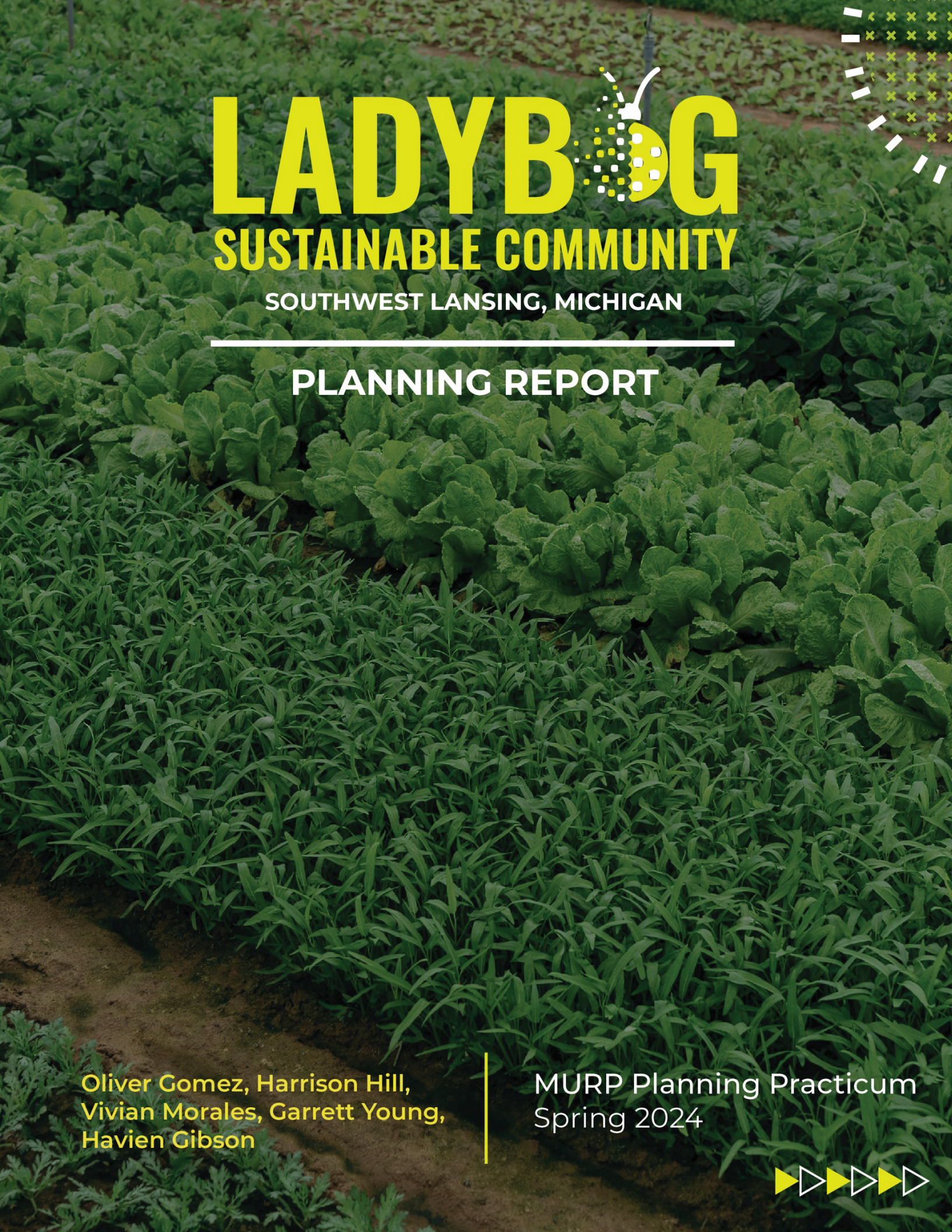

LADYBUG SUSTAINABLE COMMUNITY

SOUTHWEST LANSING, MICHIGAN

PLANNING REPORT

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MURP Planning Practicum
Spring 2024

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LADYBUG

SUSTAINABLE COMMUNITY

The Churchill Gardens Ladybug Sustainable Community initiative in Churchill Gardens, Lansing, Michigan, represents an innovative effort to establish a community-centric, ecologically mindful urban agriculture community. This initiative is dedicated to advancing sustainable and regenerative methodologies to mitigate environmental issues while enhancing community involvement and overall wellness.

The proposed project is structured into three distinct parts:

Part I: This segment involves the creation of a Planning Report. This report draws from the socio-economic dynamics of the Churchill Gardens neighborhood alongside an in-depth analysis of the site's unique features and conditions.

Part II: This section delivers a handbook that serves as an essential guide for cultivating agriculture-based communities. It encapsulates the foundational principles, strategies, and best practices for developing such communities, ensuring a sustainable framework.

Part III: This final segment produces materials intended for community dissemination. These materials, which include site layouts, informational brochures, and detailed project presentations, are designed to inform, engage, and involve the community in the ongoing development process.

PART I

PLANNING REPORT

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EXECUTIVE SUMMARY

The Ladybug Sustainable Community project in Lansing, Michigan, is a pioneering initiative aimed at creating an inclusive, environmentally sensitive urban agri-community. The proposed project seeks to address environmental challenges, foster community engagement, and promote sustainable development and regenerative practices. The report provides an overview of the project's goals, strategies, and recommendations, emphasizing the collaborative efforts and innovative approaches to create a sustainable and regenerative urban community.

The project engaged in extensive collaboration with key stakeholders, incorporating insights gained from discussions with various entities and considering the socio-economic characteristics of the community. The socioeconomic profile provides an overview of Churchill Gardens, including demographics, education, income, employment, housing, and transportation. Key findings include:

- **Demographics**: A gender shift occurred among the youngest population, with notable changes in age group populations between 2010 and 2022. The area experienced a population decrease, contrasting with state and county trends.
- **Education**: Educational attainment has fluctuated, with fewer residents holding a Bachelor's degree or higher.
- **Income**: Median household income increased significantly over the period, indicating economic growth, though it remains lower than broader regional averages.
- **Employment**: The employment rate in Churchill Gardens dipped slightly to 85.7%, indicating that most of the population remains employed. However, this is still the lowest rate when compared to larger regions such as Lansing, Ingham County, and the state of Michigan.
- **Housing**: Most housing units are single-family detached homes. Vacancy rates have gradually increased.
- **Transportation**: Commute times have aligned with regional averages over time, and driving alone remains the dominant mode of transportation.
- **Crime**: The area has seen fluctuating crime rates, with a notable reduction in the crime index by 2023.

The analysis of the site's current condition reveals it as an undeveloped area, largely forested, incorporating multiple wetlands, which are crucial considerations for any potential development endeavors.

The food access survey findings conducted in Churchill Gardens underscored generally favorable access to nutritious food and presented a diverse range of grocery spending and a moderate understanding of farm-to-table principles among residents. Moreover, a significant interest in local food cultivation emerged, suggesting potential for community-driven agriculture initiatives.

Our recommendations, devised through meticulous research and stakeholder engagement, are structured to effectively address identified challenges. They fall into two tiers: exploring alternative site selection due to constraints at the current location and proceeding with the site while implementing strategic measures to navigate its limitations.

Tier 1 Recommendations focus on the need for a larger area to accommodate the project's agricultural and housing needs, considering the current site's restrictions, such as wetland presence and limited developable space.

Tier 2 Recommendations encompass a range of strategies:

1. **Wetlands Conservation**: Advocating for sustainable interaction with the site's wetlands, including compliance with local ordinances and innovative mitigation strategies to preserve these vital ecological areas.
2. **Soil Management**: Tailoring soil management practices to enhance agricultural productivity across the site's diverse soil types, ensuring sustainable crop cultivation.
3. **Infrastructure Enhancement**: Incorporating efficient water management systems and sustainable construction practices, such as using renewable energy sources and green building materials, to support the community's ecological ethos.
4. **Ecological Development**: Addressing the challenges and constraints of carbon sequestration in an urban setting, emphasizing the need for innovative approaches to maximize environmental benefits.
5. **Sustainable Construction Materials:** This recommendation emphasizes the importance of choosing strategic materials and practices that boost environmental sustainability, improve water efficiency, and bolster ecosystem health in urban farming environments.
6. **Housing Infrastructure**: Highlighting the integration of modular homes to provide rapid, sustainable, and cost-effective housing solutions, aligning with the community's sustainable living principles.
7. **Funding and Partnerships**: Identify key funding sources and strategic partnerships with government agencies, educational institutions, and local organizations to secure the project's necessary resources.
8. **Regulatory Compliance and Zoning**: Navigating Lansing's zoning laws and building codes to ensure project alignment with local regulations and community standards.
9. **Community Engagement and Urban Farming**: Implementing comprehensive programs to educate and engage the community in sustainable agriculture, composting, and conservation practices.
10. **Agri-Community Case Studies**: Drawing on successful examples of agri-communities to inform and guide the development of the Ladybug Sustainable Community, incorporating best practices in organic farming, community design, and environmental stewardship.

By adopting these multifaceted recommendations, the Ladybug Sustainable Community project aspires to create a vibrant, sustainable agri-community that serves as a model for urban development, fostering a harmonious balance between human habitation and the natural environment.

PROJECT BACKGROUND

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1. INTRODUCTION

The Ladybug Sustainable Community at Churchill Gardens project in Lansing, Michigan, is a pioneering endeavor that seeks to create an inclusive, environmentally sensitive urban agri-community. With a focus on sustainable development and regenerative practices, the project aims to address environmental challenges while fostering community engagement and well-being. The project seeks to incorporate sustainable building design, energy conservation, farm methodology, and community engagement to achieve its objectives. This report aims to provide an overview of the project's goals, strategies, and recommendations, highlighting the collaborative efforts and innovative approaches to create a sustainable and regenerative urban community.

2. PRACTICUM STRUCTURE

Planning Practicum is the capstone requirement for undergraduate and graduate degree programs in Urban and Regional Planning at Michigan State University (MSU). This essential course offers students a practical, real-world experience where they can apply the knowledge and tools gained throughout their academic program. With a student-led and faculty-advised structure, the capstone provides a transitional bridge between academia and professional practice. Student groups assigned to projects across Michigan are expected to produce a professional report as a culmination of their capstone experience.

3. PROJECT BACKGROUND

The Ladybug Sustainable Community at Churchill Gardens, initiated by LoveJoy Community Services in collaboration with BluStar Development and TA Forsberg, is an innovative urban agricultural community project in Lansing, Michigan. It aims to foster an inclusive and environmentally conscious community that promotes sustainable and regenerative development practices, targeting a net-zero future.

Situated on Lansing's Southwest side, this eight-to-twelve-acre development will feature a mix of single-family homes, apartments, commercial spaces, a farm, and community gardens, all designed as an eco-village to minimize environmental impact. The project focuses on teaching permaculture principles and sustainable living and aims for regenerative growth. It plans to work on incorporating sustainable features, partnering with organizations for net-zero emissions, and securing funding for certification. Moreover, it intends to involve the local community through engagement sessions and education on sustainability practices.

3.1 Mission Statement

The primary objective of the Ladybug Center project is to build a sustainable and regenerative urban agri-community, seamlessly blending housing, farming, and community resources. Our collective aim is to produce a handbook that acts as a manual for developing similar projects. This guide will encompass crucial elements, including funding sources, carbon sequestration programs, sustainability certifications, construction materials, partners, native plant species, and more, all while fostering environmental stewardship and encouraging community engagement.

3.2 Client Information

LoveJoy Community Services is a non-profit organization headquartered in Livonia, MI that provides high-quality housing with person-centered supports to help disabled individuals maintain long-term stability and integration in the community. They have various residential care programs throughout Michigan that support adults with developmental disabilities and mental illness to live fully integrated lives within their communities. Founded in 2007, LoveJoy believes its core mission is to assist persons to live with the greatest degree of health, independence, and dignity as possible.

Forsberg, since 1950, has been a leading force in creating remarkable environments in Greater Lansing and mid-Michigan. Initially focused on single-family developments, Forsberg evolved as a "Community Developer," inspiring growth and aiming to make the best living and working environments. As of 2020, Forsberg continues its commitment to positive community development in the Greater Lansing Region.

4. DATA SOURCES

The presented report relies on a combination of secondary data sourced online and primary data collected on-site. Online services such as Social Explorer and ESRI Business Analyst Online (BAO), made accessible through Michigan State University, were used to access the secondary data. Both Social Explorer and ESRI's BAO offer updated and georeferenced data specific to drawn boundaries, enabling the presentation of data exclusively for the Ladybug Sustainable Community Project in the Churchill Gardens Neighborhood.

In addition, data related to biodiversity and soil composition was collected from the Department of Environmental Conservation and the Department of Agriculture.

5. CHURCHILL GARDENS NEIGHBORHOOD

5.1 Location

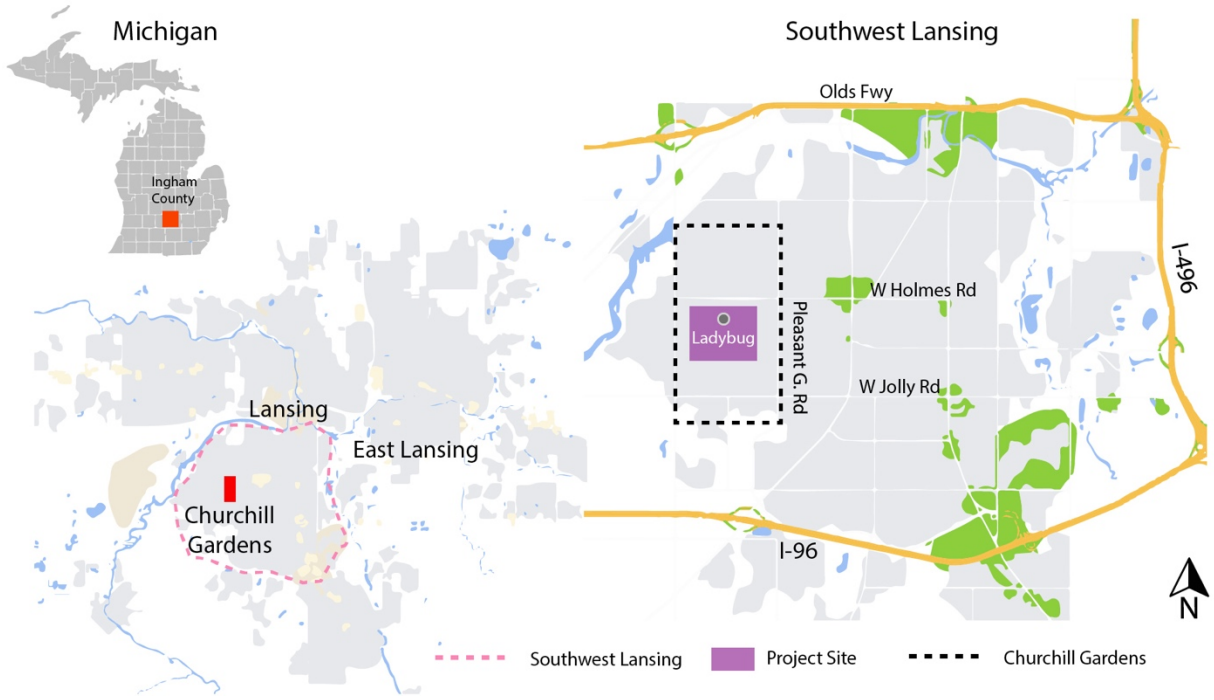

Figure 1. Map showing the location of the Ladybug Sustainable Community at Churchill Gardens.

The site for the Ladybug Sustainable Community at Churchill Gardens is located in the Southwest of the City of Lansing, Michigan. The area slated for development sits behind the Tabernacle of David Church, located on W Holmes Rd near the intersection of W Holmes and Pleasant Grove Rd. Historically, the southwest side has not received the same level of investment as other areas of Lansing, especially the downtown. The development is looking to take up around 14 acres of the current 20 acres under the ownership of the Church.

5.2 Zoning and Land Use Regulations

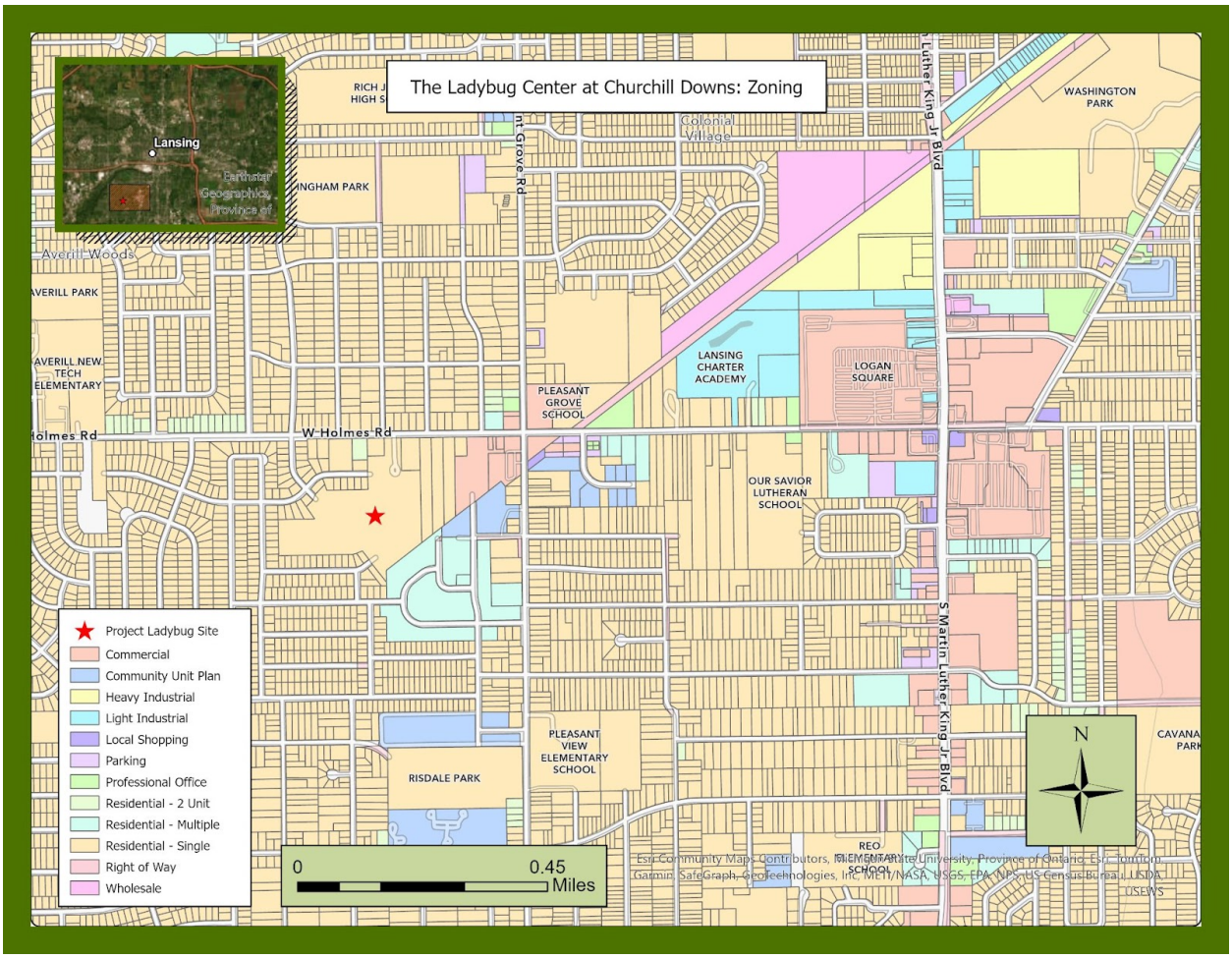

Figure 2. Land Use Map Churchill Gardens.

To the south of the site is the neighborhood of Churchill Gardens, a traditional post-war development of single-family homes, zoned R-3. To the southeast of the site is an apartment development zoned MFR. To the east of the site are several commercial developments and the Lansing Charter Academy, a tuition-free, K-8 public charter school.

Currently, the parcel is not zoned correctly for the project type. The site is zoned under R-3; this **R-3 Suburban Residential District** is intended to accommodate a more flexible rural character in the city. Deep lots are typical with variable setbacks. Character types include Ranch and Minimal Traditional, often with side-facing gable roofs. Per the Lansing zoning ordinance, R-3 zoning requires a 20’ front setback, 30’ rear setback, 5,000 sq ft minimum lot size, and can only house one dwelling unit per lot. It will be necessary going forward to be granted a rezoning request from the City of Lansing to rezone to Mixed Family Residential (MFR).

MRF is applied to areas of Lansing appropriate for the highest range of residential densities to accommodate multiple-family dwellings. The MFR zone is suitable for transitioning from residential districts into mixed-use commercial areas. MFR complexes should be designed with a campus-like character, providing shared open space, landscape buffering, and consistent site design features.

MFR zoning is considerably less restrictive than R-3. The MFR zoning requires a 20’ front setback, 25’ rear setback, and 3,000 sq ft per two-bedroom dwelling unit. With no maximum units per lot, this zoning makes the most sense for the proposed development.

SOCIO ECONOMIC PROFILE

6. SOCIOECONOMIC PROFILE

6.1 Demographics

6.1.1 Population

Churchill Gardens' population has undergone notable changes in the last decade. For the youngest residents, those under years old, there was a dramatic decline in the male demographic, while females in the same age group experienced an increase. This points to a notable gender shift among the youngest population at Churchill Gardens. Meanwhile, the age group of 18 to 24 years showed substantial growth for both males and females, indicating a strong influx of young adults.

In contrast, the 25 to 34 age brackets saw stability in male numbers but a pronounced decrease in female numbers. This pattern of decreasing female presence continued into the 45 to 54 years category despite the male population showing an uptick.

