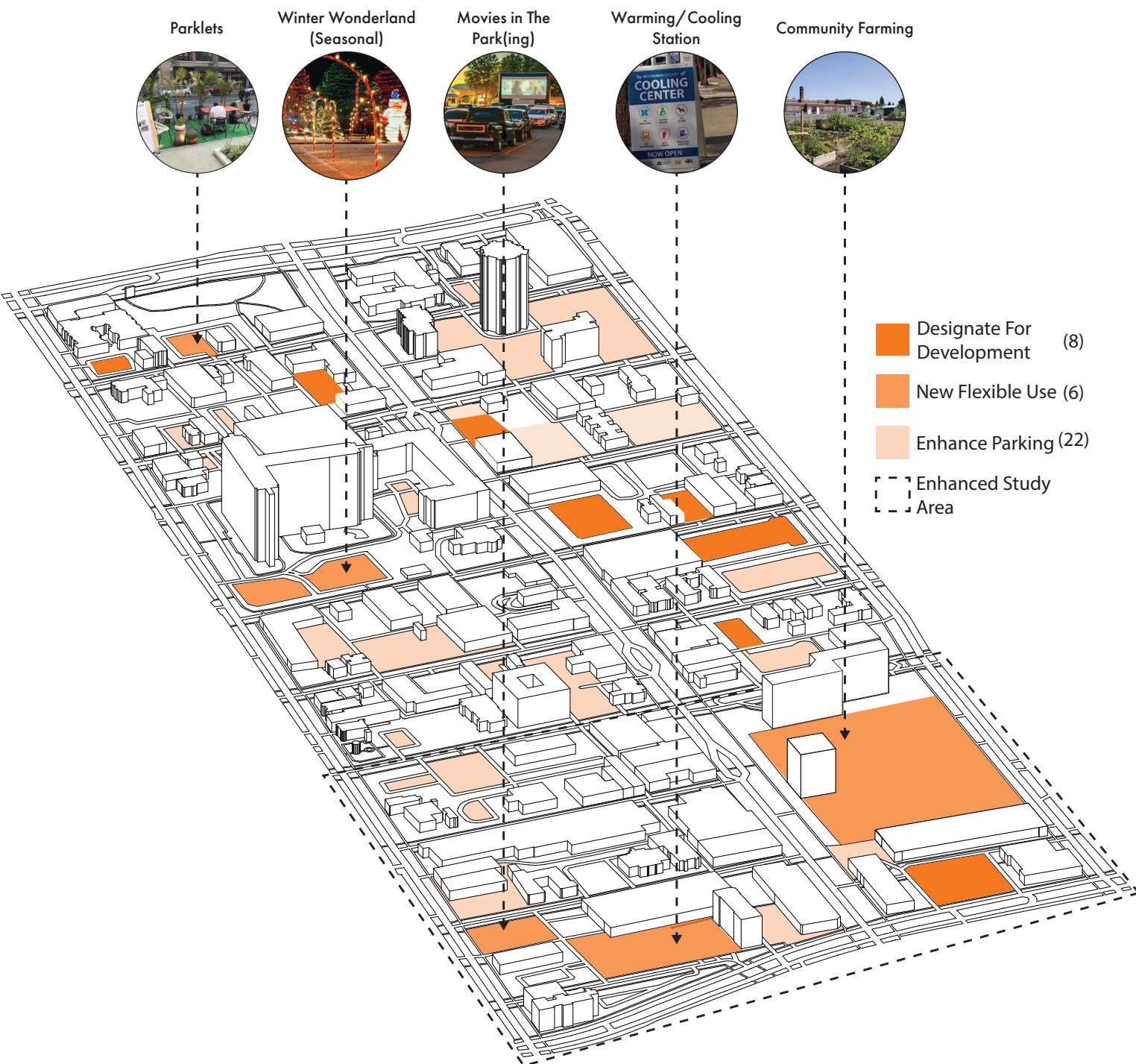


Figure 6.23 - Midtown Neighborhood Intervention Plan; Source: Author



A Portion of the Solution:

As a way to focus on a smaller portion of the Midtown neighborhood, a section that follows the Woodward corridor was used to show possible interventions as well as the amount of each change coming to this neighborhood. With only six designations for development, twenty two enhancements of the current parking situation, and six new flexible uses, this area has a wide spread of the new changes coming. This map is still too zoomed out to show exact changes coming, so a smaller section at the southern end of the neighborhood has been selected to demonstrate in better detail what is to come.

