

## ABSTRACT

Title of Thesis: **MARKETING ANACOSTIA: CREATING A  
PUBLIC HEART IN ANACOSTIA**

Marcelino Defngin, Master of Architecture, 2022

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The eastern side of the Anacostia River, is an ongoing hotspot for commercial and residential redevelopment in Washington, D.C. Often referred to as “Anacostia”, its reputation for its various recreational parks, natural commodities, and historical districts which date back to the 19th century is notorious. The commercial district along Martin Luther King Jr Avenue is currently being redeveloped by large real estate corporations. As a result, these development campaigns are causing significant shifts in population and demographics. This gentrification phenomenon is prompting the demand for additional storage spaces and a desire to synthesize surviving local businesses with the newer markets that came in after development. Therefore, this document will actively explore the relationship between storage vs business and will investigate opportunity sites for a potential commercial “heart” for the local region of Anacostia.

STORAGE-MARKET YARDS: RE-IMAGINING COMMERCIAL ACTIVITY IN  
SOUTHEAST, WASHINGTON D.C.

by

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## Chapter 1: Uncovering the Historical, Cultural and Societal Norms

Washington D.C is split into four notable quadrants; Northwest, Northeast, Southeast, and Southwest. All quadrants share a common epicenter that begins at the United States Capitol. This document will focus primarily on the Southeast quadrant since the basis of the site is located within its boundaries. It is important to acknowledge that each quadrant is innately distinct and that they all have different stories behind their respective histories, inhabitants, and community traditions.

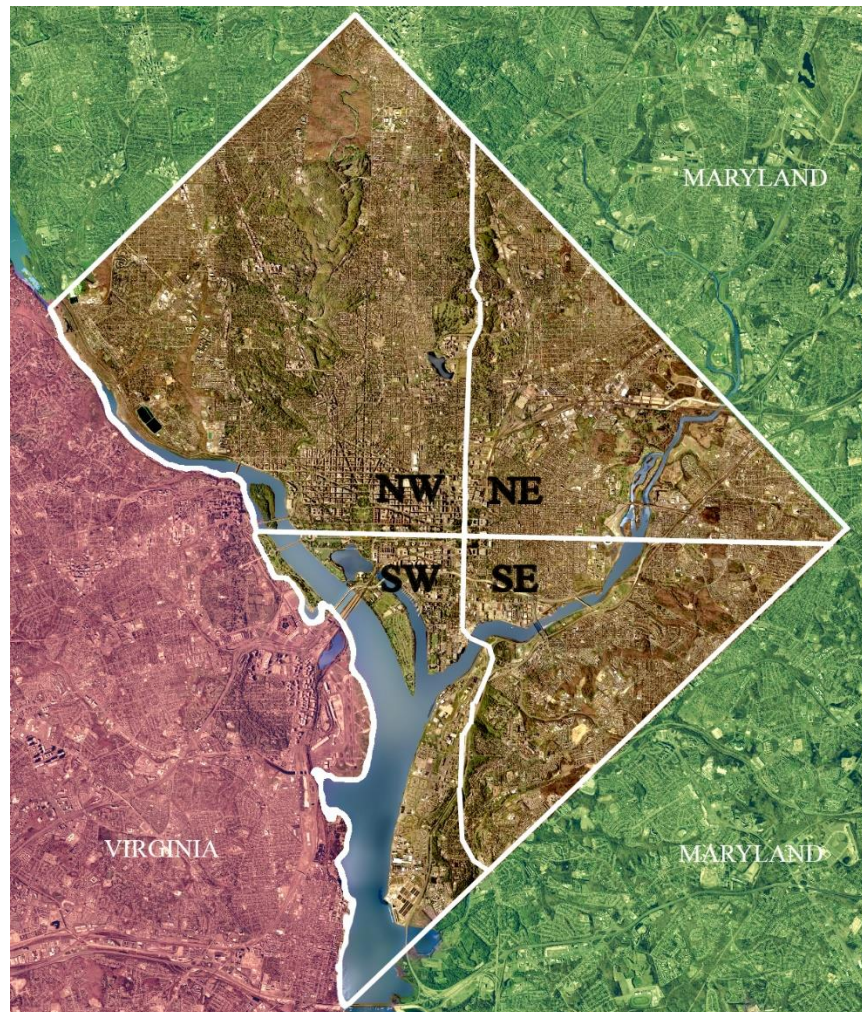


Figure 1: Quadrants of Washington D.C with the Capitol at the center (source by USGS)

The cultural identity of Anacostia is dependent on a culmination of factors such as existing storefronts, community practices, and housing typologies nearby. For that reason, the first chapter will reveal the historical, cultural, and societal norms not only in Anacostia but in Southeast D.C in general and occasionally in specified areas such as Barry Farms and Martin Luther King Avenue.

### Discovery

The boundaries of Southeast D.C start at East Capitol Street and end at South Capitol Street. It is split in the upper Northwestern corner by the Anacostia River and eventually terminates at the US Capitol. Geographically speaking, Southeast D.C is the second-smallest quadrant of the city but is also the most topographically varied. Before the years of colonization, this quadrant was once rich in natural resources and land that sheltered hundreds of indigenous tribespeople. The cross intersection between the Anacostia and Potomac Rivers provided a surplus of fish and water, sustaining the locals that dwelled in the area. The village of Nacotchtank (from which the name Anacostia is derived) was one of the largest Native American villages that settled in the Washington area at the time. It was theorized that their village was along the eastern side of the Anacostia River in an area that is between today's Bolling Air Force Base and Anacostia Park. It was also believed that the village of the Nacotchtanks, or Anacostans, served as a major trading center between other tribes during their period of settlement.





Figure 2: Settlement area of the Nacotchtank tribe in Southeast D.C. (source by author)

In the 1600s, the population of the Nacotchtank started to rapidly decline. Englishman John Smith explored the Chesapeake watershed in 1608, which led to the sudden settlement of English/European colonies along the eastern side of the Anacostia River.

As the years progressed and wars broke out, Anacostia became a prime target for defensive fortification. During the Civil War in 1861, the center of the city was vulnerable to attack from pro-Southern sympathizers in Maryland. Hence, a fortification ring was built around the capital city, with an extensive system of earthen

forts stretching into what is now the District of Columbia, Virginia, and Maryland (DMV). To protect the city's eastern entrances along the Anacostia River, three fundamental outposts east of the Anacostia River were established: Fort Greble (modern-day Anacostia), Fort Carroll, and Fort Mahan (located just north of Benning Road).

After major conflicts started to subside, businesses in Anacostia started to cluster around the intersection of Martin Luther King Jr. Avenue (formerly known as Monroe Street) and Good Hope Road (formerly known as Harrison Avenue) at the north end of the town. Taverns, food stores, even blacksmith and carriage shops were among the many different marketplaces that served both locals and visitors passing through. Even more business development resulted from the development of the streetcar and its proximity to this crossroads as a stop. Businesses had grown along both streets beyond the crossing, creating a vibrant commercial center by the end of the 19th century. To combat the major thoroughfares, rival hardware, supermarket, and pharmacy chains formed. Although Anacostia took some time to get municipal services, a robust, self-sufficient community ultimately emerged, giving rise to places like Barry Farms, Fairlawn, and Good Hope.

### Evolution

Growth of cities typically indicates that there is a prospering economy in place. While accurate to most urban environments, this is not exactly the case with Washington D.C. Unlike other cities, Washington is built as a political center; with its location chosen not because of its proximity to some special resource or trade route, but because of its geographical centrality to the original thirteen states. It should also

be noted that the major market types in Washington D.C aren't purely industrial, agricultural, or trade-based but more so focused on federal and political careers. In fact, the industry that contributed the most to Washington's gross domestic product (GDP) in 2021 was the federal government. Washington's GDP in 2021 was approximately 20% higher than the National and Regional GDP.

#### The District of Columbia's Top 5 Industries by GDP, 2021

National and regional comparisons

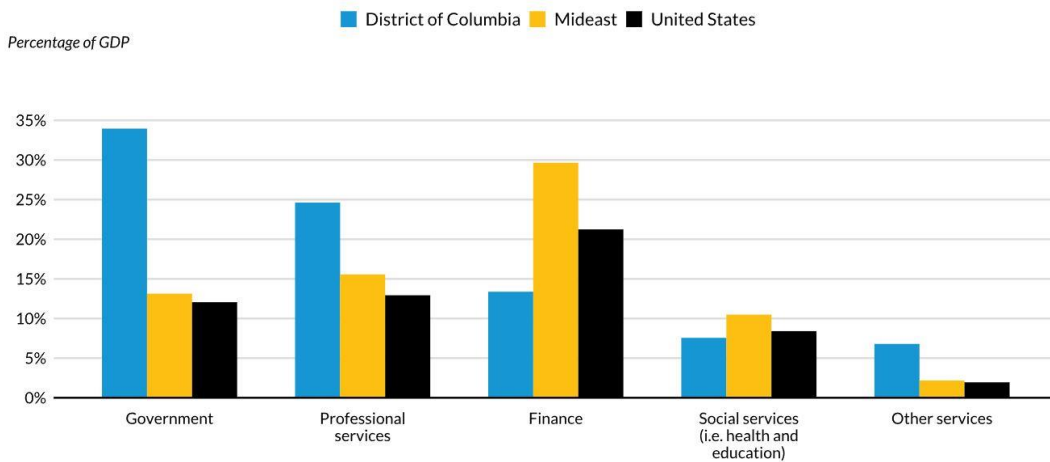


Figure 3: National and regional comparisons of D.C's top industries responsible for significant GDP raises (source by urbaninstitute).

However, when focused on the Southeast quadrant of the city, the market types shift away from federal work, and start to delve into military, retail, tourism-related services, national park services and other miscellaneous businesses. <sup>1</sup>

Nonetheless, the federal government has always been responsible for the tremendous evolution of the city. From the late 19th century to the 20th, the federal government grew larger and more powerful. New departments were added, requiring additional workers and buildings necessary for these roles. To meet this demand,

<sup>1</sup> Ross Buhrdorf, "Best Business To Start in The District of Columbia," ZenBusiness Inc. (ZenBusiness Inc, August 4, 2022), last modified August 4, 2022, accessed October 13, 2022, <https://www.zenbusiness.com/district-of-columbia-best-businesses-to-start/>.

people began to migrate into the city in waves. During World War I and II, thousands of newly hired federal workers migrated to the city to help maintain the production of military equipment. Consequently, the increasing numbers of federal workers triggered a rising demand for housing. Moreover, immigrants seeking the “land of opportunity” filtered into Washington during the late 19th century - which resulted in mass construction of additional neighborhoods, towns, and wards. With the advancement of technology and the creation of the automobile, the growth of neighborhoods and towns of Southeast D.C was propelled. Not to mention, many African Americans fled to Southeast Washington during the Reconstruction Era to live within a federal protectorate.<sup>2</sup>

Southeast D.C has a rich history and vibrant culture that was cultivated through the settlement of lower classes of minorities and whites. After World War II, the Navy Yard across the Anacostia River scaled down on operations and the commercial heart of the district moved Downtown into central D.C. Abandoned warehouses and community divestment, as well as a once heavily polluted river, made the area susceptible to high crime rates and neglect. As with any urban city, there are always areas with bad reputations, but Southeast D.C is currently undergoing a trend of upscaling development and revitalization. There are many new high-rise buildings being built near the water and in renowned neighborhoods such as Barry Farms, Capitol Hill, and Congress Heights.

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<sup>2</sup> Eric Foner, “Reconstruction, United States History,” Encyclopædia Britannica (Encyclopædia Britannica, inc., August 29, 2022), last modified August 29, 2022, accessed October 13, 2022, <https://www.britannica.com/event/Reconstruction-United-States-history>.

### Stabilization

As more people moved into the central part of D.C, the eastern edge of the Anacostia River declined in use. The construction of the Nationals Park in 2008, helped the area tremendously by attracting restaurants, grocers, parks, and public-use amenities to the Southeast Riverfront.<sup>3</sup> There is also Yards Park and Capitol Park, which are right on the river and constantly abuzz with pedestrian and tourist activity. The Eastern Market is an additional hotspot that sells popular foods and the vibrant Arts Market in the Capitol Hill neighborhood, lies only a mile north of the old Navy Yard. However, these are attractions that are found only on the western side of the Anacostia River. When compared to the Western side of the river, it becomes clear that the development of commercial activity and attractions along the Eastern riverside are significantly lower. Regardless, there are and have been many plans to redevelop much of Southeast D.C on the Eastern riverside. Barry Farms is one such neighborhood that is currently undergoing a large resuscitation in its master plan.

#### Case Study: Barry Farms

Located off Martin Luther King Jr. Avenue, the Barry Farms neighborhood has a rich history dating back to 1867. Formerly enslaved African Americans coming from Freedman's Village in Arlington, Virginia bought land in Southeast D.C and created one of the first African American communities in DC after the Civil War. In the 1940s, the district officially built the Barry Farm Dwellings, which was a public housing project that provided shelter to thousands of African Americans who moved into the

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<sup>3</sup> Walsh, Heather. "Southeast D.C." Millie. Team Millie, May 24, 2018. Last modified May 24, 2018. Accessed October 13, 2022. <https://www.gomillie.com/areas/southeast-dc/>.

city for war-related jobs. Sadly, as the years passed, Barry Farms fell into disrepair. The residents were relocated and the buildings were demolished in 2019. Thankfully, the New Communities Initiative at Barry Farm has recently put into effect a plan to transform the vacant neighborhood into one of Anacostia's first redeveloped communities.<sup>4</sup> It is aiming to host 900 affordable homes, including 380 public housing units, and the existing Barry Homes recreational center, as well as new restaurants and retail space. Priority for housing will be given to the original residents of Barry Farm, many of whom came out to see the groundbreaking.

### *Current Conditions of Southeast D.C.*

#### Neighborhoods

The growth of the federal government and the migration of various populations transformed Southeast D.C into what it is today. Composed of three wards, and thirty-two neighborhoods<sup>5</sup> (five of them being west of the river and the remaining twenty-seven being east) Southeast D.C. covers approximately 12.22 square miles, which is 20% of the city's land total.<sup>6</sup>

The Neighborhood of Anacostia is a central connection point for the Southeast quadrant for transportation, commercial retail, and community outreach centers. From

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<sup>4</sup> Megan McGrath, "'Day for Celebration': Construction Begins on Barry Farm Redevelopment in DC," Housing (NBC4 Washington, September 26, 2022), accessed October 13, 2022, <https://www.nbcwashington.com/news/local/construction-begins-on-redevelopment-of-dcs-historic-barry-farm/3166886/>.

<sup>5</sup> "Southeast (Washington, D.C.)," Wikipedia (Wikimedia Foundation, May 17, 2022), last modified May 17, 2022, accessed October 13, 2022, [https://en.wikipedia.org/wiki/Southeast\\_\(Washington,\\_D.C.\)](https://en.wikipedia.org/wiki/Southeast_(Washington,_D.C.)).

<sup>6</sup> Adam Froehlig, "How Much Land Is In Each Quadrant?," Greater Greater Washington, Last modified March 18, 2011, <https://ggwash.org/view/8706/how-much-land-is-in-each-quadrant#:~:text=Southeast%3A%2012.22%20square%20miles.,of%20the%20quadrant's%20total%20area.>

the Frederick Douglass Memorial Bridge up to East Capitol Street are many layers of zones that define Anacostia Park. For instance, almost all buildings within Martin Luther King Avenue to the intersection of Howard Road, are considered Mixed Use Buildings that go up to 4-6 stories due to their MU-8 zoning classification.