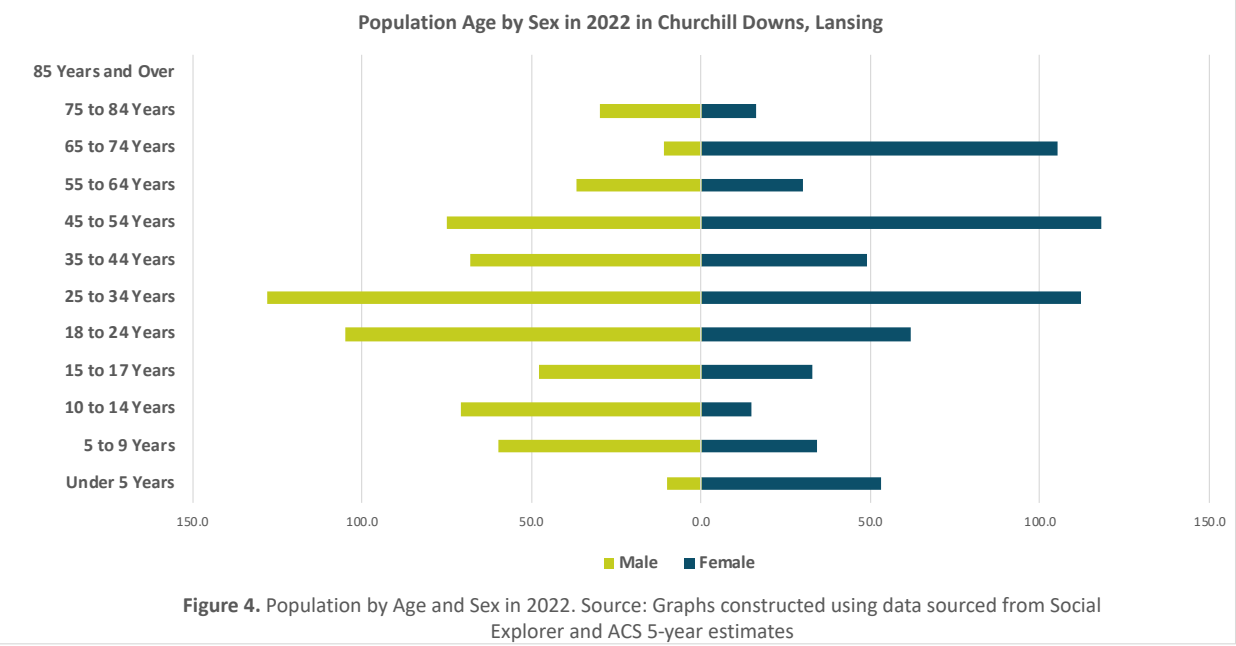

Figure 4. Population by Age and Sex in 2022. Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates

The senior population presented a mixed picture. The 65 to 74 years group experienced a sharp decrease in male numbers, yet the females only saw a slight increase. However, in the 75 to 84 years category, there was an increase in both male and female populations, although the numbers were small.

In general, the total male population at Churchill Gardens remained relatively stable with a marginal increase. In contrast, the female population decreased, leading to a slight overall decline in the total population from 2010 to 2022. These demographic trends highlight the

evolving nature of the Churchill Gardens community, with age groups experiencing more pronounced changes than others.

Population Trends at the Local, City, County, and State Level

Churchill Gardens exemplifies the significant demographic shifts observed locally within Michigan. The area has witnessed more dramatic changes than in the broader regions of Ingham County and the state itself.

From 2010 to 2016, Churchill Gardens saw its population increase from 1,347 to 1,495 residents, an expansion of approximately 11%. This upward trend was short-lived, as by 2022, the population had decreased to 1,270. This downturn reflects a substantial decrease of about 15% from its 2016 peak. It is the most prominent change at the local level, especially when contrasted with the relatively steady numbers in the wider Ingham County and the overall growth in Michigan.

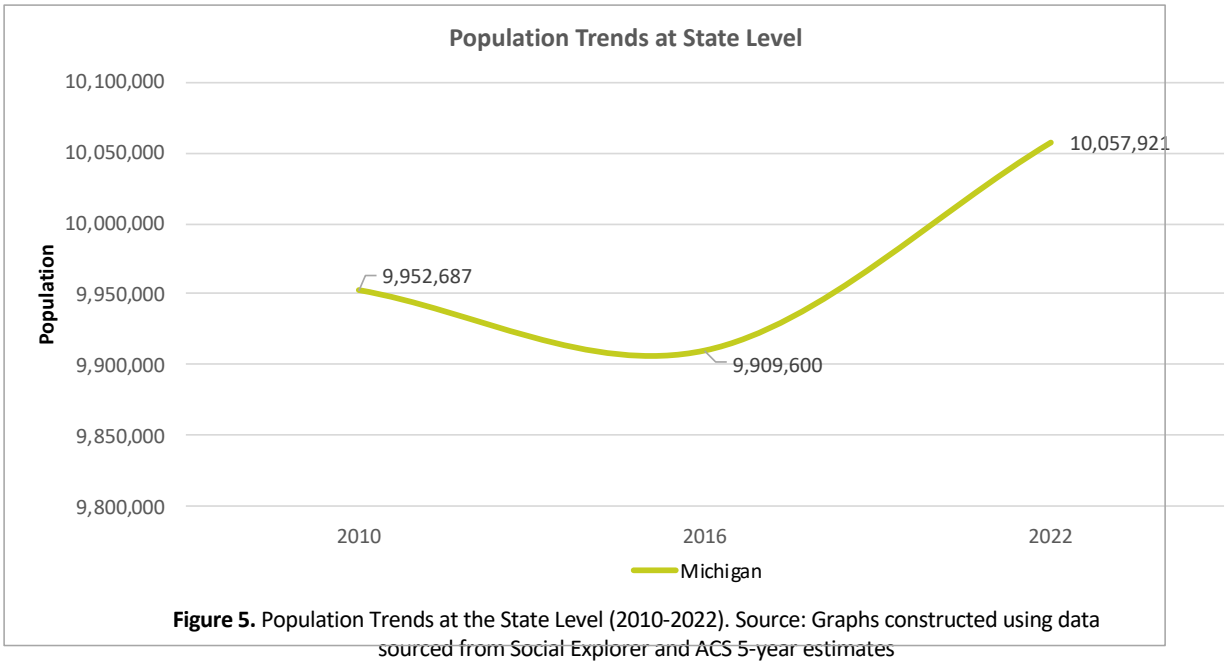

Figure 5. Population Trends at the State Level (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates

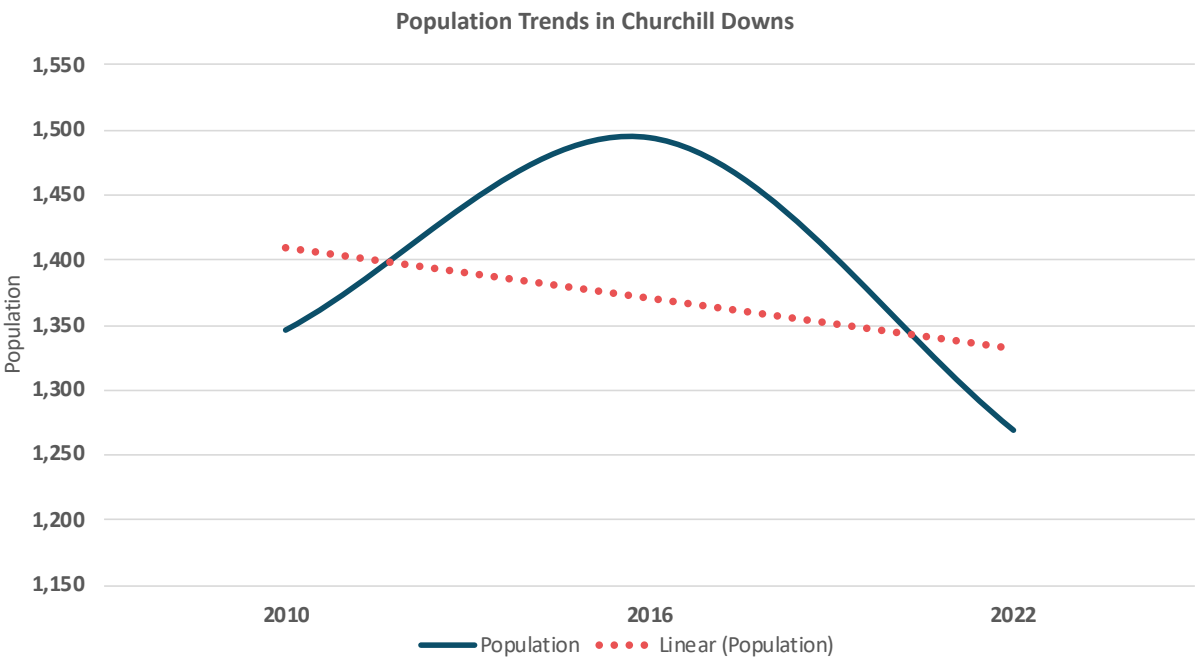

Figure 8. Population Trends in Churchill Down (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

The marked population reduction in Churchill Gardens points to specific local issues or changes that require close examination. Potential contributing factors to this trend could include economic transformations, shifts in the housing market, or alterations in community facilities and services affecting residency trends. Identifying these key elements is vital for developing strategic interventions to rejuvenate Churchill Gardens.

Median Age Trends at the Local, City, County, and State Levels

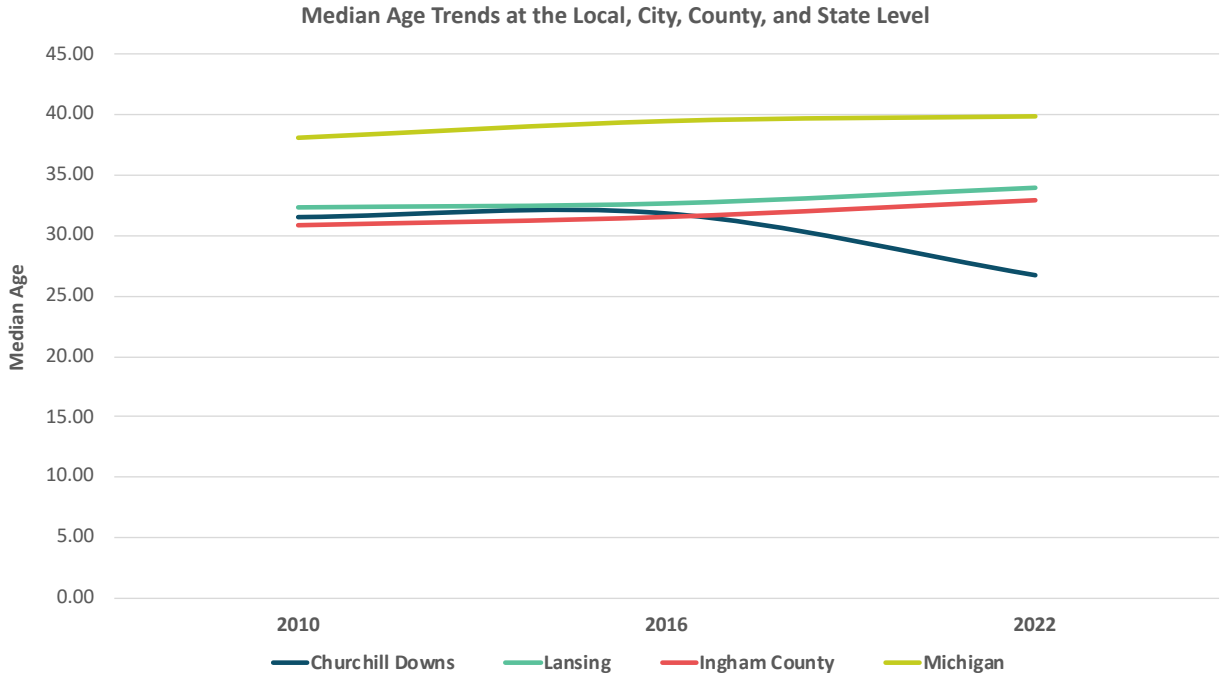

Figure 9. Median Age Trends at the Local, City, County, and State Levels (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

Figure 9 presents the median age data for Churchill Gardens in Lansing, Ingham County, and the state of Michigan over three time points: 2010, 2016, and 2022. A noticeable trend is the significant decrease in the median age of residents in Churchill Gardens. In 2010, the median age was 31.5 years, which slightly increased to 31.8 years in 2016. However, by 2022, it had sharply dropped to 26.7 years. This reduction by **5.1 years** from 2016 to 2022 indicates a substantial demographic shift, suggesting an influx of younger individuals or families into the area.

Contrasting this local trend, both Lansing and Ingham County experienced an increase in median ages across the same periods. Lansing's median age rose from 32.4 years in 2010 to 33.9 years in 2022, while Ingham County's median age increased from 30.9 to 33 years. This increment shows a gradual aging of the population in these areas.

At the state level, Michigan's median age followed a similar pattern of increase, rising steadily from 38.1 years in 2010 to 39.9 years in 2022. This consistent upward trend across the larger regions contrasts with the unique youthful shift seen in Churchill Gardens.

In summary, while Lansing, Ingham County, and Michigan are experiencing an aging trend, Churchill Gardens stands out with a marked decrease in median age, indicating a local demographic trend toward a younger population. This divergence could be significant for local

planning, services, and businesses, which may need to adapt to cater to a younger demographic with different needs and preferences.

6.1.2 Race

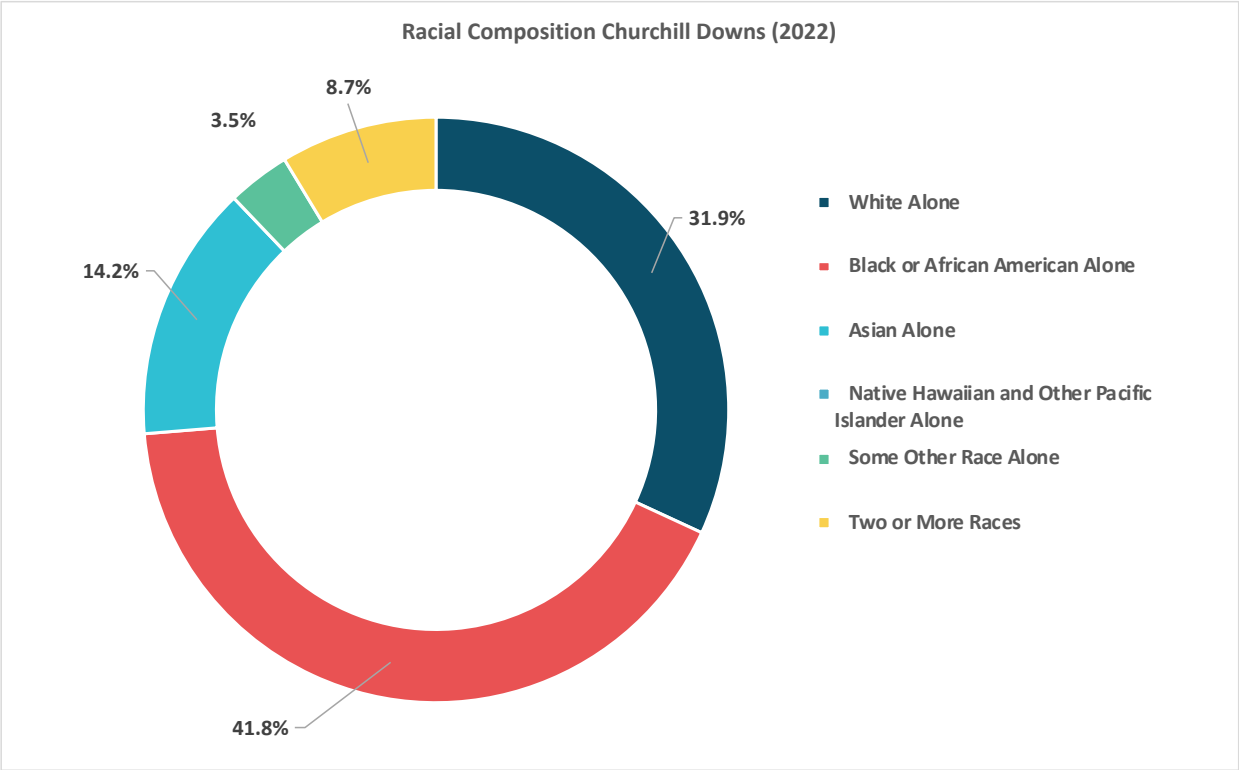

Figure 10. Racial composition in Churchill Downs (2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

The 2022 racial composition data for Churchill Gardens shows a diverse community with a majority of Black or African American individuals (41.8%) and a significant White population (31.9%). Asians also represent a notable portion of the community at 14.2%. Individuals of two or more races make up 8.7%, indicating a presence of multi-racial backgrounds. A smaller segment is identified as some other race alone at 3.5%. Notably, American Indians and Alaska Natives, as well as Native Hawaiians and Other Pacific Islander groups, are either absent or constitute a negligible percentage. The data highlights the area's multicultural demographic, which is essential for community-focused initiatives and cultural understanding.

6.2 Education

The educational attainment in Churchill Gardens, as measured by the percentage of residents with a Bachelor's Degree or more, has experienced fluctuations between 2010 and 2022. In 2010, 17.6% of Churchill Gardens residents had obtained at least a Bachelor's Degree. This figure saw a notable decrease by 2016, dropping to 10.5%. However, there was a slight rebound by 2022, with the percentage increasing to 11.2%.

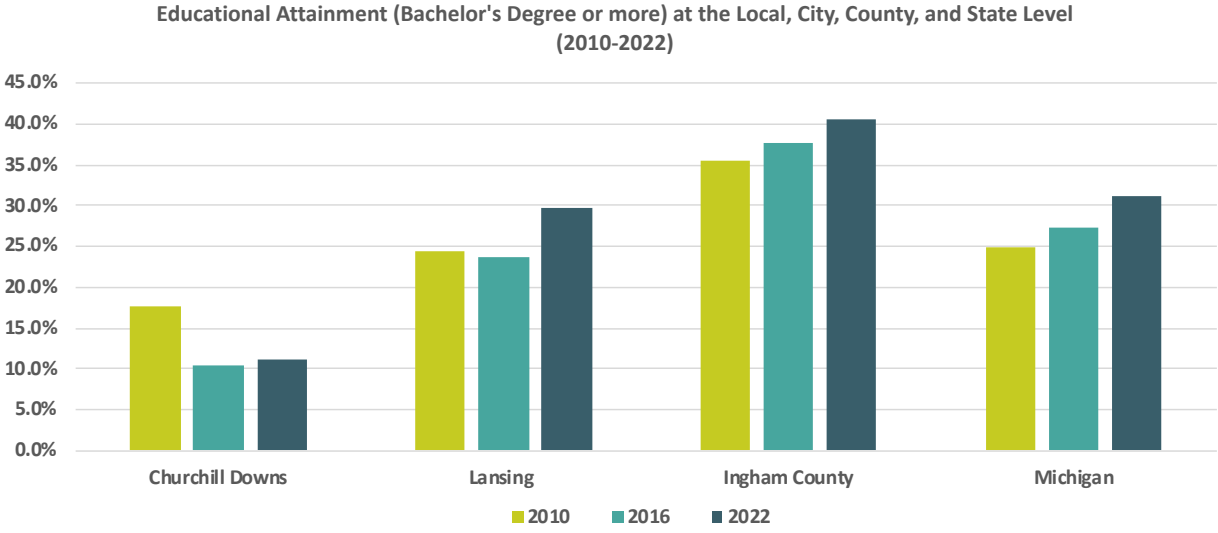

Figure 11. Educational Attainment Bachelor's Degree or more (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

In comparison, the broader regions of Lansing, Ingham County, and Michigan have all seen increases in the educational attainment of their populations over the same period. Lansing's percentage grew from 24.5% in 2010 to 29.7% in 2022. Ingham County saw a rise from 35.5% to 40.6%, and Michigan experienced an increase from 25.0% to 31.1%.

The trend in Churchill Gardens stands in contrast to these broader trends, with Lansing also falling below the educational attainment levels when compared to Ingham County and experiencing only a marginal recovery. This could have significant implications for the local workforce, economic development, and community services, as higher educational attainment is often linked with greater economic opportunities and community engagement.

6.3 Income

The median household income in Churchill Gardens has shown a positive trend over the twelve years from 2010 to 2022. Starting at $27,216 in 2010, there was a substantial increase to $36,806 by 2016, and the upward trajectory continued to $45,156 by 2022. This represents a growth of approximately 66% over the period, indicating a notable rise in the economic status of the area's residents.

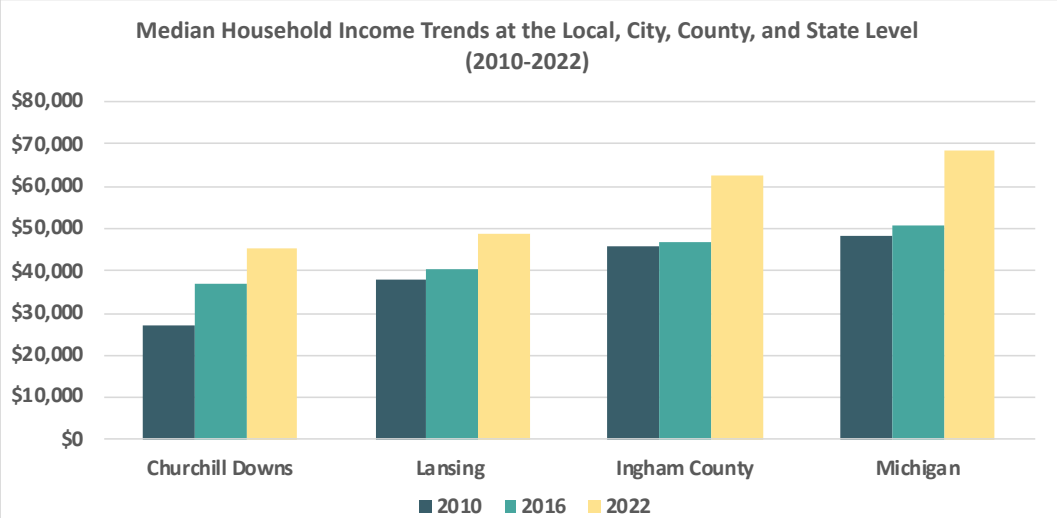

Figure 12. Median Household Income Trends at the Local, City, County, and State Level (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

In the broader context, both Lansing and Ingham County, and the state of Michigan, also experienced growth in median household income during the same timeframe. However, Churchill Gardens stands out for its rate of increase. While Lansing's median income grew from $37,843 to $48,962, Ingham County's from $45,808 to $62,548, and Michigan's from $48,432 to $68,505, the percentage increase for Churchill Gardens was more pronounced.

Despite this significant growth, Churchill Gardens' median income remains the lowest compared to Lansing, Ingham County, and the state. This disparity suggests that while the area's economic conditions are improving, there may still be room for economic development and support to ensure that residents of Churchill Gardens can continue to close the income gap with the broader regions.

6.4 Employment

The employment rates in Churchill Gardens have undergone remarkable fluctuations between 2010 and 2022. In 2010, the unemployment rate was recorded at 0%, which suggests data collection issues or an anomaly, as it is doubtful for an area to have absolutely no employment. This figure experienced an extraordinary turnaround by 2016, soaring to 91.3%, which implies a significant economic or data revision. By 2022, there was a slight decline to 85.7%, but this still reflects most of the population being employed.

