Community BioBlitz at the South Merrill Community Garden, September 2024. Photo by Delta Institute.

delta institute

GREEN INFRASTRUCTURE IMPACT MEASUREMENT AND MODELING DATASET REPORT

FALL 2024

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EXECUTIVE SUMMARY

In 2022-2024 Delta Institute (Delta) partnered with several community organizations in Chicago's South and West side neighborhoods to accomplish their goals of installing Green Infrastructure (GI) Best Management Practices (BMPs) such as bioswales, rain gardens, or permeable pavement on vacant lots. The majority of Delta's efforts focused on the crucial steps toward site acquisition such as community engagement and baseline data collection. However, beyond site acquisition and installing GI, another key component of this process is monitoring the pre- and post-implementation effects of GI on its known co-benefits such as stormwater runoff, biodiversity, and economic outcomes. Here, Delta presents measurements of baseline stormwater retention, biodiversity, and economic conditions prior to GI installation as well as modeled future outcomes for two vacant lots at different stages of GI implementation.

Blacks in Green with collaboration by Delta installed GI at 6444 S. Langley Ave, Chicago, IL 60637 in December 2024 as part of the Sustainable Square Mile™ West Woodlawn. The site was designed to intercept rainwater from all surfaces tributary to the site through a permeable pavement system, perennial gardens, native trees, and bioretention. The site also includes raised beds for vegetables, composting, and jobs training. Delta found that:

- Given the site's hydrologic soil group, moderate runoff potential, annual precipitation and volume capture goals, the installed GI BMPs may reduce annual stormwater runoff by 806 gallons - a 71% reduction. These projected runoff benefits may be related to the small footprint of the site (approximately 1800 ft^2), and a high concentration of GI BMPs in a compact area. In other words, rainfall and runoff that interacts with the site may have a greater likelihood of being intercepted than at a larger site with the same amount of BMPs.
- Measurements of biodiversity among several parcels in the West Woodlawn Square Mile found that the Mamie Till Memorial Garden had notably greater biodiversity index scores than the surrounding vacant lots, which suggests that the installation of GI BMPs at 6444 S. Langley Ave may increase biodiversity above its baseline.
- Finally, baseline metrics for economic and community co-benefits for the area surrounding 6444 S. Langley Ave. suggest that nearly 35% of housing units are vacant, with housing costs in the 99th percentile for Chicago, and availability of green space in the 86th percentile. Projected real estate value increases attributed to implementing GI BMPs to the site were approximately 19%.

South Merrill Community Garden has taken many of the needed steps toward acquiring and installing GI at a large vacant lot at approximately 7048 S. Paxton Ave, Chicago, IL 60649. The site is undergoing community visioning to identify specific GI BMPs, but rain gardens, stormwater planters, vegetated filter strips and permeable pavement have been prioritized in early discussions and community surveys. As of December 2024, South Merrill Community Garden, with assistance from Delta, is collecting letters of support, meeting with area decision makers, and requesting site access to perform environmental testing. Delta found that:

- Given the site's hydrologic soil group, moderate runoff potential, annual precipitation and volume capture goals, the installed GI BMPs may reduce annual stormwater runoff by 2676 gallons - a 66% reduction. The vacant lot at 7048 S. Paxton Ave is notably larger than the West Woodlawn site (10890 ft^2 vs. 1800 ft^2). Preliminary community visioning prioritized a mix of GI BMPs at tactical locations to ensure the site has the potential for mixed-use and

recreation. Therefore, our projected runoff benefits are notable for the fact that even installing GI BMPs with a small footprint may deliver notable stormwater management benefits.

- The BioBlitz in South Shore found that the South Shore Nature Sanctuary had greater biodiversity index scores than the two nearby community gardens and the vacant lot at 7048 S. Paxton. However, both the Nature Sanctuary and community gardens had notably higher biodiversity index scores than the vacant lot. This suggests that even a small amount of planted vegetation for stormwater management may result in marked improvements to the vacant lot's biodiversity, with likely benefits to the surrounding area. Indeed, the vacant lot is positioned between the community gardens and may serve as a corridor for pollinators.
- Finally, baseline metrics for economic and community co-benefits for the area surrounding 7048 S. Paxton Ave. suggest that nearly 25% of housing units are vacant, with housing costs in the 97th percentile for Chicago, and lack of green space is in the 95th percentile. Projected real estate value increases attributed to implementing GI BMPs to the site were approximately 13%.

Together, baseline measurements and modeled outcomes of stormwater capture potential, biodiversity, and economic and community conditions suggest that both the vacant lots in West Woodlawn and South Shore may benefit greatly from the installation of GI BMPs. The West Woodlawn site has already installed GI BMPs, but has not had time to measure actual outcomes, while the South Shore site is in the beginning stages of site acquisition and community visioning. Delta Institute will continue to partner with Blacks in Green and the South Merrill Community Garden, as well as research institutions such as Northwestern University to share successes, challenges, and lessons learned to create a replicable, community-led approach to installing GI BMPs on vacant lots.

About Delta Institute

Delta Institute collaborates with communities to solve complex environmental challenges throughout the Midwest. Delta exists because environmental, economic, and climate issues hit communities—urban and rural—through disinvestment, systemic inequity, and policy decisions. We collaborate at the community level to solve our home region's new and legacy issues, by focusing on the self-defined goals and needs of our partners.

Delta Institute improves the living conditions of more than five million Midwesterners by transitioning one million acres to more resilient, conservation-focused practices, and by improving water quality and reducing flooding by capturing 100 million stormwater gallons. By 2025 we will achieve these goals through our agriculture, climate, water, and community development projects.

This is what a more resilient, equitable, and innovative Midwest looks like. Visit us online at www.delta-institute.org.

Acknowledgements

This project was produced with generous support from Walder Foundation, the Gaylord & Dorothy Donnelley Foundation, the McDougal Family Foundation, and two anonymous donors.

We are grateful to partner with numerous community -based and -focused organizations:

- Blacks in Green (BIG) is a national network pioneering “the sustainable-square-mile” in a “city of villages,” where every household can walk-to-work, walk-to-shop, walk-to-learn, and walk-to-play – balancing environment, economics, and equity.
- Center for Neighborhood Technology (CNT) delivers innovative analysis and solutions that support community-based organizations and local governments to create neighborhoods that are equitable, sustainable, and resilient.
- Emerald South Economic Development Collaborative, Terra Firma is a 5-year, $25 million land care initiative launched in 2021 to beautify, maintain, and activate over 205 acres of vacant land on Chicago’s mid-South Side. Terra Firma uses vacant land as an engine of opportunity to create jobs, grow small businesses, improve the local environment, and enhance neighbors’ quality of life.
- Northwestern University, Civil & Environmental Engineering Department and Center for Water Research.
- South Merrill Community Garden educates and promotes a sacred space for the health and wellbeing of the intergenerational members of our community through gardening, engagement and accessibility to nature’s bounty.