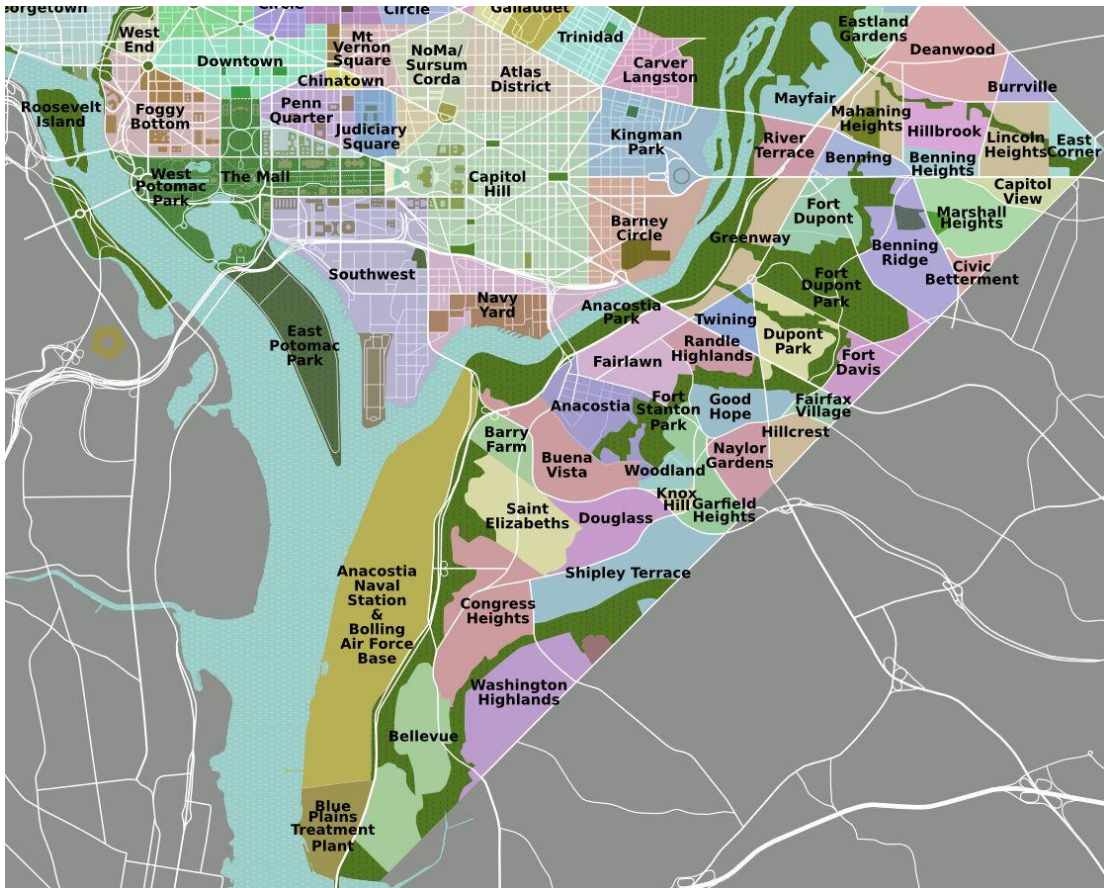


Figure 4: Dissected neighborhood map of Southeast D.C. (source by Wikipedia).

### Demographics

The demographic composition of Southeast D.C is defined through population type, household statistics, and median income rates. There has been a spike in development propositions and gentrification efforts due to the city's population increase and these projects are pushing the boundaries of the urban context.

		Y-o-Y Change
Total Population	150,708	1.2%
Male Population	70,757	2.6%
Female Population	79,951	0.1%



Figure 5a: Population demographics showcasing population by gender (source by point2homes)

		Y-o-Y Change
Median Age	33	0.0%
Citizen US Born	141,963	1.1%
Citizen not US Born	5,563	11.0%
Not Citizen	3,182	-6.6%



Figure 5b: Population demographics showcasing population by citizenship (source by point2homes)



		Y-o-Y Change
Moved from Abroad	836	-6.4%
Moved from Same County	15,411	-1.6%
Moved from Different State	8,805	12.9%
Same House as Last Year	123,669	1.1%



Figure 5c: Population demographics showcasing population by residency/locality (source by point2homes)

Based on figures 5a to figure 5c there are 150,708 residents total in Southeast Washington, with a median age of 33.<sup>7</sup> This pool is evenly split where approximately 47% of the general population are males and the remaining 53% are females. US-born citizens make up 94.2% of the resident pool in Southeast Washington, while non-US-born citizens account for 3.69%. Additionally, 2.11% of the population is represented by non-citizens. Overall, a total of 123,669 people in Southeast Washington currently live in the same house as they did last year, suggesting the future possibilities of mixed-use and residential developments waiting to take place in the area.

<sup>7</sup> "Southeast Washington Demographics," Point2 (US Census Bureau, n.d.), accessed October 14, 2022, <https://www.point2homes.com/US/Neighborhood/DC/Washington/Southeast-Washington-Demographics.html#Population>.

## Connectivity

Washington has several transportation alternatives that provide connections locally and regionally across the District. Figure 6 highlights the bus routes that provide access through the city and its occasional stops that punctuate the urban grid with its systematic nodes. These bus stops are typically found in areas nearby existing metro stations, which is appropriate as most people using the buses are looking to get to the metro to travel outside of D.C.

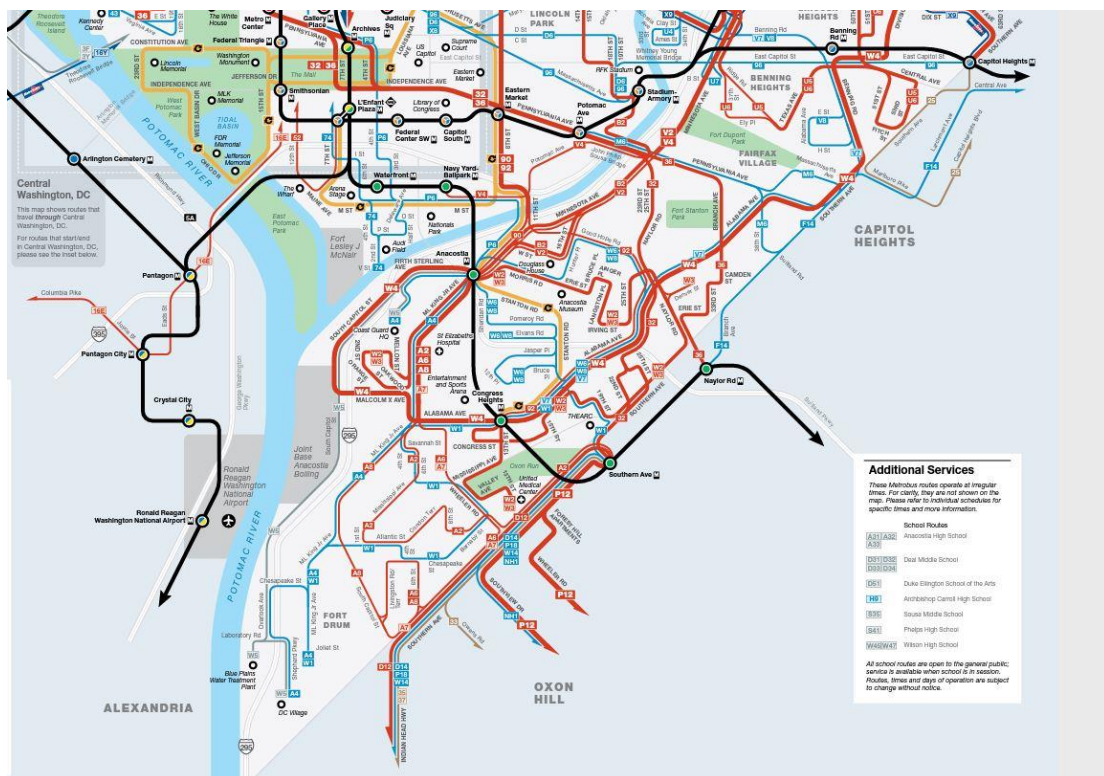


Figure 6: Map showing the regional and interstate bus routes (source by WMATA)

The Metrorail is another web of transportation that is spread widely throughout the city grid. The Metrorail system has six color-coded rail lines: Red, Orange, Silver, Blue, Yellow, and Green. The layout of the system makes it possible to travel between any two stations with at least a single transfer station that allows for you to switch onto

another colored line. The Green Line is the only line that travels across the Anacostia River where it makes stops at Anacostia Neighborhood, Congress Heights, Suitland and Branch Avenue. The Metrorail is currently undergoing additional construction for the upcoming Purple Line, which will cut from East to West in the Northern quadrants of D.C. It is also worth mentioning that Union Station serves as a central transportation center for other railway lines such as the Amtrak, Virginia Railway Express and MARC Train lines. The Greyhound Bus is also located in Union Station, for those looking to travel north towards New York City.



Figure 7: Map showing the new purple line in place with the existing metro line routes (source by WMATA)

## Chapter 2: Defining the Businesses of Martin Luther King Jr Avenue

Anacostia has a few commercial realms that shelters several local businesses of varied market types and practices. Among these realms, is the commercial district of Historic Anacostia along Martin Luther King Jr. Avenue. In order to prolong these surviving shops, one must classify them under suitable categories relative to their method of business, zoning category and building/land use.

### Surviving Early Businesses

The usual market types found along Martin Luther King Jr Avenue are physical markets where buyers physically meet the sellers and purchase the desired merchandise/service in exchange for money. Many of these physical markets along Martin Luther King Jr Avenue are very small in scale and visited by the locals of the community. The buildings along Martin Luther King Jr Avenue are classified as “Mixed-Use” by the D.C Office of Zoning (DCOZ). Therefore, the ground floor of these traditional brick + mortar stores are used for business purposes, where they might be a restaurant, barbershop, or liquor store. The upper floors are often disclosed to the general public and are typically meant for office/non-public usage. Some of the surviving local businesses that occur within Martin Luther King Avenue include;

- |                  |                            |
|------------------|----------------------------|
| 1. TROYITSBARBER | 4. PJ’s Barbers & Stylists |
| 2. Liquors       | 5. King City Restaurant    |
| 3. Service Quick | 6. Open Crumb              |

Most of these surviving businesses are merchandise reliant - where they make revenue strictly off products that are sold in their stores. That includes the occasional shops like corner stores, liquor stores and minor restaurants. The other types of surviving markets that also exist in Martin Luther King Jr Avenue are service-reliant - where they make profit by selling a professional service/deed. This includes barber shops, medical practitioners, and the occasional Limited Liability Companies (LLC) that pop up occasionally.

It is also worth noting, that there are other buildings unrelated to the commercial realm of Anacostia. For instance, around the northeast corner of Martin Luther King Avenue, are a plethora of institutional, medical, religious and communal infrastructures dedicated to the community such as the Children's National Anacostia Hospital, Union Temple Baptist Church, Thurgood Marshall High School, and the Anacostia Community Center. Essentially, the commercial line along Martin Luther King Jr Avenue has a strong variation of building usage yet there is no commercial "heart" or center to all the hustle and bustle.

#### *Significance of a Public Market*

Considering the diversity of businesses along Martin Luther King Jr Avenue, establishing an Urban Marketplace would be a necessity for Anacostia to have. Historically speaking, public markets have existed for millennia, where cities have revolved and been shaped by public market activity. In addition to establishing a commercial hub, placing a public market specifically for the Anacostia neighborhood would also offer several sorts of markets, like as open-air markets, covered markets, long-term market halls, market districts, and even unofficial marketplaces with street

sellers. A public market may also be temporary, seasonal, or permanent, demonstrating its flexibility. Vendors may provide both fresh and cooked food as well as non-food things including home goods, crafts, and antiques, depending on the kind of public market.

Public markets, however, are more than simply retail locations. Public markets operate in public spaces, support locally owned and run enterprises, and have public objectives, which distinguish them from other retail places. Successful markets expand and link urban and rural economies thanks to this commitment to the common good, something Anacostia sorely needs in light of recent reconstruction initiatives. They support neighborhood economic and communal development by retaining money in the area. Public markets also provide low-risk business possibilities for vendors, often from disadvantaged groups, and depending on the market's style, they contribute to the economic development of the rural areas where farmers cultivate, breed, and produce their goods.

The direct and indirect benefits of public markets are numerous when it comes to urbanization. But perhaps the most important advantage of a public market, is that they serve as public gathering spot for people from different ethnic, cultural, and socioeconomic communities – further strengthening its reputation as the world's original civic centers.

#### *Hypothesizing an Affordable Public Market for Southeast D.C.*

If Anacostia established a public market, then its merchandise would need to be affordable to attract the local population. There are a several types of emporiums that offer affordable products: thrift stores and bartering markets.

## Thrift Store

A thrift shop is a retail location maintained by a nonprofit organization for fundraising. In essence, it is a kind of social entrepreneurship where a range of used items given by members of the public and other volunteers are sold. One of the major ways that thrift shops renew their stock is via donations. People often give clothes, furniture, home goods, decorations, appliances, and other stuff because thrift shops offer a wide range of random goods. The donors have three options for getting these gifts to the business: they may go to the site of the shop, put the goods in a container for the store to pick up, or utilize a truck or moving vehicle to move heavy objects. Some organizations may even pick up the donations from your house. Many of the products are either new or little used, so rather than tossing them away, individuals choose to give them. People often decide to be helpful and give clothes to assist others rather than squandering it by tossing it away and clogging landfills. Following holidays and big events, donations substantially rise.

As a result, the things for sale may be offered at competitive pricing since they were received for free and because operating expenses are minimal. All proceeds from sales after expenses are deducted are used to the organization's specified charitable purpose. The cost of a building's lease or mortgage, running expenses (maintenance, municipal service fees, electricity, heat, telephone, and restricted advertising), and the purchase or depreciation of fixtures (such as garment racks, bookcases, countertops, etc.) are all included.

A few thrift shops also offer a small selection of food items for sale, including soda, water, ice cream, munchies, and sweets. These products are often located close to the checkout counters in the shops when they are available.

#### Bartering Market

A bartering market is like a regular street market, but instead of monetary exchanges between customers and sellers, transactions are done purely through the exchange of goods and services. Vendors list goods or services they desire in exchange for what they have on offer. Some will be posted online in advance of the event, but attendees can also negotiate with individual vendors. Any offer of money will be immediately refused. Barter Market is a social initiative to connect local makers and skilled individuals and to encourage a radical way of thinking – where money ceases to be currency and trade happens through interpersonal connections and communication.

A barter market tries to demonstrate the implicit position of money as a man-made social construct in a society that is mostly ruled by capitalism ideas. It supports the notion that everyone has valuable abilities that are independent of monetary compensation. There is a sizable maker community in D.C., some of whom may not have the opportunity or want to price and sell their goods, while others do so but are more aware of the principles behind this idea. By eliminating "currency" as the intermediary, Barter Market offers an innovative platform for these producers to reach a wider audience and an effective way to directly get desired items or services in exchange.



One man's trash is another man's treasure is the guiding principle of Barter Market, which seeks to decrease waste. People may exchange their excess or unnecessary possessions for goods or services they do need. One may also be wealthy in talents but not necessarily in money. Giving them buying parity without using money is possible via trading.

## Chapter 3: Redevelopment in Anacostia

For several years, Southeast D.C has reigned as the prime honeypot in the city for large real-estate corporations to buy realty and construct their projects upon. In the recent years, developers have become more aggressive in purchasing properties in both the commercial and residential realms - molding them into newer and higher-valued premises.

### Opportunity Zones

Anacostia, Barry Farms and Poplar Point are some of the neighborhoods nearby Martin Luther King Avenue that fall under domains called opportunity zones. Opportunity zones are areas that are examined for potential development to enable economic growth and finite investments in struggling American neighborhoods. Besides the tax advantages that comes with investing in opportunity zones, the main goal is to promote economic development and job creation in low-income communities. The D.C Office of Zoning (DCOZ) designates its opportunity zones by leveraging feasible investment opportunities. In their approach to identify opportunity zones, the DCOZ partnered with LAB @ DC, to gather input from the public, residents and stakeholders regarding opportunity zone priorities. From their survey they found the following results of information:

1. Areas east of the Anacostia River exhibited a higher-than-average need for investment/commercial and retail amenities.
2. Retail Corridors: contained retail corridors and are distributed across the city; align with Great Streets program objectives.

3. Creative Industries and Manufacturing: contained large amounts of industrial/commercial land; aligned with the Ward 5 Works study and efforts.

Of the three options, the East of the River option received the most support, with 202 respondents ranking it as number 1, with 103 ranking retail corridors as the top option and 87 choosing the manufacturing option.<sup>8</sup>

### Redevelopment Movement

Like the recent Barry Farms initiative, Poplar Point is another neighborhood in the process of being revitalized. Redbrick LMD, a development firm, has submitted a design review application for a mixed-use project at 632 Howard Road SE in Poplar Point called the "Bridge District".



Figure 8: Aerial of the proposed development and massing of future phases (source by Redbrick LMD).

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<sup>8</sup> "How DC Designated Our Opportunity Zones," DC.gov (The DC Office of Zoning, n.d.), accessed November 6, 2022, <https://dmped.dc.gov/page/how-dc-designated-our-opportunity-zones>.



Figure 9: Site plan of the proposed development and massing of future phases (source by Redbrick LMD).