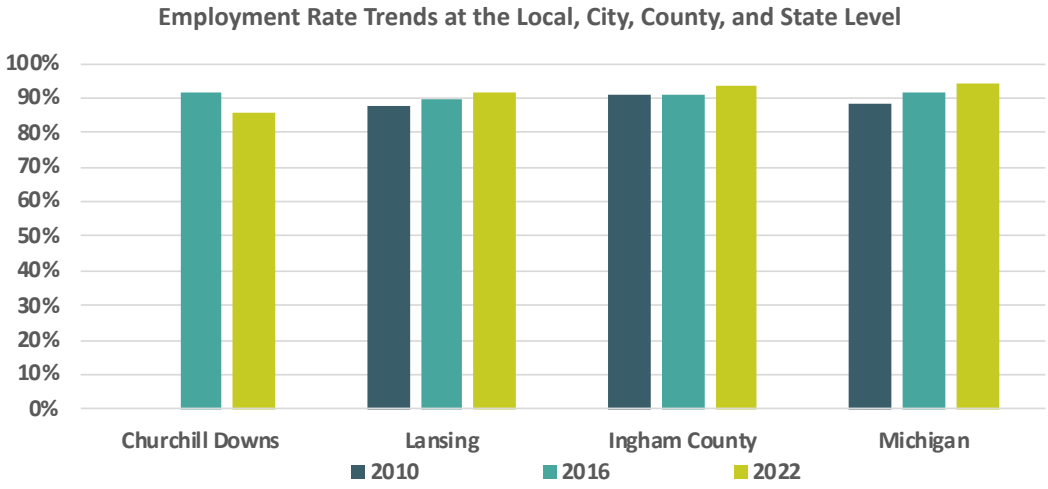

Figure 13. Employment Rate Trends at the Local, City, County, and State Levels (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

The City of Lansing, Ingham County, and the state of Michigan displayed more stability and a gradual upward trend in employment rates. Lansing's employment rate increased from 87.8% in 2010 to 91.75% in 2022, while Ingham County's rate increased from 91.1% to 93.6% over the same period. Michigan's employment rate also improved, from 88.5% to 94.0%.

The initial data point for Churchill Gardens in 2010 is an outlier compared to these trends, and the subsequent recovery by 2016 and a slight decrease by 2022 suggest a volatile economic environment that eventually stabilized. Despite this recovery, Churchill Gardens has the lowest employment rate in 2022 compared to Lansing, Ingham County, and Michigan, indicating potential local challenges in employment that might not be reflected in the broader region.

6.5 Employment by Industry

In Churchill Gardens, the Manufacturing sector emerges as a significant employer, with **Figure 14** indicating this industry surpasses others in terms of occupation numbers. It is followed by sectors like Retail Trade, Health Care, and Educational Services, which also show a notable presence. The graph illustrates lower employment levels in Construction, Wholesale Trade, and Information industries.

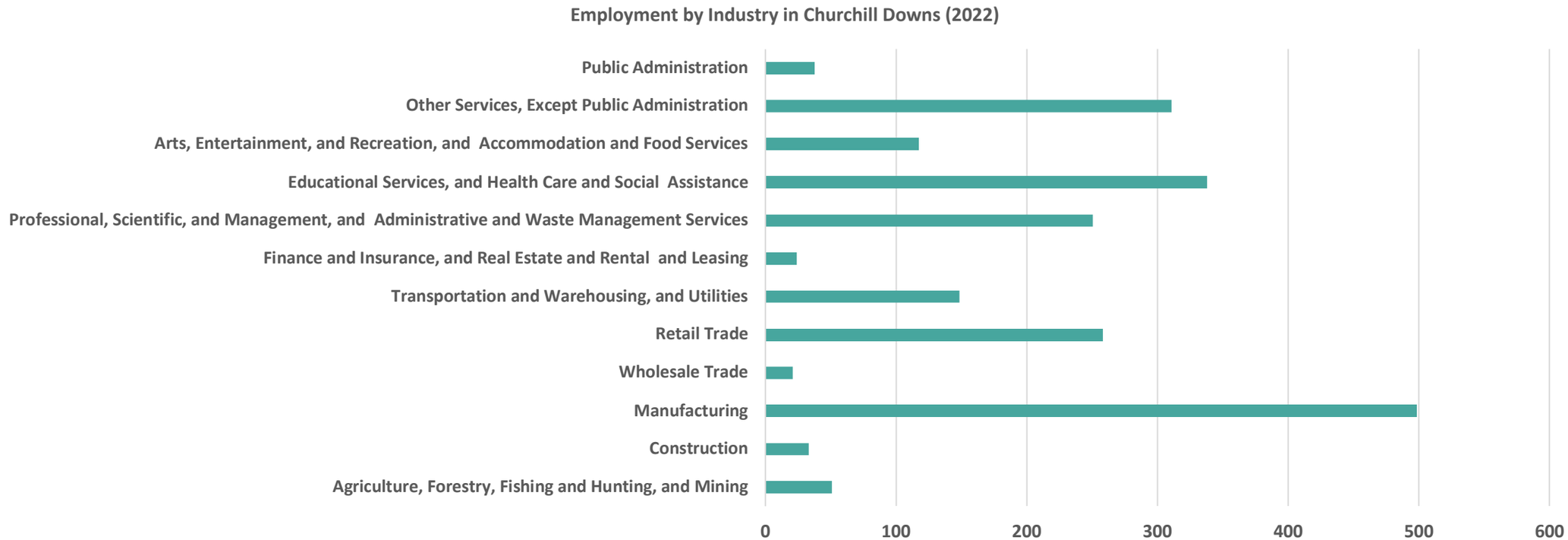

Figure 14. Industry by Occupation in Churchill Downs (2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

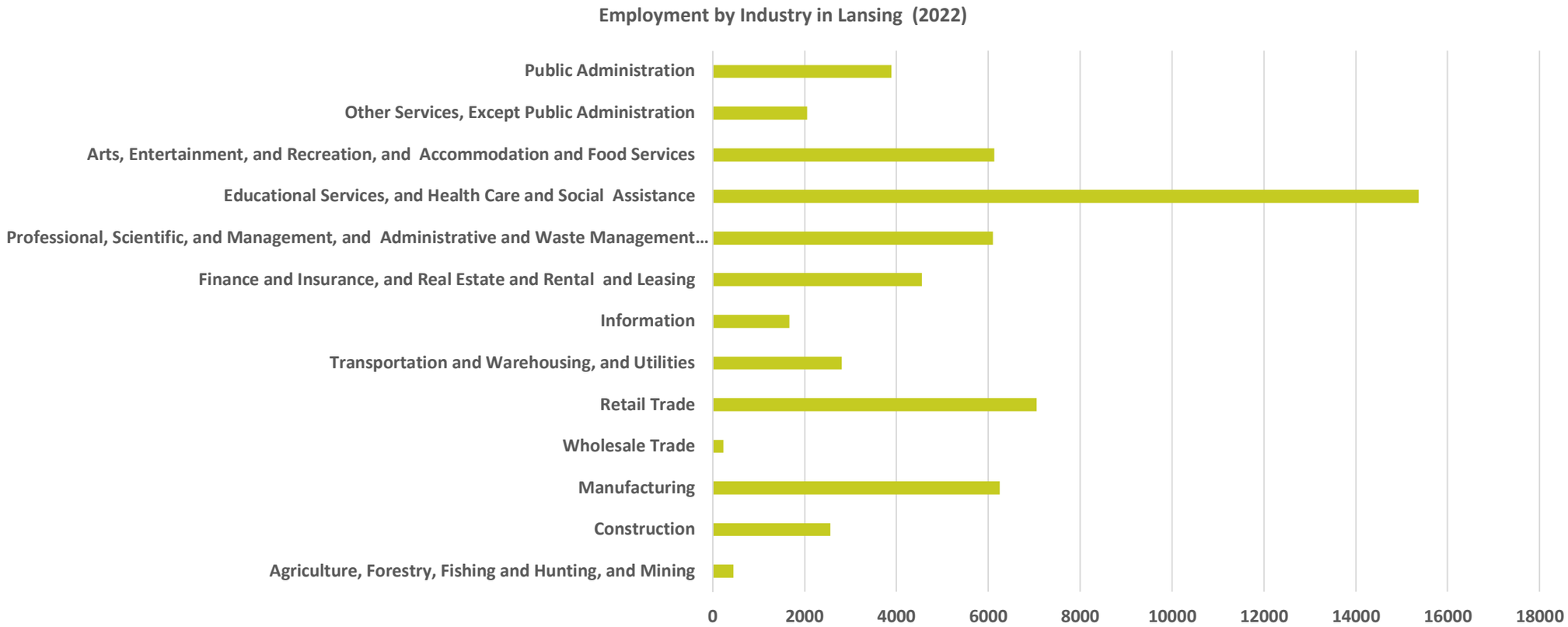

Figure 15. Industry by Occupation in Lansing (2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

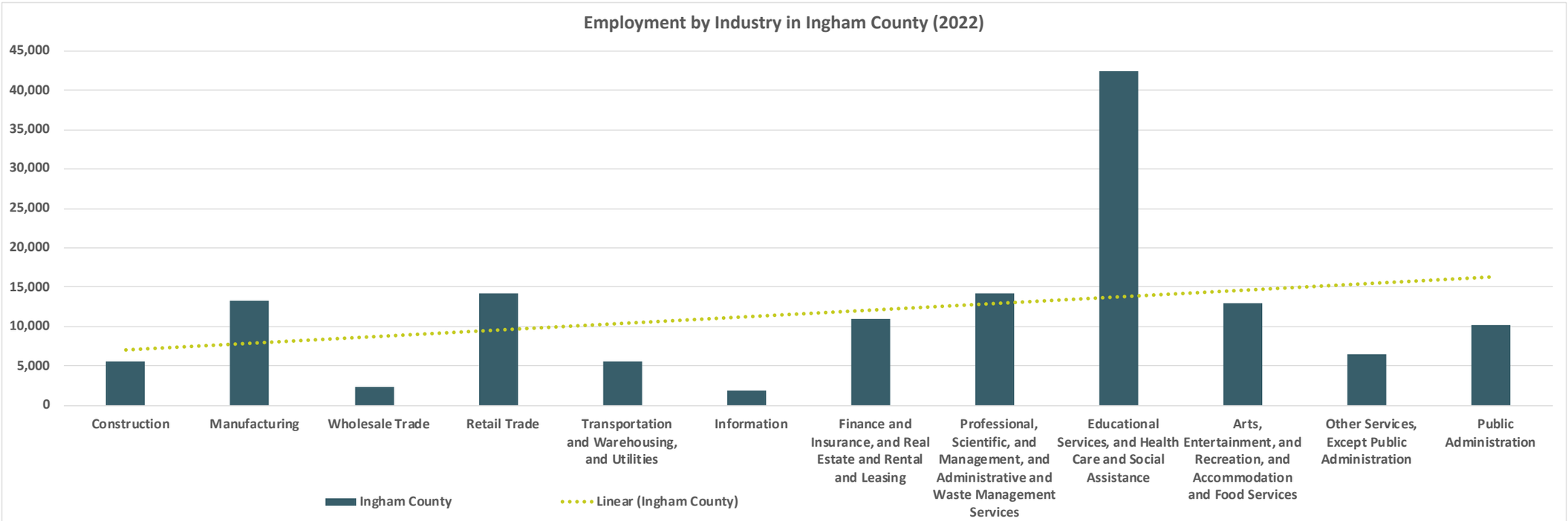

Figure 16. Industry by Occupation in Ingham County (2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

When we compare this to the broader contexts of Lansing and Ingham County, we see different dominant sectors. For example, in Ingham County, Educational Services and Health Care display a significant concentration of employment, likely reflecting the presence of educational institutions and medical facilities within the county. Lansing, on a city scale, follows a similar pattern with high employment in the healthcare sector.

At the state level, the graph for Michigan (**Figure 17**) indicates Manufacturing as a prominent industry, aligning with Churchill Gardens' local employment trends. However, the state also shows a balanced distribution of employment across other sectors like Retail Trade and Health Care, indicative of a diverse state economy.

Overall, Churchill Gardens has a notable concentration of employment in the Manufacturing sector, with other industries like Retail Trade and Health Care also playing significant roles in the local job market. This concentration distinguishes the local economy from that of the broader regions of Lansing and Ingham County, where Educational Services and Health Care are more dominant, and the state of Michigan exhibits a more diversified employment landscape across multiple industries. These insights could guide local economic development strategies and workforce training programs in Churchill Gardens to capitalize on its manufacturing strength while diversifying and growing other sectors to ensure economic resilience and provide varied employment opportunities for residents.

6.6 Unemployment

The unemployment rate data for Churchill Gardens reveals a striking trend that deviates notably from the broader patterns observed in Lansing, Ingham County, and Michigan between 2010 and 2022. The data for 2010 indicates an unemployment rate of 0% for Churchill Gardens, which, similar to the earlier employment rate data, likely means a data reporting anomaly rather than a literal absence of unemployment.

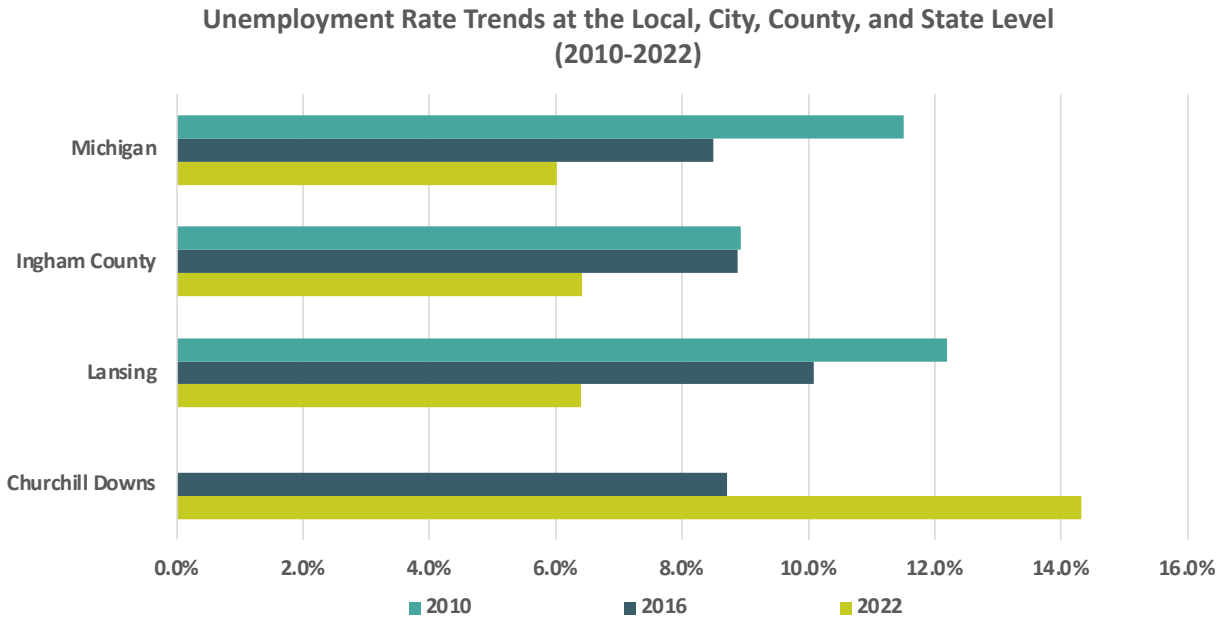

Figure 18. Unemployment Rate Trends at the Local, City, County, and State Levels (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

By 2016, Churchill Gardens' unemployment rate had risen to 8.7%, aligning more realistically with economic conditions. However, by 2022, the rate had escalated to 14.3%, indicating a significant increase in unemployment, which contrasts sharply with the downward trends in larger regions. During the same period, Lansing saw a reduction in its unemployment rate from 12.2% in 2010 to 6.4% in 2022. Ingham County mirrored this improvement, dropping from 8.9% to 6.4%, and Michigan's rate decreased from 11.5% to 6.0%.

The trend in Churchill Gardens is concerning, especially in the context of the decreasing unemployment rates in the broader geographic areas. The relatively high unemployment rate in 2022 suggests local economic challenges that the broader regional data may need to capture. It underscores potential issues such as a lack of job opportunities, skill mismatches, or other economic barriers that could affect the local workforce.

In summary, while Lansing, Ingham County, and Michigan have shown improving employment conditions over the years, Churchill Gardens has experienced an increase in unemployment, culminating in a rate more than double the state average by 2022. This divergence highlights

the need for targeted economic and workforce development interventions to address the unique challenges Churchill Gardens residents face and promote job creation and skills training within the community.

6.7 Housing Profile

Housing Types

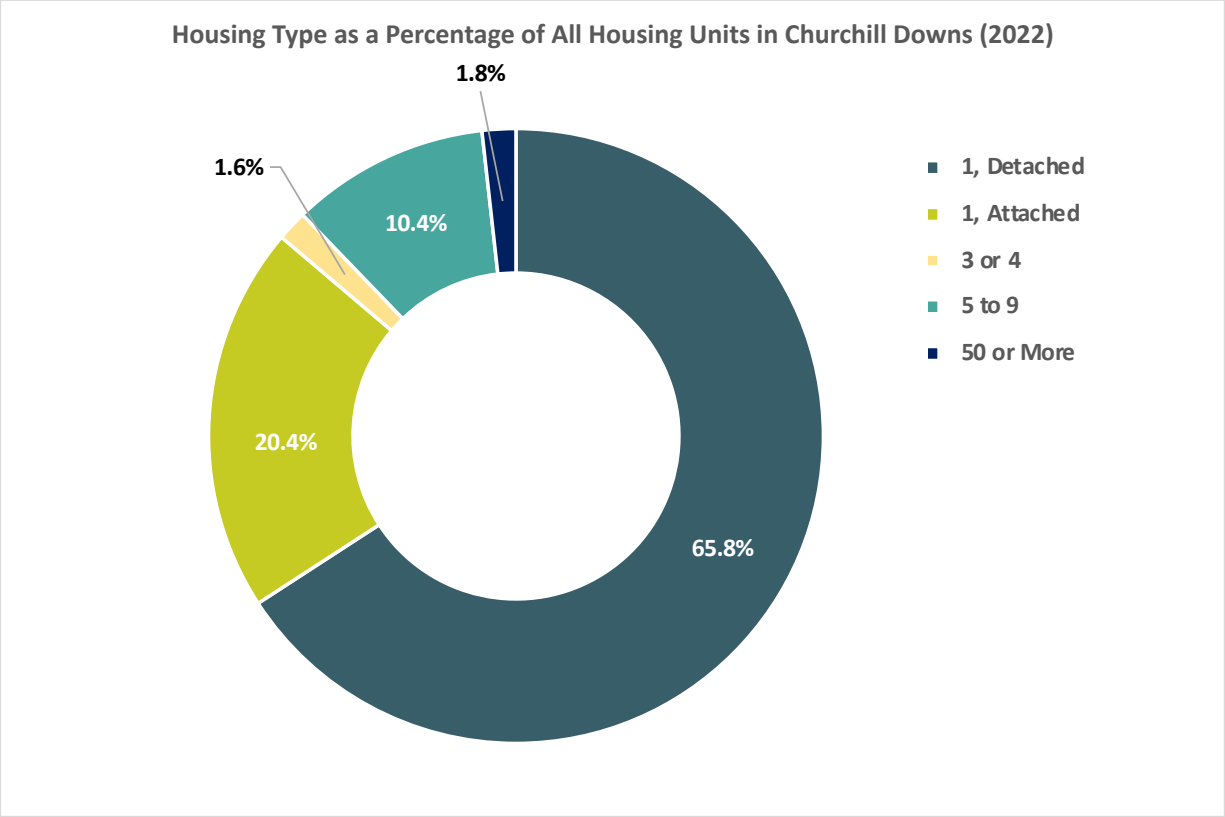

Figure 19. Housing Type as a Percentage of All Housing Units in Churchill Downs (2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

Figure 19 illustrates the housing type distribution as a percentage of all housing units in Churchill Gardens for 2022. Most housing units are **1, Detached**, comprising 65.8% of the total. This indicates that single-family detached homes are the predominant housing form in the area, often characteristic of suburban neighborhoods with lower-density residential areas.

The next significant category is **1, Attached** homes, which account for 20.4% of housing units. These are typically townhouses or duplexes, offering a slightly denser form of housing while maintaining separate entrances and individual spaces.

Housing Type as a Percentage of All Housing Units in Churchill Downs			
	2010	2016	2022
Total Housing Units:	**590**	**587**	**565**
1 Unit:	445	496	487
1, Detached	312	330	372
1, Attached	133	166	115
2		13	
5 to 9	102	45	59
10 to 19	23	26	0
50 or More	20	7	10

Table 1. Housing Type as a Percentage of All Housing Units in Churchill Downs (2010-2022).
Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

The housing data for Churchill Gardens from **Table 1** (2010-2022) indicates significant shifts in the types of housing units available in the area. Over these 12 years, the total housing units have decreased from 590 to 565, suggesting a slight reduction in housing stock.

Single-unit housing has consistently represented most housing types. However, there has been a shift within this category; while the number of 1 Detached units increased from 312 in 2010 to 372 in 2022, the number of 1 Attached units decreased from 133 in 2010 to 115 in 2022. This drop could be attributed to several factors such as market trends favoring detached homes, possible redevelopment of attached homes into detached ones, or a shift in consumer preference towards more private and spacious living afforded by detached units.

Significant shifts have been observed within the various multi-unit housing categories. The data from 2022 no longer lists any 2-unit structures, despite there being 13 such units in 2016. This absence might suggest that these units have been converted into single-unit dwellings or redeveloped into a different form of housing that the data does not explicitly identify. Moreover, the category of buildings with 10 to 19 units, which numbered 13 and 26 in 2016, has entirely vanished by 2022. In addition, there has been a reduction in the number of buildings with 5 to 9 units, declining from 102 in 2010 to 59 in 2022. On the other hand, housing structures containing 50 or more units saw a marginal increase from 20 in 2010 to 10 in 2022, after experiencing a decrease to 7 in 2016.

Overall, the housing stock in Churchill Gardens in 2022 is primarily composed of single-family detached homes, with a smaller proportion of attached homes and very few multi-family buildings, reflecting a community with predominantly traditional housing options. The lack of larger apartment complexes may influence the demographic makeup, potentially limiting housing options for individuals seeking more affordable or high-density living spaces.

Tenure and Vacancy

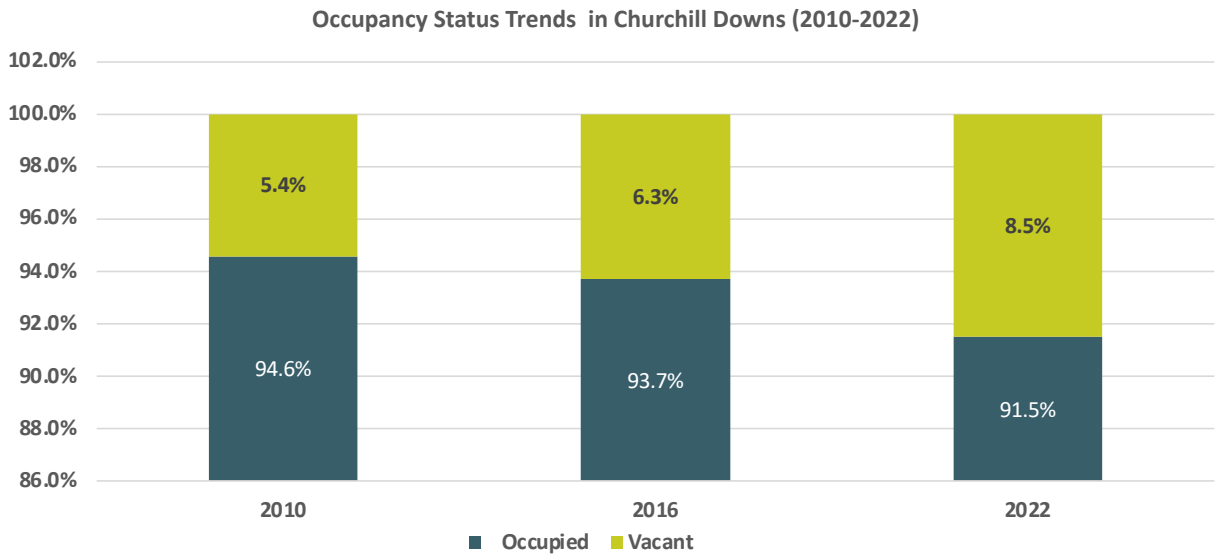

Figure 20. Occupancy Status Trends in Churchill Downs (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

In 2010, the occupancy rate was high, with 94.6% of the housing units occupied and a vacancy rate of 5.4%. Moving forward to 2016, there was a slight increase in the vacancy rate to 6.3%, while the occupancy rate correspondingly decreased. By 2022, the vacancy rate had further increased to 8.5%, indicating a gradual trend towards higher vacancy over the 12 years.