This document and the tools provided aim to be action oriented and to provide the most current, correct, and clear information possible, but some information may have changed since publication. We encourage practitioners to reach out to us at delta@delta-institute.org with questions, corrections, or to discuss implementation challenges.

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SITE DESCRIPTIONS

The following is a brief overview of current/prior conditions of two sites in West Woodlawn and South Shore that have GI installation accomplished or planned for 2025:

6444 S. Langley Ave (Chicago, IL 60637)

Figure 1: Looking east at 6444 S. Langley Ave. Chicago, IL 60637 before GI installation. Source: Blacks in Green and Google Streetview.

The West Woodlawn GI site is approximately 1800 ft^2 of turf grass with approximately 650 ft^2 of hardscaped adjacent alley (*Figure 1*). The site is oriented east-west and has a large Siberian Elm tree on the east end. It has been outfitted with a 300 ft^2 permeable pavement walkway, a series of bioretention gardens to manage rainwater from the site and surrounding tributary surfaces, three additional trees, native landscaping, and several raised beds for vegetables (*Figure 2*).

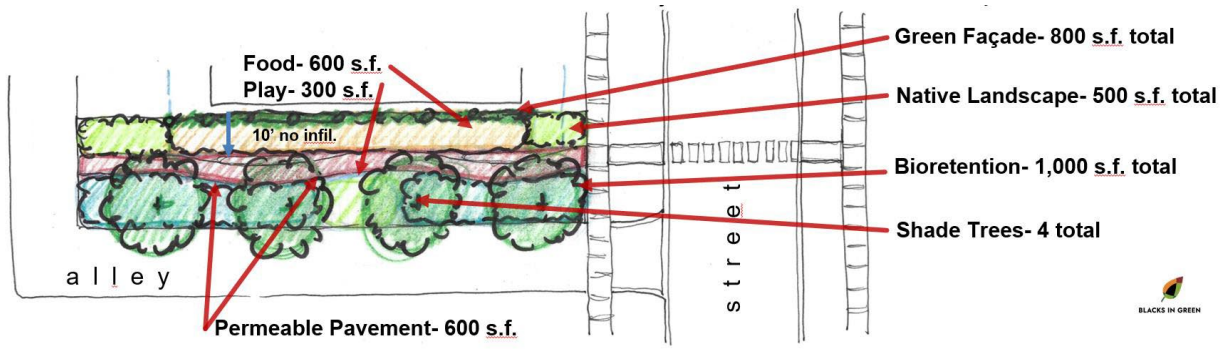

Figure 2: Design schematic of the GI installation at 6444 S. Langley Ave. Chicago, IL 60637. The design schematic includes conceptual examples of potential BMPs and layout, which will differ from the actual BMPs/sf. areas installed. Source: Blacks in Green.

Figure 3: 7048 S. Paxton Ave. Chicago, IL 60649 in Sept 2024 during the South Shore BioBlitz. Source: Delta Institute.

7048 S. Paxton Ave (Chicago, IL 60649)

In a 2022 community survey, many South Shore community members indicated that they had witnessed flooding near S. Paxton Ave, affecting their daily lives. Using GIS analysis and the community survey feedback, Delta developed a web map with several dozen sites located in priority areas in South Shore and coordinated with community members and Emerald South to determine the most suitable sites for GI projects. The vacant lot at approximately 7048 S. Paxton Ave. was prioritized as an ideal site for GI implementation by this process.

7048 S. Paxton Ave. is a large, square, 0.25-acre vacant lot dominated by regularly mowed turf grass. South Merrill Community Garden and its partners have continued to coordinate directly since 2022 to host site visits and community events, such as a neighborhood-wide BioBlitz to engage community members in discussions and visioning.

Proposed GI BMPs for 7048 S. Paxton Ave.

Rain Gardens presents an opportunity for infiltration in a low spot of a property (*Figure 4*). The rain garden acts like a bowl that fills up with water and then drains slowly to the native soil or an engineered underdrain system. A rain garden is planted with native or large herbaceous plants to encourage infiltration and to promote biofiltration. Native plants have a deeper root network

than grass, which draws surface water deeper into the ground. Native plants are naturally drought and flood tolerant, which allows them to thrive in the rain garden.

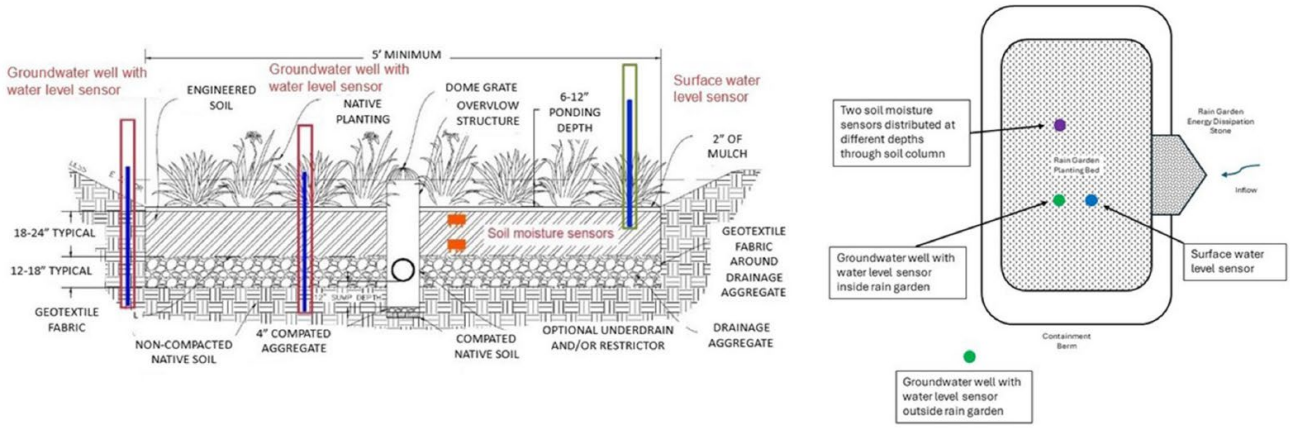

Figure 4: Instrumentation designs for rain garden including soil moisture sensors, a surface water level sensor, and piezometers with water level sensors. Rain garden section drawing provided by the Delta Institute. Source: O'Brien et al., 2024.