The project is projected to be a 130-foot-tall development would deliver 748 residential units above roughly 46,700 square feet of retail and restaurant space and a grocery store. The grocery store will occupy 15,000-25,000 square feet of space along the west side of the property, closest to Suitland Parkway and a future park space. There would also be 355 parking spaces and 250 long-term residential bicycle spaces; a 45-foot-wide ground-floor easement will connect Howard Road and Anacostia Park and provide vehicular access to the garage.<sup>9</sup>

Another development project in D.C that is amid being constructed is “The Bridge” by MRP Realty and Taylor Adams Associates. Located at 2442 MLK Ave is a 200,000 square foot multi-phase project that will include 11,000 square feet of

<sup>9</sup> Perry-Brown, Nena. “748 Units, a Grocery Store, and a Sandlot: The First Phase of the ‘Bridge District.’” UrbanTurf. UrbanTurf, August 9, 2021. Last modified August 9, 2021. Accessed November 6, 2022. <https://dc.urbanturf.com/articles/blog/748-apartments-retail-and-a-grocery-store-the-first-phase-of-the-bridge-dis/18591>.



neighborhood-serving retail, a Community Center, new quality housing, and funding for community programming.



Figure 10: Renderings of The Bridge along Martin Luther King Avenue (source by Residential ONE).

At 2458 MLK, there will be 118 affordable apartments for people of different income levels. There will be a fitness center, club room, business center, on-site parking, and on-site management.

## Positive Effects

When done properly, the eventual commercial real estate that is built allows economically obsolete properties to be reimagined. The redevelopment project will not only have added value but will have also enhanced the local community. Here are some ways it can lead to improvement:

1. Increases appreciation
2. Encourages growth
3. Protects the environment
4. Produces jobs

The first benefit from redevelopment is that it inevitably improves the chance of asset value growth. There are other properties that gain from a growth in value and demand in addition to the subject property. It's not unusual for the values of nearby houses to rise as a result of a recent development being used as a sales comparison. Redevelopment initiatives add value to properties by giving older structures new vitality. Utilizing existing, abandoned structures has particular importance because it helps maintain vacancy rates low even though some retailers have closed their doors.

Another benefit to redevelopment, is that it serves as a catalyst for future built improvement. The improved value might result in a rise in local business demand or increased customer traffic. When a local center receives a face-lift, food owners and even hotel and multifamily developers pay attention when the center inevitably becomes busier. Additionally, this frequently presents a chance to add character or historic relevance that generates awareness about the neighborhood.

Ironically, redevelopment also helps protect the environment in a broader sense because the property was built in a manner to match the guidelines of current green certification systems such as LEED. LEED Building Design + Construction (LEED BD+C) and LEED Neighborhood Development (LEED ND) are two rating systems that check for environmentally friendly factors that development projects satisfy. Some of the criteria that redevelopment achieves include minimal land and tree disturbance; reduced embodied carbon, lessen crime (if the area was previously unoccupied or run-down) and removal of hazardous materials such as asbestos or lead-based paint.

Finally, redevelopment creates more jobs in the construction industry. Painters, plumbers, lawyers, lenders, roofers, electricians, architects, structural engineers, landscape designers, and inspectors are just a few of the experts hired for the redevelopment. There will also probably be more workers at the redeveloped property and buildings nearby, such as an increase in staff if a tenant expands its space.

#### *Frequent Metro Rail Track Work*

In addition to development, Washington D.C occasionally shuts down railways to repair tracks, platforms and stations. For instance, the yellow line was recently put under reconstruction due to the Fenwick Bridge falling under disrepair. Hence, the condition of several D.C metro stations is below acceptable standards and should be considered a potential opportunity zone. On the green line, one specific station that can be considered for redevelopment/revitalization is the Anacostia metro station. In fact, the Redbrick LMD “Bridge District” project is currently trying to improve the station in several aspects. While the details are still being planned, Redbrick has confirmed the following improvements to the Anacostia Metro:

1. Taking down the ramp for cars to get to the upper parking deck
2. Putting the Kiss and Ride parking lot somewhere else
3. The exit ramp from I-295 to Howard Road is being moved.
4. Putting a small public park between the station's entrance and a housing complex
5. Improving the roads, sidewalks, and paths that lead from Howard Road to the station.

The Anacostia Metro Station is also situated between the commercial realm of Martin Luther King Avenue and the Barry Farms neighborhood. It is a neat location as it is fabricated between two realms, which may serve as a potential site for the centralized public market that was discussed in the earlier chapters.

## Chapter 4: Defining the Storage Demand of Southeast D.C

Self-storage has become essential for dealing with important life events. It is especially beneficial for events such as relocation, downsizing, remodeling, and inventory organization in enterprises. Washington offers plenty of self-storage options to cater to all needs and budgets.

### Overview of Storage Demand

The self-storage industry is ready to accommodate customers who are altering their housing arrangements, whether they are moving, downsizing, having a new baby, or embracing intergenerational living. Self-storage is typically associated with life events. Self-storage demand is also influenced by lifestyle decisions, such as preferences for snow birding, digital nomadism, and RV travel. When it comes to the



residential clients that the self-storage industry in Washington serves, it caters to both renters and homeowners, serving as an addition to their houses when personal belongings outgrow living quarters.

#### Count

By 2022, there will be more than 1.6 billion square feet of self-storage space worldwide. 258.9 million square feet of storage space, or 16% of the total inventory, have been built in the past five years. Nearly 45.9 million rentable square feet, or roughly the size of Central Park or Grand Central Terminal, were finalized in 2021 alone. In 2021, new supply will account for 3% of the current inventory. New deliveries climbed 3% in 2021 over 2020. Self-storage is used by one-third of Americans who either need extra space at home or are going to move. The self-storage sector has maintained an active development pipeline in recent years. In 2021 alone, about 129,375 square feet of self-storage space came online in Washington, representing 6.8% of the existing inventory. Compared to the year before, self-storage inventory in Washington has increased by 7.3%. Currently, there are 22 self-storage facilities and approx. 2,104 storage units in Washington. The local inventory encompasses 1,904,471 square feet of storage space, offering 2.1 square feet per capita. <sup>10</sup>

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<sup>10</sup> “Self Storage Industry Trends” Storagecafe (Yardi Systems Inc., n.d.), accessed November 27, 2022, <https://www.storagecafe.com/self-storage-industry-statistics/>.

## Washington, D.C. self storage market statistics

No. of self storage units	approx. 2,117
No. of self storage facilities	22
Local self storage inventory (sq. ft.)	1,904,471
Self storage sq. ft. per capita	2.1
Average self storage rent in Washington, D.C. for a standard 10x10 unit	\$157

Figure 11: Generic Washington D.C. self-storage market inventory statistics  
(source by storagecafe)

### Sizes

There are many unit sizes when it comes to storage, but they all follow one of the three principles; Small units can contain up to 50 square feet of goods, medium units up to 150 square feet, and large units up to 300 square feet. Most urban self-storage facilities offer the following unit sizes:

5x5	5x10	10x10
10x15	10x20	10x30

Washington homes and apartments range in size from 1,240 square feet to 746 square feet.<sup>11</sup> The rule of thumb is to take 10% of the house's total square footage and dedicate it to personal storage space. Since the average apartment size in Washington is 746 sq. ft. and the average Washington home size is 1,240 sq. ft. You need around 74.6sqft - 124sqft of storage space as a Washington resident

<sup>11</sup> "Self Storage Industry Trends" Storagecafe (Yardi Systems Inc., n.d.), accessed November 27, 2022, <https://www.storagecafe.com/self-storage-industry-statistics/>.

## Pricing

Currently, the average cost of a 10x10 storage unit in Washington is \$162/month. Nationally, self-storage street rates for 10×10 non-climate-controlled units saw a 0.8% year-over-year increase, registering an average of \$131 in September 2022. Self-storage prices can vary depending on location as some neighborhoods might offer more budget-friendly self-storage rates than others. For example, storage units in Eckington goes for \$136/month on average, in comparison to Lamond Riggs, where renters pay \$163/month on average, and in Gallaudet, where the average street rates hover around \$190/month.<sup>12</sup>

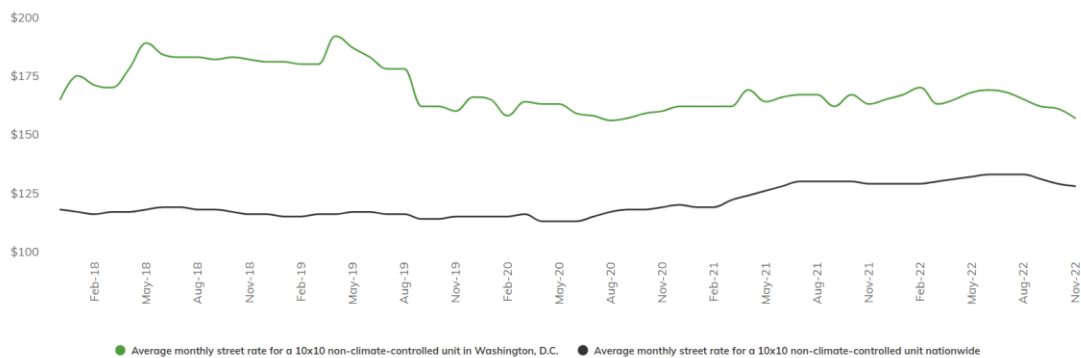


Figure 12: Comparative average monthly pay rate of D.C units to national units .  
(source by storagecafe)

### Program of a Self-Storage Facility

Self-storage facilities provide spaces for individuals to rent and store their personal or business belongings. Every facility is divided into unit, where each unit is unique in either size, classification, or amenity.<sup>13</sup> Self-storage, as opposed to full-

<sup>12</sup> “Top 30 Storage Units in Washington, DC,” *Storagecafe*, accessed November 27, 2022, <https://www.storagecafe.com/self-storage/us/dc/washington/>.

<sup>13</sup> Glidevr, “8 Types of Self Storage,” *Storage King USA* (Storage King, August 31, 2022), last modified August 31, 2022, accessed December 12, 2022, <https://www.storagekingusa.com/blog/self-storage-101/>.

service storage facilities, where clients have restricted access to their items and rely on the provider to maintain their belongings, allows the consumer much greater autonomy. Renters load the storage unit anyway they like at any time.

#### Outdoor Access Storage

Outdoor storage facilities with drive-up access are popular since they are similar to garage space in terms of convenience. Customers may load and unload things by pulling their cars, including lorries and occasionally semi-trucks, straight outside the storage facility.

#### Indoor Access Storage

Indoor storage units are located within the interior of the facility, making them more like a walk-in closet than a garage space. This not only provides shelter from the outdoors, but also access to self-storage amenities such as climate-controlled storage.

#### Climate-Controlled Storage

Climate-controlled storage containers are generally kept between 55- and 80-degrees Fahrenheit to safeguard temperature-sensitive objects from severe heat and cold. Some facilities may also feature humidity-controlled or heated storage to give further protection from the elements.

#### Vehicle Storage

Some storage facilities offer vehicle storage options for automobiles, motorcycles, trailers, campers, boats, and recreational vehicles. There are three

common types of car storage available, though storage options vary from facility to facility: indoor storage, outdoor storage, and covered outdoor storage.

#### Storage Lockers

For products/goods that can fit in spaces smaller than a 5x5 storage unit, storage lockers are the optimal answer. Lockers range in size from 2x2 to 4x5, with decreasing ceiling heights. This option ensures that the customer only pays for the space that is truly utilized.

#### Commercial Storage

The last type of storage is commercial. To suit small companies, contractors, and other commercial self-storage clients, some facilities in Washington provide unique business storage services such as warehouse spaces, workshop units, and office spaces for rent.

#### *Building with Storage Containers*

Shipping containers are not a common material used in construction. Their original purpose was to store goods that would eventually travel overseas and cross-country. However, these containers can become a great asset if all their qualities are understood and acknowledged. They are structurally sound objects, dimensionally modular and prefabricated off-site. These qualities allow for basic needs such as ample interior space for circulation, sufficient load bearing capacities, and leniency for cutting openings for future door and window installations. However, the most important quality of a shipping container is their original function to store and protect products.

## Material/Load Bearing Properties

The standard shipping container that is sold on the market is typically made from a steel type known as a weathering steel. Commonly known as “Cor-ten Steel”, this steel is a corrosion resistant steel that purposely rusts to create a layer of Patina (a brown film that appears on specific alloys) which prevents the container from rusting any further. Although beneficial regarding durability, Shipping containers lack appeal in terms of color, especially since minor corrosion is inevitable.

In terms of loads, there is no specific psi regarding a shipping container’s load bearing capacity. However, a standard 20 ft container can withstand a maximum load of approximately 33.6 tons, in addition to the weight of seven additional containers stacked above itself.<sup>14</sup> That new load is distributed evenly between the corner posts of the container. For each container, there are warning tags that specify its maximum net weight it can hold, so that any handler will not exceed the specified amount.

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<sup>14</sup> Ahmed H Radwan, “Containers Architecture Reusing Shipping Containers in Making Creative Architectural Spaces,” *International Journal of Scientific and Engineering Research* (Helwan University, December 26, 2015), last modified December 26, 2015, accessed December 12, 2022, [https://www.academia.edu/19837817/Containers\\_Architecture\\_Reusing\\_Shipping\\_Containers\\_in\\_making\\_creative\\_Architectural\\_Spaces](https://www.academia.edu/19837817/Containers_Architecture_Reusing_Shipping_Containers_in_making_creative_Architectural_Spaces), 1564.

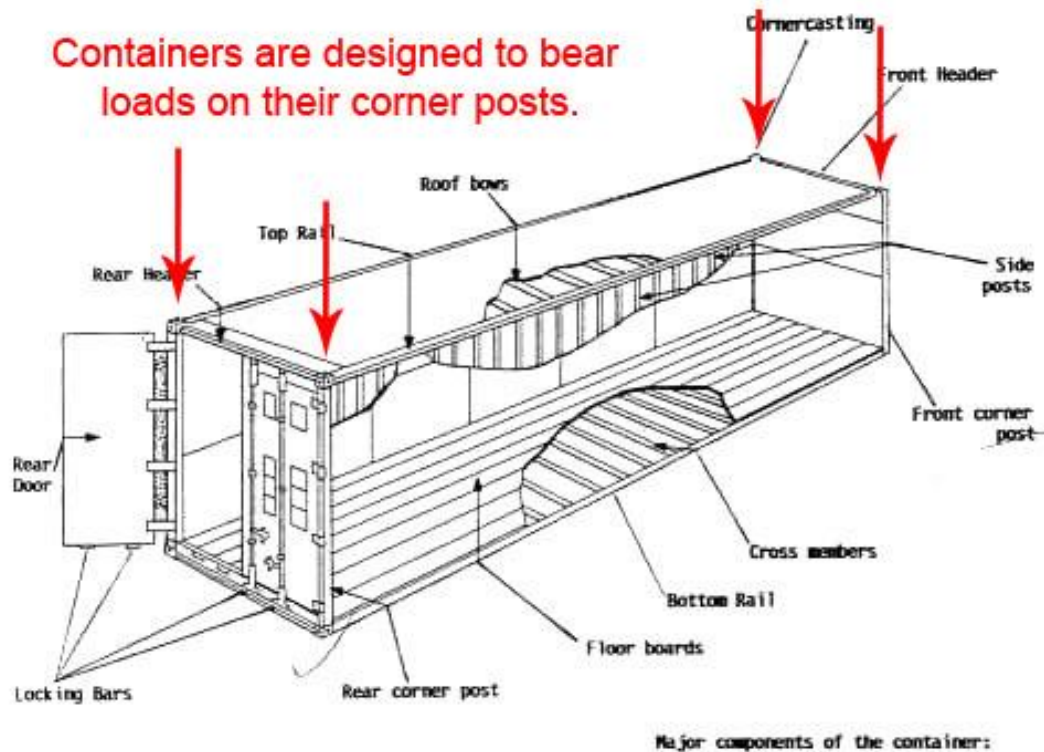


Figure 13: A diagram illustrating the separate parts and components of a basic shipping container. (source by Containers Architecture)

#### Grade/Classification

Shipping containers are categorized and graded based on their structural and aesthetic quality. The CSC (Convention for Safe Container) is the organization responsible for officially certifying if the quality of the shipping container is safe enough for transportation or construction. Several container companies follow the CSC's standards for safety and generally devise three main grades which are:

1. A Grade Containers:

Containers of the highest quality. These containers are in excellent condition, but they also may not be unless officially certified by the CSC. These containers are in clean cosmetic condition with little to no major dents/dings, minimal superficial rust, and have a valid CSC plate.