This incremental rise in the vacancy rate could indicate various factors, such as economic shifts leading to out-migration, changes in the local housing market, or demographic changes. The consistent trend towards higher vacancy rates over the years is a concern as it may signal a declining demand for housing in the area or a mismatch between the types of housing available and the needs or desires of the population.

These findings suggest that while Churchill Gardens maintains a relatively high occupancy rate, the increasing vacancy rate could warrant further investigation into the local housing market. It indicates the need for targeted initiatives to attract residents or adapt the existing housing stock to meet current demands better. The trend towards increased vacancy underscores the importance of understanding the underlying causes to inform policy and development strategies to stabilize or reverse this pattern.

In 2010, the proportion of owner-occupied units was slightly less than that of renter-occupied units. However, by 2016, there was a dramatic shift, with the percentage of renter-occupied units significantly exceeding that of owner-occupied units. This peak suggests a strong move towards rental occupancy during this period. Moving to 2022, the data shows a re-balancing, with the percentage of renter-occupied units decreasing and owner-occupied units increasing, yet renters still maintain a majority.

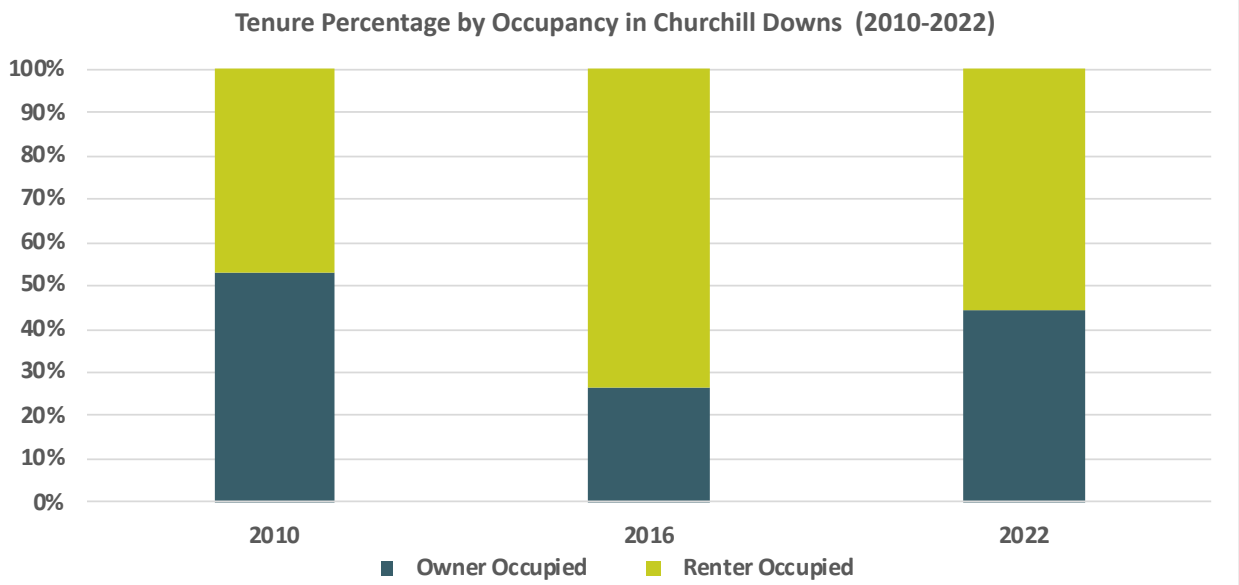

Figure 21. Tenure Percentage by Occupancy Per Room in Churchill Downs (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

This trend indicates a dynamic housing market within Churchill Gardens. The swing towards a higher percentage of renter-occupied units in 2016 could be attributed to various factors, such as economic changes that made renting more feasible than owning or a potential increase in rental properties available. The adjustment in 2022 suggests a possible stabilization or a shift in the housing market that has made owning more accessible or desirable again.

Vacancy Status by Type of Vacancy			
	2010	2016	2022
Vacant Housing Units:	32	37	48
For Sale Only		37	24
Other Vacant	32	0	24

Table 2. Vacancy Status by Type of Vacancy in Churchill Gardens (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

The vacancy data for Churchill Gardens from 2010 to 2022 indicates a gradual increase in vacant homes. In 2010, there were 32 vacancies, none for rent or sale. By 2016, while the total vacancies slightly increased to 37, all were homes for sale, with no vacancies for rent or classified as “other.” By 2022, the number of vacant homes rose to 48, with homes for sale dropping to 24 and the “other” category of vacancies reappearing with 24 units. Throughout these years, no homes were listed for rent, suggesting a limited rental market in Churchill Gardens. This trend points to changing conditions in the housing market and could have implications for local housing strategies.

Housing Cost and Affordability

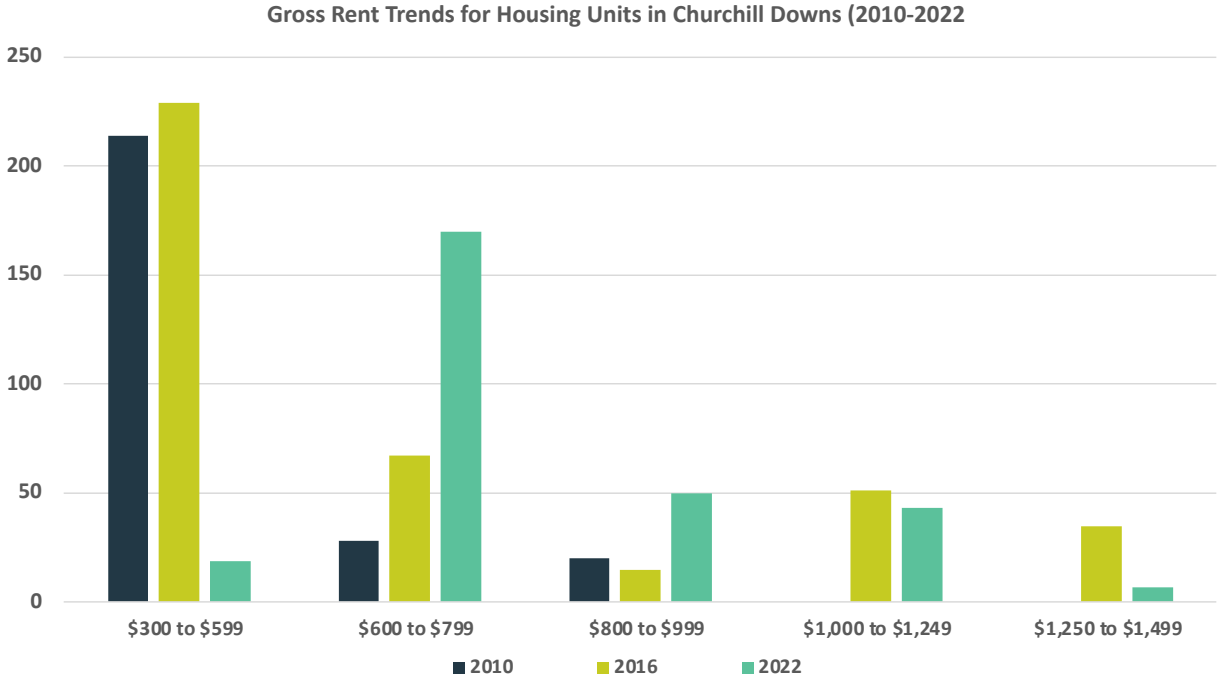

Figure 22. Gross Rent Trends for Housing Units with Cash Rent in Churchill Downs (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

In 2010, the most prominent rent category was $300 to $599, indicating that most rental units fell into this more affordable range. By 2016, there was a significant shift, with the $600 to $799 bracket seeing the most considerable number of units, suggesting an increase in the overall rent levels. In the same year, higher rent categories, specifically the $1,000 to $1,249 range, began to show presence, which was not evident in 2010.

Moving to 2022, the distribution of rents shows a further shift with a notable increase in units in the $800 to $999 range and the persistence of units in the $1,000 to $1,249 category. Interestingly, the highest rent brackets, $1,250 to $1,499 and $1,500 to $1,999, also appeared, although in smaller numbers. This indicates that higher-end rental units have become available or that the rent for some units has increased to these levels. The lowest rent bracket, less than

$300, disappeared entirely by 2022, which suggests that the most affordable housing options have either been phased out or have all increased in price.

The home value trends in Churchill Gardens from 2010 to 2022 show a clear increase in property values. In 2010, the most common home values were between $50,000 to $99,999. By 2016, the peak had shifted to the $100,000 to $149,999 bracket, and by 2022, a substantial number of homes were valued even higher, particularly in the $150,000 to $299,999 range. The data also shows emerging home values in the $300,000 to $499,999 bracket by 2022, while the lower end of the market below $50,000 has shrunk significantly. This indicates a general upward trend in the housing market, suggesting increased property values and potential concerns about affordability for lower-income buyers in Churchill Gardens.

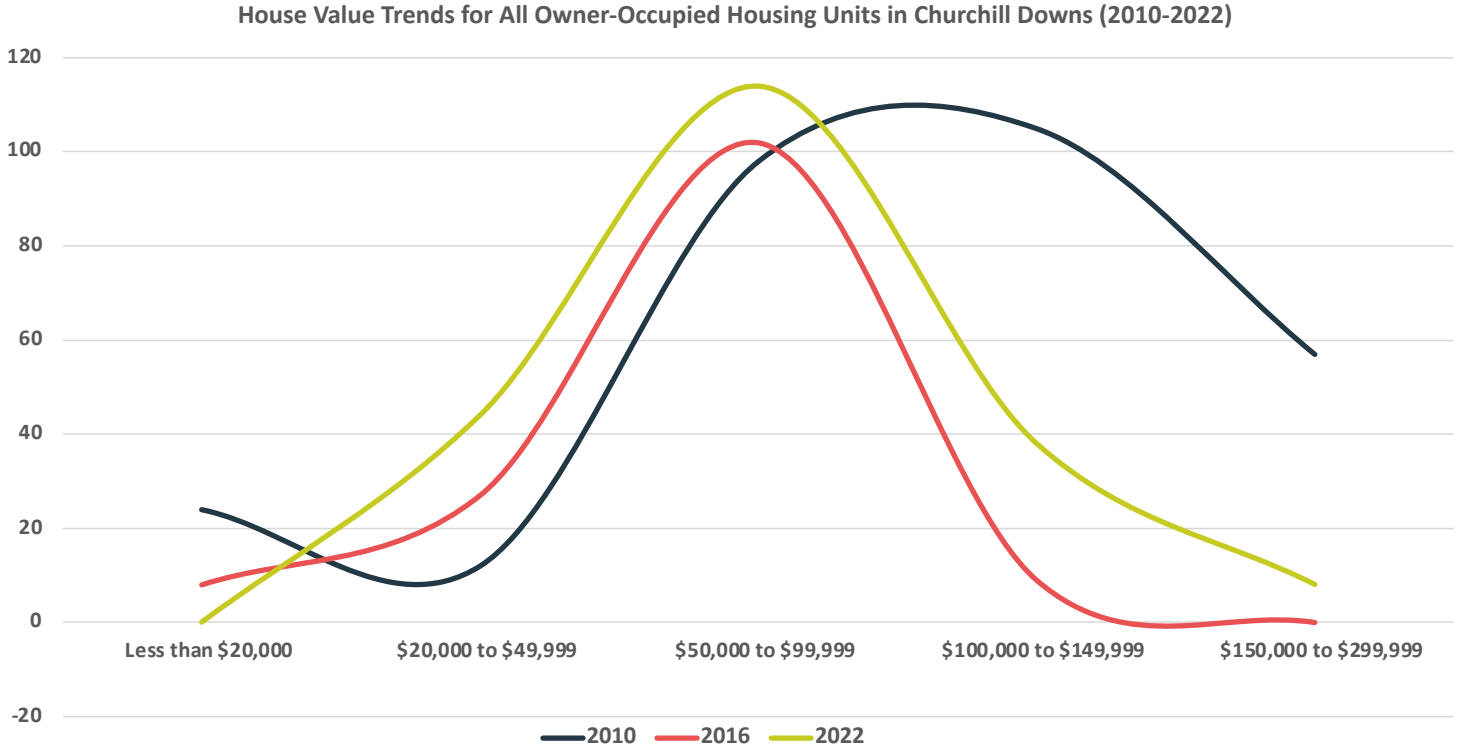

Figure 23. House Value Trends for All Owner-Occupied Housing Units in Churchill Downs (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

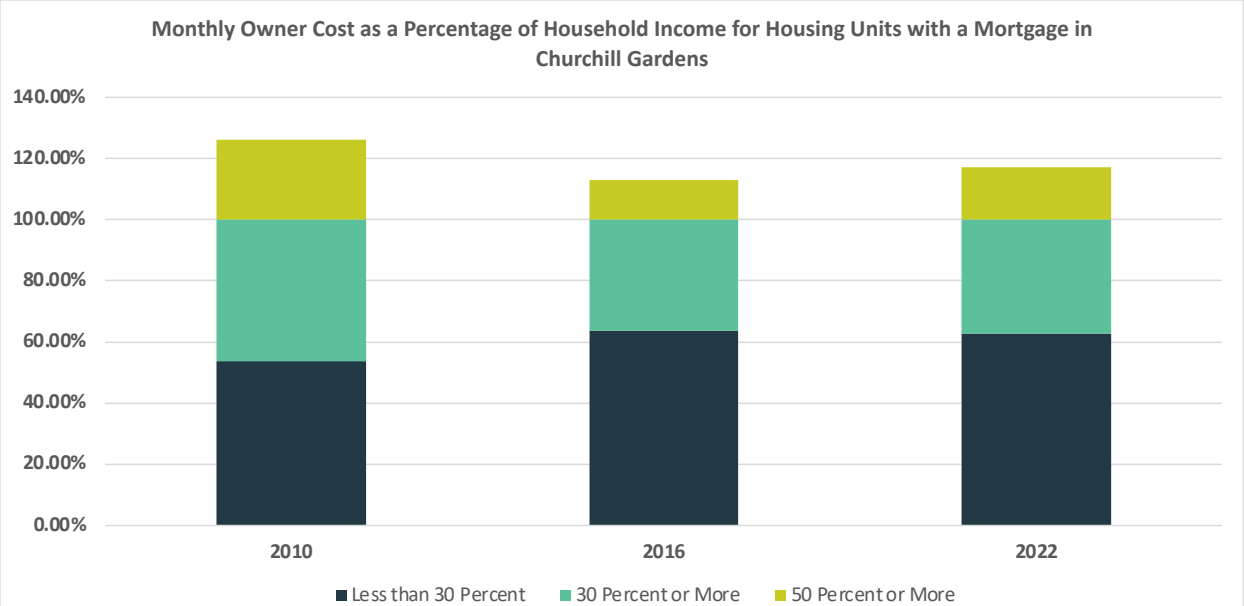

Figure 23.1 Monthly Owner Cost as a Percentage of Household Income for Housing Units (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

In 2010, the largest proportion of homeowners spent less than 30% of their household income on housing costs, which is generally considered affordable. By 2016 and continuing into 2022, the data shows a consistent pattern: a significant segment of homeowners are spending 30% or more of their income on housing, crossing the threshold of what is traditionally viewed as affordable. The most concerning trend is the increase in the proportion of homeowners spending 50% or more of their income on housing by 2022, indicating a considerable financial burden.

6.8 Transportation Profile

Transportation is critical to contemporary economic and societal structures, influencing job creation and economic expansion. Efficient transport networks enable businesses to tap into fresh markets and enhance productivity. They also facilitate individuals' ability to reach employment, utilize services, and pursue educational opportunities.

Commute Time Trends at the Local, City, County, and State Levels

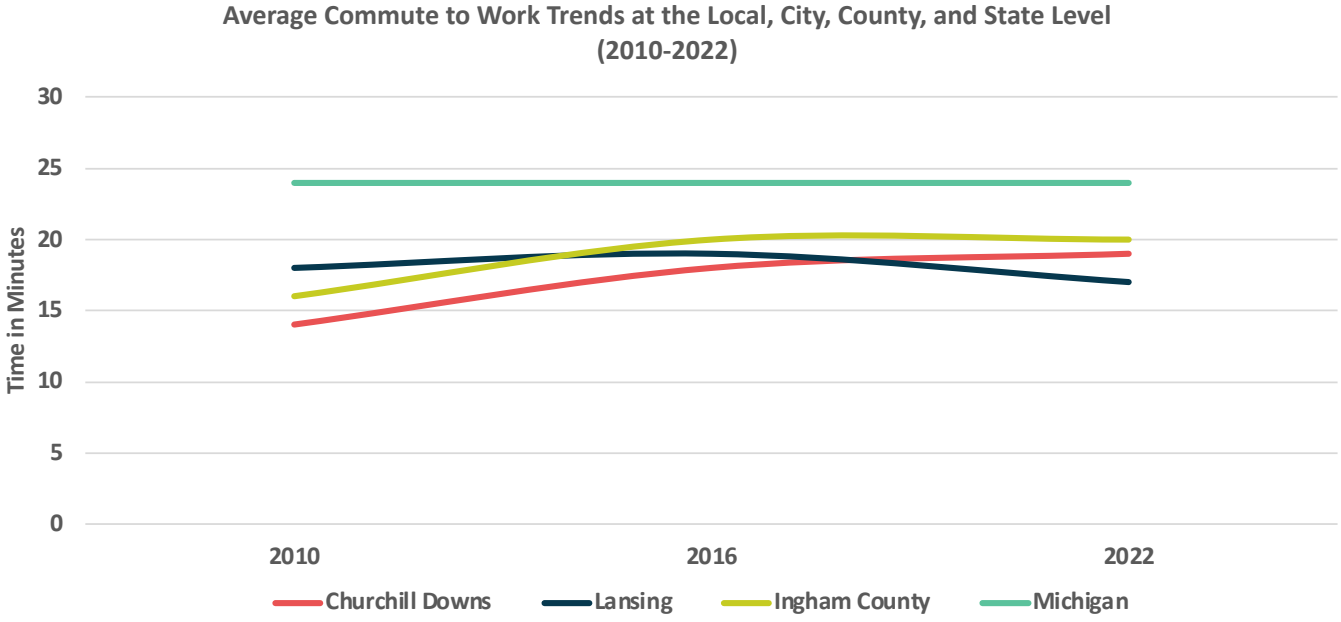

Figure 24. Average Commute to Work Trends in Churchill Downs, Lansing, Ingham County, and Michigan (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

In 2010, Churchill Gardens had a notably shorter average commute time compared to Lansing, Ingham County, and the Michigan state average. By 2016, the differences between Churchill Gardens, Lansing, and Ingham County became less pronounced, with all three showing average commute times close to the state average.

By 2022, the average commute times for Churchill Gardens, Lansing, and Ingham County remained relatively similar, with only slight variations between them. There was a slight upward trend in commute times across all areas from 2010 to 2016, but this trend appears to level off by 2022, with no significant increase or decrease.

This data suggests that while commute times for residents of Churchill Gardens were initially shorter, changes over the years have brought them in line with broader regional and state averages. This trend could indicate an increase in employment opportunities within close

proximity to Churchill Gardens or improvements in transportation infrastructure. It could also reflect a broader regional trend of employment dispersal.

Means of Transportation Trends

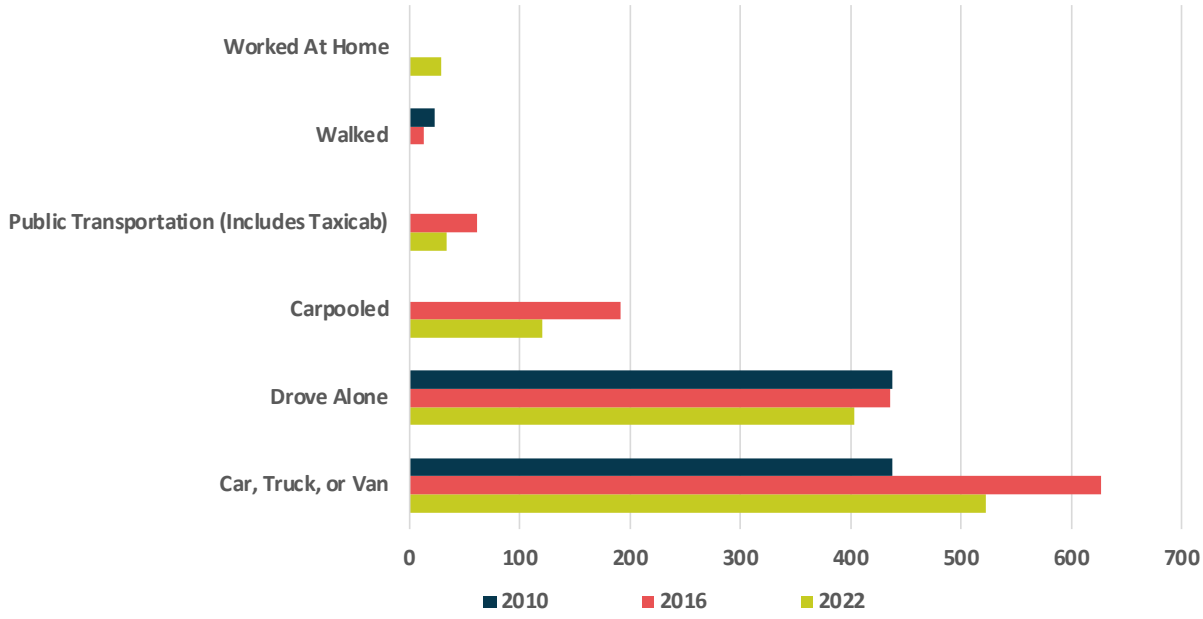

Figure 25. Trends of Means of Transportation to Work for Workers 16 Years and Over in Churchill Downs (2010-2022). Source: Graphs constructed using data sourced from Social Explorer and ACS 5-year estimates.

In Churchill Gardens, from 2010 to 2022, the dominant mode of transportation for work remains driving alone, showing a slight increase over the years. Carpooling, while still popular, has seen a slight decline. Public transportation use is low but has seen a slight rise in 2022. Walking has remained consistently low with little change. Moreover, there has been a slight increase in the number of people working from home in 2022, reflecting recent trends towards remote work.