Stormwater Planters or Bioswales are linear infiltration basins that typically sit between a street and a sidewalk in the right-of-way and are surrounded by vertical curbing (*Figure 5*). Rainwater runoff from the sidewalk and/or the street drains into the stormwater planter through openings in the curbing.

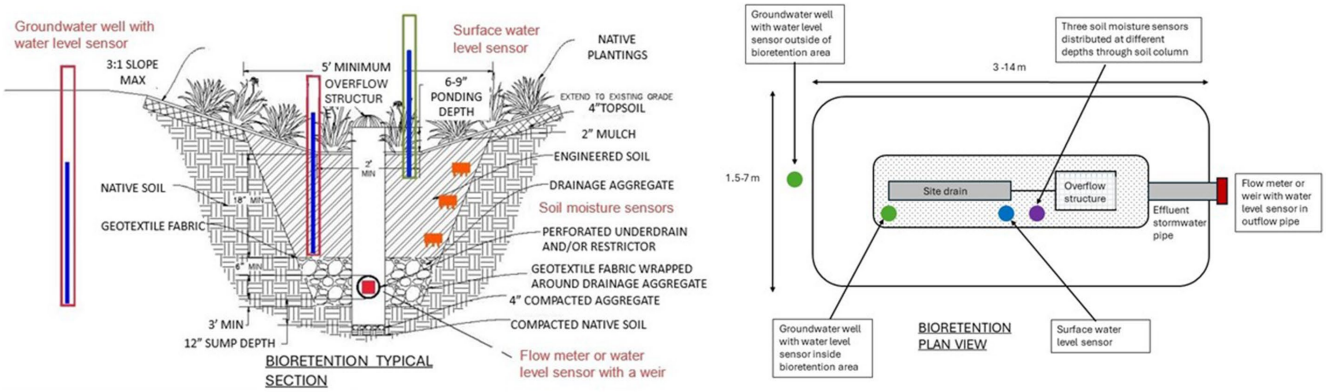

Figure 5: Instrumentation designs for bioswale including soil moisture sensors, piezometers with water level sensors, a surface water level sensor and a flow meter. Bioswale section drawing provided by the Delta Institute. Source: O'Brien et al., 2024.

Mixed-Use (e.g., permeable pavement, vegetated filter strips, stormwater trees): Community visioning can guide the prioritization and design of several different types of Green Infrastructure to be installed together on one vacant lot. Permeable pavement and vegetated filter strips intercept, capture, and convey stormwater runoff. Other GI BMPs such as urban trees provide communities with improved aesthetics, shade, and carbon and stormwater management (*Figure 6*). In this mixed-use scenario, the flooding reduction and community benefits can be multiplied.

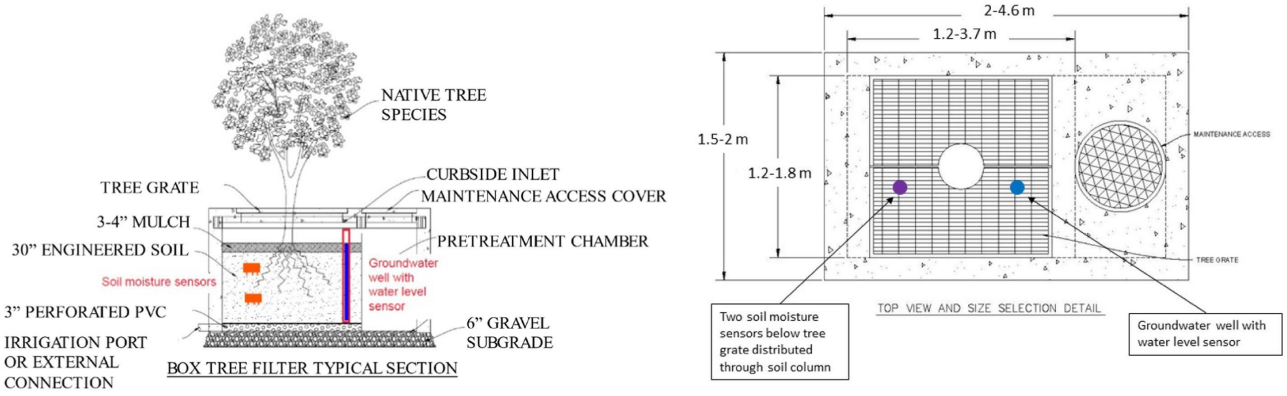

Figure 6: Instrumentation designs for box tree filter in a green streetscape including soil moisture sensors and a piezometer with a water level sensor. Box tree filter section and plan drawings provided by the Delta Institute. Source: O'Brien et al., 2024.

Project Phases and Timeline:

Currently, the timeline to develop the site is pending to allow for discussions with the community, partners, and the city. The steps identified for the project, based on current information, are:

- Community Engagement and Project Design (ongoing)
- Letter of Support from Aldermanic Office (in process)
- Right of Entry from Aldermanic Office (in process)
- Site Acquisition Process (to be determined)
- Phase 1 Environmental Site Assessment
    - Phase 2/3 Environmental Site Assessment (if applicable)
    - Site Remediation (if applicable)
- Design and Permitting
- Baseline Data Collection and Installation Start
- Installation Completion and Additional Data Collection
- Maintenance and Continued Monitoring
- Additional Community Engagement and Events

METHODOLOGY

Baseline Data Collection

Stormwater

The project team used the Center for Neighborhood Technology's (CNT) Green Values Stormwater Management Calculator to identify the volume capacity capture goals for both the South Shore and West Woodlawn GI sites. CNT's calculator requires data inputs such as the site's square footage and the GI typologies to be installed to provide runoff potential estimated

by the site's hydrologic soil group, annual precipitation, and the volume capture goal. The CNT calculator does not include evapotranspiration potential, which is typically much smaller than infiltration (capture) and runoff reduction, so the results may slightly understate the performance of the installed GI BMPs.

As of December 2024, two groundwater wells have been drilled at the West Woodlawn site, but the water level sensors and piezometers have not yet begun to collect data. The next steps for baseline data collection at the West Woodlawn site are for weather monitoring stations to be installed to collect data on ambient atmospheric conditions, soil moisture and temperature, soil CO_2 flux, and air quality.