With this small model though, the overall impact of these changes can be seen throughout the neighborhood, as parking changes into a much less harmful part of the urban fabric that those who live here interact with on a daily basis. The overall model also depicts some possible interventions that match with the choices made previously in an attempt to showcase possibilities for phase one improvements.

Figure 6.24 - Enhanced Midtown Neighborhood Phase One Map; Source: Author

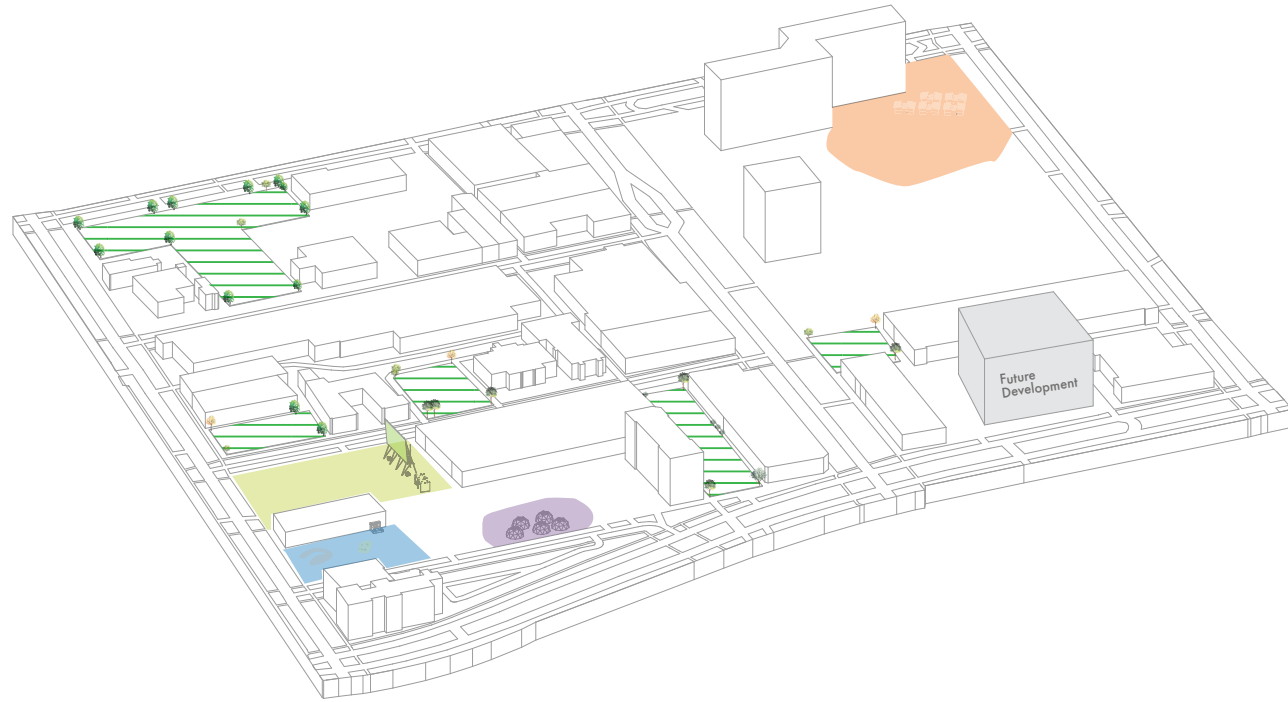


Figure 6.25 - Midtown Enhanced Study Area Model; Source: Author

Creating Change:

The above model showcases how each intervention will inhabit the parking lot that they have been chosen for as well as the enhanced parking lots that inn populate the existing parking. This is only an example of how the entire neighborhood will shift as the phased approach is implemented, but shows how each of the flexible interventions can connect with one another. These interventions will not always take up the entirety of the parking lot that they are a part of, and will allow for vehicular access for those without direct access to them. This will also allow for the interventions to be scalable in the case of community amenities and infrastructure because over time the need could grow or shrink based on other improvements to the neighborhood. Each intervention shall also reserve the entirety of the parking lots that they are created within, to prevent any future problems if the need for expansion arises. This will ensure that a growing community can easily change the use of the flexible intervention as needed or expand the current

flexible use without any interruption. Overall the goal of this zoomed in approach is to create a basis for which the entirety of the neighborhood can follow where connections are made between enhanced parking lots, future development, and flexible uses that will inform how development should occur to bolster these connections.

Each of the four flexible uses shown in figure 6.25 are only a portion of the possibilities for this neighborhood as a whole. Should future analysis show that changes need to be made to the flexible uses, they can be easily changed or adapted to fit the new needs of the community.