Figure 14: Example of a A grade shipping container (source by boxman)

## 2. B Grade Containers:

Containers of mediocre quality. They may have a few dents and scratches but are still in wind and watertight condition. There is a medium level of superficial rust and corrosion, but the container itself will be in good condition overall and is well suited for any type of storage purpose, but not so much regarding the construction of buildings.



Figure 15: Example of a B grade shipping container (source by boxman)

## 3. C Grade Containers:

Containers of lower quality but are available for purchase if customers are seeking raw materials or steel scraps. Containers of this grade have a lower visual appeal due to the extensive cosmetic damage that it had suffered. They



are prone to have medium to large holes on the exterior and large dents that discourage its purchase.



Figure 16: Example of an C grade shipping container (source by boxman)

### Sizing

In the mass cargo industry, there are two standard sizes of shipping containers available for civilians to purchase. Their sizes vary primarily in depth more so than in width, where the common width of these containers is around 8 to 12 feet.

#### 1. 20ft Long Containers:

The standard 20ft shipping container is a popular pick for many people who decide to build a home out of shipping containers. They are easier to maneuver and due to their size can be easily combined and modified to create exceptional living spaces.

#### 2. 40ft Long Containers:

The most common shipping container is the 40ft container and most large shipping container homes have utilized these containers. They offer exceptional value for money and considerable internal space.

## Chapter 5: Site Analysis

This chapter will select and analyze a specific site located within Southeast D.C. based on a set of criteria. When cycling through potential sites for this thesis, the following categories were brainstormed and deemed to be relevant in selection: Site Connectivity, Site Assets and Site Environment. The category “Site Connectivity” refers to criteria that touch on urban accessibility and methods of transportation. This includes things like walkability, vehicular access, access to public transportation and access to bike stations and bike routes. “Site Assets” refers to spaces and areas near the selected site. This includes access to a residential/commercial district, access to parks, access to open public spaces, access to the Anacostia waterfront etc. Finally, the “site environment” category refers to existing natural or artificial limits of the site such as access to park spaces, flood risks, high/low permeable surfaces and high/low tree canopy.

### Site Selection

Using the listed criteria from above, the Anacostia Metro Station block off Howard Road was proposed as the primary site area for this thesis. It lies between the residential realm of Barry Farms and the commercial district of Martin Luther King Avenue and is currently classified as a MU-14 zone by DCOZ. MU-14 zones in development typically mean that the project can be a mix of both residential and commercial use, so long as the building height does not exceed 90-100ft as well as stay within a FAR of 5-6. This site has high levels of connectivity and urban assets/amenities. The only criteria that it lacks on (but can be easily configured) is the

environmental aspect where it lacks in immediate park spaces, it has little to no tree canopy, and it has high levels of permeable surfaces.

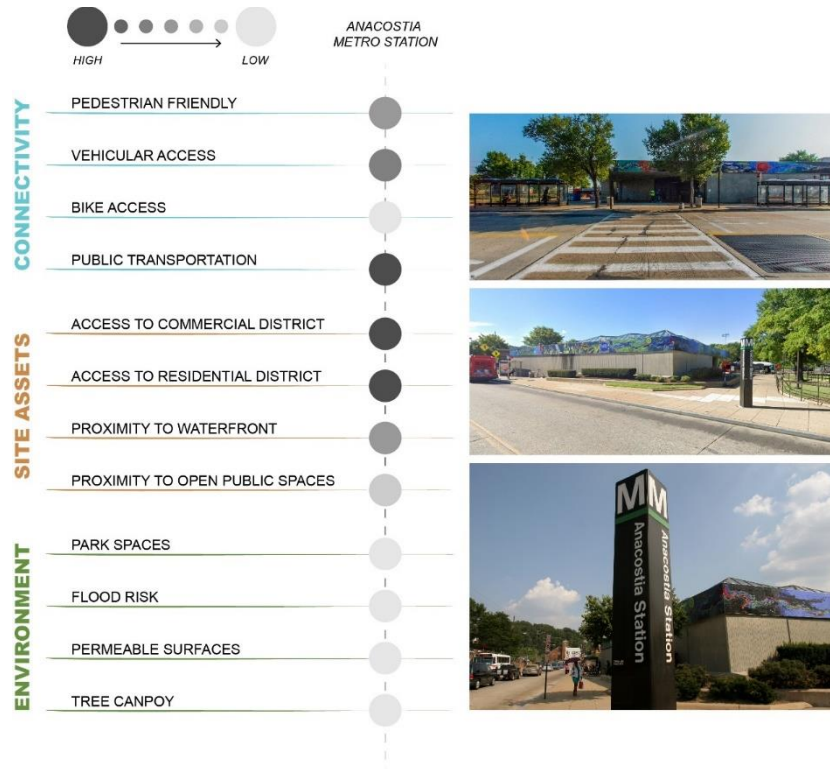
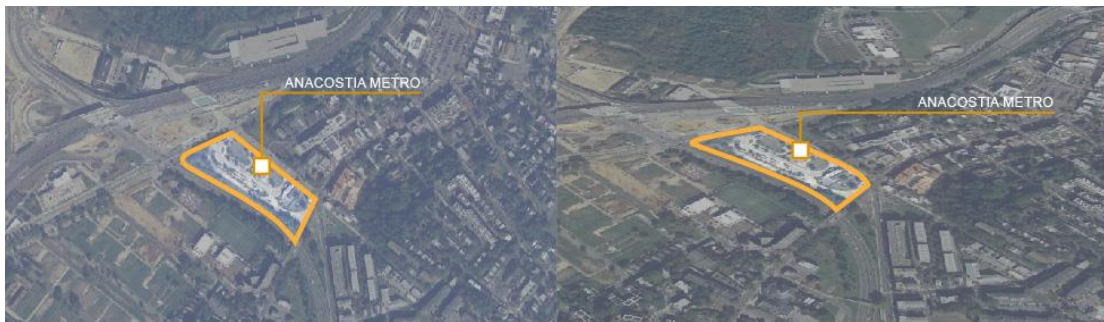


Figure 17: Site matrix and pictures of the Anacostia Metro Station (source by author)



Figures 18 & 19: Aerial and site plan of the Anacostia Metro Station (source by author)

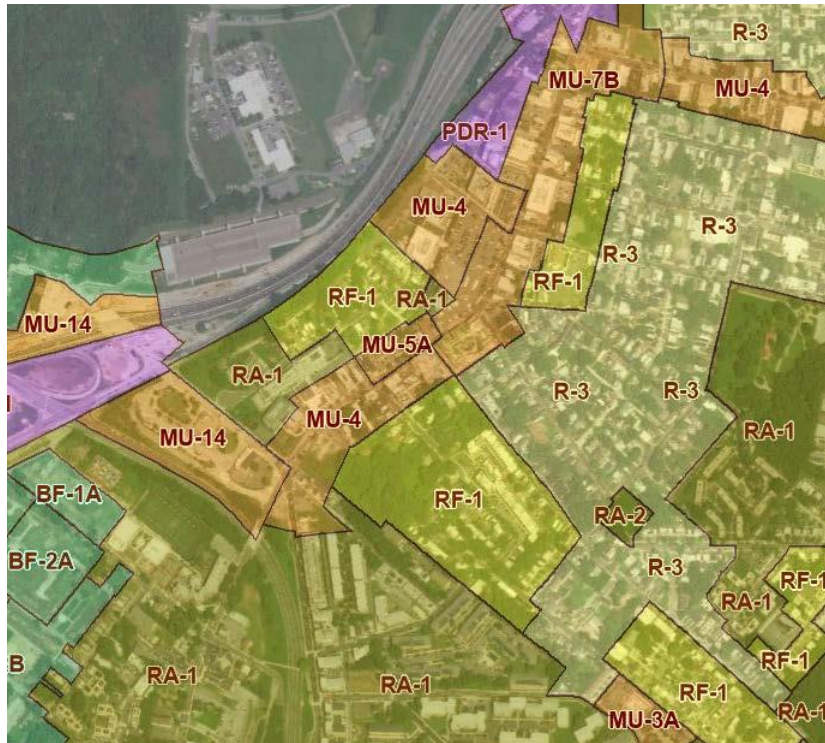


Figure 20: Zoned areas present in Anacostia (source by DCOZ)

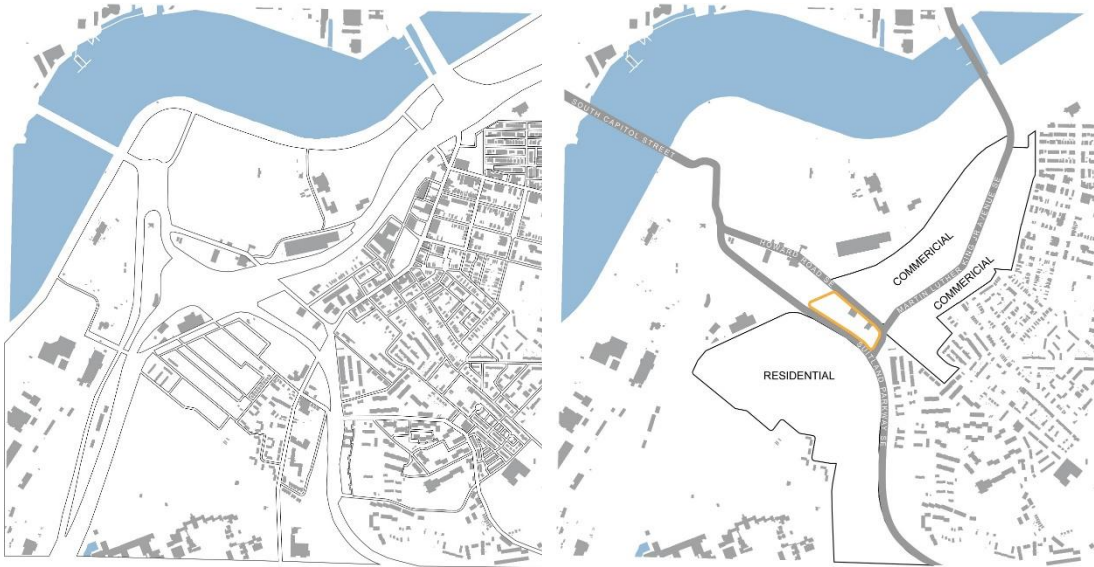
Development Standards								
	Floor Area Ratio (max.) <sup>1</sup>	Height (ft.)	Penthouse Height (ft.)/Stories <sup>1</sup>	Lot Occupancy (percentage)	Rear Setback (ft.)	Side Setback (ft.)	Green Area Ratio	Zoning Regulation Reference
MU-14	6.0	90	20 (1 story plus mezzanine)	75	12 ft. (for residential uses only)	No side yard required; minimum 8 feet if provided	0.30	Subtitle G, Chapter 5
	7.2 (IZ)	100 (IZ)	Second story permitted for penthouse mechanical space	80 (IZ)				
	5.0 (non-residential)							

Figure 21: MU-14 zoning standards (source by DCOZ)

### Urbanistic Elements

When looking at the Anacostia Metro station in figure ground, it can be clearly seen that there is a lack of defined urban tissue. There is no organizing street grid, centralized public space or civic heart, safe pedestrian environment, connection to the Anacostia waterfront or abundance of greenery. The blocks that formulate the

commercial and residential realms are organic and unconstrained by any urban planning theories or principles.



Figures 22 & 23: Urban blocks and commercial/residential realms present in Anacostia (source by author)

Yet, the Anacostia region remains varied in building usage. Along MLK Avenue are several landmarks, such as the Big Chair Statue, Frederick Douglas House, the Thurgood Good Marshall Academy and the innumerable amounts of churches that proliferate the site. All of these landmarks are within 5-15 minutes walking distance. Given that the Anacostia Metro Station appears to be both an epicenter of the Anacostia neighborhood, as well as a node for transportation and potentially for retail – it becomes an opportunity site for what was discussed in previous chapters – a commercial heart.





Figure 24: Site edges based on blocks and natural context (source by author)

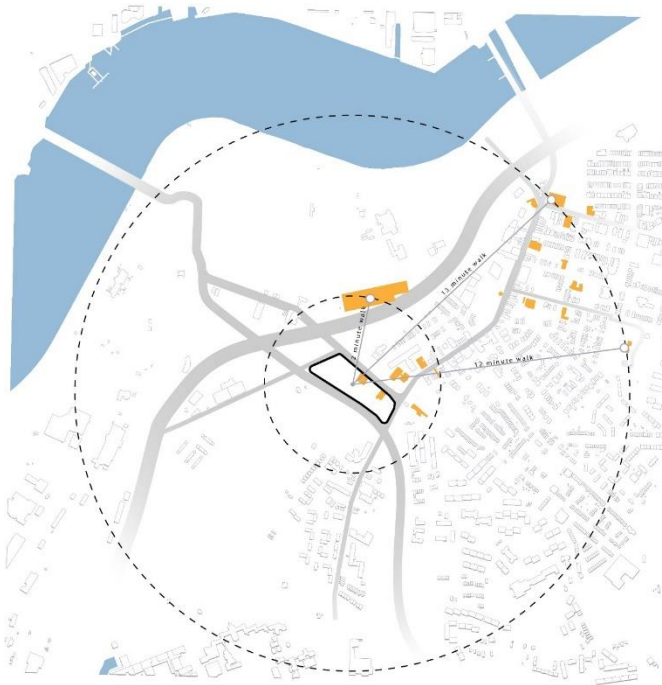


Figure 25: Landmarks and walkability distances from the site (source by author)



Figure 26: Site nodes along Howard Road and MLK Ave (source by author)

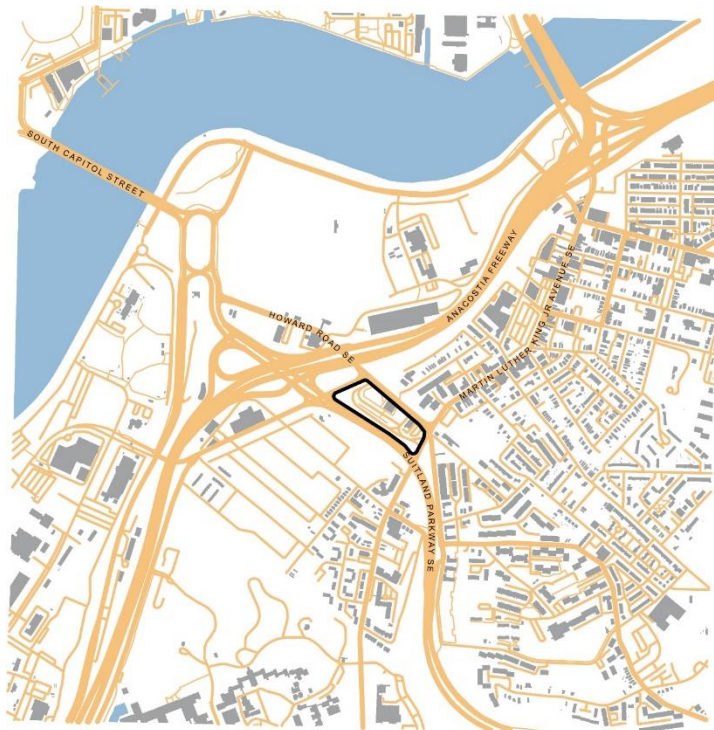


Figure 27: All existing paths nearby the Anacostia Metro Station (source by author)

### Architectural Elements

In terms of the built environment, the local building materials around the station is diverse. Although many buildings within this region tend to use brick and other types of masonry for construction, the methodology in façade design is unique for each block.