Biodiversity

Baseline biodiversity data of both the South Shore and West Woodlawn sites were measured by a neighborhood-wide BioBlitz. The West Woodlawn BioBlitz occurred on June 17th, 2023. The South Shore BioBlitz occurred on September 28th, 2024. A BioBlitz is an event in which participants identify as many living things as possible in an area in a short period of time to produce a snapshot of an area's baseline biodiversity. Civic scientists who participate in a BioBlitz not only collect valuable data about the species present in the study area prior to GI installation but may also learn about GI in their neighborhood and begin to envision what sustainable and inclusive stormwater management development in their neighborhood may look like.

BioBlitz participants used a variety of tools, such as walking surveys, $1m^2$ quadrats along random 10m transects, pitfall insect traps, and the free mobile phone app, iNaturalist, to identify and inventory as many organisms at the species level as possible to collect the following indicators of biodiversity:

- **Abundance**: the total number of organisms found in an area.
- **Biodiversity**: the variety of living things in an area. All living things interact with and influence one another as well as the environment in which they live.
- **Relative Abundance**: the evenness of distribution of individuals among species. An area may have a higher abundance of species, but less evenness of distribution of species.
- **Species Richness**: the number of different species found in an area

To determine the effects of GI on biodiversity, a comparison between sites with GI installations and control sites without them was performed. Both pre- and post- implementation assessments should be conducted to establish baseline conditions and measure changes. Comparisons among sites can only be made if experimental and control sites are similar in other respects. In doing so, changes to biodiversity, if any, may be assumed to be the result of GI implementation rather than other environmental factors. Control sites were vacant lots, and the experimental sites were parcels with a high observable degree of biodiversity such as a community garden, a nature sanctuary, or a forest preserve.

It is recommended that the two following indices be used to calculate and compare biodiversity among the control and experimental sites: First, **Simpson's Diversity Index** (SDI) may be used to quantify and compare biodiversity among all sites. SDI provides a value between 0 and 1, where high scores (close to 1) indicate high biodiversity, and low scores (close to 0) indicate low

biodiversity (Simpson, 1949). To calculate SDI, both *Species Richness* and *Abundance* of a site must be measured. The formula for calculating SDI is as follows - where Σ is to "sum", n is the number of individuals of one species and N = the total number of all individuals:

$$D = 1 - \frac{\Sigma n(n-1)}{N(N-1)}$$

The **Shannon-Weiner Species Diversity Index** (SWSDI) should also be employed to calculate and compare biodiversity among the sites. The SWSDI calculates biodiversity by taking the total number of each species in the area, the proportion of each species to the total number of individuals, and sums the proportion multiplied by the natural log of the proportion for each species. The higher the number, the higher the diversity of species. Ideally, one should compare populations that are the same size in numbers of individuals (Nolan & Callahan, 2006). The formula to calculate SWSDI is as follows where (i) represents species, Σ is to "sum", *ln* is the 'natural log', and p_i is the proportion of the entire community made up of species (i).

$$H = -\Sigma p_i * ln(p_i)$$

Economic

Collecting data for the indicators below involves a combination of methods, including surveys, data analysis, and utilizing existing datasets. Many of these indicators are already collected by organizations like the Chicago Department of Public Health, the Chicago Metropolitan Agency for Planning (CMAP), and Council on Environmental Quality. Indicators such as neighborhood safety, vacant housing units, active businesses, community belonging, and owner-occupied housing units were sourced from the Chicago Health Atlas, which compiles data from the Chicago Health Department's annual survey. Median home sale prices were obtained from Rocket Homes' website. The Inclusive Growth Score was provided by the Mastercard Center for Inclusive Growth, while the AARP Livability Score was calculated using project area ZIP codes through AARP's scoring system.

Labor force data by occupation, unemployment rates, and analyses of assessed property values were generated using Esri Business Analyst, drawing on census tract-level data. Additionally, the Climate & Economic Justice Screening Tool (CEJST) from the Council on Environmental Quality (CEQ) provided percentile-based data on the lack of green space and housing costs, offering a broader perspective on economic and environmental equity within the project area. Additionally, the CNT stormwater calculator was used to estimate the increase in real estate values resulting from the implementation of specific GI BMPs on vacant lots, demonstrating the positive economic impact of GI. Together, these diverse datasets offer a comprehensive view of the community and economic indicators relevant to assessing green infrastructure impacts.

Table 1: Data Sources and Geographic Boundaries for Monitoring Community and Economic Indicators

Dataset	Data Information	Geographic Boundaries	Data Source	Link

Perceived neighborhood safety	Number of adults who report that they feel safe in their neighborhood "all of the time" or "most of the time" – (Time Period – 2015 -2022)	Census Tract 4207	Chicago Health Atlas	https://chicagohealthatlas.org
RocketHomes	Median Sold Price in Woodlawn	Woodlawn	Rocket Homes	https://www.rockethomes.com/real-estate-trends/il/woodlawn-chicago
Vacant Housing Units	% of housing units	Census Tract 4207	Chicago Health Atlas	https://chicagohealthatlas.org
AARP Livability Score	This score rates the overall livability of a selected neighborhood, city, county, or state on a scale from 0 to 100. It is based on the average score of seven livability categories—housing, neighborhood, transportation, environment, health, engagement, and opportunity—which also range from 0 to 100. Based on zip codes, the score is under the zip code 60637	Zip code: 60637	AARP	https://livabilityindex.aarp.org/search/Chicago,%20Illinois%2060637,%20United%20States
Mastercard Inclusive Growth Score	"Measures inclusion and growth (Place + Economy + Community) - a percentile rank ranging from 0-100, with the average score at 50. It covers three pillars, Place, Economy, and Community, through 18 key metrics.	Census Tract 4207	Mastercard	https://inclusivegrowthscore.com/
Active Businesses	Count of active business licenses per 1,000 residents	Census Tract 4207	Chicago Health Atlas	https://chicagohealthatlas.org
Unemployment Rate	Number of unemployed people as a part of the labor force (percentile)	Census Tract 4207	Climate & Economic Justice Screening Tool	https://screeningtool.geoplatform.gov/en/#15.13/41.775804/-87.610192
Owner Occupied Housing Units	Percent of occupied housing units (Time Period – 2014-2021)	Census Tract 4207	Chicago Health Atlas	https://chicagohealthatlas.org