Before



After



Movies In The Park(ing):

As part of the seasonal leisure category of intervention, movies in the park(ing) aims to bring the community together within parking lots. Although this new use still promotes the use of vehicles to enjoy the space, it will encourage bringing your own chair and radio to enjoy the movie(s) without the need for access to a car. The seasonality of this use comes from the nature of the equipment as well as the emphasis on not using vehicles unless necessary as this would only be able to occur during the warmer months in Detroit's climate.

With this intervention being a leisure activity, there will also be available concessions being run by nearby local businesses as a way for them to branch out and become a bigger part of their community without needing to advertise or canvas. The idea behind this intervention is using a historically grounded American past-time that brought families and communities together outdoors to enjoy movies throughout the warmer times of year.

Before



After



Artist's Corner:

In an attempt to bring local street art onto a more legal canvas, the re-purposing of an under-maintained parking lot as a place for community expression will help the community grow together and create artwork as one. Through the use of non-toxic paints and a locally supplied material library, the artist's corner is a place for the entire community to come together and create something that represents them. The ability to clean the lot and create a blank slate will also allow for this space to adapt alongside the community over time.

This would be one of the few parking lots that would not undergo surface replacement, and would be a home for creativity and fostering community growth. Overall the artist's corner would act as a catalyst for the community to create and form an identity for themselves through more expressive means.



Warming/Cooling Station:

Within a large neighborhood like Midtown, there are bound to be many people who do not have access to air conditioning or reliable heating during the extreme weather months of the year. The implementation of a warming and cooling station would provide a space for those without this access to comfortably traverse the neighborhood by stopping to warm up in the dead of winter or cool down in the heat of summer. This amenity would also provide for the unhoused population found in and around this neighborhood in a way that change and food cannot necessarily do.

This intervention would take up minimal space within the parking lot that it would be a part of, and would only expand if demand is high enough. The use of geodesic domes allows for easily ventilation during warmer months, and allows for more space when there is an abundance of people in need of these spaces in the cooler months. These domes would signify these spaces and could expand to other parts of the neighborhood in different areas that aren't necessarily parking lots to provide for more of the community if this central location is not accessible enough for some of the population.

Interventions like these aim to be a part of the community that can help those in need, but also can be a place for those only passing through the neighborhood to spend some time and lower their risk of harm from the extreme weather.

Before



After



Community Farming

Midtown Detroit has a relatively large population, and is home to one of the only large grocery stores in the entirety of the city. For those who cannot afford produce or struggle with food security in general, a community farm would benefit a large portion of the population. This farm uses converted shipping containers that are packed with stations to grow various fruits and vegetables year-round without the risk of cross breeding so that those who need help in getting food can easily find what they need. These systems are expandable and because of their year round operation can sustain a community of 150 people with just one container.

The enclosed containers aren't the only option though, large planter beds can be used for outdoor growth of other crops that can also be used as a way to teach community members how to start their own gardens inside their homes, on rooftops, or in yards depending on their living conditions.

Use In Different Cities

How To Adapt:

The planning laid out for Midtown Detroit is a simple approach to the problems associated with parking and includes a small selection of possible options that can be used when treating parking concerns in other neighborhoods or other cities. To best adapt this study to other locations, the first step is to research the people who live there. This will set the tone for how the following steps will be conducted and will give any designer or planner some insight into who they are designing for.

After this background research has been completed, it will be beneficial to map current conditions based on transit access, park access, parking, building types, and other parking related conditions like parking lot ownership, size, and connections. These maps should be used to draw conclusions about the neighborhood being studied and will inform decisions that will be made using the provided decision matrices. These decision will guide the entire process in a smooth manner and will help to determine what should be done in place of the current surface parking lot.

Designation for future development is something that can only benefit the community if the development happens. This can be subsidized in a way to influence development, or sale of the lot can benefit the private or public owner if the sale is to a developer looking to create something helpful for the community to grow.

The overall aim of this process is to benefit the community, foster growth, and create connections through the use of underused and mono-functional spaces. This goal may be what a city or neighborhood needs to continue growth, or to restart stalled growth.

In order for this process to have the best effect on a city, it must adapt to the current conditions of the city or neighborhood. This also includes the use of projected or planned conditions so that the interventions being used can initially benefit the most people before reassessment at the neighborhood scale happens.