Public Transit

Public transit in Lansing, Michigan, is primarily operated by the Capital Area Transportation Authority (CATA), which offers various services to meet the community's transportation needs. CATA operates more than 30 urban fixed routes, providing an alternative mode of travel within the region. The routes are designed to serve specific geographic areas, with routes 1-16 catering to Lansing. The CATA Transportation Center in Downtown Lansing is the central hub, facilitating easy transfers between these routes, and access to major employers like the State of Michigan, Michigan State University, and Sparrow Health System.

CATA operates **Route 2** - South Washington – Pleasant Grove and **Route 9** - South Martin Luther King, Jr. Blvd. – Miller, both of which serve the area near Churchill Gardens in southwest Lansing on West Holmes and Pleasant Grove Rd.

Route 2 travels from the CATA Transportation Center (CTC) towards Burneway and Waverly, passing through locations on W Holmes and MLK, Jr. Blvd. and Sheffield & Bayview, before returning to CTC. Route 9 departs from the CTC and heads towards Meijer on South Pennsylvania Ave., making stops at locations including MLK, Jr. Blvd. and Holmes, Waverly and Jolly, and the Hill Vocational Center before returning to the CTC.

These routes are part of CATA's fixed-route service, providing convenient transportation options for residents in Churchill Gardens.

CAPITAL AREA TRANSPORTATION AUTHORITY (CATA)
ROUTE 2 MAP

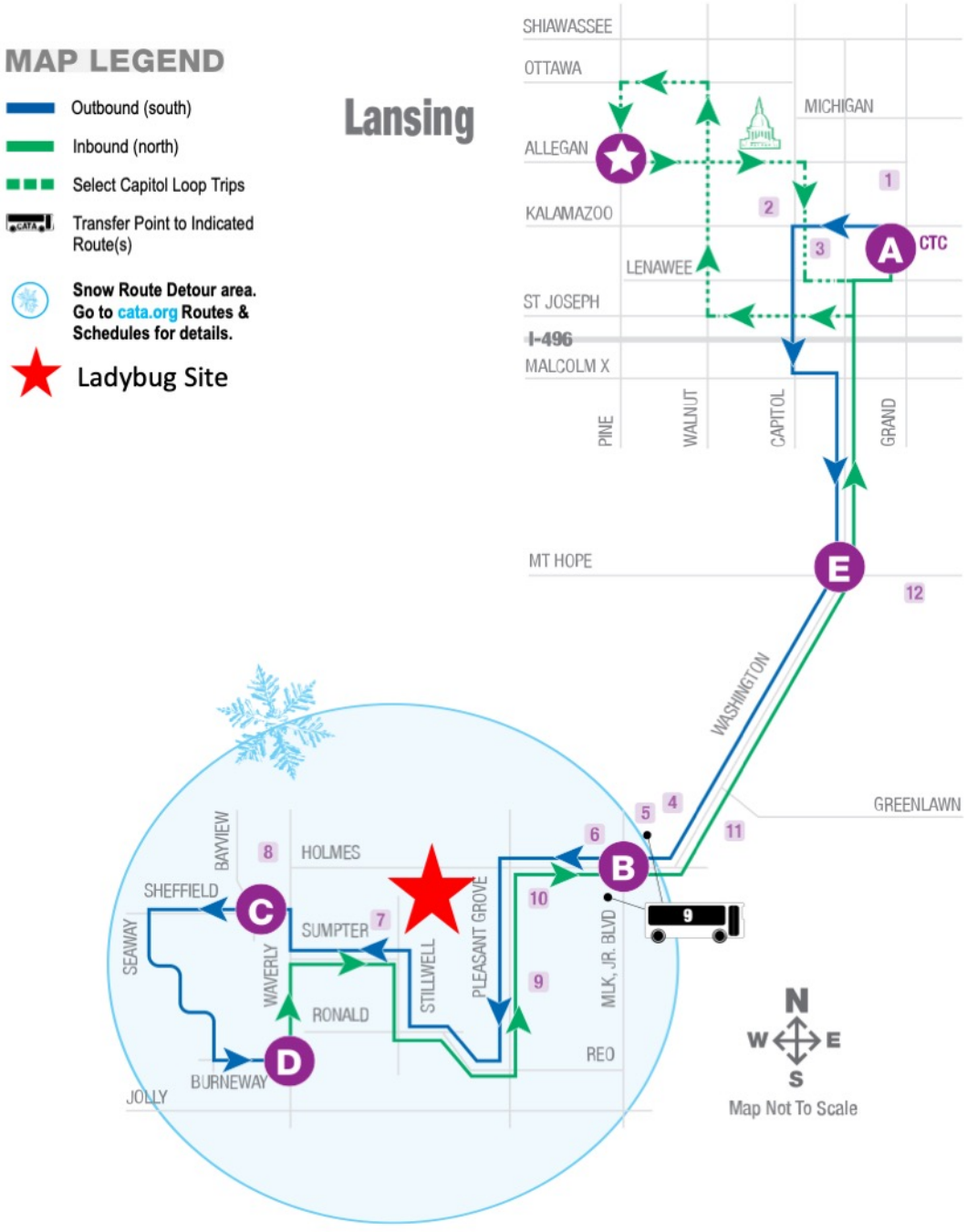

Figure 26. Route 2 Map. Source: CATA, 2022.

CAPITAL AREA TRANSPORTATION AUTHORITY (CATA)
ROUTE 9 MAP

Figure 27. Route 9 Map. Source: CATA, 2022.

6.9 Crime Profile

The crime index for Churchill Gardens over the last three years indicates a fluctuating trend in the crime rate for an area with a population of 1,270 people. In 2021, the crime index stood at 117, which increased to 122 in 2022, showing a slight rise in crime rate. However, there was a significant decrease to an index of 84 in 2023, indicating a notable reduction in crime.

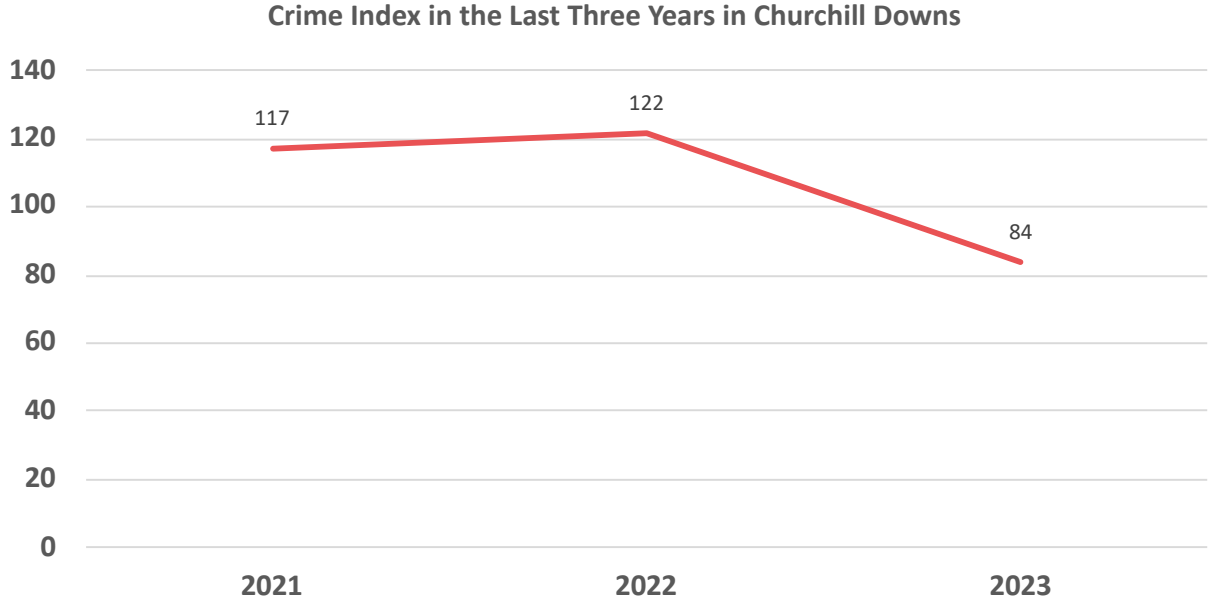

Figure 28. Crime Index in Churchill Downs (2021-2023). Source: Graphs constructed using data sourced from ArcGIS Business Analyst from ESRI.

The substantial decrease in the crime index could have several positive implications for the community, including improved safety for residents, better quality of life, and potentially more favorable conditions for economic development and housing values. It is essential to understand the strategies contributing to this reduction to continue the positive trend and apply similar measures in other areas with high crime rates.

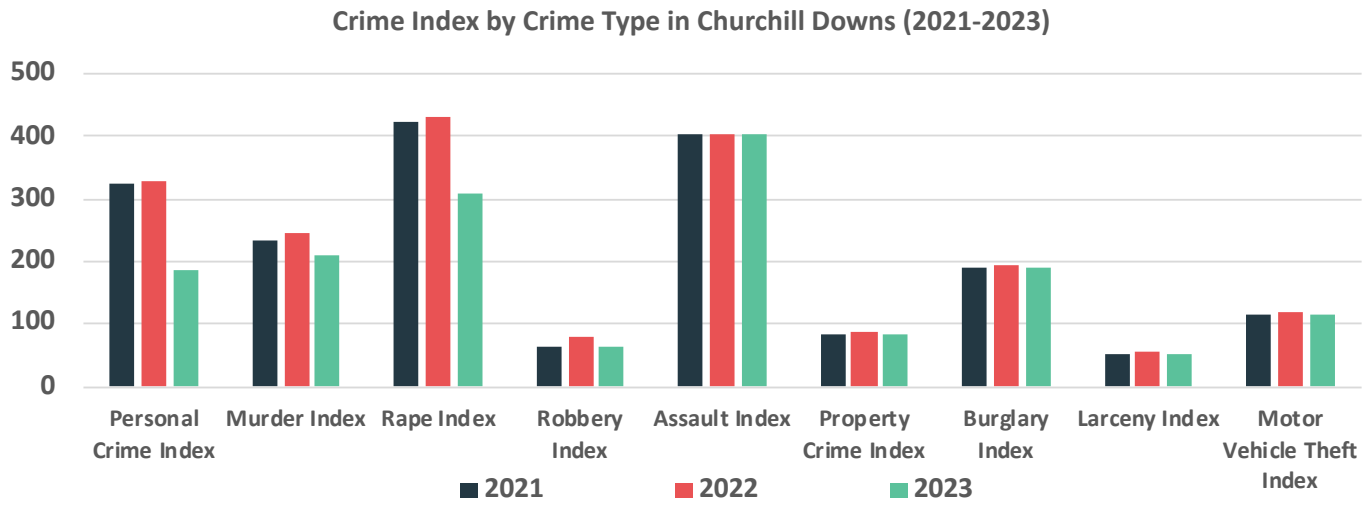

Figure 29. Crime Index by Crime Type in Churchill Downs (2021-2023). Source: Graphs constructed using data sourced from ArcGIS Business Analyst from ESRI.

Between 2021 and 2023, Churchill Gardens saw a general decrease in crime across multiple categories. Assault, property crime, and larceny experienced the most significant reductions, indicating effective measures in tackling these offenses. Although there was a slight uptick in motor vehicle theft in 2022, it decreased again by 2023. Personal crimes, murder, rape, and robbery also declined over the three years, contributing to an overall improvement in community safety. This positive trend reflects well on the area's law enforcement and public safety strategies.

7. SITE DOCUMENTATION

7.1 Existing Conditions

The site is not developed and is wooded. Located on the property are several areas of wetlands that need to be considered. There is also a conveniently placed water main that runs into the property and a mowed path from the church into the neighborhood. The site is strategically positioned with essential infrastructure, including an underlying sewer line, ensuring efficient waste management and sanitation. Furthermore, the site is well-equipped with water access, supporting domestic and agricultural activities, thereby ensuring a sustainable and functional environment for the community.

Figure 30. **A)** Parcel View and one of its wetlands. **B)** Existing Building on the site.

The site chosen for the Ladybug Center at Churchill Gardens is located within a designated opportunity zone census tract. An opportunity zone is a federally designated area that allows tax breaks for investors to spur development in low-income areas and areas that have not received the same amount of investment as others.

7.2 Soil Composition

The project's site is a mosaic of Urban Land, Colwood, Capac, Gilford, Kibbie, Brady, Houghton, and Marlette soils. This assortment underscores the area's ecological complexity and presents many opportunities for sustainable development, agriculture, and conservation efforts.[1]

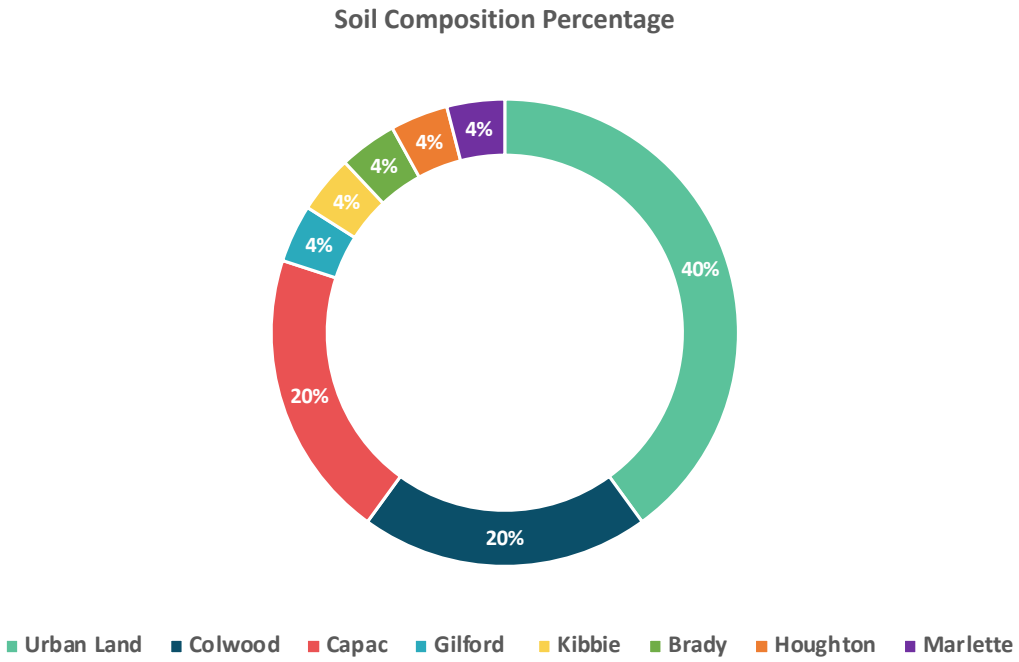

Figure 31. Soil Composition of the Ladybug Sustainable Community (2024). Source: Soil Web Resource, Department of Agriculture.

1. **Urban Land** refers to areas significantly modified by human activities. The soil in urban areas can vary widely but is often compacted, has mixed organic and inorganic materials, and may have varying degrees of contamination. However, urban soils can be improved for green spaces, urban agriculture, and stormwater management.[2]
2. **Colwood** is not commonly categorized in standard soil classifications, suggesting it might be a specific or local name. In general, forest soils like "Colwood" are rich in organic matter, have good water retention, and support a wide variety of plant life. They're beneficial for biodiversity, carbon sequestration, and erosion control.[3]

[1] UC Davis, "SoilWeb: An Online Soil Survey Browser | California Soil Resource Lab," Ucdavis.edu, 2019, https://casoilresource.lawr.ucdavis.edu/gmap/.
[2] United States Department of Agriculture, "Urban Soils," 2019, https://www.nrcs.usda.gov/sites/default/files/2022-11/Urban-Soils-Fact-Sheet.pdf
[3] National Cooperative Soil Survey, "Official Series Description - COLWOOD Series," soilseries.sc.egov.usda.gov, n.d., https://soilseries.sc.egov.usda.gov/OSD_Docs/C/COLWOOD.html.

3. **Capac** soils are typically found in agricultural or previously glaciated areas. They are well-draining, fertile, and suitable for various crops. Capac soils benefit farming due to their nutrient content and good water-holding capacity.[4]
4. **Gilford** are often sandy loams or loamy sands found in outwash plains, terraces, and lake plains. They are well-drained and can be very productive for agriculture with proper management. They're also suitable for natural vegetation and wildlife habitats.[5]
5. **Kibbie** is a less common type. Assuming it's a well-drained soil, it could be suitable for forestry, agriculture, and recreational activities, depending on its exact characteristics like texture, depth, and fertility.[6]
6. **Brady** soils are often deep, well-drained soils on uplands. They are suitable for grazing, agriculture, and forestry. Their depth and structure support a variety of root systems, making them versatile for different uses.[7]
7. **Houghton** soils are typically associated with wetlands. They are high in organic matter and have high water tables. These soils are crucial for water filtration and biodiversity and provide habitat for wetland species.[8]
8. **Marlette** soils, depending on their specific characteristics, could be well-drained and fertile, making them suitable for agriculture or supporting natural vegetation. Like other specific soil types, the benefits would depend on the exact nature of the soil.[9]

Overall Benefits of the Project Site with These Characteristics:

- **Diverse Land Use Potential**: The mix of soil types supports a variety of uses, including agriculture, urban development, forestry, and conservation areas.
- **Environmental Sustainability**: Soils like Houghton and forest-like "Colwood" can enhance biodiversity, carbon sequestration, and water filtration.
- **Agricultural Productivity**: Soils like Capac and Gilford offer agricultural potential due to their fertility and drainage properties.
- **Urban Greening**: Urban land areas can be leveraged for urban agriculture, parks, and green spaces, contributing to improved air quality, reduced heat island effect, and enhanced urban biodiversity.
- **Water Management**: Combining well-drained soils with areas of high organic matter like Houghton soils aids in effective water management and can reduce runoff and erosion.

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[4] United States Department of Agriculture, "Official Series Description - CAPAC Series," soilseries.sc.egov.usda.gov, accessed February 9, 2024, https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CAPAC.html.
[5] United States Department of Agriculture, "Official Series Description - GILFORD Series," soilseries.sc.egov.usda.gov, n.d., https://soilseries.sc.egov.usda.gov/OSD_Docs/G/GILFORD.html.
[6] United States Department of Agriculture, "Official Series Description - KIBBIE Series," soilseries.sc.egov.usda.gov, accessed February 9, 2024, https://soilseries.sc.egov.usda.gov/OSD_Docs/K/KIBBIE.html.
[7] United States Department of Agriculture, "Official Series Description - BRADY Series," soilseries.sc.egov.usda.gov, accessed February 9, 2024, https://soilseries.sc.egov.usda.gov/OSD_Docs/B/BRADY.html.
[8] United States Department of Agriculture, "Official Series Description - HOUGHTON Series," soilseries.sc.egov.usda.gov, n.d., https://soilseries.sc.egov.usda.gov/OSD_Docs/H/HOUGHTON.html.
[9] United States Department of Agriculture, "Official Series Description - MARLETTE Series," soilseries.sc.egov.usda.gov, accessed February 9, 2024, https://soilseries.sc.egov.usda.gov/OSD_Docs/M/MARLETTE.html.

This diversity in soil composition allows for a multifaceted approach to land use, balancing development with environmental conservation and agricultural production. It necessitates comprehensive planning to optimize each soil type's benefits while mitigating potential negative impacts on the environment and local communities.

7.3 Biodiversity

Wetlands

Nestled within the site lies two distinct wetland types: Freshwater Forested/Shrub Wetland and Freshwater Emergent Wetland. Each wetland type plays a crucial role in maintaining the ecological balance, supporting a wide array of wildlife, and offering unique conservation and sustainable land use opportunities.

Figure 32. Wetlands and Tree Species Map. Map built using data from the United States Department of Environmental Conservation.[10]

[10] United States Department of Environmental Conservation, "Environmental Resource Mapper," gisservices.dec.ny.gov, n.d., https://gisservices.dec.ny.gov/gis/erm/.

A. Freshwater Forested/Shrub Wetland: This type of wetland is characterized by woody vegetation, including trees and shrubs, thriving in a freshwater environment. These wetlands are typically found in low-lying areas where they accumulate significant surface water. They provide critical habitats for wildlife, serve as natural water filtration systems, and act as buffers against flooding by absorbing excess rainfall.

B. Freshwater Emergent Wetland: Unlike their forested counterparts, Freshwater Emergent Wetlands are defined by the dominance of herbaceous (non-woody) plants that emerge above the water's surface. These wetlands are often located in areas with shallow, standing water and play a key role in nutrient cycling and water purification, providing breeding grounds for numerous species of birds, fish, and amphibians.

Tree Species

With its majestic stature and sweeping canopy, the Elm tree is the predominant tree species on the project site (see *Figure 32*). This resilient and versatile species is celebrated for its imposing presence, offering aesthetic beauty and robust ecosystem service. Elms are known for their large, lush leaves, which create a dense canopy providing ample shade and cooling effects, making them an invaluable asset in enhancing the site's microclimate.

Moreover, their extensive root systems contribute significantly to soil stabilization, preventing erosion and promoting water infiltration. As a habitat, Elms offers refuge and sustenance to a diverse array of wildlife, from birds to small mammals, thus enriching the biodiversity of the project site. Their adaptability to various soil types and conditions further underscores the Elm's critical role in the landscape, embodying the resilience and natural splendor the Ladybug Sustainable Community project aims to preserve and celebrate.

7.4 Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

Strengths

- Fertile soils.
- Diverse wetlands and tree species.
- Federal designation (attracts investment, fueling economic growth).
- Income growth since 2010 (indicates strong economic potential).
- Decreasing median age suggests a dynamic, innovative, and engaged younger population.
- Existing infrastructure, like water mains, facilitates development.
- Multicultural demographics.
- Crime rate reduction since 2022.
- Good public transport access.

Weaknesses

- Lower median income compared to broader regions.
- Lower levels of educational attainment compared to state and county levels.
- Limited options for diverse housing needs.
- Few grocery stores in the area.
- Limited access to fresh produce.

Opportunities

- Increased demand for local and sustainable food sources.
- Potential for growth in agritourism.
- Opportunities for community-based educational programs focused on agriculture and sustainability.
- Grants and funding for sustainable and community-focused projects.

Threats

- Regulatory hurdles for land use and agricultural activities.
- The presence of wetlands requires careful planning and consideration, potentially limiting development options.
- Economic disparities in broader regions could hinder community growth and development.

8. CHURCHILL GARDENS FOOD ACCESS SURVEY

This survey was crucial to our data-gathering efforts for the Ladybug Sustainable Community project within the Churchill Gardens area. It was designed to collect essential information regarding access to food and the community's interest in farm-to-table methods. The data was used to shape the offerings and initiatives of the Ladybug Sustainable Community to align more effectively with the desires of the residents and the client.

The primary objective of the food access survey was to evaluate the community's access to and affordability of nutritious foods. Specifically, the survey aimed to assess the availability of fresh produce in local stores, the impact of economic constraints and transportation on dietary choices, community awareness regarding farm-to-table concepts, and the interest in establishing local farm-to-table options.