Assessed Property Values	Average assessed values within the census tract	Census Tract 4207	City of Chicago Data Portal	https://data.cityofchicago.org/
Community Belonging	number of adults who reported that they strongly agree or agree that they really feel part of their neighborhood.	Census Tract 4207	Chicago Health Atlas	https://chicagohealthatlas.org
Lack of Green Space	Amount of land, not including crop land, which is covered with artificial materials like concrete or pavement	Census Tract 4207	Climate & Economic Justice Screening Tool	https://screeningtool.geoplatform.gov/en/#15.13/41.775804/-87.610192
Housing Cost	Share of households making less than 80% of the area median family income and spending more than 30% of income on housing	Census Tract 4207	Climate & Economic Justice Screening Tool	https://screeningtool.geoplatform.gov/en/#15.13/41.775804/-87.610192
Perceived neighborhood safety	Number of adults who report that they feel safe in their neighborhood "all of the time" or "most of the time" – (Time Period – 2015 -2022)	Census Tract 4207	Chicago Health Atlas	https://chicagohealthatlas.org

RESULTS

6444 S. Langley Ave (Chicago, IL 60637)

Stormwater

The site includes 1800 ft^2 of turfgrass and 50% (650 ft^2) of the adjacent impervious alley. Soil in the pervious area is hydrologic soil group B, which has moderate runoff potential. Annual precipitation is 38.11 inches (CNT model), and the volume capture goal of the site plan is 1.8 inches of water. The CNT model does not include evapotranspiration potential, which is typically much smaller than infiltration (capture) and runoff reduction, so the results slightly understate the performance of the installed GI BMPs.

Table 2 below summarizes that the bioswale, permeable pavement, three shade trees and native vegetation installed at the 6444 S. Langley site are predicted to reduce stormwater runoff by 806 gallons per 2” storm event for a 71% reduction.

Table 2: Modelled volume capture capacity for 6444 S. Langley Ave. using the Center for Neighborhood Technology's Stormwater Management Calculator.

GI BMP	Area (sq. ft.)	Impervious gallons captured	Runoff Reduction gallons	Sediment reduction (lbs./year)	Phosphorus reduction (lbs./year)	Nitrogen reduction (lbs./year)
Bio-Swale	450	1908	a	b	b	b
Permeable pavement	300	374	a	b	b	b
Shade trees (3-inch DBH at time of planting)	48 (3 trees)	934	a	b	b	b
Native vegetation/ Food prod.	700	524	a	b	b	b
Total	1498	4351	806 (71%)	0[b]	.02[b]	.05[b]

a- the CNT model does not specify runoff reduction for individual BMPs, just the total reduction.
b- due to the small area of the site, the nutrient reductions modeled in PLET are negligible, but are included here for completeness.

Biodiversity

Overall, BioBlitz participants made 182 observations and identified 99 unique species across the four study sites, the Mamie and Emmet Till Memorial Garden and three nearby vacant lots, within the West Woodlawn Sustainable Square Mile.

Among the 99 species observed across all four sites, the majority (80.9%) were plants. Insects accounted for approximately 17.3% of species and birds represented the remaining 2.7% (*Figure 7*).

When plant species were categorized into 'functional groups' (e.g., trees, shrubs, grasses and forbs – herbaceous broadleaf plants) across the four sites, the majority of plants were shown to be forbs (61.8%) (Figure 8). Trees were the second most commonly observed functional group, representing 19.1% of plants. Shrubs and grasses were nearly equally represented across sites, 8.9% and 6.7% respectively. Finally, succulents were rarely observed

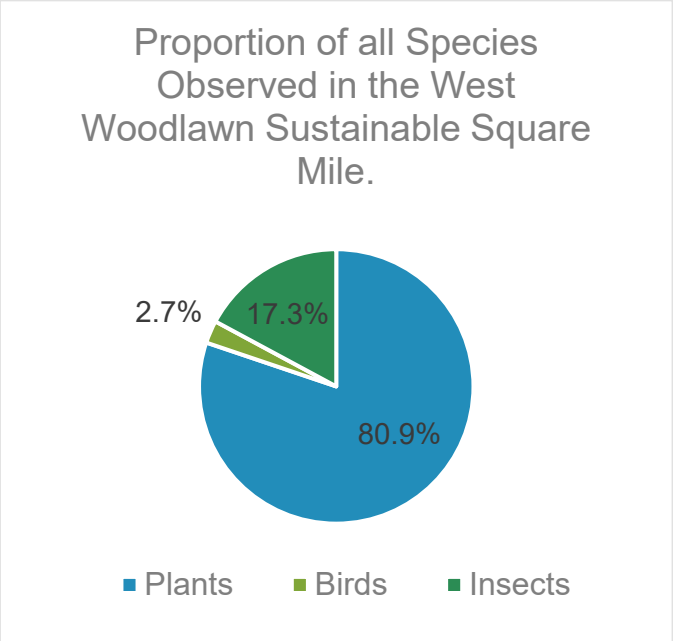

Figure 7: Proportion of all species observed across all four sites in the West Woodlawn Sustainable Square Mile on June 17th, 2023.

across the four sites (3.3%).

Among all four sites, the Mamie and Emmet Till Memorial Garden had the greatest diversity of floristic cover (Table 3). The Memorial Garden was notable for having the greatest diversity of plant groups, including trees and shrubs. The vacant lot at 6357 S. Langley Ave was notable for its abundance of forbs. The other two vacant lots were dominated by turfgrass.

When compared using both the Simpson's Diversity Index and Shannon's Diversity Index, the Memorial Garden was shown to have greater biodiversity than the vacant lots (*Table 2*).

Indeed, the number of plant species observed in the Memorial Garden (79) was over twice the number of plants species observed in the vacant lots (37) (*Figure 9*).

Additionally, the number of insects species observed in the Memorial Garden (15) was over twice the number of insect species observed in the vacant lots (6). However, only one species of bird was observed at the Memorial Garden and the Vacant Lots (*Figure 9*).