Any attempt to reduce the negative impacts of surface parking abundance will be beneficial to a city as a whole, but taking it a step further and providing spaces for smaller communities to form or grow will help to provide for a better city overall. The purpose of the small-scale initial approach is to inspire large-scale change, and the implementation of this framework when planning how to handle surface parking may lead to much larger or permanent changes that will be informed by the flexible interventions proposed. Adapting the conditions being studied to each location this is implemented in will be paramount to its overall success, and must be done to ensure the best results.

Chapter

08

Drawing Conclusions

Final Thoughts:

The overabundance of surface parking in many American cities will cause a multitude of problems over time, and the earlier this is tackled at an urban scale means the earlier a city can be prepared for change and growth. The negative impacts of surface parking as a whole should be something all Americans are well aware of, and without the knowledge of this impact, many Americans will remain blind to the problem and the solution.

Although these small scale solutions have high aspirations, enacting change now will mean for a better future not only for current Americans, but also for those who will inhabit these urban spaces in the future.

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A

New York City Parking Examples



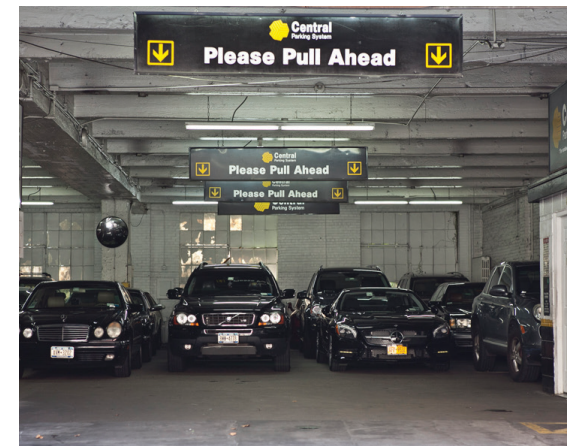
'The Parking Club' - Parking built directly into the urban fabric



'Edison Park Fast' - A forest of Mechanical Stacked Parking



'Practically Empty' - Parking Lot next to a parking deck that is empty



'Central Parking System' - Underground parking garage



'Forgotten' - An unorganized parking lot left in disrepair



'Part of the City' - Parking has become part of the entire city



'Coney Island' - Even tourist destinations sit empty



'Privacy' - A private parking lot hidden off the street edge



'The Difference' - The traffic looks no different from the parking



'Mechanically Stacked' - Mechanical stacked parking is so normalized that no one even acknowledges it



'No Room' - Not a single spot was open on this entire street



'No Parking' - Disobedient neighbors ignore someone's pleas



'Is This Enough' - Mechanical stacked parking sits half empty



'Saving Space' - Multi-level mechanical stacked parking

B

Flexible Intervention Library

Artist's Corner



Public Space

Using parking spaces as places for murals, paintings, and other forms of art that a community can enjoy like an art gallery. Also allowing community members to contribute in empty spaces.

Farmer's Market



Community Amenity

Lots within the center of a community that are surrounded by businesses that are only open on weekdays could be turned into a farmers market, craft fair, or other local business stalls for the weekend.

Cooling Centers



Community Amenity

On hot summer days underused lots on above average temperature days could serve as places for the unhoused or local community members to cool off.

Healthcare Clinics



Community Infrastructure

Popularized due to the Covid-19 Pandemic, large scale parking lots could be turned into health centers for use by anyone who has unreliable access to general healthcare.

Fairgrounds



Seasonal Leisure

In the summertime, carnivals and fairs would take over large parking lots and create exciting opportunities for community members to gather and have family-friendly fun.

Winter Wonderland



Seasonal Leisure

Use of large community centered parking lots as a space for winter lights, holiday shopping, and outdoor enjoyment in the cold winter weather.

Town Centers



Public Space

Small business implementation in large-scale parking lots that allow them to occupy the parking lots of Grocery stores and shopping centers to expand business opportunities and outreach.

Pop-Up Drive-Thrus



Community Amenity

Local businesses can use parking lots as a way to expand outward and create the same experience as a fast food chain where you can either shop outdoors or drive up and shop for your favorite items.

Outdoor Event Space



Public Space

Large-scale parking lots can become covered space for events like concerts, meetings, etc. to be held and bring the community together.

Food Banks



Community Infrastructure

Parking lots can be used as a way to combat food insecurity in underprivileged neighborhoods without the need for an enclosed space.

Free Libraries



Community Infrastructure

The partial use of parking lots to house community engaged 'free libraries' that contain donated books, but also include spaces to read and relax alongside them.