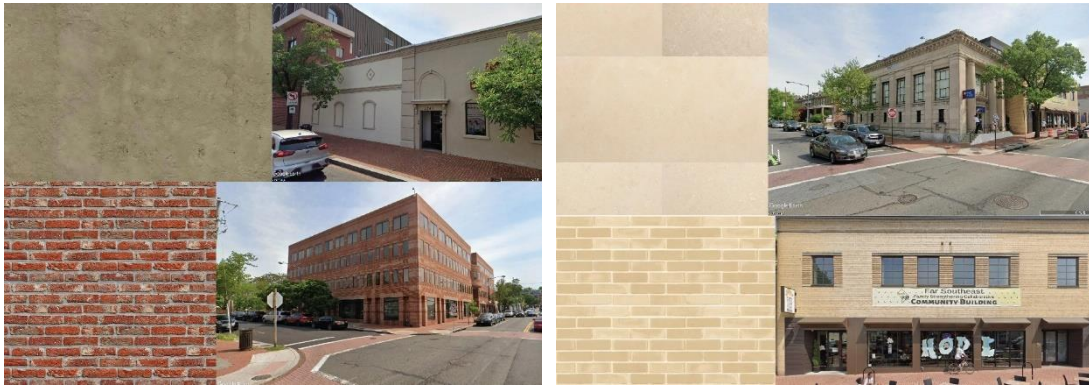


Figure 28: Several local building materials in Martin Luther King Avenue  
(source by author)

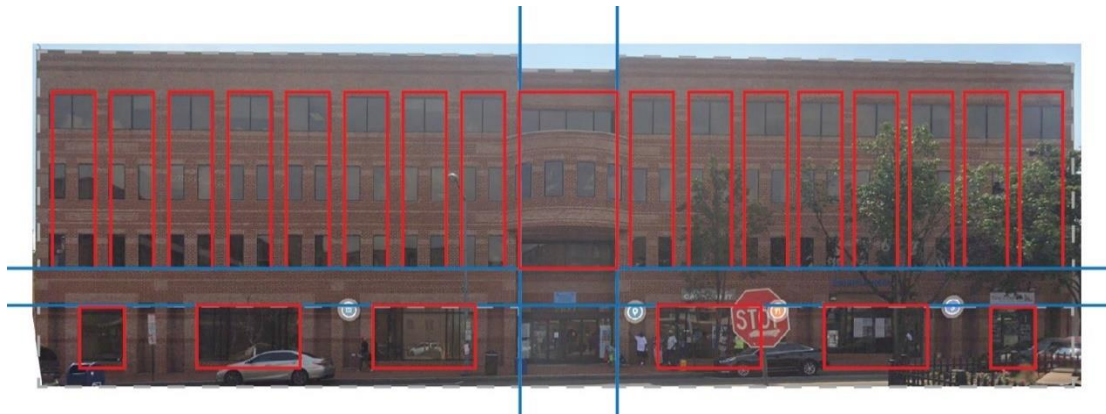


Figure 29: Western elevation of the Anacostia Service Center.





Figure 30: Several architectural typologies available within the commercial and residential realms of Anacostia (source by author).

### *User Experience*

In Anacostia, the amount of ‘public place’ that is available to the average visitor is sparse and sorely lacking. The only potential areas of ‘public place’ available to Anacostia that might be worth visiting is the Frederick Douglass House, Anacostia Park

and the Barry Farms recreational center. Since the Metro station sits between the two, there is a major opportunity to create a synthesis between the three places.



Figure 31: Several architectural typologies available within the commercial and residential realms of Anacostia (source by author).

### Environmental

Environmental considerations are also important factors to consider when analyzing east of the Anacostia River. The Anacostia Metro Station is situated in a moderately temperamental city that experiences a wide range of weather annually. The

relationship between land and water is an important consideration to understanding how the city edge can be built up in the future. This section will focus on the topography, waterflows and sun studies of the local region of Anacostia.

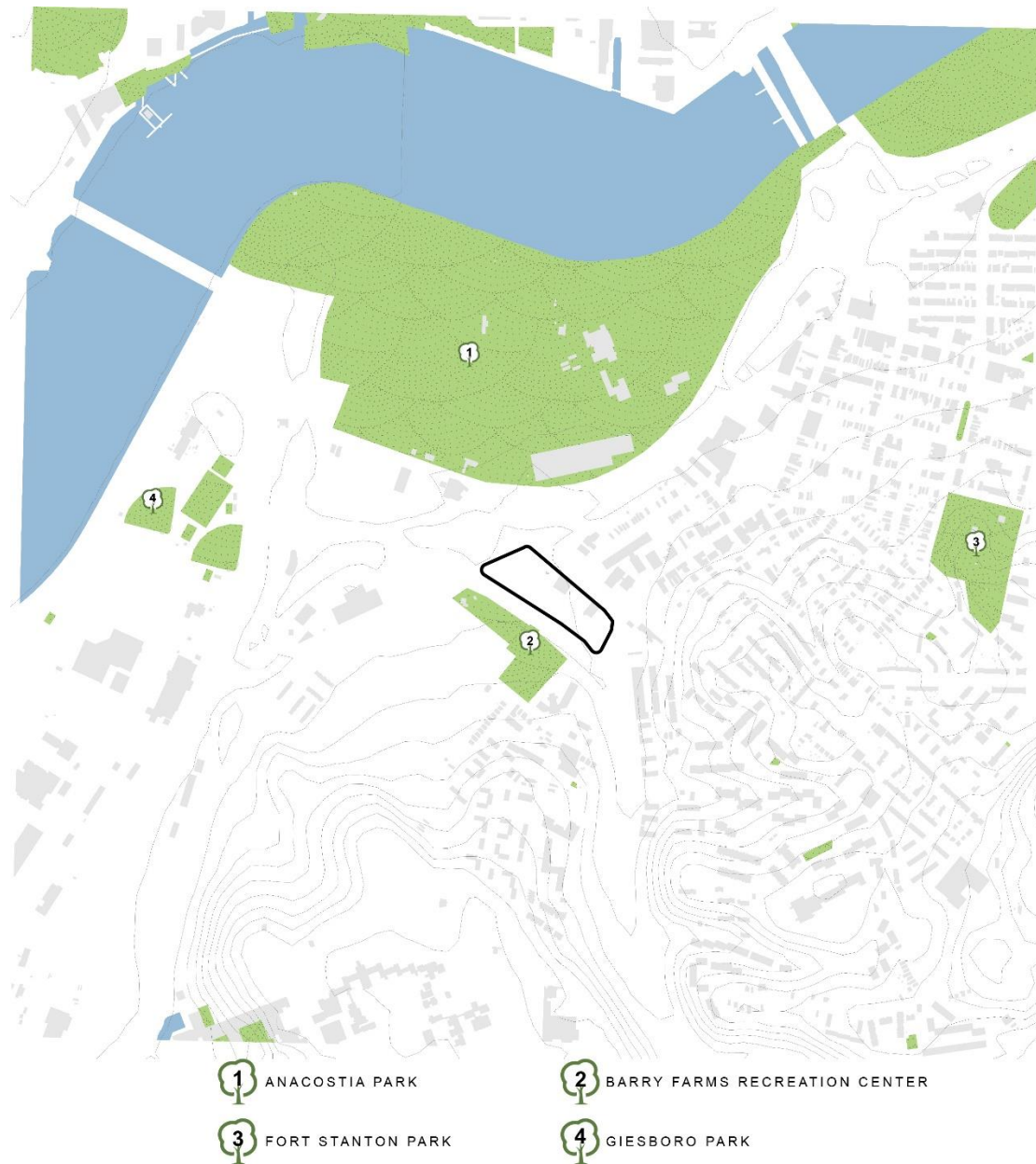


Figure 32: Parks near the site including Anacostia Park (source by author)



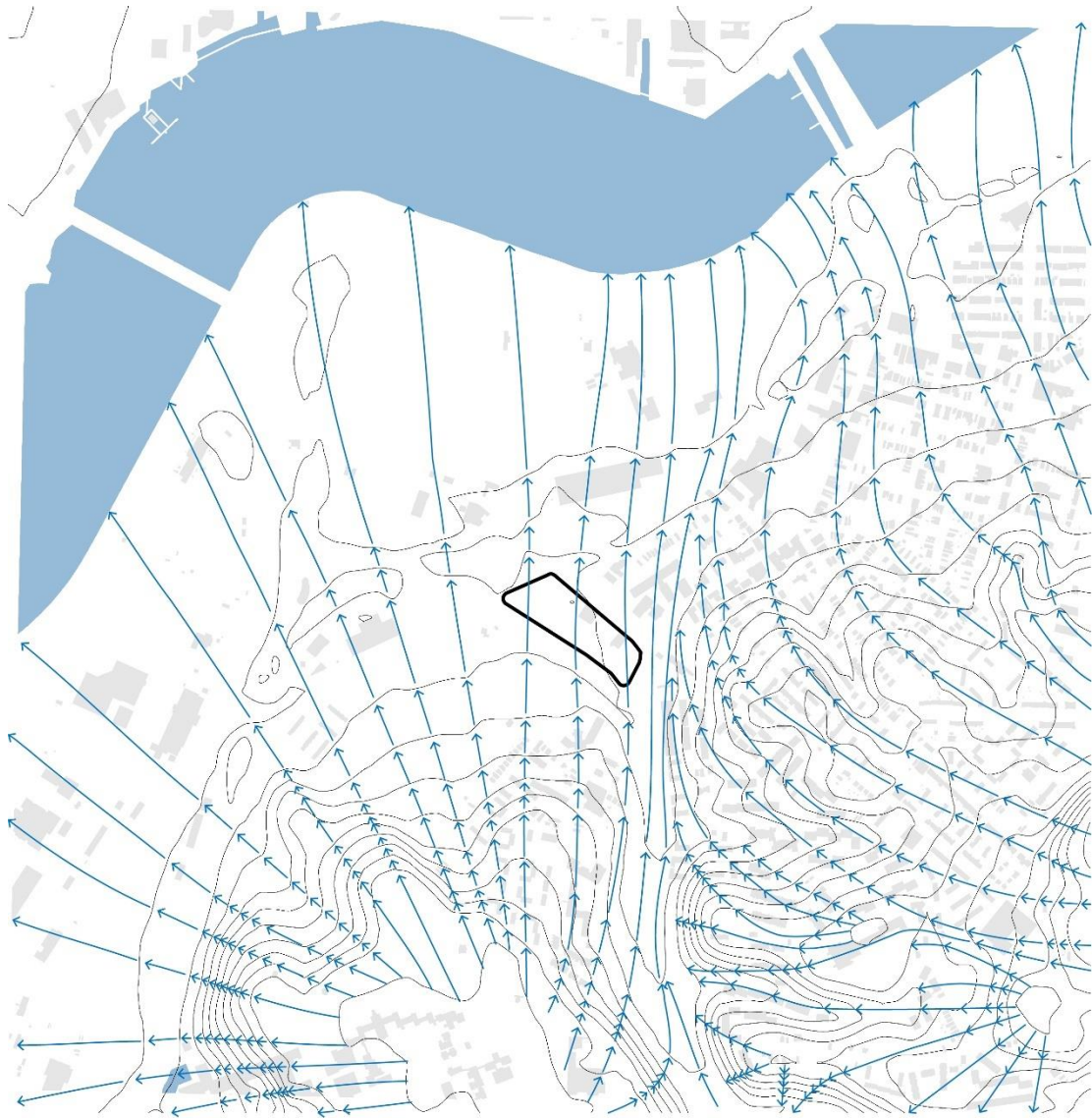


Figure 33: Water flow diagram that indicates water runs south to north into the Anacostia River (source by author)

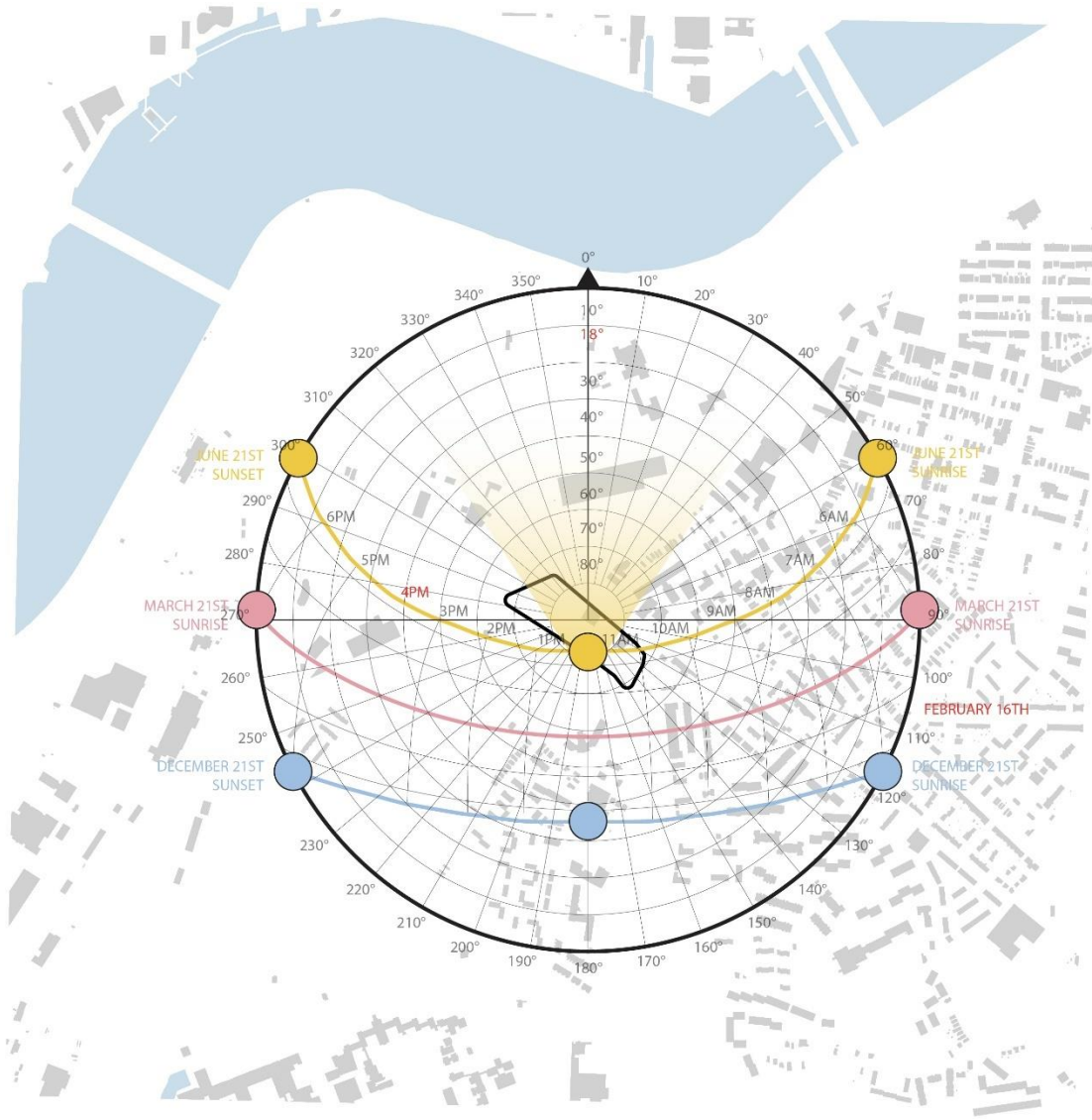


Figure 34: Sun path placed within the site (source by author)

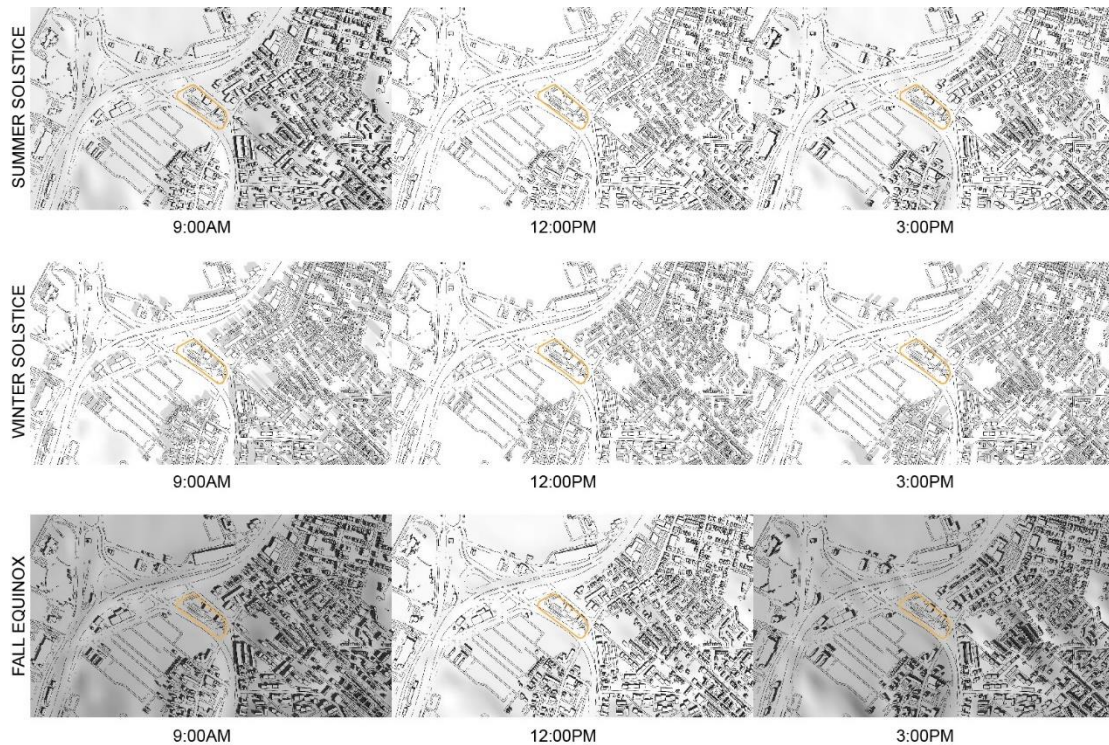


Figure 35: Sun studies taken at all Solstices during sunrise, noon and sunset  
(source by author)

## Chapter 6: Designing for The Future

As our generation moves into the future, the need to prioritize sustainability becomes dire. The practice of sustainable design lowers adverse effects on the environment, as well improve the health and comfort of building inhabitants - ultimately enhancing building performance. This is especially true in more urban areas, as the density and population increase exponentially over time.