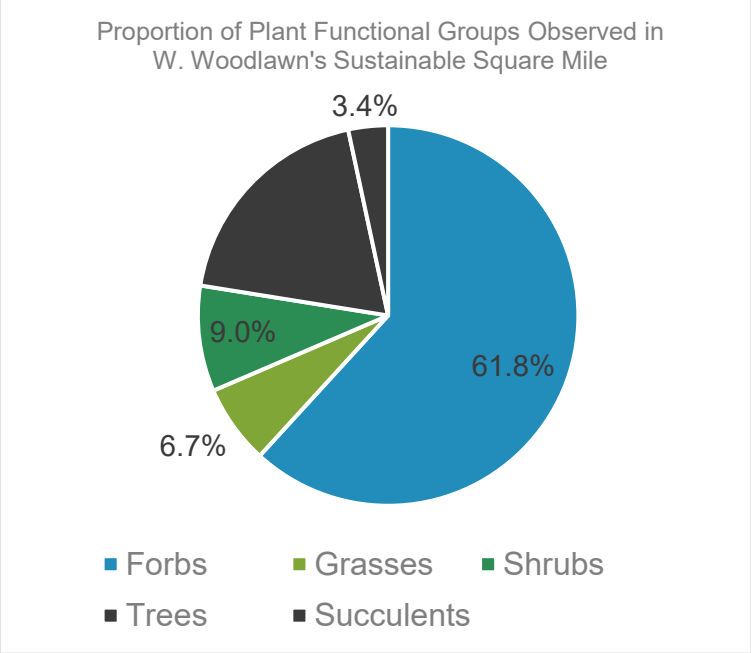

Figure 8: Proportion of plant functional groups observed across all four sites in the West Woodlawn Sustainable Square Mile on June 17th, 2023.

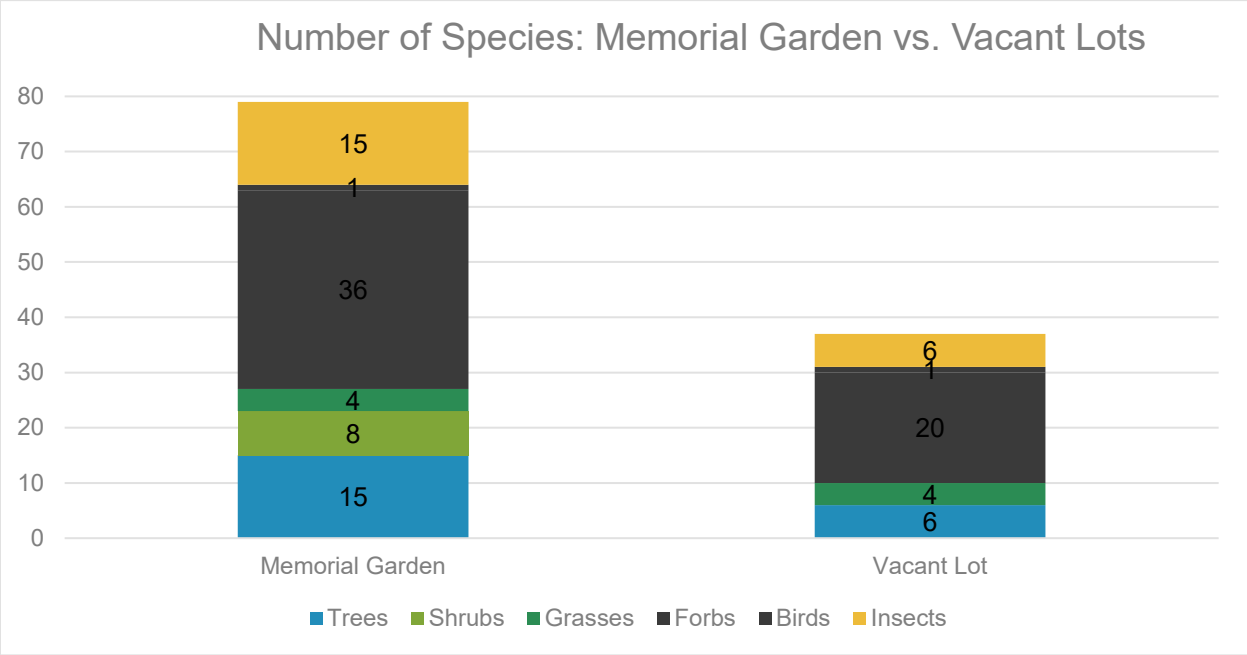

Figure 9: Comparison of the number of unique species observed among the Memorial Garden and the vacant lots on June 17th, 2023.

Table 3: Comparison of percent cover of plant functional groups among four sites in West Woodlawn's Sustainable Square Mile.

Site	Functional Group	Cover
6354 S. St. Lawrence (Memorial Garden)	Shrub	20.30%
6354 S. St. Lawrence (Memorial Garden)	Forb	10.70%
6354 S. St. Lawrence (Memorial Garden)	Grass	37.00%
6354 S. St. Lawrence (Memorial Garden)	Tree	1.20%
6354 S. St. Lawrence (Memorial Garden)	No Plants/Mulch	30.80%
6425 S. Champlain (Vacant Lot)	Forb	22.90%
6425 S. Champlain (Vacant Lot)	Grass	77.10%
6450 S. Langley (Vacant Lot)	Forb	15.50%
6450 S. Langley (Vacant Lot)	Grass	84.50%
6357 S. Langley (Vacant Lot)	Forb	69.20%
6357 S. Langley (Vacant Lot)	Grass	30.80%

Table 4: Comparison of biodiversity among sites in West Woodlawn's Sustainable Square Milet using two biodiversity indices.

	Mamie and Emmett Till Memorial Garden, 6354 S St Lawrence Ave	Vacant Lots

Simpson's Diversity Index	**0.97**	0.88
Shannon-Weiner Species Diversity Index	**3.81**	2.64

Economic Metrics

The economic and community co-benefits assessment quarterly evaluates how green infrastructure can generate economic and community co-benefits by tracking metrics such as housing market dynamics, unemployment rates, community belonging, and access to green space. The quarterly report helps identify patterns and trends in the impacts of implementing GI. These reports help understand GI can address community challenges like high vacancy rates and economic instability. The report results indicate that the neighborhood faces significant challenges, including high unemployment (28.73%), low owner-occupied housing rates (27.08%), and limited access to green spaces, ranking in the 86th percentile for lack of availability (*Figure 10*). These results are often due to systemic barriers to economic stability, community engagement, and environmental resilience. However, data also point to opportunities for improvement through green infrastructure. According to CNT, doubling the square footage of GI near a home can result in a 0.28% to 0.78% increase in home sale value. Using the CNT stormwater calculator, it was estimated that GI BMPs, such as tree planting, permeable paving, and rain gardens, could contribute a 19.1% potential increase in real estate values (*Table 5*).