Appendix



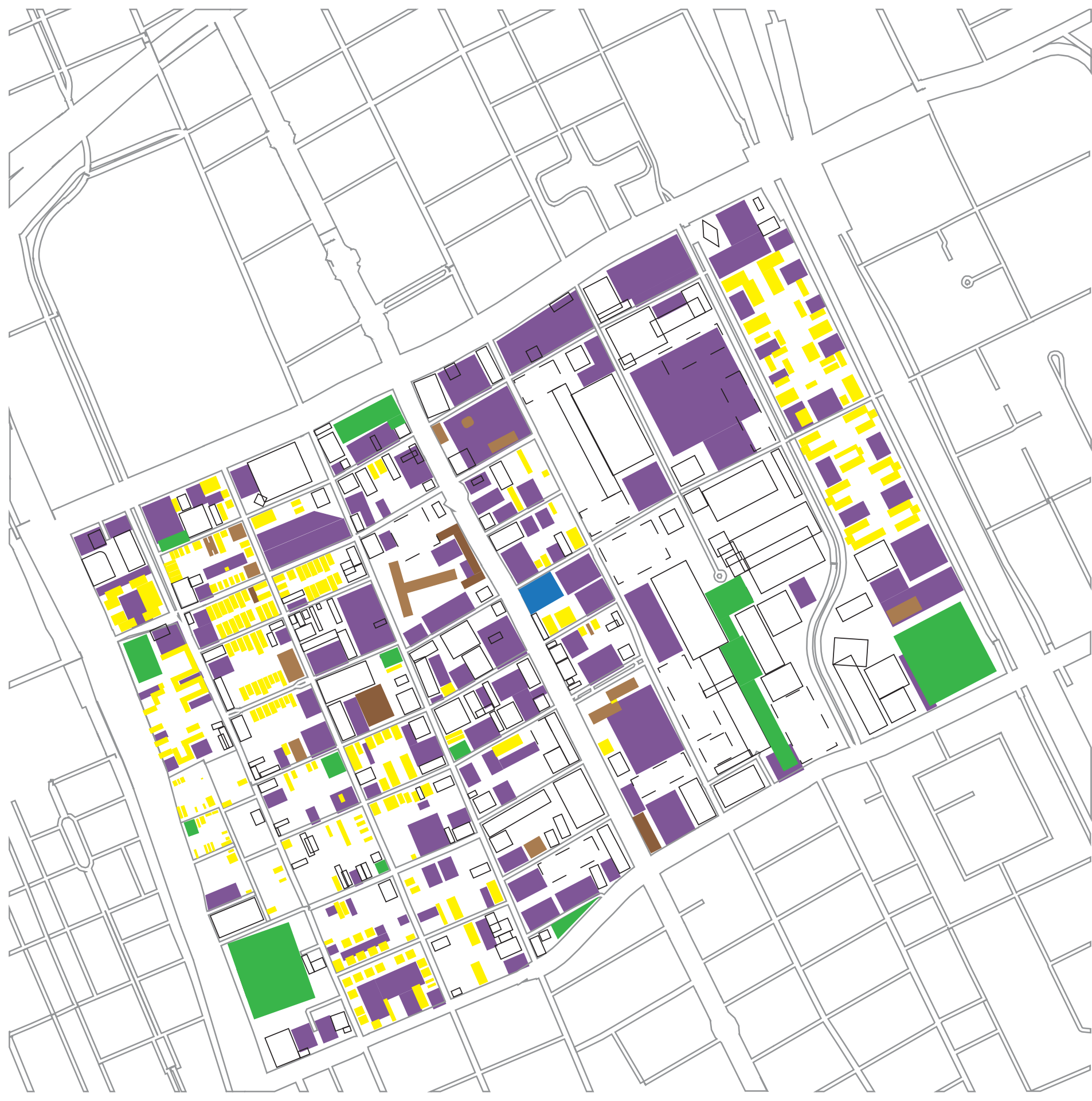
Composite Midtown Analysis

Composite Analysis Maps:

The following maps are combinations of previously created maps for Midtown Detroit and aim to analyze the data created by them. These maps are supplemental to the information in chapter 6 and are only a small sample of what can be done when combining the maps.



- Commercial
- Institutional
- Bus Stop
- Light Rail Stop
- Light Rail Line



-  Low Density Residential
-  High-Density Residential
-  Mixed-Use
-  Community Park
-  Surface Parking Lot
-  Parking Deck



- Bus Stop
- Light Rail Stop
- Light Rail Line
- Community Park
- 5-Minute Walking Radius