### Urban Farming

As the global urban population continues to expand, there is increased demand to supply stable food supplies for people dwelling within the city. Numerous urban centers are located hundreds or thousands of miles from farms, which has a negative impact on agriculture. To locally supply urban environments, it is necessary to

implement innovative methods of food and agricultural production. As a result of its influence on the populace, there has been a recent surge in interest in urban farming techniques. In addition to affecting the food supply, urban agriculture has social/economic and health benefits for cities. This section will explore urban farming techniques as a means of redefining a sense of community.

#### Advantages of Urban Farming

Urban gardening increases access to nutritious, locally farmed, and culturally acceptable foods. Having a place to produce and share food is particularly crucial in underserved areas where acquiring inexpensive fruits and vegetables may be difficult. Furthermore, producing and consuming food locally lowers the distance food travels to our plates, which is excellent for both decreasing our carbon footprint and boosting our health, since food loses nutritious content during transportation. Urban farming is also beneficial as the physical action of growing food boosts physical and mental health. Research shows that working with plants—and putting our hands in the dirt—provides outdoor physical activity, induces relaxation, and reduces stress, anxiety, blood pressure, and muscle tension.<sup>15</sup> Regarding the economic benefits, urban agriculture can also provide a flexible source of income for gardeners and cut family food costs. There are even some organizations, like Mill City Grows, that provide job training and jumpstart individuals interested in the food entrepreneurship.<sup>16</sup>

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<sup>15</sup> Dewey, Sara. “The Power of Urban Agriculture in Transforming a Community.” Conservation Law Foundation. Last modified December 23, 2021. Accessed December 12, 2022. <https://www.clf.org/blog/the-power-of-urban-agriculture-in-transforming-a-community/>.

<sup>16</sup> “Mission, Vision & Impact,” *Mill City Grows*, last modified August 30, 2022, accessed December 12, 2022, <https://www.millcitygrows.org/mission-vision-impact/>.





Figure 36: Influence diagram of urban farming in communities (source by archdaily)

Urban agriculture creates and maintains green space in cities, providing places for neighbors to gather, strengthen connections, and develop community cohesion. People are connected to the ground and the source of their food via urban agriculture, as well as to one another. Furthermore, urban farms provide critical opportunities for youthful leadership, intergenerational cooperation, and cross-cultural education.

Finally, in the face of increasing storms and temperatures, urban agriculture improves environmental health and climate resilience. The absorption of precipitation by cultivated land prevents runoff from overflowing sewage systems and damaging rivers. Additionally, by increasing vegetation and tree cover, farms and gardens attract pollinators such as bees and make city areas cooler, therefore mitigating the health effects of the heat island effect.



## Renewable Energy

The integration of sustainability and renewable energy resources into a city is an effective strategy for addressing environmental concerns. Approximately 75% of the world's total energy use occurs within cities.<sup>17</sup> Unfortunately, most cities in the United States are seriously unprepared for climate change adaptation and the process to incorporate the necessary technology into the city is difficult. Nonetheless, Washington D.C still has a great opportunity to derive energy from multiple renewable resources such as the Sun, the Potomac and Anacostia Rivers, seasonal winds and existing city sewage systems. Given the geographical centrality of the city, D.C has access to most-if-not-all of the listed resources above.

### Net Zero Energy Buildings

The District of Columbia has an opportunity to build Net Zero Energy Buildings (NZEB). The idea behind a Net Zero Energy Building (NZEB), is that it is a structure that generates as much energy as it consumes in one year. The primary metric that is used to measure a NZEB's approximate energy consumption is called Energy Usage Intensity (EUI). If the building's EUI is below 0, then it is considered NZEB. However, there are only a handful of efficient buildings that match the criteria for the term "Net Zero." They may achieve this status of being Net-zero through a multitude of active/passive strategies that are associated with LEED scorecards such as sustainable

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<sup>17</sup> Daniel M. Kammen and Deborah A. Sunter, "City-Integrated Renewable Energy for Urban Sustainability," *Science* 352, no. 6288 (2016): 922-928, 922.

sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality.<sup>18</sup>

*Passive Strategies Case Study: David and Lucile Packard Foundation*

The David and Lucile Packard Foundation Headquarters is one building precedent that has achieved NZEB status with a measured -4 EUI. The architects of this project accomplished this by prioritizing and integrating passive strategies early in the design process to reduce energy needs that are met by appropriate active technologies. Some of the passive strategies that this precedent executes are building mass/orientation, rainwater/stormwater management, natural ventilation, improved building envelope, sun shading, vegetation, and building materiality.<sup>19</sup>



Figure 37: Northeast exterior of the David and Lucile Headquarters (source by archdaily)

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<sup>18</sup> “LEED Scorecard,” *LEED Scorecard* / U.S. Green Building Council (USGBC, n.d.), accessed December 12, 2022, <https://www.usgbc.org/leed-tools/scorecard>.

<sup>19</sup> “Verified ZNE Office: David and Lucile Packard Foundation,” *New Buildings Institute* (NBI, May 26, 2021), last modified May 26, 2021, accessed December 12, 2022, <https://newbuildings.org/resource/david-and-lucille-packard-foundation-case-study/>.

### Building Mass/Orientation

The 40-foot-wide building maximizes daylighting and natural ventilation potential by having 80% of occupiable areas within 15 feet of operable windows. Furthermore, the U-shape arrangement of the building allows for maximum exposure of daylighting from sunrise to sunset.

### Rainwater Collection + Stormwater Management

This headquarters has several rain gardens on both pavement and rooftops to capture and reuse rainwater. According to reports, around 90% of rainwater that is produced by a 24-hour, 2 year storm can be absorbed and redirected on site as the project reduced impervious landscaping from 97% to 35%.

### Natural Ventilation

In addition to the sunshades being automatic, the David and Lucile Packard Foundation Headquarters also has operable windows to allow for maximized natural ventilation. There is a computer program that notifies employees of ideal times to open windows at times of the day – depending on a variety of factors.

### Improved Building Envelope

The perimeter of the headquarters is continuously insulated with wood framed walls that store and release heat at a slow rate throughout the day, eliminating the need for constant active heating. In addition, all curtain walls are triple glazed, with high insulative properties which ensure a stable interior climate for areas exposed to daylight.

## Vegetation

Native wetland and grassland ecosystems define the building parti, by separating the building masses. Natively sourced plants reaffirm a healthy ecosystem. Biophilia created by a green roof system with shallow rooting native succulents.

## Materiality

Wood sourced from rapidly growing, locally sourced eucalyptus trees Materials chosen for desirable weathering properties reduce need for replacement over time. Wood and steel hybrid system. Concrete replaces cement with 70% slag, decreasing embodied carbon. 95% of materials from construction were diverted from a landfill.

### Active Strategies Case Study: The AGU Headquarters

The AGU Headquarters in Dupont Circle is a LEED Platinum Project that is more infamous for its predominant use in active technologies. This commercial infrastructure has a varied mix of active strategies which include: <sup>20</sup>

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<sup>20</sup> "Learn about the Building," Building AGU (AGU, n.d.), accessed December 12, 2022, <https://www.agu.org/Building/Pages/Learn-About>.



Figure 39: Exterior of the AGUE Headquarters (source by archdaily)

#### Solar panels

More than 700 solar panels at the refurbished headquarters harness the sun's energy to generate direct current (DC), which can be fed to low-voltage devices, such as LED lights and laptops, within the restored offices. In the summer, the solar array generates power from the sun when energy is most expensive to acquire, and demand is at its height. This reduces the building's carbon footprint and helps reduce power costs. On bright days, the solar array can provide all the electricity required by the refurbished structure.

#### Radiant cooling

By circulating chilled water via a network of ceiling-mounted pipes, a hydronic cooling system helps to maintain a consistent, pleasant temperature throughout the

AGU headquarters. The cooled ceiling panels absorb the heat created by the building's occupants, lighting, and equipment. A dedicated outdoor air system (DOAS) interacts with the radiant cooling system to provide ventilation, pressurization, and humidity controls for the whole structure.

#### Green Wall

The AGU headquarters incorporates a six-story hydroponic phytoremediation wall system within its interior. The wall works in tandem with the building's HVAC system to reduce energy use and improve indoor air quality. Air from the inside of the building is pushed through the root systems of the live plants that make up the wall, where it is cleaned and filtered of carbon dioxide before being pumped back inside. If the recovered air is cleaner than outside air, it is determined by an air quality management system (AQMS). If so, the air is pumped back into the building. Since external air is often used to ventilate buildings, heating and cooling the air is necessary in the winter and summer, respectively. By filtering air that is already the correct temperature and humidity, the green wall at the AGU's headquarters may lower the building's energy use by up to 30%.

#### Direct current power

Electricity loses around 20% of its energy efficiency when converted from alternating current (AC) to direct current (DC). To offset this loss, the remodeled AGU headquarters directly powers low-voltage devices like LED lightbulbs, computers, printers, phone chargers, and even kitchen appliances with the DC energy generated by its solar panels. DC power is generated by solar panels and continuously monitored by

ceiling-mounted controls. The energy supplied to these low-voltage devices switches automatically to the city's AC power supply if there is insufficient solar power, which may happen on cloudy days and in the evening.

#### Sewer Heat Exchanger

AGU uses a heat exchange system for city sewers to lessen its carbon impact. One of the first of its type in the United States, this system, also known as a Huber system, uses the city's existing sewage network to generate a heat exchange that simultaneously warms and cools the structure. A sewage heat exchanger's main job is to transfer heat from the building to the sewer during warmer months and, under some circumstances, to absorb heat from the sewer during colder months. Prior to being circulated within the AGU headquarters, the Huber system diverts local effluent to an exterior settling tank. The wastewater is eventually sent to an exchange system, where it is heated and cooled using energy (heat) removed from the water, and then returned to the sewer system. The building's radiant cooling system utilizes water from the Huber system to run in "free cooling" mode when sewage temperatures are low, enabling the building's water-to-water heat pump to be turned off. This saves a significant volume of potable water and eliminates the need for a cooling tower on top of the AGU headquarters.

#### SmartGlass windows

The restored headquarters has a total of 929 windows, equal to a value of 11,227 square feet. Sage Glass Lightzone, a triple-pane smart glass that regulates light, heat, and glare, is used to make all windows. The tint on the windows changes brightness or

darkness in response to changes in sunlight. The building's interior lights are also linked to the windows, enabling them to react by shining brighter, for instance, when the tint darkens, maximizing the effectiveness of electrical illumination. The triple-paned glass also enhances the building's acoustics by dampening sounds from the buildings' bustling surroundings.

## Chapter 7: Concept, Form and Program Iterations

### Master Planning

When strategizing the master plan of this thesis, several design intentions were changed over the course of time. Firstly, the initial intention of creating a storage facility had been overridden, as Anacostia seemed to need more of a well-established urban market more so than another storage facility. This was made apparent through the constant site visits and recommendations by the residents in the area. This unfortunately meant that the goal of using storage containers to frame the building would be discarded – as they would no longer be useful with the newly changed objective. Secondly, because of the large and open plot of space within the station, it was found to be more effective if the market was designed as the center piece in between newly built transit-oriented development. The newer pieces of development would help frame the perimeter of the market, densify the site, and create a great public atmosphere. Several iterations of the masterplan were processed and experimented with, all of which were influenced by case studies of successful markets globally.



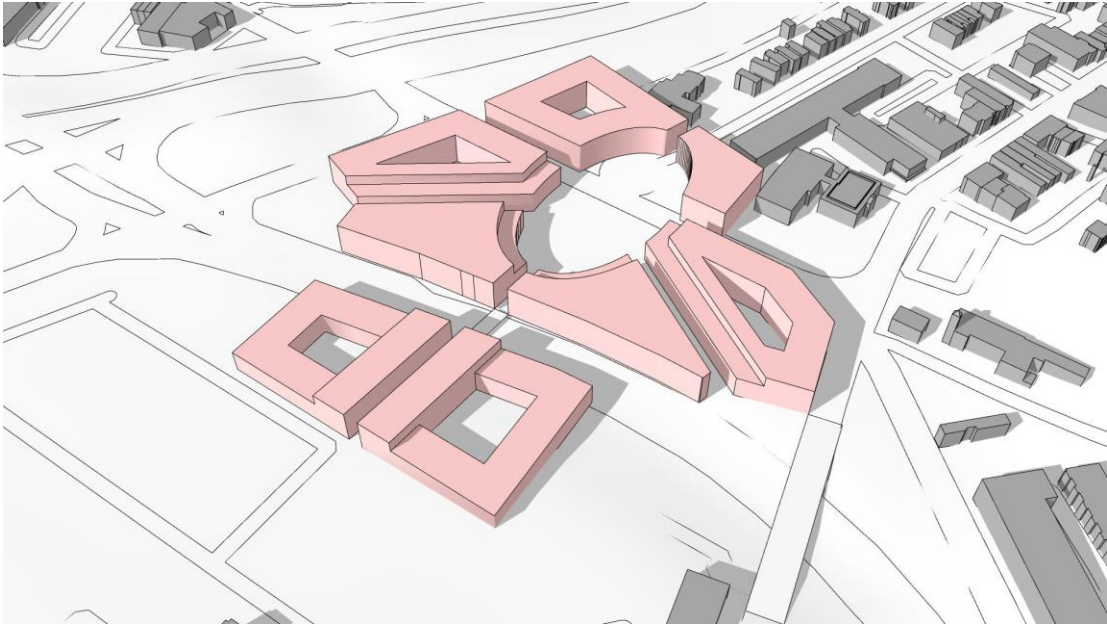


Figure 40: First version of the masterplan, which aimed to create a central gathering area for market consumers. (source by author)

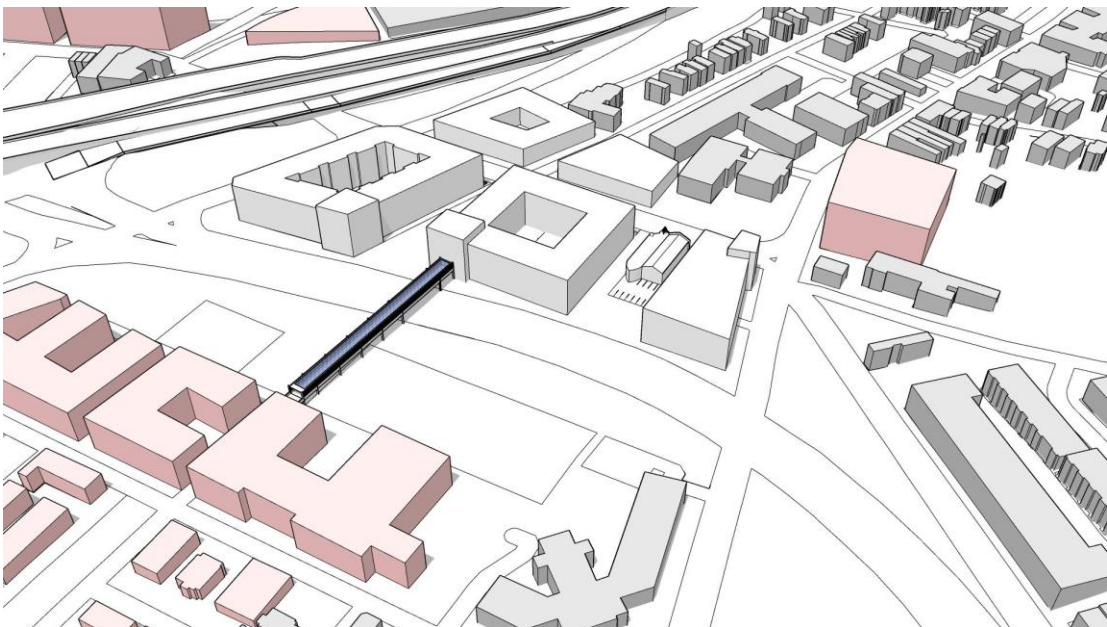


Figure 41: The second version of the masterplan has the market as the focal point, connected by a pedestrian bridge that spans Suitland Parkway. (source by author)

All schemes, attempted to define the market building itself as either the central part of the site, or used an outdoor space as the epicenter of the master plan.