Sample Size: We aimed to target 134 participants, which is 10% of Churchill Gardens' population (1,347), but due to time constraints we analyzed the responses collected until March 10, 2024; to this date, 48 responses have been recorded.

Sampling Method: Our survey employed a Non-Probability Sampling approach, specifically through Convenience Sampling. Participants were engaged based on their immediate availability and willingness to participate, facilitated via digital platforms and direct outreach within the church and broader community. This method was selected for its efficiency in data collection and cost-effectiveness. This approach introduced a degree of selection bias and only encompassed a partially representative cross-section of the entire community. Special attention was provided to mitigate limitations related to access to digital platforms.

Survey Administration: The client, LoveJoy Community Services, administered the survey in collaboration with members of the South West Action Group (SWAG) and the Tabernacle of David Church. This approach facilitated direct engagement with the community members and aligns with LoveJoy Community Services' broader mission to enhance community well-being.

Distribution: The choice of Qualtrics for online distribution was strategic, offering a robust and flexible platform for survey dissemination and data collection. This method enabled the efficient gathering of responses and data visualization.

Survey Findings

Regarding access to affordable and nutritious food, the responses from the Churchill Gardens survey are evenly distributed across the scale. There is a three-way tie for the most common rating, with 'Moderate' (3), 'Good' (4), and 'Very Good' (5) each being selected by 12 respondents. Conversely, 11 respondents rated their access as 'Very Poor' (1), which is notable and contrasts with the positive ratings. Only 1 respondent rated their access as 'Poor' (2). This distribution indicates a varied perception of food accessibility among the residents of Churchill Gardens, with significant experiences at both ends of the scale (**Figure 33**).

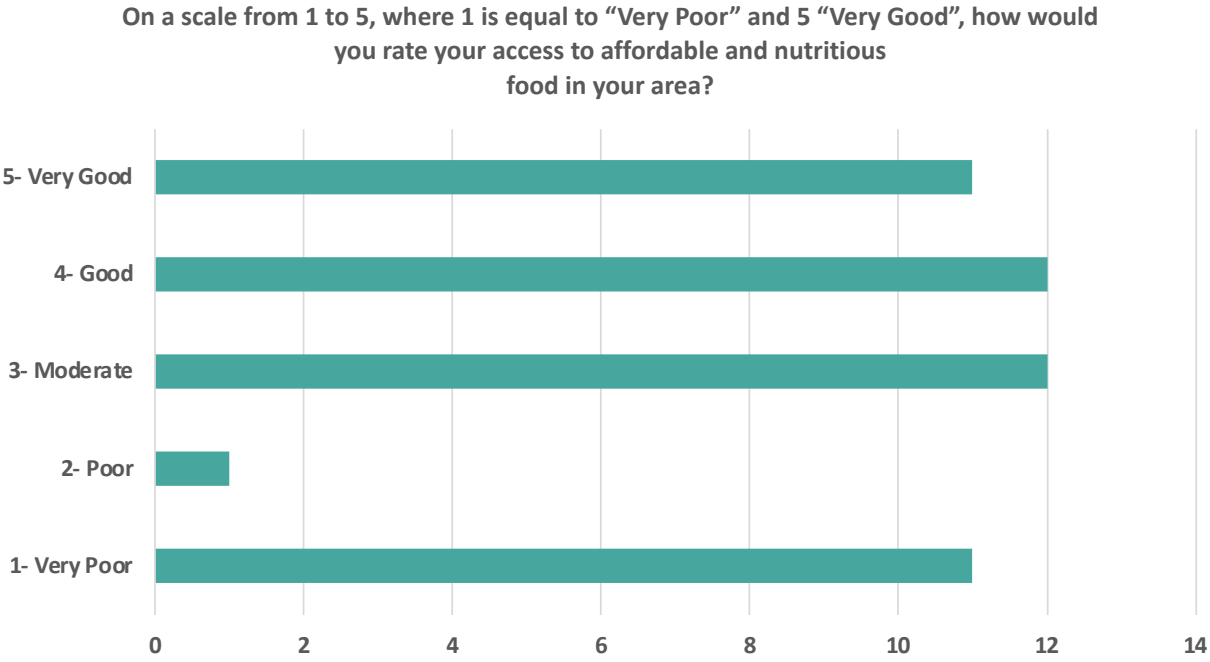

Figure 33. Question Two. Churchill Gardens Food Access Survey (2024)

Figure 34 illustrates the grocery spending patterns among Churchill Gardens residents, showing a diverse range of expenditures. There are as many residents spending between $600-$899 as there are spending between $900-$1,199 monthly, with each category having 12 respondents. A similarly notable segment of the community, 11 individuals, reports spending more than $1,200 per month on groceries. In stark contrast, the same number of respondents, 11, claim to have no grocery expenses at all. Only a single respondent reports spending less than $599. These findings highlight significant differences in grocery spending, which may reflect varying income levels or alternative means of securing food within the community.

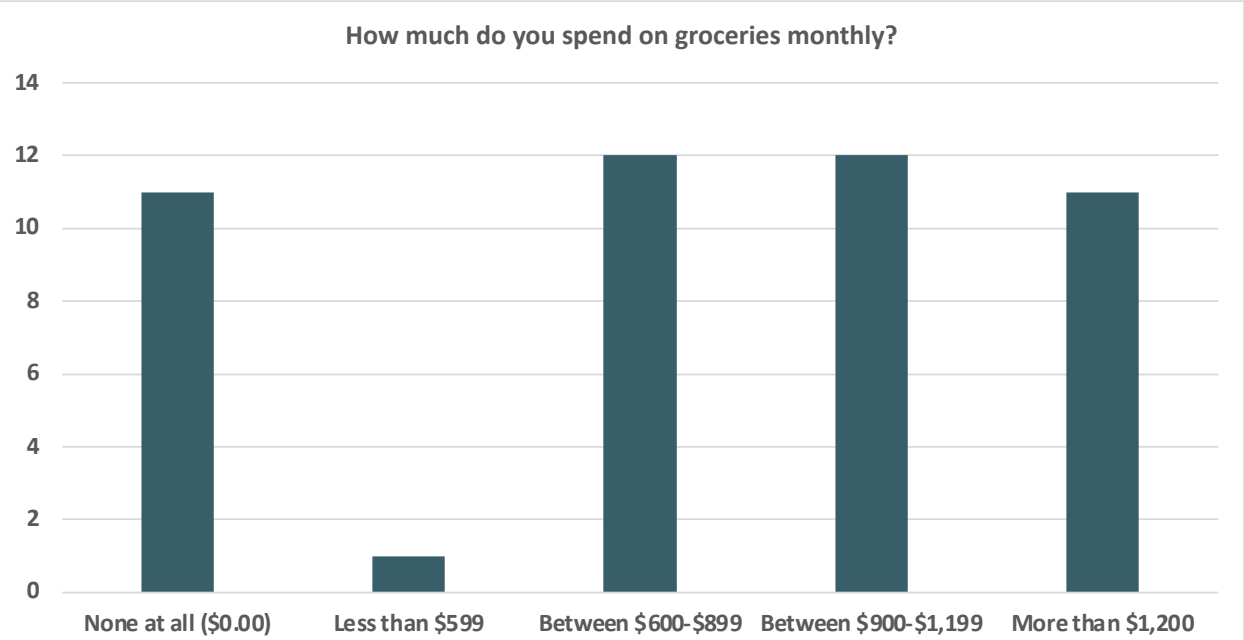

Figure 34. Question Three Churchill Gardens Food Access Survey (2024).

When it comes to farm-to-table knowledge (**Figure 35**), which reflects the understanding of how food goes from being grown to ending up on the table, the survey reveals that the average knowledge level in Churchill Gardens is significantly higher than the minimum, yet there is room for improvement when compared to the maximum. This demonstrates a moderate level of awareness regarding the origins of their food.

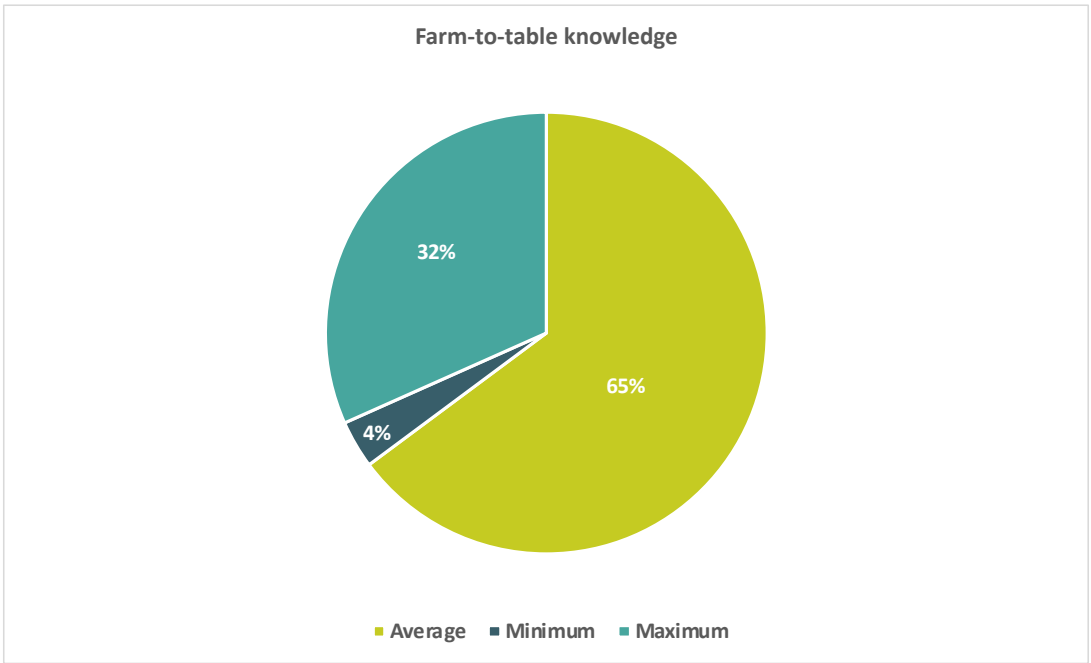

Figure 35. Question Four. Churchill Gardens Food Access Survey (2024).

A significant portion of participants showed enthusiasm for establishing a community space dedicated to cultivating their produce (**Figure 36**). This enthusiasm points to a robust inclination towards locally-grown food, potentially driven by factors such as a preference for fresh produce, a commitment to sustainable practices, or a wish for more community involvement.

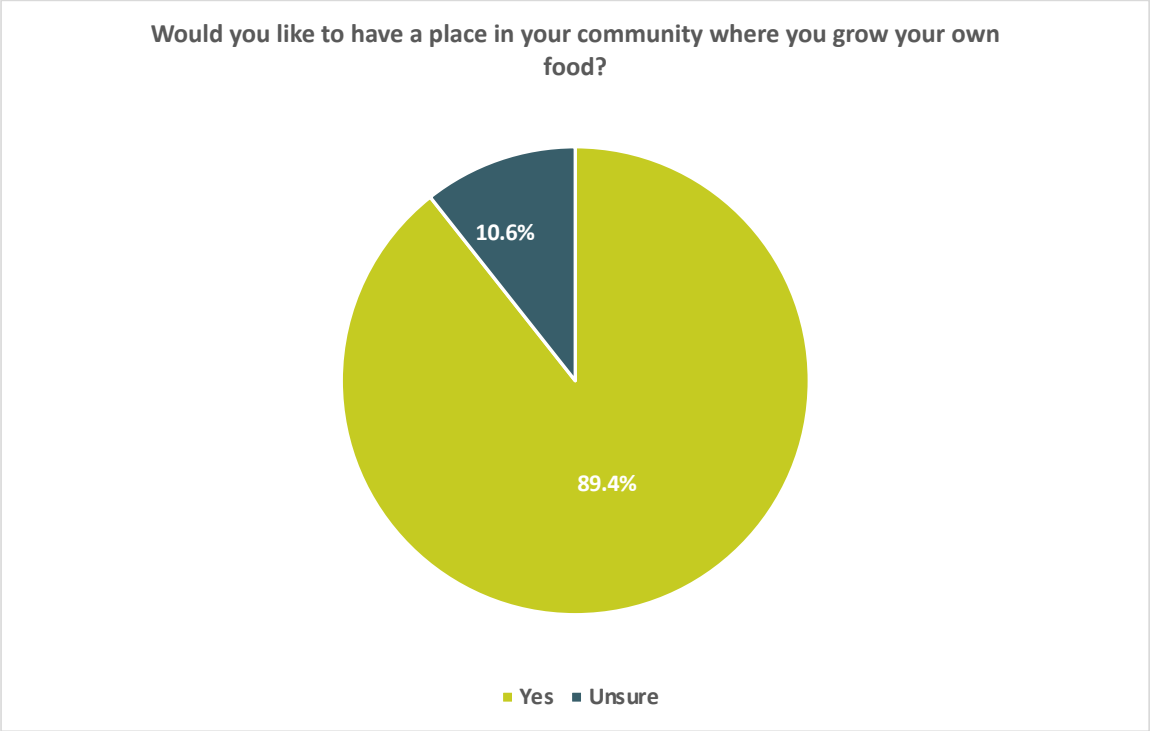

Figure 36. Question Five. Churchill Gardens Food Access Survey (2024).

To summarize, the Churchill Gardens community enjoys favorable access to food that is both affordable and nutritious, exhibits grocery expenditure patterns that range from moderate to high, possesses a fair level of knowledge about the farm-to-table process, and displays a marked interest in cultivating food within the community setting.

RECOMMENDATIONS

9. RECOMMENDATIONS

In the development of the project recommendations, the Ladybug Team engaged in extensive collaboration with key stakeholders, including the Lansing Zoning Administrator, Ingham County Land Bank, Finite Phoenix LLC, the Michigan Department of Environment, Great Lakes, and Energy (EGLE), and Tens Hens Farm. This collaborative effort was grounded in an in-depth analysis of the site's specific conditions, incorporating insights gained from discussions with these stakeholders and considering the socio-economic characteristics of the community.

The recommendations aim to assess the feasibility of the proposed site while addressing the community's needs and expectations. They represent the culmination of thorough research and thoughtful deliberation. The recommendations are organized into ten distinct sections to systematically tackle the challenges identified at the Ladybug project site. Each section focuses on a set of challenges and suggests various solutions.

Furthermore, it is crucial to examine precedents and examples from similar agri-community projects during the planning process to inform and guide the development of effective strategies.

We present an organized approach to evaluating the feasibility of establishing a small-scale agricultural community at the proposed site:

TIER 1 RECOMMENDATIONS: ALTERNATIVE SITE SELECTION

After thorough data collection and analysis, it becomes apparent that the current site does not meet the necessary criteria for developing a sustainable agri-community. The scale of the agri-community project dictates the amount of land required. Small-scale urban agri-communities are usually between 5-10 acres. The literature reveals various urban agri-communities between 3-10 acres, but they do not present the same challenges of this project. The following reasons describe the constraints of the current site and offer insights for an ideal site selection:

- **Insufficient Space for Agricultural Needs**: The site's size falls short of the minimum requirement to support the agricultural productivity needed to sustain a community of more than 30 individuals. For effective small-scale urban agriculture, a minimum of 5 acres dedicated solely to farming is essential.
- **Limited Developable Area**: The total area of the site is approximately 8 acres, with only about 2.50 acres available for farming and 1.49 acres allocated for housing. This limitation is primarily due to the significant portion of the site being occupied by wetlands. A minimum of 8 acres of developable area is needed to allocate to housing, community buildings, roads, and communal facilities.
- **Project Scale and Urban Limitations**: The potential benefits of carbon sequestration are overshadowed by the limitations posed by the urban setting of the project:
    - The restricted space in urban areas can severely limit the scale at which agricultural projects can be implemented, consequently affecting the amount of

carbon that can be effectively sequestered. Limited spaces such as rooftops, balconies, and small community gardens may not provide a substantial area to impact carbon levels significantly.

- The financial outlay required for establishing and maintaining urban agricultural projects, including necessary soil amendments, planting, and the installation of irrigation systems, may not justify the carbon sequestration benefits, particularly in a community-focused context.

An ideal site for this project should be between **5-15 acres**. See the Appendix for ideal site examples in Southwest Lansing for agri-communities. Moreover, Chapter 2 of the Agri-Communities Handbook (2024) offers examples of ideal sites and explains how to select a site for **urban** and **rural** agri-communities.

Given these considerations, it is advised to explore alternative sites that offer a greater area for agriculture and housing, less environmental restriction, and a more favorable balance between project costs and the benefits of carbon sequestration.

TIER 2 RECOMMENDATIONS: PROCEEDING WITH THE CURRENT SITE

If the decision is to proceed with the current site despite the outlined challenges, the following recommendations aim to navigate the site's limitations effectively and develop a viable agri-community (see next page).

1

Recommendation 1: Implement Wetlands Conservation Strategies

Our approach to environmental sustainability in the Ladybug Sustainable Community project emphasizes various strategies for wetland conservation. This includes strict adherence to local ordinances, efficient handling of permit applications, the formulation of effective compensatory mitigation plans, and the adoption of innovative conservation practices.

If the construction of this project does not impact the wetlands, we recommend moving forward with the pre-application process for wetlands to secure the required permit for the site:

Compliance with Local Wetland Ordinances (Section 324.30309)

- Ensure all development plans for this site comply with local ordinances for wetlands smaller than 2 acres, emphasizing the preservation of these vital ecological resources.
- Maintain a minimum setback of **30-50 feet** from the wetland boundary to protect wetland ecosystems.

Permit Application and Appeal Process (Section 324.30310)

- Be prepared for a detailed permit application process, including property revaluations for assessment if permits are denied, to ensure financial readiness.
- Formulate a clear strategy for appealing permit denials, with an understanding of judicial review processes to efficiently address regulatory concerns.

Should the development of this area lead to a reduction in wetland functions, it is recommended to adhere to guidelines for wetland mitigation banks. These banks serve as a method to offset the loss of wetland functions and values resulting from approved development projects:

Compensatory Wetland Mitigation (Section 324.30311d)

- Create compensatory wetland mitigation plans for unavoidable impacts, focusing on restoration, creation, and preservation of wetlands.
- Consider acquiring credits from wetland mitigation banks as a compensatory strategy, aligning with state regulations and ecological goals (A detailed list of these banks can be found on the Registry of Established Wetland Mitigation Banks).

- Submit detailed mitigation plans to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) for approval, ensuring permanent protection and financial assurances for mitigation efforts.

Innovative Mitigation Strategies

- Explore innovative strategies to exceed regulatory requirements, including educational and recreational features to promote wetland value. For specific information on innovative mitigation strategies contact the Michigan Department of Environment, Great Lakes and Energy (EGLE).[11]
- Collaborate with local environmental groups and community organizations to enhance wetland management and conservation efforts.

Monitoring and Adaptive Management

- Establish monitoring to assess the health and function of wetlands and the success of mitigation strategies.
- Employ adaptive management to adjust wetland management practices based on ongoing monitoring results, ensuring the sustainability of wetland areas within Ladybug Sustainable Community.

[11] Department of Environment Great Lakes and Energy, "Wetland Mitigation," Michigan.gov, 2024, https://www.michigan.gov/egle/about/organization/water-resources/wetlands/mitigation.

Recommendation 2: Develop tailored soil management strategies to enable diverse crop cultivation for better agricultural productivity.

Adopt suitable soil management techniques tailored to the site's specific soil types to enhance agricultural productivity. Below are the identified soil varieties of the site, the kinds of produce that can thrive in them, and strategies for optimal soil management:

Urban Land Areas

> **What to Grow**: Leafy greens like lettuce, spinach, and kale; root vegetables such as carrots and beets; herbs including basil, thyme, and parsley.
>
> **How to Manage:** Urban soils often require enhancement to support agriculture due to compaction, contamination, or lack of nutrients. Begin by testing soil for contaminants and nutrient levels, followed by amending the soil with compost and organic matter to improve fertility and structure. Raised beds can be particularly effective in urban settings, allowing for better control over soil quality and drainage, reducing the risk of soil compaction, and providing a barrier to some pests. Mulching and regular watering, considering the quicker drying nature of raised beds, will be crucial. Community gardens not only utilize these techniques but also foster community engagement and education on sustainable urban agriculture.

Colwood (Forest-like Soil)

> **What to Grow**: Berry bushes (blueberries, raspberries), native fruit trees (apple, cherry), and understory crops like mushrooms and ferns.
>
> **How to Manage:** Embrace the natural forest ecosystem by incorporating permaculture principles that mimic natural processes. This involves layering crops to mimic the forest structure, from canopy fruit trees to shrubs like berry bushes, and groundcover crops.

Enhance soil with organic matter from leaf litter and compost to maintain fertility. Use mulches to retain moisture, reduce weed competition, and add organic matter back into the soil. Practicing minimal tillage will preserve soil structure and microbial communities, supporting a healthy forest-like ecosystem.

Capac (Well-draining Fertile Soil)

What to Grow: A wide range of crops including staple vegetables (tomatoes, peppers, cucumbers), root crops (potatoes, onions), and grains (corn, wheat).

How to Manage: This soil type is ideal for a wide range of agricultural activities, thanks to its balance of water-holding capacity and drainage. Crop rotation and cover cropping are effective strategies to maintain soil health, prevent erosion, and manage pests and diseases. Adding organic matter periodically will help maintain the soil's fertility and structure. Efficient irrigation practices, like drip irrigation, can maximize water usage without oversaturating the soil.

Gilford (Sandy Loams or Loamy Sands)

What to Grow: Water-efficient crops and those requiring good drainage such as radishes, garlic, legumes (beans, peas), and drought-tolerant herbs (lavender, rosemary).

How to Manage: Enhance water retention and nutrient availability by incorporating organic matter and compost into the soil. Mulching is essential to minimize water evaporation and regulate soil temperature. Consider using drip irrigation to provide consistent moisture while avoiding water wastage. For crops requiring good drainage, like root vegetables and legumes, this soil type is advantageous, but regular fertilization may be necessary to compensate for quicker nutrient leaching.

Kibbie (Assumed Well-drained Soil)

What to Grow: Fruit trees (peaches, pears) and nut trees (walnuts, hazelnuts).

How to Manage: This soil is well-suited for fruit and nut trees which require deep, well-drained soils. Implement an organic mulch layer to conserve moisture, suppress weeds, and add organic matter. Adequate spacing between trees will ensure proper air circulation and sunlight penetration, reducing the risk of disease. Water deeply but infrequently to encourage deep root growth, which is essential for the stability and drought resistance of trees.

Brady (Deep, Well-drained Uplands)

What to Grow: Orchards and vineyards (grapes, apples) and large-scale vegetable farming (squash, pumpkins).

How to Manage: These soils are ideal for orchards, vineyards, and vegetable farming. To manage these deep, well-drained soils, ensure balanced nutrition by conducting soil tests and adjusting fertilization accordingly. Use cover crops to enhance soil organic matter, improve structure, and prevent erosion. For orchards and vineyards, proper pruning and trellising improve light distribution and air circulation, promoting healthy plant growth.

Houghton (Wetlands High in Organic Matter)

What to Grow: Water-tolerant plants like cranberries and wild rice, along with floating garden techniques for leafy vegetables and herbs.