Table 5: Projected Real Estate Value Increase Attributed to Implementing Green Infrastructure Features to the site (Source: Center for Neighborhood Technology, CNT)

GI BMP	Real Estate Value Increase (%)
Rain Gardens, Stormwater Planters, Bioswales	5.7%
Urban Farming/Gardening	3.1%
Permeable Paving	4.1%
Trees	5%
Total	**19.1%**

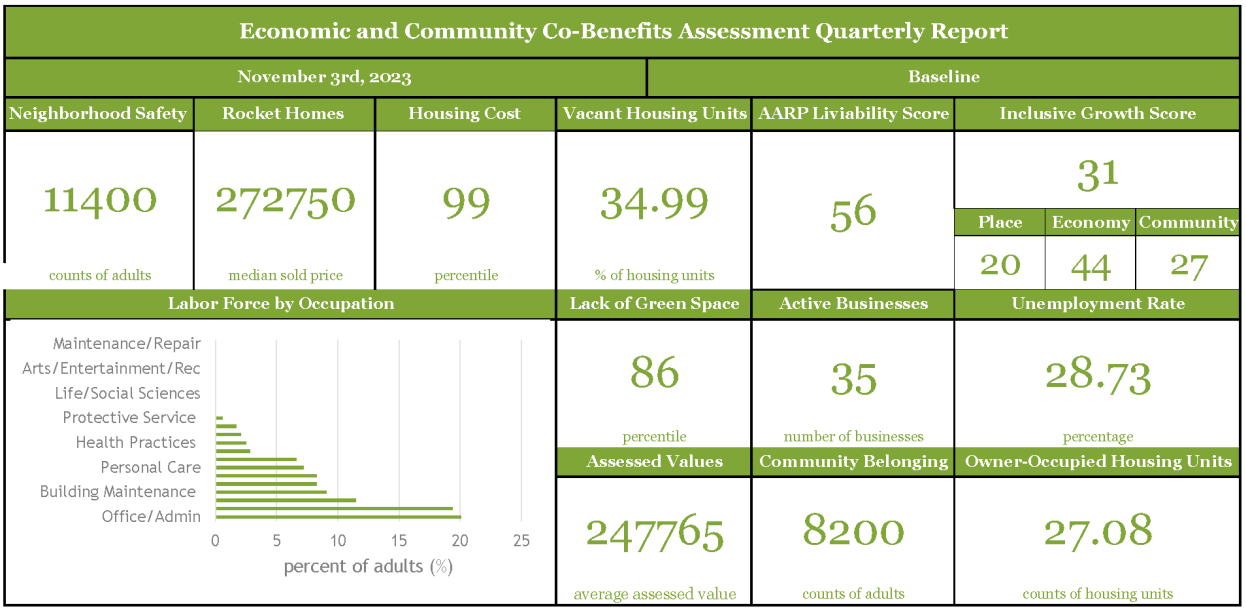

Figure 10: Baseline Metrics for Economic and Community Co-Benefits Assessment for 6444 S. Langley Ave

7048 S. Paxton Ave (Chicago, IL 60649)

Stormwater

The site includes ~ 11,000 ft^2 of turfgrass. The soil is hydrologic soil group B, which has moderate runoff potential. Annual precipitation is 32.64 inches (CNT model), and the volume capture goal of the site plan is 2.0 inches of water. The CNT model does not include evapotranspiration potential, which is typically much smaller than infiltration (capture) and runoff reduction, so the results slightly understate the performance of the installed GI BMPs.

Table 6 below summarizes that the rain garden, stormwater planter, vegetated filter strips, and permeable pavement planned to be installed at the 7048 S. Paxton site are predicted to reduce stormwater runoff by 2676 gallons per 2" storm event for a 66% reduction.

Table 6: Modelled volume capture capacity for 7048 S. Paxton Ave. using the Center for Neighborhood Technology's Stormwater Management Calculator.

GI BMP	Area (sq. ft.)	Impervious gallons captured	Runoff Reduction gallons	Sediment reduction (lbs./year	Phosphorus reduction lbs./year	Nitrogen reduction (lbs./year
Rain Garden	1000	6319	a	b	b	b
Stormwater Planter	100	653	a	b	b	b
Vegetated filter strips	670	5348	a	b	b	b
Permeable pavement	1000	1247	a	b	b	b

Total	2770	13566	2676 (66%)	0[b]	0.03[b]	0.12[b]

a- the CNT model does not specify runoff reduction for individual BMPs, just the total reduction.
b- due to the small area of the site, the nutrient reductions modeled in PLET are negligible but are included here for completeness.

Biodiversity

Overall, BioBlitz participants made 148 observations and identified 104 unique species across the four South Shore BioBlitz sites (South Shore Nature Sanctuary, South Merrill Community Garden, 71st & Crandon Garden, and the vacant lot at 7048 S. Paxton). The vast majority of species identified during the BioBlitz were plants (*Figure 11*). Of those plants identified, the majority were forbs – herbaceous, non-woody flowering plants (*Figure 12*). Trees and shrubs were the other most commonly identified functional groups of plants among the South Shore BioBlitz sites.

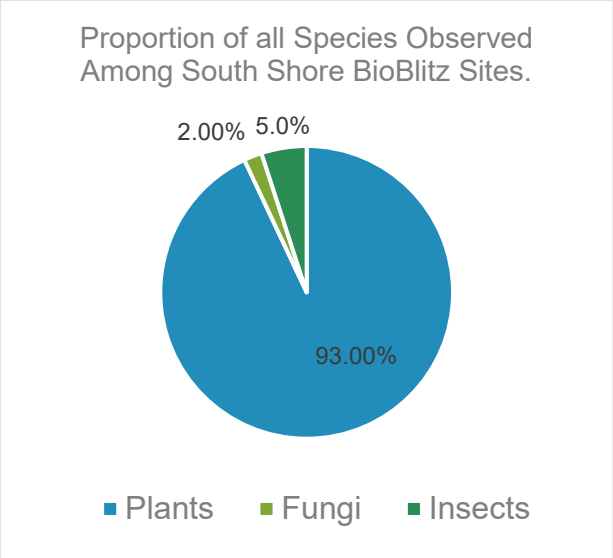

Figure 8: Proportion of all species observed among South Shore BioBlitz sites on September 28, 2024.