### Urban Marketplace Concept Explorations

Many urban market case studies were analyzed to determine the most successful forms of the building. Consider the Eastern Market, a market located in the Capitol Hill area of Washington, D.C. This is a successful example for its utilization of indoor and outdoor venues that showcase local retail and food businesses, as well as a rentable community event area. The market's assortment of seasonal programming, reasonable stall rentals, and recently refurbished interior all contribute to the space's lively and inclusive public vibe.

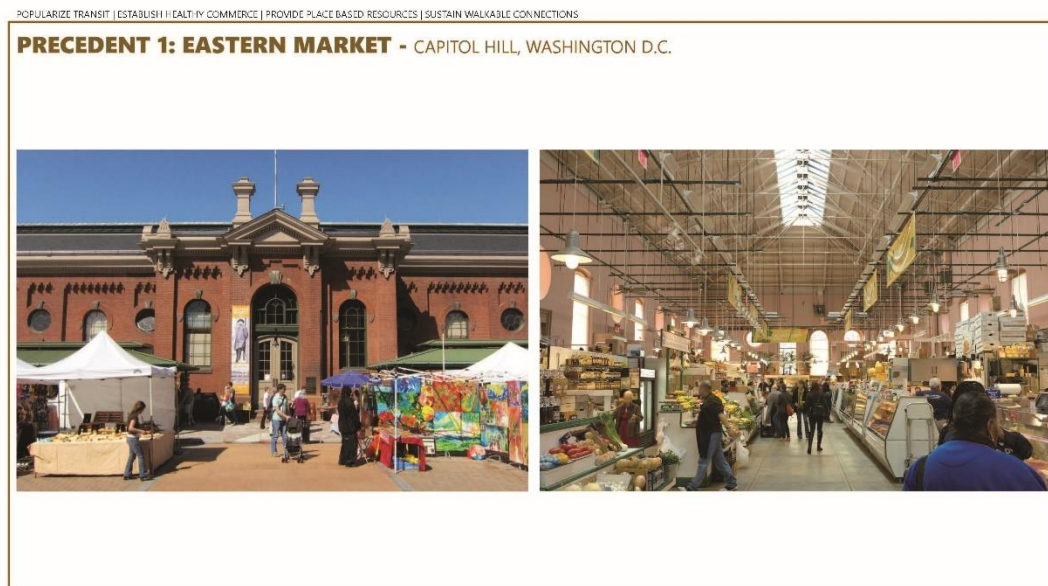


Figure 42: Eastern Market in Capitol Hill, Washington D.C (source by author)

Building scale can also differ between urban marketplaces. The Budapest Market in Hungary is a great example. Much of the success of the Budapest market is attributable to the size of its building footprint. Due to its size, the market can accommodate a variety of sellers within its walls. On the bottom floor, there are airy stalls selling an assortment of fresh fruit, regional delicacies, and other popular items. The upper floor contains more general commerce items, such as confections, snacks,

and souvenirs. Anacostia requires this communal focus on the public good and goal to unite both thriving and declining economies considering recent development attempts and the shortage of healthy foods.

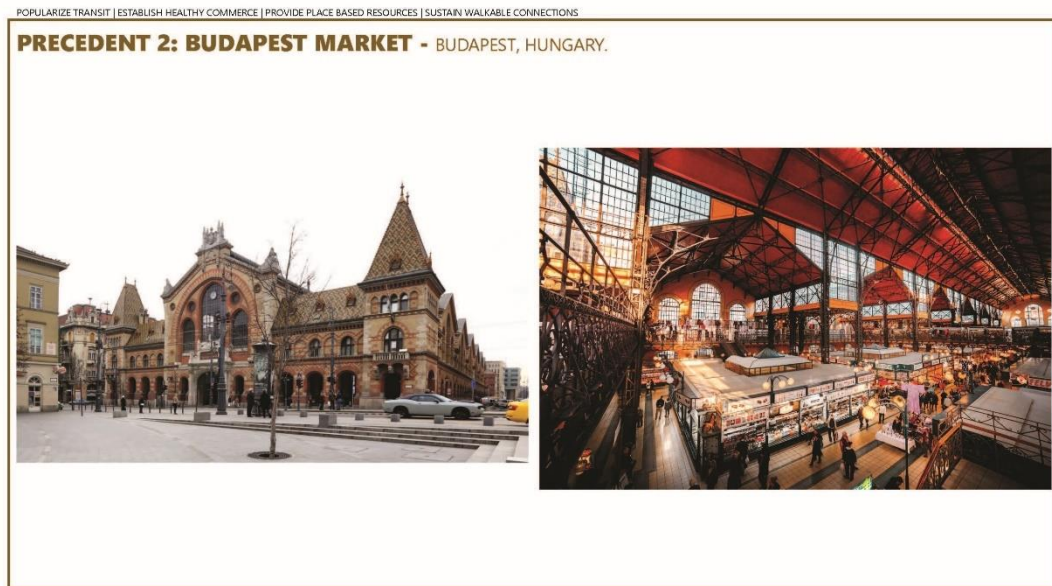
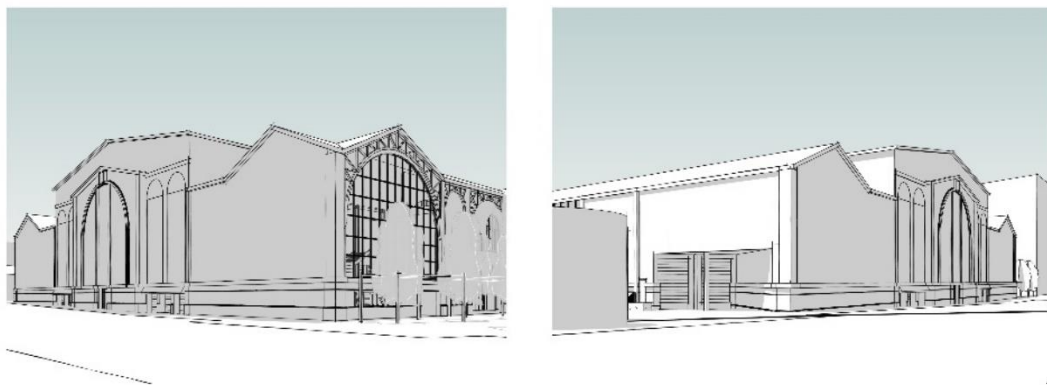


Figure 42: Budapest Market in Budapest, Hungary (source by author)

As a result of all the precedent analysis and influence of existing case studies, the form and massing of the market had been through several iterations.



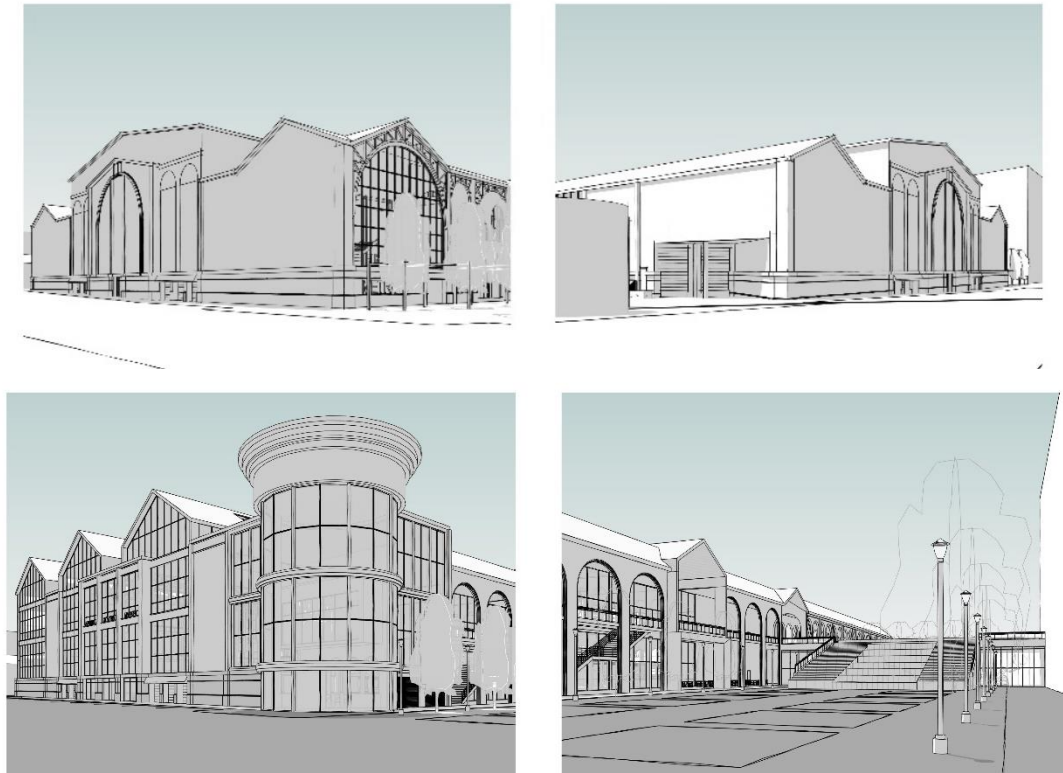


Figure 43: Massing and form iterations (source by author)

## Chapter 8: Final Results

### Final Design Outcomes

Ultimately, this thesis aims to create a public heart for Anacostia by using an urban market as a catalyst for future public gatherings and healthy living. There are four main design objectives behind this market, which are to popularize transportation, establish healthy commerce, provide place-based resources, and sustain a walkable connection between the market itself and the local community. These goals are attained through urban and building approach strategies.

The best location for the proposed market, according to the urban approach of this thesis, is right above the metro station. It was also determined that it would be



preferable to construct the market as an "integrated gemstone" between an existing United House of Prayer Church and a new apartment complex. This increases the church's worth and prevents big destruction plans.



Figure 44: Existing and proposed site plan (source by author)

When planning the urban scheme, the project was divided into several components, with each component achieving the objectives to popularize transportation, establish healthy commerce, provide place-based resources, and sustain a walkable connection between the market and the local community.

**URBAN APPROACH**

Figure 45: Places diagram showing all major spaces and buildings of the masterplan (source by author)

Beginning west of the site, there is Howard Plaza which is a shared congregation space used for large outdoor events such as a seasonal farmers market or flea market. This plaza contains a central amphitheater with retail on the lower floors and seating at the upper platform to investigate the plaza or into Suitland Parkway.

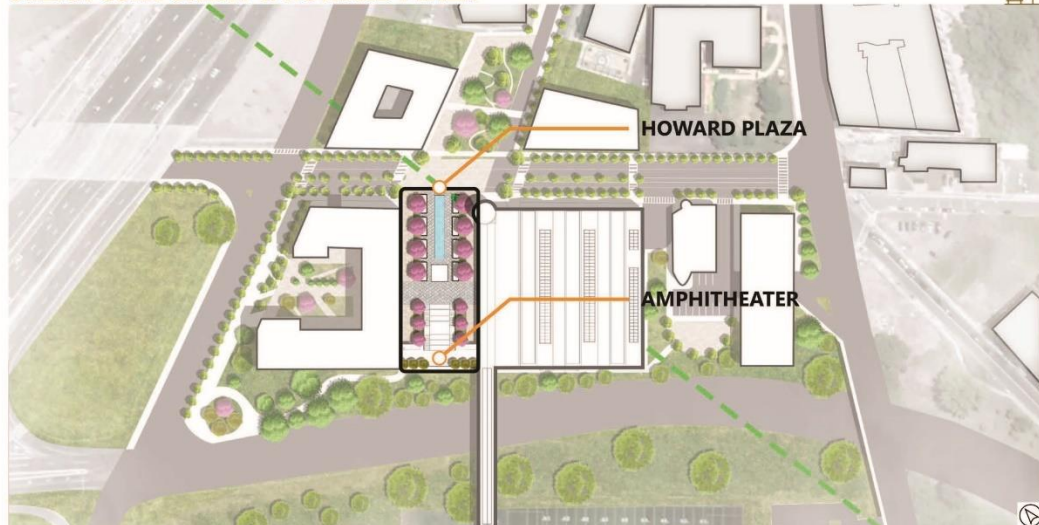
**URBAN COMPONENT 1: HOWARD PLAZA**

Figure 44: Howard plaza and amphitheater (source by author)

Howard plaza changes its uses during the seasons, which allows visitors to experience the full extent of the public atmosphere on any given day. For instance, during Christmas Eve there might be a large gathering for all locals of Anacostia to celebrate the winter holidays. Or maybe in the summer, the annual flea market takes place - offering cheap and affordable goods to all.

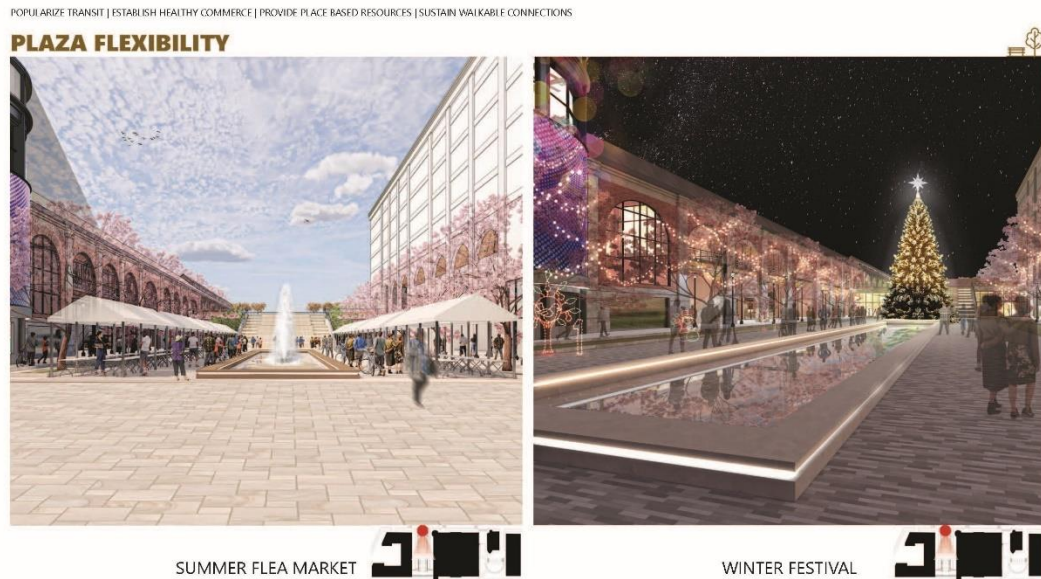


Figure 45: Howard plaza's space flexibility between seasons (source by author)

Progressing east reveals the loggia, which is located at the western end of the market. The Loggia features outdoor sitting, casual dining areas, and an entrance to the metro station. This Loggia is also connected to an upper-level pedestrian bridge that connects Barry Farm to the market.