How to Manage: For wetlands high in organic matter, focus on conserving the wetland ecosystem while cultivating suitable crops. Implement floating gardens for leafy vegetables and herbs to adapt to wet conditions without disturbing the soil structure. For cranberries and wild rice, construct water management systems that mimic natural wetland hydrology, allowing for periods of flooding and drainage as required by the crops. Regularly adding organic matter will maintain soil fertility in these water-rich environments.

Marlette (Well-drained and Fertile)

What to Grow: A broad spectrum of vegetables (broccoli, cauliflower) and fruits (strawberries, melons) that thrive in fertile conditions.

How to Manage: With its well-drained and fertile nature, this soil type supports a wide variety of crops. Implement crop rotation to maintain soil health and fertility, reducing pest and disease buildup. Use cover crops to protect against erosion, improve soil structure, and add nitrogen to the soil in the case of leguminous crops. Drip irrigation can ensure optimal water use, and mulching will help retain soil moisture and suppress weeds, enhancing the productivity of this fertile soil.

Recommendation 3: Infrastructure Enhancement

Create efficient water management systems and develop green spaces through the adoption of strategies designed to enable sustainable practices on the site. For more details on these water management systems, as well as greenhouse types and infrastructures, please see **Chapter 3 of the Agri-Communities Handbook (2024).**

For an agri-community like this, spanning between 8-13 acres, in Lansing, Michigan, where winters can be harsh and the growing season is limited, the most suitable greenhouse type would be a combination of **High Tunnel or Hoop Houses** and **Polycarbonate Greenhouses**. This recommendation is based on balancing cost-effectiveness, durability, and the ability to extend the growing season efficiently. Here's why these types are recommended:

High Tunnel or Hoop Houses

- **Season Extension**: High tunnels are excellent for extending the growing season into the colder months without the need for expensive heating systems. They can protect crops from frost, allowing for an earlier start in the spring and a later harvest in the fall.
- **Cost-Effectiveness**: Given the size of the community and the need to maximize covered space affordably, high tunnels offer a more budget-friendly option compared to traditional greenhouses. They require lower initial investment and operational costs.
- **Versatility**: High tunnels can accommodate a wide range of crops, from vegetables and fruits to flowers, enhancing the agri-community's diversity and productivity.
- **Ease of Installation and Mobility**: They are relatively easy to construct and can be moved or modified as needed, providing flexibility in farm management and crop rotation.

Figure 37. High Tunnel Green House.[12]

Figure 38. Polycarbonate Greenhouses.[13]

[12] Grow Span, "Top 10 High Tunnel Benefits," GrowSpan, n.d., https://www.growspan.com/news/top-ten-benefits-owning-high-tunnel/.
[13] Charley Greenhouse and Garden, "Traditional by Cross Country," Charley's Greenhouse & Garden, accessed March 14, 2024, https://charleysgh.com/products/traditional-greenhouse.

Polycarbonate Greenhouses

- **Durability and Insulation**: Polycarbonate panels provide good insulation, which is crucial for Michigan's cold climate, and are more durable and resistant to breakage than glass. This can be particularly important during heavy snowfalls or strong winds.
- **Light Diffusion**: Polycarbonate greenhouses offer excellent light diffusion, ensuring that plants receive even sunlight, reducing the risk of scorching, and promoting uniform growth throughout the structure.
- **Energy Efficiency**: These greenhouses are more energy-efficient than glass, helping to keep heating costs lower during the winter months. This is essential for maintaining a sustainable operation in a city with cold winters like Lansing.
- **Scalability**: Polycarbonate greenhouses can be designed to fit the specific needs of an urban agri-community, with options for expansion or incorporating advanced technologies like automated climate control and efficient irrigation systems.

Implementation Considerations

- **Hybrid Approach**: Using both high tunnels for less temperature-sensitive crops and polycarbonate greenhouses for more delicate plants or year-round production can offer a balanced approach to maximizing yield and diversity.
- **Sustainability Features**: Integrating rainwater harvesting, solar panels, and compost heating systems can further enhance the sustainability and self-sufficiency of the agri-community.
- **Community Engagement**: Involve the community in the planning and operation of the greenhouses to foster a sense of ownership and ensure the initiative aligns with local needs and values.

This combination leverages the strengths of both types, offering a flexible, cost-effective, and sustainable approach to urban agriculture in Lansing, Michigan. It allows for year-round production of a wide range of crops, enhancing food security and providing educational and community engagement opportunities.

Recommendation 4: Ecological Development

Carbon Sequestration

Implementing carbon sequestration projects in urban environments, especially in small-scale settings, under 8 acres, like this project, presents several unique challenges and constraints. These challenges stem from the limited scale, urban setting, and the specific requirements of carbon sequestration projects. Please refer to **Chapter 8 of the Agri-Communities Handbook (2024)** for information about carbon sequestration strategies, certification agencies, and environmental certifications. Here's a look at some of the key constraints of carbon sequestration for this project:

a. Limited Land Area

- **Scale of Impact**: The small size of the parcel for this type of project limits the absolute volume of carbon that can be sequestered. This makes it challenging to achieve economies of scale and can limit the financial viability of selling carbon credits.
- **Space for Trees**: Limited space, which restricts the number of trees and perennials that can be planted, directly impacting the potential for carbon sequestration.

b. Urban Soil Constraints

- **Soil Quality**: Further studies need to be conducted to determine if these soils are compacted, contaminated, or otherwise degraded, which can limit plant growth and soil carbon storage capacity.
- **Intensive Management Needed**: Improving soil for carbon sequestration may require significant amendments, ongoing management, and possibly remediation of contaminants, all of which incur costs and labor.

c. Regulatory and Zoning Limitations

- **Zoning Laws**: Urban areas have complex zoning laws that may restrict certain types of land use or agricultural activities, complicating the implementation of carbon sequestration projects.

- **Permitting and Approval**: Projects may require multiple permits and approvals from stakeholders of Lansing and Ingham County, which can be time-consuming and costly to obtain.

d. Economic Challenges

- **High Initial Investment**: The upfront costs for soil amendments, planting, and infrastructure for water management can be significant, especially without the promise of immediate financial returns from carbon credits.
- **Market Access**: Difficulty accessing carbon credit markets due to the complexity and costs of verification and certification processes relative to the size of their carbon sequestration potential.

e. Verification and Certification Barriers

- **Economies of Scale**: The fixed costs associated with certification (e.g., third-party verification, documentation) are high, and for small projects, these costs can outweigh the benefits of participating in carbon credit markets.
- **Measurement and Verification**: Accurately measuring and verifying carbon sequestration at a small scale can be technically challenging and expensive, requiring specialized knowledge and equipment.

f. Water Resource Management

- **Irrigation Needs**: Sufficient watering is essential for plant growth and carbon sequestration, there's water access available on the site, and the wetlands can be used as a reservoir for excess water, especially during drought conditions.

g. Community Engagement and Support

- **Public Awareness**: There may be a lack of public awareness or support for carbon sequestration initiatives, impacting the ability to mobilize resources and engage the community.
- **Volunteer and Labor Constraints**: Reliance on community volunteers or limited staff for maintenance and monitoring can pose challenges in consistently managing the project to optimize carbon sequestration.

Composting Strategies

The composting strategies should emphasize effective management, community education, and the right technology to ensure the sustainability and success of the initiative in Ladybug:

1. Establish a Dedicated Management Team

- Appoint a single individual or a small team specifically to oversee the composting initiative. This team will be responsible for managing the compost pile, addressing any issues that arise, and ensuring that the process adheres to best practices and community guidelines.

2. Launch an Educational Campaign

- Develop an educational program focused on composting techniques, what can and cannot be composted (with a particular emphasis on avoiding proteins in the compost), and the importance of composting for the environment. This should include:
    - Distribute informational materials to all residents.

    - Offer training classes that take about five days to complete, covering the do's and don'ts of composting.

3. Implement Suitable Composting Technology

- Based on the size of the community and the estimated volume of waste, consider implementing on-site composting using specialized equipment like in-vessel composters offered by companies such as Green Mountain. These systems can expedite the composting process, eliminate odors, and minimize rodent problems, making them ideal for densely populated areas.

4. Address Odor and Contamination Concerns

- Odor management and contamination prevention must be prioritized to ensure community acceptance and regulatory compliance:
    - Educate residents about what items can and cannot be composted, emphasizing the exclusion of meat, dairy, and oils that can cause odors and attract pests.
    - Use **composting aerated bins** designed to allow proper air circulation, which speeds up the composting process and reduces odors. Ensure bins have secure, tight-fitting lids to prevent pest access and reduce smells.
    - Regularly turn the compost to introduce oxygen, which is essential for aerobic decomposition, reducing anaerobic conditions that can cause foul odors.
    - Maintain optimal moisture levels in the compost to prevent the development of mold and odors. The compost should be moist but not wet.
    - Monitor the temperature of the compost pile to ensure it reaches high enough temperatures to break down organic material effectively and kill pathogens.
    - Maintain a good balance between nitrogen-rich "green" materials (like food scraps) and carbon-rich "brown" materials (like leaves and shredded paper) to absorb odors and facilitate the composting process.
    - Use odor-neutralizing agents or sprays that are environmentally friendly to help manage any residual odors.
    - Implement biofilters made from organic materials like wood chips or compost to filter and neutralize odors from composting operations.

5. Calculate Waste Volume and Determine the Appropriate System

- Determine the volume of organic waste generated by the community by calculating residential waste per person, which ranges from 0.6 to 1 pound. Use these figures to select the most appropriate composting system that can handle the community's needs.

6. Explore Advanced Composting Methods

- For small communities to enhance the efficiency of the composting process, consider exploring advanced methods such as **In-Vessel Composting**, this can contain and manage odors more effectively than open composting methods. These systems can also process waste faster.

7. Understand the Limitations of Compostable Plastics

- Recognize that compostable plastics may not be compatible with the chosen composting strategy and educate the community accordingly to avoid contamination.

Waste Elimination and Recycling Program

Objective

Significantly reduce the waste footprint of the Ladybug Sustainable Community by promoting efficient waste elimination techniques and implementing a comprehensive recycling program. This approach aims to minimize landfill contributions and foster a culture of environmental responsibility among community members.

1. **Community-Wide Recycling Stations**
    - **Establishment**: Set up strategically located recycling stations throughout the community for plastics, cans, cardboard, and newspapers. Each station would be clearly labeled and equipped with separate compartments for each material type.
    - **Education**: Launch an educational campaign to inform residents about the importance of recycling and how to properly sort their waste. This could include workshops, informational brochures, and signage at each recycling station.
2. **Waste Reduction Initiatives**
    - **Bulk Buying and Packaging Reduction**: Encourage the purchase of bulk items and the use of reusable containers to reduce packaging waste. Partner with local suppliers to offer discounts for bulk purchases or for bringing one's containers.
    - **E-Waste Collection**: Organize quarterly e-waste collection events to responsibly dispose of electronic waste, preventing harmful substances from entering landfills.
3. **Recycling Workshops and Education**
    - **Workshops**: Conduct regular workshops on recycling practices, including proper sorting, the recycling process, and the environmental impact of waste.
    - **School Programs**: Integrate recycling education into the curriculum of local schools within the community to instill a culture of recycling from a young age.
4. **Partnerships for Recycling**
    - **Local Businesses**: Collaborate with local recycling facilities and businesses to ensure the efficient processing of collected materials. Explore innovative recycling projects such as turning plastic waste into construction materials for community projects.
    - **Community Involvement**: Create a volunteer program for residents to get involved in the recycling process, from managing collection stations to participating in recycling awareness events.
5. **Monitoring and Feedback**
    - **Waste Audits**: Perform regular waste audits to assess the effectiveness of the recycling program and identify areas for improvement.
    - **Feedback Mechanism**: Establish a feedback mechanism for residents to suggest improvements to the recycling program or report issues.

Recommendation 5: Sustainable Construction Materials and Practices

For urban agri-communities to thrive sustainably, the choice of construction materials and the adoption of green infrastructure are pivotal. This recommendation outlines strategic materials and practices designed to enhance environmental sustainability, promote efficient water management, and support the overall ecosystem health within urban agricultural settings.

Sustainable Sourcing and Materials

Sustainably Harvested Wood: Opt for wood from Michigan's plentiful forests, including species like maple, oak, birch, and pine, for constructing community structures. Prioritize wood certified by the Forest Stewardship Council (FSC) to guarantee it originates from responsibly managed forests, ensuring minimal environmental impact.

Rainwater Harvesting Systems: Implement systems utilizing materials such as food-grade barrels or dedicated tanks to collect and store rainwater. This strategy diminishes dependency on municipal water supplies and plays a critical role in water conservation efforts.

Permeable Paving Solutions: Employ locally sourced stone or gravel to establish permeable pathways. Such materials facilitate rainwater absorption into the earth, mitigating stormwater runoff, enhancing groundwater recharge, and preventing soil erosion.

Eco-friendly Infrastructure Enhancements

Erosion Control with Native Grasses: Stabilize slopes and embankments by planting Michigan-native grasses, such as switchgrass and prairie dropseed. These species offer effective erosion control, adapt well to local conditions, and support biodiversity.

Recycled Insulation Materials: Enhance thermal efficiency in buildings by using insulation materials made from recycled content. Options like recycled denim or cellulose insulation not only improve energy efficiency but also contribute to a reduction in heating and cooling expenses.

Solar Energy Integration: Capitalize on Michigan's solar potential by integrating solar panels into community designs. This renewable energy source aligns with sustainable practices and can significantly reduce reliance on non-renewable energy.

Green Roof Installations: Incorporate green roofs to offer better insulation, reduce urban heat island effects, and decrease stormwater runoff. These living roofs also provide valuable habitats for local wildlife and contribute to the aesthetic and ecological value of urban agricommunities.

Passive Building Standards into Ladybug Sustainable Community

Passive building principles offer an approach to reducing energy consumption while enhancing indoor environmental quality. By integrating these standards, the Ladybug Sustainable Community could achieve unparalleled energy efficiency, comfort, and resilience, aligning with its mission of sustainable and regenerative living.

Key Passive Building Strategies

1. **High-Performance Building Envelope**
   - Utilize continuous insulation without thermal bridging, ensuring minimal heat loss during winter and heat gain during summer.
   - Implement an airtight construction to prevent uncontrolled air leakage, enhancing energy efficiency and indoor air quality.
2. **Advanced Window Technology**
   - Install high-performance, triple-paned windows strategically positioned to maximize natural light and facilitate passive solar heating. Windows should also minimize overheating during summer through appropriate shading.
3. **Thermal Bridge-Free Construction**
   - Design buildings to eliminate thermal bridges, ensuring that insulation is continuous and effective around the entire envelope, thereby reducing heat loss and preventing condensation issues.
4. **Mechanical Ventilation with Heat Recovery (MVHR)**
   - Incorporate MVHR systems to provide fresh air and improved climate control without letting heat escape, ensuring a comfortable and healthy indoor environment.
5. **Optimization for Solar Gain**
   - Orient buildings and windows to optimize passive solar gain in the winter, reducing heating demand. Incorporate shading solutions to prevent overheating in the summer.
6. **Moisture and Humidity Management**
   - Design the building envelope and mechanical systems to manage moisture and humidity effectively, preventing mold growth and ensuring structural durability.
7. **Energy Modeling and Performance Testing**
   - Utilize energy modeling from the design phase to predict and optimize the building's energy performance. Conduct blower door tests to ensure airtightness and validate energy efficiency goals.

Benefits for Ladybug Sustainable Community

- **Energy Savings and Sustainability**: By adhering to passive building standards, the community can achieve significant energy savings, reducing reliance on non-renewable energy sources and minimizing carbon footprint.
- **Enhanced Comfort**: The strategies ensure a stable indoor climate with minimal temperature fluctuations, providing superior comfort for residents.
- **Health and Air Quality**: Continuous, filtered ventilation systems will ensure high indoor air quality, essential for resident health.
- **Resilience and Durability**: A focus on building envelope integrity and moisture management will extend the lifespan of structures and reduce maintenance needs.
- **Economic Efficiency**: While initial construction costs may be slightly higher, the reduction in energy bills and maintenance expenses results in long-term savings for residents.

Implementation Considerations

- **Community Engagement and Education**: Educate residents and stakeholders about the benefits of passive building standards and involve them in the planning process.
- **Collaboration with Experts**: Engage with architects and engineers experienced in passive house designs to ensure that all standards are correctly implemented.
- **Regulatory Compliance**: Ensure that the project complies with local building codes and regulations, potentially advocating for recognition of the superior standards of passive buildings.

Recommendation 6: Housing Infrastructure

For the development and success of urban agriculture communities, it is highly recommended to consider integrating modular homes. These homes offer rapid construction and minimal urban disruption, essential in densely populated settings. Their adaptability to various urban spaces ensures efficient use of available land, crucial for blending residential areas with agricultural projects.

Moreover, modular homes come with options for incorporating sustainable features like green roofs, rainwater harvesting, and solar panels, aligning with the eco-friendly ethos of urban agri-communities. This sustainability aspect not only promotes environmental stewardship but also enhances the overall living experience.

Additionally, the cost-effectiveness of modular homes makes urban agricultural living accessible to a wider demographic, supporting community diversity and inclusivity. Their efficient, adaptable, and sustainable characteristics make modular homes ideal for fostering vibrant and resilient urban agriculture communities.

To effectively source modular homes in Lansing, Michigan, it is imperative to follow the next steps:

- Appoint a dedicated Project Construction Manager to steer the construction endeavors. Initiating a Request for Proposal (RFP) process is recommended to engage a qualified developer and project manager, to ensure smooth execution of the modular housing units' development.

- Coordinate with the city of Lansing to ensure the modular homes can be delivered safely. Secure permits and work with the transportation office to arrange road closures and move lights if necessary for the transport of the modular homes.

- Site preparation needs to be completed before the modules have arrived. The road conditions need to be optimal for the transport of the homes. Therefore, the project roads need to be built before beginning the housing phase. Once delivered a subcontractor will need to complete the installation based on local code.

- The modular homes need a final inspection and certificate of occupancy before sale. The modular homes can also be modified to meet LEED certification and other requirements for this project.

Modular Home Manufacturers Serving Michigan:

- **Next Modular Homes (Heckaman Homes)**: Known for their customizable and energy-efficient modular homes, Heckaman Homes provides an array of designs to cater to diverse needs. More information can be found on their floor plans page.
- **Champion Homes**: Renowned for their energy-efficient manufactured and modular homes, Champion Homes offers a variety of floor plans and serves areas within 75 miles of Michigan Center, MI.
- **Ecocor**: Specializing in prefabricated Passive Houses, Ecocor delivers highly energy-efficient homes designed for net-zero energy consumption, including Michigan in their service area.
- **FabCab**: Offers sustainable, modern homes utilizing SIPs and timber frames, focusing on energy efficiency and minimizing on-site construction waste, with shipping services available to Michigan.
- **Ideabox**: Balances modern design with energy efficiency and green building principles, offering standard and custom modular homes, with potential service extension to Michigan.
- **Innova Lab Development**: By spearheading the modular construction of both single-family and multifamily residential units, InnovaLab makes high-quality living spaces accessible and affordable for any market segment. Their approach is grounded in a strategic vision that modular construction is not just an alternative but a superior choice due to its manifold advantages: quality control, construction speed, energy efficiency, stronger more durable construction, and less waste.

For the Ladybug Sustainable Community, **Next Modular Homes** are recommended, aligning with Lansing's housing size ordinance, and approved by the Ingham County Land Bank. Their 896-square-foot home, though not inclusive of transportation, taxes, installation, or utility connection costs, presents a feasible option at approximately **$118,132 per unit**. Despite its basic façade, it complements the neighborhood's character. Note that additional features may increase the average cost per unit to around **$300,000**.

Alternative Sourcing Recommendations:

- Engage with various modular manufacturing facilities, sharing floor plans to obtain quotes and timelines, and exploring options for bulk purchase discounts or phased buying plans.
- Assess responses based on market conditions, demand for modular housing, and cost comparisons with traditional stick-built constructions to ensure fiscal prudence.
- Conduct market research to identify preferences among potential buyers regarding home styles, sizes, and features, facilitating informed decision-making for product selection.

General Guidelines for Developing Modular Home Projects in Ingham County

- **Anticipate Delays in Planning and Execution**: Understand that the process from bidding to completion, especially for additional structures like basements, can take longer than expected. Factor in potential delays when planning timelines.
- **Manage Timing with Flexibility**: Recognize the limited control over project timelines due to dependencies on manufacturers and distributors. Be prepared for schedule adjustments and maintain open communication with all stakeholders to manage expectations.
- **Prioritize Traffic and Site Logistics**: Do not underestimate the importance of traffic control and site logistics during the setup of modular homes. Plan well in advance for road usage, local regulations, and the logistical needs of construction, including necessary permits and inspections.
- **Secure Diverse Funding Sources**: Explore and secure funding from various sources, including housing trust funds, grants, and donations. Given the reimbursement nature of most funding, ensure adequate upfront capital is available to bridge the gap between construction costs and sale prices.
- **Design for Community and Family Needs**: Tailor the project to accommodate the needs of larger or immigrant families, considering space, privacy, and community dynamics. Ensure designs comply with zoning and local codes, and plan for necessary infrastructure.
- **Sustainability and Urban Farming**: Plan for the maintenance and operational needs of these features, ensuring they are manageable and beneficial to the community.
- **Understand Modular Home Specifications**: Ensure all homes comply with state and local building codes and plan for the professional installation of utilities.
- **Engage with the Public and Market Effectively**: Develop a strategy for engaging with the community and broader public. Utilize direct outreach, media engagement, and public relations efforts to generate positive awareness and interest in the project.
- **Navigate Regulatory Compliance**: Familiarize yourself with local zoning laws, building codes, and regulations affecting your project. Develop a compliance plan and consider the implications of community infrastructure decisions, such as the ownership and maintenance of roads.

- **Housing Density and Ownership**: The zoning allows for a limited number of homes (**potentially 4-6 units per acre**) with restrictions on lot coverage by impervious surfaces. Explore options for individual home ownership versus a rental community model.

Recommendation 7: Funding and Partnerships

To secure the resources for the Ladybug Sustainable Community project, exploring various funding avenues and forging strong partnerships is crucial. This entails tapping into an array of potential sources, including government initiatives, collaboration with local agriculture, and engagement with educational bodies.

Identifying Potential Funding Sources

1. **United States Department of Agriculture (USDA):** The USDA's commitment to enhancing environmental conservation and supporting agriculture through financial aid and expertise aligns with the Ladybug project's goals. Specifically, programs like the Urban Agriculture and Innovative Production Grants are designed to support urban farming initiatives, a core component of the Ladybug project. These grants can provide the necessary resources to develop urban agriculture practices and contribute to food security, community engagement, and environmental sustainability.

2. **Michigan Department of Agriculture and Rural Development (MDARD):** MDARD's focus on strengthening Michigan's agricultural framework and improving food access in urban areas matches the Ladybug project's objectives. The Value Added and Regional Food System Grant Program, by supporting equipment purchases and training for urban agriculture, can enhance the project's capacity to produce fresh, locally sourced food and create a sustainable urban food system.