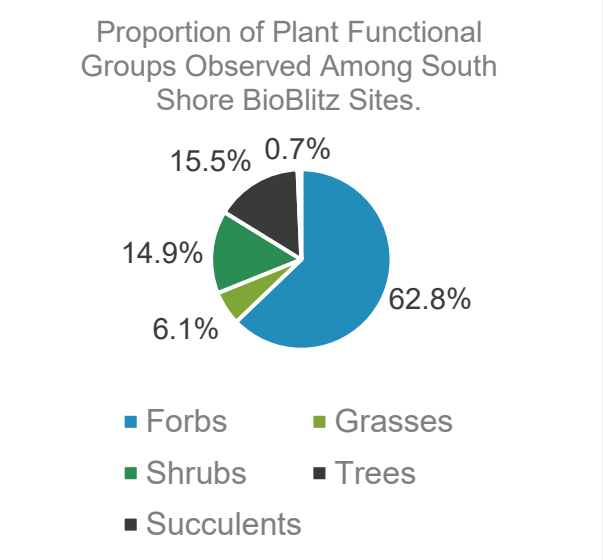

Figure 12: Proportion of plant functional groups observed among South Shore BioBlitz sites on September 28, 2024.

Floristic cover – a measurement of the Relative Abundance of plant species – was analyzed at South Merrill Community Garden, the South Shore Nature Sanctuary, and the Vacant Lot. Among these four sites, the South Shore Nature Sanctuary had the greatest diversity of floristic cover (Table 7).

Table 7: Comparison of percent cover of plant functional groups among three sites in South Shore on September 28, 2024.

Site	Plant Functional Group	Floristic Cover (%)
S. Merrill Community Garden	Grass	37.10%
S. Merrill Community Garden	Forb	26.50%
South Shore Nature Sanctuary	Grass	52.00%

South Shore Nature Sanctuary	Forb	5.00%
South Shore Nature Sanctuary	Tree	16.00%
Vacant Lot	Forb	22.00%
Vacant Lot	Grass	78.00%

The Table below summarizes the measurements taken to quantify the biodiversity of all four BioBlitz sites (*Table 8*). The South Shore Nature Sanctuary had the highest Abundance of organisms. South Merrill Community Garden, 71st and Crandon Garden and the South Shore Nature Sanctuary all had high Species Richness compared to the Vacant Lot. The Relative Abundance of species was shown to be higher in the South Shore Nature Sanctuary and Vacant Lot compared to the two Gardens. When all four BioBlitz sites were compared using both the Simpson's Diversity Index and Shannon's Diversity Index, the South Shore Nature Sanctuary was shown to have the greatest biodiversity index scores.

Table 8: Comparison of biodiversity among BioBlitz sites in South Shore using different biodiversity indices.

	S. Merrill Community Garden	71st & Crandon Garden	South Shore Nature Sanctuary	Vacant Lot
Abundance (number of organisms found in an area)	373	389	**2440**	326
Species Richness (number of different species found in an area)	High	High	**High**	Low
Relative Abundance (evenness of distribution of individuals among species)	Low	Low	**High**	High
Simpson's Diversity Index	0.96	0.96	**0.97**	0.88
Shannon-Weiner Species Diversity Index	3.66	3.71	**4.01**	2.19

Economics

Like the Langley site, the neighborhood at 7048 S. Paxton faces similar challenges, including a

low percentage of owner-occupied housing units (23.94%) and limited green space, ranking in the 95%th percentile for lack of availability (Figure 13). While some datasets were less accessible for this site, key metrics are still being tracked to understand patterns and trends in the neighborhood's response to GI implementation. Additionally, CNT stormwater calculator estimates a potential 13.1% increase in real estate values (Table 9). Compiling these reports creates a data-driven foundation for scaling GI investments in communities, highlighting how these efforts can improve both economic outcomes and quality of life over time.

Table 9: Projected Real Estate Value Increase Attributed to Implementing Green Infrastructure Features to the site (Source: Center for Neighborhood Technology, CNT)

GI BMP	Real Estate Value Increase (%)
Rain Gardens, Stormwater Planters Vegetated Filter Strips	8.6%
Permeable Paving	4.1%
Total	**13.1%**

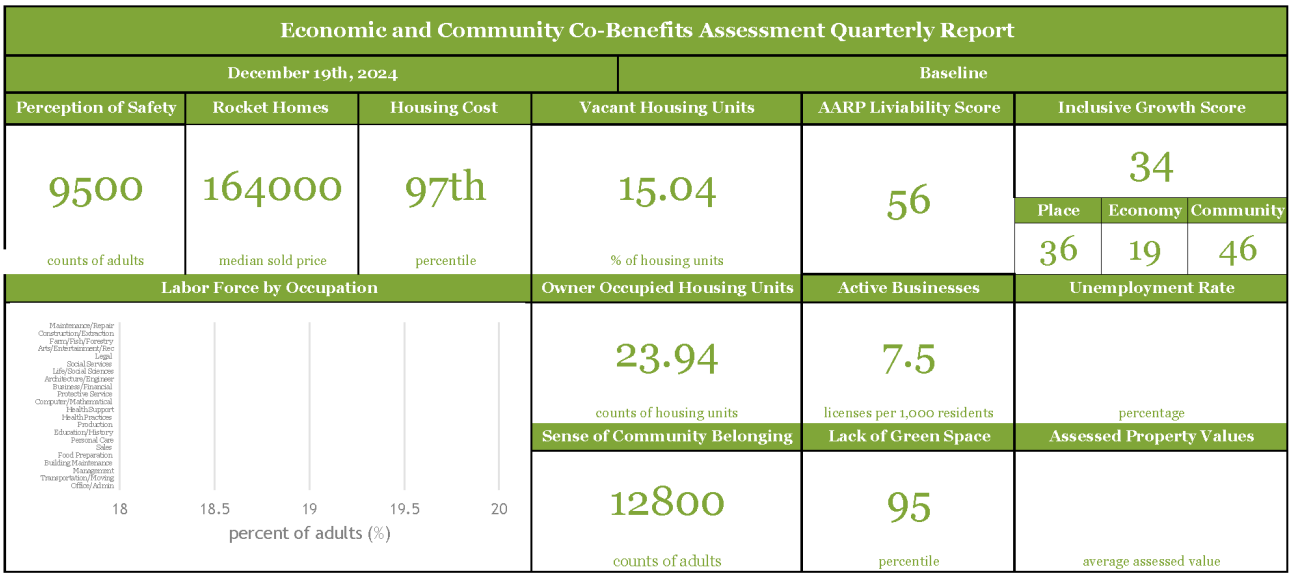

Figure 13: Baseline Metrics for Economic and Community Co-Benefits Assessment for 7048 S. Paxton Ave

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