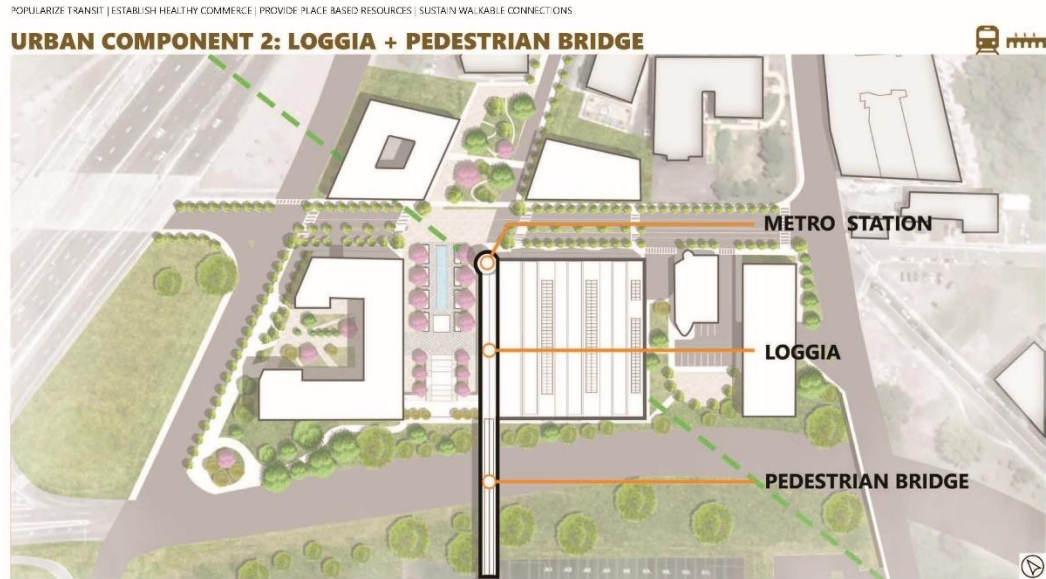


Figure 46: Howard plaza and amphitheater (source by author)

This pedestrian bridge achieves the 1st objective of Sustaining Walkable Connections. It is connected to Barry Farm with the intention that new or old residents of the neighborhood can quickly cross Suitland Parkway to go shopping or to catch the next metro while experiencing a fully lit and ventilated walk.





Figure 47: Pedestrian bridge perspective connecting to Market from Barry Farm.

(source by author)

Finally, there is the market building itself, which is the central part of this thesis that holds all the indoor spaces and private amenities necessary in creating a great public heart.

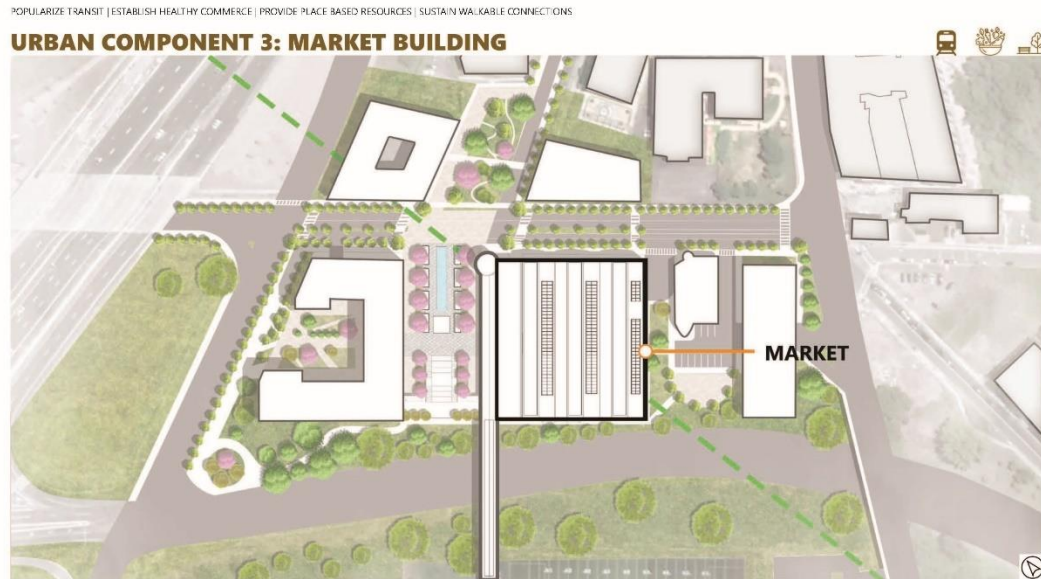


Figure 48: Market building indicated in master plan. (source by author)

Several phases contributed to the general shape of the market. The initial step was to maximize the building's permitted footprint over the metro station. The second phase involved separating the mass according to the building program and the pedestrian bridge. As evidenced by the elevated cylinder-shaped metro tower and gable-roofed market hall, the last phase involved separating these volumes by elevating them and assigning them distinct roof lines.

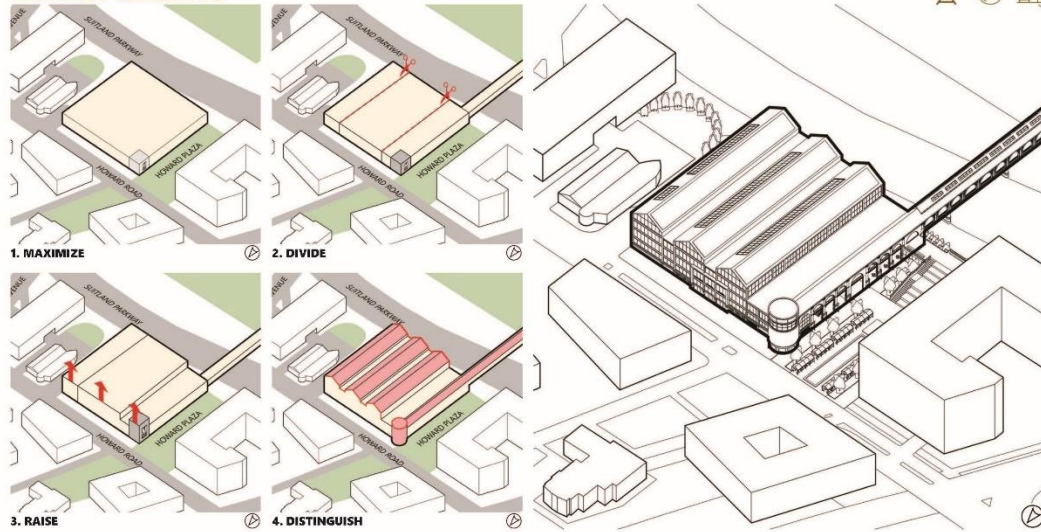
**MARKET MASSING**

Figure 49: Building massing progression. (source by author)

When entering the market from Howard Road, the relationship between roofline and building program really becomes apparent. The repeated gable roof lines help indicate the sequential bays that are dedicated to the loggia, central market hall and side wings.

**BUILDING APPROACH: HOWARD ROAD**

Figure 50: Building elevation from Howard Road. (source by author)

However, if one entered the market from Howard Plaza, they would instead see the facade relationship between the pedestrian bridge and the loggia - where the bridge slowly blends itself into the western wing of the market. The intention behind the series of arches is to communicate a sense of civic purpose, while offering visibility into the market hall indoors.

POPULARIZE TRANSIT | ESTABLISH HEALTHY COMMERCE | PROVIDE PLACE BASED RESOURCES | SUSTAIN WALKABLE CONNECTIONS

#### **BUILDING APPROACH: HOWARD PLAZA**



Figure 51: Building elevation from Howard Plaza. (source by author)

Regarding the building program, the market is broken down into 4 categories: congregation, emporium, service and private amenities. With the help of these categories, they achieve all the design objectives to Promote Transportation, Establish Healthy Commerce, Provide Place Based Resources and sustain walkable connections. For the congregation program, it consists of the previously discussed urban components, Howard Plaza, the Loggia and the Amphitheater. Each of these spaces are attractive to the public eye. This garners the attention of nearby residents and triggers

an influx of visitors - benefiting the vendors in the market, the metro station and the plaza during social events.

For the emporium program, these spaces are split into two parts: the market hall and the western wing. The western wing is fitted with casual dining spaces, such as cafes and bars, across two floors. The market hall, on the other hand, is a tall atrium space that has vendor booths at ground level for businesses selling their products. Vendors will conduct much of their business here, which encourages competitive sales and attracts commuters entering from the metro line. To accommodate the employees that work at the market, offices and other spaces dedicated to service were pushed into the eastern wing of the market to avoid mixing with the more public areas of the massing. As for the private amenities, the building has enclosed spaces for visitors to rent out. They may use these spaces for events like award ceremonies, community-related celebrations, or other social venues. This program also addresses the needs of local students and workers by including private study rooms and we-work spaces. Because of the anticipated noise coming from the market hall, all these rooms were pushed into the quieter end of the eastern wing.

**BUILDING PROGRAM**

- 4 basic program
  - CONGREGATION
  - EMPORIUM
  - SERVICE
  - PRIVATE AMENITIES
- Program popularizes metro transit, establishes healthy commerce, provides place based resources and sustains a walkable connection

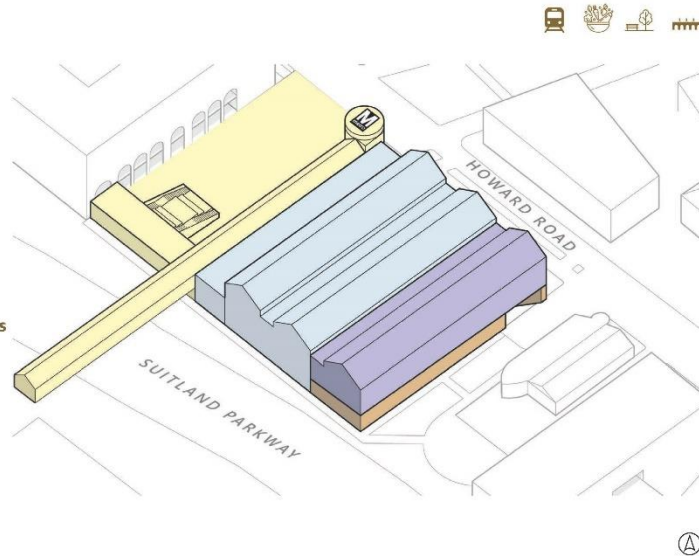
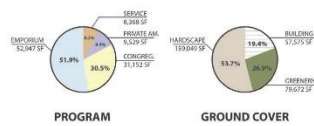


Figure 52: Building program overview. (source by author)

Back on the ground floor, the market hall exposes spaces in the open floor plan that would be appropriate for visitors coming off the metro station. These types of spaces include a cafe and a snack bar to accommodate a typical metro commuter seeking quick sustenance. The hall is also arranged into bays to take in people from the primary entrances that occur along the northern and western facades.

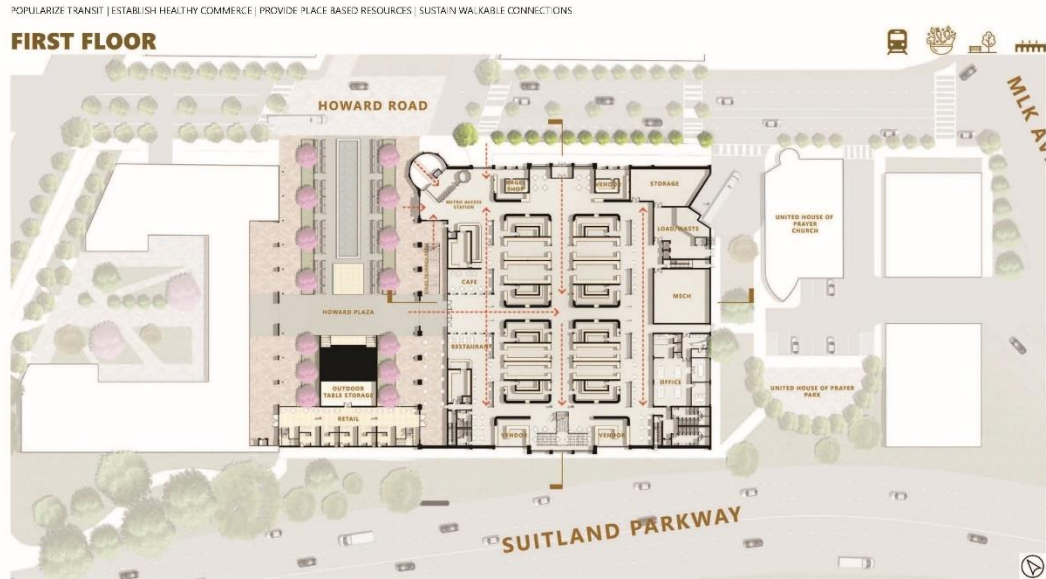


Figure 53: Ground floor plan, showing surrounding Transit Oriented Development nearby. (source by author)

Towards the central part of the hall are stalls dedicated to local vendors selling popular things like fresh produce, baked goods, staple foods and other products in high demand. In order to help the vendor continue their business and fulfill the second goal of Creating Healthy Commerce, these market stalls were designed for long-term use. Furthermore, with the seasonal occupation of Howard Plaza, there is also the opportunity to use the plaza as a temporary place for the occasional Farmers Market.





Figure 54: Envisioned products sold at the ground level market stalls. (source by author)

Since most of the shopping activity is done on the ground floor, a person standing in the central market hall views the entirety of the space in its majesty. Not only can they see how the market works, but they can also see when the next metro line is coming in on the big display screens that hang from the trusses above. This allows Metrorail commuters to keep track of their time while shopping around.

**MARKET HALL**

Figure 55: Ground market hall atrium vignette. (source by author)

At the upper level, the parallel placement of the western and eastern wings allows both sides to investigate the market below or to their respective plazas next door. Because of the connective nature of the loggia, the western wing was designed to be more transparent - with glazing on all sides facing the metro station, the central market hall, and Howard Plaza.





Figure 56: Second level floor plan. (source by author)

Not only that, both wings are connected by an upper-level platform to allow people to traverse across the market hall at a higher level. This gangplank mirrors the same user experience of the market hall for someone standing at the ground floor.

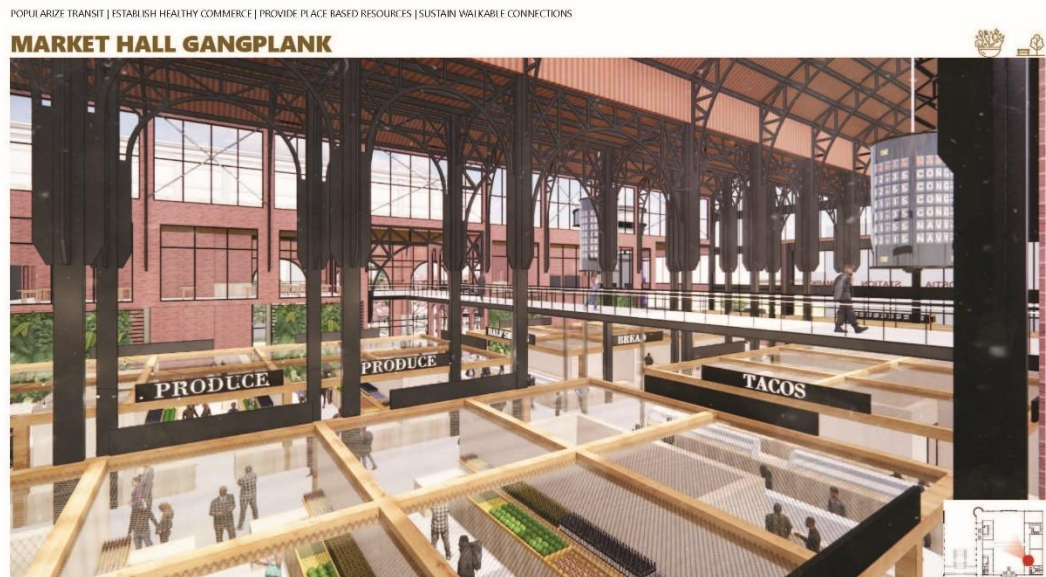


Figure 57: Market hall atrium viewed from the second level. (source by author)

This gangplank eventually leads visitors to the eastern wing of the market where they may rent one of the private rentable spaces. All these private spaces have visibility to the market hall, exposing them to the bustling and inclusive public atmosphere at the ground level.



Figure 58: Private rentable space vignette. (source by author)

In terms of tectonics, the central market hall is vertically continuous. Because of site orientation, the roof was granted skylights on faces that would receive most of the ambient lighting. On the contrary, the western wing is split into two floors to match the height of the pedestrian bridge and loggia outside. Finally, the eastern wing is more deliberately stacked, to maximize the total number of private rentable spaces and work rooms.



Figure 59: North to south section perspective showing the verticality and tectonics of the market building. (source by author)

## Conclusions

In short, Anacostia is both a high opportunity zone and a food desert. To make up for the negative effects of development and the lack of good, healthy food, there needs to be an urban market. An urban market will serve as a significant public area that welcomes both new and long-time inhabitants, bridging the gap between the surrounding development and older neighborhoods. It will also subsequently provide a substantial amount of healthy produce and other edible merchandise to the area that is deprived of such things.

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