3. **Michigan Economic Development Corporation (MEDC):** MEDC's programs are designed to foster community development and economic growth, which are essential for the success of the Ladybug project. By securing funding through programs like the Community Revitalization Program and Public Spaces Community Places, the project can drive economic development and improve community well-being, making it a viable model for sustainable urban living.

4. **Environmental Protection Agency (EPA):** The EPA supports projects that improve the environment and promote community well-being, making its programs highly relevant to the Ladybug project. The Brownfields Program, Environmental Justice Grants, and the Inflation Reduction Act Community Change Grants Program can provide critical support for addressing environmental issues within urban settings, focusing on pollution reduction, climate resilience, and community empowerment.

5. **City of Lansing:** Community Development Block Grants can be used to support infrastructure and housing components of the Ladybug project. These grants are flexible and can be used for a wide range of community development activities, including the construction t of affordable housing and the improvement of infrastructure necessary for a successful agri-community.

6. **Michigan State Housing Development Authority (MSHDA):** MSHDA's Housing Readiness Incentive aims to foster community development and support affordable housing initiatives, closely aligning with the objectives of the Ladybug Sustainable Community project. This incentive could provide critical support for integrating affordable housing within the agricultural community framework of Ladybug, enhancing its sustainability and inclusivity. By leveraging this incentive, Ladybug can access financial assistance and guidance for creating housing solutions that are economically accessible while promoting environmental stewardship and community-based agriculture. This synergy could significantly contribute to the project's success in building a cohesive, sustainable living environment that also addresses broader social and economic challenges.[14]

7. **Investment Tax Credits (ITCs) and Solar Credits:** Under the Inflation Reduction Act, solar projects are eligible for Investment Tax Credits (ITCs), offering an automatic 30% tax credit for solar incorporations as per IRS Code section 48. This provision presents a valuable opportunity for the Ladybug community to integrate solar energy solutions, thereby reducing energy costs and enhancing the project's sustainability profile. The project can benefit from consulting with financial and legal experts to navigate the complexities of tax credits and affordable housing.

8. **Community Land Trust:** The Community Land Trust (CLT) aims to obtain the designated parcel, which notably will include the existing structure on the site (Tabernacle of David Church), through various means such as purchasing, receiving as a donation, or forming a partnership with the present owner. The primary objective behind acquiring the land and placing it under trust is to guarantee that its future use is in harmony with the community's aspirations and the overarching goals of the project. Our discussions with the Lansing Zoning Administrator have concluded that subdividing the parcel is not an option, underscoring the importance of crafting a comprehensive plan that adeptly

[14] MSHDA, "Michigan Consolidated Plan," Michigan.gov, 2024, https://www.michigan.gov/mshda/neighborhoods/housing-readiness-incentive-grant-program.

maneuvers through Lansing's zoning and land use ordinances. This intricate process will likely necessitate pursuing variances or obtaining special permits, which are crucial for facilitating the establishment of an agricultural community amidst the existing zoning limitations.

9. **Brownfield Tax Increment Financing:** The Michigan Department of Environment, Great Lakes, and Energy (EGLE) offers a financial mechanism known as Tax Increment Financing (TIF) specifically for revitalizing brownfield sites within the state. Essentially, TIF works by capturing the increased property tax revenues that result from the enhancements made to a brownfield location. These additional tax revenues are then allocated to reimburse the costs incurred in the site's improvement efforts. When planning to establish a Community Land Trust (CLT) that involves construction, financing is typically needed. The structure of TIF allows for the possibility that the incremental tax revenues generated could be used to service the loan required for construction. The decision to grant such financing arrangements rests with the local governing authorities of Lansing and the Michigan Strategic Fund.[15] Moreover, the housing situation in Churchill Gardens, which indicates a significant proportion of residents may be overburdened by housing costs, provides a compelling argument in favor of pursuing such financial incentives for the project's future phases.

Building Strategic Partnerships

- **Educational Institutions**: Collaboration with Michigan State University and local schools can bring a wealth of knowledge in agriculture, sustainability, and community engagement. These institutions can provide research support, educational programs, and technical assistance, enhancing the project's impact. An example of a program that could get the Ladybug Project involved with k-12 schools in the area is the **10-cent program**. This State funded program gives schools that participate 10 cents back in a grant for each meal served, that utilizes Michigan-grown food items. This creates an incentive for farms to connect with **K-12 food programs**, this is a great opportunity for the Ladybug Center to gain community connections and can further other programs within the farm with local schools. MSU Extension also offers many opportunities for collaboration. One opportunity through MSU extension is the **4-H program**. 4-H is a non-profit organization that strives to educate K-12 students with practical engagement in agricultural settings through local universities.
- **Local Farms and Farmers' Markets**: Establishing connections with local agriculturalists and markets, such as the South Lansing Farmers Market, can foster a vibrant local food system, support small-scale farmers, and provide the community with access to fresh produce.

[15] Michigan Legislature, "Michigan Legislature - Section 125.2664a," www.legislature.mi.gov, 1996, https://www.legislature.mi.gov/(S(fk23jbjigx31aajaxw2ysyjb))/mileg.aspx?page=getObject&objectName=mcl-125-2664a.

- **City of Lansing**: Working closely with city officials can assist in navigating regulatory frameworks, securing funding, and ensuring the project's alignment with local development plans.
- **Nonprofit Organizations**: Collaboration with nonprofits focused on food security, agriculture, and community development can offer additional funding channels, expertise, and network expansion, critical for the project's success. The Allen Neighborhood Center in Lansing is a good example of a food security non-profit, they offer programs such as the veggie box and the mushroom cultivation; these programs provide fresh produce to members of the East Side Neighborhood and customers of their farmer's market.
- **Environmental and Conservation Groups**: Partnering with organizations dedicated to environmental stewardship can promote sustainable practices within the Ladybug community, contributing to habitat restoration and biodiversity conservation.

Through strategic funding and partnerships, the Ladybug Sustainable Community project can harness the necessary resources and local support to thrive, embodying a model for sustainable development and community resilience. For general guidelines on funding opportunities for agri-communities please refer to **Chapter 6 of the Agri-Communities Handbook (2024).**

Recommendation 8: Regulatory Compliance and Zoning Restrictions

For the Ladybug Sustainable Community project to progress smoothly, it's imperative to navigate the complexities of Lansing's zoning laws, building codes, and environmental regulations with precision.

Understanding Zoning and Building Codes

- The designated parcel, number **33-01-01-31-207-001**, falls under **single-family** zoning, which has specific limitations. The property cannot be subdivided for individual sale and must largely remain intact, with the potential for only one or two subdivisions if direct frontage is ensured on a public street. Despite these restrictions, urban farming is permissible within this zone.
- In terms of development density, the regulations allow for **4-5**, possibly up to **6 units per acre**. However, since the church occupies **30% of the lot**, the effective buildable area is reduced between **3-5 acres**, allowing the construction of roughly **30 homes**, with opportunities to get a density bonus if the project implements sustainable practices.

Residential Development Approval Process

The development approval process involves several stages, beginning with a **Site Plan Review and Residential Development Approval**, followed by scrutiny from the planning commission, and ultimately, the green light from the city council. This process scrutinizes every aspect of the proposed development, including stormwater management for which detailed plans from a qualified engineer are necessary.

Animal Control Standards in the City of Lansing (Section 2, Article VIII of the Ingham County Animal Control Ordinance).

- New construction must align with the city's development standards, which emphasize stormwater management, tree preservation, and adherence to the state building code,

including the use of native plant species. Although the project cannot accommodate livestock, regulations permit up to five hens, and no roosters are allowed.
- Chickens must be kept in an enclosure to keep the chickens confined on the owner's property.
- A covered enclosure or fenced enclosure shall not be located closer than 10 feet from the property line of any adjacent property, nor closer than 40 feet from any residential structure on an adjacent property unless the adjacent property owner consents in writing.
- All feed and other items associated with the keeping of chickens that are likely to attract or to become infested with or infected by rats, mice, or other rodents, shall be protected to prevent rats, mice, or other rodents from gaining access to or coming into contract with them.
- No person shall slaughter any chickens.

Navigating Property Division and Infrastructure Requirements

- The property's division is tightly regulated, necessitating an approach to development rather than focusing on individual lot sales. Any infrastructural development, including roads, sidewalks, and drainage systems, must meet stringent city standards, potentially elevating project costs.
- The presence of wetlands introduces additional regulatory challenges, requiring careful consideration and possibly state-level permitting.

Balancing Public and Private Development Concerns

The choice between public and private streets will significantly influence the project's layout and feasibility, with public streets requiring broader right-of-ways compared to the narrower requisites for private streets. Moreover, the nature of the development—whether condominium for sale or rental community—will determine the ownership structure and compliance responsibilities concerning building codes.

The recommendation between private and public roads for this project largely depends on the community's priorities between control and sustainability versus ease of access and reduced maintenance responsibilities.

- If the community values **sustainability, controlled access, and custom infrastructure** that supports its agricultural and ecological objectives, **private roads** might be more beneficial. They allow for innovative designs that public roads do not, such as roads that double as water catchment areas or are lined with communal garden spaces that reflect the agri-community's ethos.
- Conversely, if the community prioritizes **ease of access, lower maintenance responsibilities, and stronger connections to surrounding areas**, **public roads** could be more advantageous. This option ensures the community is an integral part of the urban

fabric, with all the benefits and responsibilities that come with being part of the larger municipal system.

- This project focuses on sustainable practices with an emphasis on community engagement, therefore our recommendation is to prioritize private roads but also allow concessions to the neighboring areas to use the project's forest, proposed resource center, farm, and trails. This will ensure active collaboration between members of the community.

Recommendation 9: Community Engagement and Urban Farming Programs

To nurture a deep connection between the Ladybug Sustainable Community and its ecological ethos, a robust strategy focusing on community education in composting, sustainable agriculture, and conservation practices is vital.

Composting Initiatives

- **Consultation and Planning**: Hire an environmental consultant to devise a detailed plan that outlines strategies, timelines, and milestones for boosting community participation in composting, agriculture, and conservation, with a strong emphasis on educational outcomes and the economic and environmental advantages of composting. We recommend contacting Roger Cargill from Finite Phoenix at roger@finitephoenix.com
- **Expert Collaboration and Material Development**: Work with authorities such as the MSU Extension office to assess the adequacy of available composting resources. Where gaps are identified, develop and disseminate educational content that demystifies composting techniques and benefits.
- **Training and Resource Distribution**: Create and distribute instructional resources tailored for use in individual homes or community composting sites. Highlight in these materials the cost-saving and environmental benefits of composting, such as landfill waste reduction, decreased trash handling fees, and the diminished need for commercial topsoil, thereby supporting the community's garden and landscape initiatives economically.
- **Addressing Challenges and Education**: Prepare to discuss and mitigate potential concerns related to initial investments in compost bins, the time commitment required for effective composting, and the evolving nature of composting technologies. A continuous feedback loop should be established to assess the community's adoption and to refine the program as needed.
- **Community and Educational Engagement**: Partner with local environmental groups, educational institutions, and community organizations to facilitate composting workshops, ensuring widespread adoption of best practices.

Sustainable Farming Practices

- **Development of a Sustainable Farming Plan**: Formulate a plan that integrates the use of natural compost to enhance soil fertility, alongside strategies for crop rotation, minimal tillage, and the reduction of chemical pesticides, aiming to maintain soil health and minimize erosion.
- **Strategy with Actionable Steps**: The strategy should aim to lower operational costs, lessen environmental impact, and minimize the reliance on nonrenewable energy and chemical inputs. It should advocate for the conservation of natural resources and the preservation of the land by:
    - Encouraging the efficient utilization of the farm's layout, including the retention of existing tree cover where possible.
    - Promoting renewable energy sources like solar energy within the community.

The adoption of these recommendations will not only solidify the community's commitment to sustainable living but also establish the Ladybug Sustainable Community as a model for urban agricultural development, deeply rooted in ecological stewardship and community participation. For general guidelines on community engagement, stakeholder identification, and urban farming programs, see **Chapter VII of the Agri-Communities Handbook (2024).**

Recommendation 10: Agri-Community Case Studies

Observe examples of agri-communities and adapt the applicable strategies to Ladybug's Sustainable Community. The following list provides case studies that serve as practical examples of successful agri-communities.

Michigan Urban Farming Initiative (MUFI)

The Michigan Urban Farming Initiative (MUFI) employs a variety of innovative and sustainable farming strategies to maximize the productivity of their 3-acre urban farm in Detroit and to address food insecurity. These strategies reflect a holistic approach to urban agriculture, focusing on environmental sustainability, community engagement, and the efficient use of urban space[16]. Here's how MUFI's strategies can be adapted and applied to Ladybug:

- **Organic Farming Practices:** The use of organic matter and compost to improve soil health in urban land areas can be inspired by MUFI's organic methods. This ensures sustainable crop cultivation and aligns with environmental goals.
- **Farming Techniques:** Implementing raised beds and mulching, as suggested for urban soils, mirrors MUFI's utilization of specific structures (like hoop houses) to enhance growing conditions.
- **High Tunnel or Hoop Houses and Polycarbonate Greenhouses:** Inspired by MUFI's greenhouse farming, these structures can be integrated to extend the growing season, utilizing MUFI's successful application of controlled environment agriculture to boost productivity and sustainability.
- **Mitigation Strategies:** MUFI's approach to pest control and biodiversity (e.g., planting marigolds) can inspire innovative solutions to ecological challenges, focusing on natural, sustainable methods for carbon sequestration and ecological balance.
- **Organic and Sustainable Farming Integration:** The emphasis on organic matter and composting in MUFI can guide the selection of sustainable materials and practices, emphasizing environmental stewardship in construction and landscape management.

[16] Beth Buczynski, "12 Agrihoods Taking Farm-To-Table Living Mainstream," Shareable, May 14, 2014, https://www.shareable.net/12-agrihoods-taking-farm-to-table-living-mainstream/.

Figure 39. Michigan Urban Farming Initiative (MUFI).[17]

Serenbe Farms, Atlanta, Georgia

Serenbe emphasizes organic and sustainable farming practices to integrate housing with green spaces effectively. As a certified organic farm, Serenbe Farms focuses on enriching the local community's quality of life through nourishing food, education, and community building around agriculture[18]. The key farming strategies applicable to Ladybug of this project include:

- **Composting**: Utilizing vegetable scraps from community members and restaurants to create compost, enriching the soil's nutrient content.
- **Cover Cropping**: Growing green grasses and legumes to incorporate organic matter back into the soil, enhancing its fertility.
- **Crop Rotation**: Rotating crops to disrupt disease and pest cycles and prevent nutrient depletion, ensuring soil health and productivity.

[17] Robin Runyan, "America's First Sustainable Urban Agrihood Is Growing in Detroit," Curbed Detroit, December 1, 2016, https://detroit.curbed.com/2016/12/1/13807672/urban-agrihood-detroit-mufi.
[18] Beth Buczynski, "12 Agrihoods Taking Farm-To-Table Living Mainstream," Shareable, May 14, 2014, https://www.shareable.net/12-agrihoods-taking-farm-to-table-living-mainstream/.

Figure 40. Serenbe Farms, Atlanta, Georgia.[19]

South Village, Vermont

South Village in Vermont integrates open space with village living, centered around a 4-acre organic farm operated in partnership with Common Roots, a nonprofit organization supporting local food security. This "Agrihood" serves as a model for combining community, land stewardship, and sustainability. This commitment to sustainability and organic farming practices, including being one of the 500 farms in the US certified by the Real Organic Project (ROP), highlights South Village's dedication to high organic standards and regenerative soil practices[20]. The South Village project in Vermont offers valuable strategies that can be seamlessly integrated into the Ladybug Sustainable Community project:

- **Real Organic Project Certification:** Pursuing certifications like ROP can reinforce Ladybug's commitment to organic farming practices and enhance its credibility and appeal to residents and consumers.

[19] Gregory Han, "Serenbe: The Biophilic Community That Wants to Change How We All Live," Design Milk, May 12, 2023, https://design-milk.com/the-biophilic-community-that-wants-to-change-how-we-all-live/.
[20] South Village, "South Village Community in South Burlington VT," South Village, accessed March 14, 2024, https://www.southvillage.com/.

- **Community Design for Sustainability:** Draw inspiration from South Village's mixed housing types and shared green spaces to promote a close-knit community that values sustainability, using eco-friendly materials and green infrastructure in construction.
- **Invasive Growth Control and Open Space Management:** Apply strategies for managing invasive species and conserving open spaces, ensuring that Ladybug's landscape supports biodiversity and provides recreational opportunities for residents.
- **Conservation Land Management:** Leverage South Village's strategy of dedicating a significant portion of land to conservation, applying similar principles to manage and enhance natural habitats within Ladybug for ecological balance and community enjoyment.

Figure 41. South Village, Vermont.[21]

[21] South Village, "News," South Village, accessed March 14, 2024, https://www.southvillage.com/news/.

Pendergrast Farm & Conservation Community, Atlanta, Georgia

The Pendergrast Farm & Conservation Community is a distinctive project that emphasizes conservation and sustainability within an urban setting. This community features an on-site 1-acre urban organic farm and 5.5 acres of woodlands with natural trails and a stream, reflecting a strong commitment to preserving natural habitats and fostering a connection to nature. About 60% of the buildable area is dedicated to green space, highlighting the community's focus on maintaining a significant portion of the property as a natural habitat. The farm and community emphasize sustainable construction practices, incorporating smart home technologies and systems designed to ensure healthy air quality.

Figure 42. Pendergrast Farm & Conservation Community, Atlanta, Georgia.[22]

The Pendergrast Farm & Conservation Community project provides a comprehensive blueprint for integrating sustainable living with conservation within an urban context, offering several strategies that can be adapted for the Ladybug Sustainable Community:

- **Conservation Easements:** Implement conservation easements similar to Pendergrast Farm to protect Ladybug's wetland areas from development, ensuring these ecosystems are preserved for future generations and maintain their functionality within the urban landscape.

[22] Pendergrast Farm, "Pendergrast Farm - Conservation Community," Pendergrast Farms, accessed March 14, 2024, https://pendergrastfarm.com/.

- **Sustainable Construction:** Embrace sustainable construction practices and smart home technologies that prioritize energy efficiency and healthy living environments, inspired by Pendergrast Farm's approach to building design and community layout.
- **Woodland Conservation and Trail Development:** Allocate a portion of Ladybug for woodland conservation, incorporating natural trails and green spaces to foster a connection to nature among residents, similar to Pendergrast Farm's 5.5 acres of woodlands.
- **Compact Development:** Focus on condensing the footprint of residential areas to preserve more land for natural habitats and farming, as seen in Pendergrast Farm. This strategy supports density in a way that balances urban living with conservation goals.

To learn more about agri-community projects and obtain insights into the planning, implementation, and management phases, highlighting unique challenges and solutions refer to **Chapter XI of the Agri-Communities Handbook (2024).**

Based on the recommendations and considering the challenges of the site, we created a layout for the Ladybug Sustainable Community (see next page).


W Holmes Rd
S Catherine St
S Deerfield Ave
Gibson St
Pleasant Grove Rd
Glenbrook Dr
Tabernacle of David Church
Hillcrest St
Lansing Spray Foam Insulation
Mid-Michigan Youth Athletic Foundation
Capital City Kic
Colonial Townhouses Co-Op
LADYBUG
SUSTAINABLE COMMUNITY
LEGEND
Project Boundaries
Street Connectivity
Trails
Wetlands
Project Roads
Urban Farm
Resource Center
Multi-family Buildings
Single-family homes
N

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APPENDIX

Food Access Survey Questionnaire

Welcome to the Ladybug Team's survey!

Welcome to the Ladybug Team's survey!

Greetings from the Ladybug Team, a group of urban and regional planning students from Michigan State University (MSU). We are conducting this survey as part of our data collection for the proposed project "Ladybug Agri-Community" in the Churchill Gardens neighborhood. Our survey aims to gather valuable insights on food access, and interest in farm-to-table practices. Your responses will help tailor Ladybug Agri-Community's offerings and initiatives to better meet the preferences and needs of residents in this neighborhood.

This survey should take no more than 2 minutes, and your participation will be entirely anonymous. We appreciate your participation!

Contact us at youngga4@msu.edu or gibsonh9@msu.edu if you have any questions or concerns.

Q1. Access and Affordability of Nutritious Food

How often do you find fresh produce available in your local stores?
How often do economic constraints force you to compromise on the nutritional quality of your food?
To what extent do transportation options affect your access to healthy foods?

Scale:
1 - Never
2 - Rarely
3 - Sometimes
4 - Often
5 - Always

Q2. On a scale from 1 to 5, where 1 is equal to “Very Poor” and 5 “Very Good”, how would you rate your access to affordable and nutritious food in your area?

Scale:
1 - Very Poor: I struggle to find affordable and nutritious food in my area, and it is a significant challenge in my daily life.

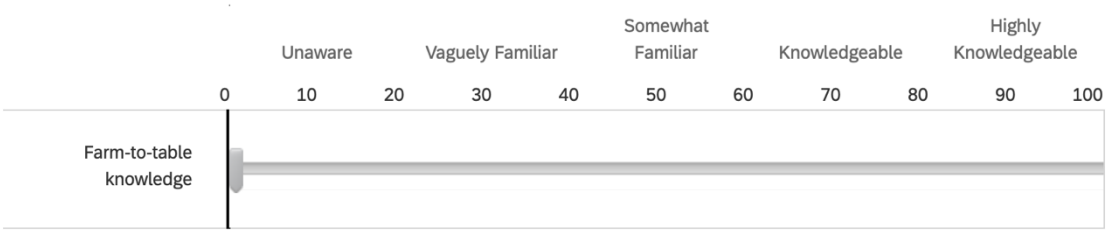
2 - Poor: While I can occasionally find affordable and nutritious food, it often requires significant effort and is not always successful.
3 - Moderate: My access to affordable and nutritious food is hit or miss. Sometimes it's easy to find, but at other times, it can be quite challenging.
4 - Good: I generally have good access to affordable and nutritious food, with only occasional difficulties.
5 - Very Good: I can easily find affordable and nutritious food in my area, and it's not a concern for me at all.

Q3. How much do you spend on groceries monthly?

- None ($0.00)
- Less than $599
- Between $600-$899
- Between $900-$1,199
- More than 1,200

Q4. Farm-to-table means food directly from a farm to your table. On a scale from 0 to 100, where 0 signifies being "Unaware" and 100 signifies being "Highly Knowledgeable", how familiar are you with this concept?

Scale:



Q5. Would you like to have a place in your community where you grow your own food?

- Yes
- No
- Unsure

Q6. Would you be interested in getting knowledge on how to grow your food?

- Yes
- No
- Unsure

Examples of Ideal Sites for Agri-Communities in Southwest Lansing, Michigan.

Ideal Sites in Lansing for Small Scale Agri-Communities

Ladybug Site

LADYBUG
SUSTAINABLE COMMUNITY

Oliver Gomez, Harrison Hill,
Vivian Morales, Garrett Young,
Havien Gibson

MURP Planning Practicum
Spring 2024